

# THE BUSINESS VALUES OF 5G CLOUD-OPTIMIZED NETWORK APPLICATIONS

## Introduction

The advent of 5G offers new opportunities for service providers<sup>1</sup> and enables the telecommunications industry to develop new services and deliver them efficiently. The combination of the 5G core network, network slicing, distributed cloud and advanced cloud-optimized network applications allows for innovation in the services that can be provided. These address not just the traditional segments of fixed and mobile broadband, telephony and M2M but also the new segments of enhanced mobile broadband (eMBB), massive machine-type communications (mMTC)<sup>2</sup> and critical machine-type communications (cMTC).

This paper explores the business values that the 5G core network and distributed cloud-optimized network applications deliver. Service providers wish to deliver innovative new services and new value to their customers with a rapid time to market. They also want to deploy all their services and operate their network in a cost-efficient manner. The network applications that provide services to users are now starting to be delivered in cloud-optimized formats and this offers a greater degree of flexibility and customization than traditional methods. Cloud-optimized network applications deployed together with advanced 4G and 5G radio solutions enable service providers to meet the demand for innovation today and in the future.

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“... advanced cloud-optimized network applications allows for innovation in the services that can be provided.”



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## A new network application paradigm

The 5G core network offers the ability to address new use cases and applications. Network slicing allows the network operators to dedicate parts of the network to the different use cases. The distributed cloud enables functionality and data to be deployed in the optimal place based on parameters related to cost and performance. And the cloud-optimized network applications enable faster time to market and operational efficiency.

Cloud-optimized network applications offer a new paradigm for the network operator. In a traditional network deployment, network components are deployed very slowly as they are delivered from the vendors and are then tested and gradually introduced into the network. In the 5G core network<sup>3</sup> the network applications are deployed in the datacenters independent of the underlying infrastructure and can be orchestrated, deployed and scaled efficiently.

In the 5G core network, the operator's business logic is decoupled and abstracted from the network application functionality that delivers this business logic. This enables the service provider to more rapidly design new services, thereby improving their time to market. This degree of isolation allows for customized services that are segment and use-case specific. This also enables a higher degree of independence of the

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<sup>1</sup> Including mobile and fixed operators as well as converged operators

<sup>2</sup> Often described as the Internet of Things (IoT)

<sup>3</sup> This includes evolution of the 4G core network

services from the underlying applications, allowing for independent lifecycle management of the services and the individual network applications. This abstraction allows the service provider team that develops their services (Service DevOps) to view the network applications themselves as a service and a toolkit for their business logic. This enables both the service provider and third parties to offer services.

A second level of abstraction occurs between the network applications and the infrastructure they run on, making them hardware (HW) and platform independent. This level of abstraction allows for optimization of the costs of the platform as well as for efficient scaling up and down of services. The applications are now independent of the infrastructure, which can have its own lifecycle. This allows the service provider team that runs the network (Infrastructure DevOps) to view the applications as running on a platform that they manage.

A third level of abstraction is within the applications. Ericsson's cloud-optimized network applications separate state from the business logic and also separate essential data into cloud data layers supporting the applications.

## What benefits do cloud-optimized network applications deployed in the 5G core network offer?

Cloud-optimized network applications deployed in the 5G core network bring key attributes that address

