The past 18 months
Product Roadmap

SLES 11 SP4

• Release Date: 15 Jul 2015
• End of General Support: 31 Mar 2019
• End of Extended Support: 31 Mar 2022

No plans for further SPs for SLES 11

SLES 12 SP1

• Release Date: 15 Dec 2015
• End of General Support: 6 months after SP2 release

SLE JeOS

• Available only on x86-64
Use modules to deploy new features without changing the core OS

- Easier access to the latest updates
- Continuous integration to three year lifecycles
- Included in subscription
- Legacy
- Web and Scripting
- Advanced Systems Mgt
- Public Cloud
- Toolchain (update)
- Containers (new)
- Certifications (new)

Base OS
SUSE® Linux Enterprise Roadmap
### SUSE® Linux Enterprise Roadmap

<table>
<thead>
<tr>
<th></th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
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<tbody>
<tr>
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<td><strong>SP3</strong></td>
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<td><strong>SP4</strong></td>
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<tr>
<td><strong>SLE 12</strong></td>
<td></td>
<td><strong>GA</strong></td>
<td><strong>SP1</strong></td>
<td><strong>SP2</strong></td>
<td><strong>SP3</strong></td>
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</table>

## SUSE® Linux Enterprise Roadmap

<table>
<thead>
<tr>
<th>Year</th>
<th>SLE 11</th>
<th>SLE 12</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
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<tr>
<td>2014</td>
<td>SP4</td>
<td>GA</td>
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<tr>
<td>2015</td>
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<td>SP1</td>
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<tr>
<td>2016</td>
<td></td>
<td>SP2</td>
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<tr>
<td>2017</td>
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Not good enough?
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<td><strong>Package Hub</strong></td>
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<tr>
<td><strong>Long term roadmap</strong></td>
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</table>
## SUSE® Linux Enterprise
### Future Planning

<table>
<thead>
<tr>
<th>Year</th>
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<th>SLE 12</th>
<th>Modules</th>
<th>Package Hub</th>
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<tr>
<td>2013</td>
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<td>2018</td>
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</table>

**Long term roadmap**
SUSE Linux Enterprise Lifecycle
## SUSE Linux Enterprise Server 12

### Lifecycle and Policies

<table>
<thead>
<tr>
<th></th>
<th>General Support</th>
<th>Extended Support</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Years 1-5</td>
<td>Years 6-7</td>
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<td>Self Support</td>
<td>Yes</td>
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<tr>
<td>Maintenance Patches</td>
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<tr>
<td>Defect Resolution</td>
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<tr>
<td>Service Packs</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Additional Hardware</td>
<td>Yes</td>
<td>Ltd.⁸</td>
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<tr>
<td>Enablement and Software</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enhancements</td>
<td></td>
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</tr>
</tbody>
</table>

*Source: [https://www.suse.com/support/policy.html](https://www.suse.com/support/policy.html)*

1. Access to previously released patches with an active subscription.
3. Limited migration and configuration assistance provided with standard or priority subscription.
4. More comprehensive installation, migration, configuration and break fix technical support available with optional LTSS.
5. Only available with LTSS.
6. Limited to severity level 1 and 2 defects.
7. Only available with LTSS. Limited to severity level 1 and 2 defects.
8. Discretionary, based on customer and partner requests.
SUSE Linux Enterprise Server 12 Lifecycle Model

13-year lifecycle
- 10 years general support
- 3 years extended support

Long Term Service Pack Support (LTSS)
- Available for all versions, including GA
- Up to 3 years extended support

- Different Lifecycle for
  - Desktop and Modules.

