



SUSE[®] Linux Enterprise 12 Service-Pack Migration

What is possible and what supported

Thorsten Kukuk
Senior Architect SUSE Linux Enterprise Server
kukuk@suse.com

Overview

- **The plan**
- **What is supported**
- **Definitions and Workflow**
- **Own and Third Party Repositories**
- **Migration via YaST2**
- **Migration via zypper**
- **SMT**
- **Common Mistakes**
- **Migration via own scripts**
- **Rollback and Recovery**

The Plan

Wishes for SUSE Linux Enterprise 12

- System always in a defined state until first RPM is updated
- Canceling possible until first RPM is updated
- Recovery in error case quite simple
- “Rollback“ via system tools, no backup/restore
- Chance that an error occurs very low
- Intuitive graphical tool
- Simple command line tool
- Use all active repositories

Supported Upgrade Scenarios

Supported Upgrade Scenarios

- **Media (fully offline)**
 - Boot from DVD, ISO image or USB stick
 - autoyast2
- **Migration via SCC/SMT (online: internet/local network)**
 - yast2 migration or zypper migration
- **Do-it-yourself “zypper”**
 - zypper dup –no-allow-vendor-change –no-recommends ...
- **Do-it-yourself “plain rpm” / 3rd Party Tools**
 - “rpm -Fhv”, “yum”, ...
 - Not recommended
- **Migration via SUSE Manager**

Supported Versions (SLE 12 SP2)

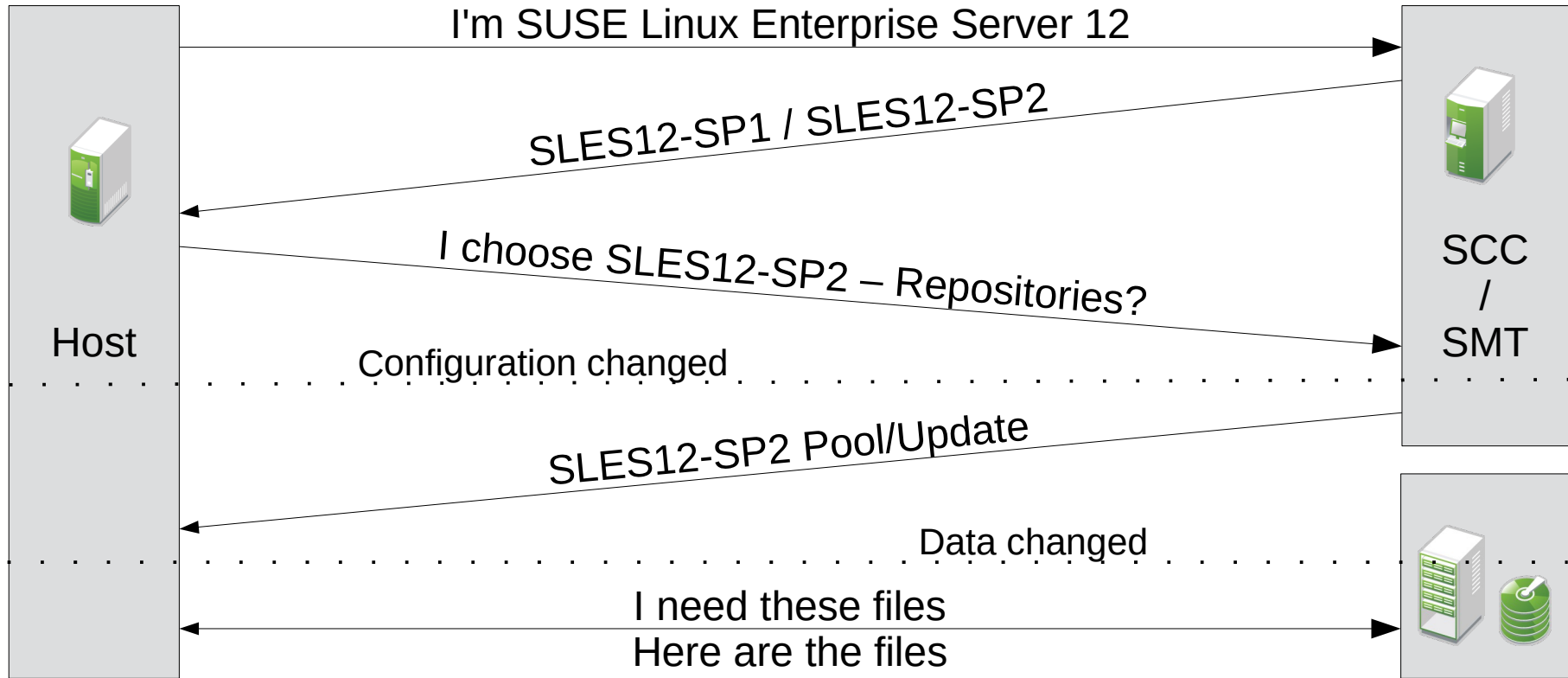
- **Offline migration via Media (DVD, autoyast2):**
 - SUSE Linux Enterprise 11 SP4
 - SUSE Linux Enterprise 12
 - SUSE Linux Enterprise 12 SP1
- **Online migration (YaST2, zypper):**
 - SUSE Linux Enterprise 12
 - SUSE Linux Enterprise 12 SP1
- **Manual / 3rd Party:**
 - SUSE Linux Enterprise 12
 - SUSE Linux Enterprise 12 SP1

