

Unlocking 5G's full potential with cloud-native functions and a service-based architecture

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There is a tendency in the market to consider a new 'G' mobile network as primarily just faster than the previous 'G'. While initially this is as much true for 5G as it was for 3G and 4G introduction, the real monetization opportunity for 5G is not so much in the radio infrastructure, but really in the 5G core and the new services that can be brought to market as a result. Are CSPs ready for this?

Forward-thinking CSPs can realize significant value-creation opportunities that generate new revenue streams when implementing the 5G standalone core. Enabled by cloud-native functions and a service-based architecture having well-defined APIs plus the functionality that Amdocs' 5G-ready, cloud-native set of solutions provides. These now include a 5G "Value Plane" that is a key enabler for driving network-embedded services and bringing cloud business models to 5G networks, working in tight conjunction with end-to-end service and network orchestration – empowering enhanced automation and innovative monetization models. However, before examining this up-coming development we should take a brief look at today's communications environment and its significance for our information-centric economy.

5G networks are now being deployed, but coverage is not ubiquitous, which means that 4G/LTE is often still the mainstream communications service. 4G/LTE was a breakthrough development; it had an all-IP architecture and an Evolved Packet Core (EPC), a key component that can be virtualised, in other words enabled in software. 5G encompasses a much wider set of network developments that go well beyond a higher speed, lower latency version of 4G. Unfortunately, 5G has been over-hyped in the radio infrastructure element and this has obscured its importance as well as the role it is set to play in next generation, virtualized networks.

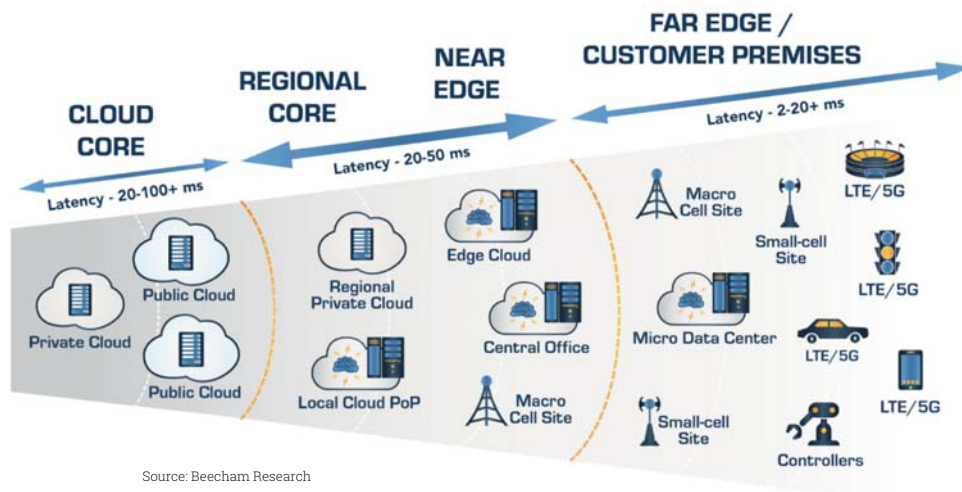
Coverage of 5G in the media has also been confusing. Early deployments were NSA (non-stand-alone), which did not bring any meaningful improvement in performance or functionality. 5G SA (stand-alone) will; it introduces three generic services: enhanced mobile broadband (eMBB), Ultra Reliable Low Latency Communication (URLLC), and massive Machine Type Communication (mMTC), as well as new functionalities such as network slicing. But deployment of these innovative services cannot start until the relevant 3GPP versions are finalised. For example, release 17, which focuses on the low-latency service for industrial IoT, is expected during 2022, with services coming in 2023. However, it is worth recalling 4G/LTE took nearly a decade to evolve from 3G.

Revenue generators

What are these value-creation opportunities from the 5G core? The following three areas are of particular note:

- **Network slicing**
- **Consumer and enterprise revenues**
- **Edge and IoT-based**

Figure 1. Components of the edge cloud, depending on application requirements.



5G Network slicing enables network operators to logically partition network resources for different use cases, applications, or customers. For example, a private mobile network can be implemented on the same network infrastructure as a public service but segregated and tailored for its own application needs. Different service providers can also be configured on the same network infrastructure for their own individual needs. Clearly, this creates opportunities to increase revenues through new services without incurring additional infrastructure costs. Rather than only being able to offer a single class of service that not all customers will find useful – as with previous ‘G’s – operators can offer differentiated services on a per-customer basis that enterprise and residential users will find more attractive and save cost at the same time.