Not committed. Subject to change.
### SUSE Linux Enterprise Server 12

#### Lifecycle, Code Streams, Future Thinking

<table>
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<tr>
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<th>2013</th>
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<td>SP1</td>
<td>SP2</td>
<td>SP3</td>
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<td></td>
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<tr>
<td>SLE 13</td>
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</tbody>
</table>

**“Yearly” Service Packs**

Not committed. Subject to change.
Future of the OS – *FUTxyz*

See also ...
SUSE Linux Enterprise 12
The advanced foundation for your success

Increase uptime

Improve operational efficiency

Accelerate innovation
Increase Uptime ...
Improved in SUSE Linux Enterprise 12 SP1
Increase Uptime

• SLE 12 SP1 is a consolidation release
  – No ABI/API changes
    → ISV certifications remain
    → Minimized impact on operations

• Rollback on Service Pack migration

• Updates on SUSE Linux Enterprise High Availability

• Support for systemd (Linux team driver, in addition to the already existing support for network bonding)
SUSE Linux Enterprise 12
Increase Uptime

- RAS
- High Availability
- Live Patching

Minimize downtime
planned and unplanned
Prevent hardware downtime

High Availability

System Rollback

Live Patching

RAS
SUSE Linux Enterprise 12
RAS - Overview

Reliability, Availability, Serviceability

• Interaction of hardware and operating system → Traditional UNIX capability

• SUSE is leading for RAS capabilities on Linux
  – Intel 64 architecture
  – IBM POWER architecture

Benefits

• Choice of HW vendor
• System and applications survive hardware failure
• Integration into systems management frameworks
Reduce Operational Downtime

RAS

High Availability

System Rollback
Improved in SUSE® Linux Enterprise 12 SP1

System Rollback

Go back to well-known state

Peace of mind for

• Patch installation
• System admin tasks
• Extended integration
• “Full system rollback”

New in SLE 12 SP1

• Service Pack rollback
SUSE Linux Enterprise Live Patching

- Available for SLES 12 (x86-64)
- Provides fixes for Kernel bugs which affect
  - Security
  - Stability
  - Data Integrity
- No runtime performance impact
- No interruption of applications while patching
- Allows full review of patch source code
- PTFs can be delivered as Live Patches
- Patches available for kernels up to 1y old
Accelerate Innovation
SUSE Linux Enterprise 12 SP2

Scope

**Key features** being introduced with SLE 12 SP2:

- Kernel: 4.4
- **New technologies**: NVDIMM *(tech preview)*, OmniPATH, Data Plane Development Kit with openVSwitch
  - New module: HPC
  - Hardware support following customer needs
  - Driver Updates
    - Stability of APIs and ABIs
SUSE Linux Enterprise 12 SP2

Migration Use Cases

- **Media / Fully Offline**
  Boot DVD (or ISO image) to upgrade without connection to any repositories on the network.

- **Migration via SCC**
  The system, directly connected to SCC, is able to receive the new migration target and run the upgrade process.

- **SUSE Manager**
  System behind SUSE Manager are ready to be migrated to the latest SP.

- **SMT**
  System behind SMT are ready to be migrated to the latest SP.

- **3rd Party Tools**
  Customers using 3rd Party tools are enable to receive information about the latest SP. Access to this information is properly documented and easily accessible
Online upgrade paths

One step migration (SP n → SP n+1)
- Standard online migration path supported since SLE 10.
- SP2 follows the standards.
- Option available via all tools (e.g. SCC, SUSE Manager, etc.)

Skipping a Service Pack (SP n → SP n+2)
- Provide fully tested, supported and maintain migration path from SLE 12 GA to SLE 12 SP2.
- Exception: SLED
- Option available via all tools (e.g. SCC, SUSE Manager, etc.)
SUSE Linux Enterprise 12 SP2
SLED

- SP2 is a **refresh release**

- Provide significant hardware enablement across the SUSE Linux Enterprise common codebase

- Lifecycle clarification:
  - **SLED 12 is maintained and supported until 6 months after SLE 13 SP1.** Plans currently indicate that this means “until 2019”.
  - SUSE Linux Enterprise Workstation Extension 12 is maintained and supported until the EoGS (End of General Support) for SUSE Linux Enterprise Server 12.
  - LTSS is not available for SLED or SLES WE.
Scale-out – pacemaker_remote

- Add many nodes to master nodes
- Up to 32 master nodes control secondary nodes
Scale-out – Data Replication (DRBD)
SUSE® Linux Enterprise High Availability

