

Thinking of moving to 5G?

What does 5G mean for our customers and the subscriber community?



Introduction

5G represents a wireless future, defined by the ability to provide 24x7 connectivity for people, places and things...everywhere! It is poised to change the world as we know it, with exceptional new levels of reliability, performance, flexibility and cost-effectiveness. Businesses and agencies will use 5G to connect devices and applications that expand customer engagement, streamline operations and enable agility in ways that have never been possible before. To recap, here is a quick overview of the mobile services that have been made available to date:

- ❖ 1G (1971): Mobile voice calls
- ❖ 2G (1991): Mobile voice calls and SMS
- ❖ 3G (2001): Mobile web browsing with commercial launches in 2003 (Operator centric)
- ❖ 4G (2008): Mobile video consumption and higher data speed (Service centric)

What is 5G?

5G is the "User Centric" technology developed to serve the consumer and digitalization of industries, and is the next major phase of mobile telecommunications and wireless systems.

It consists of a combination of standards and specifications proposed by the 3rd Generation Partnership Project (3GPP).

The 5G proposal is such that any transmission delays over the radio network will be limited to just 1 millisecond. Use cases - such as assisted navigation for autonomous vehicles and the new Google Stadia service capable of streaming video games in 4K resolution at 60 frames per second with support for high-dynamic-range (HDR) to players via Google datacentres across the globe - will require the specification of a 5G infrastructure to support it.

3GPP has been trying to enforce a unified data repository and that is the overall goal, but for now the reality is that it will take a lot longer after the initial roll-out of 5G to get there.

What does 5G mean to a mobile operator?

Mobile operators and telecommunications providers are scrambling to prepare themselves for the arrival of the first commercial 5G networks, some of which have already launched in major cities but using the System Architecture Evolution (SAE) core. One of the most innovative aspects of the 5G architecture will be its ability to network slice, which will let operators provide segments of their network capacity to deliver Quality of Service (QoS) for specific customer use cases, whether that be for the smart home, the Internet of Things (IoT) or even the connected car, all of which have aggressive latency needs. 5G will also make available new use cases or expand older ones such as Fixed Wireless Access, enabling Mobile Network Operators (MNOs) to take on the home broadband market without the headache of fiber roll-outs involved in Fiber to the home (FTTH).

Each use case receives a unique set of optimized resources and network topology, covering certain SLA-specified factors such as connectivity, speed and capacity; essentially all that will suit the requirements of that application.

What does 5G mean to a subscriber (Enterprise or Consumer)?

Here are just some of the reasons why, for a subscriber, considering an upgrade to 5G might just be worth it:

Obtain an instant connection – 5G will provide an almost instantaneous internet connection; whether it's for streaming video content, playing virtual reality games or controlling smart connected devices at home, everything will feel much quicker.

Faster speeds and better quality – 5G will enable the download of high-definition video in seconds rather than minutes, to stream at higher resolutions in real-time, and provide smoother video calls.

Better connection and bandwidth in busier places – When too many people are trying to connect to the internet simultaneously, today's networks can reach their limits and start to slow down.

Cheaper overall connectivity – With the ability to replace the home broadband connection, subscribers are able to disconnect from their fixed line altogether. As 5G will be good enough for gaming, streaming and data fees dropping to ‘all-you-can-eat’, it will be possible for subscribers to source their entire connectivity needs from their 5G capable MNO.

What are the challenges of 5G?

Subscribers are looking for speed and content. Will there be the content to justify the speed premium? Enterprises may be looking for QoS, along with bandwidth and latency reductions, thus network slicing may be of interest (as described above).

Edge computing is another term loosely connected with 5G, enabling operators to process the data closer to where it's produced, facilitating quicker processing and massive scalability...but are the use cases out there to support that? The Connected City community believes so.

4G isn't currently widespread enough and its bandwidth is such that even streaming a film for example (requiring significant bandwidth) can drive up costs which are then passed onto the consumer. Even with 5G, streaming the same film will still use the same amount of data - however the proportion of the bandwidth consumed is less with 5G, possibly enabling and encouraging new uses for mobile subscribers to download larger amounts of data.

How will 5G affect Evolving Systems' Products and Solutions? Tertio Service Activation (TSA)

- ❖ One of the major functions of TSA is to map right from the concept of services in the BSS systems through to the operator's manifestation in terms of features set on the network. The Unified Data Management (UDM) will almost certainly have a more complex data model than the Home Subscriber Server (HSS), but why is that? It's because the network is more complicated and all these things are standards set by various committees. That mapping becomes even more important in protecting the already-mammoth Business Support Systems (BSS) from knowing the detail.

