THE 8TH ANNUAL BITMOVIN VIDEO DEVELOPER REPORT

Shaping the future of video

BITMOVIN

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Welcome

Welcome to the 8th edition of Bitmovin's Annual Video Developer Report! I can't believe we have been running this report since 2017. It's been a true honor and privilege to deliver it to the industry every year and provide a snapshot of the current opportunities, challenges, and trends shaping the future of video streaming.

I recently reread our very first Video Developer Report to see how far we, as an industry, have come. When comparing the survey results, I noticed some striking differences. The first was the number of respondents. This year, the number of respondents is lower compared to previous years. We decided to produce the report because we had enough respondents to produce a report representative of the industry. But we need to rethink our approach to gathering insights. Don't worry, we will always produce the Video Developer Report, but next year's may look a little different — stay tuned!

Looking specifically at the results between our 1st and 8th Video Developer Report, in 2017, delivering playback to all devices topped the list, but now it's ad insertion. Delivering playback on all devices remains a big challenge for the industry, which isn't surprising given the enormous number of devices and platforms. However, it is clear the industry's top priority is monetizing content more effectively with ad tech, which can be attributed to the huge spike in AVOD and FAST business models. Back in 2017, SVOD was still the dominant business model, and it was 3 years before Netflix doubled down on never having adverts on its service before eventually launching them in 2022!

Something else I noticed on the encoding side was the continued support for AV1. Even in 2017, there was interest in adopting AV1, but it hasn't translated into widespread adoption. At Bitmovin, we are huge supporters of AV1 because of its compression performance that can achieve the same visual quality using ~50% less data than H.264/AVC and ~30% less data than H.265/HEVC and VP9. However, it's undeniable that there remain barriers to more widespread adoption, chiefly due to the slower-than-expected rollout of playback and decoding support. H.264/AVC remains the dominant codec, but it's clear that there's a trend toward next-generation codecs, which are just slower than anticipated.

However, one of the most striking differences between the reports is the topic of sustainability, which remains a big topic, but commitment to making the industry more sustainable has waned. The media and entertainment technology industry has had to battle challenging macroeconomic conditions, and it's slid down the list of business priorities. This year's report found that 70% of respondents said they are not prioritizing sustainability, with almost 45% saying cost is the main driver of decisions.

In contrast, AI has become a dominant topic. I remember having conversations about AI back in 2017, and companies were leveraging AI, but recent technological advancements have seen it become the hottest topic in tech. I think it's amazing to see AI-driven innovations, especially if they will help fuel growth in the industry. However, I am concerned that we risk seeing companies pumping out solutions and labeling them AI. We don't want a market flooded with gimmicks; we want ground-breaking technology that meets customer needs. This year's report provides a good barometer for where there are market needs for AI, with audio transcription and speech-to-text topping the poll.

This year's report shows an intriguing landscape for the media and entertainment technology industry. There's a real appetite for innovation and monetizing content, which will support the industry's growth. It's been a challenging couple of years, but as ever, I remain hopeful we'll regain momentum.

I'll sign off by saying thank you to everyone who completed the survey and provided invaluable insights that are the foundation of the report - it wouldn't be in its eighth year without you! Also, a huge thank you to every Bitmover who's worked on the past and present reports. A lot of work goes into it and I am always in awe at the result. Last but not least, thank you for reading this report. You are why we produce it each year, and we hope it continues to be a valuable resource for you.

STEFAN LEDERER
CEO, Bitmovin

Advertising fuels innovation, but challenges remain

- Ad insertion has ranked as the top streaming challenge for the past two years, and it's only getting harder. 38% of respondents listed ad insertion as one of the three biggest hurdles they face this year, up from 33% last year.
- Luckily, challenge drives creativity. Participants also see advertising as the biggest opportunity for innovation in the video streaming space.
- One such innovation is server-guided ad insertion (SGAI), a next-generation technology that 21% of respondents are now using.

A mixed approach to AI

- The continued popularity of audio transcription and speech-to-text as AI deployments likely stems from their relative simplicity.
- In contrast, video and image generation, requiring more sophisticated AI techniques, lags behind in adoption.
- This disparity reflects the importance of content creation and artistic originality for media companies.
- Furthermore, the significant interest in video tagging and categorization suggests a focus on leveraging data for enhanced recommendations and targeted advertising.

Commercial solutions are edging out DIY

- Commercial services for encoding, DRM, CDNs, and players are rising in popularity compared to in-house solutions.
- In-house player solutions built on open-source saw a 10% drop, while in-house player solutions not built on open source saw a 6% drop.
- There's a similar decrease in in-house CDN usage, with participants instead opting to use third-party CDN services.

Sustainability takes a backseat to cost pressures

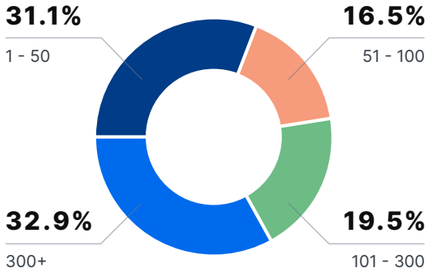
- Enthusiasm for green streaming initiatives remains lukewarm, with 70% of respondents indicating that sustainability isn't a business priority (the same percentage as last year).
- We also see a decline in those committed to green streaming at any expense, down from 6% last year to a mere 3% this year.

Methodology

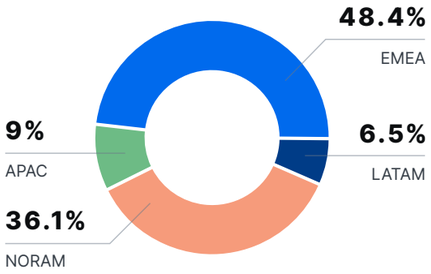
This is our 8th year of running our Bitmovin Video Developer Report. The survey was conducted between September and December 2024. The responses provided strong representation of the global market, coming from a diverse range of 167 video developers and industry experts working at companies located in 34 different countries. Participation by region was led by EMEA with 48% of our participants, followed by North America at 36%, the Asia Pacific region at 9% and Latin America with 7% of total responses.

As a number of the questions are multiple-choice, you will notice that a number of these multiple-choice/answer questions have an aggregate that will not add up to 100%. In these cases, the number indicates the percentage of respondents that chose each option. Like last year, we have used a ranking option for a number of the questions and have adapted some of the questions to align with the recent advancements in technology development. Please keep in mind that the survey was open for everyone to participate, but the results may be somewhat skewed toward the Bitmovin customer base.

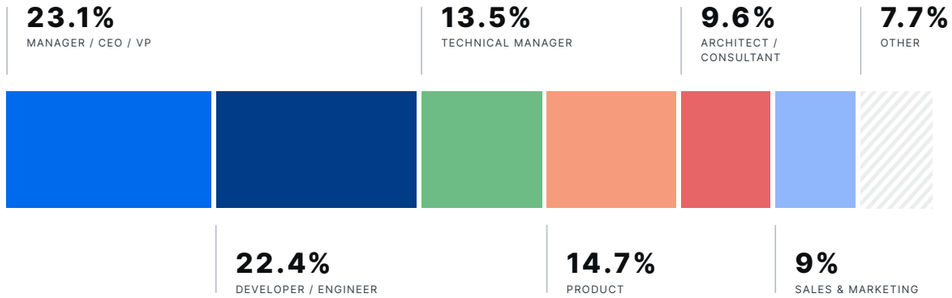
COMPANY SIZE



REGION



JOB TITLE



The State of the Streaming Industry

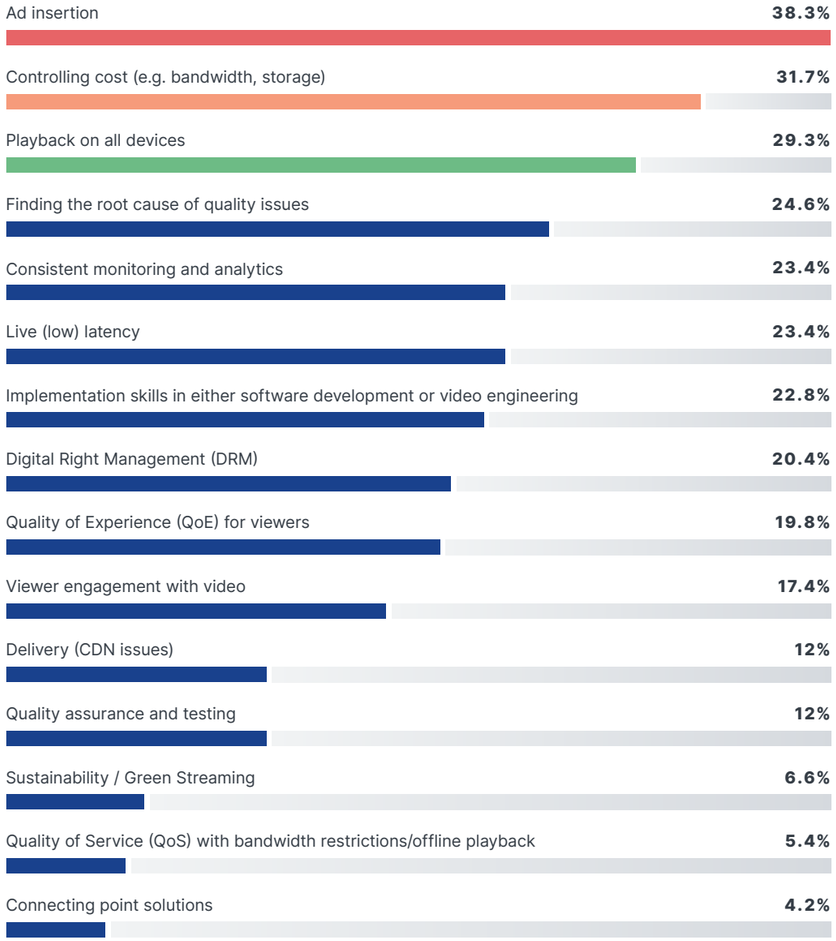
The streaming industry is in constant flux, requiring video teams to balance new standards, changing workflow requirements, and evolving viewer expectations. Meanwhile, the economic realities of the past few years have guided business decisions, influencing everything from OTT revenue models to technology adoption.

