

5G in Video Streaming: Is the Media Industry Prepared?

Abstract

By 2022, online videos will comprise more than 82% of all consumer internet traffic.¹ As online video consumption increases, providing high-quality video content along with immersive experiences is crucial for achieving greater levels of customer engagement. However, 4G networks are no longer enough to deliver high-quality video content of 4K and 8K quality that requires higher speed (> 500 kmph), higher data rates (1-5 Gbps) and lower latency (<5 milli seconds). 5G promises a giant leap in the Quality of Service (QoS) and Experience (QoE), enabled by a range of new features. While the benefits are quite compelling, deploying the capabilities requires a lot of coordination across various areas including agility in architecture, 'Multi Access Edge Computing' (MEC) and enhanced Mobile BroadBand (eMBB).

This paper focuses on the importance of deploying 5G networks and enabling a cloud-based video streaming platform architecture to drive evolution of video content streaming. It also talks about the role of technologies; services and standards in building a 5G based ecosystem.

Deploying 5G network for video streaming - The key challenges

According to the 2019 Consumer OTT report, OTT subscribers watch more than two hours of mobile video each day on average.² As viewers consume more videos, they expect faster download speed, rapid streaming and seamless playback. However, given a highly dynamic and distributed mobile environment, 4G and 4G LTE fail to meet the need for higher network bandwidth, low latency, and high compute power. The fifth-generation network (5G), underpinned by advanced technologies and available spectrum, is targeted to reach both high speed (1Gbps) and low latency (<5ms>). This can help communication service providers (CSPs) and broadcasters handle increasingly larger video files (GB to TB) and mitigate slow load times and mid-stream buffering issues. However, harnessing the potential of the 5G spectrum and deploying reliable and robust 5G networks is a daunting challenge. It entails high capex spend and a need to identify profitable use cases, upgrade existing platforms, as well as implement an effective go to market strategy for launching new services. But with most of the 5G components still in the development phase, CSPs are highly dependent on original equipment manufacturers (OEMs) and 3GPP specifications to upgrade existing networks. This hampers network security, putting the CSP's reputation at risk. Some of the key challenges in upgrading to 5G include:

- **Lack of 5G-friendly ecosystem:** Limited collaboration between CSPs, device and chip manufacturers, equipment vendors, and retail and wholesale service providers makes it difficult to develop a platform ecosystem and build B2B partnerships - a crucial imperative to offer consumer-centric services.
- **Lack of dedicated bandwidth:** The inability to allocate dedicated bandwidth to on-demand, mission-critical applications and services such as healthcare and connected cars impedes the ability to effectively deliver and monetize 5G related services.
- **Legacy IT architecture:** Most of the CSPs run their business operations on legacy applications and architecture. This limits their ability to digitally interact with customers. 5G networks require a new microservices-driven, customer-facing environment to accelerate interaction dynamics.
- **Costly fiber backhaul deployment:** To support the increasing need for low-latency and high-bandwidth applications, CSPs need to rollout fiber backhaul networks, which are costly to deploy.

- Complex technology needs:** Addressing the B2B and B2C services with a single architecture while providing guaranteed, dedicated and on demand support for mission critical services requires leveraging advanced technologies.

Getting ready for high quality video with cost effective 5G platform

5G can enable faster throughput up to 10 Gbps and higher data volume up to 10 Tbps/km². However, to exploit these benefits, CSPs will have to roll out reliable 5G networks by deploying a fully virtualized and cloud native platform that connects RAN to the core, enables network slicing and supports multiple MVNOs and enterprises. CSPs will also need to provide seamless roaming across 4G and 5G networks, and ensure network monitoring through a data-driven architecture. This is crucial to enhance user experience, reduce cost and identify network errors in near real time. Leveraging a 5G architecture (see Figure.1) built on a single cloud native network helps meet diversified service requirements for B2B and B2C services for video streaming. So, for CSPs to successfully roll out 5G, it entails creating a fully virtualized and cloud native platform which connects RAN to core, enable network slicing through cloud native service-based architecture, support multiple MVNOs, enterprises and data driven architecture with insights and intelligence support.