- ❖ If using a Long-Term Evolution (LTE) System Architecture Evolution (SAE) Evolved Packet Core (EPC) then the HSS is still provisioned as usual, requiring TSA.
- ❖ With a full 5G core, the HSS functionality is transferred to the Unified Data Management (UDM). This has a wider remit to include fixed and convergent services but, in essence, acts as a HSS. In general though, to satisfy the goals of 5G each “subscriber” may well have several network slice options available, meaning a greater amount of data may well need to be provisioned in addition to what is there today.
- ❖ Whilst the goal of the UDM is to hold all subscriber data, and then various services dip into that data store when subscribers require authentication, this was the goal of the HSS never fully realized. It is therefore expected that various Value Added Services (VAS) platforms and others will continue to require individual provisioning in the 5G paradigm.

Total Number Management (TNM)

- ❖ **MSISDNs:** Whatever happens, MSISDNs will remain for the foreseeable future – there are too many legacy networks and systems that rely on phone numbers existing and hence these will continue to need to be managed.
- ❖ **eSIMs:** There is still the complex management of identifiers, such as IMSI and eID (even if you aren't managing the eUICCID). Given that there will be on average >1 profile per eSIM, this can introduce further complexities.
- ❖ **SIMs/IMSi:** Despite the rise of eSIMs, traditional SIMs will remain in play for many years as the majority choice for accessing networks; they and their identifiers will continue to need to be managed.
- ❖ Additionally, it is yet to be seen whether network slicing requires any direct subscriber provisioning to edge network instantiations.
- ❖ **IP addressing:** As an all IP network, it may well be even more necessary to manage IP addresses allocated to subscriber devices. Managing huge IPv6 address spaces is impossible on a per item basis, hence an algorithmic approach to allocation may become necessary, with only allocated addresses being managed and stored.

Intelligent Remote Provisioning: Dynamic SIM Allocation (DSA)

- ❖ Bootstrapping and activating eSIMs will continue to be a part of a subscriber's lifecycle.
- ❖ A pure 5G core approach would involve providing the AMF→UDM interface (N8) via a revised First Use Register (FUR) although there is provision for fall-back to MME connection over S6a using Nx. It is assumed due to its ubiquity that SMS will continue to exist, or that the problems with IP OTA in LTE are overcome to provide a push to SIM IP connection using GP 2.2 annex B standards.
- ❖ A pure 5G core and 5G only devices are presumed to be some way off, much like pure LTE devices which are barely existent many years after introduction.

Smart Dealer

- ❖ Subscribers still need to purchase a service, KYC will continue to rise in prevalence, and that process will need to be managed. The only change will be that there are potentially more devices needing service, which requires more subscriptions to be sold and therefore broadening the potential appeal of low-cost 'hyper available' PoS systems, such as Smart Dealer.
- ❖ As more MNOs offer 5G services, and those services become 'all-you-can-eat', there is a need for the MNO to differentiate themselves by means other than price. Customer satisfaction, up-selling other products and services and, in particular, going to where the customer actually is will all be key factors. MNOs will not be able to expect customers to find a store or visit a web page, they must "go to the customer".

Conclusion

From understanding each of the networks, there are bound to be speed comparisons made between any new iteration compared to its predecessor, especially as a whole new network is on the horizon.

As to how 5G can greatly surpass 4G, one of its advantages will lie in data capping. The problem with 4G is that subscribers can rarely enjoy the full capacity of 4G's speed because there are certain factors that disrupt the signal; buildings, microwaves and other WiFi signals are just few examples. While 5G's small wave means there remains a challenge regarding penetration of buildings, there is a promise that there will be no need for data capping in this new network and that it will provide hundreds of possibilities in internet speed capacity. For example, it could possibly give wireless broadband the ability to allow thousands of connected devices to access the internet, both in homes and workplaces.

Furthermore, 5G isn't just faster in terms of internet speed it also, vitally, offers a much cheaper service. 5G will lead to a lower cost-per-gigabyte for wireless carriers, which in turn will translate into low-cost cell plans and possibly unlimited mobile data for everyone. As this technology is a true upgrade in our modern world, the speed of data transmission also opens up thousands of possibilities beyond the current imagination. The Internet and the world of communication has indeed become a basic necessity for our modern world and it is widely accepted that fast and limitless internet is what we have been anticipating...who knows what greater technology or what creative inventions may come from this milestone!

