* Created by Unknown User (qxz13gk), last modified on [29 Jul 2020](https://atc.bmwgroup.net/confluence/pages/diffpagesbyversion.action?pageId=893561970&selectedPageVersions=2&selectedPageVersions=3)

This page is a brief about the steps followed for SAP-HANA cluster MR(Master Release) Upgrade. Please go through the steps and follow the same while performing the task.

Reference task # TAS000004855158

**Pre Check** :

I. Take the output of the below commands for both the cluster nodes,

1. df -hT  
2. ifconfig  
3. uname -a  
4. cat /etc/SuSE-release  
5. san\_shortinfo  
6. Console Access for both the cluster servers

II. Take the output of already available MR versions on the cluster servers,

cat /etc/rudder\_vars.lst

III. Take the output of the cluster(Pacemaker) from the below command,

crm\_mon -1 (Please make a note of number of nodes and resources configured and also check where the instance (For Ex : SBQ, SBP, etc..) are running and which is currently Master and whic is Slave)

IV. Take output of Full Check command for both the cluster server nodes and make sure all are OK.

V . Ask the SAP application person to Freeze the cluster, you can verify if the cluster is freezed with the command "crm\_mon -1", the output will be similar to below,

lpsbph01:~ # crm\_mon -1  
Stack: corosync  
Current DC: lpsbph01 (version 1.1.19+20181105.ccd6b5b10-3.10.1-1.1.19+20181105.ccd6b5b10) - partition with quorum  
Last updated: Sat Jul 25 06:15:07 2020  
Last change: Sat Jul 25 05:40:35 2020 by sbpadm via crm\_attribute on lpsbph01

2 nodes configured  
7 resources configured

\*\*\* Resource management is DISABLED \*\*\*  
The cluster will not attempt to start, stop or recover services

Online: [ lpsbph01 lpsbph51 ]

Active resources:

rsc\_SAPDatabase\_SBQ10 (ocf::heartbeat:SAPDatabase): Started lpsbph51 (unmanaged)  
sbd-fencing (stonith:external/sbd): Started lpsbph01 (unmanaged)  
Clone Set: cln\_SAPHanaTopology\_SBP00 [rsc\_SAPHanaTopology\_SBP00] (unmanaged)  
rsc\_SAPHanaTopology\_SBP00 (ocf::suse:SAPHanaTopology): Started lpsbph01 (unmanaged)  
rsc\_SAPHanaTopology\_SBP00 (ocf::suse:SAPHanaTopology): Started lpsbph51 (unmanaged)  
Master/Slave Set: msl\_SAPHana\_SBP00 [rsc\_SAPHana\_SBP00] (unmanaged)  
rsc\_SAPHana\_SBP00 (ocf::suse:SAPHana): Master lpsbph01 (unmanaged)  
rsc\_SAPHana\_SBP00 (ocf::suse:SAPHana): Slave lpsbph51 (unmanaged)  
rsc\_ip\_SBP00 (ocf::heartbeat:IPaddr2): Started lpsbph01 (unmanaged)  
lpsbph01:~ #

VI. Set Down time for both the cluster servers,

**MR Execution Step** :

Perform MR upgrade on both the cluster server nodes, once you get confirmation from SAP app team and after verifying resources are freezed. MR can be performed parallely to both the cluster nodes at once,

rudderswinst -t <Task\_NO> update <Server\_Name>

After Successful completion of MR upgrade, please make sure to have console access and then perform REBOOT of the cluster servers nodes. REBOOT also can be performed in parallel and make sure you monitor console during REBOOT process,

**Post MR and REBOOT Step** :

1. Once the servers are back online after reboot, verify all the basic necessary output which had been performed during Pre check task,  
2. Verify the output "crm\_mon -1" and the cluster should be still in freezed state,

Inform SAP app person to unfreeze the cluster and start SAP and perform validation,

**Important Info and Useful Link** :

Below is the confluence link for SAP HAE cheat sheet, for any further queries, please go through the link.

The link has all the steps for :

Cluster health Checks,  
Setting cluster maintenance mode(Basically it is performed by SAP app team),  
Removing cluster maintenance mode(Basically it is performed by SAP app team),  
Switching HANA master role between cluster nodes,  
Cleaning any Failed resources during cluster freeze/unfreeze,

<https://atc.bmwgroup.net/confluence/display/IAAS18/5.18.3+SLES+HAE+Cheat+Sheet+for+SAP+HANA>

* Created by Unknown User (qxz13gk), last modified on [26 Aug 2020](https://atc.bmwgroup.net/confluence/pages/diffpagesbyversion.action?pageId=929953269&selectedPageVersions=2&selectedPageVersions=3)

**This document/steps are useful only if it is a New/Fresh install of CD application on the Clusters**.

Follow the below steps on Installing and Configuring CD on the Cluster :

1. Install CD via Rudder on both the Cluster Nodes, you can follow the below page to install CD on both the Cluster Nodes,

<https://atc.bmwgroup.net/confluence/display/IAAS18/5.1.8.1+SLES12+C%3AD+Configuration>

Once CD RPM/Package is installed on both the Cluster nodes, CD resource will need to be added Manually to Veritas Cluster. Above Confluence page has the steps to do the same,  
If it is not clear, Please follow the below steps,

1. Create & Copy CD Cluster start/stop/monitoring scripts to "**/lfs/cluster/vcs**" on both the Cluster Nodes.

Please refer attached documents for creating start/stop/monitoring scripts, since these are Generic scripts, you can either create these scripts or you need to copy these files/scripts from server which already has these scripts.

