



Q3
2019

CONVIVA'S STATE
OF STREAMING

Conviva's State of Streaming – Q3 2019

Since its inception, television has captured the hearts, minds, and wallets of consumers. Leisure time is highly valued, and television has long been the primary form of leisure. Streaming doesn't change consumers' dedication to television. Streaming expands television's reach as an integral part of society, anywhere, anytime, not just on living room big screens at primetime. In this report, we will share details of the status of the industry in the transition to streaming. This pertains to which devices, formats, and programming are leading, and how streaming enables providers to go beyond predecessors to create compelling, personalized, and ultimately delightful viewing experiences.

Highlights include:

- **Overall time spent streaming has increased rapidly, up 53%** year over year, with new entrants poised to further accelerate growth. Quality also increased with 33% less time buffering, 10% fewer video start failures, 6% faster start times, and 3% higher picture quality year over year.
- Ad quality is a critical issue for the streaming industry. On average **39.6% of all streaming ads completely failed to play** in Q3. Ads were also plagued by delays including spikes of up to 16.1 seconds ad start time and up to 45.9% ad buffering.
- **NFL streaming tallied a 77% increase in plays led by mobile devices, up 109%** and time spent also increased, up 50% year over year.
- On social media, the New England Patriots scored with **227% more views per video than the average NFL team on Instagram**, on YouTube the New York Giants captured 211% above average, and on Facebook the Miami Dolphins tallied 168% more than average.
- For top streaming providers' social accounts, **Facebook followers amounted to 44% of the total social media audience**. Instagram handily led in engagements with 76% of total likes, comments, and shares, despite capturing only 10% share of posts. Conversely, Twitter had just 8% of engagements with 71% of posts. YouTube tallied 52% of social video views, with only 13% share of videos from top streaming providers' accounts.
- Connecting via a **Roku device remained the most popular way to stream in Q3, up 73% year over year to capture 25% of all viewing hours** and 44% of all connected TV viewing. Amazon Fire TV edged closer with 78% growth in viewing hours for a distant second place with 20% share of connected TV viewing.

Conviva provides streaming media intelligence and analytics in real time, which enables media industry leaders and brands to make decisions related to content, social media, quality of experience, and advertising. Measuring every second, every stream, and every screen with a global footprint of more than 100 billion streams per year across three billion applications streaming on devices, Conviva is trusted by companies including CBS, Cirque Du Soleil, DAZN, HBO, Hulu, Sky, Sling TV, TED, Univision, and WarnerMedia.



INDEX

5	Plenty of Room, Up and to the Right	9	Calling an Audible on Social Platforms
5	The Money	9	Streaming Providers Leverage Social Platforms
5	Streaming Ads are (Still) a Major Problem for Advertisers	10	Socializing Streaming Providers
6	Content Matters in Ad Perception	10	Devices Continue the Streaming Battle
6	Streaming Varies by Device	11	TV Remains King but is Now Connected (Likely via a Roku Device)
7	NFL's Streaming Score	11	Can't Live Without It
7	NFL Viewers Snack on Mobile Streaming	12	Streaming Quality Remains Key
7	Fans Stream for their NFL Team	12	Focus on Live
8	Spikes Aren't Just for Touchdowns	13	Bright Bundled Future
8	Success on Social	13	Final Thoughts
8	Which NFL Teams are Winning?		



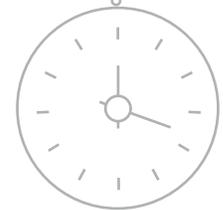
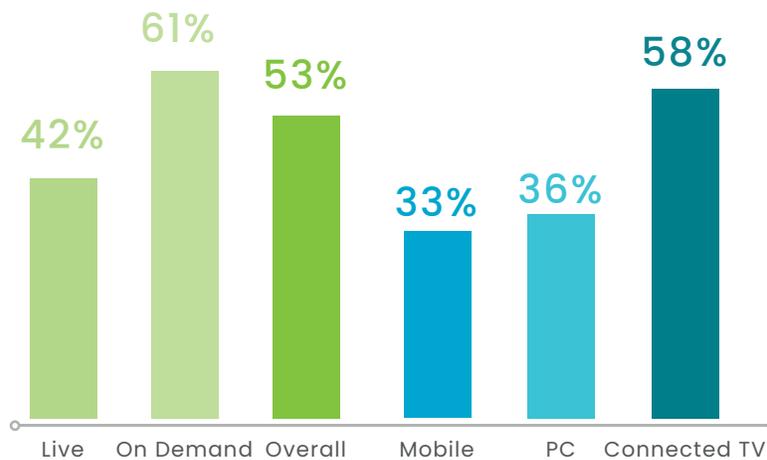
Plenty of Room, Up and to the Right