Tools helpful to know

- YaST2
- Zypper
- SUSEConnect
- Snapper
- SMT
- RPM

Definitions and Workflow

Migration Workflow



Definition of Migration Targets

- **Defines set of products to which the system can be migrated**
- **One target contains:**
 - Version of the products/extensions
- **Set of products is known to be compatible**
- **Multiple migration targets are possible**
 - SLES12 SP2 + SES3, SLES12 SP2 + SES4, SLES12 SP3, ...
- **Migration targets are dynamic**
 - Changing over time, example new release of extension
 - Depend on installed extensions

Workflow

- **Find out possible migration targets**
- **Select one migration target**
- **Request and enable new repositories**
 - Adjust 3rd Party repositories
 - Access to repositories is automatically granted
 - All our subscriptions include upgrade protection
- **Run migration (zypper dup, rpm -Fhv, ...)**

Running Migration

Prerequisites

- **Have enough free disk space**
 - A snapshot of old system will be created
- **Check that all installed products are upgradable**
 - For SUSE Enterprise products: SCC/SMT will do the check
 - If there is no new version for one extension, it could be that there will be no migration target
 - What about 3rd party Add-Ons, like from IBM or SGI?
- **Create a backup**
 - We don't think you need it, but ...

Adjust 3rd Party Repositories

Update `/etc/zypp/repos.d/*.repo` files

- **Adjust URL:**
 - Change “SLE_12” to “SLE_12_SP2” (e.g. for SUSE hosted repositories)
 - Ask the responsible person for that repository for new URL
- **Use Macros (`--releasever`) to automate**
 - Example for openSUSE Build Service URLs:
SLE_`${releasever_major}``${releasever_minor:+_SP${releasever_minor}}`

Running Migration with standard Tools

- **Update update stack first (optional)**
 - “zypper patch --updatestack-only” or equivalent
- **After that use one of:**
 - “zypper migration”
 - “yast2 migration”
- **Alternative use:**
 - Upgrade by booting from DVD
 - autoyast2

Cancel Service-Pack Migration

- **Until package upgrade starts**
 - Minimal changes on the system (only services/repositories)
 - May need a restore:
 - `/etc/zypp/repos.d/*`
- **After package upgrade starts**
 - Rollback from snapshot
 - Restore from backup
- **SCC data changed after selection of migration target**
 - Automatically restored by tools
 - Manually: “SUSEConnect --rollback”

Macros for Repository URLs

- Zypper can replace macros in URLs of repositories
- **Default value: internal version number of base product**
 - SLES 12: 12
 - SLES 12 SP1: 12.1
 - SLES 12 SP2: 12.2
- **Can be overwritten with zypper commandline option:**
 - “--releasever 12.2” means, use SLES12 SP2 repositories even if only SLES12 SP1 is installed
- **Admin needs to refresh caches himself**
 - “--releasever” will not invalidate current cache, means zypper will use different repositories!