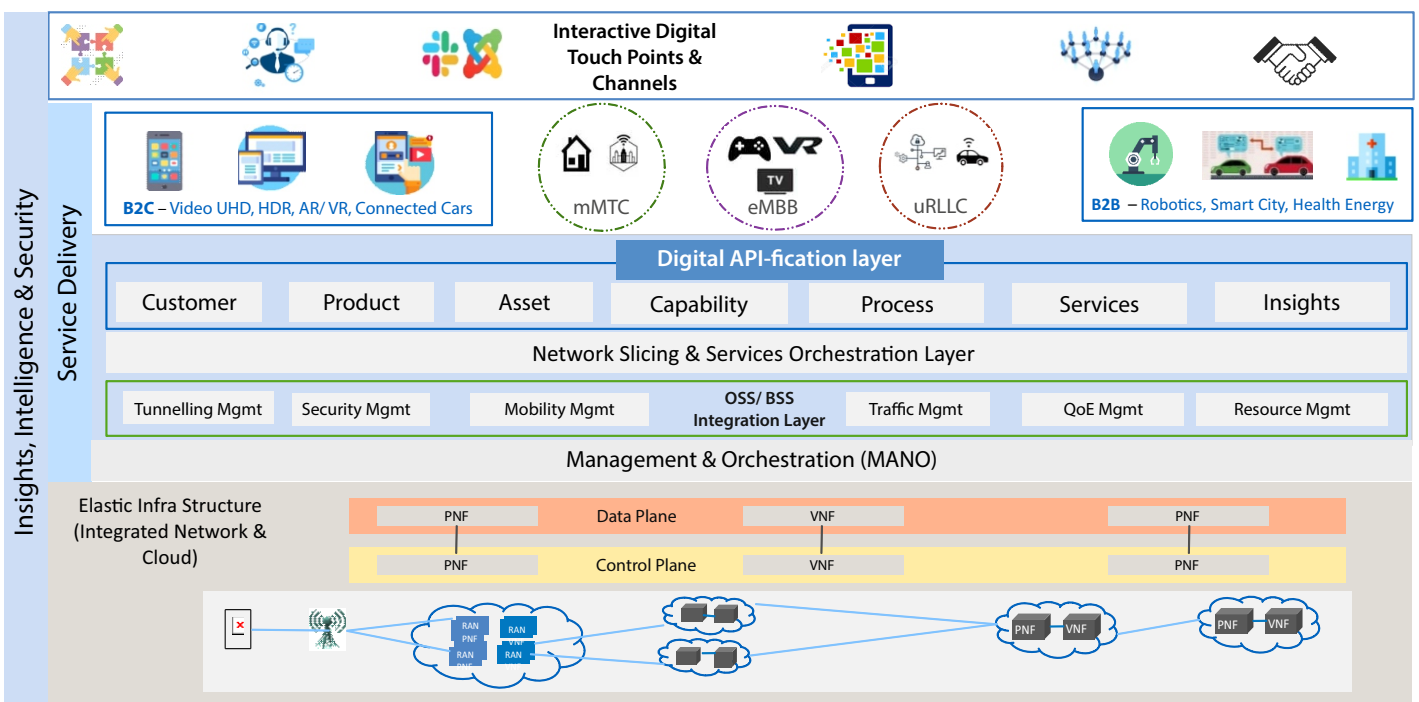


Figure 1: 5G Reference Architecture

Three key benefits of the proposed modular 5G architecture

In order to leverage 5G services of eMBB and MEC, CSPs and broadcasters need to move core video streaming to the cloud for edge processing. A cloud media architecture of the video platform can not only support traditional linear or VOD streaming services and next-gen immersive media, but also cloud gaming services, adaptive delivery for VR video streaming and proximity aware content repositioning. At the same time, it helps move streaming services and CDN functionality in the telecommunications providers' data center to 5G-user plane area to ensure support for next-gen protocols. This helps prepare and distribute content and advertising in 5G (see figure 2).

