

NEW BUSINESS OPPORTUNITIES WITH 5G AND CLOUD

5G and cloud-optimized network applications

The digital transformation underway is accelerating, enabling new business opportunities both for telecom operators and for enterprises from other industries. The main drivers are the need for increased efficiency, flexibility and new business models enabled by the introduction of 5G and increased adoption of cloud technologies. New services can be expected to be deployed at an unprecedented pace.

Service providers target speed in development and deployment of new services. It should be possible to brainstorm one day about a service and test it the next day with real customers in a live environment. If the service is well received, it is scaled up quickly to meet the market demand. And, vice versa, if the service fails, it is closed at minimal cost. Besides speed, service providers also expect efficient operations, both for new and legacy services. Hence, a very high degree of automation is needed for “no-touch” networks.

Diverse network requirements

There is a wide range of new services enabled by 5G. From support of massive media distribution to remote operation of machines and smart metering. This will result in very diverse requirements on the network. Life-cycles of services will vary greatly. Some will live for a few hours and be used by a limited number of people, while others will exist for years and be used by millions. Characteristics such as latency, resiliency, availability, performance, throughput, and security will look very different depending on the type of service.



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How to manage diverse network requirements

The 5G core network is designed with the concept of network slicing. Networks for different purposes are logically separated with each slice providing customized connectivity and features. One can imagine a slice for enterprise A, and another slice for enterprise B. All slices execute on a shared and distributed infrastructure, with a high degree of flexibility. This allows for the network to simultaneously meet many different requirements.

Services and applications optimized for cloud

Connectivity, security, mobility and communication services of users, or devices, are managed by network applications. The functions and external interfaces of these applications are, to a large extent, standardized in 3GPP. Intense work is ongoing to specify the architecture and detailed procedures of the first generation of 5G networks.

Cloud-optimized network applications are developed specifically for deployment in distributed cloud environments, while delivering 5G service characteristics. These characteristics include predictable real-time performance, massive scalability, fault tolerance, hardware and infrastructure agnosticism, and automated lifecycle management.

Designing network applications for cloud

A number of design principles are important for cloud-optimized network applications. The software must be portable across different platforms and shall efficiently use infrastructure capabilities as they evolve and mature. Today, Infrastructure-as-a-Service (IaaS) environments based on hypervisors dominate the telecom cloud market. Over time, Platform-as-a-Service (PaaS) and container-deployed applications will increase in importance.

Network slices are flexibly distributed across geographies and datacenters through an orchestration system. This puts requirements on software modularity, interfaces, and scalability. Dynamic optimization of both compute and storage is key for all applications that are deployed on a wide scale. This because consumption of cloud resources is an important cost factor.

The telco environment puts high demands on service availability and predictability. Application software must be robust and handle multiple failures in surrounding infrastructure without compromising the user service. A high degree of automation is introduced to manage and hide the complexity of a large amount of inter-operating network applications, in many cases from several software suppliers.

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Teamwork makes short software development cycles

The development of network applications combines very high quality and robustness with short turn-around times for new customer driven requirements. This is best done by organizing software development into fast-moving, independent, and empowered teams that handle the full cycle of specification, implementation, and testing. A continuous integration activity, supported by automated testing, ensures the integrity of system level software at all times and that deliveries of software can be done when needed. The increased speed in development creates an opportunity for fast introduction of software into production networks. A key enabler is to automate the entire process of customer testing, onboarding and upgrade.

The short turn-around of customer requirements puts requirements on software architecture. Modularity is key to create independence between design teams and to limit the dependencies on other parts of the system from new functionality. This modularity is part of what cloud native design principles refer to as microservices.

Optimizing the application performance – finding the right balance

Implementation of cloud-optimized applications requires skill and expertise, not only because of the feature-richness of a telecom system, but also to strike the balance between partly conflicting requirements.

One example is how real-time sensitive applications are divided into modules. Each switch and router will add latency to a flow of data or signals. While modularity is needed to divide work between design teams and to simplify deployment of new functionality, it cannot compromise the performance and predictability of a real-time service. So, finding the right architecture modularity is key.

Another example is how application data is best managed. Telecom applications continuously read and write data during a user session. Databases are used to store the data, sometimes just during a session and in some cases much longer. This is the case for subscription and charging data for users and devices. Frequently used data with short access times is stored in databases close to the stateless business logic while longer lived data with less critical delay requirements can be geographically separated.

Microservices are designed, developed, and maintained, as separate components, de-coupled from infrastructure and other functions to the extent possible. A complex network service will consist of many microservices. The cost for integration and lifecycle management of software is a key concern for telecom operators. This means that the deployment modularity of software must be treated separately from the internal architecture.

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These examples show that multiple perspectives must be considered in the design of cloud-optimized network applications. These will change over time as technology and business models develop.

SUMMARY

5G networks create opportunities for new user services and industry applications. Telecom networks are more important than ever for people, businesses, and society. New opportunities also generate new requirements on network services and applications. These will change over time as innovation in business models, applications, services, and technology continues.

Ericsson's 5G Core System supports a wide range of use cases for consumers, enterprises and industries. Network slices with cloud-optimized applications and a very high degree of automation and resource orchestration, are key capabilities for the 5G service delivery. The Ericsson 5G platform comprises the core, radio and transport portfolios, together with digital support systems, transformation services and security.