Upgrading to SUSE® 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 3rd 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 3rd party applications may continue to work
- Adjustment of configuration of 3rd 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 *.rpmsave 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/
• 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 3rd 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, macvtab, 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/](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.