

# Say Goodbye to Downtime

Achieve continuous uptime of your  
SAP Services for non-stop productivity

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# Downtime is Never an Option

Today's competitive business environment demands maximum uptime in all IT systems, and especially those running SAP HANA and other SAP applications. All downtime, whether planned or unplanned, impacts efficiency and productivity, while it reduces revenues and increases costs.

For SAP services, unplanned outages and manual failover processes are particularly disruptive, labor-intensive, time-consuming, and costly. But fortunately, today's infrastructure technology makes it possible to achieve near-100% uptime, whether on-premises or in hybrid or cloud environments. Since 1999, SUSE and SAP have worked together to minimize downtime and achieve the kind of innovative High Availability solutions that result in operational excellence.

Planned downtime for maintenance and patching is hard enough to manage, but unplanned downtime due to data corruption, hardware failure, operational mistakes, or power outages can seriously affect your profits and the perception customers have of your business.

One hundred percent uptime might seem out of reach even today, but it is truly possible to achieve near-zero downtime with innovative High Availability (HA) strategies and solutions in place. SUSE has the tools and technologies to deliver just that, so your SAP solutions and other applications are always accessible and running smoothly.

**DOWNTIME: LOST  
PRODUCTIVITY IS JUST  
THE START**

Downtime is costly, whether planned or unplanned, but the impact



is much more far-reaching than lost productivity – for example, when a customer's procurement department cannot access ordering systems, manufacturing systems are unable to build products on time. This means manufacturers, distributors, and retailers cannot get the inventory they need, and face the prospect of increased competitive threats and lost revenue.

In today's environment with GDPR (General Data Protection Regulation) and CPNI (Customer Proprietary Network Information) regulations, customers also expect corporate and personal data, like buying history and payment information, to be protected. Ongoing security vulnerabilities affecting both hardware and the OS are unfortunate facts of life for IT organizations. So it is critical that these issues are dealt with swiftly and effectively to minimize risk to your business operations and customers.

## Saying Goodbye to Downtime for SAP Solutions

The top causes for unplanned system downtime are the same ones that have been around for many years: software or operator errors; operating system, disk, or host crashes; hardware or power failure; data corruption; and of course, security breaches. While you might not be able to completely eliminate these issues, there are some important ways to minimize their effects on your SAP solutions and other business systems.

Eliminating the single point of failure is the key — and this is possible with a well-rounded strategy that focuses on these key strategies:

- Minimizing system and component downtime
- Maximizing service availability through clustering and live patching
- Automation to reduce human error
- Engaging the right provider of High Availability (HA) and Disaster Recovery (DR) solutions

### INNOVATIVE SUSE SOLUTIONS

Choosing the right infrastructure is critical.

Regardless of your choice of server platform or cloud service provider, you need a system that provides the stability and availability features that will minimize downtime.

Linux has long been known for its stability, security, and flexibility, and SUSE has added innovative features and solutions that enhance system availability and reli-



“We rely on SAP software to keep operations on track and Prague’s public transport network running smoothly. Supported by SUSE, we’re modernizing our SAP landscape to deliver stellar services for passengers — now and in the future.”

Jiri Krizek  
 Unix/Linux System and Backup Administrator  
 Prague Public Transport Company

ability for SAP environments. **SUSE Linux Enterprise Server for SAP Applications** is a highly-secure open source server operating system, built to power physical, virtual, and cloud-based mission-critical SAP workloads. In fact, it is the premier operating environment for SAP implementations, with a range of leading-edge features and innovative solutions, like integrated High Availability and automation solutions like SUSE Manager and Trento, all of which help Say Goodbye to Downtime and lead to operational excellence.

Since 2011, SUSE and SAP have been constantly working on improving the scalability and high availability of SAP HANA so customers can grow their deployments to include multiple nodes for system replication and application failover across multiple geographic locations.

SUSE delivers an enterprise Linux solution that is optimized with SAP-specific features. It runs on fully-certified servers

from leading manufacturers and a broad set of hyperscaler platforms. And SUSE Linux Enterprise Server for SAP Applications provides a comprehensive software platform for SAP HANA.

From the operating system and HA features to the installation wizard and security features, SUSE delivers one Linux solution that is optimized for both SAP HANA and SAP application servers.

The SUSE solution also features OS security hardening to reduce downtime due to security issues. Securing the underlying OS is important because hackers often target the OS and not the database directly. As an added layer of protection, SUSE provides a firewall for SAP HANA systems. SUSE has a history of innovative solutions to enhance IT security, including an aggressive international security certification program as well as an integrated antivirus solution for SAP environments. To learn more about OS security hardening, visit <https://www.suse.com/secure-sap>.

