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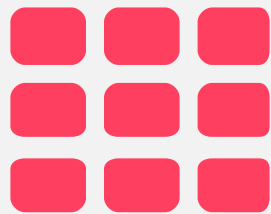
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AMAZON MEDIA SERVICES





# KINESIS VIDEO STREAMS



# Amazon Kinesis Video Streams

- What is it?
- How it works?
- Supported Sources
- Benefits

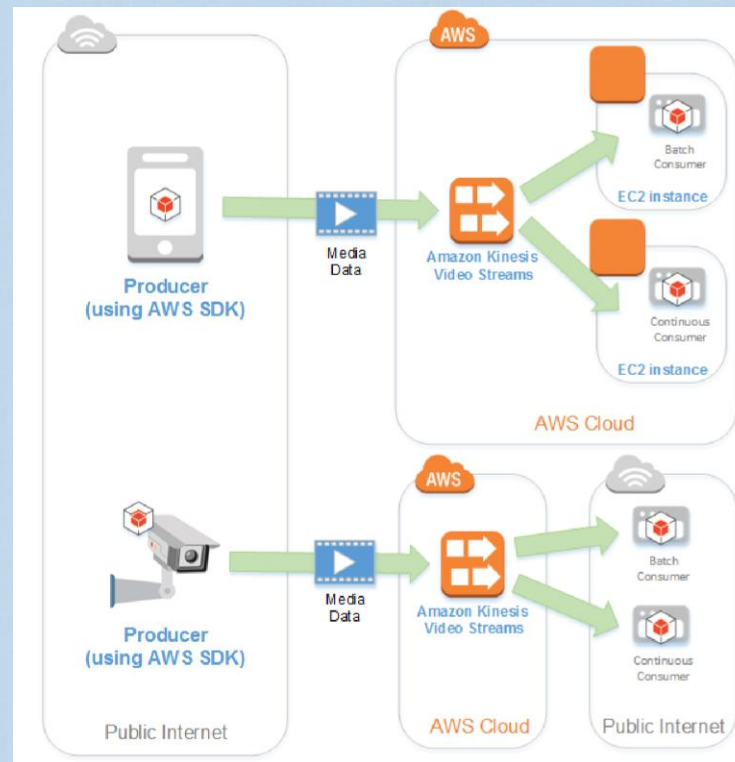


# What is it & How it works?

- Amazon Kinesis Video Streams is a fully managed AWS service that enables customers to stream live video from devices to the AWS Cloud and durably store it.
  - Applications can then be built for real-time video processing or perform batch-oriented video analytics.

## Producer

- Any source that puts data into a Kinesis video stream.
- A producer can be any videogenerating device, such as a security camera, a body-worn camera, a smartphone camera, or a dashboard camera.
- A producer can also send non-video data, such as audio feeds, images, or RADAR data.
- A single producer can generate one or more video streams. For example, a video camera can push video data to one Kinesis video stream and audio data to another.



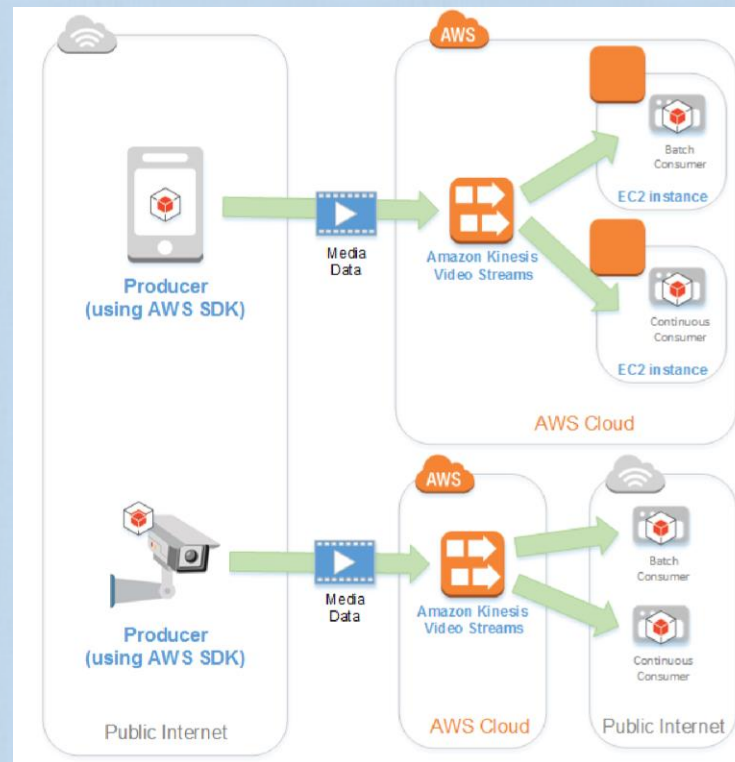
# What is it & How it works?