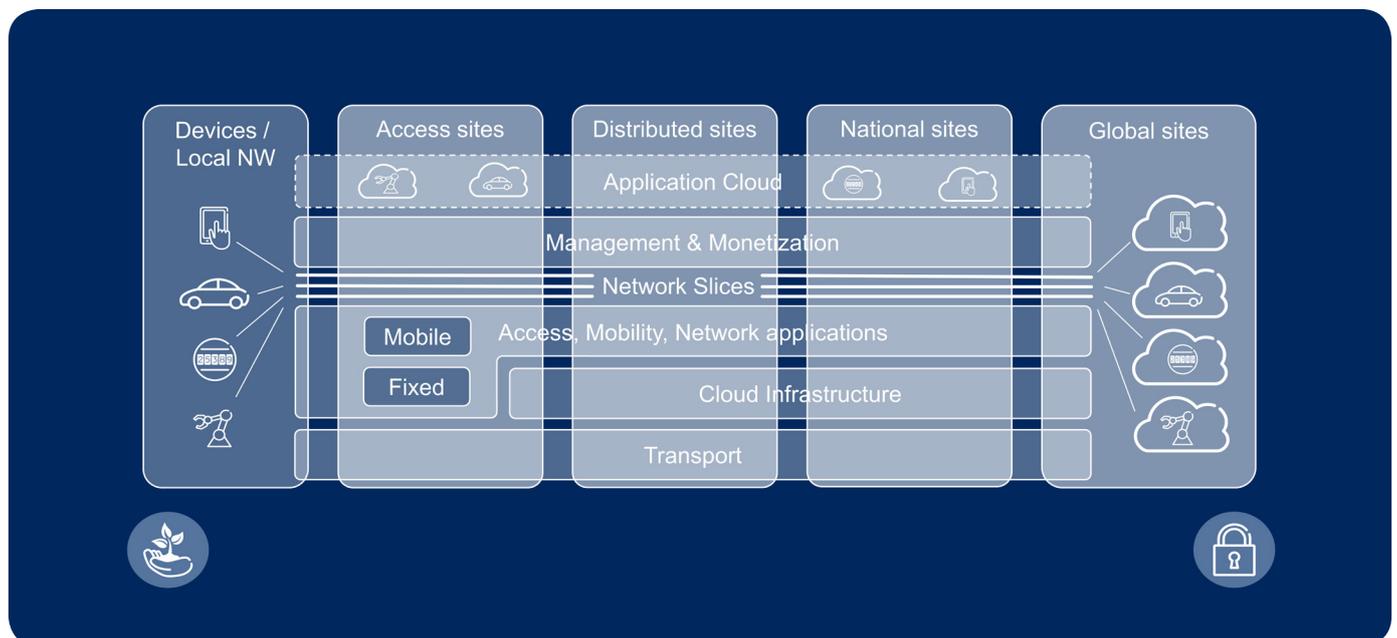
“This enables the service provider to more rapidly design new services.”



the needs of both the service providers and their customers. This is a shift in traditional ways of thinking where service innovation has been mostly implemented in the business support system (BSS) layer. These network applications can be combined in innovative ways and provide data exposure that enable new business insights.

The cloud-optimized network applications enable increased speed in deploying services by allowing sandbox development and rapid scale up and down of the services in independent containers.

- Isolated development from the underlying infrastructure, OS and network application SW
- Rapid prototyping and testing
- Innovation in developing ‘services’
- Separated and self-contained new services isolated from already deployed services



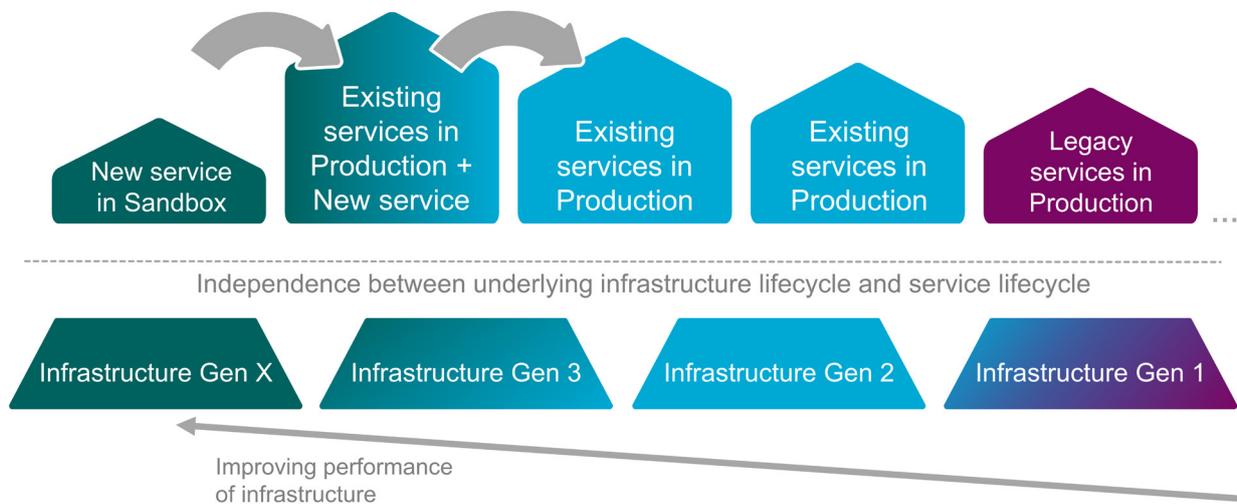
The cloud-optimized network applications improve the ability to both scale up and down as well as improving the overall capacity and operational efficiency of the network.