Consumer and Enterprise revenues. The unique generic services of 5G – eMBB (speed), URLLC (ultra-low latency) and mMTC (density) – offer opportunities for new use cases. Partnering with OTT providers, for example, there is an opportunity for CSPs to become solution enablers (Network Embedded Service (NES) enablers – see later), bundling and reselling third party services to users in a B2B or B2B2x model. Enterprise users have already seen the opportunities in a wide range of application areas, including smart factory, healthcare and transportation/logistics. Fixed wireless services are a further opportunity, aimed both at individual consumers and businesses.

Edge and IoT-based opens a wide range of opportunities that have not been addressed before by CSPs. IoT is moving from remote monitoring with data sent to the cloud, to edge-based processing of data for near real time operations. This moves IoT applications into the control and automation space, coupled with cloud connectivity for software updates, overall coordination of activities from the center and data analytics for trends and other analysis. AI and ML may be introduced at the edge for handling massive numbers of movements, such as quality control in a smart factory, or at the center for analyzing and dealing with potential operations failures and security breaches.

In many cases, companies may need to move data between the far edge, near edge, and central cloud, depending on the application's profile and security requirements. This offers strong revenue opportunities for CSPs in the form of data transfer and transformation services for business users.

A further 5G capability is communication between large numbers of devices in a small area, the massive machine-type communications (mMTC) mentioned earlier. This lends itself especially well to IoT environments. Once again, this can be useful where low latency is critical. Examples could include use of industrial drones for monitoring by oil and gas operators or electrical utilities, or in a construction or factory setting where "smart" sensors help make decisions about how to operate based on data collected from the production line.

It is clear that revenue-generating use cases overlap for 5G operators and their customers. Edge cloud and IoT often go hand in hand, meaning that both will provide telcos with differentiated service opportunities.

Each of these are areas where CSPs will most likely need support systems to enable revenue-generation.

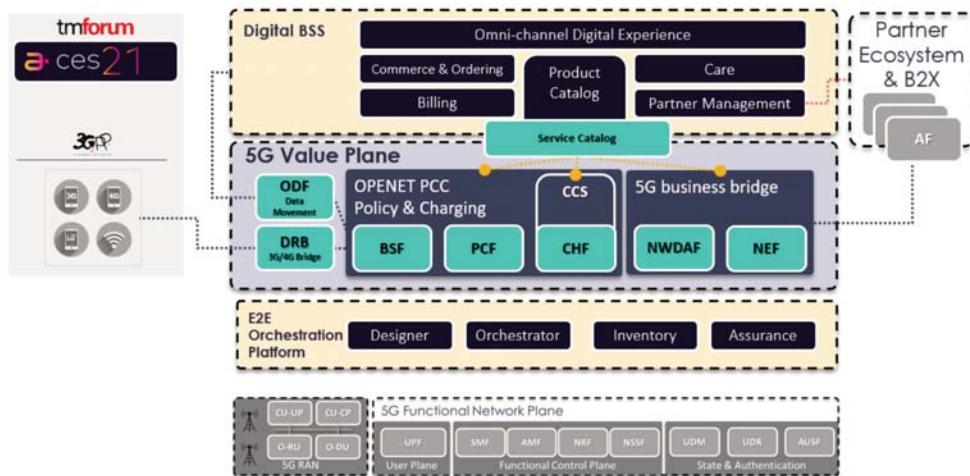
Amdocs' role in this environment

Amdocs provides the expertise and global reach to accelerate the industry's journey to the cloud and improve business operations, driving innovative, next-generation digital experiences for end users. The company's 5G-ready, cloud-native set of solutions ensures fast time to market and the flexibility needed to keep up with technology's exponential pace. Amdocs also has strategic cloud collaborations with AWS, Microsoft Azure and Google Cloud.

The company's 5G solutions span OSS and BSS, empowering enhanced automation and innovative monetization capabilities, and have recently been expanded to include the 5G 'Value Plane' that is a key enabler for driving network-embedded services and bringing cloud business models to 5G networks – more about that below. Amdocs has already engaged in more than 25 new 5G operations and monetisation projects across 15 countries, including agreements with leading CSPs like AT&T, T-Mobile and Three UK. In addition the company has expanded its collaboration with Microsoft to enable service providers to transform using cloud-native solutions and cloud transformation services and deploy 5G networks for consumers and enterprises in the cloud.

In July 2020 the company expanded its network portfolio by acquiring Openet, a leading provider of 5G products. These are built on microservices, which are the core of the cloud-native application architecture, and enable insight, monetization and control of 5G services. Flexible policy and control, and monetization rules can be applied across different services and network slices. They also support policy and charging (PCC) in the core and also at the 5G network edge. This agility enables operators to monetise different features of the network (e.g. QoS, latency) and open up new opportunities such as B2B, IoT, smart cities and industry 4.0. This can help CSPs secure a central position in the 5G value chain.

Figure 2. The 5G Value Plane acts as a centralized '5G brain'



Source: Beecham Research

The 5G Value Plane.

