

SAP Infrastructures in the Cloud

September 24th, 2020

Easing the Transition

The tools of the SUSE environment will enable a smooth transition to SAP S/4HANA in the cloud, delivering high availability with minimal disruption—and without the need to retrain staff.

The cloud offers incredible potential for streamlining operations and saving on management costs. But experienced admins are cautious about making big changes for mission-critical applications. Will you need to learn new tools when you transition to the cloud environment? Will the old tools work in the same way? Most importantly, will this transition occur smoothly, with minimal disruption of service.

If you support SAP applications in a SUSE environment, you can expect a smooth and seamless transition as you move resources to the cloud. SUSE's management tools are designed for equivalent operation in on-cloud or on-premises environments, and a cloud-based SUSE environment provides the same commitment to continuous uptime that you have come to expect for your local SUSE infrastructure.

SUSE and the Cloud

It is no secret that SAP's emphasis on versatile, expandable and self-managing systems has led to strong growth of its cloud service portfolio. SAP has invested heavily in the cloud in recent years, and SUSE's close partnership with SAP has allowed the two companies to innovate together. As the leading platform for supporting SAP, SUSE combines best-in-class SAP support with a strong emphasis on the cloud (Figure 1).

SUSE's cloud engineering team is highly focused on rapidly integrating new capabilities from leading cloud companies such as Azure, Google and AWS. Unlike other vendors, who depend on the hosting service to provide OS images, SUSE builds and certifies its own public cloud images, ensuring high quality, consistency and fastest-possible time to

market. Because the cloud images are the same for all cloud vendors, a customer can switch providers with minimal change to the guest environment.

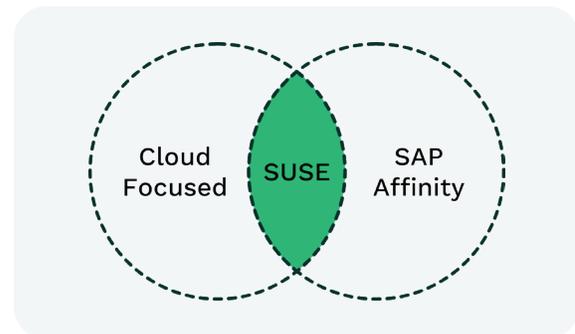


Figure 1. With its strong cloud focus and long-term history of SAP support, SUSE is uniquely positioned to assist with your transition to the SAP cloud.

SUSE provides a comprehensive platform that encompasses the full range of possibilities for SAP deployment. If your SAP deployment is mostly on-premises, the tools within the SUSE toolkit will allow you to move gracefully to the cloud with minimal disruption. If you're considering launching a new SAP implementation in a cloud-based setting, you'll find that SUSE's management tools are versatile and intuitive, and the experience of managing cloud resources is very much as you are familiar with when managing on-premises deployments. Some of the tools that highlight SUSE's commitment to SAP in the cloud are:

- Automatic failover and recovery
- Live Linux kernel patching
- Unified system management

These powerful features of the SUSE environment will help to keep your SAP systems in continuous operation as you transition to an all-cloud or hybrid-cloud environment.

Live Linux Kernel Patching

The first step in preventing downtime is eliminating lost cycles due to planned shutdowns. In the past, every server needed to shut down at a regular interval to install Linux security patches to fix system vulnerabilities. Although admins prepared for and anticipated this downtime, it was still a source of disruption, causing an interruption to SAP business process management services running on the systems.

SUSE Linux Enterprise Live Patching allows the system to remain continuously operational during system updates. SUSE's live kernel patching is based on kGraft, which was originally developed by SUSE (see the "kGraft" box). The live patching service, which lets you apply multiple patches at once, adapts easily to on-premises, hybrid and all-cloud environments. Live kernel patching removes the need for virtually all service disruptions that could have an effect on usability or performance. Servers that run SUSE live Linux kernel patching typically reboot only once per year (recommended).

