SAP **1944799 - SAP HANA Guidelines for SLES Operating System Installation**

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Priority	Recommendations / Additional Info
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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, 2055470 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 and 2055470 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)
- **libicu** (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. Turn off the SLES kernel dump function (kdump) if not needed for specific reasons (for example, root cause analysis).
3. In contrast to SAP Note 1597355 you may not dedicate 2x RAM as swap space, but configure to less extended, for example 2GB.
4. Disable transparent hugepages, see SAP Note 1824819
5. Configure c-states for lower latency in Linux, see SAP Note 1824819
6. Update glibc to avoid potential problem in the indexserver, see SAP Note 1824819
7. Select XFS (as prefered 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
8. 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, yous 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 recomments 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	☐

References

This document refers to:

SAP Notes

2055470	HANA on POWER Planning and Installation Specifics - Central Note
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
784391	SAP support terms and 3rd-party Linux kernel drivers
171356	SAP Software on Linux: General information

This document is referenced by:

SAP Notes (4)

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
2055470	HANA on POWER Planning and Installation Specifics - Central Note