aws

Low-Latency Streaming User Guide

Amazon IVS

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Amazon IVS: Low-Latency Streaming User Guide

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What is Amazon IVS Low-Latency Streaming?

Amazon Interactive Video Service (IVS) is a managed, live-video streaming service that allows you to:

- Create channels and start streaming in minutes.
- Build engaging, interactive experiences alongside low-latency live video.
- Distribute video at scale to a range of devices and platforms.
- Easily integrate into websites and apps.

Amazon IVS lets you focus on building your own interactive application and audience experience. With Amazon IVS, you don't need to manage infrastructure or develop and configure components of your video workflows, to be secure, reliable, and cost effective.

Amazon IVS supports streaming via several ingest protocols:

- RTMP (Real-Time Messaging Protocol), an industry standard for transmitting video over a network.
- RTMPS, the secure version of RTMP, running over TLS.
- SRT (Secure Reliable Transport), a relatively new, open-source protocol. SRT is designed to improve streaming over unreliable networks and protect against jitter, packet loss, and network bandwidth fluctuations.

In addition to the product documentation here, see https://ivs.rocks/, a dedicated site to browse published content (demos, code samples, blog posts), estimate cost, and experience Amazon IVS through live demos.

Latency

Latency is the delay from when a camera captures a live stream to when the stream appears on a viewer's screen. Amazon IVS has functionality that can deliver video as follows:

- Low latency — Amazon IVS channels can deliver video with latency under 5 seconds.
- Real-time latency — IVS stages can deliver video with latency under 300ms. All participants in the stage experience this enhanced "real-time latency." (Note that if the stage is broadcast to an IVS channel, channel viewers get low latency.)

For a traditional Over-The-Top (OTT) stream, latency may be as high as 30 seconds.

Low latency is a critical component in building good interactive user experiences that enrich the audience experience. It allows the streamer, the brand, and the community to connect with live audiences in a direct and personal way.

Observed latency can vary between users due to:

- The geographic locations of the streamer and viewers.
- Network type and speed.
- Individual components in the streaming chain.
- Streaming protocols and output formats.

For more information, see Reducing Latency in *Amazon IVS Streaming Configuration*.

Global Solution, Regional Control

Streaming and Viewing are Global

You can use Amazon IVS to stream to viewers worldwide:

- When you stream, Amazon IVS automatically ingests video at a location near you.
- Viewers can watch your live streams globally via the Amazon IVS content-delivery network.

Another way of saying this is that the "data plane" is global. The data plane refers to streaming/ingesting and viewing.

Control is Regional

While the Amazon IVS data plane is global, the "control plane" is regional. The control plane refers to the Amazon IVS console, API, and resources (channels, stream keys, playback key pairs, and recording configurations).

Another way of saying this is that Amazon IVS is a "regional AWS service." That is, Amazon IVS resources in each region are independent of similar resources in other regions. For example, a channel that you create in one region is independent of channels you create in other regions.

When you use resources (e.g., create a channel), you must specify the region in which it will be created. Subsequently, when you manage resources, you must do so from the same region where they were created.

If you use the ...	You specify the region by ...
Amazon IVS console	Using the **Select a Region** drop-down in the top right of the navigation bar.
Amazon IVS API	Using the appropriate service endpoint. See the Amazon IVS Low-Latency Streaming API Reference. (If you access the API through an SDK, set up the SDK's `region` parameter. See Tools to Build on AWS.)
AWS CLI	Either: • Appending `--region <aws-region>` to your CLI command. • Putting the region in your local AWS configuration file.

Remember, regardless of the region in which a channel was created, you can stream to Amazon IVS from anywhere, and viewers can watch from anywhere.

Your Channel's Region

Your channel's region is part of the ARN (Amazon Resource Name) that is assigned when you create the channel. When you create a channel:

- The Amazon IVS console shows the ARN in the **General configuration** area of the page. Subsequently, the console always shows your region (location) on the top right.
- The Amazon IVS API returns the ARN in the channel object's `arn` field.

Getting Started with IVS Low-Latency Streaming

This document takes you through the steps to set up your first Amazon Interactive Video Service (IVS) live stream.

Topics

- Step 1: Create an AWS Account
- Step 2: Set Up IAM Permissions
- Step 3: Create a Channel with Optional Recording
- Step 4: Set Up Streaming Software
- Step 5: View Your Live Stream
- Step 6: Check Your Service-Quota Limits (Optional)
- Step 7: Prevent Undesired Content and Viewers (Recommended)

Step 1: Create an AWS Account

Sign up for an AWS account

To get started with AWS, you need an AWS account. For information about creating an AWS account, see Getting started with an AWS account in the *AWS Account Management Reference Guide*.

If you want to use an existing AWS account, ensure that it uses an AWS region that is supported for Amazon IVS:

1. Navigate to the Amazon IVS Console. If you see the usual IVS console page (showing "Global Solution, regional content"), you're fine; skip to Step 2: Set Up IAM Permissions. If you are redirected to an AWS "unsupported region" page, you need to select a new region.
2. Select the appropriate tab (**Live streaming**, for IVS; **Stream chat**, for IVS Chat), then select one of the listed regions. *Note which region you choose; you will need it later*.

At any time, you can view your AWS account activity and manage your account by going to https://aws.amazon.com/ and choosing **My Account**.

Step 2: Set Up IAM Permissions

Next, you must create an AWS Identity and Access Management (IAM) policy that gives users a basic set of permissions (e.g., to create an Amazon IVS channel, get streaming information, and auto-record-to-S3) and assign that policy to users. You can either assign the permissions when creating a new user or add permissions to an existing user. Both procedures are given below.

For more information (for example, to learn about IAM users and policies, how to attach a policy to a user, and how to constrain what users can do with Amazon IVS), see:

- Creating an IAM User in the *IAM User Guide*
- The information in Amazon IVS Security on IAM and "Managed Policies for IVS."
- For record-to-S3 functionality: Using Service-Linked Roles and Auto-Record to Amazon S3 in the *Amazon IVS User Guide*

You can either use an existing AWS managed policy for Amazon IVS or create a new policy that customizes the permissions you want to grant to a set of users, groups, or roles. Both approaches are described below.

Use an Existing Policy for IVS Permissions

In most cases, you will want to use an AWS managed policy for Amazon IVS. They are described fully in the Managed Policies for IVS section of *IVS Security*.

- Use the `IVSReadOnlyAccess` AWS managed policy to give your application developers access to all IVS Get and List API operations (for both low-latency and real-time streaming).
- Use the `IVSFullAccess` AWS managed policy to give your application developers access to all IVS API operations (for both low-latency and real-time streaming).

Optional: Create a Custom Policy for Amazon IVS Permissions

Follow these steps:

1. Sign in to the AWS Management Console and open the IAM console at https://console.aws.amazon.com/iam/.
2. In the navigation pane, choose **Policies**, then choose **Create policy**. A **Specify permissions** window opens..

3. In the **Specify permissions** window, choose the **JSON** tab, and copy and paste the following IVS policy to the **Policy editor** text area. (The policy does not include all Amazon IVS actions. You can add/delete (Allow/Deny) operation access permissions as needed. See IVS Low-Latency Streaming API Reference for details on IVS operations.)

   JSON

```
{
   "Version":"2012-10-17",
   "Statement": [
      {
         "Effect": "Allow",
         "Action": [
            "ivs:CreateChannel",
            "ivs:CreateRecordingConfiguration",
            "ivs:GetChannel",
            "ivs:GetRecordingConfiguration",
            "ivs:GetStream",
            "ivs:GetStreamKey",
            "ivs:GetStreamSession",
            "ivs:ListChannels",
            "ivs:ListRecordingConfigurations",
            "ivs:ListStreamKeys",
            "ivs:ListStreams",
            "ivs:ListStreamSessions"
          ],
          "Resource": "*"
      },
      {
         "Effect": "Allow",
         "Action": [
            "cloudwatch:DescribeAlarms",
            "cloudwatch:GetMetricData",
            "s3:CreateBucket",
            "s3:GetBucketLocation",
            "s3:ListAllMyBuckets",
            "servicequotas:ListAWSDefaultServiceQuotas",
            "servicequotas:ListRequestedServiceQuotaChangeHistoryByQuota",
            "servicequotas:ListServiceQuotas",
            "servicequotas:ListServices",
            "servicequotas:ListTagsForResource"
         ],
         "Resource": "*"
```

```
      },
      {
         "Effect": "Allow",
         "Action": [
            "iam:AttachRolePolicy",
            "iam:CreateServiceLinkedRole",
            "iam:PutRolePolicy"
         ],
         "Resource":
"arn:aws:iam::*:role/aws-service-role/ivs.amazonaws.com/
AWSServiceRoleForIVSRecordToS3*"
      }
   ]
}
```

4. Still in the **Specify permissions** window, choose **Next** (scroll to the bottom of the window to see this). A **Review and create** window opens.
5. On the **Review and create** window, enter a **Policy name** and optionally add a **Description**. Make a note of the policy name, as you will need it when creating users (below). Choose **Create policy** (at the bottom of the window).
6. You are returned to the IAM console window, where you should see a banner confirming that your new policy was created.

Create a New User and Add Permissions

IAM User Access Keys

IAM Access keys consist of an access key ID and a secret access key. They are used to sign programmatic requests that you make to AWS. If you don't have access keys, you can create them from the AWS Management Console. As a best practice, do not create root-user access keys.

The only time that you can view or download a secret access key is when you create access keys. You cannot recover them later. However, you can create new access keys at any time; you must have permissions to perform the required IAM actions.

Always store access keys securely. Never share them with third parties (even if an inquiry seems to come from Amazon). For more information, see Managing access keys for IAM users in the *IAM User Guide*.

Procedure

Follow these steps:

1. In the navigation pane, choose **Users**, then choose **Create user**. A **Specify user details** window opens.
2. In the **Specify user details** window:
   a. Under **User details**, type the new **User name** to be created.
   b. Check **Provide user access to the AWS Management Console**.
   c. When prompted, select **I want to create an IAM user**.
   d. Under **Console password**, select **Autogenerated password**.
   e. Check **Users must create a new password at next sign-in**.
   f. Choose **Next**. A **Set permissions** window opens.
3. Under **Set permissions**, select **Attach policies directly**. A **Permissions policies** window opens.
4. In the search box, enter an IVS policy name (either an AWS managed policy or your previously created custom policy). When it is found, check the box to select the policy.
5. Choose **Next** (at the bottom of the window). A **Review and create** window opens.
6. On the **Review and create** window, confirm that all user details are correct, then choose **Create user** (at the bottom of the window).
7. The **Retrieve password** window opens, containing your **Console sign-in details**. *Save this information securely for future reference*. When you are done, choose **Return to users list**.

Add Permissions to an Existing User

Follow these steps:

1. Sign in to the AWS Management Console and open the IAM console at https://console.aws.amazon.com/iam/.
2. In the navigation pane, choose **Users**, then choose an existing user name to be updated. (Choose the name by clicking on it; do not check the selection box.)
3. On the **Summary** page, on the **Permissions** tab, choose **Add permissions**. An **Add permissions** window opens.
4. Select **Attach existing policies directly**. A **Permissions policies** window opens.

5. In the search box, enter an IVS policy name (either an AWS managed policy or your previously created custom policy). When the policy is found, check the box to select the policy.
6. Choose **Next** (at the bottom of the window). A **Review** window opens.
7. On the **Review** window, select **Add permissions** (at the bottom of the window).
8. On the **Summary** page, confirm that the IVS policy was added.

Step 3: Create a Channel with Optional Recording

An Amazon IVS channel stores configuration information related to your live stream. You first create a channel and then contribute video to it using the channel's stream key to start your live stream.

As part of channel creation, the following items are assigned:

- An *ingest server* identifies a specific Amazon IVS component that receives the stream, along with an ingestion protocol (RTMPS or RTMP).
- Amazon IVS assigns a *stream key* when you create a channel and uses it to authorize streaming. ***Treat the stream key like a secret, since it allows anyone to stream to the channel***.
- A *playback URL* identifies the endpoint to start playback for a specific channel. This endpoint can be used globally. It automatically selects the best location from the Amazon IVS global content delivery network for a viewer to stream the video. (Note that Amazon IVS does not support custom domains for playback. *Do not proxy the playback URL with your own domain; that does not work and will cause issues.*)

You can create a channel — with or without recording — through the Amazon IVS console or the AWS CLI. Channel creation and recording are discussed below.

Auto-Record to Amazon S3

You have the option of enabling recording for a channel. If the auto-record to S3 feature is enabled, all streams on the channel are recorded and saved to an Amazon S3 storage bucket that you own. Subsequently, the recording is available for on-demand playback.

Setting this up is an advanced option. By default, recording is disabled when a channel is created.

Before you can set up a channel for recording, you must create a *recording-configuration*. This is a resource which specifies an Amazon S3 location where the recorded streams for the channel

are stored. You can create and manage recording configurations using the console or CLI; both procedures are given below. After you create the recording configuration, you associate it with a channel either when you create the channel (as described below) or later, by updating an existing channel. (In the API, see CreateChannel and UpdateChannel.) You can associate multiple channels with the same recording configuration. You can delete a recording configuration that is no longer associated with any channels.

Keep in mind the following constraints:

- You must own the S3 bucket. That is, the account that sets up a channel to be recorded must own the S3 bucket where recordings will be stored.
- The channel, recording configuration, and S3 location must be in the same AWS region. If you create channels in other regions and want to record them, you must also set up recording configurations and S3 buckets in those regions.

Recording to your S3 bucket requires authorization with your AWS credentials. To give IVS the required access, an AWS IAM Service-Linked Role (SLR) is created automatically when the recording configuration is created: the SLR is limited to give IVS write permission only on the specific bucket.

Note that network issues between the streaming location and AWS or within AWS could result in some data loss while recording your stream. In these cases, Amazon IVS prioritizes the live stream over the recording. For redundancy, record locally via your streaming tool.

For more information (including how to set up post-processing or VOD playback on your recorded files), see *Auto-Record to Amazon S3*.

How to Disable Recording

To disable Amazon S3 recording on an existing channel:

- Console — On the details page for the relevant channel, in the **Record and store** streams section, choose **Disabled** and then choose **Save Channel**. This removes the recording configuration's association with the channel; streams on that channel will no longer be recorded.
- CLI — Run the `update-channel` command and pass in the recording-configuration ARN as an empty string:

```
aws ivs update-channel --arn "arn:aws:ivs:us-west-2:123456789012:channel/
abcdABCDefgh" --recording-configuration-arn ""
```

This returns a channel object with an empty string for `recordingConfigurationArn`, indicating that the recording is disabled.

Console Instructions for Creating an IVS Channel

These steps are divided into three phases: initial channel setup, set up to auto-record to Amazon S3 (optional), and final channel creation.

Initial Channel Setup

1. Open the Amazon IVS console.

   (You can also access the Amazon IVS console through the AWS Management Console.)
2. From the navigation bar, use the **Select a Region** drop-down to choose a region. Your new channel will be created in this region.
3. In the **Get started** box (top right), choose **Create Channel**.
4. Under **Channel configuration**, accept the **Default configuration**. Optionally, specify a **Channel name**. Channel names are not unique, but they provide a way for you to distinguish channels other than the channel ARN (Amazon Resource Name).

   Note: **Custom configuration** can be used for specifying certain non-default values, such as channel type or RTMP (instead of RTMPS) ingest. Custom specifications are not documented here.

Create channel Info

A channel is a unique configuration for streams. It includes broadcast configuration details (a server URL and stream key) for streaming software/hardware, and a playback URL for playing the stream. Channel configuration may affect pricing. Amazon IVS Pricing

▶ **How Amazon Interactive Video Service works**

Setup

Channel name

channel-1

Maximum length: 128 characters. May include numbers, letters, underscores (_) and hyphens (-).

Channel configuration

- (•) Default configuration
  Use the default video latency and configuration, optimized for live interactions.
- ( ) Custom configuration
  Specify your own channel type and video latency configuration.

Channel type Info
Standard (broadcast and deliver live video up to 1080p Full HD, with transcoding and 1080p pass-through)

Video latency Info
Low (best for low-latency interactions with viewers)

Playback authorization Info
Disabled

Insecure ingest Info
Disabled

Container format Info
MPEG Transport Stream (TS)

Multitrack encoding Info
Disabled

Restrict playback Info

Playback restriction | Info
Restrict playback by country and origin.

◯ Enable playback restriction

Record and store streams Info

Auto-record to S3
For improved redundancy, always record locally via your streaming tool.

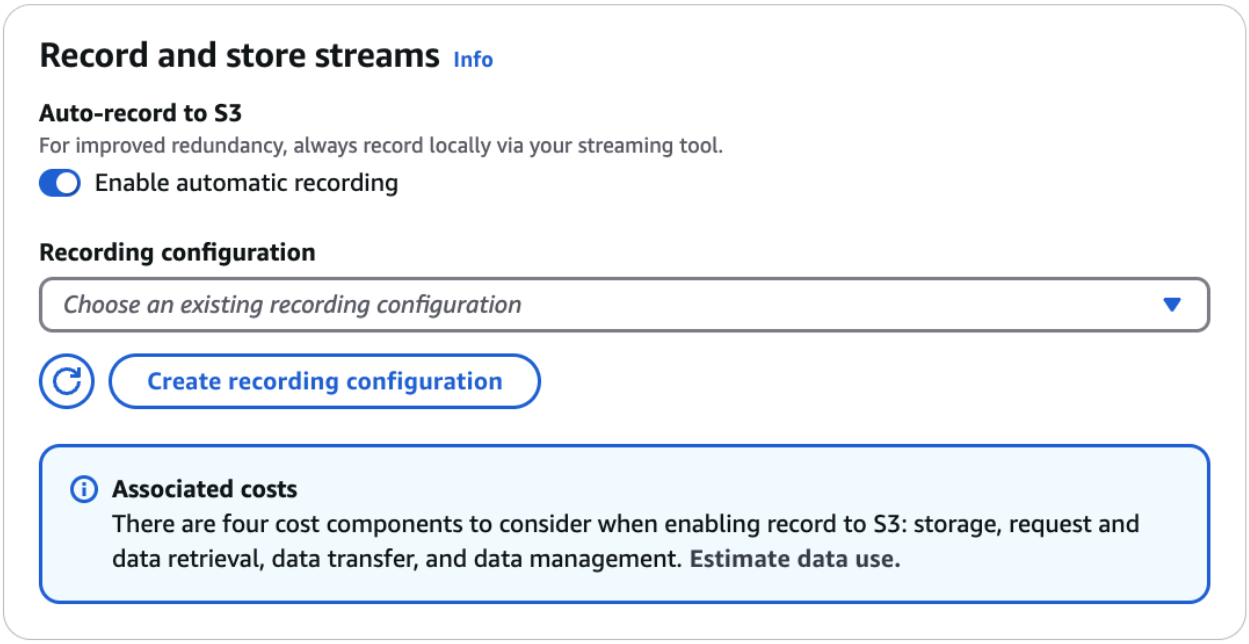
◯ Enable automatic recording

5. If you want to auto-record to Amazon S3, continue with Set Up to Auto-Record to Amazon S3 (Optional) below. Otherwise, skip that and proceed directly to Set Up to Auto-Record to Amazon S3 (Optional).

Set Up to Auto-Record to Amazon S3 (Optional)

Follow these steps to enable recording while creating a new channel:

1. On the **Create channel** page, under **Record and store streams**, turn on **Enable automatic recording.** Additional fields display, to choose an existing **Recording configuration** or create a new one.



2. Choose **Create recording configuration**. A new window opens, with options for creating an Amazon S3 bucket and attaching it to the new recording configuration.

Create recording configuration

Recording configuration name – *optional*

recording-configuration-1

Maximum length: 128 characters. May include numbers, letters, underscores (_) and hyphens (-).

Recording configuration

- (•) Default configuration
  Use the default settings for auto-recording video and thumbnails.
- ( ) Custom configuration
  Specify your own video and thumbnail recording options.

Recorded renditions
All renditions

Thumbnail recording
Record at 60-second intervals

Thumbnail resolution
Source (same resolution as input stream)

Thumbnail storage
Store thumbnails sequentially

Merge fragmented streams
Disabled

Storage

- (•) Create a new Amazon S3 bucket
- ( ) Select an existing Amazon S3 bucket

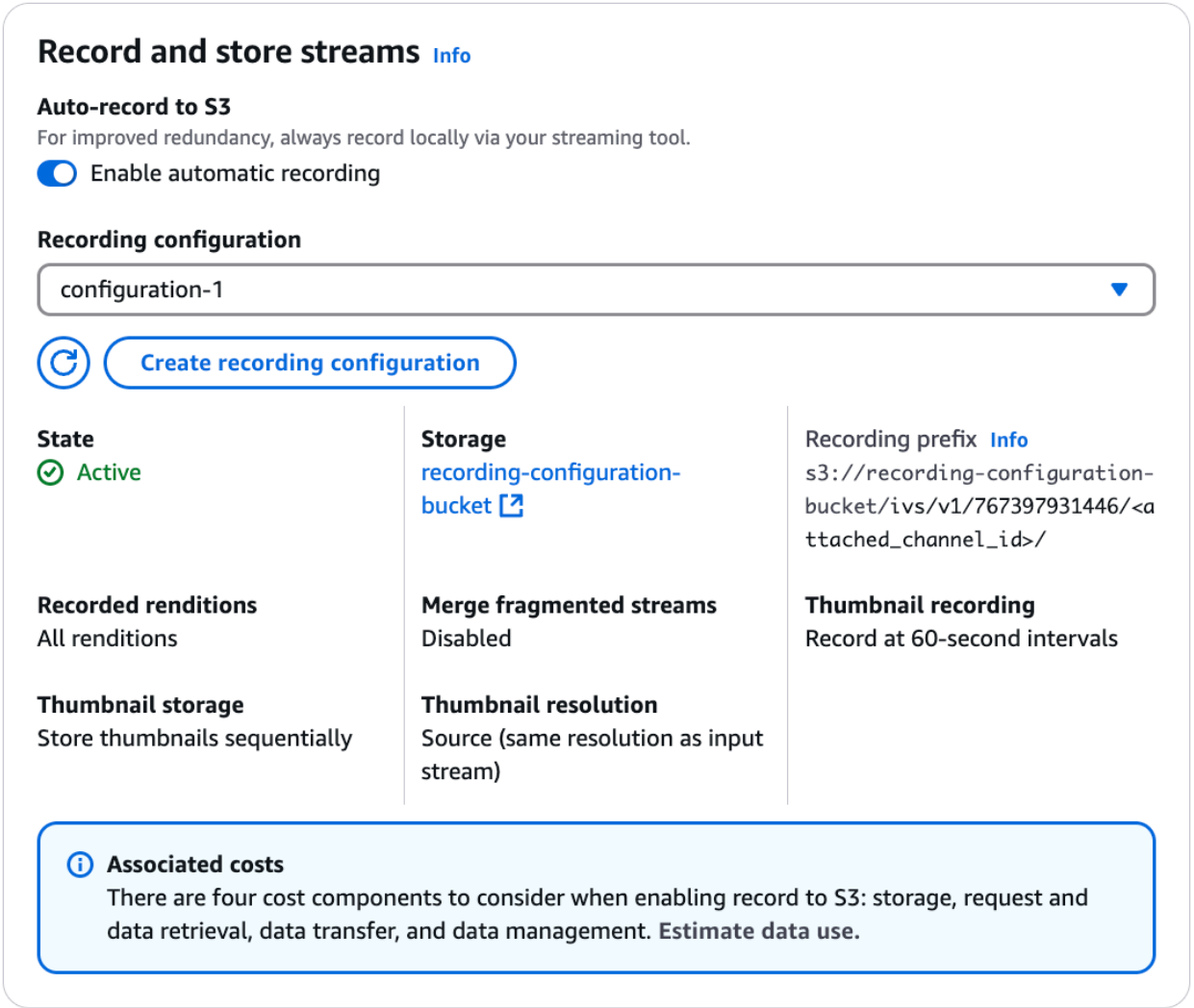
Bucket name

ivs-stream-archive

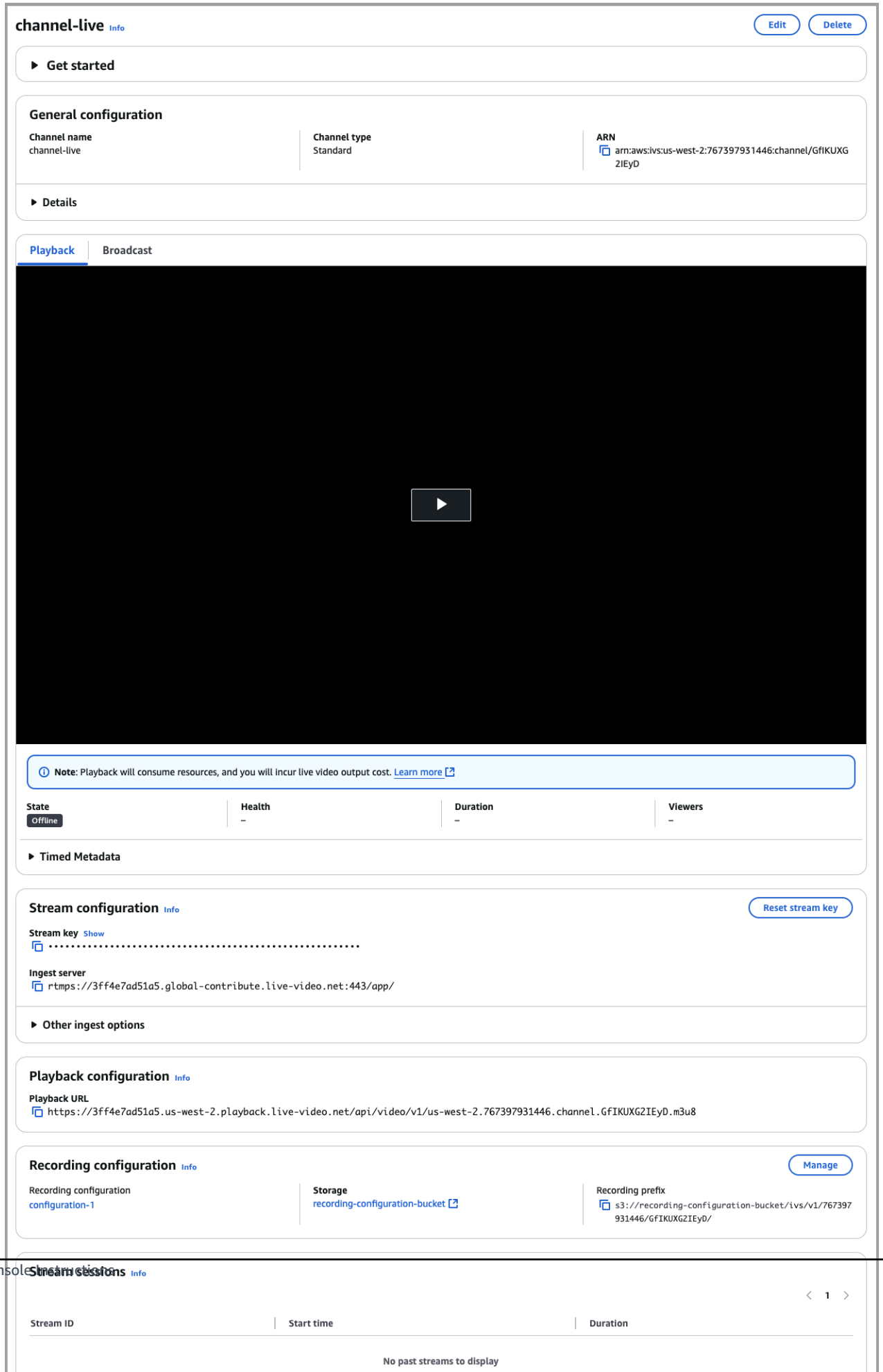
The bucket name must be unique and must not contain spaces or uppercase letters. **See rules for bucket naming**.

This bucket will be created with default permissions in the current region: **US West (Oregon) us-west-2** Choosing a region. Permissions in Amazon S3

3. Fill out the fields:
   a. Optionally enter a **Recording configuration name**.
   b. Under **Recording configuration** accept the **Default configuration**. Note: **Custom configuration** can be used for specifying certain non-default values such as recorded renditions or merge fragmented streams. Custom specifications are not documented here.
   c. Enter a **Bucket name**.
4. Choose **Create recording configuration**, to create a new recording-configuration resource with a unique ARN. Typically, creation of the recording configuration takes a few seconds, but it can be up to 20 seconds. When the recording configuration is created, you are returned to the **Create channel** window. There, the **Record and store streams** area shows your new **Recording configuration**, with its **State** as **Active** and the S3 bucket (**Storage**) that you created.



1. At the bottom of the **Create channel** window, choose **Create channel**, to create a new channel with a unique ARN. To see channel details, expand **Details**. (Note: if you did not enable recording, **Auto-record to S3** is set to **Disabled** and there is no **Recording configuration** section on the screen.)


channel-live Info
Edit
Delete
Get started
General configuration
Channel name
channel-live
Channel type
Standard
ARN
arn:aws:ivs:us-west-2:767397931446:channel/GfIKUXG2IEyD
Details
Playback
Broadcast
Note: Playback will consume resources, and you will incur live video output cost. Learn more
State
Offline
Health
–
Duration
–
Viewers
–
Timed Metadata
Stream configuration Info
Reset stream key
Stream key Show
Ingest server
rtmps://3ff4e7ad51a5.global-contribute.live-video.net:443/app/
Other ingest options
Playback configuration Info
Playback URL
https://3ff4e7ad51a5.us-west-2.playback.live-video.net/api/video/v1/us-west-2.767397931446.channel.GfIKUXG2IEyD.m3u8
Recording configuration Info
Manage
Recording configuration
configuration-1
Storage
recording-configuration-bucket
Recording prefix
s3://recording-configuration-bucket/ivs/v1/767397931446/GfIKUXG2IEyD/
Stream sessions Info
1
Stream ID
Start time
Duration
No past streams to display

2. **Important**:
   - In the **Stream configuration** area, note the **Ingest server** and **Stream key**. You will use these in the next step, to set up streaming.
   - In the **Playback configuration** area, note the **Playback URL**. You will use it later, to play back your stream.

Note: To see SRT values (endpoint and passphrase), expand **Other ingest options** in the **Stream configuration** area.

CLI Instructions for Creating an IVS Channel

Creating a channel with the AWS CLI is an advanced option and requires that you first download and configure the CLI on your machine. For details, see the AWS Command Line Interface User Guide.

Follow one of the two procedures below, depending on whether you want to create a channel with or without recording enabled.

Create a Channel without Recording

1. Run the `create-channel` command and pass in an optional name:

```
aws ivs create-channel --name test-channel
```

2. This returns a new channel:

```
{
   "channel": {
      "arn": "arn:aws:ivs:us-west-2:123456789012:channel/abcdABCDefgh",
      "authorized": false,
      "ingestEndpoint": "a1b2c3d4e5f6.global-contribute.live-video.net",
      "insecureIngest": false,
      "latencyMode": "LOW",
      "name": "channel-live",
      "playbackRestrictionPolicyArn": "arn:aws:ivs:us-west-2:123456789012:playback-
restriction-policy/abcdABCDefgh",
      "playbackUrl": "https://a1b2c3d4e5f6.us-west-2.playback.live-video.net/api/
video/v1/us-west-2.123456789012.channel.abcdEFGH.m3u8",
      "recordingConfigurationArn": "none",
      "srt": {
```

```
        "endpoint": "a1b2c3d4e5f6.srt.live-video.net",
        "passphrase:
 "ZU5A3yrjGAkghUNDr0c5NXBhsPrjlmtcKMNBluh7oImwJQ3ijeyClvMKxlpPcGAMziICJ",
     },
     "tags": {},
     "type": "STANDARD"
  },
  "streamKey": {
     "arn": "arn:aws:ivs:us-west-2:123456789012:stream-key/g1H2I3j4k5L6",
     "channelArn": "arn:aws:ivs:us-west-2:123456789012:channel/abcdABCDefgh",
     "tags": {},
     "value": "sk_us-west-2_abcdABCDefgh_567890abcdef"
  }
}
```

3. **Important**: Note the `ingestEndpoint`, `streamKey`, and `playbackUrl`. You will use these to set up streaming and playback.

Create a Channel with Recording

Prerequisite: Before starting this procedure, create an Amazon S3 bucket and note its ARN. See Getting Started with Amazon S3. The S3 bucket must be in the same region where you will create a recording configuration; see the known issue in Step 1 below.

Then follow these steps to create the channel:

1. Run the `create-recording-configuration` command and pass in the ARN of an existing Amazon S3 bucket:

   ```
   aws ivs create-recording-configuration --name configuration-1 --destination-
   configuration s3={bucketName=test-bucket}
   ```

   Optionally, pass the `thumbnail-configuration` parameter to manually set the thumbnail-recording mode and thumbnail interval:

   ```
   aws ivs create-recording-configuration --name configuration-1 --destination-
   configuration s3={bucketName=s3_bucket_name} --thumbnail-configuration
    recordingMode="INTERVAL",targetIntervalSeconds=60
   ```

Optionally, pass the `recording-reconnect-window-seconds` parameter to enable merge fragmented streams functionality:

```
aws ivs create-recording-configuration --name configuration-1 --destination-
configuration s3={bucketName=test-bucket} --recording-reconnect-window-seconds 60
```

Known issue: In the us-east-1 region, if you use the AWS CLI to create a recording configuration, it returns success even if the S3 bucket is in a different region. In this case, the `state` of the recording configuration is `CREATE_FAILED` (instead of `ACTIVE`). (In other regions, the CLI correctly returns failure if the bucket is in a different region.)

Workaround: Ensure that your S3 bucket is in the same region as the recording configuration. If you create a recording configuration in a different region as your S3 bucket, delete that recording configuration and create a new one with an S3 bucket from the correct region.

2. This returns a new recording configuration with a unique ARN. The state of the recording configuration is `CREATING`, indicating that it is in the process of being created.

```
{
   "recordingConfiguration": {
      "arn": "arn:aws:ivs:us-west-2:123456789012:recording-configuration/
mhndauNaO1te",
      "name": "configuration-1",
      "destinationConfiguration": {
         "s3": {
            "bucketName": "s3_bucket_name"
         }
      },
      "recordingReconnectWindowSeconds": 60,
      "state": "CREATING",
      "tags": {},
      "thumbnailConfiguration": {
         "recordingMode": "INTERVAL",
         "targetIntervalSeconds": 60
      }
   }
}
```

3. Typically, creation of the recording configuration takes a few seconds, but it can be up to 20 seconds. To check that the recording configuration has been created,run the `get-recording-configuration` command:

```
aws ivs get-recording-configuration --arn "arn:aws:ivs:us-
west-2:123456789012:recording-configuration/mhndauNaO1te"
```

4. This returns a response indicating that the recording configuration was created (`state` is `ACTIVE`):

```
{
   "recordingConfiguration": {
      "arn": "arn:aws:ivs:us-west-2:123456789012:recording-configuration/
mhndauNaO1te",
      "name": "configuration-1",
      "destinationConfiguration": {
         "s3": {
            "bucketName": "s3_bucket_name"
         }
      },
      "recordingReconnectWindowSeconds": 60,
      "state": "ACTIVE",
      "tags": {},
      "thumbnailConfiguration": {
         "recordingMode": "INTERVAL",
         "targetIntervalSeconds": 60
      }
   }
}
```

5. To create a channel and enable recording on it, run the `create-channel` command and pass in the recording-configuration ARN:

```
aws ivs create-channel --name channel-live --recording-configuration-arn
 "arn:aws:ivs:us-west-2:123456789012:recording-configuration/mhndauNaO1te"
```

   Alternately, to enable recording on an existing channel, run the `update-channel` command and pass in the recording-configuration ARN:

```
aws ivs update-channel --arn "arn:aws:ivs:us-west-2:123456789012:channel/
abcdABCDefgh" --recording-configuration-arn "arn:aws:ivs:us-
west-2:123456789012:recording-configuration/mhndauNaO1te"
```

6. This returns a channel object with a non-"none" value for `recordingConfigurationArn`, indicating that recording is enabled. (The response below is from `create-channel`. The `update-channel` response does not include the `streamKey` object.)


```
{
   "channel": {
      "arn": "arn:aws:ivs:us-west-2:123456789012:channel/abcdABCDefgh",
      "authorized": false,
      "ingestEndpoint": "a1b2c3d4e5f6.global-contribute.live-video.net",
      "insecureIngest": false,
      "latencyMode": "LOW",
      "name": "channel-live",
      "playbackUrl": "https://a1b2c3d4e5f6.us-west-2.playback.live-video.net/api/
video/v1/us-west-2.123456789012.channel.abcdEFGH.m3u8",
      "recordingConfigurationArn": "arn:aws:ivs:us-west-2:123456789012:recording-
configuration/mhndauNaO1te",
      "srt": {
         "endpoint": "a1b2c3d4e5f6.srt.live-video.net",
         "passphrase:
 "ZU5A3yrjGAkghUNDr0c5NXBhsPrjlmtcKMNBluh7oImwJQ3ijeyClvMKxlpPcGAMziICJ",
      },
      "tags": {},
      "type": "STANDARD"
   },
   "streamKey": {
      "arn": "arn:aws:ivs:us-west-2:123456789012:stream-key/g1H2I3j4k5L6",
      "channelArn": "arn:aws:ivs:us-west-2:123456789012:channel/abcdABCDefgh",
      "tags": {},
      "value": "sk_us-west-2_abcdABCDefgh_567890abcdef"
   }
}
```


7. **Important**: Note the `ingestEndpoint`, `streamKey`, and `playbackUrl`. You will use these to set up streaming and playback.

Step 4: Set Up Streaming Software

You can stream (low-latency) to Amazon IVS with:

- The native IVS broadcast SDKs, which support RTMPS. We recommended this, especially for production scenarios.

- The Amazon IVS console — This is suitable for testing streams.
- Other streaming software and hardware encoders — You can use any streaming encoder that supports the RTMP, RTMPS, or SRT protocols. Several examples are described below, using Open Broadcast Software (OBS) and FFmpeg with RTMPS and SRT. RTMPS enables high security via use of an encrypted TLS stream.

Key encoder settings are keyframe interval (2 seconds) and resolution/bitrate/frame rate (which are interrelated). For more detail on encoder settings, see:

- Streaming Configuration in the *Amazon IVS User Guide*
- This blog post: Setting Up for Streaming with Amazon Interactive Video Service

Notes:

- The maximum duration of Amazon IVS streams is 48 hours. After that, the stream is terminated and the streaming session is disconnected. A successful reconnect (automatically or manually) starts a new stream.
- If your encoder stops sending data (e.g., due to a temporary network issue), Amazon IVS waits for 30 seconds. If no broadcaster data is received during this time, Amazon IVS disconnects.

Streaming with the Amazon IVS Broadcast SDK

To broadcast from your iOS or Android applications, you can use the Amazon IVS broadcast SDK. The broadcast SDK leverages the Amazon IVS architecture and will see continual improvement and new features, alongside Amazon IVS. As a native mobile broadcast SDK, it is designed to minimize the performance impact on your application and on the devices with which your users access your application.

To broadcast from ...	You can use ...	Notes
Your Android or iOS applications	Amazon IVS Android or iOS broadcast SDK	As a native mobile broadcast SDK, it is designed to minimize the performance impact on your application and on the devices with which your users access your application.

To broadcast from ...	You can use ...	Notes
A web environment	Amazon IVS Web broadcast SDK	As a web broadcast SDK, the Amazon IVS Web Broadcast SDK allows you to broadcast from web environments using WebRTC. It boasts cross-browser and cross-platform support.

For details, see *IVS Broadcast SDK*.

Streaming with the Amazon IVS Console

1. Open the Amazon IVS console.

   (You can also access the Amazon IVS console through the AWS Management Console.)
2. In the navigation pane, select **Channels**. (If the nav pane is collapsed, expand it by selecting the hamburger icon.)
3. Select the channel to which you want to broadcast, to go to its details page.
4. Select the **Broadcast** tab. (Tabs are below the **General Configuration** section.)
5. You will be prompted to grant the IVS console access to your camera and microphone; **Allow** those permissions.
6. Toward the bottom of the **Broadcast** tab, use the dropdown boxes to select input devices for the microphone and camera.
7. To begin streaming, select **Start broadcasting**.
8. To view the live stream, go to the **Playback** tab.

   Note: After you start the stream, expect a brief delay (usually under 30 seconds) before it is viewable in the playback tab.

You can use this feature to simultaneously broadcast to multiple channels.

Note: Streaming from the console consumes resources, and you will incur live-video input costs. To learn more, see Live Video Input Costs on the IVS Pricing page.

Streaming with OBS Studio using RTMPS

(OBS Studio) is a free, open-source software suite for recording and live streaming. OBS provides real-time source and device capture, scene composition, encoding, recording, and streaming.

Follow these steps to get up and running quickly with OBS Studio v30.2 or later:

1. Download and install the software: https://obsproject.com/download.
2. Run the OBS Studio **Auto-Configuration Wizard**, which appears when you load OBS Studio for the first time. Follow the steps and accept the defaults.
3. At **Stream Information**, choose **Amazon IVS** from the **Service** dropdown and enter the **Stream Key**.

   If you created the channel with the Amazon IVS console, the **Stream Key** you enter in OBS is the **Stream key** from the console: `sk_us-west-2_abcd1234efgh5678ijkl`

   If you created the channel with the AWS CLI, the **Stream Key** you enter in OBS is the **streamKey value** from the CLI response `sk_us-west-2_abcd1234efgh5678ijkl`

   If your IVS channel is configured for multitrack video input, select **Enable Multitrack Video**. Optionally, configure the **Maximum Video Tracks** and **Maximum Streaming Bandwidth** settings, which are used to limit automatically configured stream settings.
4. For **Video Output Resolution** and **Bitrate**, refer to Channel Types in *Amazon IVS Streaming Configuration*. If either value chosen by the OBS wizard exceeds the values allowed by Amazon IVS, you should manually adjust the values to avoid a failed connection to Amazon IVS. After the wizard completes:
   a. To adjust video resolution, use **Settings > Video > Output (Scaled) Resolution**.
   b. To adjust video bitrate, use **Settings > Output > Streaming > Video Bitrate**.

   Note: This does not affect the live stream if you previously checked **Enable Multitrack Video**.
5. We recommend a 2-second **Keyframe Interval** to improve the stream stability and avoid buffering in the viewer playback. After the wizard completes, go to **Settings > Output > Output Mode**, select **Advanced**, and on the **Streaming** tab, ensure that **Keyframe Interval** is 2.

   Note: Keyframe Interval is configured automatically if you previously checked **Enable Multitrack Video**.
6. In the OBS Studio main window, choose **Start Streaming**.

For more on streaming with OBS Studio, see OBS Studio Quickstart.

You can modify your OBS settings manually later:

1. Choose **Settings > Stream**.
2. Choose **Amazon IVS** from the dropdown.
3. Paste in the **Stream Key**.

You can run the wizard again at any time: choose **Tools > Auto-Configuration Wizard**.

Optionally, in **Settings > General**, enable local recording to save your live stream for later use. As mentioned earlier, network issues between the broadcast and AWS or within AWS could result in some data loss while recording your stream. In these cases, Amazon IVS prioritizes the live stream over the recording. Recording locally via your streaming tool provides redundancy.

It's advisable to check for OBS Studio updates regularly and update to the most current version. (For instance, if you get a "Failed to connect to server" error, you may be using an old version of OBS Studio that does not support RTMPS.)

Streaming with OBS Studio using SRT

Follow these steps to get up and running quickly with the Secure Reliable Transport protocol:

1. Download and install the software: https://obsproject.com/download.
2. Run the OBS Studio **Auto-Configuration Wizard**, which appears when you load OBS Studio for the first time. Follow the steps and accept the defaults.
3. At **Stream Information**, choose **Custom...** from the **Service** dropdown and enter the **Server (Ingest server)** and **Stream Key**.

   If you created the channel with the AWS CLI:

   - The **Server** you enter in OBS is a combination of five things:
     - An ingestion protocol: `srt://`
     - The **endpoint** from the `srt` struct in the CLI response:

       `a1b2c3d4e5f6.srt.live-video.net`
     - A port: `9000`
     - A streamid, which is the **streamKey value** from the CLI response:

```
sk_us-west-2_abcd1234efgh5678ijkl
```

- A passphrase, used to encrypt the content. Use this only if **insecure ingest** is not enabled.

```
ZU5A3yrjGAkghUNDr0c5NXBhsPrjlmtcKMNBluh7oImwJQ3ijeyClvMKxlpPcGAMziICJ
```

The complete entry is:

```
srt://a1b2c3d4e5f6.srt.live-video.net:9000?streamid=sk_us-
west-2_abcd1234efgh5678ijkl&passphrase=ZU5A3yrjGAkghUNDr0c5NXBhsPrjlmtcKMNBlu
```

- The **Stream Key** you enter in OBS will remain empty for the SRT protocol.

4. For **Video Output Resolution** and **Bitrate**, refer to Channel Types in *Amazon IVS Streaming Configuration*. If either value chosen by the OBS wizard exceeds the values allowed by Amazon IVS, you should manually adjust the values to avoid a failed connection to Amazon IVS. After the wizard completes:
   a. To adjust video resolution, use **Settings > Video > Output (Scaled) Resolution**.
   b. To adjust video bitrate, use **Settings > Output > Streaming > Video Bitrate**.
5. We recommend a 2-second **Keyframe Interval** to improve the stream stability and avoid buffering in the viewer playback. After the wizard completes, go to **Settings > Output > Output Mode**, select **Advanced**, and on the **Streaming** tab, ensure that **Keyframe Interval** is 2.
6. In the OBS Studio main window, choose **Start Streaming**.

You can modify your OBS settings manually later:

1. Choose **Settings > Stream**.
2. Choose **Custom** from the dropdown.
3. Paste in the **Server** and/or **Stream Key**.

You can run the wizard again at any time: choose **Tools > Auto-Configuration Wizard**.

Optionally, in **Settings > General**, enable local recording to save your live stream for later use. As mentioned earlier, network issues between the broadcast and AWS or within AWS could result in some data loss while recording your stream. In these cases, Amazon IVS prioritizes the live stream over the recording. Recording locally via your streaming tool provides redundancy.

It's advisable to check for OBS Studio updates regularly and update to the most current version. (For instance, if you get a "Failed to connect to server" error, you may be using an old version of OBS Studio that does not support RTMPS.)

Streaming a Recorded Video with FFmpeg using RTMPS

Follow these steps:

1. Download and install FFmpeg: https://www.ffmpeg.org/download.html.
2. Set `$VIDEO_FILEPATH` to the location of an MP4 video to stream:

```
VIDEO_FILEPATH=/home/test/my_video.mp4
```

3. Set `STREAM_KEY` to your StreamKey **value**:

```
STREAM_KEY=sk_us-west-2_abcd1234efgh5678ijkl
```

4. Set `INGEST_ENDPOINT` to your **ingestEndpoint** (from the AWS CLI):

```
INGEST_ENDPOINT=a1b2c3d4e5f6.global-contribute.live-video.net
```

5. Start streaming with the following terminal command (this is all one line):

```
ffmpeg -re -stream_loop -1 -i $VIDEO_FILEPATH -r 30 -c:v libx264 -pix_fmt yuv420p
 -profile:v main -preset veryfast -x264opts "nal-hrd=cbr:no-scenecut" -minrate
 3000 -maxrate 3000 -g 60 -c:a aac -b:a 160k -ac 2 -ar 44100 -f flv rtmps://
$INGEST_ENDPOINT:443/app/$STREAM_KEY
```

Note, the above command is an example. For production streaming, tune the parameters to your needs.

Streaming a Recorded Video with FFmpeg using SRT

1. Download and install FFmpeg: https://www.ffmpeg.org/download.html. If you are using an old/compiled version of FFmpeg, build a new version with the `--enable-libsrt` flag.
2. Verify that SRT is available for use in FFmpeg: run the following command and ensure that `libsrt` is in the output. If `libsrt` is not there, rebuild or get a newer version of FFmpeg which supports SRT.

```
ffmpeg -version | grep enable-libsrt
```

3. Set $VIDEO_FILEPATH to the location of an MP4 video to stream:

```
VIDEO_FILEPATH=/home/test/my_video.mp4
```

4. Set STREAM_KEY to your StreamKey **value**:

```
STREAM_KEY=sk_us-west-2_abcd1234efgh5678ijkl
```

5. Set INGEST_ENDPOINT to your **endpoint** (from the AWS CLI under the `srt` object):

```
INGEST_ENDPOINT=a1b2c3d4e5f6.srt.live-video.net
```

6. Set PASSPHRASE to your **passphrase** (from the AWS CLI under the `srt` object). Use passphrase only if insecure ingest is not enabled for the channel.

```
PASSPHRASE=ZU5A3yrjGAkghUNDr0c5NXBhsPrjlmtcKMNBluh7oImwJQ3ijeyClvMKxlpPcGAMziICJ
```

7. Start streaming with the following terminal command (this is all one line):

```
ffmpeg -re -i $VIDEO_FILEPATH -c copy -f mpegts "srt://$INGEST_ENDPOINT:9000?
streamid=$STREAM_KEY&passphrase=$PASSPHRASE”
```

Step 5: View Your Live Stream

You can view your live stream with:

- The native IVS player SDKs.
- The Amazon IVS console.

Viewing with the Amazon IVS Player SDKs

1. Set up the IVS Player. Start with the IVS Player SDK overview, then read the appropriate platform-specific Player guide(s).
2. From the Amazon IVS console, get the **Playback URL** that was generated when you created your channel. (See Final Channel Creation earlier in this *Getting Started* guide.)

3. Call `player.load()` with the playback URL.

Viewing with the Amazon IVS Console

1. Open the Amazon IVS console.

   (You can also access the Amazon IVS console through the AWS Management Console.)
2. On the navigation pane, choose **Live channels**. (If the nav pane is collapsed, first open it by choosing the hamburger icon.)
3. Choose the channel whose stream you want to view, to go to a details page for that channel.

   The live stream is playing in the **Live stream** section of the page.

Note: Playback from the console consumes resources, and you will incur live-video output costs. To learn more, see Live Video Output Costs on the IVS Pricing page.

Note: After you start streaming, there is a short delay (up to 30 seconds, usually less) before your stream can be viewed in the console.

Step 6: Check Your Service-Quota Limits (Optional)

All accounts have limits on the number of concurrent viewers and concurrent broadcasts. *Ensure that your limits are adequate and request an increase if needed, especially if you are planning a large streaming event*. For details, see IVS Service Quotas.

Step 7: Prevent Undesired Content and Viewers (Recommended)

Malicious users may try to re-stream undesirable content (e.g., professional sports) on your platform, or try to embed your platform's streams on another website without permission. This kind of streaming can dramatically increase the amount of live-streamed video that your application is serving as well as the costs associated with it, without adding value to your business. In addition to providing you with controls to stop active streams, Amazon IVS provides resources to help detect and prevent this kind of behavior in the first place; see Undesired Content and Viewers in IVS.

To constrain playback to specific origins and/or countries, use a playback restriction policy. Note that these policies can be used only with public channels. Undesired Content and Viewers in IVS also discusses the use of private channels to control undesired content.

Note that playback restriction policies (such as geo-blocking) cannot be used simultaneously with playback authorization. If playback authorization is enabled for a channel, any configured playback restriction policies will be ignored. To enforce geo-restrictions on a private channel, validate the user's location within your token generation logic before issuing a playback token.

Enabling Multiple Hosts on an Amazon IVS Stream

Amazon Interactive Video Service (IVS) enables developers to build applications that combine video and audio from multiple broadcasters (also referred to as *hosts*) into one live stream.

Use cases include:

- Guest spots – Broadcasters can invite viewers into the broadcast. This opens the door to collaborative content like karaoke and Q&A.
- Versus (VS) mode – Broadcasters are matched with each other to compete (e.g., in a singing competition).
- Group broadcasts – Multiple speakers can converse with each other in front of a large audience.

To add multiple broadcasters to a live stream, you need to use both IVS Real-Time Streaming and IVS Low-Latency Streaming. IVS Real-Time Streaming is used to combine video and audio streams; Low-Latency Streaming, to broadcast the combined stream to viewers.

Real-Time Streaming provides a resource called a stage, a virtual space where broadcasters (hosts) can exchange audio and video in real time. You can then broadcast a stage to channels to reach a larger audience, and you can build applications where audience members can be brought "on stage" to contribute to the live conversation.

For more information about IVS Real-Time Streaming, see:

- IVS Real-Time Streaming User Guide
  - The IVS Broadcast SDKs incorporate real-time functionality. See the Guides for those SDKs: Web, Android, and iOS, especially the sections on "Publishing and Subscribing."
- IVS Real-Time Streaming API Reference

Getting Started with Multiple Hosts in IVS

This document takes you through the steps involved in getting started using multiple hosts in Amazon IVS.

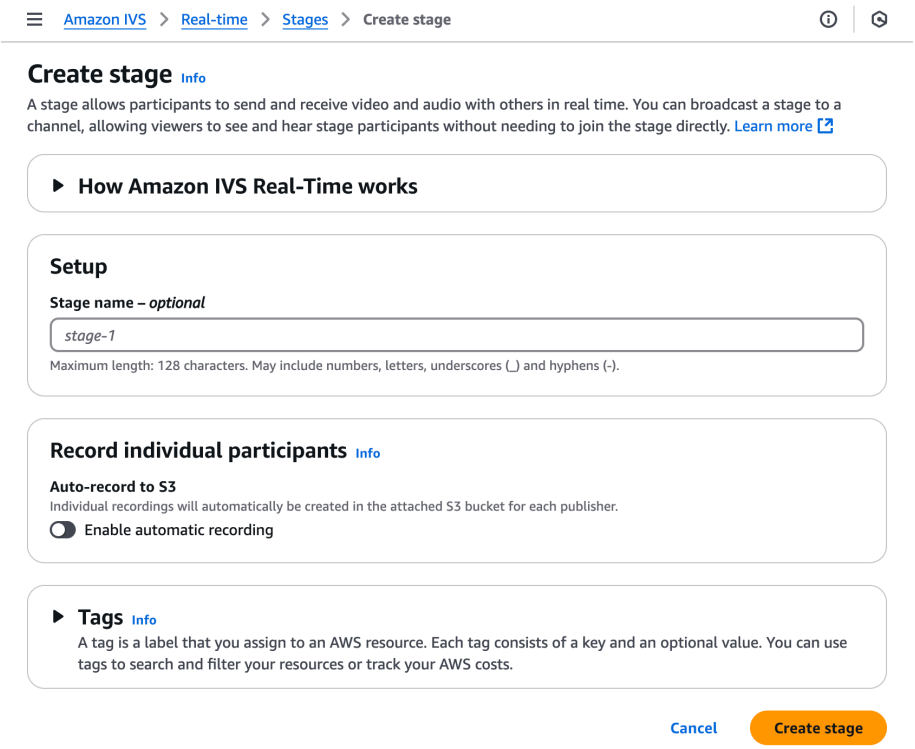
Console Instructions

To create a new stage and a participant token for it, follow these steps:

1. Open the Amazon IVS console.

   (You can also access the Amazon IVS console through the AWS Management Console.)

2. On the left navigation pane, select **Stages**, then select **Create stage**. The **Create stage** window appears.



3. Optionally enter a **Stage name**. Select **Create stage** to create the stage. The stage details page appears, for the new stage.
4. Select **Create a participant token**.
5. In the **Create a participant token** dialog, enter a User ID and select **Create a participant token**. The token appears at the top of the **Participant tokens** table. Click the "Copy token" icon (to the left of the participant token) to copy the token.

CLI Instructions

Using the AWS CLI is an advanced option and requires that you first download and configure the CLI on your machine. For details, see the AWS Command Line Interface User Guide.

Now you can use the CLI to create and manage resources. The stage API is under the ivs-realtime namespace. For example, to create a stage:

```
aws ivs-realtime create-stage --name "test-stage"
```

The response is:

```
{
   "stage": {
      "arn": "arn:aws:ivs:us-west-2:376666121854:stage/VSWjvX5XOkU3",
      "name": "test-stage"
   }
}
```

To create a participant token for that stage:

```
aws ivs-realtime create-participant-token --stage-arn arn:aws:ivs:us-
west-2:376666121854:stage/VSWjvX5XOkU3
```

The response is:

```
{
   "participant": {
      "participantId": "jFpWmveENolS",
      "expirationTime": "2022-08-26T19:17:00+00:00",
      "token":
 "eyJhbGciOiJLTVMiLCJ0eXAiOiJKV1QifQ.eyJleHAiOjE2NjE1NDE0MjAsImp0aSI6ImpGcFdtdmVFTm9sUyIsInJlc2
TaKjllW9Qac6c5xBrdAk"
   }
}
```

Broadcasting a Stage: Client-Side versus Server-Side Composition

When developers want to broadcast a stage to an IVS channel, they have two choices:

- With *client-side composition*, a host connects to a stage, downloads videos from other hosts, combines them into one stream, and broadcasts the mixed stream to an IVS channel. This approach allows for a high degree of layout flexibility: the app developer can control the look of the composition using the mixer API. However, client-side composition requires more client CPU resources to create the composition and more bandwidth to broadcast it. Also, if the host broadcasting the stage has network issues, they may impact the live stream for viewers.

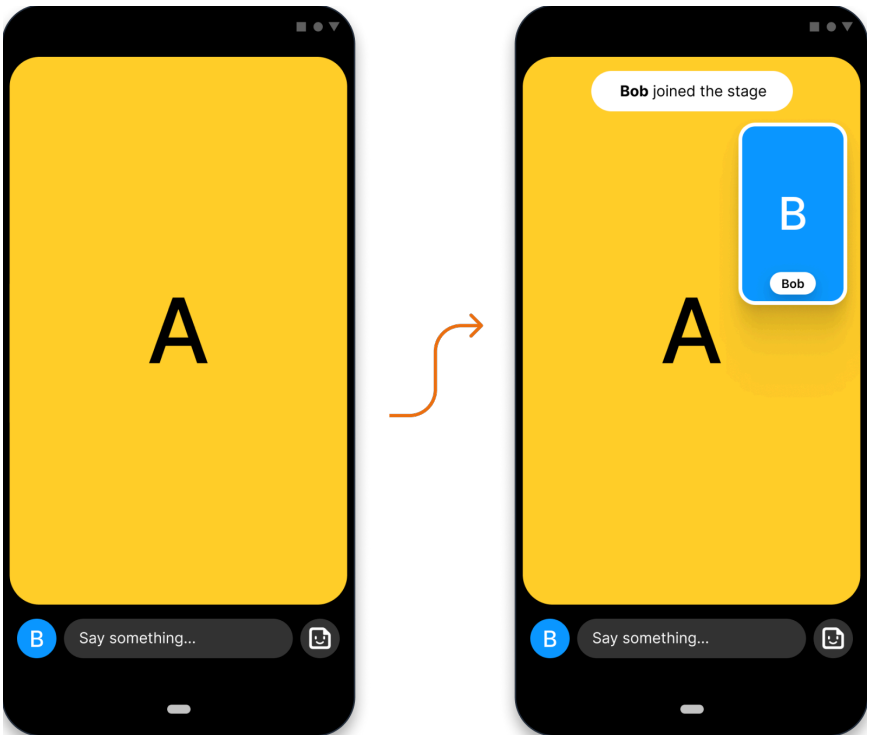
Client-side composition is the preferred choice when users need a highly personalized view of the broadcast content, such as incorporating overlays and customizing elements that aren't compatible with server-side composition.

- With *server-side composition*, clients offload the composition and broadcasting of an IVS stage to a cloud service. Server-side composition and RTMP broadcast to a channel are invoked through IVS control-plane operations in the stage's home region. Server-side composition offers numerous benefits, making it an attractive choice for users seeking efficient and reliable live streaming.
  - **Reduced client load** — With server-side composition, the burden of combining audio and video sources is shifted from individual client devices to the server itself. Server-side composition eliminates the need for client devices to use their CPU and network resources for compositing the view and transmitting it to IVS.
  - **Resilience** — By centralizing the composition process on the server, the broadcast becomes more robust. Even if a publisher device experiences technical limitations or network fluctuations, the server can adapt and provide a smoother stream to all the audience.
  - **Bandwidth efficiency** — Since the server handles the composition, stage publishers do not have to spend extra bandwidth broadcasting the video to an IVS channel.

For more information, see Server-Side Composition in the *IVS Real-Time User Guide*.

Demo of Multiple Hosts in IVS

Scenario: Alice (A) is broadcasting to her Amazon IVS channel and wants to invite Bob (B) on stage as a guest. (In a real broadcast, A and B would be images of Alice and Bob.)



1. Create a Stage

Here is a CreateStage request using the Amazon IVS Stage API:

```
POST /CreateStage HTTP/1.1
Content-type: application/json
{
   "name": "string",
   "participantTokenConfigurations": [
      {
         "userId": "9529828585",
         "attributes": {"displayName": "Alice"}
      },
      {
         "userId": "4875935192",
         "attributes": {"displayName": "Bob"}
      }
   ]
}
```

You can pre-create participant tokens when you create a stage, as is done here. You also can create tokens for an existing stage, by calling CreateParticipantToken. For each participant, you can pass in a custom `userId` and set of `attributes`. (**Important**: The `attributes` and `userId` request

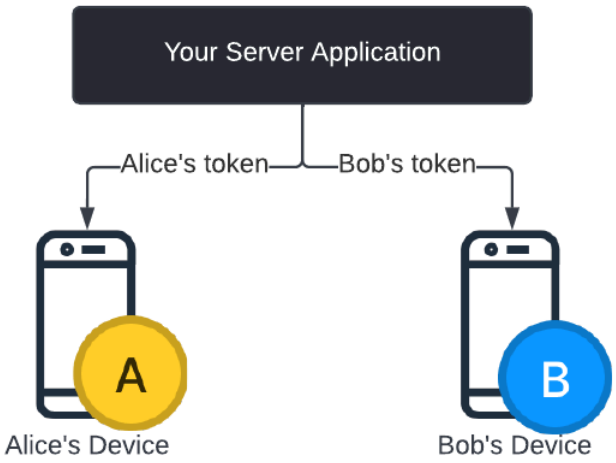
fields are exposed to all stage participants. These should not be used for personally identifying, confidential, or sensitive information.)

Here is the network response to the request above:

```
HTTP/1.1 200
Content-type: application/json
{
   "stage": {
      "arn": "arn:aws:ivs:us-west-2:123456789012:stage/abcdABCDefgh",
      "name": "alice-stage"
   },
   "participantTokens": [
      {
         "participantId": "e94e506e-f7...",
         "token": "eyJhbGci0iJ...",
         "userId": "9529828585",
         "attributes": {"displayName" : "Alice"},
         "expirationTime": number
      },
      {
         "participantId": "b5c6a79a-6e...",
         "token": "eyJhbGci0iJ...",
         "userId": "4875935192",
         "attributes": {"displayName" : "Bob"},
         "expirationTime": number
      }
   ]
}
```

2. Distribute Participant Tokens

The client now has a token for Alice (A) and Bob (B). By default, tokens are valid for 1 hour; optionally you can pass in a custom `duration` when you create the stage. Tokens can be used to join a stage.

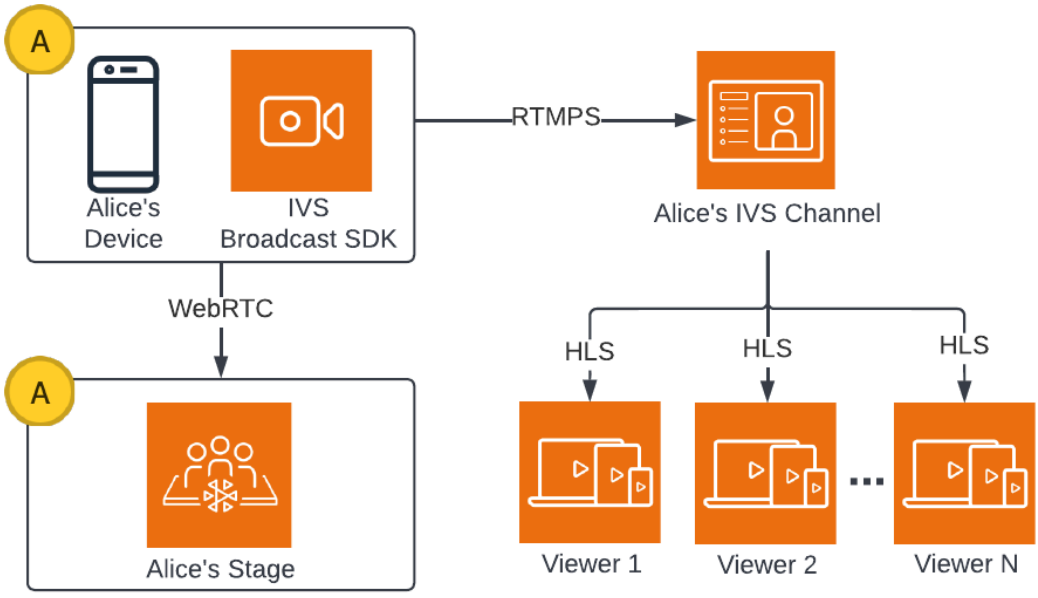


You will need a way to distribute tokens from your server to each client (e.g., via a WebSocket channel). We do not provide this functionality.

3. Join the Stage

Participants can join the stage via the Amazon IVS Broadcast SDK on Android or iOS. You can configure the video quality of each participant. Here we show Alice joining the stage first.

Here is an architecture overview:



And here is an Android code sample for joining the stage. The code snippet below would run on Alice's device. In the `join()` call, Alice joins the stage. The figure above shows the result of this

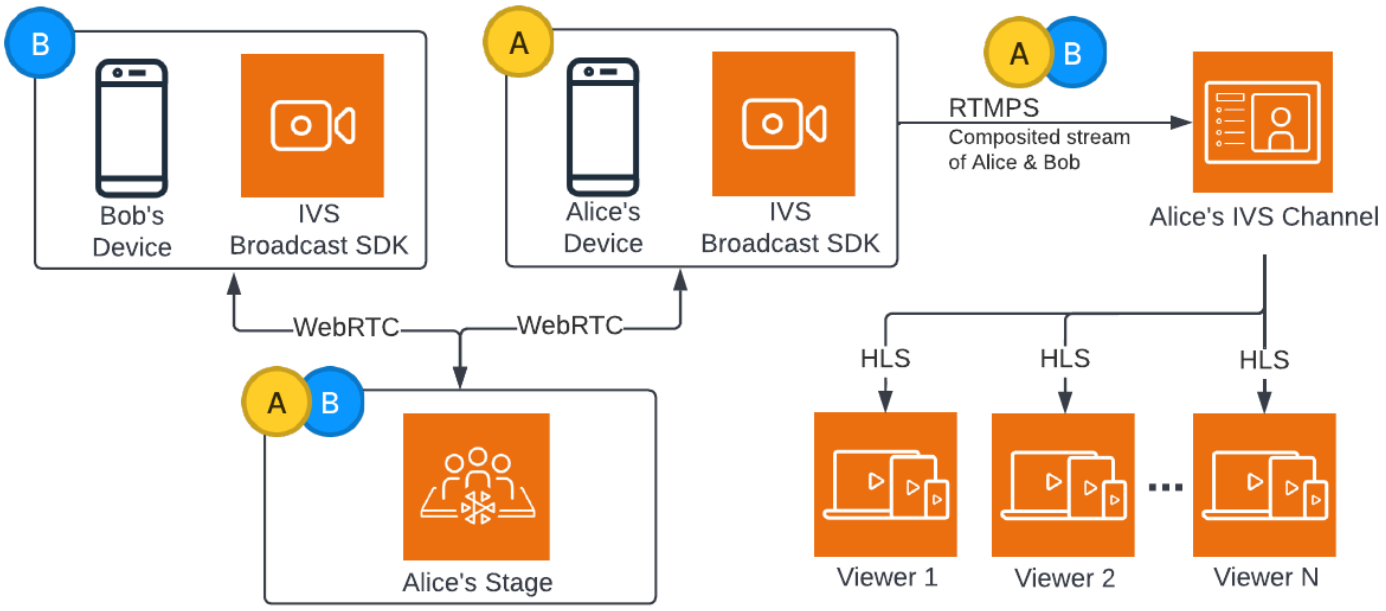
code execution: Alice has joined the stage and is publishing to it (in addition to broadcasting to her channel, which she started doing in step 1).

```
// Create streams with the front camera and first microphone.
var deviceDiscovery = DeviceDiscovery(context)
var devices : List<Device> = deviceDiscovery.listLocalDevices()
var publishStreams = ArrayList<LocalStageStream>()

// Configure video quality if desired
var videoConfiguration = StageVideoConfiguration()

// Create front camera stream
var frontCamera = devices.find { it.descriptor.type ==
 Device.Descriptor.DeviceType.Camera && it.descriptor.position ==
 Device.Descriptor.Position.FRONT }
var cameraStream = ImageLocalStageStream(frontCamera, videoConfiguration)
publishStreams.add(cameraStream)

// Create first microphone stream
var microphone = devices.find { it.descriptor.type ==
 Device.Descriptor.DeviceType.Microphone }
var microphoneStream = AudioLocalStageStream(microphone)
publishStreams.add(microphoneStream)

// A basic Stage.Strategy implementation that indicates the user always wants to
 publish and subscribe to other participants.
// Provides the front camera and first microphone as publish streams.

override fun shouldPublishFromParticipant(stage: Stage, participantInfo:
 ParticipantInfo) : Boolean {
   return true
}

override fun shouldSubscribeToParticipant(stage: Stage, participantInfo:
 ParticipantInfo) : Stage.SubscribeType {
   return Stage.SubscribeType.AUDIO_VIDEO
}

override fun stageStreamsToPublishForParticipant(stage: Stage, participantInfo:
 ParticipantInfo): List<LocalStageStream> {
   return publishStreams
}
```

```
// Create Stage using the strategy and join
var stage = Stage(context, token, strategy)

try {
   stage.join()
} catch (exception: BroadcastException) {
   // handle join exception
}
```

4. Broadcast the Stage

Client-Side Composition



Here is an Android code sample for broadcasting the stage:

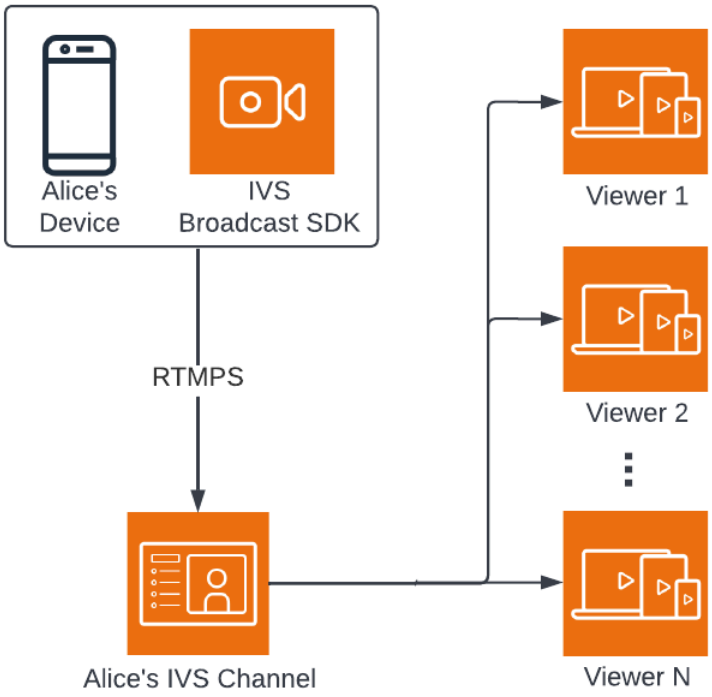
```
var broadcastSession = BroadcastSession(context, broadcastListener, configuration,
 null)

// StageRenderer interface method to be notified when remote streams are available
override fun onStreamsAdded(stage: Stage, participantInfo: ParticipantInfo, streams:
 List<StageStream>) {

   var id = participantInfo.participantId

   // Create mixer slot for remote participant
   var slot = BroadcastConfiguration.Mixer.Slot.with { s ->
```

```
      s.name = id
      // Set other properties as desired
      ...
      s
   }

   broadcastSession.mixer.addSlot(slot)

   // Attach remote stream devices, bind to mixer slot
   streams.forEach { stream ->
      broadcastSession.attachDevice(stream.getDevice())
      broadcastSession.mixer.bind(stream.getDevice(), id)
   }
}

// Start broadcasting
try {
   broadcastSession.start(IVS_RTMPS_URL, IVS_STREAM_KEY)
} catch (exception: BroadcastException) {
   // handle exception
}
```

The Android and iOS Amazon IVS Broadcast SDKs have callbacks triggered by the status of participants (e.g., onStreamsAdded and onStreamsRemoved), to simplify building a dynamic UI. This is shown in the first part of the code sample: when Bob's video and audio are available, Alice is notified via an onStreamsAdded callback.

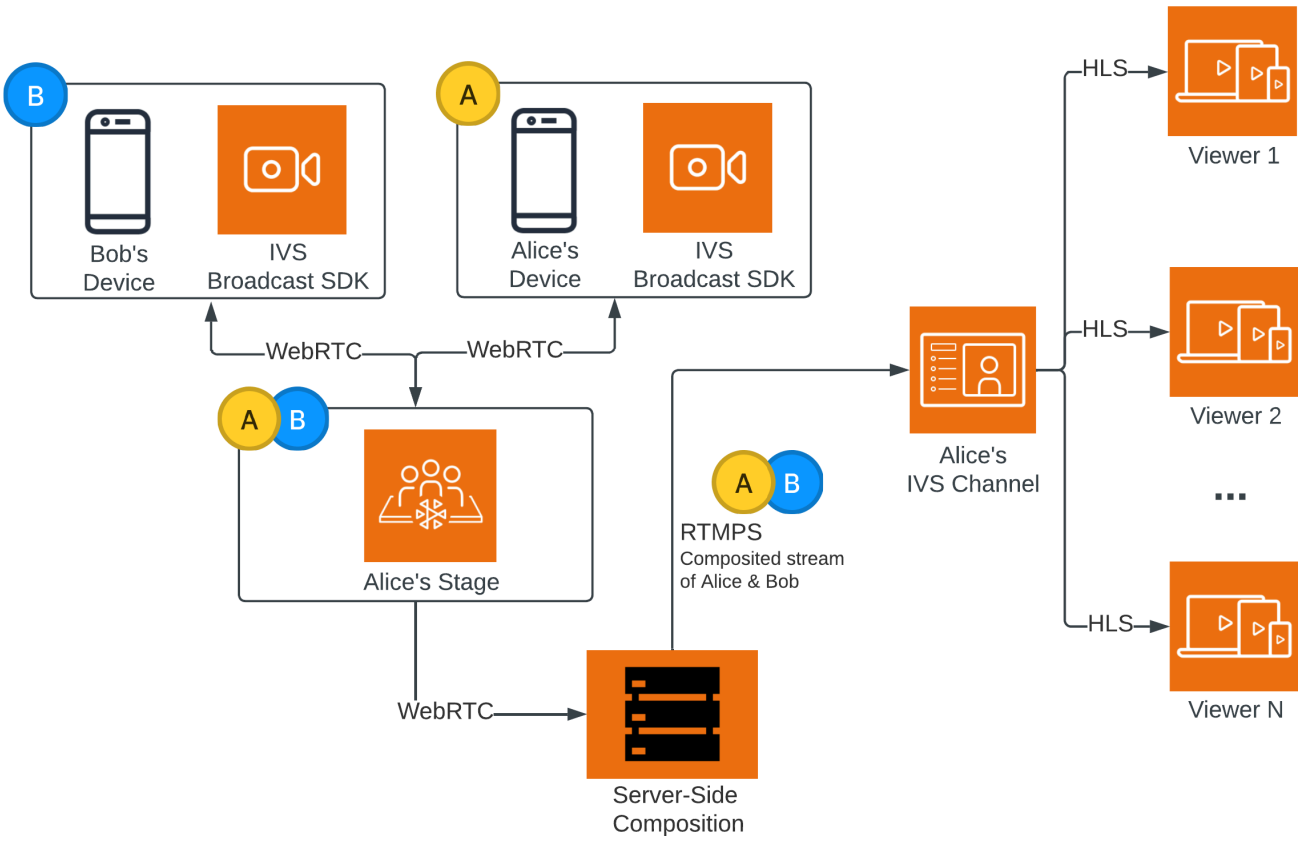
Alice can then add Bob's video and audio to the mixer, to be included in the RTMP broadcast for the wider audience of her channel. This is shown in the remainder of the code sample.

Now Alice is broadcasting to multiple viewers, via the Amazon IVS Android Broadcast SDK. Here is what this looks like architecturally:



Server-Side Composition

For comparison, here is how server-side composition works. (For details, see Server-Side Composition in the *IVS Real-Time User Guide*.)


B
Bob's Device
IVS Broadcast SDK
A
Alice's Device
IVS Broadcast SDK
WebRTC
WebRTC
A B
Alice's Stage
WebRTC
Server-Side Composition
A B
RTMPS
Composited stream of Alice & Bob
Alice's IVS Channel
HLS
HLS
HLS
Viewer 1
Viewer 2
...
Viewer N

Monitoring Amazon IVS Low-Latency Streaming

You can monitor Amazon Interactive Video Service (IVS) resources using Amazon CloudWatch. CloudWatch collects and processes raw data from Amazon IVS into readable, near real-time metrics. These statistics are kept for 15 months, so you can gain a historical perspective on how your web application or service performs. You can set alarms for certain thresholds and send notifications or take actions when those thresholds are met. For details, see the CloudWatch User Guide.

The timestamp on a metric represents the start of the period during which metric data is accumulated. For example, suppose you get a per-minute `LiveDeliveredTime` metric sum of 300 seconds at 01:02:00. This would mean that 5 minutes' worth of video was served to viewers during the 1-minute period from 01:02:00 to 01:02:59.

For metrics designated as high resolution, the first data point appears several seconds after stream start. We recommend you specify a 5-second period when making the metric requests. (See Resolution in the Amazon CloudWatch User Guide.) For other metrics, data is emitted within 1 minute of the timestamp to which it refers.

The high-resolution metrics are rolled up over time. Resolution effectively decreases as the metrics age. Here is the schedule:

- 1-second metrics are available for 3 hours.
- 60-second metrics are available for 15 days.
- 5-minute metrics are available for 63 days.
- 1-hour metrics are available for 455 days (15 months).

For current information on data retention, search for "retention period" in Amazon CloudWatch FAQs.

Prerequisites

- You must have an AWS account with sufficient IAM permissions to interface with the Stream Health APIs and CloudWatch metrics. For specific steps, see Getting Started with IVS Low-Latency Streaming.

- You must create a channel and start a stream. Relevant information is in the IVS Low-Latency Streaming User Guide:
  - For instructions on creating a channel, see Create a Channel in *Getting Started with IVS Low-Latency Streaming*.
  - For instructions on starting a stream, see Set Up Streaming Software in *Getting Started with IVS Low-Latency Streaming*.
  - For encoder-configuration details, see Amazon IVS Streaming Configuration.

Access Stream Session Data

Using the `listStreamSessions` operation, you can access a list of streams that a channel has had for up to 60 days. This list may include a live stream session (denoted by an empty `endTime`).

You can get the session data for a specific stream through the `getStreamSession` operation. If you do not specify the `streamId` parameter, the operation returns the latest session. In addition, you can periodically call the operation to get your stream's latest events (up to the most recent 500).

Console Instructions

1. Open the Amazon IVS console.

   (You also can access the Amazon IVS console through the AWS Management Console.)
2. On the navigation pane, choose **Channels**. (If the nav pane is collapsed, first open it by choosing the hamburger icon.)
3. Choose the channel to go to its details page.
4. Scroll down the page until you see the **Stream sessions** section.
5. Select the Stream ID of the session you want to access to view its session details, including charts for the Amazon CloudWatch high-resolution metrics.

Alternatively, if one or more channels are already live:

1. Open the Amazon IVS console.
2. On the navigation pane, choose **Live channels**. (If the nav pane is collapsed, first open it by choosing the hamburger icon.)
3. Select a live channel from the list to access its session details inside a split view.

AWS SDK Instructions

Accessing stream-session data with the AWS SDK is an advanced option and requires that you first download and configure the SDK on your application. Below are instructions for the AWS SDK using JavaScript.

Prerequisite: To use the code sample below, you need to load the AWS JavaScript SDK into your application. For details, see Getting started with the AWS SDK for JavaScript.

```
// This first call lists up to 50 stream sessions for a given channel.
const AWS = require("aws-sdk");
const REGION = 'us-west-2';
let channelArn = USE_YOUR_CHANNEL_ARN_HERE;

AWS.config.getCredentials(function(err) {
  if (err) console.log(err.stack);
  // credentials not loaded
  else {
    console.log("Access key:", AWS.config.credentials.accessKeyId);
  }
});

AWS.config.update({region: REGION});
var ivs = new AWS.IVS();

// List Stream Sessions
async function listSessions(arn) {
  const result = await ivs.listStreamSessions({"channelArn": arn}).promise();
  console.log(result.streamSessions);
}
listSessions(channelArn);

// Get Stream Session
async function getSession(arn, id) {
  const result = await ivs.getStreamSession({"channelArn": arn, "streamId":
 id}).promise();
  console.log(result);

  // This function polls every 3 seconds and prints the latest IVS stream events.
  setInterval(function(){
    console.log(result.streamSession.truncatedEvents);
  }, 3000);
}
```

```
getSession(channelArn);
```

CLI Instructions

Accessing stream-session data with the AWS CLI is an advanced option and requires that you first download and configure the CLI on your machine. For details, see the AWS Command Line Interface User Guide.

1. List streams sessions:

```
aws ivs list-stream-sessions --channel-arn <arn>
```

2. Get stream session data for a specific stream using its `streamId`:

```
aws ivs get-stream-session --channel-arn <arn> --stream-id <streamId>
```

Here is a sample response to the `get-stream-session` call:

```
{
    "streamSession": {
        "startTime": "2021-10-22T00:03:57+00:00",
        "streamId": "st-1FQzeLONMT9XTKI43leLSo1",
        "truncatedEvents": [
            {
                "eventTime": "2021-10-22T00:09:30+00:00",
                "name": "Session Ended",
                "type": "IVS Stream State Change"
         },
            {
                "eventTime": "2021-10-22T00:09:30+00:00",
                "name": "Stream End",
                "type": "IVS Stream State Change"
         },
         {
                "eventTime": "2021-10-22T00:03:57+00:00",
                "name": "Stream Start",
                "type": "IVS Stream State Change"
         },
         {
                "eventTime": "2021-10-22T00:03:50+00:00",
                "name": "Session Created",
```

```
                "type": "IVS Stream State Change"
         }
        ],
        "endTime": "2021-10-22T00:09:31+00:00",
        "ingestConfiguration": {
            "audio": {
                "channels": 2,
                "codec": "mp4a.40.2",
                "sampleRate": 48000,
                "targetBitrate": 160000
         },
            "video": {
                "avcLevel": "4.0",
                "avcProfile": "Baseline",
                "codec": "avc1.42C028",
                "encoder": "obs-output module (libobs version 27.0.1)",
                "targetBitrate": 3500000,
                "targetFramerate": 30,
                "videoHeight": 1080,
                "videoWidth": 1920
            }
        },
        "channel": {
            "name": "",
            "ingestEndpoint": "3f234d592b38.global-contribute.live-video.net",
            "authorized": false,
            "latencyMode": "LOW",
            "recordingConfigurationArn": "",
            "type": "STANDARD",
            "playbackUrl": "https://3f234d592b38.us-west-2.playback.live-video.net/api/
video/v1/us-west-2.991729659840.channel.dY7LsluQX1gV.m3u8",
            "arn": "arn:aws:ivs:us-west-2:991729659840:channel/dY7LsluQX1gV"
        }
    }
}
```

Filter Streams by Health

To easily find which streams are experiencing issues, you can use `listStreams` to filter live streams by “health.”

Console Instructions

1. Open the Amazon IVS console.

   (You also can access the Amazon IVS console through the AWS Management Console.)
2. On the navigation pane, choose **Live channels**. (If the nav pane is collapsed, first open it by choosing the hamburger icon.)
3. Select the search field for **Filter by health**.
4. In the drop-down list, select filtering by **Health = STARVING**.

After filtering, you can go to a channel's details page and select the channel's live-stream session, to access input-configuration details and stream events.

CLI Instructions

Using the AWS CLI is an advanced option and requires that you first download and configure the CLI on your machine. For details, see the AWS Command Line Interface User Guide.

To filter streams by health (e.g. `STARVING`):

```
aws ivs list-streams --filter-by health=STARVING
```

CloudWatch Health Dimension for ConcurrentStreams

You can filter `ConcurrentStreams` by a specific `Health`. See CloudWatch Metrics: IVS Low-Latency Streaming.

Access CloudWatch Metrics

Amazon CloudWatch collects and processes raw data from Amazon IVS into readable, near-real-time metrics. These statistics are kept for 15 months, so you can gain a historical perspective on how your web application or service performs. You can set alarms for certain thresholds and send notifications or take actions when those thresholds are met. For details, see the CloudWatch User Guide.

Note that CloudWatch metrics are rolled up over time. Resolution effectively decreases as the metrics age. Here is the schedule:

- 1-second metrics are available for 3 hours.
- 60-second metrics are available for 15 days.
- 5-minute metrics are available for 63 days.
- 1-hour metrics are available for 455 days (15 months).

When you call `getMetricData` you can specify a period of 1, 5 (recommended), 10, 30 or any multiple of 60 seconds for high-resolution metrics.

CloudWatch Console Instructions

1. Open the CloudWatch console at https://console.aws.amazon.com/cloudwatch/.
2. In the side navigation, expand the **Metrics** dropdown, then select **All metrics**.
3. On the **Browse** tab, using the unlabeled dropdown at the left, select your "home" region, where your channel(s) was(were) created. For more on regions, see Global Solution, Regional Control. For a list of supported regions, see the Amazon IVS page in the *AWS General Reference*.
4. At the bottom of the **Browse** tab, select the **IVS** namespace.
5. Do one of the following:
   a. In the search bar, enter your resource ID (part of the ARN, `arn:::ivs:channel/<resource id>`).

      Then select **IVS > By Channel**.

   b. If **IVS** appears as a selectable service under **AWS Namespaces**, select it. It will be listed if you use Amazon IVS and it is sending metrics to Amazon CloudWatch. (If **IVS** is not listed, you do not have any Amazon IVS metrics.)

      Then choose a *dimension* grouping as desired; available dimensions are listed in CloudWatch Metrics below.
6. Choose metrics to add to the graph. Available metrics are listed in CloudWatch Metrics below.

You also can access your stream session's CloudWatch chart from the stream session's details page, by selecting the **View in CloudWatch** button.

CLI Instructions

You also can access the metrics using the AWS CLI. This requires that you first download and configure the CLI on your machine. For details, see the AWS Command Line Interface User Guide.

Then, to access Amazon IVS low-latency streaming metrics using the AWS CLI:

- At a command prompt, run:

```
aws cloudwatch list-metrics --namespace AWS/IVS
```

For more information, see Using Amazon CloudWatch Metrics in the *Amazon CloudWatch User Guide*.

CloudWatch Metrics: IVS Low-Latency Streaming

Amazon IVS provides the following metrics in the **AWS/IVS** namespace.

Metric	Dimensions	Description
`ConcurrentViews`	—	A count of concurrent views across all your live channels. A *view* is a unique viewing session which is actively downloading or playing media files. (For a more detailed definition, see the IVS Glossary.) If channels are live but in aggregate have no views, the value of this metric is 0. If no channels are live, the metric has no data points. Unit: Count Valid statistics: Average, Maximum, Minimum — Average number, largest number, or smallest number (respectively) of concurrent views over the configured interval.
`ConcurrentViews`	`Channel`	Filters `ConcurrentViews` by channel ARN. If a channel is live but has no views, the value

Metric	Dimensions	Description
		of this metric is 0. If a channel is not live, the metric has no data points. This metric provides data for a channel, not a stream. To see concurrent views for a particula r streaming session on a given channel, evaluate the `ConcurrentViews` metric for that channel between the start and end times of the streaming session. Unit: Count Valid statistics: Average, Maximum, Minimum — Average number, largest number, or smallest number (respectively) of concurrent views over the configured interval.
`Concurren tStreams`	—	A count of your channels which are streaming live. If no channels are live, this metric has no data points. Unit: Count Valid statistics: Average, Maximum, Minimum — Average number, largest number, or smallest number (respectively) of concurrent streams over the configured interval.

Metric	Dimensions	Description
ConcurrentStreams	Health	Filters ConcurrentStreams by channel health. If no channels are live, this metric has no data points. Unit: Count Valid statistics: Average, Maximum, Minimum — Average number, largest number, or smallest number (respectively) of concurrent streams for a specific Health over the configured interval.
ConcurrentStreams	StreamerCountryCode	Filters ConcurrentStreams by the streamer's country. Country values are two-character ISO 3166-1 country codes. If the streamer's country cannot be determined, it is shown as UNKNOWN. If no channels are live, this metric has no data points. Unit: Count Valid statistics: Average, Maximum, Minimum — Average number, largest number, or smallest number (respectively) of concurrent streams for a specific StreamerCountryCode over the configured interval.

Metric	Dimensions	Description
IngestAudioBitrate	Channel	**(High-resolution metric)** The amount of audio data Amazon IVS receives when you stream. A higher bitrate takes up more of your available internet bandwidth. Unit: Bits/second Valid statistics: Average, Maximum, Minimum — Average number, largest number, or smallest number (respectively) of ingest audio bitrates over the configured interval
IngestAudioBitrate	Channel, Track	**(High-resolution metric)** The amount of audio data Amazon IVS receives when you stream. A higher bitrate takes up more of your available internet bandwidth. Unit: Bits/second Valid statistics: Average, Maximum, Minimum — Average number, largest number, or smallest number (respectively) of ingest audio bitrates over the configured interval
IngestBitrate	—	**(High-resolution metric)** The amount of video, audio and metadata (summed over all tracks) Amazon IVS receives when you stream. A higher bitrate takes up more of your available internet bandwidth. Unit: Bits/second Average, Maximum, Minimum — Average number, largest number, or smallest number (respectively) of ingest bitrates over the configured interval

Metric	Dimensions	Description
IngestBitrate	Channel	**(High-resolution metric)** The amount of video, audio and metadata (summed over all tracks) Amazon IVS receives when you stream. A higher bitrate takes up more of your available internet bandwidth. Unit: Bits/second Valid statistics: Average, Maximum, Minimum — Average number, largest number, or smallest number (respectively) of ingest bitrates over the configured interval
IngestFramerate	—	**(High-resolution metric)** How often video frames are received by Amazon IVS when you stream. Unit: Count/second Valid statistics: Average, Maximum, Minimum — Average number, largest number, or smallest number (respectively) of ingest framerates over the configured interval
IngestFramerate	Channel	**(High-resolution metric)** How often video frames are received by Amazon IVS when you stream. Unit: Count/second Valid statistics: Average, Maximum, Minimum — Average number, largest number, or smallest number (respectively) of ingest framerates over the configured interval

Metric	Dimensions	Description
IngestFramerate	Channel, Track	**(High-resolution metric)** How often video frames are received by Amazon IVS when you stream. Unit: Count/second Valid statistics: Average, Maximum, Minimum — Average number, largest number, or smallest number (respectively) of ingest framerates over the configured interval
IngestVideoBitrate	Channel	**(High-resolution metric)** The amount of video data Amazon IVS receives when you stream. A higher bitrate takes up more of your available internet bandwidth. Higher bitrate can improve video quality, but only up to a certain point. Unit: Bits/second Valid statistics: Average, Maximum, Minimum — Average number, largest number, or smallest number (respectively) of ingest video bitrates over the configured interval

Metric	Dimensions	Description
IngestVideoBitrate	Channel, Track	**(High-resolution metric)** The amount of video data Amazon IVS receives when you stream. A higher bitrate takes up more of your available internet bandwidth. Higher bitrate can improve video quality, but only up to a certain point. Unit: Bits/second Valid statistics: Average, Maximum, Minimum — Average number, largest number, or smallest number (respectively) of ingest video bitrates over the configured interval
KeyframeInterval	Channel	**(High-resolution metric)** The point in the video stream where the entire frame is sent instead of just the differences from the previous frame. Unit: Seconds Valid statistics: Average, Maximum, Minimum — Average number, largest number, or smallest number (respectively) of keyframe intervals over the configured interval
KeyframeInterval	Channel, Track	**(High-resolution metric)** The point in the video stream where the entire frame is sent instead of just the differences from the previous frame. Unit: Seconds Valid statistics: Average, Maximum, Minimum — Average number, largest number, or smallest number (respectively) of keyframe intervals over the configured interval

Metric	Dimensions	Description
LiveDeliveredTime	—	Total real-time duration of video served to all viewers. Unit: Seconds Valid statistic: Sum
LiveDeliveredTime	Channel	Filters LiveDeliveredTime by channel. Channel values are the channel's resource-id, which is the last part of an ARN. Unit: Seconds Valid statistic: Sum
LiveDeliveredTime	Channel, ViewerCountryCode	Filters LiveDeliveredTime by channel and viewer's country code. Channel values are the channel's resource-id, which is the last part of an ARN. Country values are two-character ISO 3166-1 country codes. This allows you to answer the question: where are my viewers watching from? If the viewer's country cannot be determined, it is shown as UNKNOWN. Unit: Seconds Valid statistic: Sum
LiveInputTime	—	Real-time duration of video stream. Unit: Seconds Valid statistic: Sum

Metric	Dimensions	Description
`LiveInputTime`	`Channel`	Filters `LiveInputTime` by channel. Channel values are the channel's `resource-id`, which is the last part of an ARN. Unit: Seconds Valid statistic: Sum
`RecordedTime`	—	Real-time duration of recorded video. Unit: Seconds Valid statistic: Sum
`RecordedTime`	`Channel`	Filters `RecordedTime` by channel. Channel values are the channel's `resource-id`, which is the last part of an ARN. Unit: Seconds Valid statistic: Sum

IVS Broadcast SDK | Low-Latency Streaming

The Amazon Interactive Video Services (IVS) Low-Latency Streaming broadcast SDK is for developers who are building applications with Amazon IVS. This SDK is designed to leverage the Amazon IVS architecture and will see continual improvement and new features, alongside Amazon IVS. As a native broadcast SDK, it is designed to minimize the performance impact on your application and on the devices with which your users access your application.

Your application can leverage the key features of the Amazon IVS broadcast SDK:

- **High quality streaming** — The broadcast SDK supports high quality streaming. Capture video from your camera and encode it at up to 1080p quality for a high quality viewing experience.
- **Automatic Bitrate Adjustments** — Smartphone users are mobile, so their network conditions can change throughout the course of a broadcast. The Amazon IVS broadcast SDK automatically adjusts the video bitrate to accommodate changing network conditions.
- **Portrait and Landscape Support** — No matter how your users hold their devices, the image appears right-side up and properly scaled. The broadcast SDK supports both portrait and landscape canvas sizes. It automatically manages the aspect ratio when the users rotate their device away from the configured orientation.
- **Secure Streaming** — Your user's broadcasts are encrypted using TLS, so they can keep their streams secure.
- **External Audio Devices** — The Amazon IVS broadcast SDK supports audio jack, USB, and Bluetooth SCO external microphones.

Platform Requirements

Native Platforms

Platform	Supported Versions
Android	6.0 and later
iOS	14+

Platform	Supported Versions
	If broadcasting is essential to your application, specify Metal as a requirement for downloading your app from the Apple App Store, using UIRequiredDeviceCapabilities.

IVS supports a minimum of 4 major iOS versions and 6 major Android versions. Our current version support may extend beyond these minimums. Customers will be notified via SDK release notes at least 3 months in advance of a major version no longer being supported.

Desktop Browsers

Browser	Supported Platforms	Supported Versions
Chrome	Windows, macOS	Two major versions (current and most recent prior version)
Firefox	Windows, macOS	Two major versions (current and most recent prior version)
Edge	Windows 8.1 and later	Two major versions (current and most recent prior version) Excludes Edge Legacy
Safari	macOS	Two major versions (current and most recent prior version)

Mobile Browsers

Browser	Supported Versions
Chrome for iOS, Safari for iOS	Two major versions (current and most recent prior version)

Browser	Supported Versions
Chrome for iPadOS, Safari for iPadOS	Two major versions (current and most recent prior version)
Chrome for Android	Two major versions (current and most recent prior version)

Webviews

The Web broadcast SDK does not provide support for webviews or weblike environments (TVs, consoles, etc). For mobile implementations, see the Low-Latency Streaming Broadcast SDK Guide for Android and for iOS.

Required Device Access

The broadcast SDK requires access to the device's cameras and microphones, both those built into the device and those connected through Bluetooth, USB, or audio jack.

Support

If you encounter a broadcast error or other issue with your stream, determine the unique playback session identifier via the broadcast API.

For this Amazon IVS Broadcast SDK:	Use this:
Android	`getSessionId` function on `BroadcastSession`
iOS	`sessionId` property of `IVSBroadcastSession`
Web	`getSessionId` function

Share this broadcast session identifier with AWS support. With it, they can get information to help troubleshoot your issue.

Note: The broadcast SDK is continually improved. See Amazon IVS Release Notes for available versions and fixed issues. If appropriate, before contacting support, update your version of the broadcast SDK and see if that resolves your issue.

Versioning

The Amazon IVS broadcast SDKs use semantic versioning.

For this discussion, suppose:

- The latest release is 4.1.3.
- The latest release of the prior major version is 3.2.4.
- The latest release of version 1.x is 1.5.6.

Backward-compatible new features are added as minor releases of the latest version. In this case, the next set of new features will be added as version 4.2.0.

Backward-compatible, minor bug fixes are added as patch releases of the latest version. Here, the next set of minor bug fixes will be added as version 4.1.4.

Backward-compatible, major bug fixes are handled differently; these are added to several versions:

- Patch release of the latest version. Here, this is version 4.1.4.
- Patch release of the prior minor version. Here, this is version 3.2.5.
- Patch release of the latest version 1.x release. Here, this is version 1.5.7.

Major bug fixes are defined by the Amazon IVS product team. Typical examples are critical security updates and selected other fixes necessary for customers.

Note: In the examples above, released versions increment without skipping any numbers (e.g., from 4.1.3 to 4.1.4). In reality, one or more patch numbers may remain internal and not be released, so the released version could increment from 4.1.3 to, say, 4.1.6.

IVS Broadcast SDK: Web Guide | Low-Latency Streaming

The IVS Low-Latency Streaming Web Broadcast SDK gives developers the tools to build interactive, real-time experiences on the web.

Latest version of Web broadcast SDK: 1.40.0 (Release Notes)

Reference documentation: For information on the most important methods available in the Amazon IVS Web Broadcast SDK, see https://aws.github.io/amazon-ivs-web-broadcast/docs/sdk-reference. Make sure the most current version of the SDK is selected.

Sample code: The samples below are a good place to get started quickly with the SDK:

- Single broadcast to an IVS channel (HTML and JavaScript)
- Single broadcast with screen share to an IVS channel (React Source Code)

Platform requirements: See Amazon IVS Broadcast SDK for a list of supported platforms.

Getting Started with the IVS Web Broadcast SDK | Low-Latency Streaming

This document takes you through the steps involved in getting started with the Amazon IVS low-latency streaming Web broadcast SDK.

Install the Library

Note that the IVSBroadcastClient leverages reflect-metadata, which extends the global Reflect object. Although this should not create any conflicts, there may be rare instances where this could cause unwanted behavior.

Using a Script Tag

The Web broadcast SDK is distributed as a JavaScript library and can be retrieved at https://web-broadcast.live-video.net/1.40.0/amazon-ivs-web-broadcast.js.

When loaded via `<script>` tag, the library exposes a global variable in the window scope named `IVSBroadcastClient`.

Using npm

To install the `npm` package:

```
npm install amazon-ivs-web-broadcast
```

You can now access the `IVSBroadcastClient` object and pull in other modules and consts such as `Errors`, `BASIC_LANDSCAPE`:

```
import IVSBroadcastClient, {
```

```
   Errors,
   BASIC_LANDSCAPE
} from 'amazon-ivs-web-broadcast';
```

Samples

To get started quickly, see the examples below:

- Single broadcast to an IVS channel (HTML and JavaScript)
- Single broadcast with screen share to an IVS channel (React Source Code)

Create an Instance of the AmazonIVSBroadcastClient

To use the library, you must create an instance of the client. You can do that by calling the `create` method on `IVSBroadcastClient` with the `streamConfig` parameter (specifying constraints of your broadcast like resolution and framerate). You can specify the ingest endpoint when creating the client or you can set this when you start a stream.

The ingest endpoint can be found in the AWS Console or returned by the CreateChannel operation (e.g., UNIQUE_ID.global-contribute.live-video.net).

```
const client = IVSBroadcastClient.create({
   // Enter the desired stream configuration
   streamConfig: IVSBroadcastClient.BASIC_LANDSCAPE,
   // Enter the ingest endpoint from the AWS console or CreateChannel API
   ingestEndpoint: 'UNIQUE_ID.global-contribute.live-video.net',
});
```

These are the common supported stream configurations. Presets are `BASIC` up to 480p and 1.5 Mbps bitrate, BASIC Full HD up to 1080p and 3.5 Mbps bitrate, and `STANDARD` (or `ADVANCED`) up to 1080p and 8.5 Mbps bitrate. You can customize the bitrate, frame rate, and resolution if desired. For more information, see BroadcastClientConfig.

```
IVSBroadcastClient.BASIC_LANDSCAPE;
IVSBroadcastClient.BASIC_FULL_HD_LANDSCAPE;
IVSBroadcastClient.STANDARD_LANDSCAPE;
IVSBroadcastClient.BASIC_PORTRAIT;
IVSBroadcastClient.BASIC_FULL_HD_PORTRAIT;
IVSBroadcastClient.STANDARD_PORTRAIT;
```

You can import these individually if using the npm package.

Note: Make sure that your client-side configuration aligns with the back-end channel type. For instance, if the channel type is STANDARD, streamConfig should be set to one of the IVSBroadcastClient.STANDARD_* values. If channel type is ADVANCED, you'll need to set the configuration manually as shown below (using ADVANCED_HD as an example):

```
const client = IVSBroadcastClient.create({
   // Enter the custom stream configuration
   streamConfig: {
      maxResolution: {
         width: 1080,
         height: 1920,
     },
     maxFramerate: 30,
     /**
      * maxBitrate is measured in kbps
      */
     maxBitrate: 3500,
   },
   // Other configuration . . .
});
```

Request Permissions

Your app must request permission to access the user's camera and microphone, and it must be served using HTTPS. (This is not specific to Amazon IVS; it is required for any website that needs access to cameras and microphones.)

Here's an example function showing how you can request and capture permissions for both audio and video devices:

```
async function handlePermissions() {
   let permissions = {
       audio: false,
       video: false,
   };
   try {
       const stream = await navigator.mediaDevices.getUserMedia({ video: true, audio:
 true });
       for (const track of stream.getTracks()) {
           track.stop();
```

```
        }
        permissions = { video: true, audio: true };
    } catch (err) {
        permissions = { video: false, audio: false };
        console.error(err.message);
    }
    // If we still don't have permissions after requesting them display the error
 message
    if (!permissions.video) {
        console.error('Failed to get video permissions.');
    } else if (!permissions.audio) {
        console.error('Failed to get audio permissions.');
    }
}
```

For additional information, see the Permissions API and MediaDevices.getUserMedia().

Set Up a Stream Preview

To preview what will be broadcast, provide the SDK with a `<canvas>` element.

```
// where #preview is an existing <canvas> DOM element on your page
const previewEl = document.getElementById('preview');
client.attachPreview(previewEl);
```

List Available Devices

To see what devices are available to capture, query the browser's MediaDevices.enumerateDevices() method:

```
const devices = await navigator.mediaDevices.enumerateDevices();
window.videoDevices = devices.filter((d) => d.kind === 'videoinput');
window.audioDevices = devices.filter((d) => d.kind === 'audioinput');
```

Retrieve a MediaStream from a Device

After acquiring the list of available devices, you can retrieve a stream from any number of devices. For example, you can use the `getUserMedia()` method to retrieve a stream from a camera.

If you'd like to specify which device to capture the stream from, you can explicitly set the `deviceId` in the `audio` or `video` section of the media constraints. Alternately, you can omit the `deviceId` and have users select their devices from the browser prompt.

You also can specify an ideal camera resolution using the `width` and `height` constraints. (Read more about these constraints here.) The SDK automatically applies width and height constraints that correspond to your maximum broadcast resolution; however, it's a good idea to also apply these yourself to ensure that the source aspect ratio is not changed after you add the source to the SDK.

```
const streamConfig = IVSBroadcastClient.BASIC_LANDSCAPE;
...
window.cameraStream = await navigator.mediaDevices.getUserMedia({
   video: {
       deviceId: window.videoDevices[0].deviceId,
       width: {
           ideal: streamConfig.maxResolution.width,
       },
       height: {
           ideal: streamConfig.maxResolution.height,
       },
   },
});
window.microphoneStream = await navigator.mediaDevices.getUserMedia({
   audio: { deviceId: window.audioDevices[0].deviceId },
});
```

Add Device to a Stream

After acquiring the stream, you may add devices to the layout by specifying a unique name (below, this is `camera1`) and composition position (for video). For example, by specifying your webcam device, you add your webcam video source to the broadcast stream.

When specifying the video-input device, you must specify the index, which represents the “layer” on which you want to broadcast. This is synonymous to image editing or CSS, where a z-index represents the ordering of layers to render. Optionally, you can provide a position, which defines the x/y coordinates (as well as the size) of the stream source.

For details on parameters, see VideoComposition.

```
client.addVideoInputDevice(window.cameraStream, 'camera1', { index: 0 }); // only
 'index' is required for the position parameter
client.addAudioInputDevice(window.microphoneStream, 'mic1');
```

Start a Broadcast

To start a broadcast, provide the stream key for your Amazon IVS channel:

```
client
   .startBroadcast(streamKey)
   .then((result) => {
       console.log('I am successfully broadcasting!');
   })
   .catch((error) => {
       console.error('Something drastically failed while broadcasting!', error);
   });
```

Stop a Broadcast

```
client.stopBroadcast();
```

Swap Video Positions

The client supports swapping the composition positions of video devices:

```
client.exchangeVideoDevicePositions('camera1', 'camera2');
```

Mute Audio

To mute audio, either remove the audio device using `removeAudioInputDevice` or set the `enabled` property on the audio track:

```
let audioStream = client.getAudioInputDevice(AUDIO_DEVICE_NAME);
audioStream.getAudioTracks()[0].enabled = false;
```

Where `AUDIO_DEVICE_NAME` is the name given to the original audio device during the `addAudioInputDevice()` call.

To unmute:

```
let audioStream = client.getAudioInputDevice(AUDIO_DEVICE_NAME);
audioStream.getAudioTracks()[0].enabled = true;
```

Hide Video

To hide video, either remove the video device using `removeVideoInputDevice` or set the `enabled` property on the video track:

```
let videoStream = client.getVideoInputDevice(VIDEO_DEVICE_NAME).source;
videoStream.getVideoTracks()[0].enabled = false;
```

Where `VIDEO_DEVICE_NAME` is the name given to the video device during the original `addVideoInputDevice()` call.