The elegance and simplicity of SUSE's live Linux kernel patching feature mean that security patches can reach your cloud-based systems as soon as they arrive, maximizing security and eliminating the need for planned downtime.

kGraft

kGraft is a live kernel patching technology developed and maintained by SUSE. The kGraft patching system works at the function level. A kGraft kernel module is inserted directly into the kernel using the `insmod` command. The module replaces the code for an existing, buggy function with new code. This on-the-fly replacement could cause stability issues for a thread that is already in execution, so the kGraft module also inserts logic that routes old threads to the old version of the function, while allowing new threads to proceed to the new function code (Figure 2). When all threads that require the old version are completed, the kernel is again modified to point directly to the new version.

How does live kernel patching work?

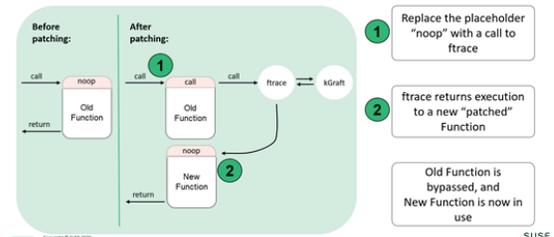


Figure 2. SUSE's live kernel patching service inserts a new function into the kernel, routing existing threads to the old version until the transition is complete and the old code is retired.

Automated Failover

Eliminating planned downtime is a good start for building a reliable SAP cloud environment, but what about downtime due to unplanned and random system events? SUSE provides near zero downtime for the SAP application layer, but the host layer below is subject to occasional incidents that are beyond the control of the guest environment. If a failure does occur within the cloud service provider network, SUSE’s automated failover feature will ensure that losing a cloud instance won’t result in a loss of service.

In a typical SAP HANA configuration scenario, clients will access read/write operations through a primary HANA node. A secondary node receives a copy of the HANA database through replication. The SAPHanaSR resource agent watches for a failure. If a failure occurs on the primary, the resource agent suspends replication and switches the secondary to be the new primary (Figure 3). The previous primary then becomes the secondary, and, when it is back online, it receives replication from the new primary node. An additional SAPHanaTopology agent maps the changes to the cluster and replicates the new topology.

