



Video Developer Report 2017

Welcome to Bitmovin's Video Developer Report!

First and foremost, I'd like to thank everyone for making the 2017 Video Developer Survey possible! Without the great support and participation of the video developer community, we would not be able to create this report and share the insights into how developers around the globe work with video. With 380 survey submissions from over 50 countries, this report aims to give an overview of the status of video technology in 2017, as well as a vision into what will be important to video developers in the next 12 months.

We hope this report provides helpful information. We have already learned a lot, and are looking forward to the 2018 Video Developer Survey a year from now!

Best Regards,



Stefan Lederer
CEO, Bitmovin

Key findings

Apple HLS is the dominant format in video streaming in 2017, but the format people are looking to in the next 12 months is **MPEG-DASH**.

HEVC is the video codec most people are planning to use in the next 12 months, but VP9 and AV1 are also growing in popularity.

Software encoders are the most popular encoders, used either on-premise or in the cloud.

Cloud encoding is more popular in North America than in Europe.

More than a third monetize their online video with **subscription models**.

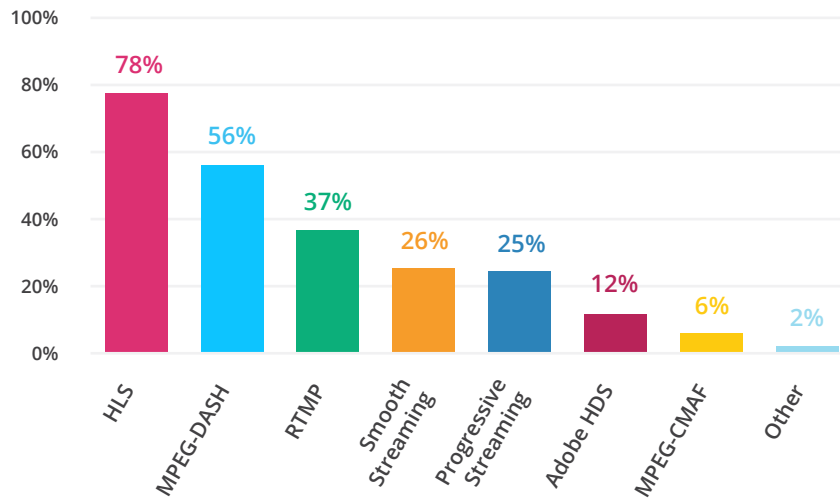
45% use some form of encryption or DRM protection.

Half of the developers with ad requirements are using a **Server-Side Ad Insertion** solution.

HTML5 is now by far the dominant platform for video playback.

OTT devices like Roku, Chromecast, Apple TV and Amazon Fire TV have significant **regional differences** in adoption.

Q1. Streaming Formats

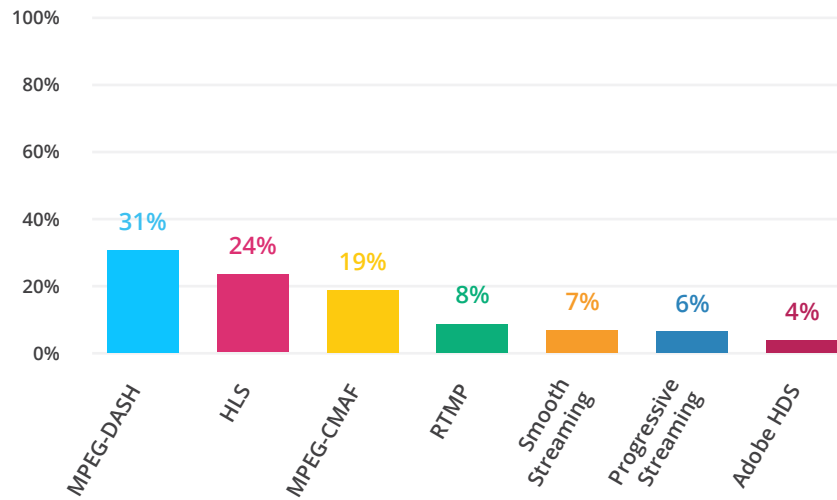


Which streaming formats are you currently using?

In 2017 Apple's HTTP Live Streaming (HLS) is the most popular streaming format. This makes sense, as one can reach all devices with HLS as long as you don't need DRM protection. In the popularity rank, it is followed by MPEG-DASH, which is required once you need to use DRM across different browsers and platforms. Progressive Streaming (simple MP4 files) are still used

by a quarter of the participants as a fallback for older browsers. Legacy formats, like HDS, Smooth Streaming and RTMP are getting phased out, although RTMP is still popular in contribution feeds as well as in low-latency use cases, like betting.

Note: The questions in the survey are multiple choice, multiple answer, and therefore will not add up to 100%.