• Independent of HW
• Prepared for >2 nodes
• GEO: DRBD proxy available from Linbit

DRBD is SUSE unique!
SUSE
High Performance Computing
SLES for High Performance Computing

A highly scalable, high performance server operating system that enables you to harness the power of the supercomputer for your day-to-day business

Solve the most demanding data-intensive problems

Keep Pace With Growing HPC Needs

Improve Scalability and Performance

Tackle High-Performance Computing

Increase Efficiency
# Strong Ecosystem for HPC

<table>
<thead>
<tr>
<th>Customers</th>
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</thead>
<tbody>
<tr>
<td><a href="#">Oak Ridge National Laboratory</a></td>
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<td><a href="#">IRZ</a></td>
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<tr>
<td><a href="#">BSC</a></td>
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<tr>
<td><a href="#">ICHEC</a></td>
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<tr>
<td><a href="#">NASA Ames Research Center</a></td>
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<tr>
<td><a href="#">Porsche</a></td>
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<td><a href="#">BMW</a></td>
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<td><a href="#">Air Force</a></td>
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<td><a href="#">Total</a></td>
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<td><a href="#">CESGA</a></td>
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<tr>
<th>Partners</th>
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<tbody>
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<td><a href="#">SGI</a></td>
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<td><a href="#">IBM</a></td>
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<td><a href="#">HP</a></td>
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<td><a href="#">DELL</a></td>
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<td><a href="#">Fujitsu</a></td>
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<td><a href="#">Cray</a></td>
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<td><a href="#">Lenovo</a></td>
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<td><a href="#">ScaleMP</a></td>
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<td><a href="#">Intel</a></td>
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</tbody>
</table>
Keeping Pace with HPC Changes

Simplify lives with SUSE HPC

- Build HPC systems based on SLES
- Platform for HPC systems
- HPC Partner
- SLES 12 SP2
- HPC Module
- Focus on HPC specific needs
- HPC Community
generic HPC stack (SUSE is founding member)
- TBA
- openhpc.community
- TBA at ISC 2016
- TBA
Make HPC more flexible

Bring HPC features as module
- Allow HPC to grow
- Flexible delivery model
- Address agile needs in the HPC space

Partner and Sponsor OpenHPC.Community
- Build a standard HPC stack
- Make HPC easily available

Technology & Support
- Provide leading edge software for the most sophisticated systems
- Support partners and customers to ensure business continuity
Advanced System Management
Advanced Systems Management Module

- Salt will be added to Advanced Systems Management module.
- Early 2017: Puppet 4 will replace Puppet 3. We will ship only the puppet client packages, puppet server needs to be used from PuppetLabs.
- Machinery: Receives regular updates, has seen improvements for drift detection and container.
Configuration with Salt
What is Salt?

• Configuration management tool
• Combines imperative approach (“Do this NOW”) with declarative approach (“Make sure all my systems look like this”) in one tool
  – vs. Puppet (needs Ansible or mcollective as a “companion”)
• Distributed architecture
• Easy to extend (with many existing plugins for OpenStack, Docker, etc.)
• Large and rapidly growing community
• Written in Python
Toolchain Module
Toolchain Module for SUSE Linux Enterprise 12

- Yearly release
- Deliver new Compiler and toolchain
  - GCC ("GNU Compiler Collection") development tools via Toolchain Module
  - GCC runtime libraries, binutils, gdb as updates for SLE Core
- 2016 update of Toolchain Module for SUSE Linux Enterprise 12:
  - GCC 6.2 with C, C++, Fortran support
  - Binutils 2.26
  - Gdb 7.11
- Package build compiler (GCC 4.8) stays as default
Highlights GCC 6.2

• C++14 default for C++ front-end rather than C++98
• OpenMP 4.5 support
• AMD HSA capabilities
• various experimental features of C++17
Security and Compliance
SUSE Linux Enterprise 12
Security and Compliance

Planned Certifications:

- FIPS 140-2
  - OpenSSL
    - OpenSSH client and server
    - Strongswan (IPSec based VPNs)
    - Kernel Crypto API
    - ...
  