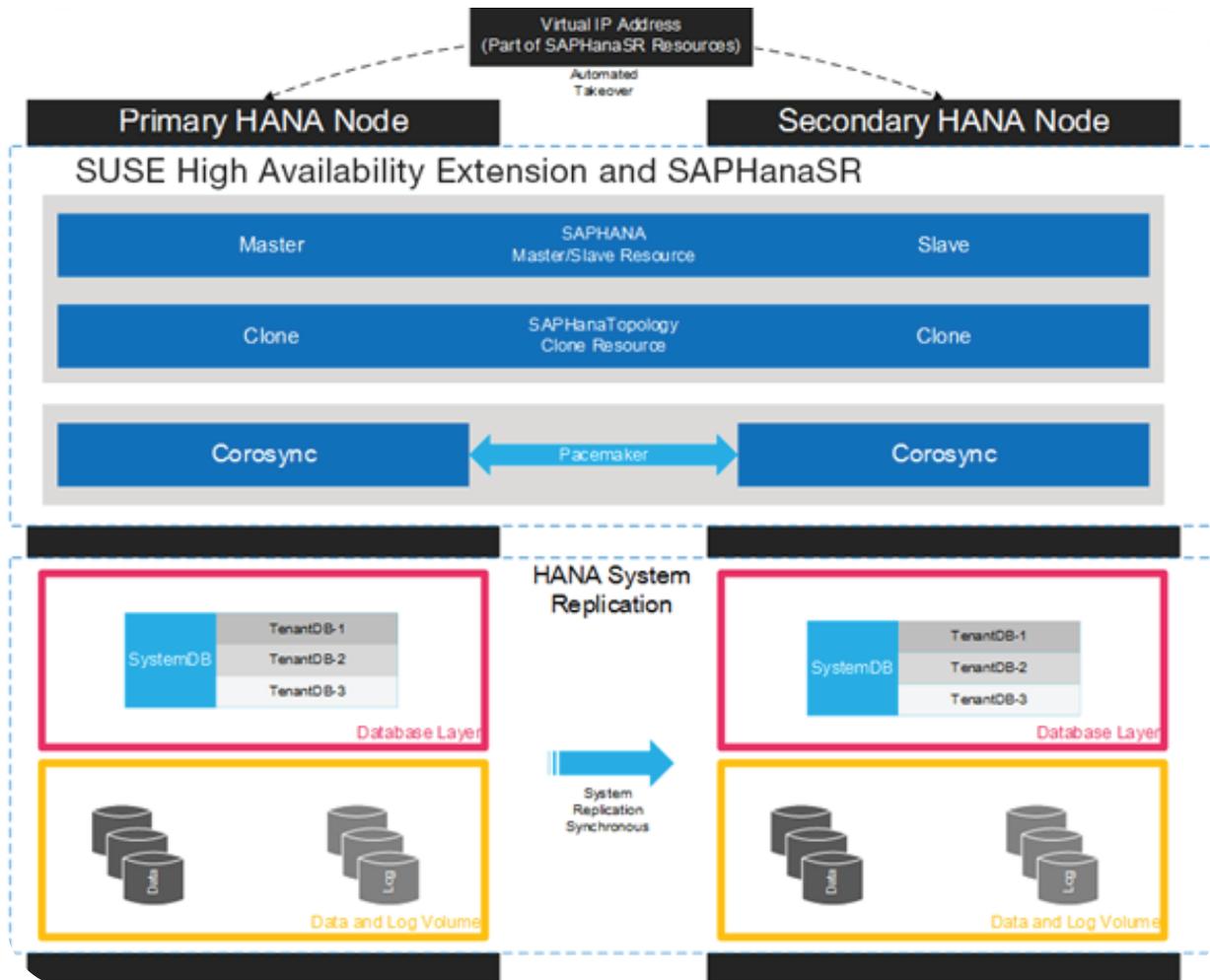


Figure 3. Automated failover SUSE’s SAPHanaSR agent watches the primary SAP HANA database, switching the secondary to primary if a failure occurs.

The SUSE Linux Enterprise Server for SAP Applications automated failover feature reduces the time and effort needed to manage your high-availability environment. You can configure automated failover on the first day of your cloud transition, and it will continue to protect you from unexpected downtime with minimal need for further attention.

Infrastructure Management

Perhaps the best way to ensure continuous operation for your SAP cloud environment is to avoid downtime before it happens. Your best chance to minimize downtime is to ensure that your systems are properly configured, secure, well-patched and in compliance. Your SAP cloud needs a versatile management solution that will lock down security and provide an airtight environment for deploying, configuring and managing server instances in the cloud. SUSE Manager is a powerful tool that keeps a close watch on your server systems, offering a single solution for the complete lifecycle of system management, including:

- **Deployment**—standardize and automate cloud deployment to eliminate random errors that could lead to downtime.
- **Configuration**—develop stable and secure system configurations in advance and apply them to cloud-based systems through automation. Avoid quirky, non-standard manual configuration scenarios that burn admin resources and lead to instability.
- **Compliance**—Once your systems are deployed, configured and secure, SUSE Manager will track all user access to identify who made changes and provide reports on compliance levels for all cloud instances.

SUSE Manager abstracts configuration and management services, handling on-premises and in-cloud resources through the same convenient interface (Figure 4). If you're accustomed to SUSE Manager on-premises, you'll transition easily to a cloud environment. If you're new to the SUSE landscape, you'll

find that SUSE Manager is a simple, practical and easy-to-learn solution for managing cloud resources.