Example repo file with Macros

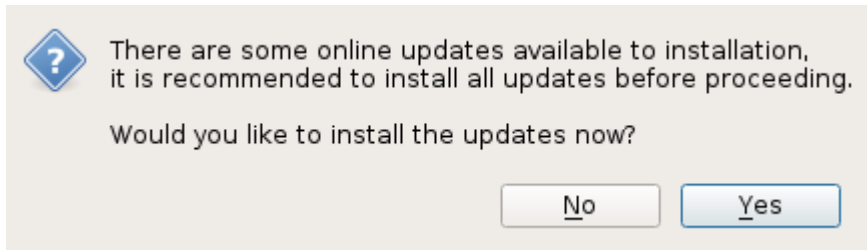
```
[example]
name=home:example
enabled=1
autorefresh=1
baseurl=http://download.opensuse.org/repositories/home:/example/
SLE_${releasever_major}${releasever_minor:+_SP$releasever_minor}
path=/
type=rpm-md
keppackages=0
```

Migration via YaST2

YaST Migration

- **Prerequisite:**
 - Make sure yast2-migration is installed:
 - “zypper in yast2-migration”
- **Start migration:**
 - “yast2 migration”

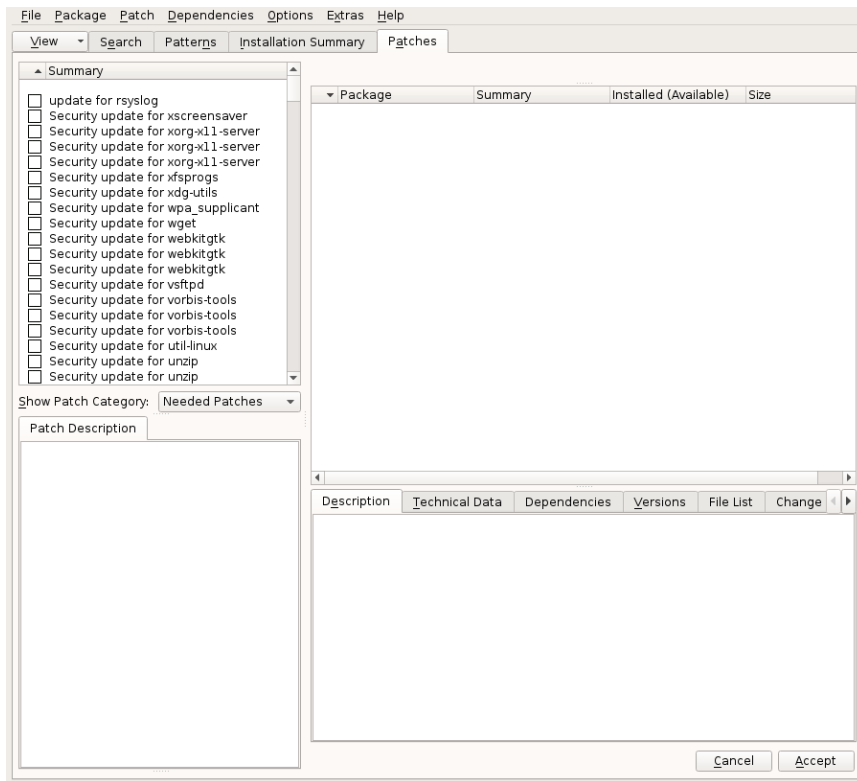
YaST Migration



There are some online updates available to installation, it is recommended to install all updates before proceeding.

Would you like to install the updates now?