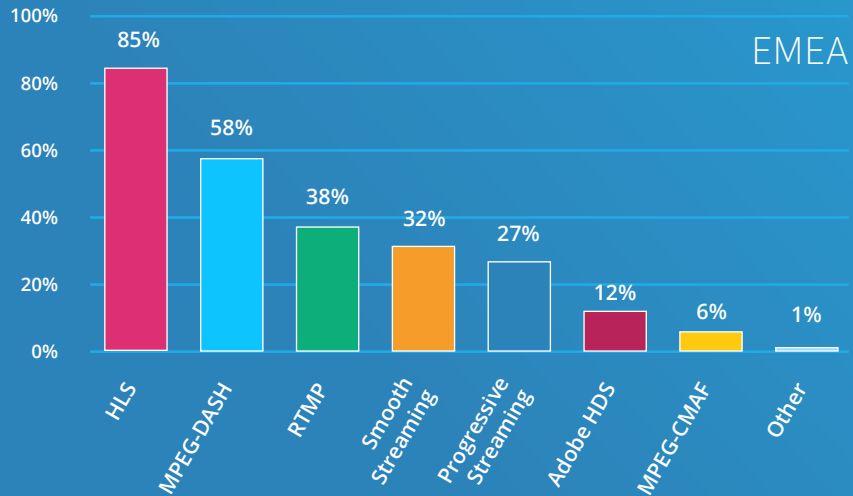
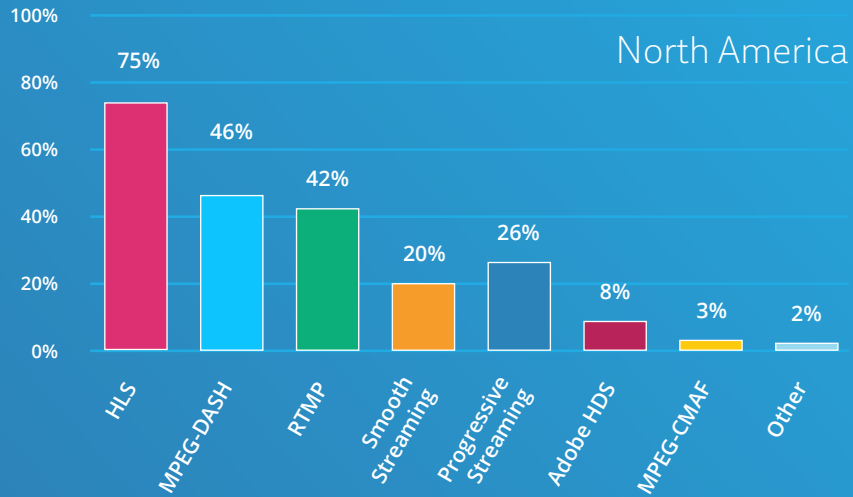


Which streaming formats are you planning to use in the next 12 months?

Most video developers in the survey are looking to use MPEG-DASH, followed by HLS. HLS is especially interesting for many people as it now supports HEVC on MacOS and iOS devices, as well as fMP4 segments, which are supported directly by HTML5 without remultiplexing in JavaScript. A rising star on the list is

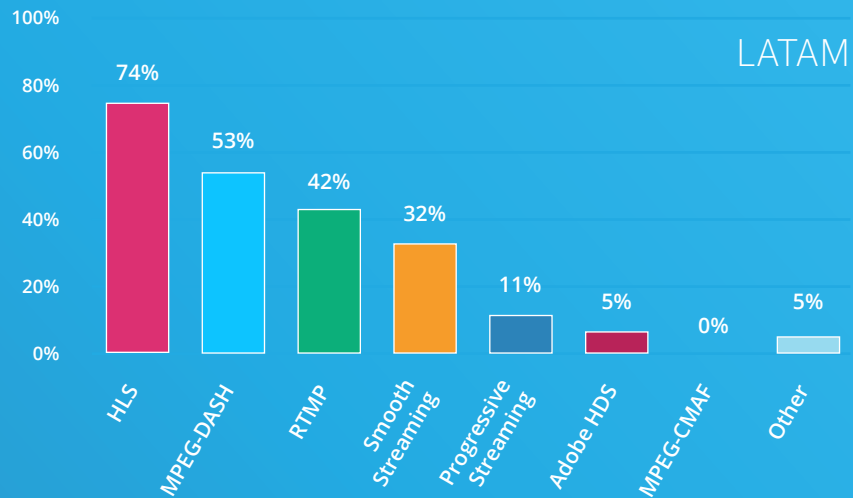
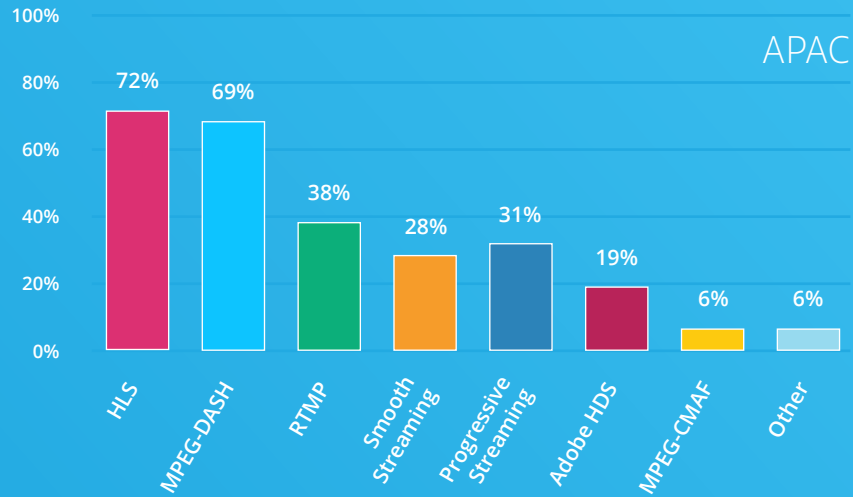
MPEG-CMAF, the new streaming format that aims to harmonize HLS and DASH. Stay tuned to see the results in the next year's survey.

Regional variations in streaming formats

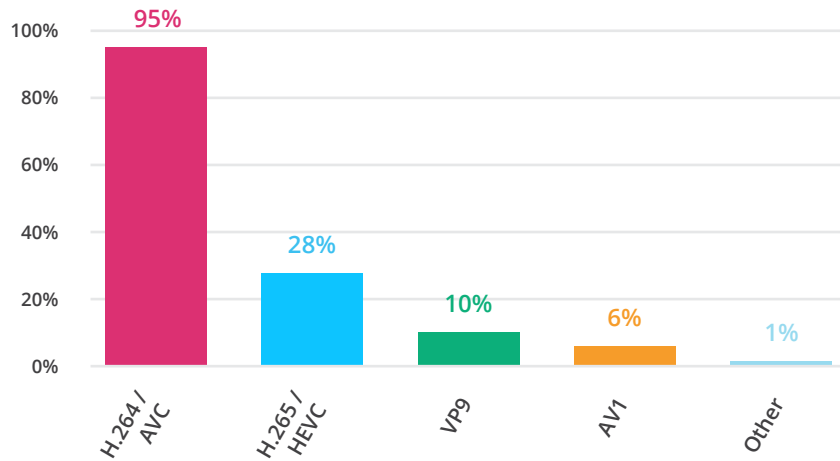


Interestingly, we don't see any real difference in the streaming formats between regions. While EMEA has the highest concentration of HLS streams, at whopping

85%, and APAC leads in MPEG-DASH adoption with almost 70% of participants reporting using the format; the distribution of formats looks surprisingly similar.