Streaming providers are faced with an upcoming challenge in this increasingly crowded market, as new services bring the weight of their expansive libraries, hired talent, and deep pockets to capture audience. But streaming is still in its early days towards becoming the dominant form of television, despite impressive growth with each passing quarter.

In Q3, overall time spent streaming increased 53% from the previous Q3, as video on demand content grew 61% in viewing hours versus a 42% increase for live content. Connected TV remained on top with the largest gains in viewing, up 58%, surprisingly followed by PC at 36% as mobile trailed in growth of viewing hours at 33%. As streaming is far from saturated in the marketplace, there remains plenty of headroom for new players and current industry leaders. The next year will be an exciting time as growth of the industry accelerates with the entry of major players including Disney+, Apple TV+, HBO Max, and NBC's Peacock.

Growth in Viewing Hours

YoY Q3 2018 vs. Q3 2019



The Money

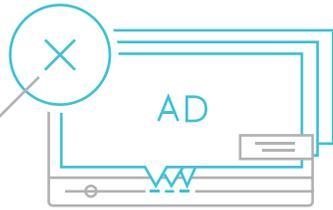
As streaming offerings multiply and consumers eventually fatigue on too many subscriptions, ad-supported services are well-positioned to succeed. With viewers only willing to pay monthly subscription fees to a handful of services, streaming providers will be more likely to offer ad-supported content, and more advertising dollars will move into streaming. But in order to capitalize on its potential, the streaming industry needs to sort out a number of technical ad delivery issues that other mediums have not had to face.

Streaming Ads are (Still) a Major Problem for Advertisers

Streaming ad quality remains a critical issue as 39.6% of all streaming ad attempts failed in Q3. This failure rate is comprised of ad start failures at 35.7% and exits before ad start at 3.9%. In addition, ads were plagued by delays including long start times and buffering. Average ad start time was 1.14 seconds and ad buffering ratio was 0.77%. Looking closer, the potential impact of avoided or corrected ad failures and delays comes into view. Single day cross-provider averages reached up to 57.8% ad failure, 3.02 second ad start times, and a ratio of 3.22% ad buffering. In addition, individual instances are frequently much higher than average. In the worst cases, ads saw failures spike to 100%, start times to 16.1 seconds, and buffering ratio to 45.9%. Previous research



from Conviva has illustrated how just 5 seconds of waiting for an ad to play results in 13.6% of the audience abandoning the stream. It should be a top priority for streaming providers, advertisers, and the industry to correct issues that cost engagement. Ad supported content is an important part of the mix today and will only grow in importance as security of the streaming industry's success.



Ad Failures, Delays, Buffering Affecting Engagement & Monetization

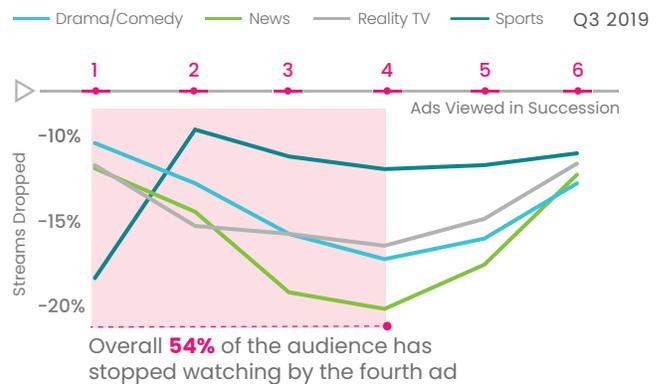
Q3 2019

	Ad Start Failures	Exits Before Ad Start	Total Ad Failures	Ad Startup Time	Ad Rebuffering
Quarter Average	35.7%	3.9%	39.6%	1.14 sec	0.77%
Highest Single Day Average	49.6%	8.2%	57.8%	3.02 sec	3.22%
Individual Instances (as high as)	90.1%	18.3%	100%	16.1 sec	45.9%

Content Matters in Ad Perception

Tolerance for streaming ads varies by content type. As viewers fatigue on ads, between 9% and 20% of viewers will stop watching with each subsequent ad. For sports, the largest impact was at the very first ad where 18% of viewers dropped in Q3, but ads that followed had less effect. Overall, the fourth ad in the stream was the most problematic, as 20% of news viewers, 17% of drama/comedy viewers, and 16% of reality TV viewers in Q3 stopped watching at that point. Overall, 54% of the audience stopped viewing by just the fourth ad. In general, the viewers that remained past the fourth ad were more invested, with the rate of abandonment per ad subsequently decreasing.

