



# Red Hat Enterprise Linux for SAP Solutions 9

## Overview of Red Hat Enterprise Linux for SAP Solutions Subscription



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## Abstract

This publication provides a technical description of Red Hat Enterprise Linux for SAP Solutions subscription's features and how it can support SAP business applications, such as SAP NetWeaver, SAP S/4HANA and the SAP HANA platforms.

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## MAKING OPEN SOURCE MORE INCLUSIVE

Red Hat is committed to replacing problematic language in our code and documentation. We are beginning with these four terms: master, slave, blacklist, and whitelist. Due to the enormity of this endeavor, these changes will be gradually implemented over upcoming releases. For more details on making our language more inclusive, see our [CTO Chris Wright's message](#).

## PROVIDING FEEDBACK ON RED HAT DOCUMENTATION

We appreciate your feedback on our documentation. Let us know how we can improve it.

### Submitting feedback through Jira (account required)

1. Make sure you are logged in to the [Jira](#) website.
2. Provide feedback by clicking on [this link](#).
3. Enter a descriptive title in the **Summary** field.
4. Enter your suggestion for improvement in the **Description** field. Include links to the relevant parts of the documentation.
5. If you want to be notified about future updates, please make sure you are assigned as **Reporter**.
6. Click **Create** at the bottom of the dialogue.



# CHAPTER 1. INTRODUCTION TO RED HAT ENTERPRISE LINUX FOR SAP SOLUTIONS

Red Hat Enterprise Linux for SAP Solutions is a SAP specific offering, tailored to the needs of SAP workloads such as SAP NetWeaver, SAP S/4HANA and SAP HANA platform.

## 1.1. RED HAT ENTERPRISE LINUX FOR SAP SOLUTIONS

Built on the foundation of Red Hat Enterprise Linux (RHEL) with its packages and components, in addition to this foundation, the RHEL for SAP Solutions subscription includes the following:

- SAP-specific technical components to support SAP S/4HANA, SAP HANA, and SAP Business Applications.
- SAP-specific High Availability solutions for SAP S/4HANA, SAP HANA, and SAP Business Applications.
- RHEL System Roles for SAP for automation of operating system configuration to run SAP workloads.
- SAP tailored Red Hat Insights Dashboard and Smart Management helps streamline operations and to reduce costs
- Update Services for SAP Solutions (E4S) or Extended Update Support (EUS), providing support for specific minor RHEL releases for up to four years from General Availability. See the [RHEL Life Cycle](#) web page for more information about EUS and Update Services for SAP Solutions.



### NOTE

- Update Services for SAP Solutions (E4S) is only provided with RHEL for SAP Solutions. It is not available on any other RHEL products.
- Update Services for SAP Solutions (E4S) is only provided on specified minor RHEL releases, which may be different from the EUS releases.

## CHAPTER 2. HOW BUSINESS CONTINUITY IS ACHIEVED WITH SAP SOLUTIONS

High availability and disaster recovery solutions for SAP are essential. Tier-1 application outages are costly and disruptive to the business. Even short periods of planned downtime for maintenance events such as software updates or hardware upgrades can negatively impact the end-user, IT productivity, as well as critical business processes.

Red Hat Enterprise Linux for SAP Solutions subscription provides high-availability to SAP solutions, as well as SAP HANA tested in-place upgrades and kernel live patching capabilities for critical and important Common Vulnerabilities and Exposures (CVEs).

### 2.1. RED HAT UPDATE SERVICES FOR SAP SOLUTIONS

Red Hat Update Services for SAP Solutions (E4S) provides up to four years of support, including security patches and critical fixes for select minor releases of Red Hat Enterprise Linux. When you upgrade to the next minor release, binary compatibility and kernel stability ensure that your system remains stable and that both SAP and custom applications continue to execute smoothly.

### 2.2. RED HAT INSIGHTS DASHBOARD FOR SAP

Red Hat Insights analyzes IT infrastructure against Red Hat's constantly expanding knowledge base to provide real-time assessment for risks related to performance, availability, stability, and security. Previously an independent service offering, Red Hat Insights has further evolved into a family of proactive monitoring services and is included into the Red Hat Enterprise Linux subscription. RH Insights helps customers gain better operational efficiency and support in security and compliance risk management. For more information on Red Hat Insights, see [Red Hat Insights](#) product page.

