SAP HANA Backup Guide
(for A2040c RHEL)

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NEC SAP Global Competence Center
1. Introduction

1.1. Purpose
This manual describes how to create an initial backup after finishing the installation of SAP HANA.

1.2. Scope
- SAP HANA single model appliance
- OS is RHEL 6

1.3. Reference documents
- SAP HANA Technical Operations Manual (TOM)
- SAP HANA Database Administration Guide

The above documents are available from the following site, be sure to check http://help.sap.com/hana_appliance

2. Planning

2.1. SAP HANA data allocation
This chapter describes the disk and filesystem layout. You can check this by typing

lsblk

If there was an additional (USB) drive mounted during system boot, then the devices attached to external storage may have an increased letter (e.g. /dev/sdb becomes /dev/sdc, and so on).
## 2.2. Appliances with 3 internal HDDs (up to 1TB)

All data except those on devices sda3, lv_kdump and lv_backup in the following table will be included with the backup.

<table>
<thead>
<tr>
<th>RAID</th>
<th>Internal disks</th>
<th>Hardware configuration</th>
<th>RAID size</th>
<th>Device path(s)</th>
<th>Partition name</th>
<th>File system</th>
<th>Size</th>
<th>Usage</th>
<th>Mount point</th>
</tr>
</thead>
<tbody>
<tr>
<td>HW1 with HotSpare</td>
<td>275GB</td>
<td>/dev/sda</td>
<td></td>
<td>/dev/sda1</td>
<td>vfat</td>
<td>1GB</td>
<td>uEFI</td>
<td>/boot/efi</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>/dev/sda2</td>
<td></td>
<td>ext4</td>
<td>1GB</td>
<td>Boot</td>
<td>/boot</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>/dev/sda3</td>
<td></td>
<td>swap</td>
<td>10GB</td>
<td>SWAP</td>
<td>(swap)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>/dev/sda4</td>
<td></td>
<td>ext3</td>
<td>263GB</td>
<td>OS/AP</td>
<td>/</td>
<td></td>
<td></td>
</tr>
<tr>
<td>External disks</td>
<td>87GB</td>
<td>/dev/md1</td>
<td></td>
<td>xfs</td>
<td>1,1TB</td>
<td>Log</td>
<td>/hana/log</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HW1 with SW0</td>
<td>260GB</td>
<td>/dev/md0</td>
<td></td>
<td>xfs</td>
<td>3,1TB</td>
<td>Data</td>
<td>/hana/data</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>/dev/md1</td>
<td></td>
<td>xfs</td>
<td>1TB</td>
<td>Shared</td>
<td>/hana/shared</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>/dev/md0</td>
<td></td>
<td>xfs</td>
<td>50GB</td>
<td>Backup</td>
<td>/backup</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>/dev/mapper/ vg_shared-lv_shared</td>
<td>xfs</td>
<td>1TB</td>
<td>Kdump</td>
<td>/var/crash</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Attention: The device names md0 and md1 are the names in the rescue environment only, in the production system the device names are md_data and md_log.
2.3. **Appliances with 8 internal HDDs (up to 2TB)**

All data except those on devices sda3, sda4 and sda6 in the following table will be included in the backup.

<table>
<thead>
<tr>
<th>Internal disks</th>
<th>RAID</th>
<th>Size</th>
<th>Device</th>
<th>Partition name</th>
<th>File system</th>
<th>Size</th>
<th>Usage</th>
<th>Mount point</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal disks</td>
<td>HW5 with</td>
<td>1800GB</td>
<td>/dev/sda</td>
<td>/dev/sda1</td>
<td>vfat</td>
<td>1GB</td>
<td>uEFI</td>
<td>/boot/efi</td>
</tr>
<tr>
<td></td>
<td>HotSpare</td>
<td></td>
<td></td>
<td>/dev/sda2</td>
<td>ext4</td>
<td>1GB</td>
<td>Boot</td>
<td>/boot</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>/dev/sda3</td>
<td>xfs</td>
<td>1,1TB</td>
<td>Kdump</td>
<td>/var/crash</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>/dev/sda4</td>
<td>ext3</td>
<td>50GB</td>
<td>Backup</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>/dev/sda5</td>
<td>swap</td>
<td>10GB</td>
<td>SWAP</td>
<td>(swap)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>/dev/sda6</td>
<td>ext3</td>
<td>702GB</td>
<td>OS/AP</td>
<td>/</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2,1TB</td>
<td>/dev/sdb</td>
<td>/dev/sdb1</td>
<td>xfs</td>
<td>2,1TB</td>
<td>Shared</td>
<td>/hana/shared</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1,2TB</td>
<td>/dev/sdc</td>
<td>/dev/sdc1</td>
<td>xfs</td>
<td>1,2TB</td>
<td>Log</td>
<td>/hana/log</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>/dev/md0</td>
<td>xfs</td>
<td>6,5TB</td>
<td>Data</td>
<td>/hana/data</td>
</tr>
<tr>
<td>External disks</td>
<td>HW1 with</td>
<td>6,6TB</td>
<td>/dev/sdd</td>
<td>/dev/md0</td>
<td>xfs</td>
<td>6,5TB</td>
<td>Data</td>
<td>/hana/data</td>
</tr>
<tr>
<td></td>
<td>SW0</td>
<td></td>
<td>to</td>
<td>/dev/sdo</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Attention: The device name /dev/md0 is the name in the rescue environment only, in the production system the device name is /dev/md_data.

