



Q3
2018

Conviva's State of the Streaming TV Industry

conviva®

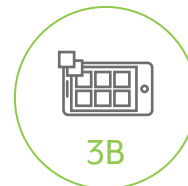
Conviva's State of the Streaming TV Industry

Q3 2018

Conviva is the real-time measurement and intelligence platform for streaming TV, with a global footprint of **50 billion streams** per year across **3 billion applications** and **200 million users**. In Q3 2018, Conviva measured the following key shifts, which demonstrate that providers must offer both a high-quality streaming experience and a breadth of content as the streaming TV ecosystem continues to mature.



Streams
per Year



Streaming
Applications



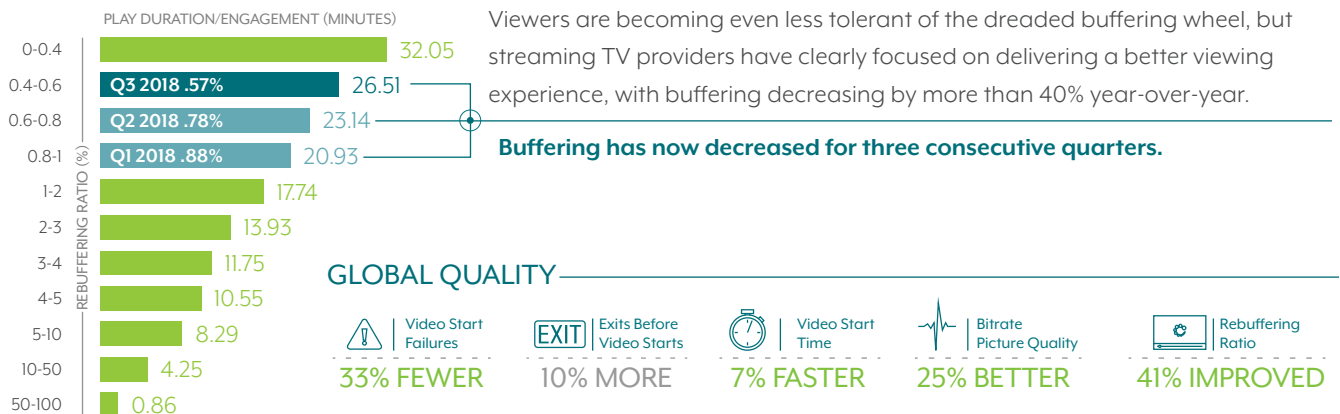
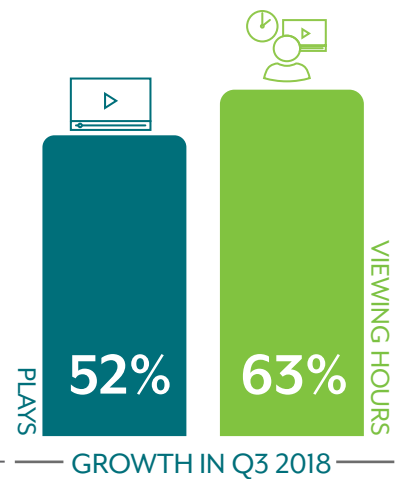
Viewers
Worldwide

- Streaming TV consumption continues to grow at a staggering rate with a **52% increase in plays and a 63% increase in viewing hours** globally.
 - In tandem, consumer expectations for streaming quality continue to soar.
- Connected TVs deliver the best streaming experience of all devices, and as a result saw a **145% increase in plays while PCs declined by 18%**.
 - The thirst for a high-quality viewing experience is one of the drivers behind the significant shift to connected TVs.
- Viewers are increasingly opting for superior-quality bundled offerings from virtual MVPDs like Hulu, Sling, PlayStation Vue, and others which saw **increases of 292% in plays and 212% in viewing hours**.
 - Virtual MVPDs now account for more than **75% of all streaming TV** in the United States.
- Live streaming adoption has increased as quality has improved, with plays up **49% and viewing time up 54%** year-over-year for all live TV content.
 - NFL live viewing increased at a faster rate than the global trend, up **72% in plays and 83% in viewing hours**.
- Despite the focus on live streaming for major sporting events like the **World Cup, which drove a 10% bump** in traffic during the weeks the tournament was played in Q3, long-form video on demand (VOD) content saw the biggest gains year-over-year.
 - Long-form content saw **111% and 93% increase in plays and viewing hours** respectively, increasing share to **more than half of all global viewing** Conviva measured.

