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# Oracle Communications Service Communications Proxy (SCP) datasheet

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## Introduction

Oracle Communications 5G Service Communication Proxy (SCP) is a cloud native 5G core signaling router that helps you efficiently secure, optimize and manage your 5G signaling by providing routing control, resiliency, security, and observability to your 5G core network. It is designed using cloud native principles that brings 5G awareness and addresses many challenges introduced by the Service Based Architecture (SBA) of the 5G core.

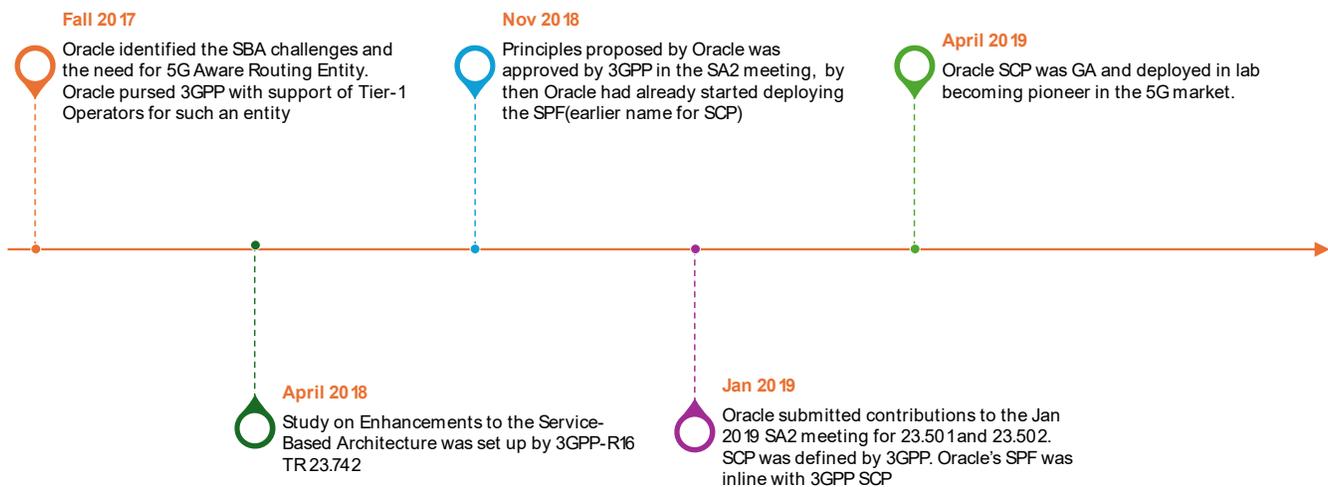
## Oracle Communications SCP is the pioneer in 5G market

3GPP has defined Service-Based Architecture (SBA) as the foundation for the 5G network. SBA lets network elements or network functions (NFs) in 5G core communicate with each other over a service-based interface (SBI). It allows the decoupling of Network Functions with more precise functionalities with authorization to access each other's services. The new service-based architecture brings in unprecedented benefits, however at the same time, this architecture is not fully equipped to deal with some of the major challenges that come with increased signaling traffic such as: -

- Routing and optimization
- Traffic management
- Robustness scalability, and security
- Network visibility
- Core security—authorization and authentication

Service-mesh was used by web-scale companies to address similar challenges during SBA adoption, but off-the-shelf service mesh is not sufficient to address challenges in the 5G Core network as it is lacking 5G awareness required to address 5G specific routing, and congestion use cases. Oracle was able to foresee these issues in managing the 5G SBA control plane and leveraged its experience in solving similar challenges faced during 3G and 4G network with its industry leading Signaling Transfer Protocol (STP), Diameter Signaling Router (DSR) respectively. Oracle along with tier-1 operators, started working closely in the 3GPP standards body for SCP standardization, and thus has been the pioneer in the 5G core Market.

Figure 1. Oracle Communications SCP is the pioneer in 5G market



## Oracle Communications SCP streamlines the network architecture from day-1 of 5G deployment

Millions of IoT devices or AI agents in the network are bringing unprecedented network signaling complexity and traffic overload. Oracle Communications SCP streamlines deployment from day-1, helping networks scale better by managing the routing behavior, and simplifying inter-region routing. SCP is important in a multi-vendor environment of 5G network of any dimension especially during initial phase.

SCP provides a unique view of 5G network communication, overcoming limitations of HTTPS based NF to NF communication, where traditional probe-based solution is not effective. SCP through message feed enables to copy both request and response messages routed through SCP with meta data for analytics purpose providing deeper insight into the network.