To unhide:

```
let videoStream = client.getVideoInputDevice(VIDEO_DEVICE_NAME).source;
videoStream.getVideoTracks()[0].enabled = true;
```

IVS Broadcast SDK: Android Guide | Low-Latency Streaming

The IVS Low-Latency Streaming Android Broadcast SDK provides the interfaces required to broadcast to IVS on Android.

The `com.amazonaws.ivs.broadcast` package implements the interface described in this document. The following operations are supported:

- Set up (initialize) a broadcast session.
- Manage broadcasting.
- Attach and detach input devices.
- Manage a composition session.
- Receive events.
- Receive errors.

Latest version of Android broadcast SDK: 1.47.0 (Release Notes)

Reference documentation: For information on the most important methods available in the Amazon IVS Android broadcast SDK, see the reference documentation at https://aws.github.io/amazon-ivs-broadcast-docs/1.47.0/android/.

Sample code: See the Android sample repository on GitHub: https://github.com/aws-samples/amazon-ivs-broadcast-android-sample.

Platform requirements: Android 9.0+

Getting Started with the IVS Android Broadcast SDK | Low-Latency Streaming

This document takes you through the steps involved in getting started with the Amazon IVS low-latency streaming Android broadcast SDK.

Install the Library

To add the Amazon IVS Android broadcast library to your Android development environment, add the library to your module's `build.gradle` file, as shown here (for the latest version of the Amazon IVS broadcast SDK):

```
repositories {
    mavenCentral()
}
dependencies {
     implementation 'com.amazonaws:ivs-broadcast:1.47.0'
}
```

Alternately, to install the SDK manually, download the latest version from this location:

https://search.maven.org/artifact/com.amazonaws/ivs-broadcast

Using the SDK with Debug Symbols

We also publish a version of the Android broadcast SDK which includes debug symbols. You can use this version to improve the quality of debug reports (stack traces) in Firebase Crashlytics, if you run into crashes in the IVS broadcast SDK; i.e., `libbroadcastcore.so`. When you report these crashes to the IVS SDK team, the higher quality stack traces make it easier to fix the issues.

To use this version of the SDK, put the following in your Gradle build files:

```
implementation "com.amazonaws:ivs-broadcast:$version:unstripped@aar"
```

Use the above line instead of this:

```
implementation "com.amazonaws:ivs-broadcast:$version@aar"
```

Uploading Symbols to Firebase Crashlytics

Ensure that your Gradle build files are set up for Firebase Crashlytics. Follow Google's instructions here:

https://firebase.google.com/docs/crashlytics/ndk-reports

Be sure to include `com.google.firebase:firebase-crashlytics-ndk` as a dependency.

When building your app for release, the Firebase Crashlytics plugin should upload symbols automatically. To upload symbols manually, run either of the following:

```
gradle uploadCrashlyticsSymbolFileRelease
```

```
./gradlew uploadCrashlyticsSymbolFileRelease
```

(It will not hurt if symbols are uploaded twice, both automatically and manually.)

Preventing your Release .apk from Becoming Larger

Before packaging the release `.apk` file, the Android Gradle Plugin automatically tries to strip debug information from shared libraries (including the IVS broadcast SDK's `libbroadcastcore.so` library). However, sometimes this does not happen. As a result, your `.apk` file could become larger and you could get a warning message from the Android Gradle Plugin that it's unable to strip debug symbols and is packaging `.so` files as is. If this happens, do the following:

- Install an Android NDK. Any recent version will work.
- Add `ndkVersion <your_installed_ndk_version_number>` to your application's `build.gradle` file. Do this even if your application itself does not contain native code.

For more information, see this issue report.

Create the Event Listener

Setting up an event listener allows you to receive state updates, device-change notifications, errors, and session-audio information.

```
BroadcastSession.Listener broadcastListener =
          new BroadcastSession.Listener() {
    @Override
    public void onStateChanged(@NonNull BroadcastSession.State state) {
        Log.d(TAG, "State=" + state);
    }

    @Override
    public void onError(@NonNull BroadcastException exception) {
        Log.e(TAG, "Exception: " + exception);
    }
};
```

Request Permissions

Your app must request permission to access the user's camera and mic. (This is not specific to Amazon IVS; it is required for any application that needs access to cameras and microphones.)

Here, we check whether the user has already granted permissions and, if not, ask for them:

```
final String[] requiredPermissions =
         { Manifest.permission.CAMERA, Manifest.permission.RECORD_AUDIO };

for (String permission : requiredPermissions) {
    if (ContextCompat.checkSelfPermission(this, permission)
                != PackageManager.PERMISSION_GRANTED) {
        // If any permissions are missing we want to just request them all.
        ActivityCompat.requestPermissions(this, requiredPermissions, 0x100);
        break;
    }
}
```

Here, we get the user's response:

```
@Override
public void onRequestPermissionsResult(int requestCode,
                                       @NonNull String[] permissions,
                                       @NonNull int[] grantResults) {
    super.onRequestPermissionsResult(requestCode,
            permissions, grantResults);
    if (requestCode == 0x100) {
        for (int result : grantResults) {
```

```
            if (result == PackageManager.PERMISSION_DENIED) {
                return;
            }
        }
        setupBroadcastSession();
    }
}
```

Create the Broadcast Session

The broadcast interface is `com.amazonaws.ivs.broadcast.BroadcastSession`. Initialize it with a preset, as shown below. If there are any errors during initialization (such as a failure to configure a codec) your `BroadcastListener` will get an error message and `broadcastSession.isReady` will be `false`.

Important: All calls to the Amazon IVS Broadcast SDK for Android *must* be made on the thread on which the SDK is instantiated. *A call from a different thread will cause the SDK to throw a fatal error and stop broadcasting*.

```
// Create a broadcast-session instance and sign up to receive broadcast
// events and errors.
Context ctx = getApplicationContext();
broadcastSession = new BroadcastSession(ctx,
                       broadcastListener,
                       Presets.Configuration.STANDARD_PORTRAIT,
                       Presets.Devices.FRONT_CAMERA(ctx));
```

Also see Create the Broadcast Session (Advanced Version) .

Set the ImagePreviewView for Preview

If you want to display a preview for an active camera device, add a preview `ImagePreviewView` for the device to your view hierarchy.

```
// awaitDeviceChanges will fire on the main thread after all pending devices
// attachments have been completed
broadcastSession.awaitDeviceChanges(() -> {
    for(Device device: session.listAttachedDevices()) {
        // Find the camera we attached earlier
        if(device.getDescriptor().type == Device.Descriptor.DeviceType.CAMERA) {
            LinearLayout previewHolder = findViewById(R.id.previewHolder);
```

```
            ImagePreviewView preview = ((ImageDevice)device).getPreviewView();
            preview.setLayoutParams(new LinearLayout.LayoutParams(
                    LinearLayout.LayoutParams.MATCH_PARENT,
                    LinearLayout.LayoutParams.MATCH_PARENT));
            previewHolder.addView(preview);
        }
    }
});
```

Start a Broadcast

The hostname that you receive in the `ingestEndpoint` response field of the `GetChannel` operation needs to have `rtmps://` prepended and `/app` appended. The complete URL should be in this format: `rtmps://{{ ingestEndpoint }}/app`

```
broadcastSession.start(IVS_RTMPS_URL, IVS_STREAMKEY);
```

The Android broadcast SDK supports only RTMPS ingest (not insecure RTMP ingest).

Stop a Broadcast

```
broadcastSession.stop();
```

Release the Broadcast Session

You *must call* the `broadcastSession.release()` method when the broadcast session is no longer in use, to free the resources used by the library.

```
@Override
protected void onDestroy() {
    super.onDestroy();
    previewHolder.removeAllViews();
    broadcastSession.release();
}
```

Advanced Use Cases for the IVS Android Broadcast SDK | Low-Latency Streaming

Here we present some advanced use cases. Start with the basic setup above and continue here.

Create a Broadcast Configuration

Here we create a custom configuration with two mixer slots that allow us to bind two video sources to the mixer. One (`custom`) is full screen and laid out behind the other (`camera`), which is smaller and in the bottom-right corner. Note that for the `custom` slot we do not set a position, size, or aspect mode. Because we do not set these parameters, the slot will use the video settings for size and position.

```
BroadcastConfiguration config = BroadcastConfiguration.with($ -> {
    $.audio.setBitrate(128_000);
    $.video.setMaxBitrate(3_500_000);
    $.video.setMinBitrate(500_000);
    $.video.setInitialBitrate(1_500_000);
    $.video.setSize(1280, 720);
    $.mixer.slots = new BroadcastConfiguration.Mixer.Slot[] {
            BroadcastConfiguration.Mixer.Slot.with(slot -> {
                // Do not automatically bind to a source
                slot.setPreferredAudioInput(
                          Device.Descriptor.DeviceType.UNKNOWN);
                // Bind to user image if unbound
                slot.setPreferredVideoInput(
                          Device.Descriptor.DeviceType.USER_IMAGE);
                slot.setName("custom");
                return slot;
            }),
            BroadcastConfiguration.Mixer.Slot.with(slot -> {
                slot.setzIndex(1);
                slot.setAspect(BroadcastConfiguration.AspectMode.FILL);
                slot.setSize(300, 300);
                slot.setPosition($.video.getSize().x - 350,
                        $.video.getSize().y - 350);
                slot.setName("camera");
                return slot;
            })
    };
    return $;
});
```

Create the Broadcast Session (Advanced Version)

Create a `BroadcastSession` as you did in the basic example, but provide your custom configuration here. Also provide `null` for the device array, as we will add those manually.

```
// Create a broadcast-session instance and sign up to receive broadcast
// events and errors.
Context ctx = getApplicationContext();
broadcastSession = new BroadcastSession(ctx,
                       broadcastListener,
                       config, // The configuration we created above
                       null); // We'll manually attach devices after
```

Iterate and Attach a Camera Device

Here we iterate through input devices that the SDK has detected. On Android 7 (Nougat) this will only return default microphone devices, because the Amazon IVS Broadcast SDK does not support selecting non-default devices on this version of Android.

Once we find a device that we want to use, we call `attachDevice` to attach it. A lambda function is called on the main thread when attaching the input device has completed. In case of failure, you will receive an error in the Listener.

```
for(Device.Descriptor desc:
 BroadcastSession.listAvailableDevices(getApplicationContext())) {
    if(desc.type == Device.Descriptor.DeviceType.CAMERA &&
            desc.position == Device.Descriptor.Position.FRONT) {
        session.attachDevice(desc, device -> {
            LinearLayout previewHolder = findViewById(R.id.previewHolder);
            ImagePreviewView preview = ((ImageDevice)device).getPreviewView();
            preview.setLayoutParams(new LinearLayout.LayoutParams(
                    LinearLayout.LayoutParams.MATCH_PARENT,
                    LinearLayout.LayoutParams.MATCH_PARENT));
            previewHolder.addView(preview);
            // Bind the camera to the mixer slot we created above.
            session.getMixer().bind(device, "camera");
        });
        break;
    }
}
```

Swap Cameras

```
// This assumes you've kept a reference called "currentCamera" that points to
// a front facing camera
for(Device device: BroadcastSession.listAvailableDevices()) {
```

```
   if(device.type == Device.Descriptor.DeviceType.CAMERA &&
          Device.position != currentCamera.position) {
        // Remove the preview view for the old device.
        // setImagePreviewTextureView is an example function
        // that handles your view hierarchy.
        setImagePreviewView(null);
        session.exchangeDevices(currentCamera, device, camera -> {
             // Set the preview view for the new device.
             setImagePreviewView(camera.getPreviewView());
             currentCamera = camera;
        });
        break;
   }
}
```

Create an Input Surface

To input sound or image data that your app generates, use `createImageInputSource` or `createAudioInputSource`. Both these methods create and attach virtual devices that can be bound to the mixer like any other device.

The `SurfaceSource` returned by `createImageInputSource` has a `getInputSurface` method, which will give you a `Surface` that you can use with the Camera2 API, OpenGL, or Vulkan, or anything else that can write to a Surface.

The `AudioDevice` returned by `createAudioInputSource` can receive Linear PCM data generated by AudioRecorder or other means.

```
SurfaceSource source = session.createImageInputSource();
Surface surface = source.getInputSurface();
session.getMixer().bind(source, “custom”);
```

Detach a Device

If you want to detach and not replace a device, detach it with `Device` or `Device.Descriptor`.

```
session.detachDevice(currentCamera);
```

Screen and System Audio Capture

The Amazon IVS Broadcast SDK for Android includes some helpers that simplify capturing the device's screen (Android 6 and higher) and system audio (Android 10 and higher). If you want to manage these manually, you can create a custom image-input source and a custom audio-input source.

To create a screen and system audio-capture session, you must first create a permission-request intent:

```
public void startScreenCapture() {
    MediaProjectionManager manager =
                        (MediaProjectionManager) getApplicationContext()
                        .getSystemService(Context.MEDIA_PROJECTION_SERVICE);
    if(manager != null) {
        Intent intent = manager.createScreenCaptureIntent();
        startActivityIfNeeded(intent, SCREEN_CAPTURE_REQUEST_ID);
    }
}
```

To use this feature, you must provide a class that extends `com.amazonaws.ivs.broadcast.SystemCaptureService`. You do not have to override any of its methods, but the class needs to be there to avoid any potential collisions between services.

You also must add a couple of elements to your Android manifest:

```
<uses-permission android:name="android.permission.FOREGROUND_SERVICE" />
<application ...>
    <service android:name=".ExampleSystemCaptureService"
         android:foregroundServiceType="mediaProjection"
         android:isolatedProcess="false" />
</application>
...
```

Your class that extends `SystemCaptureService` must be named in the `<service>` element. On Android 9 and later, the `foregroundServiceType` must be `mediaProjection`.

Once the permissions intent has returned, you may proceed with creating the screen and system audio-capture session. On Android 8 and later, you must provide a notification to be displayed in your user's Notification Panel. The Amazon IVS Broadcast SDK for Android provides the

convenience method `createServiceNotificationBuilder`. Alternately, you may provide your own notification.

```
@Override
protected void onActivityResult(int requestCode, int resultCode, Intent data) {
    super.onActivityResult(requestCode, resultCode, data);
    if(requestCode != SCREEN_CAPTURE_REQUEST_ID
       || Activity.RESULT_OK != resultCode) {
        return;
    }
    Notification notification = null;
    if(Build.VERSION.SDK_INT >= 26) {
        Intent intent = new Intent(getApplicationContext(),
                                   NotificationActivity.class);
        notification = session
                        .createServiceNotificationBuilder("example",
                                          "example channel", intent)
                        .build();
    }
    session.createSystemCaptureSources(data,
                 ExampleSystemCaptureService.class,
                 Notification,
                 devices -> {
        // This step is optional if the mixer slots have been given preferred
        // input device types SCREEN and SYSTEM_AUDIO
        for (Device device : devices) {
            session.getMixer().bind(device, "game");
        }
    });
}
```

Get Recommended Broadcast Settings

To evaluate your user's connection before starting a broadcast, use the `recommendedVideoSettings` method to run a brief test. As the test runs, you will receive several recommendations, ordered from most to least recommended. In this version of the SDK, it is not possible to reconfigure the current `BroadcastSession`, so you will need to `release()` it and then create a new one with the recommended settings. You will continue to receive `BroadcastSessionTest.Results` until the `Result.status` is SUCCESS or ERROR. You can check progress with `Result.progress`.

Amazon IVS supports a maximum bitrate of 8.5 Mbps (for channels whose `type` is `STANDARD` or `ADVANCED`), so the `maximumBitrate` returned by this method never exceeds 8.5 Mbps. To account for small fluctuations in network performance, the recommended `initialBitrate` returned by this method is slightly less than the true bitrate measured in the test. (Using 100% of the available bandwidth usually is inadvisable.)

```
void runBroadcastTest() {
    this.test = session.recommendedVideoSettings(RTMPS_ENDPOINT, RTMPS_STREAMKEY,
        result -> {
            if (result.status == BroadcastSessionTest.Status.SUCCESS) {
                this.recommendation = result.recommendations[0];
            }
        });
}
```

Using Auto-Reconnect

IVS supports automatic reconnection to a broadcast if the broadcast stops unexpectedly without calling the `stop` API; e.g., a temporary loss in network connectivity. To enable auto-reconnect, call `setEnabled(true)` on `BroadcastConfiguration.autoReconnect`.

When something causes the stream to unexpectedly stop, the SDK retries up to 5 times, following a linear backoff strategy. It notifies your application about the retry state through the `BroadcastSession.Listener.onRetryStateChanged` method.

Behind the scenes, auto-reconnect uses IVS stream-takeover functionality by appending a priority number, starting with 1, to the end of the provided stream key. For the duration of the `BroadcastSession` instance, that number is incremented by 1 each time a reconnect is attempted. This means if the device's connection is lost 4 times during a broadcast, and each loss requires 1-4 retry attempts, the priority of the last stream up could be anywhere between 5 and 17. Because of this, *we recommend you do not use IVS stream takeover from another device while auto-reconnect is enabled in the SDK for the same channel*. There are no guarantees what priority the SDK is using at the time, and the SDK will try to reconnect with a higher priority if another device takes over.

Using Bluetooth Microphones

To broadcast using Bluetooth microphone devices, you must start a Bluetooth SCO connection:

```
Bluetooth.startBluetoothSco(context);
```

```
// Now bluetooth microphones can be used
…
// Must also stop bluetooth SCO
Bluetooth.stopBluetoothSco(context);
```

IVS Broadcast SDK: iOS Guide | Low-Latency Streaming

The IVS Low-Latency Streaming iOS Broadcast SDK provides the interfaces required to broadcast to Amazon IVS on iOS.

The `AmazonIVSBroadcast` module implements the interface described in this document. The following operations are supported:

- Set up (initialize) a broadcast session.
- Manage broadcasting.
- Attach and detach input devices.
- Manage a composition session.
- Receive events.
- Receive errors.

Latest version of iOS broadcast SDK: 1.47.0 (Release Notes)

Reference documentation: For information on the most important methods available in the Amazon IVS iOS broadcast SDK, see the reference documentation at https://aws.github.io/amazon-ivs-broadcast-docs/1.47.0/ios/.

Sample code: See the iOS sample repository on GitHub: https://github.com/aws-samples/amazon-ivs-broadcast-ios-sample.

Platform requirements: iOS 14+

How iOS Chooses Camera Resolution and Frame Rate

The camera managed by the broadcast SDK optimizes its resolution and frame rate (frames-per-second, or FPS) to minimize heat production and energy consumption. This section explains how the resolution and frame rate are selected to help host applications optimize for their use cases.

When attaching an `IVSCamera` to an `IVSBroadcastSession`, the camera is optimized for a frame rate of `IVSVideoConfiguration.targetFramerate` and a resolution of `IVSVideoConfiguration.size`. These values are provided to the `IVSBroadcastSession` on initialization.

Getting Started with the IVS iOS Broadcast SDK | Low-Latency Streaming

This document takes you through the steps involved in getting started with the Amazon IVS low-latency streaming iOS broadcast SDK.

Install the Library

We recommend that you integrate broadcast SDK via Swift Package Manager. (Alternatively, you can manually add the framework to your project.)

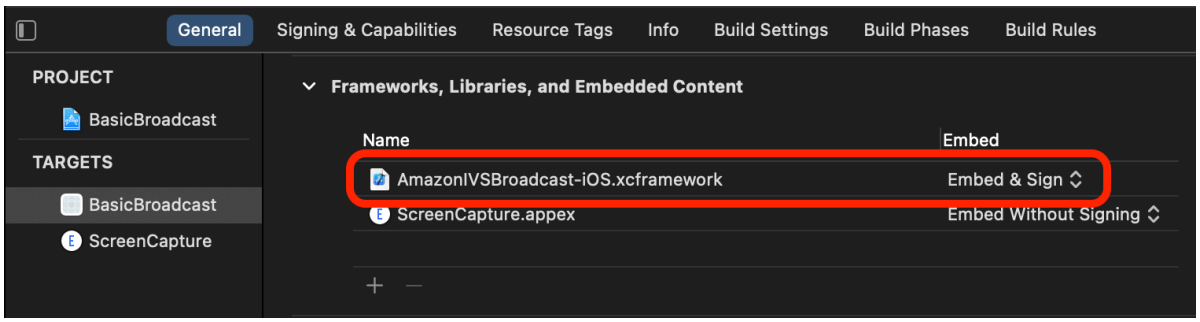
Recommended: Integrate the Broadcast SDK (Swift Package Manager)

1. Download the Package.swift file from https://broadcast.live-video.net/1.47.0/Package.swift.
2. In your project, create a new directory named AmazonIVSBroadcast and add it to version control.
3. Place the downloaded Package.swift file in the new directory.
4. In Xcode, go to **File > Add Package Dependencies** and select **Add Local...**
5. Navigate to and select the AmazonIVSBroadcast directory that you created, and select **Add Package**.
6. When prompted to **Choose Package Products for AmazonIVSBroadcast**, select **AmazonIVSBroadcast** as your **Package Product** by setting your application target in the **Add to Target** section.
7. Select **Add Package**.

Alternate Approach: Install the Framework Manually

1. Download the latest version from https://broadcast.live-video.net/1.47.0/AmazonIVSBroadcast.xcframework.zip.
2. Extract the contents of the archive. `AmazonIVSBroadcast.xcframework` contains the SDK for both device and simulator.

3. Embed `AmazonIVSBroadcast.xcframework` by dragging it into the **Frameworks, Libraries, and Embedded Content** section of the **General** tab for your application target.



Implement IVSBroadcastSession.Delegate

Implement `IVSBroadcastSession.Delegate`, which allows you to receive state updates and device-change notifications:

```
extension ViewController : IVSBroadcastSession.Delegate {
   func broadcastSession(_ session: IVSBroadcastSession,
                         didChange state: IVSBroadcastSession.State) {
      print("IVSBroadcastSession did change state \(state)")
   }

   func broadcastSession(_ session: IVSBroadcastSession,
                         didEmitError error: Error) {
      print("IVSBroadcastSession did emit error \(error)")
   }
}
```

Request Permissions

Your app must request permission to access the user's camera and mic. (This is not specific to Amazon IVS; it is required for any application that needs access to cameras and microphones.)

Here, we check whether the user has already granted permissions and, if not, we ask for them:

```
switch AVCaptureDevice.authorizationStatus(for: .video) {
case .authorized: // permission already granted.
case .notDetermined:
   AVCaptureDevice.requestAccess(for: .video) { granted in
       // permission granted based on granted bool.
   }
```

```
case .denied, .restricted: // permission denied.
@unknown default: // permissions unknown.
}
```

You need to do this for both `.video` and `.audio` media types, if you want access to cameras and microphones, respectively.

You also need to add entries for `NSCameraUsageDescription` and `NSMicrophoneUsageDescription` to your `Info.plist`. Otherwise, your app will crash when trying to request permissions.

Disable the Application Idle Timer

This is optional but recommended. It prevents your device from going to sleep while using the broadcast SDK, which would interrupt the broadcast.

```
override func viewDidAppear(_ animated: Bool) {
   super.viewDidAppear(animated)
   UIApplication.shared.isIdleTimerDisabled = true
}
override func viewDidDisappear(_ animated: Bool) {
   super.viewDidDisappear(animated)
   UIApplication.shared.isIdleTimerDisabled = false
}
```

(Optional) Set Up AVAudioSession

By default, the broadcast SDK will set up your application's `AVAudioSession`. If you want to manage this yourself, set `IVSBroadcastSession.applicationAudioSessionStrategy` to `noAction`. Without control of the `AVAudioSession`, the broadcast SDK cannot manage microphones internally. To use microphones with the `noAction` option, you can create an `IVSCustomAudioSource` and provide your own samples via an `AVCaptureSession`, `AVAudioEngine` or another tool that provides PCM audio samples.

If you are manually setting up your `AVAudioSession`, at a minimum you need to set the category as `.record` or `.playbackAndRecord`, and set it to `active`. If you want to record audio from Bluetooth devices, you need to specify the `.allowBluetooth` option as well:

```
do {
   try AVAudioSession.sharedInstance().setCategory(.record, options: .allowBluetooth)
```

```
   try AVAudioSession.sharedInstance().setActive(true)
} catch {
   print("Error configuring AVAudioSession")
}
```

We recommend that you let the SDK handle this for you. Otherwise, if you want to choose between different audio devices, you will need to manually manage the ports.

Create the Broadcast Session

The broadcast interface is `IVSBroadcastSession`. Initialize it as shown below:

```
let broadcastSession = try IVSBroadcastSession(
   configuration: IVSPresets.configurations().standardLandscape(),
   descriptors: IVSPresets.devices().frontCamera(),
   delegate: self)
```

Also see Create the Broadcast Session (Advanced Version)

Set the IVSImagePreviewView for Preview

If you want to display a preview for an active camera device, add the preview `IVSImagePreviewView` for the device to your view hierarchy:

```
// If the session was just created, execute the following
// code in the callback of IVSBroadcastSession.awaitDeviceChanges
// to ensure all devices have been attached.
if let devicePreview = try broadcastSession.listAttachedDevices()
   .compactMap({ $0 as? IVSImageDevice })
   .first?
   .previewView()
{
   previewView.addSubview(devicePreview)
}
```

Start a Broadcast

The hostname that you receive in the `ingestEndpoint` response field of the `GetChannel` operation needs to have `rtmps://` prepended and `/app` appended. The complete URL should be in this format: `rtmps://{{ ingestEndpoint }}/app`

```
try broadcastSession.start(with: IVS_RTMPS_URL, streamKey: IVS_STREAMKEY)
```

The iOS broadcast SDK supports only RTMPS ingest (not insecure RTMP ingest).

Stop a Broadcast

```
broadcastSession.stop()
```

Manage Lifecycle Events

Audio Interruptions

There are several scenarios where the broadcast SDK will not have exclusive access to audio-input hardware. Some example scenarios that you need to handle are:

- User receives a phone call or FaceTime call
- User activates Siri

Apple makes it easy to respond to these events by subscribing to `AVAudioSession.interruptionNotification`:

```
NotificationCenter.default.addObserver(
   self,
   selector: #selector(audioSessionInterrupted(_:)),
   name: AVAudioSession.interruptionNotification,
   object: nil)
```

Then you can handle the event with something like this:

```
// This assumes you have a variable `isRunning` which tracks if the broadcast is
 currently live, and another variable `wasRunningBeforeInterruption` which tracks
 whether the broadcast was active before this interruption to determine if it should
 resume after the interruption has ended.

@objc
private func audioSessionInterrupted(_ notification: Notification) {
   guard let userInfo = notification.userInfo,
         let typeValue = userInfo[AVAudioSessionInterruptionTypeKey] as? UInt,
         let type = AVAudioSession.InterruptionType(rawValue: typeValue)
   else {
```

```
      return
   }
   switch type {
   case .began:
      wasRunningBeforeInterruption = isRunning
      if isRunning {
         broadcastSession.stop()
      }
   case .ended:
      defer {
         wasRunningBeforeInterruption = false
      }
      guard let optionsValue = userInfo[AVAudioSessionInterruptionOptionKey] as? UInt
 else { return }
      let options = AVAudioSession.InterruptionOptions(rawValue: optionsValue)
      if options.contains(.shouldResume) && wasRunningBeforeInterruption {
         try broadcastSession.start(
            with: IVS_RTMPS_URL,
            streamKey: IVS_STREAMKEY)
      }
   @unknown default: break
   }
}
```

App Going Into Background

Standard applications on iOS are not allowed to use cameras in the background. There also are restrictions on video encoding in the background: since hardware encoders are limited, only foreground applications have access. Because of this, the broadcast SDK automatically terminates its session and sets its `isReady` property to `false`. When your application is about to enter the foreground again, the broadcast SDK reattaches all the devices to their original `IVSMixerSlotConfiguration` entries.

The broadcast SDK does this by responding to `UIApplication.didEnterBackgroundNotification` and `UIApplication.willEnterForegroundNotification`.

If you are providing custom image sources, you should be prepared to handle these notifications. You may need to take extra steps to tear them down before the stream is terminated.

See Use Background Video for a workaround that enables streaming while your application is in the background.

Media Services Lost

In very rare cases, the entire media subsystem on an iOS device will crash. In this scenario, we can no longer broadcast. It is up to your application to respond to these notifications appropriately. At a minimum, subscribe to these notifications:

- mediaServicesWereLostNotification — Respond by stopping your broadcast and completely deallocating your `IVSBroadcastSession` . All internal components used by the broadcast session will be invalidated.
- mediaServicesWereResetNotification — Respond by notifying your users that they can broadcast again. Depending on your use case, you may be able to automatically start broadcasting again at this point.

Advanced Use Cases for the IVS iOS Broadcast SDK | Low-Latency Streaming

Here we present some advanced use cases. Start with the basic setup above and continue here.

Create a Broadcast Configuration

Here we create a custom configuration with two mixer slots that allow us to bind two video sources to the mixer. One (`custom`) is full screen and laid out behind the other (`camera`), which is smaller and in the bottom-right corner. Note that for the `custom` slot we do not set a position, size, or aspect mode. Because we do not set these parameters, the slot uses the video settings for size and position.

```
let config = IVSBroadcastConfiguration()
try config.audio.setBitrate(128_000)
try config.video.setMaxBitrate(3_500_000)
try config.video.setMinBitrate(500_000)
try config.video.setInitialBitrate(1_500_000)
try config.video.setSize(CGSize(width: 1280, height: 720))
config.video.defaultAspectMode = .fit
config.mixer.slots = [
    try {
        let slot = IVSMixerSlotConfiguration()
        // Do not automatically bind to a source
        slot.preferredAudioInput = .unknown
        // Bind to user image if unbound
```

```
        slot.preferredVideoInput = .userImage
        try slot.setName("custom")
        return slot
    }(),
    try {
        let slot = IVSMixerSlotConfiguration()
        slot.zIndex = 1
        slot.aspect = .fill
        slot.size = CGSize(width: 300, height: 300)
        slot.position = CGPoint(x: config.video.size.width - 400, y:
 config.video.size.height - 400)
        try slot.setName("camera")
        return slot
    }()
]
```

Create the Broadcast Session (Advanced Version)

Create an `IVSBroadcastSession` as you did in the basic example, but provide your custom configuration here. Also provide `nil` for the device array, as we will add those manually.

```
let broadcastSession = try IVSBroadcastSession(
   configuration: config, // The configuration we created above
   descriptors: nil, // We'll manually attach devices after
   delegate: self)
```

Iterate and Attach a Camera Device

Here we iterate through input devices that the SDK has detected. The SDK will only return built-in devices on iOS. Even if Bluetooth audio devices are connected, they will appear as a built-in device.

Once we find a device that we want to use, we call `attachDevice` to attach it:

```
let frontCamera = IVSBroadcastSession.listAvailableDevices()
    .filter { $0.type == .camera && $0.position == .front }
    .first
if let camera = frontCamera {
    broadcastSession.attach(camera, toSlotWithName: "camera") { device, error in
        // check error
    }
}
```

Swap Cameras

```
// This assumes you've kept a reference called `currentCamera` that points to the
 current camera.
let wants: IVSDevicePosition = (currentCamera.descriptor().position
 == .front) ? .back : .front
// Remove the current preview view since the device will be changing.
previewView.subviews.forEach { $0.removeFromSuperview() }
let foundCamera = IVSBroadcastSession
        .listAvailableDevices()
        .first { $0.type == .camera && $0.position == wants }
guard let newCamera = foundCamera else { return }
broadcastSession.exchangeOldDevice(currentCamera, withNewDevice: newCamera)
 { newDevice, _ in
    currentCamera = newDevice
    if let camera = newDevice as? IVSImageDevice {
        do {
            previewView.addSubview(try finalCamera.previewView())
        } catch {
            print("Error creating preview view \(error)")
        }
    }
}
```

Create a Custom Input Source

To input sound or image data that your app generates, use `createImageSource` or `createAudioSource`. Both these methods create virtual devices (`IVSCustomImageSource` and `IVSCustomAudioSource`) that can be bound to the mixer like any other device.

The devices returned by both these methods accept a `CMSampleBuffer` through its `onSampleBuffer` function:

- For video sources, the pixel format must be `kCVPixelFormatType_32BGRA`, `420YpCbCr8BiPlanarFullRange`, or `420YpCbCr8BiPlanarVideoRange`.
- For audio sources, the buffer must contain Linear PCM data.

You cannot use an `AVCaptureSession` with camera input to feed a custom image source while also using a camera device provided by the broadcast SDK. If you want to use multiple cameras simultaneously, use `AVCaptureMultiCamSession` and provide two custom image sources.

Custom image sources primarily should be used with static content such as images, or with video content:

```
let customImageSource = broadcastSession.createImageSource(withName: "video")
try broadcastSession.attach(customImageSource, toSlotWithName: "custom")
```

Monitor Network Connectivity

It is common for mobile devices to temporarily lose and regain network connectivity while on the go. Because of this, it is important to monitor your app's network connectivity and respond appropriately when things change.

When the broadcaster's connection is lost, the broadcast SDK's state will change to `error` and then `disconnected`. You will be notified of these changes through the `IVSBroadcastSessionDelegate`. When you receive these state changes:

1. Monitor your broadcast app's connectivity state and call `start` with your endpoint and stream key, once your connection has been restored.
2. **Important:** Monitor the state delegate callback and ensure that the state changes to `connected` after calling `start` again.

Detach a Device

If you want to detach and not replace a device, detach it with `IVSDevice` or `IVSDeviceDescriptor`:

```
broadcastSession.detachDevice(currentCamera)
```

ReplayKit Integration

To stream the device's screen and system audio on iOS, you must integrate with ReplayKit. The Amazon IVS broadcast SDK makes it easy to integrate ReplayKit using `IVSReplayKitBroadcastSession`. In your `RPBroadcastSampleHandler` subclass, create an instance of `IVSReplayKitBroadcastSession`, then:

- Start the session in `broadcastStarted`
- Stop the session in `broadcastFinished`

The session object will have three custom sources for screen images, app audio, and microphone audio. Pass the `CMSampleBuffers` provided in `processSampleBuffer` to those custom sources.

To handle device orientation, you need to extract ReplayKit-specific metadata from the sample buffer. Use the following code:

```
let imageSource = session.systemImageSource;
if let orientationAttachment = CMGetAttachment(sampleBuffer, key:
 RPVideoSampleOrientationKey as CFString, attachmentModeOut: nil) as? NSNumber,
    let orientation = CGImagePropertyOrientation(rawValue:
 orientationAttachment.uint32Value) {
    switch orientation {
    case .up, .upMirrored:
        imageSource.setHandsetRotation(0)
    case .down, .downMirrored:
        imageSource.setHandsetRotation(Float.pi)
    case .right, .rightMirrored:
        imageSource.setHandsetRotation(-(Float.pi / 2))
    case .left, .leftMirrored:
        imageSource.setHandsetRotation((Float.pi / 2))
    }
}
```

It is possible to integrate ReplayKit using `IVSBroadcastSession` instead of `IVSReplayKitBroadcastSession`. However, the ReplayKit-specific variant has several modifications to reduce the internal memory footprint, to stay within Apple's memory ceiling for broadcast extensions.

Get Recommended Broadcast Settings

To evaluate your user's connection before starting a broadcast, use `IVSBroadcastSession.recommendedVideoSettings` to run a brief test. As the test runs, you will receive several recommendations, ordered from most to least recommended. In this version of the SDK, it is not possible to reconfigure the current `IVSBroadcastSession`, so you must deallocate it and then create a new one with the recommended settings. You will continue to receive `IVSBroadcastSessionTestResults` until the `result.status` is `Success` or `Error`. You can check progress with `result.progress`.

Amazon IVS supports a maximum bitrate of 8.5 Mbps (for channels whose `type` is `STANDARD` or `ADVANCED`), so the `maximumBitrate` returned by this method never exceeds 8.5 Mbps. To account

for small fluctuations in network performance, the recommended `initialBitrate` returned by this method is slightly less than the true bitrate measured in the test. (Using 100% of the available bandwidth usually is inadvisable.)

```
func runBroadcastTest() {
    self.test = session.recommendedVideoSettings(with: IVS_RTMPS_URL, streamKey:
 IVS_STREAMKEY) { [weak self] result in
        if result.status == .success {
            self?.recommendation = result.recommendations[0];
        }
    }
}
```

Using Auto-Reconnect

IVS supports automatic reconnection to a broadcast if the broadcast stops unexpectedly without calling the `stop` API; e.g., a temporary loss in network connectivity. To enable auto-reconnect, set the `enabled` property on `IVSBroadcastConfiguration.autoReconnect` to `true`.

When something causes the stream to unexpectedly stop, the SDK retries up to 5 times, following a linear backoff strategy. It notifies your application about the retry state through the `IVSBroadcastSessionDelegate.didChangeRetryState` function.

Behind the scenes, auto-reconnect uses IVS stream-takeover functionality by appending a priority number, starting with 1, to the end of the provided stream key. For the duration of the `IVSBroadcastSession` instance, that number is incremented by 1 each time a reconnect is attempted. This means if the device's connection is lost 4 times during a broadcast, and each loss requires 1-4 retry attempts, the priority of the last stream up could be anywhere between 5 and 17. Because of this, *we recommend you do not use IVS stream takeover from another device while auto-reconnect is enabled in the SDK for the same channel*. There are no guarantees what priority the SDK is using at the time, and the SDK will try to reconnect with a higher priority if another device takes over.

Use Background Video

You can continue a non-RelayKit broadcast, even with your application in the background.

To save power and keep foreground applications responsive, iOS gives only one application at a time access to the GPU. The Amazon IVS Broadcast SDK uses the GPU at multiple stages of the video pipeline, including compositing multiple input sources, scaling the image, and encoding the

image. While the broadcasting application is in the background, there is no guarantee that the SDK can perform any of these actions.

To address this, use the `createAppBackgroundImageSource` method. It enables the SDK to continue broadcasting both video and audio while in the background. It returns an `IVSBackgroundImageSource`, which is a normal `IVSCustomImageSource` with an additional `finish` function. Every `CMSampleBuffer` provided to the background image source is encoded at the frame rate provided by your original `IVSVideoConfiguration`. Timestamps on the `CMSampleBuffer` are ignored.

The SDK then scales and encodes those images and caches them, automatically looping that feed when your application goes into the background. When your application returns to the foreground, the attached image devices become active again and the pre-encoded stream stops looping.

To undo this process, use `removeImageSourceOnAppBackgrounded`. You do not have to call this unless you want to explicitly revert the SDK's background behavior; otherwise, it is cleaned up automatically on deallocation of the `IVSBroadcastSession`.

Notes: *We strongly recommend that you call this method as part of configuring the broadcast session, before the session goes live.* The method is expensive (it encodes video), so performance of a live broadcast while this method is running may be degraded.

Example: Generating a Static Image for Background Video

Providing a single image to the background source generates a full GOP of that static image.

Here is an example using CIImage:

```
// Create the background image source
guard let source = session.createAppBackgroundImageSource(withAttemptTrim: true,
 onComplete: { error in
    print("Background Video Generation Done - Error: \(error.debugDescription)")
}) else {
    return
}

// Create a CIImage of the color red.
let ciImage = CIImage(color: .red)

// Convert the CIImage to a CVPixelBuffer
let attrs = [
    kCVPixelBufferCGImageCompatibilityKey: kCFBooleanTrue,
```

```
    kCVPixelBufferCGBitmapContextCompatibilityKey: kCFBooleanTrue,
    kCVPixelBufferMetalCompatibilityKey: kCFBooleanTrue,
] as CFDictionary

var pixelBuffer: CVPixelBuffer!
CVPixelBufferCreate(kCFAllocatorDefault,
                    videoConfig.width,
                    videoConfig.height,
                    kCVPixelFormatType_420YpCbCr8BiPlanarFullRange,
                    attrs,
                    &pixelBuffer)

let context = CIContext()
context.render(ciImage, to: pixelBuffer)

// Submit to CVPixelBuffer and finish the source
source.add(pixelBuffer)
source.finish()
```

Alternately, instead of creating a CIImage of a solid color, you can use bundled images. The only code shown here is how to convert a UIImage to a CIImage to use with the previous sample:

```
// Load the pre-bundled image and get it’s CGImage
guard let cgImage = UIImage(named: "image")?.cgImage else {
    return
}

// Create a CIImage from the CGImage
let ciImage = CIImage(cgImage: cgImage)
```

Example: Video with AVAssetImageGenerator

You can use an `AVAssetImageGenerator` to generate `CMSampleBuffers` from an `AVAsset` (though not an HLS stream `AVAsset`):

```
// Create the background image source
guard let source = session.createAppBackgroundImageSource(withAttemptTrim: true,
 onComplete: { error in
    print("Background Video Generation Done - Error: \(error.debugDescription)")
}) else {
    return
}
```

```
// Find the URL for the pre-bundled MP4 file
guard let url = Bundle.main.url(forResource: "sample-clip", withExtension: "mp4") else
 {
    return
}
// Create an image generator from an asset created from the URL.
let generator = AVAssetImageGenerator(asset: AVAsset(url: url))
// It is important to specify a very small time tolerance.
generator.requestedTimeToleranceAfter = .zero
generator.requestedTimeToleranceBefore = .zero

// At 30 fps, this will generate 4 seconds worth of samples.
let times: [NSValue] = (0...120).map { NSValue(time: CMTime(value: $0, timescale:
 CMTimeScale(config.video.targetFramerate))) }
var completed = 0

let context = CIContext(options: [.workingColorSpace: NSNull()])

// Create a pixel buffer pool to efficiently feed the source
let attrs = [
    kCVPixelBufferPixelFormatTypeKey: kCVPixelFormatType_420YpCbCr8BiPlanarFullRange,
    kCVPixelBufferCGImageCompatibilityKey: kCFBooleanTrue,
    kCVPixelBufferCGBitmapContextCompatibilityKey: kCFBooleanTrue,
    kCVPixelBufferMetalCompatibilityKey: kCFBooleanTrue,
    kCVPixelBufferWidthKey: videoConfig.width,
    kCVPixelBufferHeightKey: videoConfig.height,
] as CFDictionary
var pool: CVPixelBufferPool!
CVPixelBufferPoolCreate(kCFAllocatorDefault, nil, attrs, &pool)

generator.generateCGImagesAsynchronously(forTimes: times) { requestTime, image,
 actualTime, result, error in
    if let image = image {
        // convert to CIImage then CVpixelBuffer
        let ciImage = CIImage(cgImage: image)
        var pixelBuffer: CVPixelBuffer!
        CVPixelBufferPoolCreatePixelBuffer(kCFAllocatorDefault, pool, &pixelBuffer)
        context.render(ciImage, to: pixelBuffer)
        source.add(pixelBuffer)
    }
    completed += 1
    if completed == times.count {
        // Mark the source finished when all images have been processed
        source.finish()
```

```
    }
}
```

It is possible to generate `CVPixelBuffers` using an `AVPlayer` and `AVPlayerItemVideoOutput`. However, that requires using a `CADisplayLink` and executes closer to real-time, while `AVAssetImageGenerator` can process the frames much faster.

Limitations

Your application needs the background audio entitlement to avoid getting suspended after going into the background.

`createAppBackgroundImageSource` can be called only while your application is in the foreground, since it needs access to the GPU to complete.

`createAppBackgroundImageSource` always encodes to a full GOP. For example, if you have a keyframe interval of 2 seconds (the default) and are running at 30 fps, it encodes a multiple of 60 frames.

- If fewer than 60 frames are provided, the last frame is repeated until 60 frames are reached, regardless of the trim option's value.
- If more than 60 frames are provided and the trim option is `true`, the last N frames are dropped, where N is the remainder of the total number of submitted frames divided by 60.
- If more than 60 frames are provided and the trim option is `false`, the last frame is repeated until the next multiple of 60 frames is reached.

IVS Broadcast SDK: Mixed Devices

Mixed devices are audio and video devices that take multiple input sources and generate a single output. Mixing devices is a powerful feature that lets you define and manage multiple on-screen (video) elements and audio tracks. You can combine video and audio from multiple sources such as cameras, microphones, screen captures, and audio and video generated by your app. You can use transitions to move these sources around the video that you stream to IVS, and add to and remove sources mid-stream.

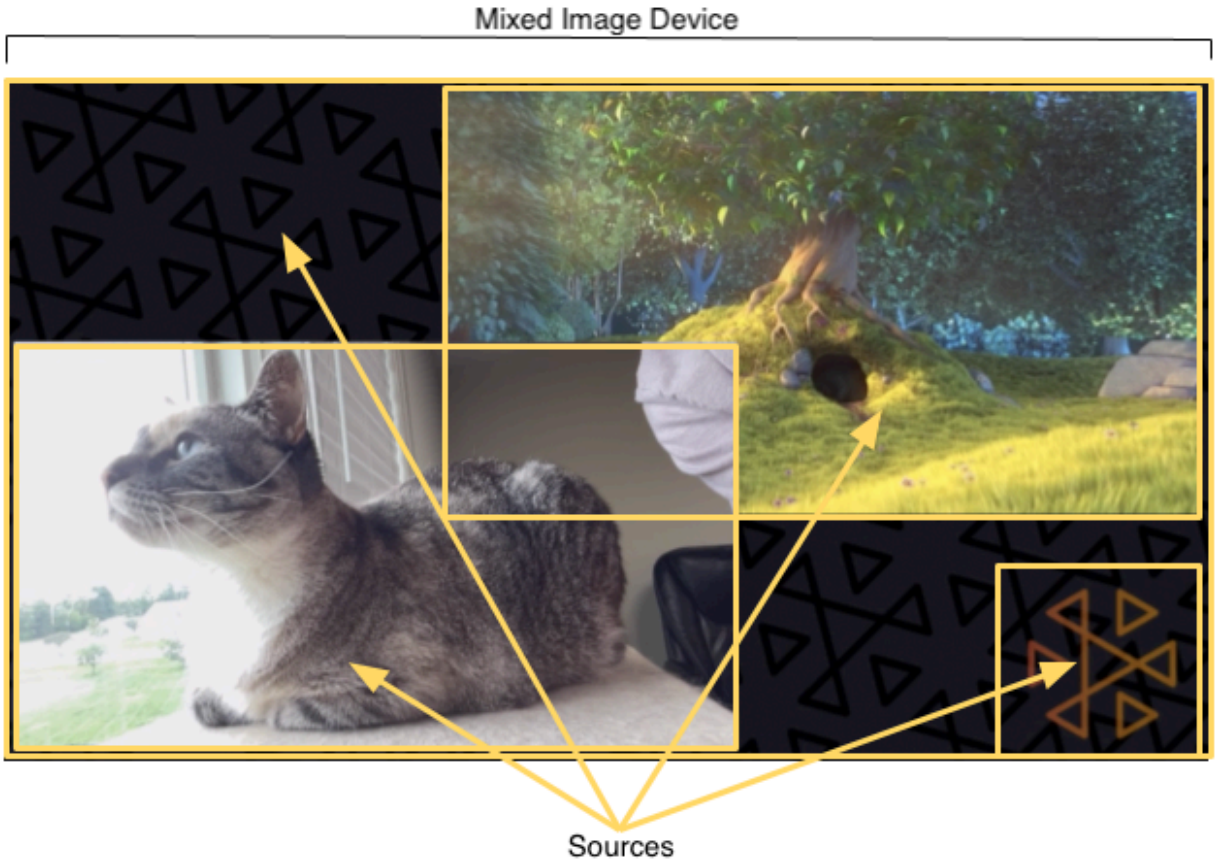
Mixed devices come in image and audio flavors. To create a mixed image device, call:

`DeviceDiscovery.createMixedImageDevice()` on Android

`IVSDeviceDiscovery.createMixedImageDevice()` on iOS

The returned device can be attached to a `BroadcastSession` (low-latency streaming) or `Stage` (real-time streaming), like any other device.

Terminology



Term	Description
Device	A hardware or software component that produces audio or image input. Examples of devices are microphones, cameras, Bluetooth headsets, and virtual devices such as screen captures or custom-image inputs.
Mixed Device	A `Device` that can be attached to a `BroadcastSession` like any other `Device`, but with additional APIs that allow `Source` objects to be added. Mixed devices have internal mixers that composite audio or images, producing a single output audio and image stream. Mixed devices come in either audio or image flavors.

Term	Description
Mixed device configuration	A configuration object for the mixed device. For mixed image devices, this configures properties like dimensions and framerate. For mixed audio devices, this configures the channel count.
Source	A container that defines a visual element's position on screen and an audio track's properties in the audio mix. A mixed device can be configured with zero or more sources. Sources are given a configuration that affects how the source's media are used. The image above shows four image sources: • Bottom left with camera input • Top right with movie input • Bottom right with the Amazon IVS logo • A full-screen background image
Source Configuration	A configuration object for the source going into a mixed device. The full configuration objects are described below..
Transition	To move a slot to a new position or change some of its properties, use `MixedDevice.transitionToConfiguration()` . This method takes: • A new source configuration that represents the next state for the source. • A duration that specifies how long the animation should take, relative to the timeline of the video. If the duration is set to 0, the transition happens on the next frame that is mixed. • An optional callback that informs you when the animation is complete. The callback may be useful for chaining animations.

Mixed Audio Device

Configuration

`MixedAudioDeviceConfiguration` on Android

`IVSMixedAudioDeviceConfiguration` on iOS

Name	Type	Description
`channels`	Integer	Number of output channels from the audio mixer. Valid values: 1, 2. 1 is mono audio; 2, stereo audio. Default: 2.

Source Configuration

`MixedAudioDeviceSourceConfiguration` on Android

`IVSMixedAudioDeviceSourceConfiguration` on iOS

Name	Type	Description
`gain`	Float	Audio gain. This is a multiplier, so any value above 1 increases the gain; any value below 1, decreases it. Valid values: 0-2. Default: 1.

Mixed Image Device

Configuration

`MixedImageDeviceConfiguration` on Android

`IVSMixedImageDeviceConfiguration` on iOS

Name	Type	Description
`size`	Vec2	Size of the video canvas.
`targetFramerate`	Integer	Number of target frames per second for the mixed device. On average, this value should be met, but the system may drop frames under certain circumstances (e.g., high CPU or GPU load).
`transparencyEnabled`	Boolean	This enables blending using the `alpha` property on image source configurations. Setting this to `true`

Name	Type	Description
		increases memory and CPU consumption. Default: `false`.

Source Configuration

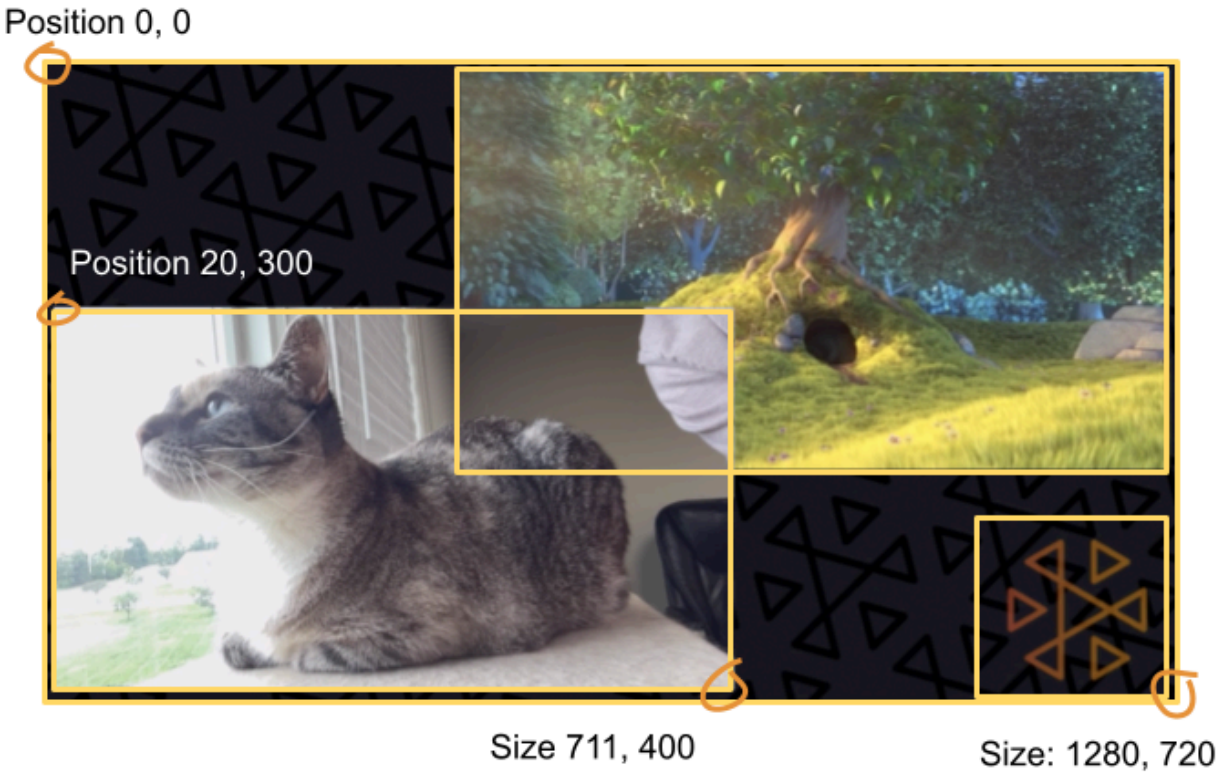
`MixedImageDeviceSourceConfiguration` on Android

`IVSMixedImageDeviceSourceConfiguration` on iOS

Name	Type	Description
`alpha`	Float	Alpha of the slot. This is multiplicative with any alpha values in the image. Valid values: 0-1. 0 is fully transparent and 1 is fully opaque. Default: 1.
`aspect`	AspectMode	Aspect-ratio mode for any image rendered in the slot. Valid values: • `Fill` — Maintain the aspect ratio of the image but fill the slot. The image is cropped if needed. • `Fit` — Maintain the aspect ratio of the image but fit the entire image into the slot. The slot may have a letterbox or pillarbox if necessary. The letter/pillarbox is in the `fillColor` if that value was set; otherwise, transparent (which may appear black if the canvas color behind the image is black). • None — Do not maintain the aspect ratio of the image. The image is scaled to match the dimensions of the slot. Default: `Fit`
`fillColor`	Vec4	Fill color to be used with `aspect Fit` when the slot and image aspect ratios do not match. The format

Name	Type	Description
		is (red, green, blue, alpha). Valid value (for each channel): 0-1. Default: (0, 0, 0, 0).
`position`	Vec2	Slot position (in pixels), relative to the top-left corner of the canvas. The origin of the slot also is top-left.
`size`	Vec2	Size of the slot, in pixels. Setting this value also sets `matchCanvasSize` to `false`. Default: (0, 0); however, because `matchCanvasSize` defaults to `true`, the rendered size of the slot is the canvas size, not (0, 0).
`zIndex`	Float	Relative ordering of slots. Slots with higher `zIndex` values are drawn on top of slots with lower `zIndex` values.

Creating and Configuring a Mixed Image Device



Here, we create a scene similar to the one at the beginning of this guide, with three on-screen elements:

- Bottom-left slot for a camera.
- Bottom-right slot for a logo overlay.
- Top-right slot for a movie.

Note that the origin for the canvas is the top-left corner and this is the same for the slots. Hence, positioning a slot at (0, 0) puts it in the top-left corner with the entire slot visible.

iOS

```
let deviceDiscovery = IVSDeviceDiscovery()
let mixedImageConfig = IVSMixedImageDeviceConfiguration()
mixedImageConfig.size = CGSize(width: 1280, height: 720)
try mixedImageConfig.setTargetFramerate(60)
mixedImageConfig.isTransparencyEnabled = true
let mixedImageDevice = deviceDiscovery.createMixedImageDevice(with: mixedImageConfig)

// Bottom Left
let cameraConfig = IVSMixedImageDeviceSourceConfiguration()
cameraConfig.size = CGSize(width: 320, height: 180)
cameraConfig.position = CGPoint(x: 20, y: mixedImageConfig.size.height -
 cameraConfig.size.height - 20)
cameraConfig.zIndex = 2
let camera = deviceDiscovery.listLocalDevices().first(where: { $0 is IVSCamera }) as?
 IVSCamera
let cameraSource = IVSMixedImageDeviceSource(configuration: cameraConfig, device:
 camera)
mixedImageDevice.add(cameraSource)

// Top Right
let streamConfig = IVSMixedImageDeviceSourceConfiguration()
streamConfig.size = CGSize(width: 640, height: 320)
streamConfig.position = CGPoint(x: mixedImageConfig.size.width -
 streamConfig.size.width - 20, y: 20)
streamConfig.zIndex = 1
let streamDevice = deviceDiscovery.createImageSource(withName: "stream")
let streamSource = IVSMixedImageDeviceSource(configuration: streamConfig, device:
 streamDevice)
mixedImageDevice.add(streamSource)
```

```
// Bottom Right
let logoConfig = IVSMixedImageDeviceSourceConfiguration()
logoConfig.size = CGSize(width: 320, height: 180)
logoConfig.position = CGPoint(x: mixedImageConfig.size.width - logoConfig.size.width -
 20,
                              y: mixedImageConfig.size.height - logoConfig.size.height
 - 20)
logoConfig.zIndex = 3
let logoDevice = deviceDiscovery.createImageSource(withName: "logo")
let logoSource = IVSMixedImageDeviceSource(configuration: logoConfig, device:
 logoDevice)
mixedImageDevice.add(logoSource)
```

Android

```
val deviceDiscovery = DeviceDiscovery(this /* context */)
val mixedImageConfig = MixedImageDeviceConfiguration().apply {
    setSize(BroadcastConfiguration.Vec2(1280f, 720f))
    setTargetFramerate(60)
    setEnableTransparency(true)
}
val mixedImageDevice = deviceDiscovery.createMixedImageDevice(mixedImageConfig)

// Bottom Left
val cameraConfig = MixedImageDeviceSourceConfiguration().apply {
    setSize(BroadcastConfiguration.Vec2(320f, 180f))
    setPosition(BroadcastConfiguration.Vec2(20f, mixedImageConfig.size.y - size.y -
 20))
    setZIndex(2)
}
val camera = deviceDiscovery.listLocalDevices().firstNotNullOf { it as? CameraSource }
val cameraSource = MixedImageDeviceSource(cameraConfig, camera)
mixedImageDevice.addSource(cameraSource)

// Top Right
val streamConfig = MixedImageDeviceSourceConfiguration().apply {
    setSize(BroadcastConfiguration.Vec2(640f, 320f))
    setPosition(BroadcastConfiguration.Vec2(mixedImageConfig.size.x - size.x - 20,
 20f))
    setZIndex(1)
}
val streamDevice = deviceDiscovery.createImageInputSource(streamConfig.size)
```

```
val streamSource = MixedImageDeviceSource(streamConfig, streamDevice)
mixedImageDevice.addSource(streamSource)

// Bottom Right
val logoConfig = MixedImageDeviceSourceConfiguration().apply {
    setSize(BroadcastConfiguration.Vec2(320f, 180f))
    setPosition(BroadcastConfiguration.Vec2(mixedImageConfig.size.x - size.x - 20,
 mixedImageConfig.size.y - size.y - 20))
    setZIndex(1)
}
val logoDevice = deviceDiscovery.createImageInputSource(logoConfig.size)
val logoSource = MixedImageDeviceSource(logoConfig, logoDevice)
mixedImageDevice.addSource(logoSource)
```

Removing Sources

To remove a source, call `MixedDevice.remove` with the `Source` object you want to remove.

Animations with Transitions

The transition method replaces a source's configuration with a new configuration. This replacement can be animated over time by setting a duration higher than 0, in seconds.

Which Properties Can Be Animated?

Not all properties in the slot structure can be animated. Any properties based on Float types can be animated; other properties take effect at either the start or end of the animation.

Name	Can It Be Animated?	Impact Point
`Audio.gain`	Yes	Interpolated
`Image.alpha`	Yes	Interpolated
`Image.aspect`	No	End
`Image.fillColor`	Yes	Interpolated
`Image.position`	Yes	Interpolated

Name	Can It Be Animated?	Impact Point
`Image.size`	Yes	Interpolated
`Image.zIndex` Note: The `zIndex` moves 2D planes through 3D space, so the transition happens when the two planes cross at some point in the middle of the animation. This could be computed, but it depends on the starting and ending `zIndex` values. For a smoother transition, combine this with `alpha`.	Yes	Unknown

Simple Examples

Below are examples of a full-screen camera takeover using the configuration defined above in Creating and Configuring a Mixed Image Device. This is animated over 0.5 seconds.

iOS

```
// Continuing the example from above, modifying the existing cameraConfig object.
cameraConfig.size = CGSize(width: 1280, height: 720)
cameraConfig.position = CGPoint.zero
cameraSource.transition(to: cameraConfig, duration: 0.5) { completed in
    if completed {
        print("Animation completed")
    } else {
        print("Animation interrupted")
    }
}
```

Android

```
// Continuing the example from above, modifying the existing cameraConfig object.
cameraConfig.setSize(BroadcastConfiguration.Vec2(1280f, 720f))
cameraConfig.setPosition(BroadcastConfiguration.Vec2(0f, 0f))
cameraSource.transitionToConfiguration(cameraConfig, 500) { completed ->
    if (completed) {
        print("Animation completed")
    } else {
```

```
        print("Animation interrupted")
    }
}
```

Mirroring the Broadcast

To mirror an attached image device in the broadcast in this direction ...	Use a negative value for ...
Horizontally	The width of the slot
Vertically	The height of the slot
Both horizontally and vertically	Both the width and height of the slot

The position will need to be adjusted by the same value, to put the slot in the correct position when mirrored.

Below are examples for mirroring the broadcast horizontally and vertically.

iOS

Horizontal mirroring:

```
let cameraSource = IVSMixedImageDeviceSourceConfiguration()
cameraSource.size = CGSize(width: -320, height: 720)
// Add 320 to position x since our width is -320
cameraSource.position = CGPoint(x: 320, y: 0)
```

Vertical mirroring:

```
let cameraSource = IVSMixedImageDeviceSourceConfiguration()
cameraSource.size = CGSize(width: 320, height: -720)
// Add 720 to position y since our height is -720
cameraSource.position = CGPoint(x: 0, y: 720)
```

Android

Horizontal mirroring:

```
val cameraConfig = MixedImageDeviceSourceConfiguration().apply {
    setSize(BroadcastConfiguration.Vec2(-320f, 180f))
   // Add 320f to position x since our width is -320f
    setPosition(BroadcastConfiguration.Vec2(320f, 0f))
}
```

Vertical mirroring:

```
val cameraConfig = MixedImageDeviceSourceConfiguration().apply {
    setSize(BroadcastConfiguration.Vec2(320f, -180f))
    // Add 180f to position y since our height is -180f
    setPosition(BroadcastConfiguration.Vec2(0f, 180f))
}
```

Note: This mirroring is different than the `setMirrored` method on `ImagePreviewView` (Android) and `IVSImagePreviewView` (iOS). That method affects only the local preview view on the device and does not impact the broadcast.

IVS Broadcast SDK: Custom Image Sources | Low-Latency Streaming

This guide assumes you are already familiar with how to set up a broadcast session (Android, iOS) and how to use the mixed devices API.

Custom image-input sources allow an application to provide its own image input to the broadcast SDK, instead of being limited to the preset cameras or screen share. A custom image source can be as simple as a semi-transparent watermark or static "be right back" scene, or it can allow the app to do additional custom processing like adding beauty filters to the camera.

You can have multiple custom image sources, like a watermark plus a camera with beauty filters. When you use a custom image-input source for custom control of the camera (such as using beauty-filter libraries that require camera access), the broadcast SDK is no longer responsible for managing the camera. Instead, the application is responsible for handling the camera's lifecycle correctly. See official platform documentation on how your application should manage the camera.

Android

After you create a broadcast session, create an image-input source:

```
SurfaceSource surfaceSource = broadcastSession.createImageInputSource();
```

This method returns a `SurfaceSource`, which is an image source backed by a standard Android Surface. It is automatically attached to the broadcast session, so there is no need to use the `attachDevice(...)` method afterward. However, the `SurfaceSource` needs to be bound to a slot; this is covered later below. The `SurfaceSource` can be resized and rotated. You also can create an `ImagePreviewView` to display a preview of its contents.

To retrieve the underlying `Surface`:

```
Surface surface = surfaceSource.getInputSurface();
```

This `Surface` can be used as the output buffer for image producers like Camera2, OpenGL ES, and other libraries. The simplest use case is directly drawing a static bitmap or color into the Surface's Canvas. However, many libraries (such as beauty-filter libraries) provide a method that allows an application to specify an external `Surface` for rendering. You can use such a method to pass this `Surface` to the filter library, which allows the library to output processed frames for the broadcast session to stream.

Finally, the `SurfaceSource` must be bound to a `Mixer.Slot` to be streamed by the broadcast session:

```
broadcastSession.getMixer().bind(surfaceSource, "customSlot");
```

The Android sample code has several examples that use a custom image source in different ways:

- A semi-transparent watermark is added in the `MixerActivity`.
- An MP4 file is looped in the `MixerActivity`.
- The CameraManager utility class does custom management of the device camera using the Camera2 method in the `CustomActivity`, which applies a simple sepia filter. This example is especially helpful since it shows how to manage the camera and pass the broadcast session's custom `SurfaceSource` to the camera capture request. If you use other external libraries, follow their documentation on how to configure the library to output to the Android `Surface` provided by the broadcast session.

iOS

After you create the broadcast session, create an image-input source:

```
let customSource = broadcastSession.createImageSource(withName: "customSourceName")
```

This method returns an `IVSCustomImageSource`, which is an image source that allows the application to submit `CMSampleBuffers` manually. For supported pixel formats, see the iOS Broadcast SDK Reference; a link to the most current version is in the Amazon IVS Release Notes for the latest broadcast SDK release. The source is not automatically attached to the broadcast session, so you must attach the image source to the session and bind it to a slot before the source will stream:

```
broadcastSession.attach(customSource, toSlotWithName: "customSourceSlot", onComplete:
 nil)
```

After the custom source is attached and bound, the application can submit `CMSampleBuffers` directly to the custom source. You may choose to use the `onComplete` callback to start doing so.

Samples submitted to the custom source will be streamed in the broadcast session:

```
customSource.onSampleBuffer(sampleBuffer)
```

For streaming video, use this method in a callback. For example, if you're using the camera, then every time a new sample buffer is received from an `AVCaptureSession`, the application can forward the sample buffer to the custom image source. If desired, the application can apply further processing (like a beauty filter) before submitting the sample to the custom image source.

For a static image, after the first sample, the application needs to resubmit the sample if the custom image source's slot binding is changed or the source is detached and reattached to the broadcast session. For example, if you remove the slot from and then add the slot to the mixer, you must resubmit the sample.

The iOS sample app has several examples that use a custom image source in different ways:

- A semi-transparent watermark is added in `MixerViewController`.
- An MP4 file is looped in `MixerViewController`.
- A CIFilter implementation with a device camera is added in `CustomSourcesViewController`. This allows an application to manage a device camera independently of the Amazon IVS

Broadcast SDK. It uses `AVCaptureSession` to capture an image from the device camera, processes the image using a CIFilter implementation, and submits `CMSampleBuffers` to `customSource` for live streaming.

IVS Player SDK

To use Amazon Interactive Video Service (IVS), you must use the Amazon IVS Player. The Player is a cross-platform suite of SDKs for playback of Amazon IVS streams. It is designed to leverage the Amazon IVS architecture and optimized for Amazon IVS playback.

The only player whose performance we can guarantee is the Amazon IVS player. To achieve low latency, the Amazon IVS player is required.

Key features of the Amazon IVS player are:

- **Low-latency streaming** — Low latency is a critical component in building good interactive user experiences that enrich the audience experience. Latency creeps in incrementally throughout the transmission path between broadcaster and viewer, eroding responsiveness.

  End-to-end latency is the delay from when a live stream is captured on camera to when it appears on a viewer's screen. Amazon IVS is designed to deliver low end-to-end latency (under five seconds, depending on the broadcast location and broadcaster settings). *To achieve this low latency, the Amazon IVS player is required*.
- **Cross-platform consistency** — Viewers watch broadcasts on a variety of platforms. From mobile devices to web browsers, the Amazon IVS Player gives all viewers a similar experience. This consistency is possible because every platform uses the same library of player functions. The player library is an integral component of the Amazon IVS architecture. Using one video stack ensures that all video-playback behaviors — including low-latency mode, timed metadata, analytics, error tracking, reporting, and logging — are available in a consistent way on all supported platforms.
- **Adaptive bitrate streaming (ABR)** — The Amazon IVS Player uses ABR algorithms optimized for low-latency environments. The Player measures quality of service and bandwidth availability in real time and adapts video quality and buffer levels, to provide uninterrupted playback. When connection quality suffers, ABR switches to a lower bitrate; when connection quality improves, it switches to a higher bitrate.
- **Timed metadata** — The Amazon IVS Player supports *timed metadata*, which can be used to build interactive elements such as polls and quizzes. Metadata is a set of data that describes and gives information about other data. With "timed" metadata, a timecode accompanies the piece of data about the stream. During playback, the timecode serves as a cue point to trigger action based on the data, such as:
  - Sending player statistics for a sports stream

  - Sending product details for a live shopping stream
  - Sending questions for a live quiz stream
- **Robust error handling** — Handling transient errors well avoids interruptions in the viewing experience. The Amazon IVS Player's robust error handling detects many potential streaming errors, automatically switching to an alternative rendition. Viewers continue watching the broadcast uninterrupted, without having to take any corrective action.
- **Ease of integration** — The Amazon IVS Player API bridges the gap between Amazon IVS customers' applications and the Player library. The API has bindings for all supported platforms, making it easy to integrate the Player into applications while using familiar coding environments and techniques. With full control over UI elements, customers can customize the branding and presentation aspects of their applications.

The Amazon IVS player does not support casting with Airplay, but developers can implement Airplay by transitioning sessions to AVPlayer. However, latency on AVPlayer is higher than in the Amazon IVS player SDK, so the switch will not be seamless. An example of how to accomplish this transition is provided here.

Casting with Chromecast can be implemented outside the player using the default Chromecast receiver apps. However, latency in those apps is higher than in the Amazon IVS player SDK, so the switch will not be seamless. Also see our documentation on the Amazon IVS Broadcast SDK: for Low-Latency Streaming and for Real-Time Streaming.

Browser & Platform Requirements

For details on the latest released versions of various browsers, see:

- Chrome Platform Status
- Firefox Releases
- Microsoft Edge Release Schedule
- Safari Release Notes

While Amazon IVS may work with some older browsers, we do not fix bugs related to older browsers.

The IVS Player Web SDK (including the Video.js and Player JW integrations) is not supported in browser-like environments. This includes Native WebViews and "10-foot devices" (TVs, consoles,

set-top boxes) which support web applications. Please contact IVS Support if you're unsure of specific browser support outside of the tables listed below.

Desktop Browsers

Desktop Browser	Supported Platforms	Supported Versions
Chrome	Windows, macOS	Two major versions (current and most recent prior version)
Firefox	Windows, macOS	Two major versions (current and most recent prior version)
Edge	Windows 8.1 and later	44.0 and later (In auto-quality mode on Microsoft Edge Legacy, only normal-latency playback is supported, not low-latency playback. Auto-quality mode refers to whether ABR is enabled. For example, on the Web player, see `setAutoQualityMode` .)
Safari	macOS	Two major versions (current and most recent prior version) (In auto-quality mode on Safari for macOS 14 and above, IVS Player 1.3.0 and above support low-latency playback. For earlier versions of Safari and IVS Player, only normal-latency playback is supported. See above for "auto-quality mode.")

Mobile Browsers

Mobile Browser	Supported Versions
Chrome for iOS, Safari for iOS	Two major versions (current and most recent prior version) (Low-latency playback is not supported. Normal latency playback is supported. This constraint applies to all browsers for iOS.) (Timed metadata is supported only in Player 1.3.0 and later.)
Chrome for iPadOS, Safari for iPadOS	Two major versions (current and most recent prior version) (When "Request Mobile Website" is selected: • Low-latency playback is not supported. • Timed metadata is supported only in Player 1.3.0 and later.)
Chrome for Android	Two major versions (current and most recent prior version)

Native Platforms

Platform	Supported Versions	Supported Devices
Android	6.0 and later	Phones and tablets
iOS	14+	All

IVS supports a minimum of 4 major iOS versions and 6 major Android versions. Our current version support may extend beyond these minimums. Customers will be notified via SDK release notes at least 3 months in advance of a major version no longer being supported.

Reducing Latency in Third-Party Players

For Basic and Standard channel types: For the lowest possible latency, you must use the Amazon IVS player. In third-party players (including iOS Safari), you can reduce latency to about 10 seconds by using the following configuration:

- Set your encoder's (e.g. OBS) keyframe interval to 2 seconds or below.
- Add `?keyframeInterval=2` to the RTMP(S) URL. For example: `rtmps://a1b2c3d4e5f6.global-contribute.live-video.net:443/app/sk_us-west-2_abcd1234efgh5678ijkl?keyframeInterval=2`

Note: The keyframe interval specified as part of the RTMP URL must be greater than or equal to the value configured in the encoder; otherwise, you may have playback issues. You can set the value to any integer between 2 and 6 inclusive, but 2 enables the lowest latency.

For Advanced channel types: The above guidance does not apply. Advanced channel types generate keyframe intervals automatically for encoding efficiency, with at most 2 seconds between keyframes, regardless of the source encoding keyframe interval setting.

iOS Safari

In iOS Safari, you can reduce latency to approximately 6-8 seconds by using the IVS player and configuring it to use a service worker. See Set Up Service Worker in the *Player SDK: Web Guide* for implementation details and a reference sample.

Note: Getting the lowest latency requires an IVS stream with the keyframe interval set to 2 seconds.

Audio-Only Playback

All IVS channel types support audio-only renditions. This can be particularly valuable for mobile applications. For instance, in your mobile app, you can switch the player to the audio-only rendition when the user backgrounds the application to conserve bandwidth.

For ADVANCED-SD and ADVANCED-HD channels, the audio-only rendition is included automatically in the multivariant playlist. For BASIC and STANDARD channels, you must append the `?allow_audio_only=true` query parameter to the playback URL to enable inclusion of the audio-only rendition.

Note: The IVS web player SDK supports audio-only playback only in versions 1.24.0 and later.

Support

If you encounter a playback error or other playback issue with your stream, determine the unique playback session identifier via the player API.

For this Amazon IVS player:	Use this:
Android	`sessionId` function
iOS	`sessionId` property of `IVSPlayer`
Web	`getSessionId` function

Share this playback session identifier with AWS support. With it, they can get information to help troubleshoot your issue.

Note: The Player is continually improved. See Amazon IVS Release Notes for available versions and fixed issues. If appropriate, before contacting support, update your version of the Player and see if that resolves your issue.

Versioning

The Amazon IVS Player SDKs use semantic versioning.

For this discussion, suppose:

- The latest release is 4.1.3.
- The latest release of the prior major version is 3.2.4.
- The latest release of version 1.x is 1.5.6.

Backward-compatible new features are added as minor releases of the latest version. In this case, the next set of new features will be added as version 4.2.0.

Backward-compatible, minor bug fixes are added as patch releases of the latest version. Here, the next set of minor bug fixes will be added as version 4.1.4.

Backward-compatible, major bug fixes are handled differently; these are added to several versions:

- Patch release of the latest version. Here, this is version 4.1.4.
- Patch release of the prior minor version. Here, this is version 3.2.5.
- Patch release of the latest version 1.x release. Here, this is version 1.5.7.

Major bug fixes are defined by the Amazon IVS product team. Typical examples are critical security updates and selected other fixes necessary for customers.

Note: In the examples above, released versions increment without skipping any numbers (e.g., from 4.1.3 to 4.1.4). In reality, one or more patch numbers may remain internal and not be released, so the released version could increment from 4.1.3 to, say, 4.1.6.

IVS Player SDK: Web Guide

The Amazon Interactive Video Service (IVS) Web player SDK can be integrated with player frameworks like Video.js or used standalone on top of an HTML `<video>` element.

Latest version of Web player: 1.57.0 (Release Notes)

Reference documentation: For information on the most important methods available in the Amazon IVS Web player, see the reference documentation at https://aws.github.io/amazon-ivs-player-docs/1.57.0/web/.

Framework Integrations

The Amazon IVS Web player SDK is designed to be easy to integrate with your framework of choice. We offer an official Video.js integration ("tech," in Video.js jargon).

The following is a brief comparison of the Web players we offer:

Player Type	Description	UI	Plugins
Amazon IVS Web player SDK	A lightweight and customizable option for developers who want more control.	No	No
Amazon IVS Player Tech for Video.js	A full-featured option, which may be appropriate if you already use Video.js and want a turnkey solution.	Yes (Video.js Skins)	Yes (Video.js Plugins)

Player Type	Description	UI	Plugins
Amazon IVS Player Provider for JW Player	A full-featured option, which may be appropriate if you already use JW Player and want a turnkey solution.	Yes	N/A

Getting Started with the IVS Web Player SDK

This document takes you through the steps involved in getting started with the Amazon IVS Web player SDK.

We provide support through a `script` tag as well as through an npm module.

Demos

The following live demo shows how to use the Web player with a `script` tag from our Content Delivery Network: Amazon IVS Player Sample. The demo includes setting up event listeners.

Also see https://github.com/aws-samples/amazon-ivs-player-web-sample for a selection of additional Web player demos.

Setup With Script Tag

To set up the Amazon IVS player using the `script` tag:

1. Include the following tag (for the latest version of the player).

```
<script src="https://player.live-video.net/1.57.0/amazon-ivs-player.min.js"></script>
```

2. Once `amazon-ivs-player.min.js` is loaded, it adds an `IVSPlayer` variable to the global context. This is the library you will use to create a player instance. First, check `isPlayerSupported` to determine if the browser supports the IVS player:

```
if (IVSPlayer.isPlayerSupported) { ... }
```

   Then, to create a player instance, call the `create` function on the `IVSPlayer` object.

```
const player = IVSPlayer.create();
```

The Amazon IVS Web player SDK uses web workers to optimize video playback.

3. Load and play a stream using the `load` and `play` functions on the player instance:

```
player.load("PLAYBACK_URL");
player.play();
```

where PLAYBACK_URL is the URL returned from the Amazon IVS API when a stream key is requested.

Sample Code

In this example, replace PLAYBACK_URL with the URL of the source stream you want to load. The example uses the latest version of the Amazon IVS player.

```
<script src="https://player.live-video.net/1.57.0/amazon-ivs-player.min.js"></script>
<video id="video-player" playsinline></video>
<script>
  if (IVSPlayer.isPlayerSupported) {
    const player = IVSPlayer.create();
    player.attachHTMLVideoElement(document.getElementById('video-player'));
    player.load("PLAYBACK_URL");
    player.play();
  }
</script>
```

In the `<video>` tag, `playsinline` is required for inline playback on iOS Safari. See https://webkit.org/blog/6784/new-video-policies-for-ios/.

Setup With NPM

For guidance, including an example Webpack configuration file, see the following repository: https://github.com/aws-samples/amazon-ivs-player-web-sample.

Note: When hosting player static assets from your own domain, you must set the "Content-Type" response header for the WebAssembly binary (`amazon-ivs-wasmworker.min.wasm`) to "application/wasm." You also should gzip your assets to reduce bytes downloaded over the wire and improve the player's time to start playback.

TypeScript

If you're using TypeScript, the npm package includes types you may want to import and use. For information on these types, see the Amazon IVS Player SDK: Web Reference.

Set Up Service Worker

To lower latency further when playing via browsers that only support native playback (primarily iOS Safari), a service worker can be set up and configured. For more context, see Reducing Latency in Third-Party Players.

To set up the Amazon IVS player to use a service worker:

1. Create a file to load the IVS service worker off the CDN. This is required as service workers must be hosted on the same domain as the page that pulls them in.

   Create a file named `amazon-ivs-service-worker-loader.js` or similar and add the following line:

   ```
   importScripts('https://player.live-video.net/1.57.0/amazon-ivs-service-
   worker.min.js');
   ```

2. When creating a player instance, pass in the following `serviceWorker` config referencing the `amazon-ivs-service-worker-loader.js` file:

   ```
   const player = IVSPlayerPackage.create({
      serviceWorker: {
         url: 'amazon-ivs-service-worker-loader.js'
      }
   });
   ```

3. On the video element, set the `crossOrigin` attribute to `anonymous`. This is required to allow the service worker to make changes to the manifest.

Note: To test the service worker locally, the page either needs to be served off *localhost* or *https*.

For a live demo, see the service worker example in the following repository:

https://github.com/aws-samples/amazon-ivs-player-web-sample

Audio-Only Playback

Audio-only quality must be manually selected with the `setQuality()` method. Note that the player does not support a `true` value for the second argument, `adaptive`, so by default, this argument is `false`.

To set the quality to audio-only before playback begins, call `setQuality()` inside the `READY` event:

```
player.addEventListener(PlayerState.READY, () => {
   const qualities = player.getQualities();
   const audioOnly = qualities.find(q => q.name === 'audio_only');
   if (audioOnly) {
      player.setQuality(audioOnly);
   }
});
```

Setting the quality within `READY` works for both autoplay and non-autoplay modes.

Optimizing Background Playback

Starting with SDK version 1.45.0, the client can be configured to optimize data usage while playing in a background tab. When this feature is enabled, then after the duration specified, the player selects the highest available SD video quality, with a maximum of 480p. The player always selects video; audio_only is not selected. This applies to both manual and auto modes. When the tab is foregrounded, the player automatically switches back to its prior setting.

To enable this feature:

```
const player = IVSPlayer.create({
   optimizeBackgroundPlayback: {
      enabled: true,
      switchDelayMs: 60 * 1000,   // Optional, defaults to 60s
   }
});
```

Working With Content Security Policy

The Amazon IVS Web player SDK is configured to work on pages that use Content Security Policy (CSP). A few key CSP directives must be in place. Here, we describe a minimal set of directives that

are necessary. Additional directives and sources are likely necessary, depending on your specific setup.

The following directives are the minimum required for CSP:

```
worker-src blob:;
media-src blob:;
connect-src *.live-video.net;
script-src 'wasm-unsafe-eval';
```

Note: Older versions of browsers may not recognize one or more of those above CSP rules (such as `wasm-unsafe-eval`) and instead could require a very lenient CSP policy (`unsafe-eval`). However, that works against the whole point of CSP to limit dangerous JavaScript from running on a page. Instead, as a workaround, we recommend that you host the library assets on the same origin as your page.

IVS Player SDK: Android Guide

The Amazon Interactive Video Service (IVS) Android player SDK provides the interfaces required to use the Amazon IVS player on Android.

We guarantee playback performance only for Android mobile devices (phones and tablets). We do not support Android TV, Fire TV, IoT devices, and emulators.

The `com.amazonaws.ivs.player` package implements the interface described in this document. The following operations are supported:

- Set up (initialize) a player.
- Manage playback.
- Manage quality.
- Receive events.
- Receive errors.

Latest version of Android player: 1.57.0 (Release Notes)

Reference documentation: For information on the most important methods available in the Amazon IVS Android player, see the reference documentation at https://aws.github.io/amazon-ivs-player-docs/1.57.0/android/.

Sample code: See the Android sample repository on GitHub: https://github.com/aws-samples/amazon-ivs-player-android-sample.

Platform requirements: Android 6.0+

A **React Native wrapper** for the Amazon IVS Player SDK is available. For the code and documentation, see https://github.com/aws/amazon-ivs-react-native-player.

Getting Started with the IVS Android Player SDK

This document takes you through the steps involved in getting started with the Amazon IVS Android player SDK.

Install the Library

To add the Amazon IVS Android player library to your Android development environment, add the library to your module's `build.gradle` file, as shown here (for the latest version of the Amazon IVS player).

```
repositories {
    mavenCentral()
}

dependencies {
     implementation 'com.amazonaws:ivs-player:1.57.0'
}
```

Alternately, to install the SDK manually, download the latest version from this location:

https://search.maven.org/artifact/com.amazonaws/ivs-player

Using the SDK with Debug Symbols

We also publish a version of the Android player SDK which includes debug symbols. You can use this version to improve the quality of debug reports (stack traces) in Firebase Crashlytics, if you run into crashes in the IVS player SDK; i.e., `libplayercore.so`. When you report these crashes to the IVS SDK team, the higher quality stack traces make it easier to fix the issues.

To use this version of the SDK, in your Gradle build files, replace this line:

```
implementation "com.amazonaws:ivs-player:$version@aar"
```

with this:

```
implementation "com.amazonaws:ivs-player:$version:unstripped@aar"
```

Uploading Symbols to Firebase Crashlytics

Ensure that your Gradle build files are set up for Firebase Crashlytics. Follow Google's instructions here:

https://firebase.google.com/docs/crashlytics/ndk-reports

Be sure to include `com.google.firebase:firebase-crashlytics-ndk` as a dependency.

When building your app for release, the Firebase Crashlytics plugin should upload symbols automatically. To upload symbols manually, run either of the following:

```
gradle uploadCrashlyticsSymbolFileRelease
```

```
./gradlew uploadCrashlyticsSymbolFileRelease
```

(It will not hurt if symbols are uploaded twice, both automatically and manually.)

Preventing your Release .apk from Becoming Larger

Before packaging the release `.apk` file, the Android Gradle Plugin automatically tries to strip debug information from shared libraries (including the IVS player SDK's `libplayercore.so` library). However, sometimes this does not happen. In that case, your `.apk` file could become larger and you could get a warning message from the Android Gradle Plugin that it's unable to strip debug symbols and is packaging `.so` files as is. If this happens, do the following:

- Install an Android NDK. Any recent version will work.
- Add `ndkVersion <your_installed_ndk_version_number>` to your application's `build.gradle` file. Do this even if your application itself does not contain native code.

For more information, see this issue report.

Create the Player and Set Up Event Listener

The player interface is `com.amazonaws.ivs.player.Player`. Initialize it as shown below:

```
// Create a player instance
// <this> refers to the current Android Activity
player = Player.Factory.create(this);

// Set up to receive playback events and errors
player.addListener(this);
```

Alternately, initialize by using `PlayerView`:

```
// Create a player instance
// <this> refers to the current Android Activity
PlayerView playerView = new PlayerView(this);
Player player = playerView.getPlayer();
// Set up to receive playback events and errors
player.addListener(this);
```

Note: The listener callback methods are executed in the main thread of your Android application.

Set the Surface View for Video

If not using `PlayerView` add a `SurfaceView` to your Android UI layout for displaying a video. This `Surface` must be available before you can play any video streams. You can access the underlying surface through the `SurfaceHolder` interface, which is retrieved by calling `getHolder()`. (See SurfaceView in the Android developer reference). Use the `SurfaceHolder.Callback` to receive events about surface changes (see SurfaceHolder.Callback).

```
surfaceView = (SurfaceView) findViewById(R.id.surfaceView);
surfaceView.getHolder().addCallback(this);

@Override
public void surfaceCreated(SurfaceHolder holder) {
   this.surface = holder.getSurface();
   if (player != null) {
       player.setSurface(this.surface);
   }
}

@Override
public void surfaceDestroyed(SurfaceHolder holder) {
   this.surface = null;
   if (player != null) {
```

```
        player.setSurface(null);
    }
}
```

Play a Stream

Because the stream is loaded asynchronously, the player must be in a READY state before your application can call the `play` method to begin playback. Use the `Player.Listener` interface to determine when the player is in the correct state.

See the following sample code:

```
player.load(Uri.parse(url));

@Override
public void onStateChanged(Player.State state) {
    switch (state) {
        case BUFFERING:
            // player is buffering
            break;
        case READY:
            player.play();
            break;
        case IDLE:
            break;
        case PLAYING:
            // playback started
            break;
     }
}
```

Release the Player

The `player.release()` method *must* be called when the player is no longer in use, to free the resources used by the library. Typically this is done in the `onDestroy` callback of the Activity or Fragment containing the player.

```
@Override
protected void onDestroy() {
    super.onDestroy();
    player.removeListener(this);
    player.release();
```

```
}
```

After the `player.release()` method is called the player can no longer be used.

Permissions

The Android player SDK requires the following permission:

```
<uses-permission android:name="android.permission.INTERNET" />
```

In addition, these optional permissions can improve the playback experience:

```
<uses-permission android:name="android.permission.ACCESS_NETWORK_STATE" />
<uses-permission android:name="android.permission.ACCESS_WIFI_STATE" />
```

Thread Safety

The player API is not thread safe. All calls made to a player instance should be from the same thread.

SDK Size

The Amazon IVS player SDKs are designed to be as lightweight as possible. For current information about SDK size, see the Release Notes.

Important: When evaluating size impact, the size of the AAB/APK produced by Android Studio is not representative of the size of your app downloaded to a user's device. The Google Play Store performs optimizations to reduce the size of your app. We recommend that you use Android App Bundles to serve optimized apps for each device configuration.

IVS Player SDK: iOS Guide

The Amazon Interactive Video Service (IVS) iOS player provides the interfaces required to use the Amazon IVS player on iOS.

Latest version of iOS player: 1.57.0 (Release Notes)

Reference documentation: For information on the most important methods available in the Amazon IVS iOS player, see the reference documentation at https://aws.github.io/amazon-ivs-player-docs/1.57.0/ios/.

Sample code: See the iOS sample repository on GitHub: https://github.com/aws-samples/amazon-ivs-player-ios-sample.

Platform requirements: iOS 14+

A **React Native wrapper** for the Amazon IVS Player SDK is available. For the code and documentation, see https://github.com/aws/amazon-ivs-react-native-player.

Getting Started with the IVS iOS Player SDK

This document takes you through the steps involved in getting started with the Amazon IVS iOS player SDK.

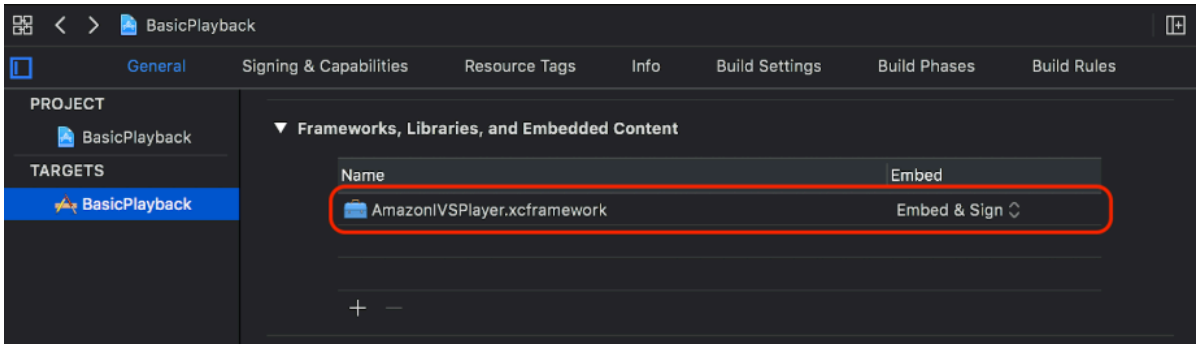
We recommend that you integrate the player SDK via Swift Package Manager. (Alternately, you can manually add the framework to your project.)

Recommended: Integrate the Player SDK (Swift Package Manager)

1. Download the Package.swift file from https://player.live-video.net/1.57.0/Package.swift.
2. In your project, create a new directory named AmazonIVSPlayer and add it to version control.
3. Put the downloaded Package.swift file in the new directory.
4. In Xcode, go to **File > Add Package Dependencies** and select **Add Local...**
5. Navigate to and select the AmazonIVSPlayer directory that you created, and select **Add Package**.
6. When prompted to **Choose Package Products for AmazonIVSPlayer**, select **AmazonIVSPlayer** as your **Package Product** by setting your application target in the **Add to Target** section.
7. Select **Add Package**.

Alternate Approach: Install the Framework Manually

1. Download the latest version from https://player.live-video.net/1.57.0/AmazonIVSPlayer.xcframework.zip.
2. Extract the contents of the archive. `AmazonIVSPlayer.xcframework` contains the SDK for both device and simulator.
3. Embed `AmazonIVSPlayer.xcframework` by dragging it into the **Frameworks, Libraries, and Embedded Content** section of the **General** tab for your application target:



Create Player

The player object is `IVSPlayer`. It can be initialized as shown below:

Swift

```
import AmazonIVSPlayer

let player = IVSPlayer()
```

Objective-C

```
#import <AmazonIVSPlayer/AmazonIVSPlayer.h>

IVSPlayer *player = [[IVSPlayer alloc] init];
```

Set Up Delegate

Delegate callbacks provide information on playback state, events, and errors. All callbacks are invoked on the main queue.

Swift

```
// Self must conform to IVSPlayer.Delegate
player.delegate = self
```

Objective-C

```
// Self must conform to IVSPlayer.Delegate
```

```
player.delegate = self
```

Display Video

The player displays video in a custom layer, `IVSPlayerLayer`. The SDK also provides `IVSPlayerView`, a `UIView` subclass backed by this layer. Use whichever is more convenient for your application's UI.

In both cases, display the video from a player instance by using the `player` property.

Swift

```
// When using IVSPlayerView:
playerView.player = player

// When using IVSPlayerLayer:
playerLayer.player = player
```

Objective-C

```
// When using IVSPlayerView:
playerView.player = player;

// When using IVSPlayerLayer:
playerLayer.player = player;
```

Load a Stream

The player loads the stream asynchronously. Its state indicates when it is ready to play.

Swift

```
player.load(url)
```

Objective-C

```
[player load:url];
```

Play a Stream

When the player is ready, use `play` to begin playback. Use the delegate interface or key-value observing on the `state` property to observe the state change. Here is an example of the delegate-based approach:

Swift

```
func player(_ player: IVSPlayer, didChangeState state: IVSPlayer.State) {
    if state == .ready {
        player.play()
    }
}
```

Objective-C

```
- (void)player:(IVSPlayer *)player didChangeState:(IVSPlayerState)state {
    if (state == IVSPlayerStateReady) {
        [player play];
    }
}
```

Pause On App Backgrounding

The player does not support playback while the app is in the background, but it does not need to be fully torn down. Pausing is sufficient; see the examples below.

Swift

```
override func viewDidLoad() {
    super.viewDidLoad()

    NotificationCenter.default.addObserver(self,
        selector: #selector(applicationDidEnterBackground(_:)),
        name: UIApplication.didEnterBackgroundNotification,
        object: nil)
}

@objc func applicationDidEnterBackground(_ notification: NSNotification) {
    playerView?.player?.pause()
```

```
}
```

Objective-C

```
- (void)viewDidLoad {
    [super viewDidLoad];

    NSNotificationCenter *defaultCenter = NSNotificationCenter.defaultCenter;
    [defaultCenter addObserver:self
                      selector:@selector(applicationDidEnterBackground:)
                          name:UIApplicationDidEnterBackgroundNotification
                        object:nil];
}

- (void)applicationDidEnterBackground:(NSNotification *)notification {
    [playerView.player pause];
}
```

Thread Safety

The player API is not thread safe. You should create and use a player instance from the application main thread.

SDK Size

The Amazon IVS player SDKs are designed to be as lightweight as possible. For current information about SDK size, see the Release Notes.

Important: When evaluating size impact, the size of the IPA produced by Xcode is not representative of the size of your app downloaded to a user's device. The App Store performs optimizations to reduce the size of your app.

Putting It All Together

The following simple, view-controller snippet loads and plays a URL in a player view. Note that the `playerView` property is initialized from an XIB/Storyboard, and its class is set to `IVSPlayerView` in Interface Builder using the Custom Class section of the Identity Inspector.

Swift

```
import AmazonIVSPlayer
```

```
class MyViewController: UIViewController {
...
    // Connected in Interface Builder
    @IBOutlet var playerView: IVSPlayerView!

    override func viewDidLoad() {
        super.viewDidLoad()

        NotificationCenter.default.addObserver(self,
            selector: #selector(applicationDidEnterBackground(_:)),
            name: UIApplication.didEnterBackgroundNotification,
            object: nil)
    }

    @objc func applicationDidEnterBackground(_ notification: NSNotification) {
        playerView?.player?.pause()
    }
...
    // Assumes this view controller is already loaded.
    // For example, this could be called by a button tap.
    func playVideo(url videoURL: URL) {
        let player = IVSPlayer()
        player.delegate = self
        playerView.player = player
        player.load(videoURL)
    }
}

extension MyViewController: IVSPlayer.Delegate {
    func player(_ player: IVSPlayer, didChangeState state: IVSPlayer.State) {
        if state == .ready {
            player.play()
        }
    }
}
```

Objective-C

```
// MyViewController.h

@class IVSPlayerView;
```

```
@interface MyViewController: UIViewController
...
// Connected in Interface Builder
@property (nonatomic) IBOutlet IVSPlayerView *playerView;
...
@end


// MyViewController.m

#import <AmazonIVSPlayer/AmazonIVSPlayer.h>

@implementation MyViewController <IVSPlayerDelegate>
...

- (void)viewDidLoad {
    [super viewDidLoad];

    NSNotificationCenter *defaultCenter = NSNotificationCenter.defaultCenter;
    [defaultCenter addObserver:self
                      selector:@selector(applicationDidEnterBackground:)
                          name:UIApplicationDidEnterBackgroundNotification
                        object:nil];
}

- (void)applicationDidEnterBackground:(NSNotification *)notification {
    [playerView.player pause];
}

// Assumes this view controller is already loaded.
// For example, this could be called by a button tap.
- (void)playVideoWithURL:(NSURL *)videoURL {
    IVSPlayer *player = [[IVSPlayer alloc] init];
    player.delegate = self;
    playerView.player = player;
    [player load:videoURL];
}

- (void)player:(IVSPlayer *)player didChangeState:(IVSPlayerState)state {
    if (state == IVSPlayerStateReady) {
        [player play];
    }
}
```

```
...
@end
```

IVS Player SDK: Video.js Integration

This document describes the most important functions available in the Amazon Interactive Video Service (IVS) Video.js player.

Latest version of Video.js player integration: 1.57.0 (Release Notes)

Getting Started

Amazon IVS support for Video.js is implemented through a Video.js tech. We provide support through script tags as well as through an npm module. Amazon IVS supports Video.js versions 7.6.6 and later 7*, and 8*.

Note that when instantiating the player, the Video.js sources option is not supported. Instead, instantiate the player normally and call the Video.js `src()` function. If autoplay is enabled, the stream will start playing; otherwise, use `play()` to start playback.

Demo

The following live demo shows how to use the Video.js integration with script tags from our Content Delivery Network: Amazon IVS Player Video.js integration.

Setup With Script Tag

To set up the Amazon IVS tech using the `script` tag:

1. Include the following tag (for the latest version of the player integration).

```
<script src="https://player.live-video.net/1.57.0/amazon-ivs-videojs-tech.min.js"></
script>
```

2. Register the tech using the `registerIVSTech` function:

```
registerIVSTech(videojs);
```

   where `videojs` is the object provided by Video.js.

3. When creating an instance of the player, add `AmazonIVS` as your first tech in the `techOrder` option.

When instantiating the player, the Video.js sources option is not supported. Instead, to set the source, instantiate the player normally, then call the Video.js `src()` function on it. If autoplay is enabled, the stream will start playing; otherwise, use `play()` to start playback.

Sample Code

In this example, PLAYBACK_URL is the source stream you want to load. The example uses the latest version of the Amazon IVS Player.

```
<!doctype html>
<html lang="en">
<head>
    <link href="https://cdnjs.cloudflare.com/ajax/libs/video.js/7.14.3/video-js.css"
 rel="stylesheet">
    <script src="https://cdnjs.cloudflare.com/ajax/libs/video.js/7.14.3/
video.min.js"></script>
    <script src="https://player.live-video.net/1.57.0/amazon-ivs-videojs-
tech.min.js"></script>
</head>

<body>
    <div class="video-container">
        <video id="amazon-ivs-videojs" class="video-js vjs-4-3 vjs-big-play-centered"
 controls autoplay playsinline></video>
    </div>
    <style>
        body {
            margin: 0;
        }

        .video-container {
            width: 640px;
            height: 480px;
            margin: 15px;
        }
    </style>
    <script>
        (function play() {
            // Get playback URL from Amazon IVS API
```

```
            var PLAYBACK_URL = '';

            // Register Amazon IVS as playback technology for Video.js
            registerIVSTech(videojs);

            // Initialize player
            var player = videojs('amazon-ivs-videojs', {
               techOrder: ["AmazonIVS"]
            }, () => {
               console.log('Player is ready to use!');
               // Play stream
               player.src(PLAYBACK_URL);
            });
        })();
    </script>
</body>
</html>
```

Setup With NPM

To use Amazon IVS player through npm:

1. Install the video.js npm package or ensure that your project has some other access to the Video.js library.
2. Install the `amazon-ivs-player` npm package:

   ```
   npm install amazon-ivs-player
   ```

3. When you're ready to register the Amazon IVS tech, import the `registerIVSTech` function:

   ```
   import { registerIVSTech } from 'amazon-ivs-player';
   ```

4. Register the tech using the `registerIVSTech` function:

   ```
   registerIVSTech(videojs, options);
   ```

   where:

   - `videojs` is the object provided by Video.js.
   - `options` is the options for the Amazon IVS tech layer. Supported options are:.
     - `wasmWorker`: URL where the `amazon-ivs-wasmworker.min.js` file is hosted.

- `wasmBinary`: URL where the `amazon-ivs-wasmworker.min.wasm` file is hosted.

The worker files are in your `node_modules/` folder under `amazon-ivs-player/dist/`. You need to host them, to use the IVS player.

5. When creating an instance of the player, add `AmazonIVS` as your first tech in the `techOrder` option:

```
const player = videojs('videojs-player', {
    techOrder: ["AmazonIVS"]
});
```

TypeScript

If you're using TypeScript, our npm package includes the following types you may want to import and use.

- `VideoJSEvents`, which describes the returned structure from `getIVSEvents()`.
- `VideoJSIVSTech`, which describes the interface to a player instance that uses the `AmazonIVS` tech. This can be intersected with the `VideoJsPlayer` type exposed by the @types/video.js npm package.
- `TechOptions`, which describes the interface defining the configuration options you can send to `registerIVSTech()`.

For more information on these types, see the Amazon IVS Player SDK: Web Reference.

Events

To listen to standard Video.js events, use the on function of the Video.js player.

To listen to events that are specific to Amazon IVS, add and remove event listeners on the Amazon IVS Web player:

```
player.getIVSPlayer().addEventListener(event, callback);
player.getIVSPlayer().removeEventListener(event, callback);
```

where `callback` is a callback you define, and `event` is one of: `PlayerEventType` or `PlayerState`. For more information about events, see the Amazon IVS Player SDK: Web Reference.

Errors

For general Video.js errors, listen to the generic `error` event on the player:

```
player.on("error", callback);
```

For errors specific to Amazon IVS, listen on the Amazon IVS player for its own errors:

```
let playerEvent = player.getIVSEvents().PlayerEventType;
player.getIVSPlayer().addEventListener(playerEvent.ERROR, callback);
```

The callback will receive an object with the following fields:

Field	Description
`type`	The error type. Corresponds to `ErrorType` events. For more information, see Amazon IVS Player SDK: Web Reference.
`code`	The error code.
`source`	Source of the error.
`message`	Human readable error message.

Plugins

We provide a plugin that creates a UI toggle for available qualities. To use this plugin, it must be loaded by including the `amazon-ivs-quality-plugin.min.js` file if you are using our tech through the following `script` tag (for the latest version of the IVS Player):

```
<script src="https://player.live-video.net/1.57.0/amazon-ivs-quality-plugin.min.js"></
script>
```

If you are using npm, import the `registerIVSQualityPlugin` from the `amazon-ivs-player` module:

```
import { registerIVSQualityPlugin } from 'amazon-ivs-player';
```

Then, once you create an instance of your Video.js player, the following calls are required to register and enable it:

```
registerIVSQualityPlugin(videojs); // where videojs is the video.js variable
player.enableIVSQualityPlugin(); // where player is the instance of the videojs player
```

This will create a UI menu button which allows you to select a quality for the stream.

Plugins and TypeScript

If you're using TypeScript, our npm package includes the `VideoJSQualityPlugin` type that you may want to import and use with our plugin. Plugins essentially are mixins, so this type interface is to be used as an intersection type with the `VideoJSIVSTech` typescript interface.

Content Security Policy

The Amazon IVS Video.js API is configured to work on pages that use Content Security Policy (CSP). See the section on "Working with Content Security Policy" in the IVS Player SDK: Web Guide.

Functions

Playback

The Amazon IVS Video.js API supports the necessary interfaces for internal use by the Video.js framework. The client application is not likely to need to use these methods directly, since Video.js does the necessary integration and presents a standard interface. However, if needed, one way to access internal Video.js and Amazon IVS player methods is to use the Video.js player object to get the needed object handle to the tech.

To access the API, retrieve the instance of your Video.js player as you would normally:

```
let player = videojs("videoTagId"); //replace videoTagId with your <video> tag's id
```

Then you can call functions on that instance.

The following are the subset of Video.js functions that the Amazon IVS tech layer overrides. For the full list of Video.js functions, see the video.js API documentation.

Function	Description and Amazon IVS-Specific Information
currentTime	Gets or sets the time (in seconds from the beginning). Amazon IVS: We do not recommend setting current time for live streams.
dispose	Deletes the player instance Amazon IVS: This also deletes the Amazon IVS tech backend.
duration	Returns the duration of the video, in seconds. Amazon IVS: For live streams, this returns `Infinity`.
load	Starts loading the `src()` data. Amazon IVS: This is a no-op.
play	Plays the stream that was set up via the `src` call. Amazon IVS: If a live stream was paused, this plays the live stream from the latest frames, instead of continuing from where it was paused.
playbackRate	Gets or sets the video-playback rate. 1.0 means normal speed; 0.5, half normal speed; 2.0, two times normal speed; and so on. Amazon IVS: On a live stream, a get returns 1, and a set is ignored.
seekable	Returns the `TimeRanges` of the media that can be seeked to. Amazon IVS: For live streams, calling `end(0)` on the return value (`TimeRange`) returns Infinity.

Amazon IVS Specific

The Amazon IVS Video.js tech has additional functions for accessing behaviors specific to Amazon IVS features:

Function	Description
getIVSPlayer	Returns the underlying Amazon IVS player instance. The full Amazon IVS Player Web API is available through this instance. We recommend using the basic Video.js playback API as much as possible, and using this function only to access Amazon IVS-specific features. The most common functions you are likely to need to access on the Amazon IVS player instance are `setQuality()` and `addEventListener()` / `removeEventListener()`.
getIVSEvents	Returns an object that holds Amazon IVS-specific enums. This is used for listening to Amazon IVS-specific errors. For more information, see Events and Errors.

currentTime

Gets or sets the time (in seconds from the beginning).

Amazon IVS: We do not recommend setting current time for live streams.

Signatures

```
currentTime
currentTime(time)
```

Parameter

Parameter	Type	Description
`time`	number	If `time` is absent, gets the current time. If `time` is present, sets video playback to that time.

Return Value

Type	Description
number	The current time, in seconds from the beginning.

dispose

Deletes the player instance.

Amazon IVS: This also deletes the Amazon IVS tech backend.

Signature

```
dispose()
```

Parameters

None

Return Value

None

duration

Returns the duration of the video, in seconds.

Amazon IVS: For live streams, this returns `Infinity`.

