

# Continuity in the cloud

## VNF states in Siemens Common Repository

### Siemens Convergence Creators

#### **Always connected, always online, always available.**

These are the expectations of today's end-users. Because the Internet is part of our daily life and mobile Internet devices are used more widely than ever, operators are facing a new challenge: Data sessions must remain active.

Video streaming and audio/video calls via data connection at high quality are basic expectations of all users – and operators need to ensure this service continuity.

The goal is to provide 100 percent availability, but how can operators achieve this? HW and SW failures are inevitable. Regular, static backups might help in restoring the network elements but cannot ensure session continuity.

Legacy systems with a stateful front-end concept based on bare metal solutions can't keep up with current expectations.

The cloud challenges the telco world to upgrade its architecture – into a lean, stateless solution with the ability to adapt to rapidly changing environments.

**The solution:** Siemens Common Repository (SCR) is capable of storing subscriber and session data and can also save VNF state information, which can be critical when restoring the last working status of an element, keeping sessions alive, and most importantly, keeping the user online.

**The Siemens Common Repository (SCR)** is the next step in SDM innovation. It manages all types of information: persistent subscriber data and dynamic session data as well as any other information required by the cloud environment, such as VNF states. In concrete terms, SCR acts as a back-end for storing data for any of the elements in the core network and EPC: Elements like HSS, HLR, PCRF and AAA, as well as IMS.

SCR is not just another LDAP directory but rather a completely new and revolutionary approach to managing data. It is the first database system for telco applications that can be expanded to any required size under load. SCR – unlike many available database solutions – is no longer based on hard drives.

It stores the database in memory. SCR has a revolutionary cellular data memory architecture that enables the system to enhance current memory resources, expand to meet new on-demand requirements, and manage resources, including redundancy, "on the fly" without impacting existing users.

This patented architecture was designed to use up to one million CPU cores (virtual or bare metal). Depending on the types of data and hardware resources, up to one billion entries and one billion transactions per second can be processed.

SCR is compatible with all relevant standards and can be operated via an intuitive, graphical user interface that permits rapid

modeling of data and client views as well as comprehensive live system monitoring.

### Based on well-known standards

SCR is the database of the future with revolutionary technology built in. It uses standard interfaces to enable an easy and seamless integration of existing elements and deliver support for any migration scenario from an existing database. It uses a standard LDAP interface for application access and SPML for subscriber provisioning. Integration in the ETSI MANO environment is realized via REST and Netconf.

### No more broken user sessions

The cloud defines design principles for all our products, and it also opens new opportunities for us to better serve our customers. HW failures should no longer cause an outage. And it should not even break the user session!

SCR is capable of storing a variety of VNF states and can support front-end systems in realizing service continuity. After the failure of a front end, a secondary VM can take over its functions and continue from exactly the same point where the initial equipment was failing. However, to achieve this capability, we need more than just a database that can securely store data and replicate it with very low latency. We also need the applications to support this new approach.

There are different levels of integration required in order to reach full service continuity:

#### Stateful VNF with asynchronous backup to the central DB

- Pros:
  - » Easy to setup
  - » Minimal impact on the application
  - » No latency impact
- Con:
  - » Session continuity can't be ensured

#### Stateless VNF with local cache synchronised to central DB

- Pros:
  - » Small impact on the application
  - » Can work even if the database is "lost"
  - » Small latency impact
- Con:
  - » Local cache needs to be managed and restored before operation continues

#### Stateless VNF with sessions stored in the central DB only

- Pros:
  - » Real stateless frontend
  - » Seamless restore in case of failure
- Cons:
  - » Network design is crucial
  - » New application concept

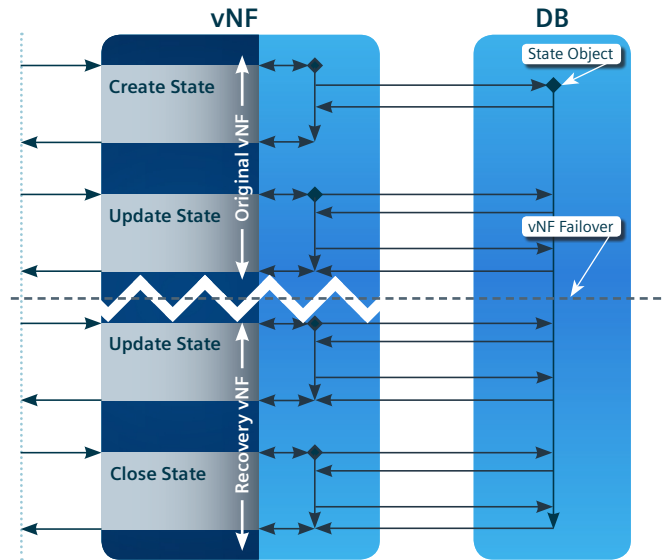


Figure: Stateless front-end failover

### Our vision

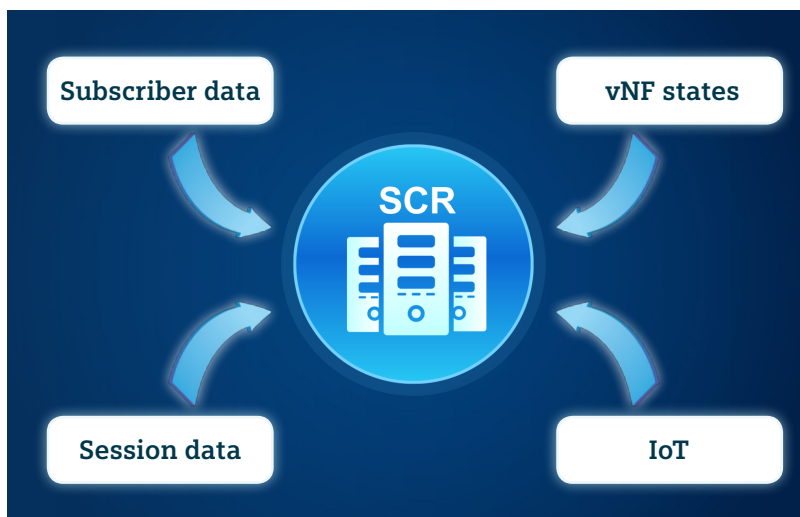
Sometimes it takes a revolution to shape the future. You can join this revolution with SCR, a new consolidated service database that stores user and session data in a single, infinitely scalable system. It speeds up your time to market for new services, gives you more in-depth insights into customer data, and offers numerous data synergies.

The future is stateless. Front ends should eliminate all subscriber and session data and any information that needs to be stored. "Handovers" between two front ends should occur automatically. The back-end database should manage data consistency and the network should ensure the latency required.

SCR is a data management product that makes enhanced reliability and speed possible with linear scaling and geographical distribution. It is optimized to offer minimum operating costs and maximum robustness.

SCR is designed to be used as the back end for subscriber, session, VNF, and device data. It can also be used as a hybrid database for ubiquitous data, including large objects, binary data, and streaming.

SCR is a central element in achieving session continuity by storing VNF states and making the core network more robust and more reliable than ever before.



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