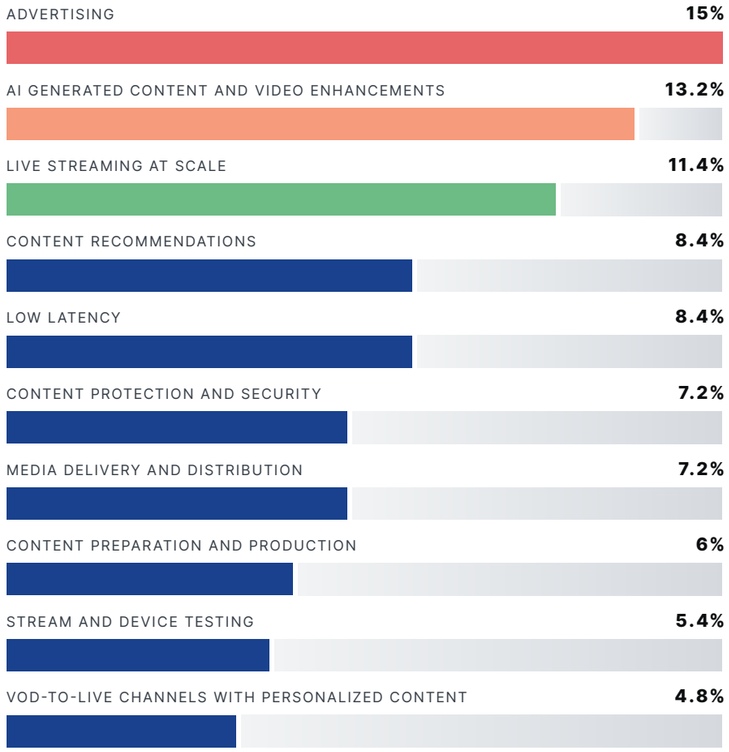
This report offers a snapshot of the industry's current state, highlighting key challenges and trends. Our aim is to keep a pulse on the evolving world of video tech — from encoding and player technologies to analytics and monetization strategies.

What are the top three biggest challenges you are experiencing with video technology today?

Ad insertion skyrocketed to the top of this list last year, and the percentage of video professionals struggling to address it is rapidly growing. This makes sense: Ad-supported streaming has become standard across all major platforms, and yet these workflows remain complex and highly variable — spanning CSAI, SSAI, and SSAI.

The second biggest concern is controlling costs, reflecting a major focus on profit margins as the industry has switched from a growth-at-all-costs mindset to prioritizing sustainable profitability.





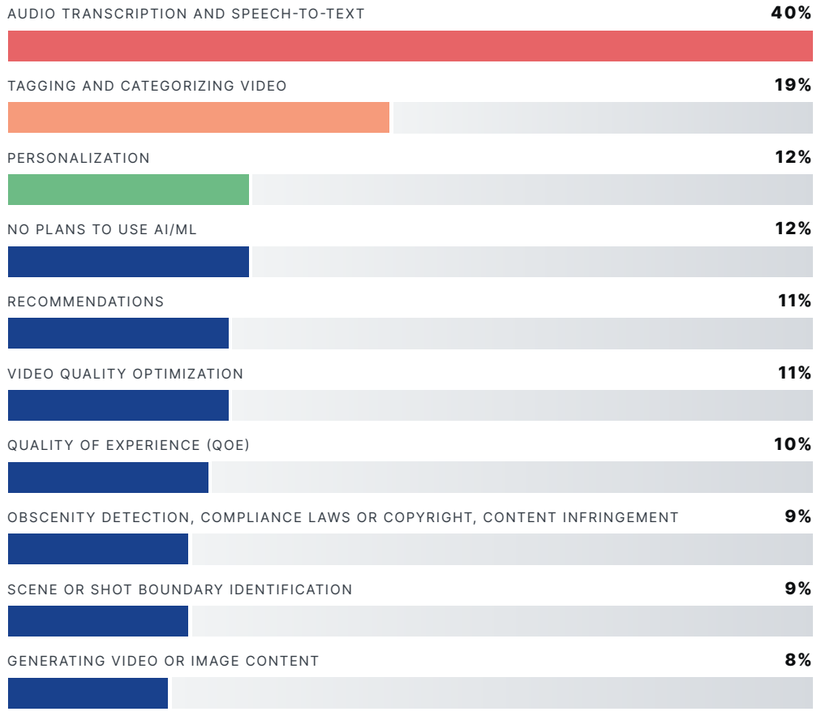
Where do you see the most opportunity for innovation in your service?

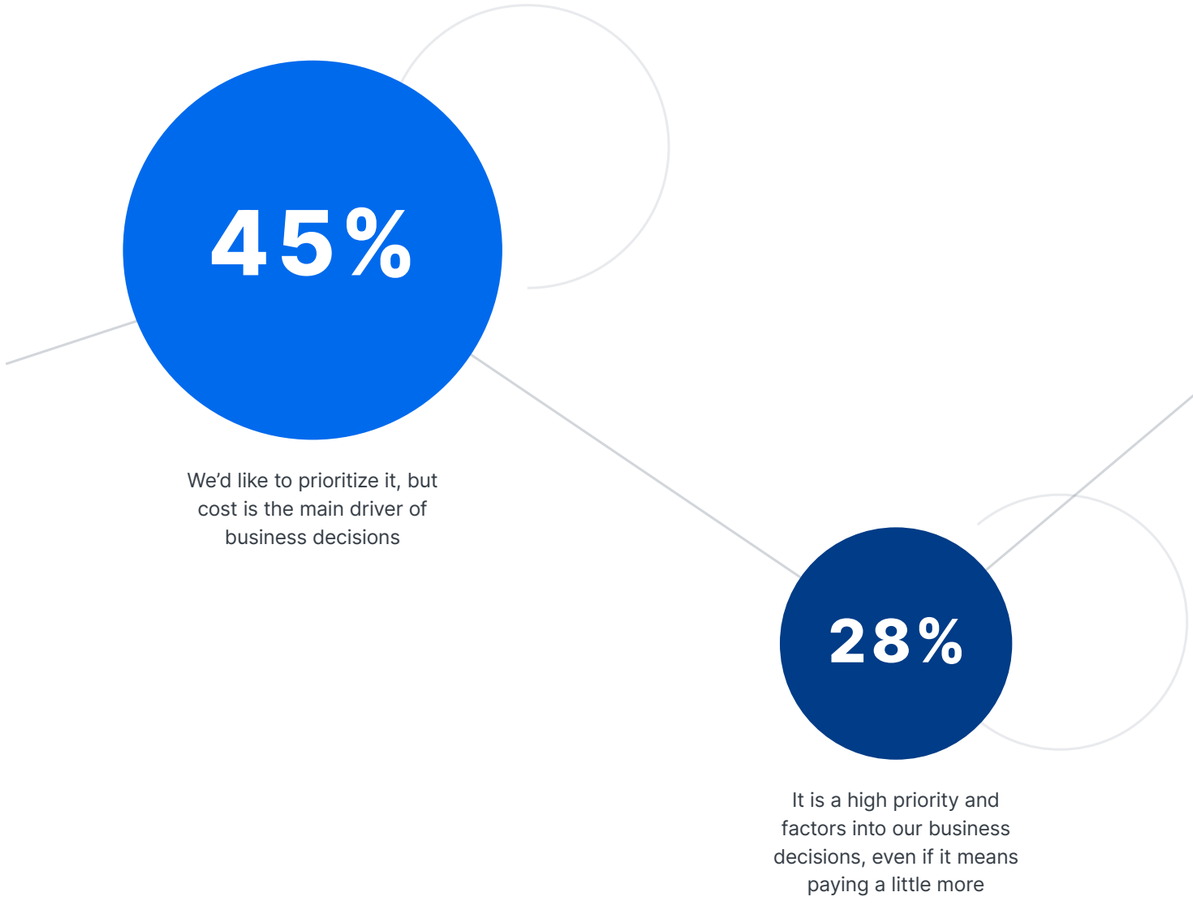
Advertising and AI-generated video enhancements continue to top the list of areas with innovation potential. This highlights an industry-wide focus on finding new ways to monetize content while also improving the viewing experience. Technologies like AI contextual advertising could help answer this need by driving both revenue and enhanced user satisfaction through more relevant ad placements.

