2019 Video Streaming Latency Report

WOWZA™ media systems

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Streaming has found its way into our living rooms, workplaces, mobile phones, and community spaces.

Today's audiences demand high-definition content and smooth video delivery, no matter where they are or what device they're using. And with an increasing number of videos being delivered live, minimizing latency is key.

This report gathers data from 391 broadcasters across the globe, in industries ranging from sports and live events to radio, gaming, and everything in between.

While OTT content has traditionally been delivered with far more latency than cable and satellite broadcasts, we expect new technologies like Apple's Low-Latency HLS and low-latency CMAF for DASH (collectively referred to as HTTP Low Latency) to change the landscape forever.

What's more, speedy video delivery is now anyone's for the taking. We're excited to see how both boutique organizations and media giants use streaming to engage their customers in the decade ahead.

Thanks to all our survey participants for giving us the insight needed to inform our readers. The video streaming space is an exciting place to be!

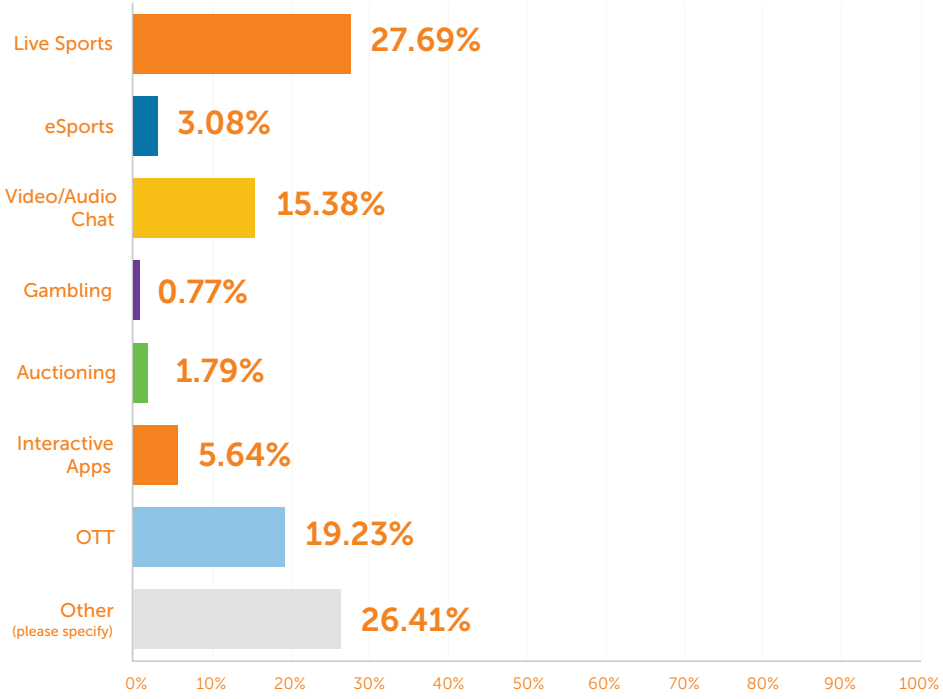
Best,

The Wowza Team

Report Highlights

- **Use cases continue to explode.** While OTT and live sports still lead the way, a whopping 26% of survey respondents didn't fit into any of the seven given categories. Our favorite niche use cases? Live commerce, healthcare, and situational awareness.
- **High-quality video reigns supreme.** Or, to put another way: sacrificing video quality for low latency simply isn't an option.
- **The majority of video streams are still lagging behind cable broadcasts in terms of delivery speed.**
- **Sub-three-second latency is the sweet spot... and 2020 is the year.** Whether by chance or by plan, it's all happening in 2020. HTTP Low Latency technologies are set to delivery sub-three-second streams at scale in the near future.
- **HLS continues to deliver the majority of streaming media.** Which explains why vendors across the streaming landscape are busy at work implementing support for the new Low-Latency HLS spec.