- Common Criteria Certification
- DISA STIG
- IPv6 recertification
SUSE® Linux Enterprise 12 JeOS
SUSE Linux Enterprise Server JeOS speeds up virtual image deployment

- Just enough Operating System
- Small size
- Designed for virtualization and cloud
- Fast deployment and configuration
- No need to re-certify
- Same SUSE Linux code base
- For mission-critical applications
- Available template for easy, large scale configuration management
SUSE Linux Enterprise 12 SP3
Current planning (tentative)
SUSE Linux Enterprise Server 12 SP3

Scope

• **Consolidation** release
  – Stability of APIs and ABIs
  – No Kernel version change

• Expand **leadership** areas of SUSE Linux Enterprise

• **Hardware** support
  – Follow customer needs
  – Incremental, non-intrusive changes on all architectures: x86-64, IBM zSystems, IBM Power LE

• **Selective Driver Updates**
SUSE Linux Enterprise Server 12 SP3

Features / Scope

• **Hardware enablement** (via the Common Code Base)
  – Full support of NVDIMM /Apache Pass
• Keep **Modules** up to date according to their life cycle
• No changes for the Security Certifications
Thank you.

Your Questions!?
Appendix
Default filesystem: btrfs
## btrfs – Functionality – Maturity

<table>
<thead>
<tr>
<th>Today</th>
<th>Future</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copy on Write</td>
<td>Inode Cache</td>
</tr>
<tr>
<td>Snapshots</td>
<td>Auto Defrag</td>
</tr>
<tr>
<td>Subvolumes</td>
<td>RAID</td>
</tr>
<tr>
<td>Metadata Integrity</td>
<td>Compression (SLE 12 SP1)</td>
</tr>
<tr>
<td>Data Integrity</td>
<td>Send / Receive</td>
</tr>
<tr>
<td>Online metadata scrubbing</td>
<td>Hot add / remove</td>
</tr>
<tr>
<td>Manual Defragmentation</td>
<td>Seeding devices</td>
</tr>
<tr>
<td>Manual Deduplication</td>
<td>Multiple Devices</td>
</tr>
<tr>
<td>Quota Groups</td>
<td>“Big” Metadata</td>
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</table>
# SUSE® Linux Enterprise 12
## Use Cases and Filesystems

<table>
<thead>
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<th>Use Case</th>
<th>btrfs</th>
<th>ext4</th>
<th>xfs</th>
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<tbody>
<tr>
<td>Need for Deduplication (Backup Server)</td>
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</tr>
<tr>
<td>Container Host</td>
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</tr>
<tr>
<td>Database</td>
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<td>+</td>
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<tr>
<td>Fileserver (NFS, Samba)</td>
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<td>Home Directory (no Quota)</td>
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<td>Home Directory (with Quota)</td>
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<td>+</td>
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<tr>
<td>Need for Snapshots</td>
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<tr>
<td>VM Host</td>
<td>+¹</td>
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<td>++</td>
</tr>
</tbody>
</table>

+¹ with NoCoW

o² Snapshots via DM/LVM

o³ subvolume quota only
System Building and Support
SUSE Linux Enterprise
How We Build It

OBS user submits source to OBS and gets a product

Source Package Image

Online Repository

OBS user submits source to OBS and gets a product
SUSE Linux Enterprise

SUSE® Maintenance and Support

**Support Process**
1. **Receive Requests**
2. **L1 and L2 Escalation**
3. **L3 Resolution**
4. **PTF Via NCC**

**PTF** = Program Temporary Fix

**NCC** = The webservice where customer interact with the support organization and get access to packages and patches
SUSE Linux Enterprise 12
Common Code Base & Architectures

<table>
<thead>
<tr>
<th>SUSE Linux Enterprise platform</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Server</td>
<td>Desktop</td>
</tr>
</tbody>
</table>

Binary Code Base
- AMD64 / Intel 64
- IBM POWER
- IBM z Systems
- AArch64

Common (Source) Code Base

- Foundation for all SUSE® products
- Fully supported core system
- Choose the right architecture for your workload