Live streaming at scale moved up from the fifth to the third spot on this list this year, potentially due to the fact that live sports content is moving from linear broadcast to streaming delivery. Once more, these workflows tend to generate revenue with advertising, so there's synergy between these top areas where respondents see opportunity for innovation.

For which of the following video use cases do you expect to use machine learning (ML) or artificial intelligence (AI) to improve the video experience for your viewers?

Interest in using AI for audio transcription and speech-to-text trumps all other use cases by a 2X margin, which reflects the maturity of AI transcription capabilities. Video tagging and personalization follow behind, showing that the top three applications for AI/ML are all related to end-user accessibility and discovery, a theme that remains consistent year over year.





Which option most closely matches your company's current approach and prioritization of Sustainability and Green Streaming initiatives?

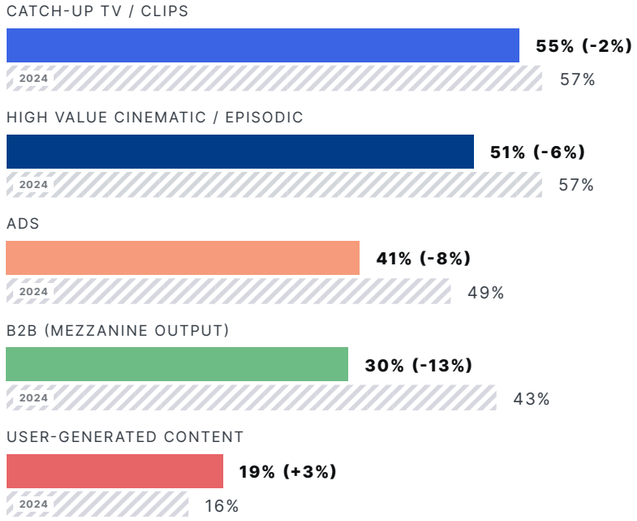
Sustainability remains a nice-to-have rather than a must-have for most video professionals. We asked this question for the first time last year, and continue to see a clear prioritization of cost considerations over green streaming initiatives.

This doesn't mean sustainability is out of reach. Solutions that deliver cost-efficiency and environmental responsibility could solve the riddle. At Bitmovin, we're working to address this need through initiatives like our GAIA project, which aims to develop an intelligent climate-friendly video platform.

Video Encoding

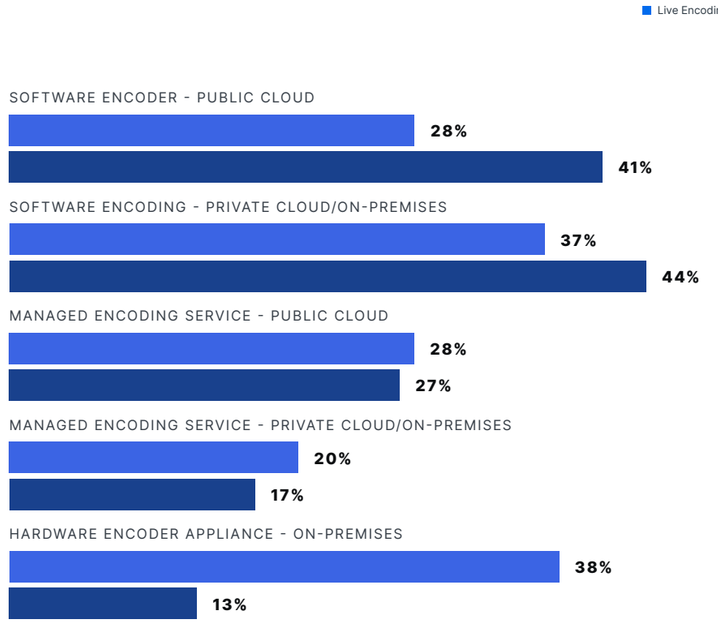
Encoding is what makes streaming possible, transforming raw video content into a digital format suitable for online delivery. This section explores trends surrounding infrastructure deployment, video codec usage, and streaming protocol trends. We also examine the factors driving encoding decisions, such as cost-efficiency, scalability, and the need to support diverse devices and platforms.

Don’t forget, you can join the conversation on social media using this hashtag #VideoDeveloperReport



Which of the following VOD encoding workflows exist in your organization?

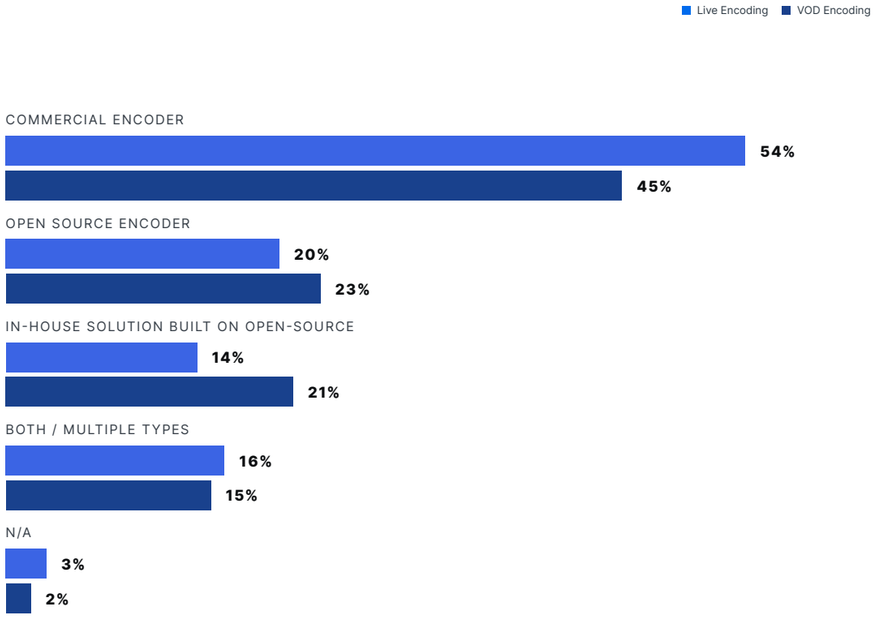
This is the first year that the number of respondents encoding catch-up TV and clips outnumbered those encoding high-value cinematic and episodic content. Given that user-generated content has also moved up the list, this reveals a growth in short-form content workflows. This is consistent with data about the type of content being viewed in participants' players on page 41, where short-form content playback has increased 14% year-over-year.



Where do you encode video?

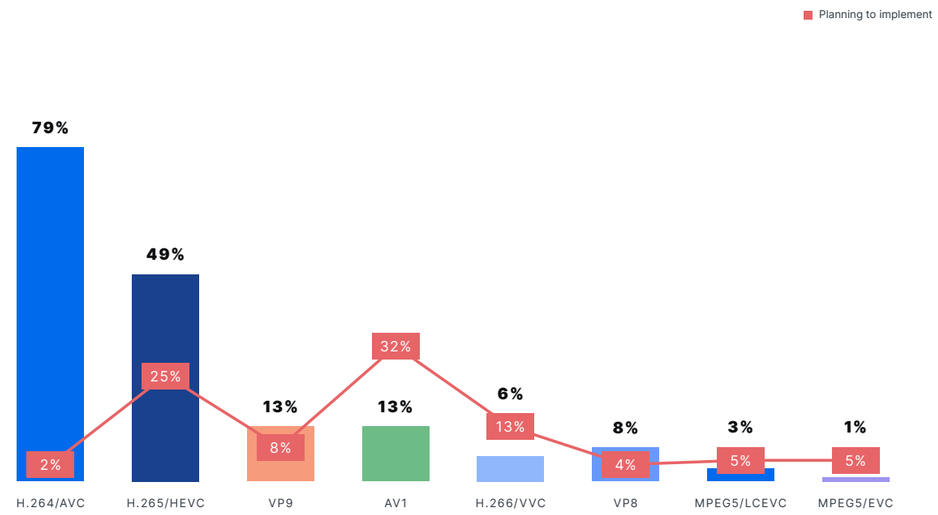
Like last year, hardware appliances deployed on-premises remain the standard for live streaming; whereas software encoding in private environments has held strong for VOD workflows.

We do see an increase in software encoders in public clouds for both live and VOD — potentially due to the cost savings that cloud encoding can deliver.



Do you use a commercial encoder or an open source based encoder?

Across live and VOD, commercial encoding solutions are stealing market share. This is the highest interest we've seen yet, likely because commercial solutions grow in flexibility and sophistication each year.