Q1. USE CASE

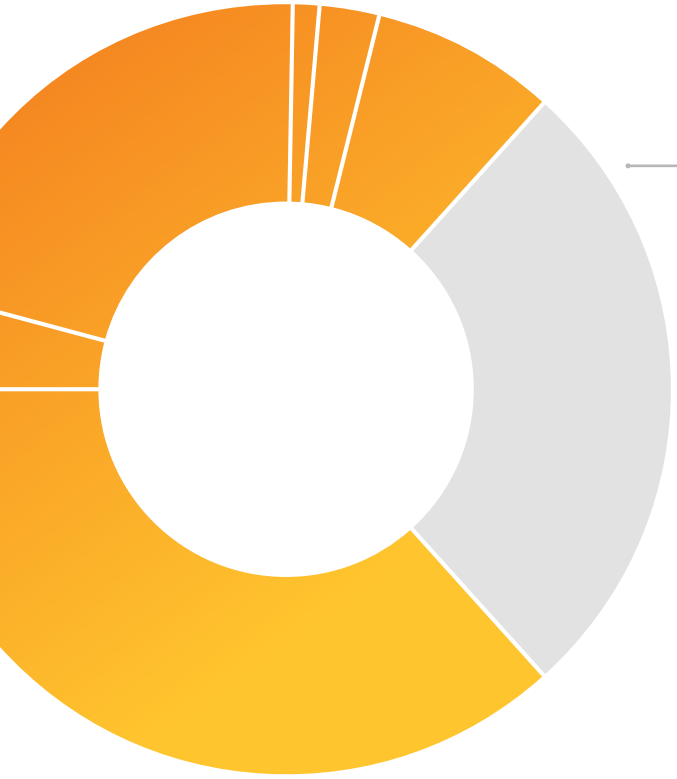


What is your use case?

While our survey broke out live sports and OTT as distinct categories, there's obviously overlap between the two. Together, they accounted for nearly half of our respondents.

We've all heard of (or experienced) the scenario where a neighbor loudly celebrates the game-winning touchdown while your OTT broadcast lags 20 seconds behind. Advancements in latency soon promise to make this a thing of the past.

What's more, today's sports fans consume content in a variety of ways supplementary to television broadcasts. These include highlight reels, training camp live streams, and game recaps.



Other (Please Specify)

Live commerce	Radio
Healthcare	Medical training
Situational awareness	Scenic/landscape
Peer-to-peer music	Weddings
Fashion and lifestyle	Town hall
Live webcams	House of worship
Surveillance	LinkedIn Live
Drones	Corporate

Use cases abound.

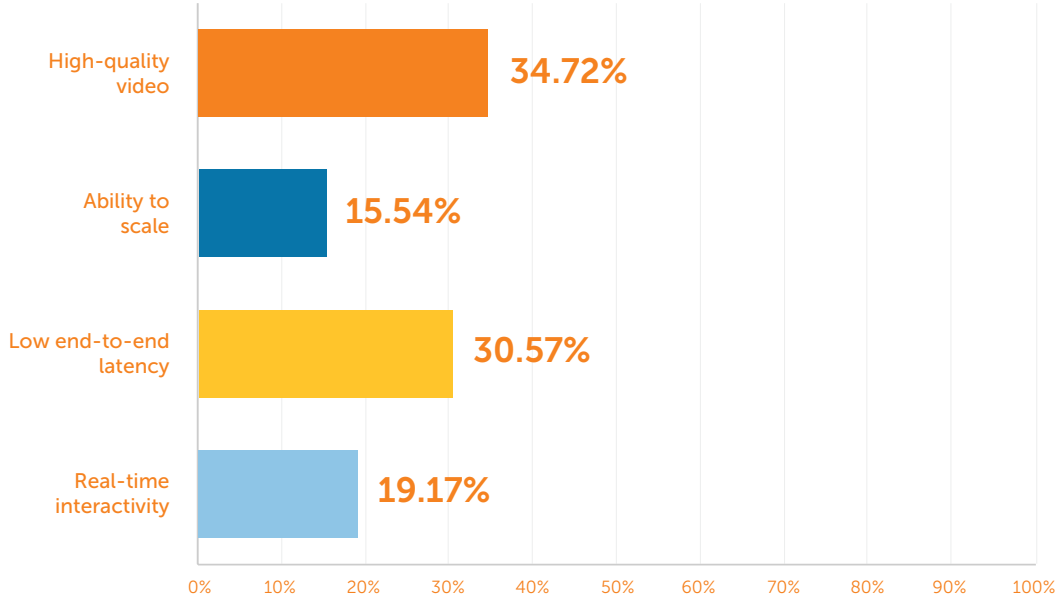
Streaming technology is more accessible than ever. For this reason, there's no limit to how organizations are using it to develop innovative products and engage with customers. A huge share of our respondents didn't fit into any of our clear-cut categories — and we only expect use cases diversity to grow.

Q2: UX PRIORITY

What is the most important UX factor for your use case?

Viewers don't appreciate high-quality video. They simply expect it. So, while reducing the delay between capture and playback is a worthy effort, quality remains top of the list for broadcasters.