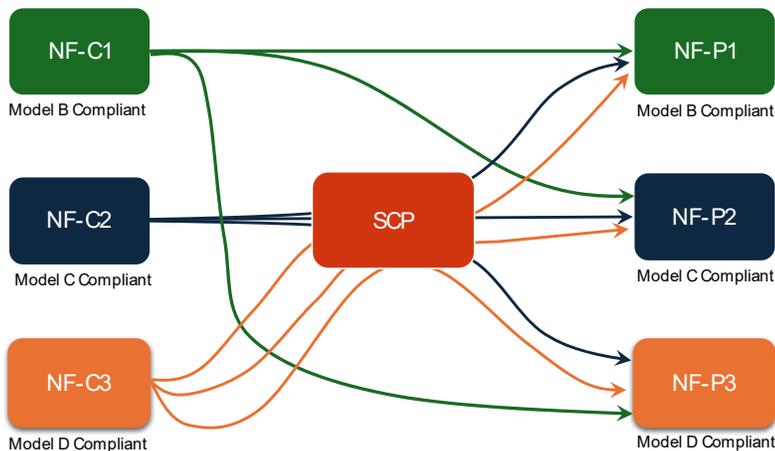
Oracle Communications SCP brings all the network protection mechanisms, including egress and ingress rate limiting, congestion control from rogue NF consumers or producer NFs, all presented in a single health dashboard.

## Oracle Communications SCP is compliant with all 5G deployment models

Initial 5G deployment sees different challenges like interoperability, unified routing control, unified congestion control, and observability into the network. Deploying SCP from day-1 address these challenges in a multi-vendor environment. Networks with smaller subscriber base will also benefit from enhanced observability and mediation using SCP.

Networks can adopt SCP incrementally interface by interface. In such networks, consumer NFs can use direct or indirect mode of NF to NF communications based on their capabilities. Oracle Communications SCP can support such hybrid NF to NF communications in the network. SCP off-loads consumer NF from producer selection, re-selection, congestion control, load balancing etc., allowing consumer NFs to focus on business logic.

Figure 2. Oracle Communications SCP in a hybrid network



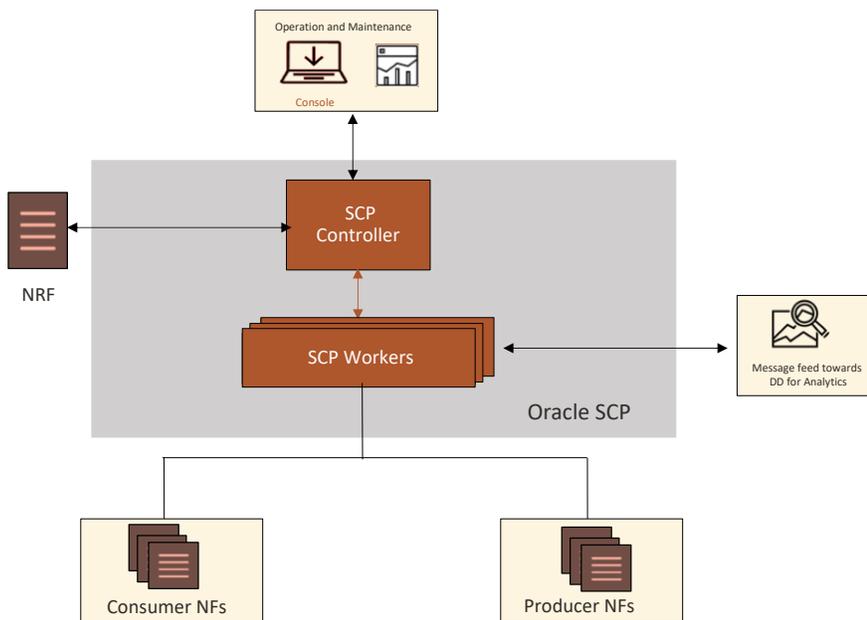
## Oracle Communications SCP functional diagram

Oracle Communications SCP is a decentralized solution that provides signaling control to a 5G core network. It is composed of Service Proxy Controllers, Service Proxy Workers and is deployed alongside other 5G network functions. It learns the topology of the 5G core from the Network Repository Function (NRF) and provides routing control by creating traffic routing rules based on learning from NRF.

The Oracle Communications SCP functional diagram consists of components as shown in figure 3.

- SCP Controller – Learns network topology by subscribing to notifications from the NRF. It then derives routing policies and transfers them to the SCP workers. Also hosts the configuration interface for SCP.
- SCP Workers - Use the routing policies to route the 5G SBA signaling traffic between consumer and producer NFs.
- Operation and Maintenance – Used to configure the SCP and observability (metrics, logs, traces) is provided using cloud native tools.
- Message feed via Data Director (DD)– Uses message feed feature to copy both request and response messages routed through SCP along with meta data for analytics.