## • Kinesis Video Streams Producer libraries

- A set of easy-to-use software and libraries that you can install and configure on your devices.
- These libraries make it easy to securely connect and reliably stream video in different ways, including in real time, after buffering it for a few seconds, or as after the-fact media uploads.

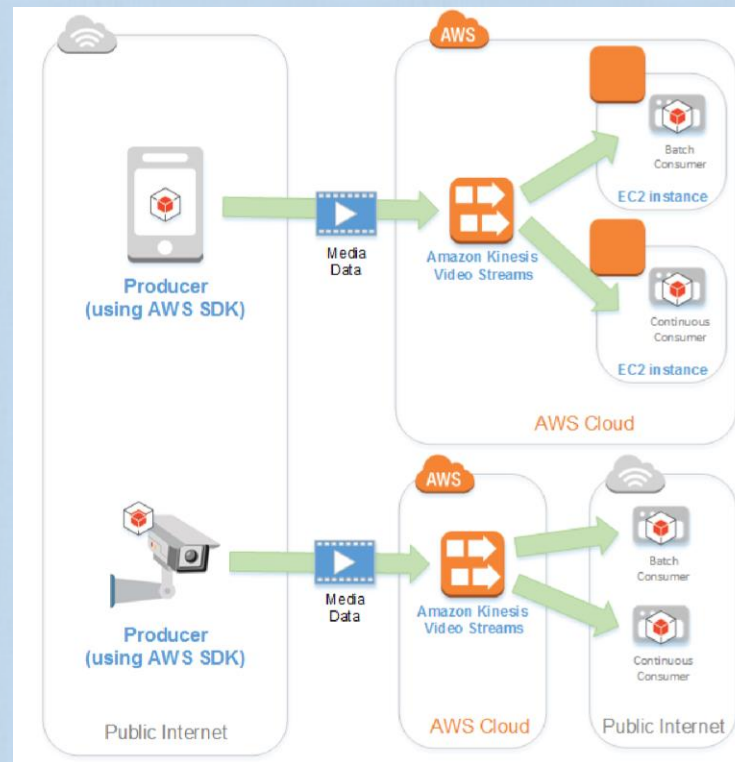
## • Kinesis video stream

- A resource that enables you to transport live video data, optionally store it, and make the data available for consumption both in real time and on a batch or ad hoc basis.
- In a typical configuration, a Kinesis video stream has only one producer publishing data into it.
- The stream can carry audio, video, and similar time-encoded data streams, such as depth sensing feeds, RADAR feeds, and more.
- You create a Kinesis video stream using the AWS Management Console or programmatically using the AWS SDKs.
- Multiple independent applications can consume a Kinesis video stream in parallel.



# What is it & How it works?

- **Consumer**
  - Gets data, such as fragments and frames, from a Kinesis video stream to view, process, or analyze it.
  - Generally these consumers are called Kinesis Video Streams applications.
  - You can write applications that consume and process data in Kinesis video streams in real time, or after the data is durably stored and time-indexed when low latency processing is not required.
  - You can create these consumer applications to run on Amazon EC2 instances.
- **Kinesis Video Stream Parser Library**
  - Enables Kinesis Video Streams applications to reliably get media from Kinesis video streams in a low-latency manner.
  - Additionally, it parses the frame boundaries in the media so that applications can focus on processing and analyzing the frames themselves.





## Kinesis Video Streams – Sources

- Live streams can be monitored using AWS management console, or custom monitoring applications using Kinesis Video Streams API library to display the live video
  - Kinesis Video Streams can be used to watch the video streams in real time as they are received in the cloud.
- Kinesis Video Streams can be used to capture massive amounts of live video data from millions of sources, including:
  - Smartphones,
  - Security cameras,
  - Webcams,
  - Cameras embedded in cars,
  - Drones, and other sources.
- Besides the listed sources, Kinesis Video Streams can also receive non-video time-serialized data such as:
  - Audio data,
  - Thermal imagery,
  - Depth data, RADAR data, and more.



