

Cloud and 5G bring the reality to AR and VR

Interactive, immersive content has the power to transform enterprises and deliver consumer experiences that will define the media and gaming industries for years to come. Although potential use cases are wide and varied, the platform at the backbone of all of these revolutionary changes will be the same – a combination of cloud and 5G connectivity.

By Linda Xu

VR/AR gaming on the rise

We're about to enter an exciting new era where some of the world's brightest companies are preparing to provide augmented, virtual, and mixed reality experiences that many consumers cannot even imagine today. Behind the scenes, forward-thinking communications providers are defining and developing the platforms to provide the strong backbone needed to deliver these experiences in a cost-effective, customer-friendly manner. One of the industries clamouring to be at the forefront of providing completely immersive customer experiences is the multi-billion dollar gaming industry.

Access to the highest quality VR experiences in the gaming sector now requires the use of expensive, high-spec on-premises hardware. Current interactive and virtual reality gaming products require expensive and unwieldy hardware in addition to high-bandwidth connectivity delivered through fixed networks. This not only limits the market by raising the barrier to entry, but severely restricts the form factor and portability

of devices using the services.

However, the demand for AR and VR gaming is huge, and the keys to unlocking it are cloud and 5G. At Huawei Mobile Broadband Forum 2018 (MBBF 2018), Paul Brown, the general manager for Europe for the VR pioneer HTC Vive, said that he believes 5G could bring mobile VR into line with experiences enjoyed by consumers using high-end home PCs. HTC Vive has already begun testing VR through 5G, with very encouraging initial results.

With collaboration, he added there was the potential to enable "cloud gaming everywhere in the world, taking the industry to a whole new level." In addition to gaming, he added VR could create "moving and emotional" experiences in a number of spheres.

5G will offer the extremely low latency needed to deliver these high-bandwidth services over a mobile network, removing limits on where devices are situated. The use of cloud means that the hardware that does the heavy lifting no longer needs to be situated in or near the devices themselves,



lowering the upfront costs of hardware and opening subscription business models for software companies.

By removing complex and expensive elements from devices, their form factors can be transformed completely, with the only limits being the imagination of designers. Augmented reality company RealWear, for example, currently provides services using eyewear for industrial applications. Going forward, however, they're limited in their application due to technological issues.

Speaking in an interview at MBBF2018, RealWear EMEA sales director John Thurgood said, "As we start to process more and more data, [current] devices are going to struggle to process what will be an awful lot of information. So that's where we need 5G and cloud or edge of cloud-type processing to help analyze objects or perform facial recognition." He added that the markets opened would be enormous, citing manufacturing, energy, and aerospace as industries where its devices could be used to process huge amounts of data in the field using low-latency mobile network technology.

Next-generation service delivery

Experts at MBBF18 generally agreed that the opportunity for innovation delivered using cloud and 5G was huge and would open a wide range of next-generation services.

The gaming company Gloud is one of the many enterprises looking to take advantage of this evolution in the entertainment sector. CEO Zhang Hexiang believes, "The cloud allows providers to reach formerly unreachable users because [traditionally] big games were designed for PCs and consoles. Now they can get users from phones and smart TVs." In addition, he says, "By removing a lot of restrictions and limitations game designers can create whole new [types of] games." Zhang believes that 4G and Wi-Fi technology aren't good enough for cloud gaming, but that, "5G's high bandwidth and low latency, cloud gaming can be as popular as the streaming video market."

One of the most popular mobile games of recent years was Niantic's Pokemon Go. The company's VP Strategic

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Partnerships, Omar Tellez, said its continued delivery of advanced AR games requires “strong infrastructure” from network operators across the world.

Augmented and mixed reality software development specialists Holo-Light believe that 5G and cloud are crucial for its reality technology to meet people's high expectations, “At Holo-Light we aim to tackle the main user pain points to enable really smooth AR experiences,” said the company's marketing manager Iris Feuchter. “We're trying to allow users to be more engaged in the content by providing this in combination with edge computing technology and low latency. So, it's crucial for us to [have a] built out 5G network.”

While augmented reality and virtual reality usually require some kind of wearable device, there are technologies evolving that don't require any peripherals. KDX is one of the leaders in simulated reality where a 3D experience is delivered using a TV screen and two eye trackers.

This technology, stated KDX president Biao Zhang, would be enhanced by 5G and cloud technology, as reduced latency would make it possible to move complex processing to the cloud – enabling wider adoption. Zhang added, “If the network is fast enough we can move

computation to the cloud site. At that cloud site you have much better computational power, but we definitely need a high-bandwidth, low-latency network.”

He believes this technology, as is the case with augmented and virtual reality, has many exciting use cases outside of entertainment – education, medical examination results, and virtual presence in the business world are three.

In the enterprise domain, cloud will open opportunities for smaller companies to compete with larger players as they'll be able to access technology and applications that previously required huge CAPEX investment and real estate to host the required computing infrastructure. Intel's general manager for its 5G infrastructure division, Caroline Chan, highlighted the vast enterprise potential of Cloud AR technology, emphasizing the many use cases in industrial settings for the new technology. Intel has recently undertaken a trial with a US retailer to deliver immersive experiences in-store, as its partner sought to stand-out in the hugely competitive sector. Using this example, she added, “If brick and mortar stores were made interactive and you get the AR/VR experience, then you want to come back.”

Opportunities for operators

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As players from the hardware and content industries outlined exciting use cases delivered by low latency 5G services, operator representatives concentrated on business cases and network rollout priorities.

Tomas Alonso, head of product engineering for Orange Spain, said that in the AR/VR field, that the “actual reality lies with the operator,” stating it was up to them to ensure these services could be delivered. “We have to change the way we operate and build networks,” he added. “We have to accommodate both processes and networks.” Deutsche Telekom SVP technology architecture and innovation, and chairman of the GSMA’s future network group, Arash Ashouriha, added that the industry has to work together to define standards that are developer friendly.

GSMA CTO Alex Sinclair said that if the industry was going to achieve the promise of a hyper responsive, intelligently connected world with 5G, then the cloud is going to have to get a bit closer to the action. “Why now?” he asked. “Because this won’t happen organically. To really be what we need, we need the industry to do what it does best and come together so we can do this the same way and make it simple so it can actually scale.” He believes that it will take some time, so we need to start now.

Collaboration is the key

Although the future is bright for these technologies, industry verticals must work together to truly deliver. That’s why companies from across enterprise, communications, gaming, and hardware are collaborating with mobile industry group GSMA in its Cloud AR/VR Forum. The group seeks to define technology best practice and establish related business models.

Following its extensive research into the area, Huawei believes a strong business case exists in a model for telcos that it describes as “thin client + broad pipe + cloud app.” The business model is based around the delivery of powerful cloud applications over high-bandwidth connectivity to light, consumer-friendly devices. This case is not only applicable to Cloud AR/VR applications, but Cloud PC capabilities and other Cloud X functionalities.

Cloud X has huge potential to transform a whole host of sectors and industries. With many exciting innovations being developed across all the “realities,” perhaps the most important aspect is to get the connectivity right, which is why good quality 5G networks and high grade cloud infrastructure are vital. [www.5g-uk.com](#)