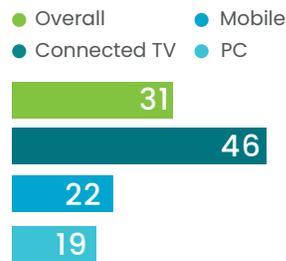
Effect of Content Type on Ad Perception



Q3

How Many Ads Have you Watched

Average Total Ads Viewed per Unique App



Streaming Varies by Device

The streaming experience on a connected TV is not the same as streaming on mobile, and the ad experience also varies by device. The device on which a viewer watches determines their likelihood to be exposed to streaming ads. In Q3, viewers saw more than twice as many ads on connected TV (46 ads on average per application) than on PC or mobile devices. Mobile exposed viewers to 22 ads per application while PC viewers saw the least at 19. Overall, viewers saw an average of 31 ads per streaming application.



NFL's Streaming Score

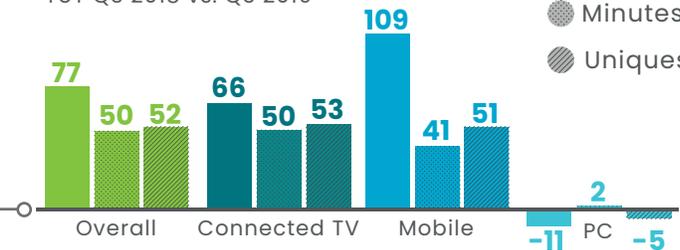
NFL fans have embraced streaming with rapid growth in the last year as NFL tallied a 77% increase in plays in Q3. Much of the NFL's streaming plays growth occurred on mobile devices, which grew 109%, and connected TV, which grew 66% year over year. Notably, NFL streaming plays on PC went down 11% over the same time period.

NFL viewers have also spent more time streaming in Q3, with a 50% increase in time spent streaming NFL compared to Q3 2018. Connected TV led in the growth of time spent streaming, with viewing hours up 50% year over year while mobile saw a 41% gain in viewing hours and PC saw 2% growth despite being down in plays.

NFL Streaming Growth %

YoY Q3 2018 vs. Q3 2019

- Plays
- Minutes
- Uniques

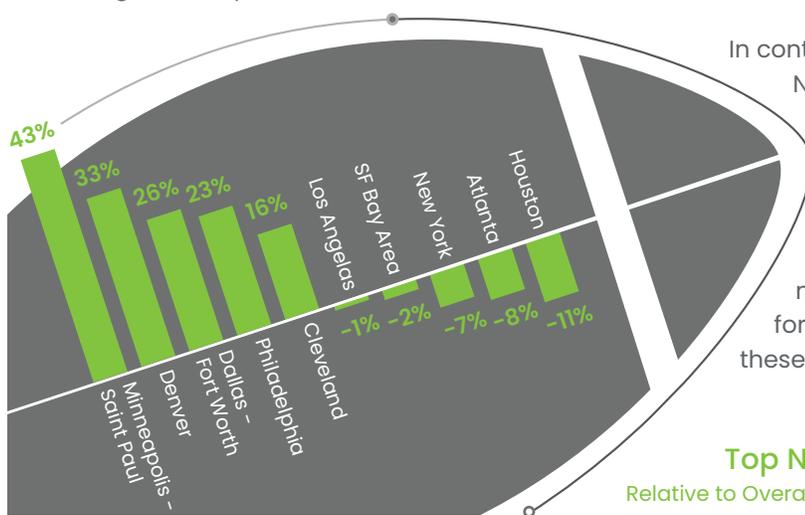


NFL Viewers Snack on Mobile Streaming

While NFL viewing was up for mobile, the minutes viewed with each play remained small at 8 minutes per play on those devices in Q3. This infers that fans use mobile devices more to check in on their favorite teams anytime, anywhere rather than to watch games in their entirety. While mobile had a 39% share of all NFL streaming plays, it captured just 18% of the total viewing hours watched. Conversely, fans who streamed the NFL via connected TV or PC watched for an average of 24 and 22 minutes, respectively. NFL viewing on connected TV was contrasted with mobile in that it delivered a 49% share of streaming plays but captured 67% of all NFL viewing time. Because of the nights and weekends nature NFL streaming, PC is nearly obsolete with just 6% of plays and 7% of viewing hours.

