



## Managing CPS Disks

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- [Adding a New Disk, on page 1](#)
- [Mounting the Replication Set from Disk to tmpfs After Deployment, on page 3](#)
- [Manage Disks to Accommodate Increased Subscriber Load, on page 5](#)

### Adding a New Disk

This section describes the procedures needed to add a new disk to a VM.

#### Prerequisites

- All the VMs were created using the deployment process.
- This procedure assumes the datastore that will be used to have the virtual disk has sufficient space to add the virtual disk.
- This procedure assumes the datastore has been mounted to the VMware ESX server, regardless of the backend NAS device (SAN or iSCSI, etc).

### ESX Server Configuration

#### Procedure

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**Step 1** Login to the ESX server shell, and make sure the datastore has enough space:

```
vmkfstools -c 4g /vmfs/volumes/datastore_name/VMNAME/xxxx.vmdk -d thin
```

**Step 2** Execute `vim-cmd vmsvc/getallvms` to get the vmid of the VM where the disk needs to be added.

Vmid	Name	File	Guest OS	Version	Annotation
173	vminstaller	[datastore5] vminstaller/vminstaller.vmx	centos64Guest	vmx-08	

**Step 3** Assign the disk to the VM.

The `xxxx` is the disk name, and 0 and 1 indicate the SCSI device number.

In this example, this is the second disk:

```
vim-cmd vmsvc/device.diskaddexisting vmid /vmfs/volumes/path to xxxx.vmdk 0 1
```

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## Target VM Configuration

### Procedure

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**Step 1** Log in as root user on your Linux virtual machine.

**Step 2** Open a terminal session.

**Step 3** Execute the `df` command to examine the current disks that are mounted and accessible.

**Step 4** Create an ext4 file system on the new disk:

```
mkfs -t ext4 /dev/sdb
```

#### Note

`b` in `/dev/sdb` is the second SCSI disk. It warns that you are performing this operation on an entire device, not a partition. That is correct, since you created a single virtual disk of the intended size. This is assuming you have specified the correct device. Make sure you have selected the right device; there is no undo.

**Step 5** Execute the following command to verify the existence of the disk you created:

```
# fdisk -l
```

**Step 6** Execute the following command to create a mount point for the new disk:

```
# mkdir /<NewDirectoryName>
```

**Step 7** Execute the following command to display the current `/etc/fstab`:

```
# cat /etc/fstab
```

**Step 8** Execute the following command to add the disk to `/etc/fstab` so that it is available across reboots:

```
/dev/sdb /<NewDirectoryName> ext4 defaults 1 3
```

**Step 9** Reboot the VM.

```
shutdown -r now
```

**Step 10** Execute the `df` command to check the file system is mounted and the new directory is available.

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## Update the `collectd` process to use the new file system to store KPIs

After the disk is added successfully, `collectd` can use the new disk to store the KPIs.

## Procedure

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**Step 1** SSH into pcrfclient01/pcrfclient02.

**Step 2** Execute the following command to open the logback.xml file for editing:

```
vi /etc/collectd.d/logback.xml
```

**Step 3** Update the file element `<file>` with the new directory that was added in the `/etc/fstab`.

**Step 4** Execute the following command to restart `collectd`:

```
monit restart collectd
```

### Note

The content of `logback.xml` will be overwritten to the default path after a new upgrade. Make sure to update it after an upgrade.

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# Mounting the Replication Set from Disk to tmpfs After Deployment

You can mount all of the members of the Replication set to tmpfs, or you can mount specific members to tmpfs. These scenarios are described in the following sections.

## Scenario 1 – Mounting All Members of the Replication Set to tmpfs

### Procedure

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**Step 1** Modify `mongoConfig.cfg` file using the `vi` editor on cluster manager. Change the `DBPATH` directory for the SPR Replication set that needs to be put on tmpfs.

### Note

Make sure you change the path to `/var/data/sessions.1`, which is the tmpfs filesystem. Also, make sure to run `diagnostics.sh` before and after the activity.