YaST Migration



YaST Migration

Select the Migration Target

Possible Migration Targets

SLEWE12-SP2, SDK12-SP2, Toolchain-Module, SLES12-SP2
SLEWE12-SP1, SDK12-SP1, Toolchain-Module, SLES12-SP1

Migration Summary

- SUSE Linux Enterprise Workstation Extension 12 **will be upgraded to** SUSE Linux Enterprise Workstation Extension 12 SP2 x86_64.
- SUSE Linux Enterprise Software Development Kit 12 **will be upgraded to** SUSE Linux Enterprise Software Development Kit 12 SP2 x86_64.
- Toolchain Module 12 x86_64 **stays unchanged.**
- SUSE Linux Enterprise Server 12 **will be upgraded to** SUSE Linux Enterprise Server 12 SP2 x86_64.

Manually Adjust the Repositories for Migration

Help Abort Back Next

YaST Migration



The registration server offers update repositories.

Would you like to enable these repositories during upgrade in order to receive the latest updates?

No

Yes

YaST Migration

Migration proposal

Click a headline to make changes.

[Migration Summary](#)

Warning: Repository **SLES12-12-0** is obsolete and should be excluded from migration.
It is highly recommended to disable this repository: [\(Disable\)](#)

- Product **SUSE Linux Enterprise Server 12** will be updated to **SUSE Linux Enterprise Server 12 SP2 RC3**
- Product **Toolchain Module** will be updated
- Product **SUSE Linux Enterprise Software Development Kit 12** will be updated
- Product **SUSE Linux Enterprise Workstation Extension 12** will be updated to **SUSE Linux Enterprise Workstation Extension 12 RC3**

[Packages](#)

Cannot solve all conflicts. Manual intervention is required.

- Packages to Update: 991
- New Packages to Install: 265
- Packages to Remove: 15
- Total Size of Packages to Update: 3 GiB

Help Abort Back Next

YaST Migration

Migration proposal

Click a headline to make changes.

[Migration Summary](#)

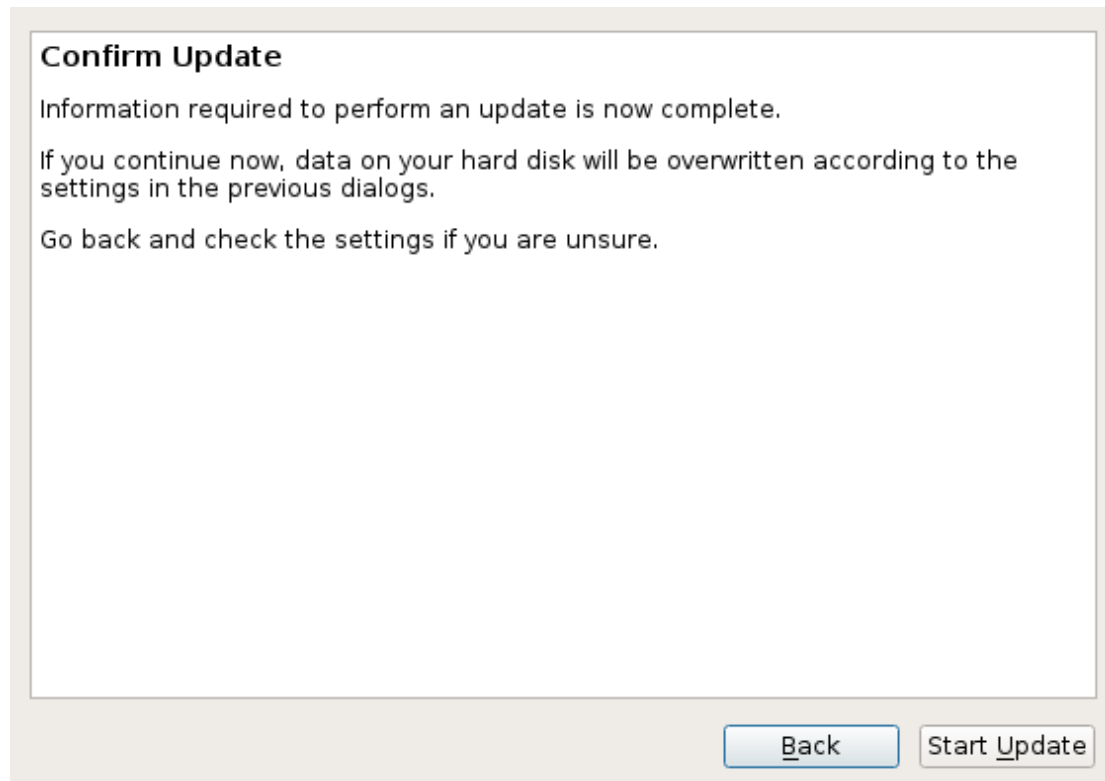
- Product **SUSE Linux Enterprise Server 12** will be updated to **SUSE Linux Enterprise Server 12 SP2 RC3**
- Product **Toolchain Module** will be updated
- Product **SUSE Linux Enterprise Software Development Kit 12** will be updated
- Product **SUSE Linux Enterprise Workstation Extension 12** will be updated to **SUSE Linux Enterprise Workstation Extension 12 RC3**

