Networks that learn and improve

Ericsson's cloud native Network Data Analytics Function solution is 3GPP-standardized and enables custom analytics use cases to keep costs low, service quality high and operations smooth.

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Data-driven 5G networks

5G is changing the way people and things communicate.

Compared with previous core network standards, cloud native 5G Core adds complexity, and 5G devices produce a significantly increased amount of data for the core network to manage.

As new network capabilities emerge to handle the increase in complexity, automated data-driven solutions will become instrumental in controlling network operational costs. Service providers cannot afford to rely on human interventions and inflated staff levels in network operations.

There are high expectations on the 5G Core network to use the benefits of artificial intelligence (AI) and automation for network optimization to deliver superior network experiences.

This is where Ericsson's Network Data Analytics Function (NWDAF), the new 3GPP standard for analytics in the 5G Core, comes into play. Ericsson has been active in 3GPP since its inception and has helped shape NWDAF as standard, ensuring it promotes a multi-vendor approach to avoid vendor lock-in. NWDAF addresses three primary standardization points:
• Data collection interface from network nodes
• Predefined analytics insights
• Data exposure interface for consumers

Why NWDAF?
NWDAF is designed to overcome market fragmentation and proprietary solutions in the area of network analytics, streamlining the way core network data is produced and consumed, as well as generating insights and taking actions based on these insights.

Figure 1: New tech and higher complexity requires automated data-driven networks.

The benefits of AI to build data-driven networks

The new analytics standard allows for multiple implementations or deployments of NWDAF and this is at the heart of Ericsson's value proposition.

Service providers evaluate three overarching questions when embarking on their NWDAF journey:

1. **The road to NWDAF.** How do I evolve from existing analytics solutions in the core network?
2. **Using NWDAF.** What is the total cost of ownership for a new NWDAF solution, compared to different solutions on the market?
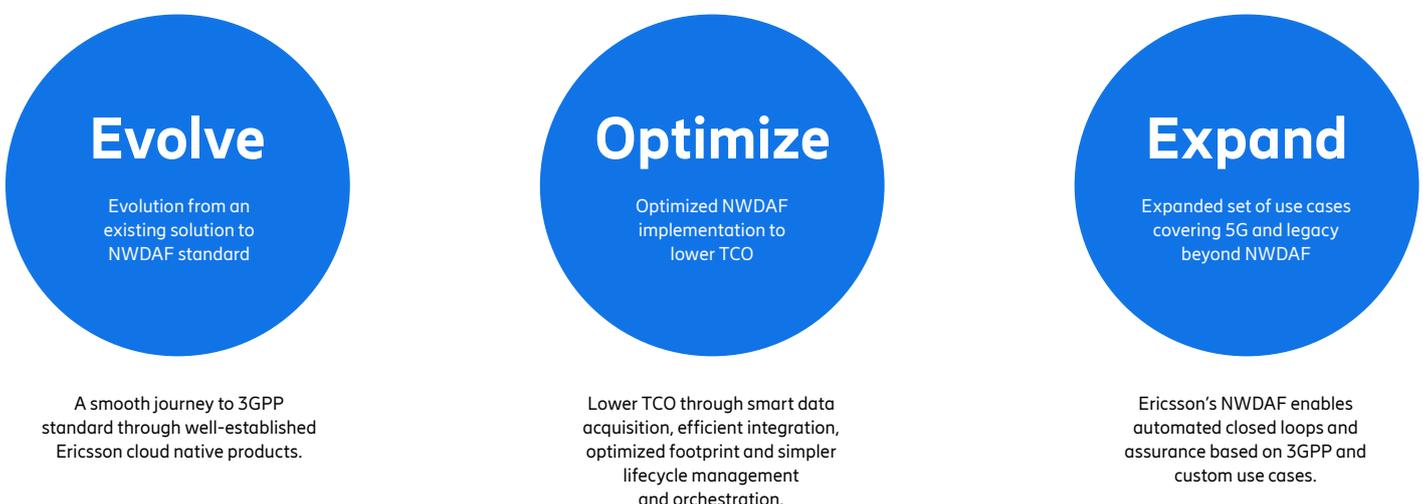3. **Beyond NWDAF.** What can I expect to get on top of the standardized interfaces?

The road to NWDAF is facilitated by Ericsson's well-established dual-mode 5G Core products: Packet Core Controller, Packet Core Gateway, Cloud Core Resource Controller, Cloud Core Policy Controller, and others, which allow the introduction of NWDAF through a software upgrade.

Ericsson's NWDAF solution enables several total cost of ownership reduction drivers that result in capex and opex savings of up to 45 percent compared to other third-party solutions:

- **Smart data acquisition.** Data movement is minimized between access/aggregation cloud to standalone locations.
- **Efficient integration and testing.** Co-located/pre-tested NWDAF delivery and interworking between different generations (2G/3G/4G/5G) out of the box.
- **Simpler orchestration.** Co-located NWDAF is part of the cloud native network function (CNF) and can be deployed in the same orchestration flow.
- **Optimized footprint.** Both co-located NWDAF and standalone NWDAF (see "Ericsson's NWDAF solution") build on existing products, reusing common services.