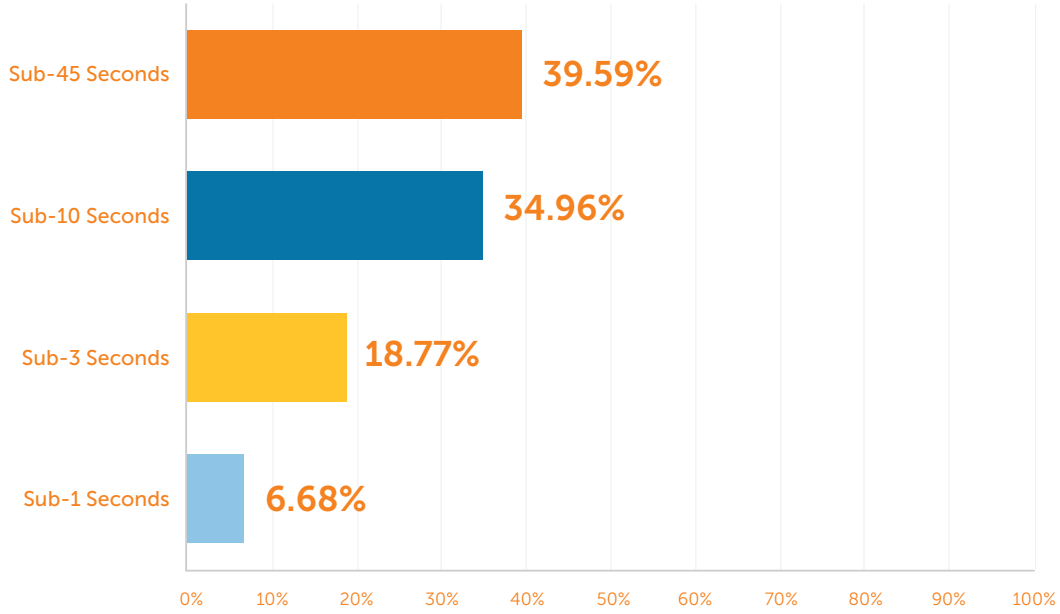
The second and third most important UX factors reported were low end-to-end latency and real-time interactivity. And while low-latency broadcasts aren't necessarily interactive, you can bet your bottom dollar that real-time interactive streaming requires low latency.



Q3: CURRENT LATENCY

How much latency are you currently experiencing in your use case?

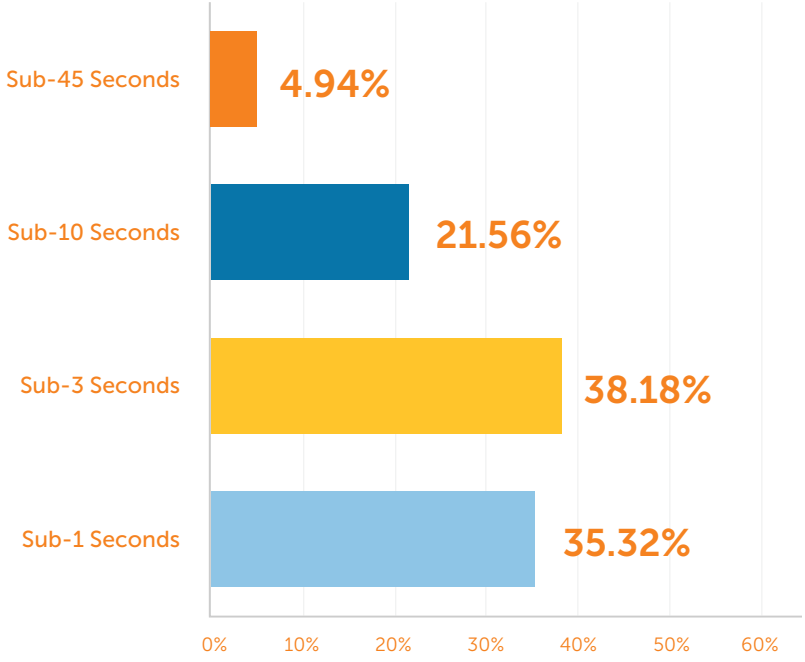
Assuming that at least some of the content distributors in the 'sub-10 second' category are north of five seconds, the majority of video streams are still lagging behind cable broadcasts. This would make sense, because tuned HLS and DASH fall in the 6-12 second range, and 41% of participants indicated that they were using short segment duration to reduce latency in question 10.