Q2. Video Codecs



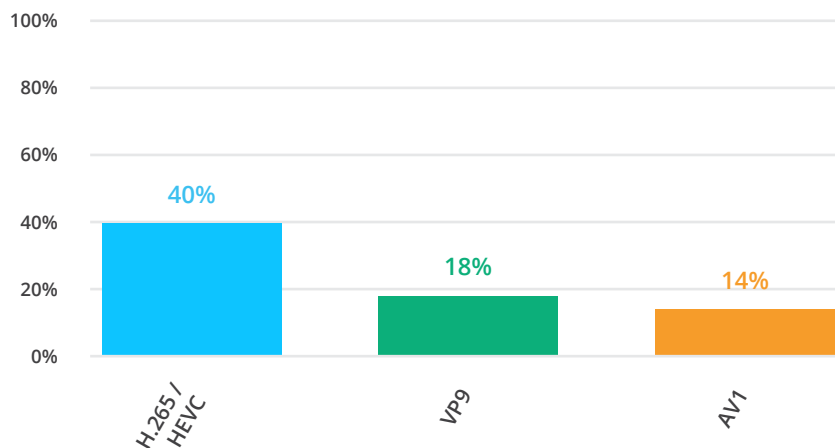
Which video codecs are you using currently?

The dominant video codec among survey participants is definitely H.264/AVC, at 95% adoption. It is supported by nearly every platform that is used by consumers today; the 5% not using H.264 maybe for playback on older set-top boxes or other niche use cases.

Interesting to see that 28% already use HEVC! Whatever the use case, these organizations are definitely ready for the upcoming HEVC support on iOS and Mac. Android has had support for HEVC playback in native apps for some time, as well as with set-top boxes in closed loop systems where people control the encoder and the playback device, and Android TVs.

VP9 arrives in production as well in 2017, especially to reach browsers like Chrome, Firefox, Microsoft Edge, and Android devices. With a more efficient compression than H.264, it can deliver better quality videos for the same amount of data, or use less data while maintaining the same visual quality. Netflix is using VP9 codec for their downloadable content, keeping bandwidth usage low and saving on CDN costs.

Interestingly, 6% of the responders already use AV1. This is surprising, as the codec is still in the creation. We assume that video developers are checking out this new codec now, to be ready for its released at the end of 2017.

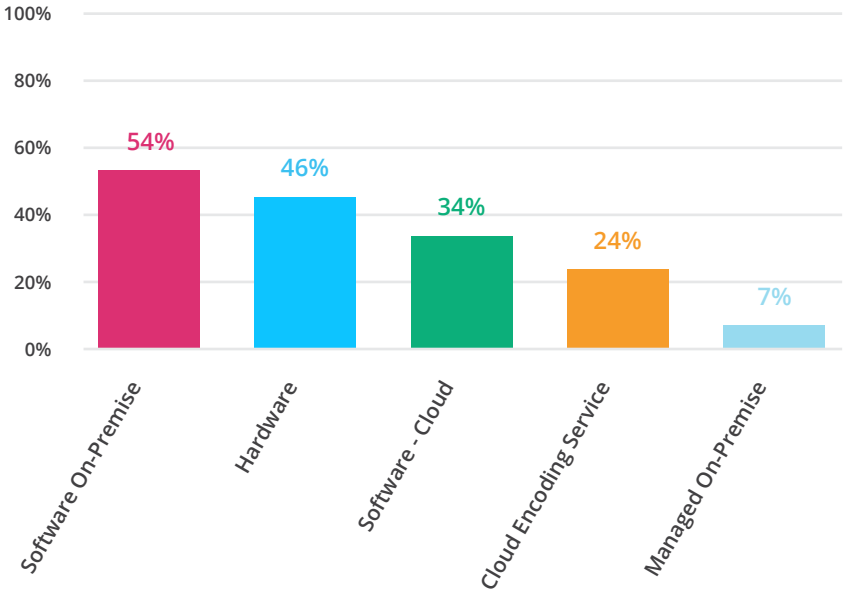


Which video codecs are you planning to use in the next 12 months?

Not surprising, in the next 12 months, most video developers are looking into HEVC. Probably because Apple has announced their support for HEVC with HLS on the new iOS 11 and MacOS High Sierra. Similarly, Android already supports HEVC, so we are looking forward to a future with higher encoding efficiency and better quality on mobile video applications.

In terms of Web browsers, currently only Microsoft Edge and Safari has support for HEVC, while Firefox, Chrome and Edge support VP9. This explains the importance of VP9 for a lot of developers in the next 12 Months. When it comes to AV1, the next 12 months will be extremely interesting, as the AV1 bitstream gets frozen and the codec will be officially released at the end of 2017.

