

Oracle Communications Cloud Native Core, Policy Control Function (PCF)

Oracle Communications Cloud Native Core, PCF enables service providers to control 5G network by implementing complex policies decisions based on network subscriber and service information. At the core of Oracle Communications PCF lies a flexible and intuitive policy design experience that helps telecom operators to generate and test network policies from scratch and deploy them into their production environment in matter of minutes. With the Oracle Communications PCF, operators can customize tailored offerings for a wide range of use cases ranging from Enhanced Mobile Broadband, Ultra-Reliable and Low Latency Communication, and Massive IoT.

OVERVIEW

The 5G network is expected to support massive number of devices with various data, transmission and bandwidth requirements. These requirements are driven mainly by use cases ranging from mobile broadband, massive IoT and mission critical IoT. Operators are required to build and manage supporting infrastructure to enable businesses to scale, manage, secure, analyze and monetize the zettabytes of data created by the growing number of connected devices, with zero impact on Quality of Service (QoS). Due to a wide range of devices and applications, targeted services for 5G will be very different from existing services in terms of amount, type and pattern of data exchange over the network.

Key Business Benefits

Oracle Communications Cloud Native Core, PCF is built on more than a decade of expertise and experience of designing and deploying policy solution. Oracle's policy solution is deployed with more than 40 tier 1 service providers across the globe. It offers various business benefits:

- Helps CSPs to efficiently manage policies in a 5G network with an intuitive and easy to use graphical interface
- Prepares the 5G network to support massive number of devices without compromising Quality of Service (QoS)
- Helps CSPs to differentiate themselves by providing customizable and tailored offerings for their consumer and enterprise customers

In order to cope with diverse service requirements, it is imperative that intelligent decisions, such as allocation of resources, scheduling of resources and efficient network adaptation are made at the network level. Therefore, to harness and capitalize the full capabilities of their 5G network, CSPs must deploy an intelligent, flexible, scalable and robust policy framework.

PRODUCT DESCRIPTION

Oracle Communications Cloud Native Core PCF is a one stop solution for managing policies in a 5G network. Designed and built as a microservices on cloud native principles, Oracle Communications PCF uses network, subscriber and service information to help service providers create policies. Oracle Communications has a rich heritage in designing policy solutions encompassing more than a decade of experience and expertise, and an established policy solution deployment base within global tier 1 operators' most demanding networks, serving hundreds of millions of subscribers. For the 5G network, Oracle Communications PCF brings the policy design experience to the next level by providing ultimate flexibility, extensibility, modularization and assurance to rapidly and securely deploy new policies supporting existing and new use cases.

Oracle Communications Cloud Native Core PCF is configured with the best of industry features and high end engineering, its prominent features includes:

- Interworks with the Oracle Communications Binding Support Function (BSF) for storing subscriber session binding information that can be accessed by PCF, Network Exposure Function (NEF) and Application Functions (AFs) for different use cases. The PCF can also use Oracle Communications 5G Unified Data Repository (UDR) for storing subscriber profile and subscriber entitlement information
- Supports Rx for Voice over 5G (Vo5G) and Over-The-Top (OTT)/AF based use cases
- Accepts handovers from 4G to 5G subscriber sessions and change QoS on 5G sessions
- Policy design evolution to support modular and flexible domain driven policy design
- Supports session management and access management services
- Flexible, user friendly policy design framework for rapid policy use case deployments
- Supports multiple deployment options – Public Land Mobile Network (PLMN) level, slice shared and slice specific
- Provides high availability and multisite geo redundancy support

Oracle Communications PCF separates processing/business logic and state concerns following the corresponding logical grouping of microservices/components. Consequently, an actual policy function can be composed of the necessary microservices to provide the desired function, e.g. PCF, PCF/PCRF, a subset of a PCF (e.g. one without usage monitoring, etc.). Oracle Communications PCF integrates with a variety of common services for data collection, analysis, and visualization services for operational aspects like logs, metrics, and traces.

- **Connectivity:** Components interfacing with external entities. This is where an API gateway is utilized to interface with external traffic to the PCF. These are stateless sets of components.
- **Business logic:** Application layer running the PCF business logic, policy engine and various services that can be enabled based on deployment needs. These are stateless sets of components.

