Migrating to SUSE Linux 16: Key Technical Differences from SLE 15

SUSE Linux 16 introduces major architectural changes from SLE 15. Key changes include replacing YaST with Agama, switching from AppArmor to SELinux and adopting NetworkManager. It mandates 64-bit architectures, adopts kernel 6.12 and consolidates SAP tuning into `saptune`. Support shifts to annual minor releases with 24-month general support windows.

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1 What is the release cycle and lifecycle for SUSE Linux 16?

SUSE Linux 16 changes both how releases are named and how long they are supported.

1.1 New versioning scheme

SLE 15 used Service Packs (SP1 through SP7) for annual updates. SUSE Linux 16 replaces this model with minor releases (for example, 16.0, 16.1), scheduled annually in November.

1.2 Extended support windows

Each SLE 15 service pack carried 18 months of general support with a 6-month overlap to the next SP. SUSE Linux 16 doubles the overlap:

- Each minor release has 24 months of general support with a 12-month overlap to the next release.
- The final minor release, 16.6, carries 48 months of general support to complete a 10-year lifecycle (general support expected to end November 2035).
- Additional Long-Term Support (LTS) and Extreme LTS options extend coverage beyond 2040.
- SUSE Linux Enterprise Server for SAP applications 16 has 2 years of general support plus 3 years of extended support.
- SUSE Linux 16 is ready for the post-2038 era (the Year 2038 problem does not affect it).

2 Hardware and system requirements

SUSE Linux 16.0 introduces updated platform support requirements, including the transition to UEFI as the default boot mode and higher minimum CPU architecture levels on most platforms. Legacy BIOS remains available only for compatibility with selected migration, cloud and upgrade scenarios.

2.1 What are the BIOS and UEFI support requirements?

UEFI is the default for fresh installations of SUSE Linux 16.0. Legacy BIOS support is deprecated and will be removed in a future release. It is retained for backward compatibility in:

- migration of VMs using Legacy BIOS
- certain public-cloud instances
- systems upgraded from SLE 15

Note that some features—such as full disk encryption with TPM—are not available with Legacy BIOS.

2.2 Minimum CPU architecture requirements

The minimum supported microarchitecture levels for SUSE Linux 16 have been raised for most platforms.

TABLE 1: MINIMUM CPU ARCHITECTURE SUPPORT FOR SUSE LINUX 16

Architecture	SUSE Linux 16 Minimum	Notes for Version 16
AMD64/Intel 64 (x86-64)	x86-64-v2	Optimized v3 shared libraries are auto-installed where supported. Package names include `x86-64-v3`.
IBM POWER (ppc64le)	POWER10	While SUSE Linux 16 can run on POWER9, this configuration is not supported.
IBM Z (s390x)	z15	While SUSE Linux 16 can run on z14, this configuration is not supported.
Arm (AArch64)	ARMv8.0-A	This requirement remains unchanged from SLE 15.
Intel 32-bit	Not supported	32-bit system calls are available via `grub2-compat-ia32` from SUSE Package Hub.

3 How to install and deploy SUSE Linux 16 with Agama

SUSE Linux 16 transitions from YaST to the Agama installer, introducing a purpose-built deployment model centered on modern hardware and improved automation. This chapter details these installer changes alongside updated procedures for accessing the recovery shell and registering systems against RMT infrastructure.

3.1 From YaST to Agama

SLE 15 used YaST for both installation and ongoing system configuration, with AutoYaST for unattended deployments. SUSE Linux 16 replaces this with Agama—a purpose-built installer that is not a general management tool.

Agama is available in three extractable image flavors:

- minimal—network-based installation
- full—complete copy of package repositories for all product variants
- remote installation—PXE client deployment

Agama provides a Web-based front-end, a command-line interface, and an HTTP API. It supports unattended installation and offers a high degree of compatibility with AutoYaST's file format and data schema. However, Agama is not a drop-in replacement for AutoYaST: some profile adjustments are expected. A new, more powerful profile schema based on JSON/Jsonnet is also available.

Unlike AutoYaST, Agama supports repeated configuration import. It is useful for iterative deployment workflows.

The installer medium now uses a standard live medium with dracut, `systemd` and NetworkManager, and provides a backward-compatibility layer with selected `linuxrc` options.