Signature

```
duration()
```

Parameters

None

Return Value

Type	Description
number	The duration of the stream, in seconds. For live streams, this value is `Infinity`.

getIVSEvents

Returns an object that holds Amazon IVS-specific enums. This is used for listening to Amazon IVS-specific errors and events. For more information, see:

- Events and Errors in this document.
- Amazon IVS Player SDK: Web Reference for more information about events, error types, and error sources.

Signature

```
getIVSEvents()
```

Parameters

None

Return Value

Type	Description
`object`	An object with `PlayerEventType` , `PlayerState` , and `ErrorType` keys, which map to their associated enums.

getIVSPlayer

Returns the underlying Amazon IVS player instance. The full Amazon IVS Player Web API is available through this instance. We recommend using the basic Video.js playback API as much as possible, and using this function only to access Amazon IVS-specific features. The most common

functions you are likely to need to access on the Amazon IVS player instance are `setQuality()` and `addEventListener()` / `removeEventListener()`.

Signature

```
getIVSPlayer()
```

Parameters

None

Return Value

Type	Description
`MediaPlayer`	The created instance of the player.

load

Starts loading the `src()` data.

Amazon IVS: This is a no-op.

Signature

```
load()
```

Parameters

None

Return Value

None

play

Plays the stream that was set up via the `src` call.

Amazon IVS: If a live stream was paused, this plays the live stream from the latest frames, instead of continuing from where it was paused.

Signature

```
play()
```

Parameters

None

Return Value

None

playbackRate

Gets or sets the video-playback rate. 1.0 means normal speed; 0.5, half normal speed; 2.0, two times normal speed; and so on.

Amazon IVS: On a live stream, a get returns 1, and a set is ignored.

Signatures

```
playbackRate
playbackRate(rate)
```

Parameter

Parameter	Type	Description
`rate`	number	The playback rate. Valid values: in the range [0.25, 2.0].

Return Value

Type	Description
number	The playback rate.

seekable

Returns the `TimeRanges` of the media that can be seeked to.

Amazon IVS: For live streams, calling `end(0)` on the return value (`TimeRange`) returns Infinity.

Signature

```
seekable()
```

Parameter

None

Return Value

Type	Description
`TimeRange`	TimeRange of the media that is available for seeking to.

IVS Player SDK: JW Player Integration

This document describes the most important functions available in the Amazon Interactive Video Service (IVS) JW Player integration.

Latest version of JW Player integration: 1.57.0 (Release Notes)

Getting Started

Amazon IVS support for JW Player is implemented through a Provider. Amazon IVS Provider is supported only on JW Player's web player. The Provider is loaded through a script tag, and any streams requiring Amazon IVS Provider playback must be tagged with `type: 'ivs'` in the playlist. Amazon IVS supports JW Player version 8.18.4 and later.

Setup

In these instructions, `JW_PLAYER_DIV` is the name of the `<div>` of your JW Player instance and `IVS_STREAM` is your IVS playback URL. To set up the Amazon IVS Provider and enable playback:

1. Include the following `script` tag (for the latest version of the player integration; in this case, 1.57.0):

```
<script src="https://player.live-video.net/1.57.0/amazon-ivs-jw-provider.min.js"></
script>
```

2. Use the `ivs` type to mark your IVS playlist items. Set the `cast` value in your `setup()` to `null` (since Chromecast is not supported).

```
jwplayer(JW_PLAYER_DIV).setup({
   playlist: [{
      file:IVS_STREAM,
      type: 'ivs',
   }]
});
```

3. If you want a reference to the underlying Amazon IVS Player to make Amazon IVS Player API calls or you want references to Amazon IVS-specific enums for callback handling, add a listener to the `'providerPlayer'` event:

```
jwplayer(JW_PLAYER_DIV).on('providerPlayer', function (player) {
   // player object has 'ivsPlayer' and 'ivsEvents' properties
   // ...callback code...
});
```

Sample Code

In this example, `JW_PLAYER_LIB` is the URL to your JW Player library script and `IVS_STREAM` is your IVS playback URL.

```
<!DOCTYPE html>
<html lang="en">
<head>
   <script src=JW_PLAYER_LIB></script>
   <script src="https://player.live-video.net/1.57.0/amazon-ivs-jw-provider.min.js"></
script>
</head>
<body>
   <div id='player'></div>
   <script>
```

```
      // set default values for ivsPlayer and ivsEvents
      var ivsPlayer = {};
      var ivsEvents = {};

      // define our player setup
      const ivsConfig = {
         playlist: [{
            file: IVS_STREAM,
            type: 'ivs',
         }]
      };

      jwplayer('player')
         .setup(ivsConfig)
         .on('providerPlayer', function (player) {
            console.log('Amazon IVS Player: ', player.ivsPlayer);
            console.log('Amazon IVS Player Events: ', player.ivsEvents);

            // store the reference to the Amazon IVS Player
            ivsPlayer = player.ivsPlayer;
            // store the reference to the Amazon IVS Player Events
            ivsEvents = player.ivsEvents;
         });
   </script>
</body>
</html>
```

Events

To listen to standard JW Player events, use the on function of the JW Player.

To listen to events that are specific to Amazon IVS, or to add and remove event listeners on the Amazon IVS Web player, you must listen to the `'providerPlayer'` event to get a reference to the Amazon IVS Player and then add event listening onto it. For example:

```
// store a default value for ivsPlayer
var ivsPlayer = {};

// store references to the Amazon IVS Player and Amazon IVS Events:
jwplayer(JW_PLAYER_DIV).on('providerPlayer', function (player) {
   ivsPlayer = player.ivsPlayer;
});
```

```
// set up event listening
ivsPlayer.addEventListener(event, callback);
ivsPlayer.removeEventListener(event, callback);
```

where `callback` is a callback that you define, and `event` is one of: `PlayerEventType`, `PlayerState`, or `ErrorType`. For more information about events, see the Amazon IVS Player SDK: Web Reference.

The `'providerPlayer'` event is emitted by JW Player, and the callback you register with it will receive an object with the following fields:

Field	Description
`ivsPlayer`	Returns the underlying Amazon IVS player instance. The full Amazon IVS Player Web API is available through this instance. We recommend using the basic JW Player playback API as much as possible, and using this function only to access Amazon IVS-specific features. The most common functions you are likely to need to access on the Amazon IVS player instance are `addEventListener()` and `removeEventListener()`.
`ivsEvents`	Returns an object with `PlayerEventType`, `PlayerState`, and `ErrorType` fields, which map to their associated Amazon IVS-specific enums. For more information, see Amazon IVS Player SDK: Web Reference.

Errors

For general JW Player errors, use the on function of the JW Player to listen to error events.

For errors specific to Amazon IVS, listen on the Amazon IVS player for its own errors:

```
// set default values for ivsPlayer and ivsEvents
var ivsPlayer = {};
var ivsEvents = {};

// store references to the Amazon IVS Player and Amazon IVS Events
jwplayer(JW_PLAYER_DIV).on('providerPlayer', function (player) {
   ivsPlayer = player.ivsPlayer;
   ivsEvents = player.ivsEvents;
});
```

```
// set up event listening:
let playerEvent = ivsEvents.PlayerEventType;
ivsPlayer.addEventListener(playerEvent.ERROR, callback);
```

The callback will receive an object with the following fields:

Field	Description
`type`	The error type. Corresponds to `ErrorType` events. For more information, see Amazon IVS Player SDK: Web Reference.
`code`	The error code.
`source`	Source of the error.
`message`	Human readable error message.

Content Security Policy

The Amazon IVS Provider API is configured to work on pages that use Content Security Policy (CSP). See the section on "Working with Content Security Policy" in the IVS Player SDK: Web Guide.

Limitations

The Provider does not support casting. If you enabled casting in the JW Player dashboard, you can disable it by setting `cast` to `null` when calling `setup()`. This hides the casting button.

Embedding Metadata within a Video Stream

Amazon Interactive Video Service (IVS) timed metadata provides a way to embed metadata in an Amazon IVS stream. It ensures that all your viewers receive the metadata at the same time in the video stream, regardless of stream latency or geographic location.

What is Timed Metadata?

Timed metadata is metadata with timestamps. It can be inserted into a stream programmatically, using the IVS API or the IVS broadcast SDK. When Amazon IVS processes a stream, the timed metadata is synchronized with the audio and video frames. During playback, all viewers of the stream get the metadata at the same time relative to the stream. The timecode serves as a cue point, which can be used to trigger an action based on the data, such as the following:

- Updating player statistics for a sports stream.
- Sending product details for a live shopping stream.
- Sending questions for a live quiz stream.

Amazon IVS timed metadata uses ID3 tags embedded in the video segments. As a result, they are available in the recorded video.

Setting Up IAM Permissions

Prerequisite: Before proceeding, you should have stepped through ??? (including creating an IAM user and setting up permissions).

Next, you must give your IAM user permission to use timed metadata. Follow these steps:

1. Sign in to the AWS Management Console and open the IAM console at https://console.aws.amazon.com/iam/.
2. In the navigation pane, choose **Users**, then choose the desired user (the user name you specified when you created an AWS account).
3. In the user **Summary** window, on the **Permissions** tab, choose **Add inline policy** (on the right side).
4. On the **JSON** tab, paste in this blob:

JSON

```
{
   "Version":"2012-10-17",
   "Statement": [
      {
        "Effect": "Allow",
        "Action": [
          "ivs:PutMetadata"
        ],
        "Resource": "arn:aws:ivs:*:*:channel/*"
      }
   ]
}
```

5. Still in the **Create Policy** window, choose **Review Policy**. Give the policy a **Name**, then choose **Create Policy**.
6. You're returned to the user **Summary** window, showing your new policy name.

Inserting Timed Metadata

You can insert timed metadata only into an active stream on a specified channel.

Using the AWS CLI

For testing, the easiest way to add timed metadata is with the AWS CLI. Using the AWS CLI requires that you first download and configure the CLI on your machine. You may have already done that when you stepped through *Getting Started with IVS*; if not, do it now. For details, see the AWS Command Line Interface User Guide.

Once you have the CLI:

1. Run the `put-metadata` command and pass in the channel ARN and your metadata:

```
aws ivs put-metadata --channel-arn <your-channel-arn> --metadata <your-metadata>
```

For example:

```
aws ivs put-metadata --channel-arn arn:aws:ivs:us-west-2:465369119046:channel/
GbiYJna5hFoC --metadata '{"question": "What does IVS stand for?", "correctIndex":
```

```
0, "answers": ["interactive video service", "interesting video service", "ingenious
video service"]}'
```

2. Amazon IVS checks whether the stream is live. If the stream is not live, you get an error; otherwise, the CLI returns without an error and the metadata (text blob) is inserted into the stream. This happens as soon as possible. There is no guarantee as to when this occurs; however, all viewers see the metadata at the same point in the stream.

Using the Amazon IVS API

To programmatically insert timed metadata, use the PutMetadata API operation.

Here is an example HTTP request:

```
POST /PutMetadata HTTP/1.1
{
    "channelArn": "my_channel",
    "metadata": "{\"question\": \"What does IVS stand for?\", \"correctIndex\":
 0, \"answers\": [\"interactive video service\", \"interesting video service\",
 \"ingenious video service\"]}"
}
```

Using the IVS Broadcast SDK

You can insert timed metadata inband using the IVS broadcast SDK. This may be useful to synchronize the metadata with the audio and video content.

- Android — In the `BroadcastSession` class, use `sendTimedMetadata`.
- iOS — In the `IVSBroadcastSession` class, use `sendTimedMetadata`.

Consuming Timed Metadata

Use the Amazon IVS Player to consume timed metadata embedded in a video stream. See IVS Player SDK and the rest of the Player documentation.

Below are example snippets that print any metadata received to the console using the Amazon IVS Player SDK. An event is triggered whenever playback reaches a segment with embedded metadata. (The event is `TEXT_METADATA_CUE` for Web, `onCue()` for Android, and `player(_:didOutputCue:)` for iOS.) You can use this event to initiate functionality within your

client application, such as updating an interactive widget. This event is triggered for both live and recorded content.

Amazon IVS Player SDK for Web:

```
const player = IVSPlayer.create();
player.addEventListener(IVSPlayer.PlayerEventType.TEXT_METADATA_CUE,
    function (cue) {
  console.log('Timed metadata: ', cue.text);
});
```

Amazon IVS Player SDK for Android:

```
@Override
public void onCue(@NonNull Cue cue) {
  if(cue instanceof TextMetadataCue) {
    Log.i("Timed Metadata: ", ((TextMetadataCue)cue).text);
  }
}
```

Amazon IVS Player SDK for iOS:

```
func player(_ player: IVSPlayer, didOutputCue cue: IVSCue) {
  if let textMetadataCue = cue as? IVSTextMetadataCue {
    print("Timed Metadata: \(textMetadataCue.text)")
  }
}
```

Note: Timed metadata is supported for iOS Safari and iOS Chrome in Player 1.3.0 and later.

Consuming SEI Data

When IVS real-time stages are recorded with individual participant recording enabled, SEI (Supplemental Enhancement Information) payloads are retained and published as `IVSPlayer.PlayerEventType.SEI` events. Below is an example snippet that prints out SEI data to the console when using the IVS web player SDK:

```
const player = IVSPlayer.create();
player.addEventListener(IVSPlayer.MetadataEventType.SEI, (event) => {
  const data = new TextDecoder().decode(event.data);
  const message = JSON.parse(data);
```

```
  console.log(message);
});
```

Note: For more information about SEI, see Supplemental Enhancement Information (SEI) in the *IVS Web Broadcast SDK Guide* for real-time streaming.

Sample Demo: Quiz App

Code samples of an interactive quiz app are available on GitHub. We use JSON via timed metadata to populate a quiz UI to display questions and answers. The answers are selectable and reveal whether the selection is correct.

Amazon IVS Player SDK Platform	Repo of Samples
Web	https://github.com/aws-samples/amazon-ivs-basic-web-sample Within this repo, see the quiz demo (and live demo).
Android	https://github.com/aws-samples/amazon-ivs-player-android-sample Within this repo, see the quiz demo.
iOS	https://github.com/aws-samples/amazon-ivs-player-ios-sample Within this repo, see the quiz demo.

Viewing Timed Metadata

If desired, you can view the timed metadata embedded in your live stream, in the console:

1. Open the Amazon IVS console.
2. In the top left, choose the hamburger icon to open the navigation pane, then choose **Live channels**.
3. Choose the channel whose stream you want to view, to go to a details page for that channel.

The live stream is playing in the **Live stream** section of the page.

4. At the bottom of the window, choose **Timed Metadata**.

   While the player is playing, as each timed-metadata event is received, its value and time received are displayed.

For More Information

See Using Amazon Interactive Video Service Timed Metadata, the first of a two-part blog series on using Amazon IVS timed metadata.

Setting Up IVS Private Channels

Amazon Interactive Video Service (IVS) offers customers the ability to create private channels, allowing customers to restrict their streams by channel or viewer. Customers control access to video playback by enabling *playback authorization* on channels and generating signed JSON Web Tokens (JWTs) for authorized playback requests.

Requiring playback authorization on a channel is optional. When a viewer tries to watch a stream, if the channel has authorization enabled, Amazon IVS verifies that the viewer has a valid playback token in the request. A playback token is a JWT that the Amazon IVS customer signs (with a playback authorization key) and includes with every playback request for a channel that has playback authorization enabled.

Topics

- How Session Protection Works
- Workflow for IVS Private Channels
- Create or Import an IVS Playback Key
- Enable Playback Authorization on IVS Channels
- Generate and Sign IVS Playback Tokens
- List IVS Playback Keys
- Delete IVS Playback Keys
- Get Information about IVS Playback Keys
- Revoke IVS Viewer Sessions

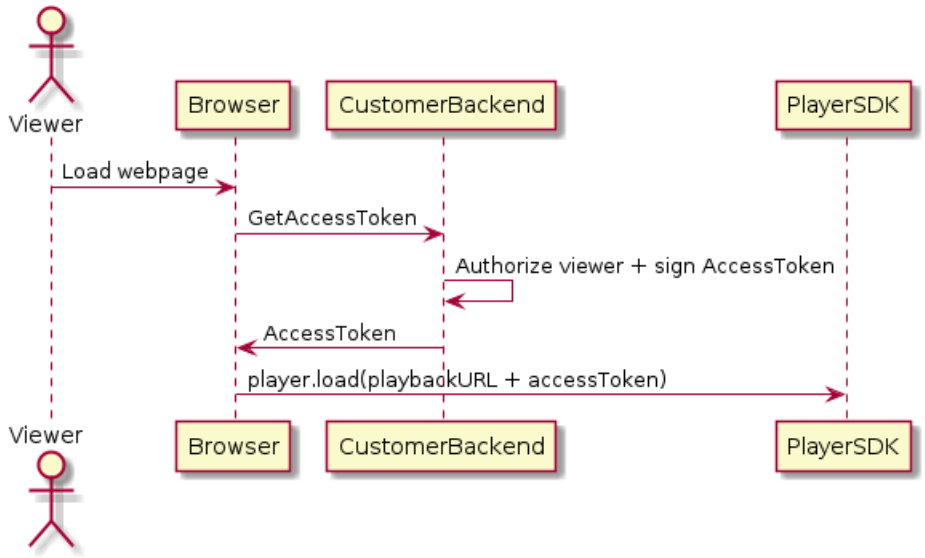
How Session Protection Works

When you request a playback URL with a valid playback token, IVS creates an authorized session and returns playlist and segment URLs that are unique to that session. These subsequent URLs do not contain a visible token parameter, but they are still tied to the authorized session.

Mechanisms are in place to mitigate sharing of session-bound URLs while still allowing legitimate usage patterns (e.g., mobile users switching between WiFi and cellular). If IVS detects unnatural usage, the authorized session is revoked and playback stops for all clients using that session.

Workflow for IVS Private Channels

This diagram illustrates the workflow for setting up IVS private channels:



1. When a viewer tries to load the webpage for a private stream, the browser requests an access token. (The customer provides the browser code to do this.)
2. The customer's backend app receives the access-token request and determines whether that viewer should be authorized to view the stream. If yes, the backend generates a JWT, uses the customer's private key to sign it, and returns the signed JWT in a playback request to the browser.
3. The browser loads the stream, using a request to the Amazon IVS player (or other player) SDK. The request contains the stream playback URL and the signed JWT.
4. Amazon IVS uses the customer's public key to verify that the JWT was signed using the correct private key.
5. If the JWT is verified, Amazon IVS plays the private stream for the viewer.

Customers are responsible for creating:

- The browser code to request access tokens.
- The backend server app that generates and signs JWTs.
- A playback authorization key pair. This has two parts: a public key that AWS retains and a private key that you download. With the private key, you sign the JWTs that authorize access to your private channel.

The method described above — using a network request from the browser to fetch tokens — is not the only way to implement playback authorization. Alternately, customers could send the signed playback tokens in the initial webpage, to reduce the number of network round trips that a viewer needs to make.

In the sections below, we describe how to make a channel private (enable playback authorization), generate and sign playback tokens, and work with playback key pairs.

Note: In the console instructions below, if the left navigation menu is not displaying, you can open it by choosing the hamburger icon in the top left.

Create or Import an IVS Playback Key

Amazon IVS allows a maximum of three key pairs that can be used to sign and verify playback tokens. Amazon IVS does not offer any key rotations.

Once imported, playback keys cannot be updated. Instead, you must delete the existing playback key and import a new key.

You need to generate an ECDSA public/private key pair to sign the JWTs and upload the public key to Amazon IVS as a playback-key resource. Then Amazon IVS can verify the signature in playback requests.

Creating a New Key Pair

There are various ways to create a key pair; below, we give two examples.

Console Instructions

To create a new key pair in the console, follow these steps. Note this process enables you to download only the private key.

1. Open the Amazon IVS console. Choose your channel's region if you are not already on it.
2. In the left navigation menu, choose **Playback security > Playback keys**.
3. Choose **Create playback key**. A **Create playback key** dialog appears.
4. Enter a name for the playback key and choose **Create**.
5. Amazon IVS generates a new key pair. The public key of this pair is saved to your AWS account and will be used to verify any playback requests that contain a token signed with the private key.

The private key is immediately downloaded to your machine and is not saved in the console or available for future download. ***Be sure you save the private key; you cannot retrieve it later.***

OpenSSL Instructions

Note: You may have to install OpenSSL before following these instructions.

To create a new P384 EC key pair with OpenSSL, follow these steps. This process enables you to access both the private and public keys. You need the public key only if you want to test verification of your tokens.

```
openssl ecparam -name secp384r1 -genkey -noout -out priv.pem
openssl ec -in priv.pem -pubout -out public.pem
```

Now import your new public key, using the instructions below.

Importing an Existing Public Key

If you already have a key pair, you can import the public key into IVS. The private key is not needed by our system but is employed by you to sign tokens.

Console Instructions

To import an existing public key with the console:

1. Open the Amazon IVS console. Choose your channel's region if you are not already on it.
2. In the left navigation menu, choose **Playback security > Playback keys**.
3. Choose **Import**. An **Import playback key** dialog appears.
4. Give the imported key a name, and browse for the public key file (or paste the public key file contents), then choose **Import**.
5. Amazon IVS imports your public key and generates a playback key resource.

CLI Instructions

To import an existing public key with the CLI:

```
aws ivs import-playback-key-pair --public-key-material "`cat public.pem`" --region
 <aws-region>
```

You can omit `--region <aws-region>` if the region is in your local AWS configuration file.

Here is an example response:

```
{
   "keyPair": {
      "arn": "arn:aws:ivs:us-west-2:693991300569:playback-key/f99cde61-c2b0-4df3-8941-
ca7d38acca1a",
      "fingerprint": "98:0d:1a:a0:19:96:1e:ea:0a:0a:2c:9a:42:19:2b:e7",
      "tags": {}
   }
}
```

API Request

For usage information, see ImportPlaybackKeyPair in the *IVS Low-Latency Streaming API Reference*.

```
POST /ImportPlaybackKeyPair HTTP/1.1
 {
   "publicKeyMaterial": "<pem file contents>"
 }
```

Enable Playback Authorization on IVS Channels

A channel's authorization requirement can be configured when the channel is created or later (using an update operation). Note that the steps are the same whether you want to enable or disable playback authorization.

Note that playback restriction policies (such as geo-blocking) cannot be used simultaneously with playback authorization. If playback authorization is enabled for a channel, any configured playback restriction policies will be ignored. To enforce geo-restrictions on a private channel, validate the user's location within your token generation logic before issuing a playback token.

Console Instructions

To enable authorization when creating a channel:

1. Open the Amazon IVS console. Choose your channel's region if you are not already on it.
2. In the **Get started** box (top right), choose **Create channel**.

3. On the **Channel create** page, choose **Custom configuration**.
4. In the **Playback authentication** section, turn on **Enable token-authentication requirement for video playback**.
5. Follow the rest of the prompts to create a channel. (See *Getting Started with IVS*.)

To enable authorization by updating an existing channel:

1. Open the Amazon IVS console. Choose your channel's region if you are not already on it.
2. In the left navigation menu, choose **Channels**.
3. Choose the checkbox for the channel you want to update, then choose **Edit**.
4. In the **Playback authentication** section, turn on **Enable token-authentication requirement for video playback**.
5. Click **Save changes**.

CLI Instructions

To enable authorization when creating a channel:

```
aws ivs create-channel --authorized --region <aws-region>
```

You can omit `--region <aws-region>` if the region is in your local AWS configuration file.

Here is an example response. Note that `authorized` is `true`.

```
{
    "streamKey": {
        "channelArn": "arn:aws:ivs:us-west-2:123456789:channel/fbc789c1-2c56-4ce6-a30a-
d99275dc4481",
        "value": "sk_us-west-2_abcd1234efgh5678ijkl",
        "arn": "arn:aws:ivs:us-west-2:123456789:stream-key/62f15f1b-fe31-4127-
b252-0666ac7f55a7",
        "tags": {}
    },
    "channel": {
        "name": "test-channel",
        "tags": {},
        "authorized": true,
        "latencyMode": "LOW",
```

```
        "ingestEndpoint": "jds34ksdg3las.global-contribute.live-video.net",
        "playbackUrl": "https://b37c565f6d79.us-west-2.playback.live-video.net/api/
video/v1/aws.ivs.us-west-2.123456789.channel.oU4OKS4LA1Dz.m3u8",
        "arn": "arn:aws:ivs:us-west-2:123456789:channel/fbc789c1-2c56-4ce6-a30a-
d99275dc4481"
    }
}
```

To enable authorization by updating an existing channel:

```
aws ivs update-channel --arn
arn:aws:ivs:us-west-2:693991300569:channel/742da049-fe9f-4f23-928e-c6753760a189
--authorized
```

This is just an example; you must specify your own channel ARN after `--arn`. As when creating a channel, `authorized` is `true` in the update response.

API Requests (Create and Update)

For usage information, see CreateChannel and UpdateChannel in the *IVS Low-Latency Streaming API Reference*.

```
POST /CreateChannel HTTP/1.1
{
  "name": "<your channel name>",
  "authorized": true
}
```

```
POST /UpdateChannel HTTP/1.1
{
  "arn": "<channel arn>",
  "authorized": true
}
```

Generate and Sign IVS Playback Tokens

For details on working with JWTs and the supported libraries for signing tokens, visit jwt.io. On the jwt.io interface, you must enter your private key to sign tokens. The public key is needed only if you want to verify tokens.

Token Schema

All JWTs have three fields: header, payload, and signature.

- The **header** specifies:
  - `alg` is the signing algorithm. This is ES384, an ECDSA signature algorithm that uses the SHA-384 hash algorithm.
  - `typ` is the token type, JWT.

```
{
  "alg": "ES384",
  "typ": "JWT"
}
```

- The **payload** contains data specific to Amazon IVS:
  - `channel-arn` is a reference for the video-playback request.
  - `access-control-allow-origin` is an optional field that can be used to restrict playback to a specified origin; i.e., to make a stream viewable from only a specified website. For example, you may want to prevent people from embedding the player on other websites. By default, playback is allowed on all origins. (Note that this restricts only the browser client; it does not restrict playback from a non-browser client.) This field may contain multiple origins, separated by commas. Wildcard domains are allowed: each origin may begin its hostname with * (example: https://*.amazon.com). If `strict-origin-enforcement` is `true`, at most 5 domains may be specified; otherwise, there is no maximum.
  - `strict-origin-enforcement` is an optional field that can be used to strengthen the origin restriction specified in the `access-control-allow-origin` field. By default, the `access-control-allow-origin` restriction applies only to the multivariant playlist. If `strict-origin-enforcement` is enabled, the server will enforce a requirement that the requesting origin matches the token for all playback requests (including multivariant playlist, variant playlist, and segments). This means that all clients (including non-browser clients) will have to provide a valid origin-request header with each request. Use the `setOrigin` method to set the header in the IVS iOS and Android player SDKs. It is set automatically in web browsers except iOS Safari. For iOS Safari, you need to add `crossorigin="anonymous"` to the video element, to ensure that the origin request header is sent. Example: `<video crossorigin="anonymous"></video>`.
  - `single-use-uuid` is an optional field which contains a valid universally unique identifier (UUID) that you generate as part of authoring the token. If you add this field and a UUID value,

the associated token that you generate is invalidated once it is used to fetch a multivariant playlist and watch a stream. Single-use auth tokens make it more difficult for malicious users to share a stream on your private channels with other viewers. Note that when using the `single-use-uuid` claim, the maximum value for the `exp` claim is 10 minutes in the future.

- `viewer-id` is an optional field which contains an ID used for tracking and referring to the viewer to whom the token is granted. This field is required to enable the ability to revoke the viewing session of the viewer in the future. The maximum length is 40 characters, and the value must qualify as a string. Do not use this field for personally identifying, confidential, or sensitive information. Note that when using `viewer-id`, the maximum value for `exp` is 10 minutes in the future.
- `viewer-session-version` is an optional field which contains a version to associate with this viewer session. When revoking viewer sessions, this value can be used to filter which viewer sessions are revoked. For example, specifying a Unix timestamp here would enable revocation of all sessions started before the specified time. The value must be a 64-bit signed integer (Int64). This field is meant to be provided (optionally) alongside `viewer-id`; it does nothing on its own. The default value is 0.
- `maximum-resolution` allows you to specify manifest filtering by resolution for a viewer session, based on viewer entitlements. For example, setting this field to `HD` means the viewer will receive a resolution less than or equal to `HD`.
- `ads-opt-out` is an optional field that allows you to opt a viewer out of receiving ads. Allowed values are `true` and `false`. The default value when this field is excluded is `false`. See Server-Side Ad Insertion for more information.
- `ads-player-params` is an optional field that allows you to pass parameters to Elemental MediaTailor as if they were player parameters. Keys that you put in this list are always namespaced as `player_params` template parameters. The total payload size for all keys and values combined is limited to 1000 bytes.
- `ads-playback-config-name` is an optional field that allows you to select which MediaTailor playback configuration is used for a viewing session. The value must match the name of one of the MediaTailor playback configurations specified in the channel's ad configuration. If omitted, the first configuration in the list is used. See Server-Side Ad Insertion for more information.
- `exp` is a Unix UTC timestamp for when the token expires. This does not indicate the length of time that the stream can be viewed. The token is validated when the viewer initializes playback, not throughout the stream. Enter this value as an integer type value.

Note that a Unix timestamp is a numeric value representing the number of seconds from 1970-01-01T00:00:00Z UTC until the specified UTC date/time, ignoring leap seconds. Different languages measure Unix timestamps in different units; e.g., JavaScript's `Date.now()` returns the time in milliseconds. (See `exp` in the JWT RFC section 4.1.4.)

```
{
    "aws:channel-arn": "<channel_arn>",
    "aws:access-control-allow-origin": "<your-origin>",
    "aws:strict-origin-enforcement": true,
    "aws:single-use-uuid": "<UUID>",
    "aws:viewer-id": "<viewer_id>",
    "aws:viewer-session-version": "<viewer_session_version>",
    "aws:maximum-resolution": "SD" | "HD" | "FULL_HD",
    "exp": <unix timestamp>
}
```

- To create the **signature**, use the private key with the algorithm specified in the header (ES384) to sign the encoded header and encoded payload.

```
ECDSASHA384(
  base64UrlEncode(header) + "." +
  base64UrlEncode(payload),
  <private-key>
)
```

Instructions

1. Generate the token's signature with the ES384 signing algorithm and a private key that is associated with one of your playback-key resources (see the ECDSASHA384 example above).
2. Assemble the token.

```
base64UrlEncode(header) + "." +
base64UrlEncode(payload) + "." +
base64UrlEncode(signature)
```

3. Append the signed token to the playback URL as a query parameter.

```
https://b37c565f6d790a14a0e78afaa6808a80.us-west-2.playback.live-video.net/
api/video/v1/aws.ivs.us-west-2.123456789.
```

```
channel.fbc789c1-2c56-4ce6-a30a-d99275dc4481.m3u8?token=<token>
```

Node.js Example

Below is one way to generate a token on the back end (via a microservice or serverless application) using Node.js.

```
import jwt from "jsonwebtoken";

const getToken = () => {
  const privateChannelArn = process.env.DEMO_PRIVATE_CHANNEL_ARN; // private channel
 ARN
  const privateChannelPrivateKey = process.env.DEMO_PRIVATE_CHANNEL_PRIVATE_KEY; //
 playback private key

  const payload = {
    "aws:channel-arn": privateChannelArn,
    "aws:access-control-allow-origin": "*",
    "exp": Date.now() + (60 * 1000), // expires in 1 minute
  };

  const token = jwt.sign(payload, privateChannelPrivateKey, { algorithm: 'ES384' });
  return token;
}
```

In your frontend application, you can retrieve this token and append it to the playback URL of the private channel, as shown below.

```
const streamUrl = `https://b37c565f6d790a14a0e78afaa6808a80.us-west-2.playback.live-
video.net/api/video/v1/aws.ivs.us-west-2.123456789.channel.fbc789c1-2c56-4ce6-a30a-
d99275dc4481.m3u8?token.m3u8?token=${token}`
const ivsPlayer = IVSPlayer.create();
ivsPlayer.attachHTMLVideoElement(document.getElementById('video-player'));
ivsPlayer.load(streamUrl);
ivsPlayer.play();
```

List IVS Playback Keys

Amazon IVS customers can get a list of all of their playback-key resources at any time.

Console Instructions

1. Open the Amazon IVS console. Choose your channel's region if you are not already on it.
2. In the left navigation menu, choose **Playback security > Playback keys**.

   All playback-key resources associated with your account are displayed. Deleted keys are not displayed, and there is no history of past keys.

CLI Instructions

```
aws ivs list-playback-key-pairs --region <aws-region>
```

You can omit `--region <aws-region>` if the region is in your local AWS configuration file.

Example response:

```
{
    "keyPairs": [
        {
            "arn": "arn:aws:ivs:us-west-2:991729659840:playback-key/3db9fc15-df57-4c02-
b5a6-d4ee3448b8ad",
            "fingerprint": "81:f3:8c:88:78:61:4e:bc:58:07:a3:ca:63:f5:72:08",
            "tags": {}
        },
        {
            "arn": "arn:aws:ivs:us-west-2:991729659840:playback-key/3ff88c71-
b18e-415f-948b-18bbde605a97",
            "fingerprint": "a2:b5:b3:0b:be:8e:73:00:0e:ad:e9:bb:02:c9:81:9a",
            "tags": {}
        }
    ]
}
```

API Request

For usage information, see ListPlaybackKeyPairs in the *IVS Low-Latency Streaming API Reference*.

```
POST /ListPlaybackKeyPairs HTTP/1.1
{
   "maxResults": number,
```

```
   "nextToken": "string"
}
```

Delete IVS Playback Keys

Amazon IVS customers can delete playback keys from their accounts. Deleted keys will remove the resource from the customer's account; playback tokens signed with deleted keys will not pass verification.

Console Instructions

1. Open the Amazon IVS console. Choose your channel's region if you are not already on it.
2. In the left navigation menu, choose **Playback security > Playback keys**.
3. Choose the key(s) you want to delete.
4. Choose **Delete**. A **Delete playback key** dialog appears.
5. Choose **Delete playback key**.

CLI Instructions

You can delete playback keys via the AWS CLI, if you have the key's ARN. Amazon IVS does not support batch deletes via the CLI.

```
aws ivs delete-playback-key-pair --arn arn:aws:ivs:us-west-2:991729659840:playback-key/3db9fc15-df57-4c02-b5a6-d4ee3448b8ad --region <aws-region>
```

You can omit `--region <aws-region>` if the region is in your local AWS configuration file.

On success, there is no response. You can run the `get` command (below) to verify that the key was deleted.

Here is an example error response:

```
An error occurred (ResourceNotFoundException) when calling the
DeletePlaybackKeyPair operation: ResourceNotFoundException:
```

API Request

For usage information, see DeletePlaybackKeyPair in the *IVS Low-Latency Streaming API Reference*.

```
POST /DeletePlaybackKeyPair HTTP/1.1
{
  "arn": "<playback key arn>"
}
```

Get Information about IVS Playback Keys

Amazon IVS customers can get information about their playback key resources. It is important to note that the associated private key will not be available, even in the case that the playback key was created by Amazon IVS via the console.

Console Instructions

1. Open the Amazon IVS console. Choose your channel's region if you are not already on it.
2. In the left navigation menu, choose **Playback security > Playback keys**.
3. Choose the key you want to get more details about and choose **View details**.

CLI Instructions

```
aws ivs get-playback-key-pair --arn arn:aws:ivs:us-west-2:991729659840:playback-
key/3db9fc15-df57-4c02-b5a6-d4ee3448b8ad --region <aws-region>
```

You can omit `--region <aws-region>` if the region is in your local AWS configuration file.

Example response:

```
{
    "keyPair": {
        "arn": "arn:aws:ivs:us-west-2:991729659840:playback-key/3ff88c71-
b18e-415f-948b-18bbde605a97",
        "fingerprint": "a2:b5:b3:0b:be:8e:73:00:0e:ad:e9:bb:02:c9:81:9a",
        "tags": {}
    }
}
```

API Request

For usage information, see GetPlaybackKeyPair in the *IVS Low-Latency Streaming API Reference*.

```
POST /GetPlaybackKeyPair HTTP/1.1
{
   "arn": "<playback key arn>"
}
```

Revoke IVS Viewer Sessions

Amazon IVS customers can revoke the viewer session associated with an auth token, to prevent and stop playback using that token. An example use case is transitioning a public stream to a private stream in which only a subset of the public stream viewers can continue watching.

For information on the `viewer-id` field mentioned in the instructions below, see the "Token Schema" under the section called “Generate and Sign Playback Tokens”.

CLI Instructions

You can revoke the viewer session via the AWS CLI, if you have the channel ARN and the viewer ID.

```
aws ivs start-viewer-session-revocation --channel-arn arn:aws:ivs:us-
west-2:991729659840:channel/abcdABCDefgh --viewer-id UDbh1u6M8nrOoarrzuKe --region
 <aws-region>
```

An optional input, `--viewer-session-versions-less-than-or-equal-to <version>` lets you specify a filter for which versions of the viewer session to revoke at once.

You can omit `--region <aws-region>` if the region is in your local AWS configuration file.

On success, there is no response.

Here is an example error response:

```
An error occurred (ValidationException) when calling the StartViewerSessionRevocation
 operation: ValidationException:
```

API Request

For usage information, see StartViewerSessionRevocation in the *IVS Low-Latency Streaming API Reference*.

```
POST /StartViewerSessionRevocation HTTP/1.1
{
  "channelArn": <channel ARN>,
  "viewerId": <viewer ID>,
  "viewerSessionVersionsLessThanOrEqualTo": <version>
}
```

There also is a BatchStartViewerSessionRevocation operation.

IVS Auto-Record to Amazon S3 | Low-Latency Streaming

This section provides information about the auto-record-to-S3 feature of Amazon IVS low-latency streaming. We discuss data storage for recorded Amazon IVS streams. We explain the storage contents and metadata file schema. We also discuss playback of your recorded content.

For details on ...	See ...
Setting up and stopping video recording	Create a Channel with Optional Recording in *Getting Started with Amazon IVS*
The API	IVS API Reference
Costs	Amazon IVS Costs

S3 Prefix

The S3 prefix is a unique directory structure for each live stream that is recorded. All media and metadata files for the live stream are written within this directory. For channels with recording enabled, the S3 prefix is generated when a live session starts and will be provided in the CloudWatch event at the start and end of a recording.

The S3 prefix has the following format:

```
/ivs/v1/<aws_account_id>/<channel_id>/<year>/<month>/<day>/<hours>/<minutes>/
<recording_id>
```

Where:

- `aws_account_id` is the ID of your AWS account (generated when you created an AWS account), from which the channel is created.
- `channel_id` is the resource ID part of the channel ARN (the last part of the Amazon Resource Name). See ARN in the Glossary.
- `<year>/<month>/<day>/<hours>/<minutes>` is a UTC timestamp when recording starts.
- `recording_id` is a unique ID generated for each recording session.

For example:

```
ivs/v1/123456789012/AsXego4U6tnj/2020/6/23/20/12/j8Z9091ndcVs
```

Recording Contents

When recording starts, video segments and metadata files are written to the S3 bucket that is configured for the channel. These contents are available for post-processing or playback as on-demand video.

Note that after a live stream starts and the Recording Start EventBridge event is emitted, it takes a little time before the manifest files and video segments are written. We recommend that you play back or process recorded streams only after the Recording End event is sent. (See Using Amazon EventBridge with IVS.)

The following is a sample directory structure and contents of a recording of a live Amazon IVS session:

```
ivs/v1/123456789012/AsXego4U6tnj/2020/6/23/20/12/j8Z9091ndcVs/
   events
      recording-started.json
      recording-ended.json
   media
      hls
      thumbnails
```

The `events` folder contains the metadata files corresponding to the recording event. JSON metadata files are generated when recording starts, ends successfully, or ends with failures:

- `events/recording-started.json`
- `events/recording-ended.json`
- `events/recording-failed.json`

A given `events` folder will contain `recording-started.json` and either `recording-ended.json` or `recording-failed.json`.

These contain metadata related to the recorded session and its output formats. JSON details are given below.

The `media` folder contains all supported media contents, in two subfolders:

- `hls` contains all media and manifest files generated during the live session and is playable with the Amazon IVS player. There are two types of HLS manifests in this folder, the standard master manifest `master.m3u8` and the byte-range enabled manifest `byte-range-multivariant.m3u8`. Therefore, each rendition folder has both `playlist.m3u8` and a `byte-range-variant.m3u8` files. (See Byte-Range Playlists below.)
- `thumbnails` contains thumbnail images generated during the live session. Thumbnails are generated and written to the bucket every minute. (To change this behavior, override the `thumbnailConfiguration` property on a recording configuration.)

Important: The contents within the `media` folder are dynamically generated and determined by the characteristics of the first received video segments; the folder contents may not represent the ultimate characteristics (e.g., rendition quality). *Do not make any assumptions about the static path.* To discover the HLS renditions available and its path, use the JSON metadata files described below.

Byte-Range Playlists

The auto-record-to-S3 feature supports byte-range playlist generation, in addition to standard HLS playlists. Byte-range playlists conform to version 4 of the HLS specification. This allows for more fine-grained content clipping: in a byte-range playlist, each segment in a rendition index file references a subrange of bytes of a video chunk, providing more granularity than the standard 10-second media file size. With a byte-range playlist, the segment duration is the same as the keyframe interval configured for the stream.

Thumbnails

The `thumbnailConfiguration` property on a recording configuration allows you to enable or disable the recording of thumbnails for a live session and modify the interval at which thumbnails are generated for the live session. Thumbnail intervals may range from 1 second to 60 seconds; by default, thumbnail recording is enabled, at an interval of 60 seconds. For details, see the Amazon IVS Low-Latency Streaming API Reference.

Thumbnail configuration also may include the `storage` field (`SEQUENTIAL` and/or `LATEST`) and a resolution (`LOWEST_RESOLUTION`, `SD`, `HD`, or `FULL_HD`). Below are the resolutions for each option:

160 <= `LOWEST_RESOLUTION` <= 360

360 < SD <= 480

480 < HD <= 720

720 < FULL_HD <= 1080

If `resolution` is unset for a stream that is using multitrack video input, thumbnails of all renditions are recorded. For information on multitrack, see Multitrack Video.

Merge Fragmented Streams

The `recordingReconnectWindowSeconds` property on a recording configuration allows you to specify a window of time (in seconds) during which, if your stream is interrupted and a new stream is started, Amazon IVS tries to record to the same S3 prefix as the previous stream. In other words, if a broadcast disconnects and then reconnects within the specified interval, the multiple streams are considered a single broadcast and merged together.

IVS Recording State Change events in Amazon EventBridge: Recording End events and *recording-ended* JSON metadata files are delayed by at least `recordingReconnectWindowSeconds`, as Amazon IVS waits to ensure a new stream is not started.

For instructions on setting up the merge-streams functionality, see Step 3: Create a Channel with Optional Recording in *Getting Started with Amazon IVS*.

Eligibility

For multiple streams to record to the same S3 prefix, certain conditions must be met for all the streams:

- Video width and height must be the same.
- Frame rate must be the same.
- The bitrate difference of subsequent streams must be less than or equal to 50% of the bitrate of the original stream.
- Video and audio codecs must be the same.

Notes:

- At most 20 streams are merged, after which a new S3 prefix is created.

- After 48 hours, a new S3 prefix is created. For example, if the first broadcast lasts for 48 hours and another broadcast is started within the `recordingReconnectWindowSeconds` interval, the next broadcast *is not* merged into the first S3 prefix.
- Rapid reconnects can result in a new broadcast starting before the previous broadcast is finished writing to S3, in which case the new broadcast *is not* merged into the previous S3 prefix. (Usually, writing to S3 completes within 10 seconds of a broadcast ending.) Rapid reconnects can occur in several scenarios, including: 1) quick mobile app background/foreground transitions, 2) when stream takeover isn't possible while using the auto-reconnect feature of IVS mobile broadcast SDKs, and 3) when calling StopStream triggers an automatic reconnect from the streaming-client software.

Known Issue

If `recordingReconnectWindowSeconds` is enabled and the Web Broadcast SDK is used, recording to the same S3 prefix may not work, as the Web Broadcast SDK dynamically changes bitrates and qualities.

JSON Metadata Files

When a recording state-change event occurs, a corresponding Amazon CloudWatch metric is generated and a metadata file is written within the S3 prefix. (See Monitoring Amazon IVS Low-Latency Streaming.)

This metadata is in JSON format. It comprises the following information.

Field	Type	Required	Description
`channel_arn`	string	Yes	ARN of the channel broadcasting the live stream.
`media`	object	Yes	Object that contains the enumerated objects of media content available for this recording. Valid values: `"hls"`, `"thumbnails"` .

Field	Type	Required	Description
`hls`	object	Yes	Enumerated field that describes the Apple HLS format output.
`duration_ms`	integer	Conditional	Duration of the recorded HLS content in milliseconds. This is available only when `recording_status` is `"RECORDING_ENDED"` or `"RECORDING_ENDED_WITH_FAILURE"`. If a failure occurred before any recording was done, this is 0.
`path`	string	Yes	Relative path from the S3 prefix where HLS content is stored.
`playlist`	string	Yes	Name of the HLS master playlist file.
`byte_range_playlist`	string	Yes	Name of the HLS byte-range multivariant playlist.
`renditions`	object	Yes	Array of renditions (HLS variant) of metadata objects. There always is at least one rendition.
`path`	string	Yes	Relative path from the S3 prefix where HLS content is stored for this rendition.
`playlist`	string	Yes	Name of the media playlist file for this rendition.
`byte_range_playlist`	string	Yes	Name of the byte-range playlist for this rendition.

Field	Type	Required	Description
`resolution_height`	int	Conditional	Pixel resolution height of the encoded video. This is available only when the rendition contains a video track.
`resolution_width`	int	Conditional	Pixel resolution width of the encoded video. This is available only when the rendition contains a video track.
`thumbnails`	object	Conditional	Enumerated field that describes thumbnails output. This is available only when the thumbnail configuration's `recordingMode` is `INTERVAL`.
`path`	string	Conditional	Relative path from the S3 prefix where thumbnail content is stored. This is available only when the thumbnail configuration's `recordingMode` is `INTERVAL`.
`resolution_height`	int	Yes	The height of the thumbnail. Default: resolution of the source rendition. This value is affected by user input in the related recording configuration; specifically, the `thumbnailConfiguration.resolution` value.

Field	Type	Required	Description
resolution_width	int	Yes	The width of the thumbnail. Default: resolution of the source rendition. This value is affected by user input in the related recording configuration; specifically, the thumbnailConfiguration.resolution value.
latest_thumbnail	object	Yes	Enumerated field that describes latest thumbnail output. This is available only when the thumbnail configuration's storage includes LATEST.
resolution_height	int	Yes	The height of the thumbnail. Default will be the resolution of the source rendition. This value is affected by user input in the related recording configuration; specifically, the thumbnailConfiguration.resolution value.
resolution_width	int	Yes	The width of the thumbnail. Default will be the resolution of the source rendition. This value is affected by user input in the related recording configuration; specifically, the thumbnailConfiguration.resolution value.

Field	Type	Required	Description
recording_ended_at	string	Conditional	RFC 3339 UTC timestamp when the recording ended. This is available only when recording_status is "RECORDING_ENDED" or "RECORDING_ENDED_WITH_FAILURE". recording_started_at and recording_ended_at are timestamps when these events are generated and may not exactly match the HLS video-segment timestamps. To accurately determine the duration of a recording, use the duration_ms field.
recording_started_at	string	Yes	RFC 3339 UTC timestamp when the recording started. See the note above for recording_ended_at.
recording_status	string	Yes	Status of the recording. Valid values: "RECORDING_STARTED", "RECORDING_ENDED", "RECORDING_ENDED_WITH_FAILURE".
recording_status_message	string	Conditional	Descriptive information on the status. This is available only when recording_status is "RECORDING_ENDED" or "RECORDING_ENDED_WITH_FAILURE".

Field	Type	Required	Description
`version`	string	Yes	The version of the metadata schema.

Example: recording_started.json

```
{
   "version": "v1",
   "channel_arn": "arn:aws:ivs:us-west-2:123456789012:channel/AsXego4U6tnj",
   "recording_started_at": "2020-06-12T12:53:26Z",
   "recording_status : "RECORDING_STARTED",
   "media": {
      "hls": {
         "path": "media/hls",
         "playlist": "master.m3u8",
         "byte_range_playlist": "byte-range-multivariant.m3u8",
         "renditions": [
            {
               "path": "480p30",
               "playlist": "playlist.m3u8",
               "byte_range_playlist": "byte-range-variant.m3u8",
               "resolution_height": 480,
               "resolution_width": 852
            },
            {
               "path": "360p30",
               "playlist": "playlist.m3u8",
               "byte_range_playlist": "byte-range-variant.m3u8",
               "resolution_height": 360,
               "resolution_width": 640
            },
            {
               "path": "160p30",
               "playlist": "playlist.m3u8",
               "byte_range_playlist": "byte-range-variant.m3u8",
               "resolution_height": 160,
               "resolution_width": 284
            },
            {
               "path": "720p60",
```

```
               "playlist": "playlist.m3u8",
               "byte_range_playlist": "byte-range-variant.m3u8",
               "resolution_height": 720,
               "resolution_width": 1280
            }
         ]
      },
      "thumbnails": {
         "path": "media/thumbnails",
         "resolution_height": 480,
         "resolution_width": 852
      },
      "latest_thumbnail": {
         "path": "media/latest_thumbnail/thumb.jpg",
         "resolution_height": 480,
         "resolution_width": 852
      }
   }
}
```

Example: recording_ended.json

```
{
   "version": "v1",
   "channel_arn": "arn:aws:ivs:us-west-2:123456789012:channel/AsXego4U6tnj",
   "recording_ended_at": "2020-06-14T12:53:20Z",
   "recording_started_at": "2020-06-12T12:53:26Z",
   "recording_status": "RECORDING_ENDED",
   "media": {
      "hls": {
         "duration_ms": 172794489,
         "path": "media/hls",
         "playlist": "master.m3u8",
         "byte_range_playlist": "byte-range-multivariant.m3u8",
         "renditions": [
            {
               "path": "480p30",
               "playlist": "playlist.m3u8",
               "byte_range_playlist": "byte-range-variant.m3u8",
               "resolution_height": 480,
               "resolution_width": 852
            },
            {
```

```
            "path": "360p30",
            "playlist": "playlist.m3u8",
            "byte_range_playlist": "byte-range-variant.m3u8",
            "resolution_height": 360,
            "resolution_width": 640
         },
         {
            "path": "160p30",
            "playlist": "playlist.m3u8",
            "byte_range_playlist": "byte-range-variant.m3u8",
            "resolution_height": 160,
            "resolution_width": 284
         },
         {
            "path": "720p60",
            "playlist": "playlist.m3u8",
            "byte_range_playlist": "byte-range-variant.m3u8",
            "resolution_height": 720,
            "resolution_width": 1280
         }
      ]
   },
   "thumbnails": {
      "path": "media/thumbnails",
      "resolution_height": 480,
      "resolution_width": 852
   },
   "latest_thumbnail": {
      "path": "media/latest_thumbnail/thumb.jpg",
      "resolution_height": 480,
      "resolution_width": 852
   }
 }
}
```

Example: recording_failed.json

```
{
   "version": "v1",
   "channel_arn": "arn:aws:ivs:us-west-2:123456789012:channel/AsXego4U6tnj",
   "recording_ended_at": "2020-06-14T12:53:20Z",
   "recording_started_at": "2020-06-12T12:53:26Z",
   "recording_status": "RECORDING_ENDED_WITH_FAILURE",
```

```
   "recording_status_message": "InternalServerException",
   "media": {
      "hls": {
         "duration_ms": 172794489,
         "path": "media/hls",
         "playlist": "master.m3u8",
         "renditions": [
            {
               "path": "480p30",
               "playlist": "playlist.m3u8",
               "resolution_height": 480,
               "resolution_width": 852
            },
            {
               "path": "720p60",
               "playlist": "playlist.m3u8",
               "resolution_height": 720,
               "resolution_width": 1280
            }
         ]
      },
      "thumbnails": {
         "path": "media/thumbnails",
         "resolution_height": 480,
         "resolution_width": 852
      },
      "latest_thumbnail": {
         "path": "media/latest_thumbnail/thumb.jpg",
         "resolution_height": 480,
         "resolution_width": 852
      }
   }
}
```

Discovering the Renditions of a Recording

When you stream content to an Amazon IVS channel, auto-record-to-s3 uses the source video to generate multiple renditions. Using Adaptive Bitrate Streaming (ABR), the Amazon IVS Player automatically switches the renditions (bitrates) as needed to optimize playback for varying network conditions.

Each rendition generated during live streaming is recorded in a unique path within the S3 recording prefix. The resolution detail, path, and playlist file names are stored in a JSON metadata file during the start and stop of the recording. If the recording configuration's `renditionSelection` value is `ALL`, all renditions are selected for recording. If `renditionSelection` is `CUSTOM`, the user must select one or more of the following options: `LOWEST_RESOLUTION`, `SD`, `HD`, and `FULL_HD`. Below are the resolutions for each option:

160 <= `LOWEST_RESOLUTION` <= 360

360 < `SD` <= 480

480 < `HD` <= 720

720 < `FULL_HD` <= 1080

Important: *Do not* make any assumptions about the static rendition path or the list of generated renditions, as these are subject to change. *Do not* assume that a specific rendition will always be available for an Amazon IVS recording. To determine the available renditions, resolutions, and paths, refer to the metadata files.

The `event/recording_started.json` or `event/recording_ended.json` file within the recording prefix contains the paths and names of media files within the recording prefix. All `path` elements are relative to the previous path in the hierarchy. Elements under `media > hls` describe HLS assets, with master playlist name and path defined at this level.

Here is a Python code snippet that shows how to generate a master playlist path using the S3 recording prefix and metadata file:

```
def get_master_playlist(metadata_json, s3_recording_prefix):
   return s3_recording_prefix + '/' + metadata_json['media']['hls']['path'] + '/' +
 metadata_json['media']['hls']['playlist']
```

Elements under `media > hls > renditions` describe the list of renditions recorded. The `resolution_height` and `resolution_width` properties can be used to identify the video resolution. The `path` and `playlist` elements can be used to derive the rendition playlist path. Use these fields to determine which rendition to use for any post processing.

To discover the highest available rendition playlist for a recording, you can subscribe to "IVS Recording State Change" EventBridge events. (See Using Amazon EventBridge with IVS.) Below is a sample Python script that illustrates using a lambda function subscribed to those events.

```
import json
import boto3
s3 = boto3.resource('s3')

def get_highest_rendition_playlist(bucket_name, prefix_name):
   object_path = "{}/events/recording-started.json".format(prefix_name)
   object = s3.Object(bucket_name, object_path)
   body = str(object.get()['Body'].read().decode('utf-8'))
   metadata = json.loads(body)
   media_path = metadata["media"]["hls"]["path"]
   renditions = metadata["media"]["hls"]["renditions"]

   highest_rendition = None
   highest_rendition_size = 0

   for rendition in renditions:
       current_rendition_size = rendition["resolution_height"]
       if (current_rendition_size > highest_rendition_size):
           highest_rendition_size = current_rendition_size
           highest_rendition = rendition

   highest_rendition_playlist = media_path + '/' + highest_rendition['path'] + '/' +
 highest_rendition['playlist']
   return highest_rendition_playlist


def lambda_handler(event, context):
   prefix_name = event["detail"]["recording_s3_key_prefix"]
   bucket_name = event["detail"]["recording_s3_bucket_name"]
   rendition_playlist = get_highest_rendition_playlist(bucket_name, prefix_name)
   print("Highest rendition playlist: {}/{}".format(prefix_name, rendition_playlist))

   return {
       'statusCode': 200,
       'body': rendition_playlist
   }
```

Playback of Recorded Content from Private Buckets

Objects recorded with the Auto-Record to Amazon S3 feature are private by default; hence, these objects are inaccessible for playback using the direct S3 URL. If you try to open the HLS master manifest (m3u8 file) for playback using the Amazon IVS player or another player, you will get an

error (e.g., "You do not have permission to access the requested resource"). Instead, you can play back these files with the Amazon CloudFront CDN (Content Delivery Network).

Amazon CloudFront Distribution

CloudFront distributions can be configured to serve content from private buckets. Typically this is preferable to having openly accessible buckets where reads bypass the controls offered by CloudFront. Your distribution can be set up to service from a private bucket by creating an origin access control (OAC), which is a special CloudFront user that has read permissions on the private origin bucket. You can create the OAC after you create your distribution, through the CloudFront console or API. See Creating a new origin access control.

Playback from Amazon CloudFront

Once you have set up your distribution using an OAC to gain access to your private bucket, your video files should be available for consumption through the CloudFront URL. Your CloudFront URL is the **Distribution domain name** on the **Details** tab in the AWS CloudFront console. It should be something like this:

a1b23cdef4ghij.cloudfront.net.

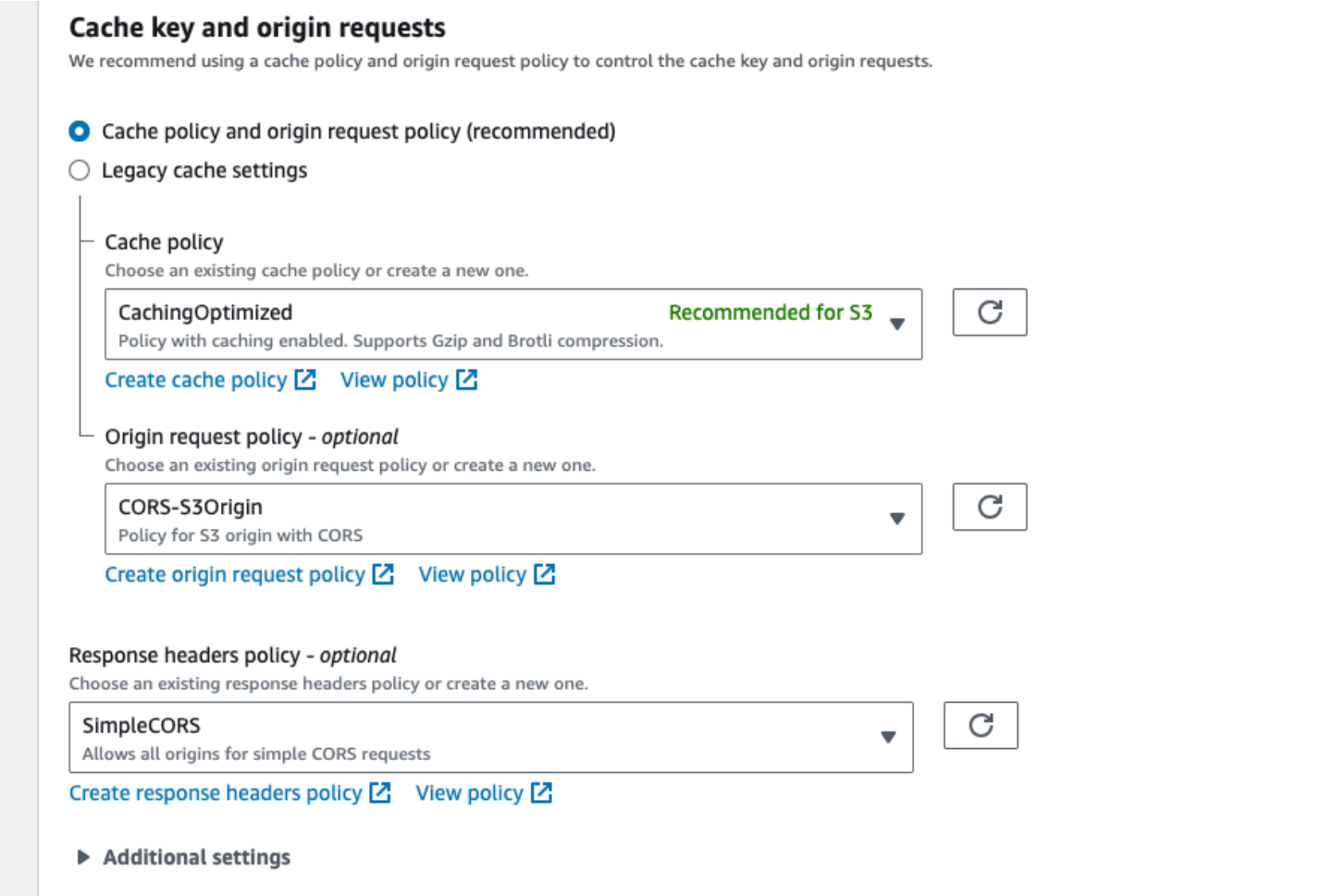
To stream your recorded video through your distribution, find the object key for your `master.m3u8` file. It should be something like this:

```
ivs/v1/012345678912/a0bCDeFGH1IjK/2021/4/20/12/03/aBcdEFghIjkL/media/hls/master.m3u8
```

Append the object key to the end of your CloudFront URL. Your final URL will be something like this:

```
https://a1b23cdef4ghij.cloudfront.net/ivs/v1/012345678912/
a0bCDeFGH1IjK/2021/4/20/12/03/aBcdEFghIjkL/media/hls/master.m3u8
```

To play back from a web browser, make sure to configure CORS in both CloudFront and S3 bucket. For CloudFront configuration, follow the instructions in Creating origin request policies to attach a **CORS-S3 Origin** request policy and **SimpleCORS** response header policy to the CloudFront distribution. See the example configuration console page below:



For S3 CORS configuration, see CORS configuration to create appropriate rules for your S3 bucket.

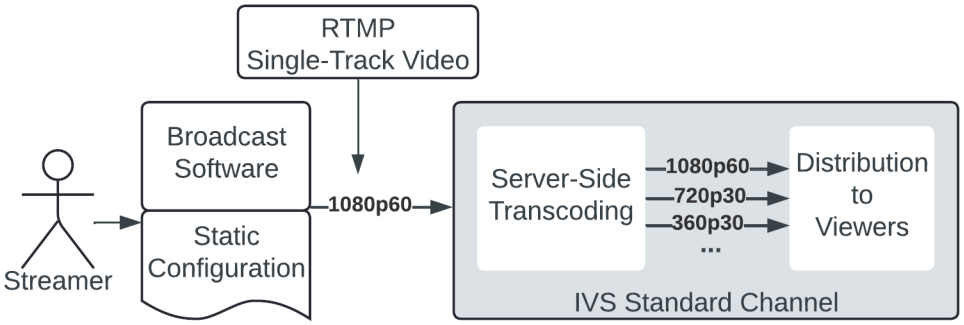
Now you can play back your recorded video as if you were playing directly from a bucket.

For more information, see Restricting access to an Amazon S3 origin.

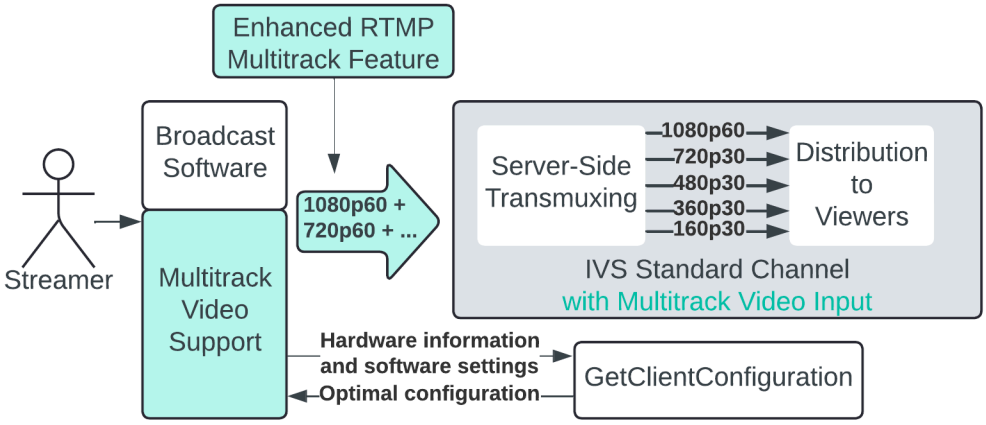
Amazon IVS Multitrack Video

Multitrack video is a new, low-latency streaming paradigm supported by Amazon Interactive Video Service (IVS) and services that use Amazon IVS.

Here is single-track video:



In contrast, here is multitrack video:



Multitrack video streaming allows broadcaster software tools (e.g., OBS Studio) to:

- Encode and stream multiple video qualities directly from their GPU-powered computer.
- Automatically configure encoder settings for the best possible stream.
- Deliver a high quality Adaptive Bitrate (ABR) viewing experience.

Multitrack enables this to be done without requiring expensive, server-side transcoding, which is required to deliver ABR viewing experiences for single-track video streams.

Streams that use multitrack video can exhibit higher visual quality by taking advantage of underutilized encoder silicon already in consumer GPUs. Because multitrack video is encoded only

once at the edge, it delivers lower glass-to-glass latency and avoids generation loss (as opposed to being decoded, scaled, and lossily re-encoded in a data center).

Also, creators and other end users no longer need to worry about encoder settings like resolution, framerate, bitrate, and profiles. Instead, broadcast software tools use the `GetClientConfiguration` API operation. `GetClientConfiguration` automatically configures multiple encoders to optimize for the best viewer experience at the highest visual quality, given the constraints of the content creator's preferences and the capabilities of their CPU, GPU, OS, driver, and network.

Resolutions for IVS

Resolutions for IVS are defined as follows:

- Standard Definition (SD) — less than or equal to 480 resolution
- High Definition (HD) — more than 480, but less than or equal to 720 resolution
- Full High Definition (Full HD) — more than 720, but less than or equal to 1080 resolution

Further Reading

If you are interested in integrating IVS APIs and SDKs into your applications, see the Multitrack Video Setup Guide.

If you are interested in integrating support for multitrack video into creator broadcast software or a third-party streaming service, see the Multitrack Video Broadcast Software Integration Guide and the Veovera Software Organization's Enhanced RTMP Specification v2.

Amazon IVS Multitrack Video: Setup Guide

This document is focused on customers that integrate Amazon IVS APIs and SDKs into their applications.

Adopting Multitrack Video Streaming

To adopt multitrack video, there are two required channel configurations and a recommended thumbnail configuration.

Required: Configure Channel ContainerFormat

Multitrack video may configure the broadcast software to use advanced codecs (e.g., HEVC), which are not compatible with MPEG2 Transport Stream (TS) files. Before using multitrack video, you must set `Channel.ContainerFormat` to `FRAGMENTED_MP4`.

Changing the `ContainerFormat` value changes the format of media files for both live distribution and S3 recordings (if enabled). You may need to update third-party player applications or downstream workflows that depend on the media container format.

Required: Configure Channel MultitrackInputConfiguration

Broadcast software tools that support IVS multitrack video are required to implement automatic stream configuration through the GetClientConfiguration API operation. For broadcast-software integration details, see the Multitrack Video Broadcast Software Integration Guide.

Channels with multitrack inputs have a more dynamic ABR ladder (on a per-channel and streaming-session basis) that is optimized for the creator's setup, the network environment, and the IVS control plane. When content creators start streaming with their software (e.g., OBS Studio), the client collects and sends to GetClientConfiguration the following information:

- The creator's preferences, including display/canvas resolution, maximum aggregate bitrate, reserved encoder sessions/bandwidth, and framerate.
- The creator's hardware/OS metadata, including GPU model, GPU memory, GPU driver version, OS version, CPU model, and system memory.

A server-side algorithm scores and ranks the configurations, to deliver a configuration that:

- Optimizes the viewer experience (highest resolution, framerate, bitrate, and number of renditions).
- Is safely supported by the streamer's setup.
- Obeys limits configured by the `MultitrackInputConfiguration` channel property.

Finally, the broadcast software applies the configuration and starts sending multiple video tracks using the enhanced RTMP protocol.

To adopt multitrack video, you must configure `Channel.MultitrackInputConfiguration` and the sub-properties specified in MultitrackInputConfiguration.

- To balance cost and quality, determine the correct value for `Channel.MultitrackInputConfiguration.MaximumResolution`, to set a maximum input resolution on a per-channel basis. When the broadcast client calls GetClientConfiguration, this field determines the resolution of the largest possible input track. If any client sends a different number of tracks, or the per-track resolution, framerate, codec, or bitrate do not match the GetClientConfiguration response, the client will be disconnected.
- To provide your broadcasters with flexibility in adoption, configure `Channel.MultitrackInputConfiguration.Policy` to `allow` or `require` broadcast clients to connect with multitrack input. When the client connects using RTMP, this field determines if the broadcaster is allowed or required to send multitrack video. You can choose to make it simpler for broadcasters to slowly adopt multitrack video flexibility (with `allow`) or require broadcasters to use multitrack clients to optimize for lower cost (with `require`).

Recommended: Review and Update ThumbnailConfiguration

If you enable thumbnailing for multitrack-enabled channels, a multitrack client is connected, and you do not specify a `resolution`, thumbnails for all input tracks are recorded. To control costs, you may want to specify a specific rendition.

The paths for the highest quality path are at the same relative locations for multitrack-input and single-track input streams. The thumbnails for additional tracks are recorded to an `additional_thumbnails` sub-key. We recommend that you use the metadata JSON file written to S3, to identify the appropriate thumbnail paths.

Broadcaster System and Environmental Requirements

Broadcast clients that support IVS multitrack video are required to implement the GetClientConfiguration API operation, to automatically configure broadcaster stream settings. In the real world, limitations include older GPUs, poor first-mile networks, specific user settings, contention of GPU resources, and limited platform codec support. When faced with these limitations, automatic stream configuration should fall back gradually and sensibly; for example:

- Vary the aggregate bitrate between 10.2 Mbps (5 renditions) and 1.5 Mbps (2 renditions).
- Vary the highest quality track's maximum resolution from 1080p (4 or 5 renditions) down to 480p (2 renditions).
- Vary the number of renditions between 5 (1080p, 720p, 480p, 360p, 160p) and 2 (480p, 360p).

- Vary the selection of renditions across an expansive set of supported resolutions (1080p, 720p, 540p, 480p, 360p, 240p, and 160p).
- Vary the bitrates of individual renditions from 6 Mbps (e.g., 1080p60 AVC) down to 200 Kbps (e.g., 160p AVC).
- Vary the framerate between high (60, 50, or 48 fps) and standard (30, 25, or 24 fps).
- Vary the video codec to balance safety/viewer support and codec efficiency (H.264/AVC and H.265/HEVC).
- Vary the scaler algorithm to balance GPU resources (e.g., Lanczos, bicubic, and bilinear).
- Vary video-encoding settings (including codec profile, encoder preset, look-ahead window, psycho visual AQ, and number of B-frames), depending on the GPU vendor and driver version.

The following table provides our recommendations in terms of hardware, software, and environmental configuration:

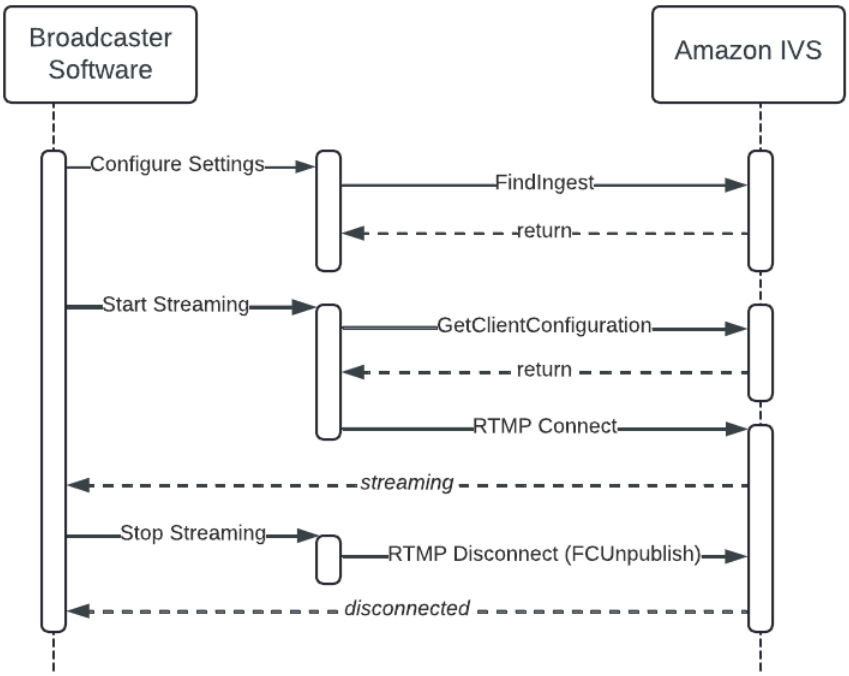
Use Case	**FULL_HD Streaming**
GPU and driver version	NVIDIA GeForce 900-series or newer with NVIDIA driver 545.92 or newer AMD Radeon RX 6000/7000 Series or newer with AMD Adrenalin 24.4.1 minimum
Display	1920x1080 at 60fps
Sustained upstream bandwidth	12 Mbps
Operating system	Windows 10 or Windows 11
Broadcast software	OBS Studio v30.2 (or newer)

Amazon IVS Multitrack Video: Broadcast Software Integration Guide

Introduction

For a third-party broadcaster software tool or service to claim that it supports IVS multitrack video, it must follow this guide and implement the two required features, automatic stream configuration and broadcast performance metrics. We highly recommend also implementing the Recommended Features.

The following diagram shows the high-level interactions between your broadcast software and Amazon IVS:



Audience

This document is intended for software developers who want to implement client support for multitrack video for:

- *Creator broadcaster software* designed to stream to Amazon IVS or to services that use Amazon IVS multitrack video.
- *Third-party streaming platforms* that offer server-side simulcast or transcoding, with users who stream to Amazon IVS or services that use Amazon IVS multitrack video.

Terminology

This document uses some terms interchangeably:

- **User, creator, broadcaster** — The end user who employs broadcast software to create and stream original content.
- **Service, platform** — A video platform or service like Amazon IVS.
- **Customer** — A business that may use a service like Amazon IVS to power a video site.

Required Feature: Automatic Stream Configuration

Automatic stream configuration helps users get started quickly and automatically improves the quality of streams over time. Instead of users manually choosing settings (e.g., bitrate, resolution, framerate) that are set once and rarely tweaked, automatic stream configuration considers current software settings, hardware configuration, and platform support every time the user starts a new stream. For example, when a user upgrades the setup (e.g., with a new GPU), installs a new GPU driver, or the destination starts to support a new codec (e.g., H.265/HEVC), automatic stream configuration reacts and improves the quality of the user's next stream.

Going Live

When a user starts streaming, your software must query information about the user's hardware and software setup, call GetClientConfiguration, configure the video scaler/encoders, and open an enhanced RTMP (E-RTMP) connection. These steps are described in more detail below.

Use GetClientConfiguration

GetClientConfiguration requires information about the user's hardware and software setup.

The algorithm considers many factors to deliver a configuration that:

- Optimizes for the best viewer experience – highest resolution, highest framerate, highest bitrate, highest number of tracks, newest/best codecs, and best video-encoder settings.
- Is safely supported by the streamer's setup and broadcast software, the limits configured by the user, and the destination service.

In the real world, limitations include older GPUs, poor first-mile networks, specific user settings, contention of GPU resources, and limited platform codec support. When faced with these

limitations, automatic stream configuration should fall back gradually and in sensible ways. For example:

- Vary the streaming bandwidth required between 10.2 Mbps (5 renditions) and 1.5 Mbps (2 renditions).
- Vary the highest quality track's maximum resolution from 1080p (4 or 5 renditions) down to 480p (2 renditions).
- Vary the number of renditions between 5 (1080p, 720p, 480p, 360p, 160p) and 2 (480p, 360p).
- Vary the selection of renditions across an expansive set of supported resolutions (1080p, 720p, 540p, 480p, 360p, 240p, and 160p).
- Vary the bitrates of individual renditions from 6 Mbps (e.g., 1080p60 AVC) down to 200 Kbps (e.g., 160p AVC).
- Vary the frame rate between high (60, 50, or 48 fps) and standard (30, 25, or 24 fps).
- Vary the video codec to balance safety/viewer support and codec efficiency (e.g., H.264/AVC or H.265/HEVC).
- Vary the scaler algorithm to balance GPU resources (e.g., Lanczos, bicubic, and bilinear).
- Vary video-encoding settings (including codec profile, encoder preset, look-ahead window, psycho visual AQ, and number of B-frames), depending on the GPU vendor and driver version (e.g., P6 on NVIDIA GeForce RTX 4080 down to P4 on NVIDIA GeForce GTX 950).

Exposing Preferences to the User

You must enable the user to configure the following settings:

- Output resolution
- Output frame rate
- Maximum video tracks
- Maximum streaming bitrate

Optional: Setting Limits in the Broadcast Software

Your software or service may provide defaults or constrain the user's ability to configure these settings. For example, if your software or service needs to retain GPU resources and you want to limit the number of video-encoder sessions used by multitrack video, you could choose to limit your users to 3 **Maximum Video Tracks** and clearly indicate to the user that **Auto** means "up to 3."

Limits Set by the Destination

The stream key in the GetClientConfiguration request is required so the service can identify the channel and determine if there are per-channel constraints. For example, Amazon IVS provides a `multitrackInputConfiguration.maximumResolution` property for `STANDARD` channels. This can be used to limit the resolution of any individual track, so customers can make available special qualities (e.g., 720p60 or 1080p60 streaming) to specific creators or otherwise control their output cost.

Handling Warnings and Errors

GetClientConfiguration returns warnings and errors in different circumstances, so you must implement user-facing support to handle both warnings and errors.

Warnings are informational. The user should be permitted to either continue streaming or cancel. Here is an example of a warning:

- The NVIDIA driver version installed on the user's machine will no longer be supported on date DD/MM/YYYY.

Errors are considered fatal. The user should not be permitted to continue streaming. Here are examples of errors:

- The channel is not configured to support multitrack video.
- Out of date / Unsupported GPU driver version.
- Your GPU is not supported.
- The stream key provided is invalid.
- Your frame rate 59.94 is not supported by Amazon IVS Multitrack Video. In Settings > Video, select one of the following supported values: 24, 25, 30, 48, 50, 60.
- Configuration request is missing required data (GPU driver version, GPU model, etc).

Configure Video Scaling and Encoding

GetClientConfiguration returns scaling and encoding settings that optimize for the best possible viewer experience, without impacting the performance of the application (e.g., game/broadcast software) and taking into account the user's settings. Use the exact scaling and encoding settings returned by GetClientConfiguration. GetClientConfiguration takes into account the specific needs of different vendors and GPU architectures that change over time.

In addition to the scaling and encoding settings (like preset), you must:

- *Align all encoders and ensure that IDRs for all renditions have the same PTS.* This is required to avoid the need for server-side transcoding to align multiple renditions when video is distributed and viewed using segmented HLS. If IDRs are not aligned across video tracks, viewers will experience time shifting and stuttering during rendition switching in ABR playback. (For a visualization, see the figure in Broadcast Performance Metrics.)
- *Clone SEI/OBU data (e.g., captions) across all video tracks.* This is required so the video player can access SEI/OBU data regardless of the individual quality being watched.

Connect Using Enhanced RTMP

For documentation on multitrack streaming via enhanced RTMP, see the Enhanced RTMP v2 specification.

When connecting with enhanced RTMP, Amazon IVS multitrack video has several requirements:

- The primary, highest quality video track must be packaged and sent as enhanced RTMP single-track video packets. For example, `videoPacketType` can be `CodedFrames`, `CodedFramesX`, `SequenceStart`, and `SequenceEnd`.
- All additional video tracks must be packaged and sent as enhanced RTMP multitrack video packets (e.g., `videoPacketType` is `Multitrack`), with the multitrack packet type set to one track (e.g., `videoMultitrackType` is `OneTrack`).
- The stream key in the `authentication` field returned by GetClientConfiguration must be used to connect to the RTMP server.
- The `config_id` value returned by GetClientConfiguration must be appended as a query argument to the RTMP connection string with key `clientConfigId`.

The following is an example of a stream configuration:

videoPacketType	videoMultitrackType	trackId	Resolution
CodedFrames CodedFramesX	NA – videoMultitrackType is not sent with single-track enhanced RTMP.	NA – trackId is not sent with single-track enhanced RTMP.	1920x1080

videoPacketType	videoMultitrackType	trackId	Resolution
SequenceStart SequenceEnd			
Multitrack	OneTrack	1	1280x720
Multitrack	OneTrack	2	852x480
Multitrack	OneTrack	3	640x360

Your broadcast software should use the data returned by GetClientConfiguration in `ingest_endpoints` and the protocol (RTMP or RTMPS) selected by the user to identify the endpoint to connect to. Use the `url_template` and the stream key returned in `authentication` to create a URL and include `config_id` as the `clientConfigId` query argument. If you allow the user to specify RTMP query arguments (for example, `?bandwidthtest=1`), you must append them in addition to specifying `clientConfigId`. Here is an example of a response from GetClientConfiguration:

```
{
   "ingest_endpoints": [
      {
         "protocol": "RTMP",
         "url_template": "rtmp://iad05.contribute.live-video.net/app/{stream_key}",
         "authentication":
 "v1_5f2e593731dad88b6bdb03a3517d306ef88a73e29619ee4b49012d557e881484_65c5dc81_7b2276223a302c22
      },
      {
         "protocol": "RTMPS",
         "url_template": "rtmps://iad05.contribute.live-video.net/app/{stream_key}",
         "authentication":
 "v1_5f2e593731dad88b6bdb03a3517d306ef88a73e29619ee4b49012d557e881484_65c5dc81_7b2276223a302c22
      }
   ],
   "meta": {
      "config_id": "d34c2f7e-ce3a-4be4-a6a0-f51960abbc4f",
      …
   }
   …
```

```
}
```

Then, if the user selected RTMP, you would open the connection to:

```
rtmp://iad05.contribute.live-video.net/app/
v1_5f2e593731dad88b6bdb03a3517d306ef88a73e29619ee4b49012d557e881484_65c5dc81_7b2276223a302c2262
clientConfigId=d34c2f7e-ce3a-4be4-a6a0-f51960abbc4f
```

Handling Video Disconnections

The multitrack video system enforces several limits. Broadly, the limitations are in place for three reasons:

1. System safety — IVS needs to constrain input for scalability. Examples include an streaming bandwidth limit on a per-channel basis that affects input processing, a bitrate entitlement on a track or resolution basis that affects output capacity/cost, and a number-of-tracks entitlement that affects CDN replication/delivery capacity.
2. System functionality — The service needs to constrain input for feature compatibility (e.g., platform support for individual codecs or delivery-container support for advanced codecs).
3. Viewer experience — The service needs to constrain input for viewer experience and brand reputation. For example, the service controls the player ABR algorithm that drives QoE across all target user devices (desktop, mobile, TV/OTT, etc.) and apps (browsers, native, etc.).

The video system disconnects the client in several scenarios:

- The client tries to connect to the RTMP server with multitrack video but does not use the stream key returned by GetClientConfiguration.
- The client provides multitrack video that does not match the specification returned by GetClientConfiguration; for example:
  - The number of tracks is mismatched.
  - An individual track has a mismatched codec.
  - An individual track has a mismatched resolution.
  - An individual track has a mismatched frame rate.
  - An individual track has a mismatched bitrate.
- The client does not provide video tracks that have aligned IDRs.
- Broadcast performance metrics do not precede every IDR on every track.

Disconnections may occur at the beginning of the stream (i.e., the channel never goes live) or mid-stream (i.e., the channel is live, a mismatch is detected, and then the client is disconnected).

Automatically Reconnecting

The validity of the stream key returned by GetClientConfiguration is 48 hours or until the stream key is invalidated by calling DeleteStreamKey. The maximum duration of IVS streams is 48 hours; after that, the stream is terminated and the streaming session is disconnected. A successful reconnect (automatically or manually) starts a new stream.

Your broadcast software may implement automatic reconnection. If you support automatic reconnection, you should allow users to enable/disable it and follow these guidelines:

- Implement an exponential backoff retry delay (including a small random deviation) between connection attempts.
- Retry for at most 25 connection attempts. For example, OBS Studio retries 25 times, with an exponentially increasing wait time between attempts that is capped at 15 minutes. In practice, this means the last retry happens roughly 3 hours after getting disconnected.
- If you get disconnected immediately after sending `publish` when connecting, call GetClientConfiguration, reconfigure the encoder settings, and then try to connect again.

Stopping the Stream and Disconnecting

When the user stops streaming, and if the TCP connection is still open (e.g., the lower-level connection was not reset), you must send FCUnpublish (example implementation in OBS Studio) before closing the RTMP connection. This is critical to signal the user's intent of the end of the stream, because downstream features rely on it to operate properly.

Required Feature: Broadcast Performance Metrics (BPM)

To enable ongoing improvement of automatic stream configuration, to deliver the best possible stream settings, broadcast performance metrics (BPM) must be measured and sent.

The metrics are collected and sent in-band via SEI (for AVC/HEVC) messages. Two classes of data are collected:

- *Timestamps* are collected to measure end-to-end latency between the broadcaster and the viewer. They are useful for:

- Providing the broadcaster or audience with an estimate of end-to-end latency.
- Analyzing timestamp jitter that may indicate system stress or poor first-mile network connectivity.
- Referencing real-world event time for aligning and aggregating time-series counter data.

  The timestamp sent from the broadcaster is based on a global common reference clock, typically an NTP-synchronized clock using the UTC+0 timezone. RFC3339 is commonly used for this scenario of "Internet time." This provides an absolute reference, making temporal difference calculations trivial.
- *Frame counters* are collected to measure the performance of the broadcast software and video encoders at the frame level. They are useful for:
  - Providing broadcasters with a performance dashboard that includes additional signals, to help them improve their streaming setup.
  - Providing a proactive signal that may correlated with environmental changes like newly released GPU drivers or OS versions/patches.
  - Providing feedback to enable video services to safely iterate and release improvements to GetClientConfiguration, including support for new hardware vendors, new GPU models, new codecs, new driver features, additional video-encoder setting tuning, and new user-controlled presets (e.g., “Dual PC Setup” vs. “Gaming+Streaming Setup”).

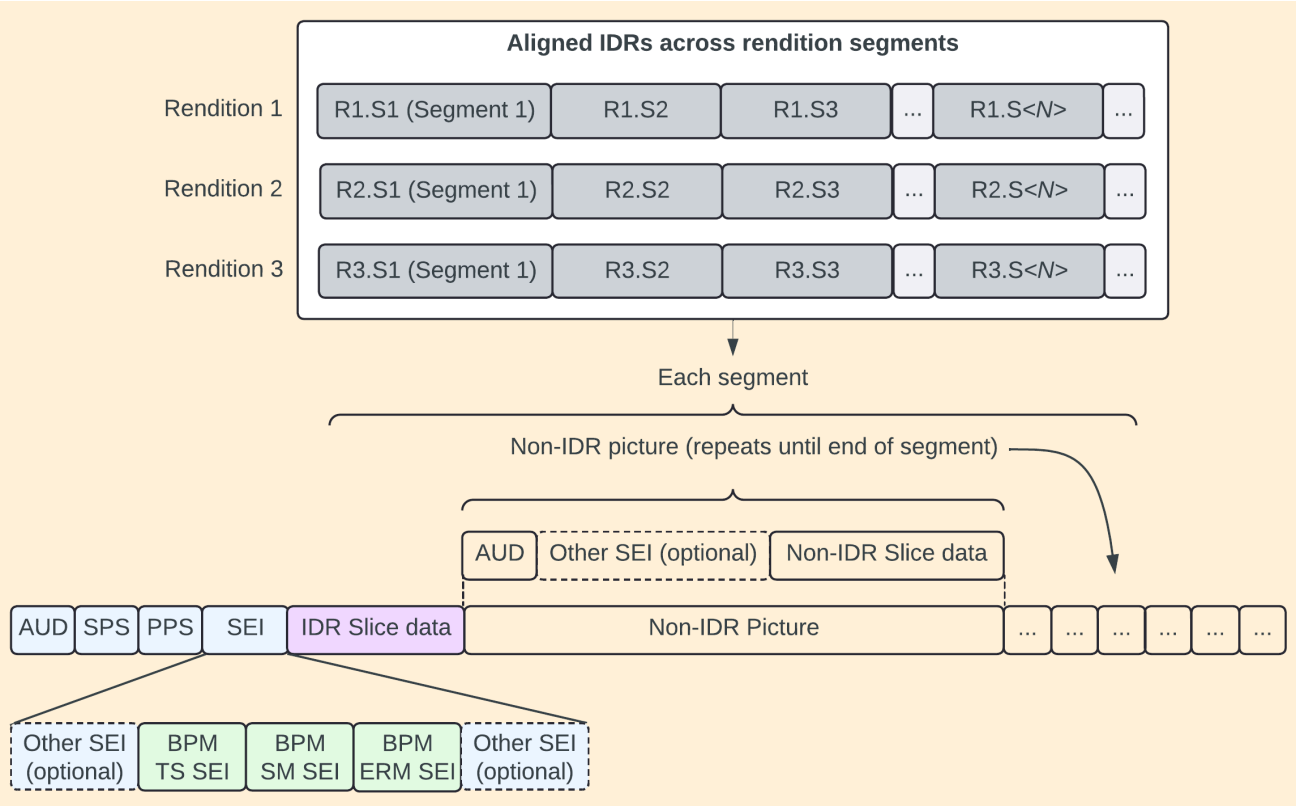
Insert SEI/OBU Messages

Refer to BPM Message Definitions for the specific message byte-stream definitions.

BPM metrics must be inserted on all video tracks just prior to the IDR. The three messages (BPM TS, BPM SM, and BPM ERM) should be sent together, but each should be sent as a separate NUT (AVC/HEVC).

BPM SM and BPM ERM sent in the first segment should have the frame counters set to 0. This may seem counterintuitive at first; however, counters such as number of frames encoded per rendition do not have meaningful data until after the encode is done, and the result is that the frame counters in segment N align with segment N-1. It is best to think about the BPM metrics as a timed-data series that is delivered in the video bitstream at the IDR interval. If necessary, precise realignment of the data series should be performed by the receiver using the timestamps provided.

The illustration below depicts a typical scenario for a three-rendition multitrack stream. With a typical segment size of two seconds, metrics will be sent every two seconds for each rendition.



Recommended Features

Allow Automatic Server Selection

Automatic server selection helps users select the best ingest server to connect to for their live streams, given changes in global network conditions and ingest PoP (Point of Presence) availability.

If your broadcast software supports automatic server selection, we expect the different behavior depending on whether the software implements GetClientConfiguration and/or FindIngest. Each scenario is listed separately below.

If the broadcast software implements both GetClientConfiguration and FindIngest:

User UI Selection	Connect to ingest endpoint specified by ...
Auto	GetClientConfiguration
Specific ingest endpoint from FindIngest	User's selection
Specify Custom Server	User's selection

If the broadcast software implements GetClientConfiguration but does not implement FindIngest:

User UI Selection	Connect to ingest endpoint specified by ...
Auto	GetClientConfiguration
Specify Custom Server	User's selection

If the broadcast software does not implements GetClientConfiguration but does implement FindIngest:

User UI Selection	Connect to ingest endpoint specified by ...
Auto	FindIngest
Specific ingest endpoint from FindIngest	User's selection
Specify Custom Server	User's selection

If the broadcast software does not implement GetClientConfiguration or FindIngest:

User UI Selection	Connect to ingest endpoint specified by ...
Auto	Global ingest URL: • For RTMP: rtmp://ingest.global-contribute.live-video.net/app • For RTMPS: rtmps://ingest.global-contribute.live-video.net:443/app
Specify Custom Server	User's selection

See the section called “Using a FindIngest Server for Auto Streaming Destination” for more information about using ingest endpoints specified by FindIngest.

Allow Users to Configure Streaming Destination

When users are configuring their streaming destinations, you should query FindIngest and provide the user with the ability to:

- Choose between RTMP or RTMPS (default for Amazon IVS).
- Select **Auto** for the server.
- Select a specific server from the list returned by FindIngest
- Enter a custom server; e.g., use **Specify Custom Server**.

You may filter the list returned by FindIngest based on the protocol selected by the user (RTMP vs. RTMPS) or other considerations.

For example, the implementation of Amazon IVS in OBS Studio achieves this by providing a simple **Server** drop-down with the following options:

- Auto (RTMPS, Recommended)
- Auto (RTMP)
- US East: Ashburn, VA (5) (RTMPS)
- US East: New York, NY (50) (RTMPS)
- US East: New York, NY (RTMPS)
- US East: Ashburn, VA (5) (RTMP)
- US East: New York, NY (50) (RTMP)
- US East: New York, NY (RTMP)
- Specify Custom Server

When **Specify Custom Server** is selected, a text box is provided for the user to enter an RTMP URL.

Using a FindIngest Server for Auto Streaming Destination

If you use ingest endpoints specified by FindIngest when Auto was specified for the streaming destination, use the entry with the lowest `priority` value returned by FindIngest. To reduce the time it takes for a stream to go live, you may cache the FindIngest response. If you do cache the response, update the cached value regularly.

If the user selects RTMP, use the `url_template` string as the RTMP broadcast destination. If the user selects RTMPS, use the `url_template_secure` string as the RTMPS broadcast destination. In both cases, replace `{stream_key}` with the user's stream key.

Broadcast Performance Metrics (BPM) Message Definitions

BPM messages are based on the H.264 standard SEI syntax. For reference, the user data unregistered SEI syntax from the H.264 specification is:

D.1.7 User data unregistered SEI message syntax

user_data_unregistered(payloadSize) {	C	Descriptor
uuid_iso_iec_11578	5	u(128)
for(i = 16; i < payloadSize; i++)		
user_data_payload_byte	5	b(8)
}		

For BPM messages, all parsing and notation rules from the H.264 standard apply, for example, "u(128)" means unsigned 128-bit integer, MSB first.

Three SEI messages are defined for BPM:

- BPM TS SEI: Timestamp message
- BPM SM SEI: Session Metrics message
- BPM ERM SEI: Encoded Rendition Metrics message

All BPM SEI messages send a 128-bit UUID required by the `user_data_unregistered()` syntax, followed by a loop of payload bytes. The resulting message is then encapsulated in higher-level semantics (e.g., NALU, RBSP, and start-code emulation prevention).

BPM TS (Timestamp) SEI

The BPM TS SEI message conveys one or more related timestamps. For example, the client can signal timestamps for frame composition, frame encode request, frame encode request complete, and packet interleaved in a single SEI message, and the client can decide if each of these timestamps should be sent as wall-clock (RFC3339/ISO8601-style) or delta (difference) clock or duration-since-epoch. There should be one timestamp that provides a reference for the delta type(s); this should be taken care of by the deployment, not by any syntactic constraints.

user_data_unregistered_bpm_ts(payloadSize) {	C	Descriptor
uuid_iso_iec_11578	5	u(128)
ts_reserved_zero_4bits	5	b(4)
num_timestamps_minus1	5	u(4)
for(i = 0; i <= num_timestamps_minus1; i++) {		
timestamp_type[i]	5	u(8)
timestamp_event[i]	5	u(8)
if (timestamp_type[i] == 1)		
rfc3339_ts[i]	5	st(v)
else if (timestamp_type[i] == 2)		
duration_since_epoch_ts[i]	5	u(64)
else if (timestamp_type[i] == 3)		
delta_ts[i]	5	i(64)
}		
}		

BPM TS SEI Field Description Table

Field	Description
uuid_iso_iec_11578	Set to hex: 0aecffe752724e2fa62fd19cd61a93b5

Field	Description
	With the usage of the unregistered SEI message, a UUID is required to disambiguate this message from any other unregistered messages.
`ts_reserved_zero_4 bits`	Reserved for future use. Set to `b('0000')` . Receiver shall ignore these bits.
`num_timestamps_min us1`	`num_timestamps=num_timestamps_minus1+1` `num_timestamps_minus1` shall be between 0 and 15, meaning between 1 and 16 timestamps can be signaled.
`timestamp_type`	See the section called “timestamp_type Table”.
`timestamp_event`	One of the following: • `BPM_TS_EVENT_CTS = 1 // Composition Time Event` • `BPM_TS_EVENT_FER = 2 // Frame Encode Request Event` • `BPM_TS_EVENT_FERC = 3 // Frame Encode Request Complete Event` • `BPM_TS_EVENT_PIR = 4 // Packet Interleave Request Event` There is no syntactic discriminator to identify uniqueness in cases where `num_timestamps_minus1` is greater than 0 (i.e., more than one timestamp is signaled); hence, `timestamp _event` should be unique within the SEI loop. Signaling multiple timestamps with the same `timestamp_event` is not precluded; however, the interpretation of the timestamps is outside the scope of the message.

timestamp_type Table

`timestamp_type` specifies types such as:

- “Wall clock” formats where the calendar-based date and time are signaled.

- Duration since epoch.
- Delta timestamps where the difference between two events is signaled.
- Additional timestamp formats that may be needed in the future.

timestamp_type	Name	Description
0	undefined	Undefined – do not use.
1	`rfc3339_ts`	RFC3339 is a profile of ISO8601 for Internet usage, which restricts some of the options in ISO8601. `timestamp_type==1` shall use RFC3339-based time notation. Note that RFC3339 does not support timezones. All timestamps are relative to UTC (aka "Zulu" time), which by definition is a UTC offset of 00:00. `rfc3339_ts` shall be a string. `st(v)` is defined in section 7.2 of the H.264 standard. See the note on leap seconds, below this table. Example: `2024-03-25T15:10:34.489Z` (489 refers to milliseconds)
2	`duration_since_epoch_ts`	Duration since epoch at 1970-01-01T00:00:00Z000 in milliseconds. See the note on leap seconds, below this table.
3	`delta_ts`	Delta timestamp, expressing the difference in nanoseconds between 2 events. Signed integers allow positive and negative deltas to be signaled.
4-255	Reserved	Reserved.

Note on leap seconds: It is important to note that an agreement was made to phase out the use of leap seconds by 2035. See the Wikipedia entry on leap seconds for details. We recommend using timestamps that exclude leap seconds. This aligns with the expected practices by 2035 and avoids possible miscalculations in timing.

BPM SM (Session Metrics) SEI

The BPM SM SEI message conveys the set of metrics that relate to the overall sender session. In OBS Studio, this means sending the following frame counters:

- Session frames rendered
- Session frames dropped
- Session frames lagged
- Session frames output

This SEI message also includes a timestamp. This is redundant with the BPM TS SEI; however, providing an explicit timestamp in each SEI message provides a unit of atomic behavior and reduces the load on the receiver to realign data. Also, should the need arise to drop or not send BPM TS SEI, there would still be an explicit timestamp in the BPM SM SEI message to use.

`user_data_unregistered_bpm_sm( payloadSize ) {`	**C**	**Descriptor**
`  uuid_iso_iec_11578`	5	u(128)
`  ts_reserved_zero_4bits`	5	b(4)
`  num_timestamps_minus1`	5	u(4)
`  for( i = 0; i <= num_timestamps_minus1; i++ ) {`		
`    timestamp_type[i]`	5	u(8)
`    timestamp_event[i]`	5	u(8)
`    if (timestamp_type[i] == 1)`		

rfc3339_ts[i]	5	st(v)
else if (timestamp_type[i] == 2)		
duration_since_epoch_ts[i]	5	u(64)
else if (timestamp_type[i] == 3)		
delta_ts[i]	5	i(64)
}		
ts_reserved_zero_4bits	5	b(4)
num_counters_minus1	5	u(4)
for(i = 0; i <= num_counters_minus1; i ++) {		
counter_tag[i]	5	b(8)
counter_value[i]	5	b(32)
}		
}		

BPM SM SEI Field Description Table

Many fields in this SEI message are similar to BPM TS SEI fields. The significant differences are the UUID value, number of timestamps expected, and counters being transmitted.

Field	Description
uuid_iso_iec_11578	Set to hex: ca60e71c-6a8b-4388-a377-151df7bf8ac2 With the usage of the unregistered SEI message, a UUID is required to disambiguate this message from any other unregistered messages.

Field	Description
`ts_reserved_zero_4 bits`	Reserved for future use. Set to `b('0000')` . Receiver shall ignore these bits.
`num_timestamps_min us1`	`num_timestamps=num_timestamps_minus1+1` `num_timestamps_minus1` shall be between 0 and 15, meaning between 1 and 16 timestamps can be signaled. Currently, this should be 0 (indicating a single timestamp).
`timestamp_type`	See the section called “timestamp_type Table”. For BPM SM SEI, this shall be type 1 - RFC3339 string.
`timestamp_event`	One of the following: • `BPM_TS_EVENT_CTS = 1 // Composition Time Event` • `BPM_TS_EVENT_FER = 2 // Frame Encode Request Event` • `BPM_TS_EVENT_FERC = 3 // Frame Encode Request Complete Event` • `BPM_TS_EVENT_PIR = 4 // Packet Interleave Request Event` There is no syntactic discriminator to identify uniqueness in cases where `num_timestamps_minus1` is greater than 0 (i.e., more than one timestamp is signaled); hence, `timestamp _event` should be unique within the SEI loop. Signaling multiple timestamps with the same `timestamp_event` is not precluded; however, the interpretation of the timestamps is outside the scope of the message. **Note:** Amazon IVS expects BPM SM SEI using `timestamp _event` only set to 4 (`BPM_TS_EVENT_PIR`). This will evolve as support for additional timestamp events are added.

Field	Description
num_counters_minus1	num_counters=num_counters_minus1+1 num_counters_minus1 shall be between 0 and 15, meaning between 1 and 16 counters can be signaled. For BPM SM SEI, this should be 3 (meaning 4 counters).
counter_tag	One of the following: • BPM_SM_FRAMES_RENDERED = 1 // Frames rendered by compositor • BPM_SM_FRAMES_LAGGED = 2 // Frames lagged by compositor • BPM_SM_FRAMES_DROPPED = 3 // Frames dropped due to network congestion • BPM_SM_FRAMES_OUTPUT = 4 // Total frames output (sum of all video encoder rendition sinks)
counter_value	The 32-bit difference value for the specified counter_tag , relative to the last time it was sent. For example, with 60 fps rendering, each 2 seconds counter_value should be 120.

BPM SM Example

Here is an example of a BPM SM SEI sent to Amazon IVS:

- uuid_iso_iec_11578 (16 bytes): ca60e71c-6a8b-4388-a377-151df7bf8ac2
- ts_reserved_zero_4bits (4 bits): 0x0
- num_timestamps_minus1 (4 bits): 0x0 (meaning 1 timestamp is being sent)
- timestamp_type (1 byte): 0x01 (RFC3339 timestamp - string format)
- timestamp_event (1 byte): 0x04 (BPM_TS_EVENT_PIR)
- rfc3339_ts: "2024-03-25T15:10:34.489Z"
- ts_reserved_zero_4bits (4 bits): 0x0
- num_counters_minus1 (4 bits): 0x3 (meaning 4 counters are being sent)

- `counter_tag` (1 byte): 0x01 (frames rendered by compositor since last message)
- `counter_value` (4 bytes)
- `counter_tag` (1 byte): 0x02 (frames lagged by compositor since last message)
- `counter_value` (4 bytes)
- `counter_tag` (1 byte): 0x03 (frames dropped due to network congestion since last message)
- `counter_value` (4 bytes)
- `counter_tag` (1 byte): 0x04 (total frames output (sum of all video encoder rendition sinks since last message)
- `counter_value` (4 bytes)

BPM ERM (Encoded Rendition Metrics) SEI

The BPM ERM SEI message conveys the set of metrics that relate to each encoded rendition. In OBS Studio, this means sending the following frame counters:

- Rendition frames input
- Rendition frames skipped
- Rendition frames output

This SEI message also includes a timestamp. This is redundant with the BPM TS SEI; however, providing an explicit timestamp in each SEI message provides a unit of atomic behavior and reduces the load on the receiver to realign data. Also, should the need arise to drop or not send BPM TS SEI, there would still be an explicit timestamp in the BPM ERM SEI message to use.

`user_data_unregistered_bpm_erm( payloadSize ) {`	**C**	**Descriptor**
`  uuid_iso_iec_11578`	5	u(128)
`  ts_reserved_zero_4bits`	5	b(4)
`  num_timestamps_minus1`	5	u(4)
`  for( i = 0; i <= num_timestamps_minus1; i++ ) {`		

timestamp_type[i]	5	u(8)
timestamp_event[i]	5	u(8)
if (timestamp_type[i] == 1)		
rfc3339_ts[i]	5	st(v)
else if (timestamp_type[i] == 2)		
duration_since_epoch_ts[i]	5	u(64)
else if (timestamp_type[i] == 3)		
delta_ts[i]	5	i(64)
}		
ts_reserved_zero_4bits	5	b(4)
num_counters_minus1	5	u(4)
for(i = 0; i <= num_counters_minus1; i ++) {		
counter_tag[i]	5	b(8)
counter_value[i]	5	b(32)
}		
}		

BPM ERM SEI Field Description Table

Many fields in this SEI message are similar to the BPM TS SEI fields and the BPM SM SEI fields. The significant differences are the UUID value, number of timestamps expected, and counters being transmitted.

Field	Description
`uuid_iso_iec_11578`	Set to hex: `f1fbc1d5-101e-4fb5-a61e-b8ce3c07b8c0` With the usage of the unregistered SEI message, a UUID is required to disambiguate this message from any other unregistered messages.
`ts_reserved_zero_4 bits`	Reserved for future use. Set to `b('0000')` . Receiver shall ignore these bits.
`num_timestamps_min us1`	`num_timestamps=num_timestamps_minus1+1` `num_timestamps_minus1` shall be between 0 and 15, meaning between 1 and 16 timestamps can be signaled. Currently, this should be 0 (indicating a single timestamp).
`timestamp_type`	See the section called “timestamp_type Table”. This shall be a type 1 - RFC3339 string.
`timestamp_event`	One of the following: • `BPM_TS_EVENT_CTS = 1 // Composition Time Event` • `BPM_TS_EVENT_FER = 2 // Frame Encode Request Event` • `BPM_TS_EVENT_FERC = 3 // Frame Encode Request Complete Event` • `BPM_TS_EVENT_PIR = 4 // Packet Interleave Request Event` There is no syntactic discriminator to identify uniqueness in cases where `num_timestamps_minus1` is greater than 0 (i.e., more than one timestamp is signaled); hence, `timestamp _event` should be unique within the SEI loop. Signaling multiple timestamps with the same `timestamp_event` is not

Field	Description
	precluded; however, the interpretation of the timestamps is outside the scope of the message. **Note:** Amazon IVS expects BPM ERM SEI using `timestamp_event` set only to 4 (`BPM_TS_EVENT_PIR`). This will evolve as support for additional timestamp events are added.
`num_counters_minus1`	`num_counters=num_counters_minus1+1` `num_counters_minus1` shall be between 0 and 15, meaning between 1 and 16 counters can be signaled. For BPM ERM SEI, this should be 2 (meaning 3 counters).
`counter_tag`	One of the following: • `BPM_ERM_FRAMES_INPUT = 1` // Frames input to the encoder rendition • `BPM_ERM_FRAMES_SKIPPED = 2` // Frames skipped by the encoder rendition • `BPM_ERM_FRAMES_OUTPUT = 3` // Frames output (encoded) by the encoder rendition
`counter_value`	The 32-bit difference value for the specified `counter_tag`, relative to the last time it was sent. For example, with 60 fps rendering, each 2 seconds `counter_value` should be 120.