Ericsson's extensive experience in the analytics field enables the building of new analytics use cases, supporting multi-vendor proprietary data sources and multi-domain event correlation. Ericsson's NWDAF solution supports flexible cloud deployment options on the Ericsson and 3P infrastructure, including hyperscale cloud provider deployments (both private cloud and public cloud).

Figure 2: Ericsson's NWDAF value proposition

Evolve
Evolution from an existing solution to NWDAF standard

A smooth journey to 3GPP standard through well-established Ericsson cloud native products.

Optimize
Optimized NWDAF implementation to lower TCO

Lower TCO through smart data acquisition, efficient integration, optimized footprint and simpler lifecycle management and orchestration.

Expand
Expanded set of use cases covering 5G and legacy beyond NWDAF

Ericsson's NWDAF enables automated closed loops and assurance based on 3GPP and custom use cases.

Ericsson's NWDAF solution

Building on Ericsson's dual-mode 5G Core and Expert Analytics solutions, we provide two types of NWDAF deployment.

Ericsson's NWDAF solution covers a wide set of use cases in various areas, including mobility and behavior tracking and prediction, as well as different Quality of Service (QoS) scenarios.

To cover these and other cases, Ericsson's NWDAF solution can be deployed in a range of ways. For example, as a co-located NWDAF, as standalone NWDAF or as a combination of the two.

Co-located NWDAF
Data, insights and actions are generated within network functions (NFs), enabling automated closed loops on the local level. Insights can also be exposed externally.

Standalone NWDAF
Data is generated within NFs, before insights are generated from larger and combined data sets coming from multiple network functions and multiple domains. Actions are then triggered by these insights. This will allow for automated closed loops on the network level combining different NFs.

Figure 3: Ericsson's NWDAF solution overview
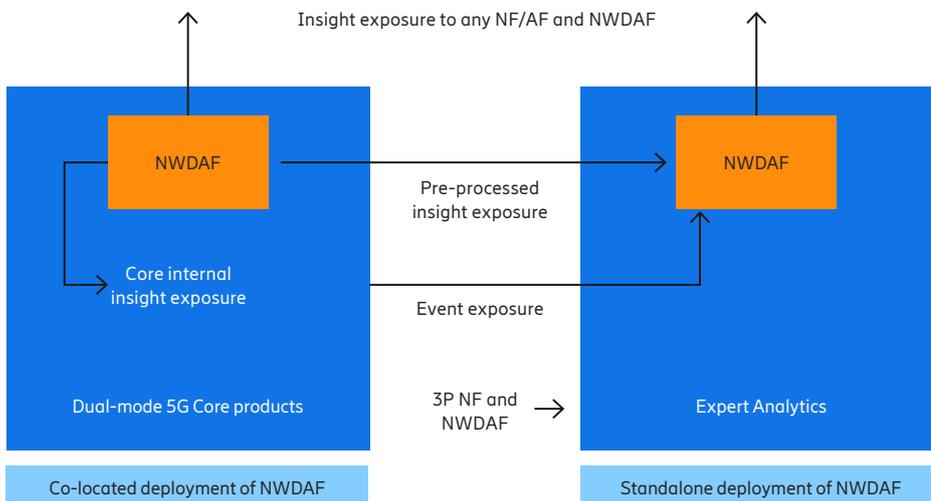
Ericsson supports scenarios with both NWDAF deployment models and model portability across the common platform.

The evolving ecosystem of NWDAF use cases

Ericsson works closely with service providers to develop new analytics use cases and has already produced multiple solutions.

Mobility tracking/prediction
ML-assisted paging:
- Predicting individual or groups of UE movement, optimizing paging schemes to avoid congestion in cells by adjusting QoS parameters.
- Adjusting resource allocation to the network as needed.

Behavior tracking/prediction
UE behavior handling:
- Finding abnormal patterns in UE or traffic behavior and adjusting accordingly.
Predictive congestion management:
- Influencing the NF Discovery Service with past congestion patterns to select proper NF.

Quality of service tracking/prediction
Enterprise service level agreement (SLA) assurance:
- Ensuring SLA is guaranteed within certain regions.
- Calculating/monitoring service quality for every user.
User plane function (UPF) selection and reselection:
- Providing session management function support to select a UPF node to serve the protocol data unit session.
- Based on user location, data network name, UPF node priority and UPF node weight, latency reductions, reduced traffic routing and opex savings achieved by reducing the number of UPFs the RAN needs to connect to.

Adaptative policies:
- Adapting actions based on the input from network, past policies and the next policy to execute.
Optimizing best data plan:
- Adapting the data plan parameters to meet the current needs of the subscriber, taking into account the historical data.
Slice selection based on load:
- Selection of what slice the UE should camp on based on the load.

Summary

Networks that have the ability to learn and improve will soon be the industry standard. Service providers that start their journey towards automated analytics sooner rather than later can position themselves as market leaders by offering reduced latency, increased bandwidth and a superior customer experience. By partnering with Ericsson rather than third-parties, service providers are just one configuration update away from 3GPP standardization. They also stand to benefit from lower TCO and new analytics use cases.

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