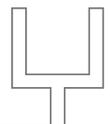
Fans Stream for their NFL Team

NFL viewing varies significantly by geography. With apologies to Green Bay, their NFC North rival Minneapolis-Saint Paul is Titledown in Q3 as the top NFL streaming metro. Minnesota Vikings fans streamed 43% more NFL than expected when normalized based on overall streaming viewing. Denver, Dallas-Fort Worth, Philadelphia, and Cleveland rounded out the top five metro areas ranging from 33% down to 16% more than expected NFL streaming consumption.



In contrast, Houston had the least engaged NFL fanbase on streaming, as Texans fans streamed 11% less than expected, followed by Atlanta at 8% below expected. Surprisingly, the San Francisco Bay Area, New York City, and Los Angeles metros rounded out the bottom five NFL streaming markets in Q3. All three regions under-index for NFL streaming viewership, despite each of these areas boasting two NFL franchises.

Top NFL Viewing Markets
Relative to Overall Streaming Consumption



Spikes Aren't Just for Touchdowns

NFL streaming viewership is important to the NFL as fans transition to another medium, but NFL streaming is also an important aspect that drives the growth of streaming overall. NFL viewing aligned with the largest Q3 spike in peak concurrent streaming, when the most viewers tune in all at once. This happened on Sunday, September 29th with millions tuned in at 4:05pm EST as 8 NFL games wrapped up and another 4 started, for a total of 12 overlapping games.



Success on Social

It is key for content providers to understand which social platforms they should leverage to best engage their audiences. When done right, social media is used to promote content, engage fans, or alternatively distribute content.

Which NFL Teams are Winning?

NFL fans have also embraced streaming videos on social media, but their appetite varies by team and platform. Among NFL teams, the Cleveland Browns were the only team to make the top five on all three social platforms in views per video, at 84% above average on Facebook, 85% above average on YouTube, and 71% above average on Instagram.

On Facebook, Miami Dolphins fans tallied more views per video posted by their franchise than any other team at 168% above the average NFL team. The Dolphins were closely followed by Kansas City Chiefs and Dallas Cowboys fans at 157% and 109% above average, respectively. To round out the top five NFL teams on Facebook, Philadelphia Eagles and Cleveland Browns fans were 94% and 84% higher than average for views per video.

For YouTube, the New York Giants commanded the most views per video at 211% above average, with the next closest team, the New England Patriots, at 106% above average. The Cleveland Browns, Kansas City Chiefs, and Los Angeles Chargers rounded out the top 5 at around 80% above average other NFL teams on YouTube.

With Instagram, the New England Patriots blew away the field with views per video 227% above average. At less than half that but still 94% above average, the Philadelphia Eagles deliver a respectable performance, followed by the New York Giants, Dallas Cowboys, and Cleveland Browns at around 80% above the average team on Instagram.

Q3 2019 NFL's Top Social Video Performance

% Above Average NFL Team in Views per Video

Platform	Team	% Above Average
FACEBOOK	Dolphins	168%
	Chiefs	157%
	Cowboys	109%
	Eagles	94%
	Browns	84%
YOUTUBE	Giants	211%
	Patriots	106%
	Browns	85%
	Chiefs	81%
	Chargers	79%
INSTAGRAM	Patriots	227%
	Eagles	94%
	Giants	83%
	Cowboys	82%
	Browns	71%



Calling an Audible on Social Platforms

The way fans engage on social media varies depending on both the platform and the type of content. Across all NFL team accounts, Facebook captured the largest audience (followers or subscribers) with 44% share in Q3. Twitter followed with 32%, Instagram with 21%, and YouTube with just 3% share of the NFL social audience.

