

Header Data

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Other Components	BC-OP-LNX-SUSE-PRIO SUSE Linux Priority Support
Priority	Recommendations / Additional Info
Category	Consulting

Symptom

For the first release of SAP HANA, SAP followed a very strict approach on controlling the initial setup and later maintenance of the underlying operating system. The constraints are described in the [SAP HANA installation documentation](#), as well as in the [SAP HANA Technical Operations Manual](#).

Over time, SAP considerably relaxed the conditions under which the operating system may be installed and configured. SAP Notes [1730928](#) and [1730999](#) are examples of this additional flexibility.

With the availability of the installation certification exam [SAP Certified Technology Specialist \(Edition 2013\) – SAP HANA Installation](#) (Booking code: E_HANAINS131) customers (and of course also our partners) now have even more freedom of choice in how to build their SAP HANA system.

This freedom also causes some drawbacks, however. The installation of the operating system - the layer between the hardware, shipped by the SAP HANA certified hardware vendors and the SAP HANA software, supplied and documented through SAP - was also part of the classic SAP HANA appliance delivery process. In the case of customers installing a SAP HANA system, the operating system installation is of course also the responsibility of the customer. Nevertheless it is not explicitly part of the SAP HANA documentation, nor the hardware partner offering.

Other Terms

HANA operating system, SLES, rpm

Reason and Prerequisites

As documented in the [SAP HANA PAM](#) the only supported operating system for SAP HANA is Suse Linux Enterprise Server (SLES) / Suse Linux Enterprise Server (SLES) for SAP applications. See the linked PDF version of SAP HANA PAM for a list of hardware platforms and supported / validated SLES 11 SP releases.

Solution

Operating System Setup

In order to ensure stable performance and efficient support for customers it is vital to maintain a consistent system environment for SAP HANA. Therefore, detailed information about, for example, security relevant configuration or required technical packages on the operating system level is necessary. This document is focused on such configuration and packages needs for SAP HANA, based on but not limited to the already available information referenced in the [#Further Reading](#) section.

SLES package selection

SAP recommends the installation of the SLES 11 "Base" pattern as the basis to run an SAP HANA system on. Additional required packages and settings are listed in the SAP HANA Master Guide and SAP HANA Server Installation Guide available from <http://help.sap.com/hana>. To guarantee optimal performance and the highest stability, SAP appliance hardware and technology partners may deliver SAP HANA systems with settings that deviate from that standard. Customers and partners are advised to document all changes to the standard pattern so that SAP support can more efficiently identify the root cause of problems, however.

List of required packages, not included in SLES 11 base-pattern:

- **gtk2** (use the version provided with the operating system distribution)
- **java-1_6_0-ibm** (use the version provided with the operating system distribution, necessary for the SAP HANA studio on the SAP HANA system)
- **libc6** (use the version provided with the operating system distribution)
- **mozilla-xulrunner192-1.9.2.xx-x.x.x** (use the version provided with the operating system, but at the given minimum version)
- **ntp**
- **sudo**
- **syslog-ng** (use the version provided with the operating system distribution)
- **tcsh**
- **libssh2-1**
- **expect**
- **autoyast2-installation**

- **yast2-ncurses**
- **bing** (a point-to-point bandwidth measurement tool, needed for supportability)
- **bonnie** (file system benchmark, needed for supportability)
- **cairo** (vector graphics library, needed for supportability)
- **findutils-locate** (tool for locating files, needed for supportability)
- **graphviz** (graph visualization tools, needed for supportability)
- **iptraf** (TCP/IP network monitor, needed for supportability)
- **krb5-32bit** (MIT Kerberos5 implementation-libraries, needed for supportability)
- **krb5-client** (MIT Kerberos5 implementation-client programs, needed for supportability)
- **nfs-client** (support utilities for NFS, needed for supportability)
- **sensors** (hardware health monitoring for Linux, needed for supportability)
- **libgcc_s1-4.7.2_20130108-0.17.2**
- **libstdc++6-4.7.2_20130108-0.17.2**

Further OS setup considerations

1. Apply file system layout / partitioning as outlined in chapter 2.1.1 of the [SAP HANA Server Installation Guide](#)
2. In contrast to SAP Note [1597355](#) you may not dedicate 2x RAM as swap space, but configure to less extended, for example 2GB.
3. Disable transparent hugepages, see [SAP Note 1824819](#)
4. Configure c-states for lower latency in Linux, see [SAP Note 1824819](#)
5. Update glibc to avoid potential problem in the indexserver, see [SAP Note 1824819](#)
6. Select XFS (as preferred file system), if not advised differently by your SAP HANA hardware or technology partner
 - a. Consider patch for XFS locking issue and file growing IO operations on XFS to be applied, see [SAP Note 1824819](#)
7. If running SAP HANA on SLES on top of hypervisors, for example VMware or XEN, but your current SUSE Linux Enterprise Server subscription (physical) does not yet include such virtual operating environment, you should get in contact with SUSE directly to upgrade your license subscription accordingly. See [SUSE Linux Enterprise Server Licensing and Pricing Policies](#) for more details.
 - a. If running SAP HANA virtualized with VMware, see SAP Note [1606643](#) for additional tasks, for example installation and configuration of VMware Tools

Operating System Maintenance

Changes to OS configuration

To guarantee optimal performance and the highest stability, SAP appliance hardware and technology partners may deliver SAP HANA systems with operating system settings that deviate from the standard as outlined in the SAP HANA Master Guide and SAP HANA Server Installation Guide. Also customers may want to change the configuration of the operating system of the SAP HANA appliance, for example, in order to apply additional customer-specific security hardening settings.