Q3. Where You Encode



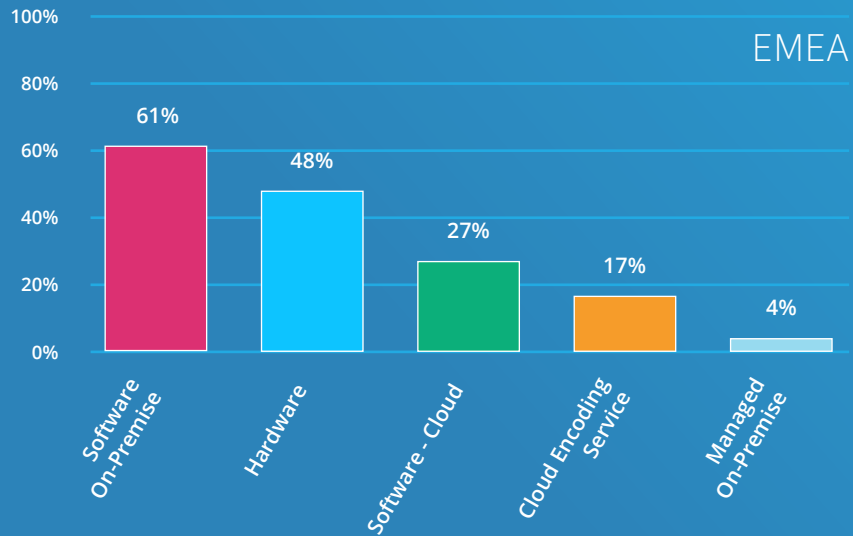
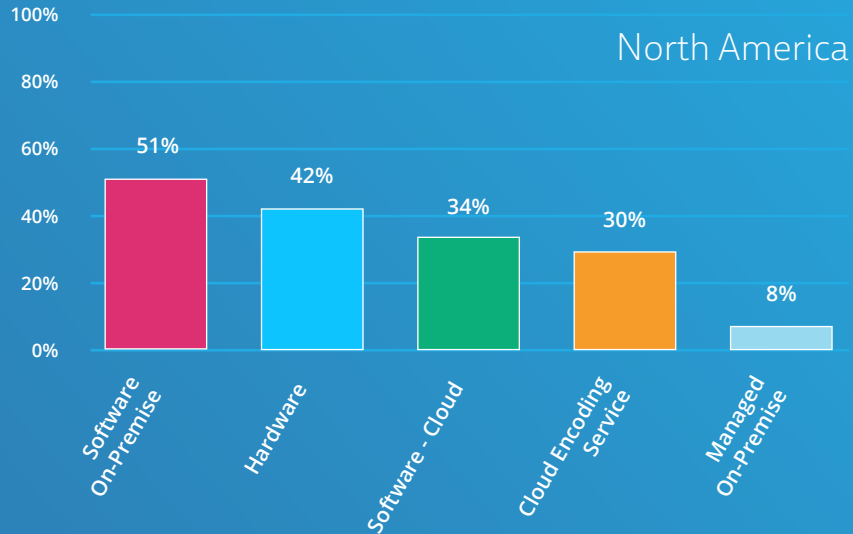
Where do you encode video?

In terms of video encoding - “software eats the world” (to quote Marc Andreessen, the famous venture capitalist and developer of the Mosaic Web browser). The majority of the video developers in our survey report using software encoders, either on local on-premise hardware, or in the cloud. Software encoders include commercial encoders as well as open source tools such as ffmpeg, x264, and others, for Live as well as On-Demand use cases.

Software is followed by the cloud, as an infrastructure layer for video encoding, either self hosted, using a software encoder, or on a SaaS model.

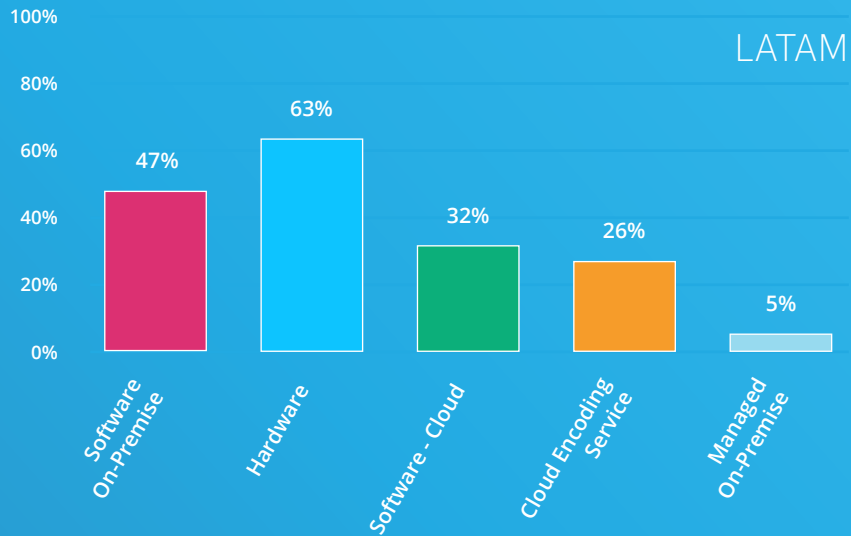
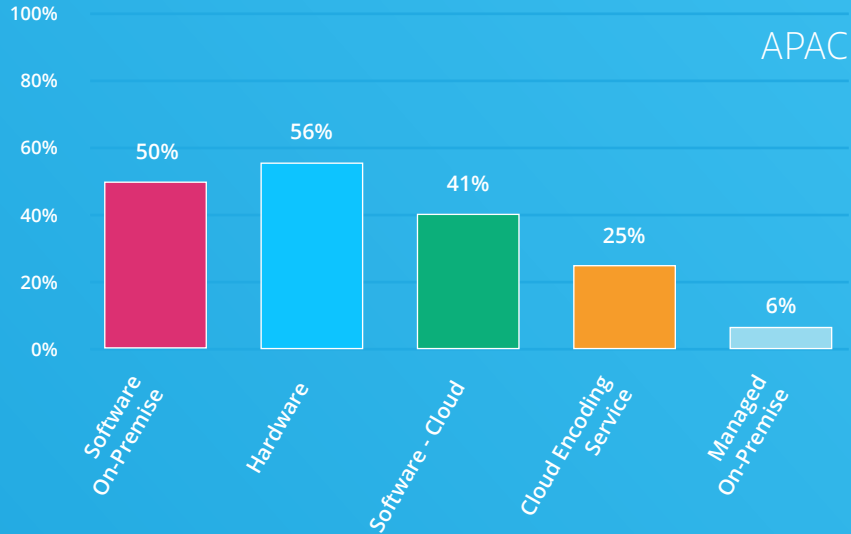
Hardware encoders are still very popular, especially for live streaming use cases. However, we expect this number to go down further in the next year, as software encoders continue gaining in popularity with benefits of scalability, flexibility and rapid deployment.