For share of engagements (likes, comments, or shares), Instagram easily dominated with 86% of NFL social engagements in Q3, despite accounting for only 11% of posts. In stark contrast, Twitter captured just 6% of engagements despite being responsible for the largest share of posts at 55%. In more measured proportion, Facebook had 27% of posts with 8% of engagements, while YouTube only accounted for 7% of posts, but with paltry engagement at 1% of the total for NFL teams across social.

NFL teams also won on Instagram in for views per video, with 38% of total for NFL teams, even though only 12% of videos were posted on Instagram. Twitter struck a balance between share of views per video and videos posted, with 35% of each. Facebook accounted for 34% of videos posted with 15% of views, while YouTube accounted for 19% of videos and just 11% of views.

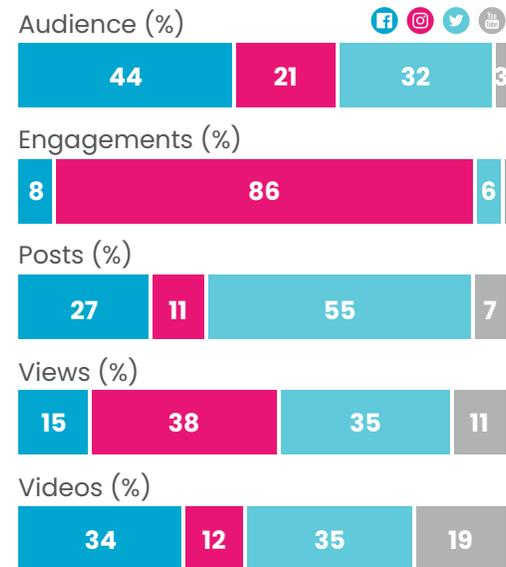
Streaming Providers Leverage Social Platforms

In Q3, Conviva measured the share-of-voice across different attributes to see how top streaming publisher accounts performed.

Across social media platforms in Q3, Facebook captured 44% of the social audience for top streaming providers' accounts, followed by Instagram with 25%, YouTube with 17%, and Twitter with 13% of the social audience. Instagram handily led in engagements with 76% of total engagements despite a mere 10% share of posts. Conversely, Twitter captured just 8% of engagements despite a commanding 71% of posts. Facebook accounted for 16% of posts with 6% of engagements, while YouTube had 10% of engagements with 3% of posts.

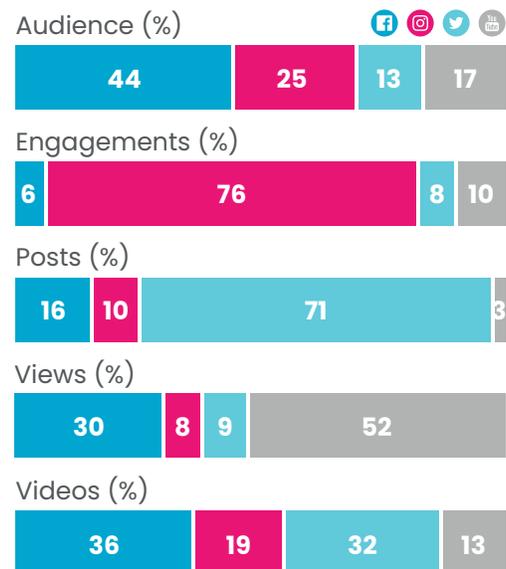
YouTube captured 52% of social media video views for top streaming providers' accounts, while only accounting for 13% of videos. This is particularly impressive when one considers how each platform tallies a view. YouTube tallies at the 30 second mark, while Facebook and Instagram tally after 3 seconds and Twitter after 2. Facebook accounted for 36% of videos posted

