



DATA SHEET

SERVICE COMMUNICATION PROXY (SCP)

The 5G service-based architecture depends on RESTful APIs between Network Functions (NFs). The Service Communication Proxy (SCP) is a key enabler that provides load balancing in a distributed cloud environment and facilitates and simplifies inter-vendor integration.

In the 3GPP Release 15 architecture, each NF, when acting as a service consumer, is responsible for choosing a service producer from among the set of results returned from a query to the Network Repository Function (NRF). The consumer NF also performs functions like load balancing among those results and manages faults and timeouts.

In Release 16, 3GPP introduced the Service Communication Proxy (SCP) to enable consumer NFs to outsource these responsibilities to a central function that can be more easily configured, monitored, and managed.

The Service Communications Proxy (SCP) provides load balancing in a distributed cloud environment and makes inter-vendor integration more feasible and easier.

Supported services and interfaces

The Mavenir SCP supports both communication models C and D as defined in [Annex E of 3GPP 23.501](#) and deployment model is based on Annex G.3 of 3GPP 23.501

In model C (Figure 1), the Consumer NF (cNF) is responsible for discovering a Producer NF (pNF) using the NRF (e.g., through SCP), and then initiates communication through the SCP.

In contrast, in model D (Figure 2), the discovery is delegated entirely to the SCP.

KEY FEATURES

- > 3GPP Release 16 compliant.
- > Support for communication model C and D
- > Cloud Native network functions
- > Network slicing support
- > Orchestration and Automation

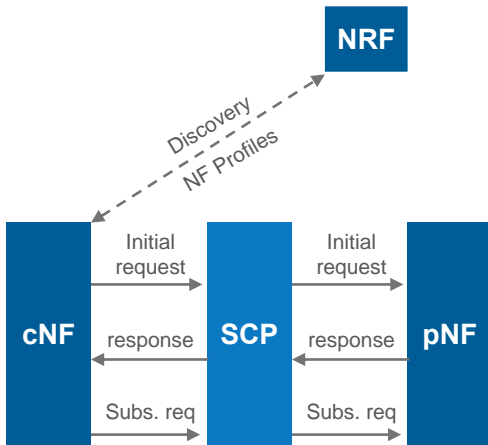


Figure 1: Communication model C

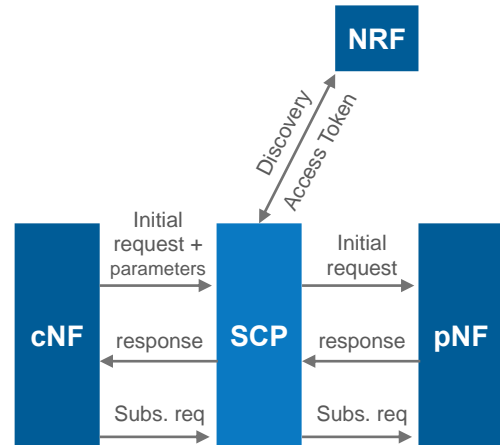


Figure 2: Communication model D

Services offered by the SCP

The SCP acts as a proxy for existing service-based interfaces and does not explicitly expose any service-based interfaces of its own. However, the SCP provides several important features to facilitate communication between service consumers and service producers.

In both communication models, the SCP supports a single point of configuration for:

- > Message routing – choosing a next-hop SCP or final delivery to the producer network function based on pattern matching of the target URI.
- > Load balancing – choosing from among a set of producers according to priority and load information.
- > Failure handling / failover – whether to retry a request to the same or to an alternate producer or give up on a request based on the message type.
- > Mediation – adjusting messages to solve interoperability issues among different vendors.

Additionally, in Model D, the SCP supports:

- > Delegated Discovery – converting discovery parameters from the Consumer NF into a query for NRF, allocating an OAuth2.0 access token (if enabled) on behalf of the cNF, and selecting an initial producer from the returned results.



Standards References

- > 3GPP TS 23.501: System Architecture for the 5G System (5GS)
- > 3GPP TS 23.502: Procedures for the 5G System (5GS)
- > 3GPP TS 33.501: Security architecture and procedures for 5G System
- > 3GPP TS 29.500: 5G System; Technical Realization of Service Based Architecture; Stage 3
- > 3GPP TS 29.510: 5G System; Network Function Repository Service
- > IETF RFC 7540: "Hypertext Transfer Protocol Version 2 (HTTP/2)".
- > IETF RFC 8259: "The JavaScript Object Notation (JSON) Data Interchange Format"
- > IETF RFC 7807: "Problem Details for HTTP APIs"

Key Standard Functions

The SCP supports the following functions and services:

- > Support for the 3gpp-Sbi-Target-apiRoot header to route requests to their destination
- > Support for the 3gpp-Sbi-Routing-Binding header to choose an eligible alternate producer during failover.
- > Support for 3gpp-Sbi-Discovery- class of headers for forming query parameters toward the NRF during delegated discovery (communication model D)
- > Support for hop-by-hop mutual TLS authentication between itself and consumers and producers.

Mavenir SCP Features

- > Supports simultaneously model B, C and D
- > Hop-by-hop mutual authentication.
- > Support for silent proxy mode for prior Release 16 Consumer NFs
- > Routing requests based on 3gpp-Sbi-Target-apiRoot and 3gpp-Sbi-Routing-Binding headers.
- > Manual and automatic configuration of routing tables for multi-SCP deployments
- > Centralized management of failover / timeout strategy per producer / consumer NF Type
- > Delegated discovery through support of 3gpp-Sbi-Discovery-headers from the consumer
- > Support for geo-distribution, geo-redundancy, and soft state
- > Webscale architecture – Cloud native SBA, service mesh, containers & analytics
- > Support for dynamic scaling of microservices, stateless availability and performance in a fully cloud-native environment
- > Finer micro-services granularity than defined by 3GPP.



Cloud-native principles

- > Stateless functional software elements with state-efficient processing to achieve greater resource efficiency and webscale capacity.
- > Microservices based software disaggregation with connectionless messaging protocol; e.g., REST APIs
- > Fully automated Life Cycle Management (LCM) and scalability based on Kubernetes integration.
- > Service Based Architecture (SBA) using web-based APIs (e.g., HTTP/2)
- > Continuous Integration and Continuous Delivery (CI/CD) software pipeline
- > Deployment flexibility — all Mavenir products and solutions including SCP can be deployed on ANY cloud.
- > Dynamic mediation and scalability:
 - SCP is built on microservices that have small image sizes, which facilitate quick and dynamic scaling compared to hardware specific solutions or VMs with specific hypervisors.
 - SCP performs mediation by harmonizing messages between 5GX NFs of the same operator even if the NFs belong to different vendors or are of different 3GPP releases.

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