[Packages](#)

- Packages to Update: 1032
- New Packages to Install: 277
- Packages to Remove: 28
- Total Size of Packages to Update: 3 GiB

Help Abort Back Next

YaST Migration



YaST Migration

Performing Upgrade

Media	Remaining	Packages	Time
Total	3,024 GiB	1309	
SLES12-SP2-Pool Medium 1	2,510 GiB	1156	
SLE-SDK12-SP2-Pool Medium 1	17,38 MiB	26	
SLE-WE12-SP2-Pool Medium 1	508,97 MiB	126	
SLE-Module-Toolchain12-Updates Medium 1	1,8 KiB	1	

Actions performed:

- Downloading apparmor-docs (download size 289,3 KiB)
- Downloading boost-license1_54_0 (download size 17 KiB)
- Downloading branding-SLE (download size 5 KiB)
- Downloading desktop-translations (download size 3,72 MiB)
- Downloading glibc-i18ndata (download size 3,18 MiB)
- Downloading gnome-user-docs (download size 2,41 MiB)
- Downloading google-noto-fonts-doc (download size 6,9 KiB)
- Downloading gtk2-data (download size 71,9 KiB)
- Downloading hicolor-icon-theme (download size 42,8 KiB)
- Downloading insserv-compat (download size 9 KiB)
- Downloading iso-codes (download size 237,8 KiB)

Downloading man-pages (download size 3,18 MiB)

0%

Installing Packages... (Remaining: 3,024 GiB, 1309 packages)

Help Abort Back Next

YaST Migration

Migration Finished

Congratulations!

You have just successfully finished the on-line migration.
The system has been upgraded, it should be restarted as soon as possible to activate the changes.

Please visit us at <http://www.suse.com>.

Have a lot of fun!

Your SUSE Development Team

[Help](#) [Abort](#) [Back](#) [Finish](#)

YaST Migration

The system will be restarted now to activate the changes.

Cancel

Restart Now

YaST Migration

- **System is migrated:**

```
# lsb_release -d  
Description:    SUSE Linux Enterprise Server 12 SP2
```

Migration via zypper

Run zypper migration (1/4)

- **Prerequisite:**
 - Make sure, that “zypper-migration-plugin” is installed
 - “zypper in zypper-migration-plugin”
- **Start migration:**

```
# zypper migration
Executing 'zypper refresh'
Executing 'zypper --no-refresh patch-check --updatestack-only'

Loading repository data...
Reading installed packages...
0 patches needed (0 security patches)
```


Run zypper migration (2/4)

Available migrations:

- 1 | SUSE Linux Enterprise Server 12 SP2 x86_64
SUSE Linux Enterprise Workstation Extension 12 SP2 x86_64
SUSE Linux Enterprise Software Development Kit 12 SP2 x86_64
Toolchain Module 12 x86_64 (already installed)

