Bitmovin Video Developer Report 2019

Shaping the future of video

BITMOVIN

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Welcome

We're excited to share the third edition of our annual Developer Report. Thank you to our 542 participants from 108 countries for their time and effort in making this report possible. It's fantastic to see the number of participants growing every year. We also see a high level of consistency in the responses over the years. We feel confident that we are capturing the video community's needs and challenges accurately, leading to results that are valuable to us all.

Our overall goal is to identify trends and adoption rates of specific technologies. The numbers in this report are often in line with our predictions: for example, adoption plans for AV1 are growing. It's well-positioned to see real-world implementation in 2020. In other cases, such as streaming formats, the answers show a slower pace of adoption than anticipated.

Two of the hottest topics are artificial intelligence and low latency in the video workflow. Consequently, we added new questions to gain insights on how developers are tackling them. The video industry is always evolving, and so is our survey.

With three reports under our belt, we have a great streak going, and we are looking forward to surpassing the number of participants yet again in 2020.

Have fun digging into the numbers and results as much as we did!

Stefan Lederer
CEO, Bitmovin

KEY FINDINGS

Increased focus on video and audio quality

- Based on the survey results, H.264/AVC continues to be a pillar of online streaming, taking the top spot three years in a row, as the most used video codec in 2019 at 91%.
- The survey data shows that one-in-five developers plan to implement AV1 in 2020.
- Developers are recognizing the growth of various living room OTT devices and are preparing to deliver a higher-quality listening experience for their audiences via premium audio codecs.

Rise in low latency applications

- Latency (broadcast delay) is still the biggest problem for video developers in 2019, identified by over half of the respondents (54%).
- Almost 50% of the survey participants are going to implement low latency in the next 1-2 years.
- Over half of the survey participants have realistic and achievable latency expectations of less than 5 seconds.

Multi device deployments

- Achieving playback on all devices is, for 40% of the survey participants, still one of the biggest problems in video technology.
- Chromecast is still the leader in OTT streaming devices, used by 40% of survey respondents, followed by Android TV (36%) and Apple TV (33%). Roku only leads in the North American market.
- Subscription (SVOD, 56% +5%) and advertising (AVOD, 48% +7%) based business models keep gaining traction according to the survey results.

Use of analytics data to monitor quality of experience (QoE)

- A suprisingly large number of survey participants, 20%, say they don't use a video analytics solution and potentially are missing out on understanding the true ROI of their video content.
- Video buffering rate is the most used performance metric, coming in at 36.5%.

Methodology

Bitmovin set out for the third time to collect, aggregate, and analyze responses to the most burning video developer questions and industry topics.

We conducted the survey from June 10th through August 5th, 2019. 542 people from 108 countries participated. Certain questions in the survey are multiple choice, multiple answer, and therefore will not add up to 100%.

The breakout of respondents based on demographic, industry, company size, and job title, indicates how vast the community is who deal with workflow, implementation, and video application development. The composition of all three categories has been consistent over the years.

While we are very proud to share the results with you, we want to preface that this report represents a small sample set that mostly consists of our customers and prospects and, as a result, may be skewed specifically towards certain regions.

JOB TITLE

Over 80% of participants in our survey come from a technical background, such as software development, solution architecture and product management, making the results of the report more tangible and relevant to the community. Almost 17% are in business roles and 2.7% in research.

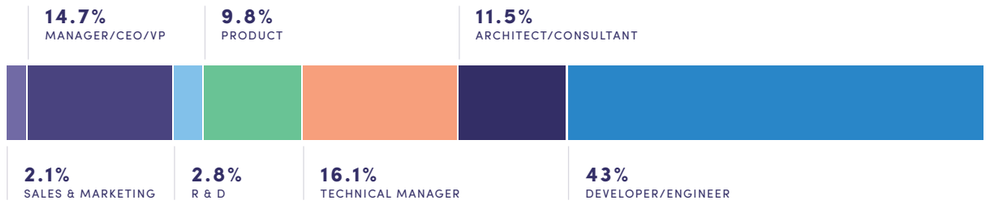
INDUSTRY

The only change we saw was a 6% uptake in participants from the broadcast industry, which is almost on-par with OTT service providers.

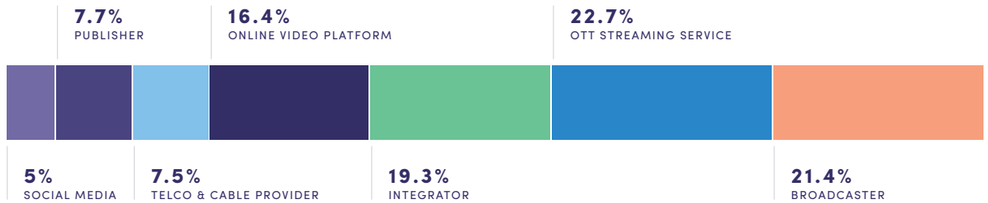
COMPANY SIZE

Over 40% of the participants work in larger organizations, with a headcount above 300 people, which is interesting with regards to how in-house and commercial solution options compare.