3.2 How to access the rescue system and recovery shell

Agama installation images no longer ship with a separate rescue system. Until a dedicated rescue image is provided in a future release, you can access a recovery shell by:

- Booting the installation image, switching to another virtual console, and logging in as `root`
- Booting the installation image and opening a terminal window
- Appending 3 to the kernel command line before booting to start in `runlevel 3`, bypassing the graphical installer

3.3 Is the RMT server supported in SUSE Linux 16?

Yes, SUSE Linux 16 instances can register against an RMT server for updates. However, the RMT service itself must currently run on a SLE 15 instance, as RMT 15 is fully supported as an installation source for SUSE Linux 16. RMT server support running directly on SUSE Linux 16 is expected to be released with SUSE Linux 16.1.

4 How to migrate from SLE 15 to SUSE Linux 16

Migration from SLE 15 to SUSE Linux 16 uses the Distribution Migration System that replaces the previous Unified Installer approach. The migration is performed over the network using the Zypper migration workflow. The Distribution Migration System provides a bootable live migration image and a start-up utility, `run_migration`, which reboots the running system into the migration environment and executes the migration in stages:

- Pre-migration: The migration image boots and analyzes the existing installation. It detects the system to be upgraded, mounts the required file systems, configures the network to match the existing system and prepares SSH access. Settings that cannot be converted automatically (such as AppArmor profiles) are flagged. If an error occurs before the migration begins, the system reverts to its original state.
- Migration: The migration environment prepares the package manager and upgrades the system using Zypper.
- Post-migration: The workflow updates the boot loader configuration, unmounts all file systems used during migration, and reboots into the newly upgraded operating system. After the first boot, the migrated system can run optional post-migration finalization tasks.

While SUSE Linux 16.0 featured a limited migration scope, SUSE Linux 16.1 provides full migration support, including additional source releases. This enables migrations from SLE 15 SP5 and later.

Upgrading to a new major version requires the system to be offline. Migration of a running system is no longer supported.

5 Base system and boot process changes

Several foundational aspects of the operating system have changed in SUSE Linux 16, affecting the boot process, configuration file layout, temporary storage behavior and service management. Review this section carefully before migrating, as some changes require adjustments to existing scripts and applications.

5.1 Supported boot loaders

SUSE Linux 16 ships GRUB 2 version 2.12. BLS and `systemd-boot` are not used in 16.0 but may be added in future releases. On AMD64/Intel 64, full disk encryption is supported using PCR to unlock the disk, provided the system has a TPM v2.1 or later chip.

5.2 How to manage configuration files with the `/usr/etc` transition

SUSE Linux 16 continues the ongoing migration of vendor-supplied default configuration from `/etc` to `/usr/etc`. This separation allows administrator customization in `/etc` to survive maintenance updates without being overwritten.

To customize the configuration of a service, you have three options (using a hypothetical tool `frobnicator` as an example):

- Place a full copy of the configuration file in `/etc/frob.conf`. This takes precedence over the vendor default in `/usr/etc/frob.conf`.
- Place drop-in files in `/etc/frob.d`. The tool loads `/usr/etc/frob.conf` first, then applies the drop-ins.
- Do not modify `/usr/etc/frob.conf` directly maintenance updates may overwrite it.

Important: Blind updates to `/etc`

Tools that blindly create or overwrite files in `/etc` can produce unexpected results. For example, creating an empty `/etc/ssh/sshd_config` file may lock you out of SSH access. Review the full list of affected packages at https://en.opensuse.org/openSUSE:Packaging_UsrEtc.

5.3 Changes to `/etc/hostname` handling

In SLE 15, if a fully qualified host name (FQDN) was provided, the domain name part was silently stripped when storing the host name in `/etc/hostname`. This was done to achieve conformance with RFC 1178.

In SUSE Linux 16, the host name will be stored as provided in `/etc/hostname` rather than silently being changed, because RFC 1178 has been marked as legacy.

However, putting a FQDN in `/etc/hostname` may lead to unexpected behavior by some applications. Therefore, we recommend providing only the short host name and allowing the resolver to determine the host's FQDN at runtime based on DNS information or entries in `/etc/hosts`.

5.4 How is the `/tmp` directory managed in SUSE Linux 16?

In SLE 15, `/tmp` was a regular directory or Btrfs subvolume. In SUSE Linux 16, `/tmp` uses `tmpfs`, which stores data in RAM and/or swap space.

Important: `/tmp` is not persistent across reboots

Any data written to `/tmp` is lost on reboot. Adapt applications that write persistent data to `/tmp` to use a different location such as `/var/cache`.

Warning: Do not oversize `tmpfs`

Setting `tmpfs` beyond the sum of physical RAM and swap can cause deadlock situations. Size `/tmp` accordingly.

5.5 Are SysV init scripts supported in SUSE Linux 16?

SLE 15 used `systemd` as the default but retained compatibility for third-party SysV init scripts. SUSE Linux 16 completes the transition: SysV init scripts are removed. All services must use standard `systemd` units.