Tip : Make sure all the 3 files have root:root Ownership & 744 Permissions.

2. Create "**add\_<sid>\_cd.sh**" script in your home dir on the node where CD needs to be configured, most of the time CD needs to be configured only on PROD instance, but please make sure you have checked the same, and also check if the created script has executable permissions, if not, please provide the same.

#! /bin/bash -x

pkg=<instance/pkg\_name>  
sid=<sid>  
APP=${pkg}\_${sid}\_cd

haconf -makerw; sleep 2  
hares -add ${APP}\_app Application ${pkg}  
hares -modify ${APP}\_app Critical 0  
hares -modify ${APP}\_app StartProgram "/lfs/cluster/vcs/${APP}\_start"  
hares -modify ${APP}\_app StopProgram "/lfs/cluster/vcs/${APP}\_stop"  
hares -modify ${APP}\_app MonitorProgram "/lfs/cluster/vcs/${APP}\_monitor"  
hares -modify ${APP}\_app AutoStart 1  
hares -link ${APP}\_app ${pkg}\_${sid}\_app  
hares -modify ${APP}\_app Enabled 1  
sleep 2; haconf -dump -makero

3. Run the "**add\_<sid>\_cd.sh**" on the node where CD needs to be configured.

Check if CD resource is configured on the node/server for correctness,

**hares -state <${pkg}\_${sid}\_app>** : If the state shows as OFFLINE, make the resource ONLINE by using the below command,

**hares -online <${pkg}\_${sid}\_app> -sys <Server\_Name>**

Check again if CD resource is ONLINE,

**hares -state <${pkg}\_${sid}\_app>**

**hares -list|grep \_cd**

Once CD resource in ONLINE, inform the CD team/requester to configure CD application from their end and validate the application.

* Created by Unknown User (qxz13gk), last modified on [20 Jan 2021](https://atc.bmwgroup.net/confluence/pages/diffpagesbyversion.action?pageId=1120897400&selectedPageVersions=8&selectedPageVersions=9)

The following guide describes the SAP Physic ( Cluster and Standalone) upgrade from SLES11 to SLES12.

**Please read the complete documentation before beginning with the task, this takes around 10 min. It's mandatory to understand the task before beginning with it.**

If you should have any questions please address them immediately to the SAP Expert Team ( [Praveen.DE.Desai@partner.bmw.de](mailto:Praveen.DE.Desai@partner.bmw.de) & [Suchetan.Raj@partner.bmw.de](mailto:Suchetan.Raj@partner.bmw.de) ).

**Below are the steps to perform as part of PREPARATION task for SAP SLES11 to SLES12 Upgrade for Clusters**

* Perform config checks for both the cluster servers individually, take the O/P for the below commands,                                                                                                                                                                                            
  uptime, uname -a, hastatus -sum & hastatus -sum | grep -i online, /etc/SuSE-release, df -hT, ifconfig -a(do nslookup for the IP's on bond0), /etc/fstab, /etc/hosts,   
  /etc/resolv.conf, /etc/BMW-release, san\_shortinfo & san\_shortinfo | wc -l, san\_info -s, lsblk, lsscsi, free -g/free -m, cat /proc/partitions, pvs, lvs, vgs,  
  rudder agent info, fullcheck <HOST>
* Check for DG & LV names on the clusters individually. If they need to be renamed, please send out an email to requester with the details.
* Check NFS shares on the cluster servers individually, please make sure the 4 standard NFS shares(sapmnt, sapsst, Archive & Trans) are present and mounted on both the  
   cluster servers and also make a note of non-standard NFS shares which are mounted on the   servers, so that they need to be remounted manually on the servers after  
   the upgrade activity is completed.
* Check VXVM Patch Level and Disk Layout Version for vxfs filesystem's, run the script " check\_dlv.sh "(the script is under /var/tmp on the install server) against the server or copy the script to the server and run the script.  
  Check vxfs filesystem version, Check if vxfs filesystem version is at least >= 10 ( SLES11SP3, SLES11SP4 ) or the latest supported vxfs filesystem version,                                                                                                                             
   for i in $(df -hP -t vxfs |awk '!/Filesystem/{print $1}'); do echo "${i}:"; /opt/VRTS/bin/fstyp -v $i |grep -i version; done
* Check for SecFS on both the cluster servers,                                                                                                                                                                                                                                                                                                             
   rpm -qa|grep -i vee
* Get the Package/Instance details on the cluster servers individually,  
  hares -display, vxdg list, vxdisk -o alldgs list, vxlist volume, vxlist plex, rpm -qa|grep -i veritas, rpm -qa|grep -i vxfs
* Check for CD & other MW Components installed on the cluster servers,                                                                                                                                                                                                                                                             
  rpm -qa | egrep -i 'BMW.\*(mqs-|pix)''   
  rpm -qa|grep cd-server  
  ps -ef |egrep "cdpmgr|cdstatm"