JOB TITLE



INDUSTRY



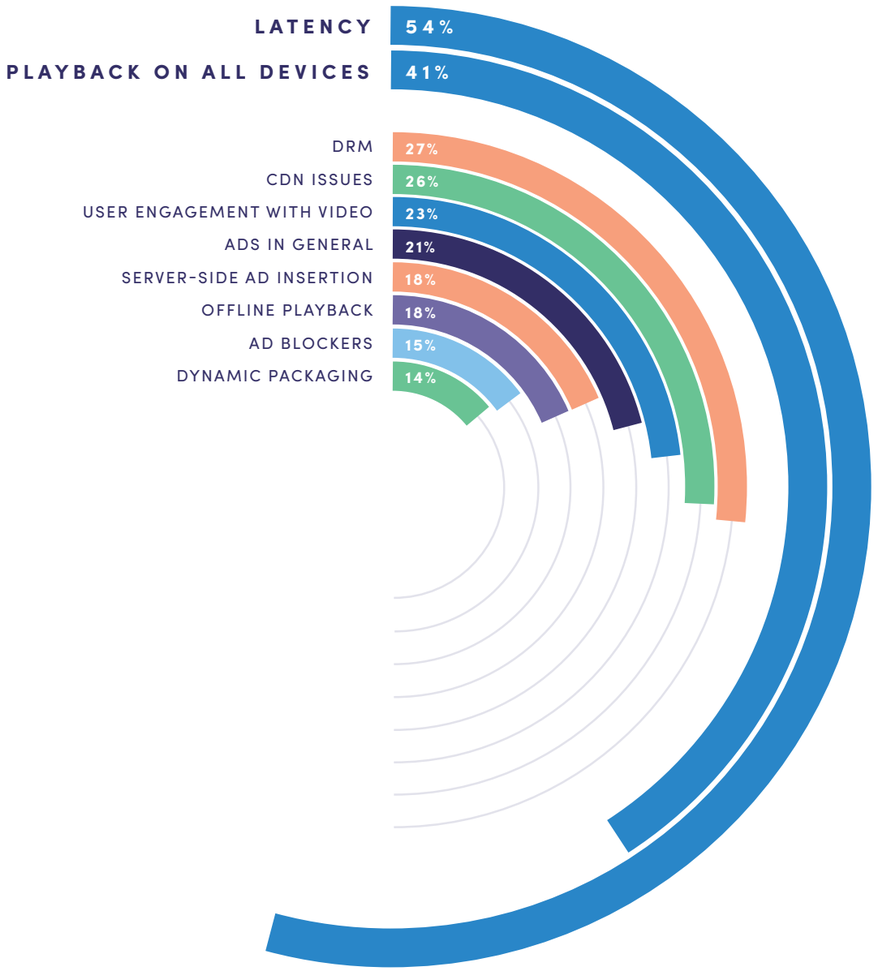
The biggest challenges

Before diving into the more detailed topics, let's start at a high level, to see the most significant issues developers are facing with digital video in 2019. Not much has changed since 2018 as the most checked answers to "What are the biggest challenges?", are still "latency" and "playback working on all devices."

It shouldn't come as a surprise, as the video streaming ecosystem is quite fragmented, complex, and hence slow to change. As an example scenario, low latency requires encoders, packagers, CDN and video players to be updated to deliver glass-to-glass latency targets. Achieving this across multiple devices and platforms in a consistent manner takes the complexity to a whole other level, increasing time-to-market.

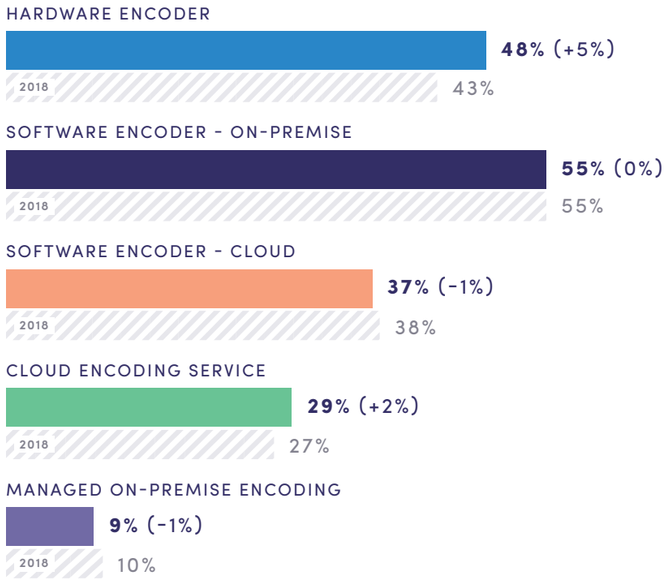
Adding another layer of complexity is the fact that developers are frequently tasked with solving all of these challenges and meeting business needs around content protection and monetization. In short, everyone is trying to figure out how to deliver video in the highest-quality, the most cost-effective way, and at scale.

Now let's dive into the individual areas of the video streaming workflow and see what our respondents have to say.



Video workflows

What are companies doing to deliver the highest quality streams at the lowest cost? On the following pages we'll provide insights into the winning formats and codecs, combined with their adoption rates across this competitive and ever evolving market.

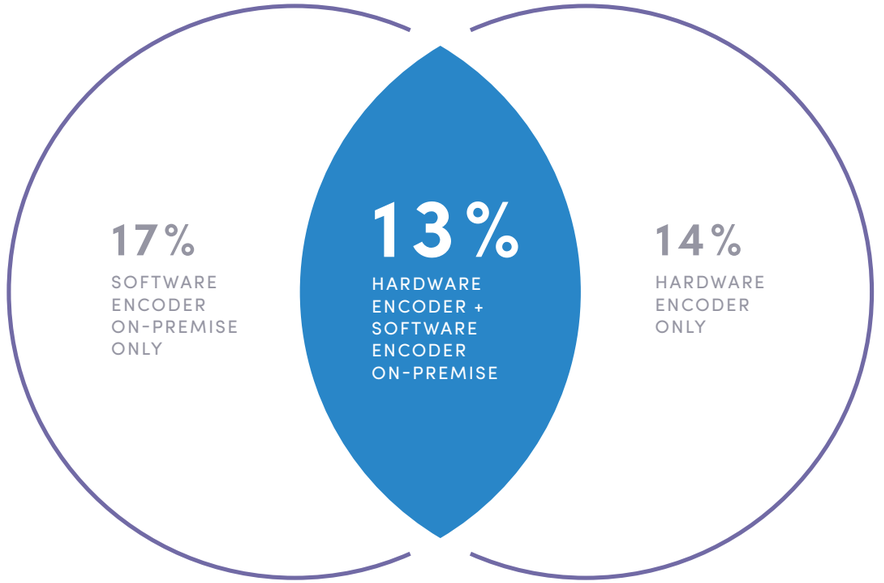


Where do you encode video?

Consistent with our 2018 report, software on-premise encoding remains a top choice among the survey participants.

