

5G CLOUD DATA LAYER

Introduction

The 5G core network enables a large variety of innovative use cases and services creating new service provider revenue streams and cost optimized production of those services. Many implementation aspects of the 5G core network are inspired by the web-scale industry enabling agile and continuous rollout of new services and low cost service production through a high degree of automation and a very scalable infrastructure, which is shared among multiple services.

One of the architectural cornerstones in the web-scale industry is the clear separation between business logic and its data into a data layer. This separation allows for simple schemes in the lifecycle management process that can be automated. Examples are elasticity, where the service provider can scale services up and down depending on the load situation, automated service upgrades and automated recovery from software and hardware failures.

Challenging Requirements

The telco industry must allow the flexibility and decoupling underpinning the above-mentioned values, while providing the performance necessary to guarantee satisfactory delivery of a large variety of services. This is particularly true for the separation between business logic and data in the service implementation. In this case, telco requirements on transaction frequencies, response latencies, recovery times and predictability are tougher.



Staffan Bonnier

Packet Core Chief Implementation Architect
staffan.bonnier@ericsson.com



Antonio Alonso

Expert, Data Management Architecture-
Consolidation
antonio.alonso@ericsson.com

Another challenge to address is the smooth migration from legacy installations into new cloud-optimized service implementations, allowing each operator to migrate at their own pace. This requires interoperability and feature parity between legacy network applications and new cloud-optimized network applications.

Ericsson is uniquely positioned to address the above-mentioned challenges. The high level of internal isolation of the business logic has allowed us to entirely re-architect the portfolio, making it cloud-optimized and ready to follow future technology evolution with preserved feature parity. Moreover, with the introduction of Ericsson's multi-tiered 5G cloud data layer, we deliver a separation of business logic and data while maintaining each type of data in a way that enables the optimizations required by the end-to-end service characteristics.

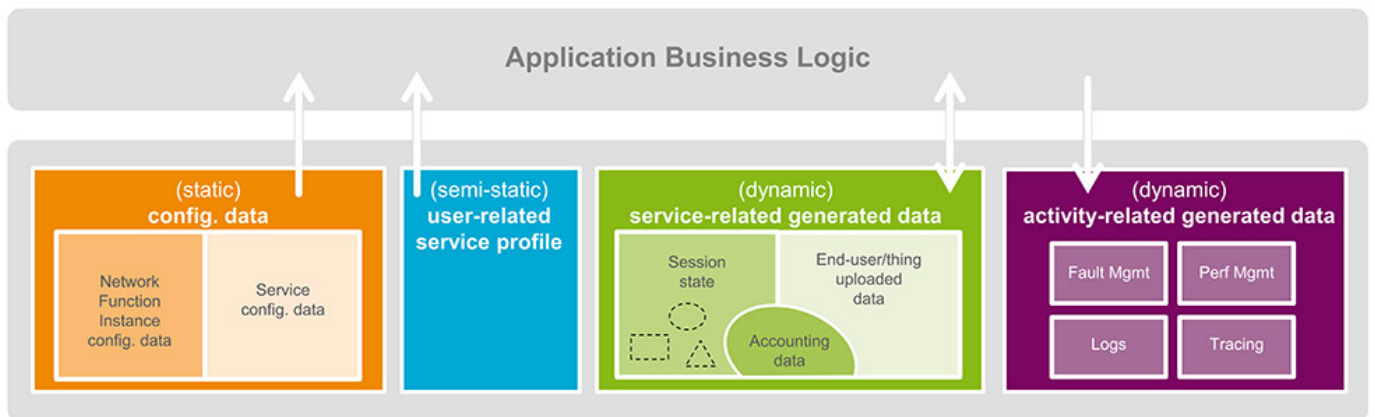
The 5G cloud data layer

The key to addressing the data performance challenge in the 5G core network is to appreciate and understand the flavor of the different types of data. This includes the access patterns induced by services using or generating that data and the real-time characteristics associated with those patterns. These are requirements that are ultimately imposed by the demands of end-to-end real-time services. In addition, non real-time

aspects must be considered in the classification such as data generation and data provisioning. The end-result is a classification of data into groups, each with its own particular characteristics. The 5G core network services are implemented by cloud-optimized network applications.