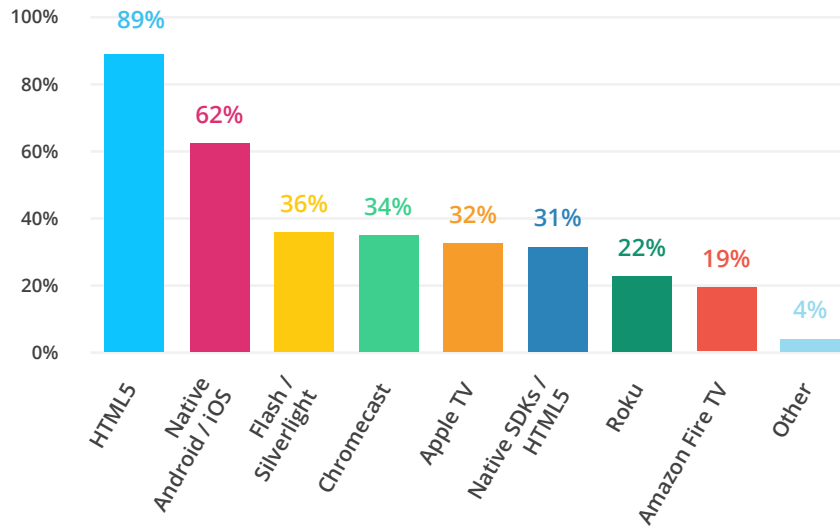
Regional variations in encoding deployments



We see an interesting difference here between the North America + EMEA regions, where software encoder on-premise is the most popular deployment, vs. LATAM and APAC regions where hardware encoders have higher

popularity. There is also a significant difference between the usage of Cloud Encoding Services in North America, where 30% of the respondents use them, vs. Europe, where only 17% encode with cloud-based services.

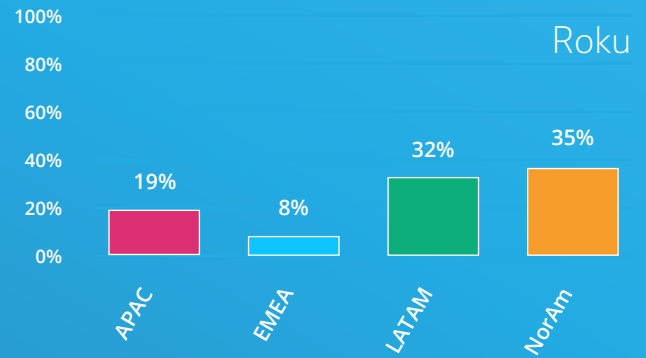
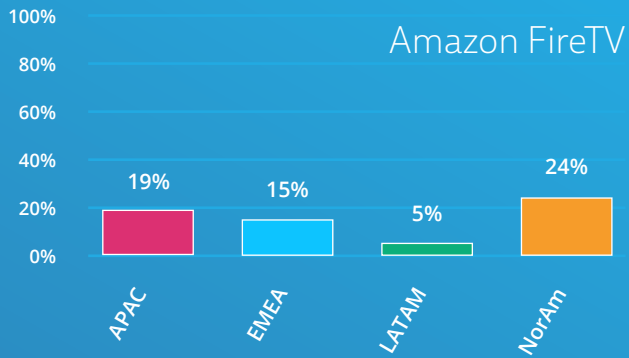
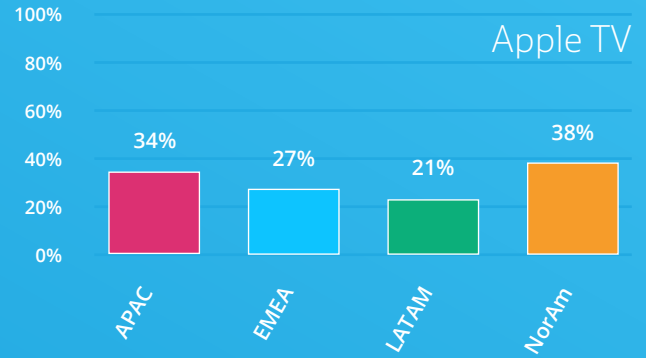
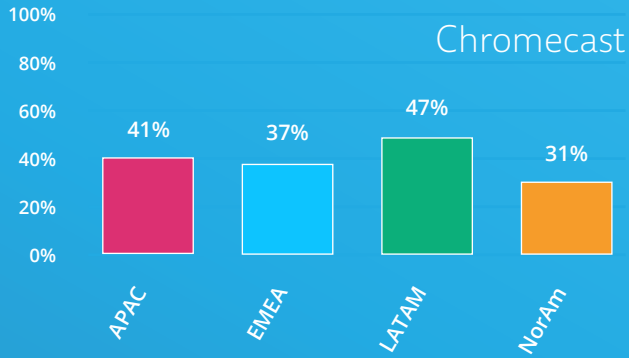




Which platforms and video players do you currently use for your content?