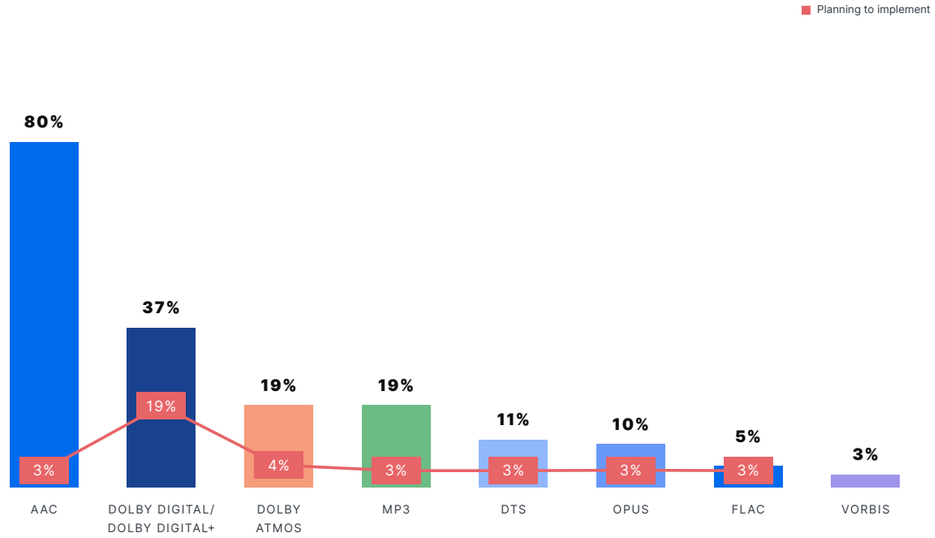
Which video codecs are you using in production and which codecs are you planning to implement within the next 12 months?

H.264/AVC still dominates, but there's a clear trend in the direction of next-generation codecs. There has been perpetual optimism about AV1 adoption in the near future, but implementation continues to lag.

Either way, this graph makes it clear that multi-codec encoding is the only way to achieve the efficiencies of next-generation technologies while still ensuring playback on legacy devices.

“I find Bitmovin’s codec survey data an indispensable gauge of sentiment for different codecs. If you equate planned adoption with sentiment, sentiment for AV1 remains strong but stagnant, as interest isn’t translating to adoption. VVC shows stable but cautious optimism, while LCEVC continues to fill niche needs with slow but steady interest. Overall, the ecosystem appears to be moving more cautiously toward newer codecs than past projections suggested.”

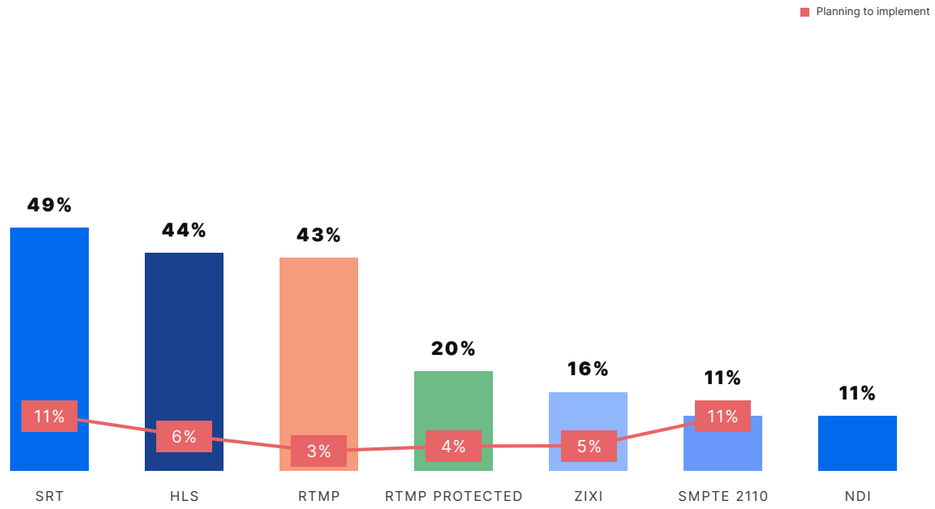
Jan Ozer
Streaming Consultant @ Streaming Learning Center



Which audio codecs are you using in production and which are you planning to implement within the next 12 months?

This graph looks similar to last year’s with one surprising exception. While a high percentage of people expressed interest in adding Dolby Atmos in prior Video Developer Reports, that hasn’t come to fruition and interest is now declining. This corresponds with the fact that immersive audio fell off the list of opportunities for innovation entirely, with only a single respondent selecting that option (on page 15).

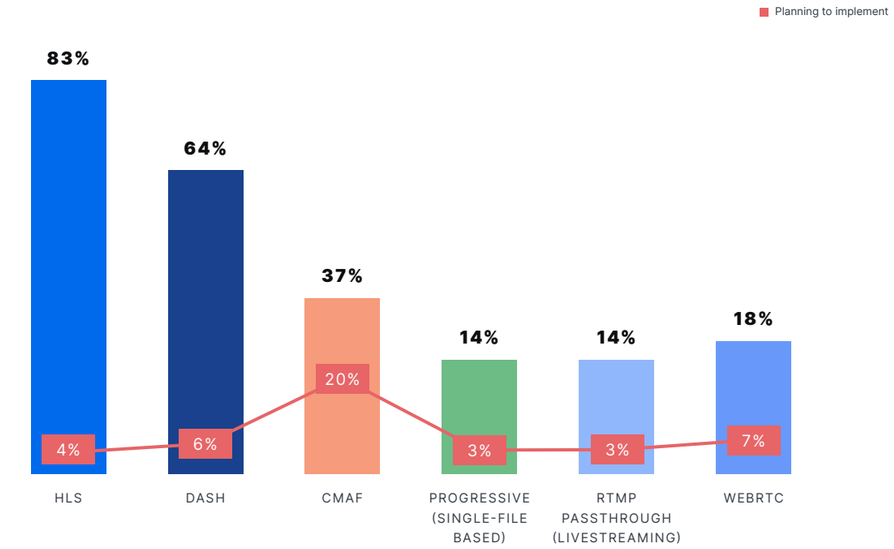
Meanwhile, AAC and Dolby Digital / Dolby Digital+ continue to hold strong positions.



Which stream formats do you use for Live contribution feeds and which are you planning to use within the next 12 months?

It's noteworthy that SRT leads the pack in live contribution feeds for the first time ever! This signals that new technologies are finally replacing the RTMPs of the world. Based on respondents plans to implement within the next 12 months, this growth will only continue.

That said, we differentiate between RTMP and RTMP protected in our reports so it's not quite the takeover this graph might suggest.

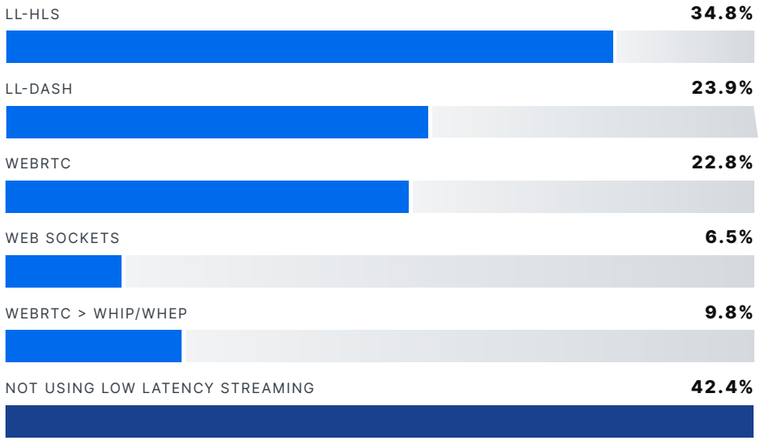


Which streaming formats are you using in production for distribution and which ones are you planning to introduce within the next 12 months?

HLS still has its stronghold, but future plans to use it are at an all-time low. The way forward? CMAF, according to this year's respondents.

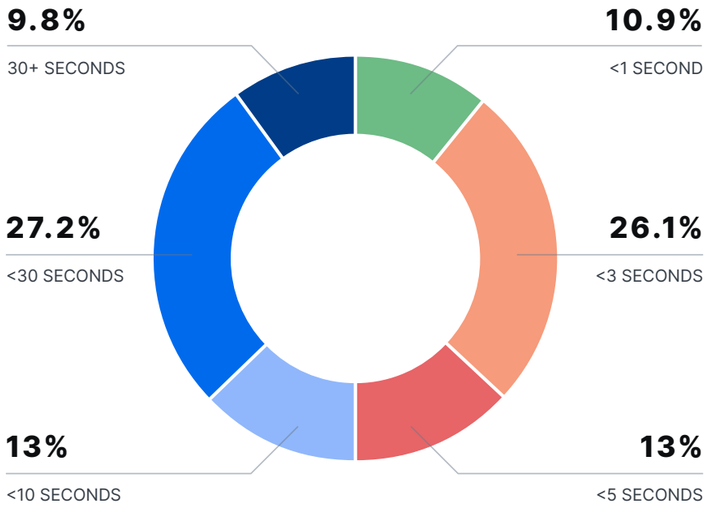
Because CMAF acts as a container for both HLS and DASH streams, it can alleviate some of the costs associated with encoding and storing multiple copies of the same content.

RTMP passthrough continues its decline, which is to be expected given the availability of modern alternatives like WebRTC.



Which technology do you use for low latency streaming?