2.4. **Backup procedure overview**

The backup procedure exists of the following 4 phases:

- Boot up to the rescue mode.
- Read-only mount each volume.
- Backup each volume with the tar command.
- Reboot server and start SAP HANA.

3. **Backup procedure**

In this chapter a procedure to obtain an initial backup of the environment is shown. This procedure should be run after the initial installation of SAP HANA has completed.

3.1. **Boot to rescue mode**

Insert the RHEL Installation Media and boot from DVD.

As soon as the system starts from the DVD the boot menu is displayed:

```
Press any key to enter the menu

Booting Red Hat Enterprise Linux 6.5 in 3 seconds...```

Please press any key to enter the boot menu.

Select “rescue” in the menu and then press “ENTER”:

Use the ↑ and ↓ keys to select which entry is highlighted.
Press enter to boot the selected OS, ‘c’ to edit the commands before booting, ‘a’ to modify the kernel arguments before booting, or ‘e’ for a command-line.

When the rescue mode loads it will ask you several questions. Please use the following settings:

- Change a Language : English
- Keyboard Type : us
- Rescue Method : Local CD/DVD
- Setup Networking : No
- Rescue : Read-Only
- Start shell : Ok

Attention: An error message will be displayed after mounting filesystems in read-only mode under /mnt/sysimage, please ignore this and continue to the shell. Then execute the following command

df

and verify all mount points to be included in the backup as shown in chapter 1 are available underneath /mnt/sysimage.
3.2. Backup

In this chapter you will create a backup of every partition. All commands are valid for all appliance models, if not otherwise mentioned.

① Mount backup partition in writeable mode

**For appliance up to 1TB with 3 internal HDDs:**

```
 lvmd vgschange -a y
 mount /dev/mapper/vg-shared-lv_backup /mnt/sysimagebackup
```

**For appliance up to 2TB with 8 internal HDDs:**

```
 mount /dev/sda4 /mnt/sysimagebackup
```

② Run the following command in the directory `/mnt/sysimage/boot/efi` to get a backup of the uEFI boot partition:

```
 cd /mnt/sysimage/boot/efi
 tar zc -sp . > /mnt/sysimagebackup/hana-bootefi.tar.gz
```

③ Run the following command in the directory `/mnt/sysimage/boot` to get a backup of the boot partition:

```
 cd /mnt/sysimage/boot
 tar zc -sp --one-file-system . > /mnt/sysimagebackup/hana-boot.tar.gz
```

④ Run the following command in the directory `/mnt/sysimage` to get a backup of the OS partition:

```
 cd /mnt/sysimage
 tar zc -sp --one-file-system . > /mnt/sysimagebackup/hana-root.tar.gz
```

⑤ Run the following command in the directory `/mnt/sysimage/hana/data` to get a backup of the HANA data partition:

```
 cd /mnt/sysimage/hana/data
 tar zc -sp . > /mnt/sysimagebackup/hana-data.tar.gz
```

⑥ Run the following command in the directory `/mnt/sysimage/hana/shared` to get a backup of the HANA shared partition:

```
 cd /mnt/sysimage/hana/shared
 tar zc -sp . > /mnt/sysimagebackup/hana-shared.tar.gz
```

⑦ Run the following command in the directory `/mnt/sysimage/hana/log` to get a backup of the HANA log partition:

```
 cd /mnt/sysimage/hana/log
 tar zc -sp . > /mnt/sysimagebackup/hana-log.tar.gz
```
⑧ Verify that 6 backup files exist in the backup partition:
   
   ```bash
   cd /mnt/sysimage/backup
   ls -lh
   ```

   ![Backup files in the backup partition](image)

   ⑨ Run the following command in the directory `/tmp/datamount` to get a backup of the HANA data partition:
   
   ```bash
   cd /tmp/datamount
   tar zc -p . > /tmp/backup/hana-data.tgz
   ```

   ⑩ Run the following command in the directory `/tmp/shared` to get a backup of the HANA shared partition:
   
   ```bash
   cd /tmp/shared
   tar zc -p . > /tmp/backup/hana-shared.tgz
   ```

   ⑪ Run the following command in the directory `/tmp/logmount` to get a backup of the HANA log partition:
   
   ```bash
   cd /tmp/logmount
   tar zc -p . > /tmp/backup/hana-log.tgz
   ```

   ⑫ Verify that 6 backup files exist in the backup partition:
   
   ```bash
   cd /tmp/backup
   ls -lh
   ```

   ![Backup files in the backup partition](image)
3.3. Reboot and HANA startup

After the backup finished restart your NEC HANA appliance and start HANA

① Reboot your server by typing

```
shutdown -r now
```

② Remove the DVD media before the system boot starts.

③ Login to the OS, open a terminal and change to /usr/sap/hostctrl/exe/:

```
cd /usr/sap/hostctrl/exe
```

④ Start your HANA instance and verify the command output is “OK”:

```
./sapcontrol -nr <instance no> -function Start
```

⑤ Run this command and check its output says “OK” and all listed processes have the status “Green”. If some are still “Initializing”, wait a while and issue the same command again:

```
./sapcontrol -nr <instance no> -function GetProcessList
```