**Check if Console access is available for both the Cluster Servers. Make sure it is available.**

**After performing all the above steps, Create SAP PREREQ configuration,**

This creates the PREREQ and the SAP SLES12 OS setup configuration  
  
[INSTSERV][qxj2131][lpinstiaas01] ~ $ cp /global/instserv/bin/SAP\_PREREQ/create-prereq-config-from-existing.sh \  
    /global/instserv/data/BMW-SW-SAP\_PREREQ\_2012\_v1/<HOST>.create-prereq-config-from-existing.sh  
  
Edit the script copy and configure the SET\_ME variables in the script.  
  
Run create\_PREREQ\_config\_from\_existing for the host(s) from the location "/global/instserv/data/BMW-SW-SAP\_PREREQ\_2012\_v1"  
  
./<HOST>.create-prereq-config-from-existing.sh

**Run SAP PREREQ in check only mode,**

grep CHECK\_ONLY /global/instserv/data/BMW-SW-SAP\_PREREQ\_2012\_v1/<HOST>.BMW-SW-SAP\_PREREQ\_2012\_v1.conf, make sure **CHECK\_ONLY=true**

install\_override.sh <HOST> BMW-SW-SAP\_PREREQ\_2012\_v1 | tee /var/tmp/<HOST>\_SAP\_PREREQ.log

Check log for ERRORs ( ERROR-AUTO, SYSCTL, LIMITS, Override/SUP Pattern ERRORs can be ignored ).

**Create .conf file which will be used in Upgrade-EXEC task in location "/global/instserv/data/BMW-CFG-SAP-SLES12/<HOST>.conf and edit the values carefully.**

Check for the directory on the server " /usr/sap/trans/SLES12\_MIGRATION\_$(uname -n)/AO\_USERS\_$(uname -n) ", if the dir exists, it is fine, else send email to Willy Schwartz ([Willy.Schwartz@partner.bmw.co.za](mailto:Willy.Schwartz@partner.bmw.co.za)

&& also cc to [Geoffrey.Noyes@partner.bmw.de](mailto:Geoffrey.Noyes@partner.bmw.de), change requester, [Suchetan.Raj@partner.bmw.de](mailto:Suchetan.Raj@partner.bmw.de) & [Praveen.DE.Desai@partner.bmw.de](mailto:Praveen.DE.Desai@partner.bmw.de)) and check if AO Pre-Check task has been raised for him as well.

# [**BTRFS Balancing Disable**](https://atc.bmwgroup.net/confluence/display/IAAS18/BTRFS+Balancing+Disable)

* Created by Unknown User (qxy1272), last modified on [30 Jan 2020](https://atc.bmwgroup.net/confluence/pages/diffpagesbyversion.action?pageId=621874912&selectedPageVersions=3&selectedPageVersions=4)

1- Please remove the weekly cron for BTRFS balancing .

SERVERX:~ # ll /etc/cron.weekly

total 8

drwxr-xr-x 1 root root   46 May  4  2019 .

drwxr-xr-x 1 root root 3980 Jan 15 01:19 ..

lrwxrwxrwx 1 root root   44 May  4  2019 btrfs-balance -> /usr/share/btrfsmaintenance/btrfs-balance.sh

lrwxrwxrwx 1 root root   41 May  4  2019 btrfs-trim -> /usr/share/btrfsmaintenance/btrfs-trim.sh

SERVERX:~ # rm "/etc/cron.weekly/btrfs-balance"

SERVERX:~ # ll /etc/cron.weekly

total 4

drwxr-xr-x 1 root root   20 Jan 23 17:02 .

