ORACLE

Oracle Communications Network Data Analytics Function (OC-NWDAF)

CLOUD READY ANALYTICS FUNCTION

Communications service providers (CSPs) are transforming in preparation for the fifth-generation network. Pursuing 5G standalone core networks will allow CSPs to generate new revenue streams and provide differentiated services for their subscribers. To do so, telcos are employing network analytics to identify insights critical to 5G enabled opportunities. As a preamble, the 3GPP has defined the Network Data Analytics Function (NWDAF) for the 5G core to drive network analytics objectives.

OVERVIEW

Constantly evolving network principles and guidelines require CSPs to adapt to newer and more stable analytics functions to manage their networks. While multiple proprietary analytics solutions are available in the market, NWDAF as a core principle is defined by 3GPP standards to provide statistical and predictive analytics for 5G network function consumption. It standardizes and streamlines how data is collected and how analytical insights drawn from the network are consumed. 3GPP has defined standard interfaces for 5G core network functions to deliver and receive the performance thresholds and analytics information, to and from the NWDAF.

PRODUCT DESCRIPTION

The Oracle Communications Cloud Native Core Network Data Analytics Function (OC-NWDAF) is a 3GPP defined 5G analytics Network Function (NF). The OC-NWDAF allows CSPs to efficiently monitor, manage, automate, and optimize their network operations based on statistical information on past events, thresholding on current events, or predictive information which can be used to balance network resources.

The 0C-NWDAF also helps service providers achieve operational efficiency and provide an enhanced service experience.

OC-NWDAF is a highly scalable and agile 5G core (5GC) network function. It not only supports the 3GPP recommended functionalities, but also offers integration with multiple data sources (data lakes, common message buses etc.), and the ability to publish analytics reports to any consumer via industry leading messaging frameworks, such as Kafka. It has the potential to offer any analytics use case including non-3GPP use cases that CSPs may require in the future. OC-NWDAF provides advanced deep learning capabilities such as neural networks, as well as balancing resources versus accuracy with its two-pronged ML strategy

The OC-NWDAF network function is disaggregated into two logical functions: the 3GPP front-end, the **NWDAF-FE,** and the analytics platform, the **Converged Analytics Platform for Communication (CAP4C).** All the Network Functions (NF) offered by Oracle are developed based on a cloud native architecture and operate in a container-based Cloud Native Environment (CNE) and the NWDAF is no exception.

The NWDAF-FE provides REST API to allow third parties to request model execution of the standard use case categories and the proprietary use cases that are supported. It collects the standards-defined data from the 5G network functions (NFs), application functions (AFs), operations, administration, and maintenance (OAM). Data is then fed to the backend **analytics engine** for further processing and analysis. It also reinforces the analytics information towards the consumer NFs and AFs on a request basis and/or subscription basis, including threshold-based reports. For non-3GPP consumers, the analytics reports can be published to an operator's message bus (Kafka based).

The CAP4C processes data collected from the NWDAF-FE module or directly from other non-3GPP or proprietary sources via Kafka. It examines the streaming data in real time and enables statistical and predictive analysis. Further, it automates machine learning models, including life cycle.

OC-NWDAF comprises various microservices deployed in a Kubernetes based CNE. The environment provides common services like logs, metrics, data collection, analysis, graphs, charts, and visualization. OC-NWDAF uses standard interfaces from the Service-Based Architecture (SBA) to collect data by subscription or request model from other network functions.

Key Features and Benefits

- In addition to supporting 3GPP Rel 16 and 17 use cases, OC-NWDAF also addresses a comprehensive set of use cases not defined under 3GPP
- OC-NWDAF provides both private and public cloud deployment flexibility
- Advance cloud technologies, Time-Series Database, and Window Stream Processing
- OC-NWDAF can be co-located with other network functions to provide real-time analytics at the edge of the network
- OC-NWDAF is fundamentally insightful and provides an intuitive user interface
- Built using strong cloud native credentials OC-NWDAF ensures operational automation, agile delivery, and API based integration
- The suite provides a security first approach for most critical workloads including improved visibility of threats and vulnerabilities
- A fast and accurate approach to providing high quality ML models for time-sensitive situations

