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Cloud SPR

SUBSCRIPTION PROFILE REPOSITORY

Introduction

This document describes Globberry Cloud SPR, the Subscription Profile Repository within the Globberry Policy Management Suite. The suite also includes Globberry PCRF/PCF for policy and charging control and Globberry DRA for Diameter routing and mediation.

Cloud SPR is a 3GPP-oriented subscriber-data repository for information used by Policy and Charging Control. It supports operators running 4G and 5G NSA environments with PCRF and provides a common subscriber-data foundation for evolution toward 5G SA and PCF-based policy control.

The product is based on a microservice architecture and can be deployed on physical, virtualized, or cloud infrastructure. The updated architecture adds multi-site sharding and replication, allowing the repository to scale horizontally and maintain subscriber-data availability across distributed deployments.

Cloud SPR can operate as a pre-integrated component of the Globberry Policy Management Suite or as a standalone product connected to an existing policy-control environment. REST API provisioning replaces the legacy LDAP/SOAP provisioning approach and simplifies integration with modern OSS/BSS and CRM systems.

What Cloud SPR Provides

Structured subscriber profiles: Persistent and dynamic subscriber data used by policy-control systems, with a clear separation between relatively stable profile information and fast-changing service context.

Real-time policy context: Fast access to subscriber entitlements, usage-related attributes, QoS information, and other policy-relevant data required by PCRF/PCF decisions.

Distributed scale and resilience: A multi-site sharded data architecture with replication, horizontal scaling, and failover capabilities for large subscriber populations.

Modern integration: REST-based provisioning and controlled access for OSS/BSS, CRM, customer-care, self-service, and other authorized systems.

> **ROLE IN POLICY MANAGEMENT**
>
> Cloud SPR remains a deterministic source of structured subscriber data.

Cloud SPR Key Features

Static Profile Storage: Stores persistent subscriber information required for policy decisions, including subscriber category, services, charging-related attributes, service entitlements, and preferred QoS parameters.

Dynamic Profile Maintenance: Maintains fast-changing subscriber context such as usage, spending-related information, current service conditions, effective QoS, and policy-relevant session data.

PCRF/PCF Integration: Provides a consistent subscriber-data layer for Globberry PCRF/PCF and can also integrate with third-party policy-control environments through dedicated adapters and APIs.

Real-Time Profile Updates: Makes subscriber profile changes available to policy-control systems quickly so policy decisions can respond to updated entitlements, usage, or service conditions.

REST API Provisioning: Provides REST-based interfaces for creating and maintaining subscriber profiles from OSS/BSS and CRM systems, replacing the legacy LDAP/SOAP provisioning model.

Multi-Site Sharding and Replication: Distributes subscriber data across multiple nodes and sites to support horizontal scaling, geographic resilience, and high availability.

> FLEXIBLE DEPLOYMENT
>
> Cloud SPR can be deployed as a standalone subscriber-data platform or together with Globberry PCRF/PCF for integrated policy and subscriber-profile management.

Cloud SPR Benefits

- Support for 4G and 5G NSA policy environments, with a subscriber-data foundation for migration toward 5G SA and PCF-based policy control.
- High-performance read/write access designed for real-time policy operations, including low-latency access to dynamic subscriber context.
- Horizontal scalability through microservices, distributed deployment, and sharded subscriber-data storage.
- Multi-site resilience through replication, geo-redundancy, and automatic recovery from component or site failures.
- Lower operational complexity through centralized subscriber-data provisioning and a common profile model for policy-control systems.
- Flexible deployment across physical, virtualized, private-cloud, and public-cloud environments.

Cloud SPR: Architecture

Cloud SPR is designed as a distributed, microservice-based subscriber-data platform. The architecture separates subscriber-data storage, policy-control access, provisioning, operational management, and distributed data handling so each area can scale and evolve independently.