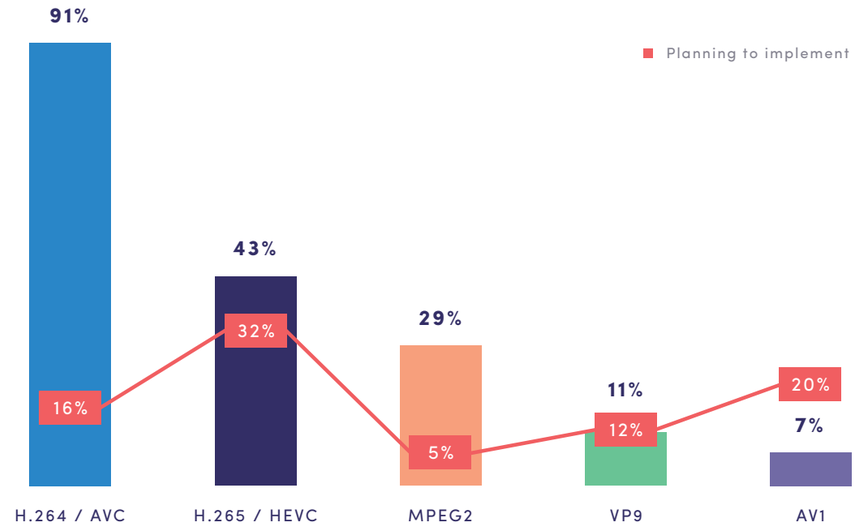
Cloud encoding implementations are increasing slowly and steadily, at +2% year over year growth.

Hardware encoding implementations increased by +5% in 2019. We attribute this to an increase in live streaming workflows depending on SDI connections — especially those demanding low latency applications. Additionally, hardware encoders remain the preferred choice for simplified set up and stream management, in particular among broadcasters.



Respondents also indicated a stronger preference for implementing a hybrid approach using hardware and software on-premise encoding services before completely switching to software cloud only encoding approach.

This can be attributed to operators maximizing the value of their hardware purchases while making a more cautious shift towards the cloud.

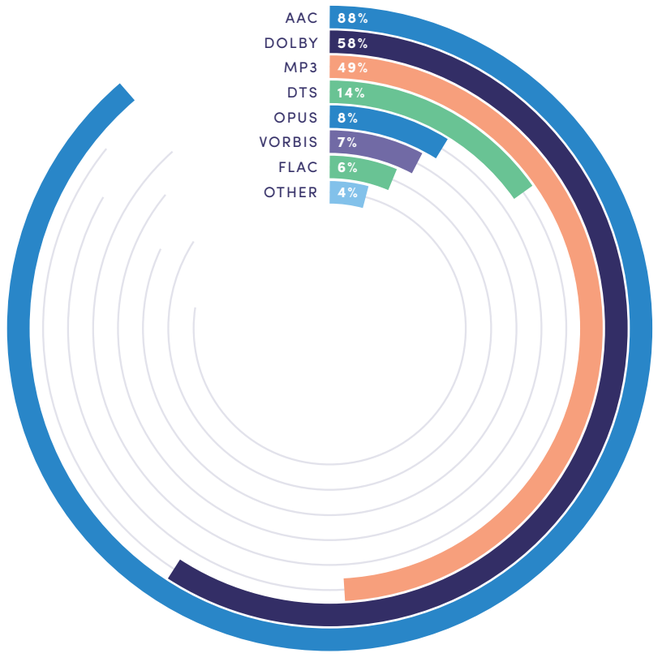


Which video codecs are you currently using and planning to implement within the next 12 months?

As expected, H.264/AVC remains the most used codec for three consecutive years.

In line with our earlier prediction, survey data shows that one-in-five developers plan to implement AV1 in 2020.

Device manufacturers, browser vendors, and content distributers like Cisco, Mozilla, and YouTube have already started implementing AV1 on larger scales. Therefore, we think that AV1 is well positioned to compete with H.265/HEVC and to succeed VP9 for open-source use-cases in 2020.

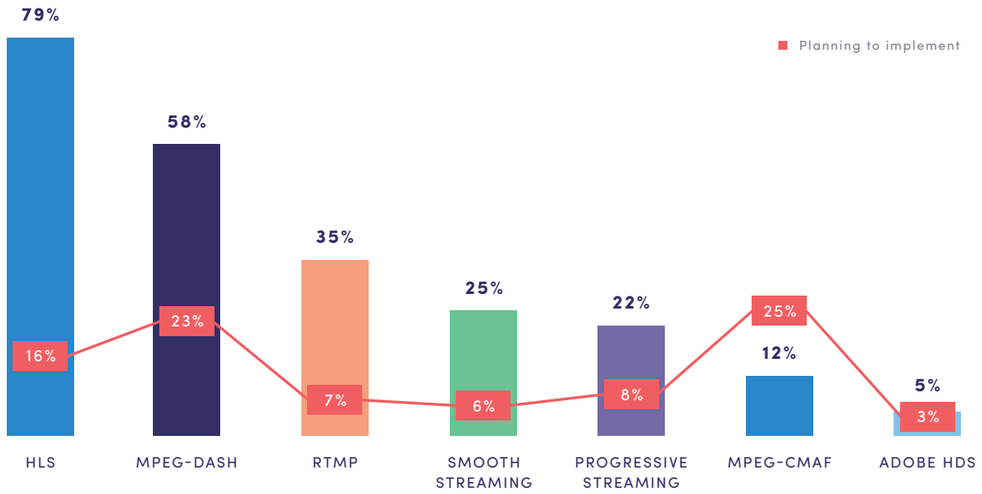


Which audio codecs do you use?

As seen over the last 2 years in the developer report, AAC continues to dominate the audio codec space.

This year, we added a few more proprietary audio codec options and observed that Dolby ranked second amongst survey respondents.

This indicates developers are paying attention to serving professional audio experiences (in addition to video). Delivering premium audio is especially important to address the growing list of living room OTT devices and large-screen viewing experiences.