BPM ERM Example

Here is an example of a BPM ERM SEI sent to Amazon IVS:

- `uuid_iso_iec_11578` (16 bytes): f1fbc1d5-101e-4fb5-a61e-b8ce3c07b8c0
- `ts_reserved_zero_4bits` (4 bits): 0x0
- `num_timestamps_minus1` (4 bits): 0x0 (Meaning 1 timestamp is being sent)
- `timestamp_type` (1 byte): 0x01 (RFC3339 timestamp - string format)
- `timestamp_event` (1 byte): 0x04 (BPM_TS_EVENT_PIR)

- `rfc3339_ts`: "2024-03-25T15:10:34.489Z"
- `ts_reserved_zero_4bits` (4 bits): 0x0
- `num_counters_minus1` (4 bits): 0x2 (Meaning 3 counters are being sent)
- `counter_tag` (1 byte): 0x01 (Encoded rendition frames input since last message)
- `counter_value` (4 bytes)
- `counter_tag` (1 byte): 0x02 (Encoded rendition frames skipped since last message)
- `counter_value` (4 bytes)
- `counter_tag` (1 byte): 0x03 (Encoded rendition frames output since last message)
- `counter_value` (4 bytes)

Channel Types

There are four channel types: STANDARD, ADVANCED_SD, ADVANCED_HD, and BASIC. When you create a channel, the default type is STANDARD.

There are two types of video processing, *transcoding* and *transmuxing*. This is determined by the channel type, whether the channel is configured for multitrack video input, and whether the broadcaster uses a multitrack-enabled client. (Multitrack video is configured with the multitrackInputConfiguration API property of the Channel data type.)

- Video on STANDARD (without multitrack input) and ADVANCED channels is transcoded: multiple qualities are generated from the original input, to automatically give viewers the best experience for their devices and network conditions. Transcoding allows higher playback quality across a range of download speeds. Transcoding is the best option for broadcasters with limited first-mile internet connectivity and/or limited device capabilities (e.g., mobile phones instead of desktop PCs).
- Video on STANDARD (with multitrack input enabled and the broadcaster using a multitrack-enabled client) and BASIC channels is transmuxed: Amazon IVS delivers the original input to viewers. Similar to transcoding, transmuxed multitrack input delivers viewers the best experience for their devices and network conditions.

All transcoded channels have *transcode* presets, which determine which renditions are produced. Think of these as ABR ladders. They allow you to trade off available download bandwidth and video quality, to optimize the viewing experience.

- STANDARD channels have one, default transcode preset.
- ADVANCED channels have two, selectable transcode presets:
  - *Constrained bandwidth delivery* uses a lower bitrate than STANDARD for each quality level. Use it if you have low download bandwidth and/or simple video content (e.g., talking heads).
  - *Higher bandwidth delivery* uses a higher bitrate for each quality level. Use it if you have high download bandwidth and/or complex video content (e.g., flashes and quick scene changes). This is the default.

STANDARD Channels

Single-Track Video Input

STANDARD channels are transcoded. The highest video resolution produced is full HD, 1080p. This is the default channel type.

- **Transcode presets**: There is one, default transcode-preset ladder.
- **Audio**: For renditions 360p and below, audio is transcoded. For other renditions: original audio is passed through.

Input Resolution and Maximum Bitrate	Ladder Details
1080p60 at 8.5 Mbps	1. Video: source passthrough, audio: source passthrough 2. Video: 720p60 at 3.4 Mbps, audio: source passthrough 3. Video: 480p30 at 1.4 Mbps, audio: source passthrough 4. Video: 360p30 at 0.63 Mbps, audio: 64 kbps 5. Video: 160p30 at 0.23 Mbps, audio: 48 kbps
1080p30 at 8.5 Mbps	1. Video: Source passthrough, audio: source passthrough 2. Video: 720p30 at 2.4 Mbps, audio: source passthrough 3. Video: 480p30 at 1.4 Mbps, audio: source passthrough 4. Video: 360p30 at 0.63 Mbps, audio: 64 kbps 5. Video: 160p30 at 0.23 Mbps, audio: 48 kbps
Less than 1080p60 and greater than 720p60, at 8.5 Mbps	1. Video: source passthrough, audio: source passthrough 2. Video: 720p60 at 3.4 Mbps, audio: source passthrough 3. Video: 480p30 at 1.4 Mbps, audio: source passthrough

Input Resolution and Maximum Bitrate	Ladder Details
	4. Video: 360p30 at 0.63 Mbps, audio: 64 kbps 5. Video: 160p30 at 0.23 Mbps, audio: 48 kbps
Less than 1080p30 and greater than 720p30, at 8.5 Mbps	1. Video: source passthrough, audio: source passthrough 2. Video: 720p30 at 2.4 Mbps, audio: source passthrough 3. Video: 480p30 at 1.4 Mbps, audio: source passthrough 4. Video: 360p30 at 0.63 Mbps, audio: 64 kbps 5. Video: 160p30 at 0.23 Mbps, audio: 48 kbps
720p60 at 8.5 Mbps	1. Video: 720p60 at 3.4 Mbps, audio: source passthrough 2. Video: 480p30 at 1.4 Mbps, audio: source passthrough 3. Video: 360p30 at 0.63 Mbps, audio: 64 kbps 4. Video: 160p30 at 0.23 Mbps, audio: 48 kbps
720p30 at 8.5 Mbps	1. Video: 720p30 at 2.4 Mbps, audio: source passthrough 2. Video: 480p30 at 1.4 Mbps, audio: source passthrough 3. Video: 360p30 at 0.63 Mbps, audio: 64 kbps 4. Video: 160p30 at 0.23 Mbps, audio: 48 kbps
Less than 720p30/60 and greater than or equal to 480p30/60, at 8.5 Mbps	1. Video: 480p30 at 1.4 Mbps, audio: source passthrough 2. Video: 360p30 at 0.63 Mbps, audio: 64 kbps 3. Video: 160p30 at 0.23 Mbps, audio: 48 kbps

Multitrack Video Input

STANDARD channels are transmuxed when the input is multitrack video. The highest video resolution produced is limited by the `multitrackInputConfiguration.maximumResolution`

property. The specific renditions are dynamic depending on the broadcaster's system and environmental requirements.

For all video renditions, audio is source passthrough.

ADVANCED-HD Channels

ADVANCED_HD channels are transcoded. The highest video resolution produced is HD, 720p.

- **Transcode presets**: There are two, selectable transcode-preset ladders.
- **Audio**: Audio is transcoded.

Input Resolution and Maximum Bitrate	Ladder Details
720p60 up to 1080p60, at 8.5 Mbps	Transcode preset: higher bandwidth delivery (default): 1. Video: 720p60 at 3 Mbps, audio: 128 kbps 2. Video: 480p30 at 1.3 Mbps, audio: 128 kbps 3. Video: 360p30 at 0.7 Mbps, audio: 64 kbps 4. Video: 160p30 at 0.27 Mbps, audio: 48 kbps 5. Audio-only at 64 kbps Transcode preset: constrained bandwidth delivery: 1. Video: 720p60 at 2.2 Mbps, audio: 128 kbps 2. Video: 480p30 at 0.8 Mbps, audio: 128 kbps 3. Video: 360p30 at 0.4 Mbps, audio: 64 kbps 4. Video: 160p30 at 0.22 Mbps, audio: 48 kbps 5. Audio-only at 64 kbps
720p30 up to 1080p30, at 8.5 Mbps	Transcode preset: higher bandwidth delivery (default): 1. Video: 720p30 at 2.3 Mbps, audio: 128 kbps 2. Video: 480p30 at 1.3 Mbps, audio: 128 kbps

Input Resolution and Maximum Bitrate	Ladder Details
	3. Video: 360p30 at 0.7 Mbps, audio: 64 kbps 4. Video: 160p30 at 0.27 Mbps, audio: 48 kbps 5. Audio-only at 64 kbps Transcode preset: constrained bandwidth delivery: 1. Video: 720p30 at 1.9 Mbps, audio: 128 kbps 2. Video: 480p30 at 0.8 Mbps, audio: 128 kbps 3. Video: 360p30 at 0.4 Mbps, audio: 64 kbps 4. Video: 160p30 at 0.22 Mbps, audio: 48 kbps 5. Audio-only at 64 kbps
Less than 720p30/60 and greater than 480p30/60, at 8.5 Mbps	Transcode preset: higher bandwidth delivery (default): 1. Video: Source transcoded at 2.3 Mbps, audio: 128 kbps 2. Video: 480p30 at 1.3 Mbps, audio: 128 kbps 3. Video: 360p30 at 0.7 Mbps, audio: 64 kbps 4. Video: 160p30 at 0.27 Mbps, audio: 48 kbps 5. Audio-only at 64 kbps Transcode preset: constrained bandwidth delivery: 1. Video: Source transcoded at 1.9 Mbps, audio: 128 kbps 2. Video: 480p30 at 0.8 Mbps, audio: 128 kbps 3. Video: 360p30 at 0.4 Mbps, audio: 64 kbps 4. Video: 160p30 at 0.22 Mbps, audio: 48 kbps 5. Audio-only at 64 kbps

Input Resolution and Maximum Bitrate	Ladder Details
480p30/60 at 8.5 Mbps	Transcode preset: higher bandwidth delivery (default): 1. Video: 480p30 at 1.3 Mbps, audio: 128 kbps 2. Video: 360p30 at 0.7 Mbps, audio: 64 kbps 3. Video: 160p30 at 0.27 Mbps, audio: 48 kbps 4. Audio-only at 64 kbps Transcode preset: constrained bandwidth delivery: 1. Video: 480p30 at 0.8 Mbps, audio: 128 kbps 2. Video: 360p30 at 0.4 Mbps, audio: 64 kbps 3. Video: 160p30 at 0.22 Mbps, audio: 48 kbps 4. Audio-only at 64 kbps

ADVANCED-SD Channels

ADVANCED_SD channels are transcoded. Available renditions are capped at input quality, with no up-conversion.

- **Transcode presets**: There are two, selectable transcode-preset ladders.
- **Audio**: Audio is transcoded.

Input Resolution and Maximum Bitrate	Ladder Details
480p30/60 up to 1080p30/60, at 8.5 Mbps	Transcode preset: higher bandwidth delivery (default): 1. Video: 480p30 at 1.3 Mbps, audio: 128 kbps 2. Video: 360p30 at 0.7 Mbps, audio: 64 kbps 3. Video: 160p30 at 0.27 Mbps, audio: 48 kbps 4. Audio-only at 64 kbps

Input Resolution and Maximum Bitrate	Ladder Details
	Transcode preset: constrained bandwidth delivery: 1. Video: 480p30 at 0.8 Mbps, audio: 128 kbps 2. Video: 360p30 at 0.4 Mbps, audio: 64 kbps 3. Video: 160p30 at 0.22 Mbps, audio: 48 kbps 4. Audio-only at 64 kbps

BASIC Channels

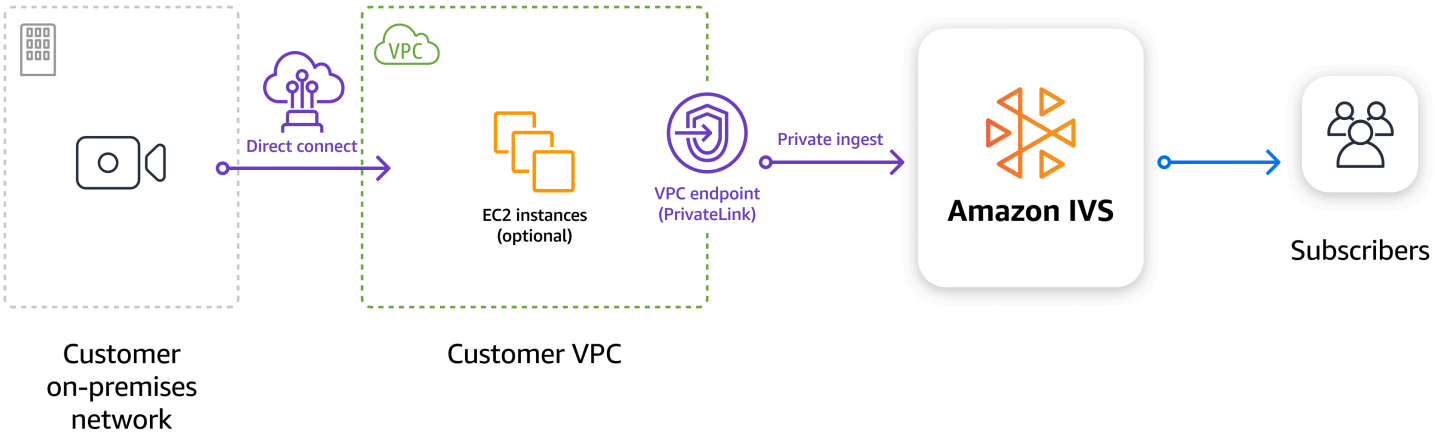
`BASIC` channels are transmuxed. A single rendition is produced.

- **Transcode presets**: NA
- **Audio**: Source audio is passed through.

Input Resolution and Maximum Bitrate	Ladder Details
Greater than 480p30/60 and less than or equal to 1080p30/60, at 3.5 Mbps	Source encoding parameters (no ladder)
480p30/60 at 1.5 Mbps	Source encoding parameters (no ladder)

IVS Private Ingest

For workloads that require secure, live video ingestion, you can use an interface VPC (Virtual Private Cloud) endpoint to establish a secure private connection between your Amazon VPC and IVS. This keeps your IVS ingest traffic within the AWS network and off the public internet. Interface VPC endpoints are powered by AWS PrivateLink, an AWS technology that enables private communication between AWS services, using an elastic network interface with private IPs in your Amazon VPC. For more information, see Amazon Virtual Private Cloud and Access an AWS service using an interface VPC endpoint (AWS PrivateLink).



You can ingest RTMP(S) streams into IVS from your Amazon VPC or through AWS Direct Connect, and send video privately to either IVS low-latency channels or IVS real-time stages. You are billed for standard interface VPC endpoint hourly usage and data-processing charges; for details, see Interface endpoint pricing. There is no additional cost from Amazon IVS for enabling this capability.

Ensure that your Amazon VPC is in a supported region:

- ap-northeast-1
- ap-northeast-2
- ap-south-1
- ap-southeast-1
- ap-southeast-2
- eu-central-1
- eu-north-1
- eu-west-1
- eu-west-3

- sa-east-1
- us-east-1
- us-east-2
- us-west-2

Note: While your Amazon VPC must be in one of these supported regions, IVS control-plane resources need not be in the same region or AWS account as the Amazon VPC. For more details, see Global Solution, Regional Control.

To ingest a stream through an interface VPC endpoint, use a private ingest URL composed of the VPC endpoint's DNS name and the stream key for the IVS resource (channel or stage ingest configuration), in this format:

`rtmps://<VPC_ENDPOINT_DNS_NAME>/app/<STREAM_KEY>`

To stream to a channel, create a channel and retrieve its stream key as explained in set up streaming software. To stream to a stage using RTMP(S) or E-RTMP(S), create an RTMP ingest configuration and use its associated stream key.

Below is a quick walkthrough of streaming from an EC2 instance to an IVS channel or stage using an interface VPC endpoint:

1. Create an interface VPC endpoint.
2. Launch an EC2 instance.
3. Install FFmpeg on your instance.
4. Stream to an IVS channel or stage.

Step 1: Create an Interface VPC Endpoint

Each VPC endpoint needs to be associated with a VPC in your account. If your account already has a default VPC, you can use that; otherwise, create a new VPC. If you want to use IPv6 or dualstack with your VPC endpoint, ensure that your VPC has subnets with IPv6 CIDRs assigned.

To create a VPC endpoint, see the instructions in Create a VPC endpoint (in the Amazon VPC documentation). Once you are on the **Create endpoint** page:

1. Select **AWS services**. Then in the **Services** section, search for **IVS**. You should see a service like **com.amazonaws.<region>.ivs.contribute**.

2. In the **Network settings** section, select the VPC where you want to create the endpoint. In the **Subnets** section, select which subnets and other network settings you want to configure for the endpoint.
3. In the **Security groups** section, select a security group that allows inbound traffic on TCP ports 443 and 1935 from wherever you will be streaming. You can edit this later, after creating the endpoint, so if you don't know what security group you want to use yet, leave it unselected for now.

After you select **Create endpoint**, you will be taken back to the VPC **Endpoints** overview page, where you will see the VPC endpoint you just created:

- The **Status** of the new endpoint is **Pending** for about 30 seconds, then it will be auto-accepted and its Status will change to a green **Available**.
- On the right side of the VPC endpoint information panel, you will see several **DNS names** associated with your VPC endpoint. Copy and save the first one listed; you will need to specify it as your stream-ingestion server URL in a future step.

Step 2: Launch an EC2 Instance

There are many options that customers can use to broadcast a stream from AWS. The example here uses an Ubuntu EC2 instance with FFmpeg installed.

First, create an EC2 instance (a t2.micro is fine). Be sure to create the instance within the same VPC where you created your VPC endpoint.

The security group you assign to this instance will need egress to the VPC endpoint for TCP ports 443 and 1935. Also be sure to enable ingress on TCP port 22 if using SSH to access the instance, as well as egress on TCP port 80 for the package manager operations in step 3 below.

Launch the instance. Once it initializes, use SSH or AWS Session Manager to connect to the instance.

Step 3: Install FFmpeg on your Instance

Once connected to your instance, run the following commands on your machine (assuming you created the instance with Ubuntu) to install FFmpeg:

```
sudo add-apt-repository ppa:savoury1/ffmpeg4
sudo apt-get update
sudo apt-get install ffmpeg
```

Step 4: Stream to an IVS Channel or Stage

The private ingest URL format is:

`rtmps://<VPC_ENDPOINT_DNS_NAME>/app/<STREAM_KEY>`

For example:

`rtmps://vpce-0a8dfb0b7a4611439-xyzabc12.contribute.ivs.us-west-2.vpce.amazonaws.com/app/sk-usw2-abc123example456`

Run the following example FFmpeg command, replacing <VPC_ENDPOINT_DNS_NAME> with the DNS name from Step 1 and <STREAM_KEY> with the appropriate stream key (for a channel or ingest configuration):

```
ffmpeg -re -f lavfi -i "testsrc=duration=360:size=1024x768:rate=30" -f lavfi -i
 "sine=frequency=1000" -pix_fmt yuv420p -profile:v baseline -level 3.0 -r 30 -g 60
 -shortest -vcodec libx264 -acodec aac -f flv "rtmps://<VPC_ENDPOINT_DNS_NAME>/app/
<STREAM_KEY>"
```

If all the above was successful, your stream should be running. A stream ingested through a VPC endpoint should be processed and treated the same as a stream ingested through a public IVS endpoint; the only difference is the ingestion path.

When you are done using them, be sure to delete the created EC2 instance and VPC endpoint to avoid any unnecessary charges.

Server-Side Ad Insertion (SSAI)

Amazon IVS server-side ad insertion (SSAI) enables you to monetize your streams with video ads. IVS SSAI integrates with AWS Elemental MediaTailor, giving you access to capabilities such as ad decisioning, audience targeting, and personalization. IVS supports two types of ad breaks:

- **Mid-roll** — Manually triggered during a live stream using the `InsertAdBreak` API.
- **Post-roll** — Automatically inserted at the end of a stream.

IVS stitches ads directly into the video stream. This provides a seamless viewing experience and avoids complex client-side logic.

For information about costs associated with SSAI, see IVS Costs.

Getting Started with SSAI

This tutorial helps you get started with Amazon IVS server-side ad insertion (SSAI). At the end of this tutorial, you will have an IVS channel configured for server-side ad insertion, and you will know how to insert ad breaks into your live stream. IVS SSAI integrates with AWS Elemental MediaTailor to handle ad decisioning.

Step 1: Create an IVS Channel

Create an IVS channel. You need the channel's playback URL to configure MediaTailor in the next step. After creating your channel, save the following values:

- **Channel ARN** — You need this to update the channel later.
- **Playback URL prefix** — Extract the URL prefix from the playback URL (everything before /api/). For example, if your playback URL is:

  https://c17b3fb37fc9.us-west-2.playback.live-video.net/api/video/v1/us-west-2.123456789012.channel.ABcdef12ghIJ.m3u8

  the prefix is:

  https://c17b3fb37fc9.us-west-2.playback.live-video.net/
- **Container format** — Must be set to MPEG Transport Stream (TS).

Step 2: Create a MediaTailor Playback Configuration

Create an AWS Elemental MediaTailor playback configuration. This configuration connects your ad decision server to IVS and enables ad insertion for your streams.

The playback configuration uses the playback URL prefix, which is common across all IVS channels in your account and region. This means you can use a single MediaTailor playback configuration with multiple IVS channels.

See Creating a MediaTailor Playback Configuration in the *AWS Elemental MediaTailor User Guide* for instructions. When creating the configuration, the following settings are required for IVS SSAI:

Setting	Location	Value
Ad decision server URL	Required Settings	URL of the ad decision server
Content source	Required Settings	URL prefix of your IVS playback URL; e.g., https://c17b3fb37fc9.us-west-2.playback.live-video.net/
Insertion mode	Personalization Details	PLAYER_SELECT

> **Important**
>
> Specify the content source using only the prefix of your channel's playback URL (ending in `live-video.net/`), not the full URL. If the format is incorrect, creating an ad configuration in the next step fails with a validation error.

Step 3: Create an IVS Ad Configuration

An ad configuration links your IVS resources to your MediaTailor playback configuration. You can use a MediaTailor playback configuration created in any IVS home region with an ad configuration in any other IVS home region. IVS home regions include `us-west-2`, `us-east-1`, `eu-west-1`, `eu-central-1`, `ap-northeast-1`, `ap-northeast-2`, and `ap-south-1`.

You can reuse a single ad configuration across multiple channels. An ad configuration supports up to 3 MediaTailor playback configurations. The first configuration in the list is used by default. To select a different one per viewing session, specify the `aws:ads-playback-config-name` claim in a playback authorization token.

To create an ad configuration (AWS CLI):

```
aws ivs create-ad-configuration \
       --name "my-ad-config" \
       --media-tailor-playback-configurations
 playbackConfigurationArn="arn:aws:mediatailor:us-
west-2:123456789012:playbackConfiguration/my-mediatailor-config" \
              --post-roll-configuration enabled=true,durationSeconds=30
```

The `--post-roll-configuration` parameter is optional. If omitted, post-roll configuration defaults to disabled (`enabled`: false) with a duration of 15 seconds (`durationSeconds`: 15). If provided, both `enabled` and `durationSeconds` are required. If omitted, you can enable it later using the UpdateAdConfiguration API.

For UpdateAdConfiguration: if `--post-roll-configuration` is not included in the request, the existing post-roll configuration is not modified. If included, both fields are required.

Save the arn value from the response. You need it in the next step.

Step 4: Update the Channel with the Ad Configuration

Update your IVS channel to associate it with the ad configuration you created. To update the channel (AWS CLI):

```
aws ivs update-channel --arn "arn:aws:ivs:us-west-2:123456789012:channel/ABcdef12ghIJ"
 --ad-configuration-arn "arn:aws:ivs:us-west-2:123456789012:ad-configuration/
ABcdef12ghIJ"
```

Step 5: Start Streaming

Use the ingest endpoint and stream key from your channel to start streaming.

Step 6: Insert Ad Break

While your stream is live, call the InsertAdBreak operation to insert an ad break. Specify the channel ARN and the duration (in seconds) for the ad break. This step applies to **mid-roll** ad breaks only. Post-roll ad breaks are triggered automatically and do not require calling `InsertAdBreak`.

To insert an ad break (AWS CLI):

```
aws ivs insert-ad-break --channel-arn "arn:aws:ivs:us-west-2:123456789012:channel/
ABcdef12ghIJ" --duration-seconds 30
```

Upon successful return of InsertAdBreak, you can receive an EventBridge event (IVS Ad Break State Change) that contains a timestamp indicating the expected time the ad break will be inserted into viewer playlists. This is the time when the broadcaster can reasonably expect ads to begin replacing content. If an ad cannot be filled (for example, if your ad decision server does not return an ad or ads need to be transcoded by MediaTailor), source content is shown instead.

> **Important**
>
> You cannot insert additional ad breaks while an existing ad break is still in progress. Subsequent calls to InsertAdBreak will return a 409 `ConflictException` until the current ad break concludes.

EventBridge Integration

With SSAI, an IVS Ad Break State Change event (called Ad Break Inserted) is added, with the following fields:

Field	Description
`event_name`	The name of the event being emitted.
`channel_name`	The name of the channel that is triggered by the InsertAdBreak API request.
`stream_id`	The ID of the live stream to the channel triggered by the InsertAdBreak API request.

Field	Description
`ad_break_id`	The unique ID associated with the ad break, which corresponds to the ad break ID in the response from the initial InsertAdBreak request.
`duration_seconds`	The value in seconds that was included on the InsertAdBreak request and specified by the customer.
`target_start_time`	The estimated timestamp for the live stream of when the ad break is inserted into the playlist.

Player SDK Events

Across platforms, the Player SDK surfaces events when an ad break is played, notifying when an ad starts, progresses, and stops. Here is a high-level summary of the available events and timing:

Event	Payload	Trigger
Ad break started	AdBreak	First segment of ad break
Ad creative started	AdCreative	First segment of each creative
Ad time update	AdTimeUpdate	Every second during ad playback
Ad creative ended	AdCreative	Last segment of each creative
Ad break ended	AdBreak	First content segment after break

For the specific event and payload names for each platform, see the Player SDK documentation:

- Web: See the PlayerEventType enumeration at https://aws.github.io/amazon-ivs-player-docs/latest/web/

- Android: See the Player.Listener class at https://aws.github.io/amazon-ivs-player-docs/latest/android/
- IOS: See the IVSPlayerDelegate protocol at https://aws.github.io/amazon-ivs-player-docs/latest/ios/

Below is an example of using ad events in the Web SDK to create a simple ad countdown UI component during an ad break:

```
// State
let podLength = 0;
let podIndex = 0;
let remainingSeconds = 0;

// Fired every second during the ad break
player.addEventListener(PlayerEventType.AD_TIME_UPDATE, (payload) => {
    podLength = payload.podLength;
    podIndex = payload.podIndex;
    remainingSeconds = Math.round(payload.creativeDuration - payload.creativeElapsed);
    const text = `Ad ${podIndex} of ${podLength} · ${remainingSeconds}s remaining`
    // Ad 1 of 2 · 20s remaining
    console.log('Ad countdown text', text);
    UpdateAdOverlay(text);
});

// Fired when the ad break ends
player.addEventListener(PlayerEventType.AD_BREAK_ENDED, (payload) => {
    hideAdOverlay();
});
```

Ad Markers in Recorded Content

When a live stream is recorded using auto-record to Amazon S3, IVS generates and writes a VOD playlist to S3 that includes SCTE-35 ad markers at the positions where ads were triggered during the live stream. See the section called “SSAI Playlist Reference” for details.

Viewer Experience

By default, MediaTailor fills and serves ads to all viewers when you insert an ad break. If you are using playback authorization tokens for your streams, you can opt viewers out of receiving ads by adding the claim `"aws:ads-opt-out": true` to your playback authorization JWT token.

When viewers begin streaming partway through an ad break, IVS rounds up the ad break duration to the nearest quartile. For example, a viewer who joins with 35 seconds remaining in a 60-second ad break will experience a 45-second ad break.

When updating your MediaTailor playback configuration or adding new ads, viewers might not see ads the first time you request an ad break because MediaTailor must first transcode the ads. After a few minutes, subsequent calls to InsertAdBreak will result in viewers seeing ads. MediaTailor's transcode logs record these transcodes.

Viewer Tracking Parameters

When configuring an Ad Decisioning Server (ADS) in your Elemental MediaTailor PlaybackConfiguration, you can pass parameters to the ADS using templates (see MediaTailor passing parameters to ADS). With IVS SSAI, you can pass parameters for each viewer using the playback authorization token for that user, by adding a claim with the following format:

```
"aws:ads-player-params": {
   "key1": "value1",
   "key2": "value2"
}
```

These parameters are passed to Elemental MediaTailor to be filled as the `[player_params.key1]` and `[player_params.key2]` template variables. Keys that you put in this list are always namespaced as `player_params` template parameters.

The total payload size for all keys and values combined is limited to 1000 bytes.

Reporting Mode

As a viewer watches an ad, the client or server can send beacons indicating playback progress for each ad creative. By default, MediaTailor handles beaconing on the server side. You can control the reporting mode by adding the following claim to the playback authorization token:

```
"aws:ads-reporting-mode": "CLIENT" | "SERVER"
```

The default value is `SERVER`. When set to `SERVER`, MediaTailor sends beacons on the server side. When set to `CLIENT`, server-side beaconing is disabled and tracking data is provided in the `metadata.trackingData` field of the IVS Player SDK adBreakStarted event. The IVS player SDK does not call beacon URLs.

Known Issues

- IVS ads do not work if the IVS channel `containerFormat` is set to `FRAGMENTED_MP4`. Calls to UpdateChannel and CreateChannel will return a validation error if the FMP4 container format is used with an ad configuration.
- During ad playback, switching between adaptive bitrate mode and manual quality selection can cause the player to experience freezing and buffering issues.
- For streams longer than 12 hours that have encountered starvation, it is possible for the program date time to drift, causing viewers to not be served ads. The workaround is for the broadcaster to restart the stream.

SSAI Playlist Reference

Live Variant Playlist with SSAI

When an ad is stitched into the stream, IVS inserts the tags documented below, before the ad segments.

1. Stitched Ad Declaration

```
#EXT-X-DATERANGE:ID="stitched-ad-1765566299-20000000000",CLASS="live-video-net-
stitched-ad",START-DATE="2025-12-12T19:04:59.079Z",DURATION=20.000,X-NET-LIVE-VIDEO-AD-
AD-BREAK-ID="test"
```

Attribute	Description
`ID`	Format: `stitched-ad-{timestamp}-{duration}` `{timestamp}` : Unix timestamp of the ad start `{duration}:` Ad duration as an integer in nanoseconds Type: Array of strings
`CLASS`	Always `live-video-net-stitched-ad` for SSAI ads.
`START-DATE`	ISO 8601 program date/time when the ad begins.

Attribute	Description
DURATION	Ad length in seconds.
X-NET-LIVE-VIDEO-AD-AD-BREAK-ID	The ad break ID returned by IVS when the InsertAdBreak operation was called.

2. Stream Source Change

```
#EXT-X-DATERANGE:ID="source-1765566299",CLASS="live-video-net-stream-source",START-
DATE="2025-12-12T19:04:59.079Z",END-ON-NEXT=YES,X-NET-LIVE-VIDEO-STREAM-
SOURCE="0f262e65-a709-4ef1-8741-e82d936c"
```

Attribute	Description
CLASS	Always live-video-net-stream-source .
START-DATE / END-ON-NEXT	Time metadata for this source range.
X-NET-LIVE-VIDEO-STREAM-SOURCE	Hints to the player that the video source is changing. Value is live for primary content or a unique ID for ad content.

3. Discontinuity Marker

```
#EXT-X-DISCONTINUITY
```

Standard HLS tag signaling that encoding parameters may change between the live stream and the ad content.

Ad Segments

```
#EXT-X-PROGRAM-DATE-TIME:2025-12-12T19:04:59.079Z
#EXTINF:2.000,0f262e65-a709-4ef1-8741-e82d936c
https://4ce388b1cf28.j.cloudfront.hls.live-video.net/v1/segment/
CvsCse8Qbs5DU_aRmrVLd72_nK9lo9xS1KjD115LsIXcsD27JfLfkSuamLUivqOTrfHUeGf6Zmx_c9rhq0btTOu7E4F1DaU
oPsjH3qVcMOCuKfKZSmRJGFLvkrO1PefV5ya3eUvihXCMvDE-81EmGp5q9ErEgFpz06rMDbYFWb3z9H8X0t8KzvGDOaqKTY
```

```
fULeDQ76pDy_OVPwhO2vJMxBpfdQ_IeB1QUK2wJmXJ96Mvv0C2dcb0F7zE3lr_iBGemUjwmb7JmBoM3HdJbpV0TGp8C6vhI
dna=CmanuVzG9F6kGS2X7ThbGZyZPHWgX2TiBlBMYsvGWLcWaLWyntTaWRp5D9qjZsrGKkzdwoLNY4pri6ZgpxnzqLqWvhc
```

Attribute	Description
`EXT-X-PROGRAM-DATE-TIME`	Timestamp of this segment.
`EXTINF`	Format: `{duration},{tag}` `{duration}` : Segment length in seconds. `{tag}`: Source identifier. For live content, this is always `live`. For ad content, this is a UUID provided by MediaTailor that uniquely identifies the ad asset transcode
Segment URL	IVS-hosted endpoint containing encrypted information about the segment and its location in IVS caches.

VOD Variant Playlist with SSAI

When a live stream is recorded, IVS generates and writes a VOD playlist to S3 that includes SCTE-35 ad markers at the positions where ads were triggered during the live stream. To serve ads during VOD playback, you serve this IVS playlist through MediaTailor, which is responsible for stitching ad segments into the playlist. MediaTailor replaces the original VOD segments during the ad break with ad segments.

1. Ad Break Start Marker (SCTE35-OUT)

```
#EXT-X-DATERANGE:ID="12345678",START-DATE="2025-12-06T00:45:45.723Z",PLANNED-
DURATION=20.0,SCTE35-
OUT=0xFC3020000000000000FFF00F05F8E7AEFC7FFFFE001B774000000000000340CFD88
```

Attribute	Description
`ID`	Unique identifier for this ad break. Used to correlate the start and end markers.

Attribute	Description
START-DATE	ISO 8601 program date/time when the ad break begins.
PLANNED-DURATION	Expected duration of the ad break in seconds.
SCTE35-OUT	SCTE-35 marker signaling the start of the ad break.

2. Ad Segments (MediaTailor Stitched)

```
#EXTINF:2.0, ../../../../segment/b2857627df9428679e888ee8daa979d0b7559801/gk-test-ivs-vod/bd0c7d90-a47c-4a91-b5ec-7d0f9897049b/0/3
```

Attribute	Description
EXTINF	Duration of the ad segment in seconds.
Segment URL	Relative path to MediaTailor-hosted ad segment.

3. Ad Break End Marker (SCTE35-IN)

```
#EXT-X-DATERANGE:ID="12345678",START-DATE="2025-12-06T00:45:45.723Z",END-DATE="2025-12-06T00:46:07.889Z",DURATION=20.0,SCTE35-IN=0xFC3020000000000000FFF00F05F8E7AEFC7F7FFE001B774000000000000C23E5851
```

Attribute	Description
ID	Same ID as the start marker. Links the two together.
START-DATE	Original start time of the ad break (same as start marker).
END-DATE	ISO 8601 timestamp when the ad break ended.
DURATION	Actual duration of the ad break in seconds.
SCTE35-IN	SCTE-35 marker signaling the end of the ad break.

Using Amazon EventBridge with IVS Low-Latency Streaming

You can use Amazon EventBridge to monitor your Amazon Interactive Video Service (IVS) streams.

Amazon IVS sends change events about the status of your streams to Amazon EventBridge. All events that are delivered are valid. However, events are sent on a best-effort basis, which means there is no guarantee that:

- Events are delivered — A designated event can occur (e.g., a stream starts) but it is possible that Amazon IVS will not send a corresponding change event to EventBridge. Amazon IVS tries to deliver events for several hours before giving up.
- Events that are delivered will arrive in a specified timeframe — You may receive events up to a few hours old.
- Events are delivered in order — Events may be out of order, especially if they are sent within a short time of each other. For example, you could see Stream Down before Stream Up.

While it's rare for events to be missing, late, or out of sequence, you should handle these possibilities if you write business-critical programs that depend on the order or existence of notification events.

You can create EventBridge rules for any of the following events.

Event Type	Event	Sent When ...
IVS Ad Break State Change	Ad Break Inserted	An ad break is inserted into an active stream.
IVS Stream State Change	Session Created	A channel stream key was used successfully and a stream session was created. This event fires when a stream is initiated, before video is processed or delivered to viewers. This event can help you determine if a stream was initiated but failed to

Event Type	Event	Sent When ...
		go live; e.g., due to misconfiguration or limit breach.
IVS Stream State Change	Session Ended	The encoder disconnected and Amazon IVS is no longer receiving video. This event can help you determine when the encoder stopped sending media. For multitrack streams, the code field can provide additional details on why the session ended. For details, see the code field in the StreamEvent API object. Note: When the encoder disconnects, the Session Ended event may come before the Stream End event. This is because there may be a short period of time after the Session Ended event when Amazon IVS is still processing video.
IVS Stream State Change	Stream Start	A stream is being processed and segments are available for the viewer to watch. This event indicates that the video stream is being processed and can be watched by viewers. This event can help you determine if a stream went live successfully.

Event Type	Event	Sent When ...
IVS Stream State Change	Stream End	A stream stops being processed and no longer produces video segments for the viewer. This event can help you determine when the stream ended and no new video segments can be consumed by the viewers. (Also see the note in Session Ended.)
IVS Stream State Change	Stream Failure	A stream is not being processed and is not available because processing capacity was exceeded.
IVS Stream State Change	Stream Takeover	An existing stream was taken over.

Event Type	Event	Sent When ...
IVS Stream State Change	Stream Takeover Failure	An attempt to take over an existing stream was rejected. The `code` field provides additional details on why the stream takeover failed. There are several values; note that the long descriptions are provided in the IVS console but not delivered through the IVS API or EventBridge: • `StreamTakeoverMediaMismatch` — The broadcast client attempted to take over with different media properties (e.g., codec, resolution, or video track type) from the original stream. • `StreamTakeoverInvalidPriority` — The broadcast client attempted a takeover with either a priority integer value equal to or lower than the original stream's value or a value outside the allowed range of 1 to 2,147,483,647. • `StreamTakeoverLimitBreached` — The broadcast client reached the maximum allowed takeover attempts for this stream.
IVS Stream Health Change	Starvation Start	A stream is not receiving data from the streamer; the stream is said to be in “starvation.”

Event Type	Event	Sent When ...
IVS Stream Health Change	Starvation End	A starving stream begins receiving data from the streamer and the stream is healthy again.
IVS Limit Breach	Ingest Bitrate	The incoming stream's bitrate exceeds the Amazon IVS limit.
IVS Limit Breach	Ingest Resolution	The incoming stream's resolution exceeds the Amazon IVS limit.
IVS Limit Breach	Concurrent Broadcasts	The total number of channels streaming at the same time exceeds the Amazon IVS limit.
IVS Limit Breach	Concurrent Viewers	The total number of viewers watching your channels at the same time exceeds the Amazon IVS limit.
IVS Recording State Change	Recording Start	A stream starts being processed, and the recording prefix is created and validated. Segments will be written to the storage location configured for the channel. Note that after a live stream starts and the Recording Start event is emitted, it takes a little time before the manifest files and video segments are written to the S3 bucket that is configured for the channel. We recommend that you play back or process recorded streams only after the Recording End event is sent.

Event Type	Event	Sent When ...
IVS Recording State Change	Recording End	A stream ends and recording stops for this channel.
IVS Recording State Change	Recording Start Failure	A stream starts but recording fails to start due to errors (for example, the S3 bucket does not exist or is not in the correct region). This live stream is not recorded.
IVS Recording State Change	Recording End Failure	Recording ends with failure, due to errors encountered during recording (e.g., if the attempt to write a master playlist fails). Some objects may still be written to the configure d storage location.

Note on stream IDs: The `stream_id` field (in many events) is a unique stream identifier assigned each time a channel goes live. For a given channel, each live stream has a new `stream_id`. Hence, each channel ARN can have many corresponding stream IDs. Stream IDs allow customers to distinguish different stream sessions on the same channel.

Note on latency of some events: Encoder-configuration settings, especially the IDR/keyframe interval, affect the timing of stream startup and the latency of related events (Stream Start and Recording Start). A shorter keyframe interval decreases this latency. See "Reducing Latency" in *Amazon IVS Streaming Configuration* for information on setting `IDR/Keyframe`.

Creating Amazon EventBridge Rules for Amazon IVS

You can create a rule that triggers on an event emitted by Amazon IVS. Follow the steps in Create a rule in Amazon EventBridge in the *Amazon EventBridge User Guide*. When selecting a service, choose **Interactive Video Service (IVS)**.

Example: Ad Break State Change

Ad Break Inserted: This event is sent when an ad break is inserted into an active stream.

```
{
    "version": "0",
    "id": "d2f07e23-86ba-04b4-e636-5fd2c70b5278",
    "detail-type": "IVS Ad Break State Change",
    "source": "aws.ivs",
    "account": "049054135175",
    "time": "2026-02-05T01:03:08Z",
    "region": "us-east-1",
    "resources": [
        "arn:aws:ivs:us-west-2:123456789012:channel/abcdABCDefgh "
    ],
    "detail": {
        "event_name": "Ad Break Inserted",
        "channel_name": "SSAIBeta-test-channel",
        "stream_id": "st-1GI11DKd3yvJm8eWREJq6Xz",
        "ad_break_id": "hSi2o1WIVgij",
        "duration_seconds": 20,
        "target_start_time": "2026-02-05T01:03:18Z"
    }
}
```

Examples: Stream State Change

Session Created: This event is sent when a channel stream key was used successfully and a stream session was created.

```
{
   "version": "0",
   "id": "aa5b7a40-36cf-8dc4-5554-32d70e047215",
   "detail-type": "IVS Stream State Change",
   "source": "aws.ivs",
   "account": "535011710559",
   "time": "2024-09-09T16:17:26Z",
   "region": "us-east-1",
   "resources": [
      "arn:aws:ivs:us-west-2:535011710559:channel/UCGaMPGLCbcE"
   ],
   "detail": {
      "event_name": "Session Created",
      "channel_name": "",
      "stream_id": "st-1AuTyMDASvHUTSb8p5Pvbs0"
   }
```

```
}
```

Session Ended: This event is sent when the encoder disconnected and IVS is no longer receiving video.

```
{
   "version": "0",
   "id": "6f2723f3-ee31-9e48-b030-ac865e261a8e",
   "detail-type": "IVS Stream State Change",
   "source": "aws.ivs",
   "account": "535011710559",
   "time": "2024-09-09T16:17:26Z",
   "region": "us-east-1",
   "resources": [
      "arn:aws:ivs:us-west-2:535011710559:channel/UCGaMPGLCbcE"
   ],
   "detail": {
      "event_name": "Session Ended",
      "channel_name": "",
      "code": "MultitrackInputNotAllowed",
      "stream_id": "st-1AuTyMDASvHUTSb8p5Pvbs0"
   }
}
```

Stream Start: This event is sent when a stream is being processed and segments are available for the viewer.

```
{
   "version": "0",
   "id": "01234567-0123-0123-0123-012345678901",
   "detail-type": "IVS Stream State Change",
   "source": "aws.ivs",
   "account": "aws_account_id",
   "time": "2017-06-12T10:23:43Z",
   "region": "us-east-1",
   "resources": [
     "arn:aws:ivs:us-east-1:aws_account_id:channel/12345678-1a23-4567-
a1bc-1a2b34567890"
   ],
   "detail": {
     "event_name": "Stream Start",
     "channel_name": "Your Channel",
     "stream_id": "st-1A2b3c4D5e6F78ghij9Klmn"
```

```
    }
}
```

Stream End: This event is sent when a stream stops being processed and no longer produces video segments for the viewer.

```
{
   "version": "0",
   "id": "01234567-0123-0123-0123-012345678901",
   "detail-type": "IVS Stream State Change",
   "source": "aws.ivs",
   "account": "aws_account_id",
   "time": "2017-06-12T10:23:43Z",
   "region": "us-east-1",
   "resources": [
     "arn:aws:ivs:us-east-1:aws_account_id:channel/12345678-1a23-4567-
a1bc-1a2b34567890"
   ],
   "detail": {
     "event_name": "Stream End",
     "channel_name": "Your Channel",
     "stream_id": "st-1A2b3c4D5e6F78ghij9Klmn"
   }
}
```

Stream Failure: This event is sent when a stream is not being processed and is not available because processing capacity was exceeded.

```
{
   "version": "0",
   "id": "01234567-0123-0123-0123-012345678901",
   "detail-type": "IVS Stream State Change",
   "source": "aws.ivs",
   "account": "aws_account_id",
   "time": "2017-06-12T10:23:43Z",
   "region": "us-east-1",
   "resources": [
     "arn:aws:ivs:us-east-1:aws_account_id:channel/12345678-1a23-4567-
a1bc-1a2b34567890"
   ],
   "detail": {
     "event_name": "Stream Failure",
     "channel_name": "Your Channel",
```

```
     "stream_id": "st-1A2b3c4D5e6F78ghij9Klmn",
     "reason": "Transcode capacity exceeded. Please try again."
   }
}
```

Stream Takeover: This event is sent when an existing stream was taken over.

```
{
   "version": "0",
   "id": "01234567-0123-0123-0123-012345678901",
   "detail-type": "IVS Stream State Change",
   "source": "aws.ivs",
   "account": "aws_account_id",
   "time": "2017-06-12T10:23:43Z",
   "region": "us-east-1",
   "resources": [

"arn:aws:ivs:us-east-1:aws_account_id:channel/12345678-1a23-4567-a1bc-1a2b34567890"
],
   "detail": {
      "event_name": "Stream Takeover",
      "channel_name": "Your Channel",
      "stream_id": "st-1A2b3c4D5e6F78ghij9Klmn"
   }
}
```

Stream Takeover Failure: This event is sent when an attempt to take over an existing stream was rejected. This can be due to mismatched codec/resolution/video-track type, an invalid priority integer, or surpassing the maximum number of takeovers per stream.

```
{
   "version": "0",
   "id": "01234567-0123-0123-0123-012345678901",
   "detail-type": "IVS Stream State Change",
   "source": "aws.ivs",
   "account": "aws_account_id",
   "time": "2017-06-12T10:23:43Z",
   "region": "us-east-1",
   "resources": [
       "arn:aws:ivs:us-east-1:aws_account_id:channel/12345678-1a23-4567-
a1bc-1a2b34567890"
],
   "detail": {
```

```
      "event_name": "Stream Takeover Failure",
      "channel_name": "Your Channel",
      "stream_id": "st-1A2b3c4D5e6F78ghij9Klmn",
      "code": "StreamTakeoverInvalidPriority"
   }
}
```

Examples: Stream Health Change

Starvation Start: This event is sent when a stream is not receiving data from the streamer; the stream is said to be in "starvation."

```
{
   "version": "0",
   "id": "01234567-0123-0123-0123-012345678901",
   "detail-type": "IVS Stream Health Change",
   "source": "aws.ivs",
   "account": "aws_account_id",
   "time": "2017-06-12T10:23:43Z",
   "region": "us-east-1",
   "resources": [
     "arn:aws:ivs:us-east-1:aws_account_id:channel/12345678-1a23-4567-
a1bc-1a2b34567890"
   ],
   "detail": {
     "event_name": "Starvation Start",
     "channel_name": "Your Channel",
     "stream_id": "st-1A2b3c4D5e6F78ghij9Klmn"
   }
}
```

Starvation End: This event is sent when a starving stream begins receiving data from the streamer and the stream is healthy again.

```
{
   "version": "0",
   "id": "01234567-0123-0123-0123-012345678901",
   "detail-type": "IVS Stream Health Change",
   "source": "aws.ivs",
   "account": "aws_account_id",
   "time": "2017-06-12T10:23:43Z",
   "region": "us-east-1",
```

```
   "resources": [
     "arn:aws:ivs:us-east-1:aws_account_id:channel/12345678-1a23-4567-
a1bc-1a2b34567890"
   ],
   "detail": {
     "event_name": "Starvation End",
     "channel_name": "Your Channel",
     "stream_id": "st-1A2b3c4D5e6F78ghij9Klmn"
   }
}
```

Examples: Limit Breach

All limit-breach events include the name of the limit that is breached, the value of the limit, and the number by which the limit was exceeded (value at breach subtracted by the limit).

Ingest Bitrate: This event is sent when the incoming stream's bitrate exceeds the Amazon IVS limit.

```
{
   "version": "0",
   "id": "01234567-0123-0123-0123-012345678901",
   "detail-type": "IVS Limit Breach",
   "source": "aws.ivs",
   "account": "aws_account_id",
   "time": "2017-06-12T10:23:43Z",
   "region": "us-east-1",
   "resources": [
     "arn:aws:ivs:us-east-1:aws_account_id:channel/12345678-1a23-4567-
a1bc-1a2b34567890"
   ],
   "detail": {
     "limit_name": "Ingest Bitrate",
     "limit_value": 1234,
     "exceeded_by": 3,
     "limit_unit": "bits per second",
     "channel_name": "Your Channel",
     "stream_id": "st-1A2b3c4D5e6F78ghij9Klmn"
   }
}
```

Ingest Resolution: This event is sent when the incoming stream's resolution (total pixels or pixels per edge) exceeds the Amazon IVS limits.

Maximum total pixels exceeded:

```
{
   "version": "0",
   "id": "01234567-0123-0123-0123-012345678901",
   "detail-type": "IVS Limit Breach",
   "source": "aws.ivs",
   "account": "aws_account_id",
   "time": "2017-06-12T10:23:43Z",
   "region": "us-east-1",
   "resources": [
      "arn:aws:ivs:us-east-1:aws_account_id:channel/12345678-1a23-4567-
a1bc-1a2b34567890"
   ],
   "detail": {
      "limit_name": "Ingest Resolution",
      "limit_value": 495000,
      "exceeded_by": 426600,
      "limit_unit": "total pixels",
      "channel_name": "Your Channel",
      "stream_id": "st-1A2b3c4D5e6F78ghij9Klmn"
   }
}
```

Maximum pixels per edge exceeded:

```
{
   "version": "0",
   "id": "01234567-0123-0123-0123-012345678901",
   "detail-type": "IVS Limit Breach",
   "source": "aws.ivs",
   "account": "aws_account_id",
   "time": "2017-06-12T10:23:43Z",
   "region": "us-east-1",
   "resources": [
      "arn:aws:ivs:us-east-1:aws_account_id:channel/12345678-1a23-4567-
a1bc-1a2b34567890"TBD
   ],
   "detail": {
      "limit_name": "Ingest Resolution",
      "limit_value": 855,
      "exceeded_by": 45,
      "limit_unit": "pixels per edge",
```

```
      "channel_name": "Your Channel",
      "stream_id": "st-1A2b3c4D5e6F78ghij9Klmn"
   }
}
```

Concurrent Broadcasts: This event is sent when the total number of channels streaming at the same time exceeds the Amazon IVS limit.

```
{
   "version": "0",
   "id": "01234567-0123-0123-0123-012345678901",
   "detail-type": "IVS Limit Breach",
   "source": "aws.ivs",
   "account": "aws_account_id",
   "time": "2017-06-12T10:23:43Z",
   "region": "us-east-1",
   "resources": [],
   "detail": {
     "limit_name": "Concurrent Broadcasts",
     "limit_value": 2,
     "exceeded_by": 3,
     "limit_unit": "active streams"
   }
}
```

Concurrent Viewers: This event is sent when the total number of viewers watching your channels at the same time exceeds the Amazon IVS limit.

```
{
   "version": "0",
   "id": "01234567-0123-0123-0123-012345678901",
   "detail-type": "IVS Limit Breach",
   "source": "aws.ivs",
   "account": "aws_account_id",
   "time": "2017-06-12T10:23:43Z",
   "region": "us-east-1",
   "resources": [],
   "detail": {
     "limit_name": "Concurrent Viewers",
     "limit_value": 10,
     "exceeded_by": 11,
     "limit_unit": "viewers"
```

```
    }
}
```

Examples: Recording State Change

For all recording state change events, the top-level path where all objects for this live stream are stored is `recording_s3_key_prefix`. In the case of failures, the reason for the failure is in `recording_status_reason`. The `recording_duration_ms` field is the number of milliseconds of recording duration.

Recording Start: This event is sent when a stream starts being processed and segments are being written to the storage location configured for the channel.

```
{
    "version": "0",
    "id": "12345678-1a23-4567-a1bc-1a2b34567890",
    "detail-type": "IVS Recording State Change",
    "source": "aws.ivs",
    "account": "123456789012",
    "time": "2020-06-23T20:12:36Z",
    "region": "us-west-2",
    "resources": [
        "arn:aws:ivs:us-west-2:123456789012:channel/AbCdef1G2hij"
    ],
    "detail": {
        "channel_name": "Your Channel",
        "stream_id": "st-1A2b3c4D5e6F78ghij9Klmn",
        "recording_status": "Recording Start",
        "recording_status_reason": "",
        "recording_s3_bucket_name": "r2s3-dev-channel-1-recordings",
        "recording_s3_key_prefix": "ivs/v1/123456789012/AbCdef1G2hij/2020/6/23/20/12/
j8Z9O91ndcVs",
        "recording_duration_ms": 0,
        "recording_session_id": "a6RfV23ES97iyfoQ"
    }
}
```

Recording End: This event is sent when a stream ends and recording stops for this channel.

```
{
    "version": "0",
```

```
    "id": "12345678-1a23-4567-a1bc-1a2b34567890",
    "detail-type": "IVS Recording State Change",
    "source": "aws.ivs",
    "account": "123456789012",
    "time": "2020-06-24T07:51:32Z",
    "region": "us-west-2",
    "resources": [
        "arn:aws:ivs:us-west-2:123456789012:channel/AbCdef1G2hij"
    ],
    "detail": {
        "channel_name": "Your Channel",
        "stream_id": "st-1A2b3c4D5e6F78ghij9Klmn",
        "recording_status": "Recording End",
        "recording_status_reason": "",
        "recording_s3_bucket_name": "r2s3-dev-channel-1-recordings",
        "recording_s3_key_prefix": "ivs/v1/123456789012/AbCdef1G2hij/2020/6/23/20/12/
j8Z9O91ndcVs",
        "recording_duration_ms": 99370264,
        "recording_session_id": "a6RfV23ES97iyfoQ",
        "recording_session_stream_ids": ["st-254sopYUvi6F78ghpO9vn0A",
 "st-1A2b3c4D5e6F78ghij9Klmn"]
    }
}
```

Recording Start Failure: This event is sent when a stream starts but recording fails to start due to errors (for example, the S3 bucket does not exist or is not in the correct region). This live stream is not recorded.

```
{
    "version": "0",
    "id": "12345678-1a23-4567-a1bc-1a2b34567890",
    "detail-type": "IVS Recording State Change",
    "source": "aws.ivs",
    "account": "123456789012",
    "time": "2020-06-23T20:12:36Z",
    "region": "us-west-2",
    "resources": [
        "arn:aws:ivs:us-west-2:123456789012:channel/AbCdef1G2hij"
    ],
    "detail": {
        "channel_name": "Your Channel",
        "stream_id": "st-1A2b3c4D5e6F78ghij9Klmn",
        "recording_status": "Recording Start Failure",
```

```
        "recording_status_reason": "ValidationException",
        "recording_s3_bucket_name": "r2s3-dev-channel-1-recordings",
        "recording_s3_key_prefix": "",
        "recording_duration_ms": 0,
        "recording_session_id": "a6RfV23ES97iyfoQ"
    }
}
```

Recording End Failure: This event is sent when recording ends with failure, due to errors encountered during recording. Some objects may still be written to the configured storage location.

```
{
    "version": "0",
    "id": "12345678-1a23-4567-a1bc-1a2b34567890",
    "detail-type": "IVS Recording State Change",
    "source": "aws.ivs",
    "account": "123456789012",
    "time": "2020-06-24T07:51:32Z",
    "region": "us-west-2",
    "resources": [
        "arn:aws:ivs:us-west-2:123456a7-ab1c-2d34-e5f6-1a2b3c4d5678"
    ],
    "detail": {
        "channel_name": "Your Channel",
        "stream_id": "st-1A2b3c4D5e6F78ghij9Klmn",
        "recording_status": "Recording End Failure",
        "recording_status_reason": "InternalServerException",
        "recording_s3_bucket_name": "r2s3-dev-channel-1-recordings",
        "recording_s3_key_prefix": "ivs/v1/123456789012/AbCdef1G2hij/2020/6/23/20/12/
j8Z9O91ndcVs",
        "recording_duration_ms": 0,
        "recording_session_id": "a6RfV23ES97iyfoQ"
    }
}
```

Logging Amazon IVS API Calls with AWS CloudTrail

Amazon Interactive Video Service (IVS) is integrated with AWS CloudTrail, a service that provides a record of actions taken by a user, role, or AWS service in Amazon IVS. CloudTrail captures all API calls for Amazon IVS as events. The calls captured include API calls from the Amazon IVS console and from your applications.

If you create a *trail*, you can enable continuous delivery of CloudTrail events to an Amazon S3 bucket, including Amazon IVS events. If you don't configure a trail, you can still view the most recent events in the CloudTrail console in **Event history**. Using the information collected by CloudTrail, you can determine the request that was made to Amazon IVS, the IP address from which the request was made, who made the request, when it was made, and additional details.

To learn more about CloudTrail, see the AWS CloudTrail User Guide.

Amazon IVS Information in CloudTrail

CloudTrail is enabled on your AWS account when you create the account. When activity occurs in Amazon IVS, that activity is recorded in a CloudTrail event along with other AWS service events in **Event history**. You can view, search, and download recent events in your AWS account. For more information, see Viewing Events with CloudTrail Event History.

For an ongoing record of events in your AWS account, including events for Amazon IVS, create a trail. A trail enables CloudTrail to deliver log files to an Amazon S3 bucket. By default, when you create a trail in the CloudTrail console, the trail applies to all AWS regions. The trail logs events from all Regions in the AWS partitions and delivers the log files to the Amazon S3 bucket that you specify. Additionally, you can configure other AWS services to analyze and act on the event data collected in CloudTrail logs. For more information, see these items in the *CloudTrail User Guide*:

- Creating a Trail For Your AWS Account (overview)
- CloudTrail Supported Services and Integrations
- Configuring Amazon SNS Notifications for CloudTrail
- Receiving CloudTrail Log Files from Multiple Regions
- Receiving CloudTrail Log Files from Multiple Accounts

All Amazon IVS actions are logged by CloudTrail and documented in the IVS Low-Latency Streaming API Reference, IVS Real-Time Streaming API Reference, and IVS Chat API Reference. For

example, calls to the `CreateChannel`, `ListChannels`, and `DeleteChannel` operations generate entries in the CloudTrail log files.

Every event or log entry contains information about who generated the request. The identity information helps you determine whether the request was made:

- With root or AWS Identity and Access Management (IAM) user credentials
- With temporary security credentials for a role or federated user.
- By another AWS service.

For more information, see the CloudTrail userIdentity Element.

Understanding Amazon IVS Log File Entries

A trail is a configuration that enables delivery of events as log files to an Amazon S3 bucket that you specify. An event represents a single request from any source and includes information about the requested action, the date and time of the action, request parameters, and so on.

CloudTrail log files contain one or more log entries. CloudTrail log files are not an ordered stack trace of the public API calls, so they do not appear in any specific order.

The following example shows a CloudTrail log entry for the `CreateChannel` operation.

```
{
    "eventVersion": "1.05",
    "userIdentity": {
        "type": "AssumedRole",
        "principalId": "ABCDEFGHIJK1L2EXAMPLE:account_name",
        "arn": "arn:aws:sts::123456789012:assumed-role/
First_Streamer/1234567890123456789",
        "accountId": "123456789012",
        "accessKeyId": "ABCDEFGHIJKL1EXAMPLE",
        "sessionContext": {
            "sessionIssuer": {
                "type": "Role",
                "principalId": "ABCDEFGHIJK1L2EXAMPLE",
                "arn": "arn:aws:iam::123456789012:role/Admin",
                "accountId": "123456789012",
                "userName": "First_Streamer"
            },
```

```
            "webIdFederationData": {},
            "attributes": {
                "mfaAuthenticated": "false",
                "creationDate": "2020-04-02T20:57:43Z"
            }
        }
    },
    "eventTime": "2020-04-02T20:57:46Z",
    "eventSource": "ivs.amazonaws.com",
    "eventName": "CreateChannel",
    "awsRegion": "us-west-2",
    "sourceIPAddress": "10.10.10.10",
    "userAgent": "console.amazonaws.com",
    "requestParameters": {
        "name": "default"
    },
    "responseElements": {
        "channel": {
            "arn": "arn:aws:ivs:us-west-2:123456789012:channel/1EXAMPLE",
            "authorized": false,
            "ingestEndpoint": "EXAMPLE.global-contribute.live-video.net",
            "latencyMode": "LOW",
            "name": "default",
            "playbackUrl": "https://EXAMPLE.m3u8",
            "tags": {}
        },
        "streamKey": {
            "arn": "arn:aws:ivs:us-west-2:123456789012:stream-key/2EXAMPLE",
            "channelArn": "arn:aws:ivs:us-west-2:123456789012:channel/1EXAMPLE",
            "tags": {}
        }
    },
    "requestID": "12a34bc5-EXAMPLE",
    "eventID": "a1b2c3de-EXAMPLE",
    "readOnly": false,
    "eventType": "AwsApiCall",
    "recipientAccountId": "123456789012"
}
```

Amazon IVS Security

Cloud security at AWS is the highest priority. As an AWS customer, you benefit from a data center and network architecture that are built to meet the requirements of the most security-sensitive organizations.

Security is a shared responsibility between AWS and you. The shared responsibility model describes this as security *of* the cloud and security *in* the cloud:

- **Security of the cloud** — AWS is responsible for protecting the infrastructure that runs AWS services in the AWS Cloud. AWS also provides you with services that you can use securely. Third-party auditors regularly test and verify the effectiveness of our security as part of the AWS compliance programs.
- **Security in the cloud** — Your responsibility is determined by the AWS service that you use. You are also responsible for other factors including the sensitivity of your data, your organization's requirements, and applicable laws and regulations.

This documentation helps you understand how to apply the shared responsibility model when using Amazon IVS. The following topics show you how to configure Amazon IVS to meet your security and compliance objectives.

Topics

- IVS Data Protection
- Identity and Access Management in IVS
- Managed Policies for Amazon IVS
- Using Service-Linked Roles for Amazon IVS
- IVS Logging and Monitoring
- IVS Incident Response
- IVS Resilience
- IVS Infrastructure Security

IVS Data Protection

For data sent to Amazon Interactive Video Service (IVS), the following data protections are in place:

- Amazon IVS encrypts data in transit via HTTPS API endpoints, RTMPS ingest, and HTTPS playback. No configuration is required for the API endpoints.
  - For ingest, streamers can secure their content by using RTMPS. This is available by default. See *Getting Started with IVS*.
  - IVS channels can be configured to allow insecure RTMP ingest, though we recommend using RTMPS unless you have specific and verified use cases that require RTMP.
  - For transcoding/transmuxing, data may be transmitted unencrypted on internal Amazon networks.
  - For playback, data is served over HTTPS.
- Live-video content is not stored and is ephemeral. It simply travels through the system and is cached (on internal systems) while being viewed.
- For the auto-record-to-S3 feature, video content is written to Amazon S3. For more information, see data protection in Amazon S3.
- All stored, customer-input metadata is in AWS-managed services using server-side encryption.
- To improve quality of service, Amazon IVS stores customer (end user) metadata (for example, buffer rates for a particular region). This metadata cannot be used to personally identify your end users.
- Public encryption keys (which you manage) can be used with the `ImportPlaybackKeyPair` API operation. See the IVS Low-Latency Streaming API Reference. *Do not share these encryption keys*.

Amazon IVS does not require that you supply any customer (end user) data. There are no fields in channels, inputs, or input security groups where there is an expectation that you will provide customer (end user) data.

Do not put sensitive identifying information such as your customer (end user) account numbers into free-form fields such as a Name field. This includes when you work with the Amazon IVS console or API, AWS CLI, or AWS SDKs. Any piece of data that you enter into Amazon IVS might be included in diagnostic logs.

Streams are not end-to-end encrypted; a stream may be transmitted unencrypted internally in the IVS network, for processing.

Identity and Access Management in IVS

AWS Identity and Access Management (IAM) is an AWS service that helps an account administrator securely control access to AWS resources. Every AWS resource is owned by an AWS account, and permissions to create or access a resource are governed by permissions policies. IAM account administrators control who can be authenticated (signed in) and authorized (have permissions) to use Amazon IVS resources. IAM is a feature of your AWS account offered at no additional charge.

Important: For comprehensive information, see the AWS IAM product page, IAM User Guide, and Signing AWS API Requests. Throughout this section, we also provide links to specific sections of the *IAM User Guide*. You should be familiar with this material before proceeding.

Audience

How you use IAM differs, depending on the work you do in Amazon IVS:

- **Service user** – If you use the Amazon IVS service to do your job, your administrator provides you with the credentials and permissions that you need. As you use more Amazon IVS features to do your work, you might need additional permissions. Understanding how access is managed can help you request the right permissions from your administrator. If you cannot access a feature in Amazon IVS, see Troubleshooting.
- **Service administrator** – If you're in charge of Amazon IVS resources at your company, you probably have full access to Amazon IVS. It's your job to determine which Amazon IVS features and resources your employees should access. You must then submit requests to your IAM administrator, to change the permissions of your service users. Review the information on this page to understand basic IAM concepts. To learn more about how your company can use IAM with Amazon IVS, see How Amazon IVS Works with IAM.
- **IAM administrator** – If you're an IAM administrator, you can write policies to manage access to Amazon IVS. To view example Amazon IVS identity-based policies that you can use in IAM, see Identity-Based Policy Examples.

How Amazon IVS Works with IAM

Before you can make Amazon IVS API requests, you must create one or more IAM *identities* (users, groups, and roles) and IAM *policies*, then attach policies to identities. It takes up to a few minutes for the permissions to propagate; until then, API requests are rejected.

For a high-level view of how Amazon IVS works with IAM, see AWS Services That Work with IAM in the *IAM User Guide*.

Identities

You can create IAM identities to provide authentication for people and processes in your AWS account. IAM groups are collections of IAM users that you can manage as a unit. See Identities (Users, Groups, and Roles) in the *IAM User Guide*.

Policies

See these sections in the *IAM User Guide*:

- Access Management — All about policies.
- Actions, Resources, and Condition Keys for Amazon IVS
- AWS Global Condition Context Keys
- IAM JSON Policy Elements Reference — All the elements that you can use in a JSON policy.

By default, IAM users and roles don't have permission to create or modify Amazon IVS resources (even to change their own passwords). They also cannot perform tasks using the AWS console, AWS CLI, or AWS API. An IAM administrator must create IAM policies that grant users and roles permission to perform specific API operations on the specified resources that they need.

IAM policies define permissions for an action regardless of the method that is used to perform the operation. For example, suppose that you have a policy that allows the `iam:GetRole` action. A user with that policy can get role information from the AWS Management Console, the AWS CLI, or the AWS API.

Policies are JSON permissions-policy documents made up of *elements*. Amazon IVS supports three elements:

- **Actions** — Policy actions for Amazon IVS use the `ivs` prefix before the action. For example, to grant someone permission to create an Amazon IVS channel with the Amazon IVS `CreateChannel` API method, you include the `ivs:CreateChannel` action in the policy for that person. Policy statements must include either an `Action` or `NotAction` element.
- **Resources** — The Amazon IVS channel resource has the following ARN format:

```
arn:aws:ivs:${Region}:${Account}:channel/${channelId}
```

For example, to specify the `VgNkEJgOVX9N` channel in your statement, use this ARN:

```
"Resource": "arn:aws:ivs:us-west-2:123456789012:channel/VgNkEJgOVX9N"
```

Some Amazon IVS actions, such as those for creating resources, cannot be performed on a specific resource. In those cases, you must use the wildcard (*):

```
"Resource":"*"
```

- **Conditions** — Amazon IVS supports some global condition keys: `aws:RequestTag`, `aws:TagKeys`, and `aws:ResourceTag`.

You can use variables as placeholders in a policy. For example, you can grant an IAM user permission to access a resource only if it is tagged with the user's IAM username. See Variables and Tags in the *IAM User Guide*.

Amazon IVS provides AWS managed policies that can be used to grant a preconfigured set of permissions to identities (read only or full access). You can choose to use managed policies instead of the identity-based policies shown below. For details, see Managed Policies for Amazon IVS.

Authorization Based on Amazon IVS Tags

You can attach tags to Amazon IVS resources or pass tags in a request to Amazon IVS. To control access based on tags, you provide tag information in the condition element of a policy using the `aws:ResourceTag/key-name`, `aws:RequestTag/key-name`, or `aws:TagKeys` condition keys. For more information about tagging Amazon IVS resources, see "Tagging" in the IVS Low-Latency Streaming API Reference, IVS Real-Time Streaming API Reference, and IVS Chat API Reference.

For an example, see View Amazon IVS Channels Based on Tags.

Roles

See IAM Roles and Temporary Security Credentials in the *IAM User Guide*.

An IAM *role* is an entity within your AWS account that has specific permissions.

Amazon IVS supports using *temporary security credentials*. You can use temporary credentials to sign in with federation, assume an IAM role, or assume a cross-account role. You obtain temporary

security credentials by calling AWS Security Token Service API operations such as `AssumeRole` or `GetFederationToken`.

Privileged and Unprivileged Access

API resources have privileged access. Unprivileged playback access can be set up through private channels; see Setting Up Private Channels.

Best Practices for Policies

See IAM Best Practices in the *IAM User Guide*.

Identity-based policies are very powerful. They determine whether someone can create, access, or delete Amazon IVS resources in your account. These actions can incur costs for your AWS account. Follow these recommendations:

- **Grant least privilege** — When you create custom policies, grant only the permissions required to perform a task. Start with a minimum set of permissions and grant more permissions as needed. Doing so is more secure than starting with permissions that are too lenient, then trying to tighten them later. Specifically, reserve `ivs:*` for admin access; do not use it in applications.
- **Enable multi-factor authentication (MFA) for sensitive operations** — For extra security, require IAM users to use MFA to access sensitive resources or API operations.
- **Use policy conditions for extra security** — To the extent practical, define the conditions under which your identity-based policies allow access to a resource. For example, you can write conditions to specify a range of allowable IP addresses from which a request must come. You also can write conditions to allow requests only within a specified date or time range, or to require the use of SSL or MFA.

Identity-Based Policy Examples

Use the Amazon IVS Console

To access the Amazon IVS console, you must have a minimum set of permissions which allow you to list and view details about the Amazon IVS resources in your AWS account. If you create an identity-based policy that is more restrictive than the minimum required permissions, the console will not function as intended for identities with that policy. To ensure access to the Amazon IVS console, attach the following policy to the identities (see Adding and Removing IAM Permissions in the *IAM User Guide*).

The parts of the following policy provide access to:

- All Amazon IVS API operations
- Your Amazon IVS service quotas
- Amazon S3 endpoints needed for IVS auto-record-to-S3 functionality (low-latency-streaming) and IVS composite-recording functionality (real-time streaming).
- Auto-record-to-S3 service-linked-role creation
- Amazon Cloudwatch to get metrics for your live-stream session

JSON

```
{
  "Version":"2012-10-17",
  "Statement": [
    {
      "Action": "ivs:*",
      "Effect": "Allow",
      "Resource": "*"
    },
    {
      "Action": [
        "servicequotas:ListServiceQuotas"
      ],
      "Effect": "Allow",
      "Resource": "*"
    },
    {
      "Action": [
        "s3:CreateBucket",
        "s3:DeleteBucketPolicy",
        "s3:GetBucketLocation",
        "s3:GetBucketPolicy",
        "s3:ListAllMyBuckets",
        "s3:PutBucketPolicy"
      ],
      "Effect": "Allow",
      "Resource": "*"
    },
    {
      "Action": [
```

```
        "iam:AttachRolePolicy",
        "iam:CreateServiceLinkedRole",
        "iam:PutRolePolicy"
      ],
      "Effect": "Allow",
      "Resource": "arn:aws:iam::*:role/aws-service-role/ivs.amazonaws.com/
AWSServiceRoleForIVSRecordToS3*"
    },
    {
      "Action": [
        "cloudwatch:GetMetricData"
      ],
      "Effect": "Allow",
      "Resource": "*"
    },
    {
      "Action": [
        "lambda:AddPermission",
        "lambda:ListFunctions"
      ],
      "Effect": "Allow",
      "Resource": "*"
    }
  ]
}
```

Allow Users to View Their Own Permissions

This example shows a policy that allows IAM users to view the inline and managed policies that are attached to their user identity. This policy includes permissions to complete this action on the AWS console or programmatically using the AWS CLI or AWS API.

JSON

```
{
   "Version":"2012-10-17",
   "Statement": [
      {
         "Sid": "ViewOwnUserInfo",
         "Effect": "Allow",
         "Action": [
```

```
            "iam:GetUserPolicy",
            "iam:ListGroupsForUser",
            "iam:ListAttachedUserPolicies",
            "iam:ListUserPolicies",
            "iam:GetUser"
         ],
         "Resource": [
            "arn:aws:iam:*:*:user/${aws:username}"
         ]
      },
      {
         "Sid": "NavigateInConsole",
         "Effect": "Allow",
         "Action": [
            "iam:GetGroupPolicy",
            "iam:GetPolicyVersion",
            "iam:GetPolicy",
            "iam:ListAttachedGroupPolicies",
            "iam:ListGroupPolicies",
            "iam:ListPolicyVersions",
            "iam:ListPolicies",
            "iam:ListUsers"
         ],
         "Resource": "*"
      }
   ]
}
```

Access an Amazon IVS Channel

Here, you want to grant an IAM user in your AWS account access to one of your Amazon IVS channels, VgNkEJgOVX9N. You also want to allow the user to stop the stream (`ivs:StopStream`), add metadata (`ivs:PutMetadata`), and update the channel (`ivs:UpdateChannel`). The policy also grants permissions required by the Amazon IVS console: `ivs:ListChannels`, `ivs:ListStreams`, `ivs:GetChannel`, and `ivs:GetStream`.

JSON

```
{
   "Version":"2012-10-17",
   "Statement":[
```

```
      {
         "Sid":"ListChannelsInConsole",
         "Effect":"Allow",
         "Action":[
            "ivs:ListChannels",
            "ivs:ListStreams"

         ],
         "Resource":"arn:aws:ivs:*:*:channel/*"
      },
      {
         "Sid":"ViewSpecificChannelInfo",
         "Effect":"Allow",
         "Action":[
            "ivs:GetChannel",
            "ivs:GetStream"
         ],
         "Resource":"arn:aws:ivs:*:*:channel/VgNkEJgOVX9N"
      },
      {
         "Sid":"ManageChannel",
         "Effect":"Allow",
         "Action":[
            "ivs:StopStream",
            "ivs:PutMetadata",
            "ivs:UpdateChannel"
         ],
         "Resource":"arn:aws:ivs:*:*:channel/VgNkEJgOVX9N"
      }
   ]
}
```

View Amazon IVS Channels Based on Tags

You can use conditions in your identity-based policy to control access to Amazon IVS resources based on tags. This example shows a policy that allows viewing a channel. This policy also grants the permissions necessary to complete this action on the Amazon IVS console.

JSON

```
{
```

```
   "Version":"2012-10-17",
   "Statement": [
      {
         "Sid": "ListWidgetsInConsole",
         "Effect": "Allow",
         "Action": "ivs:ListChannels",
         "Resource": "arn:aws:ivs:*:*:channel/*"
      },
      {
         "Sid": "ViewChannelIfOwner",
         "Effect": "Allow",
         "Action": "ivs:GetChannel",
         "Resource": "arn:aws:ivs:*:*:channel/*",
         "Condition": {
            "StringEquals": {"aws:ResourceTag/Owner": "${aws:username}"}
         }
      }
   ]
}
```

You can attach this policy to the IAM users in your account. However, permission is granted only if the channel is tagged with that user's username as an owner. If a user named richard-roe tries to view an Amazon IVS channel, the channel must be tagged `Owner=richard-roe` or `owner=richard-roe`; otherwise he is denied access. (The condition tag key `Owner` matches both `Owner` and `owner` because condition-key names are not case sensitive.)

Troubleshooting

Use the following information to help diagnose and fix common issues that you might encounter when working with Amazon IVS and IAM.

- **I am not authorized to perform an action in Amazon IVS.**

  The following example error occurs when the mateojackson IAM user tries to use the AWS console to view details about a channel but does not have `ivs:GetChannel` permission.

```
User: arn:aws:iam::123456789012:user/mateojackson is not authorized to perform:
 ivs:GetChannel on resource: arn:aws:ivs:us-west-2:123456789012:channel/VgNkEJgOVX9N
```

In this case, Mateo asks his administrator to update his policies to allow him to access the `arn:aws:ivs:us-west-2:123456789012:channel/VgNkEJgOVX9N` resource using the `ivs:GetChannel` action.

- **I want to view my access keys**.

  After you create your IAM user access keys, you can view your access key ID at any time. However, you can't view your secret access key again. If you lose your secret key, you must create a new access key pair. Access keys have two parts:

  - An access key ID (for example, `AKIAIOSFODNN7EXAMPLE`)
  - A secret access key (for example, `wJalrXUtnFEMI/K7MDENG/bPxRfiCYEXAMPLEKEY`)

  As with a username and password, you must use both the access key ID and the secret access key together to authenticate your requests. Manage your access keys as securely as you do your user name and password.

  Important: Do not give your access keys to a third party, even to help find your canonical user ID. Doing so might give someone permanent access to your account.

  When you create an access key pair, you are prompted to save the access key ID and secret access key in a secure location. The secret access key is available only when you create it. If you lose your secret access key, you must add new access keys to your IAM user.

  You can have at most two access keys. If you already have two, you must delete one key pair before creating a new one. See Managing Access Keys for IAM Users in the *IAM User Guide*.

- **I'm an administrator and want to allow others to access Amazon IVS.**

  To allow others to access Amazon IVS, you must create an IAM entity (user or role) for the person or application that needs access. The person or application will use the credentials for that entity to access AWS. You must then attach a policy to the entity that grants the correct permissions in Amazon IVS.

  To get started, see Creating Your First IAM Delegated User and Group in the *IAM User Guide*.

- **I want to allow people outside my AWS account to access my Amazon IVS resources.**

  You can create a role that users in other accounts or people outside your organization can use to access your resources. You can specify who is trusted to assume the role. For services that support resource-based policies or access control lists (ACLs), you can use those policies to grant

people access to your resources. For related information, see these sections of the *IAM User Guide*:

To learn ...	See ...
How to provide access to your resources across AWS accounts that you own	Providing Access to an IAM User in Another AWS Account That You Own
How to provide access to your resources to third-party AWS accounts	Providing Access to AWS Accounts Owned by Third Parties
How to provide access through *identity federation*	Providing Access to Externally Authenticated Users (Identity Federation)
The difference between using roles and resource-based policies for cross-account access	Cross Account Resource Access in IAM

Managed Policies for Amazon IVS

An AWS managed policy is a standalone policy that is created and administered by AWS. AWS managed policies are designed to provide permissions for many common use cases so that you can start assigning permissions to users, groups, and roles.

Keep in mind that AWS managed policies might not grant least-privilege permissions for your specific use cases because they're available for all AWS customers to use. We recommend that you reduce permissions further by defining customer managed policies that are specific to your use cases.

You cannot change the permissions defined in AWS managed policies. If AWS updates the permissions defined in an AWS managed policy, the update affects all principal identities (users, groups, and roles) that the policy is attached to. AWS is most likely to update an AWS managed policy when a new AWS service is launched or new API operations become available for existing services.

For more information, see AWS managed policies in the *IAM User Guide*.

IVSReadOnlyAccess

Use the IVSReadOnlyAccess AWS managed policy to give your application developers access to all non-mutating IVS API operations (for both low-latency and real-time streaming).

IVSFullAccess

Use the IVSFullAccess AWS managed policy to give your users access to all IVS and IVS Chat API operations (for both low-latency and real-time streaming). This policy includes additional permissions for dependent services, to allow full access to the IVS console.

Policy Updates

View details about updates to AWS managed policies for Amazon IVS since this service began tracking these changes. For automatic alerts about changes to this page, subscribe to the RSS feed on the Amazon IVS Low-Latency Streaming Document History page.

Change	Description	Date
IVSReadOnlyAccess – Change	IVS added a new action to grant ListParticipantReplicas permission in support of the Participant Replication real-time-streaming release.	July 24, 2025
IVSReadOnlyAccess – Change	IVS added new actions to grant the following permissio ns in support of two real-time -streaming releases, RTMP Ingest and Generate Participa nt Tokens with a Key Pair: • GetIngestConfiguration • ListIngestConfigurations	September 18, 2024

Change	Description	Date
	• GetPublicKey • ListPublicKeys	
IVSReadOnlyAccess – Change	IVS added new actions to grant the following permissions in support of Server-Side Composition, Real-Time Composite Recording, and Tokenless Playback Restrictions: • GetComposition • ListCompositions • GetEncoderConfiguration • ListEncoderConfigurations • GetPlaybackRestrictionPolicy • ListPlaybackRestrictionPolicies • GetStorageConfiguration • ListStorageConfigurations	February 16, 2024
IVSFullAccess – New policy	IVS added a new policy to allow full access to IVS (both low-latency and real-time streaming) and IVS Chat.	December 5, 2023
IVSReadOnlyAccess – New policy	IVS added a new policy to allow read-only access to IVS (both low-latency and real-time streaming).	December 5, 2023

Change	Description	Date
Amazon IVS started tracking changes	Amazon IVS started tracking changes for its AWS managed policies.	December 5, 2023

Using Service-Linked Roles for Amazon IVS

Amazon IVS uses IAM service-linked roles. A service-linked role is a unique type of IAM role that is linked directly to an AWS service. Service-linked roles are predefined by Amazon IVS and include all the permissions that the service requires to call other AWS services on your behalf.

A service-linked role makes setting up Amazon IVS easier because you don't have to manually add the necessary permissions. Amazon IVS defines the permissions of its service-linked roles, and only Amazon IVS can assume its roles. The defined permissions include the trust policy and the permissions policy, and that permissions policy cannot be attached to any other IAM entity.

You can delete an IVS service-linked role only after first deleting the related IVS resources. This prevents you from inadvertently removing permission for IVS to access the AWS resources associated with the service-linked role.

For information about other services that support service-linked roles, see AWS Services That Work with IAM and look for the services that have **Yes** in the **Service-Linked Role** column. Choose a **Yes** with a link to view the service-linked role documentation for that service.

Service-Linked Role Permissions for Amazon IVS

Amazon IVS uses the service-linked role named **AWSServiceRoleForIVSRecordToS3** to access Amazon S3 buckets on behalf of your Amazon IVS Channels.

The AWSServiceRoleForIVSRecordToS3 service-linked role trusts the following services to assume the role:

- `ivs.amazonaws.com`

The role permissions policy allows Amazon IVS to complete the following actions on the specified resources:

- Action: `s3:PutObject` on `your Amazon S3 buckets`

You must configure permissions to allow an IAM entity (such as a user, group, or role) to create, edit, or delete a service-linked role. For more information, see Service-Linked Role Permissions in the *IAM User Guide*.

Creating a Service-Linked Role for Amazon IVS

You don't need to manually create the service-linked role for IVS. Amazon IVS creates it for you, when you create a recording-configuration resource in the Amazon IVS Console, the AWS CLI, or the AWS API. The service-linked role is named AWSServiceRoleForIVSRecordToS3.

> **Important**
>
> This service-linked role can appear in your account if you completed an action in another service that uses the features supported by this role. To learn more, see A New Role Appeared in My IAM Account.

If you delete this service-linked role and then need to create it again, you can use the same process to recreate the role in your account. When you create a recording-configuration resource, Amazon IVS creates the service-linked role for you again.

Editing a Service-Linked Role for Amazon IVS

Amazon IVS does not allow you to edit the AWSServiceRoleForIVSRecordToS3 service-linked role. After you create a service-linked role, you cannot change the name of the role because various entities might reference the role. However, you can edit the description of the role using IAM. For more information, see Editing a Service-Linked Role in the *IAM User Guide*.

Deleting a Service-Linked Role for Amazon IVS

If you no longer need to use a feature or service that requires a service-linked role, we recommend that you delete that role. That way you don’t have an unused entity that is not actively monitored or maintained. However, you must clean up the resources for your service-linked role before you can manually delete it.

> **Note**
>
> If the Amazon IVS service is using the role when you try to delete the resources, then the deletion might fail. If that happens, wait for a few minutes and try the operation again.

To delete Amazon IVS resources used by the AWSServiceRoleForIVSRecordToS3 service-linked role:

Use the Amazon IVS Console, the AWS CLI, or the AWS API to remove the recording-configuration association from all channels and delete all recording-configuration resources in the region.

To manually delete the service-linked role using IAM:

Use the IAM console, the AWS CLI, or the AWS API to delete the AWSServiceRoleForIVSRecordToS3 service-linked role. For more information, see Deleting a Service-Linked Role in the *IAM User Guide*.

Supported Regions for Amazon IVS Service-Linked Roles

Amazon IVS supports using service-linked roles in all of the regions where the service is available. For more information, see Amazon IVS Service Endpoints.

IVS Logging and Monitoring

To log performance and/or operations, use Amazon CloudTrail. See Logging Amazon IVS API Calls with AWS CloudTrail.

IVS Incident Response

To detect or alert for incidents, you can monitor your stream's health via Amazon EventBridge events. See Using Amazon EventBridge with Amazon IVS: for Low-Latency Streaming and for Real-Time Streaming.

Use the AWS Health Dashboard for information on the overall health of Amazon IVS (by region).

IVS Resilience

IVS APIs use the AWS global infrastructure and is built around AWS Regions and Availability Zones. AWS Regions provide multiple Availability Zones, which are:

- Physically separated and isolated.
- Connected with low-latency, high-throughput, highly-redundant networking.
- More available, fault tolerant, and scalable than traditional single or multiple data-center infrastructures.

For more information on the APIs, see the IVS Low-Latency Streaming API Reference, IVS Real-Time Streaming API Reference, and IVS Chat API Reference. For more information on AWS Regions and Availability Zones, see AWS Global Infrastructure.

Amazon IVS Video Data Plane

Video ingestion and distribution run over a global content delivery network (CDN) optimized for low-latency video. This enables Amazon IVS to provide customers with end-to-end, high quality video served to a global audience with minimal delay. The video CDN has global Points-of-Presence (PoPs), allowing broadcasters and viewers to be geographically dispersed.

Regardless of the AWS region where you chose to configure your Amazon IVS resources:

- Streamers automatically ingest video to a PoP geographically close to their location.
- Viewers stream video via the global video CDN.

Once ingested, video streams are processed and transcoded in one of several Amazon IVS datacenters. Amazon IVS does not provide automated failover for ingestion or transcoding failures. Instead, streamers should configure their encoders or broadcasting clients to automatically re-ingest on any broadcasting failures.

IVS Infrastructure Security

As a managed service, Amazon IVS is protected by the AWS global network security procedures. These are described in Best Practices for Security, Identity, & Compliance.

API Calls

You use AWS published API calls to access Amazon IVS through the network. Clients must support Transport Layer Security (TLS) 1.2 or later. We recommend TLS 1.3 or later (due to vulnerabilities in earlier versions). Clients must also support cipher suites with perfect forward secrecy (PFS) such as

Ephemeral Diffie-Hellman (DHE) or Elliptic Curve Ephemeral Diffie-Hellman (ECDHE). Most modern systems such as Java 7 and later support these modes.

Also, API requests must be signed by using an access key ID and a secret access key that is associated with an IAM principal. Or you can use the AWS Security Token Service to generate temporary security credentials to sign requests.

You can call these API operations from any network location, but Amazon IVS does support resource-based access policies, which can include restrictions based on the source IP address. You can also use Amazon IVS policies to control access from specific Amazon Virtual Private Cloud (Amazon VPC) endpoints or specific VPCs. Effectively, this isolates network access to a given Amazon IVS resource from only the specific VPC within the AWS network.

Also, all API requests are signed sigv4.

For API details, see the IVS Low-Latency Streaming API Reference, IVS Real-Time Streaming API Reference, and IVS Chat API Reference.

Streaming and Playback

Playback happens over HTTPS from the edge to the viewer, and the “contribution edge” (ingest endpoint) supports RTMPS (RTMP over TLS) or RTMP if the channel is configured to allow insecure ingest. Amazon IVS streaming requires TLS version 1.2 or later. Streams are not end-to-end encrypted; a stream may be transmitted unencrypted internally in the IVS network, for processing.

IVS Service Quotas | Low-Latency Streaming

The following are service quotas and limits for Amazon Interactive Video Service (IVS) endpoints, resources, and other operations. Service quotas (also known as limits) are the maximum number of service resources or operations for your AWS account. That is, these limits are per AWS account, unless noted otherwise in the table. Also see AWS Service Quotas.

You use an endpoint to connect programmatically to an AWS service. Also see AWS Service Endpoints.

All quotas are enforced per region.

Important: All accounts have limits on the number of concurrent views and concurrent streams. (A *view* is a unique viewing session which is actively downloading or playing video. For a more detailed definition, see the IVS Glossary.) *Ensure that your limits are adequate and request an increase if needed, especially if you are planning a large streaming event.*

Service Quota Increases

For quotas that are adjustable, you can request a rate increase through the AWS console. Use the console to view information about service quotas too.

API call rate quotas are not adjustable.

API Call Rate Quotas

Operation Type	Operation	Default
Ad configuration	`CreateAdConfiguration`	3 TPS
Ad configuration	`DeleteAdConfiguration`	3 TPS
Ad configuration	`GetAdConfiguration`	3 TPS
Ad configuration	`InsertAdBreak`	1 TPS
Ad configuration	`ListAdConfigurations`	3 TPS
Channel	`BatchGetChannel`	5 TPS

Operation Type	Operation	Default
Channel	CreateChannel	5 TPS
Channel	DeleteChannel	5 TPS
Channel	GetChannel	5 TPS
Channel	ListChannels	5 TPS
Channel	UpdateChannel	5 TPS
Playback restriction policy	CreatePlaybackRestrictionPolicy	5 TPS
Playback restriction policy	DeletePlaybackRestrictionPolicy	5 TPS
Playback restriction policy	GetPlaybackRestrictionPolicy	5 TPS
Playback restriction policy	ListPlaybackRestrictionPolicies	5 TPS
Playback restriction policy	UpdatePlaybackRestrictionPolicy	5 TPS
Private channel	DeletePlaybackKeyPair	3 TPS
Private channel	GetPlaybackKeyPair	3 TPS
Private channel	ImportPlaybackKeyPair	3 TPS
Private channel	ListPlaybackKeyPairs	3 TPS
Private channel	BatchStartViewerSessionRevocation	2 TPS
Private channel	StartViewerSessionRevocation	10 TPS
Recording configuration	CreateRecordingConfiguration	3 TPS
Recording configuration	DeleteRecordingConfiguration	3 TPS
Recording configuration	GetRecordingConfiguration	3 TPS
Recording configuration	ListRecordingConfigurations	3 TPS

Operation Type	Operation	Default
Stream	GetStream	5 TPS
Stream	GetStreamSession	5 TPS
Stream	ListStreams	5 TPS
Stream	ListStreamSessions	5 TPS
Stream	PutMetadata	5 TPS per channel 155 TPS per account
Stream	StopStream	5 TPS
Stream key	BatchGetStreamKey	5 TPS
Stream key	CreateStreamKey	5 TPS
Stream key	DeleteStreamKey	5 TPS
Stream key	GetStreamKey	5 TPS
Stream key	ListStreamKeys	5 TPS
Tags	ListTagsForResource	10 TPS
Tags	TagResource	10 TPS
Tags	UntagResource	10 TPS

Other Quotas

Resource or Feature	Default	Adjustable	Description
Ad configurations	20	No	Maximum number of ad configurations, per AWS Region.
Channels	5,000	Yes	Maximum number of channels, per AWS Region.
Concurrent streams	100	Yes	Maximum number of channels that can be streamed simultaneously, per AWS Region. If you exceed this threshold, the stream is rejected.
Concurrent views	15,000	Yes	Maximum number of views allowed to play back a live channel, across all channels in an AWS Region. (A *view* is a unique viewing session which is actively downloadi ng or playing video. See the **Important** note at the beginning of this page.)
Ingest bitrate (if channel `type` is `BASIC`)	1.5 Mbps or 3.5 Mbps	No	Maximum bits per second that can be streamed to a channel whose `type` is `BASIC`. • If input video quality is 480p or less, the default quota is 1.5 Mbps.

Resource or Feature	Default	Adjustable	Description
			• If input video quality is more than 480p but less than 1080p, the default quota is 3.5 Mbps. Warning: If you exceed this threshold, the stream probably will disconnect immediately. For details on channel `type`, see Channel Types in the *IVS Low-Latency Streaming API Reference*.
Ingest bitrate (if channel `type` is `STANDARD`, with single-track input)	8.5 Mbps	No	Maximum bits per second that can be streamed to a channel whose `type` is `STANDARD` (the default), with single-track input. Warning: If you exceed this threshold , the stream probably will disconnect immediately. For details on channel `type`, see Channel Types in the *IVS Low-Latency Streaming API Reference*.

Resource or Feature	Default	Adjustable	Description
Ingest bitrate (if channel `type` is `STANDARD`, with multitrack input up to `FULL_HD` resolution)	15 Mbps	No	Maximum bits per second that can be streamed to a channel whose `type` is `STANDARD` (the default), whose `multitrackInputConfiguration.maximumResolution` is `SD`, `HD`, or `FULL_HD`, with multitrack input. Warning: If you exceed this threshold, the stream probably will disconnect immediately. For details on channel `type`, see Channel Types in the *IVS Low-Latency Streaming API Reference*.
Ingest bitrate (if channel `type` is `ADVANCED_HD`)	8.5 Mbps	No	Maximum bits per second that can be streamed to a channel whose type is `ADVANCED_HD`. Warning: If you exceed this threshold, the stream probably will disconnect immediately. For details on channel `type`, see Channel Types in the *IVS Low-Latency Streaming API Reference*.

Resource or Feature	Default	Adjustable	Description
Ingest bitrate (if channel `type` is `ADVANCED_SD`)	8.5 Mbps	No	Maximum bits per second that can be streamed to a channel whose type is `ADVANCED_SD`. Warning: If you exceed this threshold, the stream probably will disconnect immediately. For details on channel `type`, see Channel Types in the *IVS Low-Latency Streaming API Reference*.
Ingest resolution (single-track input)	1080p (2.1M total pixels, 1920 pixels/edge)	No	Maximum resolution in pixels that can be streamed to a channel (regardless of its `type`) with single-track input. There are two relevant thresholds: total pixels and pixels per edge. Warning: If you exceed either of these thresholds, the stream probably will disconnect immediately. For details on channel `type`, see Channel Types in the *IVS Low-Latency Streaming API Reference*.

Resource or Feature	Default	Adjustable	Description
Ingest resolution (if channel `type` is `STANDARD`, with multitrack input)	see Description	No	Maximum resolution in pixels that can be streamed to an individual track on a channel whose `type` is `STANDARD`, with multitrack input. The default varies depending on the value of `multitrackInputConfiguration.maximumResolution`: • SD: 480p (0.4M total pixels, 864 pixels/edge) • HD: 720p (0.9M total pixels, 1280 pixels/edge) • `FULL_HD`: 1080p (2.1M total pixels, 1920 pixels/edge)> There are two relevant thresholds: total pixels and pixels per edge. Warning: If you exceed either of these thresholds, the stream probably will disconnect immediately. For details on channel `type`, see Channel Types in the *IVS Low-Latency Streaming API Reference*.
Metadata payload	1 KB	No	Maximum size of a `PutMetadata` request payload (Amazon IVS API).

Resource or Feature	Default	Adjustable	Description
Playback authorization key pairs	3	No	Maximum number of playback authorization key pairs, per AWS Region.
Playback restriction policies	3	No	Maximum number of playback restriction policies, per AWS Region.
Playback restriction policy countries	200	No	Maximum size of the `allowedCountries` list in a playback restriction policy; that is, the maximum number of countries per policy.
Playback restriction policy origins	5	No	Maximum size of the `allowedOrigins` list in a playback restriction policy; that is, the maximum number of origins per policy.
Playback restriction policy origin length	256	No	Maximum size (in characters) of an entry in the `allowedOrigins` list in a playback restriction policy.
Playback token size	2 KB	No	Maximum size of the entire JSON web token (JWT) used to initiate playback.
Recording configurations	20	Yes	Maximum number of recording configurations, per AWS Region.
Stream key	1	No	Maximum number of stream keys, per channel.

Resource or Feature	Default	Adjustable	Description
Stream takeovers	100	Yes	Maximum number of stream takeovers, per stream.

Service Quotas Integration with CloudWatch Usage Metrics

You can use CloudWatch to proactively manage your service quotas, via CloudWatch *usage metrics*. You can use these metrics to visualize your current service usage on CloudWatch graphs and dashboards. Amazon IVS usage metrics correspond to Amazon IVS service quotas.

You can use a CloudWatch metric math function to display the service quotas for those resources on your graphs. You can also configure alarms that alert you when your usage approaches a service quota.

To access usage metrics:

1. Open the Service Quotas console at https://console.aws.amazon.com/servicequotas/
2. In the navigation pane, select **AWS services**.
3. From the AWS services list, search for and select **Amazon Interactive Video Service**.
4. In the **Service quotas** list, select the service quota of interest. A new page opens with information about the service quota/metric.

Alternately, you can get to these metrics through the CloudWatch console. Under **AWS Namespaces**, choose **Usage**. Then, from the **Service** list, choose **IVS**. (See Monitoring Amazon IVS Low-Latency Streaming.)

In the **AWS/Usage** namespace, Amazon IVS provides the following metric:

Metric Name	Description
`ResourceCount`	A count of the specified resources running in your account. The resources are defined by the dimensions associated with the metric. Valid statistic: Maximum (the maximum number of resources used during the 1-minute period).

The following dimensions are used to refine the usage metric:

Dimension	Description
Service	The name of the AWS service containing the resource. Valid value: `IVS`.
Class	The class of resource being tracked. Valid value: `None`.
Type	The type of resource being tracked. Valid value: `Resource`.
Resource	The name of the AWS resource. Valid values: `ConcurrentStreams` , `ConcurrentViews` . The ConcurrentStreams and ConcurrentViews usage metrics are copies of the ones in the **AWS/IVS** namespace (with the None dimension), as described in Monitoring Amazon IVS Low-Latency Streaming.

Creating a CloudWatch Alarm for Usage Metrics

To create a CloudWatch alarm based on an Amazon IVS usage metric:

1. From the Service Quotas console, select the service quota of interest, as described above. Currently, alarms can be created only for ConcurrentStreams and ConcurrentViews.
2. In the **Amazon CloudWatch alarms** section, choose **Create**.
3. From the **Alarm threshold** dropdown list, choose the percentage of your applied quota value that you want to set as the alarm value.
4. For **Alarm name**, enter a name for the alarm.
5. Select **Create**.

Amazon IVS Streaming Configuration

Amazon Interactive Video Service (IVS) allows developers to easily deliver low-latency video to viewers worldwide. With Amazon IVS, streamers need to handle only stream production, then send the stream to Amazon IVS. Amazon IVS handles video processing (ingesting and transcoding), delivery, and playback to viewers using the Amazon IVS player.

There is a wealth of solutions for live streaming. Whether you have a studio equipped with multiple cameras, visual switchers, graphics compositing, and a variety of audio mixing equipment, or you plan to start your first stream off a smartphone, you need to deal with some of the same concepts and encoding parameters.

This document describes how to configure video encoders to stream to Amazon IVS. The audience for this document is developers who want to build streaming functionality into their applications.

Note that audio-only input is not supported for IVS low-latency streaming.

Prerequisites

Follow the steps in *Getting Started with IVS*, to create a channel and set up streaming. In the process, a channel ARN (Amazon Resource Name) and stream key are assigned, along with URLs for ingesting and playing back a stream. You will need to point your streaming application to the ingest URL.

Before reading this document, you should be familiar with:

- Amazon IVS basics: Read What is IVS Low-Latency Streaming and *Getting Started with IVS*
- Amazon IVS API: Understand the IVS Low-Latency Streaming API Reference.

Reducing Latency

Amazon IVS low-latency streaming is compatible with most streaming applications and requires only minor changes to your streaming-application configuration. For the lowest possible latency, you must use the Amazon IVS player; third-party HLS video players are not supported. See the Amazon IVS Player SDK documentation.

To prepare your streaming application for low-latency streaming, do the following. (Note: not all these options are available on every streaming application.)

- On the video encoder, set `IDR/Keyframe` to a 2-second interval (or 1 second, for even lower end-to-end latency).

  `IDR/Keyframe` directly affects the timing of stream startup and the latency of related EventBridge events (Stream Start and Recording Start). If `IDR/Keyframe` is 2 seconds, stream-start latency will be approximately 6-7 seconds. If `IDR/Keyframe` is 1 second, stream-start latency will be approximately 3-4 seconds. Your video will be available for viewers and auto-recording to Amazon S3 only after the initial stream-start latency period.

  The shorter, 1-second keyframe interval has some QoS tradeoffs. It can cause the Amazon IVS Player's adaptive bitrate streaming (ABR) to switch resolution more often; the segment size is smaller, so the ABR check happens more often. Buffering may increase due to increased resolution-switching and/or if the viewer's network cannot download the segments fast enough. Evaluate these tradeoffs when deciding between a 1- or 2-second keyframe interval.

  Avoid setting `IDR/Keyframe` to values higher than 5 seconds. Not only will the stream-start latency be higher than when using 1 or 2 seconds, but IVS will be unable to guarantee that every segment generated for playback will begin with an IDR/keyframe. Segments not beginning with an IDR/keyframe may result in decode errors or visual distortions when viewers start playback or change renditions.
- If available, set your encoder to zero-latency tuning within an x264 configuration.
- Ensure that buffer size (VBV) does not exceed the average bitrate (kilobits-per-second) of the stream.

Avoid Third-Party Streaming/Forwarding Services

We strongly recommend you do not use third-party service to restream or forward content to Amazon IVS. *This will incur extra latency.* For low latency, stream directly to Amazon IVS.

Encoder Settings

Stream Ingest: Codecs and Ingest Protocols

Codecs: Amazon IVS supports H.264 for video and AAC (LC) for audio.

Ingest protocols: Amazon IVS supports the most common ingest protocols used in streaming software and hardware: RTMPS (Real-Time Messaging Protocol over a TLS/SSL connection), RTMP,

and SRT (Secure Reliable Transport). Amazon IVS streaming through RTMPS requires TLS version 1.2 or later.

RTMPS/RTMP

Your video encoder must connect to Amazon IVS ingest over the RTMPS protocol associated with outbound port 443/TCP. To ensure this, specify an IVS ingest server, which includes the port in the path:

```
rtmps://<IVS-ingest-server>/<IVS-stream-key>
```

For example:

```
rtmps://a1b2c3d4e5f6.global-contribute.live-video.net:443/app/<IVS-stream-key>
```

IVS channels also can be configured to allow insecure RTMP ingest, though we recommend that you use RTMPS unless you have specific and verified use cases that require RTMP. When streaming RTMP, ensure that the protocol is set to `rtmp://` and remove the `:443` port. For example:

```
rtmp://a1b2c3d4e5f6.global-contribute.live-video.net/app/<IVS-stream-key>
```

SRT

Your video encoder must connect to the ingest endpoint using the SRT protocol at port 9000. To ensure this, specify an ingest endpoint, which includes the port and passphrase in the path:

```
srt://<ingest-endpoint>:<port>?streamid=<stream-key>&passphrase=<passphrase>
```

Use a passphrase only if insecure ingest is not enabled for the channel.

For example:

```
srt://a1b2c3d4e5f6.srt.live-video.net:9000?streamid=sk_us-west-2_abcd1234efgh5678ijkl&passphrase=ZU5A3yrjGAkghUNDr0c5NXBhsPrjlmtcKMNBluh7o
```

To optimize SRT stream performance, see this Haivision blog: [How to Configure SRT Settings on Your Video Encoder for Optimal Performance.]

Resolution/Bitrate/FPS

The stream's resolution largely determines its bitrate and frame rate (frames-per-second, or FPS). Use the following guidelines; these are our recommendations. Note the resolutions shown below are landscape orientation (horizontal x vertical), so reverse these for portrait orientation.

	Acceptable Quality (SD) 480p (852x480)	Good Quality (HD) 720p (1280x720)	High Quality (Full HD) 1080p (1920x1080)
Bitrate	Up to 1500 Kbps	Up to 4500 Kbps	Up to 8500 Kbps
FPS	30	30 or 60	30 or 60
Keyframe interval	2 seconds	2 seconds	2 seconds

Bitrate, FPS, and resolution are interrelated. The optimal values depend on circumstances and can be complicated to determine. Our best guidance is to start with the values above and experiment if desired. The goal is clear and smooth motion of video components during streaming and good resolution within the available bandwidth. Increasing frame rate and/or resolution increases overall video quality, but this is necessarily limited by bandwidth.

Amazon IVS supports framerates up to 60 FPS (including European PAL 25 and 50 standard frame rates). The higher the framerate, the better the quality -- as long as there is adequate bitrate bandwidth. Depending on the application, a low framerate can be fine; e.g., for a security camera.

Channel Types

Channel type determines the allowable resolution and bitrate. *If you exceed the allowable input resolution or bitrate, the stream probably will disconnect immediately*.

There are four channel types: `STANDARD`, `ADVANCED_SD`, `ADVANCED_HD`, and `BASIC`. When you create a channel, the default type is `STANDARD`.

There are two types of video processing, *transcoding* and *transmuxing*. This is determined by the channel type, whether the channel is configured for multitrack video input, and whether the broadcaster uses a multitrack-enabled client. (Multitrack video is configured with the `multitrackInputConfiguration` API property of the Channel data type.)

- Video on STANDARD (without multitrack input) and ADVANCED channels is transcoded: multiple qualities are generated from the original input, to automatically give viewers the best experience for their devices and network conditions. Transcoding allows higher playback quality across a range of download speeds. Transcoding is the best option for broadcasters with limited first-mile internet connectivity and/or limited device capabilities (e.g., mobile phones instead of desktop PCs).
- Video on STANDARD (with multitrack input enabled and the broadcaster using a multitrack-enabled client) and BASIC channels is transmuxed: Amazon IVS delivers the original input to viewers. Similar to transcoding, transmuxed multitrack input delivers viewers the best experience for their devices and network conditions.

All transcoded channels have *transcode* presets, which determine which renditions are produced. Think of these as ABR ladders. They allow you to trade off available download bandwidth and video quality, to optimize the viewing experience.

- STANDARD channels have one, default transcode preset.
- ADVANCED channels have two, selectable transcode presets:
  - *Constrained bandwidth delivery* uses a lower bitrate than STANDARD for each quality level. Use it if you have low download bandwidth and/or simple video content (e.g., talking heads).
  - *Higher bandwidth delivery* uses a higher bitrate for each uality level. Use it if you have high download bandwidth and/or complex ideo content (e.g., flashes and quick scene changes). This is the default.

STANDARD Channels

Single-Track Video Input

STANDARD channels are transcoded. The highest video resolution produced is full HD, 1080p. This is the default channel type.

- **Transcode presets**: There is one, default transcode-preset ladder.
- **Audio**: For renditions 360p and below, audio is transcoded. For other renditions, original audio is passed through.