The following example shows the contents of `mongoConfig.cfg` file before modification:

```
[SPR-SET1]
SETNAME=set06
OPLOG_SIZE=5120
ARBITER1=pcrfclient01a:27720
ARBITER_DATA_PATH=/var/data/sessions.6
MEMBER1=sessionmgr04a:27720
MEMBER2=sessionmgr03a:27720
MEMBER3=sessionmgr04b:27720
MEMBER4=sessionmgr03b:27720
```

## Scenario 2 – Mounting Specific Members of the Replication Set to tmpfs

```
DATA_PATH=/var/data/sessions.4
[SPR-SET1-END]
```

The following example shows the contents of `mongoConfig.cfg` file after modification:

```
[SPR-SET1]
SETNAME=set06
OPLOG_SIZE=5120
ARBITER1=pcrfclient01a:27720
ARBITER_DATA_PATH=/var/data/sessions.6
MEMBER1=sessionmgr04a:27720
MEMBER2=sessionmgr03a:27720
MEMBER3=sessionmgr04b:27720
MEMBER4=sessionmgr03b:27720
DATA_PATH=/var/data/sessions.1/set06
[SPR-SET1-END]
```

- Step 2** Run `build_etc.sh` to update the modified files.
- Step 3** Verify that the `sessionmgr-27720` files on `sessionmgr` VMs are updated with new `DB_PATH` by using `vi` or `cat` command.
- Step 4** Stop and start the mongo databases one by one using the following commands:
- ```
systemctl stop sessionmgr-<port>
systemctl start sessionmgr-<port>
```
- Step 5** Run `diagnostics.sh`.
- Step 6** If this is an Active/Active GEOHA setup, scp the `mongoConfig.cfg` file to Site-B Cluster Manager, and run `build_etc.sh` to update puppet files.

## Scenario 2 – Mounting Specific Members of the Replication Set to tmpfs

### Procedure

- Step 1** Ssh to the respective session manager.
- Step 2** Edit the mongoDB startup file using the `vi` editor. In this example we are modifying the SPR member.
- ```
[root@sessionmgr01 init.d]# vi /etc/init.d/sessionmgr-27720
```
- Step 3** Change the `DBPATH` directory from `DBPATH=/var/data/sessions.4` to `DBPATH=/var/data/sessions.1/set06`.
- Step 4** Save and exit the file (using `!wq`).
- Step 5** Enter the following commands to stop and start the SPR DB member:
- ```
/usr/bin/systemctl stop sessionmgr-27720
/usr/bin/systemctl start sessionmgr-27720
```
- Step 6** Wait for the recovery to finish.

# Manage Disks to Accommodate Increased Subscriber Load

If you need to prepare CPS for an increased number of subscribers (> 10 million), you can clone and repartition the sessionmgr disks as per your requirement.

## Clone Sessionmgr01 VM

Downtime: No downtime

### Before you begin

- Before disk repartition, clone sessionmgr01. This step is optional but to reduce the risk of losing the data during disk repartitioning, the customer can take the backup of sessionmgr01 VM. If the customer does not have enough space to take the backup this step can be ignored.
- Blade with enough space to hold cloned image of sessionmgr01.

### Procedure

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- Step 1** Login to vSphere Client on sessionmgr01 blade with administrator credentials.
- Step 2** Right-click sessionmgr01 and select **Clone** > Choose appropriate inventory in which blade resides > Choose the blade with enough space to hold sessionmgr01 image > **Next** > **Next** > **Finish**.
- Step 3** Cloning starts. Wait for it to finish the process.
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## Disk Repartitioning of Sessionmgr01 VM

Downtime: During this procedure Sessionmgr01 is shut down 2 times. Estimate approximately 30 minutes of downtime for sessionmgr01.

CPS continues to operate using the other sessionmgr02 while sessionmgr01 is stopped as part of procedure.