NFL's Share of Voice by Social Platform Q3 2019



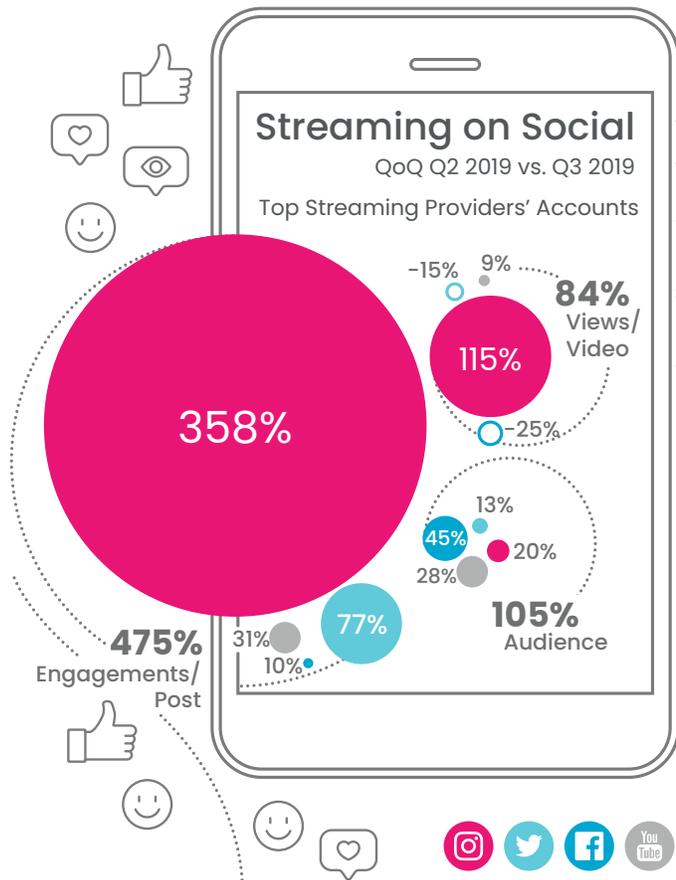
Share of Voice by Social Platform Q3 2019

Top Streaming Providers' Accounts



with 30% of views, Twitter 32% of videos with 9% of views, and Instagram with 19% of videos and 8% of views in Q3. The distribution of video views is likely driven by the tradition of posting content like official trailers on YouTube that command millions of views, while other platforms see higher quantity and diversity of videos. With these indicators in mind, success is most likely achieved with real-time refinement of social strategy. Granular, cross-platform data allows streaming providers to understand their audiences and to act upon it, ultimately improving their success.

Socializing Streaming Providers



In the battle for streaming, exclusive content is an important factor in acquiring and retaining viewers. But even having a deep content library doesn't guarantee success. Social media is a key tool to generate excitement, demand, and to activate communities of rabid fans. With the rapid growth of streaming on social, even a quarter-over-quarter analysis of Q2 versus Q3 2019 showed top streaming publisher accounts on social media made impressive progress in increasing key metrics including engagements per post, views per video, and overall audiences.

Instagram was clearly the growth platform in the span of a single quarter (Q2 2019 versus Q3 2019), netting a 358% increase in engagements per post, a 115% increase in views per video, and a 20% increase in audience. YouTube also increased in all three categories although its growth was more measured with increases of 31% in engagements per post, 9% in views per video, and 28% in audience. Facebook led among platforms in audience growth, up 45% while increasing engagements per post 10%, although views per video declined 25%. Twitter also recorded growth in audience and engagements per post, up 13% and 77% respectively, while views per video declined 15%.

Devices Continue the Streaming Battle

As streaming providers vie to drive viewer attention to their services, device manufacturers are also engaged in the streaming wars. Whether pertaining to the age-old battle between Android and iOS or the battle for the living room waged between Roku and Amazon, hardware will play an important role in the streaming industry. Devices are also positioning to gain from the surge of advertising dollars, as they may advertise themselves or offer a limited piece of the puzzle to streaming providers which are trying to understand their viewers for personalization and targeting. First-party data will be critical, as antiquated ratings services become obsolete. But only a piece of the puzzle via devices will not solve the key challenge the industry faces today, which is true understanding of the viewer across disparate devices, geographies, and streaming services including social media.

