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Oracle Communications Network Slice Selection Function (NSSF) datasheet

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Introduction

Network slicing is one of the prominent features of 5G which allows connectivity and data processing to be custom-made to meet specific requirements. Network slicing is a method of creating unique logical and virtualized networks over a common multi-domain infrastructure, capable of providing an agreed service quality. The customizable network capabilities include data speed, quality, latency, reliability, security, and services. These capabilities are always provided based on a service level agreement (SLA) between the mobile operator and the customer.

Oracle Network Slice Selection Function (NSSF) helps telcos to build multiple virtual networks on a shared infrastructure to offer tailored services to a varied set of users. Furthermore, it enables operators to deploy applications and services flexibly and quickly to accommodate specific requirements for a diverse set of offerings.

As industry 4.0 further propels 5G services, network slicing can also be leveraged by operators to offer private networks as network slices, tailor made to serve a variety of industries, such as manufacturing, supply chain and, health care to name a few. In manufacturing low latency enables monitoring of machines and controls in giving clear insights and better management. In healthcare, increased bandwidth and low latency provides stronger video and images, increasing the quality and value of interaction between practitioner and patient and many more such use cases. Click here to find out more about how different industries are leveraging 5G.

The Oracle NSSF will be the integral part of the network in providing a centralized control for the use of different network slices, defined to satisfy different requirements of industry verticals or different consumer services and their associated use cases.

Oracle Communications NSSF in the 5G network

The Oracle NSSF is a solution which sits in the middle of the 5G core, enabling to select the optimal network slice available for the service requested by the user. For example, it allows the users to select customized networks with different functionalities such as mobility, as well as performance requirements such as latency, availability, and reliability.

The Oracle NSSF stores authorization data, policy rules, slice availability data and slice mapping. The Access and Mobility Management Function (AMF) interacts with the NSSF through communication interface N22 for slice selection and authorization, as well as to select the NF instances for a network slice.

Figure 1.   Oracle Communications Cloud Native Core, NSSF System Architecture
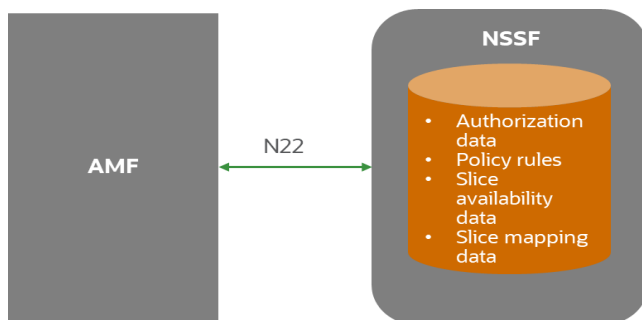
Oracle NSSF architecture

The Oracle NSSF is a cloud native application, composed of a collection of microservices in a three-layer architecture, to separate network connectivity, business logic and data management.

Figure 2. Oracle Communications Cloud Native Core, NSSF architecture
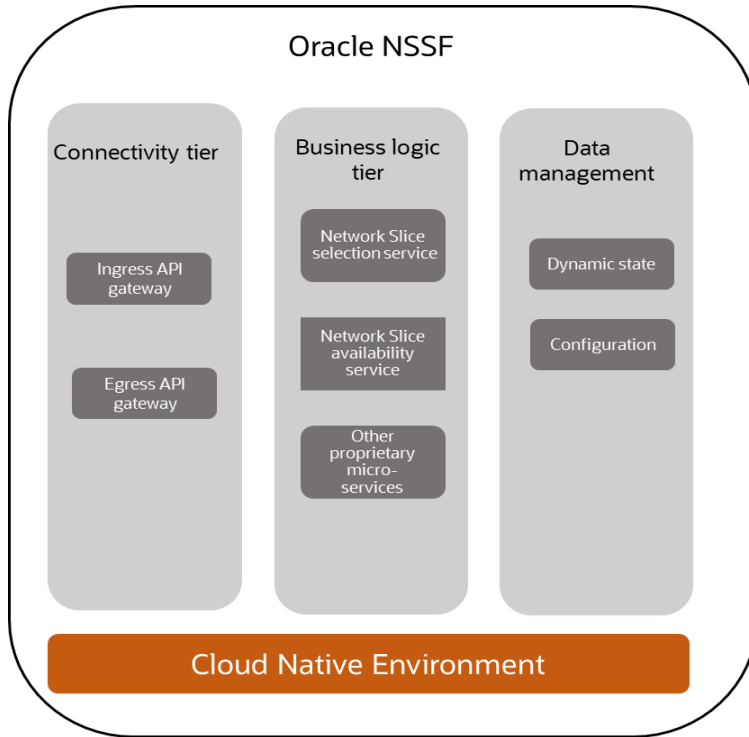
The **Connectivity** tier load balances the traffic via ingress API gateway and egress API gateway. It also provides authenticity and integrity protection.