5.6 Are transactional updates supported in SUSE Linux 16?

Yes. While unsupported in SUSE Linux 16.0, transactional updates are introduced in SUSE Linux 16.1 via its immutable version. This transition provides atomic, rollback-capable updates that ensure system resilience and business continuity.

6 Supported file systems and storage configurations

SUSE Linux 16.1 ships with kernel 6.12 and removes several legacy subsystems and file systems. If your environment relies on deprecated kernel features or file systems such as `quota v1`, `cgroups v1` or `reiserfs`, plan your migration accordingly before upgrading.

6.1 What is the default kernel version and which subsystems were removed?

SUSE Linux 16.1 ships with kernel version 6.12. The following kernel subsystems have been removed:

- `quota v1`
- `cgroups v1 interface`

6.2 Which file systems are supported?

The following table provides an overview of the file system status in SUSE Linux 16:

TABLE 2: FILE SYSTEM SUPPORT STATUS

File system	Status in SUSE Linux 16
btrfs	Supported—default file system

File system	Status in SUSE Linux 16
xfs	Supported
ext2/3/4	Supported
gfs2	Supported—both read and write operations. Available on SLE HA only.
ocfs2	Dropped. Use gfs2 instead (available only on SLE HA).
reiserfs	Dropped
hfsplus	Dropped
UFS	Dropped
quota v1	Dropped

6.3 How to configure Kdump using the command line

In SLE 15, Kdump was configured through YaST. With YaST no longer available, use the `kdumptool` command-line tool. Configure Kdump via the following variables in `/etc/sysconfig/kdump`:

- KDUMP_CRASHKERNEL
- KDUMP_UPDATE_BOOTLOADER

The `kdumptool` utility can check whether the running kernel has the expected crashkernel settings, update the boot loader configuration, and disable kdump by removing crashkernel settings from the boot loader.

7 What are the new security features and sudo policies?

SUSE Linux 16 tightens security at every level replacing AppArmor with a fully enforced SELinux policy, restricting remote root access, and hardening privilege escalation defaults.

7.1 SELinux replaces AppArmor

SLE 15 used AppArmor by default and shipped SELinux without policies. SUSE Linux 16 makes a definitive switch:

- AppArmor is removed.
- SELinux is enabled and set to enforcing mode by default, with policies covering more than 400 modules confining nearly the entire system.
- Parts of the system can run unconfined if required.
- On SUSE Linux Enterprise Server for SAP applications 16, SELinux provides workload isolation for data, data flows and containers. When configuring SUSE Linux or SUSE Linux Enterprise Server for SAP applications to run SAP, SELinux is automatically set to permissive mode.

For full details, see Understanding SELinux Basics (https://documentation.suse.com/sles/16.1/html/SLES-SELinux/).

7.2 How to manage remote root login via SSH

Physical console login as root is unchanged. For SSH access, password-based root login is disabled by default. To re-enable it, install the `openssh-server-config-rootlogin` package. Key-based root login (via `/root/.ssh/authorized_keys`) continues to work.

7.3 What are the new sudo password policies?

In SLE 15, **`sudo`** prompted for the target user's password. SUSE Linux 16 tightens this:

- The first user created during installation is added to the wheel group.
- Users in the wheel group are prompted for their own password when using **`sudo -i`**, **`kexec`** or **`polkit`**.
- Users not in the wheel group are prompted for the `root` password.

This policy is implemented by the `sudo-policy-wheel-auth-self` package, which is installed by default on new SUSE Linux 16 systems.

7.4 Yama security enhancements

SUSE Linux 16 now supports the Yama security module, which enhances system-wide security by restricting the use of the `ptrace` system call. By introducing configurable scopes that control which processes can observe or manipulate others, Yama addresses a fundamental weakness in the traditional Linux process model and prevents lateral movement by attackers. This ensures that compromised low-privilege applications cannot easily steal sensitive data from other processes running in the same session. For more details on how to enable, configure and troubleshoot Yama, see Hardening Linux with Linux Security Module Framework and Yama (https://documentation.suse.com/sles/16.1/html/SLES-lsm/).

8 How is networking managed in SUSE Linux 16?

SLE 15 supported both `wicked` and NetworkManager. SUSE Linux 16 consolidates on a single stack:

- `wicked` is removed. NetworkManager is the only supported network management tool.
- NIS (Network Information Service, also known as Yellow Pages) is removed. Use LDAP instead.
- ISC DHCP server is removed. Use the more modern Kea DHCP server instead.
- `nscd` (name service caching daemon) is removed.