Input Resolution and Maximum Bitrate	Ladder Details
1080p60 at 8.5 Mbps	1. Video: source passthrough, audio: source passthrough 2. Video: 720p60 at 3.4 Mbps, audio: source passthrough 3. Video: 480p30 at 1.4 Mbps, audio: source passthrough 4. Video: 360p30 at 0.63 Mbps, audio: 64 kbps 5. Video: 160p30 at 0.23 Mbps, audio: 48 kbps
1080p30 at 8.5 Mbps	1. Video: Source passthrough, audio: source passthrough 2. Video: 720p30 at 2.4 Mbps, audio: source passthrough 3. Video: 480p30 at 1.4 Mbps, audio: source passthrough 4. Video: 360p30 at 0.63 Mbps, audio: 64 kbps 5. Video: 160p30 at 0.23 Mbps, audio: 48 kbps
Less than 1080p60 and greater than 720p60, at 8.5 Mbps	1. Video: source passthrough, audio: source passthrough 2. Video: 720p60 at 3.4 Mbps, audio: source passthrough 3. Video: 480p30 at 1.4 Mbps, audio: source passthrough 4. Video: 360p30 at 0.63 Mbps, audio: 64 kbps 5. Video: 160p30 at 0.23 Mbps, audio: 48 kbps
Less than 1080p30 and greater than 720p30, at 8.5 Mbps	1. Video: source passthrough, audio: source passthrough 2. Video: 720p30 at 2.4 Mbps, audio: source passthrough 3. Video: 480p30 at 1.4 Mbps, audio: source passthrough 4. Video: 360p30 at 0.63 Mbps, audio: 64 kbps 5. Video: 160p30 at 0.23 Mbps, audio: 48 kbps

Input Resolution and Maximum Bitrate	Ladder Details
720p60 at 8.5 Mbps	1. Video: 720p60 at 3.4 Mbps, audio: source passthrough 2. Video: 480p30 at 1.4 Mbps, audio: source passthrough 3. Video: 360p30 at 0.63 Mbps, audio: 64 kbps 4. Video: 160p30 at 0.23 Mbps, audio: 48 kbps
720p30 at 8.5 Mbps	1. Video: 720p30 at 2.4 Mbps, audio: source passthrough 2. Video: 480p30 at 1.4 Mbps, audio: source passthrough 3. Video: 360p30 at 0.63 Mbps, audio: 64 kbps 4. Video: 160p30 at 0.23 Mbps, audio: 48 kbps
Less than 720p30/60 and greater than or equal to 480p30/60, at 8.5 Mbps	1. Video: 480p30 at 1.4 Mbps, audio: source passthrough 2. Video: 360p30 at 0.63 Mbps, audio: 64 kbps 3. Video: 160p30 at 0.23 Mbps, audio: 48 kbps

Multitrack Video Input

STANDARD channels are transmuxed when the input is multitrack video. The highest video resolution produced is limited by the `multitrackInputConfiguration.maximumResolution` property. The specific renditions are dynamic depending on the broadcaster's system and environmental requirements.

For all video renditions, audio is source passthrough.

ADVANCED-HD Channels

ADVANCED_HD channels are transcoded. The highest video resolution produced is HD, 720p.

- **Transcode presets**: There are two, selectable transcode-preset ladders.
- **Audio**: Audio is transcoded.

Input Resolution and Maximum Bitrate	Ladder Details
720p60 up to 1080p60, at 8.5 Mbps	Transcode preset: higher bandwidth delivery (default): 1. Video: 720p60 at 3 Mbps, audio: 128 kbps 2. Video: 480p30 at 1.3 Mbps, audio: 128 kbps 3. Video: 360p30 at 0.7 Mbps, audio: 64 kbps 4. Video: 160p30 at 0.27 Mbps, audio: 48 kbps 5. Audio-only at 64 kbps Transcode preset: constrained bandwidth delivery: 1. Video: 720p60 at 2.2 Mbps, audio: 128 kbps 2. Video: 480p30 at 0.8 Mbps, audio: 128 kbps 3. Video: 360p30 at 0.4 Mbps, audio: 64 kbps 4. Video: 160p30 at 0.22 Mbps, audio: 48 kbps 5. Audio-only at 64 kbps
720p30 up to 1080p30, at 8.5 Mbps	Transcode preset: higher bandwidth delivery (default): 1. Video: 720p30 at 2.3 Mbps, audio: 128 kbps 2. Video: 480p30 at 1.3 Mbps, audio: 128 kbps 3. Video: 360p30 at 0.7 Mbps, audio: 64 kbps 4. Video: 160p30 at 0.27 Mbps, audio: 48 kbps 5. Audio-only at 64 kbps Transcode preset: constrained bandwidth delivery: 1. Video: 720p30 at 1.9 Mbps, audio: 128 kbps 2. Video: 480p30 at 0.8 Mbps, audio: 128 kbps 3. Video: 360p30 at 0.4 Mbps, audio: 64 kbps 4. Video: 160p30 at 0.22 Mbps, audio: 48 kbps 5. Audio-only at 64 kbps

Input Resolution and Maximum Bitrate	Ladder Details
Less than 720p30/60 and greater than 480p30/60, at 8.5 Mbps	Transcode preset: higher bandwidth delivery (default): 1. Video: Source transcoded at 2.3 Mbps, audio: 128 kbps 2. Video: 480p30 at 1.3 Mbps, audio: 128 kbps 3. Video: 360p30 at 0.7 Mbps, audio: 64 kbps 4. Video: 160p30 at 0.27 Mbps, audio: 48 kbps 5. Audio-only at 64 kbps Transcode preset: constrained bandwidth delivery: 1. Video: Source transcoded at 1.9 Mbps, audio: 128 kbps 2. Video: 480p30 at 0.8 Mbps, audio: 128 kbps 3. Video: 360p30 at 0.4 Mbps, audio: 64 kbps 4. Video: 160p30 at 0.22 Mbps, audio: 48 kbps 5. Audio-only at 64 kbps
480p30/60 at 8.5 Mbps	Transcode preset: higher bandwidth delivery (default): 1. Video: 480p30 at 1.3 Mbps, audio: 128 kbps 2. Video: 360p30 at 0.7 Mbps, audio: 64 kbps 3. Video: 160p30 at 0.27 Mbps, audio: 48 kbps 4. Audio-only at 64 kbps Transcode preset: constrained bandwidth delivery: 1. Video: 480p30 at 0.8 Mbps, audio: 128 kbps 2. Video: 360p30 at 0.4 Mbps, audio: 64 kbps 3. Video: 160p30 at 0.22 Mbps, audio: 48 kbps 4. Audio-only at 64 kbps

ADVANCED-SD Channels

ADVANCED_SD channels are transcoded. Available renditions are capped at input quality, with no up-conversion.

- **Transcode presets**: There are two, selectable transcode-preset ladders.
- **Audio**: Audio is transcoded.

Input Resolution and Maximum Bitrate	Ladder Details
480p30/60 up to 1080p30/60, at 8.5 Mbps	Transcode preset: higher bandwidth delivery (default): 1. Video: 480p30 at 1.3 Mbps, audio: 128 kbps 2. Video: 360p30 at 0.7 Mbps, audio: 64 kbps 3. Video: 160p30 at 0.27 Mbps, audio: 48 kbps 4. Audio-only at 64 kbps Transcode preset: constrained bandwidth delivery: 1. Video: 480p30 at 0.8 Mbps, audio: 128 kbps 2. Video: 360p30 at 0.4 Mbps, audio: 64 kbps 3. Video: 160p30 at 0.22 Mbps, audio: 48 kbps 4. Audio-only at 64 kbps

BASIC Channels

BASIC channels are transmuxed. A single rendition is produced.

- **Transcode presets**: NA
- **Audio**: Source audio is passed through.

Input Resolution and Maximum Bitrate	Ladder Details
Greater than 480p30/60 and less than or equal to 1080p30/60, at 3.5 Mbps	Source encoding parameters (no ladder)
480p30/60 at 1.5 Mbps	Source encoding parameters (no ladder)

Video Settings

We recommend the following settings. They are available to most H.264 video-encoding software or hardware APIs.

- On the video encoder, set `IDR/Keyframe` to a 2-second interval (or 1 second, for even lower end-to-end latency).
- H.264 level: Main
- Scene change: Off (preferred)
- Chroma subsample: YUV420P
- CABAC: Preferred
- ColorSpace: BT.709 (recommended for maximum compatibility across HDTVs and computer displays). Amazon IVS video transcoding supports ColorSpace pass-through; advanced users can use other ColorSpace video and full-range video.

Audio Settings

We support the following settings:

- Codec: AAC (LC)
- Bitrate: 96 Kbps to 320 Kbps
- Sample rate: 44.1 Khz or 48 Khz (it is best to match your production audio flow)
- Channels: Maximum 2 - Stereo (1: mono or 2: stereo audio channel support)

Use CBR, Not VBR

Always use CBR (Constant BitRate), not VBR (Variable BitRate), as the rate-control method for encoders. CBR is better suited for the fixed-bandwidth nature of networks, and it produces more

predictable, stable video playback for client devices. With a consistent bitrate, it is easy for viewers to select a quality level that their connection can handle over time.

Depending on the complexity of the scene, VBR can result in spikes in bitrate, which can cause frame drops before the video reaches Amazon IVS and/or buffering in client players.

We strongly recommend you only use CBR. If you use VBR, your streams will be more subject to buffering and playback that is not smooth.

Use Progressive Signals

Use progressive signal flows; avoid any interlaced video in production flow and/or encoding. Progressive stream signals yield much better playback quality displaying a whole frame at a time, avoiding any motion artifacting that is produced when displaying an interlaced signal.

Network Requirements

You must have a stable internet connection that can maintain an adequate, constant upload stream. An unstable internet connection could result in stream stuttering and lagging for your viewers.

Use wired connections. WiFi and LTE connections can be spotty or suffer from interference or latency due to bad QoS/packet-queue prioritization. Whenever possible, rely on a hardwired connection for streams.

Plan to allocate 50% more bandwidth than the minimum required. The overhead is added to compensate for the bitrate fluctuations in encoding of a video bitstream.

Use a dedicated Internet VLAN to encoding machines. Keeping the encoder on a separate network prevents potentially disruptive effects, including: pollution by traffic, bandwidth bottlenecks and adverse security factors.

Closed Captioning

IVS supports closed captioning. As a streamer, if you want to offer captions to your audience, you must transmit caption data in an accepted format, either embedded in your stream or alongside your stream, through your video encoder.

Amazon IVS accepts captions in line 21 CEA-708/EIA-608 format (also referred to as 608 over 708). You can transmit captions using one of the following methods:

- CEA-708/EIA-608 embedded in the video elementary stream, as described in ATSC A/72 (SEI user_data). This format is common among television broadcast encoders.
- CEA-708/EIA-608 transmitted via RTMPS onCaptionInfo script/AMF0 tag. This format is common among Internet broadcast encoders and media servers like Elemental Technologies and Wowza. The Amazon IVS Player SDKs support one language; they do not support multi-track captions playback.

Note: The Amazon IVS Player SDKs support caption data only in the CC1 NTSC field 1. They do not support multi-track captions playback.

When transmitting via RTMPS, the payload must contain an ECMA array with two element pairs:

- A string named `type` that contains the characters `708`.
- A string named `data` that contains a base64-encoded CEA-708/EIA-608 payload.

For example:

```
00000000  12 00 00 69 00 00 00 00  00 00 00 02 00 0d 6f 6e  |...i..........on|
00000010  43 61 70 74 69 6f 6e 49  6e 66 6f 08 00 00 00 02  |CaptionInfo.....|
00000020  00 04 74 79 70 65 02 00  03 37 30 38 00 04 64 61  |..type...708..da|
00000030  74 61 02 00 3c 74 51 41  78 52 30 45 35 4e 41 4e  |ta..<tQAxR0E5NAN|
00000040  4c 41 50 79 55 72 76 79  55 49 50 79 52 51 50 7a  |LAPyUrvyUIPyRQPz|
00000050  49 35 66 7a 73 37 50 7a  76 4c 50 77 67 56 50 7a  |I5fzs7PzvLPwgVPz|
00000060  33 36 66 7a 30 34 2f 78  6f 67 50 79 55 4c 2f 38  |36fz04/xogPyUL/8|
00000070  3d 00 00 09 00 00 00 74                           |=......t|
```

If you use the Elemental video encoder, set it up as follows:

- Set caption embed to “capture 608 Field 1.”
- Embed captions with **onCaptionInfo** as the RTMPS tag in the output group.

For more information, see the blog post Adding Closed Captions to an Amazon IVS Live Stream.

Stream with FFmpeg

FFmpeg is a free, open-source project comprising a vast suite of software libraries for handling video, audio, and other multimedia files and streams. It can be used with many operating systems and devices.

See the FFmpeg website for installation and other information about FFmpeg. Use the latest static build (do not compile).

After installing, choose an audio/video input source for FFmpeg. You can look up what is available, as follows:

`ffmpeg -list_devices true -f dshow -i dummy`.

For more information, see here. Depending on what is available and what capture method is targeted, you should be able to capture the video/audio (embedded) directly from your selected device and encode the signals with FFmpeg. For example:

- Webcam — To capture output from the Logitech C920 webcam:

```
ffmpeg -f dshow -video_size 1920x1080 -framerate 30 -i video="HD Pro Webcam
 C920":audio="Microphone (HD Pro Webcam C920)" -c:v libx264 -b:v 6000K -maxrate
 6000K -pix_fmt yuv420p -r 30 -s 1920x1080 -profile:v main -preset veryfast -g 120
 -x264opts "nal-hrd=cbr:no-scenecut” -acodec aac -ab 160k -ar 44100 -f flv rtmps://
<IVS-ingest-server>/<IVS-stream-key>
```

- Video file — FFmpeg works with many video-file formats and capture cards. Here is an example of streaming based on a MP4 input:

```
ffmpeg -re -i input.mp4 -c:v libx264 -b:v 6000K -maxrate 6000K -pix_fmt yuv420p -s
 1920x1080 -profile:v main -preset veryfast -force_key_frames expr:gte(t,n_forced*2)
 -x264opts "nal-hrd=cbr:no-scenecut” -acodec aac -ab 160k -ar 44100 -f flv rtmps://
<IVS-ingest-server>/app/<IVS-stream-key>
```

For more information about what to enter for `<IVS-ingest-server>` and `<IVS-stream-key>`, see the information about setting up live-streaming software in *Getting Started with IVS*. For example:

- Ingest server: `rtmps://jds34ksdg3las.global-contribute.live-video.net/app/`
- Stream key: `sk_us-west-2_abcd1234efgh5678ijkl`

Stream Takeover

Stream takeover allows a user to replace an ongoing stream on a channel they own with a new stream. During this process, the previous stream never disconnects, it is simply replaced by the new stream. This allows users to seamlessly connect to a new stream without having to wait until the ongoing stream disconnects entirely.

The stream-takeover process extends an ongoing stream session but does not initiate a new one. This maintains stream continuity without requiring viewers to refresh the player, though they may experience a brief buffering state. There are no discontinuities in recordings of stream sessions during which a stream takeover occurs.

To initiate a stream takeover, append the `priority` URL parameter to the user's stream key. The stream key becomes `<IVS-stream-key>?priority=<priority>`, where `<priority>` is a positive integer between 1 and 2,147,483,647.

The URI syntax for using stream takeover with the RTMPS protocol is:

```
rtmps://<uri>/<streamkey>?priority=N
```

For SRT ingest, the URI syntax for stream takeover is:

```
srt://<uri>?streamid=#!::u=<streamkey>,priority=N&passphrase=foobar
```

A takeover succeeds if the priority integer provided for the new stream is greater than the priority integer for the ongoing stream, or if no previous priority integer was set. Also, the old and new stream must share the same resolution, video codec, audio codec, and number of tracks.

By default, up to 100 takeovers can be done in a single stream, as long as a greater priority integer is used for each successive takeover. The maximum number of stream takeovers is adjustable per AWS account (see Service Quotas). Once the stream is over, the channel retains no memory of previous priority integers or how many takeovers were done, so any priority integer can be reused in future streams. Also, if encoder settings were changed for stream takeover, the stream session retains no memory of previous encoder settings, displaying only the latest settings.

If the auto-reconnect feature is enabled, the IVS mobile broadcast SDKs use stream takeover to automatically reconnect when a broadcaster switches networks (for example, from WiFi to cellular). To enable auto-reconnect:

- On iOS, set `config.autoReconnect.enabled = true` on your `IVSBroadcastConfiguration` object.
- On Android, set `config.autoReconnect.setEnabled(true)` on your `BroadcastConfiguration` object.

Considerations for Using Auto-Reconnect and Stream Takeover Together

When mobile broadcast SDK customers enable auto-reconnect as described above, the ongoing streamer (Broadcaster A) will try to reconnect up to 5 times following a network disruption, starting with `priority=1` and incrementing the priority with each reconnect attempt. This process allows the broadcast to automatically recover on unstable networks by gradually increasing the priority with each successful reconnect.

However, due to the incremental nature of the auto-reconnect behavior, it becomes challenging for another broadcaster (Broadcaster B) to successfully use stream takeover when the original broadcaster is using auto-reconnect. The priority value required to ensure a successful takeover will be unpredictable, as reconnect attempts by Broadcaster A increment the priority value with each retry over the stream duration.

Note: *We do not recommend using stream takeover to override a stream from the mobile broadcast SDK when auto-reconnect is enabled*, as you will need to manage or keep a record of the priority required for takeover. While setting a large priority value may work initially, it could create challenges if another takeover is needed later. We recommend maintaining auto-reconnect for Broadcaster A during network instability and stream takeover by Broadcaster B as distinct use cases.

Stream with the Amazon IVS Broadcast SDK

The Amazon IVS broadcast SDK is for developers who are building Android, iOS, or Web applications with Amazon IVS. See the broadcast SDK documentation in the *Amazon IVS User Guide*, starting here. There are subpages with guides for Android, iOS, and Web streaming. The broadcast SDKs enable you to customize bitrate, frame rate, and resolution.

Testing the Stream

Always verify that your stream works.

Navigate to the video stream in the Amazon IVS console, to watch what is being streamed and manage the live stream.

Network Requirements | Low-Latency Streaming

IVS low-latency streaming relies on RTMP(S), SRT, and WebRTC protocols for the transmission of media and data. To ensure a seamless experience, the destinations and ports listed below must be accessible to broadcast with a given protocol. Any restrictions on inbound or outbound traffic to these destinations may disrupt the functionality of IVS low-latency streaming.

Note: The information in this document does not apply when streaming content to IVS over AWS PrivateLink. For more information, see Private Ingest.

Ports

Protocol	Destinations	Port
RTMPS	*.live-video.net	TCP:443
Insecure RTMP	*.live-video.net	TCP:1935
SRT	*.srt.live-video.net	TCP:9000
WebRTC	*.live-video.net	TCP:4443 (SDP exchange) UDP:32768-61000 (ephemeral ports for WebRTC)

IP Ranges

The data plane for IVS low-latency streaming is global. To broadcast to IVS, it is important that all subnets for the service IVS_LOW_LATENCY in ip-ranges.json must be accessible, regardless of their region or your chosen AWS Region. Streamers may be connected to any subnet automatically. See Global Solution, Regional Control for details.

For a list of all IVS_LOW_LATENCY subnets, run the following `jq` commands:

ipv4

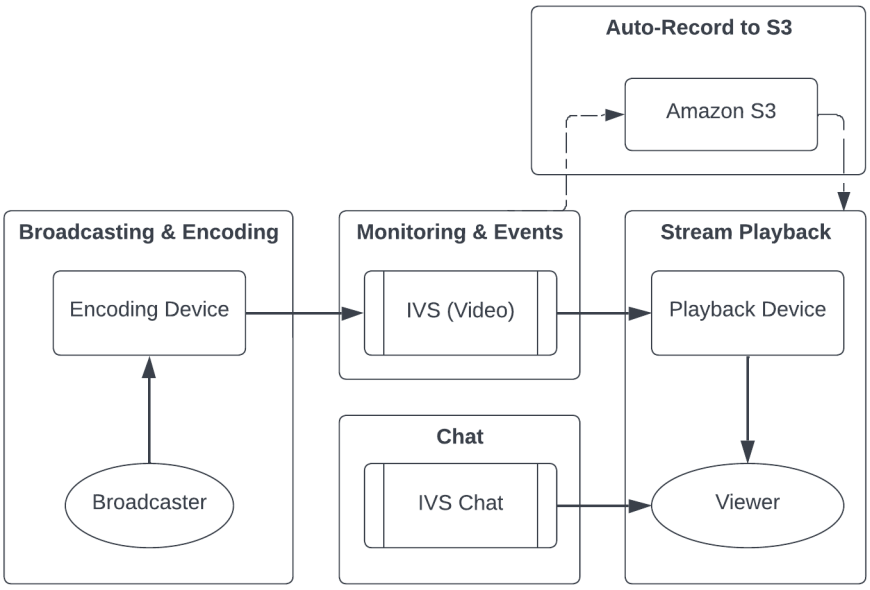
```
curl https://ip-ranges.amazonaws.com/ip-ranges.json | jq -r '.prefixes[] |
 select(.service=="IVS_LOW_LATENCY") | .ip_prefix'
```

ipv6

```
curl https://ip-ranges.amazonaws.com/ip-ranges.json | jq -r '.ipv6_prefixes[] |
 select(.service=="IVS_LOW_LATENCY") | .ipv6_prefix'
```

Troubleshooting IVS Low-Latency Streaming

This document describes best practices and troubleshooting tips for Amazon Interactive Video Service (IVS). Unexpected or unintended behaviors may occur when using IVS. These behaviors can occur at various points in the streaming process, from broadcasting to playback of content:



For information on support and other Amazon IVS resources, see Resources and Support.

Broadcasting and Encoding

Questions in this section are about broadcasting, encoding, and first-mile conditions of streaming to IVS. These behaviors occur before the content reaches IVS servers.

Topics:

- the section called “What is stream starvation?”
- the section called “Why did the stream suddenly stop?”
- the section called “What happens when I switch networks while streaming?”
- the section called “How can I have multi-region redundancy with IVS?”
- the section called “How do I troubleshoot an IVS Web Broadcast SDK session?”
- the section called “How do I use Google Chrome’s WebRTC-internals metrics to evaluate an IVS Web Broadcast SDK session?”

What is stream starvation?

"Stream starvation" is a delay or halt in content packet delivery when you are sending content to IVS; that is, when content is being ingested by IVS. If IVS does not get the expected amount of bits on ingest that the encoding device advertised it would send over a certain timeframe, this is considered a starvation event. Often, starvation events are caused by the broadcaster's encoder, local network conditions, and/or in transit over the public internet, between the encoding device and IVS.

From a viewer's perspective, starvation events may appear as video that lags, buffers, or freezes. Stream-starvations events can be brief (less than 5 seconds) or long (several minutes), depending on the nature of the starvation event.

To allow monitoring for starvation events, IVS sends starvation events as Amazon EventBridge events; see Examples: Stream Health Change in *Using Amazon EventBridge with Amazon IVS*. These are sent when a stream enters or exits a state of starvation. Depending on the use case, you can take an appropriate action, like notifying the broadcaster and viewers of intermittent stream conditions.

For additional starvation monitoring tools, see Monitoring Amazon IVS Low-Latency Streaming, the IVS ListStreams API operation (filtering by health), and the IVS GetStream operation (to analyze an individual stream). Also see the section called "How do I monitor stream-starvation events?"

Why did the stream suddenly stop?

The following are the most common reasons why a stream can abruptly stop (i.e., the stream session ends):

- **Missing ingest data** — When the ingest of a stream session completely stops (no data ingested into IVS) for 30 seconds, the IVS ingest server terminates the IVS stream session. The 30-second period allows the broadcaster to reconnect to the ingest server. However, in some cases (such as switching networks), reconnection to the existing stream session may not be possible, as the TLS handshake of RTMPS has been broken. Common root causes for this include network issues (like congestion between the broadcast device and IVS), complete loss of internet on the broadcast device, or the broadcast device not producing content segments (FLV tags).

  Often, stream disconnection aligns with a stream-starvation event; the starvation event is triggered when there is a halt in incoming data. If a starvation-start event is sent and then a

stream-end event is sent (without a starvation-end event), this often indicates that the stream was ended due to no data being sent to IVS.

- **IVS StopStream operation** — During an IVS stream session, if the StopStream API call is made, the IVS stream session will end. The StopStream operation disconnects the incoming RTMPS stream from the IVS ingest server. Depending on the encoding software/hardware being used, a new stream session may be attempted.
- **Encoder error** — Some software/hardware encoders will disconnect the stream session when an error occurs during the encoding process. From the IVS perspective, these disconnections appear as intentional disconnects by the broadcaster. However, in the encoding logs, it may be determined that the stream was disconnected due to an unintentional error.

What happens when I switch networks while streaming?

When a broadcaster switches networks (for example, from WiFi to cellular), an ongoing RTMPS connection is disconnected. While the broadcaster's internet connection probably is re-established after 3-4 seconds, the new connection has a new IP address due to the network switch, which generates a new RTMPS connection. During this switch, the previous RTMPS connection is not disconnected cleanly: the encoder does not send IVS a disconnect message. As a result, IVS waits 30 seconds for the previous RTMPS connection to reconnect, which blocks the new RTMPS stream on the new network from connecting to IVS.

To enable faster switching between networks, we recommend that you use the stream takeover feature. In this scenario, when the broadcast device connects to the new network, the broadcast device can "take over" the existing stream by streaming up with `?priority=N` appended to the stream key, where N is any positive integer up to 2,147,483,647. The stream takeover will succeed if the priority provided for the new stream is greater than the priority set for the ongoing stream. (Note that the original stream-up does not require the priority parameter to be set, but all takeover attempts do.)

How can I have multi-region redundancy with IVS?

Redundancy within IVS can be achieved in several ways; see IVS Resilience in *IVS Security* .

IVS is separated into different networking planes; Control and Data.

- The *control plane* is regional (based on AWS regions) and stores information about IVS resources (channels, stream keys, playback key pairs, and recording configurations).

- The *data plane* is not restricted to an AWS region and is the network that carries data from ingest to egress. Even if a channel is created in the us-west-2 region (for example), the video that is streamed to that channel may not go through us-west-2.

Also see Global Solution, Regional Control. Consider these two scenarios:

- If only one control-plane region (e.g., us-east-1) is being used — If a particular AWS control region experiences a degradation or outage, the IVS control plane may experience latency or errors when creating, reading, updating, or deleting any of the following: channels, stream keys, playback key pairs, or recording configurations. Trying to start a new stream during an outage may result in more latency or errors when initiating a stream session. Depending on severity of the degradation, it may be possible to continue broadcasting to a channel with an already ongoing stream.

  If playback authorization is enabled, current viewers probably can continue their playback of ongoing streams, but new viewers may not be able to start viewing if there are issues with playback key-pair authorization. If playback authorization is not enabled, both current and new viewers should be able to view the ongoing stream.

  The IVS Auto-Record to S3 feature also may be interrupted in the event of an outage.

  The IVS control plane does not automatically fail over to another AWS region in the event of a regional outage.
- If two control-plane regions (e.g., us-east-1 and us-west-2) are being used, and the second region is a failover if the primary region is unavailable — IVS does not natively support regional control-plane failover; thus, if a control-plane region experiences issues, new streams starting or calls to the control plane may experience issues. However, the data plane probably would not be impacted, so ongoing streams for the control plane region would continue without issue. Moving the control plane to a secondary (failover) region would need to be accomplished on the application side. You can write custom implementation logic to handle control-plane failover. We do not have official guidance on how to manage a regional channel failover.

  By separating the video data plane and the regional control plane, the IVS architecture adds resilience: ongoing live streams should have little to no interruption in the event of a regional control-plane failure. IVS maintains an SLA of 99.9% uptime and is committed to ensuring the stability of its infrastructure for its customers (see our SLA).

How do I troubleshoot an IVS Web Broadcast SDK session?

The IVS Web Broadcast SDK works slightly differently than a normal IVS RTMPS ingest session. The Web Broadcast SDK leverages the WebRTC protocol to stream to an IVS endpoint. Once the content enters the IVS endpoint, it is processed and remuxed/transcoded into the HLS output for viewing.

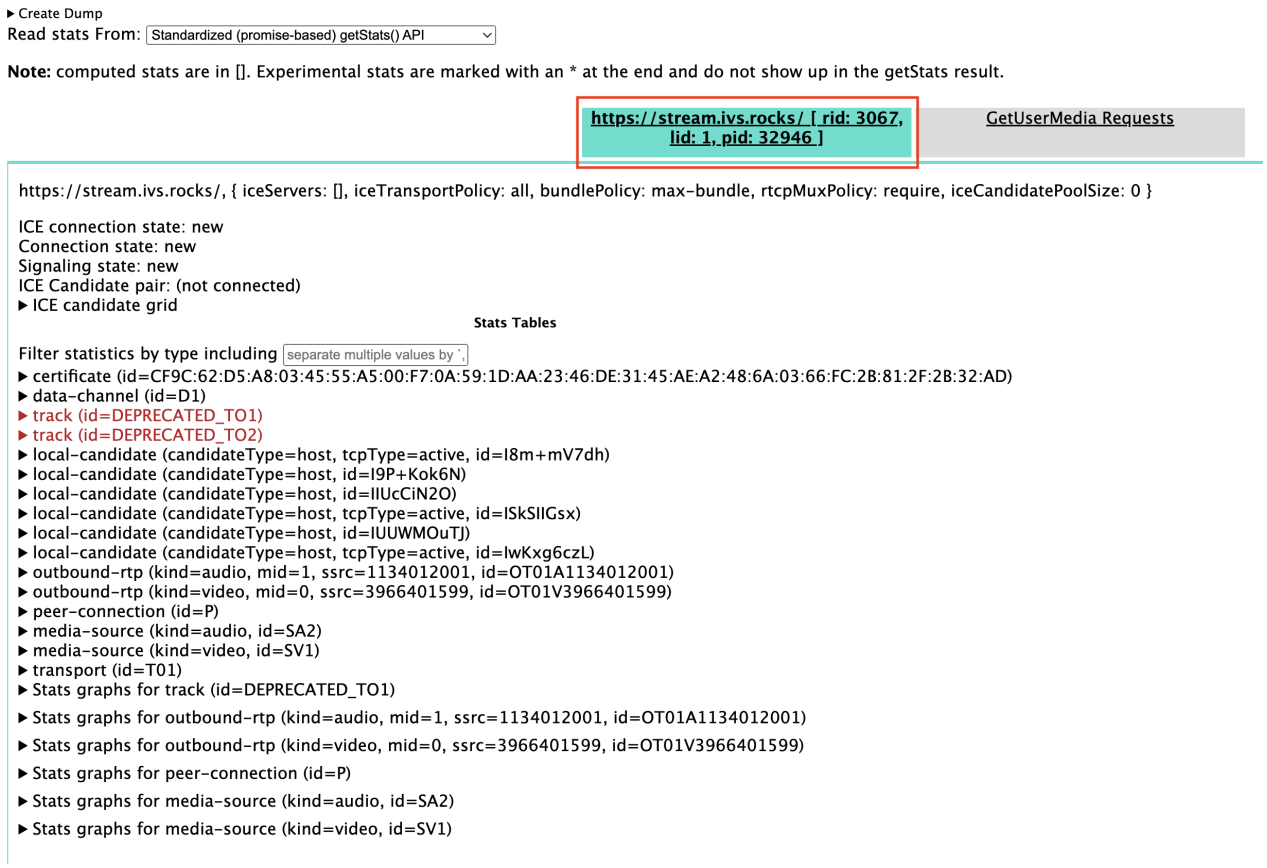
Due to the nature of the Web Broadcast SDK, note these tips for troubleshooting encoding behaviors:

- Close any tabs/programs on the broadcasting device that are not required to be open during the broadcasting session. Extraneous tabs/programs can use computing resources (such as CPU, RAM, and networking), which can cause poor performance for the broadcasting application. For tabs/programs that cannot be closed, ensure they are not using unnecessary amounts of computing resources.
- Ensure that the device's upload speed exceeds 200 Kbps. To evaluate the upload speed, open the Task Manager of the broadcasting device to analyze the network available when streaming. If the upload speed/bitrate is lower than expected or desired, evaluate other tabs/processes that may be consuming bandwidth. Also, look at other machines on the local network that may be consuming high amounts of bandwidth.
- If there are random spikes in CPU usage, look at the Task Manager of the machine to understand what processes may be consuming CPU. A common service that randomly causes CPU usage is anti-virus software which runs periodic scans on the machine.
- Try to stream via https://stream.ivs.rocks/ to help isolate environments and ensure that the application logic is not causing the undesirable behavior. This site is operated by IVS and is a solid testing environment to evaluate if any part of the integration with the Web Broadcast SDK is the root cause of the undesirable behavior.
- Try using Google Chrome's WebRTC-internals (see below).

How do I use Google Chrome's WebRTC-internals metrics to evaluate an IVS Web Broadcast SDK session?

When streaming via the IVS Web Broadcast SDK, various behaviors can occur during encoding and sending of the broadcast. Follow these steps to troubleshoot or gather information about the session on the broadcasting device:

1. In Google Chrome, open the broadcasting webpage.
2. Open a new Chrome tab and go to `chrome://webrtc-internals/` (copy this exactly).
3. In the original broadcasting-webpage tab, start the Web Broadcasting SDK session and let the session run until the behavior is observed.
4. Once the behavior is observed, switch to the chrome://webrtc-internals/ tab (do not end the broadcast session), and ensure that the correct webpage is displayed:



5. Open the **Create Dump** expandable section at the very top of the screen.
6. Select **Download the PeerConnection updates and stats data** at the top of the screen (right below **Create Dump**), to download the `.txt` file from the relevant session.
7. Once downloaded, the file will show an historical view of the WebRTC connection. You can view this in various tools or send it to the AWS Support team for further analysis.

Monitoring and Events

Questions in this section are about IVS monitoring, metrics, and events.

Topics:

- the section called “How do I monitor stream-starvation events?”
- the section called “How do I use Amazon CloudWatch to monitor IVS service quotas?”
- the section called “How do I diagnose stream instability using IVS Stream Health?”

How do I monitor stream-starvation events?

We recommend the following methods of monitoring for stream-starvation events:

- Amazon EventBridge with Amazon IVS — When a stream-starvation event starts or ends, IVS produces an EventBridge stream health change event. Using Amazon EventBridge targets and rules, you can use these stream-starvation event to get alerts when stream starvation is occurring. For details on targets and rules, see the Amazon EventBridge User Guide.
- Monitoring Amazon IVS Low-Latency Streaming — During a live-stream session, data is recorded and then available via IVS stream-health analytics. This includes information about encoder configuration, ingest metrics, and stream-session events. This is beneficial when monitoring an ongoing stream or retroactively evaluating a stream. You can use the IVS console or API to identify streams that have experienced starvation. Stream-session data is available for 60 days, even after a channel is deleted, so this can be useful for identifying past streams with starvation events.
- Filtering Streams by Health — With the IVS console or the IVS ListStreams API operation, you can use the `health` filter to find stream sessions that are in a `STARVING` state. Also, the IVS CloudWatch metric for `ConcurrentStreams` includes a `Health` dimension that you can use to gather a total count of streams that are in a stream-starvation state. See Monitoring Amazon IVS Low-Latency Streaming.
- You can use the IVS GetStream operation to analyze an individual stream.

Also see the section called “What is stream starvation?”

How do I use Amazon CloudWatch to monitor IVS service quotas?

You can use Amazon CloudWatch to proactively monitor/manage IVS service quotas. See IVS Service Quotas. This documentation includes information on creating CloudWatch alarms for usage metrics.

We recommend that you set up a proper SNS topic to notify the correct individuals/groups when an alarm is triggered. If the alarm is triggered and the quota is adjustable, you should request a

service-quota increase with a new value. See IVS Service Quotas for information on requesting an increase.

How do I diagnose stream instability using IVS Stream Health?

We recommend that you evaluate stream instability using the IVS Stream Health dashboard. Instructions are in Monitoring Amazon IVS Low-Latency Streaming.

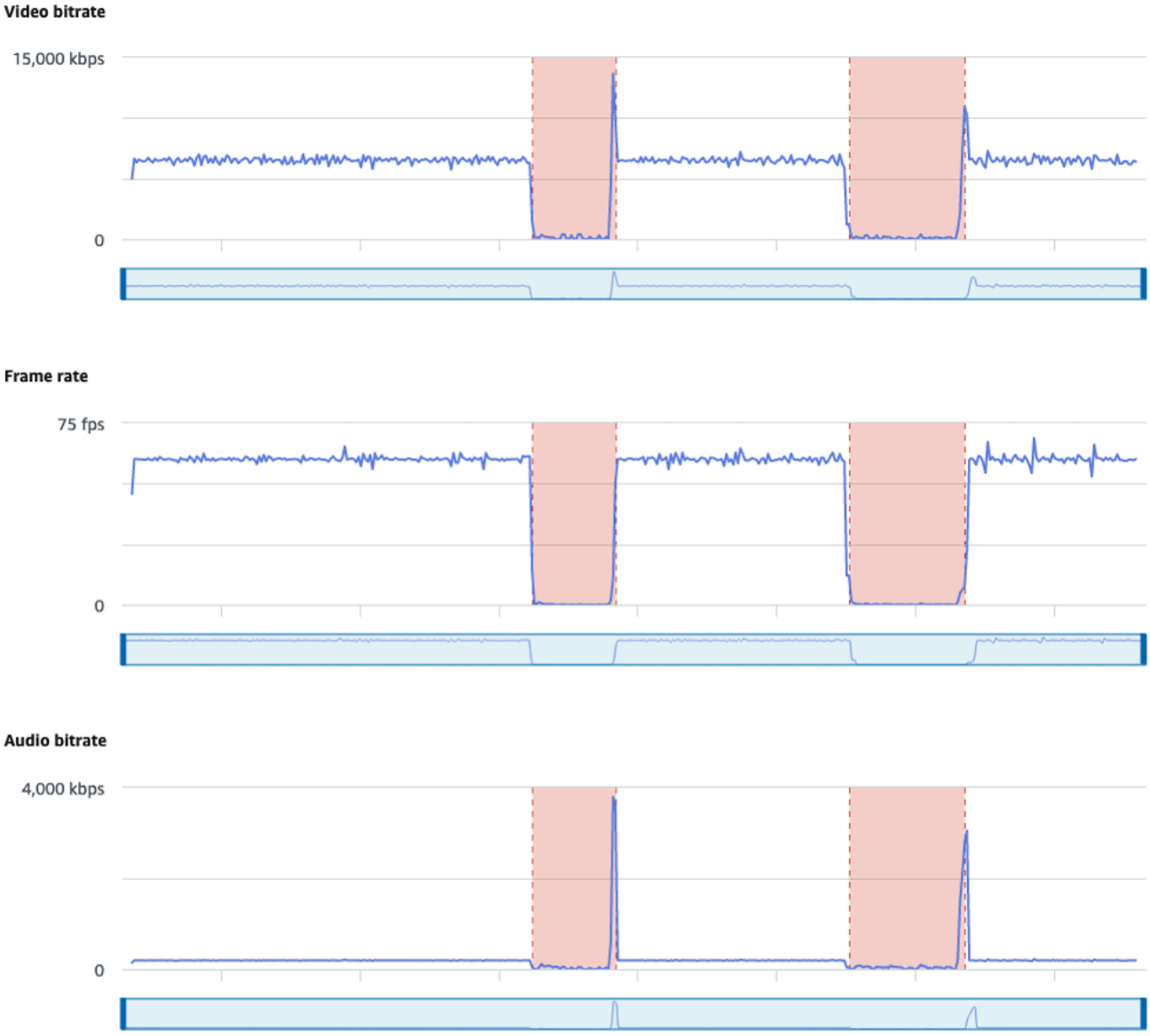
The dashboard has time-series graphs for video bitrate, frame rate, and audio bitrate; examples are below. Also, you can click **View in CloudWatch** to view the data in Amazon CloudWatch.

Several scenarios are discussed below.

Low Internet Bandwidth or Internet Congestion

In this case, the stream is relatively unstable, even when bitrates are lowered. Either there is not enough bandwidth between the broadcaster and the ISP or between the ISP and IVS, or something is wrong in the network path to IVS. To resolve this, check that no other network process is using bandwidth, or contact the ISP for network diagnostics.

IVS Stream Health dashboard:

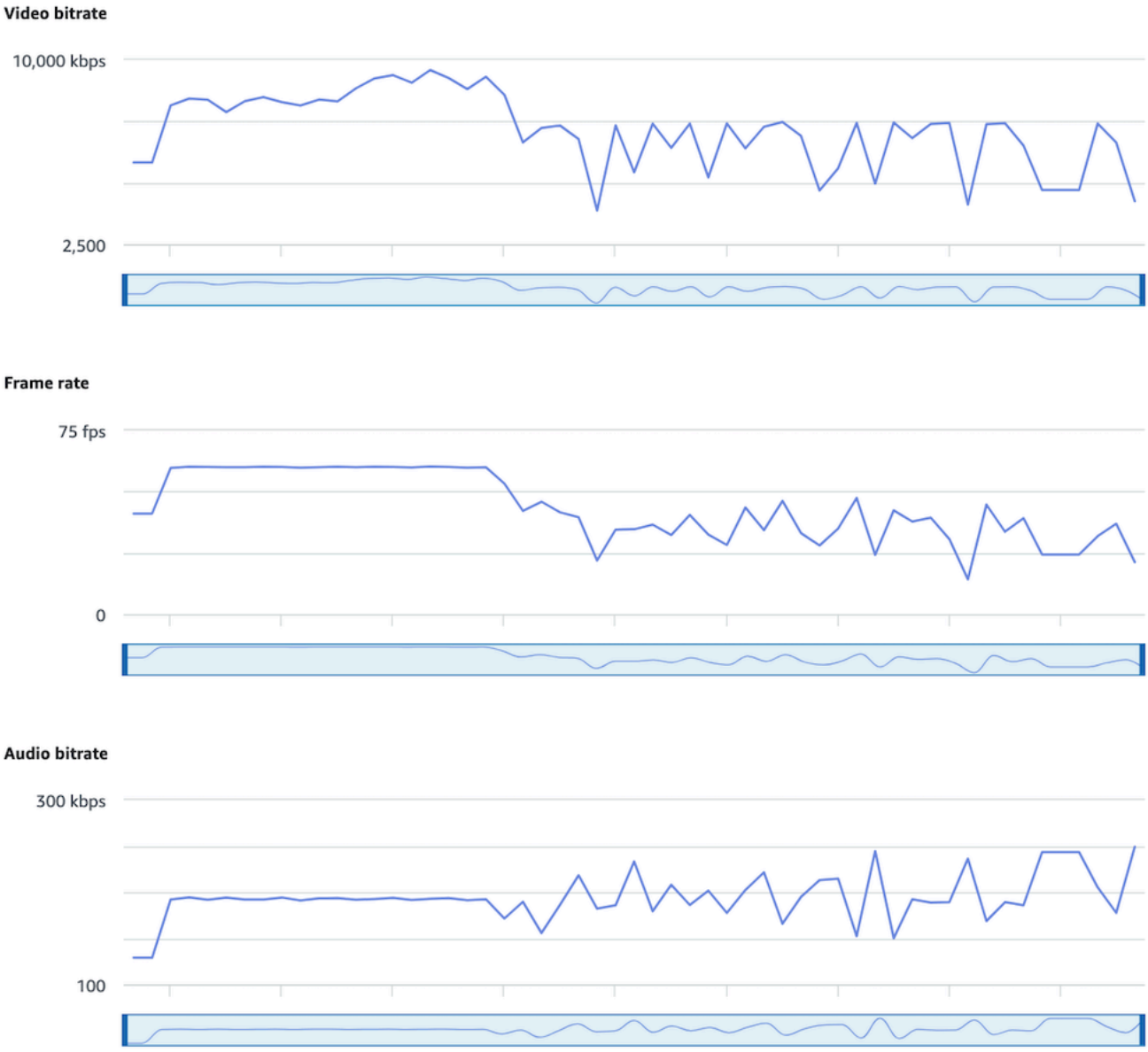


CloudWatch:

Excessive High Bitrate

A higher bitrate does not necessarily mean better quality; here, high bitrate is causing instability. In many cases, due to network congestion, high bitrates causes stream instability throughout a broadcast. Adhere to the maximum bitrates listed in the section called “Resolution/Bitrate/FPS”.

IVS Stream Health dashboard:



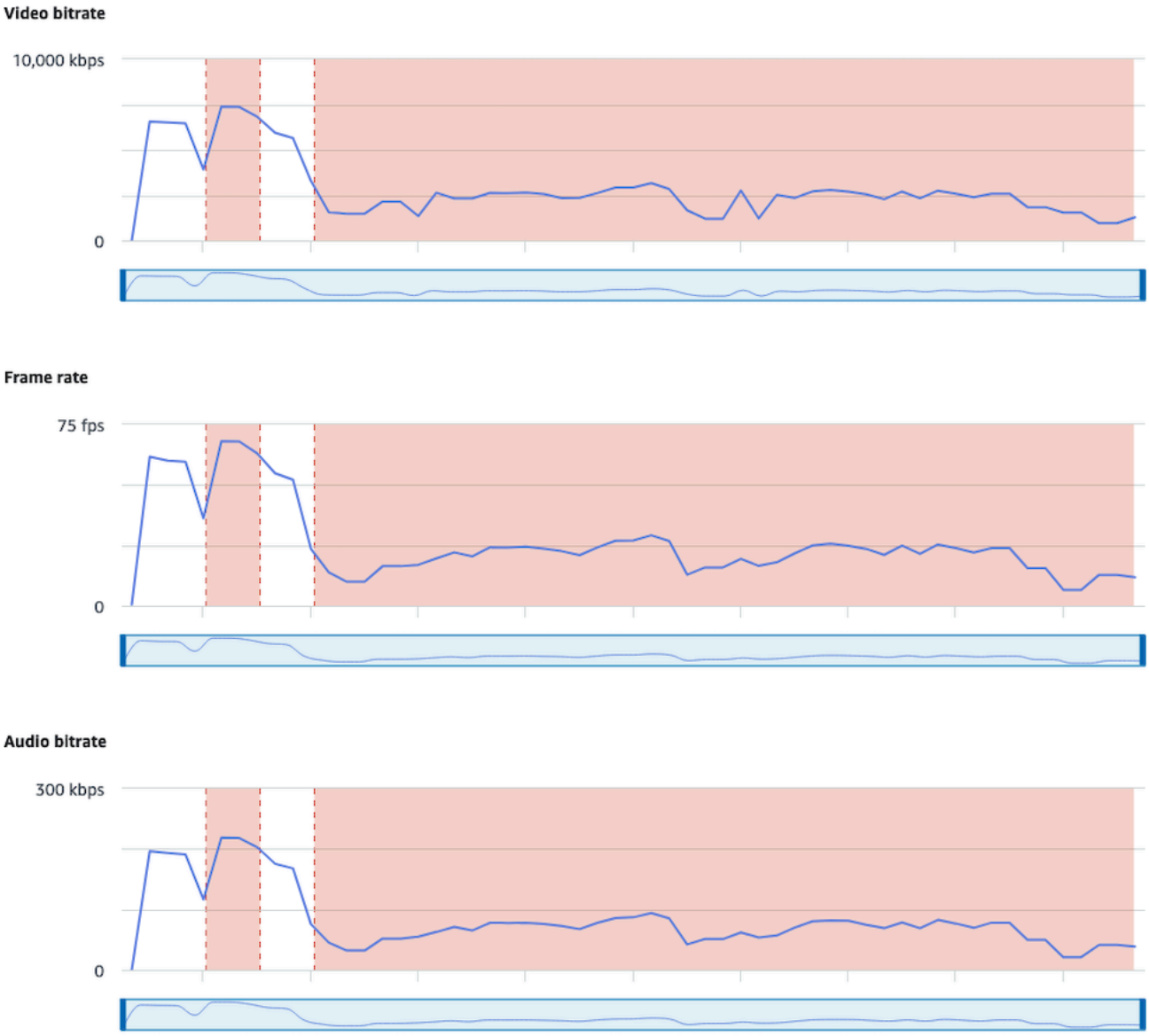
CloudWatch:

Network or Hardware Problems

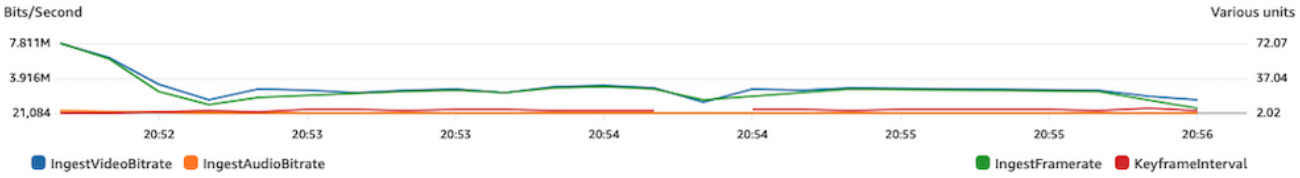
Video encoding takes a lot of computing resources, and sometimes the machine doing the video encoding cannot keep up with the load. In this case, verify that the machine is not overloaded

(running too many things at a time) and that the encoder is up to date. Consider switching to an encoding preset that uses less CPU.

IVS Stream Health dashboard:



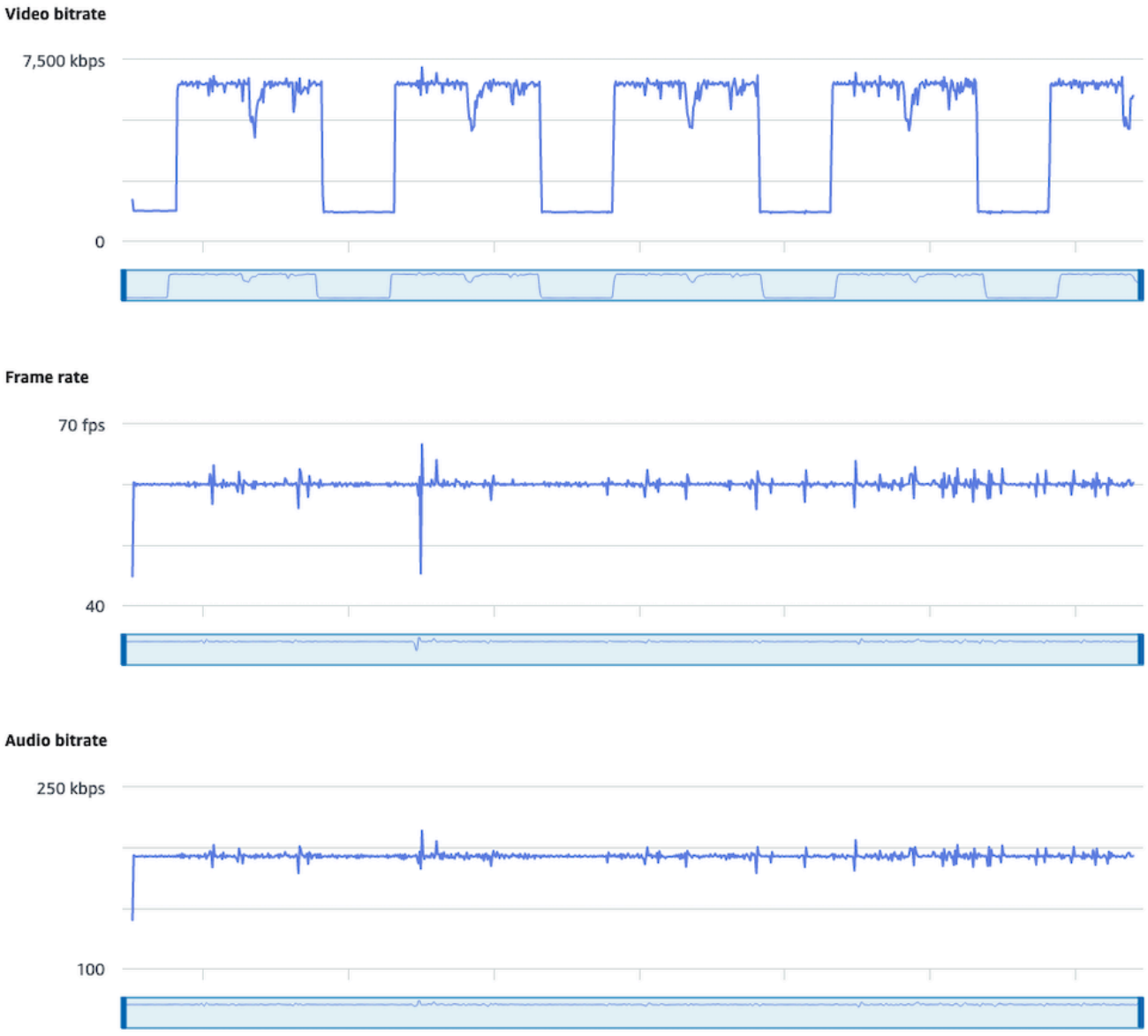
CloudWatch:



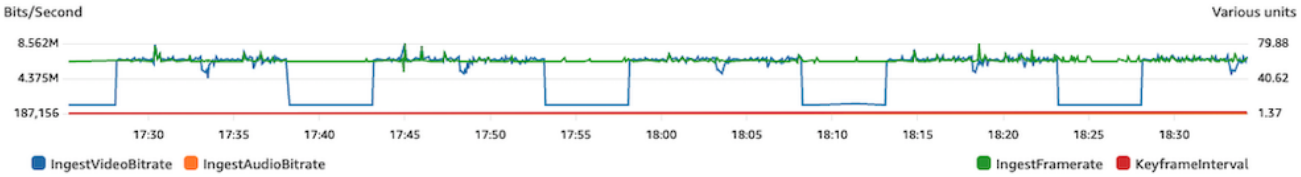
Bitrate Spikes and Dips

Sometimes streaming encoders try to be too smart and optimize bitrate, often depending on the complexity of the frame being compressed. If the bitrate fluctuates rapidly, viewers may experience buffering from trying to load too much data. Ensure that Constant Bitrate (CBR) is enabled, as it maintains a consistent bitrate across the stream, regardless of frame complexity. Be aware that dips also can happen; that can be a sign that your machine does not have enough CPU power for the encoder to compress video.

IVS Stream Health dashboard:



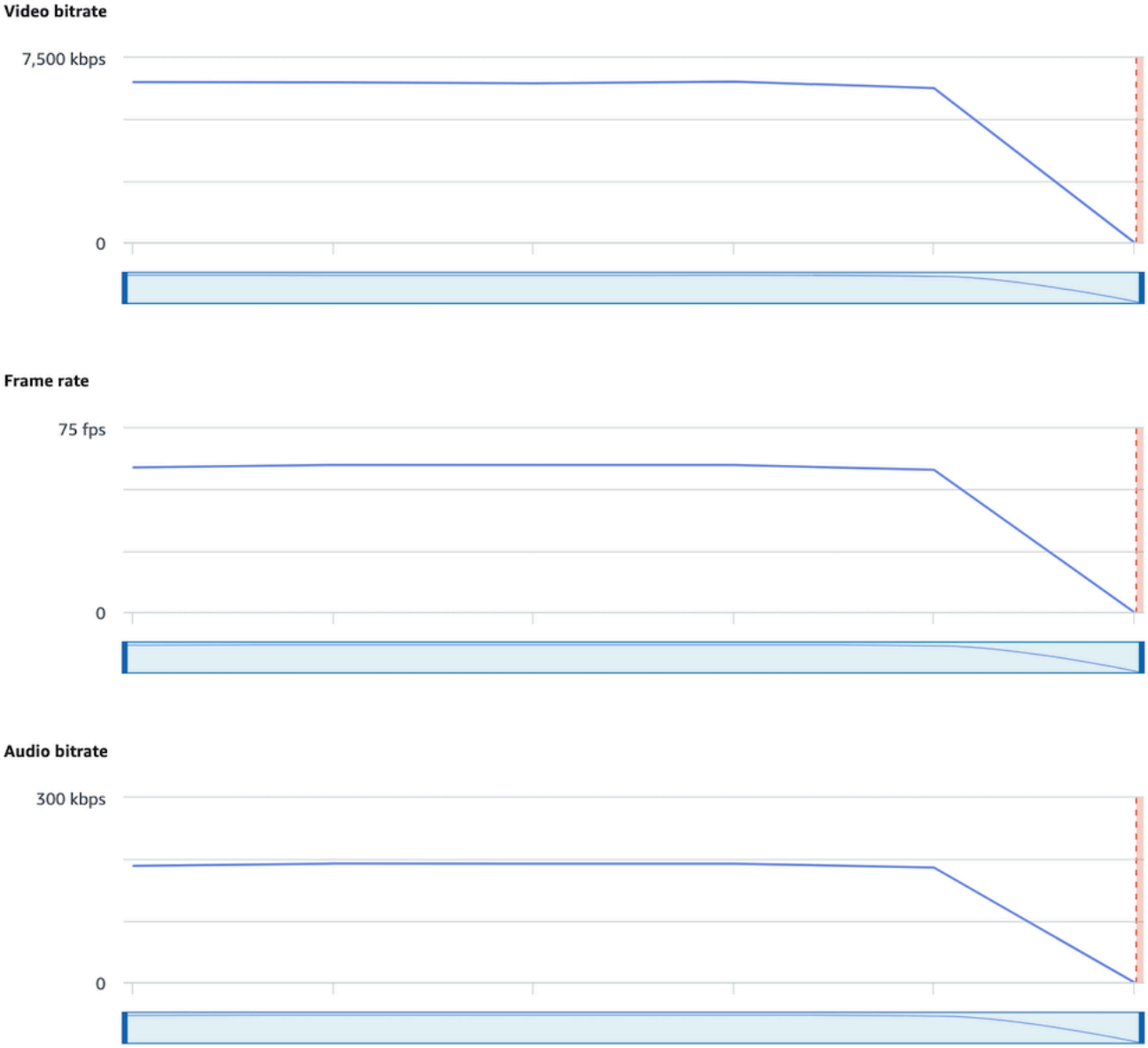
CloudWatch:



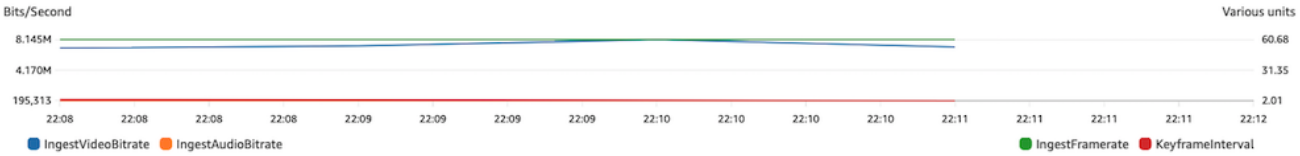
Internet Disconnection

When a broadcast device experiences an internet issue, IVS servers enter a 30-second period in which they evaluate whether the same connection is re-established. If the same connection is not re-established, the IVS server ends the stream session. Some encoders will try to reconnect to the broadcast session if the internet connection is lost, in which case a new stream session may be started after the initial stream ends.

IVS Stream Health dashboard:



CloudWatch:



Stream Playback

Most of the information in this section is specific to the IVS Player SDK and may not apply to other players. For more information, see Amazon IVS Player.

Topics:

- the section called “How do I debug IVS player behaviors?”
- the section called “Why did playback freeze/stop for all viewers?”
- the section called “What is causing the IVS player to buffer?”

How do I debug IVS player behaviors?

To enable verbose logging to assist in debugging the IVS Player, use the `setLogLevel` player method. Alter the log level of the player to use the `DEBUG` argument; then the IVS Player will produce verbose logging around the state and logic occurring on the IVS Player.

To quickly test using the IVS Player, with or without `DEBUG` logs enabled, use the https://debug.ivsdemos.com/ testing site. If `DEBUG` logs are enabled via the settings menu, you can view the logs in the browser console view.

Why did playback freeze/stop for all viewers?

If playback for all viewers freezes/stops at the same time within the content, this probably is the result of an upstream behavior. Often the root cause is the broadcast encoder.

Stream starvation or adverse broadcast-encoder behaviors can have an impact on all viewers simultaneously. If the broadcasting encoding disconnects and a new stream session is started, all viewers stop receiving content concurrently. When you are evaluating this behavior, we recommend you evaluate the stream session using Monitoring Amazon IVS Low-Latency Streaming.

What is causing the IVS player to buffer?

In the context of playback of live-streaming video and audio, "buffering" means the playback device is unable to download the content before the content is supposed to be played. Buffering can manifest in several ways: content may randomly stop and start (also known as stuttering), content may stop for long periods of time (also known as freezing), or the player may enter a `BUFFERING` state.

There are many causes of buffering, which we can organize into three main categories:

- **Viewer-side buffering** often occurs when a single viewer or small group of viewers are impacted by a buffering event. The root cause of these buffering events often stems from a local network (LAN) or playback-device issue. In the case of a slow local network or device issue, the buffering

may be resolved by ensuring that adaptive bitrate playback (ABR) is enabled, manually selecting a lower quality, or reducing the bandwidth being used by other programs and devices.

- **Network-level buffering** — Issues can occur between the local network and the IVS distribution server, otherwise known as the ISP level. Buffering behaviors that arise at the ISP level can be hard to troubleshoot, as full visibility into the ISP may be impossible. Behaviors like latency and network strain (e.g., the ISP cannot handle the overall incoming/outgoing traffic) can cause delays in providing content to the viewer.
- **Broadcast-side buffering** — Issues on the broadcast side of the live stream session can cause large-scale viewer-buffering problems. For example, if a broadcasting device stops sending data to IVS, IVS has no content to deliver to the player, and the IVS Player enters a buffering state when no content is being downloaded. In many cases, a broadcast-side buffering event results in most, if not all, viewers being impacted simultaneously.

Auto-Record to Amazon S3

For more information, see Auto-Record to Amazon S3.

Topics:

- the section called “Why is some recording content missing?”
- the section called “Can KMS-S3 encryption be used with auto-record to S3?”

Why is some recording content missing?

There are various reasons why recorded content may be missing. We recommend the following steps to troubleshoot the missing content:

1. Ensure that Auto-Record to S3 is enabled for the desired IVS channel:
   a. Console — On the details page for the relevant channel, in the **General configuration** section, ensure that Auto-record to S3 is `Enabled`. If it is enabled, check the **Recording configuration** to ensure that both **Storage** and **Recording prefix** are correct.
   b. CLI — Run `get-channel` and pass in the desired IVS channel ARN:

```
aws ivs get-channel --arn "arn:aws:ivs:us-west-2:123456789012:channel/
abcdABCDefgh"
```

See if a `recordingConfigurationArn` is returned.

2. Look in the designated S3 bucket for the Recording Contents for the specific stream session (see S3 Prefix.) The S3 key prefix for a recorded session is in the Amazon EventBridge Recording State Change event. Note: If the merge fragmented streams feature is enabled, some content may be another recorded session.
3. If the overall stream duration was less than 10 seconds or the content of the stream was missing (i.e., stream starvation occurred), recorded content may be missing as nothing was generated.

Can KMS-S3 encryption be used with auto-record to S3?

The IVS auto-record to Amazon S3 feature does not support KMS-S3 encryption. When attempting to use KMS-S3 encryption, the recording start will fail and produce a Recording Start Failure EventBridge event. The recommended workaround is to use the supported SSE-S3 encryption, which is enabled by default on all objects uploaded to Amazon S3.

Miscellaneous Topics

Questions in this section are about topics that cannot be categorized elsewhere.

Topics:

- the section called “What does the "pending verification" error mean?”
- the section called “Can I estimate the cost of IVS usage?”

What does the "pending verification" error mean?

When using IVS, an error may appear that states: "Your account is pending verification. Until the verification process is complete, you may not be able to carry out requests with this account. If you have questions, contact AWS Support."

This indicates that the AWS account you are using must be verified with AWS before you can use IVS. (While your account may work with other AWS services, IVS uses an enhanced verification method.)

To verify your AWS account, contact AWS Account Support — with the error message that you are receiving — from the AWS Support Center: https://support.console.aws.amazon.com/support/home?#/

Can I estimate the cost of IVS usage?

While the exact cost of IVS usage cannot be determined before a stream session, a rough cost estimator is at: https://ivs.rocks/calculator. Additional pricing information is at: https://aws.amazon.com/ivs/pricing/.

Undesired Content and Viewers in IVS

Malicious users may try to re-stream undesired content (e.g., professional sports) on your platform. This kind of streaming can dramatically increase the amount of live-streamed video that your application is serving as well as the costs associated with it, without adding value to your business. In addition to providing you with controls to stop active streams, Amazon IVS provides resources to help detect and prevent this kind of behavior in the first place.

Detecting Undesired Content

Anomaly Detection

You can detect and alert on the kind of anomalous spike in viewership that happens when certain undesired content is being streamed. (Once you detect that a spike has occurred, you can take the steps mentioned in stop the stream and reset the stream key, as discussed below.)

Amazon CloudWatch allows you to create alarms which can send alerts under specific circumstances; for example, when your viewership spikes. Amazon IVS automatically reports concurrent views (CCV) metrics to Amazon CloudWatch for all your channels, so you only need to set up an alarm. To set up an anomaly-detection alarm based on CCV, follow these steps:

1. Open the Amazon CloudWatch console at https://console.aws.amazon.com/cloudwatch/.
2. On the left navigation bar, select **Alarms**, then select **All alarms**.
3. On the top right of the page, select **Create alarm**.
4. Select **Select Metric**. Under *Metrics*, select **IVS**, then **All**, then select the checkbox next to **ConcurrentViews**.
5. On the lower right, select **Select metric**. A 4-step alarm-creation wizard opens.
6. Wizard: In **Step 1, Specify metric and conditions**, specify these settings:
   a. **Statistic** = **Maximum**
   b. **Period** = **1 minute**
   c. **Threshold type** = **Anomaly Detection**
   d. **Whenever concurrent views is...** = **Greater than the band**
   e. **Anomaly detection threshold** = **3**

This threshold value is an initial suggestion. You may want to select a different value depending on your typical traffic patterns and needs. Use a lower value to watch your metrics more closely; a higher value, to get fewer alarms.

f. Select **Next**.

7. Wizard: In **Step 2, Configuration actions**, choose an existing SNS topic or create a new one, to send email to an address you specify. To create a topic which sends an email, select **Create new topic**, provide a topic name, enter your email address, and select **Create topic**. Select **Next** to continue.
8. Wizard: In **Step 3, Add name and description**, add a name and optional description for the alarm, then select **Next**.
9. Wizard: In **Step 4, Preview and create**, verify that the information is correct, then select **Create alarm**.
10. Your alarm is created. If prompted, follow any instructions for confirming SNS subscriptions.

For more information, see:

1. Monitoring Amazon IVS Low-Latency Streaming
2. Creating a CloudWatch alarm based on anomaly detection

Custom Content Moderation

You can explore custom content-moderation solutions to detect undesired content via image recognition. Amazon IVS provides the ability to automatically record Amazon IVS live streams to Amazon S3, including the generation of thumbnail images for use in this kind of solution.

Consider these additional detection and prevention techniques:

- The Amazon IVS moderation with Amazon Rekognition demo showcases how to use IVS Auto-Record to S3 in conjunction with Amazon Rekognition to moderate live content.
- Add Hive content moderation to your Amazon IVS video streams
- Creating Safer Online Communities with AI/ML Content Moderation is a blog post about using Amazon Rekognition within an IVS application.

Preventing Undesired Content and Viewers

Stop the Stream and Reset the Stream Key

If you detect that a channel is being used to stream undesired content, you can use the Amazon IVS console to shut down the stream:

1. Open the Amazon IVS console. (You can also access the Amazon IVS console through the AWS Management Console.)
2. If needed, from the navigation bar, use the **Select a Region** drop-down to choose the region in which the channel is hosted.
3. Select the channel on which the stream that you want to stop is running.
4. On the channel page, navigate down to the **Live Stream** section and select **Stop stream**.

Even after you stop the stream, the broadcaster can restart the stream on that channel. To prevent this, reset the stream key; that prevents the broadcaster from restarting a stream without first acquiring a new stream key. To reset the stream key:

- While still on the channel page, navigate down to the **Stream configuration** section and select **Reset stream key**.

You also can stop a stream and reset (delete/create) the stream key programmatically. See the Amazon IVS Low-Latency Streaming API Reference.

Depending on how your application issues stream keys, you may need to take further measures to prevent any new stream keys from being acquired.

Use Private Channels

In many cases, undesired content is streamed to a large audience outside of your platform by simply embedding the playback URL in a third-party website. The best solution to prevent this kind of behavior is Amazon IVS private channels. By using private channels, you can restrict playback to viewers with valid playback tokens. Playback tokens are used to validate the viewer within the playback application, impeding viewership on unintended platforms. In addition, you can enable origin enforcement, which prevents viewers from watching streams on websites that aren't hosted on your domains. You can extend this protection to cover common streaming applications by also enabling strict origin enforcement.

Note that you can get the protection of private channels and authentication without forcing users to create and/or log in to formal accounts. Your playback application can simply acquire a token anonymously behind the scenes. You'll still be able to take advantage of origin enforcement.

To learn more about private channels, see:

- Setting Up Private Channels in the *IVS Low-Latency Streaming User Guide*. Within that document, to learn more about origin enforcement, see Generate and Sign IVS Playback Tokens.
- Creating a Private Channel for Authorized Live Stream Playback with Amazon IVS (blog post)

Use Playback Restriction Policies

If you do not want to use private channels, you can still benefit from some of the same protections by leveraging playback restriction policies. These policies allow you to enable features such as GeoBlocking and origin enforcement on public channels. You create a playback restriction policy using the IVS console or API, then attach the policy's ARN to your channels.

Console Instructions (Playback Restriction Policy)

1. Create a playback restriction policy
   a. Open the Amazon IVS console. On the left navigation pane, select **Playback security > Playback restriction policies**.
   b. Select **Create policy**.
   c. Optionally, name the policy.
   d. Optionally, toggle **Strict origin enforcement** (see note below).
   e. Specify **Allowed countries** and **Allowed origins**.
   f. Select **Create policy**.
2. Attach this policy to a new or existing channel
   a. Create a new channel or edit an existing channel.
   b. In the **Restrict playback section** (of the **Create channel** or **Update channel** window), select **Enable playback restriction**.
   c. From the **Playback restriction policy** drop-down list, select the policy you created in Step 1.
   d. Select **Create channel** (for a new channel) or **Save** (to update an existing channel).

Note on strict origin enforcement: This is an optional setting that can be used to strengthen the origin restriction specified with allowed origins. By default, the origin restriction applies only to the multivariant playlist. If strict origin enforcement is enabled, the server will enforce a requirement that the requesting origin matches the policy for all playback requests (including multivariant playlist, variant playlist, and segments). This means that all clients (including non-browser clients) will have to provide a valid origin-request header with each request. Use the `setOrigin` method to set the header in the IVS iOS and Android player SDKs. It is set automatically in web browsers except iOS Safari. For iOS Safari, you need to add `crossorigin="anonymous"` to the video element, to ensure that the origin request header is sent. Example: `<video crossorigin="anonymous"></video>`.

Note on mapping between IP addresses and countries: IVS determines the location of your users by using a third-party database. The accuracy of the mapping between IP addresses and countries varies by region. Based on recent tests, the overall accuracy is 99.8%. If IVS can't determine a user's location, IVS serves the content that the user requested.

CLI Instructions (Playback Restriction Policy)

1. Create a playback restriction policy. Here is an example. *For the `allowed-countries` and `allowed-origins` fields, replace the example values below with your actual values, or delete one or both fields, depending on your use case.*

   ```
   aws ivs create-playback-restriction-policy --name test-playback-restriction-policy
    --enable-strict-origin-enforcement --allowed-countries "US","JP" --allowed-origins
    "https://example1.com","https://*.example2.com"
   ```

   This returns a new playback restriction policy. For its fields, see PlaybackRestrictionPolicy in the *IVS Low-Latency Streaming API Reference*.

2. Attach the new policy to a channel. For an existing channel, run `update-channel` and pass in the ARN of the playback restriction policy created in the previous step:

   ```
   aws ivs update-channel --arn "arn:aws:ivs:us-west-2:123456789012:channel/
   abcdABCDefgh" --playback-restriction-policy-arn "arn:aws:ivs:us-
   west-2:123456789012:playback-restriction-policy/abcdABCDefgh"
   ```

   For a new channel, include the `--playback-restriction-policy-arn` statement during channel creation.

IVS Costs | Low-Latency Streaming

There are separate costs for Amazon IVS live video and Amazon S3 storage related to the auto-record-to-S3 feature.

Live Video

The Amazon IVS pricing model incorporates separate fees for video input and output.

Video-input fees depend on your channel type. For details about channel types, see Channel Types in *IVS Streaming Configuration*.

For help selecting the right channel type for your use case, use the "Help me choose" tool in the console:

1. On the console's **Create channel** page, select **Custom configuration**.
2. Under **Channel type**, select **Help me choose**.
3. Follow the prompts until a recommendation is made, then choose **Select recommendation**.

For video output, you pay an hourly rate for video delivered to viewers. Rates vary by resolution and "billing region" (where the video is delivered from). There are several tiers of video-output costs based on usage, including a free tier.

A useful interactive tool is the IVS Cost Estimator. You can plug in values for channel type, resolution, hours streamed, number of viewers, and billing region. When estimating costs, note the following rules of thumb:

- Viewers come and go, and on average, 50% of a stream is "delivered." The Cost Estimator includes a selector for "Average viewer watch duration." This defaults to 50%. Expect viewership for paid events to be higher; even in this case, though, it's likely that not all ticket-holders will view at the same time.
- Some viewers watch at a lower resolution than the source resolution of the broadcast. This is especially true for high-resolution streams: some viewers will watch at lower resolutions, which are less expensive. This is due to various viewer constraints, including bandwidth, network conditions, ISP, and hardware.
- Timing matters. For instance, if your stream competes with school, work, or vacation, this can affect your audience size.

- It is very hard to build a live audience from non-live users. Of course, there are exceptions; bringing in external talent (like influencers with their own following) can increase audience size.

Cost Allocation Tags

You can assign tags to your Amazon IVS resources (such as channels) and use them as cost allocation tags to organize and track your Amazon IVS costs. A tag is a key-value pair that you define—for example, by application, environment, team, or event. After you activate cost allocation tags, AWS includes them in your cost allocation report so you can categorize and track your AWS spending at a finer level of detail.

To use cost allocation tags with Amazon IVS:

1. Tag your Amazon IVS resources. You can add tags when you create a resource or add them later, using the Amazon IVS console, the AWS CLI, or the Amazon IVS API. For tag restrictions and naming requirements, see Best practices and strategies in *Tagging AWS Resources and Tag Editor*. For the Amazon IVS tagging operations (such as `TagResource`), see the Amazon IVS Low-Latency Streaming API Reference.
2. Activate your tags as cost allocation tags in the AWS Billing and Cost Management console. Only tags you have activated appear in your billing reports. See Activating user-defined cost allocation tags. After you apply tags to resources, it can take up to 24 hours for the tag keys to appear on the Cost allocation tags page, and up to another 24 hours for them to activate.
3. View your costs by tag using AWS Cost Explorer, AWS Cost and Usage Reports, or your monthly cost allocation report.

For more information, see Organizing and tracking costs using AWS cost allocation tags in the *AWS Billing User Guide*.

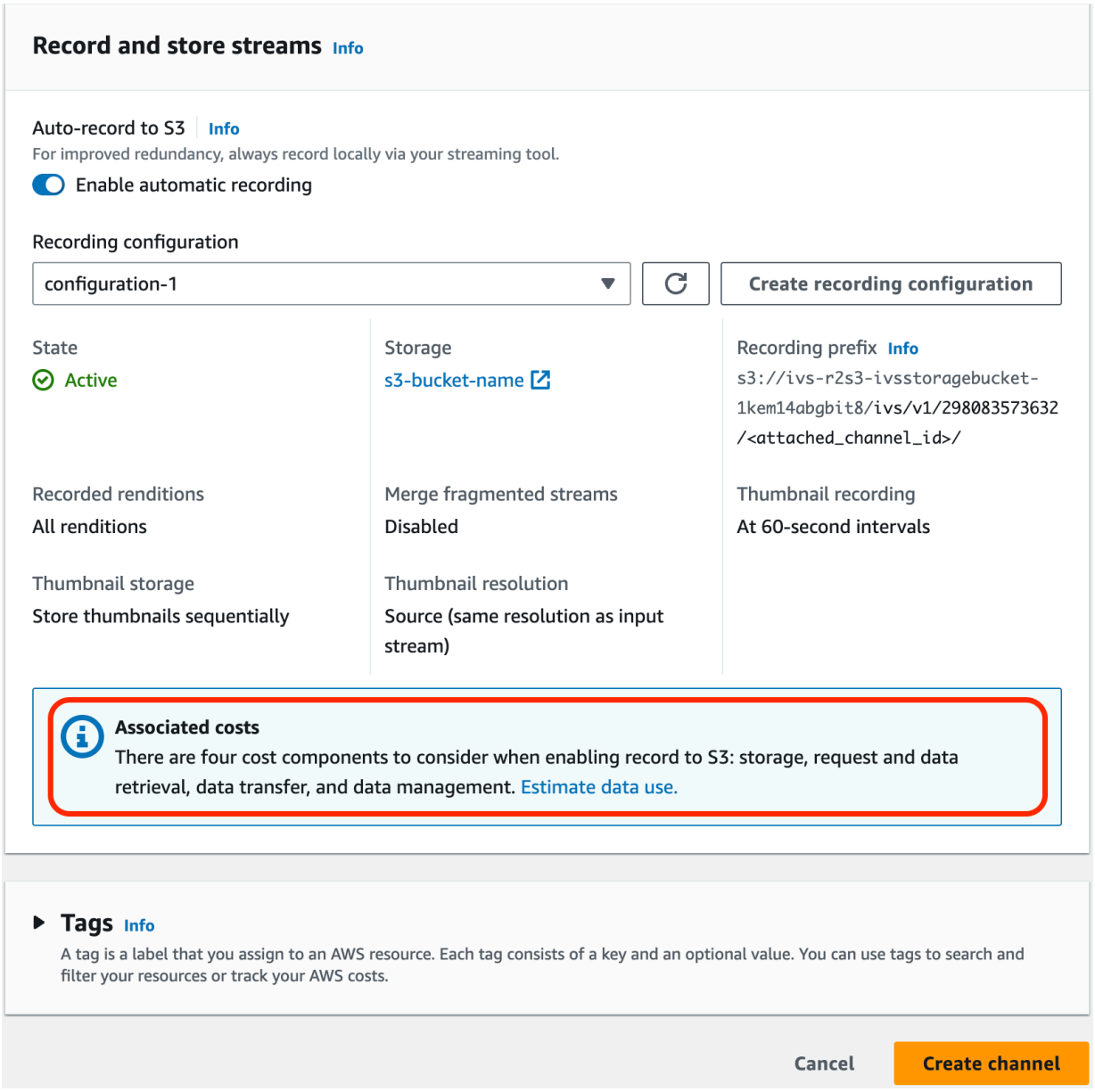
Auto-Record to Amazon S3

There are no Amazon IVS charges for using the auto-record to Amazon S3 feature or for writing to S3. There are charges for Amazon S3 storage, S3 API calls that Amazon IVS makes on behalf of the customer, and serving the stored video to viewers.

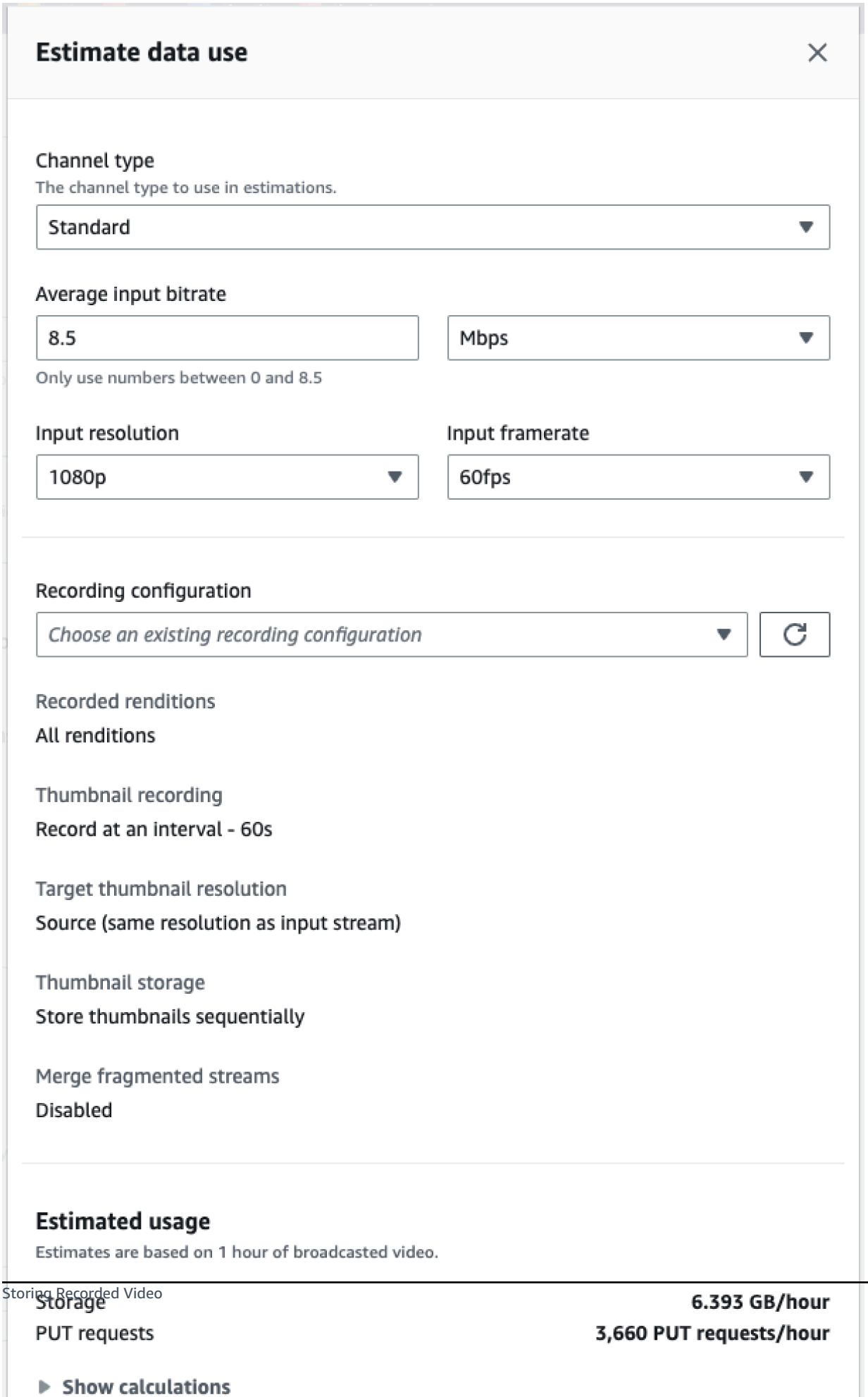
Storing Recorded Video

Customers can generate estimates of S3 storage needs and costs by using the IVS console. When a customer uses the console to set up recording for a channel (either when the channel is created or later), a data-use estimator is offered. These data-use estimates can be plugged into the AWS Pricing Calculator for S3 to estimate the monthly cost of S3 storage and data movement.

In the console, when creating a new channel or editing an existing channel, turn on **Enable automatic recording** in the **Record and store streams** area. This displays information about **Associated costs**.



Select **Estimate data use** to display the data-use calculator:


Estimate data use
Channel type
The channel type to use in estimations.
Standard
Average input bitrate
8.5
Mbps
Only use numbers between 0 and 8.5
Input resolution
1080p
Input framerate
60fps
Recording configuration
Choose an existing recording configuration
Recorded renditions
All renditions
Thumbnail recording
Record at an interval - 60s
Target thumbnail resolution
Source (same resolution as input stream)
Thumbnail storage
Store thumbnails sequentially
Merge fragmented streams
Disabled
Estimated usage
Estimates are based on 1 hour of broadcasted video.
Storage
6.393 GB/hour
PUT requests
3,660 PUT requests/hour
Show calculations

As noted on the screen, the estimates that are provided can be used with the AWS Pricing Calculator to compute estimates of the monthly cost incurred by S3 storage and data movement.

Serving Recorded Video

The cost of serving recorded video to viewers depends on the CDN that is used. For example, see the Amazon CloudFront pricing page.

Server Side Ad Insertion

If you use server-side ad insertion with IVS, ads are inserted using AWS Elemental MediaTailor, which incurs separate charges for ad insertion and ad transcoding.

Each time you insert an ad break via IVS, you are billed for a MediaTailor ad insertion for each viewer of the channel.

To match the video quality of the ad content to the source content, MediaTailor transcodes ads into the following renditions:

Resolution	Frame Rate	Bitrate
1080p	30 fps	2.0 - 8.0 Mbps (13 renditions)
720p	30 fps	1.7 Mbps
480p	30 fps	800 Kbps
360p	30 fps	400 kbps
160p	30 fps	90 kbps
audio-only		64 kbps

IVS delivers ad content to viewers as part of the video stream. You will not incur MediaTailor ad delivery charges, as the delivery of ad content is included in IVS video output costs.

For more details, see the AWS Elemental MediaTailor pricing page.

IVS Resources and Support | Low-Latency Streaming

This document lists resources to help support your use of Amazon IVS low-latency streaming.

Demos and Other Resources

https://ivs.rocks/ is a dedicated site to browse published content (demos, code samples, blog posts), estimate cost, and experience IVS through live demos. For demos and code samples, see https://ivs.rocks/examples.

The Amazon IVS page on the DEV Community site has a wealth of demos and blog posts. For example, Getting Started with Amazon Interactive Video Service is a series of articles about using IVS, for beginners. The articles give step-by-step walkthroughs of IVS APIs with interactive demos embedded in the posts. All the demos can be run directly in the posts themselves via an embedded CodePen.

The AWS Blogs site has many IVS blog postings on a variety of topics. Filter for IVS by selecting **Product or solution** > **Media Services** > **Amazon Interactive Video Service** on the right side of the page.

Partner Solutions

Amazon IVS partners with third-party providers in the Amazon Partner Network (APN) to provide technology solutions to augment live-streaming applications. There are several types of partner solution areas:

This type of partner:	Offers solutions that do this ...
Analytics	Provide operational and business insights into your live-streaming video application. These insights, in turn, can drive increased engagement from viewers and identify opportunities to improve return on investment.
Interactivity	Help drive engagement with audiences of your live-streaming video application.
Face and background filters	Enable broadcasters to change their facial or background appearance to audiences of their live streams.

Analytics

Datadog

Integrating Amazon IVS with Datadog allows you to monitor live-stream playback analytics through Datadog.

By leveraging the IVS Player SDK's events and state updates, key metrics can be calculated and sent to Datadog on a recurring basis to create playback analytics. This integration allows for the capture of crucial playback metrics, providing insights into live-stream viewers' quality of experience (QoE) . The process involves using IVS Player events to derive essential data points, which are then transmitted to Datadog for analysis and visualization using the Datadog Real User Monitoring (RUM) SDK.

To integrate the IVS Player SDK with Datadog to monitor playback analytics, see Unlocking Live Streaming Analytics: Amazon IVS and Datadog Integration.

Bitmovin

Bitmovin's Analytics is a fully managed service with analytics collectors built for the IVS Player. Analytics enables you to track and monitor playback health across devices, understand viewer demographics, monitor quality of playback experience, and quickly identify any issues affecting viewers.

With actionable data collected across all your channels, Bitmovin's Analytics aids in increasing viewer engagement and retention through metric dashboards for Audience, Quality of Experience (QoE), and Top Errors. This gives you access to about 40 metrics with 30 filters and breakdowns. Also, 200 dimensions and filters are available through Bitmovin's API and data exports.

To integrate Bitmovin's Analytics with the IVS Player SDK, see the following Getting Started guides: Android and iOS.

Interactivity

LiveLike offers a ready-to-use engagement platform that can enhance your online user experience in just a few weeks. Boost your average revenue per user through increased registration, interactions, impressions, and sponsorships. See results such as a 70% increase in year-over-year registrations (2022 vs 2021) with our NASCAR case study. Reduce churn and increase retention by creating interactive and engaging experiences on your platform with our solution. To integrate

LiveLike with Amazon IVS, see the following blog post: A Quick Guide to LiveLike: How to Enhance Live Stream Interactivity.

Face and Background Filters

DeepAR is a technology company that builds AR infrastructure for digital product teams. Businesses of every size - from startups to public companies - use our software to provide world class AR experiences to billions of users around the world. To integrate DeepAR with Amazon IVS, see the DeepAR page on Amazon IVS Integration.

BytePlus Effects combines a huge library of AR effects, stickers, and filters, giving app developers all the tools they need to drive deeper engagement with their audience. To integrate BytePlus with Amazon IVS, see the following blog post: How to improve user engagement with real-time AR effects using BytePlus Effects and Amazon IVS.

Camera Kit is Snap AR's SDK that allows partners to leverage Snap AR technology in their applications and websites. Using Camera Kit, businesses can bring a new dimension to their customer experiences and unleash new applications for Snap's underlying AR technology. To integrate Snap AR Lenses using Snap's Camera Kit SDK with Amazon IVS, see the following blog post: Unlocking creator expressions to enhance live streaming experiences with Amazon IVS and Snap's Camera Kit AR SDK.

Support

The AWS Support Center offers a range of plans that provide access to tools and expertise to support your AWS solutions. All support plans provide 24/7 access to customer service. For technical support and more resources to plan, deploy, and improve your AWS environment, choose a support plan that best aligns with your AWS use case.

AWS Premium Support is a one-on-one, fast-response support channel to help you build and run applications on AWS.

AWS re:Post is a community-based Q&A site for developers to discuss technical questions related to Amazon IVS.

Contact AWS has links for nontechnical inquiries about your billing or account. For technical questions, use the discussion forums or support links above.

IVS Glossary

Also see the AWS glossary. In the table below, LL stands for IVS low-latency streaming; RT, IVS real-time streaming.

Term	Description	LL	RT	Chat
AAC	Advanced Audio Coding. AAC is an audio coding standard for lossy digital audio compression. Designed to be the successor of the MP3 format, AAC generally achieves higher sound quality than MP3 at the same bitrate. AAC has been standardi zed by ISO and IEC as part of the MPEG-2 and MPEG-4 specifications.	✓	✓	
Adaptive bitrate streaming	Adaptive Bitrate (ABR) streaming allows the IVS player to switch to a lower bitrate when connectio n quality suffers, and to switch back to a higher bitrate when connection quality improves.	✓		
Adaptive streaming	See Layered encoding with simulcast.		✓	
Administrative user	An AWS user with administrative access to resources and services available in an AWS account. See Terminology in *AWS Setup User Guide*.	✓	✓	✓
ARN	Amazon Resource Name, a unique identifier for an AWS resource. Specific ARN formats depend on the resource type. For ARN formats used by IVS resources, see in *Service Authorization Reference*.	✓	✓	✓
Aspect ratio	Describes the ratio of frame width to frame height. For example, 16:9 is the aspect ratio that corresponds to the Full HD or 1080p resolution.	✓	✓	
Audio mode	A preset or custom audio configuration optimized for different types of mobile device users and the		✓	

Term	Description	LL	RT	Chat
	equipment that they use. See IVS Broadcast SDK: Mobile Audio Modes (Real-Time Streaming).			
AVC, H.264, MPEG-4 Part 10	Advanced Video Coding, also referred to as H.264 or MPEG-4 Part 10, a video compression standard for lossy digital video compression.	✓	✓	
Background replacement	A type of camera filter that enables live-stre am creators to change their backgrounds. See Background Replacement in *IVS Broadcast SDK: Third-Party Camera Filters (Real-Time Streaming).*		✓	
Bitrate	A streaming metric for the number of bits transmitted or received per second.	✓	✓	
Broadcast, broadcaster	Other terms for stream, streamer.	✓		
Buffering	A condition that occurs when the playback device is unable to download the content before the content is supposed to be played. Buffering can manifest in several ways: content may randomly stop and start (also known as stuttering), content may stop for long periods of time (also known as freezing), or the IVS player may pause playback.	✓	✓	
Byte-range playlist	A more granular playlist than the standard HLS playlist. The standard HLS playlist is made up of 10-second media files. With a byte-range playlist, the segment duration is the same as the keyframe interval configured for the stream. Byte-range playlist is available only for the broadcasts that were auto-recorded to an S3 bucket. It is created in addition to the HLS playlist. See Byte-Range Playlists in *Auto-Record to Amazon S3 (Low-Latency Streaming).*	✓		

Term	Description	LL	RT	Chat
CBR	Constant Bitrate, a rate-control method for encoders that maintains a consistent bitrate throughout the entire playback of a video, regardless of what is happening during the broadcast. Lulls in the action may be padded to achieve the desired bitrate, and peaks may be quantized by adjusting the quality of encoding to match the target bitrate. *We strongly recommend using CBR instead of VBR.*	✓	✓	
CDN	Content Delivery Network or Content Distribut ion Network, a geographically distributed solution that optimizes delivery of content such as streaming video by bringing it closer to where users are located.	✓		
Channel	An IVS resource that stores configuration for streaming, including an ingest server, a stream key, a playback URL, and recording options. Streamers use the stream key associated with a channel to start a broadcast. All metrics and events generated during a broadcast are associate d with a channel resource.	✓		
Channel type	Determines the allowable resolution and frame rate for the channel. See Channel Types in the *IVS Low-Latency Streaming API Reference*.	✓		
Chat logging	An advanced option that can be enabled by associating a logging configuration with a chat room.			✓

Term	Description	LL	RT	Chat
Chat room	An IVS resource that stores configuration for a chat session, including optional features such as Message Review Handler and Chat Logging. See Step 2: Create a Chat Room in *Getting Started with IVS Chat*.			✓
Client-side composition	Uses a host device to mix audio and video streams from stage participants and then sends them as a composite stream to an IVS channel. This allows more control over the look of the composition at the cost of higher utilization of client resources and a higher risk of a stage or a host issue impacting the viewers. Also see server-side composition.	✓	✓	
CloudFront	A CDN service provided by Amazon.	✓		
CloudTrail	An AWS service for collecting, monitoring, analyzing, and retaining events and account activity from AWS and external sources. See Logging IVS API Calls with AWS CloudTrail.	✓	✓	✓
CloudWatch	An AWS service for monitoring applications, responding to performance changes, optimizing resource use, and providing insights into operational health. You can use CloudWatch to monitor IVS metrics; see Monitoring IVS Real-Time Streaming and Monitoring IVS Low-Latency Streaming.	✓	✓	✓
Composition	The process of combining audio and video streams from multiple sources into a single stream.	✓	✓	
Composition pipeline	A sequence of processing steps required to combine multiple streams and encode the resulting stream.	✓	✓	

Term	Description	LL	RT	Chat
Compression	Encoding of information using fewer bits than the original representation. Any particular compression is either lossless or lossy. Lossless compression reduces bits by identifying and eliminating statistical redundancy. No information is lost in lossless compression. Lossy compression reduces bits by removing unnecessary or less important information.	✓	✓	
Control plane	Stores information about IVS resources such as channels, stages, or chat rooms and provides interfaces for creating and managing these resources. It is regional (based on AWS regions).	✓	✓	✓
CORS	Cross-Origin Resource Sharing, an AWS feature that allows client web applications that are loaded in one domain to interact with resources such as S3 buckets in a different domain. Access can be configured based on headers, HTTP methods, and origin domains. See Using cross-origin resource sharing (CORS) - Amazon Simple Storage Service in *Amazon Simple Storage Service User Guide*.	✓		
Custom audio source	An interface provided by the IVS Broadcast SDK that allows an application to provide its own audio input, instead of being limited to the device's built-in microphone.		✓	
Custom image source	An interface provided by the IVS Broadcast SDK that allows an application to provide its own image input instead of being limited to the preset cameras.	✓	✓	
Custom participant ordering	Enables positioning of stage participants in both grid and PiP layouts based on custom attribute values in participant tokens.		✓	

Term	Description	LL	RT	Chat
Data plane	The infrastructure that carries data from ingest to egress. It operates based on the configuration managed in the control plane and is not restricted to an AWS region.	✓	✓	✓
Encoder, encoding	The process of converting video and audio content into a digital format, suitable for streaming. Encoding can be hardware or software based.	✓	✓	
E-RTMP	Enhanced RTMP protocol. IVS supports the features of E-RTMP required for multitrack video.	✓		
Event	An automatic notification published by IVS to the AmazonEventBridge monitoring service. An event represents a state or health change of a streaming resource such as a stage or a composition pipeline. See Using Amazon EventBridge with IVS Low-Latency Streaming and Using Amazon EventBridge with IVS Real-Time Streaming.	✓	✓	✓
FFmpeg	A free and open-source software project consisting of a suite of libraries and programs for handling video and audio files and streams. FFmpeg provides a cross-platform solution to record, convert and stream audio and video.	✓		
Fragmented stream	Created when a broadcast disconnects and then reconnects within the interval specified in the channel's recording configuration. The resulting multiple streams are considered a single broadcast and merged together into a single recorded stream. See Merge Fragmented Streams in *Auto-Record to Amazon S3 (Low-Latency Streaming)*.	✓		
Frame rate	A streaming metric for the number of video frames transmitted or received per second.	✓	✓	

Term	Description	LL	RT	Chat
HLS	HTTP Live Streaming (HLS), an HTTP-based adaptive bitrate streaming communications protocol used to deliver IVS streams to viewers.	✓		
HLS playlist	A list of media segments that make up a stream. Standard HLS playlists are made up of 10-second media files. HLS also supports more granular byte-range playlists.	✓		
Host	A real-time user who creates a stage.		✓	
IAM	Identity and Access Management, an AWS service that allows users to securely manage identitie s and access to AWS services and resources, including IVS.	✓	✓	✓
Ingest	IVS process for receiving video streams from a host or broadcaster for processing or delivery to viewers or other participants.	✓	✓	
Ingest server	Receives video streams and delivers them to a transcoding system, where streams are transmuxe d or transcoded into HLS for delivery to viewers. Ingest servers are specific IVS components that receive streams for channels, along with an ingestion protocol (RTMP, RTMPS). See the information on creating a channel in Getting Started with IVS Low-Latency Streaming.	✓		
Interlaced video	Transmits and displays only odd or even lines of subsequent frames to create perceived doubling of frame rate without consuming extra bandwidth. We do not recommend using interlaced video due to the video quality concerns.	✓	✓	

Term	Description	LL	RT	Chat
JSON	JavaScript Object Notation, an open-standard file format that uses human-readable text to transmit data objects consisting of attribute-value pairs and array data types or other serializable values.	✓	✓	✓
Keyframe, delta frame, keyframe interval	The keyframe (also referred to as intra-cod ed or i-frame) is a full frame of the image in a video. Subsequent frames, the delta frames (also referred to as predicted or p-frames), only contain the information that has changed. Keyframes will appear multiple times within a stream, depending on the keyframe interval defined in the encoder.	✓	✓	
Lambda	An AWS service for running code (referred to as Lambda functions) without provisioning any server infrastructure. Lambda functions can run in response to events and invocation requests, or based on a schedule. For example, IVS Chat uses Lambda functions to enable message review for a chat room.	✓	✓	✓
Latency, glass-to-glass latency	A delay in data transfer. IVS defines latency ranges as: • Low latency: under 3 sec • Real-time latency: under 300 ms *Glass-to-glass* latency refers to the delay from when a camera captures a live stream to when the stream appears on a viewer's screen.	✓	✓	

Term	Description	LL	RT	Chat
Layered encoding with simulcast	Enables simultaneous encoding and publishing of multiple video streams with different quality levels. See Adaptive Streaming: Layered Encoding with Simulcast in *Real-Time Streaming Optimizations*.		✓	
Message review handler	Enables IVS Chat customers to automatically review/filter user chat messages before they are delivered to the chat room. It is enabled by associating a Lambda function with a chat room. See Creating a Lambda Function in *Chat Message Review Handler*.			✓
Mixer	A feature of the IVS Mobile Broadcast SDKs that takes multiple audio and video sources and generates a single output. It supports management of on-screen video and audio elements representing sources such as cameras, microphones, screen captures, and audio and video generated by the application. The output can then be streamed to IVS. See Configuring a Broadcast Session for Mixing in *IVS Broadcast SDK: Mixer Guide (Low-Latency Streaming)*.	✓		
Multi-host streaming	Combines streams from multiple hosts into a single stream. This can be accomplished using either client-side or server-side composition. Multi-host streaming enables scenarios such as inviting viewers onto a stage for Q&A, competitions between hosts, video chat, and hosts conversing with each other in front of a large audience.		✓	

Term	Description	LL	RT	Chat
Multitrack video	Allows broadcaster software tools to encode and stream multiple video qualities directly from a GPU-powered computer. See Amazon IVS Multitrack Video.	✓		
Multivariant playlist	An index of all the variant streams available for a broadcast.	✓		
OAC	Origin Access Control, a mechanism for restricting access to an S3 bucket, so that content such as a recorded stream can be served only through CloudFront CDN.	✓		
OBS	Open Broadcaster Software, free and open source software for video recording and live streaming. OBS offers an alternative (to the IVS broadcast SDK) for desktop publishing. More sophisticated streamers familiar with OBS may prefer it for its advanced production features, such as scene transitions, audio mixing, and overlay graphics.	✓	✓	
Participant	A real-time user connected to a stage as a publisher or subscriber.		✓	
Participant ordering	The order in which stage participants are positioned in grid and PiP layouts.		✓	
Participant token	Authenticates a real-time event participant when they join a stage. A participant token also controls whether a participant can send video to the stage.		✓	

Term	Description	LL	RT	Chat
Playback token, playback key pair	An authorization mechanism that allows customers to restrict video playback on private channels. Playback tokens are generated from a playback key pair. A playback key pair is the public-private pair of keys used to sign and validate the viewer authorization token for playback. See Create or Import an IVS Playback Key in *Setting up IVS Private Channels* and see the Playback Key Pair operations in the IVS Low-Latency API Reference.	✓		
Playback URL	Identifies the address a viewer uses to start playback for a specific channel. This address can be used globally. IVS automatically selects the best location on the IVS global content delivery network for delivering the video to each viewer. See the information on creating a channel in Getting Started with IVS Low-Latency Streaming.	✓		
Private channel	Allows customers to restrict access to their streams using an authorization mechanism based on playback tokens. See Workflow for IVS Private Channels in *Setting up IVS Private Channels*.	✓		
Private ingest	Enables secure private connection between your Amazon VPC and IVS using interface VPC endpoints powered by AWS PrivateLink. See IVS Private Ingest.	✓		
Progressive video	Transmits and displays all lines of each frame in sequence. We recommend using progressive video during all stages of a broadcast.	✓	✓	

Term	Description	LL	RT	Chat
Publisher	A real-time event participant who publishes video and/or audio to a stage. See What is IVS Real-Time Streaming.		✓	
Quotas	The maximum numbers of IVS service resources or operations for your AWS account. That is, these limits are per AWS account, unless noted otherwise. All quotas are enforced per region. See Amazon Interactive Video Service endpoints and quotas in *AWS General Reference Guide*.	✓	✓	✓
Regions	Provide access to AWS services that physicall y reside in a specific geographic area. Regions provide fault tolerance, stability, and resilience, and can also reduce latency. With Regions, you can create redundant resources that remain available and unaffected by a regional outage. Most AWS service requests are associated with a particular geographic region. The resources that you create in one region do not exist in any other region unless you explicitly use a replication feature offered by an AWS service. For example, Amazon S3 supports cross-region replication. Some services, such as IAM, do not have cross-reg ional resources.	✓	✓	✓
Resolution	Describes the number of pixels in a single video frame, for example, Full HD or 1080p defines a frame with 1920x1080 pixels.	✓	✓	
Root user	The owner of an AWS account. The root user has complete access to all AWS services and resources in the AWS account.	✓	✓	✓

Term	Description	LL	RT	Chat
RTMP, RTMPS	Real-Time Messaging Protocol, an industry standard for transmitting audio, video, and data over a network. RTMPS is the secure version of RTMP, running over a Transport Layer Security (TLS/SSL) connection.	✓	✓	
S3 bucket	A collection of objects stored in Amazon S3. Many policies, including access and replication, are defined at the bucket level and apply to all objects in the bucket. For example, an IVS broadcast is stored as multiple objects in an S3 bucket.	✓		
SDK	Software Development Kit, a collection of libraries for the developers building applications with IVS. The IVS *Player SDK* is for playback of IVS streams. It leverages the IVS architecture and is optimized for IVS low-latency playback. There are IVS player SDKs for web, Android, and iOS. The IVS *Broadcast SDK* is for developers who are building applications with IVS. This SDK leverages the IVS architecture and is continually improved, alongside IVS. As a native broadcast SDK, it is designed to minimize the performance impact on your applications and on the devices with which users access applications. There are IVS broadcast SDKs for web, Android, and iOS, for low-latency and real-time streaming.	✓	✓	✓

Term	Description	LL	RT	Chat
Selfie segmentation	Enables replacing the background in a live stream, using a client-specific solution that accepts a camera image as input and returns a mask that provides a confidence score for each pixel of the image, indicating whether it is in the foreground or the background. See Background Replacement in *IVS Broadcast SDK: Third-Party Camera Filters (Real-Time Streaming)*.		✓	
Semantic versioning	A version format in the form of Major.Minor.Patch. Bug fixes not affecting the API increment the patch version, backward compatible API additions /changes increment the minor version, and backward incompatible API changes increment the major version.	✓	✓	✓
Server-side composition	Uses an IVS server to mix audio and video from stage participants and then sends this mixed video to an IVS channel to reach a larger audience or to store it in an S3 bucket. Server-side composition reduces client load, improves resilience of the broadcast, and enables more efficient use of bandwidth. Also see client-side composition.		✓	
Service quotas	An AWS service that helps you manage your quotas for many AWS services from one location. Along with looking up the quota values, you can also request a quota increase from the Service Quotas console.	✓	✓	✓

Term	Description	LL	RT	Chat
Service-linked role	A unique type of IAM role that is linked directly to an AWS service. Service-linked roles are automatically created by IVS and include all the permissions that the service requires to call other AWS services on your behalf, for example, to access an S3 bucket. See Using Service-Linked Roles for IVS in *IVS Security*.	✓		
Stage	An IVS resource that represents a virtual space where real-time event participants can exchange video in real time. See Create a Stage with Optional Participant Recording in *Getting Started with IVS Real-Time Streaming*.		✓	
Stage session	Begins when the first participant joins a stage and ends a few minutes after the last participant stops publishing to the stage. A long-lived stage may have multiple sessions over its lifetime.		✓	
Stream	Data representing video or audio content being sent continuously from a source to a destination.	✓	✓	
Stream key	An identifier assigned by IVS when you create a channel; it is used to authorize streaming to the channel. **Treat the stream key like a secret, since anyone with it can stream to the channel.** See Getting Started with IVS Low-Latency Streaming.	✓		

Term	Description	LL	RT	Chat
Stream starvation	A delay or halt in stream delivery to IVS. It occurs when IVS does not receive the expected amount of bits that the encoding device advertise d it would send over a certain timeframe. An occurrence of stream starvation results in a stream starvation event. From a viewer's perspective, stream starvatio n may appear as video that lags, buffers, or freezes. Stream starvation can be brief (less than 5 seconds) or long (several minutes), depending on the specific situation that resulted in stream starvation. See What is Stream Starvation in *Troubleshooting FAQ*.	✓	✓	
Streamer	A person or a device sending a video or audio stream to IVS.	✓	✓	
Subscriber	A real-time event participant who receives video and/or audio of stage publishers. See What is IVS Real-Time Streaming.		✓	
Tag	A metadata label that you assign to an AWS resource. Tags can help you identify and organize your AWS resources. On the IVS documentation landing page, see “Tagging” in any of the IVS API documentation (for real-time streaming, low-laten cy streaming, or chat).	✓	✓	✓
Third-party camera filters	Software components that can be integrated with the IVS Broadcast SDK to allow an application to process images before providing them to the Broadcast SDK as a custom image source. A third-party camera filter may process images from the camera, apply a filter effect, etc.	✓	✓	

Term	Description	LL	RT	Chat
Thumbnail	A reduced-size image taken from a stream. By default, thumbnails are generated every 60 seconds, but a shorter interval can be configure d. Thumbnail resolution depends on the channel type. See Recording Contents in *Auto-Record to Amazon S3 (Low-Latency Streaming)*.	✓		
Timed metadata	Metadata tied to specific timestamps within a stream. It can be added programmatically using the IVS API and becomes associated with specific frames. This ensures that all viewers receive the metadata at the same point relative to the stream. Timed metadata can be used to trigger actions on the client such as updating team statistics during a sporting event. See Embedding Metadata within a Video Stream.	✓		
Token exchange	An interface provided by the IVS Broadcast SDK that allows upgrading or downgrading participant-token capabilities and updating token attributes, without requiring participants to reconnect. This enables scenarios like co-hosting, where participants may start with subscribe-only capabilities and later need publish capabilities.		✓	
Transcoding	Converts video and audio from one format to another. An incoming stream may be transcode d to a different format at multiple bitrates and resolutions, to support a range of playback devices and network conditions.	✓	✓	

Term	Description	LL	RT	Chat
Transmuxing	A simple repackaging of an ingested stream to IVS, with no re-encoding of the video stream. “Transmux” is short for transcode multiplexing, a process that changes the format of an audio and/or video file while keeping some or all of the original streams. Transmuxing converts to a different container format without changing the file contents. Distinguished from transcoding.	✓	✓	
Variant streams	A set of encodings of the same broadcast in several distinct quality levels. Each variant stream is encoded as a separate HLS playlist. An index of the available variant streams is referred to as a multivariant playlist. After the IVS player receives a multivariant playlist from IVS, it can then choose between the variant streams during playback, changing back and forth seamlessly as network conditions change.	✓		
VBR	Variable Bitrate, a rate-control method for encoders that uses a dynamic bitrate that changes throughout playback, depending on the level of detail needed. We strongly recommend against using VBR due to video-quality concerns; use CBR instead.	✓	✓	

Term	Description	LL	RT	Chat
View	A unique viewing session which is actively downloading or playing media files. Views are the basis for the concurrent views quota. A view starts when a viewing session begins video playback. A view ends when a viewing session stops video playback. Playback is the sole indicator of viewership; engagement heuristic s such as audio levels, browser tab focus, and video quality are not considered. When counting views, IVS does not consider the legitimacy of individual viewers or try to deduplicate localized viewership, such as multiple video players on a single machine. See Other Quotas in *Service Quotas (Low-Latency Streaming)*.	✓		
Viewer	A person receiving a stream from IVS.	✓		
WebRTC	Web Real-Time Communication, an open-sour ce project providing web browsers and mobile applications with real-time communication. It allows audio and video communication to work inside web pages by allowing direct peer-to-peer communication, eliminating the need to install plugins or download native apps. The technologies behind WebRTC are implement ed as an open web standard and are available as regular JavaScript APIs in all major browsers or as libraries for native clients, like Android and iOS.	✓	✓	

Term	Description	LL	RT	Chat
WHIP	WebRTC-HTTP Ingestion Protocol, an HTTP based protocol that allows WebRTC based ingestion of content into streaming services and/or CDNs. WHIP is an IETF draft developed to standardize WebRTC ingestion. WHIP enables compatibility with software like OBS, offering an alternative (to the IVS broadcast SDK) for desktop publishing. More sophisticated streamers familiar with OBS may prefer it for its advanced production features, such as scene transitions, audio mixing, and overlay graphics WHIP is also beneficial in situations where using the IVS broadcast SDK isn't feasible or preferred . For example, in setups involving hardware encoders, the IVS broadcast SDK might not be an option. However, if the encoder supports WHIP, you can still publish directly from the encoder to IVS. See IVS WHIP Support (Real-Time Streaming).		✓	
WSS	WebSocket Secure, a protocol for establishing WebSockets over an encrypted TLS connection. It is being used for connecting to IVS Chat endpoints . See Step 4: Send and Receive Your First Message in *Getting Started with IVS Chat*.			✓

IVS Document History | Low-Latency Streaming

The following tables describe the important changes to the documentation for Amazon IVS Low-Latency Streaming. We update the documentation frequently, for new releases and to address the feedback that you send us.