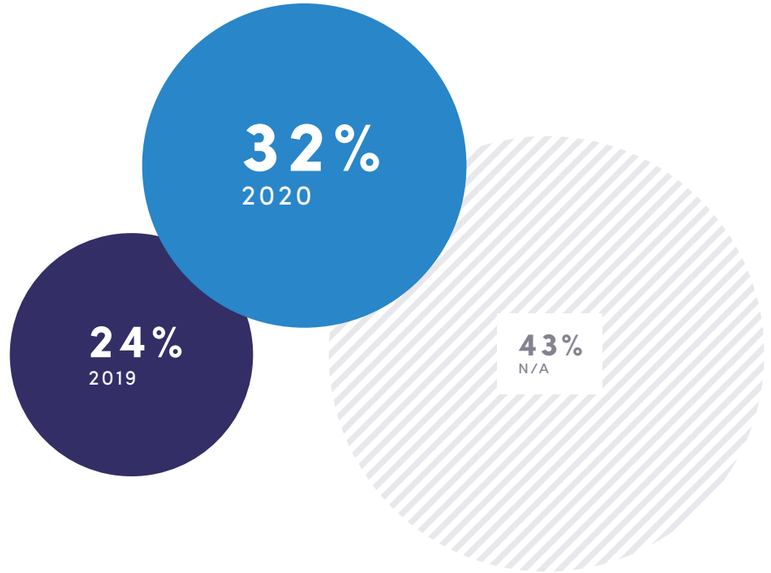


Which streaming formats are you currently using and are you planning to introduce within the next year?

Apple's HTTP Live Streaming (HLS) is leading the pack just like last year.

The outlook for wider CMAF adoption shows the most promise among the survey participants compared to other formats, almost doubling up in 2020.

The year over year data shows relatively small percentage shifts (2-3%) for all other formats which leads us to believe that the adoption of new streaming formats is happening at a slower pace overall than expected.



When do you expect to start using AI/ML based video workflow solutions?

The future of high-quality and personalized video experiences is driven by artificial intelligence (AI) and machine learning (ML) both on the video production and deployment side.

Consequently, the data shows that over half of the survey participants will start using AI and ML in the next two years to enhance existing workflows, accelerate time to market, and reduce cost.

We predict that this number will continue to increase. We are keeping a close eye on the ML applications coming to the market.

Codebase

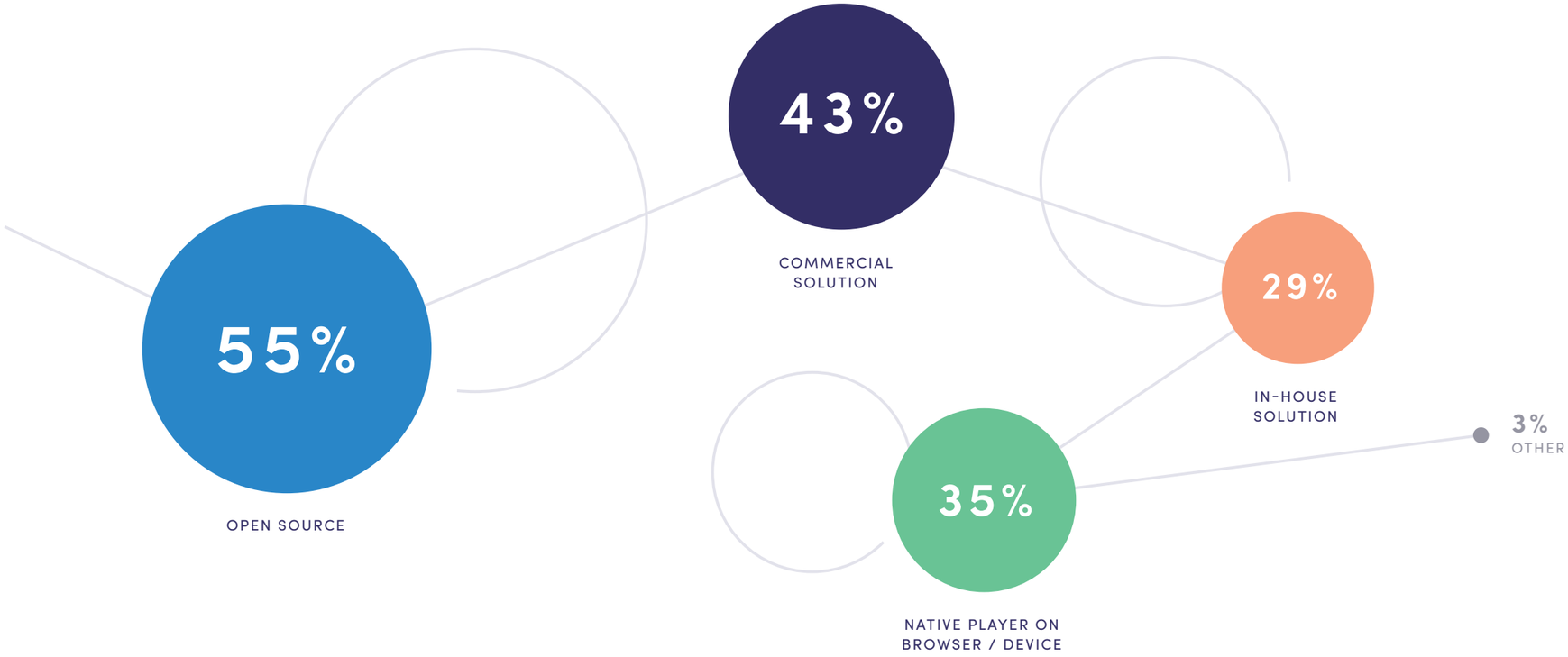
Which player codebase are you using?

Open Source and commercial solutions remain top choices for player development across our survey respondents, similar to last year's report.

