ORACLE

Oracle Communications Cloud Native Core, Network Repository Function (NRF)

Oracle Communications Cloud Native Core, Network Repository Function (NRF) serves as a registrar for all 5G Network Functions (NFs) and allow the NFs to register and discover each other via a standards based API. The NRF enhances flexibility and efficiency of the 5G core network and is a key component required to implement the new Service Based Architecture (SBA) in the 5G core.

OVERVIEW

With its high speeds, low latency and massive bandwidth features, 5G promises to cater to a vast array of use cases. To support these, the control plane architecture of the 5G core network is drastically enhanced. The control plane in the 5G core network is based on Service Based Architecture (SBA) wherein different Network Functions (NFs) expose their services to other NFs in the core using new the Service Based Interfaces (SBIs). This decoupling between the service consumer and service provider increases the flexibility and efficiency of the new 5G core network. 3GPP has defined a dedicated function called NF Repository Function to enable this kind of service discovery and management.

PRODUCT DESCRIPTION

Oracle Communications Cloud Native Core, Network Repository Function is a key component of the 5G Service Based Architecture. The NRF works to maintain an updated repository of all the 5G elements available in the operator's network. It also keeps the status of the services provided by each of the elements in the 5G core that are expected to be instantiated, scaled and terminated without manual intervention. Given its role in the 5G core, the Oracle Communications NRF interacts with every other element in the core of the Home Public Land Mobile Network (HPLMN) and provides management and discovery services besides providing authorization and

Key Business Benefits

Oracle Communications Network Reposiroty Function is the practical realization of SBA. It is the most fundamental NF required to implement 5G:

- Works as a centralized repository to increases the efficiency, scalability and flexibility of a 5G core network.
- Helps CSPs to effectively manage their 5G network by providing automated resource control in the core
- Improves 5G network robustness by eliminating the need for network configuration every time a new NF is added or removed from the network, or every time NF capacity is updated due to elasticity needs.

authentication. It not only reduces the processing burden on consumer NFs, but also supports options to prioritize discovery results based on:

- location,
- registered priority,
- capacity,
- Or, nework load.

Oracle Communications NRF functions in stand-alone mode as defined in 3GPP Rel. 16. However there are significant benefits in integrating it with Oracle Communications Service Communication Proxy (SCP) for better selection results.

Oracle Communication Cloud Native Core, NRF supports a range of differentiated features like monitoring and visibility, auto scaling up/down, NRF overload and notification throttling, enhanced discovery based on true load and is HTTPS & Oauth 2.0 compliant. The feature rich Oracle's NRF supports the following:

- API gateway: The API gateway hides the deployment details of internal services and other components from external entities. Oracle Communications NRF uses Ambassador API gateway to enable this.
- NF Registration: This microservice provides the registration functionality defined as part of NRF management services. It stores the registered profiles.
- NF Subscription: This microservice provides the subscription functionality defined as part of NRF management services. It stores the subscription data and sends NF notification to the consumer subscribed for NF services.
- NF Discovery: This microservice provides the functionality defined as part of NRF discovery services.
- Oracle Communications NRF Auditor: This is an internal microservice, it removes stale entries from the NRF database.
- Enhanced discovery: Configurable option to limit the instances returned in discovery result.
- Supports monitoring and visibility to provide network traffic view.
- Supports loggings and tracing.

Table 1: Services offered by Oracle Communications Cloud Native Core NRF

Services	Decsription
NRF Management Service	*Register NF instance (NFRegister)* – Allows for an NF instance to register its profile. *Update NF instance (NFUpdate)* – Allows for an NF instance to update partially or replace the parameters of its profile in the NRF *De-register NF instance (NFDeregister*) - Allows for an NF instance to de-register its profile *Subscribe to Status (NFStatusSubscribe*) – Allows for an NF instance to subscribe to changes on the status of other NF instances registered in the NRF *Unsubscribe to Status (NFStatusUnsubscribe)* – Allow for an NF instance to unsubscribe to changes on the status of other NF instances *Receive Notifications of Status (NFStatusNotify)* – Allows the NRF to notify of changes in NF instances status to any subscribers of NF status.

