



What Is Transcoding and Why Is It Critical for Streaming?

Introduction

You, like most folks thinking about streaming media, probably fall into one of two camps—you either already know something about transcoding (/products/capabilities/live-transcoding), or you are wondering why you keep hearing about it. If you are not sure you need it, bear with us for a few paragraphs. We will explain what it is (and is not) and why it might be critical for your success with future streaming, especially if you want to deliver adaptive streams to any device.

So, what is transcoding?

First, the word “transcoding” is commonly used as an umbrella term that covers a number of digital media tasks:

- Transcoding, at a high level, is taking already-compressed (or encoded) content, decompressing (decoding) it, and then somehow altering and recompressing it. As an example, you might change the audio and/or video format (codec) from one to another, such as converting from an MPEG-2 source (commonly used in broadcast television) to H.264 video and AAC audio (the most popular codecs for streaming). Other basic tasks could include adding watermarks, logos, or other graphics to your video.
- Transrating refers specifically to changing bitrates, such as taking an HD video input stream at 5 Mbps and converting it into one or more lower-bitrate streams (also known as renditions): 3 Mbps, 1.8 Mbps, 1 Mbps, 600 kbps, etc.
- Trans-sizing refers specifically to resizing the video frame; say, from a resolution of 1920x1080 (1080p) down to 1280x720 (720p).

As a result, when you think about “transcoding,” you might be referring to any combination of the above tasks—and typically are. Video conversion is computationally intensive, so transcoding usually requires more powerful hardware resources, including faster CPUs or graphics acceleration capabilities.

Let us look at what transcoding is not.

Transcoding should not be confused with “transmuxing,” which can also be referred to as repackaging, packetizing, or rewrapping. Transmuxing is when you take compressed audio and video and—without changing the actual audio or video content—(re)package it into different delivery formats. For example, you might have H.264/AAC content, and by changing the container it is packaged in, you can deliver it as HTTP Live Streaming (HLS), Smooth Streaming, HTTP Dynamic Streaming (HDS), or Dynamic Adaptive Streaming over HTTP (DASH). The computational overhead for transmuxing is much smaller than for transcoding.



When is transcoding critical? Simply put, when you want your content to reach more end users.

For example, let us say you want to do a live webinar from your office. You might be capturing your webcam audio and video with a Flash-based desktop application that generates 1080p H.264 video and Speex audio, and then delivering that to viewers on the Internet.

However, if you stream that directly to end users, you will have a few problems. First, viewers without sufficient bandwidth aren't going to be able to view the stream—their players will be buffering constantly as they wait for packets of that 1080p video to arrive. Secondly, in order to render the Speex audio, most people will need to watch using Flash Player on a computer. Collectively, you have just excluded almost anyone with slower data speeds, tablets, mobile phones, and connected TV devices. According to The Nielsen Company: TV still constitutes the majority of video consumption, but every other screen is much more valuable to Millennials. TV-connected devices -- DVD players, VCRs, game consoles, tablets, and smartphones compose four times the percentage of Millennials' total video minutes than adults 35 and older: TV-connected devices account for 23% of Millennials' total time with video, compared with just 6% for consumers 35 and older. And as a result, Millennials spend about 27% less time watching traditional TV (89% among 35+ vs. 66% among Millennials).

Using a transcoder, you can simultaneously create a set of time-aligned video streams, each with a different bitrate and frame size, while converting the Speex audio to AAC audio. This set of Internet-friendly streams could then be packaged into several adaptive streaming formats (HLS, etc.), allowing you to now reach almost any screen on the planet.

A more common example is when you are doing a live broadcast using a camera and encoder, or with an IP camera. Again, to reach the largest number of viewers with the best possible quality their bandwidth and devices allow, you would want to support adaptive streaming. You would stream one HD H.264/AAC stream to your transcoder (typically located on a server image in the cloud) to create multiple H.264/AAC renditions at different bitrates and resolutions. Then you would have your media server (which might be the same server as your transcoder) package those renditions into one or more adaptive streaming formats before delivering them to viewers.

Where does Arumai fit in?

Arumai-TranStream™: Cloud-Based Transcoding & Streaming System for Media Companies:

Today, content, service, and network providers including broadcasters are expanding the distribution of their On-Demand and Live offerings to the Web and across multiple devices beyond TV. Due to the increasing customer expectations, the success of media companies is dependent on the video quality they provide. Therefore, Arumai provides its high-quality end-to-end adaptive bitrate transcoding and streaming services, enabling highest quality on the Web up to HD and 4K, while keeping the distribution costs low by using the efficient HTTP infrastructure.



Transcoding and streaming of audio and video content for Web delivery is an increasingly complex task with substantial requirements and costs in terms of:

- hardware and systems (encoders, servers, network, etc.);
- bandwidth & connectivity; and
- specialized staff for encoding/streaming.

Furthermore, companies need to balance investments in (hardware) systems and connectivity with the required scalability and flexibility. Today's encoding systems are dimensioned on peak loads (e.g., during special events) while the financial returns on those systems are driven by overall utilization of the infrastructure. As a result, content providers have not enough infrastructure for peak hours and special events, although their existing infrastructure is underutilized or idle at the rest of the time.

Arumai's Cloud-Based Transcoding & Streaming System for Media Companies provides benefits across multiple dimensions:

- Remove capacity bottlenecks in the streaming media workflows;
- Flexibility to scale resources and associated operational costs with the demand;
- Right-size encoding and streaming infrastructure;
- Eliminate the necessity for capital investments in dedicated encoding systems;
- Full flexibility to choose quality and speed of encoding; and
- Reduce reliance on specific technical encoding/streaming expertise.

Due to these benefits Arumai's customers can focus on operating their business more economically, while delivering a better service to their customers and gain a faster time to market.

Arumai offers an end-to-end portfolio: from content generation (Arumai-eCode™ transcoding portion of Arumai-TranStream™) to content consumption (Arumai-Vision™ clients streaming portion of Arumai-TranStream™). Arumai-TranStream™ v1.5 will include a Private OTT CDN for Licensees only.

Arumai's solution is suitable for OTT playout of all types of audio/video content and media file formats, including live streams - such as TV broadcast signals, live events, etc. – and On- Demand media. Using the cloud-based transcoding platform Arumai-eCode™ it is possible to generate highest quality adaptive bitrate streaming output for any type of device, ranging from smartphones to set-top boxes and smart TV sets.

ARUMAI TECHNOLOGIES, INC.



Arumai is the only leading, independent, pure play OTT products and solutions company in the industry today. Arumai's groundbreaking video frame manipulation techniques, proprietary streaming systems and methods, and OTT Video Suite of products make any video content universally enjoyable in high quality on any screen, by any viewer, across any network, at any time enabling a pure play OTT products and solutions company. Arumai-TranStream™ individually and when combined with Arumai-Multiscreen OTT Platform with Social Media Layers for OEMs™ is prepared to deliver millions of content streams to mobile phones/handhelds, tablets/laptops/PCs, Blu-ray Players, Game Consoles, and Smart TVs, and in every market in the world on behalf of content owners, mobile service providers, cable companies, satellite companies, telecom operators, streaming video providers – OTT products and solutions.