It's great to see that HTML5 is by far the most popular platform for video playback, and that only 36% of the developers still leverage Flash or Silverlight plugins. The second most popular platforms, after HTML5, are the

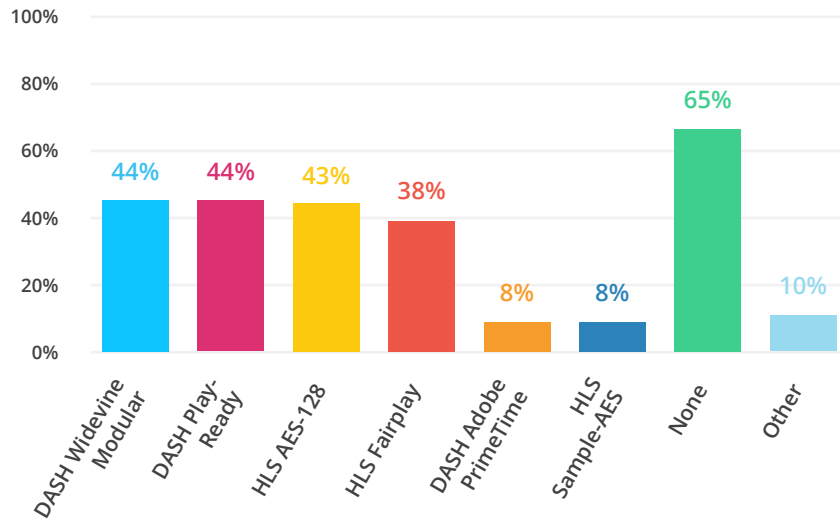
native mobile players on Android and iOS. Mobile video delivery has become a key focus for developers, as video publishers are eager to support the growing numbers of viewers on mobile devices.



Regional variations in OTT adoption

When it comes to OTT devices like Amazon Fire TV, Chromecast, Roku and AppleTV, we see notable regional differences. While Amazon Fire, Roku, Apple TV and Chromecast are all popular OTT streaming platforms

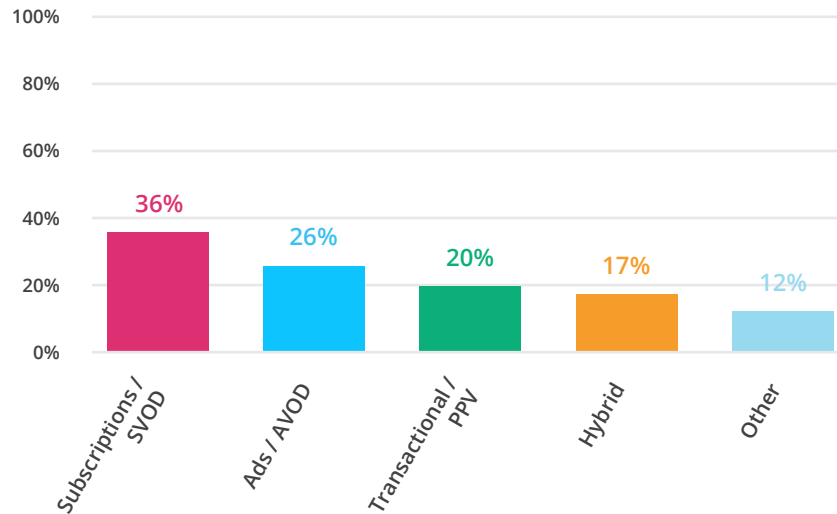
in North America, Chromecast is the most popular OTT platform in Latin America. At the same time, Amazon Fire TV is not used much in LATAM and Roku has a low distribution in EMEA.



Which DRM systems do you use?

We see that 35% of the video developers apply some form of content protection on the streams they deliver. Whether using basic encryption, like AES-128, or Hollywood-grade DRM (Digital Rights Management) protection, like Widevine Modular and Microsoft Fairplay, content security is a necessary part of today's video streaming business.

MPEG-DASH has significantly simplified the complexities of implementing a multi-DRM workflow, applying the right DRM schema to fit the end-user device and browser.

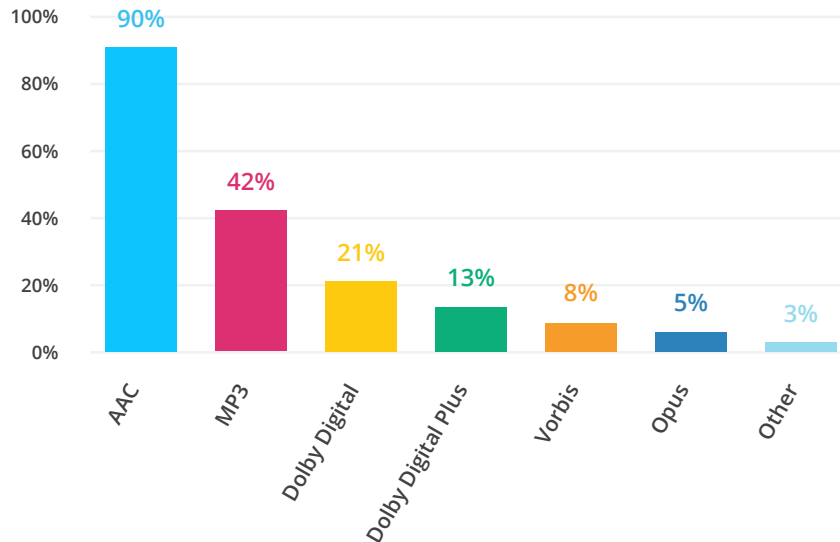


Which monetization model do you follow?

More than a third of survey participants monetize their online video deployments using subscription based models. Subscription model generates the most predictable recurring revenue stream and is more popular choice for OTT streaming services. Ad-supported models are very common for online video distribution, especially among broadcasters, digital

publishers and social media companies that want to get their content in front of a wide audience. Finally, transactional/PPV model is a popular choice for supplementing ad-supported and subscription models, in fact, 17% of participants report using a hybrid approach to video monetization.