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“...network applications can be combined in innovative ways and provide data exposure that enable new business insights.”



- Lower infrastructure costs for deploying services (Capex & Opex)
- Faster infrastructure deployment time
- Faster deployment time for services
- Effective use of human resources
- Ability to share the infrastructure between services
- Ability to adjust the amount of infrastructure between services depending on the point in the lifecycle (scale up/down/maintenance mode)
- Easier and independent management of the data center’s infrastructure lifecycle
- Easier and independent management of the lifecycle of services
- Cloud automation for deploying services



Enhance Lifecycle Management from Cloud Optimization

## Example use cases for cloud-optimized network applications

A number of use cases can be envisaged that demonstrate both the requirements for and the benefits of the 5G core network and cloud-optimized network applications.

### i) Massive IoT offer for asset tracking

In this example, a service provider wishes to deploy a 'connected luggage' service. While this market exists, it is typically based on Bluetooth-connected tags with crowdsourced connectivity. A premium mobility-enabled offer would allow the user to track their luggage from a different country. The service provider's offer includes LTE tags and a tracking service for a low monthly fee and may be offered directly or via third parties. This offer has a relatively low ARPU and needs a long life in the network.

The cloud-optimized network applications enable this service to be deployed efficiently in the network. The isolating and abstraction properties of the cloud ensure that such service can be deployed efficiently and cost-effectively. The lifecycle costs across the long-life span are optimized since the service can live on for years in the cloud with almost no maintenance and testing. The cloud packet core and data management applications are deployed in a small corner of the cloud and need limited lifecycle maintenance and low Opex. This type of service will normally operate at a low and stable capacity until an event such as poor weather disrupts travel services. The combination of low-cost and fast hyper-scalability is a challenge that can only be met with cloud-optimized applications running on a distributed cloud.

### ii) Critical machine-type offer for manufacturing

In this example, a major auto manufacturer wishes to use the low latency and extreme reliability of the 5G network to connect their manufacturing machines to each other and to the design team. They are concerned about receiving the performance they need, getting a strict service level agreement (SLA) as well as about the privacy and security of their machines. The service provider's enterprise division develops a package suitable for the factory and deploys a network slice in the cloud partitioned from the rest of their network. They use dynamic network slicing to provide the SLA for latency and throughput. Part of the network is distributed onto the manufacturer's premises using a local cloud-optimized user plane delivering low latency operation and local breakout. Information on the machines that are connected is held in a dedicated part of the cloud making it secure and protected. When another manufacturer wishes a similar package, the service provider can then deploy this in another network slice with their own dedicated cloud applications.

### iii) Resilient healthcare offer

In this example, a major hospital wishes to upgrade their IT and telecommunications systems to enable a truly mobile workforce. Rather than a traditional PBX, they will unwire the medical staff using mobile devices. A key attribute required is that the hospital needs to operate even if external connections are cut to the location. An LTE small cell system is deployed in all the buildings on the campus, offering advanced connectivity. Enterprise-specific features are deployed in the cloud-optimized network applications, enabling capabilities such as speed dialing and messaging across multiple devices. During normal operation, the service is delivered from a local datacenter; in the event of a network disruption, a local distributed copy of all the required network applications takes over automatically, offering seamless service.