Conviva's Video AI Platform provides insight into the consumer's streaming experience across all screens and applications at scale, for many of the world's top streaming TV providers across 180 countries and four continents. Conviva's data is collected using proprietary sensor technology, which is embedded directly within 3 billion streaming video applications and currently measures 1 trillion data events per day across Conviva's customer base. In this report, the year-over-year data from Q3 2018 as compared to Q3 2017 was normalized based on Conviva's consistent customer base.

The Continued Rise of Global Streaming

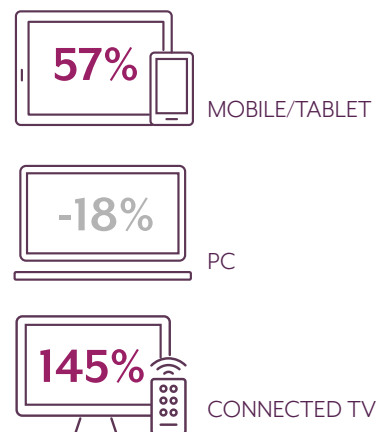
As global streaming continued to grow rapidly in Q3, streaming TV providers were pushed to deliver more content than ever while exceeding viewer expectations for streaming quality. Quality and viewer engagement have historically been tightly correlated, and Q3 2018 was no exception as **minutes per play increased to 20.1 minutes from 18.8 minutes** the previous year. Conviva measured a **52% increase in plays** and a **63% increase in viewing hours** year-over-year, while overall video quality made great strides with picture quality up by 25%, and video start times and video start failures down 7% and 33% respectively.



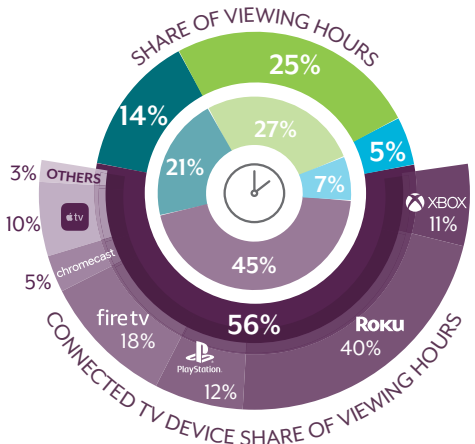
PC Lags as Connected TVs Capture Viewers

When it comes to how viewers tune in, mobile viewing continues to rise steadily – growing 57% year-over-year – but mobile no longer dominates streaming as it once did. Instead, connected TVs, which offer a higher-quality viewing experience across almost every metric as compared to other devices, experienced a **145% growth in plays** and a **103% growth in viewing hours** year-over-year. Connected TVs now account for as many streaming TV plays as mobile devices with 38% and 39% share respectively, and more than twice as many hours of viewing time with 56% and 25% share respectively. In sharp contrast, consumption on PCs was down by 18%, as viewers made the switch to higher quality alternatives with quality markedly lower on PCs. Connected TVs continue to be a major driver for the overall growth of streaming TV, with **plays and viewing hours on connected TVs more than doubling over the past year.**

Growth in Plays vs Q3 2017



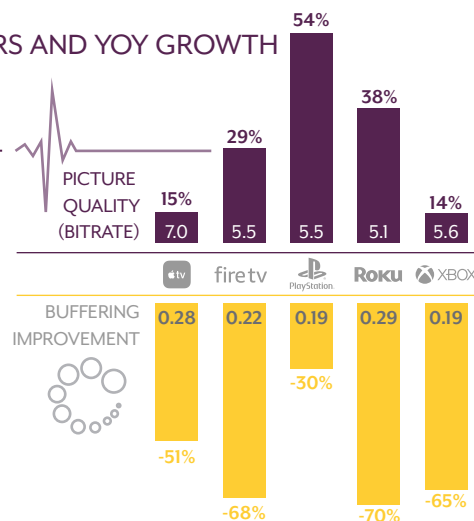
Q3 2018
 Connected TV Mobile/Tablet PC Other
Q3 2017
 Connected TV Mobile/Tablet PC Other