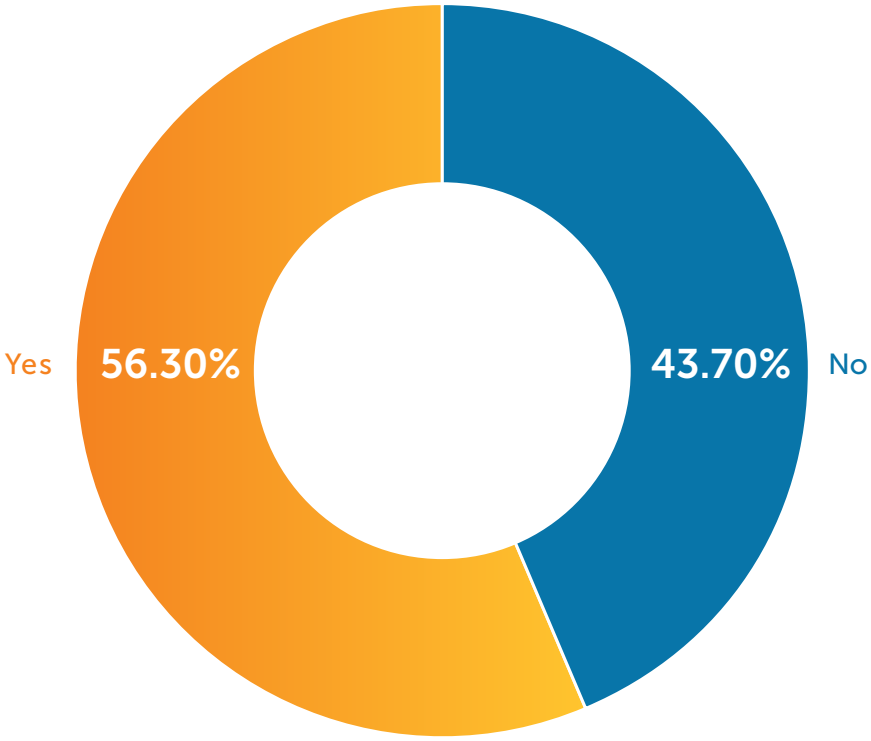
Q4: DESIRED LATENCY

How much latency do you hope to achieve in the future?

The majority of survey participants hope to achieve sub-three-second delivery. Luckily, this should be easily achievable as support is rolled out for Apple Low-Latency HLS and low-latency CMAF for DASH. The two specifications promise to drop end-to-end delivery time from 30-45 seconds to less than three seconds.



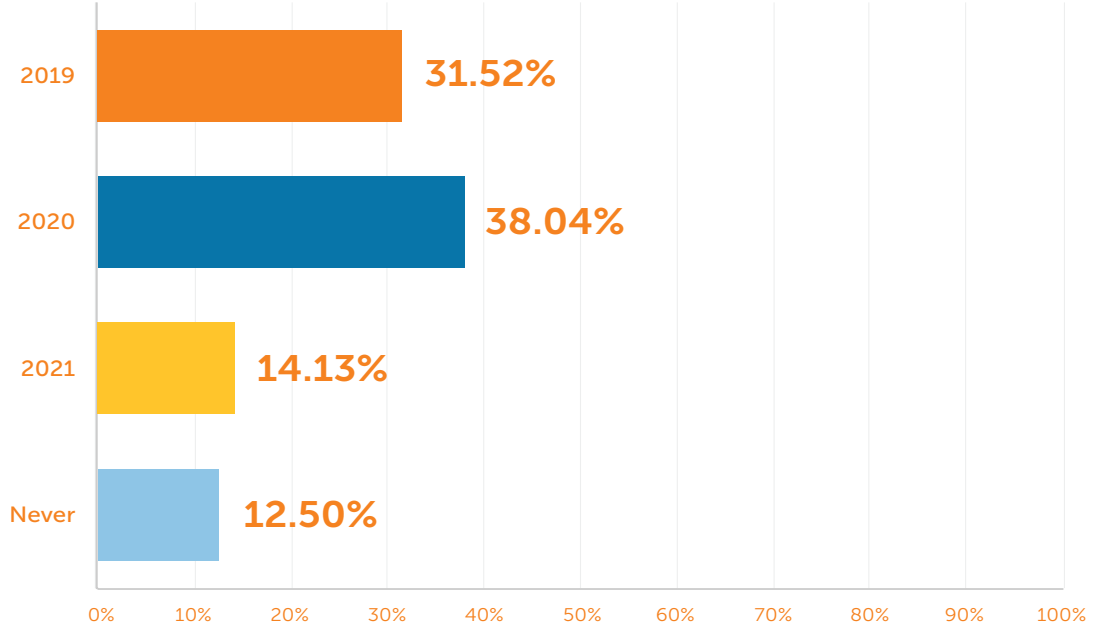
Q5: LOW-LATENCY SERVICE USE



Are you currently using low-latency live-streaming services?