Key Features

Oracle Communications cloud native 5G Policy framework is designed and built to handle stringent demands of 5G network and to seamlessly scale to cater operator's ever expanding network. The prominent features of PCF are as follows:

- Microservices based cloud-native architecture
- Compliant with 3GPP release 15 specifications
- Supports Session Management (SM) policy control service, Access and Mobility Management (AM) policy control service and Policy Authorization (PA) service
- Separates processing/business logic and state concerns following the corresponding logical grouping of microservices/components
- Packaged to support VM-based and container-based cloud infrastructure

- **Data Management:** Data layer responsible for storing various types of persistent data. The PCF is built to be able to plug in different types of backend data layers that could be internal or external.

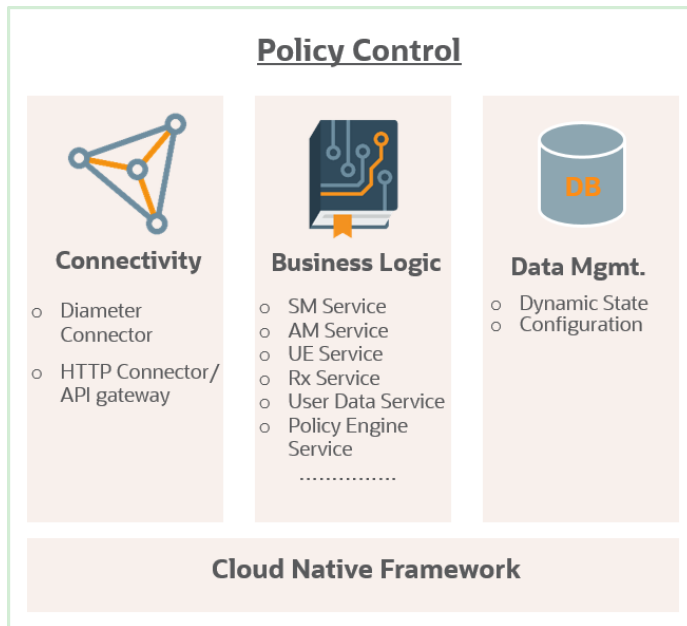


Figure 1. Oracle Communications Cloud Native Core, PCF System Architecture

Oracle Communications Policy Design and Run-time Environment

Oracle Communications robust and reliable policy design has evolved over years to provide modularity, automation and flexibility to its PCF

Table 1: Oracle Policy Design and Run-time Environment

Component	Description
Design	<ul style="list-style-type: none"> • Modular and flexible domain driven policy design • Modules will encompass data model, triggers, conditions and actions • Modules can be designed via a GUI • Modules can be extended or built by operators
Run-time	<ul style="list-style-type: none"> • Run time engine service to expose APIs • Run time engine service to be stateless and independently scalable
Testing	<ul style="list-style-type: none"> • Automated testing framework to enable regression and validation of policy logic and modules

Policy Control Services Supported by PCF

Oracle Communications PCF supports the following services as per defined by 3GPP release 15

Oracle Communications Solutions

- Oracle Communications Cloud Native Core, Policy and Charging Rules Function (CNPCRF)
- Oracle Communications Cloud Native Core, Service Communication Proxy (SCP)
- Oracle Communications Cloud Native Core, Network Repository Function (NRF)
- Oracle Communications Cloud Native Core, Unified Data Repository (UDR)
- Oracle Communications Cloud Native Core, Unstructured Data Storage Function (UDSF)
- Oracle Communications Cloud Native Core, Binding Support Function (BSF)
- 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.

Table 2: Policy control services supported by Oracle Communications PCF

Services	Description
Session management policy control service	<ul style="list-style-type: none">• Enforcement control of policy decisions related to QoS, charging, gating, service flow detection, packet routing and forwarding, and traffic usage reporting• Policy decisions can be distributed among the User Plane Function (UPF), Radio Access Network (RAN) and User Equipment (UE) depending on the policy type and Network Slice Selection Assistance Information
Access and mobility policy control service	<ul style="list-style-type: none">• Enforcement control of policy decisions related to Radio Access Technologies (RAT) /Frequency Selection Priority• Enforcement of Service Area Restrictions is executed in the UE• Enables location tracking for a UE to get periodic updates on subscriber current location
Policy Authorization (PA)	<ul style="list-style-type: none">• Supports APP session establishment, termination and notify to terminate feature• Supports PCC rule authorization for app flow info• Provides gating control

SUMMARY

In the evolution to 5G, telecom operators are making a transition from a limited policy scope to network wide policy management. They are also looking forward to move away from purpose built hardware, monolithic software and legacy deployment to a cloud native model. Oracle Communications PCF is uniquely positioned to meet these requirements, Oracle Communications has combined more than a decade of experience in developing insightful policy management solution with wide portfolio of advanced cloud technologies to offer a sophisticated, robust and scalable policy management framework for 5G.

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