SAP permit such changes to configuration parameters of the SLES operating system that deviate from the patterns described above unless these changes are listed in SAP Note [1731000](#) – “[Unrecommended configuration changes](#)”. The changes described in this note have caused problems in customer environments or in the laboratories of SAP or SAP HANA appliance hardware and technology partners.

Changes to operating system parameters are permitted only with the agreement of the corresponding hardware and operating system suppliers of your SAP HANA appliance. Customers and partners are advised to document all changes to the standard patterns so that SAP support can more efficiently identify the root cause of problems. In case administration was outsourced to 3rd party service provider, the provider should first consult with the hardware support provider before changing any settings in the operating system.

See [SAP Note 1730999](#) for the latest information.

Maintenance / Patching

The customer is generally responsible for implementing operating system patches. If the customer has a special agreement with the hardware or technology partner, support for operating system patching may be the responsibility of the corresponding partner.

The initially delivered configuration of the appliance's operating system should persist. If configuration settings are subsequently changed, problems may occur, for example in regards to performance. The customer can request a validation of configuration changes for the operating system and for the installation of additional operating system components by the hardware partner depending on the service contract between the hardware partner and the customer. The hardware partner then supports these changes and additional components in accordance with the existing service contract with the customer. No modified Linux version can be used.

OS security patches may be installed immediately after they are available. However, the original packages of the distributors must be used, that a customer is entitled to within the framework of a valid support contract with the distributor or an authorized OEM.

For all other operating system patches, the customer should wait until they are released as part of SLES Support Package Stacks (SPS). These SPS shall be downloaded and applied to the SAP HANA system only according to agreements with SAP and the respective hardware partner. In particular, any updates related to kernel or runtime libraries (glibc) need to be validated and approved by SAP beforehand.

On rare occasions, SAP might require a certain operating system patch to be implemented. In this case SAP strongly recommends to not change configuration settings unless explicitly stated in the corresponding SAP release note. SAP will state any dependencies in the relevant SAP Note published when a revision is released which requires such modifications.

Support

If errors occur in any software component of SAP HANA, SAP is the main point of contact. SAP distributes all issues within the support organization by default, as is the case for other SAP applications. To investigate SAP HANA related problems, SAP support requires a support connection to all servers in the SAP HANA landscape. (See [SAP Note 1635304](#) for more information about how to establish a service connection for SAP HANA.)

SUSE offers enhanced support for SUSE Linux in collaboration with SAP Linux Lab ('SUSE Priority Support for SAP'). This support offer facilitates

communication and ensures high quality. See [SAP Note 1056161](#) for more information on SUSE Priority Support for SAP applications.

If the customer has defined special support agreements with the hardware or technology partner (such as special Service Level Agreements), the customer should contact the corresponding partner directly in the case of obvious hardware or operating system issues.

Further Reading

- [SAP HANA Platform Availability Matrix](#)
- Chapter 1.4 and 2.1.1 of [SAP HANA Server Installation Guide](#)
- Chapter 2.1, 2.3 and 2.5 of [SAP HANA Technical Operational Manual](#)
- [SUSE Linux Enterprise Server \(SLES11\) Deployment Guide](#)

Other Attributes

Operating system **LINUX/INTEL**

Validity

Software Component	From Rel.	To Rel.	And Subsequent
HDB	1.00	1.00	<input type="checkbox"/>

References

This document refers to:

- SAP Notes
- 2009879 [SAP HANA Guidelines for Red Hat Enterprise Linux \(RHEL\) Operating System](#)
 - 2001528 [Linux: SAP HANA Database SPS 08 revision 80 \(or higher\) on RHEL 6 or SLES 11](#)
 - 1954788 [SAP HANA DB: Recommended OS settings for SLES 11 / SLES for SAP Applications 11 SP3](#)
 - 1855805 [Recommended SLES 11 packages for HANA support on OS level](#)
 - 1824819 [SAP HANA DB: Recommended OS settings for SLES 11 / SLES for SAP Applications 11 SP2](#)
 - 1730999 [Configuration changes to SAP HANA system](#)
 - 1730928 [Using external software in a HANA appliance](#)
 - 1635304 [Central note for HANA support connections](#)
 - 1606643 [Linux: VMware vSphere host monitoring interface](#)
 - 1597355 [Swap-space recommendation for Linux](#)
 - 1310037 [SUSE LINUX Enterprise Server 11: Installation notes](#)
 - 1056161 [SUSE Priority Support for SAP applications](#)
 - 171356 [SAP software on Linux: General information](#)

This document is referenced by:

- SAP Notes (3)
- 171356 [SAP software on Linux: General information](#)
 - 2004651 [SAP HANA Platform SPS 08 Release Note](#)
 - 2009879 [SAP HANA Guidelines for Red Hat Enterprise Linux \(RHEL\) Operating System](#)