Key Features

- Implemented as a cloud native functionality based on microservices architecture
- Compliant with 3GPP Release 16 specifications
- Supports enhanced discovery
- Supports NF management, discovery and authorization services
- Supports deployment at PLMN/shared slice and slice specific levels
- Supports recursive lookups
- Supports discovery to/from foreign PLMNs
- Can be combined with Oracle SCP to enable more optimized NF selection
- Supports full address resolution database
- Provides metrics, kpi(s), alerts, tracing and logging
- Supports custom NF

Discovery service	*Discover NF instance (NFDiscover)* – Allows NF consumers to discover the IP address/FQDN of the NF instances or NF services that match certain input criteria.
NRF audit	Audit the registered NF profiles for any stale record and delete it Audit the subscription records and delete the expired subscriptions

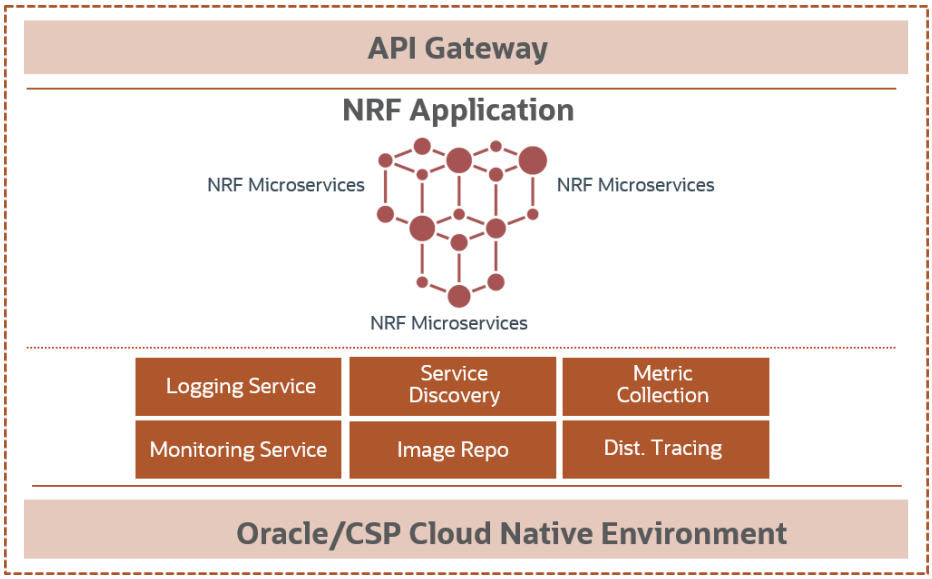

Figure 1. Oracle Communications Cloud Native Core, NRF System Architecture

SUMMARY

Network Repository Function completes a 5G core network and helps CSPs to fully exploit the flexibility and efficiency of the new 5G core network architecture by decoupling the service consumers and service providers. Given its role in the 5G core, the NRF interacts with every other element in the core of the HPLMN and supports SBA. Oracle Communications is on the journey of reimagining communications to connect the world, and focus deeply on quality, customer centricity and security to design various telecom applications. In the same capacity Oracle Communications NRF is designed with cutting edge Oracle engineering and is compliant with 3GPP release 16 standards. Oracle Communications empowers CSPs to launch the best in breed features and create differentiation in the market by offering world class reliable products.

Oracle Communications Solutions

- Oracle Communications Cloud Native Core, Binding Support Function (BSF)
- Oracle Communications Cloud Native Core, Service Communication Proxy (SCP)
- Oracle Communications Cloud Native Core, Unified Data Repository (UDR)
- Oracle Communications Cloud Native Core, Unstructured Data Storage Function (UDSF)
- 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, Network Function Cloud Native Environment (NF CNE)
- Oracle Communications Cloud Native Core, Interworking and Mediation Function (IWF)
- Oracle Communications Cloud Native Core, Network Exposure Function (NEF)
- Oracle Communications Cloud Native Core, Network Slice Selection Function (NSSF)
- Oracle Communications Cloud Native Core, Security and Edge Protection Proxy (SEPP)

Oracle Communications Cloud Native deployable Network Functions (NFs) enable service providers to manage and monetize the 5G network. CSPs can manage and analyze quality of service and create policies for innovative digital lifestyle services through Oracle Communications products and solutions.

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