RHEL for SAP Solutions customers gain the following benefits by using Red Hat Insights for monitoring your SAP environment:

- Auto detection and profiling of SAP workloads
- Intuitive grouping by SAP SystemID within SAP dashboard
- SAP application specific recommendations, facts, and filter rules
- Automated remediation through corresponding Ansible playbooks for SAP
- Configuration drift analysis and policies based e.g. by SAP System ID

#### Additional resources

- [Red Hat Insights dashboard provides automatic discovery, health and security assessment for SAP HANA on Red Hat Enterprise Linux](#)

### 2.3. RED HAT ENTERPRISE LINUX HIGH AVAILABILITY SOLUTIONS FOR SAP

The Red Hat Enterprise Linux High Availability Add-On provides all the necessary packages for configuring a pacemaker-based cluster that provides reliability, scalability, and availability to critical production services.

The Red Hat High Availability solutions for SAP NetWeaver, S/4HANA and SAP HANA which are based on the RHEL HA Add-On, help to easily setup up and configure highly available SAP environments, providing a standard-based approach to reduce planned and unplanned downtime in corresponding SAP environments RHEL for SAP Solutions also provides the components required for support of the SAP HA interface. The SAP HA interface allows customers to manage SAP NetWeaver and S/4HANA application servers, which are controlled by the RHEL HA solutions for SAP, to use SAP management tools like SAP MMC or SAP Landscape Manager.

#### Additional resources

- For more information on Red Hat supported SAP HA scenarios, see [Red Hat HA Solutions for SAP HANA, S/4HANA and NetWeaver based SAP Applications](#)
- For more information on the integration of the SAP HA interface see [How to enable the SAP HA Interface for SAP ABAP application server instances managed by the RHEL HA Add-On?](#)

## 2.4. KERNEL LIVE PATCHING

Kernel live patching allows customers to patch a running RHEL kernel with selected critical and important CVEs without rebooting the system. This provides operational efficiency to support mission critical infrastructure underpinning SAP business applications, where downtime is not an option, and security responsiveness is required.

For more information about the kernel live patching solution and how it works, see the Red Hat Knowledgebase solution:

- For RHEL 9 [Applying patches with kernel live patching](#)



#### NOTE

Kernel live patching is supported starting with RHEL version 7.7 and 8.1 and above

## 2.5. IN-PLACE OPERATING SYSTEM UPGRADES

As part of the RHEL for SAP Solutions subscription, Red Hat provides validated in-place upgrades of the underlying operating system in context of SAP workloads. An in-place upgrade offers upgrading the RHEL system to a later major release of RHEL by replacing the existing operating system without removing applications. Doing so can greatly reduce the costs, for example, highly expensive hardware for an SAP HANA in-memory database does not need to be purchased twice.

#### Additional resources

- For more information, see [Upgrading SAP environments from RHEL 8 to RHEL 9](#) .

## CHAPTER 3. SECURITY AND SAP SOLUTIONS

Enterprises usually have substantial compliance requirements based on the industry, type of customers, geographic location, and more. Such requirements may need specific certifications, cryptographic modules, and support for encryptions. With Red Hat Enterprise Linux for SAP Solutions, Red Hat delivers a stable, security-focused, high-performance foundation for SAP business applications to support such requirements and provide an easy way to set and validate compliance policies.

You can learn about processes and practices for securing Red Hat Enterprise Linux systems against local and remote intrusion, exploitation, and malicious activity. These approaches and tools can create a more secure environment for running SAP HANA.

### Additional resources

- For more information, see [Security hardening guide for SAP HANA](#).

## 3.1. SELINUX FOR SAP PRODUCTION ENVIRONMENTS

[SELinux](#) is a security technology for process isolation to mitigate attacks via privilege escalation. Configuring SELinux helps you enhance your system's security. SELinux is an implementation of Mandatory Access Control (MAC), and provides an additional layer of security. The SELinux policy defines how users and processes can interact with the files on the system. You can control which users can perform which actions by mapping them to specific SELinux confined users.

### Additional resources

- For more information, see [Using SELinux for SAP HANA](#).

## 3.2. FILE ACCESS POLICY DAEMON FOR SAP

File access policy Daemon **fapolicyd** is a technology provided in RHEL to determine access rights to files based on a trust database and file or process attributes. It helps customers to ensure data remains protected even in case an attacker has successfully gained control over certain processes.