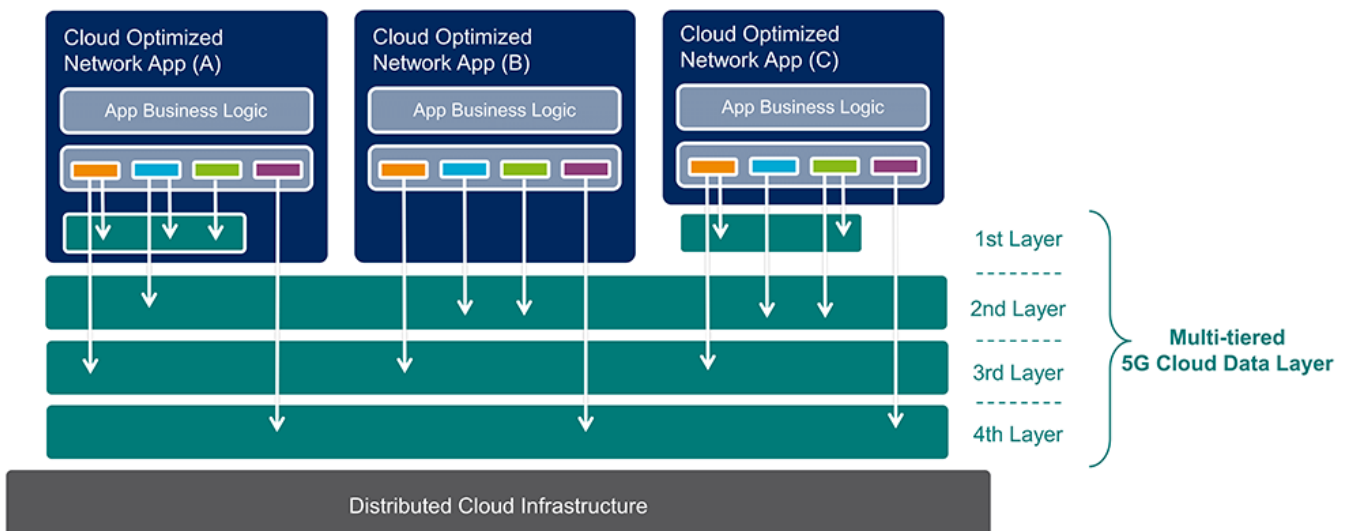
The figure below illustrates a range of possible types of data handled by a generic network application:

Network Application



By allowing for a division of the 5G cloud data layer into different sublayers or tiers, each identified group of data can be mapped into a tier depending on its characteristics. Each tier is managed as a separate entity, allowing for flexible deployment throughout the distributed cloud infrastructure. Each tier is optimized

according to its particular characteristics such as real-time and high-throughput requirements, forcing proximity to a particular network application instance or centralization for simplified provisioning and high data consistency. The tier principle is illustrated below.



This division into separate storage tiers allows for a higher degree of business logic and data decoupling. For instance, the decision regarding the storage technologies to apply and the properties to fulfill, such as durability, dynamicity, consistency, volume, resiliency, access frequency, read/write ratio and access latency is made per layer. This also allows for selecting the most cost-optimal solution for each layer.

The clear separation of business logic from data in Ericsson's cloud-optimized network applications allows each operator to transition at their own pace to the Ericsson 5G cloud data layer, with a fully preserved, backwards compatible feature set. The Ericsson multi-tiered 5G cloud data layer also allows for orchestration of all the different storage instances on each data tier.

From the outset, Ericsson's multi-tiered 5G cloud data layer is designed to support and be deployed in a distributed cloud infrastructure. The different storage instances are physically deployed in one of the cloud-enabled central offices and/or data centers. Some of those storage instances can be geographically spread across many physical sites in order to provide geographical replication characteristics for the data being handled.

“The separation of business logic from data allows for a smooth transition to Ericsson's multi-tiered 5G cloud data layer, with a fully preserved, proven feature set.”



Last, but not least important, in a “big data and machine learning”-driven digital world, the multi-tiered 5G cloud data layer supports pre-integration of the various storage technologies with standard real-time data analytics solutions. Selected data can then be read by a cloud-optimized data exposure layer where the analytics tools can analyze it and provide automated business insights.

SUMMARY

The multi-tiered 5G cloud data layer enables well-known benefits from the web-scale industry in terms of resiliency, upgradability, scalability/elasticity, and data analytics, while at the same time allowing for telco real-time characteristics. The decoupling and statelessness of the business logic in Ericsson network applications allows for a smooth transition into a cloud-optimized setting. Delivering feature parity between legacy installations and cloud-optimized network applications.

Ericsson's multi-tiered 5G cloud data layer provides an optimized storage solution consisting of a set of orchestrated data tiers accommodating different cloud deployed storage technologies to best support the different data workloads.