- 2 | SUSE Linux Enterprise Server 12 SP1 x86_64
SUSE Linux Enterprise Workstation Extension 12 SP1 x86_64
SUSE Linux Enterprise Software Development Kit 12 SP1 x86_64
Toolchain Module 12 x86_64 (already installed)

[num/q]: 1

Run zypper migration (3/4)

```
Executing 'snapper create --type pre --print-number --description  
'before online migration''
```

```
Upgrading product SUSE Linux Enterprise Server 12 SP2 x86_64.
```

```
Found obsolete repository SLES12-12-0
```

```
Disable obsolete repository SLES12-12-0 [y/n] (y): y
```

```
... disabling.
```

```
Executing 'zypper --releasever 12.2 ref -f'
```

Run zypper migration (4/4)

```
1020 packages to upgrade, 2 to downgrade, 279 new, 30 to remove, 2 to change arch.
```

```
Overall download size: 888.8 MiB. Already cached: 0 B After the operation, additional 840.1 MiB will be used.
```

```
Continue? [y/n/? shows all options] (y): y
```

- Now your system will be updated
- Reboot to activate new kernel

SMT

Migration with SMT as Proxy

- **Prerequisite:**
 - SMT, which supports migration of SUSE Linux Enterprise 12
 - SUSE Linux Enterprise Server 11: smt >= 2.0.14 (better 2.0.16)
 - SUSE Linux Enterprise Server 12 SP1: smt >= 3.0.8
 - SMT needs to use SCC
 - Clients needs to be configured against SMT
- **Start migration with:**
 - yast2 migration
 - zypper migration

Common Mistakes

Common Mistakes

- **Installed/registered products are not in sync with SCC**
 - SUSE::Connect::ZypperError: No provider of '<product>' found.
=> Module/Extension registered, but not installed
=> "SUSEConnect --rollback"
 - SUSE::Connect::ApiError: The requested products '<product>' are not activated on the system.
=> Module/Extension installed, but not registered
- **Customer created own installation repository**
 - Reproducible with official POOL/Update channel?
 - Dependencies partly ignored, which is a bigger problem for full update, not single updates

Migration via own scripts

Migration via own scripts (Preparation)

- **De-register current system from SCC:**
 - “SUSEConnect –de-register”
- **Disable old installation sources like DVD, etc.**
 - e.g. /etc/zypp/repos.d/SLES12-12-0.repo
- **Adjust 3rd Party Repositories**

Migration via own scripts (Add Repos)

- **Add new installation sources (online channel)**
 - “SUSEConnect -p SLES/12.2/x86_64 -r [code] -e [mail]”
 - See “SUSEConnect –list-extensions”

Or

- **Add local installation source**
 - “zypper ar -f http://example.com/media/SLES12SP2/”
 - “zypper ar dvd:///?devices=/dev/sr0 SLES12SP2”

Migration via own scripts (Update)

- **Refresh all repositories:**
 - “zypper --releasever 12.2 ref -f -s”
- **Run migration:**
 - “zypper --releasever 12.2 dup --no-allow-vendor-change --no-recommends”
- **Register system if not already done**
- **Check, that system is registered correctly:**
 - “SUSEConnect --status”

Service-Pack Rollback

Rollback via snapper/grub2

- **Select snapshot to rollback to via:**
 - “snapper rollback”
 - grub2 boot menu
- **During boot, registration should be reset automatically.**
- **Check, that system is registered correctly:**
 - “SUSEConnect –status”
- **If needed, repair registration:**
 - “SUSEConnect --rollback”

Rollback via Disk Snapshot or Restore

- **System does not know if a product downgrade was done via:**
 - LVM snapshots
 - KVM or VMWare snapshots
 - Restore of backup
- **=> Next zypper call will update to new Service-Pack again!**
- **Re-Register system to get back access to old repositories:**
 - “SUSEConnect --rollback”



Questions?

Thank you.



We adapt. You succeed.