Most broadcasters haven't made the switch to low-latency services. Why? The reasons range from budget constraints and other priorities to using alternatives like RTMP and short segment lengths.

Q6: TIMEFRAME FOR LOW-LATENCY IMPLEMENTATION



When do you plan to start using a low-latency technology?

2020 is the year most broadcasters plan to address video lag head-on. Many responders indicated that they were waiting for the HTTP Low Latency implementations to gain support and work out any bugs. The end-of-life date for Flash was also listed as a strong motivator for implementing new technology.

Q7: NEED FOR LOW-LATENCY

What problem is low latency solving for you?

Top responses included:

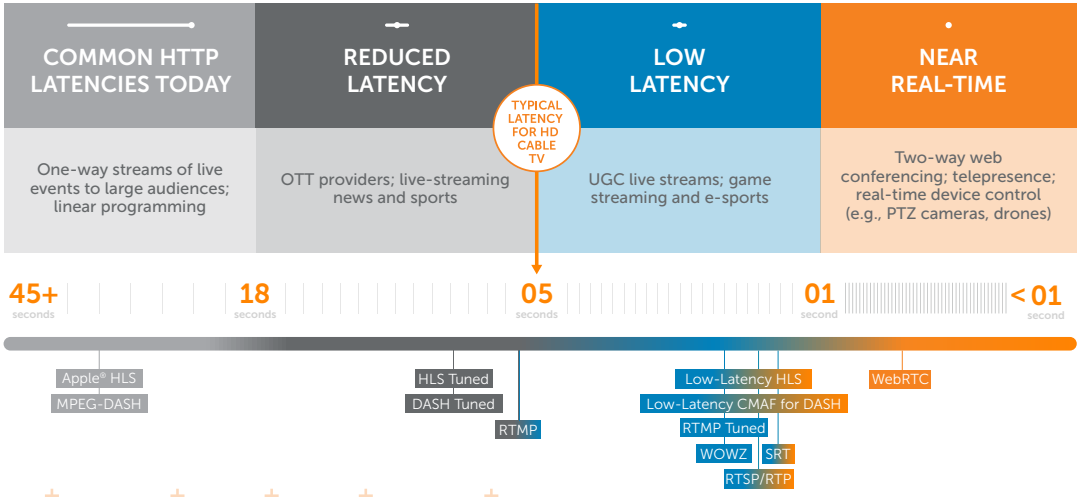
- Improving user experience
- Enables interactivity
- Enabling real time for emergency responders
- Competing with broadcast television
- Supports remote monitoring and control
- Synchronized video feed and chat or gambling
- Allows for second screen and multimedia experiences
- Supports quick reactions in medical procedures

Who needs low-latency technology?

When streaming sporting events, we'd recommend aiming for five seconds or less. Any longer than that and the cable broadcasters you're competing against will be one step — or touchdown, goal, home run, you name it — ahead of you. Keeping the delay down is also crucial for interactive solutions, such as trivia apps, live-commerce sites, e-sports platforms, and more.

When it comes to two-way conferencing, military-grade bodycams, remote-control drones, and medical cameras, broadcasts should aim for near real time. Any latency north of one second would make these streaming scenarios awkward at best, disastrous at worst.

If your streaming application falls outside of the use cases described above, it might be wise not to prioritize latency at all.