9 How to manage systems and packages in SUSE Linux 16

SUSE Linux 16 replaces YaST with a combination of Cockpit for interactive management and Ansible or SUSE Multi-Linux Manager for automation, while also simplifying the package and update stack.

9.1 Cockpit replaces YaST for 1:1 management

YaST is not shipped in SUSE Linux 16. For interactive 1:1 management tasks, Cockpit provides a Web-based front-end. Note that Cockpit does not fully replace YaST some modules present in YaST are not yet available in Cockpit.

9.2 Ansible and SUSE Multi-Linux Manager for automation

SUSE Linux 16 supports Ansible for automation. SUSE Multi-Linux Manager, which uses Salt internally, is also available for managing SUSE Linux 16 installations. Note that SUSE Linux 16 itself does not include Salt packages.

WBEM support (previously provided by SBLIM packages in SLE 15) has been dropped.

9.3 How has package management and the update stack changed?

SUSE Linux 16 removes the module concept used in SLE 15 (base system, server applications, development packages, and so on). Separate pool and update channels are also gone. These changes, combined with Zypper improvements, deliver better update performance.

Minor releases (16.1, 16.2, and so on) continue to use separate repositories.

10 Desktop environment in SUSE Linux 16

SLE 15 included GNOME as a full desktop with SUSE Linux Enterprise Desktop and SUSE Linux Enterprise Workstation Extension providing productivity tools. SUSE Linux 16 takes a minimal approach:

- SUSE Linux Enterprise Desktop is not planned for 16.0.
- A minimal GNOME desktop is included, with essential applications such as Firefox, a file browser and viewers for PDFs and images.
- X11 is no longer shipped. Desktop sessions use Wayland exclusively.
- The VNC server is removed. Remote desktop and screen sharing are provided via RDP.
- The GTK2, Qt5 and wxWidgets widget libraries have been dropped.
  Removing the full desktop product reduces the security attack surface of the base system.

11 Supported virtualization and hypervisor technologies

KVM continues to be fully supported. Xen support has been removed:

- SUSE Linux 16 cannot function as a Xen host or as a paravirtualized Xen guest (PV).
- Running SUSE Linux 16 as a fully virtualized Xen guest (HVM) or using hardware virtualization features (PVH) is still possible.
- Windows Subsystem for Linux: WSL1 support is removed in favor of WSL2, which provides a full Linux kernel with complete system call compatibility.

12 High Availability stack components

The SUSE Linux Enterprise High Availability stack has been modernized:

TABLE 3: CHANGES IN THE SLE HA STACK

Component	SLE HA 15	SLE HA 16
Pacemaker	Version 2	Version 3
Corosync	Version 2	Version 3
Distributed file system	OCFS2, GFS2 (read-only)	GFS2 (full read/write support)
Fence agents	All agents in a single package	Agents packaged separately

13 SAP on SUSE Linux 16

SUSE Linux 16 modernizes SAP workloads by consolidating system tuning into `saptune` and removing `sapconf`. For High Availability, the platform standardizes on the next-generation `SAPHanaSR-angi` resource agent for SAP HANA and mandates a static simple-mount architecture for SAP S/4HANA. These changes accelerate failover times, simplify cluster management and safeguard custom settings during upgrades.

TABLE 4: KEY SAP-SPECIFIC FEATURE CHANGES IN SUSE LINUX 16

Component / Feature	SLE 15	SUSE Linux 16	Primary technical benefit
SAP OS Tuning	Dual utilities: `sapconf` (basic systemd tuning) and `saptune` (advanced profile tuning)	`sapconf` is fully removed: `saptune` is the single consolidated tuning tool	Configurations moved out of `/etc`. Safe **`saptune configure`** commands introduced.
SAP HANA High Availability	Classic resource agents: `SAPHanaSR` (scale-up) and `SAPHanaSR-ScaleOut` (scale-out).	`SAPHanaSR-angi` (Advanced Next Generation Interface) is the sole standard.	Unified codebase with faster failover response times.
SAP S/4HANA Application HA	Dynamic shared file system resources mounted/unmounted at runtime via Pacemaker	Mandatory simple-mount file system structure	Eliminates storage bottlenecks and node fencing loops.

13.1 OS tuning for SAP workloads: moving from `sapconf` to `saptune`

In SLE 15, SAP operating system tuning was handled by two separate packages: `sapconf`, which provided basic, systemd-based tuning, and `saptune` which offered advanced, profile-based tuning with active monitoring and verification.

SUSE Linux 16 simplifies this model by fully removing `sapconf`. `saptune` is now the single, consolidated tool for tuning the operating system for SAP workloads and is included directly in the base SUSE Linux 16 product repositories, making it universally available.