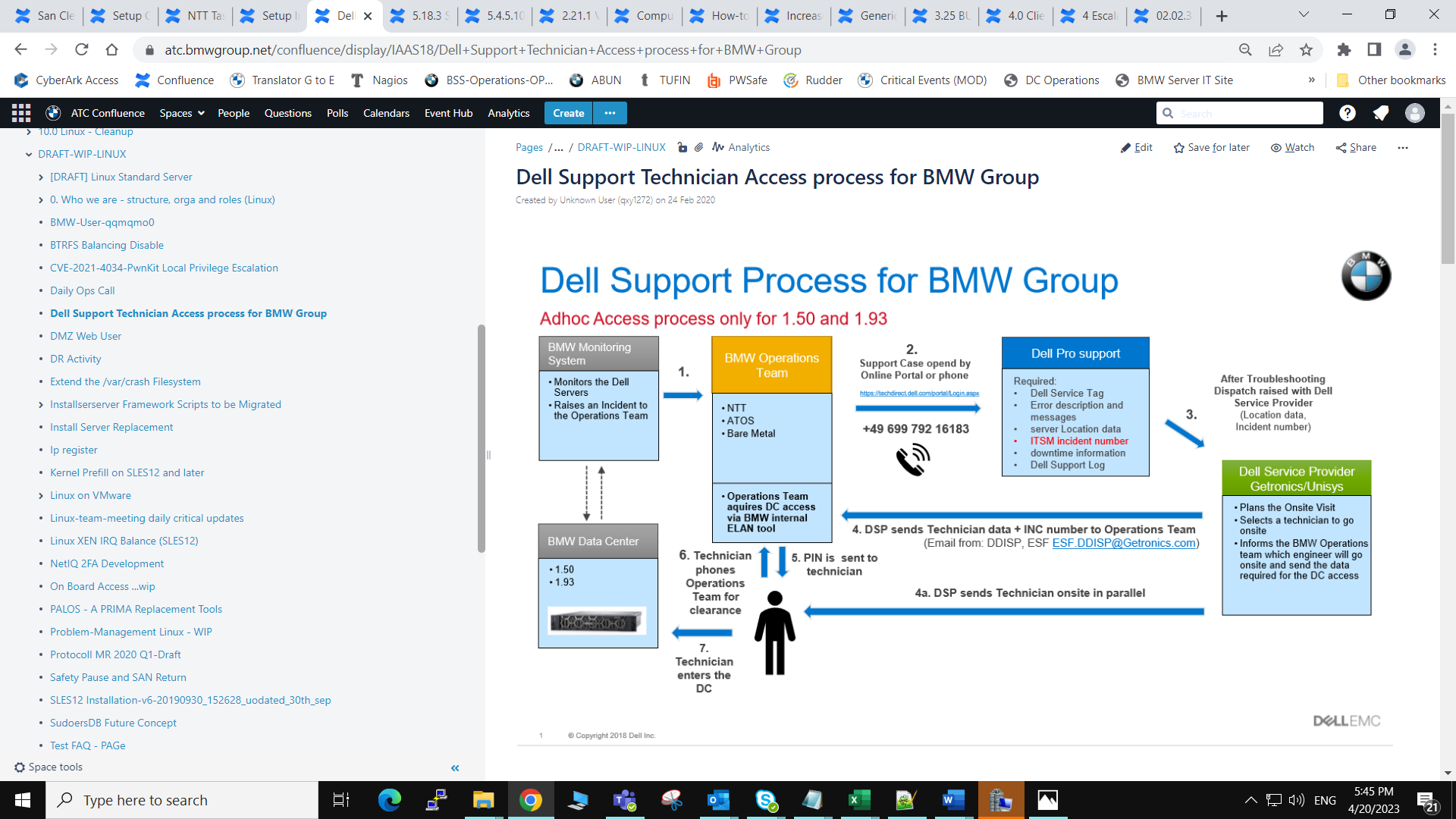
drwxr-xr-x 1 root root 3980 Jan 15 01:19 ..

lrwxrwxrwx 1 root root   41 May  4  2019 btrfs-trim -> /usr/share/btrfsmaintenance/btrfs-trim.sh

2- Please disable the BTRFS maintenance service

SERVERX:~ # systemctl mask btrfsmaintenance-refresh.service

Created symlink from /etc/systemd/system/btrfsmaintenance-refresh.service to /dev/null.



# [**DR Activity**](https://atc.bmwgroup.net/confluence/display/IAAS18/DR+Activity)

* Created by Unknown User (qxy1272), last modified on [28 May 2020](https://atc.bmwgroup.net/confluence/pages/diffpagesbyversion.action?pageId=781344362&selectedPageVersions=3&selectedPageVersions=4)

1)Make sure the latest backup is available  
If backup is not running address the issue (if required open a incident to backup team)

2)Make sure all checks on nagios are green and there are no running tasks or incident (scheduled at task implementation )

3)Take a backup of the directories and move the backup to install server .  
/boot  
/etc  
command backup  
df -hP  
route -n  
ifconfig  
ethtool eth(1,2,3,4,,,)  
pvdisplay  
vgdisplay  
lvdisplay

4)Check the console access and and login using root credentials (from pwsafe)  
  
5)Take fullcheck and sup check output or sles12 rudderswinst check .Set the down time in nagios

6)Get the approval to do a reinstall of the server  
Note: Change status of the server to installation