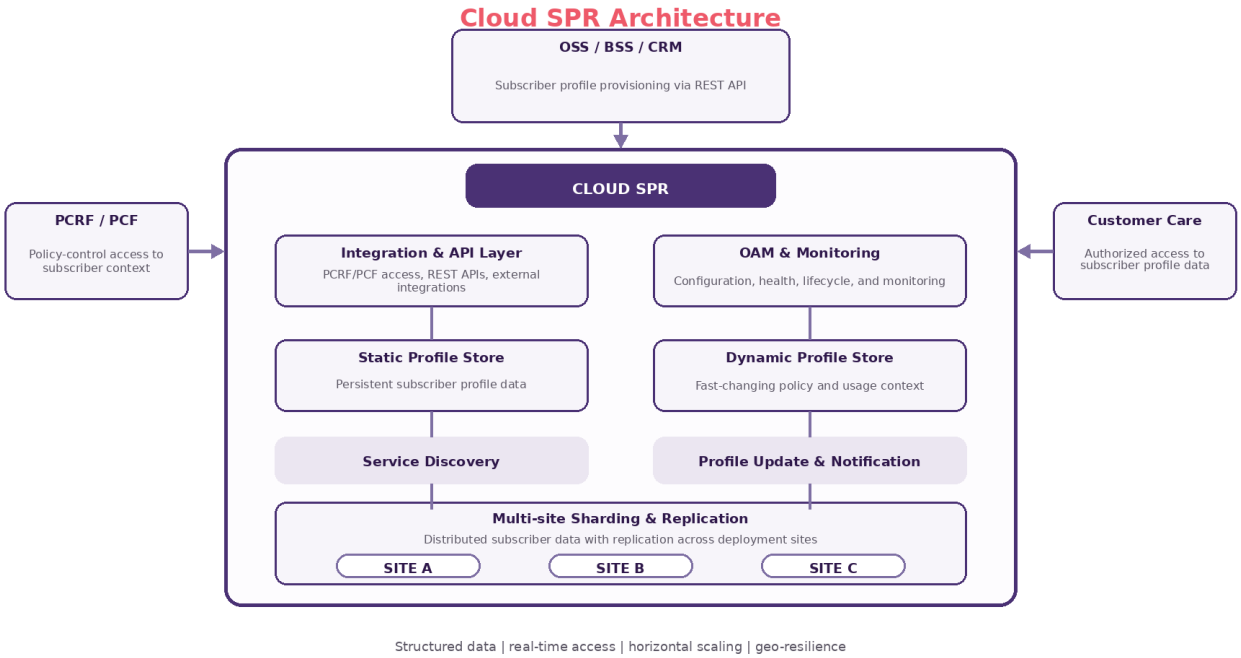


Figure 1. Cloud SPR logical architecture with REST-based provisioning and multi-site sharding.

- Distributed data layer for static and dynamic subscriber profile information.
- PCRF/PCF integration and policy-profile access to subscriber context.
- REST API provisioning from OSS/BSS and CRM systems.
- Controlled subscriber-data access for customer-care, self-service, and other authorized systems.
- Multi-site sharding and replication for scale, geographic resilience, and continuity.
- OAM, monitoring, service discovery, and profile-update mechanisms for operational control.

Distributed Deployment and Resilience

Microservice Deployment

Cloud SPR modules operate as independent microservices and can be distributed across multiple nodes and sites. Operators can scale processing and storage incrementally as subscriber volumes and transaction rates grow, rather than scaling the complete platform as a single unit.

Multi-Site Sharding and Replication

The updated architecture distributes subscriber records across multiple database nodes using a sharded data model. Replication maintains additional copies of data across the deployment, while multi-site placement provides geographic redundancy and supports service continuity if a node or site becomes unavailable.

Scaling, Failover, and Monitoring

Additional processing or storage capacity can be introduced as demand increases. The microservice architecture supports load redistribution across available modules, while monitoring and service-discovery functions provide visibility into component health and support recovery from individual module failures.