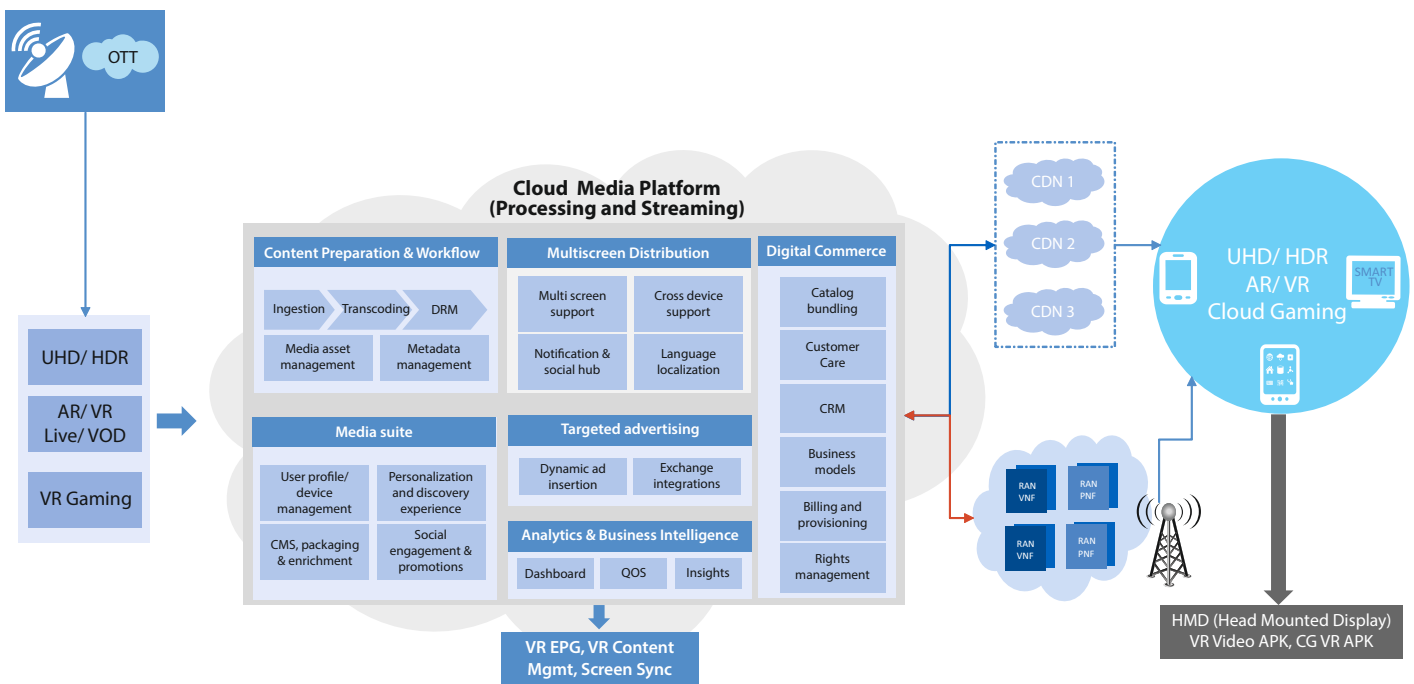


Figure 2: Cloud Media Architecture Video Streaming

Some of the key benefits of cloud media architecture-based platform include:

#1 Enables high video quality backhauling: The proposed architecture can provide support to traditional video streaming through IPTV, cable, DTT and 5G with processing at the edge. Built on a wireless network, the cloud media platform provides high speed connectivity with single digit latency, allowing auto scaling to build, run, secure, manage, and scale AR/VR, UHD, and HDR streaming at the edge.

#2 Ensures high resolution and better immersive experiences: eMBB and MEC enable broadcasters to provide superior immersive experiences through greater personalization and video supply at the wireless edge. 5G coupled with cloud media streaming platform helps broadcasters and premium video customers to ingest live video into the cloud and securely transmit it to multiple destinations through the global network.

#3 Supports dynamic Ad insertion: Through CRN and MEC servers, 5G can facilitate dynamic ad insertion for offering a higher degree of consumer personalization. An advertising platform can be easily integrated with a video processing platform and advertising server to deliver a consistent TV like experience, thereby opening sizable advertising opportunities.

5G will transform livestreaming forever

5G is more than just a speed upgrade – it's a whole new revolution that will alter how consumers view video content on the go. Livestreaming experiences on 5G, especially in the sports and events space, promise to be even better than the real thing with multiple wireless cameras streaming to the 5G network. Barcelona and Manchester United are already headed in that direction³. However, unlocking the full potential of 5G isn't going to happen in isolation. It will require mobile-tech to become smarter, large scale infrastructure changes, and planning with the ability to integrate next-gen technologies with global standards and a mature ecosystem. Organizations seeking to take advantage of 5G will need to establish common understanding and tight cross-industry collaborations among equipment vendors, telcos and broadcasters - an imperative to create a 5G-based ecosystem. This will help deliver firsthand experiences and novel content, enabling unprecedented ways in which customers interact with media.

References

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