Quality has improved significantly for connected TV devices as a whole and is reflected in the top five devices that drive the most connected TV viewing among Conviva's customers. Significant **declines of 30-70% in buffering** are particularly impressive because picture quality has also improved drastically by 14-54%. Among Conviva's customer base, Roku maintained a lead in market share with 34% of all plays and 40% of all viewing hours Conviva measured in Q3 2018. At the same time, **Amazon Fire TV gained significant share of the market** since Q3 2017 among Conviva's customer base, increasing its share of plays from 4% to 19% and its share of viewing hours from 3% to 18% over a 12-month period.

Q3 NUMBERS AND YOY GROWTH

Video Start Failures	2.66%	3.72%	0.99%
Exits Before Video Starts	16.22%	27.92%	8.00%
Video Start Time	3.47	6.29	4.68
Rebuffering Ratio	1.09%	0.82%	0.27%
Bitrate Picture Quality	3.5 Mbps	2.4 Mbps	5.4 Mbps



Q3 QUALITY BY DEVICE



Changing The Way Viewers Tune In: Virtual MVPDs

Bundled offerings from virtual MVPDs offer viewers a streaming TV experience that most closely resembles traditional cable or satellite TV, but with additional benefits for cord-cutters of a broader mix of content relative to individual publisher apps. Over the last 12 months, consumers have flocked to these services, which have experienced year-over-year **growth of 292% in plays and 212% in viewing hours** in the United States. Conversely, **publisher apps experienced a 16% decline in plays and a 9% decline in viewing hours**. As a result, **virtual MVPDs now account for over three-quarters of all plays and viewing hours in the United States** – a significant shift from just a year ago.

GROWTH VS Q3 2017 | PUBLISHER VS. VIRTUAL MVPD

Publisher Virtual MVPD



PLAYS

292%

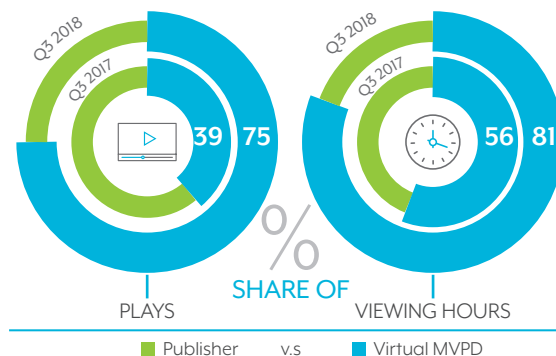
-16%



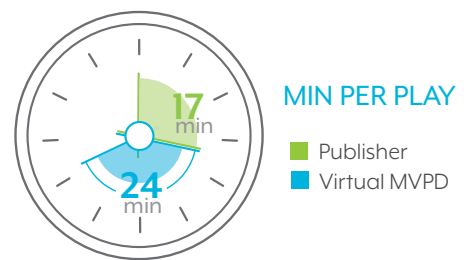
VIEWING HOURS

212%

-9%

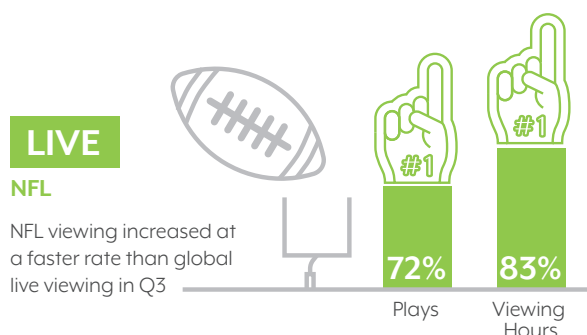


In the United States, virtual MVPDs led the way across all streaming quality metrics in Q3 2018 and have a significant edge over publisher apps in terms of engagement, driving **40% more viewing time** per play. As compared to all providers in the United States, with virtual MVPDs, viewers enjoyed a **22% decrease in video start failures, a 7% shorter wait time for videos to start playing, 25% higher picture quality, and 63% less buffering.** The combination of a high-quality streaming experience and a breadth of content seems to be a winning formula as virtual MVPDs have largely driven the growth of the streaming TV industry in the United States year-over-year.