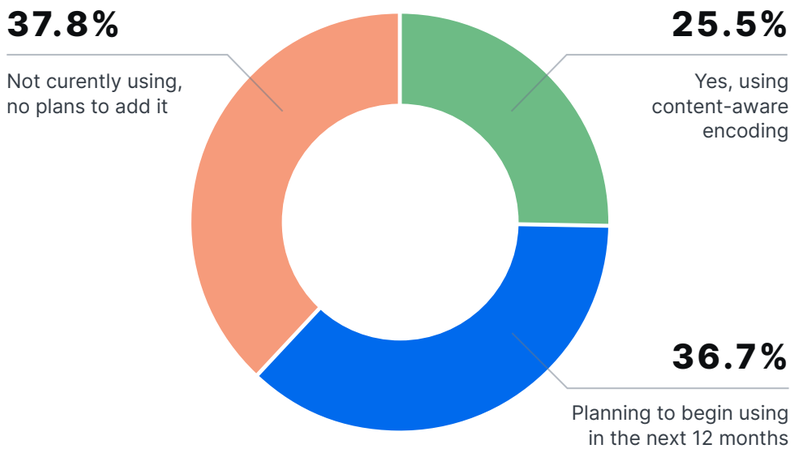
The most notable changes here are the decline in Low-Latency HLS (from 41% last year to 35% this year) and Low-Latency DASH (from 29% last year to 23% this year); as well as the increase in WebRTC use (from 18% to 23%).



What is your current end-to-end latency?

Consistent with last year (and showing hardly any variance in percentages), the majority of participants fall in one of two categories: the 1-3 second range and the 10-30 second range.

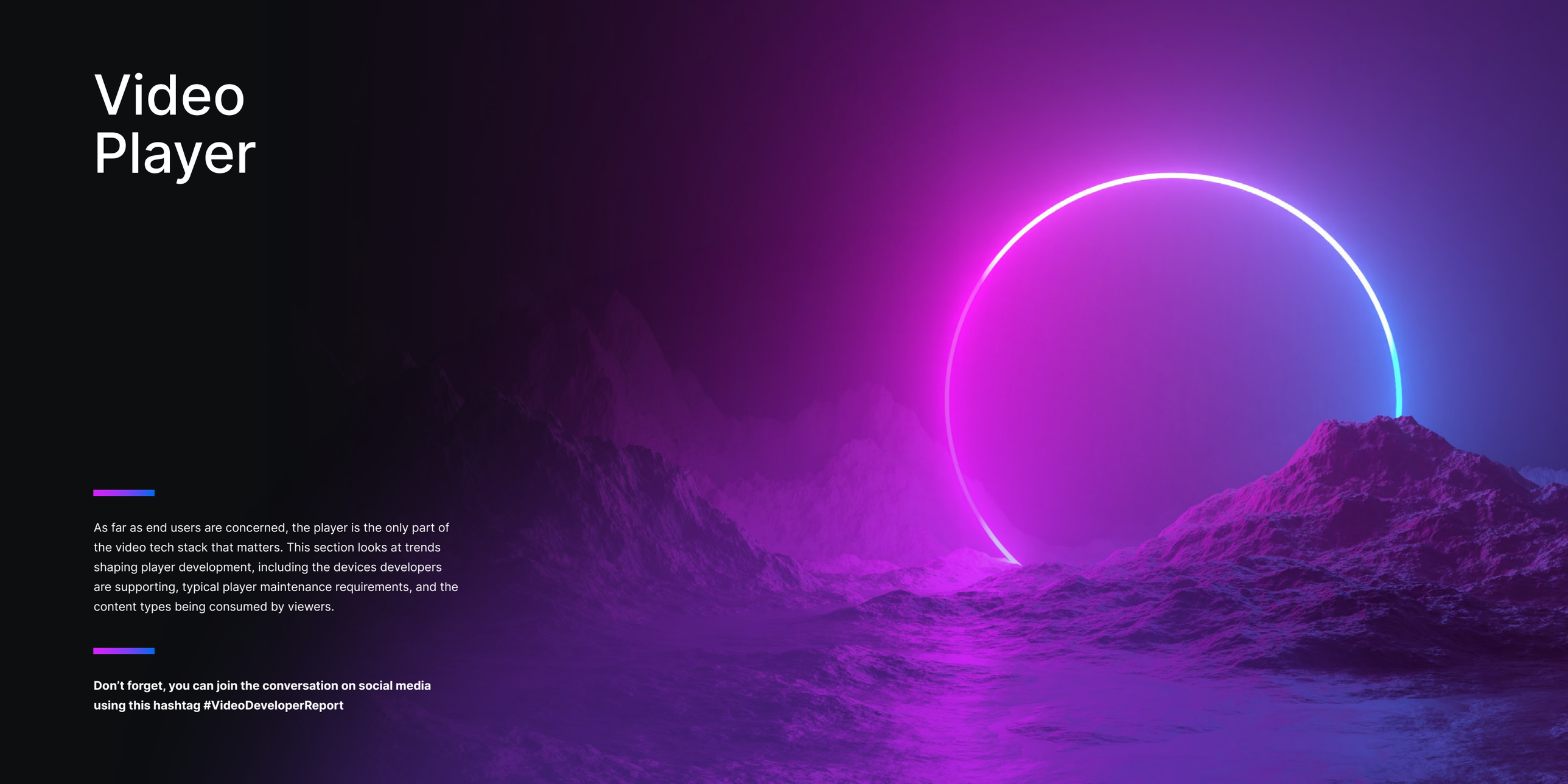
There's also an equal split between those achieving sub-5-second latencies and those experiencing more than 5 seconds. Given that today's video workflows span a wide range of content types and viewer expectation, this diversity makes sense. After all, low latency should only be a priority for video streaming services when the use case demands it.



Are you using or planning to use content-aware encoding technology (i.e., Per-Title)?

The majority of video professionals aren't using content-aware encoding but adoption plans continue to grow. Even so, we've seen similar numbers for the past couple of years, indicating that respondents aren't following through on their plans to implement it. We attribute this to economic pressures, despite the fact that content-aware encoding would deliver cost efficiencies in the long run.

Video Player



As far as end users are concerned, the player is the only part of the video tech stack that matters. This section looks at trends shaping player development, including the devices developers are supporting, typical player maintenance requirements, and the content types being consumed by viewers.

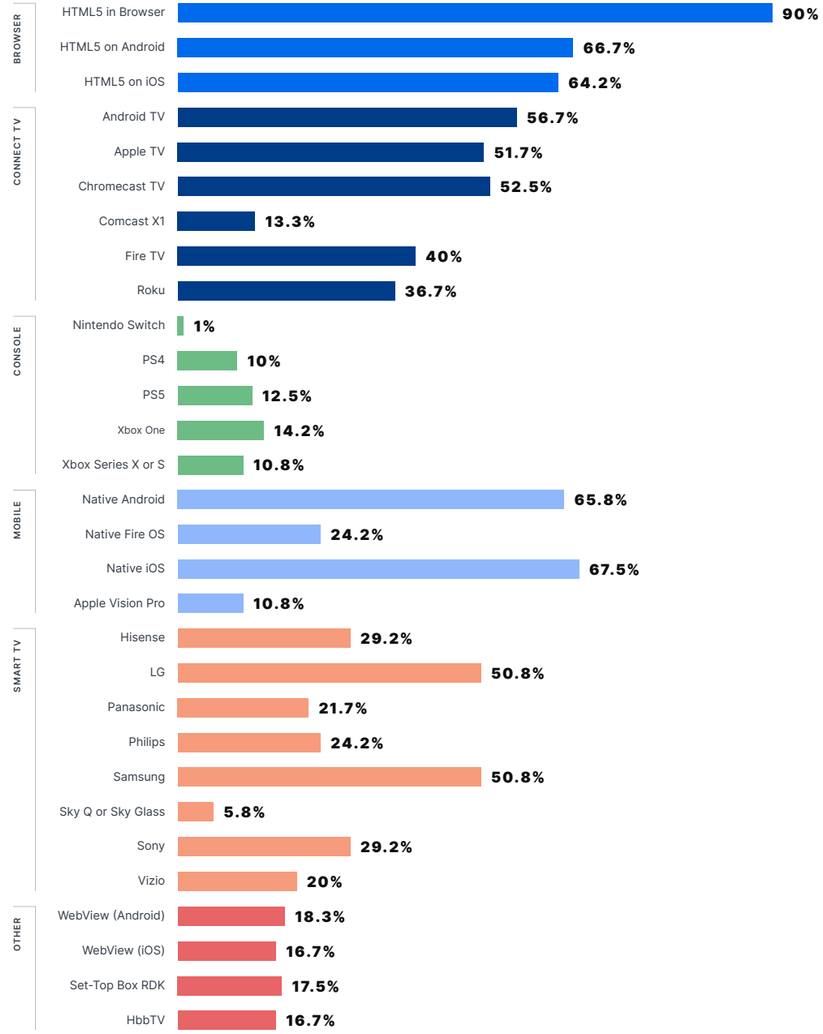
Don’t forget, you can join the conversation on social media using this hashtag #VideoDeveloperReport

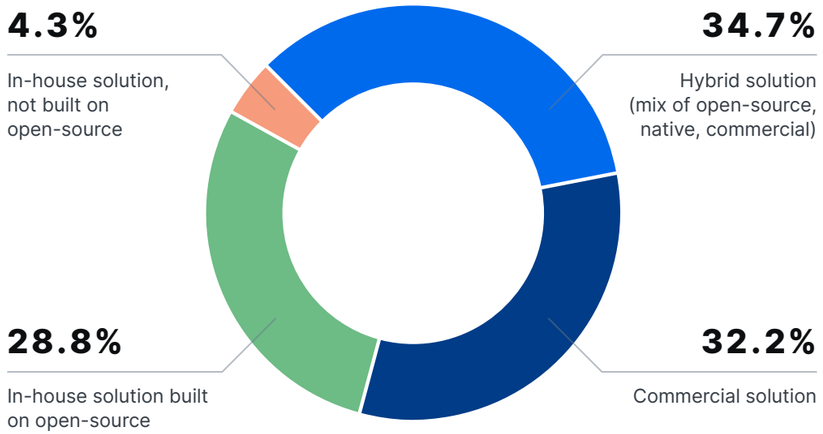
Which of the following platforms and devices do you support to stream video or audio content?