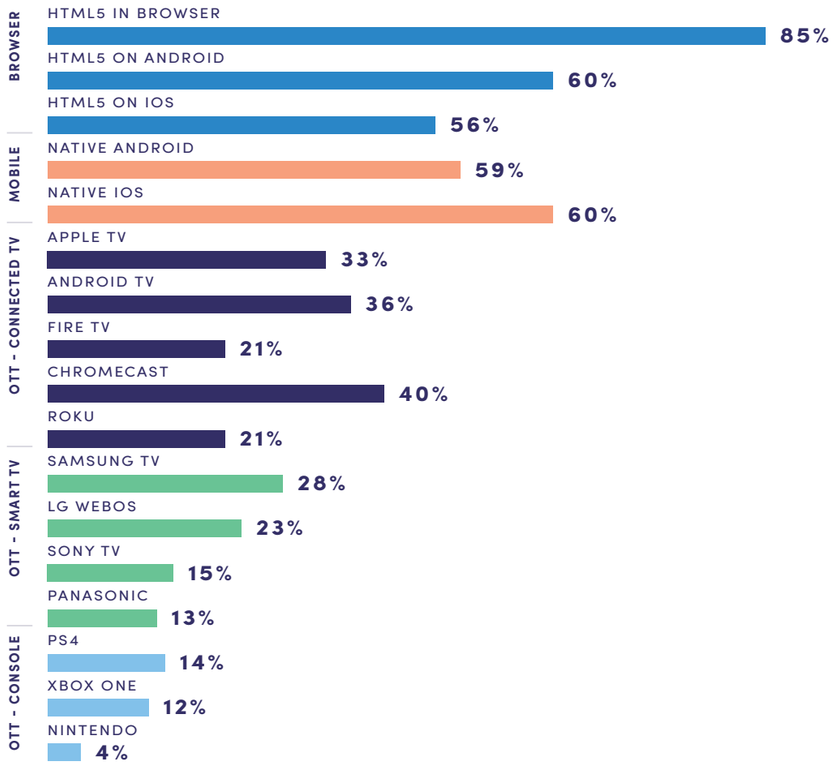
Since we introduced a new option this year, "native player", results showed a favorable shift from in-house development to native player development.

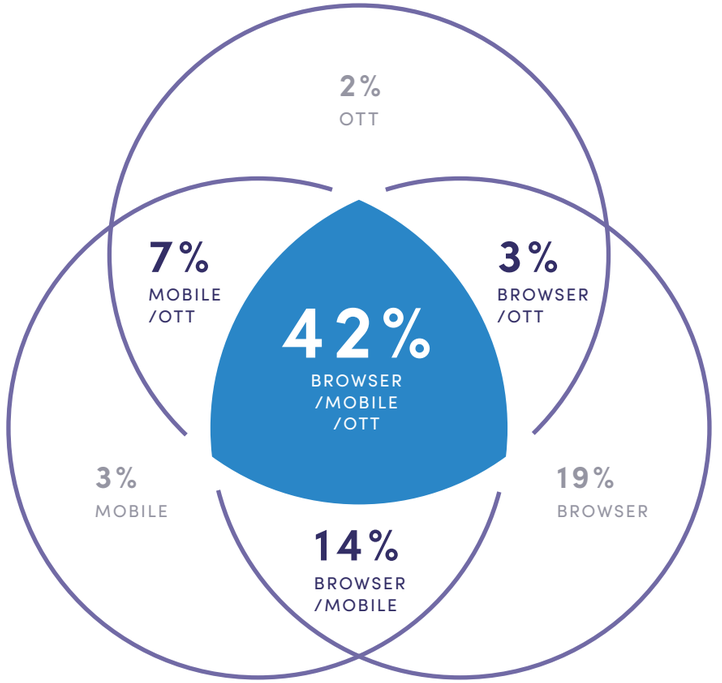
> We think this is mainly because it presents a much faster and easier development option compared to building an in-house solution.

> We also attribute this to device manufacturers (like Apple and Google) making more investments into video streaming capabilities on their devices and building a developer friendly community to promote native development.



Which of the following platforms and devices do you use to stream video or audio content?





This year we expanded the options to include more devices to see where developers are investing their efforts.

The survey results show that many developers are already working on multi-device deployment. While HTML5 and mobile are leading the pack, OTT is catching up pretty quickly.

The venn diagram illustrates that the majority of developers are already prioritizing development across all three platforms: browser, mobile and OTT, scaling their services to where the viewers are.

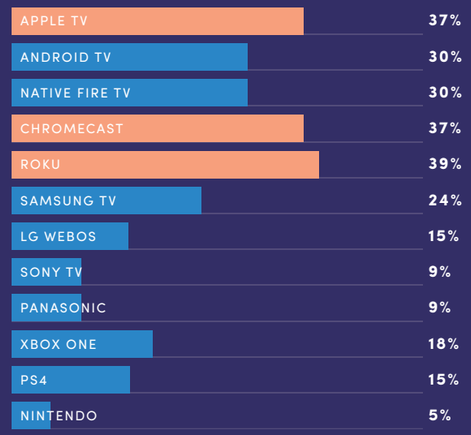
BY REGION

Which of the following platforms and devices do you use to stream video or audio content?

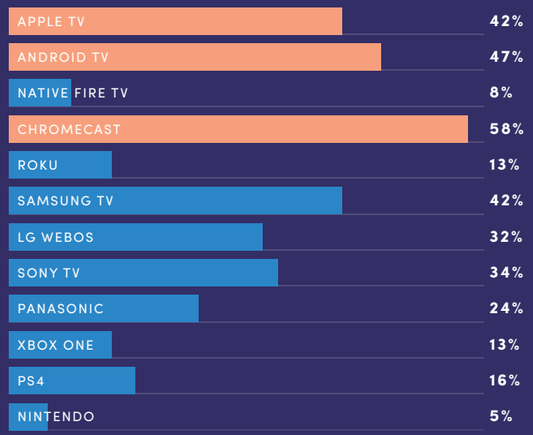
The survey participants have spoken, Android TV, Chromecast and Apple TV are dominating the top spots for OTT regardless of region.

The only outlier is Roku. It was one of the first streaming players and continues to hold the #1 spot in North American market.