The OC-NWDAF platform

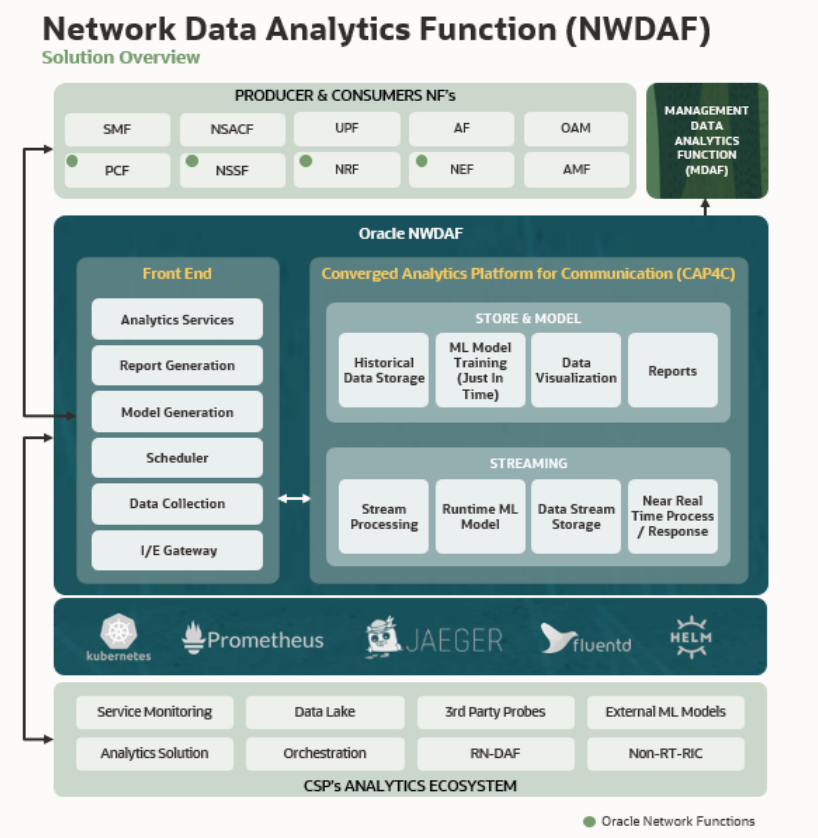

Figure 1: OC-NWDAF Solution Overview

The OC-NWDAF differentiator

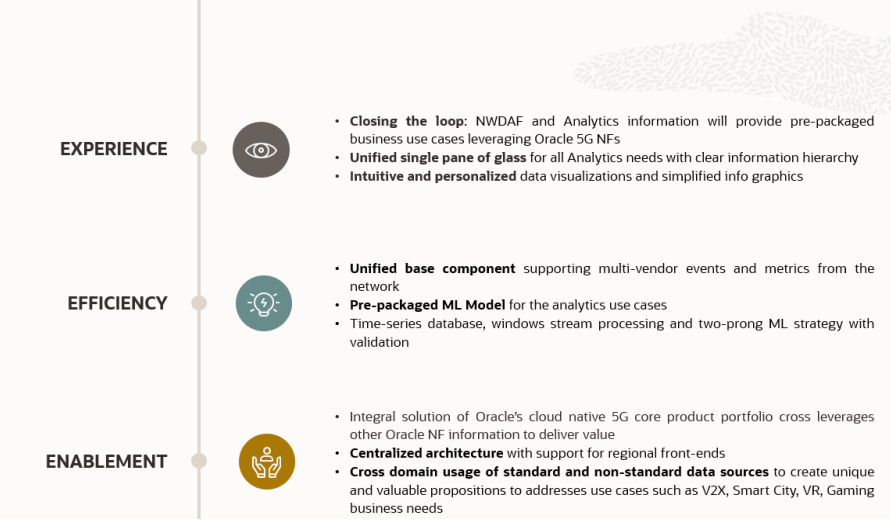

Figure 2: OC-NWDAF Differentiator

Oracle Communications solutions and related network functions

- Oracle Communications Cloud Native Core, Binding Support Function (BSF)
- Oracle Communications Cloud Native Core, Service Communication Proxy (SCP)
- Oracle Communications Cloud Native Core, Policy Control Function (PCF)
- Oracle Communications Cloud Native Core, Policy, and Charging Rules Function (cnPCRF)
- Oracle Communications Cloud Native Core, Cloud Native Environment (CNE)
- Oracle Communications Cloud Native Core, Network Exposure Function (NEF)
- Oracle Communications Cloud Native Core, Security and Edge Protection Proxy (SEPP)

To develop an analytics ecosystem for the industry Oracle Communications employs Streaming Analytics and Oracle AutoML.