7)Do a reinstall of the server

8)Verify the ip configuration, file system mount, NAS fount, route, LVS status  
Do a Bond interface active-slave swtich test  
# cat /proc/net/bonding/bondx | egrep "Slave Interface"  
Slave Interface: ethx  
Slave Interface: ethy  
# cat /proc/net/bonding/bond0 | grep "Currently Active Slave"  
Currently Active Slave: eth(x/y)  
option on server re install to check bond status  
ifenslave -c bond0 eth(x/y) ; sleep 5 ; cat /proc/net/bonding/bondx | grep "Currently Active Slave"  
Currently Active Slave: eth(x/y)  
# ifenslave -c bond0 eth(y/x); sleep 5 ; cat /proc/net/bonding/bondx | grep "Currently Active Slave"

Currently Active Slave: eth(y/x)

9)Update nagios client if required.

10)Do sup check again and re install missing override or software.

11)check ethernet configuration using ethtool

12)take a clean reboot of the server and remove dcodb status of the server

13)fullcheck <servername> and validate and ensure no issues reported

14)Do a mount -a and check all mounts (local and NFS)

15)Check again NW configuration, Nagios alerts

16)Customer should open a high priority incident to backup team to restore the OS files (refer : INC000021223254)  
Note: Restore only in case we are re installing same os version .in case of different os restore at a particular place and compare manually .

17) once restore done - please do one more reboot  
validate and handover to app team for further validation

==========================================================================================

**DR for virtual machine**

Note: Make sure valid OS backup and application team should check they have valid backup available .  
1- Store VM information : vmc info , pvinfo , df , pvs , lvs and vgs, fstab ,

Take a backup of the directories and move the backup to install server .  
/boot  
/etc  
command backup   
df -hP   
route -n   
ifconfig  
ethtool eth(1,2,3,4,,,)   
pvdisplay  
vgdisplay  
lvdisplay

1- First remove the application disks.

2- Stop the virtual machine.

Note : Please change the status of the server to installation.  
if without changing status we use force option to delete the machine...application disks will be deleted automatically so please don't use force option.

3- Delete the virtual machine with vmc delete vmanme.

4- vmc restore vmname backupid ===> BAREMETAL RESTORE -- Fresh install and mount given backup and restore the virtual machine.

5- Attach the application disks ...vmc attdisk vmname .  
change the vm status in dcodb.

