



# Upgrading to **SUSE<sup>®</sup> Linux Enterprise 12**

## SLE11 to SLE12 Migration

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# Overview

- General - Customer Dreams and Reality
- Supported Upgrade Scenarios
- Upgrade or Fresh Installation
- Upgrade related
- General changes
- Documentation
- What's next?

# General

# Customer Dreams

- Inplace Online Migration
- No interruption of running services
- No reboot
- All new features available
- ...

# SLES12 is not SLES11 SP4.5

- New major release
- Binary incompatible (shared libraries)
- New features requiring major changes to base system
- Old cruft removed
- Chance to solve old mistakes
- No inherited burdens
- ...



# Supported Upgrade Scenarios

# Supported Versions

- **SUSE Linux Enterprise 12**
  - SUSE Linux Enterprise 11 SP3
  - SUSE Linux Enterprise 11 SP4
- **SUSE Linux Enterprise 12 SP1**
  - SUSE Linux Enterprise 11 SP3
  - SUSE Linux Enterprise 11 SP4
  - SUSE Linux Enterprise 12
- **SUSE Linux Enterprise 12 SP2**
  - SUSE Linux Enterprise 11 SP4
  - SUSE Linux Enterprise 12 SP1

# Supported Upgrade Scenarios

- **Full offline Migration:**
  - Boot from DVD, ISO image, USB stick, Network (PXE/tftp)
  - AutoYaST (autoupgrade=1 parameter)
- **Online Migration:**
  - This is not possible



# Upgrade or Fresh Installation

# Upgrade or fresh Installation?

- We don't know your workload!
- Why do you want to upgrade?

# Questions - Hardware

- **How old is your hardware?**
  - If you need to replace them anyways...
- **Is your hardware still supported by SLES12?**
  - Support for old graphic cards was removed
  - Token ring no longer supported
  - Support of some disk controllers was removed by some IHVs
  - POWER switched from big-endian to little-endian
- **Do you have enough free disk space?**
  - RPMs and data are continuously growing

# Questions - Software

- **What is running on your machine?**
  - “Small” services like DNS?
  - “Big” services like SAP+Oracle+...
  - How long can the services be down?
- **Is your 3<sup>rd</sup> Party Software supported on SLES12?**
- **What do third party vendors recommend?**
  - Some vendors don't support major upgrade of OS in general
- **Adjustment of configuration of third party packages?**
- **How good is your setup documented?**
- **Any things you always wanted to setup differently?**

# Upgrade (1/2)

- **No need to do new package selection**
- **Old stuff will stay (zypper packages –orphaned)**
  - Not maintained anymore
  - No updates/security fixes
  - But: old 3<sup>rd</sup> party applications may continue to work
- **Adjustment of configuration of 3<sup>rd</sup> party packages**
- **SLES12 Modules – Which are needed for an upgrade?**
- **Database migration mostly done automated**
- **Filesystem still supported? → Reiserfs**

# Upgrade (2/2)

- **Not all new features are useable**
  - Btrfs/snapshot/rollback
  - New xfs on disk format
  - Full root filesystem encryption including /boot
  - IPv6 support for e.g. iSCSI (could be archived by reconfiguration)
- **Check \*.rpmnew config files for new options**
- **Check \*.rpm\_save config files for missing changes**
- **Obsolete packages could still be the default**
  
- **Updating RPMs takes longer than fresh installation**



# Fresh Installation

- **All new features are useable**
- **Need to think about new disk layout**
- **Need to think about package selection**
- **No old stuff left**
- **Complete new installation of third party software**
- **Migration of configuration files and data to new system**

# Upgrade Related

# Upgrade Preparation

- **Check the release-notes**
- [https://www.suse.com/releasenotes/x86\\_64/SUSE-SLES/12-SP2/](https://www.suse.com/releasenotes/x86_64/SUSE-SLES/12-SP2/)
- **Check if all partitions are still big enough**
  - Software tends to grow from version to version
- **Shut down virtual machine guests**
- **Make a backup**
- **If needed, migrate your PostgreSQL database**
  - If you are still on PostgreSQL 8.x

# During Upgrade

- **Enable all Modules**
  - Packages you used on SLES11 could now be in modules
- **Only grub2 as bootloader**
  - New bootloader proposal during upgrade
  - Serial Console setup could be lost

# Upgrade by booting from Media

- **New workflow only for Upgrade**
  - No switch later in installation workflow to upgrade possible!
- **Select “Upgrade” in the DVD-Boot menu**
- **Select keyboard layout for upgrade process, accept EULA**
- **Select installed system for upgrade**
- **Re-enable 3<sup>rd</sup> party repositories you still need**
- **Accept licenses and EULA for packages and modules**
- **Add additional Add-Ons/repositories if needed**
- **Check for conflicts**
- **Start upgrade**

# Upgrade by booting from Media

Alternative Screenshots or live Demonstration



# Upgrade with AutoYaST

- **AutoYaST profile has same format as for installations**
- **Parts like “partitioning” don't make sense**
- **“Upgrade” section**
  - 'only\_installed\_packages'
    - True: only installed packages will be upgraded
    - False: installed patterns will be upgraded
  - 'stop\_on\_solver\_conflict'
- **“Software” section**
  - Block RPMs you don't want
- **Backup Before Upgrade (sysconfig, config files)**
  - Better do a real backup