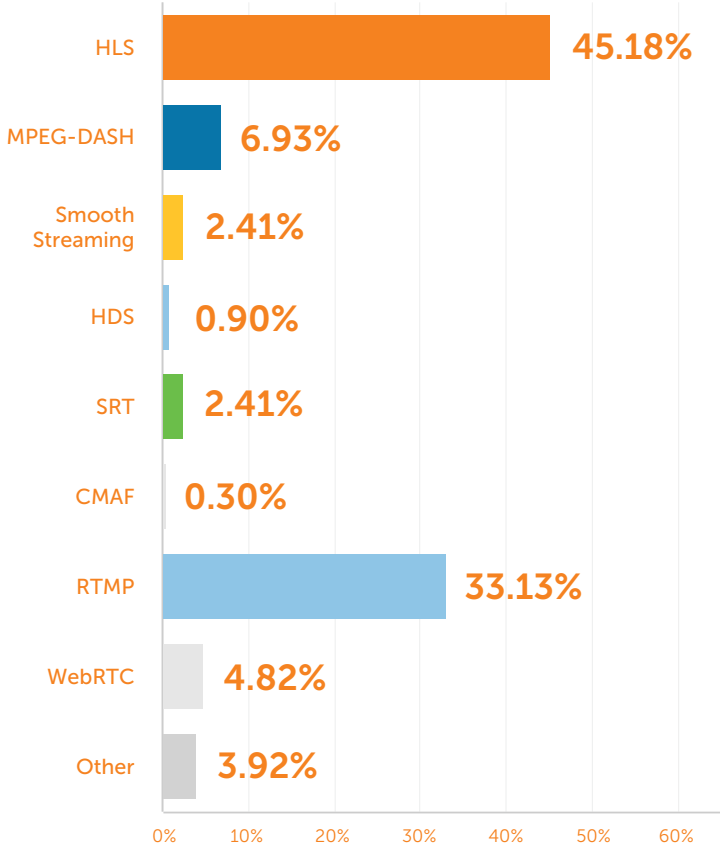


Q8: STREAMING FORMAT IMPLEMENTATION

Which streaming formats are you currently using?

As the most supported protocol in the video streaming space, it makes sense that Apple HLS is the protocol of choice for 45% of content distributors surveyed. What piqued our interest, though, is the fact that RTMP follows close behind.

The RTMP specification was designed by Adobe for the transmission of audio and video data between technologies like the Adobe Flash Player. And with the death of Flash slated for 2020, we expect this graph to change significantly in years to come.



Q9: SOURCE OF BROADCAST DELAY

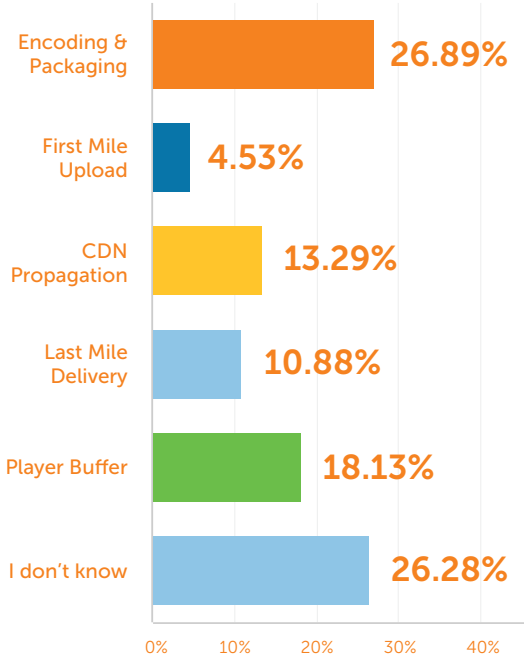
Where do you experience broadcast delay in your current workflow?
Latency injected during encoding and packaging is a major pain point for broadcasters, followed by the player buffer. For the 26% of participants unsure where the delay stems from, let's take a look at the workflow.

Encoding and Packaging:
Bitrate, resolution, which codec you use, and even segment size impact the speed of video encoding. The higher the bitrate and resolution, the longer encoding will take. Additionally, while reducing segment size helps reduce overall latency, it also results in a longer encoding process.

First Mile Upload:
Contribution delays often result from transmitting data over suboptimal networks and synchronizing multiple video sources. By choosing a protocol designed for low-latency content acquisition like SRT, this can easily be avoided in remote locations. Otherwise, connection type is key.

CDN Propagation:
You wouldn't strap a horse carriage to a donkey. Likewise, it's important to make sure that your CDN can support any low-latency technologies that you're trying to utilize (such as Low-Latency HLS or low-latency CMAF for DASH).

Last Mile:
The farther your viewers are from the media server, the longer it'll take to distribute a stream. This part of the workflow is largely outside of your control. End-users' proximity to the CDN edge and their network conditions will influence last-mile delivery.



Player Buffer:
Many specifications require a certain number of segments to be loaded before playback can begin. This buffer is intended to improve viewer experience. When additional latency isn't an option, you'll need a player that's optimized for low-latency playback and catch-up functionality.