Device fragmentation is a long-running story. Complexity is also growing, with us adding Apple Vision Pro to this list for the first time this year. Interestingly, 10% of respondents are already supporting it.

Also notable, gaming consoles (PS4, PS5, Xbox One, Xbox series X or S, and Nintendo Switch) show declining support across the board. While this makes sense for older consoles that developers are choosing to no longer support, we're not sure why this would be the case for new devices.

The use of native players on iOS and Android is now even with HTML5 support on those platforms, which is consistent with last year's results. Samsung and LG also continue to lead the pack for Smart TVs.

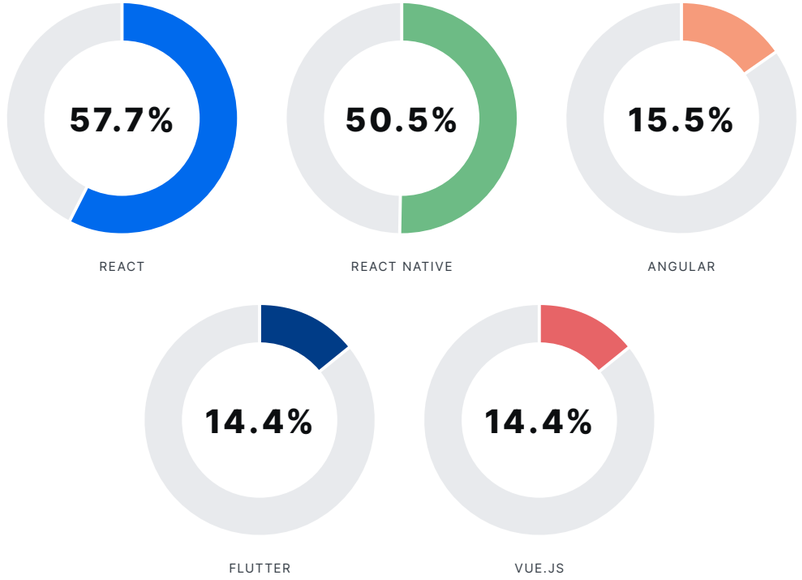




Which type of player codebase are you using?

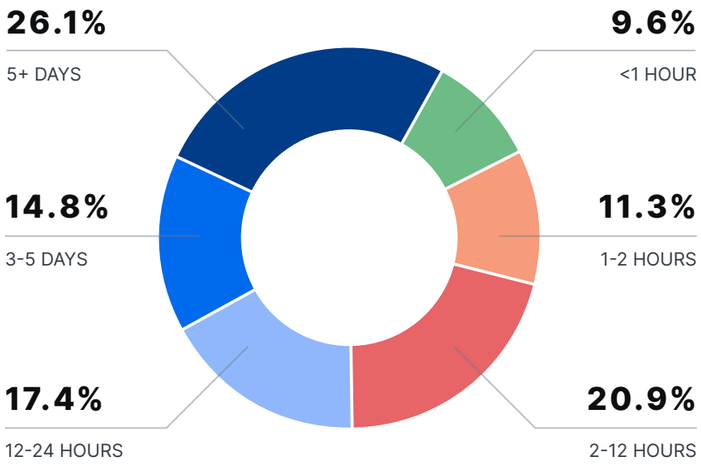
We've seen a steady decrease in purely DIY player development — with the number of participants building in-house solutions not built on open-source dropping from 20% in 2023 to 10% in 2024 and now sitting at just 4%.

In-house solutions built on open source have also seen a drop, with more people opting to take a hybrid approach. It's worth noting that this year's results show an almost perfect three-way split between in-house, hybrid, and commercial player solutions.



Which development frameworks do you use?

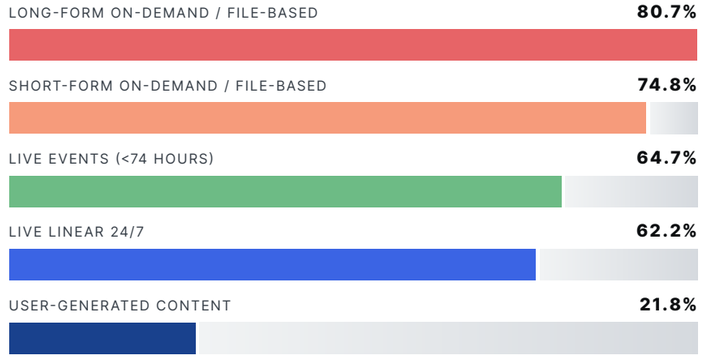
Since introducing this question three years ago, React and React Native have held the top two spots. Preference for React Native has grown 10% year-over-year, with all other frameworks shrinking.



How much time per month does your development team spend on maintaining your video player solution?

Our research has found that open-source players require approximately two times the annual maintenance time of commercial players. It therefore makes sense to see such a disparity in time investment given that respondents were spread fairly evenly across custom in-house player solutions, open-source, and commercial.

The 26% of respondents spending 5+ days per month likely represents those building in-house, whereas those survey participants spending 24 hours or less on maintenance are probably doing so with an off-the-shelf solution.



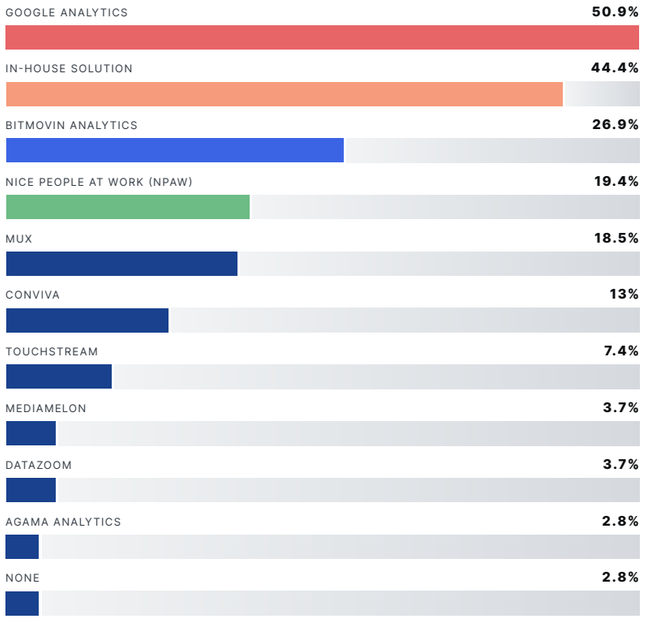
What type of content is viewed in your player?

More participants are distributing short-form and user-generated content. Preparing these types of assets requires a different approach, which we detail in our guide on Short-Form Video Content: Workflow Considerations for Ads, Video Clips, and UGC

Video Analytics

The role of streaming analytics is evolving as the industry prioritizes monetizing content with advertising. Developers are primarily using these tools to ensure stable, reliable playback — and yet 40% of those surveyed indicate that it takes 12 or more hours to pinpoint streaming issues. This is only a 1% improvement from our 2022/2023 report, which is not promising.

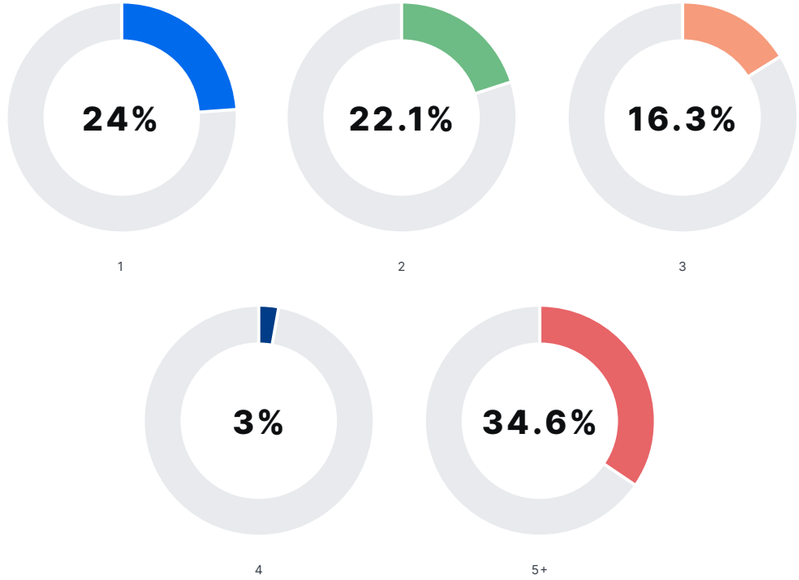
Don’t forget, you can join the conversation on social media using this hashtag #VideoDeveloperReport



What video analytics provider/ solution do you use today?