Figure 3. Oracle Communications SCP Functional diagram



## Features and benefits

Oracle Communications SCP is based on Cloud Native Computing Foundation (CNCF) principles and is cloud agnostic, which can be deployed over any cloud. Oracle Communications SCP not only resolves the challenges introduced by the 5G Service Based Architecture but also optimizes signaling controls and helps improving the stability and resiliency of the network. The prominent features of Oracle Communications SCP are listed in the below tables:

### Ease of operability

- **Simplifies network topology** - Indirect communication via SCP eliminates the need of every NF creating connections to every other NF in the network. Consumer NF only needs to create redundant connections towards SCP. This off-loads the consumer NFs from handling complex connection management. SCP simplifies the scaling of the network.
- **Load balancing** - The SCP has a complete view of all the messages arriving for a given NF type. It supports schemes such as round robin, weighted round robin, factors in current load and NF availability to improve the load balancing.
- **Improves routing control** - By using Network Function notifications, SCP can dynamically adjust routing decisions based on real-time network conditions.

- **Canary upgrade for producer NFs**- The SCP plays a crucial role in the roll out of new NF releases. It supports mechanism that allows for a new release to be exposed to a fraction of the users or friendly users. Once successful, the SCP slowly opens additional users to the new release in a controlled manner providing confidence during the roll out.
- **Mediation**- This functionality brings an immense benefit by ensuring interoperability and compatibility between different NFs.

## Enhances resilience

- **Alternate routing, Circuit breaking, Outlier detection** - The SCP boosts resiliency in 5G network by providing features like alternate routing, circuit breaking and outlier detection. It relieves consumer NFs from remembering and interpreting complex routing rules associated with next hop selection, at the same time makes re-routing decisions based on load conditions and health status of NF providers.

In the absence of an alternate route, the SCP will quickly reject requests destined to a failed or degraded NF, thereby acting as a circuit breaker. This prevents valuable resources at the consumer NFs from being tied up waiting for responses from providers. The SCP also performs retries on behalf of the service consumer there by relieving the service consumer from this burden and leaving it to focus on the application

- **Congestion control** – SCP diverts the traffic when produces load exceeds the configured threshold. This avoids producer service failure in the network.
- **SCP health check** - SCP exposes health status APIs which can be used by peers to track availability.

## Enhances visibility into 5G core

- **5G SBI traffic feed** - SCP plays the role of 5G SBI traffic mirror and provides enriched message feed to the external monitoring/analytics solutions through Oracle Data Director. Existing tap-based solution cannot be used because of challenges in 5G core like HTTPS (encrypted SBA traffic), network translations in K8s cluster etc. Oracle Communications SCP solves these problems and enables more business use-cases on top of it.
- **5G aware metrics** - SCP collects metrics and KPI related to message processing such as request and response counts or messages/sec or average transaction latency, etc. as services requests are proxied via the SCP. With this information, the SCP is in a unique position to provide a status of the network health indicators at any given time.
- **5G aware tracing with enhanced logging** - SCP can support subscriber tracing through logs with minimal performance impact, enabling you to obtain E2E visibility on control plane flows.

## Enhances security

- **Confidentiality and integrity protection**- Oracle Communications SCP provides native HTTPS encryption in SBA traffic between 5G NFs, supporting mTLS1.2 and m TLS1.3. This brings maximum security by preventing unsolicited interception of packets. The security can be further bolstered by packet screening functionality to mitigate against DOS attacks.
- **Authorization and authentication**- Oracle Communications SCP supports OAuth framework and Client Credentials Assertion (CCA).
- **Identity and access management** - Support Role-Based Access Management(RBAC) to manage SCP.
- **Rate limiting** - Protects from rogue NF Consumers that may flood the network and cause denial of service.

## Summary

Deploying a 5G Next Generation core is no easy task. 5G replaces a traditional mobile core network architecture with a new Service Based Architecture (SBA), allowing cloud native deployment, and modular approach for NF services. It also allows

service producers and consumers to evolve independently, enabling you to introduce new capabilities incrementally and rapidly with lower risk and effort. While this new architecture enables more flexibility, agility, and service deployment speed, it will require “soak time” to mature and address real deployment challenges.

Oracle communications SCP has been deployed across the globe for tier-1 operators like [DISH](#), [Orange](#). Oracle Communications is where 40+ years of heritage in network experience meets cloud innovation to deliver highly secure, robust, and flexible cloud native 4G/5G core network solutions. Oracle’s dominance in 3G,4G control plane, being the category innovator for Diameter Signaling Router, continues in the 5G signaling core with the distinct advantage of delivering 5G core signaling solutions in a cloud native environment based on Oracle’s cloud leadership and expertise.

## Key business benefits

- Ease of operability through traffic balancing.
- Enhance resilience & security through alternate routing.
- Enhanced visibility into 5G core, through 5G SBI traffic feed for monitoring.

## Related products

- Oracle Communications Cloud Native Core, Network Repository Function (NRF)
- 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, Network Slice and Selection Function (NSSF)
- Oracle Communications Cloud Native Core, Unified Data Repository (UDR)
- Oracle Communications Cloud Native Core, Network Data Analytics Function (NWDAF)
- Oracle Communications Cloud Native Core, Data Director (DD)

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