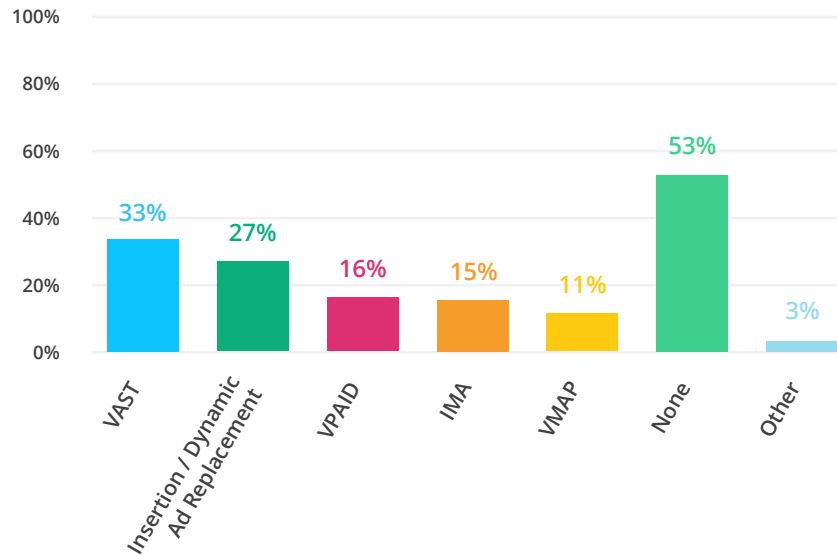
Q7. Audio Codecs



Which audio codecs do you use?

In terms of audio formats, we see one clearly dominating format with AAC. It surprised us to see MP3 being used by 43% of the developers. This might be a result of MP3 being used for legacy HLS streams, older Smooth Streaming or RTMP streams or audio-only progressive streams. Dolby Digital and Dolby Digital

Plus are primarily used in premium use cases on set-top boxes and TVs, where the user has the necessary audio hardware to appreciate the premium sound quality. The open source codecs Vorbis and Opus are not widely used by the survey participants.

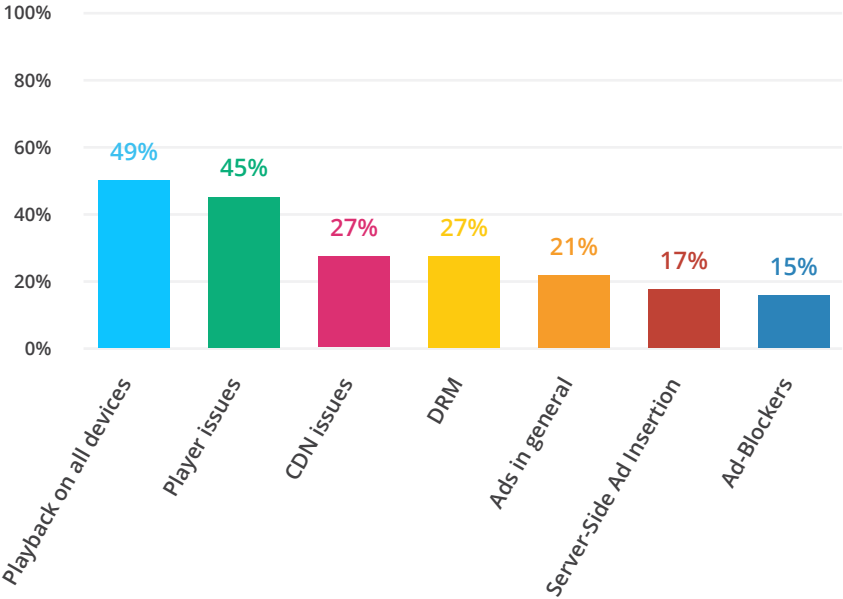


What type of ad standard technology are you using today?

Nearly half of the video developers are using standardized advertising technologies for their deployments. Among the advertising standards, VAST is the most common way of serving ads in video, due to its simplicity and support by most ad-providers and

video players. It is very noteworthy that half of the developers with ad requirements have a Server-Side Ad Insertion / Dynamic Ad Replacement solution in place, which generally requires more complex workflows and systems.

Q9. The Biggest Pain Points



What are the biggest problems that you are experiencing with video technology today?

When we asked the survey participants about the biggest problems they are experiencing with online video, the answer was very clear - Video Playback and Player.

This might be a result of the trend towards HTML5-based playback; while in most cases HTML5 significantly simplifies online video, using the MSE/EME is definitely more challenging than other ecosystems, like Flash or Silverlight. On top of this, video is consumed on more and more different platforms, which all come with their own special problems.

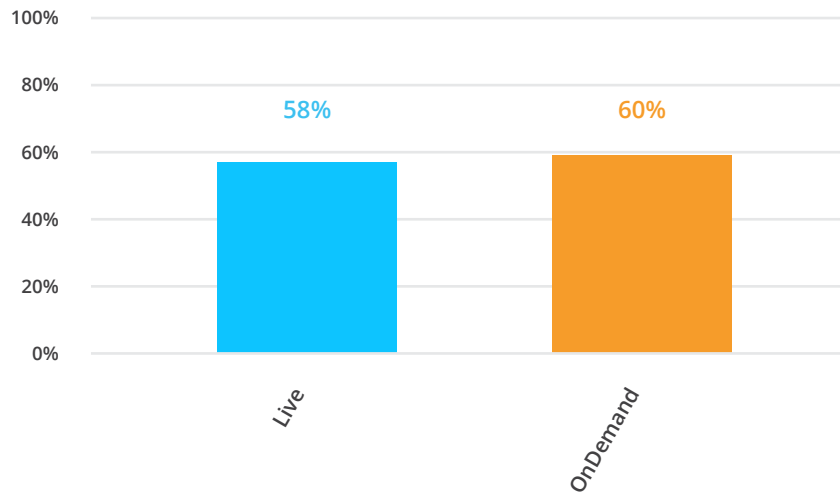
After player and playback issues, we see the other classical pains and problems video developers face on a daily basis: CDNs, Ads, and DRM, which are all fairly equally distributed. We would expect that video playback and player are a big challenge, but it is surprising to see that this is a bigger problem than DRM, Ads or CDN. However, it makes sense, once you consider that all those other problems involve playback, making it the focus for many people.