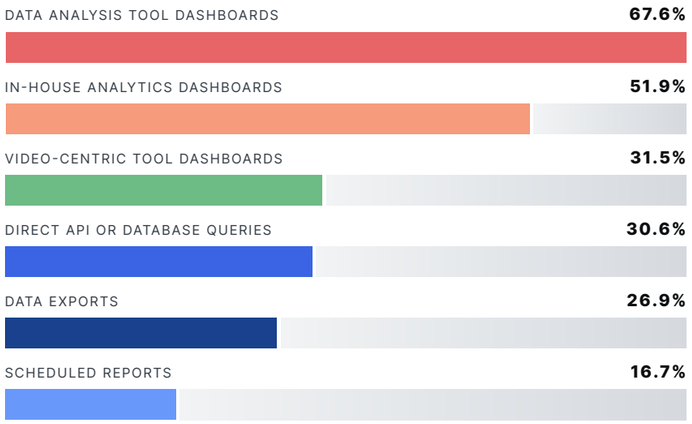
Google Analytics grows in popularity each year, which can be attributed to the fact that most participants are using multiple analytics solutions in tandem and Google Analytics is free to all website owners.

This is the first time Conviva no longer holds a spot in the three top commercial offerings — with Bitmovin, NPAW, and Mux leading the way. Additionally, video analytics is the only category where in-house solutions are still in favor.



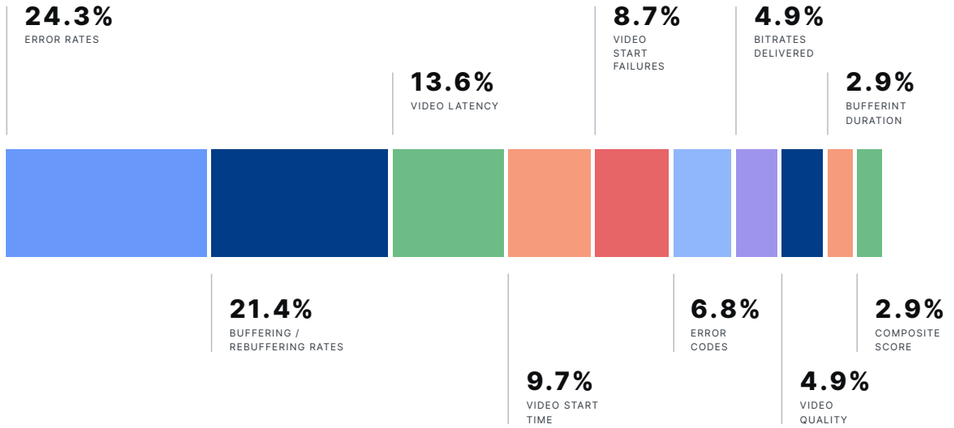
How many sources do you collect video streaming related data from?

While the reliance on 5+ sources remains high, there's an increase in developers using a single source compared to the previous two years. This shift could indicate the emergence of more comprehensive solutions, consolidation of data sources, or more narrowed-down KPIs.



How do you access your video analytics data?

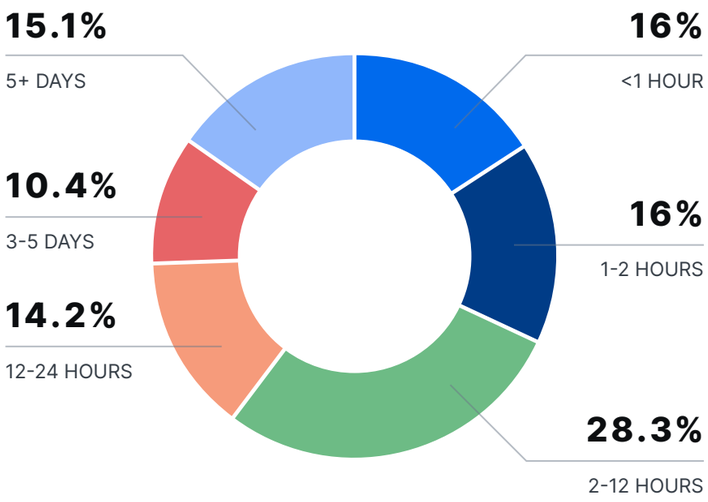
Dashboards still reign supreme, likely driven by the need for video analytics information to be easily accessible for users at every technical level. While the majority of respondents go with general data analysis tools like Tableau and Looker Studio to access analytics data, we see an uptick in survey participants using in-house analytics dashboards and video-centric dashboards like Bitmovin Analytics.



What video performance metric is most important to you?

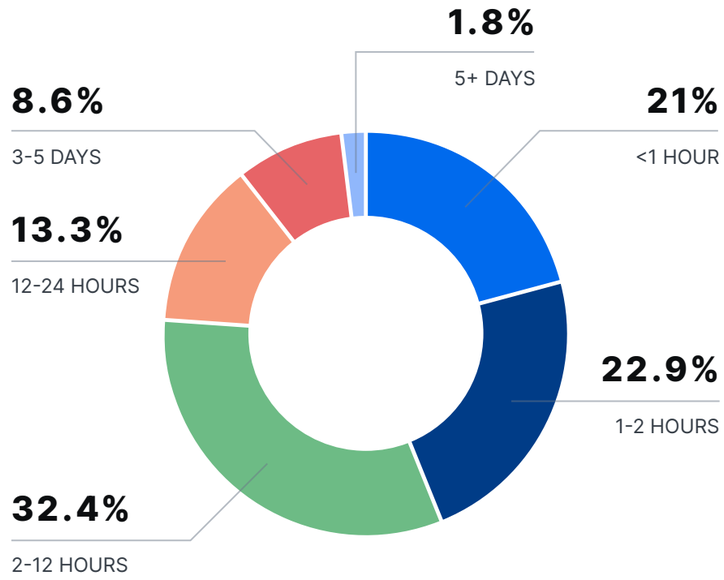
Error rates and rebuffering and latency, oh my! Latency jumped up from the seventh to third biggest priority this year, which we can only assume is due to the growth in live sports, esports, and similar workflows where time is of the essence.

We also see a broad shift in valuing reliability over quality. Bitrates delivered and video quality (VMAF, PSNR) have moved to the bottom of this list, while metrics related to stable, error-free playback now demand the most attention.



How much time per month does your development team spend on maintaining your video streaming analytics solution?

The 2024/2025 data shows some improvements in maintenance requirements for streaming analytics solutions, with fewer respondents spending upwards of five days. This could indicate more efficient analytics solutions, likely driven by improvements in automation, integration, and usability.



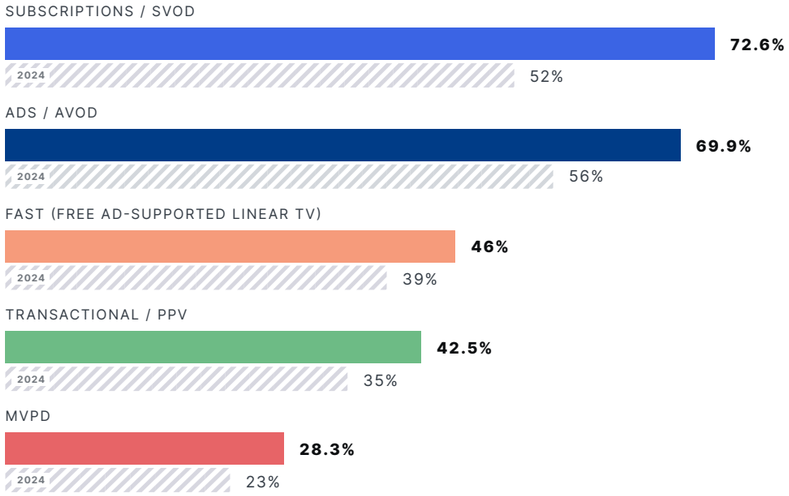
On average, how long does it take your team to find the root cause of streaming-related issues?

The majority of video developers require 12-24 hours to pinpoint streaming issues. This highlights the challenge of identifying streaming problems before viewers are impacted.
No matter whether you're using a third-party vendor or in-house solution for your analytics, you'll want to ensure that your team can quickly find the root cause of streaming-related issues.