# General Changes

# Filesystems

- **Reiserfs is no longer supported for fresh installations**
- **Btrfs is the new, default root filesystem**
  - Root should be big enough for several snapshots
  - Everything in subvolumes or on own partitions is excluded from snapshots/rollback
  - Subvolumes/Partitions can have own snapshot configuration
    - Rollback only available for root partition
  - Every subvolume can be replaced by own partition (if YaST2 partitioner allows)
- **XFS is the recommended filesystem for data partitions**
- **Ext4 is fully supported (with exceptions)**

# RPM/Package incompatibilities

- **Configurations gets lost during upgrade**
  - RPM not able to track config files moved around
  - /etc/crontab needs restore (new cron implementation)
  - Services no longer enabled by default (no 1:1 matching of LSB init scripts with systemd unit files)
- **Meaning/default of options can have changed**
  - ntp commandline options
  - IPv6 privacy extensions per default active (temp\_addr)
  - Samba defaults changed, so if not set explicit in config files...
  - Syslog-ng starts with old config, but behaves different
  - Same true for many more packages

# Package Removals/Replacements

- SuSEConfig code moved to %post section in RPMs
- KDE Desktop was removed
- Mono was removed
- iscsitarget was replaced by lio
- Cyrus IMAP was replaced by dovecot
- Pure-ftpd was replaced by vsftpd
- LPRng was removed
- **/etc/SuSE-release was obsoleted by /etc/os-release**
  - Cross distribution format

# Package Changes

- **OpenLDAP:**
  - Ldap overlays are now modules, adjust configuration
- **Apache Access/Deny handling changed**
  - `sysconf_addword /etc/sysconfig/apache2 APACHE_MODULES access_compat`
- **YaST2 command line interface obsoleted/gone**
  - Use zypper for package management instead
- **Ntpd**
  - Has problems chrooted, like name resolution stops working
- **Parted only resizes partitions, no longer filesystems**
  - Use filesystem specific command



# Databases

- **MySQL was replaced by MariaDB**
  - Full L3 supported
  - Needs migration:
    - Create a backup before upgrade
    - touch /var/lib/mysql/.force\_upgrade
    - rcmysql start
    - rcmysql status
- **PostgreSQL was updated to version 9.x**
  - Don't update from SLES11 with PostgreSQL 8.x directly
  - Update first PostgreSQL to version 9.x and upgrade database

# Wicked

- **New framework for network configuration**
- **Configuration file back-ends**
  - SUSE style `/etc/sysconfig/network/`
  - Network interface configuration in XML
- **Bring up and shutdown of “normal” interfaces such as Ethernet or InfiniBand, VLAN, bridge, bonds, tun, taps, dummy, macvlan, macvtap, his, qeth, iucv, wireless**
- **Built-in DHCPv4 and DHCPv6 client**
- **Nanny daemon (“interface hotplugged”, link detecting)**
- **Handles incremental changes (no ifdown if possible)**

# CUPS

- **CUPS was updated to version 1.7**
  - Major incompatible changes compared with SLES11
  - Default version of IPP protocol now 2.0 (rejected by older CUPS clients, add '/version=1.1' to server name on client)
- **Printer browsing dropped, native DNS-SD now used**
  - Use cups-browsed as replacement
- **Several filters and back-ends dropped**
  - Try “cups-filters”

# Systemd

- **System- and Session Manager for Linux**
- **Systemd replaces SysV-Init (New init process)**
- **Can execute LSB init scripts**
  - “systemctl reload-daemon” after changes
- **Unit Files preferred**
  - Rewrite init scripts to unit files!
  - Don't use 'su' in init scripts (or create own “sessions” otherwise)
- **Provides aggressive parallelization capabilities**
- **Uses socket and D-Bus activation for starting services**
- **Keeps track of processes using Linux cgroups**

# Systemd configuration changes

- **Variables/Features from /etc/sysconfig replaced by systemd configuration tools**
  - /etc/sysconfig/cron → /etc/tmpfiles.d/tmp.conf
  - /etc/sysconfig/language fallback for /etc/locale.conf
- **System locale and keyboard settings**
  - Localectl
    - /etc/vconsole.conf
    - /etc/X11/xorg.conf.d/00-keyboard.conf
- **System time and date**
  - timedatectl

# CA Certificates/FIPS

- **CA Certificates**

- Old: /etc/ssl/certs
  - PEM format only for legacy reasons
- New: /etc/pki/trust/anchors/
- New: /etc/pki/trust/blacklist/
  - Call 'update-ca-certificates' afterwards for both

- **FIPS enablement**

- FIPS disables “unsafe” crypto algorithm
  - This includes traditional password hashes like DES!

# Documentation



# Documentation

- <https://www.suse.com/documentation/sles-12/>
  - Release Notes
  - Installation Quick Start
  - Deployment Guide
  - Administration Guide
  - Virtualization Guide
  - Storage Administration Guide
  - System Analysis and Tuning Guide
  - Security Guide
  - Whitepapers

**What's next?**

# Upgrade to the latest SLES12 Service-Pack

**zypper migration -n --no-recommends**



**Questions?**

**Thank you.**



We adapt. You succeed.