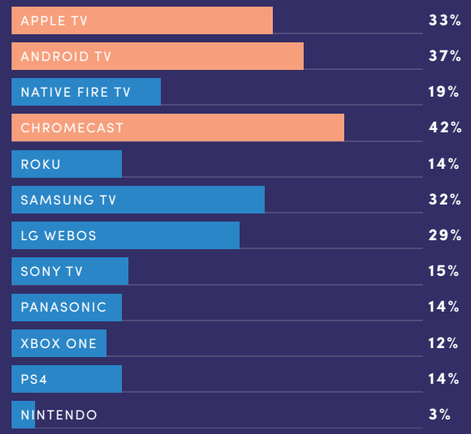
NORAM



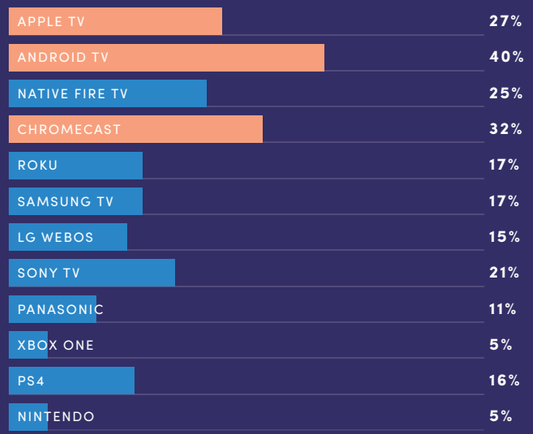
LATAM



EMEA



APAC



Business insights

Companies are looking for ways to maximize their content offerings across multiple platforms. The next section looks at the monetization models the survey participants use. Is low latency streaming becoming relevant?

Video analytics offerings are becoming more common-place in enabling businesses to understand the real ROI of their video content. Is that the case? Let's see what the survey participants said.

Which monetization model do you follow?

Subscription (SVOD) and advertising (AVOD) based business models keep gaining traction according to the survey results.

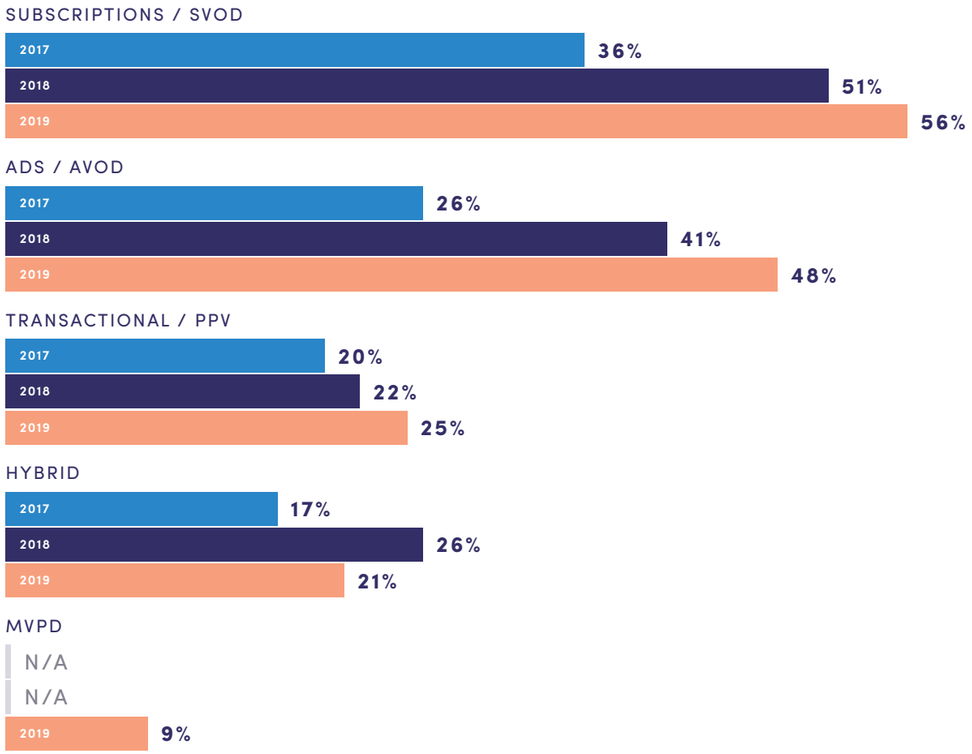
Each of the business models requires different player features and capabilities.

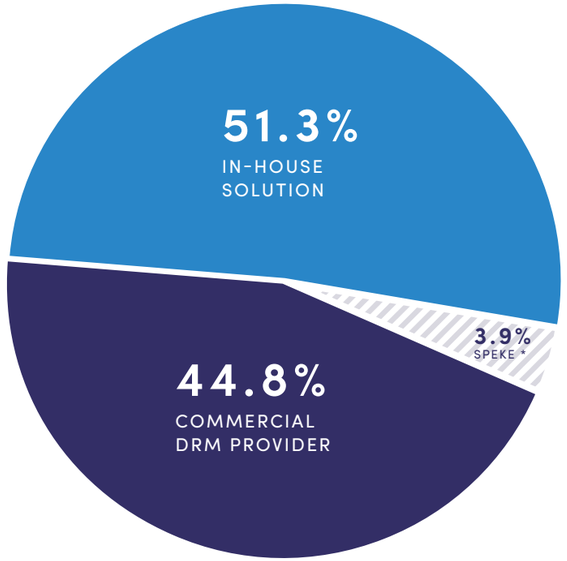
SVOD - Premium content with paid membership requires content protection schemes to save subscriber revenue.

AVOD - In order to keep the content free, ad revenue needs to offset costs and hence the ads should run smoothly.

In practice, there are services which operate multiple business models.

We also introduced MVPD in 2019 which is not insignificant as aggregators generally enforce this model on network streaming channels.





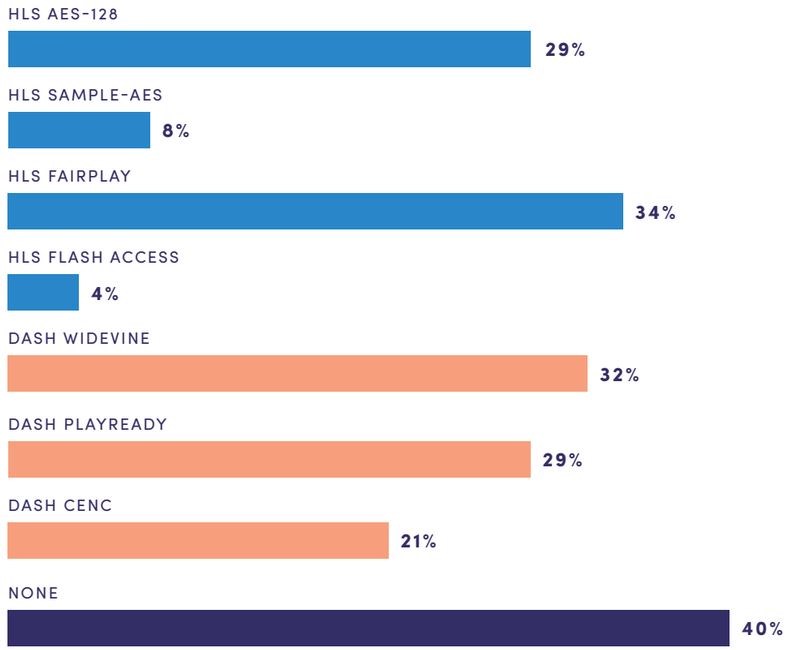
How are you implementing DRM in your workflow?