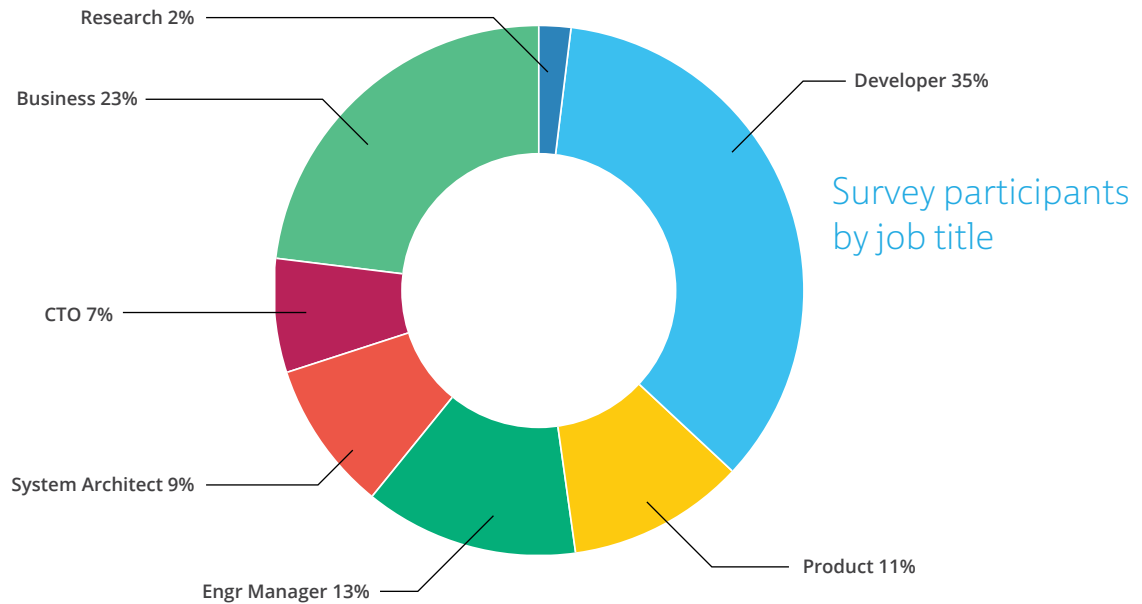
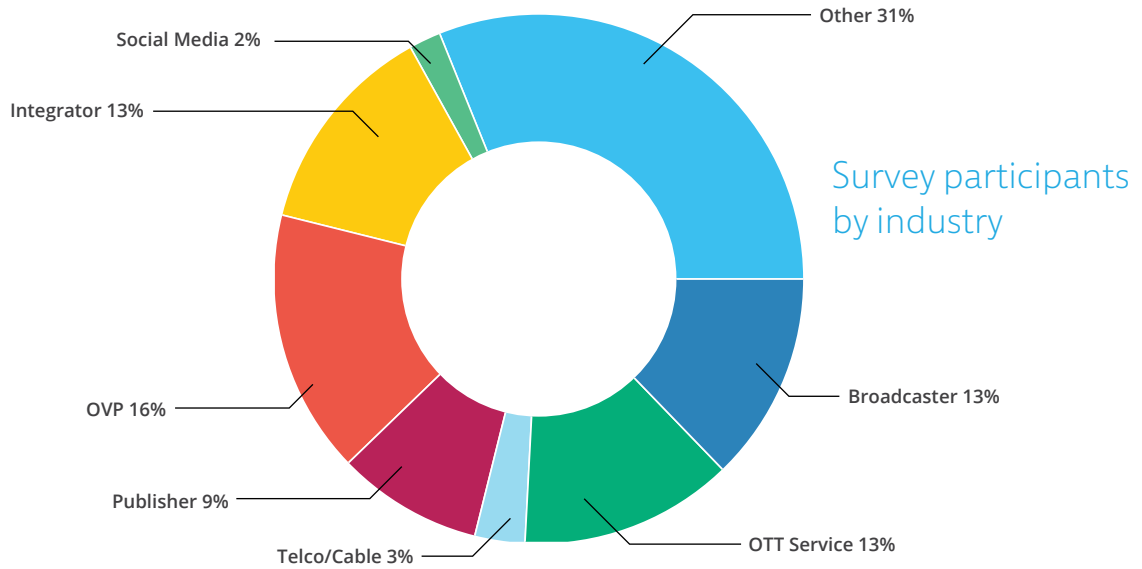
Survey participants

A survey is an aggregate of opinions expressed by its participants. The Bitmovin Developer Survey has voices from a wide swath of the online video industry players, from broadcasters and publishers, to OTT streaming services and online video platforms (OVPs).

75% of the participants come from technical roles, like developers & product managers, 23% are in business roles and 2% are in research.

Interestingly, there is an almost equal distribution between participants operating live and on-demand content, and many, obviously, work with both.







About Bitmovin

Bitmovin is a leading provider of video infrastructure for forward-thinking media companies around the world. The company has been at the forefront of every significant development in online video - from building the world's first commercial adaptive streaming Player for DASH/HLS/fMP4, to implementing next generation AV1 codec and deploying the first software-defined encoding service that runs anywhere: cloud, on-premise or hybrid through Kubernetes and Docker. We work with companies in over 100 countries to build innovative video products. Bitmovin solutions are completely in-house developed, highly customizable to fit with existing workflows and easy to integrate. To find out more about Bitmovin's video infrastructure solutions visit our website bitmovin.com.