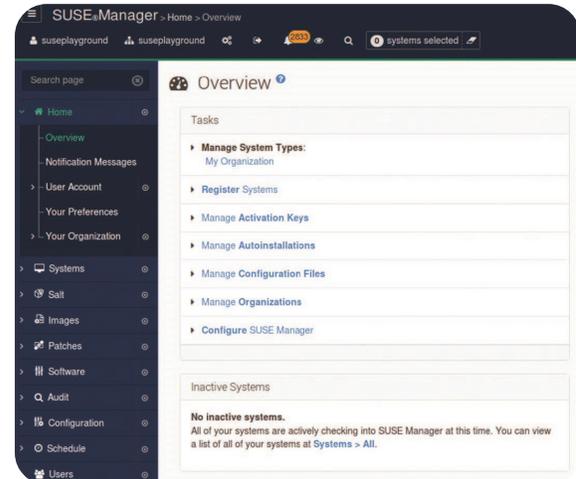


Figure 4. SUSE Manager offers airtight support for deploying, configuring, updating and managing your Linux server systems—whether they are on-premises or in the cloud.

System Monitoring

System monitoring is another important way to ensure continuous operation and catch problems before they occur. SUSE Linux Enterprise Server for SAP Applications includes a powerful built-in monitoring framework specially designed for SAP systems. The monitoring features included with SUSE Linux Enterprise Server for SAP Applications offer a real-world example of how SUSE's experience and co-innovation with SAP provides improved reliability and added value.

SUSE Linux Enterprise Server for SAP Applications comes with built-in support for the open source Prometheus monitoring framework. SUSE Manager includes an expanded version of Prometheus and also supports the Grafana visualization tool. Prometheus and Grafana let you monitor your systems across the network and visualize performance metrics to spot potential problems at a glance.

The versatile Prometheus supports the integration of third-party exporters. An exporter is a library or service that exports metrics from a third-party application in a form that is accessible to Prometheus. The SUSE team has developed and implemented a collection of specialized exporters that are tailored to deliver SAP metrics for easy monitoring. The custom exporters built into SUSE Linux Enterprise Server for SAP Applications include:

- SAP HANA database exporter—monitors data on SAP HANA database performance and replication.
- High-availability cluster exporter—monitors Pacemaker, Corosync, SBD, DRBD and other components of high-availability clusters hosting SAP resources.
- SAP host exporter—monitors server metrics and internal alerts for SAP NetWeaver, SAP HANA and related applications.

SUSE's SAP monitoring tools let you keep watch over your cloud-based SAP landscape from a single interface. You can also configure alerts and automate workarounds through scripting to ensure smooth operations and tune your systems for optimum performance.

SUSE and SAP

SUSE Linux Enterprise Server for SAP Applications is the leading platform for supporting SAP HANA, S/4HANA and NetWeaver. SUSE and SAP have had a partnership for over 20 years, and about 90 percent of all SAP HANA deployments around the world run on SUSE Linux.

Every SUSE Linux Enterprise Server for SAP Applications service pack is validated by SUSE. The latest release of SUSE Linux Enterprise Server for SAP Applications also includes new automation tools for deploying and managing SAP HANA and NetWeaver, including full support for deploying SAP HANA Pacemaker clusters.

To the Cloud!

When you are ready to move your SAP resources into the cloud, SUSE offers a platform that will ensure a smooth transition and steady operations. Live Linux kernel patching will help you keep your SAP HANA database and ERP systems fully operational while you install important system and security updates. SUSE's automated failover and recovery will ensure that the failure of a host system on the cloud provider's network won't bring down the SAP services that your business depends on. SUSE solutions will help you manage your cloud infrastructure as easily as you managed an on-premise SAP landscape, providing a unified interface for seamless deployment, configuration, software management and compliance. By merging on-premises and cloud management into a single interface, the SUSE platform is perfectly positioned to manage your transition to the SAP cloud, ensuring an orderly migration with minimal disruption and maximum security.

The experts at SUSE are ready to help you unlock the power of the cloud as you transition your SAP environment.



Thank You

SUSE
Maxfeldstrasse
90409 Nuremberg
www.suse.com

For more information, contact SUSE at:
+1 800 796 3700 (U.S./Canada)
+49 (0)911-740 53-0 (Worldwide)