With SVOD being the leading business model, we wanted to understand how content providers are implementing DRM to protect their premium content.

A slight majority utilize in-house development as native DRM capabilities in browsers and devices have improved and been standardized over the last couple of years.

But, people are also looking for commercial DRM solutions to simplify work flows and reduce time to market.

* SPEKE is a protocol standardization which could be implemented in either in-house or commercial solutions, and therefore should have been omitted as a selection.

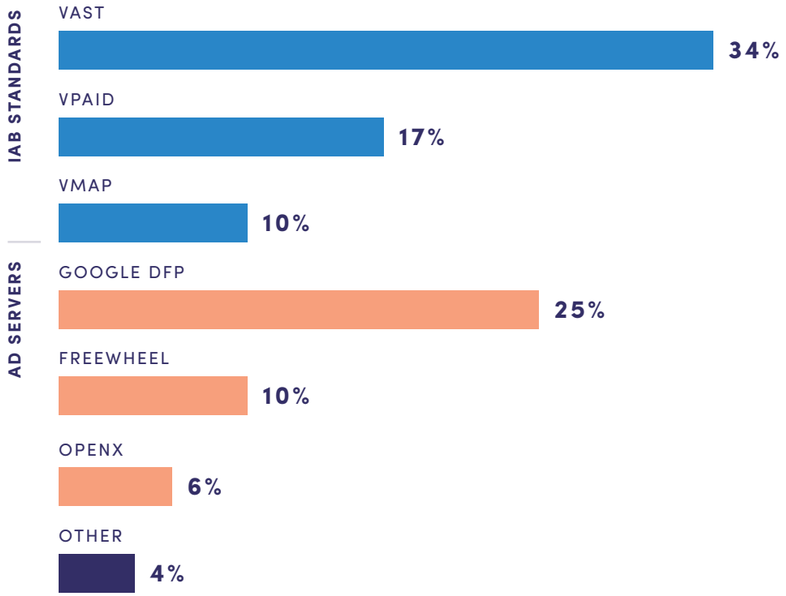


What DRM/content protection systems do you use?

As we saw in the device distribution graph on page 20: Most respondents are using HLS Fair Play because of Apple's device proliferation and majority of market share. DASH Widevine is next, representing a wide range of devices under Google and Roku ecosystems.

Finally, HLS Flash Access is phasing out. We expect Flash Access to not make the list in 2020.

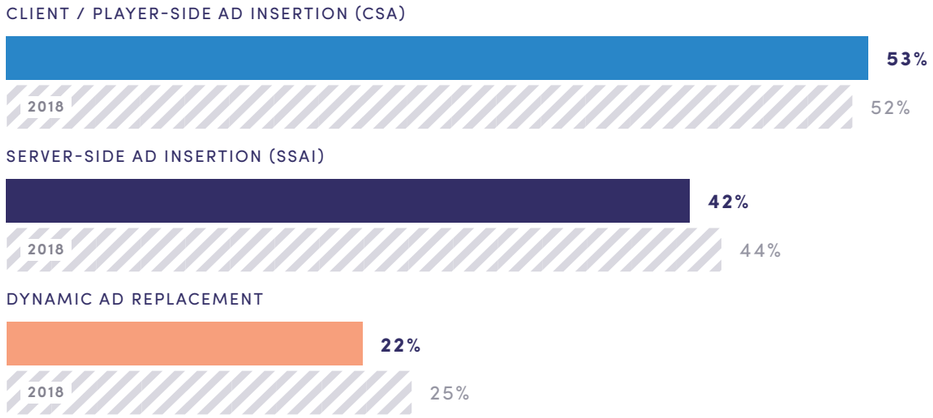
There is still a significant number of video developers not using DRM. Most likely for non-premium and short-form content.



What type of ad standard and technology are you using today?

Nearly half of the video developers surveyed are using standardized advertising technologies in their deployments which is similar to the past two years.

- VAST is the leading IAB standard.
- Google DFP is the leading ad server.



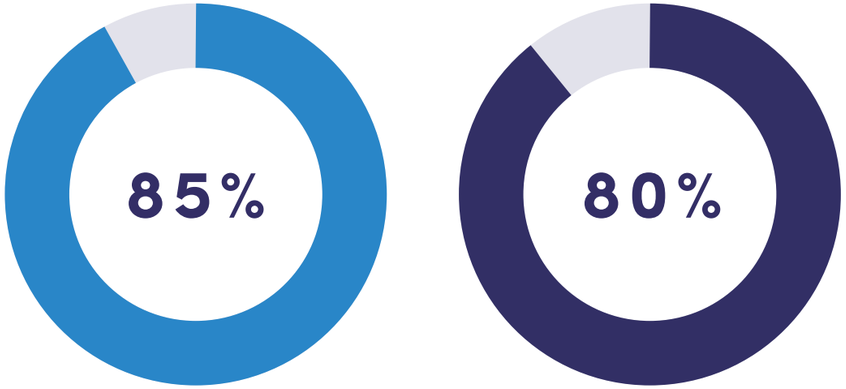
What ad architecture are you using today?

The ad deployment model answers are very consistent year over year.

Both ad architectures have their own challenges associated with implementation. For providers targeting many devices or those streaming predominantly live content, SSAI may be the most direct and effective architecture. Similarly, those targeting few unique devices with VOD assets may find client-side ad insertion meets their requirements.

