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A practical strategy for a common network data layer (Reader Forum)

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In 5G standalone (SA), the control plane has been significantly enhanced as service-based architecture. Components for policy, authentication, session management and user management have been disaggregated. They provide a flexible, open deployment framework for a range of new use cases.

Driven by the range of use cases for deployment and the need to transition from existing systems provides an inflection point to consider how user data and session data is stored, updated, distributed and synchronized. This is what is called 'stateful data' and must be accurate, consistent and delivered across the network to the right service, the right device – at the right time.

Why is this important for 5G deployments? – simply the operator needs to own the data and the tools for its distribution and synchronization at scale; The data (subscribers, profiles, application, enterprise) is the most valuable commodity to the operator's business.

Although the concept of a Common Network Data layer to manage and distribute data isn't new, it's important to consider whether it's practical. From the perspective of business, network and technical, the question is whether data storage and distribution can be another common layer in the architecture to fulfill core needs. An alternate idea is to let each group of network functions determine their own approach to managing data and distribution. This may be well specified by the operator, but it is always open to interpretation by different vendors, which eventually leads to fragmentation of functions and service.

Business needs

The business needs include low cost, flexibility, resiliency and the ability to rapidly onboard new clients who require stateful storage. It is important to combine functions into new use cases, and therefore isolating client access to a specific need. What we have seen is a maturing and detailing of the requirements for operational management, resiliency, data privacy, interoperability and data

migration. The maturing of the requests point to the implementation of 3GPP standards and the evolution from current network environments.

The key use cases are 5G SA, multi-tenancy, enterprise and network slicing, all of which are driving change. Multi-tenancy is also a business need based on geography (different operating companies), for backup and for multiple applications.

Technical needs: Is a common approach practical?

From a technical perspective the common requirements on standard interfaces (3GPP or IETF) are balanced today by considerations on interoperability, synchronization and consistency models, data access management, distribution, scale of access and management utilities. Specifically, the question is whether **fast read/access** time be matched with:

1. The ability to define and extend the data model to balance synchronization and consistency, i.e. not all data has to be replicated everywhere at once

2. Providing different virtual views of data so clients don't have to change interface and schema understanding

3. Managing the actual data store in hybrid models (memory, disk) on COTS hardware

4. Controlling the access to data for multi-tenancy and data protection

5. Scaling in/out for demand and to enable slices

6. Storing structured objects (e.g. profile information) and unstructured (e.g. session objects)

7. Intelligently distributing application load

Network needs

From a network perspective, the core requirement from next generation network architectures is zero down time combined with fast access time (read & write) and flexible interface. The understanding of 5G architecture is maturing into practical call flows and interworking; however, the flexibility of deployment, schema modeling and interfaces should not be more important than core resiliency, performance and operation.

In reviewing a common network data layer from a practical perspective, it has to provide for fast onboarding of new application consumers combined with the operational capability needed for a foundational layer. Next-generation architects need the confidence that such an approach provides toolsets they can use to build out the functions needed for 5G use cases – both technically and from a business perspective.

But is it practical to combine business and technical considerations with those for network planning on a common network data layer? The answer yes if standards are followed and an open system is used to onboard multiple applications.

Perhaps the more salient question is: What other option is there? Without a common network data layer, operators are forced to stay with existing, unchallenged vendors; limit longer-term evolution and approaches to use cases; and risk fragmented storage and replication architecture as a result of working with multiple new vendors.

Operators should approach this as a unique opportunity to change how data is architected for 5G, with the ultimate goal of providing business and operations teams with a common approach to data, thus simplifying architecture, taking advantage of 5G network slicing and edge deployment, while also providing the foundation for core network transition.