Streaming Analytics is used to identify business threats and opportunities by filtering, aggregating, correlating, and analyzing high volumes of data in real time. Streaming Analytics simplifies and reduces processing and storage costs while improving upon speed and functionality.

The Oracle Communications Analytics Suite

The OC-NWDAF is part of the Oracle Communications Analytics Suite, a portfolio designed to be flexible enough to support the network journey of a CSP while providing the foundational capabilities needed to drive other analytics functions.

- **Multivendor support**, the disaggregation of the NWDAF means flexibility, increased pace of innovation, and the avoidance of vendor lock-ins.
- **Industry-standard, open-source components, that include observability tools** for monitoring and auditing software components, are built into the applications running on the platform. Beyond delivering the solution, these components are also enabling operational automation (day 1 and day 2 configuration and management)
- **End-to-end analytics** lifecycle from data collection and storage to management is enabled by common data governance practices to provide full accountability of available data and assure its quality and accessibility
- **Data collection agents** retrieve data from 3GPP-defined network functions for NWDAF use cases. Data from non-3GPP-defined data sources such as network-related data sources from legacy 3G and 4G networks, customer data, and third-party data can also be collected
- **Support different levels of analytics use cases** (real time, near real time and non-real time). Predictive analytics capabilities for functions such as anomaly detection are supported to avoid events such as network function failure. Real-time analytics functions are crucial to reducing CSPs' reliance on complex batch analytics that take a long time to perform, thereby enabling them to adopt streaming analytics solutions that provide faster responses to events such as network failures or changes in service performance or customer behavior
- **Kubernetes' environment** provides runtime and lifecycle management services. Just like the cloud native framework, Oracle maintains a reference Kubernetes environment but allows CSPs to select the specific version used in the deployment CNE. Oracle NWDAF runs in a Docker runtime environment, uses Kubernetes DNS for service discovery, and can support a variety of container network interfaces to integrate Oracle NF networking requirements with the deployment SDN environment

Support for multiple use cases

Analytics consumption occurs via 3GPP- and non-3GPP-defined interfaces for the NWDAF and delivers analytics results to other systems. The NWDAF can execute actions immediately for specific use cases. The delivery of analytics results occurs in one of two ways:

- Analytics results can be delivered as a **data source** to support decision-making processes before an action or operation is initiated. For example, the NWDAF can send user experience (UE) mobility analytics information to another network function (NF) or group of NFs to enable an appropriate action to be taken. Analytical insights can also be delivered to end user applications via dashboard interfaces such as those used in a Network Operations Center (NOC). Intuitive and interactive dashboards can be written to flag anomalies to engineers in real time; this information can then be combined with other data to drive business decisions. This feature will enable CSPs to prevent issues, which in turn will help them to deliver better experiences to customers and reduce churn.
- Analytics results can also be delivered as a **key decision driver** that triggers immediate actions by the receiving network function or application. For example, if a slice load threshold defined by the policy control rules function (PCF) is reached, the NWDAF can immediately recognize that the slice is reaching its capacity and let another entity, namely a function related to the operations, administration, and maintenance (OAM) domain, execute a slice lifecycle management operation to fix the issue.

SUMMARY

Oracle Communications solutions enable service providers to securely manage and monetize the incremental growth in mobile data traffic and multimedia applications. They help service providers protect their network and customer data, analyze subscribers' quality of service, and set policies to improve customer experience, and optimize network performance.

Oracle Communications helps billions of people, devices, and machines intelligently connect and engage over any network. With proven capabilities, scalable solutions, network security, cloud services, common intelligent signaling platform, Oracle Communications solutions guarantee security, high availability, and continued support.