* Created by [Janos Mattyasovszky (FG-832)](https://atc.bmwgroup.net/confluence/display/~q276704), last modified by [Andras Miko (FG-832)](https://atc.bmwgroup.net/confluence/display/~q545913) on [24 Mar 2023](https://atc.bmwgroup.net/confluence/pages/diffpagesbyversion.action?pageId=979915821&selectedPageVersions=9&selectedPageVersions=10)
* [Introduction](https://atc.bmwgroup.net/confluence/display/IAAS18/Kernel+Prefill+on+SLES12+and+later#KernelPrefillonSLES12andlater-Introduction)
  + [Technical backend](https://atc.bmwgroup.net/confluence/display/IAAS18/Kernel+Prefill+on+SLES12+and+later#KernelPrefillonSLES12andlater-Technicalbackend)
  + [Involved components:](https://atc.bmwgroup.net/confluence/display/IAAS18/Kernel+Prefill+on+SLES12+and+later#KernelPrefillonSLES12andlater-Involvedcomponents:)
* [Operational information](https://atc.bmwgroup.net/confluence/display/IAAS18/Kernel+Prefill+on+SLES12+and+later#KernelPrefillonSLES12andlater-Operationalinformation)
* [Under the hood](https://atc.bmwgroup.net/confluence/display/IAAS18/Kernel+Prefill+on+SLES12+and+later#KernelPrefillonSLES12andlater-Underthehood)
* [Managing Pulp-Repos](https://atc.bmwgroup.net/confluence/display/IAAS18/Kernel+Prefill+on+SLES12+and+later#KernelPrefillonSLES12andlater-ManagingPulp-Repos)
* [Rudder Rule details](https://atc.bmwgroup.net/confluence/display/IAAS18/Kernel+Prefill+on+SLES12+and+later#KernelPrefillonSLES12andlater-RudderRuledetails)
  + [Group](https://atc.bmwgroup.net/confluence/display/IAAS18/Kernel+Prefill+on+SLES12+and+later#KernelPrefillonSLES12andlater-Group)
    - [OS-Latest-Kernel-ENABLED](https://atc.bmwgroup.net/confluence/display/IAAS18/Kernel+Prefill+on+SLES12+and+later#KernelPrefillonSLES12andlater-OS-Latest-Kernel-ENABLED)
    - [OS-Latest-Kernel-DISABLED](https://atc.bmwgroup.net/confluence/display/IAAS18/Kernel+Prefill+on+SLES12+and+later#KernelPrefillonSLES12andlater-OS-Latest-Kernel-DISABLED)
  + [Rule](https://atc.bmwgroup.net/confluence/display/IAAS18/Kernel+Prefill+on+SLES12+and+later#KernelPrefillonSLES12andlater-Rule)
    - [CFG-OSBasis-Latest-Kernel](https://atc.bmwgroup.net/confluence/display/IAAS18/Kernel+Prefill+on+SLES12+and+later#KernelPrefillonSLES12andlater-CFG-OSBasis-Latest-Kernel)
  + [NCF](https://atc.bmwgroup.net/confluence/display/IAAS18/Kernel+Prefill+on+SLES12+and+later#KernelPrefillonSLES12andlater-NCF)
    - [File OSBasis zypper multikernel](https://atc.bmwgroup.net/confluence/display/IAAS18/Kernel+Prefill+on+SLES12+and+later#KernelPrefillonSLES12andlater-FileOSBasiszyppermultikernel)
      * [Operation](https://atc.bmwgroup.net/confluence/display/IAAS18/Kernel+Prefill+on+SLES12+and+later#KernelPrefillonSLES12andlater-Operation)
      * [Components](https://atc.bmwgroup.net/confluence/display/IAAS18/Kernel+Prefill+on+SLES12+and+later#KernelPrefillonSLES12andlater-Components)
  + [Directives](https://atc.bmwgroup.net/confluence/display/IAAS18/Kernel+Prefill+on+SLES12+and+later#KernelPrefillonSLES12andlater-Directives)
    - [Directive Package Latest Kernel](https://atc.bmwgroup.net/confluence/display/IAAS18/Kernel+Prefill+on+SLES12+and+later#KernelPrefillonSLES12andlater-DirectivePackageLatestKernel)
    - [Directive File OSBasis zypper multikernel](https://atc.bmwgroup.net/confluence/display/IAAS18/Kernel+Prefill+on+SLES12+and+later#KernelPrefillonSLES12andlater-DirectiveFileOSBasiszyppermultikernel)
    - [Directive var\_OS\_SHORTNAME for \*](https://atc.bmwgroup.net/confluence/display/IAAS18/Kernel+Prefill+on+SLES12+and+later#KernelPrefillonSLES12andlater-Directivevar_OS_SHORTNAMEfor*)
    - [Directive Repo BMW-kernel-latest](https://atc.bmwgroup.net/confluence/display/IAAS18/Kernel+Prefill+on+SLES12+and+later#KernelPrefillonSLES12andlater-DirectiveRepoBMW-kernel-latest)
* [Tests / Examples](https://atc.bmwgroup.net/confluence/display/IAAS18/Kernel+Prefill+on+SLES12+and+later#KernelPrefillonSLES12andlater-Tests/Examples)

# **Introduction**

On SLES11 a kernel-prefill exists, which enables having multiple Kernel versions installed, so prior a reboot (or a crash) the latest kernel can be installed, so after reboot/crash it becomes automaticall active.

This is the documentation on the same topic, but for SLES12 and later, in combination with Rudder.

In a regular Master Release update, new packages are only installed on a system shortly before rebooting it, not to conflict with any applications running (due to libraries being updated, old ones removed). This is to keep stability of the running user-land.

Compared to that, Kernel-Prefill means, that multiple kernel version are installed, including one that is newer than the currently running one, and set so any planned or unplanned reboot of the systems results in booting the latest available kernel version.

This can be done because there are no hard dependencies of the version of kernel installed as long the runtime of the currently running is not removed while it is running.

## **Technical backend**

As of Version 12, SLES / zypper supports having multiple kernel versions installed in parallel, and automatically cleans up according to a given configuration in zypp.conf, see for details this page:   
<https://en.opensuse.org/SDB:Keep_multiple_kernel_versions#Changing_the_default_behaviour_with_the_multiversion_kernel_feature>

The current solution is maintaining the following kernels on the system it is applied to:

* latest
* latest-1
* running

After a reboot, running becomes latest, that means it will only have (running==latest) and (latest-1) installed. Details below.

## **Involved components:**

* Pulp Repositories for each OS Version (incl. Service Pack) that only holds the installable kernel version for that Service Pack.
* Rudder Rule that maintains this pulp repository and automatically ensures, that always the latest kernel is installed.
* SLES Built-In Configurations that enable the multi-versioning of the kernel-default package, and manages the removal of old packages.

# **Operational information**

The Rule is Active on:

* Module: **Xen-Farmservers**
* Servers having the Node Property "**kernel-latest=ENABLED**" set.
* Except: Servers having the Node Property "**kernel-latest=DISABLED**" set.

**Important**

Disabling the rule will not remove any already installed kernel, only prevent newly published kernels from being installed!