You can configure **fapolicyd** to secure the environment for running SAP HANA against local and remote intrusion, exploitation, and malicious activity.

### Additional resources

- For more information, see [Configuring fapolicyd to allow only SAP HANA executables](#).

## CHAPTER 4. SAP AUTOMATION AND PERFORMANCE

### 4.1. RHEL SYSTEM ROLES FOR SAP

The Red Hat Enterprise Linux System Roles for SAP, provided exclusively with the Red Hat Enterprise Linux for SAP Solutions subscription, removes human error from complex and repetitive SAP configuration tasks, such as configuration of a Red Hat Enterprise Linux system for installation of SAP HANA, SAP S/4HANA or SAP NetWeaver software.

Customers can use RHEL System Roles for SAP to enforce SAP best practices for configuration and setup of both SAP NetWeaver and SAP HANA deployments on RHEL 9, install SAP HANA scale-up and scale-out, and configure a 2-node Pacemaker cluster for managing HANA Scale-Up System Replication.

#### Additional resources

- For more information, see [Red Hat Enterprise Linux System Roles for SAP](#) .

### 4.2. TUNED

To ensure that RHEL is configured appropriately to best support SAP workloads, the RHEL for SAP Solutions provides tuned profiles **sap** and **sap-hana**, which contain many of the SAP best practices and some additional recommended configuration settings.

#### Additional resources

- For more information, see SAP note [3108302](#).

### 4.3. COMPATIBILITY LIBRARIES

RHEL for SAP Solutions provides additional GCC runtime compatibility libraries required by newer SAP NetWeaver, S/4HANA and SAP HANA releases when necessary. RHEL 9 is GCC11 compatible, so no `compat-sap-c++` package is required when installing SAP software which has been built with GCC11 or lower.

#### Additional resources

- For more information, see SAP note [3057467](#).

### 4.4. SMART MANAGEMENT

The RHEL subscription includes the [Smart Management Add-On](#) to provide easy management and updates of Red Hat Enterprise Linux systems by using Red Hat Satellite Server.

## CHAPTER 5. DIFFERENCES BETWEEN RHEL FOR SAP APPLICATIONS AND RHEL FOR SAP SOLUTIONS

Red Hat Enterprise Linux for SAP Solutions subscription contains more features and capabilities than our lightweight RHEL for SAP Applications subscription. The following table lists the technical differences between the two subscriptions.

Feature	RHEL for SAP Applications	RHEL for SAP Solutions
Software packages for SAP NetWeaver: Repository rhel-7-SAP / rhel-(8,9)-SAP-NetWeaver (check the <b>SAP-specific technical components</b> table for a list of components)	X	X
Software packages for SAP HANA: Repository rhel-7-SAP-HANA / rhel-(8,9)-SAP-Solutions (check the <b>SAP-specific technical components</b> table for a list of components)		X
RHEL High-Availability Add-On		X
RHEL System Roles for SAP		X
Extended Update Support (EUS)	Only in Premium	X
Update Services for SAP Solutions (E4S)		X
Smart Management Add-On		X
Insights	X	X



### NOTE

All future solutions for SAP applications are planned to be added to the RHEL for SAP Solutions repository. See the datasheet [Red Hat Enterprise Linux for SAP Solutions](#) for more information.

### 5.1. OVERVIEW OF THE RHEL FOR SAP APPLICATIONS REPOSITORY

The SAP-specific software packages are available with both, the RHEL for SAP Applications and the RHEL for SAP Solutions subscription.

- **compat-sap-c++-**: Provides additional runtime compatibility libraries required by newer NetWeaver releases. These libraries are installed independently of the standard runtime libraries provided by RHEL. For more information, see the Red Hat Knowledgebase solution [Installation](#)

of SAP NetWeaver 7.51 and later on Red Hat Enterprise Linux 6 fails with the message `GLIBCXX_3.4.14 not found`.

Also, for more information regarding which `compat-sap-c++` package you need for SAP on RHEL, please refer to SAP Note [3057467](#).