The **Business** tier provides the business logic of NSSF. It has network selection, network selections availability, configuration services, network selection subscription, and Network Repository Function (NRF) client microservices.

The **Data tier** uses Oracle MySQL Network Database (NDB) cluster as the backend database which provides high availability and georedundancy capabilities.

Detail description of features and benefits

The prominent features of the Oracle NSSF are listed as below:

- **Built on cloud native principles**
    - o Cloud native solution having containerized microservices architecture, based on Kubernetes.
    - o Deployed in any cloud native environment. It is cloud agnostics and can be deployed in any public or private or on prem cloud and on different cloud environments, such as Oracle CNE or OpenShift for private clouds, OKE and EKS for public cloud.

- **Intelligent slice selection and allocation**

    - **Time of the day-based network slice instance selection**

        - Allows to configure policy to select network slice instances based on the time spans through TOD feature (time of day-based slice selection). CSPs can provide date spans, day spans, time spans, or any combination of above to provide a policy to select different network slice instances catering to the same S-NSSAI (single – network slice selection assistance information), helping in avoiding congestion and overloading of a single slice instance.
        - Applies the policy to assist AMF with authorized slice information based on UE's current location, during UE registration. The Oracle NSSF has a built-in intelligence which avoids overloading common AMF based on Oracle's proprietary relevance algorithm and performs traffic segregation, enhancing overall service quality.

    - **Slice associations and allocations to user session**

        - NS Selection service is used by an NF service consumer (AMF) to retrieve the information related to network slice. It enables network slice selection in the serving network.
        - NS availability service stores and maintains list of supported S-NSSAIs per tracking area (TA). It allows NF service consumer (AMF) to update and subscribe the above data and get notifications for any addition or deletion of supported S-NSSAIs.

- **High availability**

    - Leverages redundancy through three sites geo-redundant deployment model ensuring high availability.
    - Supports indirect communications with SCP.

- **Highly Secure**

    - Protects integrity and confidentiality using NF-NRF OAuth authorization.
    - Manages O-Auth access token-based authorization, and NF authentication using Transport Layer Security (TLS) certificates.
    - Has a built-in feature which provides protection against Distributed Denial-of-Service (DDoS) attack, has rate limiting feature for ingress and egress messages which helps to prevent the DDoS attack.
    - Supports encryption using HTTPs.

- **Ease of Operation**

    - Eases the operations by providing in-service upgrade.
    - Takes advantage of the Oracle Automated Test Suite (ATS) for cluster automation testing with zero manual intervention.
    - Supports ease of integration through automated pipeline.
    - Easily integrated with cloud native observability stack for logs, metric, and traces
    - Intelligently configures network slice availability for given single – network slice selection assistance information (-NSSAIs) from AMFs, auto-learns AMFs / AMF sets in the network from NRF.
    - Supports indirect communication with SCP, for advanced routing in the SBA, improving availability and load balancing.

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Summary

In the fifth generation of mobile technology network slicing plays a critical role in enabling new business models and innovative services spanning both the consumer and enterprise set of use cases. For example, in industry 4.0 use cases *network slicing* will include new SLA delivery models that go beyond traditional operation management capabilities. CSPs need a partner with strong expertise and experience in cloud native environments to leverage automation, analytics and unlock the value of their network by making it more programmable for differentiated and agile service delivery. Oracle Communications provides integrated communications and cloud solutions for service providers and enterprises to accelerate digital transformation journey in a communications-driven world from network evolutions to digital business to customer experience. Oracle NSSF has been deployed across the globe for tier-1 operators like DISH, Orange. supporting in providing slices to cover critical uses or specific needs and offer different levels of quality and security.

"Oracle's capabilities will essentially serve as the control tower of our network core, enabling our customers to consume software on demand and facilitating the advanced core functions required to power a truly automated network."

Marc Rouanne
Chief Network Officer,
DISH Wireless

Key business benefits

- Architected based CNCF principle.
- Integrates with Oracle Automated Test Suite for E2E automated 5G core testing.
- Provides sustaining supports for maximization of investment.

Related products

- Oracle Communications Cloud Native Core, Security Edge Protection Proxy (SEPP)
- Oracle Communications Cloud Native Core, Binding Support Function (BSF)
- 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, Signal Communications Proxy (SCP)
- Oracle Communications Cloud Native Core, Network Data Analytics Function (NWDAF)
- Oracle Communications Cloud Native Core, Data Director (DD)

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