To manually enable or disable this on any SLES12 or later system, rudderctl can be used:

|  |
| --- |
| # rudderctl properties-set --hostname itavmw005 --key=kernel-latest --value=ENABLED --force  Info[1]: Setting property: kernel-latest => ENABLED    # rudderctl properties-set --hostname itavmw005 --key=kernel-latest --value=DISABLED --force  Info[1]: Setting property: kernel-latest => DISABLED    # rudderctl properties-del --hostname itavmw005 --key=kernel-latest --force  Info[1]: Deleting following properties: kernel-latest |

Please note the difference between deleting the node property and setting it to DISABLED:

* Node property **not present**: Server **might inherit** this behavior by any other group membership it might have defined on a higher level (maybe Module or BU)
* Node property **set to DISABLED**: Server is **forced not** to receive this setting.
* Node property **set to ENABLED**: Server is **forced to** receive this setting.

This Rule causes the following Pulp Repository "active-P-latest-kernel-BMW-SLES{12/15}-SP{1-5}" Named "kernel-latest" to be enabled and auto-refreshed on the Server:

|  |
| --- |
| # zypper lr kernel-latest  Alias : kernel-latest  Name : kernel-latest  URI : https://cm-repo-qa.bmwgroup.net/active-P-latest-kernel-BMW-SLES12-SP5  Enabled : Yes  GPG Check : (r ) Yes  Priority : 99 (default priority)  Autorefresh : On  Keep Packages : Off  Type : rpm-md  GPG Key URI :  Path Prefix :  Parent Service :  Keywords : ---  Repo Info Path : /etc/zypp/repos.d/rudder-kernel-latest.repo  MD Cache Path : /var/cache/zypp/raw/kernel-latest |

# **Under the hood**

Zypper supports natively having multiple kernel version installed. This is maintained by a configuration in zypp.conf:

|  |
| --- |
| itavmw005:~ # grep ^mult /etc/zypp/zypp.conf  multiversion = provides:multiversion(kernel)  multiversion.kernels = latest,latest-1,running  itavmw005:~ # |

The kernel-default rpm contains a logic to touch a file after installation at: **/boot/do\_purge\_kernels**

There is a systemd unit that runs at startup, that is in charge to deleting the kernels up to the given logic detailed above, and runs at the boot process:

The details of what has been deleted can be seen in the unit's logfiles (or status output):

|  |
| --- |
| itavmw005:~ # systemctl status purge-kernels  ● purge-kernels.service - Purge old kernels     Loaded: loaded (/usr/lib/systemd/system/purge-kernels.service; enabled; vendor preset: enabled)     Active: inactive (dead) since Fri 2020-09-25 14:48:26 CEST; 3min 21s ago    Process: 736 ExecStart=/sbin/purge-kernels (code=exited, status=0/SUCCESS)    Process: 657 ExecStartPre=/bin/rm -f /boot/do\_purge\_kernels (code=exited, status=0/SUCCESS)   Main PID: 736 (code=exited, status=0/SUCCESS)    Sep 25 14:48:24 itavmw005 systemd[1]: Starting Purge old kernels...  Sep 25 14:48:26 itavmw005 purge-kernels[736]: Removed:  Sep 25 14:48:26 itavmw005 purge-kernels[736]:     kernel-default-4.12.14-95.48.1.x86\_64              <<<<<<< This was removed due to the logic defined **in** zypp.conf  Sep 25 14:48:26 itavmw005 systemd[1]: Started Purge old kernels.  itavmw005:~ # |

# **Managing Pulp-Repos**

Following Pulp Repositories exist and must be kept up-to-date with kernels, required to roll out between Master-Releases, due to critical bugs:

|  |
| --- |
| [CENTOS7] root@lppulp01:~ # pulp-admin rpm repo list | grep active-P-latest-kernel | grep Id: | sort  Id:                  active-P-latest-kernel-BMW-SLES12-SP2  Id:                  active-P-latest-kernel-BMW-SLES12-SP3  Id:                  active-P-latest-kernel-BMW-SLES12-SP4  Id:                  active-P-latest-kernel-BMW-SLES12-SP5  Id:                  active-P-latest-kernel-BMW-SLES15-SP1  Id:                  active-P-latest-kernel-BMW-SLES15-SP2 |

They can be sync'd with this command from a new Master Release repo:

|  |
| --- |
| # export PULP\_SOURCE\_REPO PULP\_TARGET\_REPO  # pulp-admin rpm repo  copy rpm --from-repo=${PULP\_SOURCE\_REPO} --to-repo=${PULP\_TARGET\_REPO} --match="name=^kernel-default$" |

# **Rudder Rule details**

## **Group**

### OS-Latest-Kernel-ENABLED

* Category: 50\_Rollout
* Nodes with property: **kernel-latest=ENABLED**

### OS-Latest-Kernel-DISABLED

* Category: 50\_Rollout
* Node with property: **kernel-latest=DISABLED**

## **Rule**

### CFG-OSBasis-Latest-Kernel

* Category: OS
* Directives:
  + Repo BMW-kernel-latest
  + File OSBasis zypper multikernel
  + Package Latest Kernel
* Groups:
  + Include: OS-Latest-Kernel-ENABLED
  + Exclude: OS-Latest-Kernel-DISABLED