### Before you begin

None

### Procedure

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- Step 1** Login to sessionmgr01 as a root user.
- Step 2** The following commands may be executed to help identify which partition requires additional space.

```
synph# df -h/synph
synphFilesystem      Size  Used Avail Use% Mounted on/synph
synph/dev/mapper/vg_shiprock-lv_root 7.9G  1.5G  6.0G  20% //synph
synphtmpfs            1.9G   0    1.9G   0% /dev/shm/synph
```

```

synph/dev/sda1                485M   32M   428M   7% /boot/synph
synph/dev/mapper/vg_shiprock-lv_home 2.0G   68M   1.9G   4% /home/synph
synph/dev/mapper/vg_shiprock-lv_var   85G   16G   65G   20% /var/synph
synphtmpfs                    2.3G   2.1G   172M   93% /var/data/sessions.1/synph
synph/synph
synph# pvdisplay/synph
synph --- Physical volume ---/synph
synph PV Name                  /dev/sda2/synph
synph VG Name                  vg_shiprock/synph
synph PV Size                  99.51 GiB / not usable 3.00 MiB/synph
synph Allocatable             yes (but full)/synph
synph PE Size                  4.00 MiB/synph
synph Total PE                 25474/synph
synph Free PE                  0/synph
synph Allocated PE            25474/synph
synph PV UUID                  13Mjox-tLfK-jj4X-98dJ-K3c1-EOel-S1OBq1/synph
synph/synph
synph# vgdisplay/synph
synph-- Volume group ---/synph
synph VG Name                  vg_shiprock/synph
synph System ID                /synph
synph Format                    lvm2/synph
synph Metadata Areas           1/synph
synph Metadata Sequence No     5/synph
synph VG Access                 read/write/synph
synph VG Status                 resizable/synph
synph MAX LV                    0/synph
synph Cur LV                     4/synph
synph Open LV                    4/synph
synph Max PV                     0/synph
synph Cur PV                     1/synph
synph Act PV                     1/synph
synph VG Size                   99.51 GiB/synph
synph PE Size                   4.00 MiB/synph
synph Total PE                 25474/synph
synph Alloc PE / Size           25474 / 99.51 GiB/synph
synph Free PE / Size            0 / 0 /synph
synph VG UUID                   P1ET44-jiEI-DIbd-baYt-fVom-bhUn-zgs5Fz/synph

```

- (df -h): /var is /dev/mapper/vg\_shiprock-lv\_var. This is equivalent to device /dev/vg\_shiprock/lv\_var.
- (pvdisplay): vg\_shiprock (used by lv\_var which is /var) is on /dev/sda2.

### Step 3 Execute the fdisk command to check the disk size.

```

# fdisk -l /dev/sda

Disk /dev/sda: 107.4 GB, 107374182400 bytes
255 heads, 63 sectors/track, 13054 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x0008dcae

   Device Boot      Start         End      Blocks   Id  System
/dev/sda1 *          1           64     512000   83  Linux
Partition 1 does not end on cylinder boundary.
/dev/sda2            64        13055    104344576   8e  Linux LVM

```

### Step 4 Power down the Virtual Machine.

```
# shutdown -h now
```

#### Note

If cloning is not possible because of space limitation on Blade, backup of sessionmgr01 VM can be taken by saving OVF of sessionmgr01 VM to local storage like Laptop, Desktop. (Both cloning and OVF backup are optional steps, but either one of them is highly recommended.)

- Step 5** Log in using the VMware vSphere Client as an administrator (e.g. root) to the ESXi host which has your Linux Virtual Machine on it.
- Step 6** Right-click on the Virtual Machine and select Edit Settings > Click Hard Disk 1 > Increase the Provisioned Size of the Hard Disk.
- Step 7** Power ON the Virtual Machine.
- Step 8** Login (ssh) to the Virtual Machine as root user.
- Step 9** Confirm that disk space has been added to the /dev/sda partition.

```
# fdisk -l /dev/sda

Disk /dev/sda: 70.5 GB, 79529246720 bytes
255 heads, 63 sectors/track, 9668 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes
```