We believe industry trends will show continued growth adoption of SSAI models, especially as client-side ad blockers become more sophisticated and the device market remains fragmented.

*Dynamic Ad Replacement/Insertion (DAI) is an example of SSAI, and therefore can be counted along with SSAI responses



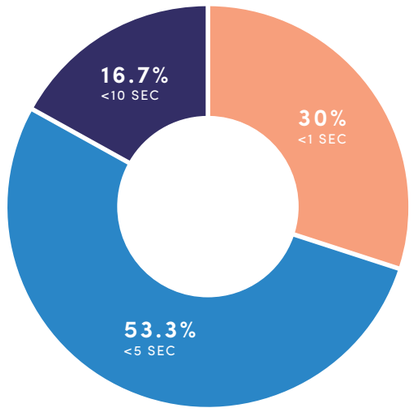
What type of streams do you run?

Live streams and on-demand streams are at par.

Live is mainly driven by sports, news and gaming content.

We are seeing new formats emerge, like interactive content which demands more live-like experiences.

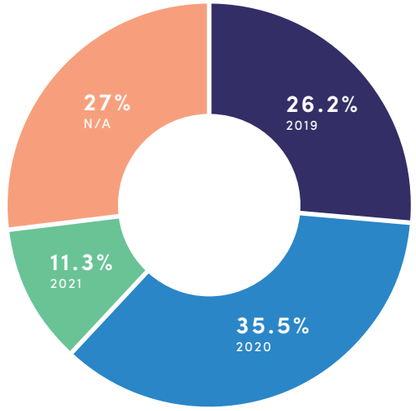
This leads to our next topic: low latency is emerging as a top focus area in 2020 to supplement the growing demand for live and engaging streaming experiences.



What is your latency expectation for live streams?

Over half of the survey participants have a latency expectation of less than 5 seconds.

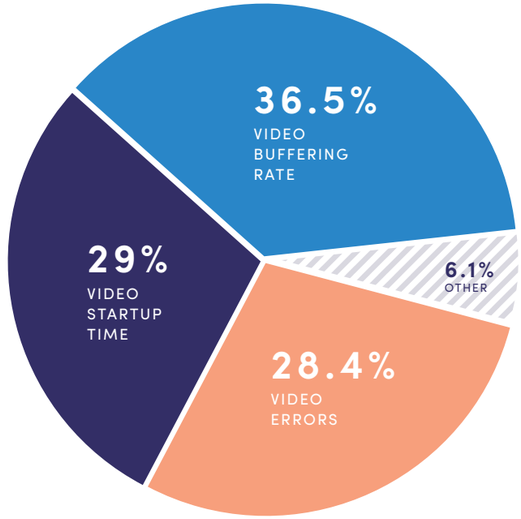
This is a more realistic and achievable goal in the short-term when it comes to scalable events and environments, compared to the "less than 1 second" option that 30% of the participants selected.



When do you expect to start using low latency live video streaming services?

Almost 50% of the survey participants are going to implement low latency in the next 1-2 years.

This trend is dependent on developers adopting CMAF, which is showing positive adoption rates as seen on page 16.



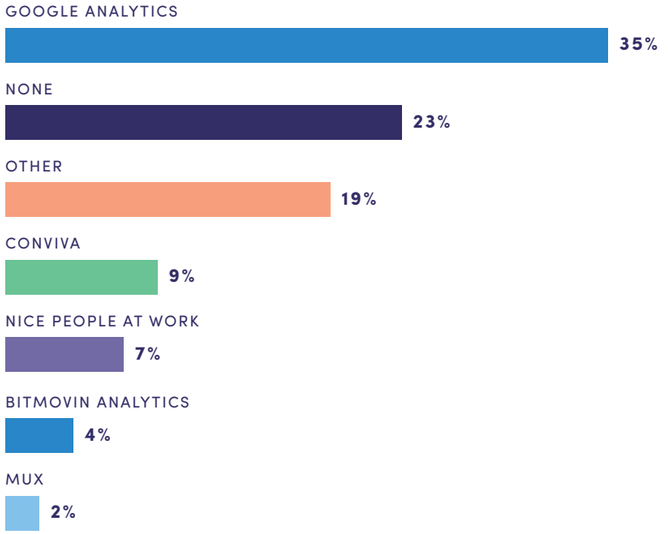
What video performance data do you use the most?

The performance data that developers from our survey are looking at, mirrors the quality and speed issues that they are solving in everyday development.

These performance metrics also lead back to understanding conditions that cause viewers to engage or abandon video viewing ultimately impacting the bottom line.

We are able to validate the survey results with real-world data from our own Bitmovin Analytics product: all three metrics shown here fall into the top five QoS metrics* that developers monitor on a daily basis.

*Bitmovin Analytics: Daily aggregated numbers August 20, 2018–August 14, 2019



What video analytics provider do you use today?

The free Google Analytics tool ranks as a top choice across our survey respondents. It is usually implemented at the website level and developers find it easy to extend collecting a few additional video related metrics.

Surprisingly, a very high number of survey participants responded that they do not use any video analytics products. We believe this can be attributed to three reasons; integrating insightful analytics is complex and can be costly with not many affordable video analytics solutions available. Last but not least, it is hard for decision makers to understand that analytics provide a ROI.

However, participants also disclosed that they use multiple providers and/or have an in-house solution.

Bitmovin is a leading provider of video software and cloud infrastructure for digital media companies and enterprises globally. Bitmovin technology innovations focus on video encoding, playback, and analytics around user experiences. Innovations include the co-authoring of the MPEG-DASH streaming protocol and the first commercial HTML5 MPEG-DASH player, as well as massively parallel cloud-native API-driven encoding, featuring the first commercial AV1 next-generation codec. Another feature is industry-leading transcode speeds, reaching 100 times real-time.

The Bitmovin Player runs on the widest array of compelling consumer devices, ranging from mobile handheld devices to large screen televisions fed by dongle devices or with native smart TV capabilities - providing a rich feature set with consistent UI's and API's. Bitmovin's newest analytics product provides multi-screen audience and QoS data to analyze and optimize every play in real-time.

To find out more about Bitmovin video infrastructure and analytics solutions visit our website at www.bitmovin.com

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