Monetization, Content Protection and Distribution

A successful stream is a revenue stream. And we've seen a major shakeup in monetization models over the past few years. Ad-supported business models now abound, with every major streaming service prioritizing profit over growth. But because the industry's departure from pure SVOD workflows is somewhat recent, many video platforms are experiencing growing pains as they implement advertising. Content protection is also becoming a bigger priority, with the majority of respondents implementing digital rights management (DRM).

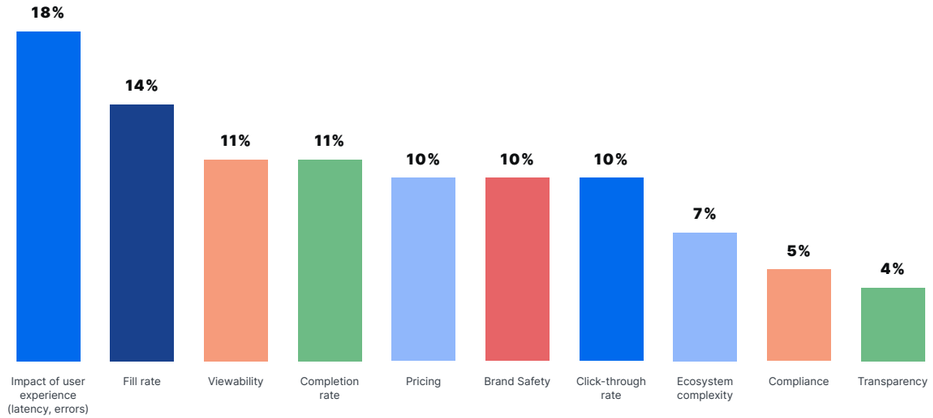
Don't forget, you can join the conversation on social media using this hashtag #VideoDeveloperReport



What monetization model(s) do you follow?

While SVOD still leads the pack, we see a major jump in survey participants using ads/AVOD — from 56% last year to 70% this year. FAST also continues its uptick with a 7% gain year-over-year.

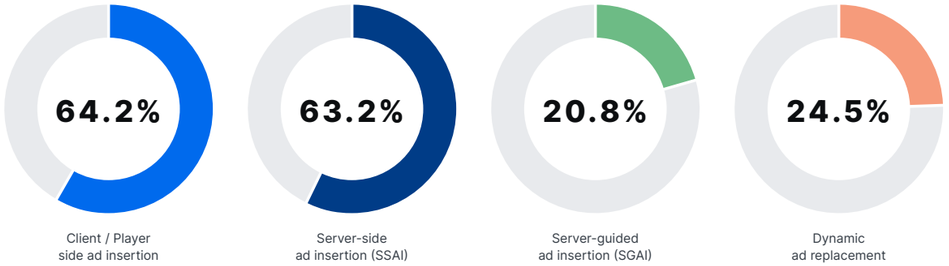
Why this growth in ad-based revenue models? It's simple: viewers prefer the economics of it. Subscription fatigue is real, and even Netflix is going all-in on advertising after seeing early success.



When running ads, what aspects are you most concerned about?

Speaking of ads, they often introduce additional complexity to streaming workflows. Compared to the last few years, fill rate and viewability have shot up to the top of this list.

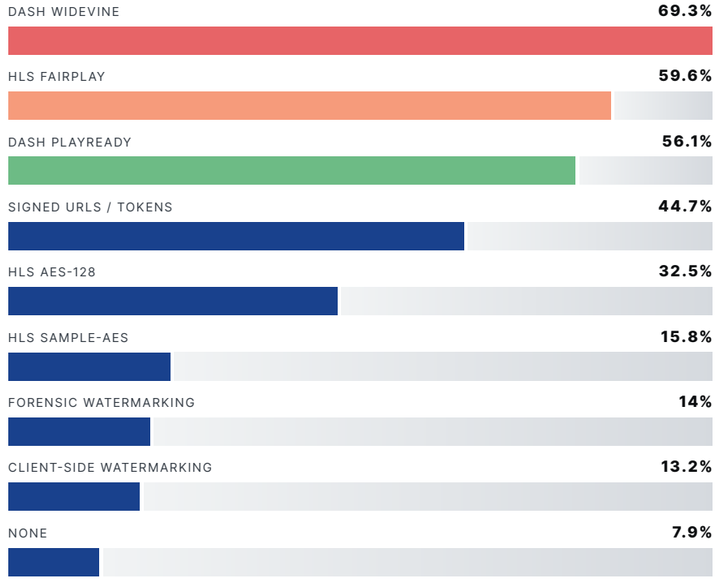
There's a good reason for this. Both fill rates and viewability have a direct impact on publishers' ability to monetize content. This is why it's critical to use analytics tools that provide real-time insight into performance metrics.



What ad architecture are you using today?

Client-side ad insertion (CSAI) and server-side ad insertion (SSAI) have long been the two primary methods for inserting ads into video content. This is the first year that we've added server-guided ad insertion (SGAI) as an option on this question, so it's surprising to see a whopping 21% of respondents already using it.

SGAI is an emerging technology that combines the best aspects of CSAI and SSAI. We anticipate significant growth in adoption over the coming years as more streaming vendors add support and its benefits become widely recognized.

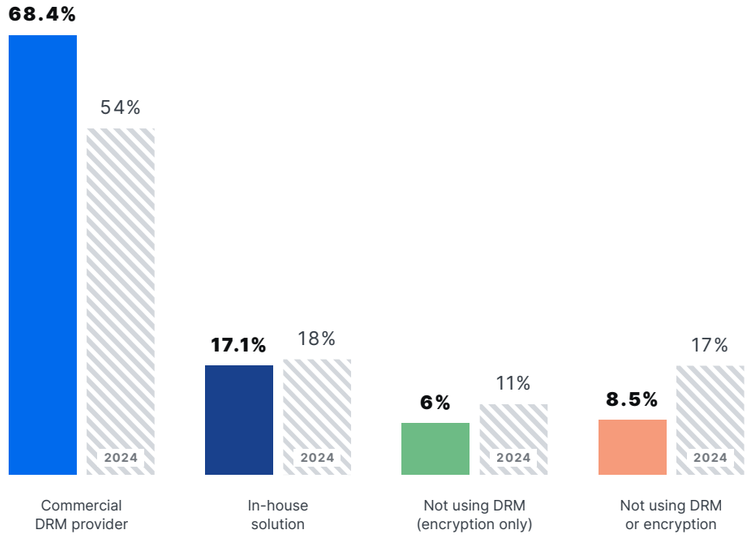


What type of content protection do you use?

Content protection is getting more sophisticated. More respondents are using DRM solutions (DASH Widevine, HLS Fairplay, DAH PlayReady, and HLS AES-128) than ever before. And even more reassuring, only 8% report using no content protection at all — which was at 20% just two years ago.

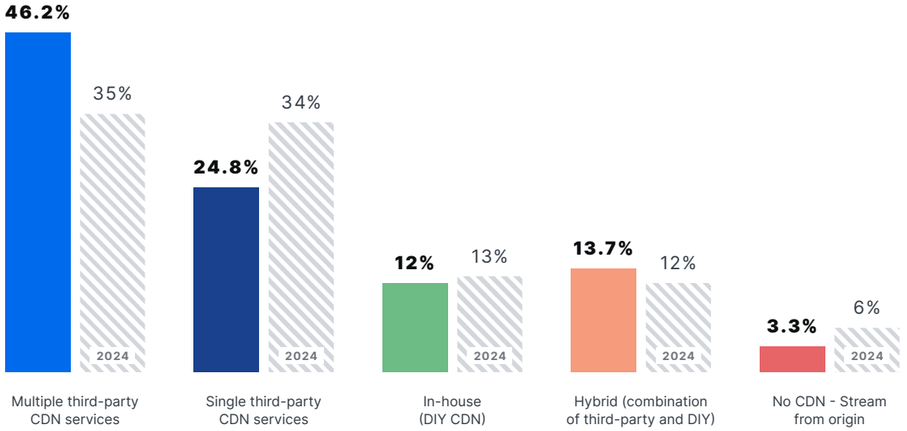
“The respondents this year are aligned with the data we gather from our own commercial DRMaaS operations. It’s encouraging to see that the percentage of respondents using no protection continues to decline, as the need for security is well documented in our environment. We also note the rise of DASH (and presumably CMAF) as a protected streaming format, using multi-DRM capabilities to target the widest range of consumer device types.”

Olga Kornieko
COO and Cofounder @ EZDRM



How are you implementing DRM in your workflow?

It appears that video developers can agree on one thing: DRM is often too complex to take in house. Each year, the share of respondents using a commercial DRM provider has grown, while those using an in-house solution continue to dwindle.



Which CDN solution are you using?

This move to third-party CDN services also shows continued momentum, with 46% of respondents using multiple commercial solutions to get their content from point A to B and 25% using a single commercial solution. It's likely that organizations are outsourcing this part of the pipeline due to the convenience and scalability that third-party CDNs offer.

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Built for technical professionals in the OTT video market, Bitmovin's software solutions are designed to optimize customer operations and reduce time-to-market, resulting in the best viewer experience imaginable. This is achieved through Bitmovin's unparalleled device reach, flexible integration, and commitment to supporting their customers.

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