## Who benefits from the 5G cloud-optimized network applications?

The key values of the 5G cloud-optimized network applications address four separate segments, which benefit from it in multiple ways.

### i) Service provider business teams

The operator's business teams desire the ability to design innovative new services for their customers and to bring these to market rapidly, cost-effectively and efficiently. The business teams are motivated to provide enhanced customer value that they can then monetize efficiently, resulting in a strong need to speed up the

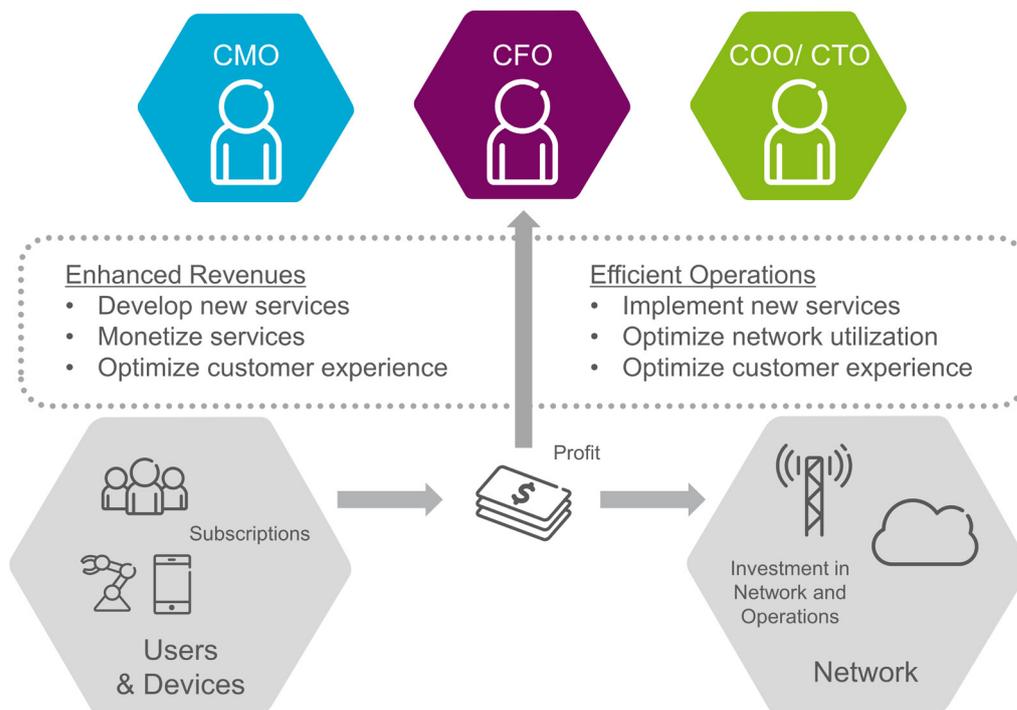
development of their service offers. Cloud-optimized network applications from Ericsson provide a set of capabilities that reduce the time to market for new services by actively participating in the business logic and providing business-relevant data exposure and feedback.

### ii) Service provider technical and operations teams

The technical teams who select technology want to have leading-edge solutions that they can innovate on to deliver new services and that can evolve along with the service offers.

The operations teams who run the network are concerned with delivering those services in an efficient manner. They want the services to be easy to deploy and easy to scale up and down to meet fluctuations in demand. They also want to deploy solutions that have a low and predictable lifecycle cost. Cloud-optimized network applications from Ericsson can be efficiently and automatically deployed in service provider datacenters using Ericsson's COMPA (Control, Orchestration, Management, Policy, Analytics) architecture.

“...a set of capabilities that reduce the time to market for new services.”



