

Oracle Communications Network Slice Selection Function (NSSF) datasheet

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Table of Contents

Introduction	3
Oracle Communications NSSF: enabling intelligent Network Slice Selection in 5G Core networks	3
Oracle Communications NSSF architecture	3
Detailed description of features and benefits	4
Built on Cloud Native principles	4
Intelligent Network Slice Selection and Allocation	5
High availability and resiliency	5
Comprehensive security	5
Operational simplicity	5
Summary	6

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 Communications 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 help deploy applications and services more flexibly and efficiently 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 service providers 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 helping provide improved visibility and operational management. In healthcare, increased bandwidth and low latency provides stronger video and images, helping improve the quality and value of interaction between practitioner and patient and many more such use cases.

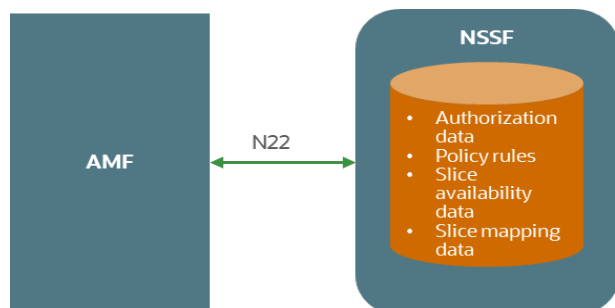
Oracle Communications NSSF is designed to serve as a centralized control function within the network in providing a centralized control for the use of different network slices, defined to satisfy different requirements of industry verticals or different consumer services and their associated use cases.

Oracle Communications NSSF: enabling intelligent Network Slice Selection in 5G Core networks

Oracle Communication NSSF is a solution which sits in the middle of the 5G core, enabling to select the most appropriate available 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.

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

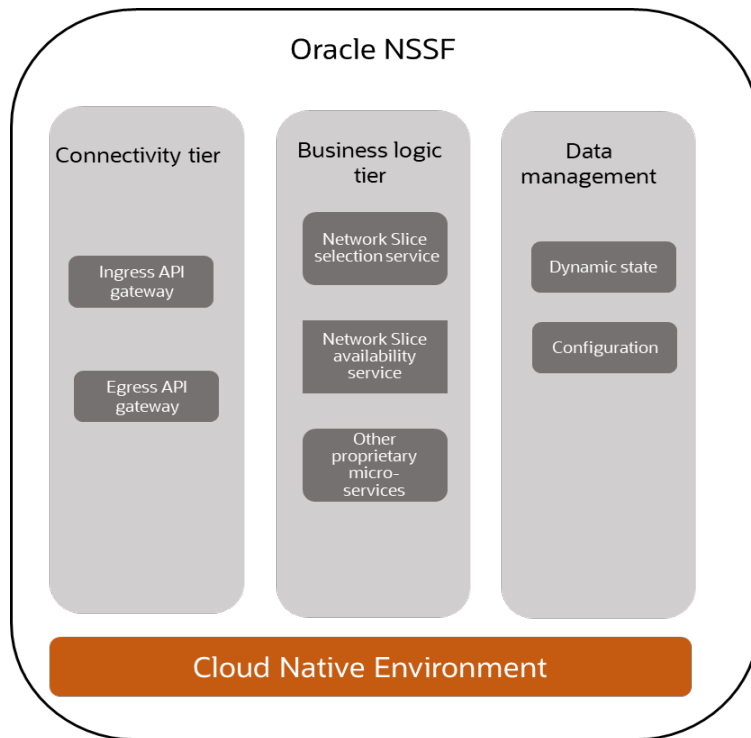
Figure 1. Oracle Communications NSSF System Architecture



Oracle Communications NSSF architecture

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

Figure 2. Oracle Communications NSSF system architecture



The **Connectivity tier** load balances the traffic via ingress API gateway and egress API gateway. It also provides capabilities that support 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.

Detailed description of features and benefits

Oracle Communications NSSF helps providing automated, secure, and resilient network slice selection for 5G standalone networks. Its cloud native architecture and standards-based services help communications service providers simplify network slice operations, reduce manual configuration, and maintain accurate slice availability information across the network.

Built on Cloud Native principles

- Uses a Kubernetes-based, containerized microservices architecture to support flexible deployment, scalability, and lifecycle management.
- Supports deployment across public, private, and on-premises cloud native environments, including Oracle Cloud Native Environment, Red Hat OpenShift, Oracle Kubernetes Engine (OKE), and Amazon Elastic Kubernetes Service (Amazon EKS), where supported.

Intelligent Network Slice Selection and Allocation

- **Enables zero-touch network slice availability configuration**
 - Dynamically learns and maintains mappings between tracking areas (TAs) and supported network slices (S-NSSAs) from AMF network slice availability updates, eliminating the need for operators to manually configure authorization lists.
 - Uses authenticated and authorized AMFs with NRF-issued OAuth 2.0 access tokens as trusted sources of network slice availability information.
 - Helps lower operational costs, minimize configuration errors, improve service agility, and maintain accurate, up-to-date network slice authorization information.
- **Supports standards-based network slice selection**
 - Provides the Network Slice Selection service, enabling an NF service consumer, such as the AMF, to retrieve the information required to select an appropriate network slice in the serving network.
 - Supports the selection and association of network slices for user sessions.
- **Provides dynamic network slice availability management**
 - The Network slice availability service stores and maintains the list of supported S-NSSAs for each tracking area.
 - Help Enabling AMFs to update network slice availability information and could subscribe to changes.
 - Provides notifications when supported S-NSSAs are added or removed, helping network functions remain synchronized with current network conditions.

High availability and resiliency

- Supports a three-site, geo-redundant deployment model to improve service continuity and network resiliency.
- Supports indirect communication through the Service Communication Proxy (SCP), help enabling advanced routing, load balancing, and improved service availability within the service-based architecture.

Comprehensive security

- Uses NRF-based OAuth 2.0 authorization to control access to network function services.
- Supports OAuth access token-based authorization and TLS certificate-based network function authentication.
- Uses HTTPS and TLS to help protect the confidentiality and integrity of data in transit.
- Provides configurable rate limiting for ingress and egress messages to help mitigate Distributed Denial-of-Service (DDoS) attacks and protect service availability.

Operational simplicity

- Supports in-service software upgrades to help minimize service disruption during maintenance and lifecycle operations.
- Uses Oracle Automated Test Suite (ATS) to support automated cluster validation with minimal manual intervention.
- Supports automated deployment and integration pipelines to simplify software delivery and operational processes.

- Integrates with cloud native observability frameworks for centralized collection and analysis of logs, metrics, and traces.
- Automates network slice availability configuration and AMF discovery, helping reduce repetitive administrative tasks and simplify ongoing network operations.

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 and analytics and help 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 help accelerate digital transformation journey in a communications-driven world from network evolutions to digital business to customer experience. Oracle Communications NSSF has been deployed with leading operators worldwide DISH, Orange., supporting in providing slices to cover critical uses or specific needs and offer different levels of quality.

“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 on CNCF principles.
- Integrates with Oracle Automated Test Suite for E2E automated 5G core testing.
- Provides ongoing lifecycle support designed to help maximize operational efficiency 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, Service Communications Proxy (SCP)
- Oracle Communications Cloud Native Core, Network Repository Function (NRF)
- Oracle Communications Cloud Native Core, Network Data Analytics Function (NWDAF)
- Oracle Communications Cloud Native Core, Data Director (DD)

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