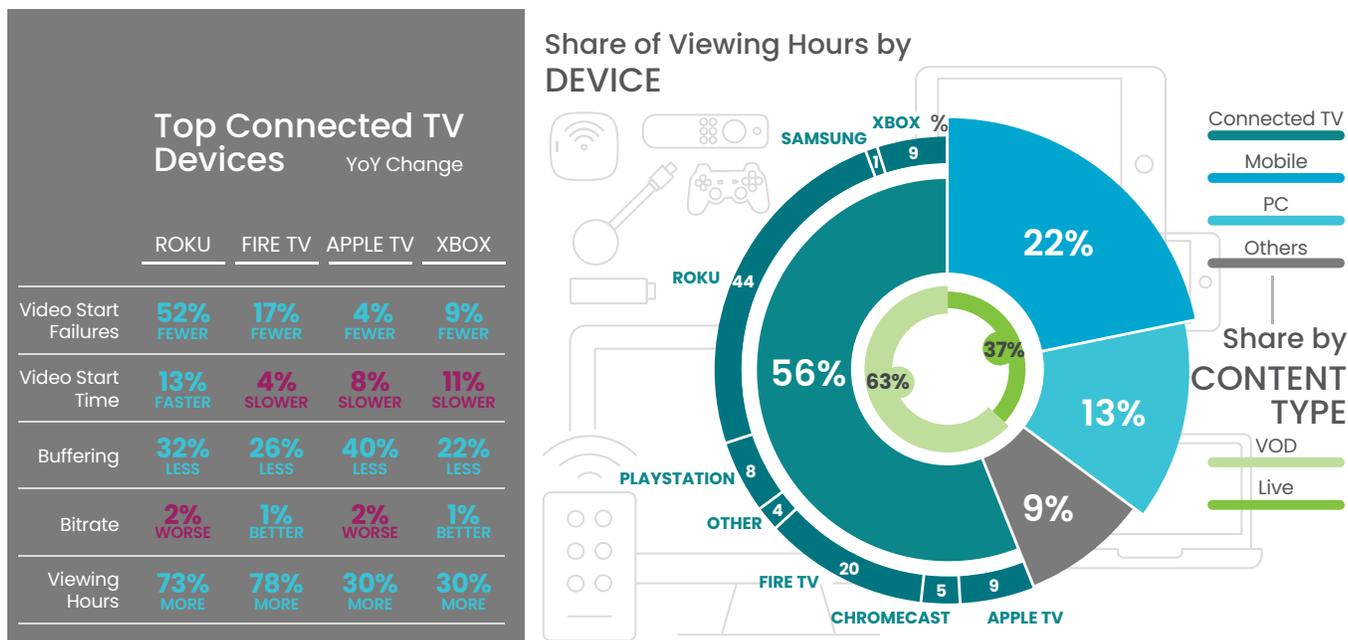


TV Remains King but is Now Connected (Likely via a Roku Device)

Despite worthy challengers, Roku has remained the most popular device in streaming. As 25% of all time spent viewing and 44% of connected TV viewing happened on a Roku device in Q3, Amazon, Apple, and Google haven't been able to shake this ad-supported streaming pioneer's stronghold. It's no surprise Roku's position has skyrocketed as an easy, purpose-built solution with deep market penetration. With 73% year-over-year growth in viewing hours, it shows little sign of slowing. As advertising gains additional importance in the streaming industry, Roku is well-positioned to further capitalize.

Roku contributed heavily to the quality improvements in the connected TV category, with significant gains over the past year. Roku delivered the lowest rate of video start failures at 0.18% on average, down 52% year over year, and was the only top connected TV device to improve in start time, now 13% faster than the previous Q3. Xbox again impressed with the least buffering at a mere ratio of 0.15% on average, while Apple TV was the most improved with buffering down 40% year over year. Apple TV once again blew away the competition with the fastest video start time at 2.6 seconds and highest picture quality at 6.8 Mbps on average in Q3.

Overall, connected TV remained the device of choice for streaming, on top in Q3 with 56% share of all viewing hours, compared to 22% share for mobile and just 13% share for PC. Among connected devices, Fire TV tallied the largest year-over-year growth in viewing, up 78% to edge closer to Roku and claim second place with 20% share of connected TV viewing. Apple TV and Xbox each saw 30% growth and maintained a 9% share of viewing hours for connected TV.



Can't Live Without It

It's no surprise that mobile devices command less share of overall viewing time. But with the anywhere, anytime viewing option, phones and tablets remain an important component of streaming. Among mobile devices, Android dropped 4% in share of viewing since Q3 2018 but maintained a lead with 59% share. iPhone picked up 3% share to grow to 25% of the mobile category viewing while iPad picked up one additional percentage point to account for 16% share in Q3.



Streaming Quality Remains Key

As streaming providers compete against the seamless delivery of linear television, viewer expectations demand linear quality from their streams without failures, delays, buffering, or poor picture quality. Streaming providers, along with many industry stakeholders, have continued to invest in technology, redundancies, and oversight to make this a reality. In Q3 they delivered large improvements to that end.