- Step 10** Execute the following commands (Bold Characters indicates actual inputs from user (all of them are in lower case)).

```
# fdisk /dev/sda
The number of cylinders for this disk is set to 7832.
There is nothing wrong with that, but this is larger than 1024,
and could in certain setups cause problems with:
 1) software that runs at boot time (e.g., old versions of LILO)
 2) booting and partitioning software from other OSs
   (e.g., DOS FDISK, OS/2 FDISK)
Command (m for help): p
Disk /dev/sda: 64.4 GB, 64424509440 bytes
255 heads, 63 sectors/track, 7832 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes
   Device Boot      Start         End      Blocks   Id  System
/dev/sda1  *           1           13       104391    83  Linux
/dev/sda2                14          7179       57560895    8e  Linux LVM
Command (m for help): d
Partition number (1-4): 2
Command (m for help): n
Command action
   e   extended
   p   primary partition (1-4)
p
Partition number (1-4): 2
First cylinder (14-7832, default 14): [press enter]
Using default value 14
Last cylinder +sizeM/+sizeK (14-7832,default 7832): [press enter]
Using default value 7832
Command (m for help): t
Partition number (1-4): 2
Hex code (type L to list codes): 8e
Changed system type of partition 2 to 8e (Linux LVM)
Command (m for help): w
The partition table has been altered!
Calling ioctl() to re-read partition table.
WARNING: Re-reading the partition table failed with error 16: Device or resource busy.
The kernel still uses the old table.
The new table will be used at the next reboot.
Syncing disks.
```

- Step 11** Reboot the sessionmgr01 VM by executing the following command:

```
# reboot
```

This ensures that the new setting match up with the kernel.

**Step 12** After reboot, execute following command:

```
# pvresize /dev/sda2
Physical volume "/dev/sda2" changed
1 physical volume(s) resized / 0 physical volume(s) not resized
```

**Step 13** Confirm that the additional free space is added in sessionmgr VM.

```
# vgdisplay
--- Volume group ---
VG Name          vg_shiprock
System ID
Format           lvm2
Metadata Areas   1
Metadata Sequence No 5
VG Access        read/write
VG Status        resizable
MAX LV           0
Cur LV          4
Open LV          4
Max PV           0
Cur PV          1
Act PV           1
VG Size          129.51 GiB
PE Size          4.00 MiB
Total PE         32974
Alloc PE / Size 25474 / 99.51 GiB
Free PE / Size   7500 / 30.00 GB
VG UUID          pPSNBU-FRWO-z3aC-iAxS-ewaw-jOFT-dTcBKd
```

**Step 14** Verify that the /var partition is mounted on /dev/mapper/vg\_shiprock-lv\_var.

```
#df -h
Filesystem          Size Used Avail Use% Mounted on
/dev/mapper/vg_shiprock-lv_root
 18G 2.5G  15G 15% /
/dev/mapper/vg_shiprock-lv_home
 5.7G 140M 5.3G  3% /home
/dev/mapper/vg_shiprock-lv_var
 85G  16G  65G  20% /var
/dev/sdal           99M  40M  55M  43% /boot
tmpfs               16G   0  16G   0% /dev/shm
tmpfs               8.0G  1.1G  7.0G  14% /data/sessions.1
```

**Step 15** Extend /var partition to take up additional free space.

```
#lvextend -l +100%FREE /dev/mapper/vg_shiprock-lv_var
Extending logical volume lv_var to 120.00 GB
Logical volume lv_var successfully resized
```

**Step 16** Check the newly added space in /dev/mapper/vg\_shiprock-lv\_var.

```
# lvsdisplay
```

**Step 17** Add space to VM file system.

```
# resize2fs /dev/mapper/vg_shiprock-lv_var
resize2fs 1.39 (29-May-2006)
Filesystem at /dev/mapper/vg_shiprock-lv_var is mounted on /var; on-line resizing required
Performing an on-line resize of /dev/mapper/vg_shiprock-lv_var to 6553600 (4k) blocks.
The filesystem on /dev/mapper/vg_shiprock-lv_var is now 6553600 blocks long.
```

**Step 18** Check the increased size of /var partition.

```
# df -h
Filesystem                Size      Used Avail Use% Mounted on
/dev/mapper/vg_shiprock-lv_root
                          23G       2.1G   20G  10% /
/dev/mapper/vg_shiprock-lv_home
                          5.7G     140M   5.3G   3% /home
/dev/mapper/vg_shiprock-lv_var
                          130G     16G    95G  12% /var
/dev/sda1                  99M       40M    55M  43% /boot
tmpfs                      2.0G       0    2.0G   0% /dev/shm
```

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## Cloning and Disk Repartitioning of Sessionmgr02 VM

Repeat [Clone Sessionmgr01 VM, on page 5](#) and [Disk Repartitioning of Sessionmgr01 VM, on page 5](#) on sessionmgr02 for cloning and disk repartitioning of sessionmgr02 VM.