## Kinesis Video Streams - Benefits

- **Connect and stream from millions of devices**
  - Kinesis Video Streams producer libraries can be used to configure your devices and reliably stream in real time, or as after-the-fact media uploads.
- **Durably store, encrypt, and index data**
  - Kinesis Video Streams also generates an index over the stored data based on producer-generated or service-side time stamps.
  - Applications can easily retrieve specified data in a stream using the time-index.
- **Focus on managing applications instead of infrastructure**
  - Kinesis Video Streams is serverless, fully managed service, so there is no infrastructure to set up or manage.
  - Deployment, configuration, and elastic scaling of the underlying infrastructure are all taken care of by the service.



## Kinesis Video Streams – Benefits (cont.)

- **Build real-time and batch applications on data streams**
  - Kinesis Video Streams can be used to build custom real-time applications that operate on live data streams, and create batch or ad hoc applications that operate on durably persisted data without strict latency requirements.
  - Custom applications can be built, deployed, and manage to process and analyze your streams.
  - Kinesis Video Streams Get APIs allows for multiple concurrent applications processing data in a real-time or batch-oriented basis.
- **Stream data more securely**
  - Kinesis Video Streams encrypts all data as it flows through the service and when it persists the data.
  - Kinesis Video Streams enforces Transport Layer Security (TLS)-based encryption on data streaming from devices, and encrypts all data at rest using AWS KMS
  - Access to your data is managed using AWS IAM
- **Pay as you go**



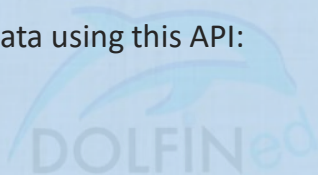
# Amazon Kinesis Video Streams

- PutMedia & GetMedia APIs
- Playback using HLS
- Monitoring and Logging



## Producer APIs – PutMedia API

- Kinesis Video Streams provides a PutMedia API to write media data to a Kinesis video stream.
  - In a PutMedia request, the producer sends a stream of media fragments.
    - A fragment is a self-contained sequence of frames.
  - The frames belonging to a fragment should have no dependency on any frames from other fragments.
  - Kinesis Video Streams supports only the Matroska (MKV) container format for sending media data using this API.
- You have the following options for sending data using this API:
  - Send media data in real time
  - Send media data offline (in batches):
    - For example, a body camera might record video for hours and store it on the device.
    - Later, when you connect the camera to the docking port, the camera can start a PutMedia session to send data to a Kinesis video stream. In this scenario, latency is not an issue



## Consumer APIs - GetMedia API to read data from streams

- When used by Consumers, they must identify the starting fragment.
- The API then returns fragments in the order in which they were added to the stream (in increasing order by fragment number).
- The media data in the fragments is packed into a structured format such as Matroska (MKV).
- GetMedia knows where the fragments are (archived in the data store or available in real time). For example, if GetMedia determines that the starting fragment is archived, it starts returning fragments from the data store.
- When it needs to return newer fragments that are not archived yet, GetMedia switches to reading fragments from an in-memory stream buffer.
  - This is an example of a continuous consumer, which processes fragments in the order that they are ingested by the stream.



# Kinesis Video Streams Playback with HLS

- HTTP Live Streaming (HLS) is an industry-standard HTTP-based media streaming communications protocol.
  - You can use HTTP Live Streaming (HLS) to view an Amazon Kinesis video stream, either for live playback or to view archived video.
- You can view a Kinesis video stream using either HLS or the GetMedia API.
- The differences between these methods are as follows:
  - **GetMedia:**
    - You use the GetMedia API to build your own applications to process Kinesis video streams.
    - GetMedia is a real-time API with low latency.
    - If you want to create a player that uses GetMedia, you have to build it yourself.
  - **HLS:**
    - You can use HLS for live playback.
    - Latency is typically between 3 and 5 seconds, but it can be between 1 and 10 seconds, depending on the use case, player, and network conditions.
    - You can use a third-party player (such as Video.js or Google Shaka Player) to display the video stream by providing the HLS streaming session URL, either programmatically or manually.
    - You can also play back video by typing the HLS streaming session URL in the Location bar of the Apple Safari or Microsoft Edge browsers.





## Monitoring Kinesis Video Streams

- Monitoring Kinesis Video Streams metrics using CloudWatch
  - You can monitor a Kinesis video stream using Amazon CloudWatch, which collects and processes raw data from Kinesis Video Streams into readable, near real-time metrics.
  - These statistics are recorded for a period of 15 months, so that you can access historical information and gain a better perspective on how your web application or service is performing.
- . Amazon Kinesis Video Streams is integrated with AWS CloudTrail, a service that provides a record of actions taken by a user, role, or an AWS service in Amazon Kinesis Video Streams.
  - CloudTrail captures all API calls for Amazon Kinesis Video Streams as events