Plus, SUSE Linux Enterprise Server for SAP Applications includes a key server to protect data on remote storage systems with enhanced encryption management. This feature, combined with automation of the remote storage mount in your cluster, is also critical for minimizing SAP downtime in a cluster takeover when you need to restore access to remote storage from a new node running in the cluster.

## The Goal: Achieve Zero Downtime

SAP systems running critical workloads need to meet the highest standards of availability for their SAP services. SUSE Linux Enterprise Server for SAP Applica-

tions helps ensure high availability in a number of ways – enhanced High Availability solutions, Live Patching, automated system management, and more. The goal is always to achieve zero downtime.

Business continuity architectures based solely on SAP HANA System Replication rely on the System Administrator to determine that a failure has occurred, and then initiate a failover to the secondary system. This is a manual task which results in significant downtime when your business must come to a stop, plus it can be a risky and error-prone task done under the pressure of an emergency. SUSE Linux Enterprise Server (SLES) for SAP Applications automates this process to eliminate the time and risk of a failover by providing resource agents for detecting a failure and automatically initiating the SAP HANA takeover, across on-premises, cloud, or hybrid environments.

Yet it goes even further, supplementing that with integrated High Availability that provides failover detection and automation.

### SUSE HIGH AVAILABILITY



Ensuring platform reliability is crucial for any business that relies on computer systems to function. So High Availability – the ability of a system to remain operational even in the event of a hardware or software failure – is increasingly important for enterprise systems.

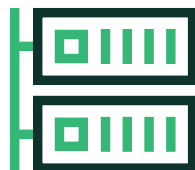
The **SUSE High Availability** solution, designed based on feedback from SAP customers, uses innovative clustering technologies, unique to SUSE, to ensure the continuous operation of core

business services. It leverages automation to protect workloads from system failures while increasing the availability of services with greater reliability, redundancy, and fast failover to standby systems. Automated SAP HANA failover is central to the SUSE HA solution. SAP HANA has a business continuity architecture that replicates the in-memory data so administrators can initiate failover to a secondary backup in case of a primary system failure. SUSE Linux Enterprise Server for SAP Applications enhances this capability by providing resource agents to automate that failover action. This means failover happens without needing action from the administrator, so systems recover automatically while the IT team is focusing on other projects.

SUSE developed two resource agents for this automation: SAPHanaSR, which performs the actual check of the SAP HANA database instances, and SAPHanaTopology, which runs information about the status and configuration of system replications. The solution supports failover automation for the following SAP HANA scenarios across the environment:

- Performance-optimized scale-up
- Cost-optimized scale-up
- Chain topology scale-up
- Performance-optimized scale-out

### SUSE LINUX ENTERPRISE HIGH AVAILABILITY EXTENSION



SUSE Linux Enterprise Server for SAP Applications comes with an SAP-certified HA extension for NetWeaver clusters. This feature allows you to cluster physical servers, virtual guests, or any combination of the two. That provides the

ability to maximize your system’s flexibility while improving service availability and resource usage. Its easy-to-use graphical user interface makes cluster configuration and management easy, even simulating failure scenarios before they happen.

The HA extension has a cluster simulator, which lets you test and validate configuration changes before implementing them. This can cut down on unplanned downtime by ensuring that changes are made only when you know they’ll work.

### LIVE PATCHING: ELIMINATE THE PATCHING PARADOX



Patching less complex software that isn’t mission-critical doesn’t present the same risk as patching systems that are complex and cannot afford downtime. But in any case, patching and updating software does not always go as planned.

**SUSE Linux Enterprise Live Patching** is a unique solution that enables you to deploy multiple live Linux kernel and key library patches for stability and security issues in SLES for SAP Applications – all without rebooting for up to one year. No interruption, no downtime. This solution works independently from the applications that run on top, so you can use it on an SAP application server, or on SAP HANA or other databases.

SUSE Linux Enterprise Live Patching eliminates the **Patching Paradox** – the need to patch critical systems vs. the specter of downtime when you do. Since there is no service downtime, there is no need to risk security exposures waiting for the next maintenance window, or interrupting

mission-critical workloads to fix vulnerabilities immediately. The solution is ideal for in-memory databases such as SAP HANA, as well as time-consuming simulations or having to make a quick fix in a large server farm without the need to stop operations.

The SUSE Linux Enterprise Server for SAP Applications subscription includes access to a dedicated update channel. This allows you to get new and updated features for SAP environments that are not part of the Linux kernel and, therefore, don't require revalidation.

### LEVERAGING AUTOMATION AND MANAGEMENT TOOLS



No one is perfect, so IT mistakes can happen, some of which may result in major downtime. For example, manual management of clusters and remote storage present real downtime risks. The complexity of SAP systems requires management tools to secure systems and remain in compliance with policies and regulations. Being dependent on manual procedures to manage today's server environments is inefficient, slow, and prone to error.