STREAMING QUALITY FOR	Video Start Failures	Exits Before Video Starts	Video Start Time	Bitrate Picture Quality	Rebuffering Ratio
U.S. vMVPDs	1.10%	10.31%	4.32	5.2 Mbps	0.32%
V.S. All U.S. Providers	1.41%	13.22%	4.65	4.1 Mbps	0.87%

Spotlight On Live



As confidence in streaming TV grows and providers continue to deliver improved quality, viewers are increasingly turning to streaming TV for live sports. Among Conviva's customer base, streaming increased **49% in plays and 54% in viewing time year-over-year for live streaming content.** The NFL has been an especially important growth driver for live content, with NFL streaming growth in the United States increasing more rapidly than the overall live category globally; **NFL live streaming plays were up 72% and viewing hours were up 83%** in Q3 as compared to the previous year across Conviva's customer base. NFL viewing drove major traffic as viewership accounted for 3% of total plays and 2.8% of all viewing hours in the United States during the weeks games were played in Q3, as more fans than ever before elected to stream NFL games.

Live streaming TV providers have been able to scale quickly and successfully to meet increased demand, and have delivered **42% less buffering, 34% less videos start failures, and 26% higher picture quality** as compared to a year ago. It is particularly difficult to deliver high-quality streams for live TV, as many viewers tune in simultaneously to consume the programming. As a result, **live streams take 10% longer for the video to start and see 72% more exits before the video starts.** Although improved year-over-year, there is definitely still room for providers to improve their delivery infrastructure and quality.

LIVE QUALITY



While live streaming TV saw significant growth, especially with NFL streaming increasing and the major influence of the **World Cup, which drove a 10% bump in traffic** during the weeks the tournament was played in Q3, it is surprising that the comparative share of live streaming across all types of streaming remained relatively steady in Q3 year-over-year. In comparison, long-form VOD content, defined as more than 15 minutes in length, saw the biggest gains year-over-year. **Long-form plays grew by 111% while viewing hours increased by 93%** year-over-year, which coincides with the move toward connected TVs, which provide a more comfortable long-form viewing experience. When comparing long-form to short-form VOD and live content, **long-form now accounts for more than half of all plays and viewing hours** at 51% and 54% respectively, up from 37% and 45% in Q3 2017. This trend supports streaming TV providers which continue to spend billions of dollars annually on episodic content and movies.



Closing Thoughts

Conviva's real-time measurement and intelligence platform for streaming TV measured significant changes in user behavior during the third quarter of 2018. Globally, consumers are choosing to stream their video content on connected TV devices more than ever, especially since those devices have proved to offer the best streaming quality experiences available. Bundled virtual MVPD services are also driving a majority of the growth by combining more content with a better overall streaming experience. And finally, while live content remains a significant growth driver for streaming TV during major sporting events like the World Cup and the NFL season, consumers are watching more long-form video on demand content than ever, supporting continued investment into episodic content and movies. Conviva's Q3 data overall continues the trend of a strong and growing streaming TV industry, as viewers and providers alike dedicate more time to streaming.

About Conviva

Conviva is the real-time measurement and intelligence platform for streaming TV. Conviva's Video AI Platform provides insight into the consumer streaming experiences across all screens and applications at scale. With a global footprint of 50 billion streams per year across 3 billion applications and 200 million users, Conviva serves 200+ brands globally, including HBO, Hulu, Sky, Sling TV, Turner, and more. The company is privately held and headquartered in Silicon Valley, California, with offices around the globe (www.conviva.com).

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