Low-Latency Streaming User Guide Changes

Change	Description	Date
Player SDK: Web 1.57.0	Updated version number and artifact links in the player SDK guides: Web, Video.js integration, and JW Player integration. Also see the Release Notes.	October 1, 2026
Player SDK: Android 1.57.0, iOS 1.57.0	Updated version number and artifact links in the player SDK guides: Android and iOS. Also see the Release Notes.	October 1, 2026
Broadcast SDK: Web 1.40.0	Updated version number and artifact links in the low-latency-streaming broadcast SDK guide: Web. Also see the Release Notes.	September 24, 2026
Broadcast SDK: Android 1.47.0, iOS 1.47.0	Updated version number and artifact links in the low-latency-streaming broadcast SDK guides: Android and iOS. Also see the Release Notes.	September 24, 2026
Player SDK: Web 1.56.1	Updated version number and artifact links in the player SDK guides: Web, Video.js integrati	September 8, 2026

	on, and JW Player integration. Also see the Release Notes.	
Player SDK: Web 1.56.0	Updated version number and artifact links in the player SDK guides: Web, Video.js integration, and JW Player integration. Also see the Release Notes.	September 3, 2026
Player SDK: Android 1.56.0, iOS 1.56.0	Updated version number and artifact links in the player SDK guides: Android and iOS. Also see the Release Notes.	September 3, 2026
IVS Broadcast SDK Guide and IVS Player SDK Guide	Removed known issues and workarounds from SDK documentation.	August 31, 2026
Cost Allocation Tags	Added information about using cost allocation tags with Amazon IVS. See Cost Allocation Tags.	August 27, 2026
Broadcast SDK: Web 1.39.0	Updated version number and artifact links in the low-latency-streaming broadcast SDK guide: Web. Also see the Release Notes.	August 27, 2026
Broadcast SDK: Android 1.46.0, iOS 1.46.0	Updated version number and artifact links in the low-latency-streaming broadcast SDK guides: Android and iOS. Also see the Release Notes.	August 27, 2026
Broadcast SDK: Android 1.43.2	Added SDK patch 1.43.2 to the Release Notes.	August 19, 2026

Broadcast SDK: Web 1.38.1	Updated version number and artifact links in the low-latency streaming broadcast SDK guide: Web. Also see the Release Notes.	August 12, 2026
Broadcast SDK: Android 1.43.1	Added SDK patch 1.43.1 to the Release Notes.	August 11, 2026
Player SDK: Web 1.55.0	Updated version number and artifact links in the player SDK guides: Web, Video.js Integration, and JW Player Integration. Also see the Release Notes.	August 6, 2026
Player SDK: Android 1.55.0, iOS 1.55.0	Updated version number and artifact links in the player SDK guides: Android and iOS. Also see the Release Notes.	August 6, 2026
Broadcast SDK: Web 1.38.0	Updated version number and artifact links in the low-latency-streaming broadcast SDK guide: Web. Also see the Release Notes.	July 30, 2026
Broadcast SDK: Android 1.45.0, iOS 1.45.0	Updated version number and artifact links in the low-latency-streaming broadcast SDK guides: Android and iOS. Also see the Release Notes.	July 30, 2026
Player SDK: Web 1.54.1	Updated version number and artifact links in the player SDK guides: Web, Video.js Integration, and JW Player Integration. Also see the Release Notes.	July 21, 2026

Player SDK: Android 1.54.1, iOS 1.54.1	Updated version number and artifact links in the player SDK guides: Android and iOS. Also see the Release Notes.	July 21, 2026
Server-Side Ad Insertion (SSAI)	Updated Server-Side Ad Insertion documentation for post-roll ad breaks.	July 9, 2026
Player SDK: Web 1.54.0	Updated version number and artifact links in the player SDK guides: Web, Video.js Integration, and JW Player Integration. Also see the Release Notes.	July 9, 2026
Player SDK: Android 1.54.0, iOS 1.54.0	Updated version number and artifact links in the player SDK guides: Android and iOS. Also see the Release Notes.	July 9, 2026
Broadcast SDK: iOS 1.44.1	Updated version number and artifact links in the low-latency-streaming broadcast SDK guide: iOS. Also see the Release Notes.	July 7, 2026
Broadcast SDK: Web 1.37.0	Updated version number and artifact links in the low-latency-streaming broadcast SDK guide: Web. Also see the Release Notes.	July 2, 2026
Broadcast SDK: Android 1.44.0, iOS 1.44.0	Updated version number and artifact links in the low-latency-streaming broadcast SDK guides: Android and iOS. Also see the Release Notes.	July 2, 2026

Monitoring Low-Latency Streaming	Added CloudWatch metric information for `ConcurrentStreams` (`StreamerCountryCode`).	June 29, 2026
Player SDK: Web 1.53.0	Updated version number and artifact links in the player SDK guides: Web, Video.js Integration, and JW Player Integration. Also see the Release Notes.	June 11, 2026
Player SDK: Android 1.53.0, iOS 1.53.0	Updated version number and artifact links in the player SDK guides: Android and iOS. Also see the Release Notes.	June 11, 2026
Broadcast SDK: Web 1.36.0	Updated version number and artifact links in the low-latency-streaming broadcast SDK guide: Web. Also see the Release Notes.	June 4, 2026
Broadcast SDK: Android 1.43.0, iOS 1.43.0	Updated version number and artifact links in the low-latency-streaming broadcast SDK guides: Android and iOS. Also see the Release Notes.	June 4, 2026
Player SDK: Web 1.52.1	Updated version number and artifact links in the player SDK guides: Web, Video.js Integration, and JW Player Integration. Also see the Release Notes.	May 28, 2026

Server-Side Ad Insertion (SSAI)	Ad configurations now support up to 3 MediaTail or playback configurations. Added the `aws:ads-playback-config-name` playback token claim for selecting a configuration per viewing session. See Server-Side Ad Insertion and Generate and Sign IVS Playback Tokens. Also see API Reference Changes.	May 18, 2026
Player SDK: Web 1.52.0	Updated version number and artifact links in the player SDK guides: Web, Video.js Integration, and JW Player Integration. Also see the Release Notes.	May 14, 2026
Player SDK: Android 1.52.0, iOS 1.52.0	Updated version number and artifact links in the player SDK guides: Android and iOS. Also see the Release Notes.	May 14, 2026
Broadcast SDK: Web 1.35.0	Updated version number and artifact links in the low-latency-streaming broadcast SDK guide: Web. Also see the Release Notes.	May 7, 2026
Broadcast SDK: Android 1.42.0, iOS 1.42.0	Updated version number and artifact links in the low-latency-streaming broadcast SDK guides: Android and iOS. Also see the Release Notes.	May 7, 2026

Server-Side Ad Insertion (SSAI)	Several low-latency streaming documents were changed:
	• Server-Side Ad Insertion — New document.
	• Using Amazon EventBridge with Amazon IVS — Added an IVS Ad Break State Change event.
	• IVS Service Quotas (Low-Latency Streaming) —
	  • Added call-rate quotas for the new ad-configuration operations.
	  • Added quotas for ad configurations and media tailor playback configurations.
	• Costs — Added section describing AWS Elemental MediaTailor costs.
	
	Also see API Reference Changes.
		April 22, 2026

Player SDK: Web 1.51.0	Updated version number and artifact links in the player SDK guides: Web, Video.js Integration, and JW Player Integration. Also see the Release Notes.	April 16, 2026
Player SDK: Android 1.51.0, iOS 1.51.0	Updated version number and artifact links in the player SDK guides: Android and iOS. Also see the Release Notes.	April 16, 2026

Broadcast SDK: Web 1.34.0	Updated version number and artifact links in the low-latency-streaming broadcast SDK guide: Web. Also see the Release Notes.	April 9, 2026
Broadcast SDK: Android 1.41.0, iOS 1.41.0	Updated version number and artifact links in the low-latency-streaming broadcast SDK guides: Android and iOS. Also see the Release Notes.	April 9, 2026
Player SDK: Web 1.50.0	Updated version number and artifact links in the player SDK guides: Web, Video.js Integration, and JW Player Integration. Also see the Release Notes.	March 19, 2026
Player SDK: Android 1.50.0, iOS 1.50.0	Updated version number and artifact links in the player SDK guides: Android and iOS. Also see the Release Notes.	March 19, 2026
Broadcast SDK: Web 1.33.0	Updated version number and artifact links in the low-latency-streaming broadcast SDK guide: Web. Also see the Release Notes.	March 12, 2026
Broadcast SDK: Android 1.40.0, iOS 1.40.0	Updated version number and artifact links in the low-latency-streaming broadcast SDK guides: Android and iOS. Also see the Release Notes.	March 12, 2026

Player SDK: Web 1.49.0	Updated version number and artifact links in the player SDK guides: Web, Video.js Integration, and JW Player Integration. Also see the Release Notes.	February 19, 2026
Player SDK: Android 1.49.0, iOS 1.49.0	Updated version number and artifact links in the player SDK guides: Android and iOS. Also see the Release Notes. For iOS integration, CocoaPods is no longer used. Related documentation changes were made in iOS Player SDK Guide (in "Getting Started with the IVS iOS Player SDK").	February 19, 2026
Broadcast SDK: Android 1.39.0, iOS 1.39.0	Updated version number and artifact links in the low-latency-streaming broadcast SDK guides: Android and iOS. Also see the Release Notes. For iOS integration, CocoaPods is no longer used. Related documentation changes were made in iOS Broadcast SDK Guide (in "Install the Library").	February 13, 2026
Broadcast SDK: Web 1.32.0	Updated version number and artifact links in the low-latency-streaming broadcast SDK guide: Web. Also see the Release Notes.	February 12, 2026

Setting Up Private Channels	Added "How Session Protection Works."	January 13, 2026
Broadcast SDK: Android 1.38.0, iOS 1.38.0	Updated version number and artifact links in the low-latency-streaming broadcast SDK guides: Android and iOS. Also see the Release Notes.	January 13, 2026
Player SDK: Web 1.48.0	Updated version number and artifact links in the player SDK guides: Web, Video.js Integration, and JW Player Integration. Also see the Release Notes.	December 18, 2025
Player SDK: Android 1.48.0, iOS 1.48.0	Updated version number and artifact links in the player SDK guides: Android and iOS. Also see the Release Notes.	December 18, 2025
Broadcast SDK: Android 1.37.1	Updated version number and artifact links in the low-latency-streaming broadcast SDK guides: Android. Also see the Release Notes.	December 11, 2025
Broadcast SDK: Web 1.31.0	Updated version number and artifact links in the low-latency-streaming broadcast SDK guide: Web. Also see the Release Notes.	December 5, 2025
Broadcast SDK: Android 1.37.0, iOS 1.37.0	Updated version number and artifact links in the low-latency-streaming broadcast SDK guides: Android and iOS. Also see the Release Notes.	December 5, 2025

Player SDK: Web 1.47.0	Updated version number and artifact links in the player SDK guides: Web, Video.js Integration, and JW Player Integration. Also see the Release Notes.	November 20, 2025
Player SDK: Android 1.47.0, iOS 1.47.0	Updated version number and artifact links in the player SDK guides: Android and iOS. Also see the Release Notes.	November 20, 2025
Broadcast SDK: Web 1.30.0	Updated version number and artifact links in the low-latency-streaming broadcast SDK guide: Web. Also see the Release Notes.	October 30, 2025
Broadcast SDK: Android 1.36.0, iOS 1.36.0	Updated version number and artifact links in the low-latency-streaming broadcast SDK guides: Android and iOS. Also see the Release Notes.	October 30, 2025
Player SDK: Web 1.46.0	Updated version number and artifact links in the player SDK guides: Web, Video.js Integration, and JW Player Integration. Also see the Release Notes.	October 23, 2025
Player SDK: Android 1.46.0, iOS 1.46.0	Updated version number and artifact links in the player SDK guides: Android and iOS. Also see the Release Notes.	October 23, 2025
Private Ingest	Expanded the list of supported regions.	October 15, 2025

Broadcast SDK: Web 1.29.0	Updated version number and artifact links in the low-latency-streaming broadcast SDK guide: Web. Also see the Release Notes.	October 2, 2025
Broadcast SDK: Android 1.35.0, iOS 1.35.0	Updated version number and artifact links in the low-latency-streaming broadcast SDK guides: Android and iOS. Also see the Release Notes.	October 2, 2025
Player SDK: Web 1.45.0	Updated version number and artifact links in the player SDK guides: Web, Video.js Integration, and JW Player Integration. Also see the Release Notes. In the Web guide we added Optimizing Background Playback.	September 25, 2025
Player SDK: Android 1.45.0, iOS 1.45.0	Updated version number and artifact links in the player SDK guides: Android and iOS. Also see the Release Notes.	September 25, 2025
CloudWatch Metrics	Added IngestBitrate and IngestFramerate (no dimension) metrics.	September 23, 2025
Embedding metadata	Added Consuming SEI Data.	September 16, 2025

Broadcast SDK: Android 1.34.0, iOS 1.34.0	Updated version number and artifact links in the low-latency-streaming broadcast SDK guides: Android and iOS. Also see the Release Notes. In the Android and iOS Broadcast SDK Guides, we added a Known Issue regarding B-frame enablement.	September 11, 2025
Private Ingest	New document for the release of interface VPC endpoints.	September 10, 2025
Network Requirements	New document.	September 10, 2025
Broadcast SDK: Web 1.28.0	Updated version number and artifact links in the low-latency-streaming broadcast SDK guide: Web. Also see the Release Notes.	September 4, 2025
Player SDK: Web 1.44.0	Updated version number and artifact links in the player SDK guides: Web, Video.js Integration, and JW Player Integration. Also see the Release Notes.	August 28, 2025
Player SDK: Android 1.44.0, iOS 1.44.0	Updated version number and artifact links in the player SDK guides: Android and iOS. Also see the Release Notes.	August 28, 2025

Broadcast SDK: Web 1.27.0	Updated version number and artifact links in the low-latency-streaming broadcast SDK guide: Web. Also see the Release Notes.	August 7, 2025
Broadcast SDK: Android 1.33.0, iOS 1.33.0	Updated version number and artifact links in the low-latency-streaming broadcast SDK guides: Android and iOS. Also see the Release Notes. In the iOS Broadcast Guide, we added "Recommended: Integrate the Player SDK (Swift Package Manager)" and updated the existing information on CocoaPods integration.	August 7, 2025
Player SDK: Web 1.43.0	Updated version number and artifact links in the player SDK guides: Web, Video.js Integration, and JW Player Integration. Also see the Release Notes.	July 31, 2025

Player SDK: Android 1.43.0, iOS 1.43.0	Updated version number and artifact links in the player SDK guides: Android and iOS. Also see the Release Notes. In the iOS Player Guide, we added "Recommended: Integrate the Player SDK (Swift Package Manager)" and updated the existing information on CocoaPods integration.	July 31, 2025
Broadcast SDK: Mixed Devices	Rewrote the previous Mixer Guide to reflect the new API. (*Mixed Devices* is identical in both the IVS Low-Latency Streaming User Guide and the IVS Real-Time Streaming User Guide.)	July 28, 2025
Broadcast SDK: Android 1.32.2	Updated version number and artifact links in the low-latency-streaming broadcast SDK guide: Android. Also see the Release Notes.	July 25, 2025
IAM managed policies	Added entry to Policy Updates table in Managed Policies for Amazon IVS to reflect updates to IVSReadOnlyAccess for the Participant Replication real-time-streaming release.	July 24, 2025

Player SDK: Web 1.42.0	Updated version number and artifact links in the player SDK guides: Web, Video.js Integration, and JW Player Integration. Also see the Release Notes.	July 10, 2025
Player SDK: Android 1.42.0, iOS 1.42.0	Updated version number and artifact links in the player SDK guides: Android and iOS. Also see the Release Notes. For Android, we added Using the SDK with Debug Symbols.	July 10, 2025
Broadcast SDK: Android 1.32.1, iOS 1.32.1	Updated version number and artifact links in the low-latency-streaming broadcast SDK guides: Android and iOS. Also see the Release Notes.	July 10, 2025
Broadcast SDK: Web 1.26.0	Updated version number and artifact links in the low-latency-streaming broadcast SDK guide: Web. Also see the Release Notes.	July 7, 2025
Broadcast SDK: Web 1.25.1	Updated version number and artifact links in the low-latency-streaming broadcast SDK guide: Web. Also see the Release Notes.	June 16, 2025
Broadcast SDK: Web 1.25.0	Updated version number and artifact links in the low-latency-streaming broadcast SDK guide: Web. Also see the Release Notes.	June 12, 2025

Broadcast SDK: Android 1.31.0, iOS 1.31.0	Updated version number and artifact links in the low-latency-streaming broadcast SDK guides: Android and iOS. Also see the Release Notes.	June 12, 2025
Player SDK: Web 1.41.0	Updated version number and artifact links in the player SDK guides: Web, Video.js Integration, and JW Player Integration. Also see the Release Notes.	June 5, 2025
Player SDK: Android 1.41.0, iOS 1.41.0	Updated version number and artifact links in the player SDK guides: Android and iOS. Also see the Release Notes.	June 5, 2025
Broadcast SDK: Android 1.30.1	Updated version number and artifact links in the low-latency-streaming broadcast SDK guide: Android. Also see the Release Notes.	May 26, 2025
Broadcast SDK: Web 1.24.0	Updated version number and artifact links in the low-latency-streaming broadcast SDK guide: Web. Also see the Release Notes.	May 15, 2025
Broadcast SDK: Android 1.30.0, iOS 1.30.0	Updated version number and artifact links in the low-latency-streaming broadcast SDK guides: Android and iOS. Also see the Release Notes.	May 15, 2025
Auto-Record to S3	Updated the list of Notes in Merge Fragmented Streams > Eligibility.	May 12, 2025

Player SDK: Web 1.40.0	Updated version number and artifact links in the player SDK guides: Web, Video.js Integration, and JW Player Integration. Also see the Release Notes.	May 8, 2025
Player SDK: Android 1.40.0, iOS 1.40.0	Updated version number and artifact links in the player SDK guides: Android and iOS. Also see the Release Notes.	May 8, 2025
Broadcast SDK: Web 1.23.1	Updated version number and artifact links in the low-latency-streaming broadcast SDK guide: Web. Also see the Release Notes.	May 2, 2025
Broadcast SDK: Web 1.23.0	Updated version number and artifact links in the low-latency-streaming broadcast SDK guide: Web. Also see the Release Notes.	April 17, 2025
Broadcast SDK: Android 1.29.0, iOS 1.29.0	Updated version number and artifact links in the low-latency-streaming broadcast SDK guides: Android and iOS. Also see the Release Notes.	April 17, 2025
Player SDK: Web 1.39.0	Updated version number and artifact links in the player SDK guides: Web, Video.js Integration, and JW Player Integration. Also see the Release Notes.	April 10, 2025

Player SDK: Android 1.39.0, iOS 1.39.0	Updated version number and artifact links in the player SDK guides: Android and iOS. Also see the Release Notes.	April 10, 2025
Broadcast SDK: Web 1.22.0	Updated version number and artifact links in the low-latency-streaming broadcast SDK guide: Web. Also see the Release Notes.	March 20, 2025
Broadcast SDK: Android 1.28.1, iOS 1.28.1	Updated version number and artifact links in the low-latency-streaming broadcast SDK guides: Android and iOS. Also see the Release Notes.	March 20, 2025
Broadcast SDK: Android 1.27.2, iOS 1.27.2	Updated version number and artifact links in the low-latency-streaming broadcast SDK guides: Android and iOS. Also see the Release Notes.	March 19, 2025
Player SDK: Web 1.38.0	Updated version number and artifact links in the player SDK guides: Web, Video.js Integration, and JW Player Integration. Also see the Release Notes.	March 13, 2025
Player SDK: Android 1.38.0, iOS 1.38.0	Updated version number and artifact links in the player SDK guides: Android and iOS. Also see the Release Notes.	March 13, 2025
Security (CDNs)	In IVS Resilience > Amazon IVS Video Data Plane, updated information on CDNs (Content Delivery Networks).	March 7, 2025

Playback restriction policies	In Getting Started with IVS Low-Latency Streaming > Step 8: Prevent Undesired Content and Viewers, we noted that playback restricti on policies can be used only with public channels. Also, we moved the step-by-s tep instructions for these policies from *Getting Started* to Undesired Content and Viewers > Use Playback Restriction Policies.	March 4, 2025
Setting Up Private Channels	In Token Schema, we added the `maximum-resolution` payload field. This enables manifest filtering by resolutio n for a viewer session, based on viewer entitlements.	March 3, 2025
Broadcast SDK: iOS 1.27.1	Updated version number and artifact links in the low-latency-streaming broadcast SDK guide: iOS. Also see the Release Notes.	March 3, 2025
Broadcast SDK: Web 1.21.0	Updated version number and artifact links in the low-latency-streaming broadcast SDK guide: Web. Also see the Release Notes.	February 20, 2025

Broadcast SDK: Android 1.27.0, iOS 1.27.0	Updated version number and artifact links in the low-latency-streaming broadcast SDK guides: Android and iOS. Also see the Release Notes.	February 20, 2025
Player SDK: Web 1.37.0	Updated version number and artifact links in the player SDK guides: Web, Video.js Integration, and JW Player Integration. Also see the Release Notes.	February 13, 2025
Player SDK: Android 1.37.0, iOS 1.37.0	Updated version number and artifact links in the player SDK guides: Android and iOS. Also see the Release Notes.	February 13, 2025
Broadcast SDK: Android 1.26.0, iOS 1.26.0	Updated version number and artifact links in the low-latency-streaming broadcast SDK guides: Android and iOS. Also see the Release Notes.	January 30, 2025
Broadcast SDK: Web 1.20.0	Updated version number and artifact links in the low-latency-streaming broadcast SDK guide: Web. Also see the Release Notes.	January 23, 2025
Player SDK: Web 1.36.0	Updated version number and artifact links in the player SDK guides: Web, Video.js Integration, and JW Player Integration. Also see the Release Notes.	January 16, 2025

Player SDK: Android 1.36.0, iOS 1.36.0	Updated version number and artifact links in the player SDK guides: Android and iOS. Also see the Release Notes.	January 16, 2025
Player overview	In the introduction, added information on Airplay and a pointer to a new Airplay sample on GitHub.	December 18, 2024
Setting Up Private Channels	In Generate and Sign Playback Tokens, we added an example for generating a token on the backend using Node.js. We also updated the document structure and added details and links in several sections to improve clarity and readability.	December 17, 2024
Broadcast SDK: Web 1.19.0	Updated version number and artifact links in the low-latency-streaming broadcast SDK guide: Web. Also see the Release Notes.	December 12, 2024
Broadcast SDK: Android 1.25.0, iOS 1.25.0	Updated version number and artifact links in the low-laten cy-streaming broadcast SDK guides: Android and iOS. Also see the Release Notes.	December 12, 2024

Player SDK: Web 1.35.0	Updated version number and artifact links in the player SDK guides: Web, Video.js Integration, and JW Player Integration. Also see the Release Notes.	December 6, 2024
Player SDK: Android 1.35.0, iOS 1.35.0	Updated version number and artifact links in the player SDK guides: Android and iOS. Also see the Release Notes.	December 6, 2024
Streaming Configuration	In Channel Types, added audio bitrates and updated audio information.	November 24, 2024

Multitrack video	Many low-latency streaming documents were changed: • Getting Started with IVS Low-Latency Streaming - Updated screenshots in "Step 4: Create a New Channel." Updated "Step 5: Set Up Streaming Software" > "Streaming with OBS Studio using RTMPS." • Monitoring IVS Low-Latency Streaming - Added the `IngestBitrate` metric and added the `Track` dimension to four metrics (`IngestAudioBitrate`, `IngestFramerate`, `IngestVideoBitrate`, `KeyframeInterval`). • Auto-Record to Amazon S3 - In "Thumbnails," mentioned multitrack. • Multitrack Video overview - New document. Under this are two new documents: • • Multitrack Video: Setup Guide • Multitrack Video: Broadcast Software Integration Guide • Using Amazon EventBridge with IVS Low-Latency Streaming - Updated the	November 14, 2024

	Session Ended event (added code). • IVS Service Quotas - Added and modified items for ingest bitrate and ingest resolution. • IVS Streaming Configuration - In "Channel Types," created separate discussions of single-track and multitrack video input. Also see API Reference Changes.	
Broadcast SDK: Android 1.24.0, iOS 1.24.0	Updated version number and artifact links in the low-latency-streaming broadcast SDK guides: Android and iOS. Also see the Release Notes. We also added a new section, "Using Auto-Reconnect," to the Android and iOS Broadcast SDK Guides.	November 13, 2024
Broadcast SDK: Web 1.18.0	Updated version number and artifact links in the low-latency-streaming broadcast SDK guide: Web. Also see the Release Notes.	November 12, 2024

Player SDK: Web 1.34.1	Updated version number and artifact links on the IVS documentation landing page and in the player SDK guides: Web, Video.js Integration, and JW Player Integration. Also see the Release Notes.	October 31, 2024
Player SDK: Android 1.34.0, iOS 1.34.0	Updated version number and artifact links on the IVS documentation landing page and in the player SDK guides: Android and iOS. Also see the Release Notes.	October 31, 2024
Streaming Configuration	In "Encoder Settings > Stream Ingest: Codecs and Ingest Protocols > SRT," we added a link to information on configuring settings. In "Stream Takeover," we updated the URI for SRT streams.	October 22, 2024

Stream Takeover	In Streaming Configuration, we added a section on "Stream Takeover." In Using Amazon EventBridge with Amazon IVS, we added two events: Stream Takeover and Stream Takeover Failure. In Service Quotas, we added a "Stream takeovers" row in Other Quotas. In Troubleshooting, we updated What happens when I switch networks while streaming? to recommend using Stream Takeover when switching between networks.	October 15, 2024
Broadcast SDK: Web 1.17.0	Updated version number and artifact links on the IVS documentation landing page and in the low-latency-streaming broadcast SDK guide: Web. Also see the Release Notes.	October 10, 2024
Broadcast SDK: Android 1.23.0, iOS 1.23.0	Updated version number and artifact links on the IVS documentation landing page and in the low-latency-streaming broadcast SDK guides: Android and iOS. Also see the Release Notes. For Android, we added Using the SDK with Debug Symbols.	October 10, 2024

Player SDK: Web 1.33.0	Updated version number and artifact links on the IVS documentation landing page and in the player SDK guides: Web, Video.js Integration, and JW Player Integration. Also see the Release Notes.	October 3, 2024
Player SDK: Android 1.33.0, iOS 1.33.0	Updated version number and artifact links on the IVS documentation landing page and in the player SDK guides: Android and iOS. Also see the Release Notes.	October 3, 2024
Resources and Support	Added Analytics > Datadog.	October 2, 2024
IAM managed policies	Added entry to Policy Updates table in Managed Policies for Amazon IVS to reflect updates to IVSReadOnlyAccess for two real-time -streaming releases, RTMP Ingest and Generate Participant Tokens with a Key Pair.	September 18, 2024
Broadcast SDK: Web 1.16.0	Updated version number and artifact links on the IVS documentation landing page and in the low-latency-streaming broadcast SDK guide: Web. Also see the Release Notes.	September 11, 2024

Broadcast SDK: Android 1.22.0, iOS 1.22.0	Updated version number and artifact links on the IVS documentation landing page and in the low-latency-streaming broadcast SDK guides: Android and iOS. Also see the Release Notes.	September 11, 2024
Player SDK: Web 1.32.1	Updated version number and artifact links on the IVS documentation landing page and in the player SDK guides: Web, Video.js Integration, and JW Player Integration. Also see the Release Notes.	September 5, 2024
Player SDK: Android 1.32.0, iOS 1.32.0	Updated version number and artifact links on the IVS documentation landing page and in the player SDK guides: Android and iOS. Also see the Release Notes.	September 5, 2024
Broadcast SDK: Web 1.15.0	Updated version number and artifact links on the IVS documentation landing page and in the low-latency-streaming broadcast SDK guide: Web. Also see the Release Notes.	August 15, 2024

Broadcast SDK: Android 1.21.0, iOS 1.21.0	Updated version number and artifact links on the IVS documentation landing page and in the low-latency-streaming broadcast SDK guides: Android and iOS. Also see the Release Notes.	August 15, 2024
Player SDK: Web 1.31.0	Updated version number and artifact links on the IVS documentation landing page and in the player SDK guides: Web, Video.js Integration, and JW Player Integration. Also see the Release Notes.	August 8, 2024
Player SDK: Android 1.31.0, iOS 1.31.0	Updated version number and artifact links on the IVS documentation landing page and in the player SDK guides: Android and iOS. Also see the Release Notes.	August 8, 2024
Broadcast SDK: Web 1.14.0	Updated version number and artifact links on the IVS documentation landing page and in the low-latency-streaming broadcast SDK guide: Web. Also see the Release Notes.	July 18, 2024

Broadcast SDK: Android 1.20.0, iOS 1.20.0	Updated version number and artifact links on the IVS documentation landing page and in the low-latency-streaming broadcast SDK guides: Android and iOS. Also see the Release Notes.	July 18, 2024
Player SDK: Web 1.30.0	Updated version number and artifact links on the IVS documentation landing page and in the player SDK guides: Web, Video.js Integration, and JW Player Integration. Also see the Release Notes.	July 11, 2024
Player SDK: Android 1.30.0, iOS 1.30.0	Updated version number and artifact links on the IVS documentation landing page and in the player SDK guides: Android and iOS. Also see the Release Notes. In *IVS Player SDK*, we updated Native Platforms to change the iOS Supported Version to 13+ and deleted the iOS 12 deprecation notice.	July 11, 2024
Getting Started with IVS	Updated Streaming with OBS Studio using RTMPS to align with OBS Studio v30.2.	June 27, 2024

Broadcast SDK: Web 1.13.0	Updated version number and artifact links on the IVS documentation landing page and in the low-latency-streaming broadcast SDK guide: Web. Also see the Release Notes.	June 13, 2024
Broadcast SDK: Android 1.19.0, iOS 1.19.0	Updated version number and artifact links on the IVS documentation landing page and in the low-latency-streaming broadcast SDK guides: Android and iOS. Also see the Release Notes. In *IVS Broadcast SDK*, we updated "Native Platforms" to change the iOS Supported Version to 13+ and deleted the iOS 12 deprecation notice.	June 13, 2024
Player SDK: Web 1.29.0	Updated version number and artifact links on the IVS documentation landing page and in the player SDK guides: Web, Video.js Integration, and JW Player Integration. Also see the Release Notes.	June 6, 2024
Player SDK: Android 1.29.0, iOS 1.29.0	Updated version number and artifact links on the IVS documentation landing page and in the player SDK guides: Android and iOS. Also see the Release Notes.	June 6, 2024

Broadcast SDK: Web 1.12.0	Updated version number and artifact links on the IVS documentation landing page and in the low-latency-streaming broadcast SDK guide: Web. Also see the Release Notes.	May 20, 2024
Broadcast SDK: Android 1.18.0, iOS 1.18.0	Updated version number and artifact links on the IVS documentation landing page and in the low-latency-streaming broadcast SDK guides: Android and iOS. Also see the Release Notes.	May 16, 2024
Player SDK: Web 1.28.0	Updated version number and artifact links on the IVS documentation landing page and in the player SDK guides: Web, Video.js Integration, and JW Player Integration. Also see the Release Notes.	May 9, 2024
Player SDK: Android 1.28.0, iOS 1.28.0	Updated version number and artifact links on the IVS documentation landing page and in the player SDK guides: Android and iOS. Also see the Release Notes.	May 9, 2024

Broadcast SDK: Web 1.11.0	Updated version number and artifact links on the IVS documentation landing page and in the low-latency-streaming broadcast SDK guide: Web. Also see the Release Notes.	May 6, 2024
Broadcast SDK: Web 1.10.1	Updated version number and artifact links on the IVS documentation landing page and in the low-latency-streaming broadcast SDK guide: Web. Also see the Release Notes.	April 30, 2024
Broadcast SDK: Android 1.15.2, iOS 1.15.2	Updated version number and artifact links on the IVS documentation landing page and in the low-latency-streaming broadcast SDK guides: Android and iOS. Also see the Release Notes.	April 30, 2024
Broadcast SDK: Android 1.17.0, iOS 1.17.0	Updated version number and artifact links for the new release, in the low-latency-streaming broadcast SDK guides: Android and iOS. On the Amazon IVS documentation landing page, updated the broadcast SDK Reference links to point to the new version. Also see the Amazon IVS Release Notes for this release.	April 22, 2024

Player SDK 1.27.0	Updated version number and artifact links for the new release, in the player SDK guides: Web, Android, iOS, Video.js Integration, and JW Player Integration. On the Amazon IVS documentation landing page, updated the player SDK Reference links to point to the new versions. Also see the Amazon IVS Release Notes for this release. In the Web Player Guide, we added more information on “Demos.”	April 11, 2024
SRT additional information	Added SRT information to: • What is IVS Low-Latency Streaming: See the introduction. • Getting Started with IVS Low-Latency Streaming: See "Final Channel Creation" and the introduction to "Step 5: Set Up Streaming Software." • Streaming Configuration: See Stream Ingest: Codecs and Ingest Protocols.	April 10, 2024

Secure Reliable Transport ingest support	IVS now supports H.264-encoded video content using the SRT protocol. In Getting Started With IVS Low-Latency Streaming, in "Step 5: Set Up Streaming Software," we added new sections, "Streaming with OBS Studio using SRT" and "Streaming a Recorded Video with FFmpeg using SRT." Also see API Reference Changes.	April 4, 2024
Getting Started with Low-Latency Streaming	In "Step 6: View Your Live Stream," we added a section on "Viewing with the Amazon IVS Player."	April 4, 2024
Broadcast SDK: Android 1.16.0, iOS 1.16.0, Web 1.10.0	Updated version number and artifact links for the new release, in the low-latency-streaming broadcast SDK guides: Android, iOS, and Web. On the Amazon IVS documentation landing page, updated the broadcast SDK Reference links to point to the new version. Also see the Amazon IVS Release Notes for this release.	March 21, 2024

Player SDK 1.26.0	Updated version number and artifact links for the new release, in the player SDK guides: Web, Android, iOS, Video.js Integration, and JW Player Integration. On the Amazon IVS documentation landing page, updated the player SDK Reference links to point to the new versions. Also see the Amazon IVS Release Notes for this release.	March 14, 2024
Broadcast SDK: Android 1.15.1, iOS 1.15.1	Updated version number and artifact links for the new release, in the low-latency-streaming broadcast SDK guides: Android and iOS. On the Amazon IVS documentation landing page, updated the broadcast SDK Reference links to point to the new version. Also see the Amazon IVS Release Notes for this release.	March 13, 2024
Setting Up Private Channels	In Token Schema, added a note about the maximum number of domains for `access-control-allow-origin` .	March 11, 2024
Monitoring	Changed the unit for `IngestFramerate` from Frames per second to Count/Second.	March 11, 2024

Player SDK: Web 1.25.0	Updated version number and artifact links for the new release, in the player SDK guides: Web, Video.js Integration, and JW Player Integration. On the Amazon IVS documentation landing page, updated the player SDK Reference links to point to the new versions. Also see the Amazon IVS Release Notes for this release.	February 29, 2024
iOS 12 support deprecation for Player and Broadcast SDKs	Added a deprecation notice for iOS 12, in the "Native Platforms" tables of Player SDK overview and Broadcast SDK overview (low-latency streaming).	February 23, 2024
Broadcast SDK: Android 1.15.0, iOS 1.15.0, Web 1.9.0	Updated version number and artifact links for the new release, in the low-latency-streaming broadcast SDK guides: Android, iOS, and Web. On the Amazon IVS documentation landing page, updated the broadcast SDK Reference links to point to the new version. Also see the Amazon IVS Release Notes for this release.	February 22, 2024

IAM managed policies	Added entry to Policy Updates table in Managed Policies for Amazon IVS to reflect updates to IVSReadOnlyAccess for Server-Side Composition, Real-Time Composite Recording, and Tokenless Playback Restrictions.	February 16, 2024
Player SDK: Mobile 1.25.0	Updated version number and artifact links for the new release, in the player SDK guides: Android and iOS. On the Amazon IVS documentation landing page, updated the player SDK Reference links to point to the new versions. Also see the Amazon IVS Release Notes for this release.	February 15, 2024
Service Quotas	In the "API Call Rate Quotas" table, we added `StartViewerSessionRevocation` and `BatchStartViewerSessionRevocation` . (These are not new endpoints but were missing from the table.) They are in the same part of the table as the playback-key-pair endpoints; the **Endpoint Type** is "Private channel."	February 5, 2024

Broadcast SDK: Android 1.14.1, iOS 1.14.1, Web 1.8.0	Updated version number and artifact links for the new release, in the low-latency-streaming broadcast SDK guides: Android, iOS, and Web. On the Amazon IVS documentation landing page, updated the broadcast SDK Reference links to point to the new version. Also see the Amazon IVS Release Notes for this release. For the Android Guide, we added a new Known Issue (video size less than 176x176).	February 1, 2024

Tokenless playback restrictions	This release enables origin enforcement and geofencing outside of playback authorization. Several low-latency streaming documents were changed: • Getting Started - Updated "Step 4: Create a Channel" and "Step 8: Prevent Undesired Content and Viewers." • Service Quotas - Added TPS limits for new endpoints, and in "Other Quotas," added new quotas. • Undesired Content and Viewers - Added “Use Playback Restriction Policies.” • Private Channels - Updated the location of Playback Keys on the console navigation pane. Also see API changes.	January 31, 2024
Audio-only playback	Added Audio-Only Playback to the Player overview.	January 25, 2024

Player SDK 1.24.0	Updated version number and artifact links for the new release, in the player SDK guides: Web, Android, iOS, Video.js Integration, and JW Player Integration. On the Amazon IVS documentation landing page, updated the player SDK Reference links to point to the new versions. Also see the Amazon IVS Release Notes for this release. In the Web guide, we added a new section, "Audio-Only Playback," and deleted the "Known Issue" about lack of support for the `audio-only` rendition.	January 18, 2024
Troubleshooting Auto-Record to Amazon S3	In Troubleshooting, we added a section, Can KMS-S3 encryption be used with auto-record to S3?	January 4, 2024
Broadcast SDK: Android 1.13.4, iOS 1.13.4, Web 1.7.0	Updated version number and artifact links for the new release, in the low-latency-streaming broadcast SDK guides: Android, iOS, and Web. On the Amazon IVS documentation landing page, updated the broadcast SDK Reference links to point to the new version. Also see the Amazon IVS Release Notes for this release.	January 3, 2024

Split out a Chat UG	Major documentation changes accompany this release. We moved chat information from the IVS Low-Latency Streaming User Guide to a new IVS Chat User Guide, located in the existing IVS Chat section of the IVS documentation landing page. For other documentation changes, see Document History (Chat).	December 28, 2023
IVS Glossary	Extended the glossary, covering IVS real-time, low-latency, and chat terms.	December 20, 2023
IAM managed policies	Added two managed policies, IVSReadOnlyAccess and IVSFullAccess. See: • The new section on Managed Policies for Amazon IVS on the *Security* page. • Changes to Step 3: Set Up IAM Permissions in *Getting Started with IVS Low-Latency Streaming*.	December 5, 2023

Broadcast SDK: Android 1.13.2, iOS 1.13.2	Updated version number and artifact links for the new release, in the low-latency-streaming broadcast SDK guides: Android and iOS. On the Amazon IVS documentation landing page, updated the broadcast SDK Reference links to point to the new version. Also see the Amazon IVS Release Notes for this release.	December 4, 2023
Broadcast SDK: Android 1.13.1	Updated version number and artifact links for the new release, in the low-latency-streaming broadcast SDK guide: Android. On the Amazon IVS documentation landing page, updated the broadcast SDK Reference links to point to the new version. Also see the Amazon IVS Release Notes for this release.	November 21, 2023

Broadcast SDK: Android 1.13.0, iOS 1.13.0	Updated version number and artifact links for the new release, in the low-latency-streaming broadcast SDK guides: Android and iOS. On the Amazon IVS documentation landing page, updated the broadcast SDK Reference links to point to the new version. Also see the Amazon IVS Release Notes for this release.	November 17, 2023
Auto-Record to S3	In Merge Fragmented Streams > Eligibility, we added a bullet: "Each stream must start 10 seconds or more after the previous stream."	November 17, 2023
Server-side composition and real-time composite recording	In Enabling Multiple Hosts on an IVS Stream, we added "Broadcasting a Stage: Client-Side versus Server-Side Composition" and updated "4. Broadcast the Stage." In Security, we added S3 endpoints to the policy in "Identity-Based Policy Examples > Use the Amazon IVS Console." For additional changes, see Document History (Real-Time Streaming).	November 16, 2023

Player SDK 1.23.0	Updated version number and artifact links for the new release, in the player SDK guides: Web, Android, iOS, Video.js Integration, and JW Player Integration. On the Amazon IVS documentation landing page, updated the player SDK Reference links to point to the new versions. Also see the Amazon IVS Release Notes for this release.	November 14, 2023
IVS player and broadcast SDKs	In the Player overview and Broadcast SDK overview, we updated Platform Requirements > Native Platforms to clarify which SDK versions are supported.	November 9, 2023
Getting Started with IVS Low-Latency Streaming	We updated procedures in Set Up IAM Permissions.	October 20, 2023

Broadcast SDK: Web 1.6.0	Updated version number and artifact links for the new release, in the low-latency-streaming broadcast SDK guide: Web. The Amazon IVS documentation landing page points to the current version of Broadcast SDK References. Also see the Amazon IVS Release Notes for this release. In the Web Guide, in "Retrieve a MediaStream from a Device," we also deleted the two `max` lines; best practice is to specify only `ideal`.	October 16, 2023
Monitoring IVS Low-Latency Streaming	Renamed the "Monitoring Live Stream Health" page and added information from "Monitoring IVS with CloudWatch" (which has been deleted as a separate page). Updated the CloudWatch console instructions.	October 12, 2023

Broadcast SDK: Android 1.12.1	Updated version number and artifact links for the new release, in the low-latency-streaming broadcast SDK guide: Android. Also added a new section, Using Bluetooth Microphones. On the Amazon IVS documentation landing page, updated the broadcast SDK Reference links to point to the new version. Also see the Amazon IVS Release Notes for this release.	October 12, 2023
Player SDK 1.22.0	Updated version number and artifact links for the new release, in the player SDK guides: Web, Android, iOS, Video.js Integration, and JW Player Integration. On the Amazon IVS documentation landing page, updated the player SDK Reference links to point to the new versions. Also see the Amazon IVS Release Notes for this release.	October 3, 2023
In-console streaming	In *Getting Started with Low-Latency Streaming*, we added in-console streaming to Step 5: Set Up Streaming Software.	October 2, 2023

Broadcast SDK: Mixed Devices	Added Mirroring the Broadcast, with Android and iOS examples.	September 18, 2023
Broadcast SDK: Web 1.5.2	Updated version number and artifact links for the new release, in the low-latency-streaming broadcast SDK guide: Web. The Amazon IVS documentation landing page points to the current version of Broadcast SDK References. Also see the Amazon IVS Release Notes for this release.	September 14, 2023
Undesired Content	Split out existing content from Troubleshooting FAQs into its own top-level page. In Getting Started with IVS Low-Latency Streaming, added "Step 8: Prevent Undesired Content (Recommended)."	September 8, 2023
Auto-Record to Amazon S3	In Byte-Range Playlists, clarified that segment duration is the same as the keyframe interval configured for the stream (not a fixed duration of approximately 2 seconds).	August 25, 2023

Broadcast SDK: Web 1.5.1, Android 1.12.0, and iOS 1.12.0	Updated version number and artifact links for the new release, in the low-latency-streaming broadcast SDK guides: Web, Android, and iOS. On the Amazon IVS documentation landing page, updated the broadcast SDK Reference links to point to the new version. Also see the Amazon IVS Release Notes for this release.	August 23, 2023
Player SDK 1.21.0	Updated version number and artifact links for the new release, in the player SDK guides: Web, Android, iOS, Video.js Integration, and JW Player Integration. On the Amazon IVS documentation landing page, updated the player SDK Reference links to point to the new versions. Also see the Amazon IVS Release Notes for this release.	August 22, 2023
Channel-type definitions	Updated channel-type definitions to provide more detail, especially about rendered transcode ladders. See Channel Types in *IVS Streaming Configuration*.	August 18, 2023

Real-time streaming launch	Major documentation changes accompany this release. We renamed the previous documentation to be IVS Low-Latency Streaming and published new IVS Real-Time Streaming documentation. The IVS documentation landing page now has separate sections for real-time streaming and low-latency streaming. Each section has its own User Guide and API Reference. We moved some information from the IVS Low-Latency User Guide to the new IVS Real-Time User Guide: • Most information about stages and multiple hosts. • Monitoring Stage Health is now Monitoring Real-Time Streaming. For other documentation changes, see: • Stage API Reference Changes • Document History (Real-Time Streaming)	August 7, 2023

Broadcast SDK: Web 1.5.0, Android 1.11.0, and iOS 1.11.0	Updated version number and artifact links for the new release, in the broadcast SDK guides: Web, Android, and iOS. On the Amazon IVS documentation landing page, updated the broadcast SDK Reference links to point to the new version. Also see the Amazon IVS Release Notes for this release.	August 7, 2023
Setting Up Private Channels	In Token Schema, added clarifying information on the `exp` field.	July 31, 2023
Security: getting IVS status information	In Incident Response, updated information on getting IVS status, to point to the AWS Health Dashboard.	July 31, 2023
Auto-Record to Amazon S3: OAC and CORS	In Playback of Recorded Content from Private Buckets, replaced origin access identity (OAI) with origin access control (OAC). Also added information about configuri ng the S3 bucket for CORS, to play back recorded streams.	July 31, 2023
Resources and Support	In "Partner Solutions" > "Face and Background Filters," added a paragraph on Camera Kit.	July 21, 2023

Broadcast SDK: Android Guide	Minor changes. In the introduction, mentioned that there is no support for emulators. In "Create the Player and Set Up Event Listener" changed `PlayerActivity class` to `Activity`. In "Thread Safety" changed the text.	July 21, 2023

R2S3 rendition filtering and thumbnail enhancements	IVS customers can now control what renditions are generated for a stream when recording to Amazon S3 and what resolutions are generated for thumbnails. In the IVS User Guide, see: • Getting Started with IVS – In "Step 4: Create a Channel" > "Console Instructions," we updated screenshots and instructi ons. • Auto-Record to Amazon S3 – In "JSON Metadata Files," we added `latest_th umbnail` and updated `thumbnail` . In "Thumbnai ls" and "Discovering the Renditions of a Recording," we added rendition-resoluti on descriptions. • Costs – In "Storing Recorded Video," we updated screenshots. Also see IVS API Reference Changes.	July 17, 2023

Player SDK 1.20.0	Updated version number and artifact links for the new release, in all player guides: Web, Android, iOS, Video.js Integration, and JW Player Integration. On the Amazon IVS documentation landing page, updated the player SDK Reference links to point to the new versions. Also see the Amazon IVS Release Notes for this release.	July 14, 2023
Getting Started with IVS	In How to Disable Recording, fixed the CLI example.	July 14, 2023
Broadcast SDK: Web 1.4.0, Android 1.10.0, and iOS 1.10.0	Updated version number and artifact links for the new release, in the broadcast SDK guides: Web, Android, and iOS. On the Amazon IVS documentation landing page, updated the broadcast SDK Reference links to point to the new version. Also see the Amazon IVS Release Notes for this release.	July 13, 2023

Viewer session revocation for private channels	IVS customers can now revoke the viewer session associated with an auth token, to prevent and stop playback using that token. For more information, see Setting Up Private Channels: • "Token Schema" – We added `viewer-id` and modified `viewer-session-version` . • "Revoke Viewer Sessions" – New section. Also see IVS API Reference Changes.	June 28, 2023
Security TLS update	In "Infrastructure Security" > "API Calls," updated the TLS version to 1.2 minimum and 1.3 recommended.	June 27, 2023
Broadcast SDK: iOS 1.9.1 and iOS 1.7.5	Updated version number and artifact links for the new release in the broadcast SDK guide: iOS. The Amazon IVS documentation landing page points to the latest version of the Broadcast SDK Reference. Also see the Amazon IVS Release Notes for this release.	June 27, 2023

Broadcast SDK: Web 1.3.3	Updated version number and artifact links for the new release in the broadcast SDK guide: Web. The Amazon IVS documentation landing page points to the latest version of the Broadcast SDK Reference. Also see the Amazon IVS Release Notes for this release.	June 16, 2023

Advanced channel types	Introduced two new channel types, `ADVANCED_SD` and `ADVANCED_HD`. We updated several pages: • Player SDK Overview – In "Reducing Latency in Third-Party Players," noted that the reducing-latency feature isn't required with Advanced streams • Broadcast Web SDK Guide – Changes in "Create an Instance of the AmazonIVS BroadcastClient." • Broadcast Android SDK Guide – Change in "Get Recommended Broadcast Settings." • Broadcast iOS SDK Guide – Change in "Get Recommend ed Broadcast Settings." • Service Quotas – In Other Quotas > IVS, added two rows for "Ingest bitrate" for the new channel types. • Streaming Configuration – Changes in "Channel Types." • Costs – Added the new channel types and mentioned the "Help me choose" tool	June 2, 2023

Broadcast SDK: Android 1.9.0 & iOS 1.9.0	Updated version number and artifact links for the new release, in the broadcast SDK guides: Android and iOS. On the Amazon IVS documentation landing page, updated the broadcast SDK Reference links to point to the new version. In the Broadcast SDK overview, updated supported iOS versions from 11+ to 12+ (for the SDK without stage functionality). In the iOS Guide, added a new section, "How iOS Chooses Camera Resolution and Frame Rate." Also see the Amazon IVS Release Notes for this release.	June 1, 2023
Auto-Record to AmazonS3	In "Example: recording _ended.json," updated the `byte_range_playlist` value from `byte-range-multivariant.m3u8` to `byte-range-variant.m3u8` .	May 25, 2023

Player SDK 1.19.0	Updated version number and artifact links for the new release, in all player guides: Web, Android, iOS, Video.js Integration, and JW Player Integration. On the Amazon IVS documentation landing page, updated the player SDK Reference links to point to the new versions. Also see the Amazon IVS Release Notes for this release.	May 23, 2023
Broadcast SDK: iOS 1.8.1 and iOS 1.7.4	Updated version number and artifact links for the new release in the broadcast SDK guide: iOS. The Amazon IVS documentation landing page points to the latest version of the Broadcast SDK Reference. Also see the Amazon IVS Release Notes for this release.	May 16, 2023

Monitoring stage health	Added Monitoring Stage Health, a new User Guide page for new Amazon IVS functionality. For Stage Health, we also: • Added Health information to Enabling Multiple Hosts on an IVS Stream. • Added two Stage Update events to Using Amazon EventBridge with Amazon IVS. • Added call-rate quotas for the new endpoints to IVS Service Quotas. Note: With the IVS real-time streaming launch on Aug 2, 2023, this document was renamed "Monitoring Amazon IVS Real-Time Streaming" and moved to the new *IVS Real-Time Streaming user Guide*.	May 11, 2023
Stage participant limits	In Service Quotas, deleted the "stage participants" limit. This is superceded by the limits for subscriber and publisher participants.	May 2, 2023

Broadcast SDK: Web 1.3.2	Updated version number and artifact links for the new release in the broadcast SDK guide: Web. The Amazon IVS documentation landing page points to the latest version of the Broadcast SDK Reference. Also see the Amazon IVS Release Notes for this release.	May 1, 2023
RTMP support: documentation errata	Changed Broadcast Android SDK Guide and Broadcast iOS SDK Guide to indicate that these SDKs support only RTMPS ingest (not insecure RTMP ingest).	April 29, 2023
Stage participant limits	This release includes the following changes: • Enabling Multiple Hosts – Updated the maximum number of stage participants from 12 to 1,000. • Service Quotas – Updated the participant limit to 1,000 and added add new limits for subscriber and publisher participants. Changes TPSs for some endpoints.	April 27, 2023

IVS User Guide landing page	On the What is IVS? home page, we added sections for "Multiple Hosts" and "IVS Chat" and updated the section on "Latency."	April 27, 2023
Resources and Support	In "Partner Solutions" > "Face and Background Filters," updated the DeepAR link.	April 25, 2023
Resources and Support	Added a section on Partner Solutions.	April 17, 2023
Player SDK: Web Guide	In "Known Issues and Workarounds," added an issue (the Web Player does not support the `audio_only` rendition).	April 17, 2023
Streaming Configuration	In Closed Captioning, added a link to a new blog post on captioning.	April 14, 2023

Broadcast Web SDK Guide	Made miscellaneous updates: • In “Create an Instance of the AmazonIVSBroadcast Client,” added a note about making sure your client-side configuration aligns with the back-end channel type. • In “Hide Video” code examples, changed `VIDEO_DEVICE_NAME` to `VIDEO_DEVICE_NAME.source`. • In “Enabling Multiple Hosts,” changed `ConnectionState` references to `StageConnectionState`. • In “Add Multiple Hosts with the Broadcast SDK” and “Known Issues,” synchronized information here and on GitHub.	April 10, 2023
Streaming Configuration	In Video Settings, added a ColorSpace bullet.	April 5, 2023
Enabling Multiple Hosts	In Set Up the AWS CLI, changed the stage namespace from `ivsrealtime` to `ivs-realtime`.	April 5, 2023

Player SDK 1.18.0	Updated version number and artifact links for the new release, in all player guides: Web, Android, iOS, Video.js Integration, and JW Player Integration. On the Amazon IVS documentation landing page, updated the player SDK Reference links to point to the new versions. Also see the Amazon IVS Release Notes for this release.	April 4, 2023
RTMP support	In several documents, indicated that both RTMP (insecure ingest) and RTMPS are now supported. Among other things, this affects the ingest endpoint; see Set Up Streaming Software, Broadcast Android SDK Guide, and Broadcast iOS SDK Guide.	March 30, 2023
Setting Up Private Channels	In Generate and Sign Playback Tokens, added to the payload an optional field, `single-use-uuid` , for generating a single-use token.	March 29, 2023

Broadcast SDK: Web 1.3.1	Updated version number and artifact links for the new release, in the broadcast SDK guide: Web. On the Amazon IVS documentation landing page, updated the broadcast SDK Reference links to point to the new version. Also see the Amazon IVS Release Notes for this release.	March 28, 2023
Support for multiple hosts on a stream	Added a new page, Enabling Multiple Hosts on an IVS Stream. And in Service Quotas, added "Amazon IVS Stage" endpoints and added stage limits to Other Quotas > Amazon IVS. Also see Stage API Reference Changes.	March 23, 2023

Broadcast SDK: Android 1.8.0, iOS 1.8.0, and Web 1.3.0	Updated version number and artifact links for the new release, in the broadcast SDK guides: Android, iOS, and Web. On the Amazon IVS documentation landing page, updated the broadcast SDK Reference links to point to the new version. In the Broadcast SDK overview, added stage platform requirements. Also see the Amazon IVS Release Notes for this release.	March 23, 2023
Web Broadcast SDK	In Known Issues and Workarounds, added an issue: viewers of a Safari broadcast sometimes see green artifacts in the video feed.	March 17, 2023
Broadcast SDK: Android 1.7.3	Updated version number and artifact links for the new release, in the broadcast SDK guide: Android. On the Amazon IVS documentation landing page, updated the broadcast SDK Reference link to point to the new version. Also see the Amazon IVS Release Notes for this release.	March 2, 2023

Player SDK 1.17.0	Updated version number and artifact links for the new release, in all player guides: Web, Android, iOS, Video.js Integration, and JW Player Integration. On the Amazon IVS documentation landing page, updated the player SDK Reference links to point to the new versions. Also see the Amazon IVS Release Notes for this release.	February 28, 2023
Service Quotas	Clarified that all quotas are enforced per region.	February 24, 2023
Troubleshooting FAQs	In "Use Private Channels," clarified the use of private channels to prevent undesirable content. In "Broadcasting and Encoding," added two subsections on troubleshooting an IVS Web Broadcast SDK session and using Chrome WebRTC-internals.	February 17, 2023
Byte-range tags and manifest files for auto-record to S3	In Auto-Record to Amazon S3, updated "Recording Contents, " added "Byte-Range Playlists " and new fields in JSON examples for `recording_started` and `recording_ended`.	February 16, 2023

Getting Started with IVS Chat	In the beginning, say that IVS Chat also can be used on its own, without a video stream. See Getting Started with IVS Chat in the *Amazon IVS Chat User Guide*.	February 9, 2023
Troubleshooting FAQs	Added a new section on Undesirable Content. Sept 8, 2023 update: This section was moved to Undesired Content.	February 6, 2023
Player SDK overview	In Browser & Platform Requirements, added a note that the Web SDK Video.js and Player JW integrations are not supported in browser-like environments.	February 6, 2023
Auto-Record to Amazon S3	In the Eligibility requirements for merge fragmented streams, changed the required bitrate difference from 10% to 50%.	February 6, 2023
Streaming configuration	Revised Stream with the Amazon IVS Broadcast SDK to include the Web Broadcast SDK (not just Android and iOS).	February 2, 2023

IVS Chat Client Messaging SDK: Android 1.1.0	Updated version number and artifact links for the new release, in the Chat SDK Guide: Android. The Amazon IVS documentation landing page points to the current version of the SDK Reference. Also see the Amazon IVS Release Notes for this release. This release includes an extensive Chat Kotlin Coroutines tutorial, split into two parts: • Part 1: Chat Rooms • Part 2: Messages and Events	January 31, 2023
Chat Android SDK tutorial	Added an extensive Android tutorial for the Chat Client Messaging SDK. The tutorial is split into two parts: • Part 1: Chat Rooms • Part 2: Messages and Events	January 24, 2023

Service Quotas	Increased some Chat quotas: • TPS for CreateChatToken, DeleteMessage, DisconnectUser, and SendEvent Rooms • Other Quotas: concurrent chat connections; rate of DeleteMessage, DisconnectUser, and SendMessage requests; rate of messaging requests per connection; and Rooms	January 19, 2023
Private Channels	In Token Schema, added the `strict-origin-enforcement` field to the token payload.	January 17, 2023
Player SDK 1.16.0	Updated version number and artifact links for the new release, in all player guides: Web, Android, iOS, Video.js Integration, and JW Player Integration. On the Amazon IVS documentation landing page, updated the player SDK Reference links to point to the new versions. Also see the Amazon IVS Release Notes for this release.	January 17, 2023

Chat React & React Native Best Practices	Added this new Chat page. Note: On December 28, 2023, this document was moved to the new *IVS Chat User Guide*.	January 13, 2023
Chat React Native SDK tutorial	Added an extensive React Native tutorial for the Chat Client Messaging SDK. The tutorial is split into two parts: • Part 1: Chat Rooms • Part 2: Messages and Events	January 10, 2023
Troubleshooting	Added a new Troubleshooting FAQs page, describing best practices and troubleshooting tips.	January 6, 2023
Added timestamp to record-to-S3 manifest files	Added a timestamp to S3 manifest files created by the auto-record to S3 feature. See the Amazon IVS Release Notes.	December 9, 2022
Player SDK latency	Added Reducing Latency in Third-Party Players.	December 8, 2022
Broadcast Web SDK Guide	Added content (previously only on GitHub) to this page.	December 8, 2022

Broadcast SDK: Android 1.7.2	Updated version number and artifact links for the new release, in the broadcast SDK guide: Android. On the Amazon IVS documentation landing page, updated the broadcast SDK Reference link to point to the new version. Also see the Amazon IVS Release Notes for this release.	December 6, 2022
IVS setup	In IVS Getting Started, updated steps to create an AWS account and set up permissions. Added "Step 2: Set Up Root and Administr ative Users." In Security, made minor changes to the beginning of the IAM section.	December 5, 2022
Chat: setup and iOS SDK tutorial	In Getting Started with IVS Chat, updated and renamed "Initial Setup." Added a Chat iOS Tutorial page to the User Guide, pointing to an existing tutorial on GitHub.	December 5, 2022
Costs for Auto-Record to S3	In Auto-Record to Amazon S3, clarified costs.	December 2, 2022

Chat JavaScript SDK tutorial	Added an extensive JS tutorial for the Chat Client Messaging SDK. The tutorial is split into two parts: • Part 1: Chat Rooms • Part 2: Messages and Events	December 2, 2022
Web Player known issue	In the Player Web SDK Guide, we added a Known Issue and Workaround: when playing a muted live stream on an iOS mobile browser, player instability may be seen when resuming an inactive player tab.	November 18, 2022
Setting Up Private Channels	In "Create or Import a Playback Key," reorganized content and clarified use of private and public keys. In "Generate and Sign Playback Tokens," clarified that you do not have to enter the public key in jwt.io.	November 18, 2022

Chat Logging	Initial release of this new functionality. See these User Guide changes: • Chat Logging – New page. • Getting Started with Chat – Updated IAM permissions and added procedures for setting up chat logging. • Service Quotas – Added limits for new endpoints and logging configurations. • Cloudwatch – Added log-destination metrics. Oct 12, 2023 update: This CloudWatch document was deleted and the content was moved to Monitoring IVS Low-Latency Streaming. Dec 28, 2023 update: Chat-related CloudWatch content was moved to Monitoring Amazon IVS Chat.	November 17, 2022

Chat Client Messaging SDK: JavaScript 1.0.2	Updated version number and artifact links for the new release, in the Chat SDK guide: JavaScript. The Amazon IVS documentation landing page points to the current version of the SDK Reference. Also see the Amazon IVS Release Notes for this release.	November 9, 2022
Split-view on live channels (for monitoring live stream health)	In Access Stream Session Data, added console instructions for accessing the new split view. This is a faster way to get session health data, right from the "Live channels" page.	November 8, 2022
Resources and Support	Added a link to IVS blogs on the DEV community site.	November 7, 2022
Auto-Record to Amazon S3	In "Merge Fragmented Streams" > "Eligibility," deleted the redundant bullet, "Source video quality must be the same."	November 7, 2022

Player SDK 1.14.0	Updated version number and artifact links for the new release, in all player guides: Web, Android, iOS, Video.js Integration, and JW Player Integration. On the Amazon IVS documentation landing page, updated the player SDK Reference links to point to the new versions. Also see the Amazon IVS Release Notes for this release.	November 1, 2022
Player SDK: Web Guide	Updated Working with Content Security Policy, to reflect the fact that newer versions of all browsers have been updated to deal with new CSP rules. Deleted old sections on "Hosting Assets on the Same Origin" and "Hosting Assets on a Separate Origin."	October 27, 2022
Getting Started with Amazon IVS Chat	Updated and clarified Step 3, formerly "Authenticate and Authorize Chat Clients," now Create a Chat Token.	October 27, 2022
Player SDK: Web Guide	In “Sample Code,” added quotes around `PLAYBACK_URL` and clarified that it should be replaced with a URL string.	October 24, 2022

Chat Client Messaging SDK: JavaScript Guide	Added a new section, React Native Support.	October 24, 2022
IVS Chat Client Messaging SDK: JavaScript 1.0.1	Initial release of this new SDK. See Amazon IVS Chat Client Messaging SDK in the *IVS User Guide*. The Amazon IVS documentation landing page points to the current version of the SDK References. Also see the Amazon IVS Release Notes for this release.	October 18, 2022
Broadcast SDK: iOS 1.7.1	Updated version number and artifact links for the new release, in the broadcast SDK guide: iOS. On the Amazon IVS documentation landing page, updated the broadcast SDK Reference links to point to the new version. Also see the Amazon IVS Release Notes for this release.	October 6, 2022
Web Player SDK 1.13.0 Release Notes	Added a known issue to the Release Notes for Web Player 1.13.0, about the Sawmill Enabled log.	September 27, 2022

Broadcast SDK 1.7.0 release	Updated version number and artifact links for the new release, in the broadcast SDK guide: Android, iOS. On the Amazon IVS documentation landing page, updated the broadcast SDK Reference links to point to the new version. Also see the Amazon IVS Release Notes for this release.	September 22, 2022
Player 1.13.0 release	Updated version number and artifact links for the new release, in all player guides: Web, Android, iOS, Video.js Integration, and JW Player Integration. On the Amazon IVS documentation landing page, updated the player SDK Reference links to point to the new versions. Also see the Amazon IVS Release Notes for this release.	September 20, 2022

Broadcast SDK: iOS 1.5.2	Updated version number and artifact links for the new release, in the broadcast SDK guide: iOS. The Amazon IVS documentation landing page points to the current version of Broadcast SDK References. Also see the Amazon IVS Release Notes for this release.	September 12, 2022
IVS Chat Client Messaging SDK: Android 1.0.0 and iOS 1.0.0	Initial release of these new SDKs. See Amazon IVS Chat Client Messaging SDK in the *IVS User Guide*. The Amazon IVS documentation landing page points to the current version of the SDK References. Also see the Amazon IVS Release Notes for this release. We updated Getting Started with Amazon IVS Chat with links to various demos (including a backend server app that demonstrates token generation) and sample code for deleting a chat message.	September 8, 2022

Monitoring Amazon IVS with Amazon CloudWatch	For some Amazon IVS metrics with the `Channel` dimension , we corrected the description. Channel values are not ARNs (as previously stated). They are the channel's `resource-id` , which is the last part of an ARN. Oct 12, 2023 update: This CloudWatch document was deleted and the content was moved to Monitoring IVS Low-Latency Streaming.	September 2, 2022
Resources and Support	Added a new page to the Amazon IVS User Guide. This points to additional informati on about, and support for, Amazon IVS.	September 1, 2022

Merge fragmented streams	Initial release of this new functionality. See these documentation changes: • Getting Started with Amazon IVS – Updated console and CLI instructions in Step 3: Create a Channel with Optional Recording. • Auto-Record to S3 – Added Merge Fragmented Streams • EventBridge – Added `recording_session_id` and `recording_session_stream_ids` fields to Examples: Recording State Change.	August 30, 2022
Monitoring Live Stream Health	In Filter Streams by Health, corrected the CLI example: changed `filter-by name` to `filter-by health`.	August 17, 2022

Expand BASIC channel	The maximum resolution and bitrate for BASIC channels have changed. Resolution can be up to 1080p and bitrate can be up to 1.5 Mbps for 480p and up to 3.5 Mbps for resolutions between 480p and 1080p. See these documentation changes: • *Getting Started with IVS* – Updated the screenshot in Initial channel setup. • *Streaming Configuration* – Updated definitions in Channel Types. • *Costs* – Updated channel definitions in Live Video. • *Service Quotas* – In Other Quotas, updated IVS information for Ingest bitrate & Ingest resolution, for BASIC channels.	August 16, 2022
Player SDK 1.12.0 release: Web	Updated version numbers and artifact links for the new release in Player guides: Web, Video.js Integration, and JW Player Integration. The Amazon IVS documentation landing page points to the current version of Player SDK References. Also see the Amazon IVS Release Notes for this release.	August 9, 2022

Broadcast SDK: iOS 1.5.1	Updated Release Notes for the July 28 release: added a fixed item (memory leak).	August 8, 2022
Auto-Record to Amazon S3	In JSON Metadata Files, added notes for `recording_started_at` and `recording_ended_at`, about using `duration_ms` to determine the duration of a recording.	August 8, 2022
Amazon IVS Broadcast SDK: Web	Updated (here and in Release Notes) the July 21 entry for this release, by deleting the 1.0.0 version number and adding a note that documentation for future releases will be updated only on GitHub.	August 4, 2022
Clarify console instructions	Noted that you click the hamburger icon to open the nav pane only if the pane is collapsed. This occurs in three places: • IVS Getting Started – "Step 5: View Your Live Stream" • Monitoring Live Streams – "Access Stream Session Date" & "Filter Streams by Health"	August 3, 2022

Broadcast SDK release: iOS 1.5.1	Updated version number and artifact links for the new release, in the broadcast SDK guide: iOS. The Amazon IVS documentation landing page points to the current version of Broadcast SDK References. Also see the Amazon IVS Release Notes for this release.	July 28, 2022
Amazon IVS Broadcast SDK: Web	Initial release of the Web broadcast SDK. See the documentation under "Amazon IVS Broadcast SDK" on the Amazon IVS documentation landing page. Also updated Streaming with Amazon IVS Broadcast SDK in *Getting Started with Amazon IVS*. **Important:** For future releases, documentation will be updated only on GitHub: https://aws.github.io/amazon-ivs-web-broadcast/ (not here).	July 21, 2022

IVS Chat metric	Monitoring Amazon IVS with Amazon CloudWatch – A metric (`Deliveries`) was added for IVS Chat. Oct 12, 2023 update: This CloudWatch document was deleted and the content was moved to Monitoring IVS Low-Latency Streaming.	July 15, 2022
Player SDK release: iOS 1.8.3	Updated version number and artifact links for the new release, in the iOS Player Guide. The Amazon IVS documentation landing page points to the current version of Player SDK References.	July 14, 2022
Estimate data use screenshot	In Costs, the screenshot for "Estimate data use" was updated: the "audio" rendition is no longer provided.	June 30, 2022

Player SDK 1.11.0 release: Web	Updated version number and artifact links for the new release, in Player guides: Web, Video.js Integration, and JW Player Integration. On the Amazon IVS documentation landing page, updated the player SDK Web Reference link to point to the new version. Also see the Amazon IVS Release Notes for this release. In the Player SDK: Web Guide, we deleted two items from "Known Issues and Workaroun ds" which no longer apply: • When playing recorded content on an iOS mobile browser using the Video.js integration, the replay button does not work properly. • When playing a live stream on a Google Pixel 4 or 4a mobile browser, playback may stop unexpectedly.	June 28, 2022

Broadcast SDK 1.5.0 release	Updated version number and artifact links for the new release, in the broadcast SDK guide: Android, iOS. On the Amazon IVS documentation landing page, updated the broadcast SDK Reference links to point to the new version. Also see the Amazon IVS Release Notes for this release.	June 22, 2022
Streaming ingest configuration	In Stream Ingest: Codecs, RTMPS, and Port 443, clarified terminology: you specify an IVS *ingest server* (which includes port 443 in the path).	June 20, 2022
Service Quotas	For IVS Chat quotas, added quota for "rate of SendMessage requests per room" and clarified that the existing rate quota for SendMessage requests applies across all your rooms.	June 14, 2022

Ingest server format	In Getting Started with Amazon IVS, updated the screenshot in "Final Channel Creation" to show the current format of **Ingest server** (with port 443 and path /app/). Updated instructions in "Streaming with OBS Studio" and "Streaming a Recorded Video with FFmpeg."	June 14, 2022
Player SDK 1.10.0 release: Web and Android	Updated version number and artifact links for the new release, in Player guides: Web, Android, Video.js Integration, and JW Player Integration. On the Amazon IVS documentation landing page, updated the player SDK Reference links to point to the new versions. Also see the Amazon IVS Release Notes for this release.	May 24, 2022
Service Quotas	Added call-rate quotas for GetStreamSession and ListStreamSessions. (These IVS endpoints were added previously, when Stream Health was launched.)	May 16, 2022

iOS Player Guide	In "Known Issues and Workarounds," deleted a bullet about iOS 10, which is no longer supported: • iOS 10 devices may experience a crash when returning from background. **Workaround:** Set the layer's `player` property to `nil` before entering the background.	May 10, 2022
Broadcast SDK: Custom Image Sources	Added a bullet for a new CIFilter implementation in the sample iOS app.	May 10, 2022
Web Player Guide	In "Content Security Policy," added domains for video streams from third-party CDNs (`*.akamaized.net` and `*.ext.cloudfront.live.hls.ttvnw.net`).	April 29, 2022
Video.js Player Guide	In "Events," deleted `MetadataEventType` (which is no longer available) from the list of allowable `event` values.	April 29, 2022
Security policy updates	In Identity-Based Policy Examples, changed the console policy (added Chat, lambda, and Amazon CloudWatch) and the introductory text to it.	April 29, 2022

Private channels	In Generate and Sign Playback Tokens, specified that the `exp` timestamp value in the **payload** field of the token schema is UTC.	April 29, 2022
OBS Studio setup	IVS Getting Started – In Streaming with OBS Studio, clarified how to specify the server and stream key, and added steps to set video resolution, bitrate, and keyframe interval.	April 29, 2022

Stream Health updates	Monitoring Amazon IVS Live Stream Health – In "Console Instructions," noted that charts of the high-resolution CloudWatch metrics are available in the stream session details pages. In "Filter Streams by Health," added "CloudWatch Health Dimension for ConcurrentStreams." Monitoring Amazon IVS with Amazon CloudWatch – A new dimension (`Health`) was added to the `ConcurrentStreams` metric, to filter the results by channel health. Oct 12, 2023 update: This CloudWatch document was deleted and the content was moved to Monitoring IVS Low-Latency Streaming.	April 28, 2022

Amazon IVS Chat	Initial release of this new functionality. New and updated information is accessible from the Amazon IVS documentation landing page: • Getting Started with Amazon IVS Chat -- New page (in the *Amazon IVS Chat User Guide*). • Chat Message Review Handler – New page (in the *Amazon IVS Chat User Guide*). • Monitoring Amazon IVS with Amazon CloudWatch -- Added new metrics and a new namespace for chat. Oct 12, 2023 update: This CloudWatch document was deleted and the content was moved to Monitoring IVS Low-Latency Streaming. Dec 28, 2023 update: Chat-related CloudWatch content was moved to Monitoring Amazon IVS Chat. • Security -- In "Data Protection," added chat bullets. In "Identity and Access Managemen t," added a section on "Resource-Based Policy for Amazon IVS Chat." In	April 26, 2022

"Infrastructure Security, " added a section on "Amazon IVS Chat."

- Service Quotas -- In "Service Quota Increases ," updated which quotas are adjustable. Merged two sections into "Other Quotas." Added chat information in "API Call Rate Quotas," "Other Quotas," and "Service Quotas Integration with CloudWatch Usage Metrics."
- On the Amazon IVS documentation landing page, added an *Amazon IVS Chat* section with two API reference documents. See IVS Chat API Documentation Changes (a new section of this page).

  Dec 28, 2023 update: We moved chat-related information to the new IVS Chat User Guide. For other documentation changes see Document History (Chat).

iOS Player 1.8.2 release	Updated version number and artifact links for the new release, in the iOS Player Guide. On the Amazon IVS documentation landing page, updated the iOS Player SDK Reference link to point to the new version.	April 22, 2022
Manual SDK installation	In the "Getting Started" > "Install the Library" section of Broadcast SDK: Android and Player: Android Guide, added a sentence about installing manually.	April 19, 2022
Broadcast SDK 1.4.0 release	Updated version number and artifact links for the new release, in the broadcast SDK guide: Android, iOS. Added a new page on Broadcast SDK: Custom Image Sources. On the Amazon IVS documentation landing page, updated the broadcast SDK Reference links to point to the new version. Also see the Amazon IVS Release Notes for this release.	April 19, 2022

iOS Player 1.8.1 release	Updated version number and artifact links for the new release, in the iOS Player Guide. On the Amazon IVS documentation landing page, updated the iOS Player SDK Reference link to point to the new versions.	March 31, 2022
Device support for Android player	In the Android Player Guide, clarified which native Android devices are supported (phones and tablets). In the Player overview, added a Supported Devices table column in the "Native Platform" section.	March 23, 2022
Using Amazon EventBridge with Amazon IVS	Modified the Session Ended event and updated its description. Also clarified the event descriptions of Session Created and Stream End.	March 18, 2022
Player Video.js Integration	In "Setup with Script Tag," step 1, added a closing `</script>` to the example.	March 4, 2022

Broadcast SDK 1.3.0 release	Updated version number and artifact links for the new release, in the broadcast SDK guide: Android, iOS. On the Amazon IVS documentation landing page, updated the broadcast SDK Reference links to point to the new version. Also see the Amazon IVS Release Notes for this release.	March 3, 2022
Player 1.8.0 release	Updated version number and artifact links for the new release, in all player guides: Web, Android, iOS, Video.js Integration, and JW Player Integration. On the Amazon IVS documentation landing page, updated the player SDK Reference links to point to the new versions. Also see the Amazon IVS Release Notes for this release.	March 1, 2022
Using Amazon EventBridge with Amazon IVS	For the Recording End Failure event, added an example failure case: the attempt to write a master playlist fails.	February 10, 2022

Using Amazon EventBridge with Amazon IVS	For the Recording Start event, added a note that it takes awhile before manifest files and video segments are written.	February 9, 2022
Broadcast SDK: Android 1.2.1 release	Updated version number and artifact links for the new release, in the broadcast SDK guide: Android. On the Amazon IVS documentation landing page, updated the broadcast SDK Reference link to point to the new version. Also see the Amazon IVS Release Notes for this release.	February 3, 2022
React Native wrapper for Player SDK	In the Player Android Guide and Player iOS Guide, added a link to GitHub code and documentation for the new React Native wrapper.	January 27, 2022
React Native wrapper for Player SDK	In the Player Android Guide and Player iOS Guide, added a link to GitHub code and documentation for the new React Native wrapper.	January 27, 2022
Web Player CSP change	In "Hosting Assets on a Separate Origin," add information for Chrome.	January 25, 2022

Setting Up Private Channels	In "Token Schema," added information about support for multiple domains and wildcard domains in the `access-control-allow-origin` token-payload field.	January 24, 2022
Web Player 1.7.0 Release Notes	In the Release Notes, updated the bullet on `setInitialBufferDuration()` to say it does **not** work on iOS mobile browsers.	January 21, 2022
Player 1.7.0 release	Updated version number and artifact links for the new release, in all player guides: Web, Android, iOS, Video.js Integration, and JW Player Integration. On the Amazon IVS documentation landing page, updated the player SDK Reference links to point to the new versions. Also see the Amazon IVS Release Notes for this release.	January 20, 2022

R2S3 thumbnail configuration release	In *Getting Started with Amazon IVS*, we updated Step 3: Create a Channel with Optional Recording. In Auto-Record to Amazon S3, we added a note to "Recordin g Contents" about modifying the `thumbnails` folder, added a new "Thumbnai ls" section, and changed the information about the `thumbnails` and `path` fields in "JSON Metadata Files."	January 18, 2022
Android Player Guide	In "Install the Library," deleted the `jcenter()` line, as JCenter is deprecated.	January 7, 2022
iOS Player	Added a "Known Issue" about the player crashing when testing against the arm64e architecture.	December 20, 2021
Broadcast SDK 1.2.0 release	Updated version number and artifact links for the new release, in all broadcast SDK guides: Android, iOS. On the Amazon IVS documentation landing page, updated the broadcast SDK Reference links to point to the new versions. Also see the Amazon IVS Release Notes for this release.	December 9, 2021

Using Amazon EventBridge with Amazon IVS	Expanded the descriptions of stream/session start/create/end events and added usage suggestions.	December 3, 2021
Streaming Configuration	For streaming from Android and iOS, replaced the information on Larix Broadcaster with a pointer to documentation on the Amazon IVS broadcast SDK.	November 24, 2021
Broadcasting: SDK for Android Guide	Added an issue for Android 5/6/7 devices, which can use only the system's default microphone, hence cannot receive the broadcast SDK's `onDeviceAdded` and `onDeviceRemoved` callbacks for microphones.	November 24, 2021
Player 1.6 release	Updated version number and artifact links for the new release, in all player guides: Web, Android, iOS, Video.js Integration, and JW Player Integration. On the Amazon IVS documentation landing page, updated the player SDK Reference links to point to the new versions. Also see the Amazon IVS Release Notes for this release.	November 23, 2021

Amazon IVS Player	At the end of the introductory text, added a paragraph about casting support and a pointer to Amazon IVS Broadcast SDK documentation.	November 23, 2021

Monitoring Amazon IVS Live Stream Health	New User Guide page for new Amazon IVS functionality. For Stream Health, we also: • Updated the IAM policy in "Step 2: Set up IAM Permissions" of Getting Started with Amazon IVS: added three IVS permissions (`GetStream`, `GetStreamSession`, `ListStreamSessions`) and `cloudwatch:GetMetricData`. • Added four high-resolution metrics to Monitoring Amazon IVS with Amazon CloudWatch: `IngestAudioBitrate`, `IngestFramerate`, `IngestVideoBitrate`, and `KeyframeInterval`. Oct 12, 2023 update: This CloudWatch document was deleted and the content was moved to Monitoring IVS Low-Latency Streaming. • Added two events to Using Amazon EventBridge with Amazon IVS: Session Created and Session Ended.	November 18, 2021
Using Amazon EventBridge with Amazon IVS	Updated the description of the Recording Start event.	November 5, 2021

Broadcasting: SDK for iOS Guide	Add a "Known Issue" for AirPods connected to an iOS 12 device.	November 4, 2021
Stream with FFmpeg	In *Streaming Configuration*, clarified that FFmpeg can be used with many OSs/devices (not just Windows Desktop) and fixed the format of the example in the Webcam bullet.	November 3, 2021

Broadcast SDK (Android and iOS) 1.1.0 release	Updated version number and artifact links for the new release, in broadcast SDK guides: Android and iOS. In Android, there are new `setPosition` coordinates in "Create a Broadcast Configuration." In iOS, there is a new advanced use case ("Use Background Video"), slot-position changes in "Create a Broadcast Configuration," and a new "Known Issue." On the Amazon IVS documentation landing page, updated the broadcast SDK Reference links to point to the new versions. Added a new page, Broadcast SDK: Mixed Devices, to the documentation for this feature. Also see the Amazon IVS Release Notes for this release.	October 20, 2021
Setting Up Private Channels	In "Token Schema," updated `access-control-allow-origin` definition to refer to "origin" instead of "domain."	October 11, 2021

Android Player 1.5.1 release	Bug-fix release; see Amazon IVS Release Notes. Also updated version-number references in links and text in the Android Player Guide.	September 29, 2021
Player 1.5.0 release	Updated version number and artifact links for the new release, in all player guides: Web, Android, iOS, Video.js Integration, and JW Player Integration. On the Amazon IVS documentation landing page, updated the player SDK Reference links to point to the new versions. Also see the Amazon IVS Release Notes for this release.	September 28, 2021
Streaming Configuration	In "Audio Settings," specified a minimum bitrate, 96 Kbps.	September 22, 2021
Getting Started with Amazon IVS	In "Step 4: Set Up Streaming Software," added a note about disconnecting if no data is sent for 30 seconds.	September 20, 2021
Identity-based policy example	In Amazon IVS Security, fixed a typo in the example in Access an Amazon IVS Channel: added ending punctuation (}]}).	September 17, 2021

SDK sizes for Player 1.4.1 and 1.4.0	In the Release Notes for Player 1.4.1 and 1.4.0, we made corrections to the tables of mobile SDK sizes.	September 16, 2021
Player 1.4.1 release	Bug-fix release; see Amazon IVS Release Notes. Also updated version number and artifact links in all player guides: Web, Android, iOS, Video.js Integration, and JW Player Integration. On the Amazon IVS documentation landing page, updated the player SDK Reference links to point to the new versions. In Streaming Configuration, updated the information on Closed Captioning.	September 8, 2021
Broadcasting: SDK for Android Guide	In "Set the ImagePreviewView for Preview," made minor text clarifications. In "Swap Cameras," fixed two typos. In "Create a Broadcast Configuration," deleted the line referencing `video.setDefaultAspectMode`, which is not usable now.	September 1, 2021

Streaming configuration with FFmpeg	Modified settings for capturing video files. Specifically, `-g 120` was changed to `-force_key_frames expr:gte(t,n_forced*2)`. This causes the encoder to insert a keyframe every 2 seconds, regardless of source-input frame rate.	August 23, 2021
Amazon IVS Player: Video.js Integration	In "Sample Code," updated the version number to 7.14.3. There is a security vulnerability in versions of Video.js earlier than 7.14.3.	August 19, 2021
Streaming Configuration	For the `STANDARD` channel type, added a note that audio is transcoded only for renditions 360p and below; above that, audio is passed through.	August 18, 2021
Getting Started with Amazon IVS	In "Step 2: Set Up IAM Permissions," added steps to attach the policy to an existing user. This new procedure is in addition to the old procedure, which is for creating a new user and attaching a policy to that user.	August 11, 2021

Player 1.4.0 release	Updated version number and artifact links for the new release, in all player guides: Web, Android, iOS, Video.js Integration, and JW Player Integration. On the Amazon IVS documentation landing page, updated the player SDK Reference links to point to the new versions. Also see the Amazon IVS Release Notes for this release.	August 10, 2021
Amazon IVS Player: SDK for Web Guide	In "Setup With NPM," added a note about hosting player static assets from your own domain.	July 30, 2021
Getting Started with Amazon IVS	In "Step 2: Set Up IAM Permissions," updated policy information and instructions. In "Step 3: Create a Channel with Optional Recording," added a section, "Auto-Rec ord to S3" (to replace a prior paragraph). In "Step 4: Set up Streaming Software," added a section, "Streaming with the Amazon IVS Broadcast SDK."	July 29, 2021

Auto-Record to S3	Added a new section, "Playback of Recorded Content from Private Buckets." Also updated the introduction to this page.	July 28, 2021
Amazon IVS Broadcast SDK (Android and iOS)	Initial release of the broadcast SDK for Android and iOS. See the documentation under "Amazon IVS Broadcast SDK," a new section of the Amazon IVS documentation landing page.	July 27, 2021
Amazon IVS Player	Updated Desktop Browsers to indicate Amazon IVS Player 1.3.0 support for ultra-low latency on new versions of Safari for macOS.	July 14, 2021
Amazon IVS Service Quotas	For the PutMetadata endpoint, added a limit of 155 TPS per account.	June 29, 2021
ivs.rocks	On the Amazon IVS User Guide landing page, added a link to and brief description of ivs.rocks.	June 25, 2021
Player Browser & Platform Requirements	For the Amazon IVS Player, added links to sites listing the latest versions of supported browsers.	June 25, 2021

Streaming Configuration	In "Channel Types," updated definitions of channel types. For `STANDARD` channels, resolution can be up to 1080p; for `BASIC` channels, 480p. (The prior definitions were only in terms of vertical resolution.)	June 17, 2021
Costs	Added a new page on costs.	June 17, 2021
Amazon IVS Player: SDK for Android Guide	Added a new "Permissions" section.	June 17, 2021
Player mobile-browser support	In Mobile Browsers, added information about support for Chrome for iPadOS and Safari for iPadOS.	June 14, 2021
Player SDK size	Added a new "SDK Size" section to the Android and iOS Player SDK guides.	June 11, 2021

Supported regions and service endpoints	Replace lists of supported regions with a link to the Amazon IVS page in the AWS General Reference, which is updated automatically when support for new regions is added. Changes were made on the Monitoring Amazon IVS with Amazon CloudWatch page. Oct 12, 2023 update: This CloudWatch document was deleted and the content was moved to Monitoring IVS Low-Latency Streaming.	June 8, 2021
Amazon IVS Player issues	In "Known Issues and Workarounds," for the Web, Android, and iOS Player, asked customers to report all issues to Support. Also added an issue with Android 11 emulators.	June 4, 2021
Android and iOS Player 1.3.3 release	Bug-fix release; see Amazon IVS Release Notes. Also updated version-number references in links and text in the Android Player Guide and iOS Player Guide. The Amazon IVS documentation landing page always points to the most current versions of the Player SDK References.	June 1, 2021

Setting Up Private Channels	Updated "Generate and Sign Playback Tokens" (information on creating the signature and steps in "Instructions").	May 26, 2021
Global versus regional	Moved "Global Solution, Regional Control" from Getting Started with Amazon IVS to What Is Amazon IVS.	May 21, 2021
Amazon IVS Player: Video.js Integration	In "Sample Code," updated the Cloudflare version number from 7.6.6 to 7.11.4.	May 20, 2021
Android Player 1.3.2 release	Bug-fix release; see Amazon IVS Release Notes. Also updated version-number references in links and text in the Android Player Guide.	May 19, 2021
Amazon IVS Service Quotas	Minor wording changes. Deleted information about maximum number of tags; this was moved to the API Reference.	May 12, 2021
Amazon IVS Release Notes	Added a note for Web Player 1.3.1: the 1.3.0 NPM package exists but does not work.	May 11, 2021
Using Amazon EventBridge with Amazon IVS	Updated `stream_id` to be a "sanitized" value in all relevant examples.	May 10, 2021
Streaming Configuration	Renamed the Encoder Configuration page to Streaming Configuration.	May 6, 2021

Using Amazon EventBridge with Amazon IVS	In "Examples: Recording State Change," added the `recording_duration_ms` field, changed the example value of the `recording_s3_key_prefix` field, and changed the value of the `recording_status_reason` field.	May 5, 2021
Player 1.3 release	Updated version number and artifact links for the new release, in all player guides: Web, Android, iOS, Video.js Integration, and JW Player Integration. For Android, added `mavenCentral()` to "Install the Library." On the Amazon IVS documentation landing page, updated the player SDK Reference links to point to the new versions. In Player 1.3.0 and later, timed metadata is now supported on Chrome and Safari for iOS. This is noted in the IVS Player SDK overview (table on "Mobile Browsers") and Embedding Metadata within a Video Stream (in "Consuming Metadata"). Also see the Amazon IVS Release Notes for this release.	May 5, 2021

Amazon IVS Service Quotas	Added a new section, "Service Quotas Integration with CloudWatch Usage Metrics."	April 26, 2021
Maximum duration of a stream	In Getting Started with Amazon IVS ("Step 4: Set Up Streaming Software"), added a note about the maximum duration of a stream, 48 hours.	April 23, 2021
IAM policy changes	Made several IAM policy changes: • Getting Started with Amazon IVS – In "Step 2: Set Up IAM Permissions," added service quotas. • Amazon IVS Security – In "Use the Amazon IVS Console," simplified the policy example and added service quotas.	April 22, 2021

New CloudWatch metrics	Various doc changes for the release of new CloudWatch metrics: • Monitoring Amazon IVS with Amazon CloudWatch — Added new metrics: concurrent views and concurrent streams. Oct 12, 2023 update: This CloudWatch document was deleted and the content was moved to Monitoring IVS Low-Latency Streaming. • Service Quotas – Updated the names of related quotas to match the new metrics. • IVS Glossary – Added "view."	April 13, 2021

Auto-Record to S3	New User Guide page for this new Amazon IVS functiona lity. This also affects several existing documents: • Getting Started with Amazon IVS — Added IAM policy info for R2S3. Rewrote the step to create a channel. Added a paragraph on optionally enabling local recording in OBS Studio. New section on disabling recording. • Using Amazon EventBridge with Amazon IVS — Added Recording State Change events. • Monitoring Amazon IVS with Amazon CloudWatch — Added `RecordedTime` metric. Oct 12, 2023 update: This CloudWatch document was deleted and the content was moved to Monitoring IVS Low-Latency Streaming. • Amazon IVS Security — Added a section on "Using Service-Linked Roles (SLRs) for Amazon IVS." • Service Quotas — Added "API Call Rate Quotas" for the new recording-configur ation endpoints and a	April 7, 2021

	"Resource Quotas" limit for recording configurations.	
Amazon IVS Streaming Configuration	In "Closed Captioning," clarified that the Player SDKs support only 1 language, not multi-track captions playback.	March 29, 2021
Global versus regional	In What is Amazon IVS, added a new section, "Global Solution, Regional Control," to clarify what is global versus regional. In Getting Started with Amazon IVS, mentioned selecting a region, in the instructions for creating a channel.	March 25, 2021
EventBridge event latency & IDR/Keyframe encoder setting	Clarified the relationship between the `IDR/Keyframe` video-encoder setting and latency in some EventBridge events. This affects two documents: • "Amazon IVS Streaming Configuration" – See the `IDR/Keyframe` bullet in "Reducing Latency." • "Using Amazon EventBridge with Amazon IVS" – See the new "Note on latency of Stream State Change events."	March 25, 2021

Monitoring Amazon IVS with Amazon CloudWatch	Clarified how long CloudWatch retains data. Oct 12, 2023 update: This CloudWatch document was deleted and the content was moved to Monitoring IVS Low-Latency Streaming.	March 18, 2021
Streaming Configuration	In "Audio Settings," changed the supported bitrate to 320 Kpbs (from 192).	March 15, 2021
Required versions of TLS	Clarified requirements for TLS (Transport Layer Security) . For API calls, clients must support TLS 1.0 or later, but we recommend TLS 1.2 or later. For streaming/playback , TLS version 1.2 or later is required. Changes were made in two documents: Streaming Configuration (section on "Stream Ingest: Codecs, RTMPS, and Port 443") and Security (section on "Infrastructure Security").	March 15, 2021

Amazon IVS Player	Added sections on "Thread Safety" in SDK for Android Guide and SDK for IOS Guide. Also, for Android, noted that after the `player.release()` method is called, the player can no longer be used.	March 2, 2021
Monitoring Amazon IVS with Amazon CloudWatch	Updated the procedure for accessing Amazon IVS metrics using the CloudWatch console: added information on when "IVS" is listed and a screenshot. Oct 12, 2023 update: This CloudWatch document was deleted and the content was moved to Monitoring IVS Low-Latency Streaming.	February 26, 2021
Security	In “Infrastructure Security,” added a note that Amazon IVS streaming requires TLS 1.2. Also listed a new web page for details on AWS global network security procedures.	February 17, 2021
Amazon IVS Player: JW Player Integration	New User Guide page on the JW Player plug-in for the Amazon IVS player. Also added a JW Player row to the Framework Integrations table in the *Web Player Guide*.	January 28, 2021

Using Amazon EventBridge with Amazon IVS	Expanded the wording about guarantees for sending events.	January 22, 2021
Using Amazon EventBridge with Amazon IVS	Added: Events are sent on a best-effort basis.	January 13, 2021
Streaming Configuration	Changed the codec audio setting from AAC to AAC (LC).	December 18, 2020
Amazon IVS Service Quotas	In "Resource Quotas," added the maximum number of tags for a resource.	December 17, 2020
Android Player 1.2.1 release	Bug-fix release; see Amazon IVS Release Notes. Also updated version-number references in links and text in the Android Player Guide.	December 16, 2020
Amazon IVS Release Notes	For Amazon IVS Android Player 1.2.0 and 1.1.0, added a known issue which causes the SDK to crash.	December 11, 2020
Getting Started with Amazon IVS	In bullet on playback URLs (in "Step 3: Create a Channel") , added a note that custom domains for playback are not supported.	December 4, 2020
Amazon IVS Release Notes	Deleted download links for iOS Player 1.0.6 and 1.0.0; these versions are deprecated. Added a "Known Issue" for iOS Player 1.2.0.	December 4, 2020

Player 1.2.0 release	Updated version number and artifact links for the new release, in all player guides: Web, Android, iOS, and Video.js Integration. Added a Known Issue to the Android guide. On the Amazon IVS documentation landing page, updated the player SDK Reference links to point to the new versions. Also see the updated Amazon IVS Release Notes.	November 23, 2020
Setting Up Private Channels	In the section on "Generate and Sign Playback Tokens," the `channel-arn` value in the JWT payload is a string.	November 18, 2020
Using Amazon EventBridge with Amazon IVS	Added `stream_id` field to many events. This is a unique stream identifier assigned each time a channel goes live. For a given channel, each live stream has a new `stream_id`. Stream IDs allow customers to distinguish different stream sessions on the same channel.	November 12, 2020
Embedding Metadata Within a Video Stream	Added new section on "Viewing Timed Metadata" from the Amazon IVS console.	November 9, 2020

Web Player Guide	Updated the section on "Content Security Policy," especially for hosting assets on a separate page when using Safari.	November 4, 2020
Service Quotas (CCV and CCB limits)	Added notes about the importance of ensuring adequate concurrent-viewer and concurrent-broadcaster limits, especially before large streaming events. See Getting Started with Amazon IVS and Amazon IVS Service Quotas.	November 4, 2020
Using Amazon EventBridge with Amazon IVS	Updated Limit Breach events: the `detail` section of the JSON blob uses `limit_name` for all these events. (Previously only Concurrent Broadcasts showed that and the others showed `limit`.)	October 28, 2020
Setting Up Private Channels	In the section on "Generate and Sign Playback Tokens,"noted that the `exp` (expiration) field in JWT payloads is an integer.	October 27, 2020
Amazon IVS Service Quotas	Increased three limits: number of channels, concurrent viewers, and concurrent broadcasts.	October 27, 2020

Web Player 1.1.2 release	Bug-fix release; see the Amazon IVS Release Notes. Version-number references in links and text were updated in the Web Player Guide and Video.js integration Guide.	October 9, 2020
Ingest resolution quotas & event	Added service quotas and EventBridge events for ingest resolution. See Amazon IVS Service Quotas and Using Amazon EventBridge with Amazon IVS.	October 9, 2020
Player 1.1.0 release	Updated version number and artifact links for the new release, in all player guides: Web, Android, iOS, and Video.js Integration. In the iOS and Web guides, added a new section on "Known Issues." On the Amazon IVS documentation landing page, updated the player SDK Reference links to point to the new versions. In the Amazon IVS Player overview, deleted the Android `getSessionId` function (which does not yet work).	October 7, 2020

Setting Up Private Channels	Added a new section, "Workflow for Private Channels." In the section on generating and signing tokens, clarified payload field descriptions and example. Corrected examples for listing and getting playback key pairs.	September 21, 2020
Using Amazon EventBridge with Amazon IVS	The `channel_name` field was added to several events.	September 14, 2020
Embedding Metadata Within a Video Stream	Expanded information on setting up IAM permissio ns (full procedure and policy), inserting metadata (added a CLI procedure), and consuming metadata (linked to several GitHub demos).	September 14, 2020
Player guides	Clarified which is the most current version of each player (Web, Android, iOS, and Video.js Integration).	September 9, 2020
Getting Started with Amazon IVS	Mentioned that there is a short delay before a new stream can be viewed in the console.	September 9, 2020
Amazon IVS Release Notes	Changed the Player iOS download link to be the same as what is in the Player iOS Guide.	September 9, 2020
Embedding Metadata within a Video Stream	Added link to relevant AWS blog posts.	September 3, 2020

Amazon IVS Player	Expanded the discussion of player features. Clarified that we can guarantee the performance of only the Amazon IVS player (not third-party players).	September 3, 2020
Amazon IVS Service Quotas	Corrected this to indicate that only the channels, concurrent viewers, and concurrent broadcasts quotas can be adjusted.	August 31, 2020
Streaming Configuration	Several changes, including adding Reducing Latency subsection on "Avoid Third-Party Streaming/Forwarding Services" and clarifying why we strongly recommend CBR over VBR.	August 24, 2020
Embedding Metadata within a Video Stream	Updated Web example in Consuming Timed Metadata.	August 24, 2020
Amazon IVS Player: SDK for Android Guide	Updated code example in Install the Library.	August 24, 2020
Using Amazon EventBridge with Amazon IVS	In the section on "Examples: Limit Breach," updated several field names: `limit_name` , `limit_value` , `exceeded_by` , and `limit_unit` . These names include underscores (not dashes).	August 19, 2020

Setting Up Private Channels	New User Guide page on new Amazon IVS functionality, supporting private channels. This also affects several existing documents: Getting Started with Amazon IVS and Logging Amazon IVS API Calls with AWS CloudTrail: Added `authorized` field to channel. Security: Several changes including a new section on "Privileged and Unprivileged Access." Service Quotas: Added several playback quotas. Glossary: Added playback key pair.	August 19, 2020
Getting Started with Amazon IVS	Added a new section on AWS Regional Service.	August 11, 2020
Amazon IVS Player: SDK for iOS Guide	Updated links to the reference documentation and framework download to point to the 1.0.6 release. Also updated reference-doc link on the Amazon IVS doc landing page.	August 11, 2020

Using Amazon EventBridge with Amazon IVS	Amazon IVS EventBridge events are now available through the Amazon EventBridge console. See the section on "Creating Amazon EventBridge Rules for Amazon IVS."	August 5, 2020
Amazon IVS Player: Video.js Integration	In the “Setup With NPM” section, updated the link to the Video.js npm package to install, to version 7.6.6.	July 30, 2020
Using Amazon EventBridge with Amazon IVS	For Amazon IVS stream-state and stream-health changes, the event name is provided in a field called `event_name` (not `eventName`, as previously documented).	July 29, 2020
Getting Started with Amazon IVS	Changed the instructions for setting up streaming software, to indicate that port 443 is required for Amazon IVS ingest. This also affects the *Streaming Configuration* document; see the new section on RTMPS and Port 443.	July 27, 2020
Amazon IVS Player: SDK for iOS Guide	Changed the download location of the latest version, in the instructions for installing the framework manually.	July 27, 2020

Embedding Metadata Within a Video Stream	Added Android and iOS examples of consuming timed metadata.	July 24, 2020
New service and User Guide	This is the initial release of Amazon Interactive Video Service (IVS).	July 15, 2020

IVS Low-Latency Streaming API Reference Changes

API Change	Description	Date
Server-Side Ad Insertion (SSAI)	Added `postRollConfiguration` object to `CreateAdConfiguration` and `UpdateAdConfiguration` operations.	July 9, 2026
Server-Side Ad Insertion (SSAI)	Added the `UpdateAdConfiguration` operation.	June 4, 2026
Server-Side Ad Insertion (SSAI)	Ad configurations now support up to 3 `mediaTailorPlaybackConfigurations` (previously fixed at 1).	May 18, 2026
Server-Side Ad Insertion (SSAI)	We made many updates to the control-plane API, documented in the IVS Low-Latency Streaming API Reference: • Added five operations, CreateAdConfiguration, DeleteAdConfiguration, GetAdConfiguration, ListAdConfigurations, and InsertAdBreak. • Modified the ListChannels request (added `filterByAdConfigurationArn`). • Modified requests for CreateChannel and UpdateChannel (added `adConfigurationArn`).	April 22, 2026

API Change	Description	Date
	• Added three objects, AdConfiguration, AdConfigurationSummary, and MediaTailorPlaybackConfiguration. • Modified the Channel and ChannelSummary objects (added `adConfigurationArn`). This in turn affects the StreamSession object. This affects responses for BatchGetChannel, CreateChannel, GetChannel, GetStreamSession, ListChannels, & UpdateChannel.	
Multitrack Video Integration API Reference	We added Client as a separate object. Previously it was part of the CapabilitiesDescription object. This affects the GetClientCapabilities request.	February 7, 2025
Channel Types	We added audio bitrates and updated audio information.	November 24, 2024

API Change	Description	Date
Multitrack video	We made many updates to the control-plane API, documented in the IVS Low-Latency Streaming API Reference: • Added IngestConfigurations and MultitrackInputConfiguration. • Modified the IngestConfiguration description (to distinguish it from IngestConfigurations). • Modified AudioConfiguration (added `track`) and updated its description to indicate it's part of both IngestConfiguration and IngestConfigurations. • Modified VideoConfiguration (added `level`, `profile`, and `track`) and updated its description to indicate it's part of both IngestConfiguration and IngestConfigurations. • Modified Channel (added `containerFormat` and `multitrackInputConfiguration`). This affects StreamSession (which contains Channel) and several endpoints: BatchGetChannel response, CreateChannel request and response, GetChannel response, GetStreamSession response, and UpdateChannel request and response. • Modified StreamEvent (description and new code values). This affects `truncatedEvents` in StreamSession. • Modified StreamSession (added `ingestConfigurations` and updated the `ingestConfiguration` description).	November 14, 2024

API Change	Description	Date
	• Modified ThumbnailConfiguration (added multitrack to the `targetIntervalSeconds` description). • In "Channel Types," created separate discussions of single-track and multitrack video input. On the IVS documentation landing page, in the IVS Low-Latency Streaming section, we added a tile for Multitrack Video Integration API Reference. This new document describes in detail all operations for the IVS data-plane API for broadcast-software developers implementing client support for multitrack video. The API is REST compatible, using a standard HTTP API.	
Stream Takeover	Added the `code` field to the StreamEvent object. This affects one response: GetStreamSession.	October 15, 2024
Remove `svs` from ARN patterns	ARN patterns which specified `[is]vs` were updated to specify `ivs`. This affects several endpoints (including all Tags endpoints) and the following objects: BatchError, BatchStartViewerSessionRevocationError, BatchStartViewerSessionRevocationViewerSession, Channel, ChannelSummary, PlaybackKeyPair, PlaybackKayPairSummary, Stream, StreamSummary, StreamKey, StreamKeySummary.	April 25, 2024

API Change	Description	Date
Secure Reliable Transport ingest support	We added the `srt` field to the Channel object. This affects six responses: BatchGetChannel, CreateChannel, GetChannel, UpdateChannel, and GetStreamSession.	April 4, 2024
Tokenless playback restricti ons	• Added a new resource, PlaybackRestrictio nPolicy. • Added five PlaybackRestrictionPolicy(ies) endpoints (Create/Delete/Get/List/Update). • Added the PlaybackRestrictionPolicy and PlaybackRestrictionPolicySummary objects. • Added `playbackRestrictio nPolicyArn` to the Channel and ChannelSummary objects. This affects Channel endpoint responses (Create/B atchGet/Get/List/Update). • In the ListChannel request, added `filterByPlaybackRestriction PolicyArn` .	January 31, 2024
Channel-type definitions	Updated channel-type definitions to provide more detail, especially about rendered transcode ladders. See Channel Types in the *IVS Low-Latency Streaming API Reference*.	August 18, 2023

API Change	Description	Date
R2S3 rendition filtering and thumbnail enhancements	• In ThumbnailConfiguration, added `resolution` and `storage`. This affects the CreateRecordingConfiguration request and response, GetRecordingConfiguration response, and GetStreamSession response. • In ThumbnailConfiguration, changed the `targetIntervalSeconds` minimum from 5 to 1 and updated the "Important" note to say it applies only to `BASIC` channels. • Added the RenditionConfiguration object. • Added `renditionConfiguration` to the RecordingConfiguration object. This affects three responses: CreateRecordingConfiguration, GetRecordingConfiguration, and GetStreamSession. We also added `renditionConfiguration` to the CreateRecordingConfiguration request.	July 17, 2023
Viewer session revocation for private channels	• Added two endpoints: StartViewerSessionRevocation and BatchStartViewerSessionRevocation. • Added two objects: BatchStartViewerSessionRevocationError and BatchStartViewerSessionRevocationViewerSession.	June 28, 2023

API Change	Description	Date
Advanced channel types	• Added new channel `type` values and definitions. This affects two requests (Create/UpdateChannel) and the Channel object. • Added the `preset` field to the Channel and ChannelSummary objects. This affects several requests (Create/UpdateChannel) and responses (BatchGetChannel, Create/Get/UpdateChannel, GetStreamSession, ListChannels). • Added `type` to the ChannelSummary object. This affects the ListChannels response.	June 2, 2023
RTMP support	Added the `insecureIngest` field to the Channel and ChannelSummary objects. This affects several requests and responses.	March 30, 2023
Stream state	In the Stream and StreamSummary objects, noted that the `OFFLINE` value of the `state` field should not be relied on. Instead, a "NotBroadcasting" error will indicate that the stream is not live.	February 8, 2023
Merge fragmented streams	Added the `recordingReconnectWindowSeconds` field to the CreateRecordingConfiguration request and the RecordingConfiguration object. This affects three responses (CreateRecordingConfiguration, GetRecordingConfiguration, and GetStreamSession).	August 30, 2022
Expand `BASIC` channel to 1080p	Updated channel `type` definitions in CreateChannel, UpdateChannel, and the Channel object.	August 16, 2022

API Change	Description	Date
Restrictions on `tags`	Updated information on `tags` restrictions. Amazon IVS has no constraints on tags beyond what is documented in the AWS documentation that we link to. This affects the "Welcome" section and several endpoints and data types.	August 12, 2022
Max and default values of `maxResults`	Updated the maximum and default values of `maxResults` to reflect the actual behavior of the system. Affects all List endpoints that use `maxResults` .	August 12, 2022
Timestamp fields	For ISO 8601 fields, added a note that these are returned as strings. Due to an auto-gene ration issue, these appear in our documented syntax as `number`.	March 28, 2022
API authorization	In "Authentication versus Authorization," clarify the bullet on authorization.	March 18, 2022
ARN encoding in tag endpoints	For the three tag endpoints, added a statement that the `resourceArn` field must be URL-encoded.	March 18, 2022
Audio/video configuration objects	Updated the definitions of the AudioConf iguration and VideoConfiguration data types, to indicate that they are used for monitorin g. (Configuration is done in the broadcaster's encoder.)	February 17, 2022

API Change	Description	Date
R2S3 thumbnail configuration release	Added a new field (`thumbnailConfiguration`) in the RecordingConfiguration object. This in turn affects the CreateRecordingConfiguration request and response, GetRecordingConfiguration response, and GetStreamSession response. Added a new object: ThumbnailConfiguration.	January 18, 2022
Stream Health release	Added 2 endpoints: GetStreamSession and ListStreamSessions. Added 7 objects: AudioConfiguration, IngestConfiguration, StreamEvent, StreamFilters, StreamSession, StreamSessionSummary, and VideoConfiguration. Added the `streamID` field to the Stream and StreamSummary objects. This in turn affects the GetStream and ListStreams responses. Added the `filtersBy` field to the ListStreams request.	November 18, 2021
Format of time fields	Updated the description of `startTime` in the Stream and StreamSummary objects, to add that it's an ISO 8601 timestamp returned as a string.	September 21, 2021
`STANDARD` channel type	For the `STANDARD` channel type, added notes that audio is transcoded only for renditions 360p and below; above that, audio is passed through.	August 18, 2021

API Change	Description	Date
ListTagsForResource endpoint	Removed support for pagination; i.e., the `maxResults` request field and `nextToken` request/response field. (Pagination did not work correctly.)	August 13, 2021
PutMetadata TPS limit per account	For the PutMetadata endpoint, added a limit of 155 TPS per account.	June 29, 2021
Channel-type definitions	Updated the definitions of channel types. For `STANDARD` channels, resolution can be up to 1080p; for `BASIC` channels, 480p. (The prior definitions were only in terms of vertical resolution.)	June 17, 2021
Supported regions and service endpoints	Replace lists of supported regions with a link to the Amazon IVS page in the AWS General Reference, which is updated automatically when support for new regions is added. Changes were made on the "Welcome" page.	June 8, 2021
Tagging	In "Tagging" (in the "Welcome" section), added the maximum number of tags that can be applied to a resource (50).	May 12, 2021
New CloudWatch Metrics	Changed the definition of `viewerCount` in the Stream and StreamSummary objects.	April 13, 2021

API Change	Description	Date
Auto-Record to S3	• Added 4 recording-configuration endpoints (Create, Delete, Get, List). • Add 4 data types (DestinationConfiguration, RecordingConfiguration, RecordingConfigurationSummary, S3DestinationConfiguration). • Added a `RecordingConfigurationArn` field to the Channel and ChannelSummary objects and channel endpoints. • Modified ListChannels to filter by recording-configuration ARN.	April 7, 2021
Authentication & authorization	• Added an "Authentication versus Authorization" section to clarify the difference between these concepts. • Changed the description of the `authorized` field (in the Channel data type and channel endpoints), to: "Whether the channel is private (enabled for playback authorization)."	March 16, 2021
PutMetadata	Added a minimum length (1) for the `metadata` request field.	March 4, 2021
Channel latency mode	In Create/UpdateChannel and Channel/ChannelSummary objects, added a description of `latencyMode` values.	December 18, 2020
Channel default values	• In Channel data type, add default value for `authorized`. • In Channel data type and CreateChannel, add default value for `type`.	December 17, 2020
All List endpoints	Indicated that the `maxResults` request field has a default value, 50.	December 5, 2020

API Change	Description	Date
Stream & StreamSummary objects	Changed the description of the `viewerCount` field to indicate that a value of -1 indicates that the request timed out; in this case, retry.	November 10, 2020
Authentication	Added Sigv4 signing info. See "Authentication" in the Welcome section.	October 9, 2020
DeleteChannel & DeleteStreamKey	Changed the HTTP response from 200 to 204.	August 26, 2020
DeleteChannel	Clarified how to delete a channel that's live, to avoid an error.	August 20, 2020
Playback authorization (for private channels)	• New PlaybackKeyPair endpoints • A new `authorized` field in the Channel and ChannelSummary objects • New objects, PlaybackKeyPair and PlaybackKeyPairSummary	August 19, 2020
New service and API Reference	This is the initial release of Amazon Interactive Video Service (IVS).	July 15, 2020

Stage API Reference Changes

API Change	Description	Date
IVS Real-Time Streaming launch	Major documentation changes accompany this release. We renamed the previous documentation to be IVS Low-Latency Streaming and published new IVS Real-Time Streaming documentation. The IVS documentation landing page now has separate sections for real-time streaming and low-latency	August 7, 2023

API Change	Description	Date
	streaming. Each section has its own User Guide and API Reference. The Stage API Reference is part of IVS real-time streaming documentation, where it was renamed IVS Real-Time Streaming API Reference. We will list future updates to this API Reference in Document History (Real-Time Streaming), not here.	
Stage Health	• Added five endpoints: GetParticipant, ListParticipants, GetStageSession, ListStageSessions, ListParticipantEvents. • Added five objects: Event, Participant, ParticipantSummary, StageSession, StageSessionSummary.	May 11, 2023
New functionality	This is the initial release of the stage API. We added a Stage API Reference tile to the documentation landing page.	March 23, 2023

IVS Chat API Documentation Changes

API Change	Description	Date
New error message	Added the ConflictException error to UpdateLoggingConfiguration.	March 17, 2023
`maximumMessageRatePerSecond` max value	Changed the maximum value of `maximumMessageRatePerSecond` from 10 to 100. This affects the CreateRoom, GetRoom, and UpdateRoom endpoints.	January 30, 2023
Event (Subscribe) `MessageID` field	In the Chat Messaging API Reference, in Event (Subscribe), added a deprecated field (`MessageID`) to `Attributes`. This is included for backward compatibility.	January 25, 2023

API Change	Description	Date
New error type	Added the PendingVerification error for DeleteMessage, DisconnectUser, & SendEvent.	December 5, 2022
WebSocket errors	In the Chat Messaging API Reference, we updated descriptions of two WebSocket errors (Unauthorized & Forbidden).	November 18, 2022
Chat Logging	Initial release of this new functionality. We added the following: • A new resource, LoggingConfiguration • Five data types: CloudWatchDestinationConfiguration, DestinationConfiguration, KinesisDestinationConfiguration, LoggingConfigurationSummary, S3DestinationConfiguration • Five endpoints: Create/Delete/Get/List/UpdateLoggingConfiguration(s) • The `loggingConfigurationIdentifiers` field to the RoomSummary object and Room requests/responses	November 17, 2022
CreateChatToken description	Updated the description of CreateChatToken, including new guidance on using the `attributes` field.	November 17, 2022
Restrictions on `tags`	Updated information on `tags` restrictions. Amazon IVS Chat has no constraints on tags beyond what is documented in the AWS documentation that we link to. This affects the "Welcome" section, four endpoints (CreateRoom, ListTagsForResource, TagResource, UntagResource), and the RoomSummary data type.	August 12, 2022

API Change	Description	Date
New functionality	This is the initial release of Amazon IVS Chat. We added an *Amazon IVS Chat* section of the documentation landing page, with two API reference documents: • Chat API Reference -- Control-plane API (HTTPS) • Chat Messaging API Reference -- Data-plane API (WebSocket)	April 26, 2022

IVS Release Notes | Low-Latency Streaming

This document contains all Amazon IVS Low-Latency Streaming release notes, latest first, organized by date of release.

