



5G CORE

Product Data Sheet

5G Service Communication Proxy (SCP)

✓ Business Benefits

- Central element of the 5G Core service-based signaling network providing secure message routing, load-balancing, overload protection & traffic visibility.
- Greatly reduces the complexity of managing large geo-distributed 5G Core signaling networks.
- Incorporates powerful award-winning Dissector-based Rules Engine enabling flexible customer programmability.
- Part of the Titanium InterGenerational™ Cloud-Native Ecosystem interworking of HTTP2, Diameter, SS7 & SIP signaling.
- “Deploy anywhere” installation on premises or in the cloud via Containers.

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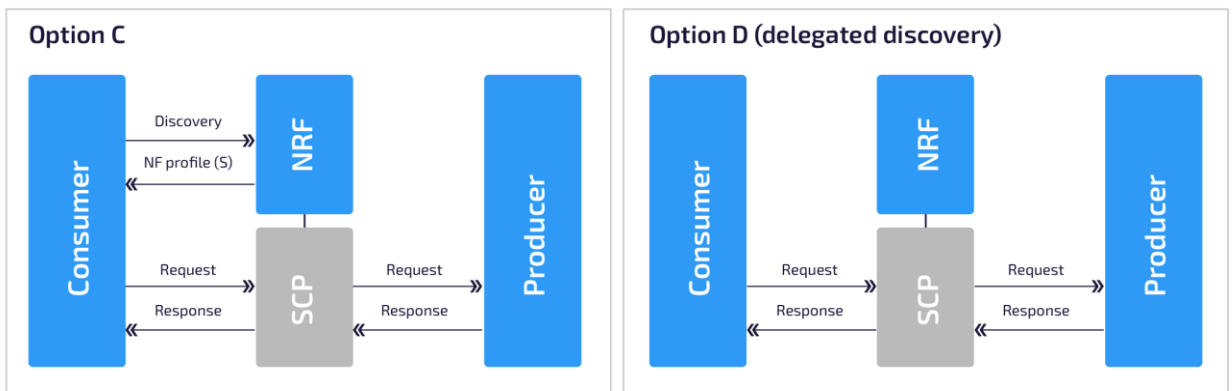
5G Service Communication Proxy (SCP)

+ Overview

The Service Communication Proxy (SCP) is one of the most important elements of the 3GPP Service-Based Architecture (SBA) for 5G Core networks. The SCP is functionality similar to the Diameter Routing Agent (DRA) in 4G, functioning as a central control point in the signaling network core.

The SCP performs multiple key functions, simplifying core network routing topology & offloading the Network Repository Function (NRF) from service discovery, thus enabling greater 5G core network geo-distributed scalability. Key functions include

- Message routing, load balancing & distribution
- Traffic prioritization & overload handling
- 5G Service Delegated Discovery
- Optional message manipulation & transformation



∨ The Titan.ium Solution

All Titan.ium's 5G products are designed following the best practices for cloud-native microservices-based architectures and associated processes such as continuous integration, testing, delivery, and deployment. Titan.ium's 5G SCP boasts auto-scaling capabilities, ensuring efficient handling of fluctuations in traffic volume while maintaining optimal performance and reliability. Additionally, it employs caching mechanisms for discovered network function profiles, reducing the number of delegated discovery requests sent to the NRF. Leveraging consumer/producer bindings further enhances the benefits provided in conjunction with the Titan.ium's SCP, ultimately outweighing any potential increase in latency associated with routing all 5G core traffic through a centralized component.

Another distinctive feature of Titan.ium's 5G SCP is the ability to screen any parameter within received messages and alter their content, providing for seamless integration and interoperability with the network functions inside the 5G core. The ability to append content to messages holds particular significance in facilitating information exchange between PLMNs, enabling Security Edge Protection Proxies (SEPPs) to authenticate both the source and destination PLMN IDs, as well as the intended purpose of the connection between the PLMNs.