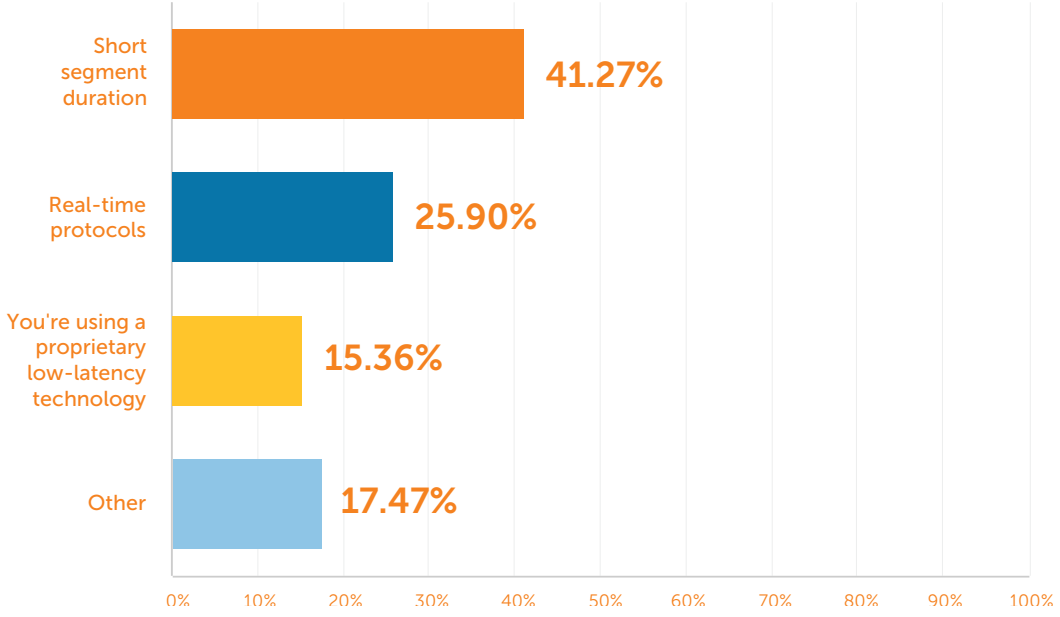
Q10: CURRENT TACTICS

How are you currently reducing latency?

Changing default segment size is the primary way respondents are reducing latency today. This can be applied to all HTTP streaming protocols and the process is simple.

Up until 2016, Apple recommended using ten-second segments for HLS. The specification also required three segments to be loaded before playback could begin. By sticking with the ten-second recommendation, broadcasters would start out with 30 seconds of latency based on segment size alone. Apple has since decreased the default segment size to six seconds, but that still means that the 'live' stream lags almost 20 seconds behind.

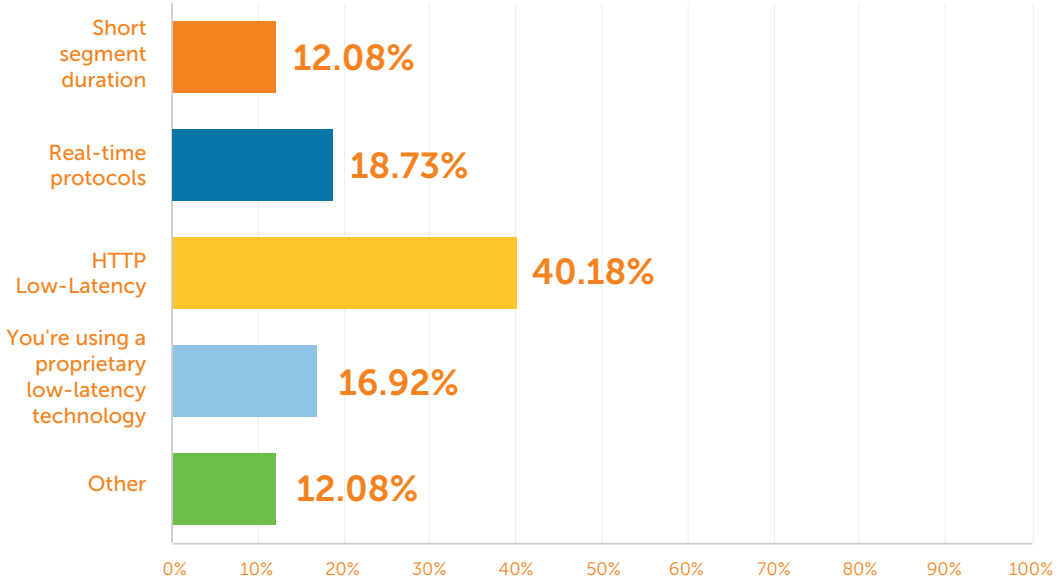
It's easy to manually tune your streaming software by reducing the duration of each segment or packet. Shorter chunks enable faster download times, thereby improving overall latency.



Q11: FUTURE TACTICS

How do you plan to reduce latency in the future?