October 1, 2026

IVS Player SDK: Web 1.57.0

Platform	Downloads and Changes
Web player 1.57.0 & Video.js integration & JW player integration	**NPM Package:** https://www.npmjs.com/package/amazon-ivs-player **Script asset:** https://player.live-video.net/1.57.0/amazon-ivs-player.min.js **Video.js tech asset:** https://player.live-video.net/1.57.0/amazon-ivs-videojs-tech.min.js **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.57.0/web/ • Bug fixes and stability improvements.

October 1, 2026

IVS Player SDK: Android 1.57.0, iOS 1.57.0

Platform	Downloads and Changes
Android player 1.57.0	**Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.57.0/android/ • Bug fixes and stability improvements.

Platform	Downloads and Changes
iOS player 1.57.0	**Download:** https://player.live-video.net/1.57.0/AmazonIVSPlayer.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.57.0/ios/ • Bug fixes and stability improvements.

Mobile SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.615 MB	4.134 MB
armeabi-v7a	1.435 MB	2.936 MB
x86_64	1.616 MB	4.218 MB
x86	1.677 MB	4.219 MB

Mobile SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.852 MB	1.852 MB

September 24, 2026

Amazon IVS Broadcast SDK: Android 1.47.0, iOS 1.47.0 (Low-Latency Streaming)

Platform	Downloads and Changes
Android Broadcast SDK 1.47.0	**Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.47.0/android/ • After an application calls `BroadcastSession.createSystemCaptureResources`, if capture is later stopped via system UI (e.g. stopping it from the status bar chip), the SDK will now call `onDeviceRemoved` with the `SCREEN_SOURCE` and/or `SYSTEM_AUDIO` device types so that the application can update its UI and stop or reconfigure its broadcast accordingly. When using the `BroadcastSession.createSystemAudioSource()` API, the `MediaProjection` is owned by the application itself and it should handle its own `MediaProjection.Callback` and detach the created device when the projection stops. • Fixed a bug where bitrate calculations were artificially low in extremely low bandwidth scenarios.
iOS Broadcast SDK 1.47.0	**Download for low-latency streaming:** https://broadcast.live-video.net/1.47.0/AmazonIVSBroadcast.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.47.0/ios/

Platform	Downloads and Changes
	• Fixed a bug where previews could freeze on iOS 27 before a broadcast has started. • Fixed a bug where bitrate calculations were artificially low in extremely low bandwidth scenarios.

Broadcast SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	2.009 MB	5.413 MB
armeabi-v7a	1.763 MB	3.746 MB
x86_64	2.096 MB	5.751 MB
x86	2.119 MB	5.553 MB

Broadcast SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	1.024 MB	2.248 MB

September 24, 2026

IVS Broadcast SDK: Web 1.40.0 (Low-Latency Streaming)

Platform	Downloads and Changes
Web Broadcast SDK 1.40.0	**Reference documentation:** https://aws.github.io/amazon-ivs-web-broadcast/docs/sdk-reference

Platform	Downloads and Changes
	• Bug fixes and stability improvements.

September 8, 2026

IVS Player SDK: Web 1.56.1

Platform	Downloads and Changes
Web player 1.56.1 & Video.js integration & JW player integration	**NPM Package:** https://www.npmjs.com/package/amazon-ivs-player **Script asset:** https://player.live-video.net/1.56.1/amazon-ivs-player.min.js **Video.js tech asset:** https://player.live-video.net/1.56.1/amazon-ivs-videojs-tech.min.js **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.56.1/web/ • Added missing TypeScript types for the `TEXT_TRACKS_CHANGED` and `TEXT_TRACK_CHANGED` events.

September 3, 2026

IVS Player SDK: Web 1.56.0

Platform	Downloads and Changes
Web player 1.56.0 & Video.js integration & JW player integration	**NPM Package:** https://www.npmjs.com/package/amazon-ivs-player **Script asset:** https://player.live-video.net/1.56.0/amazon-ivs-player.min.js

Platform	Downloads and Changes
	Video.js tech asset: https://player.live-video.net/1.56.0/amazon-ivs-videojs-tech.min.js **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.56.0/web/ • Added beta support for Text Track APIs and WebVTT. • Bug fixes and stability improvements.

September 3, 2026

IVS Player SDK: Android 1.56.0, iOS 1.56.0

Platform	Downloads and Changes
Android player 1.56.0	**Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.56.0/android/ • Added beta support for Text Track APIs and WebVTT. • Bug fixes and stability improvements.
iOS player 1.56.0	**Download:** https://player.live-video.net/1.56.0/AmazonIVSPlayer.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.56.0/ios/ • Added beta support for Text Track APIs and WebVTT. • Bug fixes and stability improvements.

Mobile SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.574 MB	4.049 MB
armeabi-v7a	1.399 MB	2.879 MB
x86_64	1.575 MB	4.124 MB
x86	1.640 MB	4.136 MB

Mobile SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.829 MB	1.789 MB

August 27, 2026

Amazon IVS Broadcast SDK: Android 1.46.0, iOS 1.46.0 (Low-Latency Streaming)

Platform	Downloads and Changes
Android Broadcast SDK 1.46.0	**Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.46.0/android/ • Bug fixes and stability improvements.
iOS Broadcast SDK 1.46.0	**Download for low-latency streaming:** https://broadcast.live-video.net/1.46.0/AmazonIVSBroadcast.xcframework.zip

Platform	Downloads and Changes
	Reference documentation: https://aws.github.io/amazon-ivs-broadcast-docs/1.46.0/ios/ • Bug fixes and stability improvements.

Broadcast SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	2.004 MB	5.404 MB
armeabi-v7a	1.759 MB	3.739 MB
x86_64	2.092 MB	5.741 MB
x86	2.113 MB	5.523 MB

Broadcast SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	1.024 MB	2.248 MB

August 27, 2026

IVS Broadcast SDK: Web 1.39.0 (Low-Latency Streaming)

Platform	Downloads and Changes
Web Broadcast SDK 1.39.0	**Reference documentation:** https://aws.github.io/amazon-ivs-web-broadcast/docs/sdk-reference/

Platform	Downloads and Changes
	• Bug fixes and stability improvements.

August 19, 2026

Amazon IVS Broadcast SDK: Android 1.43.2 (Low-Latency Streaming)

Platform	Downloads and Changes
Android Broadcast SDK 1.43.2	**Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.43.2/android/ • There were no changes to the low-latency SDK in this release.

Broadcast SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	2.015 MB	5.455 MB
armeabi-v7a	1.765 MB	3.778 MB
x86_64	2.097 MB	5.790 MB
x86	2.122 MB	5.575 MB

August 12, 2026

IVS Broadcast SDK: Web 1.38.1 (Low-Latency Streaming)

Platform	Downloads and Changes
Web Broadcast SDK 1.38.1	**Reference documentation:** https://aws.github.io/amazon-ivs-web-broadcast/docs/sdk-reference/ • There were no changes to the low-latency SDK in this release. Changes only apply to the real-time SDK.

August 11, 2026

Amazon IVS Broadcast SDK: Android 1.43.1 (Low-Latency Streaming)

Platform	Downloads and Changes
Android Broadcast SDK 1.43.1	**Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.43.1/android/ • There were no changes to the low-latency SDK in this release.

Broadcast SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	2.015 MB	5.455 MB
armeabi-v7a	1.765 MB	3.778 MB
x86_64	2.097 MB	5.790 MB

Architecture	Compressed Size	Uncompressed Size
x86	2.122 MB	5.575 MB

August 6, 2026

IVS Player SDK: Web 1.55.0

Platform	Downloads and Changes
Web player 1.55.0 & Video.js integration & JW player integration	**NPM Package:** https://www.npmjs.com/package/amazon-ivs-player **Script asset:** https://player.live-video.net/1.55.0/amazon-ivs-player.min.js **Video.js tech asset:** https://player.live-video.net/1.55.0/amazon-ivs-videojs-tech.min.js **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.55.0/web/ • Bug fixes and stability improvements.

August 6, 2026

IVS Player SDK: Android 1.55.0, iOS 1.55.0

Platform	Downloads and Changes
Android player 1.55.0	**Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.55.0/android/ • Bug fixes and stability improvements.
iOS Player 1.55.0	**Download:** https://player.live-video.net/1.55.0/AmazonIVSPlayer.xcframework.zip

Platform	Downloads and Changes
	Reference documentation: https://aws.github.io/amazon-ivs-player-docs/1.55.0/ios/ • Bug fixes and stability improvements. • Support for iOS 14 will be deprecated as of IVS Player 1.58.0.

Mobile SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.550 MB	3.987 MB
armeabi-v7a	1.377 MB	2.834 MB
x86_64	1.550 MB	4.060 MB
x86	1.614 MB	4.071 MB

Mobile SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.814 MB	1.739 MB

July 30, 2026

Amazon IVS Broadcast SDK: Android 1.45.0, iOS 1.45.0 (Low-Latency Streaming)

Platform	Downloads and Changes
Android Broadcast SDK 1.45.0	**Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.45.0/android/ • Bug fixes and stability improvements.
iOS Broadcast SDK 1.45.0	**Download for low-latency streaming:** https://broadcast.live-video.net/1.45.0/AmazonIVSBroadcast.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.45.0/ios/ • Bug fixes and stability improvements. • Support for iOS 14 will be deprecated as of IVS Broadcast SDK 1.48.0.

Broadcast SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	2.000 MB	5.393 MB
armeabi-v7a	1.755 MB	3.731 MB
x86_64	2.088 MB	5.729 MB
x86	2.109 MB	5.511 MB

Broadcast SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	1.022 MB	2.248 MB

July 30, 2026

IVS Broadcast SDK: Web 1.38.0 (Low-Latency Streaming)

Platform	Downloads and Changes
Web Broadcast SDK 1.38.0	**Reference documentation:** https://aws.github.io/amazon-ivs-web-broadcast/docs/sdk-reference/ • Bug fixes and stability improvements.

July 21, 2026

IVS Player SDK: Web 1.54.1

Platform	Downloads and Changes
Web player 1.54.1 & Video.js integration & JW player integration	**NPM Package:** https://www.npmjs.com/package/amazon-ivs-player **Script asset:** https://player.live-video.net/1.54.1/amazon-ivs-player.min.js **Video.js tech asset:** https://player.live-video.net/1.54.1/amazon-ivs-videojs-tech.min.js **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.54.1/web/

Platform	Downloads and Changes
	• Fixes a regression in 1.54.0 related to certain HLS metadata content.

July 21, 2026

IVS Player SDK: Android 1.54.1, iOS 1.54.1

Platform	Downloads and Changes
Android player 1.54.1	**Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.54.1/android/ • Fixes a regression in 1.54.0 related to certain HLS metadata content.
iOS Player 1.54.1	**Download:** https://player.live-video.net/1.54.1/AmazonIVSPlayer.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.54.1/ios/ • Fixes a regression in 1.54.0 related to certain HLS metadata content.

Mobile SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.543 MB	3.956 MB
armeabi-v7a	1.371 MB	2.814 MB
x86_64	1.545 MB	4.030 MB
x86	1.608 MB	4.043 MB

Mobile SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.809 MB	1.739 MB

July 9, 2026

IVS Player SDK: Web 1.54.0

Platform	Downloads and Changes
Web player 1.54.0 & Video.js integration & JW player integration	**NPM Package:** https://www.npmjs.com/package/amazon-ivs-player **Script asset:** https://player.live-video.net/1.54.0/amazon-ivs-player.min.js **Video.js tech asset:** https://player.live-video.net/1.54.0/amazon-ivs-videojs-tech.min.js **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.54.0/web/ • Bug fixes and stability improvements.

July 9, 2026

IVS Player SDK: Android 1.54.0, iOS 1.54.0

Platform	Downloads and Changes
Android player 1.54.0	**Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.54.0/android/ • Bug fixes and stability improvements.

Platform	Downloads and Changes
iOS Player 1.54.0	**Download:** https://player.live-video.net/1.54.0/AmazonIVSPlayer.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.54.0/ios/ • Bug fixes and stability improvements.

Mobile SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.547 MB	3.964 MB
armeabi-v7a	1.375 MB	2.819 MB
x86_64	1.549 MB	4.038 MB
x86	1.613 MB	4.052 MB

Mobile SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.811 MB	1.739 MB

July 7, 2026

Amazon IVS Broadcast SDK: iOS 1.44.1 (Low-Latency Streaming)

Platform	Downloads and Changes
iOS Broadcast SDK 1.44.1	**Download for low-latency streaming:** https://broadcast.live-video.net/1.44.1/AmazonIVSBroadcast.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.44.1/ios/ • There were no changes to the low-latency SDK in this release.

Broadcast SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	1.021 MB	2.248 MB

July 2, 2026

Amazon IVS Broadcast SDK: Android 1.44.0, iOS 1.44.0 (Low-Latency Streaming)

Platform	Downloads and Changes
Android Broadcast SDK 1.44.0	**Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.44.0/android/ • Bug fixes and stability improvements.

Platform	Downloads and Changes
iOS Broadcast SDK 1.44.0	**Download for low-latency streaming:** https://broadcast.live-video.net/1.44.0/AmazonIVSBroadcast.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.44.0/ios/ • `IVSReplayKitBroadcastSession` has a new initializer that takes a complete `IVSBroadcastConfiguration` object, allowing changes to the network property. Note the mixer property will be ignored for ReplayKit sessions.

Broadcast SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.994	5.384
armeabi-v7a	1.749	3.723
x86_64	2.082	5.721
x86	2.103	5.502

Broadcast SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	1.021	2.248

July 2, 2026

IVS Broadcast SDK: Web 1.37.0 (Low-Latency Streaming)

Platform	Downloads and Changes
Web Broadcast SDK 1.37.0	**Reference documentation:** https://aws.github.io/amazon-ivs-web-broadcast/docs/sdk-reference/ • Bug fixes and stability improvements.

June 11, 2026

IVS Player SDK: Web 1.53.0

Platform	Downloads and Changes
Web player 1.53.0 & Video.js integration & JW player integration	**NPM Package:** https://www.npmjs.com/package/amazon-ivs-player **Script asset:** https://player.live-video.net/1.53.0/amazon-ivs-player.min.js **Video.js tech asset:** https://player.live-video.net/1.53.0/amazon-ivs-videojs-tech.min.js **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.53.0/web/ • Bug fixes and stability improvements.

June 11, 2026

IVS Player SDK: Android 1.53.0, iOS 1.53.0

Platform	Downloads and Changes
Android player 1.53.0	**Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.53.0/android/ • Added `Player.setUserAgent(String)` API to Android to set custom User-Agent string for all HTTP requests made by the player. An IVS default is used when no override is set. • Bug fixes and stability improvements.
iOS Player 1.53.0	**Download:** https://player.live-video.net/1.53.0/AmazonIVSPlayer.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.53.0/ios/ • Added `IVSPlayer.setUserAgent(_:)` API to iOS to set custom User-Agent string for all HTTP requests made by the player. An IVS default is used when no override is set. • Bug fixes and stability improvements.

Mobile SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.531 MB	3.930 MB
armeabi-v7a	1.360 MB	2.793 MB
x86_64	1.533 MB	4.000 MB

Architecture	Compressed Size	Uncompressed Size
x86	1.595 MB	4.015 MB

Mobile SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.800 MB	1.706 MB

June 4, 2026

Amazon IVS Broadcast SDK: Android 1.43.0, iOS 1.43.0 (Low-Latency Streaming)

Platform	Downloads and Changes
Android Broadcast SDK 1.43.0	**Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.43.0/android/ • Fixed a memory leak when a Broadcast Session was created but was not Broadcasting. • Fixed a rare crash when tearing down a BroadcastSession that was streaming with the device's microphone.
iOS Broadcast SDK 1.43.0	**Download for low-latency streaming:** https://broadcast.live-video.net/1.43.0/AmazonIVSBroadcast.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.43.0/ios/

Platform	Downloads and Changes
	• Fixed a bug where the camera torch may turn back on unintentionally after changing cameras and rotating the device.

Broadcast SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	2.015 MB	5.455 MB
armeabi-v7a	1.765 MB	3.778 MB
x86_64	2.097 MB	5.790 MB
x86	2.122 MB	5.575 MB

Broadcast SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	1.031 MB	2.265 MB

June 4, 2026

IVS Broadcast SDK: Web 1.36.0 (Low-Latency Streaming)

Platform	Downloads and Changes
Web Broadcast SDK 1.36.0	**Reference documentation:** https://aws.github.io/amazon-ivs-web-broadcast/docs/sdk-reference/ • Bug fixes and stability improvements.

May 28, 2026

IVS Player SDK: Web 1.52.1

Platform	Downloads and Changes
Web player 1.52.1 & Video.js integration & JW player integration	**NPM Package:** https://www.npmjs.com/package/amazon-ivs-player **Script asset:** https://player.live-video.net/1.52.1/amazon-ivs-player.min.js **Video.js tech asset:** https://player.live-video.net/1.52.1/amazon-ivs-videojs-tech.min.js **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.52.1/web/ • Bug fixes and stability improvements.

May 14, 2026

IVS Player SDK: Android 1.52.0, iOS 1.52.0

Platform	Downloads and Changes
Android player 1.52.0	**Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.52.0/android/ • Bug fixes and stability improvements.
iOS Player 1.52.0	**Download:** https://player.live-video.net/1.52.0/AmazonIVSPlayer.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.52.0/ios/ • Bug fixes and stability improvements.

Mobile SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.490 MB	3.832 MB
armeabi-v7a	1.321 MB	2.721 MB
x86_64	1.491 MB	3.894 MB
x86	1.544 MB	3.901 MB

Mobile SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.786 MB	1.714 MB

May 14, 2026

IVS Player SDK: Web 1.52.0

Platform	Downloads and Changes
Web player 1.52.0 & Video.js integration & JW player integration	**NPM Package:** https://www.npmjs.com/package/amazon-ivs-player **Script asset:** https://player.live-video.net/1.52.0/amazon-ivs-player.min.js **Video.js tech asset:** https://player.live-video.net/1.52.0/amazon-ivs-videojs-tech.min.js **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.52.0/web/ • Bug fixes and stability improvements.

May 7, 2026

Amazon IVS Broadcast SDK: Android 1.42.0, iOS 1.42.0 (Low-Latency Streaming)

Platform	Downloads and Changes
Android Broadcast SDK 1.42.0	**Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.42.0/android/ • Bug fixes and stability improvements.
iOS Broadcast SDK 1.42.0	**Download for low-latency streaming:** https://broadcast.live-video.net/1.42.0/AmazonIVSBroadcast.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.42.0/ios/ • Bug fixes and stability improvements.

Broadcast SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	2.014 MB	5.456 MB
armeabi-v7a	1.765 MB	3.779 MB
x86_64	2.096 MB	5.791 MB
x86	2.119 MB	5.568 MB

Broadcast SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	1.017 MB	2.252 MB

May 7, 2026

IVS Broadcast SDK: Web 1.35.0 (Low-Latency Streaming)

Platform	Downloads and Changes
Web Broadcast SDK 1.35.0	**Reference documentation:** https://aws.github.io/amazon-ivs-web-broadcast/docs/sdk-reference/ • Bug fixes and stability improvements.

April 22, 2026

Server-Side Ad Insertion (SSAI)

Server-side ad insertion enables you to monetize your streams with video ads. IVS SSAI integrates with AWS Elemental MediaTailor, giving you access to capabilities such as ad decisioning, audience targeting, and personalization. IVS provides an API operation to insert ad breaks into your live stream, allowing you to give creators or operators control over when ads run. Ads are stitched directly into the video stream, enabling a seamless viewing experience while avoiding complex client-side logic.

See the new SSAI document in the *IVS Low-Latency Streaming User Guide*. For details of all documentation changes, see the Document History (both the User Guide and API Reference tables).

April 16, 2026

IVS Player SDK: Web 1.51.0

Platform	Downloads and Changes
Web player 1.51.0 & Video.js integration & JW player integration	**NPM Package:** https://www.npmjs.com/package/amazon-ivs-player **Script asset:** https://player.live-video.net/1.51.0/amazon-ivs-player.min.js **Video.js tech asset:** https://player.live-video.net/1.51.0/amazon-ivs-videojs-tech.min.js **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.51.0/web/ • Bug fixes and stability improvements.

April 16, 2026

IVS Player SDK: Android 1.51.0, iOS 1.51.0

Platform	Downloads and Changes
Android player 1.51.0	**Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.51.0/android/ • Bug fixes and stability improvements.
iOS Player 1.51.0	**Download:** https://player.live-video.net/1.51.0/AmazonIVSPlayer.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.51.0/ios/ • Bug fixes and stability improvements.

Mobile SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.470 MB	3.794 MB
armeabi-v7a	1.305 MB	2.694 MB
x86_64	1.473 MB	3.854 MB
x86	1.525 MB	3.863 MB

Mobile SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.779 MB	1.697 MB

April 9, 2026

IVS Broadcast SDK: Web 1.34.0 (Low-Latency Streaming)

Platform	Downloads and Changes
Web Broadcast SDK 1.34.0	**Reference documentation:** https://aws.github.io/amazon-ivs-web-broadcast/docs/sdk-reference/ • Bug fixes and stability improvements

April 9, 2026

Amazon IVS Broadcast SDK: Android 1.41.0, iOS 1.41.0 (Low-Latency Streaming)

Platform	Downloads and Changes
Android Broadcast SDK 1.41.0	**Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.41.0/android/ • Bug fixes and stability improvements
iOS Broadcast SDK 1.41.0	**Download for low-latency streaming:** https://broadcast.live-video.net/1.41.0/AmazonIVSBroadcast.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.41.0/ios/ • Bug fixes and stability improvements

Broadcast SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	2.055 MB	5.433 MB
armeabi-v7a	1.755 MB	3.762 MB
x86_64	2.087 MB	5.767 MB
x86	2.109 MB	5.547 MB

Broadcast SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	1.030 MB	2.264 MB

March 19, 2026

IVS Player SDK: Android 1.50.0, iOS 1.50.0

Platform	Downloads and Changes
Android player 1.50.0	**Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.50.0/android/ • Bug fixes and stability improvements.
iOS Player 1.50.0	**Download:** https://player.live-video.net/1.50.0/AmazonIVSPlayer.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.50.0/ios/ • Annotated `NS_SWIFT_SENDABLE` conformance to public data classes. • Bug fixes and stability improvements.

Mobile SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.477 MB	3.825 MB
armeabi-v7a	1.308 MB	2.710 MB
x86_64	1.479 MB	3.889 MB

Architecture	Compressed Size	Uncompressed Size
x86	1.534 MB	3.896 MB

Mobile SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.797 MB	1.740 MB

March 19, 2026

IVS Player SDK: Web 1.50.0

Platform	Downloads and Changes
Web player 1.50.0 & Video.js integration & JW player integration	**NPM Package:** https://www.npmjs.com/package/amazon-ivs-player **Script asset:** https://player.live-video.net/1.50.0/amazon-ivs-player.min.js **Video.js tech asset:** https://player.live-video.net/1.50.0/amazon-ivs-videojs-tech.min.js **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.50.0/web/ • Bug fixes and stability improvements.

March 12, 2026

IVS Broadcast SDK: Web 1.33.0 (Low-Latency Streaming)

Platform	Downloads and Changes
Web Broadcast SDK 1.33.0	**Reference documentation:** https://aws.github.io/amazon-ivs-web-broadcast/docs/sdk-reference/ • Bug fixes and stability improvements.

March 12, 2026

Amazon IVS Broadcast SDK: Android 1.40.0, iOS 1.40.0 (Low-Latency Streaming)

Platform	Downloads and Changes
Android Broadcast SDK 1.40.0	**Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.40.0/android/ • Improved reliability of auto-reconnect behavior. • Improved error messages around TLS certificate validation failures and expanded error enum codes.
iOS Broadcast SDK 1.40.0	**Download for low-latency streaming:** https://broadcast.live-video.net/1.40.0/AmazonIVSBroadcast.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.40.0/ios/

Platform	Downloads and Changes
	• Improved reliability of auto-reconnect behavior. • Improved error messages around TLS certificate validation failures and expanded error enum codes.

Broadcast SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.998 MB	5.421 MB
armeabi-v7a	1.749 MB	3.754 MB
x86_64	2.081 MB	5.756 MB
x86	2.102 MB	5.535 MB

Broadcast SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	1.027 MB	2.248 MB

February 19, 2026

IVS Player SDK: Android 1.49.0, iOS 1.49.0

Platform	Downloads and Changes
Android player 1.49.0	**Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.49.0/android/

Platform	Downloads and Changes
	• Fixed an issue related to automatic quality switching in auto mode when consuming certain OBS x264 encoded streams. Previously, switching from a manually selected rendition back to auto could impact the transition up to the source quality. • Bug fixes and stability improvements.
iOS Player 1.49.0	**Download:** https://player.live-video.net/1.49.0/AmazonIVSPlayer.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.49.0/ios/ • Bug fixes and stability improvements. • Effective with this release, the IVS SDKs are no longer distributed via CocoaPods. CocoaPods announced its deprecation in 2024 and will enter read-only state later this year. Swift Package Manager (SPM) replaces CocoaPods as Apple's supported dependency-management solution and is the standard way to integrate SDKs in modern Xcode projects. We recommend that you migrate to SPM or integrate the IVS SDK frameworks directly into your project. IVS SDKs are fully supported via both approaches. Related documentation changes were made in iOS Player SDK Guide (in "Getting Started with the IVS iOS Player SDK").

Mobile SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.517 MB	3.917 MB
armeabi-v7a	1.344 MB	2.780 MB
x86_64	1.519 MB	3.982 MB
x86	1.575 MB	3.989 MB

Mobile SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.810 MB	1.773 MB

February 19, 2026

IVS Player SDK: Web 1.49.0

Platform	Downloads and Changes
Web player 1.49.0 & Video.js integration & JW player integration	**NPM Package:** https://www.npmjs.com/package/amazon-ivs-player **Script asset:** https://player.live-video.net/1.49.0/amazon-ivs-player.min.js **Video.js tech asset:** https://player.live-video.net/1.49.0/amazon-ivs-videojs-tech.min.js **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.49.0/web/ • Bug fixes and stability improvements.

February 13, 2026

Amazon IVS Broadcast SDK: Android 1.39.0, iOS 1.39.0 (Low-Latency Streaming)

Platform	Downloads and Changes
Android Broadcast SDK 1.39.0	**Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.39.0/android/ • Updated core Android build tools and NDK version. • Fixed rare deadlock when stopping a `MixedImageDevice` .
iOS Broadcast SDK 1.39.0	**Download for low-latency streaming:** https://broadcast.live-video.net/1.39.0/AmazonIVSBroadcast.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.39.0/ios/ • Updated Xcode to version 26.2. • Effective with this release, the IVS SDKs are no longer distributed via CocoaPods. CocoaPods announced its deprecation in 2024 and will enter read-only state later this year. Swift Package Manager (SPM) replaces CocoaPods as Apple's supported dependency-management solution and is the standard way to integrate SDKs in modern Xcode projects. We recommend that you migrate to SPM or integrate the IVS SDK frameworks

Platform	Downloads and Changes
	directly into your project. IVS SDKs are fully supported via both approaches. Related documentation changes were made in iOS Broadcast SDK Guide (in "Install the Library").

Broadcast SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.969 MB	5.353 MB
armeabi-v7a	1.726 MB	3.704 MB
x86_64	2.049 MB	5.682 MB
x86	2.072 MB	5.463 MB

Broadcast SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	1.016 MB	2.230 MB

February 12, 2026

IVS Broadcast SDK: Web 1.32.0 (Low-Latency Streaming)

Platform	Downloads and Changes
Web Broadcast SDK 1.32.0	**Reference documentation:** https://aws.github.io/amazon-ivs-web-broadcast/docs/sdk-reference/

Platform	Downloads and Changes
	• Bug fixes and stability improvements.

January 13, 2026

Amazon IVS Broadcast SDK: Android 1.38.0, iOS 1.38.0 (Low-Latency Streaming)

Platform	Downloads and Changes
Android Broadcast SDK 1.38.0	**Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.38.0/android/ • Changed the codes associated with some errors. See Mobile Broadcast SDK Error Migration Guide below.
iOS Broadcast SDK 1.38.0	**Download for low-latency streaming:** https://broadcast.live-video.net/1.38.0/AmazonIVSBroadcast.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.38.0/ios/ • Changed the codes associated with some errors. See Mobile Broadcast SDK Error Migration Guide below.

Broadcast SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.974 MB	5.361 MB

Architecture	Compressed Size	Uncompressed Size
armeabi-v7a	1.730 MB	3.709 MB
x86_64	2.054 MB	5.693 MB
x86	2.078 MB	5.474 MB

Broadcast SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.946 MB	2.296 MB

Mobile Broadcast SDK Error Migration Guide

In version 1.38.0 of the iOS and Android broadcast SDKs, the codes associated with some errors have changed. Previously, there was no single property that could be used to uniquely identify any error emitted from the SDKs. Instead, to understand what an error meant, a combination of the following properties needed to be examined:

Android	iOS
`BroadcastException.getCode()`	`NSError.code`
`BroadcastException.getUid()`	`NSError.userInfo[IVSBroadcastUidDescriptionErrorKey]`
`BroadcastException.getError()`	`NSError.userInfo[IVSBroadcastResultDescriptionErrorKey]`
`BroadcastException.getSource()`	`NSError.userInfo[IVSBroadcastSourceDescriptionErrorKey]`
`BroadcastException.getDetail()`	`NSError.userInfo[NSLocalizedDescriptionKey]`

With version 1.38.0 and greater, `BroadcastException.getCode()` (Android) and `NSError.code` (iOS) return a unique ID that can be looked up in the public `BroadcastErrorCode` (Android) and `IVSBroadcastErrorCode` (iOS) enums.

In addition to making `code` the unique ID for all errors, an additional field was added: `BroadcastException.getPlatformCode()` (Android) and `NSError.userInfo[IVSBroadcastPlatformCodeDescriptionErrorKey]` (iOS). If an error is caused by the underlying platform (such as a network error or a video encode or decode error), this field is non-zero and can be used to collect additional information from the platform's documentation.

Migrating from SDK 1.37.0 and Earlier

To make every error conform to the new strategy, some existing errors had to change their values. Below is a guide to map existing logic to the new logic:

- Any error where `code` was non-zero will keep the same value for code; however, referencing the code through the new enum constants may improve clarity. For example, comparing an error to `BroadcastErrorCode.Broadcast.LatencyThresholdReached` is clearer than comparing it to `20401`.
- Any error where `UID` had a value (i.e. was not `-1` on Android or `"-1"` on iOS) will now have the `code` field set to what the existing `UID` value was. If you have conditionals comparing the `UID` field, you can keep the constants but compare them against the `code` field going forward.
- Some legacy errors did not contain a `code` or a `UID` value. These were commonly matched based on the `message` (Android) or `description` (iOS) of the error, which is not a reliable way to identify errors because of the dynamic nature of error messages. Because these errors didn't have uniquely identifying characteristics, one-to-one mappings can't be provided. However, most errors kept the same description, so it is possible to continue using the same matching logic while also gathering and reporting the new `code` value for future app releases.

As a concrete example, the error checking in the following table should be migrated as follows:

Before	After
`error.code == 20401`	`error.code == BroadcastErrorCode .Broadcast.LatencyThreshold Reached`

Before	After
	No change, but prefer comparison to the enum value.
`error.uid == 207`	`error.code == BroadcastErrorCode.Net.SocketRemoteHangup` Compare to `code` instead of `uid`.
`error.message.contains("IceConnectionFailed")`	`error.code == BroadcastErrorCode.RealTime.PeerConnectionIceConnectionFailed` Don't compare to `message` (or `source`, or `result/detail`). Instead, find the appropriate enum code to compare to.

The most important part of an error is still `BroadcastException.getPlatformCode()` (Android) and `NSError.userInfo[IVSBroadcastPlatformCodeDescriptionErrorKey]` (iOS), but in version 1.38.0 and beyond, the `code` field uniquely identifies errors and allows immediate lookup of the error name and description in the `BroadcastErrorCode` (Android) and `IVSBroadcastErrorCode` (iOS) enums. As a result, other fields like `UID`, `source`, and `detail` should not be used in lookup logic; they exist only as supplemental information.

December 18, 2025

IVS Player SDK: Web 1.48.0

Platform	Downloads and Changes
Web player 1.48.0 & Video.js integration & JW player integration	**NPM Package:** https://www.npmjs.com/package/amazon-ivs-player **Script asset:** https://player.live-video.net/1.48.0/amazon-ivs-player.min.js

Platform	Downloads and Changes
	Video.js tech asset: https://player.live-video.net/1.48.0/amazon-ivs-videojs-tech.min.js **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.48.0/web/ • Bug fixes and stability improvements.

December 18, 2025

IVS Player SDK: Android 1.48.0, iOS 1.48.0

Platform	Downloads and Changes
Android player 1.48.0	**Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.48.0/android/ • The public constructor for the `UnavailableQuality` class has been removed. (This was previously made public in error.) • Bug fixes and stability improvements.
iOS Player 1.48.0	**Download:** https://player.live-video.net/1.48.0/AmazonIVSPlayer.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.48.0/ios/ • Bug fixes and stability improvements.

Mobile SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.495 MB	3.862 MB

Architecture	Compressed Size	Uncompressed Size
armeabi-v7a	1.323 MB	2.736 MB
x86_64	1.496 MB	3.926 MB
x86	1.552 MB	3.936 MB

Mobile SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.751 MB	1.822 MB

December 11, 2025

Amazon IVS Broadcast SDK: Android 1.37.1 (Low-Latency Streaming)

Platform	Downloads and Changes
Android Broadcast SDK 1.37.1	**Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.37.1/android/ • Stability improvement in the networking stack.

Broadcast SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.953 MB	5.320 MB
armeabi-v7a	1.713 MB	3.681 MB

Architecture	Compressed Size	Uncompressed Size
x86_64	2.036 MB	5.665 MB
x86	2.062 MB	5.454 MB

December 5, 2025

IVS Broadcast SDK: Web 1.31.0 (Low-Latency Streaming)

Platform	Downloads and Changes
Web Broadcast SDK 1.31.0	**Reference documentation:** https://aws.github.io/amazon-ivs-web-broadcast/docs/sdk-reference/ • Bug fixes and stability improvements.

December 5, 2025

Amazon IVS Broadcast SDK: Android 1.37.0, iOS 1.37.0 (Low-Latency Streaming)

Platform	Downloads and Changes
Android Broadcast SDK 1.37.0	**Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.37.0/android/ • Bug fixes and stability improvements.
iOS Broadcast SDK 1.37.0	**Download for low-latency streaming:** https://broadcast.live-video.net/1.37.0/AmazonIVSBroadcast.xcframework.zip

Platform	Downloads and Changes
	Reference documentation: https://aws.github.io/amazon-ivs-broadcast-docs/1.37.0/ios/ • Bug fixes and stability improvements.

Broadcast SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.953 MB	5.316 MB
armeabi-v7a	1.713 MB	3.678 MB
x86_64	2.036 MB	5.661 MB
x86	2.062 MB	5.450 MB

Broadcast SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.941 MB	2.279 MB

November 20, 2025

IVS Player SDK: Web 1.47.0

Platform	Downloads and Changes
Web player 1.47.0 & Video.js integration & JW player integration	**NPM Package:** https://www.npmjs.com/package/amazon-ivs-player **Script asset:** https://player.live-video.net/1.47.0/amazon-ivs-player.min.js

Platform	Downloads and Changes
	Video.js tech asset: https://player.live-video.net/1.47.0/amazon-ivs-videojs-tech.min.js **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.47.0/web/ • Bug fixes and stability improvements.

November 20, 2025

IVS Player SDK: Android 1.47.0, iOS 1.47.0

Platform	Downloads and Changes
Android player 1.47.0	**Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.47.0/android/ • Bug fixes and stability improvements.
iOS Player 1.47.0	**Download:** https://player.live-video.net/1.47.0/AmazonIVSPlayer.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.47.0/ios/ • Bug fixes and stability improvements.

Mobile SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.487 MB	3.833 MB
armeabi-v7a	1.318 MB	2.718 MB

Architecture	Compressed Size	Uncompressed Size
x86_64	1.489 MB	3.894 MB
x86	1.547 MB	3.912 MB

Mobile SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.742 MB	1.806 MB

October 30, 2025

IVS Broadcast SDK: Web 1.30.0 (Low-Latency Streaming)

Platform	Downloads and Changes
Web Broadcast SDK 1.30.0	**Reference documentation:** https://aws.github.io/amazon-ivs-web-broadcast/docs/sdk-reference/ • Bug fixes and stability improvements.

October 30, 2025

Amazon IVS Broadcast SDK: Android 1.36.0, iOS 1.36.0 (Low-Latency Streaming)

Platform	Downloads and Changes
Android Broadcast SDK 1.36.0	**Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.36.0/android/

Platform	Downloads and Changes
	• Improved camera recovery when returning to the foreground after being in the background for a prolonged period of time.
iOS Broadcast SDK 1.36.0	**Download for low-latency streaming:** https://broadcast.live-video.net/1.36.0/AmazonIVSBroadcast.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.36.0/ios/ • Bug fixes and stability improvements.

Broadcast SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.955 MB	5.317 MB
armeabi-v7a	1.716 MB	3.681 MB
x86_64	2.037 MB	5.661 MB
x86	2.065 MB	5.451 MB

Broadcast SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.939 MB	2.279 MB

October 23, 2025

IVS Player SDK: Web 1.46.0

Platform	Downloads and Changes
Web player 1.46.0 & Video.js integration & JW player integration	**NPM Package:** https://www.npmjs.com/package/amazon-ivs-player **Script asset:** https://player.live-video.net/1.46.0/amazon-ivs-player.min.js **Video.js tech asset:** https://player.live-video.net/1.46.0/amazon-ivs-videojs-tech.min.js **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.46.0/web/ • Bug fixes and stability improvements.

October 23, 2025

IVS Player SDK: Android 1.46.0, iOS 1.46.0

Platform	Downloads and Changes
Android player 1.46.0	**Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.46.0/android/ • Bug fixes and stability improvements.
iOS Player 1.46.0	**Download:** https://player.live-video.net/1.46.0/AmazonIVSPlayer.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.46.0/ios/ • Bug fixes and stability improvements.

Mobile SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.481 MB	3.816 MB
armeabi-v7a	1.314 MB	2.707 MB
x86_64	1.485 MB	3.876 MB
x86	1.540 MB	3.896 MB

Mobile SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.738 MB	1.789 MB

October 15, 2025

Expanded Interface VPC Endpoints

We extended the supported regions for interface VPC (Virtual Private Cloud) endpoints (released on September 10, 2025). See Private Ingest in the *IVS Low-Latency Streaming User Guide*.

October 2, 2025

IVS Broadcast SDK: Web 1.29.0 (Low-Latency Streaming)

Platform	Downloads and Changes
Web Broadcast SDK 1.29.0	**Reference documentation:** https://aws.github.io/amazon-ivs-web-broadcast/docs/sdk-reference/ • Bug fixes and stability improvements.

October 2, 2025

Amazon IVS Broadcast SDK: Android 1.35.0, iOS 1.35.0 (Low-Latency Streaming)

Platform	Downloads and Changes

Android Broadcast SDK 1.35.0	**Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.35.0/android/
	• We changed the `BroadcastSession.recommendedVideoSettings` operation:
	  • A cancelled operation emits a final result with an error.
	  • All callbacks are emitted on the main thread.
	  • If bandwidth is too low to broadcast, an error (instead of a video configuration) is emitted for the final result.
	• Support for Android 5 is deprecated as of this release.

iOS Broadcast SDK 1.35.0	**Download for low-latency streaming:** https://broadcast.live-video.net/1.35.0/AmazonIVSBroadcast.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.35.0/ios/ • `IVSImageDevice.setOnFrameCallback` can now be customized with a `DispatchQueue`, and optionally can include the `CVPixelBuffer` associated with the frame.

Platform	Downloads and Changes

	• We changed the `IVSBroadcastSession.recommendedVideoSettings` operation:
	  • A cancelled operation emits a final result with an error.
	  • All callbacks are emitted on the main queue.
	  • If bandwidth is too low to broadcast, an error (instead of a video configuration) is emitted for the final result.

Broadcast SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.946 MB	5.303 MB
armeabi-v7a	1.709 MB	3.671 MB
x86_64	2.030 MB	5.646 MB
x86	2.055 MB	5.434 MB

Broadcast SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.936 MB	2.280 MB

September 25, 2025

IVS Player SDK: Web 1.45.0

Platform	Downloads and Changes
Web player 1.45.0 & Video.js integration & JW player integration	**NPM Package:** https://www.npmjs.com/package/amazon-ivs-player **Script asset:** https://player.live-video.net/1.45.0/amazon-ivs-player.min.js **Video.js tech asset:** https://player.live-video.net/1.45.0/amazon-ivs-videojs-tech.min.js **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.45.0/web/ • Added the capability to lower playback quality when the player is in a hidden tab. This is disabled by default; it can be enabled by setting `optimizeBackgroundPlayback` in the Player constructor config. See Optimizing Background Playback in the *Web Player SDK Guide*. • Reduced bundle size. • Additional bug fixes and stability improvements.

September 25, 2025

IVS Player SDK: Android 1.45.0, iOS 1.45.0

Platform	Downloads and Changes
Android player 1.45.0	**Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.45.0/android/ • Bug fixes and stability improvements. • Support for Android 5 is deprecated as of this release.
iOS Player 1.45.0	**Download:** https://player.live-video.net/1.45.0/AmazonIVSPlayer.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.45.0/ios/ • Fixed a race condition that could occur as a result of reassigning the `player` property of the `IVSPlayerLayer` or `IVSPlayerView` class to a different player instance. • It is now considered thread-safe to dealloc `IVSPlayer` instances off the main thread. • Additional bug fixes and stability improvements.

Mobile SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.472 MB	3.787 MB
armeabi-v7a	1.303 MB	2.683 MB

Architecture	Compressed Size	Uncompressed Size
x86_64	1.479 MB	3.845 MB
x86	1.534 MB	3.867 MB

Mobile SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.738 MB	1.790 MB

September 11, 2025

Amazon IVS Broadcast SDK: Android 1.34.0, iOS 1.34.0 (Low-Latency Streaming)

Platform	Downloads and Changes
Android Broadcast SDK 1.34.0	**Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.34.0/android/ • CPU improvements for RTMP and RTMPS broadcasting. • Support for Android 5 will be deprecated as of IVS Broadcast SDK 1.35.0.
iOS Broadcast SDK 1.34.0	**Download for low-latency streaming:** https://broadcast.live-video.net/1.34.0/AmazonIVSBroadcast.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.34.0/ios/

Platform	Downloads and Changes
	• CPU improvements for RTMP and RTMPS broadcasting.

Broadcast SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	2.020 MB	5.504 MB
armeabi-v7a	1.778 MB	3.828 MB
x86_64	2.106 MB	5.864 MB
x86	2.134 MB	5.655 MB

Broadcast SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.965 MB	2.346 MB

September 10, 2025

Interface VPC Endpoints

New support for interface VPC (Virtual Private Cloud) endpoints enables you to establish a secure private connection between your Amazon VPC and IVS, for workloads that require secure, live video ingestion. This keeps your IVS ingest traffic within the AWS network and off the public internet. Interface VPC endpoints are powered by AWS PrivateLink, an AWS technology that enables private communication between AWS services, using an elastic network interface with private IPs in your Amazon VPC. See Private Ingest in the *IVS Low-Latency Streaming User Guide* and Private Ingest to Stages in the *IVS Real-Time Streaming User Guide*.

September 4, 2025

IVS Broadcast SDK: Web 1.28.0 (Low-Latency Streaming)

Platform	Downloads and Changes
Web Broadcast SDK 1.28.0	**Reference documentation:** https://aws.github.io/amazon-ivs-web-broadcast/docs/sdk-reference/ • Bug fixes and stability improvements.

August 28, 2025

IVS Player SDK: Web 1.44.0

Platform	Downloads and Changes
Web player 1.44.0 & Video.js integration & JW player integration	**NPM Package:** https://www.npmjs.com/package/amazon-ivs-player **Script asset:** https://player.live-video.net/1.44.0/amazon-ivs-player.min.js **Video.js tech asset:** https://player.live-video.net/1.44.0/amazon-ivs-videojs-tech.min.js **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.44.0/web/ • Bug fixes and stability improvements.

August 28, 2025

IVS Player SDK: Android 1.44.0, iOS 1.44.0

Platform	Downloads and Changes
Android player 1.44.0	**Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.44.0/android/ • Bug fixes and stability improvements. • Support for Android 5 will be deprecated as of IVS Player 1.45.0.
iOS Player 1.44.0	**Download:** https://player.live-video.net/1.44.0/AmazonIVSPlayer.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.44.0/ios/ • Bug fixes and stability improvements.

Mobile SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.399 MB	3.693 MB
armeabi-v7a	1.234 MB	2.611 MB
x86_64	1.406 MB	3.748 MB
x86	1.461 MB	3.767 MB

Mobile SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.738 MB	1.790 MB

August 7, 2025

IVS Broadcast SDK: Web 1.27.0 (Low-Latency Streaming)

Platform	Downloads and Changes
Web Broadcast SDK 1.27.0	**Reference documentation:** https://aws.github.io/amazon-ivs-web-broadcast/docs/sdk-reference/ • Bug fixes and stability improvements.

August 7, 2025

Amazon IVS Broadcast SDK: Android 1.33.0, iOS 1.33.0 (Low-Latency Streaming)

Platform	Downloads and Changes
Android Broadcast SDK 1.33.0	**Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.33.0/android/ • Added support for insecure ingest (RTMP). • New methods to control device torch: • `CameraSource.Capabilities` implements `isTorchSupported` .

Platform	Downloads and Changes
	• `CameraSource.Options.Builder` implements `setEnableTorch` . • The Android broadcast SDK meets Google Play's 16 KB page-size compatibility requirement. (Note: This was implemented as of version 1.23.0 of the SDK.) • Support for Android 5 will be deprecated as of IVS Broadcast SDK 1.35.0.
iOS Broadcast SDK 1.33.0	**Download for low-latency streaming:** https://broadcast.live-video.net/1.33.0/AmazonIVSBroadcast.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.33.0/ios/ • Added support for insecure ingest (RTMP). • New method to control device torch: `IVSImageDevice` implements two properties, `isTorchSupported` and `torchEnabled` . Check if the device supports torch with `isTorchSupported` , and then toggle it by setting `torchEnabled` . • Support for iOS 13 is deprecated as of this release.

Broadcast SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.968 MB	5.372 MB
armeabi-v7a	1.753 MB	3.775 MB

Architecture	Compressed Size	Uncompressed Size
x86_64	2.067 MB	5.767 MB
x86	2.090 MB	5.558 MB

Broadcast SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.942 MB	2.296 MB

July 31, 2025

IVS Player SDK: Android 1.43.0, iOS 1.43.0

Platform	Downloads and Changes

Android player 1.43.0	**Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.43.0/android/
	• The SDK now supports using the system's default CookieManager for HTTP requests. To use this feature:
	  • Set the default CookieManager before creating a Player instance.
	  • If you are using `okhttp3:4.x` as an HTTP client, add `okhttp-urlconnection` as a dependency. No additional dependencies are required if you are using other HTTP clients.
	  • Add the cookie to the default CookieManager.
	• Bug fixes and stability improvements.

Platform	Downloads and Changes
	• Support for Android 5 will be deprecated as of IVS Player 1.45.0.
iOS Player 1.43.0	**Download:** https://player.live-video.net/1.43.0/AmazonIVSPlayer.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.43.0/ios/ • Using the Swift Package Manager is now the recommended way to integrate the Player SDK. See Recommended: Integrate the Player SDK (Swift Package Manager) in the iOS Player Guide. • Bug fixes and stability improvements. • Support for iOS 13 is deprecated as of this release.

Mobile SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.387 MB	3.661 MB
armeabi-v7a	1.223 MB	2.588 MB
x86_64	1.393 MB	3.716 MB
x86	1.447 MB	3.734 MB

Mobile SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.728 MB	1.757 MB

July 31, 2025

IVS Player SDK: Web 1.43.0

Platform	Downloads and Changes
Web player 1.43.0 & Video.js integration & JW player integration	**NPM Package:** https://www.npmjs.com/package/amazon-ivs-player **Script asset:** https://player.live-video.net/1.43.0/amazon-ivs-player.min.js **Video.js tech asset:** https://player.live-video.net/1.43.0/amazon-ivs-videojs-tech.min.js **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.43.0/web/ • Bug fixes and stability improvements.

July 25, 2025

Amazon IVS Broadcast SDK: Android 1.32.2 (Low-Latency Streaming)

Platform	Downloads and Changes
Android Broadcast SDK 1.32.2	**Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.32.2/android/ • There were no changes to the low-latency SDK in this release. • Support for Android 5 will be deprecated as of IVS Broadcast SDK 1.35.0.

Broadcast SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.979 MB	5.409 MB
armeabi-v7a	1.762 MB	3.801 MB
x86_64	2.078 MB	5.808 MB
x86	2.103 MB	5.598 MB

July 10, 2025

IVS Player SDK: Web 1.42.0

Platform	Downloads and Changes
Web player 1.42.0 & Video.js integration & JW player integration	**NPM Package:** https://www.npmjs.com/package/amazon-ivs-player **Script asset:** https://player.live-video.net/1.42.0/amazon-ivs-player.min.js **Video.js tech asset:** https://player.live-video.net/1.42.0/amazon-ivs-videojs-tech.min.js **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.42.0/web/ • Bug fixes and stability improvements.

July 10, 2025

IVS Player SDK: Android 1.42.0, iOS 1.42.0

Platform	Downloads and Changes
Android player 1.42.0	**Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.42.0/android/ • With this release we also began publishing a version of the Android Player SDK with support for debug symbols. See Using the SDK with Debug Symbols. • Bug fixes and stability improvements. • Support for Android 5 will be deprecated as of IVS Player 1.45.0.
iOS Player 1.42.0	**Download:** https://player.live-video.net/1.42.0/AmazonIVSPlayer.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.42.0/ios/ • Bug fixes and stability improvements. • Support for iOS 13 will be deprecated as of IVS Player 1.43.0.

Mobile SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.341 MB	3.520 MB
armeabi-v7a	1.184 MB	2.488 MB
x86_64	1.346 MB	3.567 MB

Architecture	Compressed Size	Uncompressed Size
x86	1.399 MB	3.589 MB

Mobile SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.706 MB	1.716 MB

July 10, 2025

Amazon IVS Broadcast SDK: Android 1.32.1, iOS 1.32.1 (Low-Latency Streaming)

Platform	Downloads and Changes
Android Broadcast SDK 1.32.1	**Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.32.1/android/ • RTMP auto-reconnect improvements. • RTMP stability improvements. • Added a `MixedDevice` API suite for compositing multiple image and audio sources into a single output `Device`, replacing `BroadcastSession.Mixer`. • Support for Android 5 will be deprecated as of IVS Broadcast SDK 1.35.0.
iOS Broadcast SDK 1.32.1	**Download for low-latency streaming:** https://broadcast.live-video.net/1.32.1/AmazonIVSBroadcast.xcframework.zip

Platform	Downloads and Changes
	Reference documentation: https://aws.github.io/amazon-ivs-broadcast-docs/1.32.1/ios/ • RTMP auto-reconnect improvements. • RTMP stability improvements. • Added an `IVSMixedDevice` API suite for compositing multiple image and audio sources into a single output `IVSDevice`, replacing `IVSMixer`. • Support for iOS 13 will be deprecated as of IVS Broadcast SDK 1.33.0

Broadcast SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.979 MB	5.409 MB
armeabi-v7a	1.762 MB	3.801 MB
x86_64	2.078 MB	5.808 MB
x86	2.103 MB	5.598 MB

Broadcast SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.951 MB	3.508 MB

July 7, 2025

IVS Broadcast SDK: Web 1.26.0 (Low-Latency Streaming)

Platform	Downloads and Changes
Web Broadcast SDK 1.26.0	**Reference documentation:** https://aws.github.io/amazon-ivs-web-broadcast/docs/sdk-reference/ • Bug fixes and stability improvements.

June 16, 2025

IVS Broadcast SDK: Web 1.25.1 (Low-Latency Streaming)

Platform	Downloads and Changes
Web Broadcast SDK 1.25.1	**Reference documentation:** https://aws.github.io/amazon-ivs-web-broadcast/docs/sdk-reference/ • Removed the NPM unintentional engine enforcement of v22. All LTS node versions are supported as the package is transpiled.

June 12, 2025

Amazon IVS Broadcast SDK: Android 1.31.0, iOS 1.31.0 (Low-Latency Streaming)

Platform	Downloads and Changes
Android Broadcast SDK 1.31.0	**Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.31.0/android/ • Bug fixes and stability improvements.
iOS Broadcast SDK 1.31.0	**Download for low-latency streaming:** https://broadcast.live-video.net/1.31.0/AmazonIVSBroadcast.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.31.0/ios/ • Bug fixes and stability improvements. • Support for iOS 13 will be deprecated as of IVS Broadcast SDK 1.33.0

Broadcast SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.936 MB	5.294 MB
armeabi-v7a	1.723 MB	3.715 MB
x86_64	2.034 MB	5.689 MB
x86	2.056 MB	5.487 MB

Broadcast SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.935 MB	2.288 MB

June 12, 2025

IVS Broadcast SDK: Web 1.25.0 (Low-Latency Streaming)

Platform	Downloads and Changes
Web Broadcast SDK 1.25.0	**Reference documentation:** https://aws.github.io/amazon-ivs-web-broadcast/docs/sdk-reference/ • Bug fixes and stability improvements.

June 5, 2025

IVS Player SDK: Android 1.41.0, iOS 1.41.0

Platform	Downloads and Changes
Android player 1.41.0	**Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.41.0/android/ • Bug fixes and stability improvements.
iOS Player 1.41.0	**Download:** https://player.live-video.net/1.41.0/AmazonIVSPlayer.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.41.0/ios/ • Bug fixes and stability improvements.

Platform	Downloads and Changes
	• Support for iOS 13 will be deprecated as of IVS Player 1.43.0.

Mobile SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.323 MB	3.482 MB
armeabi-v7a	1.169 MB	2.460 MB
x86_64	1.326 MB	3.517 MB
x86	1.385 MB	3.551 MB

Mobile SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.699 MB	1.717 MB

June 5, 2025

IVS Player SDK: Web 1.41.0

Platform	Downloads and Changes
Web player 1.41.0 & Video.js integration & JW player integration	**NPM Package:** https://www.npmjs.com/package/amazon-ivs-player **Script asset:** https://player.live-video.net/1.41.0/amazon-ivs-player.min.js

Platform	Downloads and Changes
	Video.js tech asset: https://player.live-video.net/1.41.0/amazon-ivs-videojs-tech.min.js **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.41.0/web/ • Added an event to expose metadata sourced from `UserDataUnregistered` SEI messages contained in the video track. • Additional bug fixes and stability improvements.

May 26, 2025

Amazon IVS Broadcast SDK: Android 1.30.1 (Low-Latency Streaming)

Platform	Downloads and Changes
Android Broadcast SDK 1.30.1	**Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.30.1/android/ • There were no changes to the low-latency SDK in this release.

Broadcast SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.936 MB	5.293 MB
armeabi-v7a	1.723 MB	3.715 MB
x86_64	2.035 MB	5.689 MB

Architecture	Compressed Size	Uncompressed Size
x86	2.057 MB	5.487 MB

May 15, 2025

IVS Broadcast SDK: Web 1.24.0 (Low-Latency Streaming)

Platform	Downloads and Changes
Web Broadcast SDK 1.24.0	**Reference documentation:** https://aws.github.io/amazon-ivs-web-broadcast/docs/sdk-reference/ • Bug fixes and stability improvements.

May 15, 2025

Amazon IVS Broadcast SDK: Android 1.30.0, iOS 1.30.0 (Low-Latency Streaming)

Platform	Downloads and Changes
Android Broadcast SDK 1.30.0	**Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.30.0/android/ • Bug fixes and stability improvements.
iOS Broadcast SDK 1.30.0	**Download for low-latency streaming:** https://broadcast.live-video.net/1.30.0/AmazonIVSBroadcast.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.30.0/ios/

Platform	Downloads and Changes
	• Bug fixes and stability improvements. • Support for iOS 13 will be deprecated as of IVS Broadcast SDK 1.33.0

Broadcast SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.936 MB	5.293 MB
armeabi-v7a	1.722 MB	3.715 MB
x86_64	2.034 MB	5.689 MB
x86	2.057 MB	5.486 MB

Broadcast SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.935 MB	2.288 MB

May 8, 2025

IVS Player SDK: Android 1.40.0, iOS 1.40.0

Platform	Downloads and Changes
Android player 1.40.0	**Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.40.0/android/ • Bug fixes and stability improvements.

Platform	Downloads and Changes
iOS Player 1.40.0	**Download:** https://player.live-video.net/1.40.0/AmazonIVSPlayer.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.40.0/ios/ • dSYM files are now shipped alongside the SDK in the `xcframework` . • Bug fixes and stability improvements. • Support for iOS 13 will be deprecated as of IVS Player 1.43.0.

Mobile SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.308 MB	3.439 MB
armeabi-v7a	1.154 MB	2.429 MB
x86_64	1.311 MB	3.471 MB
x86	1.368 MB	3.504 MB

Mobile SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.685 MB	1.633 MB

May 8, 2025

IVS Player SDK: Web 1.40.0

Platform	Downloads and Changes
Web player 1.40.0 & Video.js integration & JW player integration	**NPM Package:** https://www.npmjs.com/package/amazon-ivs-player **Script asset:** https://player.live-video.net/1.40.0/amazon-ivs-player.min.js **Video.js tech asset:** https://player.live-video.net/1.40.0/amazon-ivs-videojs-tech.min.js **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.40.0/web/ • Bug fixes and stability improvements.

May 2, 2025

IVS Broadcast SDK: Web 1.23.1 (Low-Latency Streaming)

Platform	Downloads and Changes
Web Broadcast SDK 1.23.1	**Reference documentation:** https://aws.github.io/amazon-ivs-web-broadcast/docs/sdk-reference/ • Bug fixes and stability improvements.

April 17, 2025

Amazon IVS Broadcast SDK: Android 1.29.0, iOS 1.29.0 (Low-Latency Streaming)

Platform	Downloads and Changes
Android Broadcast SDK 1.29.0	**Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.29.0/android/ • Bug fixes and stability improvements.
iOS Broadcast SDK 1.29.0	**Download for low-latency streaming:** https://broadcast.live-video.net/1.29.0/AmazonIVSBroadcast.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.29.0/ios/ • Bug fixes and stability improvements.

Broadcast SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.930 MB	5.272 MB
armeabi-v7a	1.718 MB	3.702 MB
x86_64	2.030 MB	5.663 MB
x86	2.053 MB	5.463 MB

Broadcast SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.933 MB	2.272 MB

April 17, 2025

IVS Broadcast SDK: Web 1.23.0 (Low-Latency Streaming)

Platform	Downloads and Changes
Web Broadcast SDK 1.23.0	**Reference documentation:** https://aws.github.io/amazon-ivs-web-broadcast/docs/sdk-reference/ • Bug fixes and stability improvements.

April 10, 2025

IVS Player SDK: Web 1.39.0

Platform	Downloads and Changes
Web player 1.39.0 & Video.js integration & JW player integration	**NPM Package:** https://www.npmjs.com/package/amazon-ivs-player **Script asset:** https://player.live-video.net/1.39.0/amazon-ivs-player.min.js **Video.js tech asset:** https://player.live-video.net/1.39.0/amazon-ivs-videojs-tech.min.js **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.39.0/web/

Platform	Downloads and Changes
	• Bug fixes and stability improvements.

April 10, 2025

IVS Player SDK: Android 1.39.0, iOS 1.39.0

Platform	Downloads and Changes
Android player 1.39.0	**Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.39.0/android/ • Bug fixes and stability improvements.
iOS Player 1.39.0	**Download:** https://player.live-video.net/1.39.0/AmazonIVSPlayer.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.39.0/ios/ • Fixed a bug that could cause a crash as a result of reassigning the `player` property of the `IVSPlayerLayer` or `IVSPlayerView` class to a different player instance. • Additional bug fixes and stability improvements.

Mobile SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.281 MB	3.369 MB
armeabi-v7a	1.128 MB	2.377 MB
x86_64	1.283 MB	3.394 MB

Architecture	Compressed Size	Uncompressed Size
x86	1.340 MB	3.428 MB

Mobile SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.673 MB	1.600 MB

March 20, 2025

Amazon IVS Broadcast SDK: Android 1.28.1, iOS 1.28.1 (Low-Latency Streaming)

Platform	Downloads and Changes
Android Broadcast SDK 1.28.1	**Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.28.1/android/ • Bug fixes and stability improvements.
iOS Broadcast SDK 1.28.1	**Download for low-latency streaming:** https://broadcast.live-video.net/1.28.1/AmazonIVSBroadcast.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.28.1/ios/ • Bug fixes and stability improvements.

Broadcast SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.918 MB	5.268 MB
armeabi-v7a	1.704 MB	3.693 MB
x86_64	2.017 MB	5.657 MB
x86	2.040 MB	5.455 MB

Broadcast SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.936 MB	2.288 MB

March 20, 2025

IVS Broadcast SDK: Web 1.22.0 (Low-Latency Streaming)

Platform	Downloads and Changes
Web Broadcast SDK 1.22.0	**Reference documentation:** https://aws.github.io/amazon-ivs-web-broadcast/docs/sdk-reference/ • Bug fixes and stability improvements.

March 19, 2025

Amazon IVS Broadcast SDK: Android 1.27.2, iOS 1.27.2 (Low-Latency Streaming)

Platform	Downloads and Changes
Android Broadcast SDK 1.27.2	**Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.27.2/android/ • Fixed a resource-leak regression that impacted some devices when creating 50 or more sessions.
iOS Broadcast SDK 1.27.2	**Download for low-latency streaming:** https://broadcast.live-video.net/1.27.2/AmazonIVSBroadcast.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.27.2/ios/ • No changes for the low-latency SDK.

Broadcast SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.902 MB	5.246 MB
armeabi-v7a	1.692 MB	3.687 MB
x86_64	1.998 MB	5.624 MB
x86	2.024 MB	5.421 MB

Broadcast SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.955 MB	2.371 MB

March 13, 2025

IVS Player SDK: Web 1.38.0

Platform	Downloads and Changes
Web player 1.38.0 & Video.js integration & JW player integration	**NPM Package:** https://www.npmjs.com/package/amazon-ivs-player **Script asset:** https://player.live-video.net/1.38.0/amazon-ivs-player.min.js **Video.js tech asset:** https://player.live-video.net/1.38.0/amazon-ivs-videojs-tech.min.js **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.38.0/web/ • Bug fixes and stability improvements.

March 13, 2025

IVS Player SDK: Android 1.38.0, iOS 1.38.0

Platform	Downloads and Changes
Android player 1.38.0	**Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.38.0/android/ • Bug fixes and stability improvements.

Platform	Downloads and Changes
iOS Player 1.38.0	**Download:** https://player.live-video.net/1.38.0/AmazonIVSPlayer.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.38.0/ios/ • Bug fixes and stability improvements.

Mobile SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.244 MB	3.322 MB
armeabi-v7a	1.092 MB	2.333 MB
x86_64	1.247 MB	3.347 MB
x86	1.303 MB	3.381 MB

Mobile SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.621 MB	1.538 MB

March 3, 2025

Amazon IVS Broadcast SDK: iOS 1.27.1 (Low-Latency Streaming)

Platform	Downloads and Changes
iOS Broadcast SDK 1.27.1	**Download for low-latency streaming:** https://broadcast.live-video.net/1.27.1/AmazonIVSBroadcast.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.27.1/ios/ • Improved focus performance for objects held close to the camera while using the ultra-wide lens on Pro devices.

Broadcast SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.955 MB	2.371 MB

February 20, 2025

Amazon IVS Broadcast SDK: Android 1.27.0, iOS 1.27.0 (Low-Latency Streaming)

Platform	Downloads and Changes
Android Broadcast SDK 1.27.0	**Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.27.0/android/ • Bug fixes and stability improvements.

Platform	Downloads and Changes
iOS Broadcast SDK 1.27.0	**Download for low-latency streaming:** https://broadcast.live-video.net/1.27.0/AmazonIVSBroadcast.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.27.0/ios/ • Bug fixes and stability improvements.

Broadcast SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.902 MB	5.246 MB
armeabi-v7a	1.682 MB	3.687 MB
x86_64	1.998 MB	5.624 MB
x86	2.024 MB	5.421 MB

Broadcast SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.955 MB	2.371 MB

February 20, 2025

IVS Broadcast SDK: Web 1.21.0 (Low-Latency Streaming)

Platform	Downloads and Changes
Web Broadcast SDK 1.21.0	**Reference documentation:** https://aws.github.io/amazon-ivs-web-broadcast/docs/sdk-reference/ • Bug fixes and stability improvements.

February 13, 2025

IVS Player SDK: Android 1.37.0, iOS 1.37.0

Platform	Downloads and Changes
Android player 1.37.0	**Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.37.0/android/ • Bug fixes and stability improvements.
iOS Player 1.37.0	**Download:** https://player.live-video.net/1.37.0/AmazonIVSPlayer.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.37.0/ios/ • Bug fixes and stability improvements.

Mobile SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.229 MB	3.289 MB

Architecture	Compressed Size	Uncompressed Size
armeabi-v7a	1.079 MB	2.302 MB
x86_64	1.231 MB	3.305 MB
x86	1.288 MB	3.336 MB

Mobile SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.613 MB	1.504 MB

February 13, 2025

IVS Player SDK: Web 1.37.0

Platform	Downloads and Changes
Web player 1.37.0 & Video.js integration & JW player integration	**NPM Package:** https://www.npmjs.com/package/amazon-ivs-player **Script asset:** https://player.live-video.net/1.37.0/amazon-ivs-player.min.js **Video.js tech asset:** https://player.live-video.net/1.37.0/amazon-ivs-videojs-tech.min.js **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.37.0/web/ • Fixed a bug where playback could skip for streams with many discontinuities. • Additional bug fixes and stability improvements.

January 30, 2025

Amazon IVS Broadcast SDK: Android 1.26.0, iOS 1.26.0 (Low-Latency Streaming)

Platform	Downloads and Changes
Android Broadcast SDK 1.26.0	**Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.26.0/android/ • Bug fixes and stability improvements.
iOS Broadcast SDK 1.26.0	**Download for low-latency streaming:** https://broadcast.live-video.net/1.26.0/AmazonIVSBroadcast.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.26.0/ios/ • Bug fixes and stability improvements.

Broadcast SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.896 MB	5.238 MB
armeabi-v7a	1.686 MB	3.681 MB
x86_64	1.992 MB	5.615 MB
x86	2.018 MB	5.412 MB

Broadcast SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.954 MB	2.371 MB

January 23, 2025

IVS Broadcast SDK: Web 1.20.0 (Low-Latency Streaming)

Platform	Downloads and Changes
Web Broadcast SDK 1.20.0	**Reference documentation:** https://aws.github.io/amazon-ivs-web-broadcast/docs/sdk-reference/ • Bug fixes and stability improvements.

January 16, 2025

IVS Player SDK: Android 1.36.0, iOS 1.36.0

Platform	Downloads and Changes
Android player 1.36.0	**Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.36.0/android/ • Bug fixes and stability improvements.
iOS Player 1.36.0	**Download:** https://player.live-video.net/1.36.0/AmazonIVSPlayer.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.36.0/ios/

Platform	Downloads and Changes
	• Fixed a bug where playback could stall for streams with many discontinuities. • Fixed a bug where buffering could occur on muted sections of a VOD. • Additional bug fixes and stability improvements.

Mobile SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.176 MB	3.191 MB
armeabi-v7a	1.031 MB	2.217 MB
x86_64	1.189 MB	3.188 MB
x86	1.244 MB	3.208 MB

Mobile SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.578 MB	1.449 MB

January 16, 2025

IVS Player SDK: Web 1.36.0

Platform	Downloads and Changes
Web player 1.36.0 & Video.js integration & JW player integration	**NPM Package:** https://www.npmjs.com/package/amazon-ivs-player

Platform	Downloads and Changes
	Script asset: https://player.live-video.net/1.36.0/amazon-ivs-player.min.js **Video.js tech asset:** https://player.live-video.net/1.36.0/amazon-ivs-videojs-tech.min.js **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.36.0/web/ • Bug fixes and stability improvements.

December 12, 2024

Amazon IVS Broadcast SDK: Android 1.25.0, iOS 1.25.0 (Low-Latency Streaming)

Platform	Downloads and Changes
Android Broadcast SDK 1.25.0	**Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.25.0/android/ • Bug fixes and stability improvements.
iOS Broadcast SDK 1.25.0	**Download for low-latency streaming:** https://broadcast.live-video.net/1.25.0/AmazonIVSBroadcast.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.25.0/ios/ • Bug fixes and stability improvements.

Broadcast SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.893 MB	5.226 MB
armeabi-v7a	1.683 MB	3.674 MB
x86_64	1.988 MB	5.604 MB
x86	2.015 MB	5.400 MB

Broadcast SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.957 MB	2.371 MB

December 12, 2024

IVS Broadcast SDK: Web 1.19.0 (Low-Latency Streaming)

Platform	Downloads and Changes
Web Broadcast SDK 1.19.0	**Reference documentation:** https://aws.github.io/amazon-ivs-web-broadcast/docs/sdk-reference/ • Bug fixes and stability improvements.

December 6, 2024

IVS Player SDK: Web 1.35.0

Platform	Downloads and Changes
Web player 1.35.0 & Video.js integration & JW player integration	**NPM Package:** https://www.npmjs.com/package/amazon-ivs-player **Script asset:** https://player.live-video.net/1.35.0/amazon-ivs-player.min.js **Video.js tech asset:** https://player.live-video.net/1.35.0/amazon-ivs-videojs-tech.min.js **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.35.0/web/ • Increased ability to recover from decode errors. • Additional bug fixes and stability improvements.

December 6, 2024

IVS Player SDK: Android 1.35.0, iOS 1.35.0

Platform	Downloads and Changes
Android player 1.35.0	**Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.35.0/android/ • Bug fixes and stability improvements.
iOS Player 1.35.0	**Download:** https://player.live-video.net/1.35.0/AmazonIVSPlayer.xcframework.zip

Platform	Downloads and Changes
	Reference documentation: https://aws.github.io/amazon-ivs-player-docs/1.35.0/ios/ • Bug fixes and stability improvements.

Mobile SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.076 MB	2.968 MB
armeabi-v7a	0.941 MB	2.059 MB
x86_64	1.131 MB	3.121 MB
x86	1.161 MB	3.067 MB

Mobile SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.521 MB	1.331 MB

November 14, 2024

Multitrack Video

Multitrack video is a new, low-latency streaming paradigm supported by Amazon Interactive Video Service (IVS) and services that use IVS. Multitrack video streaming allows broadcaster software tools (e.g., OBS Studio) to:

- Encode and stream multiple video qualities directly from their GPU-powered computer.
- Automatically configure encoder settings for the best possible stream.
- Deliver a high quality Adaptive Bitrate (ABR) viewing experience.

Multitrack enables this to be done without requiring expensive, server-side transcoding, which is required to deliver ABR viewing experiences for single-track video streams.

To get started, see Multitrack Video. For details on the documentation changes, see the Document History (both the User Guide and API Reference tables).

November 13, 2024

Amazon IVS Broadcast SDK: Android 1.24.0, iOS 1.24.0 (Low-Latency Streaming)

Platform	Downloads and Changes
Android Broadcast SDK 1.24.0	**Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.24.0/android/ • Added a new section, “Using Auto-Reconnect,” to the Android Broadcast SDK Guide. • Bug fixes and stability improvements.
iOS Broadcast SDK 1.24.0	**Download for low-latency streaming:** https://broadcast.live-video.net/1.24.0/AmazonIVSBroadcast.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.24.0/ios/ • Added a new section, “Using Auto-Reconnect,” to the iOS Broadcast SDK Guide. • Bug fixes and stability improvements.

Broadcast SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.837 MB	5.084 MB
armeabi-v7a	1.631 MB	3.624 MB
x86_64	1.988 MB	5.681 MB
x86	1.985 MB	5.425 MB

Broadcast SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.945 MB	2.337 MB

November 12, 2024

IVS Broadcast SDK: Web 1.18.0 (Low-Latency Streaming)

Platform	Downloads and Changes
Web Broadcast SDK 1.18.0	**Reference documentation:** https://aws.github.io/amazon-ivs-web-broadcast/docs/sdk-reference/ • Bug fixes and stability improvements.

October 31, 2024

IVS Player SDK: Web 1.34.1

Platform	Downloads and Changes
Web player 1.34.1 & Video.js integration & JW player integration	**NPM Package:** https://www.npmjs.com/package/amazon-ivs-player **Script asset:** https://player.live-video.net/1.34.1/amazon-ivs-player.min.js **Video.js tech asset:** https://player.live-video.net/1.34.1/amazon-ivs-videojs-tech.min.js **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.34.1/web/ • Minor bug fixes.

October 31, 2024

IVS Player SDK: Android 1.34.0, iOS 1.34.0

Platform	Downloads and Changes
Android player 1.34.0	**Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.34.0/android/ • Minor bug fixes.
iOS Player 1.34.0	**Download:** https://player.live-video.net/1.34.0/AmazonIVSPlayer.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.34.0/ios/ • Minor bug fixes.

Mobile SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.073 MB	2.962 MB
armeabi-v7a	0.938 MB	2.054 MB
x86_64	1.128 MB	3.114 MB
x86	1.159 MB	3.059 MB

Mobile SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.519 MB	1.315 MB

October 15, 2024

Stream Takeover

On a channel that you own, you can now replace an ongoing stream with a new stream by streaming up with the `priority` parameter appended to the stream key. For details on the documentation changes, see the Document History (both the User Guide and API Reference tables).

October 10, 2024

IVS Broadcast SDK: Web 1.17.0 (Low-Latency Streaming)

Platform	Downloads and Changes
Web Broadcast SDK 1.17.0	**Reference documentation:** https://aws.github.io/amazon-ivs-web-broadcast/docs/sdk-reference/

Platform	Downloads and Changes
	• Minor bug fixes.

October 10, 2024

Amazon IVS Broadcast SDK: Android 1.23.0, iOS 1.23.0 (Low-Latency Streaming)

Platform	Downloads and Changes
Android Broadcast SDK 1.23.0	**Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.23.0/android/ • With this release we also began publishing a version of the Android broadcast SDK which includes debug symbols. See Using the SDK with Debug Symbols. • Minor bug fixes.
iOS Broadcast SDK 1.23.0	**Download for low-latency streaming:** https://broadcast.live-video.net/1.23.0/AmazonIVSBroadcast.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.23.0/ios/ • Minor bug fixes.

Broadcast SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.832 MB	5.080 MB

Architecture	Compressed Size	Uncompressed Size
armeabi-v7a	1.626 MB	3.621 MB
x86_64	1.983 MB	5.678 MB
x86	1.982 MB	5.422 MB

Broadcast SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.943 MB	2.320 MB

October 3, 2024

IVS Player SDK: Android 1.33.0, iOS 1.33.0

Platform	Downloads and Changes
Android player 1.33.0	**Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.33.0/android/ • Fixed an infinite buffering issue that occurred during MP4 playback. • Fixed a bug where the player would sometimes skip content.
iOS Player 1.33.0	**Download:** https://player.live-video.net/1.33.0/AmazonIVSPlayer.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.33.0/ios/ • Fixed an infinite buffering issue that occurred during MP4 playback.

Platform	Downloads and Changes
	• Fixed a bug where the player would sometimes skip content.

Mobile SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.096 MB	2.978 MB
armeabi-v7a	0.959 MB	2.075 MB
x86_64	1.148 MB	3.130 MB
x86	1.178 MB	3.071 MB

Mobile SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.519 MB	1.347 MB

October 3, 2024

IVS Player SDK: Web 1.33.0

Platform	Downloads and Changes
Web player 1.33.0 & Video.js integration & JW player integration	**NPM Package:** https://www.npmjs.com/package/amazon-ivs-player **Script asset:** https://player.live-video.net/1.33.0/amazon-ivs-player.min.js

Platform	Downloads and Changes
	Video.js tech asset: https://player.live-video.net/1.33.0/amazon-ivs-videojs-tech.min.js **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.33.0/web/ • Minor bug fixes.

September 11, 2024

Amazon IVS Broadcast SDK: Android 1.22.0, iOS 1.22.0 (Low-Latency Streaming)

Platform	Downloads and Changes
Android Broadcast SDK 1.22.0	**Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.22.0/android/ • Minor bug fixes.
iOS Broadcast SDK 1.22.0	**Download for low-latency streaming:** https://broadcast.live-video.net/1.22.0/AmazonIVSBroadcast.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.22.0/ios/ • Minor bug fixes.

Broadcast SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.752 MB	4.900 MB
armeabi-v7a	1.553 MB	3.488 MB
x86_64	1.901 MB	5.475 MB
x86	1.890 MB	5.211 MB

Broadcast SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.887 MB	2.215 MB

September 11, 2024

IVS Broadcast SDK: Web 1.16.0 (Low-Latency Streaming)

Platform	Downloads and Changes
Web Broadcast SDK 1.16.0	**Reference documentation:** https://aws.github.io/amazon-ivs-web-broadcast/docs/sdk-reference/ • Minor bug fixes.

September 5, 2024

IVS Player SDK: Web 1.32.1

Platform	Downloads and Changes
Web player 1.32.1 & Video.js integration & JW player integration	**NPM Package:** https://www.npmjs.com/package/amazon-ivs-player **Script asset:** https://player.live-video.net/1.32.1/amazon-ivs-player.min.js **Video.js tech asset:** https://player.live-video.net/1.32.1/amazon-ivs-videojs-tech.min.js **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.32.1/web/ • Minor bug fixes.

September 5, 2024

IVS Player SDK: Android 1.32.0, iOS 1.32.0

Platform	Downloads and Changes
Android player 1.32.0	**Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.32.0/android/ • Minor bug fixes.
iOS Player 1.32.0	**Download:** https://player.live-video.net/1.32.0/AmazonIVSPlayer.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.32.0/ios/ • Minor bug fixes.

Mobile SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.092 MB	2.967 MB
armeabi-v7a	0.955 MB	2.063 MB
x86_64	1.145 MB	3.118 MB
x86	1.172 MB	3.057 MB

Mobile SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.488 MB	1.252 MB

August 15, 2024

IVS Broadcast SDK: Web 1.15.0 (Low-Latency Streaming)

Platform	Downloads and Changes
Web Broadcast SDK 1.15.0	**Reference documentation:** https://aws.github.io/amazon-ivs-web-broadcast/docs/sdk-reference/ • Minor bug fixes.

August 15, 2024

Amazon IVS Broadcast SDK: Android 1.21.0, iOS 1.21.0 (Low-Latency Streaming)

Platform	Downloads and Changes
Android Broadcast SDK 1.21.0	**Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.21.0/android/ • Minor bug fixes.
iOS Broadcast SDK 1.21.0	**Download for low-latency streaming:** https://broadcast.live-video.net/1.21.0/AmazonIVSBroadcast.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.21.0/ios/ • Minor bug fixes.

Broadcast SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.748 MB	4.896 MB
armeabi-v7a	1.549 MB	3.482 MB
x86_64	1.898 MB	5.471 MB
x86	1.887 MB	5.207 MB

Broadcast SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.887 MB	2.215 MB

August 8, 2024

IVS Player SDK: Web 1.31.0

Platform	Downloads and Changes
Web player 1.31.0 & Video.js integration & JW player integration	**NPM Package:** https://www.npmjs.com/package/amazon-ivs-player **Script asset:** https://player.live-video.net/1.31.0/amazon-ivs-player.min.js **Video.js tech asset:** https://player.live-video.net/1.31.0/amazon-ivs-videojs-tech.min.js **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.31.0/web/ • Minor bug fixes.

August 8, 2024

IVS Player SDK: Android 1.31.0, iOS 1.31.0

Platform	Downloads and Changes
Android player 1.31.0	**Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.31.0/android/ • Minor bug fixes.

Platform	Downloads and Changes
iOS Player 1.31.0	**Download:** https://player.live-video.net/1.31.0/AmazonIVSPlayer.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.31.0/ios/ • Updated the SDK reference documentation to clarify that calling the `IVSPlayerLayer.copyDisplayedPixelBuffer` method at high frequencies (e.g., the video framerate) is not supported and may result in undefined behavior. • Minor bug fixes.

Mobile SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.062 MB	2.881 MB
armeabi-v7a	0.929 MB	2.003 MB
x86_64	1.142 MB	2.968 MB
x86	1.114 MB	3.027 MB

Mobile SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.472 MB	1.217 MB

July 18, 2024

IVS Broadcast SDK: Web 1.14.0 (Low-Latency Streaming)

Platform	Downloads and Changes
Web Broadcast SDK 1.14.0	**Reference documentation:** https://aws.github.io/amazon-ivs-web-broadcast/docs/sdk-reference/ • Minor bug fixes.

July 18, 2024

Amazon IVS Broadcast SDK: Android 1.20.0, iOS 1.20.0 (Low-Latency Streaming)

Platform	Downloads and Changes
Android Broadcast SDK 1.20.0	**Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.20.0/android/ • Fixed some microphone issues that occur when detaching devices. • Minor bug fixes.
iOS Broadcast SDK 1.20.0	**Download for low-latency streaming:** https://broadcast.live-video.net/1.20.0/AmazonIVSBroadcast.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.20.0/ios/ • Minor bug fixes.

Broadcast SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.729 MB	4.844 MB
armeabi-v7a	1.533 MB	3.445 MB
x86_64	1.877 MB	5.416 MB
x86	1.868 MB	5.152 MB

Broadcast SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.867 MB	2.163 MB

July 11, 2024

IVS Player SDK: Android 1.30.0, iOS 1.30.0

Platform	Downloads and Changes
Android player 1.30.0	**Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.30.0/android/ • Minor bug fixes.
iOS Player 1.30.0	**Download:** https://player.live-video.net/1.30.0/AmazonIVSPlayer.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.30.0/ios/ • Minor bug fixes.

Platform	Downloads and Changes
	• The iOS Player SDK now requires iOS 13+ as the native platform.

Mobile SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.048 MB	2.857 MB
armeabi-v7a	0.920 MB	1.985 MB
x86_64	1.102 MB	3.000 MB
x86	1.131 MB	2.943 MB

Mobile SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.462 MB	1.199 MB

July 11, 2024

IVS Player SDK: Web 1.30.0

Platform	Downloads and Changes
Web player 1.30.0 & Video.js integration & JW player integration	**NPM Package:** https://www.npmjs.com/package/amazon-ivs-player **Script asset:** https://player.live-video.net/1.30.0/amazon-ivs-player.min.js

Platform	Downloads and Changes
	Video.js tech asset: https://player.live-video.net/1.30.0/amazon-ivs-videojs-tech.min.js **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.30.0/web/ • Minor bug fixes.

June 13, 2024

Amazon IVS Broadcast SDK: Android 1.19.0, iOS 1.19.0 (Low-Latency Streaming)

Platform	Downloads and Changes
Android Broadcast SDK 1.19.0	**Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.19.0/android/ • Recent Android versions require an icon in the notification that is displayed when capturing the screen. If desired, you can now customize the icon by calling `setSmallIcon` on the `Notification.Builder` returned by `Session#createServiceNotificationBuilder`.
iOS Broadcast SDK 1.19.0	**Download for low-latency streaming:** https://broadcast.live-video.net/1.19.0/AmazonIVSBroadcast.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.19.0/ios/

Platform	Downloads and Changes
	• The iOS Broadcast SDK now requires iOS 13+ as the native platform.

Broadcast SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.696 MB	4.768 MB
armeabi-v7a	1.508 MB	3.390 MB
x86_64	1.840 MB	5.315 MB
x86	1.827 MB	5.038 MB

Broadcast SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.834 MB	2.081 MB

June 13, 2024

IVS Broadcast SDK: Web 1.13.0 (Low-Latency Streaming)

Platform	Downloads and Changes
Web Broadcast SDK 1.13.0	**Reference documentation:** https://aws.github.io/amazon-ivs-web-broadcast/docs/sdk-reference/
	• Minor bug fixes.

June 6, 2024

IVS Player SDK: Android 1.29.0, iOS 1.29.0

Platform	Downloads and Changes
Android player 1.29.0	**Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.29.0/android/ • Added the `getChannelMetadata()` method, which returns a list of String values to communicate channel features.
iOS Player 1.29.0	**Download:** https://player.live-video.net/1.29.0/AmazonIVSPlayer.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.29.0/ios/ • The iOS 12 deprecation that was planned for iOS player 1.29.0 is delayed until version 1.30.0. • Added the `getChannelMetadata()` method, which returns a list of String values to communicate channel features. • Improved consistency when deallocating `IVSPlayerLayer` on a background queue.

Mobile SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.044 MB	2.834 MB
armeabi-v7a	0.916 MB	1.969 MB
x86_64	1.127 MB	2.919 MB

Architecture	Compressed Size	Uncompressed Size
x86	1.097 MB	2.976 MB

Mobile SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.465 MB	1.183 MB

June 6, 2024

IVS Player SDK: Web 1.29.0

Platform	Downloads and Changes
Web player 1.29.0 & Video.js integration & JW player integration	**NPM Package:** https://www.npmjs.com/package/amazon-ivs-player **Script asset:** https://player.live-video.net/1.29.0/amazon-ivs-player.min.js **Video.js tech asset:** https://player.live-video.net/1.29.0/amazon-ivs-videojs-tech.min.js **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.29.0/web/ • Minor bug fixes.

May 20, 2024

IVS Broadcast SDK: Web 1.12.0 (Low-Latency Streaming)

Platform	Downloads and Changes
Web Broadcast SDK 1.12.0	**Reference documentation:** https://aws.github.io/amazon-ivs-web-broadcast/docs/sdk-reference/ • No changes.

May 16, 2024

Amazon IVS Broadcast SDK: Android 1.18.0, iOS 1.18.0 (Low-Latency Streaming)

Platform	Downloads and Changes
Android Broadcast SDK 1.18.0	**Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.18.0/android/ • Minor bug fixes.
iOS Broadcast SDK 1.18.0	**Download for low-latency streaming:** https://broadcast.live-video.net/1.18.0/AmazonIVSBroadcast.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.18.0/ios/ • Added the IVSCamera `setVideoZoomFactor` method and the associated `IVSCameraDelegate` methods. • Minor bug fixes.

Broadcast SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.692 MB	4.758 MB
armeabi-v7a	1.504 MB	3.382 MB
x86_64	1.834 MB	5.304 MB
x86	1.822 MB	5.026 MB

Broadcast SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.834 MB	2.064 MB

May 9, 2024

IVS Player SDK: Web 1.28.0

Platform	Downloads and Changes
Web player 1.28.0 & Video.js integration & JW player integration	**NPM Package:** https://www.npmjs.com/package/amazon-ivs-player **Script asset:** https://player.live-video.net/1.28.0/amazon-ivs-player.min.js **Video.js tech asset:** https://player.live-video.net/1.28.0/amazon-ivs-videojs-tech.min.js **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.28.0/web/ • Minor bug fixes.

May 9, 2024

IVS Player SDK: Android 1.28.0, iOS 1.28.0

Platform	Downloads and Changes
Android player 1.28.0	**Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.28.0/android/ • No changes.
iOS Player 1.28.0	**Download:** https://player.live-video.net/1.28.0/AmazonIVSPlayer.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.28.0/ios/ • Added the `CF_RETURNS_RETAINED` annotation to the `IVSPlayerLayer.copyDisplayedPixelBuffer` method for automatic memory management when using Swift.

Mobile SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.045 MB	2.830 MB
armeabi-v7a	0.918 MB	1.967 MB
x86_64	1.127 MB	2.913 MB
x86	1.097 MB	2.971 MB

Mobile SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.468 MB	1.199 MB

May 6, 2024

IVS Broadcast SDK: Web 1.11.0 (Low-Latency Streaming)

Platform	Downloads and Changes
Web Broadcast SDK 1.11.0	**Reference documentation:** https://aws.github.io/amazon-ivs-web-broadcast/docs/sdk-reference/ • No changes.

April 30, 2024

IVS Broadcast SDK: Web 1.10.1 (Low-Latency Streaming)

Platform	Downloads and Changes
Web Broadcast SDK 1.10.1	**Reference documentation:** https://aws.github.io/amazon-ivs-web-broadcast/docs/sdk-reference/ • Minor bug fixes.

April 30, 2024

Amazon IVS Broadcast SDK: Android 1.15.2, iOS 1.15.2 (Low-Latency Streaming)

Platform	Downloads and Changes
Android Broadcast SDK 1.15.2	**Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.15.2/android/ • Minor bug fixes. Upgrade to this version only if you have a specific reason to do so; otherwise, use the highest version that is released.
iOS Broadcast SDK 1.15.2	**Download for low-latency streaming:** https://broadcast.live-video.net/1.15.2/AmazonIVSBroadcast.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.15.2/ios/ • Minor bug fixes. Upgrade to this version only if you have a specific reason to do so; otherwise, use the highest version that is released.

Broadcast SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.678 MB	4.723 MB
armeabi-v7a	1.492 MB	3.356 MB

Architecture	Compressed Size	Uncompressed Size		
x86_64	1.819 MB	5.267 MB		
x86	1.808 MB	4.991 MB		

Broadcast SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size		
arm64	0.813 MB	2.001 MB		

April 22, 2024

Amazon IVS Broadcast SDK: Android 1.17.0, iOS 1.17.0 (Low-Latency Streaming)

Platform	Downloads and Changes
Android Broadcast SDK 1.17.0	**Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.17.0/android/ • No changes.
iOS Broadcast SDK 1.17.0	**Download for low-latency streaming:** https://broadcast.live-video.net/1.17.0/AmazonIVSBroadcast.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.17.0/ios/

Platform	Downloads and Changes
	• The `AmazonIVSBroadcast` framework now includes a privacy manifest, as required by Apple.

Broadcast SDK Size: Android

Architecture	Compressed Size	Uncompressed Size		
arm64-v8a	1.692 MB	4.757 MB		
armeabi-v7a	1.504 MB	3.381 MB		
x86_64	1.834 MB	5.303 MB		
x86	1.822 MB	5.025 MB		

Broadcast SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size		
arm64	0.831 MB	2.047 MB		

April 11, 2024

Amazon IVS Player SDK: Mobile & Web 1.27.0

Platform	Downloads and Changes
Web player 1.27.0 & Video.js integration & JW player integration	**NPM Package:** https://www.npmjs.com/package/amazon-ivs-player

Platform	Downloads and Changes
	Script asset: https://player.live-video.net/1.27.0/amazon-ivs-player.min.js **Video.js tech asset:** https://player.live-video.net/1.27.0/amazon-ivs-videojs-tech.min.js **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.27.0/web/ • No changes.
Android player 1.27.0	**Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.27.0/android/ • No changes.
iOS Player 1.27.0	**Download:** https://player.live-video.net/1.27.0/AmazonIVSPlayer.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.27.0/ios/ • The `AmazonIVSPlayer` framework now includes a privacy manifest, as required by Apple. • Fixed key value observation for several properties on the `IVSPlayer` class.

Mobile SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.044 MB	2.826 MB
armeabi-v7a	0.916 MB	1.963 MB
x86_64	1.096 MB	2.965 MB

Architecture	Compressed Size	Uncompressed Size
x86	1.124 MB	2.907 MB

Mobile SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.445 MB	1.131 MB

April 4, 2024

Secure Reliable Transport (SRT) Ingest Support

Amazon IVS introduces support for streaming using the SRT protocol. SRT is an open-source transport technology optimized for live audio/video streaming. SRT enables secure and reliable transport of content across unpredictable, noisy networks, like the Internet. SRT offers multiple benefits when transporting live video content over the internet:

- It helps compensate for jitter and bandwidth fluctuations.
- It is resilient to packet loss.
- It supports AES encryption to protect content in transit.

We support H.264-encoded video content using the SRT protocol.

March 21, 2024

Amazon IVS Broadcast SDK: Android 1.16.0, iOS 1.16.0, Web 1.10.0 (Low-Latency Streaming)

Platform	Downloads and Changes
Web Broadcast SDK 1.10.0	**Reference documentation:** https://aws.github.io/amazon-ivs-web-broadcast/docs/sdk-reference/ • No changes.
Android Broadcast SDK 1.16.0	**Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.16.0/android/ • Fixed a previews freeze on the Exynos variant of Samsung devices with Android 14.
iOS Broadcast SDK 1.16.0	**Download for low-latency streaming:** https://broadcast.live-video.net/1.16.0/AmazonIVSBroadcast.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.16.0/ios/ • Minor bug fixes.

Broadcast SDK Size: Android

Architecture	Compressed Size	Uncompressed Size		
arm64-v8a	1.683 MB	4.730 MB		
armeabi-v7a	1.498 MB	3.362 MB		

Architecture	Compressed Size	Uncompressed Size		
x86_64	1.824 MB	4.998 MB		
x86	1.813 MB	5.274 MB		

Broadcast SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size		
arm64	0.813 MB	2.001 MB		

March 14, 2024

Amazon IVS Player SDK 1.26.0

Platform	Downloads and Changes
Web player 1.26.0 & Video.js integration & JW player integration	**NPM Package:** https://www.npmjs.com/package/amazon-ivs-player **Script asset:** https://player.live-video.net/1.26.0/amazon-ivs-player.min.js **Video.js tech asset:** https://player.live-video.net/1.26.0/amazon-ivs-videojs-tech.min.js **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.26.0/web/ • Added an API to expose the synchronization time. • Added an event to indicate when the `syncTime` has changed.

Platform	Downloads and Changes
Android player 1.26.0	**Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.26.0/android/ • Added an API to expose the synchronization time. • Added an event to indicate when the `syncTime` has changed.
iOS Player 1.26.0	**Download:** https://player.live-video.net/1.26.0/AmazonIVSPlayer.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.26.0/ios/ • Added an API to expose the synchronization time. • Added an event to indicate when the `syncTime` has changed.

Mobile SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.07 MB	2.969 MB
armeabi-v7a	0.943 MB	2.098 MB
x86_64	1.123 MB	3.107 MB
x86	1.151 MB	3.039 MB

Mobile SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.44 MB	1.11 MB

March 13, 2024

Amazon IVS Broadcast SDK: Android 1.15.1, iOS 1.15.1 (Low-Latency Streaming)

Platform	Downloads and Changes
Android Broadcast SDK 1.15.1	**Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.15.1/android/ • No changes in this release.
iOS Broadcast SDK 1.15.1	**Download for low-latency streaming:** https://broadcast.live-video.net/1.15.1/AmazonIVSBroadcast.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.15.1/ios/ • No changes in this release.