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⌵ The Titan.ium Solution (continued)

Similarly, the SCP can augment network slice, location, or SCP domain-specific information to the network function profiles registered in the 5G Network Repository Function (NRF), thereby enabling a more refined approach to service discovery.

Robust security and operational efficiency are crucial in the successful delivery of 5G Stan-Alone (SA) services. Titan.ium's SCP ensures interoperability by strictly adhering to 3GPP standards and by undergoing rigorous module and systems tests. As a cloud-native implementation, Titan.ium's SCP leverages the inherent robustness and resiliency of the underlying container orchestration platform. Comprising of individual components (containers) deployed across distributed compute nodes, each component is continuously screened for its liveness and readiness ensuring that the communication service is always delivered at required resiliency level. Self-healing, auto-scaling, canary roll-outs and rolling updates enhance the operational experience driven by fully automated rollouts leveraging GitOps and continuous deployment best practices.

Key Capabilities

Secure Indirect Communications

The SCP provides secure indirect communications between service NF-Consumers and NF-Producers, or between SCPs, with TLS mutual authentication, Server Name Indication (SNI) support, and TLSv1.2 / TLSv1.3.

High Performance HTTP/2 Stack

The SCP relies on a high-performance HTTP stack with rich configuration options, including settings related to connections, buffers, traffic classes, and TLS.

Delegated Discovery / Discovery Caching

"On the fly" NF-Producer service discovery & selection on behalf of the NF-Consumer. The SCP caches NRF NF-Profile information, subscribing to NRF status changes to ensure that cached NF-Profiles are kept up to date with latest service discovery information.

HTTP Proxy

Message routing function that routes to the destination NF-Producer service directly, or via the next hop Proxy/SCP. **Consumer-Producer Binding**

Caching of binding indication and relevant NF profiles for routing of subsequent requests based on routing binding indication. Cached binding indications and NF profiles are automatically removed after expiration of their configurable lifetime.

Multi-Service & Multi-Slice Support

Each service instance is associated with a combination of HTTP IP address + port and URI path prefix. This allows different service logic & routing decisions for different traffic profiles, e.g., different network slices.

Dissectors

The Titan.ium Dissector facility includes Predefined & User-defined HTTP2 dissectors allowing retrieval of any information contained in an HTTP2 message, which can then be used for routing or service logic.

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Key Capabilities (continued)

Dissector-based Rules Engine

Routing & Service logic processing is supported by Titan.iium's powerful Rules Engine allowing programmable logical expressions (And/Or/Not) on different Dissector parameters as needed. Also provided are pre-defined functions that can be applied to optimize User programmable processing logic.

Configurable Actions

The programmable Rules Engine also allows the user to configure context-specific actions. For example, programmable logic may invoke an NRF discovery request, make an NF selection, generate an Event, among other capabilities.

Flexible Routing

Create rules as matching criteria for routing table entries, which means that any information contained in an HTTP request can be used for a routing decision. Static information like priority/weight, or dynamic information like load, latency and/or endpoint health may be referenced for a matched route entry that may be used to affect routing decisions.

Events and Tracing

Raise Event actions when defined situations occur or disappear, for example with the onset of a certain load level or when it abates. You can also enable tracing for a certain service instance for diagnostics purposes.

Overload Protection

SCP replicas & instances monitor their traffic load interacting with the Service Router to throttle traffic and/or auto-scale SCP services as needed to handle overload.

Statistics and Key Performance Indicators (KPI)

The SCP generates Statistics and KPIs so that external servers can retrieve them for performance & health tracking purposes (e.g., the number of inbound & outbound requests per unit time). SCP service logic also uses these statistics for congestion control and for routing decisions based on load/latency of route entries.

Optional Features

The following features may optionally be added to the SCP deployment as needed.

HTTP2 Message Transformation

This feature enables the operator to invoke configurable message Dissectors and Rules-based Actions to transform message content as needed, for example to aid in 5G to 3G/4G interworking.