Business Flow and the benefits of Cloud Optimization

### iii) Enterprises

Enterprises are interested in using the 5G core network to address their telecommunications needs end-to-end. Modern enterprises are mobile and both the people and things in the enterprise connect wirelessly. The three key drivers of mobility, consumerization and the need to optimize business mean that the enterprises are motivated to outsource their telecommunications needs to service providers so they can focus on their own core businesses. Ericsson's cloud-optimized network applications enable this by offering the ability to distribute functionality to the best location-based on use case and by enabling segment-specific offers and network slices.

### iv) Consumers

Consumers want to see innovative offers delivered by their service providers at cost-effective prices,

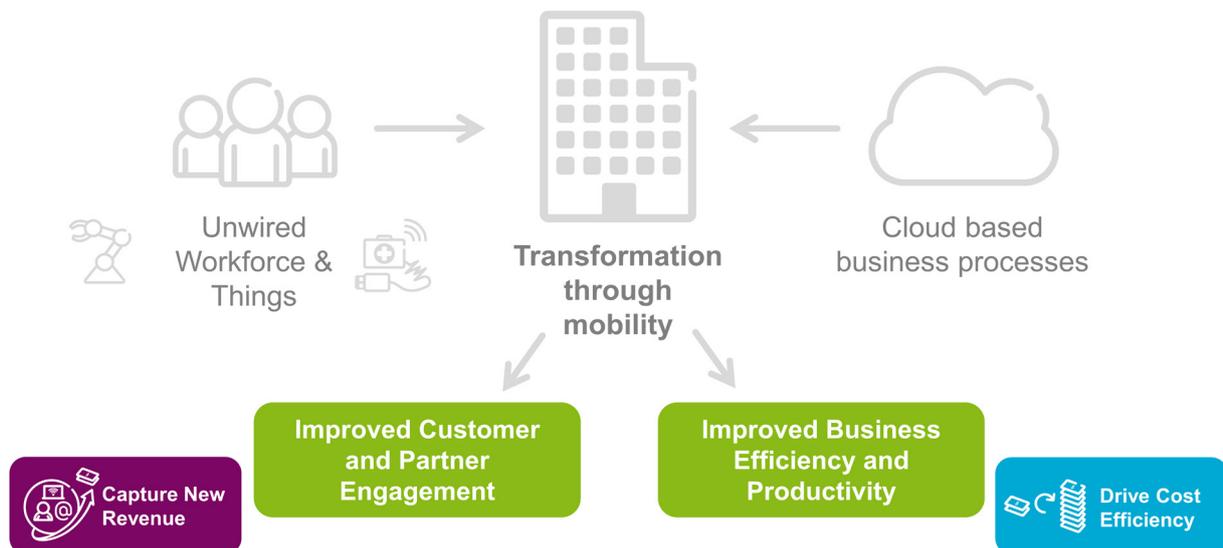
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“Ericsson’s cloud-optimized network applications enable this by offering the ability to distribute functionality...”



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and to have a world-class user experience. Mobility is central to their way of life and they shop, socialize, communicate, surf, talk, travel, listen to music, watch videos, game and do diverse other activities on their mobile devices.



## SUMMARY

With its ability to address new business segments, the 5G core network offers a new paradigm to the service provider and new capabilities to their customer. The 5G core network is implemented on a distributed cloud infrastructure with a high degree of flexibility in order to provide tailor-made network slices to meet many different requirements. Network slicing allows networks to be logically separated, with each slice providing customized connectivity. With the use of cloud-optimized network applications, the service provider and their customers benefit from both a faster time to market for new services and a more efficient set of operations. The ability of cloud-optimized network applications to participate directly in the building of services and the business logic offers new capabilities beyond simple pricing models.

Ericsson offers a strong portfolio of cloud-optimized network applications that deliver these values end-to-end and ensure that they will continue to evolve in the network. This will enable more diverse use cases and improved user experience in the network, unleashing a new generation of innovation in network services. Service providers can act now and deploy Ericsson's cloud-optimized network applications and know that they have deployed a network that is ready for the future.