Broadcast SDK Size: Android

Architecture	Compressed Size	Uncompressed Size		
arm64-v8a	1.678 MB	4.723 MB		
armeabi-v7a	1.492 MB	3.356 MB		

Architecture	Compressed Size	Uncompressed Size		
x86_64	1.808 MB	4.991 MB		
x86	1.819 MB	5.267 MB		

Broadcast SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size		
arm64	0.813 MB	2.001 MB		

February 29, 2024

Amazon IVS Player SDK: Web 1.25.0

Platform	Downloads and Changes
Web player 1.25.0 & Video.js integration & JW player integration	**NPM Package:** https://www.npmjs.com/package/amazon-ivs-player **Script asset:** https://player.live-video.net/1.25.0/amazon-ivs-player.min.js **Video.js tech asset:** https://player.live-video.net/1.25.0/amazon-ivs-videojs-tech.min.js **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.25.0/web/ • Minor bug fixes.

February 22, 2024

Amazon IVS Broadcast SDK: Android 1.15.0, iOS 1.15.0, Web 1.9.0 (Low-Latency Streaming)

Platform	Downloads and Changes
Web Broadcast SDK 1.9.0	**Reference documentation:** https://aws.github.io/amazon-ivs-web-broadcast/docs/sdk-reference/ • No changes.
Android Broadcast SDK 1.15.0	**Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.15.0/android/ • Minor bug fixes.
iOS Broadcast SDK 1.15.0	**Download for low-latency streaming:** https://broadcast.live-video.net/1.15.0/AmazonIVSBroadcast.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.15.0/ios/ • Minor bug fixes.

Broadcast SDK Size: Android

Architecture	Compressed Size	Uncompressed Size		
arm64-v8a	1.678 MB	4.723 MB		
armeabi-v7a	1.492 MB	3.356 MB		

Architecture	Compressed Size	Uncompressed Size		
x86_64	1.808 MB	4.991 MB		
x86	1.819 MB	5.267 MB		

Broadcast SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size		
arm64	0.813 MB	2.001 MB		

February 15, 2024

Amazon IVS Player SDK: Mobile 1.25.0

Platform	Downloads and Changes
Android player 1.25.0	**Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.25.0/android/ • Minor bug fixes.
iOS Player 1.25.0	**Download:** https://player.live-video.net/1.25.0/AmazonIVSPlayer.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.25.0/ios/ • Minor bug fixes.

Mobile SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.047 MB	2.9 MB
armeabi-v7a	0.921 MB	2.047 MB
x86_64	1.128 MB	2.97 MB
x86	1.1 MB	3.036 MB

Mobile SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.42 MB	1.08 MB

February 1, 2024

Amazon IVS Broadcast SDK: Android 1.14.1, iOS 1.14.1, Web 1.8.0 (Low-Latency Streaming)

Platform	Downloads and Changes
Web Broadcast SDK 1.8.0	**Reference documentation:** https://aws.github.io/amazon-ivs-web-broadcast/docs/sdk-reference/ • No changes.
Android Broadcast SDK 1.14.1	**Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.14.1/android/ • Minor bug fixes and improvements.

Platform	Downloads and Changes
iOS Broadcast SDK 1.14.1	**Download for low-latency streaming:** https://broadcast.live-video.net/1.14.1/AmazonIVSBroadcast.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.14.1/ios/ • Fixed multiple stability issues on iOS 12.

Broadcast SDK Size: Android

Architecture	Compressed Size	Uncompressed Size		
arm64-v8a	1.663 MB	4.708 MB		
armeabi-v7a	1.482 MB	3.350 MB		
x86_64	1.804 MB	5.246 MB		
x86	1.793 MB	4.973 MB		

Broadcast SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size		
arm64	1.640 MB	4.010 MB		

January 31, 2024

Tokenless Playback Restrictions

This release enables origin enforcement and geofencing outside of playback authorization. The IVS Low-Latency Streaming User Guide and API Reference were updated; see the Document History for details of the changes.

January 25, 2024

Audio-Only Playback

IVS now fully supports audio-only playback. See Audio-Only Playback in the IVS Player overview and Audio-Only Playback in the IVS Web Player Guide.

January 18, 2024

Amazon IVS Player SDK 1.24.0

Platform	Downloads and Changes
Web player 1.24.0 & Video.js integration & JW player integration	**NPM Package:** https://www.npmjs.com/package/amazon-ivs-player **Script asset:** https://player.live-video.net/1.24.0/amazon-ivs-player.min.js **Video.js tech asset:** https://player.live-video.net/1.24.0/amazon-ivs-videojs-tech.min.js **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.24.0/web/ • Added support for audio-only playback. Audio-only quality must be selected manually with `setQuality()` ; it will not be selected automatically in auto quality

Platform	Downloads and Changes
	mode. See Audio-Only Playback in the *Player Web Guide*.
Android player 1.24.0	**Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.24.0/android/ • No changes
iOS Player 1.24.0	**Download:** https://player.live-video.net/1.24.0/AmazonIVSPlayer.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.24.0/ios/ • No changes

Mobile SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.006 MB	2.846 MB
armeabi-v7a	0.88 MB	1.995 MB
x86_64	1.085 MB	2.916 MB
x86	1.058 MB	2.982 MB

Mobile SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.43 MB	1.08 MB

January 3, 2024

Amazon IVS Broadcast SDK: Android 1.13.4, iOS 1.13.4, Web 1.7.0 (Low-Latency Streaming)

Platform	Downloads and Changes
Web Broadcast SDK 1.7.0	**Reference documentation:** https://aws.github.io/amazon-ivs-web-broadcast/docs/sdk-reference/ • No changes to the low-latency SDK.
Android Broadcast SDK 1.13.4	**Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.13.4/android/ • No changes to the low-latency SDK.
iOS Broadcast SDK 1.13.4	**Download for low-latency streaming:** https://broadcast.live-video.net/1.13.4/AmazonIVSBroadcast.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.13.4/ios/ • No changes to the low-latency SDK.

Broadcast SDK Size: Android

Architecture	Compressed Size	Uncompressed Size		
arm64-v8a	1.663 MB	4.704 MB		
armeabi-v7a	1.484 MB	3.352 MB		

Architecture	Compressed Size	Uncompressed Size		
x86_64	1.804 MB	5.243 MB		
x86	1.795 MB	4.97 MB		

Broadcast SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size		
arm64	1.63 MB	4.01 MB		

December 4, 2023

Amazon IVS Broadcast SDK: Android 1.13.2 and iOS 1.13.2 (Low-Latency Streaming)

Platform	Downloads and Changes
Android Broadcast SDK 1.13.2	**Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.13.2/android/ • No changes in the low-latency SDK.
iOS Broadcast SDK 1.13.2	**Download for low-latency streaming:** https://broadcast.live-video.net/1.13.2/AmazonIVSBroadcast.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.13.2/ios/ • No changes in the low-latency SDK.

Broadcast SDK Size: Android

Architecture	Compressed Size	Uncompressed Size		
arm64-v8a	1.663 MB	4.704 MB		
armeabi-v7a	1.484 MB	3.352 MB		
x86_64	1.804 MB	5.243 MB		
x86	1.795 MB	4.970 MB		

Broadcast SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size		
arm64	1.63 MB	4.01 MB		

November 21, 2023

Amazon IVS Broadcast SDK: Android 1.13.1 (Low-Latency Streaming)

Platform	Downloads and Changes
Android Broadcast SDK 1.13.1	**Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.13.1/android/ • No changes in the low-latency SDK.

Broadcast SDK Size: Android

Architecture	Compressed Size	Uncompressed Size		
arm64-v8a	1.663 MB	4.705 MB		
armeabi-v7a	1.484MB	3.352 MB		
x86_64	1.804 MB	5.243 MB		
x86	1.795 MB	4.971 MB		

November 17, 2023

Amazon IVS Broadcast SDK: Android 1.13.0 and iOS 1.13.0 (Low-Latency Streaming)

Platform	Downloads and Changes
All mobile (Android and iOS)	• Improved IPv6 support by adopting RFC 6555 "Happy Eyeballs" and adding the `BroadcastConfiguration.network.useIPv6` configuration option to enable or disable IPv6 for broadcasting.
Android Broadcast SDK 1.13.0	**Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.13.0/android/ • Fixed a crash when an AudioSource object is used after releasing it. • Added support to `Surfaceview` -based preview for better performance. The existing `getPreview` methods in `Session` and `StageStream` continue to return a

Platform	Downloads and Changes
	subclass of `TextureView` , but this may change in a future SDK version. • If your application depends on `TextureView` specifically, you can continue with no changes. You also can switch from `getPreview` to `getPreviewTextureView` to prepare for the eventual change of what the default `getPreview` returns. • If your application does not require `TextureView` specifically, we recommend switching to `getPreviewSurfaceView` for lower CPU and memory usage. • The SDK now implements a new type of preview called `ImagePreviewSurfaceTarget` which works with the application-provided Android Surface object. It is not a subclass of Android View, which provides better flexibility.
iOS Broadcast SDK 1.13.0	**Download for low-latency streaming:** https://broadcast.live-video.net/1.13.0/AmazonIVSBroadcast.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.13.0/ios/ • There were no changes for this release.

Broadcast SDK Size: Android

Architecture	Compressed Size	Uncompressed Size		
arm64-v8a	1.66 MB	4.70 MB		
armeabi-v7a	1.48 MB	3.35 MB		
x86_64	1.80 MB	5.24 MB		
x86	1.79 MB	4.96 MB		

Broadcast SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size		
arm64	1.63 MB	4.01 MB		

November 14, 2023

Amazon IVS Player SDK 1.23.0

Platform	Downloads and Changes
Web player 1.23.0 & Video.js integration & JW player integration	**NPM Package:** https://www.npmjs.com/package/amazon-ivs-player **Script asset:** https://player.live-video.net/1.23.0/amazon-ivs-player.min.js **Video.js tech asset:** https://player.live-video.net/1.23.0/amazon-ivs-videojs-tech.min.js **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.23.0/web/

Platform	Downloads and Changes
	• Added support for low-latency playback in iOS Safari.
Android player 1.23.0	**Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.23.0/android/ • Updated the reference documentation with a new UI and more details.
iOS Player 1.23.0	**Download:** https://player.live-video.net/1.23.0/AmazonIVSPlayer.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.23.0/ios/ • No changes.

Mobile SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	0.975 MB	2.744 MB
armeabi-v7a	0.853 MB	1.917 MB
x86_64	1.028 MB	2.873 MB
x86	1.055 MB	2.811 MB

Mobile SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.39 MB	0.93 MB

October 16, 2023

Amazon IVS Broadcast SDK: Web 1.6.0 (Low-Latency Streaming)

Platform	Downloads and Changes
Web Broadcast SDK 1.6.0	**Reference documentation:** https://aws.github.io/amazon-ivs-web-broadcast/docs/sdk-reference • No changes to the low-latency SDK.

October 12, 2023

Amazon IVS Broadcast SDK: Android 1.12.1 (Low-Latency Streaming)

Platform	Downloads and Changes
Android Broadcast SDK 1.12.1	**Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.12.1/android/ • Fixed a bug where calling `BroadcastSession.setListener` resulted in an error.

Broadcast SDK Size: Android

Architecture	Compressed Size	Uncompressed Size		
arm64-v8a	1.685 MB	5.046 MB		
armeabi-v7a	1.503 MB	3.702 MB		
x86_64	1.826 MB	5.576 MB		

Architecture	Compressed Size	Uncompressed Size		
x86	1.822 MB	5.290 MB		

October 3, 2023

Amazon IVS Player SDK 1.22.0

Platform	Downloads and Changes
Web player 1.22.0 & Video.js integration & JW player integration	**NPM Package:** https://www.npmjs.com/package/amazon-ivs-player **Script asset:** https://player.live-video.net/1.22.0/amazon-ivs-player.min.js **Video.js tech asset:** https://player.live-video.net/1.22.0/amazon-ivs-videojs-tech.min.js **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.22.0/web/ • Added a static method to get the SDK version, `MediaPlayerPackage.getVersion()`.
Android player 1.22.0	**Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.22.0/android/ • Added the `setNetworkRecoveryMode` function to the `Player` interface, to set the desired playback behavior after a network interruption.
iOS Player 1.22.0	**Download:** https://player.live-video.net/1.22.0/AmazonIVSPlayer.xcframework.zip

Platform	Downloads and Changes
	Reference documentation: https://aws.github.io/amazon-ivs-player-docs/1.22.0/ios/ • Added the `setNetworkRecoveryMode` function to the `IVSPlayer` interface, to set the desired playback behavior after a network interruption. • The `copyDisplayedPixelBuffer` method on `IVSPlayerLayer` can now be used when the player is playing. Previously it was callable only when the player was idle.

Mobile SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	0.948 MB	2.676 MB
armeabi-v7a	0.828 MB	1.865 MB
x86_64	1.025 MB	2.741 MB
x86	1.000 MB	2.802 MB

Mobile SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.37 MB	0.89 MB

October 2, 2023

In-Console Streaming

You can now stream from the IVS console. In *Getting Started with Low-Latency Streaming*, see Step 5: Set Up Streaming Software.

September 14, 2023

Amazon IVS Broadcast SDK: Web 1.5.2 (Low-Latency Streaming)

Platform	Downloads and Changes
Web Broadcast SDK 1.5.2	**Reference documentation:** https://aws.github.io/amazon-ivs-web-broadcast/docs/sdk-reference

August 23, 2023

Amazon IVS Broadcast SDK: Web 1.5.1, Android 1.12.0, and iOS 1.12.0 (Low-Latency Streaming)

Platform	Downloads and Changes
Web Broadcast SDK 1.5.1	**Reference documentation:** https://aws.github.io/amazon-ivs-web-broadcast/docs/sdk-reference
Android Broadcast SDK 1.12.0	**Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.12.0/android/ • Fixed a rare bug that caused broadcasts to end prematurely with the message "Attempted to recv after receiving shutdown from peer."

Platform	Downloads and Changes
iOS Broadcast SDK 1.12.0	**Download for low-latency streaming:** https://broadcast.live-video.net/1.12.0/AmazonIVSBroadcast.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.12.0/ios/ • Corrected the signature of `IVSDeviceDiscovery.createAudioSourceWithName` to return an `IVSCustomAudioSource` instead of `IVSCustomImageSource`.

Broadcast SDK Size: Android

Architecture	Compressed Size	Uncompressed Size		
arm64-v8a	1.685 MB	5.046 MB		
armeabi-v7a	1.503 MB	3.702 MB		
x86_64	1.826 MB	5.576 MB		
x86	1.822 MB	5.290 MB		

Broadcast SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size		
arm64	1.58 MB	3.88 MB		

August 23, 2023

Amazon IVS Broadcast SDK: Android 1.7.6 (Low-Latency Streaming)

Platform	Downloads and Changes
Android Broadcast SDK 1.7.6	**Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.7.6/android/ • Fixed a rare bug that caused broadcasts to end prematurely with the message "Attempted to recv after receiving shutdown from peer."

Broadcast SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.630 MB	4.689 MB
armeabi-v7a	1.520 MB	3.792 MB
x86_64	1.761 MB	4.748 MB
x86	1.825 MB	5.219 MB

August 22, 2023

Amazon IVS Player SDK 1.21.0

Platform	Downloads and Changes
Web player 1.21.0 & Video.js integration & JW player integration	**NPM Package:** https://www.npmjs.com/package/amazon-ivs-player

Platform	Downloads and Changes
	Script asset: https://player.live-video.net/1.21.0/amazon-ivs-player.min.js **Video.js tech asset:** https://player.live-video.net/1.21.0/amazon-ivs-videojs-tech.min.js **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.21.0/web/
Android player 1.21.0	**Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.21.0/android/
iOS Player 1.21.0	**Download:** https://player.live-video.net/1.21.0/AmazonIVSPlayer.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.21.0/ios/ • Added support for obtaining the most recently displayed video frame, via the new `copyDisplayedPixelBuffer` method on the `IVSPlayerLayer` class.

Mobile SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	0.942 MB	2.662 MB
armeabi-v7a	0.823 MB	1.853 MB
x86_64	1.020 MB	2.726 MB
x86	0.993 MB	2.788 MB

Mobile SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.36 MB	0.87 MB

August 7, 2023

Amazon IVS Broadcast SDK: Web 1.5.0, Android 1.11.0, and iOS 1.11.0

Platform	Downloads and Changes
Web Broadcast SDK 1.5.0	**Reference documentation:** https://aws.github.io/amazon-ivs-web-broadcast/docs/sdk-reference • Fixed an issue in Safari where a race condition periodically causes an error in media-track retrieval
Android Broadcast SDK 1.11.0	**Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.11.0/android
iOS Broadcast SDK 1.11.0	**Download for low-latency streaming:** https://broadcast.live-video.net/1.11.0/AmazonIVSBroadcast.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.11.0/ios

Broadcast SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.659 MB	4.918 MB

Architecture	Compressed Size	Uncompressed Size
armeabi-v7a	1.482 MB	3.590 MB
x86_64	1.804 MB	5.444 MB
x86	1.795 MB	5.160 MB

Broadcast SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.771 MB	1.879 MB

July 17, 2023

R2S3 Rendition Filtering & Thumbnail Enhancements

IVS customers can now control what renditions are generated for a stream when recording to Amazon S3 and what resolutions are generated for thumbnails. For more information, see:

- Getting Started with IVS – In "Step 4: Create a Channel" > "Console Instructions," we updated screenshots and instructions.
- Auto-Record to Amazon S3 – In "JSON Metadata Files," we added `latest_thumbnail` and updated `thumbnail`. In "Thumbnails" and "Discovering the Renditions of a Recording," we added rendition-resolution descriptions.
- Costs – In "Storing Recorded Video," we updated screenshots.
- IVS API Reference:
  - In ThumbnailConfiguration, we added `resolution` and `storage`. This affects the CreateRecordingConfiguration request and response, GetRecordingConfiguration response, and GetStreamSession response.
  - In ThumbnailConfiguration, we changed the `targetIntervalSeconds` minimum from 5 to 1 and updated the "Important" note to say it applies only to `BASIC` channels.
  - We added the RenditionConfiguration object.

- We added `renditionConfiguration` to the RecordingConfiguration object. This affects three responses: CreateRecordingConfiguration, GetRecordingConfiguration, and GetStreamSession. We also added `renditionConfiguration` to the CreateRecordingConfiguration request.

July 14, 2023

Amazon IVS Player SDK 1.20.0

Platform	Downloads and Changes
Web player 1.20.0 & Video.js integration & JW player integration	**NPM Package:** https://www.npmjs.com/package/amazon-ivs-player **Script asset:** https://player.live-video.net/1.20.0/amazon-ivs-player.min.js **Video.js tech asset:** https://player.live-video.net/1.20.0/amazon-ivs-videojs-tech.min.js **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.20.0/web/ • Fixed an issue when playing a live stream or recorded content on an iOS mobile browser, where player.`getLiveLatency()` calls return 0. (This was fixed starting with Web Player 1.17.0.) • Fixed the type definitions of the `amazon-ivs-player` npm package. • In the Web Player SDK Reference, added a new landing page and removed duplicate entries. • Added support for Video.js version 8+.

Platform	Downloads and Changes
Android player 1.20.0	**Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.20.0/android/
iOS Player 1.20.0	**Download:** https://player.live-video.net/1.20.0/AmazonIVSPlayer.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.20.0/ios/ • The iOS SDK now requires iOS 12.0 or higher. (iOS 11 is no longer supported.)

Mobile SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.039 MB	2.922 MB
armeabi-v7a	0.909 MB	2.043 MB
x86_64	1.094 MB	3.069 MB
x86	1.126 MB	3.006 MB

Mobile SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.41 MB	0.99 MB

July 13, 2023

Amazon IVS Broadcast SDK: Web 1.4.0, Android 1.10.0, and iOS 1.10.0

Platform	Downloads and Changes
Web Broadcast SDK 1.4.0	**Reference documentation:** https://aws.github.io/amazon-ivs-web-broadcast/docs/sdk-reference • Fixed a bug where the SDK provided insufficient typing information for consumption by host applications. • Fixed a bug where a combination of `leave()` and subsequent `refreshStrategy()` could republish media even though weâ€™ve left. • Fixed a bug where `stageStreamsToPublish` returning a single track (audio or video) can prevent clean updates when the strategy is refreshed. • Added a faster disconnect flow when the browser tab is closed.
All mobile (Android and iOS)	• Improved the stability of stages by reducing occurrences of rare crashes. • Added a new `sendTimedMetadata` method to `BroadcastSession`, which allows sending a string through the same socket connection as the current broadcast. This string has timing information attached and can be received by the IVS Player SDK. • When a participant leaves a stage, the participant now has its published state updated to unpublished before `onPartici`

Platform	Downloads and Changes
	`pantLeft` is called on Android or `participantDidLeave` is called on iOS.
Android Broadcast SDK 1.10.0	**Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.10.0/android/ • Fixed a bug where rotating while reconnecting to a stage caused other participants to appear badly cropped. • Fixed an issue where the `AudioStageStream` device could not be cast to `AudioDevice`. • Fixed an issue where rapid background-to-foreground app switch caused subscribed video streams to be muted.

Platform	Downloads and Changes
iOS Broadcast SDK 1.10.0	**Download without stages:** https://broadcast.live-video.net/1.10.0/AmazonIVSBroadcast.xcframework.zip **Download with stages:** https://broadcast.live-video.net/1.10.0/AmazonIVSBroadcast-Stages.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.10.0/ios/ • Fixed an issue where viewers could lose audio after a broadcast session is interrupted by a phone call. The workaround (restarting the broadcast session after a phone-call interruption) is no longer needed. • Fixes an issue that prevented multiple stages from existing and all being able to play audio. • When network loss happens suddenly, an ongoing Broadcast will now be stopped immediately instead of waiting for the connection to time out.

Broadcast SDK Size: Android

Architecture	Compressed Size without Stage Functionality	Uncompressed Size without Stage Functionality	Compressed Size with Stage Functionality	Uncompressed Size with Stage Functionality
arm64-v8a	1.517 MB	4.761 MB	5.324 MB	15.028 MB
armeabi-v7a	1.340 MB	3.433 MB	4.370 MB	9.489 MB

Architecture	Compressed Size without Stage Functionality	Uncompressed Size without Stage Functionality	Compressed Size with Stage Functionality	Uncompressed Size with Stage Functionality
x86_64	1.653 MB	5.003 MB	5.802 MB	15.837 MB
x86	1.662 MB	5.287 MB	5.621 MB	15.964 MB

Broadcast SDK Size: iOS

Architecture	Compressed Size without Stage Functionality	Uncompressed Size without Stage Functionality	Compressed Size with Stage Functionality	Uncompressed Size with Stage Functionality
arm64	1.56 MB	3.84 MB	5.04 MB	10.85 MB

June 28, 2023

Viewer Session Revocation for Private Channels

IVS customers can now revoke the viewer session associated with an auth token, to prevent and stop playback using that token. For more information, see:

- Setting Up IVS Private Channels – We changed the "Token Schema" section and added "Revoke Viewer Sessions."
- IVS API Reference – We added two endpoints (StartViewerSessionRevocation and BatchStartViewerSessionRevocation) and two objects (BatchStartViewerSessionRevocationError and BatchStartViewerSessionRevocationViewerSession).

June 27, 2023

Amazon IVS Broadcast SDK: iOS 1.9.1

Platform	Downloads and Changes
iOS Broadcast SDK 1.9.1	**Download without stages:** https://broadcast.live-video.net/1.9.1/AmazonIVSBroadcast.xcframework.zip **Download with stages:** https://broadcast.live-video.net/1.9.1/AmazonIVSBroadcast-Stages.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.9.1/ios/ • Resolved an issue on iOS 16.5 and above where video bitrate gradually degrades after either: (1) approximately 20 minutes if not using auto-bitrate with b-frames turned off, or (2) approximately 20 minutes from reaching `IVSVideoConfiguration.maxBitrate` and the network connection has remained stable, with b-frames turned off. **Known issue**: Viewers may lose audio after a broadcast session is interrupted by a phone call. The workaround is to restart the broadcast session after a phone-call interruption.

Broadcast SDK Size: iOS

Architecture	Compressed Size without Stage Functionality	Uncompressed Size without Stage Functionality	Compressed Size with Stage Functionality	Uncompressed Size with Stage Functionality
arm64	1.55 MB	3.77 MB	5.01 MB	10.77 MB

June 27, 2023

Amazon IVS Broadcast SDK 1.7.5

Platform	Downloads and Changes
iOS Broadcast SDK 1.7.5	**Download:** https://broadcast.live-video.net/1.7.5/AmazonIVSBroadcast.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.7.5/ios/ • Resolved an issue on iOS 16.5 and above where video bitrate gradually degrades after either: (1) approximately 20 minutes if not using auto-bitrate with b-frames turned off, or (2) approximately 20 minutes from reaching `IVSVideoConfiguration.maxBitrate` and the network connection has remained stable, with b-frames turned off.

Broadcast SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	1.48 MB	3.43 MB

June 16, 2023

Amazon IVS Broadcast SDK: Web 1.3.3

Platform	Downloads and Changes
Web Broadcast SDK 1.3.3	**Reference documentation:** https://aws.github.io/amazon-ivs-web-broadcast/docs/sdk-reference • Fixed regressions in internal analytics used to support IVS multiple-hosts health.

June 2, 2023

Advanced Channel Types

This release introduces two new channel types – `ADVANCED_SD` and `ADVANCED_HD` – in addition to the existing `BASIC` and `STANDARD` types. Channel type determines the allowable playback and recording resolution and bitrate.

- `ADVANCED_SD`: Video is transcoded; multiple qualities are generated from the original input, to automatically give viewers the best experience for their devices and network conditions. Input resolution can be up to 1080p and bitrate can be up to 8.5 Mbps; output is capped at SD quality (480p). You can select an optional transcode preset (see below). Audio for all renditions is transcoded, and an audio-only rendition is available.
- `ADVANCED_HD`: Video is transcoded; multiple qualities are generated from the original input, to automatically give viewers the best experience for their devices and network conditions. Input resolution can be up to 1080p and bitrate can be up to 8.5 Mbps; output is capped at HD

quality (720p). You can select an optional transcode preset (see below). Audio for all renditions is transcoded, and an audio-only rendition is available.

Optional *transcode presets* for the new channel types allow you to trade off available download bandwidth and video quality, to optimize the viewing experience. There are two presets:

- *Constrained bandwidth delivery* uses a lower bitrate for each quality level. Use it if you have low download bandwidth and/or simple video content (e.g., talking heads).
- *Higher bandwidth delivery* uses a higher bitrate for each quality level. Use it if you have high download bandwidth and/or complex video content (e.g., flashes and quick scene changes).

The Document History page lists related changes to the IVS User Guide and IVS API Reference.

June 1, 2023

Amazon IVS Broadcast SDK: Android 1.9.0 and iOS 1.9.0

Platform	Downloads and Changes
All	• Improved stability of stages by reducing occurrences of rare crashes. • Enhanced automated recovery from recurrent network disruptions.
Android Broadcast SDK 1.9.0	**Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.9.0/android/ • Fixed a bug where disconnecting wired headphones would result in an error when the user tried to switch to a non-default microphone on some devices. • Fixed a bug on some devices where an incorrect microphone is attached when switching microphones during a broadcasting session.

Platform	Downloads and Changes
	• Fixed a crash when calling `Presets` methods before creating a `BroadcastSession` , `Stage`, or `DeviceDiscovery` object.

Platform	Downloads and Changes
iOS Broadcast SDK 1.9.0	**Download without stages:** https://broadcast.live-video.net/1.9.0/AmazonIVSBroadcast.xcframework.zip **Download with stages:** https://broadcast.live-video.net/1.9.0/AmazonIVSBroadcast-Stages.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.9.0/ios/ • When you have joined a Stage and have not attached a microphone to the Stage, the new default behavior when entering the background is to stay in the Stage instead of leaving automatically. This enables the use case of listening to a Stage as a viewer-only participant while in the background. • Improved the handling of a stageâ€™s Bluetooth device connect/disconnect. • Fixed an issue where audio is much lower when using `setGain` to mute and unmute. • When attaching a camera to a `IVSBroadcastSession`, the camera now configures itself based on the `size` and `targetFramerate` on the `IVSVideoConfiguration`. • The iOS SDK now requires iOS 12.0 or higher. (iOS 11 is no longer supported.) **Known issue**: Viewers may lose audio after a broadcast session is interrupted by a phone call. The workaround is to restart the

Platform	Downloads and Changes
	broadcast session after a phone-call interruption.

Broadcast SDK Size: Android

Architecture	Compressed Size without Stage Functionality	Uncompressed Size without Stage Functionality	Compressed Size with Stage Functionality	Uncompressed Size with Stage Functionality
arm64-v8a	1.638 MB	4.846 MB	5.451 MB	14.778 MB
armeabi-v7a	1.461 MB	3.532 MB	4.506 MB	9.475 MB
x86_64	1.770 MB	5.082 MB	5.753 MB	15.904 MB
x86	1.781 MB	5.366 MB	5.919 MB	15.708 MB

Broadcast SDK Size: iOS

Architectur9	Compressed Size without Stage Functionality	Uncompressed Size without Stage Functionality	Compressed Size with Stage Functionality	Uncompressed Size with Stage Functionality
arm64	1.55 MB	3.77 MB	5.00 MB	10.77 MB

May 23, 2023

Amazon IVS Player SDK 1.19.0

Platform	Downloads and Changes
Web player 1.19.0 & Video.js integration & JW player integration	**NPM Package:** https://www.npmjs.com/package/amazon-ivs-player **Script asset:** https://player.live-video.net/1.19.0/amazon-ivs-player.min.js **Video.js tech asset:** https://player.live-video.net/1.19.0/amazon-ivs-videojs-tech.min.js **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.19.0/web/
Android player 1.19.0	**Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.19.0/android/ • Fixed an issue in auto quality mode, where the player stayed in the lowest quality after rebuffering, even when there was enough bandwidth to switch up.
iOS Player 1.19.0	**Download:** https://player.live-video.net/1.19.0/AmazonIVSPlayer.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.19.0/ios/

Mobile SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.013 MB	2.866 MB

Architecture	Compressed Size	Uncompressed Size
armeabi-v7a	0.919 MB	2.272 MB
x86_64	1.084 MB	3.001 MB
x86	1.058 MB	2.702 MB

Mobile SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.41 MB	0.99 MB

May 16, 2023

Amazon IVS Broadcast SDK: iOS 1.8.1

Platform	Downloads and Changes
iOS Broadcast SDK 1.8.1	**Download without stages:** https://broadcast.live-video.net/1.8.1/AmazonIVSBroadcast.xcframework.zip **Download with stages:** https://broadcast.live-video.net/1.8.1/AmazonIVSBroadcast-Stages.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.8.1/ios/ • Fixed a bitrate degradation issue on iOS 16.4. I, for both RTMP (without stages) and WebRTC (with stages). If you had implemented a workaround on your app (by enabling

Platform	Downloads and Changes
	b frame), you can remove it after installing this update.

Broadcast SDK Size: iOS

Architecture	Compressed Size without Stage Functionality	Uncompressed Size without Stage Functionality	Compressed Size with Stage Functionality	Uncompressed Size with Stage Functionality
arm64	1.53 MB	3.73 MB	5.00 MB	10.73 MB

May 16, 2023

Amazon IVS Broadcast SDK 1.7.4

Platform	Downloads and Changes
iOS Broadcast SDK 1.7.4	**Download:** https://broadcast.live-video.net/1.7.4/AmazonIVSBroadcast.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.7.4/ios/ • Fixed a bitrate degradation issue on iOS 16.4. If you had implemented a workaround on your app (by enabling b frame), you can remove it after installing this update.

Broadcast SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	1.48 MB	3.40 MB

May 11, 2023

Multiple Hosts Health

Now you can monitor the health of your IVS stages with multiple hosts. See:

- Monitoring Stage Health – This is a new *Amazon IVS User Guide* page.
- Using Amazon EventBridge with Amazon IVS – We added two Stage Update events.
- IVS Service Quotas – We added call-rate quotas for the new endpoints.
- IVS Stage API Reference – We added five endpoints (GetParticipant, ListParticipants, GetStageSession, ListStageSessions, ListParticipantEvents) and five objects (Event, Participant, ParticipantSummary, StageSession, StageSessionSummary).

May 1, 2023

Amazon IVS Web Broadcast SDK 1.3.2

Platform	Downloads and Changes
Web Broadcast SDK 1.3.2	**Reference documentation:** https://aws.github.io/amazon-ivs-web-broadcast/docs/sdk-reference • Fixed an issue where broadcasting a screenshare sometimes resulted in a black screen for live channels. • Fixed an issue where broadcasting a stage participant sometimes resulted in a black screen for live channels.

Platform	Downloads and Changes
	• Fixed an analytics issue where duplicate unpublish and publish events were reported. • Fixed an issue where `getStats` was not always updated for RemoteStageStream objects. • Fixed an `OverconstrainedError` when trying to broadcast stage participants. • Added an enhancement: subscribe-only participants are ignored when the stage strategy `shouldPublishParticipant` is set to `true`.

April 27, 2023

Stage Participant Increase

The maximum number of participants who can be connected to a stage at once was increased from 12 to 1,000. At most 12 participants can be publishing to a stage at once and at most 1,000 can be subscribing at once. For more information see Enabling Multiple Hosts on an Amazon IVS Stream and Amazon IVS Service Quotas.

April 4, 2023

Amazon IVS Player SDK 1.18.0

Platform	Downloads and Changes
Web player 1.18.0 & Video.js integration & JW player integration	**NPM Package:** https://www.npmjs.com/package/amazon-ivs-player **Script asset:** https://player.live-video.net/1.18.0/amazon-ivs-player.min.js

Platform	Downloads and Changes
	Video.js tech asset: https://player.live-video.net/1.18.0/amazon-ivs-videojs-tech.min.js **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.18.0/web/ • Fixed a Safari issue where after refresh, in the console tab, "HTTP Response Error" – "Load failed" was displayed.
Android player 1.18.0	**Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.18.0/android/ • Fixed an issue with video playback when the playback rate is greater than 1x.
iOS Player 1.18.0	**Download:** https://player.live-video.net/1.18.0/AmazonIVSPlayer.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.18.0/ios/

Mobile SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.011 MB	2.854 MB
armeabi-v7a	0.916 MB	2.261 MB
x86_64	1.082 MB	2.990 MB
x86	1.055 MB	2.691 MB

Mobile SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.41 MB	0.99 MB

March 30, 2023

RTMP Support

Amazon IVS now supports RTMP (Real-Time Messaging Protocol) streaming, in addition to RTMPS. RTMPS is the secure version of RTMP. We recommend using RTMPS for secure ingest, unless you have specific and verified use cases that require RTMP.

RTMP streaming can be set up via:

- IVS console – Use the **Custom configuration** button during initial channel setup or the **Enable RTMP ingest** toggle when modifying an existing channel.
- API – Use the new `insecureIngest` field in CreateChannel or UpdateChannel requests. See the IVS API Reference.

For information on RTMP ingest endpoints, see Set Up Streaming Software, Broadcast Android SDK Guide, and Broadcast iOS SDK Guide.

April 29, 2023 correction: We changed Broadcast Android SDK Guide and Broadcast iOS SDK Guide to indicate that these SDKs support only RTMPS ingest (not insecure RTMP ingest).

March 29, 2023

Single-Use Tokens for Private Channels

In Generate and Sign Playback Tokens, we added to the payload an optional field, `single-use-uuid`, for generating a single-use token.

March 28, 2023

Amazon IVS Web Broadcast SDK 1.3.1

Platform	Downloads and Changes
Web Broadcast SDK 1.3.1	**Reference documentation:** https://aws.github.io/amazon-ivs-web-broadcast/docs/sdk-reference • There were no customer-facing changes in this release.

March 23, 2023

Support for Multiple Hosts on a Stream (Stage Resource)

This is the first release of new functionality: you can now combine video from multiple participants into one live stream. A *stage* is a virtual space where participants can exchange audio and video in real time. You can then broadcast a stage to channels to reach a larger audience, and you can build applications where audience members can be brought "on stage" to contribute to the live conversation. For details, see:

- Enabling Multiple Hosts on an IVS Stream (new document)
- Stage API Reference (new document)
- Service Quotas (see "Amazon IVS Stage" endpoints and stage limits in Other Quotas > Amazon IVS)
- Documentation changes for the simultaneous release of Amazon IVS Broadcast SDK 1.8.0

March 23, 2023

Amazon IVS Broadcast SDK: Android 1.8.0, iOS 1.8.0, Web 1.3.0

In conjunction with adding support for multiple hosts on a stream, the Android and iOS Broadcast SDKs were updated to support the new stage functionality.

Platform	Downloads and Changes
All	• Added stage support. See Support for Multiple Hosts on a Stream (Stage Resource) . • In the Broadcast SDK overview, added stage platform requirements.
Android Broadcast SDK 1.8.0	**Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.8.0/android/ • Depending on how your gradle file is configured (using classifier), you can download the SDK without or without stage support. The SDK without stage support is smaller. For details, see Broadcast SDK: Android Guide. • In Broadcast SDK: Android Guide, added "Add Multiple Hosts with the Stage SDK" and stage-related "Known Issues and Workarounds."
iOS Broadcast SDK 1.8.0	**Download without stages:** https://broadcast.live-video.net/1.8.0/AmazonIVSBroadcast.xcframework.zip **Download with stages:** https://broadcast.live-video.net/1.8.0/AmazonIVSBroadcast-Stages.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.8.0/ios/ • Depending on how your pod file is configured, you can download the SDK with or without stage support The SDK without

Platform	Downloads and Changes
	stage support is smaller. For installation details, see Broadcast SDK: iOS Guide. • In Broadcast SDK: iOS Guide, added "Add Multiple Hosts with the Stage SDK" and stage-related "Known Issues and Workaroun ds." • Deprecated bitcode support from the SDK, as Apple has officially deprecated bitcode and no longer accepts it for App Store submissions. For more information, see the Xcode 14 release notes.
Web Broadcast SDK 1.3.0	**Reference documentation:** https://aws.github.io/amazon-ivs-web-broadcast/docs/sdk-reference • In Broadcast SDK: Web Guide, added "Add Multiple Hosts with the Stage SDK" and stage-related "Known Issues and Workaroun ds."

Broadcast SDK Size: Android

Architecture	Compressed Size without Stage Functiona lity	Uncompressed Size without Stage Functiona lity	Compressed Size with Stage Functionality	Uncompressed Size with Stage Functionality
arm64-v8a	1.767 MB	5.192 MB	5.886 MB	16.398 MB
armeabi-v7a	1.656 MB	4.263 MB	4.946 MB	10.924 MB
x86_64	1.967 MB	5.735 MB	6.316 MB	17.376 MB
x86	1.894 MB	5.196 MB	6.387 MB	16.730 MB

Broadcast SDK Size: iOS

Architecture	Compressed Size without Stage Functionality	Uncompressed Size without Stage Functionality	Compressed Size with Stage Functionality	Uncompressed Size with Stage Functionality
arm64	1.53 MB	3.73 MB	5.03 MB	10.67 MB

March 2, 2023

Amazon IVS Broadcast SDK: Android 1.7.3

Platform	Downloads and Changes
Android Broadcast SDK 1.7.3	**Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.7.3/android/ • Fixed an issue where custom image sources failed to work properly on devices with the MediaTek Dimensity 700 SoC.

Broadcast SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.629 MB	4.688 MB
armeabi-v7a	1.520 MB	3.792 MB
x86_64	1.825 MB	5.218 MB
x86	1.629 MB	4.688 MB

February 28, 2023

Amazon IVS Player SDK 1.17.0

Platform	Downloads and Changes
Web player 1.17.0 & Video.js integration & JW player integration	**NPM Package:** https://www.npmjs.com/package/amazon-ivs-player **Script asset:** https://player.live-video.net/1.17.0/amazon-ivs-player.min.js **Video.js tech asset:** https://player.live-video.net/1.17.0/amazon-ivs-videojs-tech.min.js **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.17.0/web/ • Implemented support for the `getLiveLatency` method for mobile Safari.
Android player 1.17.0	**Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.17.0/android/
iOS Player 1.17.0	**Download:** https://player.live-video.net/1.17.0/AmazonIVSPlayer.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.17.0/ios/ • Deprecated bitcode support from the SDK, as Apple has officially deprecated bitcode and no longer accepts it for App Store submissions. For more information, see the Xcode 14 release notes.

Mobile SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.009 MB	2.853 MB
armeabi-v7a	0.915 MB	2.260 MB
x86_64	1.081 MB	2.988 MB
x86	1.054 MB	2.690 MB

Mobile SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.41 MB	0.99 MB

February 16, 2023

Byte-Range Tags and Manifest Files for Auto-Record to S3

The auto-record-to-S3 feature now supports byte-range playlist generation, in addition to standard HLS playlists. For more information, see Auto-Record to Amazon S3 ("Recording Contents," "Byte-Range Playlists," and new `byte_range_playlist` fields in JSON examples for `recording_started` and `recording_ended`).

January 31, 2023

Amazon IVS Chat Client Messaging SDK: Android 1.1.0

Platform	Downloads and Changes
Android Chat Client Messaging SDK 1.1.0	**Reference documentation:** https://aws.github.io/amazon-ivs-chat-messaging-sdk-android/1.1.0/

Platform	Downloads and Changes
	• To support Kotlin Coroutines, we added new IVS Chat Messaging APIs in the com.amazonaws.ivs.chat.messaging.coroutines package. Also see the new Kotlin Coroutines tutorial; part 1 (of 2) is Chat Rooms.

Chat Client Messaging SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
All architectures (bytecode)	89 KB	92 KB

January 17, 2023

Amazon IVS Player SDK 1.16.0

Platform	Downloads and Changes
Web player 1.16.0 & Video.js integration & JW player integration	**NPM Package:** https://www.npmjs.com/package/amazon-ivs-player **Script asset:** https://player.live-video.net/1.16.0/amazon-ivs-player.min.js **Video.js tech asset:** https://player.live-video.net/1.16.0/amazon-ivs-videojs-tech.min.js **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.16.0/web/ • Updated SDK documentation to note which methods are not supported on iOS mobile browsers.

Platform	Downloads and Changes
Android player 1.16.0	**Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.16.0/android/ • Added the `setOrigin` method to enable inclusion of an `Origin` request header with playback requests. Also see in Token Schema for the new `strict-origin-enforcement` field.
iOS Player 1.16.0	**Download:** https://player.live-video.net/1.16.0/AmazonIVSPlayer.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.16.0/ios/ • Added the `setOrigin` method to enable inclusion of an `Origin` request header with playback requests. Also see in Token Schema for the new `strict-origin-enforcement` field.

Mobile SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.009 MB	2.852 MB
armeabi-v7a	0.914 MB	2.258 MB
x86_64	1.054 MB	2.689 MB
x86	1.080 MB	2.987 MB

Mobile SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.41 MB	0.99 MB

December 9, 2022

Timestamp Added to Auto-Record to S3 Manifest Files

When Auto-Record to Amazon S3 is enabled, HLS manifest files are created. Those files now contain HLS Program-Date-Time (PDT) tags indicating the wall-clock time for every HLS segment when produced, using the UTC ISO-8601 format.

December 6, 2022

Amazon IVS Broadcast SDK: Android 1.7.2

Platform	Downloads and Changes
Android Broadcast SDK 1.7.2	**Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.7.2/android/ • Fixed a bug where the `Device.Descriptor` returned by a non-Camera device subclassing `SurfaceSource` would provide a unique `deviceId` and `urn` on each call, making those properties unreliable for identifying devices. • Fixed a bug where the `preferredAudioInput` property on a `BroadcastConfiguration.Mixer.Slot` was null when queried by `Mixer.getSlots()`, if the associated slot had a `preferredAudioInput` value of `Device.De`

Platform	Downloads and Changes
	`scriptor.DeviceType.MICROPHONE` when it was added.

Broadcast SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.628 MB	4.682 MB
armeabi-v7a	1.519 MB	3.786 MB
x86_64	1.701 MB	5.075 MB
x86	1.637 MB	4.605 MB

November 17, 2022

Chat Logging

This is the first release of new functionality. You can now create logging configurations to enable storage of messages sent to your chat rooms. For more information, see:

- Chat Logging - New page.
- Getting Started with Chat - Updated IAM permissions and added procedures for setting up chat logging.
- Service Quotas - new endpoints and logging configurations.
- CloudWatch – Added log-destination metrics.

  Oct 12, 2023 update: This CloudWatch document was deleted and the content was moved to Monitoring IVS Low-Latency Streaming.

  Dec 28, 2023 update: Chat-related CloudWatch content was moved to Monitoring Amazon IVS Chat.
- Chat API Reference – Added a LoggingConfiguration resource and several data types and endpoints. For details see Document History.

November 9, 2022

Amazon IVS Chat Client Messaging SDK: JavaScript 1.0.2

Platform	Downloads and Changes
JavaScript Chat Client Messaging SDK 1.0.2	**Reference documentation:** https://aws.github.io/amazon-ivs-chat-messaging-sdk-js/1.0.2/ • Fixed an issue that affected Firefox: clients erroneously received a socket error when they were disconnected from a chat room using the DisconnectUser endpoint.

November 1, 2022

Amazon IVS Player SDK 1.14.0

Platform	Downloads and Changes
All	• Improved player stability by reducing occurrences of rare crashes.
Web player 1.14.0 & Video.js integration & JW player integration	**NPM Package:** https://www.npmjs.com/package/amazon-ivs-player **Script asset:** https://player.live-video.net/1.14.0/amazon-ivs-player.min.js **Video.js tech asset:** https://player.live-video.net/1.14.0/amazon-ivs-videojs-tech.min.js **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.14.0/web/
Android player 1.14.0	**Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.14.0/android/

Platform	Downloads and Changes
	• Added the `getErrorCode()` method to the `ErrorType` class.
iOS Player 1.14.0	**Download:** https://player.live-video.net/1.14.0/AmazonIVSPlayer.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.14.0/ios/ • Made public the IVS Player `setQuality:adaptive:` method.

Mobile SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.004 MB	2.840 MB
armeabi-v7a	0.909 MB	2.248 MB
x86_64	1.049 MB	2.678 MB
x86	1.075 MB	2.975 MB

Mobile SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.41 MB	0.99 MB

October 18, 2022

Amazon IVS Chat Client Messaging SDK: JavaScript 1.0.1

Platform	Downloads and Changes
JavaScript Chat Client Messaging SDK 1.0.1	**Reference documentation:** https://aws.github.io/amazon-ivs-chat-messaging-sdk-js/1.0.1/

October 6, 2022

Amazon IVS Broadcast SDK 1.7.1

Platform	Downloads and Changes
iOS Broadcast SDK 1.7.1	**Download:** https://broadcast.live-video.net/1.7.1/AmazonIVSBroadcast.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.7.1/ios/ • Fixed a linker error when directly linking against a few classes. • Removed `init` and new functions on classes that should never be instantiated by the host application. • Slots using the camera provided by the SDK and configured to a 9:16 portrait aspect ratio now correctly use the matching 9:16 camera ratio. (Previously they used a 3:4 camera ratio.) Slots using the FIT aspect mode now use the entire space. (Previously they were letterboxed.)

Broadcast SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	1.48 MB	3.40 MB

September 22, 2022

Amazon IVS Broadcast SDK 1.7.0

Note: There was no 1.6.0 release.

Platform	Downloads and Changes
All	• Improved stability by reducing occurrences of rare crashes. • Added an `AutomaticBitrateProfile` enum on VideoConfiguration. This controls the rate at which the ABR algorithm adjusts the video bitrate. • Added the `onTransmissionStatsChanged` method. It contains more detailed transmission statistics than `onBroadcastQualityChanged` and `onNetworkHealthChanged`. We deprecated the latter two methods and we recommend you use `onTransmissionStatsChanged` instead.
Android Broadcast SDK 1.7.0	**Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.7.0/android/
iOS Broadcast SDK 1.7.0	**Download:** https://broadcast.live-video.net/1.7.0/AmazonIVSBroadcast.xcframework.zip

Platform	Downloads and Changes
	Reference documentation: https://aws.github.io/amazon-ivs-broadcast-docs/1.7.0/ios/ • Added `IVSBroadcastSessionAudioSessionStrategy.PlayAndRecordDefaultToSpeaker`, which allows developers to specify whether devices with handsets (e.g., iPhones) prefer the speaker over the headset.

Broadcast SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.628 MB	4.682 MB
armeabi-v7a	1.519 MB	3.786 MB
x86_64	1.824 MB	5.212 MB
x86	1.760 MB	4.742 MB

Broadcast SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	1.47 MB	3.40 MB

September 20, 2022

Amazon IVS Player SDK 1.13.0

Platform	Downloads and Changes
Web player 1.13.0 & Video.js integration & JW player integration	**NPM Package:** https://www.npmjs.com/package/amazon-ivs-player **Script asset:** https://player.live-video.net/1.13.0/amazon-ivs-player.min.js **Video.js tech asset:** https://player.live-video.net/1.13.0/amazon-ivs-videojs-tech.min.js **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.13.0/web/ • Added support for the VideoJS `seeking()` function. • Removed unused types (CaptureEventTypes) which caused development issues. • Fixed intermittent MediaSource errors on network recovery. **Known issue:** The Sawmill Enabled log may appear when you open the console. This internal log is meant to be hidden, as it does not affect customers. If you see it, ignore it.
Android player 1.13.0	**Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.13.0/android/ • Added additional guards to prevent playback crashes related to race conditions. • Made stability improvements to ABR bandwidth estimation.

Platform	Downloads and Changes
iOS Player 1.13.0	**Download:** https://player.live-video.net/1.13.0/AmazonIVSPlayer.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.13.0/ios/ • Fixed a bug where audio-only playback could stop while playing in the background. • Added additional guards to prevent playback crashes related to race conditions. • Made stability improvements to ABR bandwidth estimation. • Clarified in the SDK Reference that `setAutoMaxQuality` filters qualities based on bitrate. • Changed the `setQuality:` method of the `IVSPlayer` class so it ignores invalid values.

Mobile SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.000 MB	2.829 MB
armeabi-v7a	0.904 MB	2.237 MB
x86_64	1.070 MB	2.962 MB
x86	1.045 MB	2.665 MB

Mobile SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.44 MB	1.06 MB

September 15, 2022

Vertical Video Improvement (Final Release)

Today we began rolling out the changes documented in Vertical Video Improvement *for all Amazon IVS customers*. It will take 2-3 days for the changes to propagate across all accounts.

September 12, 2022

Amazon IVS Broadcast SDK 1.5.2: iOS

Platform	Downloads and Changes
iOS Broadcast SDK 1.5.2	**Download:** https://broadcast.live-video.net/1.5.2/AmazonIVSBroadcast.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.5.2/ios/ • Fixed a rare crash when the network connection is lost very soon after a broadcast is stopped but before the broadcast shutdown has completed. • Fixed a memory-growth issue when a retry loop repeatedly tries to restart a broadcast after a fatal error.

Broadcast SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	1.39 MB	3.20 MB

September 8, 2022

Amazon IVS Chat Client Messaging SDK: Android 1.0.0 and iOS 1.0.0

Platform	Downloads and Changes
Android Chat Client Messaging SDK 1.0.0	**Reference documentation:** https://aws.github.io/amazon-ivs-chat-messaging-sdk-android/1.0.0/
iOS Chat Client Messaging SDK 1.0.0	**Reference documentation:** https://aws.github.io/amazon-ivs-chat-messaging-sdk-ios/1.0.0/

Chat Client Messaging SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
All architectures (bytecode)	53 KB	58 KB

Chat Client Messaging SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
ios-arm64_x86_64-simulator (bitcode)	484 KB	2.4 MB
ios-arm64_x86_64-simulator	484 KB	2.4 MB

Architecture	Compressed Size	Uncompressed Size
ios-arm64 (bitcode)	1.1 MB	3.1 MB
ios-arm64	233 KB	1.2 MB

September 2, 2022

Amazon IVS Web Broadcast SDK 1.2.0

Platform	Downloads and Changes
Web Broadcast SDK	**Reference documentation:** https://aws.github.io/amazon-ivs-web-broadcast/docs/sdk-reference • Fixed bundle type definitions when the `npm pack` is run. • Added a preset configuration to support 1080 BASIC channels.

August 30, 2022

Merge Fragmented Streams

This is the first release of new functionality. If your stream is configured for Auto-Record to Amazon S3, you can now specify a window of time during which, if your stream is interrupted and a new stream is started, Amazon IVS tries to record to the same S3 prefix as the previous stream. In other words, if a broadcast disconnects and then reconnects within the specified interval, the multiple streams are considered a single broadcast and merged. For more information, see:

- Getting Started with Amazon IVS – We updated Step 3: Create a Channel with Optional Recording, for console and CLI instructions.
- Auto-Record to S3 – See the new section, Merge Fragmented Streams.

- EventBridge – In Examples: Recording State Change, `recording_session_id` and `recording_session_stream_ids` fields were added.
- IVS API Reference – We added the `recordingReconnectWindowSeconds` field to the CreateRecordingConfiguration request and the RecordingConfiguration object. This affects three responses (CreateRecordingConfiguration, GetRecordingConfiguration, and GetStreamSession).

August 9, 2022

Amazon IVS Web Player SDK 1.12.0

Platform	Downloads and Changes
Web player 1.12.0 & Video.js integration & JW player integration	**NPM Package:** https://www.npmjs.com/package/amazon-ivs-player **Script asset:** https://player.live-video.net/1.12.0/amazon-ivs-player.min.js **Video.js tech asset:** https://player.live-video.net/1.12.0/amazon-ivs-videojs-tech.min.js **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.12.0/web/ • Added additional guards to prevent playback crashes related to race conditions.

July 28, 2022

Amazon IVS iOS Broadcast SDK 1.5.1

Platform	Downloads and Changes
iOS Broadcast SDK 1.5.1	**Download:** https://broadcast.live-video.net/1.5.1/AmazonIVSBroadcast.xcframework.zip

Platform	Downloads and Changes
	Reference documentation: https://aws.github.io/amazon-ivs-broadcast-docs/1.5.1/ios/ • Fixed compatibility issues with iOS 16 that prevented audio encoding, causing all broadcasts to fail. *This issue impacts all previous versions of the IVS Broadcast SDK for iOS. Version 1.5.1 is required to broadcast on iOS 16.* • Fixed a memory leak when providing a delegate directly to the `IVSBroadcastSession` 's initializer. (A workaround was to set the delegate property afterwards.)

Broadcast SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	1.36 MB	3.20 MB

July 21, 2022

Amazon IVS Web Broadcast SDK

Platform	Downloads and Changes
Web Broadcast SDK	**Reference documentation:** https://aws.github.io/amazon-ivs-web-broadcast/docs/sdk-reference • This is the initial release of the Amazon IVS Web Broadcast SDK.

July 14, 2022

Amazon IVS iOS Player SDK 1.8.3

Platform	Downloads and Changes
iOS Player 1.8.3	**Download:** https://player.live-video.net/1.8.3/AmazonIVSPlayer.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.8.3/ios/ • Fixed an issue where the Player could not play recorded content served via a URL that includes a relative path. • Fixed a memory-growth issue that could occur when the main thread is blocked.

Mobile SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.46 MB	1.10 MB

June 28, 2022

Amazon IVS Player Web SDK 1.11.0

Platform	Downloads and Changes
Web player 1.11.0 & Video.js integration & JW player integration	**NPM Package:** https://www.npmjs.com/package/amazon-ivs-player **Script asset:** https://player.live-video.net/1.11.0/amazon-ivs-player.min.js

Platform	Downloads and Changes
	Video.js tech asset: https://player.live-video.net/1.11.0/amazon-ivs-videojs-tech.min.js **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.11.0/web/ • Made stability improvements to ABR bandwidth estimation. • Fixed an issue when playing recorded content on an iOS mobile browser using the Video.js integration: the replay button now works. The prior workaround (hiding the replay button when initializing Video.js) is no longer required.

June 22, 2022

Amazon IVS Broadcast SDK 1.5.0

Platform	Downloads and Changes
All	• Improved stability by reducing occurrences of rare crashes. • Improved stability for high-bitrate streams. • Broadcasts experiencing extremely high latency will be ended with error code 20401 and this message: "The broadcast has ended because the network got too far behind. Check that you have a stable connection or reduce the broadcast bitrate." The threshold latency value for this is likely to change over time; currently it is 45 seconds.

Platform	Downloads and Changes
Android Broadcast SDK 1.5.0	**Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.5.0/android/ • Added a new configuration option to `Video` that enables transparency for the broadcast session: `enableTransparency(boolean)` and `isTransparencyEnabled()`. By default, transparency is disabled. Note that you must set `Video.enableTransparency` to TRUE for individual slotâ€™s `fillColor` or `transparency` values to work as expected. Enable transparency only when required, since it is more computationally intensive.

Platform	Downloads and Changes
iOS Broadcast SDK 1.5.0	**Download:** https://broadcast.live-video.net/1.5.0/AmazonIVSBroadcast.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.5.0/ios/ • When using `IVSReplayKitBroadcastSession` for screen share, we recommend that you call `IVSReplayKitBroadcastSession::broadcastFinished` in `RPBroadcastSampleHandler::broadcastFinished` to ensure proper shutdown of the stream. Failure to do this might result in the stream staying live until it times out. • `IVSImagePreviewView` is no longer backed by `MTKView`, but instead a normal `UIView` that has a `AVSampleBufferDisplayLayer` based `CALayer`.

Broadcast SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.539 MB	4.355 MB
armeabi-v7a	1.431 MB	3.483 MB
x86_64	1.729 MB	4.868 MB
x86	1.675 MB	4.436 MB

Broadcast SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	1.36 MB	3.20 MB

June 9, 2022

Vertical Video Improvement

This release improves how Amazon IVS processes *vertical input*; e.g., content broadcast from mobile devices where the height is greater than the width. This change is being rolled out over time, as explained at the end of this post.

There are three changes:

1. (Affects `Standard` channels only) Vertical input is scaled based on the contentâ€™s width, resulting in less downscaling and visually higher quality output. For example, here is how this change impacts 720x1280 input:

Name	Old Width x Height	New Width x Height
1280p	720 x 1280	â€”
720p	404 x 720	720 x 1280
480p	268 x 480	480 x 852
360p	200 x 360	360 x 640
160p	88 x 160	160 x 284

2. (Affects `Standard` channels only) The only renditions that are generated are those with width less than or equal to your input width. For example, if your input is 720x1280, you get 720p, 480p, 360p, and 160p renditions. If your input width is between renditions, you get all renditions with lower widths than your input. For example, here is how this change impacts 540x960 input:

Name	Old Width x Height	New Width x Height
960p	540 x 960	â€”
720p	404 x 720	â€”
480p	268 x 480	480 x 852
360p	200 x 360	360 x 640
160p	88 x 160	160 x 284

3. (Affects `Standard` and `Basic` channels) Renditions for vertical input use a more conventional naming scheme based on width instead of height. For example, 360x640 input to a `Basic` channel has one output rendition named 360p.

   This name appears in video playlists as the `NAME` attribute and in the user-facing quality selector (example). The name also is used as the Amazon S3 directory name for recorded assets. For example, for 360x640 input, the quality selector and Auto-Record to Amazon S3 directory name is 360p60 (the old value was 640p60).

We are rolling out this improvement over time:

- Now – Did you broadcast vertical input in the past six months? If not, we are enabling this change for your account now (specifically, over a 1-week period starting today). If yes, you will get a notification about this change in your account events section of the AWS Health Dashboard.
- September 15, 2022 – We will enable the change on all remaining accounts. If you broadcast vertical input in the past six months and want this change to be enabled on your account sooner, please submit an AWS support ticket.

Important: Make sure you do not have any code (e.g., post-processing of recordings) that depends on the old behavior. For instance, if you have a script with rendition width/height hardcoded, you must edit that or it may break after this change is applied.

May 24, 2022

Amazon IVS Web and Android Player SDK 1.10.0

Platform	Downloads and Changes
Web player 1.10.0 & Video.js integration & JW player integration	**NPM Package:** https://www.npmjs.com/package/amazon-ivs-player **Script asset:** https://player.live-video.net/1.10.0/amazon-ivs-player.min.js **Video.js tech asset:** https://player.live-video.net/1.10.0/amazon-ivs-videojs-tech.min.js **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.10.0/web/ • Fixed console errors related to pausing and playing with the Video.js plugin. • In the reference documentation, removed from the TypeScript definitions file two types which should not have been exposed, `AutoplayOptions` and `PlayerEventType.STATE_CHANGED`. • Fixed an issue where not all qualities were considered when using `setAutoMaxQuality` and `setAutoMaxVideoSize`. • Exposed the `setAutoMaxVideoSize` method, with corresponding documentation. • Clarified in the SDK Reference that `setAutoMaxQuality` filters qualities based on bitrate.

Platform	Downloads and Changes
	• Corrected the end-of-stream behavior for VODs for web platforms.
Android player 1.10.0	**Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.10.0/android/ • Fixed an issue where not all qualities were considered when using `setAutoMaxQuality` and `setAutoMaxVideoSize`. • Added `getVolume()` to the `Player` class. • Clarified in the SDK Reference that `setAutoMaxQuality` filters qualities based on bitrate. • Corrected the end-of-stream behavior for VODs for web platforms.

Mobile SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	0.990 MB	2.805 MB
armeabi-v7a	0.895 MB	2.215 MB
x86_64	1.033 MB	2.643 MB
x86	1.058 MB	2.936 MB

April 28, 2022

Stream Health Updates

There are two updates to Amazon IVS Stream Health, for monitoring the health of your live streams in near real time:

- Charts of the high-resolution CloudWatch metrics are now available in the stream session details pages on the console.
- A new dimension (`Health`) was added to the `ConcurrentStreams` metric, to filter the results by channel health.

See Monitoring Amazon IVS Live Stream Health and Monitoring Amazon IVS with Amazon CloudWatch.

Oct 12, 2023 update: These documents were combined into Monitoring IVS Low-Latency Streaming.

April 26, 2022

Amazon IVS Chat

This is the initial release of Amazon IVS Chat, a managed, live-chat feature to go alongside live video streams. New documentation is accessible from the Amazon IVS documentation landing page.

- Start with Getting Started with Amazon IVS Chat.
- In the *Amazon IVS Chat User Guide*:
  - See Chat Message Review Handler, a new page.
  - Search for "chat" changes in Monitoring Amazon IVS with Amazon CloudWatch, Amazon IVS Security, and Amazon IVS Service Quotas.

    Oct 12, 2023 update: The CloudWatch document was deleted and the content was moved to Monitoring IVS Low-Latency Streaming.

  Dec 28, 2023 update: All chat information was collected in a new Chat User Guide.
- The new **Amazon IVS Chat** section of the documentation landing page has two API References:

- Chat API Reference – Control-plane API (HTTPS).
- Chat Messaging API Reference – Data-plane API (WebSocket).

As always, documentation changes are described in the Amazon IVS Document History.

April 22, 2022

Amazon IVS iOS Player SDK 1.8.2

Platform	Downloads and Changes
iOS Player 1.8.2	**Download:** https://player.live-video.net/1.8.2/AmazonIVSPlayer.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.8.2/ios/ • Added support for Picture in Picture on devices running iOS 15 and later. You can instantiate the AVPictureInPictureController class directly with an instance of `IVSPlayerLayer`. Refer to the public sample app for an example implementation. • Fixed a deadlock issue that can occur while manipulating the `IVSPlayer` state from inside the completion handler of the `-seekTo:completionHandler:` method. • Fixed an issue introduced by the 1.8.1 release in an attempt to resolve a memory growth issue that can occur when the main thread is blocked.

Mobile SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.46 MB	1.10 MB

April 19, 2022

Amazon IVS Broadcast SDK 1.4.0

Platform	Downloads and Changes
All	• Improved stability by reducing occurrences of rare crashes. • Added a new page on Broadcast SDK: Custom Image Sources.
Android Broadcast SDK 1.4.0	**Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.4.0/android/ • Fixed a bug in `createServiceNotificationBuilder` to enable targeting Android 12. • Fix issue on devices with a buggy main AVC profile by falling back to the baseline AVC profile. • Adds some NonNull annotations to several public API method signatures to prevent unexpected exceptions from crashing the application.
iOS Broadcast SDK 1.4.0	**Download:** https://broadcast.live-video.net/1.4.0/AmazonIVSBroadcast.xcframework.zip

Platform	Downloads and Changes
	Reference documentation: https://aws.github.io/amazon-ivs-broadcast-docs/1.4.0/ios/ • Improved performance on iOS throughout the entire SDK by better utilizing GCD and Darwin-optimized locks, and improving buffer reuse. • In BroadcastConfiguration, changed the Keyframe interval maximum value from 10 to 5 to be consistent with Android. • Added a new method to control the audio encoder quality. On `IVSAudioConfiguration`, use the `setQuality` method. Reducing the encoder quality can have a large impact on CPU usage.

Broadcast SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.526 MB	4.324 MB
armeabi-v7a	1.416 MB	3.442 MB
x86_64	1.657 MB	4.393 MB
x86	1.712 MB	4.827 MB

Broadcast SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	1.33 MB	3.13 MB

March 31, 2022

Amazon IVS iOS Player SDK 1.8.1

Platform	Downloads and Changes
iOS Player 1.8.1	**Download:** <deprecated> **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.8.1/ios/ • Added support for Picture in Picture on devices running iOS 15 and later. You can instantiate the AVPictureInPictureController class directly with an instance of `IVSPlayerLayer` . Refer to the public sample app for an example implementation. • Fixed a memory-growth issue that can occur when the main thread is blocked. • Fixed a deadlock issue that can occur while manipulating the `IVSPlayer` state from inside the completion handler of the `-seekTo:completionHandler:` method.

Mobile SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.46 MB	1.10 MB

March 3, 2022

Amazon IVS Broadcast SDK 1.3.0

Platform	Downloads and Changes
All	• Improved stability by reducing occurrences of rare crashes. • Added support for 32-bit signed integer and 64-bit floating point PCM audio.
Android Broadcast SDK 1.3.0	**Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.3.0/android/ • Fixed an intermittent issue where disconnecting a Bluetooth headset while streaming would lead to a crash. • The `BroadcastSession.onBroadcastQuality` method now reports low initial broadcast-quality values. • Added support for PCM buffers that include multiple `AudioBufferLists` . This is common for USB microphones. Incorporates changes from the Android 1.2.1 release: new methods and a bug fix to properly support surface size and rotation changes: • Fixed a bug where `SurfaceSource.setSize(...)` did not set a new size for the SurfaceSource. • Added the `Device.setRotation (float rotation)` method to set the rotation on a device in radians.

Platform	Downloads and Changes
	• Added the `ImageDevice.rotateOnConfigurationChanges(boolean enable)` method to enable/disable automatic rotation of the ImageDevice when the physical handset is rotated. • Added the `ImageDevice.willRotateOnConfigurationChanges()` method to return whether the ImageDevice is configured to automatically rotate when the physical handset rotates.
iOS Broadcast SDK 1.3.0	**Download:** https://broadcast.live-video.net/1.3.0/AmazonIVSBroadcast.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.3.0/ios/ • Fixed some race conditions when using the `createAppBackgroundImageSource` method, which could have prevented the stream from resuming after the app returns to the foreground. • Added support for the arm64 simulator.

Broadcast SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.531 MB	4.411 MB
armeabi-v7a	1.420 MB	3.525 MB
x86_64	1.719 MB	4.877 MB
x86	1.659 MB	4.925 MB

Broadcast SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	1.30 MB	3.06 MB

March 1, 2022

Amazon IVS Player SDK 1.8.0

Platform	Downloads and Changes
All	• Reduced occurrences of freezing during quality switches when playing recorded content.
Web player 1.8.0 & Video.js integration & JW player integration	**NPM Package:** https://www.npmjs.com/package/amazon-ivs-player **Script asset:** https://player.live-video.net/1.8.0/amazon-ivs-player.min.js **Video.js tech asset:** https://player.live-video.net/1.8.0/amazon-ivs-videojs-tech.min.js **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.8.0/web/ • Fixed an edge case where playback of recorded content could stall in some browsers. • Fixed an issue where timed metadata events were not triggered after seeking forward and then backward on recorded video. • Removed unnecessary, confusing warnings for the JW Player integration on `remove()`.

Platform	Downloads and Changes
	• Enabled stricter type checking for cue types to support correct cue-type filtering.
Android player 1.8.0	**Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.8.0/android/ • Removed the `ViewUtil` class, which is internal and was deprecated. Use `PlayerView` instead.
iOS Player 1.8.0	**Download:** https://player.live-video.net/1.8.0/AmazonIVSPlayer.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.8.0/ios/

Mobile SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	0.975 MB	2.761 MB
armeabi-v7a	0.882 MB	2.177 MB
x86_64	1.020 MB	2.603 MB
x86	1.043 MB	2.890 MB

Mobile SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.46 MB	1.10 MB

February 3, 2022

Amazon IVS Broadcast SDK: Android 1.2.1

Platform	Downloads and Changes
Android Broadcast SDK 1.2.1	**Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.2.1/android/ This release has new methods and a bug fix to properly support surface size and rotation changes. This is needed for use cases involving custom video input. • Fixed a bug where `SurfaceSource.setSize(...)` did not set a new size for the SurfaceSource. • Added the `Device.setRotation(float rotation)` method to set the rotation on a device in radians. • Added the `ImageDevice.rotateOnConfigurationChanges(boolean enable)` method to enable/disable automatic rotation of the ImageDevice when the physical handset is rotated. • Added the `ImageDevice.willRotateOnConfigurationChanges()` method to return whether the ImageDevice is configured to automatically rotate when the physical handset rotates.

Broadcast SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.642 MB	4.536 MB
armeabi-v7a	1.468 MB	3.261 MB
x86_64	1.866 MB	5.225 MB
x86	1.809 MB	4.916 MB

January 20, 2022

Amazon IVS Player SDK 1.7.0

Platform	Downloads and Changes
All	• Fixed stuttering when playing a stream from a source media playlist.
Web player 1.7.0 & Video.js integration & JW player integration	**NPM Package:** https://www.npmjs.com/package/amazon-ivs-player **Script asset:** https://player.live-video.net/1.7.0/amazon-ivs-player.min.js **Video.js tech asset:** https://player.live-video.net/1.7.0/amazon-ivs-videojs-tech.min.js **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.7.0/web/ • Fixed an issue where timed metadata events were not triggered after replaying an Amazon IVS recorded video. • Fixed an issue where the ErrorNotAvailable error was not emitted when a streamâ€™s

Platform	Downloads and Changes
	playback URL is unavailable on iOS mobile web browsers. • Fixed a console warning when calling `dispose()` using the Video.js wrapper. • Fixed several null reference errors caused by attempting to access the player instance after it is destroyed. • Updated `setQuality` documentation to more clearly specify that one should listen to the `QUALITY_CHANGED` to be notified of success. • Updated `setInitialBufferDuration()` documentation to specify that it does not function on iOS mobile browsers. **Known issue:** When a viewer skips forward in recorded content, then skips backward, timed metadata within iOS browsers is not re-fired until after the skip-forward time. For example, if a viewer begins watching recorded content, skips forward to 60 seconds, then skips backward to 30 seconds, no timed metadata is triggered between 30 and 60 seconds. We expect to fix this issue in an upcoming release.

Platform	Downloads and Changes
Android player 1.7.0	**Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.7.0/android/ • Deprecated the `ViewUtil` class, which is internal; use `PlayerView` instead. This class will be removed completely in the next Amazon IVS Player release (1.8.0, tentatively planned for 2022Q1). • Added `PlayerView.setResizeMode(mode)` to control how the video is displayed in the view, allowing the video to be optionally zoomed in or to fill the view entirely ignoring the video aspect ratio.
iOS Player 1.7.0	**Download:** https://player.live-video.net/1.7.0/AmazonIVSPlayer.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.7.0/ios/ • The iOS SDK now requires iOS 11.0 or higher. • The SDK no longer contains an `arm64e` slice. It will be re-enabled once Apple makes this a standard architecture. • Fixed rare crashes that could occur during app termination and media-service reset event.

Mobile SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.013 MB	2.820 MB

Architecture	Compressed Size	Uncompressed Size
armeabi-v7a	0.895 MB	2.012 MB
x86_64	1.119 MB	3.099 MB
x86	1.125 MB	2.970 MB

Mobile SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	0.46 MB	1.09 MB

January 18, 2022

R2S3 Thumbnail Configuration

This release allows you to enable/disable the recording of thumbnails for a live session and modify the interval at which thumbnails are generated for the live session. This is the first release of this new functionality. See:

- Getting Started with Amazon IVS – We updated "Step 3: Create a Channel with Optional Recording."
- Auto-Record to Amazon S3 – We made several changes:
  - We added a note to "Recording Contents" about modifying the `thumbnails` folder.
  - We added a new "Thumbnails" section.
  - We changed the information about the `thumbnails` and `path` fields in "JSON Metadata Files."
- Amazon IVS API Reference – We made several changes:
  - New field (`thumbnailConfiguration`) in the RecordingConfiguration object. This in turn affects the CreateRecordingConfiguration request and response, GetRecordingConfiguration response, and GetStreamSession response.
  - New object: ThumbnailConfiguration.

December 9, 2021

Amazon IVS Broadcast SDK 1.2.0

Platform	Downloads and Changes

All	• Improved stability by reducing occurrences of rare crashes.
	• Added a new method, on`NetworkHealthChanged` (Android) and `broadcastSession:networkHealthChanged` (iOS). This provides updates when the instantaneous quality of the network changes. It can be used to provide feedback about when the broadcast might have temporary disruptions.
	• Added methods to get/set `BroadcastConfiguration.mixer.canvasAspectMode`. This is used as the default aspect mode for slots when the slot's aspect mode is not set explicitly.
	• Changed the `Mixer` (Android) and `IVSBroadcastMixer` (iOS) APIs:
	  • Added `getSlots()` which returns all added slots.
	  • Added unbind, which unbinds a device from a mixer slot.
	  • Updated bind, unbind, and `transition` to return a bool indicating success or failure.

Android Broadcast SDK 1.2.0	**Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.2.0/android/

Platform	Downloads and Changes
	• Fixed a bug where, even if transparency was enabled, a slotâ€™s video or image was not blended with other slots beneath it (using zIndex values).

iOS Broadcast SDK 1.2.0	**Download:** https://broadcast.live-video.net/1.2.0/AmazonIVSBroadcast.xcframework.zip
	
	Reference documentation: https://aws.github.io/amazon-ivs-broadcast-docs/1.2 .0/ios/
	
	• Improved the connection stability of Bluetooth and wired headsets.
	• Added support to `IVSCustomImageSource` for the following pixel formats:
	  • kCVPixelFormatType_Lossless_420YpCbCr8BiPlanarFullRange
	  • kCVPixelFormatType_Lossy_420YpCbCr8BiPlanarFullRange
	  • kCVPixelFormatType_Lossless_420YpCbCr8BiPlanarVideoRange
	  • kCVPixelFormatType_Lossy_420YpCbCr8BiPlanarVideoRange
	  • kCVPixelFormatType_Lossless_32BGRA
	  • kCVPixelFormatType_Lossy_32BGRA
	• Fixed two race conditions when using the `createAppBackgroundImageSource` method, which could have prevented the stream from resuming after the app returns to the foreground.

Broadcast SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.639 MB	4.530 MB
armeabi-v7a	1.466 MB	3.255 MB
x86_64	1.863 MB	5.219 MB
x86	1.806 MB	4.910 MB

Broadcast SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	1.42 MB	3.30 MB

November 23, 2021

Amazon IVS Player SDK 1.6

Platform	Downloads and Changes
All	• Added a new player function, `setInitialBufferDuration()`, which allows customers to set the initial buffer duration. This duration determines when playback can start. The allowable range is 0.1 to 5 seconds. This method has no effect on iOS browser platforms. • Fixed a bug where a loaded stream could play without the `play` method being called, during a network reconnect.

Platform	Downloads and Changes
	• Fixed an issue where stale closed caption data was not cleared. • Improved player stability by reducing occurrences of rare crashes.
Web player 1.6.1 & Video.js integration & JW player integration	**NPM Package:** https://www.npmjs.com/package/amazon-ivs-player **Script asset:** https://player.live-video.net/1.6.1/amazon-ivs-player.min.js **Video.js tech asset:** https://player.live-video.net/1.6.1/amazon-ivs-videojs-tech.min.js **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.6.1/web/ • Added a note to `setQuality` documentation about how the video element's controls attribute impacts invocation. • Improved how the player recovers from video decode and playlist network errors. • Changed the default log level for the player from *warning* to *error*, to match other platforms.
Android player 1.6.0	**Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.6.0/android/

Platform	Downloads and Changes
iOS Player 1.6.0	**Download:** https://player.live-video.net/1.6.0/AmazonIVSPlayer.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.6.0/ios/ • iOS 10 support will be deprecated starting with the next IVS Player release (1.7.0, tentatively planned for 2022Q1).

Mobile SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.01 MB	2.82 MB
armeabi-v7a	0.84 MB	2.16 MB
x86_64	1.13 MB	2.97 MB
x86	1.12 MB	3.09 MB

Mobile SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
universal	0.94 MB	2.02 MB
arm64	0.47 MB	1.11 MB
armv7	0.46 MB	0.89 MB

November 18, 2021

Stream Health

Amazon IVS Stream Health lets you monitor the health of your live streams in near real time thanks to new high resolution CloudWatch metrics. You also can gain insights into your stream's events and input configuration through two new API endpoints. This is the first release of this new functionality. See:

- Monitoring Amazon IVS Live Stream Health – This is a new *Amazon IVS User Guide* page.
- Getting Started with Amazon IVS – We updated the IAM policy in "Step 2: Set up IAM Permissions" with three more IVS permissions (`GetStream`, `GetStreamSession`, `ListStreamSessions`) and `cloudwatch:GetMetricData`.
- Monitoring Amazon IVS with Amazon CloudWatch – We added four new, high-resolution metrics (`IngestAudioBitrate`, `IngestFramerate`, `IngestVideoBitrate`, and `KeyframeInterval`).

  Oct 12, 2023 update: This CloudWatch document was deleted and the content was moved to Monitoring IVS Low-Latency Streaming.
- Using Amazon EventBridge with Amazon IVS – We added two events, Session Created and Session Ended.
- Amazon IVS API Reference – Many changes:
  - Two new endpoints: GetStreamSession and ListStreamSessions.
  - Seven new objects: AudioConfiguration, IngestConfiguration, StreamEvent, StreamFilters, StreamSession, StreamSessionSummary, and VideoConfiguration.
  - New field (`streamID`) in the Stream and StreamSummary objects. This in turn affects the GetStream and ListStreams responses.
  - New field (`filtersBy`) in the ListStreams request.

October 20, 2021

Amazon IVS Broadcast SDK 1.1.0: Android and iOS

Platform	Downloads and Changes

All	• Fixed a bug that could leave a mixer-slo t configuration in an unexpected state when the slot configuration provided to the transition method had a name that did not match the target-slot name parameter.
	• Improved stability by reducing occurrences of rare crashes.
	• Rebalanced preset bitrates to better reflect the expected user experience. These are documented in the Broadcast SDK reference documentation.
	  • Standard (portrait/landscape) – Initial: 2.1 Mbps. Maximum: 6 Mbps.
	  • Basic (portrait/landscape) – Initial: 1.2 Mbps. Maximum: 1.5 Mbps.
	  • Gaming (portrait/landscape) (Android only) – Initial: 2.1 Mbps. Maximum 6 Mbps.
	• Added support for mono audio. A broadcast session can now be configured with 1 or 2 audio channels (mono or stereo, respectiv ely). Also, custom audio sources can be configured with 1 or 2 audio channels.
	• Changed the Mixer canvas and slot origins to be top-left. This should be more natural for developers and provide more consisten t usability. If you are using custom Mixer slots, you must update your code; see

Platform	Downloads and Changes
	Broadcast SDK Mixer: Migrating from 1.0.0 to 1.1.0 below. • Added a new documentation page, Broadcast SDK: Mixed Devices.
Android Broadcast SDK 1.1.0	**Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.1.0/android/reference/packages.html • Fixed a bug where device-orientation changes could crash the SDK. • Fixed a bug where `getPreviewView()` worked only the first time it was called. Now `getPreviewView()` returns a new `ImagePreviewView` every time it is called, so you can add multiple `ImagePreviewViews` of the same device or session to your view hierarchy at the same time. Note that using many `ImagePreviewViews` simultaneously can degrade performance. • Added `stopSystemCapture()` to stop the system-capture service without releasing the entire broadcast session. • Added an `attachDevice` override, to ignore mixer-slot preferred devices when attaching a device.

Platform	Downloads and Changes
iOS Broadcast SDK 1.1.0	**Download:** https://broadcast.live-video.net/1.1.0/AmazonIVSBroadcast.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.1.0/ios/ • Setting size on an `IVSMixerSlotConfiguration` object now sets `matchCanvasSize` to `false`. Similarly, setting aspect on an `IVSMixerSlotConfiguration` object sets `matchCanvasAspectMode` to `false`. • Added support for background audio with pre-encoded video. A new method, `createAppBackgroundImageSourceOnComplete`, changes the default behavior when backgrounding an app. Previously, the entire stream stopped because the SDK no longer had access to the camera or the GPU (which means no video input compositing or video encoding could be done). The new method returns a subclass of `IVSCustomVideoSource`. Normally, `IVSCustomVideoSource` allows you to submit image samples to be broadcast. The subclass allows you to submit image samples to be pre-encoded for broadcast later, when your app is in the background.

Broadcast SDK Mixer: Migrating from 1.0.0 to 1.1.0

Version 1.1.0 of the Broadcast SDK changes how the mixer coordinate system works. In 1.0.0, the mixer used inconsistent origin points. In 1.1.0, the origin is the top-left corner. See the new Broadcast SDK: Mixed Devices.

Canvas Changes: Horizontal (X-axis) positions are unchanged. Vertical positioning is inverted, compared to 1.0.0. A Y-axis value of 0 places the slot at the top of the canvas (rather than the bottom, as with 1.0.0). To keep a slot at the same position as in 1.0.0, subtract its current Y value from the height of the canvas; e.g., `config.video.size.height - y`

Slot Changes: Slots also have a top-left origin in 1.1.0. The orientation is unchanged from 1.0.0, but the origin has shifted from the center to the top-left. A slot aligned with the top left will be (0, 0), a slot aligned with the bottom right is:

```
(canvas_width - slot_width, canvas_height - slot_height)
```

To keep a slot in the same position as 1.0.0, subtract half its width from the X position and half its height from the Y position. Also, the slot's size is relative to the top-left corner. Therefore, to expand a slot from the center, you must change the position at the same time as the size; otherwise, the slot will appear to grow down and to the right.

Broadcast SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	2.23 MB	5.75 MB
armeabi-v7a	2.07 MB	4.99 MB
x86_64	2.35 MB	5.78 MB
x86	2.55 MB	6.78 MB

Broadcast SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
arm64	3.11 MB	6.74 MB

September 29, 2021

Amazon IVS Player SDK: Android 1.5.1

Platform	Downloads and Changes
Android player 1.5.1	**Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.5.1/android/ • Fixed `getVersion()` , which now returns the correct version number.

Mobile SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.00 MB	2.80 MB
armeabi-v7a	0.83 MB	2.15 MB
x86_64	1.11 MB	3.07 MB
x86	1.12 MB	2.94 MB

September 28, 2021

Amazon IVS Player SDK 1.5.0

Platform	Downloads and Changes
All	• Fixed an issue where a loaded stream could `play` without the play method being called during a network reconnect. • Fixed an issue where the player stayed in the `PLAYING` state after a stream disconnect, instead of moving to the `ENDED` state.

Platform	Downloads and Changes
	• Updated CEA-608 captions parsing to support more encoders. • Improved the player's ability to play pass-through content; i.e., content from `BASIC` channels and the highest quality from `STANDARD` channels.
Web player 1.5.0 & Video.js integration & JW player integration	**NPM Package:** https://www.npmjs.com/package/amazon-ivs-player **Script asset:** https://player.live-video.net/1.5.0/amazon-ivs-player.min.js **Video.js tech asset:** https://player.live-video.net/1.5.0/amazon-ivs-videojs-tech.min.js **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.5.0/web/ • Improved how the player recovers from video-decode and playlist-network errors. • Fixed a bug where live streams did not resume (or resumed after a delay) when native HTML5 controls are enabled. • Fixed an issue where the getBuffered() method returned undefined instead of the expected `{ start: 0, end: 0 }` when no content is loaded. • Added support for picture-in-picture mode in Video.js. • Changed the default log level for the player to error instead of warning.

Platform	Downloads and Changes
Android player 1.5.0	**Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.5.0/android/ • Fixed zoom-in bug that happens on the Android SDK 30 emulator. • Improved the performance of `PlayerView` view layouts. • `getVersion()` returns `1.5.0-ivs.rc.2` instead of `1.5.0`.
iOS Player 1.5.0	**Download:** https://player.live-video.net/1.5.0/AmazonIVSPlayer.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.5.0/ios/ • Added support for the iOS Simulator on Apple Silicon Macs. • Fixed an issue in which the memory heap size of the player continues to increase during playback until the player is deallocated. • Improved playback behavior when there is bad data in the video by ignoring it and continuing playback rather than stopping playback.

Mobile SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.00 MB	2.80 MB
armeabi-v7a	0.83 MB	2.15 MB

Architecture	Compressed Size	Uncompressed Size
x86_64	1.11 MB	3.07 MB
x86	1.12 MB	2.94 MB

Mobile SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
universal	0.92 MB	1.99 MB
arm64	0.47 MB	1.09 MB
armv7	0.46 MB	0.87 MB

September 8, 2021

Amazon IVS Player SDK 1.4.1

Platform	Downloads and Changes
All	Fixed the closed-caption decoder to handle captions that are inserted out of order.
Web player 1.4.1 & Video.js integration & JW player integration	**NPM Package:** https://www.npmjs.com/package/amazon-ivs-player **Script asset:** https://player.live-video.net/1.4.1/amazon-ivs-player.min.js **Video.js tech asset:** https://player.live-video.net/1.4.1/amazon-ivs-videojs-tech.min.js **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.4.1/web/

Platform	Downloads and Changes
Android player 1.4.1	**Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.4.1/android/
iOS Player 1.4.1	**Download:** https://player.live-video.net/1.4.1/AmazonIVSPlayer.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.4.1/ios/

Mobile SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.00 MB	2.79 MB
armeabi-v7a	0.83 MB	2.15 MB
x86_64	1.11 MB	3.06 MB
x86	1.11 MB	2.94 MB

Mobile SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
universal	0.89 MB	1.91 MB
arm64	0.45 MB	1.05 MB
armv7	0.44 MB	0.84 MB

August 13, 2021

ListTagsForResource API Endpoint

We removed support for pagination in this endpoint; i.e., the `maxResults` request field and `nextToken` request/response field. (Pagination did not work correctly.)

August 10, 2021

Amazon IVS Player SDK 1.4.0

Platform	Downloads and Changes
All	• Fixed a rare issue in which VOD playback could stall if a seek happens right after a `DURATION_CHANGED` event or `READY` state update. • Fixed a memory leak when playing streams with ID3 metadata. • Fixed an edge case in which injected captions could be rendered incorrectly. • Improved the performance of the player's adaptive bitrate streaming algorithm. • Improved player stability by reducing occurrences of rare crashes. • Added a log warning message when the player is accessed from a different thread than it was created on. • Updated `getLiveLatency()` documentation to be more specific about how latency is calculated, from the server to the player.
Web player 1.4.0 & Video.js integration & JW player integration	**NPM Package:** https://www.npmjs.com/package/amazon-ivs-player

Platform	Downloads and Changes
	Script asset: https://player.live-video.net/1.4.0/amazon-ivs-player.min.js **Video.js tech asset:** https://player.live-video.net/1.4.0/amazon-ivs-videojs-tech.min.js **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.4.0/web/ • Fixed an edge case in which the `TIMED_METADATA` event did not fire on iOS Safari. • Improved performance of the playerâ€™s adaptive bitrate streaming algorithm when playing low-latency streams on Firefox. • Fixed documentation for `getDuration()`, which always returns Infinity for live streams. • Fixed a bug in which autoplaying on desktop Safari sometimes failed. • Fixed an error in which "Cannot read property 'collectLogs' of undefined" is reported in the developer console. • Video.js: Added support for picture-in-picture mode. • Web: Added a new method, `setRequestCredentials`. This controls whether the player makes credentialed requests to cross-origin endpoints. The remote endpoint needs to respond with the appropriate CORS response headers (like `Access-Control-Allow-Origin`, matching the request's Origin) and `Access-Control-Allow-Credentials` must be `true`.

Platform	Downloads and Changes
	This setting persists throughout the player instanceâ€™s lifecycle. Therefore , all subsequent `player.load()` calls with URL endpoints should respond with appropriate CORS headers. This method has no effect on iOS browser platforms. To allow credentialed cross-ori gin requests on iOS platforms, users must explicitly allow Cross-site Tracking and allow Cookies; these are in the settings for the device and the respective browser app.
Android player 1.4.0	**Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.4.0/android/ • Fixed an issue in which high-resolution portrait video was considered as not supported video, even though the device can support it. • Fixed an issue in which changing the playback rate failed on certain Android devices. • Updated background-video handling to not decode content if the output surface is not set. • Implemented additional checks to ignore SDK calls after the `player.release()` method is called. This improves player stability. • Reduced Android library file size through optimization.

Platform	Downloads and Changes
iOS Player 1.4.0	**Download:** https://player.live-video.net/1.4.0/AmazonIVSPlayer.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.4.0/ios/ • Fixed an issue in which the memory heap size of the player continues to increase during playback until the player is deallocated. • Fixed a potential deadlock when there is animation on top of video playback (e.g., a UI animation or GIF image). • Fixed a potential crash during media-services reset events. • Resolved a memory leak of `CMFormatDescriptionRef` that could occur during quality switches. • Added an error message that is logged if IVS-specific properties of the `IVSPlayerView` and `IVSPlayerLayer` classes are accessed on a thread other than the main thread. • Updated background-video handling to not decode content if the output surface is not set. • Improved documentation coverage in the IOS SDK Reference. • Reduced iOS library file size through optimization.

Mobile SDK Size: Android

Architecture	Compressed Size	Uncompressed Size
arm64-v8a	1.00 MB	2.79 MB
armeabi-v7a	0.83 MB	2.15 MB
x86_64	1.11 MB	3.06 MB
x86	1.11 MB	2.93 MB

Mobile SDK Size: iOS

Architecture	Compressed Size	Uncompressed Size
universal	0.89 MB	1.91 MB
arm64	0.45 MB	1.05 MB
armv7	0.44 MB	0.84 MB

July 27, 2021

Amazon IVS Broadcast SDK: Android 1.0.0 and iOS 1.0.0

Platform	Downloads and Changes
Android Broadcast SDK 1.0.0	**Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.0.0/android/
iOS Broadcast SDK 1.0.0	**Download:** https://broadcast.live-video.net/1.0.0/AmazonIVSBroadcast.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-broadcast-docs/1.0.0/ios/

June 1, 2021

Amazon IVS Player SDK: Android 1.3.3 and iOS 1.3.3

Platform	Downloads and Changes
Android and iOS	Fixed an issue where high-resolution portrait video was considered as not supported, although the device could support it.
Android player 1.3.3	**Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.3.3/android/
iOS Player 1.3.3	**Download:** https://player.live-video.net/1.3.3/AmazonIVSPlayer.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.3.3/ios/ • Fixed a potential deadlock when there is animation on top of video playback (e.g., a UI animation or GIF image). • Fixed a potential crash during media-services reset events.

May 19, 2021

Amazon IVS Player SDK: Android 1.3.2

Reference documentation: https://aws.github.io/amazon-ivs-player-docs/1.3.2/android/

To improve player stability, additional checks were implemented to ignore API calls after the `player.release()` method is called.

May 5, 2021

Amazon IVS Player SDK 1.3

Platform	Downloads and Changes
All	• Updated SDK documentation for using TextCue usage documentation. See the latest the Player SDK References on the Amazon IVS documentation landing page. • Fixed an issue with audio playback of malformed mono input streams. • Fixed a rare playback error that could occur when playing content outside of the live HLS window. • Improved the player's ability to play standard HLS live and recorded streams. • Improved the accuracy of `getLiveLatency`, notably ensuring it is reset to zero when loading a new stream. • Improved the ABR (adaptive bitrate streaming) algorithm to increase video quality more quickly when network connections improve. • Improved player stability by reducing occurrences of rare crashes.
Web player 1.3.1 & Video.js integration & JW player integration	**NPM Package:** https://www.npmjs.com/package/amazon-ivs-player **Script asset:** https://player.live-video.net/1.3.1/amazon-ivs-player.min.js **Video.js tech asset:** https://player.live-video.net/1.3.1/amazon-ivs-videojs-tech.min.js

Platform	Downloads and Changes
	Reference documentation: https://aws.github.io/amazon-ivs-player-docs/1.3.1/web/ • Fixed an issue where seek calls executed immediately after load were sometimes ignored, causing the player to begin at the wrong position. • Fixed several issues with seeking within recorded content (also known as VOD). • Fixed an issue where playback could fail in suboptimal network conditions. • Added support for IVS Timed Metadata on iOS mobile web browsers. • Fixed a bug where autoplaying in desktop Safari sometimes failed. • The Web SDK `getVersion` function no longer appends a hash to the player version. • Fixed an issue where seeking to the exact start of a buffered range may result in another seek forward. • Enabled low-latency ABR (adaptive bitrate streaming) in macOS Safari 14 and later. • Fixed an issue with loading the player in a server context, by removing an unsafe import side effect. • Changed the amazon-ivs-player NPM package so it exports the LogLevel enum, which is used by `setLogLevel` . **Note:** The Web Player 1.3.0 NPM package exists but does not work. It is marked as deprecated on NPM. Use Web Player 1.3.1 or newer, as documented.

Platform	Downloads and Changes
Android player 1.3.0	**Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.3.0/android/ • Fixed an issue where the player SDK crashed if the app targeted Android 11 (API level 30) and the user was running Android 11 on a cellular network. • Fixed a network recovery issue. Playback is now automatically paused when the network connection is lost, and it is resumed when the connection is restored. Use the `onNetworkUnavailable` callback in `Player.Listener` to observe network state changes. • Fixed an issue where player controls could not be hidden with `setControlsEnabled(false)` while playing VODs. • Fixed an issue where the SDK could crash if the client app uses an old (pre-4.0) version of OkHttp. • The Amazon IVS Android player library moved from a JCenter repository to Maven Central. • Removed `BuildConfig` version properties from the library.

Platform	Downloads and Changes
iOS Player 1.3.0	**Download:** https://player.live-video.net/1.3.0/AmazonIVSPlayer.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.3.0/ios/ • Fixed an issue where if there was an audio sample-rate change within a single HLS media segment, the iOS SDK could not handle it properly. This could result in an unexpected memory increase and playback failure or a crash, due to bad media. • Fixed a network-recovery issue. Playback is now automatically paused when the network connection is lost, and it is resumed when the connection is restored. Use the `playerNetworkDidBecomeUnavailable` delegate method to observe network state changes. • Fixed an issue which caused an iOS memory increase that could happen over time. • Added graceful handling of audio hardware problems. Playback is now automatically paused in the event of a media-services reset notification (`AVAudioSessionMediaServicesWereResetNotification`). Note that a playback error may still occur if media is playing when the reset occurs. • Added audio-session interruption handling. Playback is now automatically paused when an audio-session interruption begins. When the interruption ends, playback automatically resumes if the player was

Platform	Downloads and Changes
	previously playing and the interruption options indicate that the app should resume playback.

April 26, 2021

Service Quotas Integration with CloudWatch Usage Metrics

You can use CloudWatch to proactively manage your service quotas, via CloudWatch *usage metrics*. See Amazon IVS Service Quotas.

April 13, 2021

New CloudWatch Metrics

CloudWatch metrics were added for concurrent views and concurrent streams. See Monitoring Amazon IVS with Amazon CloudWatch.

Oct 12, 2023 update: This CloudWatch document was deleted and the content was moved to Monitoring IVS Low-Latency Streaming.

The names of related service quotas were updated to match the new metrics. See IVS Service Quotas | Low-Latency Streaming.

For a full definition of "view," see the Amazon IVS Glossary.

April 7, 2021

Auto-Record to S3 (R2S3)

Amazon IVS now enables you to save your live video content to Amazon S3. Saved video is available later for actions like editing or replaying as a VOD.

When you enable recording for a channel, all live broadcasts of the channel are stored to an S3 bucket of your choice. All available quality renditions and thumbnails images are saved. Your recording configuration also is saved, so it can be easily re-used for additional channels.

You can set up a recording configuration and enable/disable recording through the Amazon IVS console or API. For details, see Getting Started with IVS and the Amazon IVS API Reference.

January 28, 2021

Amazon IVS Player SDK: JW Player Integration 1.2.0

The Amazon IVS player now integrates with JW Player. See JW Player Integration.

Known Issue: In some cases, the duration of the video appears to be 00:00 and the playhead does not seek if dragged on the seekbar. This happens only when watching an ad-free playlist with a mixture of Amazon IVS live streams and VODs, using Safari on an iPhone.

December 16, 2020

Amazon IVS Player: SDK for Android 1.2.1

Reference documentation: https://aws.github.io/amazon-ivs-player-docs/1.2.1/android/

This release includes an Android Player patch which fixes an issue: in prior Android player SDK releases, the SDK crashes if the app targets Android 11 (API level 30) and the user is running Android 11 on a cellular network.

November 23, 2020

Amazon IVS Player SDK 1.2.0

Platform	Downloads and Changes
All	Improved detection of Amazon IVS streams, so metrics are more accurate.
Web player 1.2.0 & Video.js integration	**NPM Package:** https://www.npmjs.com/package/amazon-ivs-player **Script asset:** https://player.live-video.net/1.2.0/amazon-ivs-player.min.js

Platform	Downloads and Changes
	Video.js tech asset: https://player.live-video.net/1.2.0/amazon-ivs-videojs-tech.min.js **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.2.0/web/ • If the master playlist for a stream is unavailable, we now emit ErrorNotAvailable for all web playback sources. • Updated reference documentation with respect to errors related to reaching the concurrent-viewers (CCV) limit.
Android player 1.2.0	**Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.2.0/android/ • Fixed an issue where the getSessionId function crashed on Android. • Updated reference documentation with respect to errors related to reaching the concurrent-viewers (CCV) limit. **Known Issue:** The player SDK will crash if the app targets Android 11 (API level 30) and the user is running Android 11 on a cellular network. This will be fixed in the next release. In the meantime, we recommend targeting a previous Android API level (29 or lower).

Platform	Downloads and Changes
iOS Player 1.2.0	**Download:** https://player.live-video.net/1.2.0/AmazonIVSPlayer.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.2.0/ios/ • Fixes a potential source of memory corruption when switching the stream URL or closing the player. • Resolves an issue that could cause playback to fail when the best audio pitch correction could not be enabled before starting playback. Pitch correction improves audio quality at playback speeds faster or slower than normal. If pitch correction cannot be enabled or the highest quality correction algorithm is unavailable, a message is logged but playback continues. **Known Issue:** If there is an audio sample-rate change within a single HLS media segment, the iOS SDK cannot handle it properly. This can result in an unexpected memory increase and playback failure or a crash, due to bad media. This will be fixed in the next major iOS player release.

November 12, 2020

New Event Field, stream_id

The `stream_id` field was added to several events. See Using Amazon EventBridge with IVS.

November 9, 2020

Add Metadata Viewing to Console

Timed metadata can now be viewed from the Amazon IVS console. In the *Amazon IVS User Guide*, see the new section on Viewing Timed Metadata in *Embedding Metadata within a Video Stream*.

October 30, 2020

CloudFormation Support

Amazon IVS now supports AWS CloudFormation. This enables Amazon IVS customers to create and manage channels, stream keys, and playback key pairs with AWS CloudFormation.

Amazon IVS support for CloudFormation is available in all AWS regions where Amazon IVS is available. To get started, see the Amazon IVS product page or the Amazon IVS information in the *AWS CloudFormation User Guide*.

October 27, 2020

Higher Limits for Channels, CCV, and CCB

We increased three service-quota limits:

- The maximum number of *channels* that users can create, per AWS region, increased from 500 to 5,000.
- The maximum number of *concurrent viewers* allowed to play back a live channel, across all channels in an AWS region, increased from 3,000 to 15,000.
- The maximum number of *concurrent broadcasts* (channels that can be streamed simultaneously), per AWS region, increased from 30 to 100.

These increases are available in all regions where Amazon IVS is available. To learn more, see IVS Service Quotas | Low-Latency Streaming in the *Amazon IVS User Guide*.

October 9, 2020

New Service Quotas and EventBridge Event

There are now service quotas and EventBridge events related to ingest resolution. See IVS Service Quotas | Low-Latency Streaming and Using Amazon EventBridge with IVS.

Amazon IVS Player: SDK for Web 1.1.2

NPM Package: https://www.npmjs.com/package/amazon-ivs-player

Script asset: https://player.live-video.net/1.1.2/amazon-ivs-player.min.js

Video.js tech asset: https://player.live-video.net/1.1.2/amazon-ivs-videojs-tech.min.js

Reference documentation: https://aws.github.io/amazon-ivs-player-docs/1.1.2/web/

This release includes a Web Player patch which fixes an issue that affected viewers using Microsoft Edge. For those viewers, if auto-quality mode is turned on for the stream (i.e., ABR is in effect), low-latency playback does not work; under these circumstances, streams played back with higher latency.

October 7, 2020

Amazon IVS Player SDK 1.1.0

The Amazon Interactive Video Service (IVS) Player SDKs use semantic versioning.

Platform	Downloads and Changes
All	• Fixed an issue where the player's adaptive bitrate algorithm could incorrectly drop quality to 160p. • The player now throws an error if there are no playable video qualities. • Updated VOD seek behavior: when attempting to seek beyond the end, the

Platform	Downloads and Changes
	player seeks to the end instead of returning an error. • The player now throws a fatal error after exhausting all available qualities during error recovery.

Platform	Downloads and Changes
Web Player 1.1.0	**NPM Package:** https://www.npmjs.com/package/amazon-ivs-player **Script asset:** https://player.live-video.net/1.1.0/amazon-ivs-player.min.js **Video.js tech asset:** https://player.live-video.net/1.1.0/amazon-ivs-videojs-tech.min.js **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.1.0/web/ **Known Issues:** • If Video.js is not available, `registerIVSQualityPlugin` now throws an exception instead of writing to `console.error`. • If `registerIVSTech` or `registerIVSQualityPlugin` is called more than once, calls after the first one now do nothing (instead of attempting to re-register). • The type of the first parameter to `registerIVSQualityPlugin` has changed from `VideoJS` to `any`. • Removed dependencies on browser context to enable server-side rendering. • If the browser autopauses in response to unmuting, the player now fires the `AUDIO_BLOCKED` event and resumes muted playback. • Added network connectivity recovery. A network timeout will not result in an error

Platform	Downloads and Changes
	state being sent to the client app. Instead, when network connectivity is lost: • If the app is playing, the player library sends the `NETWORK_UNAVAILABLE` event to the app and the player enters the IDLE state. When connectivity is restored, the player library resumes playing and the app receives a `PLAYING` event. • If the app is paused, the `NETWORK_UNAVAILABLE` event is not sent to the app and the player library remains in the IDLE state. When connectivity is restored, the player library stays in the IDLE state. • At any time, if the app tries to play, the player library attempts a normal play. The `NETWORK_UNAVAILABLE` event is sent to the app and the player enters the IDLE state.
Android Player 1.1.0	**Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.1.0/android/ **Known Issue:** The player SDK will crash if the app targets Android 11 (API level 30) and the user is running Android 11 on a cellular network. This will be fixed in the next release. In the meantime, we recommend targeting a previous Android API level (29 or lower).

Platform	Downloads and Changes
iOS Player 1.1.0	**Download:** https://player.live-video.net/1.1.0/AmazonIVSPlayer.xcframework.zip **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.1.0/ios/ • Fixed an issue that could cause crashes, with this message from UIKit: "Modifications to the layout engine must not be performed from a background thread after it has been accessed from the main thread." This could occur when backgrounding and foregroun ding the application.

September 14, 2020

New Event Field, channel_name

The `channel_name` field was added to several events. See Using Amazon EventBridge with IVS.

August 19, 2020

Playback Authorization (Private Channels)

Amazon IVS now offers customers the ability to create private channels, allowing customers to restrict which vieres can watch their streams. Customers control access to video playback by enabling playback authorization on channels and generating signed JSON Web Tokens (JWTs) for authorized playback requests. For details, see Setting Up Private Channels.

A new `authorized` field in the Channel object indicates whether the channel is private. See the Amazon IVS API Reference.

August 11, 2020

Amazon IVS Player: SDK for iOS 1.0.6

Download: <deprecated>

Reference documentation: https://aws.github.io/amazon-ivs-player-docs/1.0.6/ios/

This release includes an iOS Player patch which fixes an issue that had prevented some iOS Player apps from being added to the Apple App Store. Specifically, apps built with bitcode enabled would fail App Store Connect validation after uploading.

August 5, 2020

Using Amazon EventBridge with Amazon IVS

Amazon IVS EventBridge events are now available through the Amazon EventBridge console. See the section on Creating Amazon EventBridge Rules for Amazon IVS in *Using Amazon EventBridge with Amazon IVS*, in the *Amazon IVS User Guide*.

July 15, 2020

Player Version 1.0

The Amazon Interactive Video Service (IVS) Player SDKs use semantic versioning.

Platform	Downloads and Changes
All	**Known Issue:** For the `setAutoMaxQuality` and `setQuality` functions, the quality you provide is applied correctly to the current stream but is not applied correctly if you load a new stream. To avoid this, If you load a new stream, call this with a quality for the new stream after `PlayerState.READY` .

Platform	Downloads and Changes
Web Player 1.0.0	**NPM Package:** https://www.npmjs.com/package/amazon-ivs-player **Script asset:** https://player.live-video.net/1.0.0/amazon-ivs-player.min.js **Video.js tech asset:** https://player.live-video.net/1.0.0/amazon-ivs-videojs-tech.min.js **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.0.0/web/ **Known Issues:** • When playing a VOD on an iOS mobile browser (e.g. Safari or Chrome), seeking backwards will mute the player. To avoid this, call `player.setMuted(false)` after seeking. • When playing a VOD on an iOS mobile browser, seeking backwards works intermittently when directly selecting the desired position. To avoid this, drag the seek bar to the desired position. • When playing a VOD on an iOS mobile browser using the Video.js integration, the replay button does not work properly. To avoid this, hide the replay button when initializing Video.js: https://videojs.com/guides/components/#play-toggle.

Platform	Downloads and Changes
Android Player 1.0.0	**Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.0.0/android/ **Known Issue:** Backgrounding and foregrounding can cause audio/video de-synchronization for VOD playback on Android.
iOS Player 1.0.0	**Download:** <deprecated> **Reference documentation:** https://aws.github.io/amazon-ivs-player-docs/1.0.0/ios/ **Known Issues:** • Backgrounding and foregrounding cause live and VOD playback failure. To avoid this, pause the stream when the `UIApplicationDidEnterBackgroundNotification` is received and resume play on the `UIApplicationDidBecomeActiveNotification` . • iOS 10 devices may experience a crash when returning from background. To avoid this, set the layerâ€™s `player` property to `nil` before entering the background.