One of the biggest CSP concerns is not to repeat the experience of 4G. When 4G was launched, the value of new services was seized on by OTT market players who could adapt their services to rely on 'best efforts' connectivity. CSPs were substantially limited to a pure connectivity role, with significantly lower revenue potential.

The introduction of 5G provides an opportunity for CSPs to move out of that role. This is because each use case requires a tailored network profile and this moves the CSP into what Amdocs refers to as a Network Embedded Service (NES) enabler. Without CSP support, the NES enabler role would not exist.

Amdocs recently introduced the concept of the 5G value plane, served by the company's cloud native, 3GPP compliant monetization and automation capabilities. The concept behind this is that while 5G SA includes a user plane and a control plane, these alone do not generate revenue for the CSP. To generate revenue from 5G, CSPs need a 'value plane' that provides a range of capabilities to monetize the network.

It combines policy control and charging and a product catalog with a 'business bridge' that includes a network data and analytics function (NWDAF) and a Network Exposure Function (NEF), which uses API's to expose network capabilities to CSP partners. Integrated with end-to-end network and service orchestration capabilities, the Value Plane acts as a centralized '5G brain' across business, IT and network and makes possible enriched data and monetization for the expanded 5G ecosystem.

Creating the revenue services

These services depend on the network-based capabilities enabled in part by the NEF and NWDAF. NEF facilitates secure, robust, developer-friendly access to exposed network services and capabilities. NWDAF is then a 3GPP standard method used to collect data from user equipment, network functions, and operations, administration, and maintenance systems that can be used for analytics.

Network Slicing depends on inherent 5G Security and Privacy mechanisms to avoid becoming a commodity service. Cloud Enablers depend on Dynamic Compute and Storage Allocation at the edge and across the metro area to create a "Telco Connectivity Cloud". This adds significant value to the "Data Center Cloud" of cloud providers.

User Controlled Service Options and Policies will eventually evolve and become a cloud-native, hyper-scalable service. These services are likely to be very "sticky" when they are embedded in enterprise and cloud solution solutions. MNOs and CSPs can expect these capabilities to translate to enhanced revenues and margins through 2026. That timeline reflects the limited deployment of 5G standalone. It is beginning to take off, with 19 deployments so far expected to be completed in 2022.

Hyperscalers: Partner opportunities for CSPs

Hyperscaler Cloud Providers (HCPs) such as AWS, Google Cloud, and MS Azure provide computing, storage, and networking services to enterprises and the B2B sector. MNOs and CSPs provide value-added connectivity, but is 5G's upcoming ability to provide cloud-native services a competitive or a complementary offer? Should the two communities compete or partner in an ecosystem?

CSPs bring next-generation wireless technology, operational expertise, and connectivity expertise to enterprise environments and they make extensive use of cloud services. Hyperscalers bring in-depth computing and automation expertise plus effortless scaling of enterprise services, which include connectivity but not at the granular CSP level. These offers are clearly different, but they are complementary. Moreover, a partnership/ecosystem is logical because neither community can meet the demanding needs of enterprises on their own, but CSPs have to step up and meet the 5G challenge.

5G SA cloud native service platforms make it possible for CSPs to provide secure trusted access to 3rd party, cloud-hosted or private enterprise apps. They are therefore able to leverage access to internal network control plane functions and allow enterprises and HCPs to safely modify their own service feature combinations. Authorisation can be controlled by the customer. IT executives at enterprises and HCP sites will be able to control multiple network service and connectivity features or proactively monitor network SLAs, just as they do today for cloud data center services.

Many MNOs and CSPs have established partnerships with the HCPs and several are even hosting their 5G Core service platforms at HCP Data Centers and looking to co-locate their RAN network components with Cloud Edge Services. Partnerships would add value and high value service enablers ensure that they become part of the HCPs applications and enterprise services value chain. However, at time of writing, Q4 2021, only a few networks have enabled a full 5G core out of the hundreds of networks that need to be upgraded.



Conclusion

In the near term 5G SA represents a deployment and marketing challenge for MNOs and CSPs. Providing ubiquitous coverage takes time and requires significant technical resources. Meanwhile confusion has been generated in and by the media about the availability of the three key services: eMBB, URLLC and mMTC. However, it is hard to overstate the size of the medium- and long-term opportunity when evaluating the potential of 5G cloud-native solutions operating in a service-orientated architecture and enabled by those three connectivity services. That said, MNOs and CSPs need to start planning their transition to this new, service-centric environment now, recognise the complementary role of the Hyperscalers, and start developing partnerships and expanded ecosystems. Amdocs has invested heavily in this service-centric environment to assist in this and are strongly positioned to accompany CSPs on their evolutionary journey to operate and monetize 5G.