SUSE Linux Enterprise Server for SAP Applications has a management framework that allows you to configure your systems correctly from the start, and leverage automation to remove the risks inherent in manual tasks. For example, management tools help you by automating provisioning, patch management, health monitoring, and compliance management.

**SUSE Manager** goes even further. It enables you to achieve near-zero downtime

“Building on SUSE Linux Enterprise Server for SAP Applications and SUSE Manager helped us lift our IT efficiency to new heights. The combination of SAP HANA and SUSE Linux Enterprise Server for SAP Applications is allowing us to harness the full analytics potential of our business data, identify new business opportunities, and drive our growth.”

Oliver Widhölzl  
Team Leader Data Center Operations  
Egger Group

with powerful management tools for SAP HANA that maintain the proper configurations for both SAP and non-SAP applications. It enables System Administrators to deploy, configure, and monitor all Linux systems, on bare metal, in virtualized platforms, and in the cloud.

It is the tool of choice because it combines methods, processes, and functions to manage, monitor, and control complete SAP HANA scale-out scenarios. At the heart of SUSE Manager is automated patch and update management, which integrates all the relevant OS components in your SAP HANA environment. Handling system management and updates from a single, central location helps minimize the complexity of SAP HANA environments.

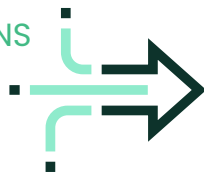
It also gives you precise control over the environments needed for your unique business operations, whether they are development, test, or production. And since SUSE Manager automates a variety of recurring manual tasks, it helps save money by reducing time requirements of the IT team.

**Trento** is another SUSE innovation that contributes to eliminating downtime. To ensure an SAP platform stays secure, reliable, and maintainable, it is important to validate that the configuration of the platform follows best practices, in both cloud-based and on-premises environments.

SUSE's Trento, included in SLES for SAP Applications, is a tool that automates the process of continuously validating the configuration of an SAP system. It provides visibility and validates best practices of the platform configuration and HA configuration, identifying potential security risks and misconfigurations in the SAP system. When issues are found, remediation actions can be applied either manually or using automation.

### MORE SUSE INNOVATIONS FOR HIGH AVAILABILITY

The goal is always to achieve zero downtime so, recognizing that even in the best-case failovers take time to complete, SUSE High Availability also includes unique features like a **Fast Dying Indexserver** which can reduce failover time from hours to seconds in the event of an indexserver crash. Plus, HA eliminates the need for manual interventions in case of a failure, so system admins can be comfortable



in the knowledge their SAP system can minimize or even eliminate downtime.

Even if a mistake is made, SUSE Linux Enterprise Server for SAP Applications can get your systems back up and operational with just one click. Built-in **Automatic Snapshot and Rollback** enables you to quickly revert the whole system, including kernel files, back to a previously known state.

### CONTINUOUS HA INNOVATION IS KEY TO ELIMINATE DOWNTIME



At SUSE, we believe it is critical to truly Say Goodbye to Downtime, achieving non-stop productivity by ensuring continuous uptime of SAP Services. And although the goal is always to achieve zero downtime, mistakes do happen and inevitably cost time, productivity, and even lost revenue.

So we consistently listen closely to feedback from customers, partners, and the SAP ecosystem at-large – which leads us to a state of continuous innovation. For example, listening has led us to improve our products with innovative HA features like these:

- **Fast Dying Indexserver** which can reduce failover time from hours to seconds in the event of an indexserver crash.
- **Single Mount Cluster** scenario which simplifies processes and eliminates risk in the HA configuration.
- **Automatic Snapshot and Rollback**, so even if a mistake is made, just one click enables you to quickly revert the whole system, including kernel files, back to a previously known state.



## A Longstanding Partnership of Development

To most effectively reduce planned and unplanned downtime, it is important to use tools and technologies from providers that are innovators, with experience and expertise in HA and DR, as well as intimate knowledge of SAP systems.

SUSE has all that. As the leading platform for SAP applications on Linux, and a recommended Linux provider for SAP HANA, SUSE is uniquely positioned

to deliver solutions optimized for your SAP systems. SUSE and SAP have a longstanding partnership of development – in fact, SAP itself uses SUSE for its development and production environments.

No other Linux provider knows SAP applications like SUSE. Plus, we have a serious commitment to providing High Availability and Disaster Recovery tools to keep those SAP solutions operational and accessible.

**When downtime is not an option, the clear choice is SUSE.**

Learn how to [Say Goodbye to Downtime](#), and discover more about SUSE Linux Enterprise Server for SAP Applications.



SUSE Linux Enterprise Server for SAP is an SAP endorsed app.

SUSE Frankenstraße 146  
90461 Nürnberg Germany  
[www.suse.com](http://www.suse.com)

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

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