

Optimizing Video In The Era Of Streaming Wars

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The promise of increased bandwidth and low latency made possible by 5G networks is contributing to a massive increase in the development of new mobile video technologies and streaming services designed specifically for 5G networks. But even as excitement builds among mobile operators over the revenue potential from new 5G video services, they also have to account for the new challenges those services will create. And while video will become even more important in a 5G network, the types of video supported will change dramatically.



For instance, while mobile gaming currently has little impact on existing mobile networks, 5G networks will fully empower cloud gaming services such as Google Stadia, further driving a demand for high-definition video delivered without buffering or stalling. To support this, operator networks will need the ability to support three to four times more bandwidth compared to typical usage today. Crucially, this video will need to be delivered at latencies of a few milliseconds to enable an authentic gaming experience. All in all, mobile video will account for as much as [90 percent of 5G traffic](#), driven by gaming and increased video streaming as well as more esoteric uses of video such as augmented reality (AR), virtual reality (VR) and mixed reality. We will see the continued battle between Moore's law (processor capacity doubling every 18 months) with devices getting smarter and consuming more HD, AR, VR videos and Shannon's law, (bits per hertz over the air) which will allow more data speeds and capacity delivered over 5G networks.

History so far has shown that Moore's law outpaces Shannon's law, creating significant challenges for operators in terms of congestion in their networks. To add to this challenge, because mobile data traffic patterns are so irregular, capacity planning—even with cloudification of their networks—will remain a challenge, as total mobile data volumes being carried by these networks continue to double every six to 12 months. As an example, a HD video on average requires up to four times more bandwidth than standard video and encrypted over-the-top (OTT) traffic. An Augmented Reality video, which will become a reality with 5G rollout, has an even bigger appetite for network resources, consuming three to five times the volume of a similar-length HD video.

Another key quality metric is driven by the fact that consumers tend to base their concept of video quality on the length of time it takes for the video to start playing. The majority of consumers [won't wait longer than six seconds](#) for video delivery to their mobile device, yet the average buffering time in a mobile network is seven seconds. As such, operators are having to walk a fine line between video picture quality (definition) and video delivery quality (latency).

The question for mobile operators, then, is how to ensure their 5G networks are optimized to meet the huge demands that video streaming applications will create.

What's Being Streamed?

By next year, more than 100 million consumers are expected to [shop online using augmented reality \(AR\)](#), enabling them to visualize products in different settings, and giving retailers the opportunity to individualize customer experience. Research indicates, in fact, that almost 50 percent of retailers plan to [deploy AR or virtual reality \(VR\)](#) solutions to amp up customer experience by next year.

Meanwhile, the video streaming wars, triggered by the huge success of Netflix, have reached epic proportions. One of the latest announcements from AT&T, which owns WarnerMedia—as well as its own 5G network—is the planned launch next year of a new streaming environment, dubbed HBO Max. In addition to housing 10,000 hours of content at launch, including *Friends* and *Doctor Who* (which it will feature exclusively), it will feature the DC Extended Universe superhero movies and *The Lord of the Rings* franchise.

HBO Max joins a plethora of streaming services that recently have hit the market or that are expected shortly. Although specific details still are lacking, Apple TV Plus is expected in November at \$10 per month and will feature unique content specifically created by Apple, which has reportedly budgeted \$6 billion to promote the service. Disney announced it is bundling [Disney+, ESPN and Hulu](#) for the same monthly subscription that Netflix currently charges. And the video streaming market is becoming even more crowded by new entrants like BritBox, a venture from BBC and ITV that features British television shows.

Netflix, once the reigning king of streaming as noted above, lost the right to offer flagship content, including the full range of Disney and Marvel titles, partially resulting in [its loss of 130,000 US subscribers](#). That's the biggest loss of customers Netflix has experienced since 2011, when it split its streaming and mail delivery businesses. Moreover, Netflix signed up only 2.8 million subscribers internationally, about half of what it predicted for the year.

What's the Impact On 5G Quality?

With 5G promising speeds of anywhere between 10 and 50 Gbps, orders of magnitude faster than anything 4G can offer, and with an increase in gigabit internet deployments across the globe, over-the-top (OTT) content will become easier and faster to access than ever before. As a result, there will be more OTT subscribers than traditional pay TV consumers by the end of 2019. Indeed, subscriptions to streaming services have already begun overtaking pay TV in both the UK and the US.

Perhaps unsurprisingly, mobile will become an increasingly popular means of consuming OTT content, although it's likely to be an additional screen rather than a replacement. And, given the sheer volume of video content and with the APIs it offers, 5G could soon be regarded as a video distribution network. Delivering a wealth of data for content providers and advertisers, it could truly transform the future of mobile video.

Some of this is not new: mobile video usage has grown between 50 to 100 percent each year for the past five years, and in locales that lack fixed-line alternatives or competitive data plan pricing, growth rates are higher still. What is challenging operators is a two-fold problem from video traffic: encryption, which generally applies to between 65 to 95 percent of total traffic depending upon geography, and the inability to control data on their networks.

While growth in mobile video content has been expected, many operators have not anticipated the exponential growth in HD content. By the end of 2018, [50 percent of all mobile video traffic will be HD](#), and that's set to increase to around 60 percent in 2019. This growth in HD, in addition to longer viewing times, will drive a further increase in video traffic on mobile networks.

This is good news for millions of subscribers, of course, but mobile operators now face the challenge of having to handle the resultant increase in traffic and ensuing encrypted protocols, which have the potential to wreak havoc on QoE. In fact, the importance of QoE to 5G networks is driving significant growth in the mobile video optimization market, which is projected to grow significantly over the next five years. One should also note that it will take mobile operators many years to ensure ubiquitous 5G coverage. This means they will need to support their customers through a mix of 4G and 5G networks, ensuring a smooth experience as customers roam between the two networks. This requires an intelligent video optimization solution that is 4G- or 5G-, device-, content- and subscriber-policy aware to ensure a smooth user QOE, especially for video streaming content.

An interesting side note to that research is that, on a daily basis, tablet users are three times more likely to view video content than smartphone users, yet sales growth of tablets has slowed to some extent in recent years. That growth is shifting toward mini-tablets, or phablets, which are primarily focused on entertainment.

Another key challenge is the need for operators to optimize the new services that 5G will support versus optimizing the network itself. 5G networks require experience modeling and network optimization based on low latency. This basis matters because different 5G services will have different requirements in terms of data rates and delay stability to support different low-latency services like live VR video streams and live VR eSports games. This means different management solutions have to be formulated for network optimization based on differentiated experiences. For example, optimizing for VR video services requires developing multiple cases, along with mapping different rates and delays to key performance indicators (KPIs).

There is no question that 5G networks present a great deal of opportunity for mobile operators to monetize their networks and compete against OTTs, regaining market share and establishing their place in the digital economy. The operators that understand the coming tsunami of mobile video—and understand the importance of implementing network optimization to address it—will ride the wave to success.