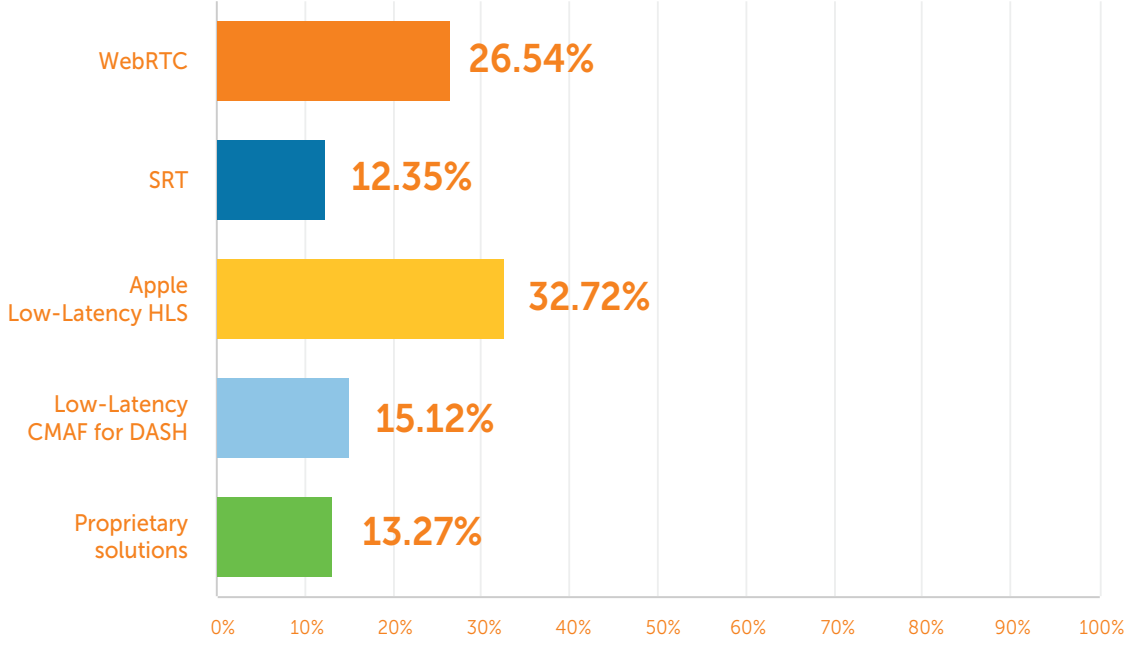
Not surprisingly, HTTP Low Latency streaming (Apple Low-Latency HLS and low-latency CMAF for DASH) is how 40% of broadcasters plan to end the latency saga. To help assist with this process, we're getting to work. Wowza now supports Apple's Low-Latency HLS, and we're adding support for low-latency CMAF for DASH next year.



Q12: FUTURE STREAMING FORMAT

Which low-latency streaming protocol do you plan to use in the near future?

In line with responses to the last question, 47% percent of broadcasters plan to use HTTP Low Latency (either Apple Low-Latency HLS or low-latency CMAF for DASH). WebRTC will also be a popular option, with 26% of responders planning to implement it. That's a significant increase from the 4% of WebRTC users shown in question 8.



Conclusion: Why Do We Need Low-Latency Streaming?

From within a burning building, an emergency responder communicates with her commander via a live-streaming bodycam. While video enables better information sharing, any lag could mean the difference between life and death.

Meanwhile, crowds pack into Churchill Downs to watch the Kentucky Derby. Gamblers across the world also participate via their mobile devices and computers. To ensure legal online wagering — especially in case of a controversial post-race disqualification — the stream must be delivered in near real-time.

And let's say a recently discovered Caravaggio painting goes up for auction via a live stream. Selling to the highest bidder, no matter where in the world they're bidding from, starts with a low-latency streaming solution.

Begin building and testing your low-latency workflows. **Download the FREE Wowza Streaming Engine Developer Trial today.**
https://www.wowza.com/media-server/developers/license

About Wowza Media Systems™

Wowza Media Systems empowers organizations to expand their reach and deepen their audience engagement through streaming. Wowza is the global leader in the market, powering streams for 35,000+ organizations over the last decade. From source to delivery, Wowza's full-service streaming platform provides reliable and low-latency streaming to any device, at any scale. The flexible infrastructure enables customers to easily build, deploy, manage, and monitor live, on-demand, and audio streaming in the highest quality possible.

For more information on rock-solid, low-latency streaming, visit: www.wowza.com