Key architectural modifications in `saptune` on SUSE Linux 16 include:

- **Moving configuration out of `/etc`:** To align with the SUSE Linux 16 `/usr/etc` transition, `saptune` vendor default configurations have been moved away from `/etc`. This ensures that any subsequent package or OS updates will not silently overwrite custom parameters.
- **Introduction of `saptune configure` commands:** SUSE Linux 16 introduces an interactive and safe configuration editing model. Users must use commands such as **`saptune configure`** *`OPTION VALUE`*. This command performs immediate sanity checks and verification before saving, preventing unworkable tuning configurations.
- **Built-in safeguards:** Safeguards prevent administrators from saving broken values, ensuring the stability of the kernel and memory parameters required for SAP HANA databases and NetWeaver.

13.2 How is SAP HANA High Availability managed in SUSE Linux 16?

For SAP HANA System Replication (SR) setups, SLE 15 supported classic resource agents: `SAPHanaSR` for scale-up and `SAPHanaSR-ScaleOut` for scale-out setups.

In SUSE Linux Enterprise Server for SAP applications 16, `SAPHanaSR-angi` completely replaces these legacy resource agents for all new installations.

Benefits of `SAPHanaSR-angi` over the legacy agents include:

- **Reduced complexity:** Scale-up and scale-out scenarios use the identical software package and highly similar configuration files, unifying deployment logic across the landscape.
- **Faster takeovers:** The agent features optimized, low-latency failure detection. It triggers significantly faster database takeover times during critical events, such as file system outages, node crashes or an unresponsive HANA database.
- **Resilience to administrative errors:** ANGI is designed to be more robust and forgiving during manual cluster maintenance. It reduces the likelihood of false failover triggers caused by administrator missteps.

13.3 Configuring SAP S/4HANA High Availability

Legacy SLE HA environments configured shared file systems, such as NFS or EFS mounts for the ABAP Central Services (ASCS) and Enqueue Replication Server (ERS), as individual Pacemaker cluster resources. Pacemaker mounted and unmounted these file systems dynamically during failovers, a model that frequently caused storage bottlenecks, hung mount points and node fencing loops.

In SUSE Linux Enterprise Server for SAP applications 16, the simple-mount file system structure is mandatory for all new SAP S/4HANA high availability deployments.

13.3.1 What is the simple mount architecture?

Instead of Pacemaker controlling NFS/EFS resources at runtime, file systems are statically mounted on all cluster nodes at boot time via systemd (configured in `/etc/fstab`). Pacemaker no longer manages file system mounting. It only manages the start, stop and monitoring of SAP service instances using the lightweight `SAPStartSrv` resource agent, leading to highly robust and stable failover behavior.

14 Which technologies were removed or replaced in SUSE Linux 16?

The following technologies are removed in SUSE Linux 16:

TABLE 5: TECHNOLOGIES REMOVED IN SUSE LINUX 16

Area	Removed	Replacement
Architecture	32-bit application support	`grub2-compat-ia32` (SUSE Package Hub) for 32-bit kernel syscalls only
Architecture	Intel 32-bit and IBM POWER 32-bit libraries	No replacement—use 64-bit builds
Init system	SysV init scripts	`systemd` units
Installer	YaST / AutoYaST	Agama (Web, CLI, API)
Management	YaST (system management)	Cockpit (1:1), Ansible / SUSE Multi-Linux Manager (automation)

Area	Removed	Replacement
Management	WBEM / SBLIM	No direct replacement
Network	`wicked`	NetworkManager
Network	NIS / Yellow Pages	LDAP
Network	ISC DHCP server	Kea DHCP
Network	`nscd`	No replacement (use system resolver)
Security	AppArmor	SELinux with policies for 400+ modules
File systems	`reiserfs`, `hfsplus`, `UFS`, `OCFS2`, `quota v1`	`btrfs` (default), `xfs`, `ext`, `gfs2` (High Availability only)
Virtualization	Xen host and PV guest	KVM
Desktop	X11	Wayland
Desktop	VNC server	RDP
Desktop	GTK2, Qt5, wxWidgets	GTK4, Qt6
WSL	WSL1	WSL2

15 For more information

For more information on the topics covered in this article, refer to the following resources:

- Agama installer (https://documentation.suse.com/sles/16.1/html/SLES-x86-64-agama-automated-installation/index.html)
- Cockpit guide (https://documentation.suse.com/sles/16.1/html/SLES-cockpit/)
- SUSE Linux 16 product page (https://www.suse.com/products/server/)
- Upgrading to SUSE Linux 16 (https://documentation.suse.com/sles/16.1/html/SLES-upgrading/)

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