REST-Based Provisioning

The updated provisioning model uses REST APIs for subscriber-profile creation and maintenance. This replaces the legacy LDAP/SOAP provisioning approach described in the previous white paper and provides a simpler integration model for modern OSS/BSS and CRM environments.

Performance and Data Consistency

The dynamic data layer is optimized for frequent read/write operations required by policy-control workflows. Distributed storage and replication are designed to preserve subscriber-data availability and consistency while maintaining the low access latency required by real-time policy decisions.

> **DEPLOYMENT OPTIONS**
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> Cloud SPR can be deployed on physical servers, virtualized infrastructure, private cloud, or public-cloud environments. Multi-site deployments can span separate data centers or geographic regions according to operator resilience and regulatory requirements.

Cloud SPR: Functionality

Static Profile Storage

The static profile layer stores persistent subscriber information used by policy and charging systems. Typical profile elements include:

- Subscriber class and category
- Charging-related information and service entitlements
- Subscriber services and service-specific parameters
- Preferred or allowed QoS parameters
- Access, roaming, and other policy-relevant subscriber attributes

Static profile information is normally created and maintained through REST-based provisioning from OSS/BSS or CRM systems. Repeated updates are handled consistently so the resulting subscriber state remains predictable.

Dynamic Profile Maintenance

The dynamic profile layer stores subscriber information that changes frequently during service usage or policy execution. This can include:

- Usage and consumption information received from policy or charging systems
- Current QoS and service conditions
- Policy state relevant to active subscriber sessions
- Spending-related attributes and service thresholds
- Notification and service-event history required for policy decisions
- Temporary state used to support continuity and recovery workflows

Dynamic profile information is optimized for real-time access by policy-control systems. The distributed data model allows multiple PCRF/PCF instances or policy-processing nodes to work with a common subscriber context.

Profile Updates and Notifications

Subscriber profile changes that affect policy decisions can be propagated to the policy-control environment so active policy behavior can reflect updated entitlements, usage, or service conditions without waiting for a separate manual synchronization cycle.

Integration with Globberry PCRF/PCF

Cloud SPR can operate as a standalone subscriber-data platform or as a pre-integrated component of the Globberry Policy Management Suite. In an integrated deployment, PCRF/PCF and SPR share a consistent subscriber-data model and operational framework.

4G, 5G NSA, and 5G SA Policy Environments

For 4G and 5G NSA environments, PCRF can use Cloud SPR as the subscriber profile source for policy decisions. As operators evolve toward 5G SA, the same repository can provide a common subscriber-data foundation for PCF-oriented policy-control workflows through the appropriate integration layer.

Supporting AI-Assisted Policy Operations

The updated Globberry PCRF/PCF adds AI-assisted policy configuration, policy explanation, what-if analysis, conversational analytics, dashboard assistance, and troubleshooting. Cloud SPR remains the deterministic source of subscriber context used by these functions.

For example, when investigating why a subscriber received a particular QoS, restriction, or service treatment, the PCRF/PCF operational layer can combine policy configuration and session information with structured subscriber attributes stored in SPR. This helps specialists reach the relevant context faster without allowing AI to replace the underlying subscriber data or deterministic policy-execution logic.

Migration and Coexistence

Cloud SPR can support phased policy-platform evolution. Operators can maintain a shared subscriber-data layer while PCRF and PCF environments coexist during migration, reducing the need to duplicate subscriber-profile management across separate policy-control stacks.

External Systems and Subscriber Data Access

Authorized customer-care, self-service, analytics, and operational systems can retrieve relevant subscriber information through controlled integration interfaces. REST API provisioning is used for profile creation and maintenance, while policy-control integrations continue to access the subscriber context required for real-time decisions.

> **DESIGN PRINCIPLE**
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> The repository remains a structured, deterministic system of record. AI-assisted functions operate around the policy-management workflow, using subscriber context from SPR as trusted input rather than generating or inferring subscriber profile data.



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