## **NCF**

### File OSBasis zypper multikernel

#### Operation

The directive configures the "multikernel" settings on sles12 and newer systems. We keep the actual kernel (described as "latest" and "running" - we need both of them) and the latest-1 kernel (the previous one) on the systems.  On SLES15 SUSE introduced a dedicated systemd service: "purge-kernels", which needs to be enabled to purge the older kernels. This service will be started during the boot, it checks for to old kernels and removes them from the system.

#### Components

* File lines present:
  + File: /etc/zypp/zypp.conf
  + Lines:

|  |
| --- |
| multiversion = provides:multiversion(kernel)  multiversion.kernels = latest,latest-1,running |

* Service enabled at boot
  + **condition: sles\_15**
  + **Service name:**purge-kernels

## **Directives**

### Directive Package Latest Kernel

* Package #1
  + **Package name:** kernel-default
  + **Package state:** Present
  + **Package version:** Latest available version
* Package #2
  + **Package name:** drbd-kmp-default
  + **Package state:** Upgrade only if already installed
  + **Package version:** Latest available version

### Directive File OSBasis zypper multikernel

* Based on NCF Method with the same name

### Directive var\_OS\_SHORTNAME for \*

* Added "var\_OS\_REPONAME" with "SLESXX-SPY" to each Directive

### Directive Repo BMW-kernel-latest

* Name: kernel-latest
* URL: https://${generic\_variable\_definition.var\_REPO\_FQDN}/active-P-latest-kernel-BMW-SLES${releasever\_major}-SP${releasever\_minor}

# **Tests / Examples**

After uploading a new RPM to the Repository and sync done, rudder automatically installs the new RPM:  
   
Before testing:

[2:45 PM] Pickl Johann, FG-840

itavmw005:~ # rpm -q kernel-default

kernel-default-4.12.14-95.48.1.x86\_64

kernel-default-4.12.14-95.51.1.x86\_64

   
Agent ran:

[2:45 PM] Pickl Johann, FG-840

itavmw005:~ # rudder agent run -fuq

Rudder agent 4.1.10.release (CFEngine Core 3.10.3)

Node uuid: 31185c84-208d-4e98-a6c9-c8da3b4e42a3

ok: Rudder agent promises were updated.

Start execution with config [20200925-133342-185fb557]

M| State         Technique                 Component                 Key                Message

E| repaired      packageManagement         Package                   kernel-default     Presence of package kernel-default in latest available version was repaired

E| error         File\_OSBasis\_backupconf   Command execution result  /usr/local/sbin/b| Execute the command /usr/local/sbin/backupconf mincheck could not be repaired

E| error         File\_OSBasis\_backupconf   Command execution result  /usr/local/sbin/b| Execute the command /usr/local/sbin/backupconf configure could not be repaired

## Summary #####################################################################

   => 367 components in Enforce mode

      -> 251 compliant

      -> 1 repaired

      -> 113 not-applicable

      -> 2 error

execution time: 39.03s

################################################################################

After agent ran:

[2:45 PM] Pickl Johann, FG-840  
itavmw005:~ # rpm -q kernel-default

kernel-default-4.12.14-95.48.1.x86\_64

kernel-default-4.12.14-95.51.1.x86\_64

kernel-default-4.12.14-95.57.1.x86\_64

   
After Reboot:

itavmw005:~ # rpm -q kernel-default

kernel-default-4.12.14-95.51.1.x86\_64

kernel-default-4.12.14-95.57.1.x86\_64

itavmw005:~ #

itavmw005:~ # systemctl status purge-kernels

● purge-kernels.service - Purge old kernels

   Loaded: loaded (/usr/lib/systemd/system/purge-kernels.service; enabled; vendor preset: enabled)

   Active: inactive (dead) since Fri 2020-09-25 14:48:26 CEST; 3min 21s ago

  Process: 736 ExecStart=/sbin/purge-kernels (code=exited, status=0/SUCCESS)

  Process: 657 ExecStartPre=/bin/rm -f /boot/do\_purge\_kernels (code=exited, status=0/SUCCESS)

 Main PID: 736 (code=exited, status=0/SUCCESS)

Sep 25 14:48:24 itavmw005 systemd[1]: Starting Purge old kernels...

Sep 25 14:48:26 itavmw005 purge-kernels[736]: Removed:

Sep 25 14:48:26 itavmw005 purge-kernels[736]:     kernel-default-4.12.14-95.48.1.x86\_64

Sep 25 14:48:26 itavmw005 systemd[1]: Started Purge old kernels.

itavmw005:~ #