HTTP2 Traffic Mirroring

Traffic mirroring interface towards external Probing/Monitoring/Analytics system via gRPC protocol. It provides observability over alarms, events and statistics.

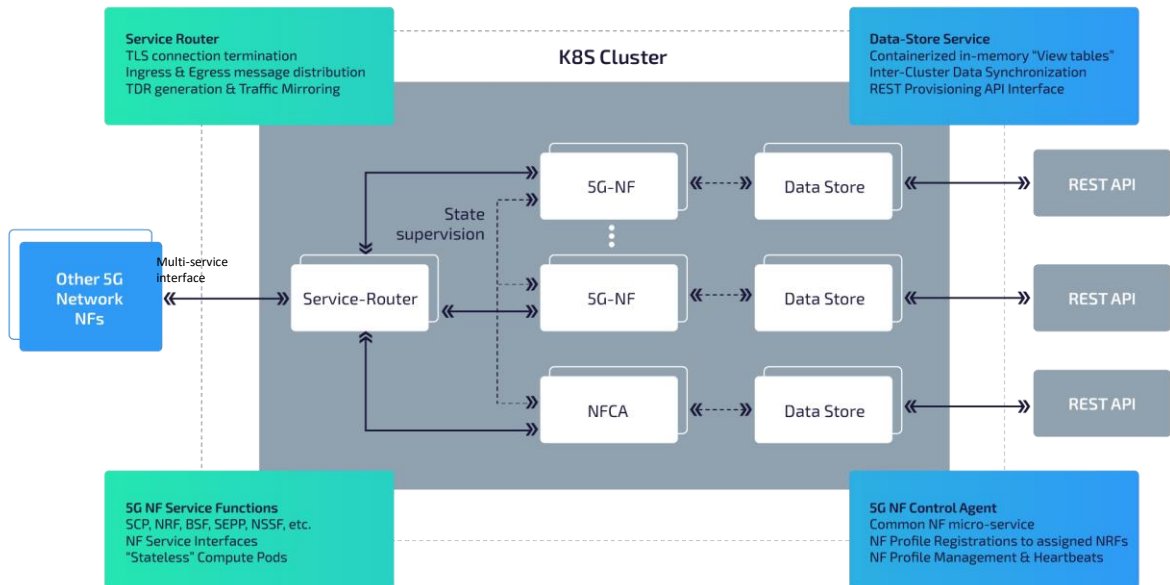
Additional Related Products

Titan.iium also offers an Element Management System (EMS) system which may be used for centralized configuration, performance and fault management of distributed SCPs as needed.

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5G Container-Native Architecture



The SCP is implemented as a set of containerized micro-services, decomposed into a Service-Router function, SCP compute front-end functions, and back-end Data Store micro-service for persistent storage. All component micro-services may be replicated within a Kubernetes (K8S) Cluster for both resiliency & scalability purposes. In addition, two or more K8S Clusters may comprise a single Titan.iium system deployment to achieve multi-site system geo-redundancy, with cross-site Datastore replication to ensure a common view of SCP persistent data.

The Service-Router provides HTTP1/2 routing services and securely exposes SBI interfaces to external IP networks. All Titan.iium, 5G NFs share a common "Network Function Control Agent" (NFCA) micro-service, responsible for common NF management, e.g., to handle Registration of NF-Profiles to their assigned NRF(s) and keep these NF-Profile registrations up to date via heart-beats.

Contact Titan.iium Today

Please visit www.titaniumplatform.com for product or solution information. For configuration and pricing details, please contact your local account representative via sales@titaniumplatform.com

About Titan.iium

Titan.iium Platform is a leader in signaling, routing, subscriber data management, and security software and services. Our solutions are deployed in more than 80 countries by over 180 companies, including eight of the world's top ten communications service providers and all of the top five. Titan.iium supports any network, domain, signaling protocol, and infrastructure with advanced routing capabilities and a unified end-user experience.