Buffering, when the video pauses during playback so it can reload, was down 33% overall to a ratio of just 0.43%. Just 0.78% of attempted plays resulted in a failure, down 10% from the previous year. Videos also had 6% faster start times, down to 4.24 seconds of waiting between pressing play and the video appearing on screen. This came at no sacrifice as picture quality was 3% higher, with an average bitrate of 4.6 Mbps.

Among devices, quality was improved nearly across the board in Q3 2019 for each category and device. Connected TV was most improved in video start failures (down 25%), PC was most improved in video start time (down 23%), and mobile most improved in both buffering (with 34% less) and picture quality (8% better) than the previous year's Q3.

	Video Start Failures	Video Start Time	Buffering	Picture Quality
Mobile	2% FEWER	4% FASTER	34% LESS	8% BETTER
PC	17% FEWER	23% FASTER	26% LESS	3% BETTER
TV	25% FEWER	1% FASTER	26% LESS	1% WORSE
Global Quality	10% FEWER	6% FASTER	33% LESS	3% BETTER
	0.78%	4.24 sec	0.43%	4.6 Mbps

Focus on Live

Live content is a critical component viewers' consumption television even though it only captured 37% of time spent streaming while video on demand commanded 63% share in Q3. When live content is compared to video on demand, there has been a trend that live content delivers near equal quality to video on demand. This is despite live being more challenging with higher spikes in viewing. Q3 was no different.

Live and video on demand were nearly equal in global quality. Video on demand outperformed with less failures and better picture quality with 12% less video start failures and 1% better picture quality in Q3. But live bested video on demand in buffering and start times, delivering 3% less buffering and 34% faster start times. In addition, live content drove longer viewing sessions, with minutes viewed per play 48% higher than video on demand in Q3.

	Video Start Failures	Video Start Time	Buffering	Picture Quality	Mins / Play
vs. VOD Live Has	12% MORE	34% FASTER	3% LESS	1% WORSE	48% MORE



Bright Bundled Future

In the United States, aggregators have impressive quality to frequently best publishers across the board. The strong focus on quality was illustrated again in Q3 as aggregators delivered 65% less video start failures, 11% faster start time, 72% less buffering, and 16% better picture quality than publishers. Not unexpectedly, aggregators also grew faster, up 65% in viewing hours compared to the 33% increase in viewing hours for publishers. In addition, aggregators in the United States drove continued engagement with longer viewing sessions. Minutes viewed per play for aggregators was 79% than for publishers.

	Video Start Failures	Video Start Time	Buffering	Picture Quality	Mins / Play
vs. US Publishers, US Aggregators Have	65% FEWER	11% FASTER	72% LESS	16% BETTER	79% MORE

Final Thoughts

With television a touchstone of culture, it is clear that streaming must honor the traditions of past formats and deliver on its potential for compelling, personalized, delightful viewing experiences anywhere, anytime. The television industry is in the transition to streaming, with acceleration of growth, increased advertising dollars and personalization, the growing sway of social media, and further fragmentation of viewing on the horizon. Quality of the entire video stream across content and ads, as well as a complete understanding of the viewer journey across content, device, platform, and geography, will be crucial for the streaming industry to progress to its potential.

Methodology

Data for Conviva's State of Streaming report was primarily collected from Conviva's proprietary sensor technology currently embedded in three billion streaming video applications, measuring in excess of a 100 billion streams per year and a trillion real-time transactions per day across more than 180 countries. Year-over-year comparisons were normalized at the customer level for accurate representations of industry growth. The advertising data included in this report is based on an analysis of nearly 10 billion ad attempts in Q3. The social media data included in this report is based on an analysis of more than 100,000 social posts and 2.5 billion social video views across Facebook, YouTube, Twitter, and Instagram.



About Conviva

Conviva is the real-time intelligence platform for optimized streaming media. More than 250 industry leaders and brands – including CBS, Cirque Du Soleil, DAZN, HBO, Hulu, Sky, Sling TV, TED, Univision, and WarnerMedia – rely on Conviva to maximize their consumer engagement, deliver the quality experiences viewers expect, and drive revenue growth. With a global footprint of more than 100 billion streams per year across 3 billion applications streaming on devices, Conviva offers streaming providers unmatched scale for continuous video measurement, intelligence, and benchmarking across every second of every stream on every screen.

Any Questions?

Visit www.conviva.com or contact Conviva at pr@conviva.com.



Q3
2019

Conviva's
State of
Streaming