- **tuned-profiles-sap:** Provides the `+sap-netweaver+profile` to tune RHEL for running SAP NetWeaver-based applications.
- **resource-agents-sap:** Provides Pacemaker cluster resource agents (SAPDatabase and SAPInstance) to set up high availability for SAP NetWeaver environments. For more information and guidelines, see the Red Hat Knowledgebase solution the [Deploying Highly Available SAP NetWeaver-based Servers Using Red Hat Enterprise Linux HA add-on with Pacemaker](#). For more information Red Hat HA solutions for managing ENSA1 and ENSA2 using the resource agents provided by the `resource-agents-sap` package, see the Red Hat Knowledgebase solutions [HA Solution for S/4HANA based on ABAP Platform 1809 or newer](#) and [HA Solution for NetWeaver or S/4 Based on ABAP Platform 1709 or older](#).
- **compat-locales-sap:** Enables Legacy SAP locales to easily port non-Unicode SAP NetWeaver installations from UNIX or Windows to Linux. For more information, see [SAP Note 187864](#). This package also provides users with additional locales to run non-Unicode SAP applications. For example, the `de_DE@HPUX` locale changes the sorting for German on RHEL to match the sorting on HP-UX to avoid sorting issues. For more information, see [SAP Note 952625](#).
- **vhostmd/vm-dump-metrics:** A monitoring daemon and client required by SAP for KVM support; For more information, see [SAP Note 1400911](#). In RHEL 8.0, the **vm-dump-metrics package** is part of the BaseOS repository and the **vhostmd** package is part of the AppStream repository.

## 5.2. OVERVIEW OF THE RHEL FOR SAP HANA REPOSITORY

The SAP-specific software packages are available only with the RHEL for SAP Solutions subscription.

- **rhel-system-roles-sap (only in RHEL 7.7 Batch Update 3 and later):** Provides the automated RHEL system preparation of a local or remote server for the installation of SAP HANA or SAP NetWeaver, including required packages, kernel parameters, and network parameters. **rhel-system-roles-sap** has the ability to be integrated into Red Hat Satellite Server and Red Hat Ansible Tower. For more information, see [Red Hat Enterprise Linux System Roles for SAP](#) .
- **compat-sap-c++:** Provides additional runtime compatibility libraries required by newer NetWeaver and HANA releases. These libraries are installed independently of the standard runtime libraries provided by RHEL. For more information regarding which `compat-sap-c++` package you need for SAP on RHEL, please refer to SAP Note [3057467](#).
- **tuned profiles-sap-hana:** Provides the `sap-hana` tuned profile to tune RHEL for running SAP HANA.
- **resource-agents-sap-hana:** Resource agents and other components for managing SAP HANA Scale-Up System replication. For more information, see the Red Hat Knowledgebase article [Supported Scenarios of Automated SAP HSR in HANA Scale-Up](#) .
- **resource-agents-sap-hana-scaleout:** Resource agents and other components for managing SAP HANA Scale-Out System replication. For more information, see the Red Hat Knowledgebase article [Supported Scenarios of Automated SAP HSR in HANA Scale-Out](#) .

## 5.3. SAP RELATED SOFTWARE PACKAGES AND REPOSITORIES

The following table contains an overview of the SAP-specific technical components that are included in the respective repository:

### 5.3.1. RHEL 9

Package	rhel-9-SAP-NetWeaver(*)	rhel-9-SAP-Solutions(*)
<i>compat-locales-sap</i>	X	
<i>compat-sap-c++</i>	X	X
<i>resource-agents-sap</i>	X	
<i>resource-agents-sap-hana</i>		X
<i>tuned-profiles-sap</i>	X	
<i>tuned-profiles-sap-hana</i>		X
<i>rhel-system-roles-sap</i>		X
<i>_vhostmd/vm-dump-metrics</i>	X	

(\*) Use the following list and examples to identify the full repository labels:

**rhel-9-SAP-NetWeaver:**

- **rhel-9-for-<arch>-sap-netweaver-rpms**
- **rhel-9-for-<arch>-sap-netweaver-eus-rpms**
- **rhel-9-for-<arch>-sap-netweaver-e4s-rpms**

**rhel-9-SAP-Solutions:**

- **rhel-9-for-<arch>-sap-solutions-rpms**
- **rhel-9-for-<arch>-sap-solutions-eus-rpms**
- **rhel-9-for-<arch>-sap-solutions-e4s-rpms**

**<arch>** denotes the specific hardware architecture as follows:

- x86\_64
- ppc64le
- s390x



**NOTE**

e4s repos are only available for hardware architectures x86\_64 and ppc64le.