Troubleshooting Restore - Linux File System

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| Table of Contents  [Browse and Restore](http://documentation.commvault.com/commvault/v11/article?p=24201_1.htm#o24202)  [Installation](http://documentation.commvault.com/commvault/v11/article?p=24201_1.htm#o24203) |

The following sections provide information on some of the troubleshooting scenarios related to restore:

Browse and Restore

* **Symptom**

Some of the files included in the user-defined subclient are not restored.

**Solution**

You may be performing the restore of user-defined subclient along with the restore of default subclient.

When you are recovering data backed up by the default subclient, you cannot recover the data backed up by a user-defined subclient.

* **Symptom**

Browse from default subclient displays**No Backup at Time**error.

**Solution**

Ensure that you do not include the root directory (/) as the subclient content.

When performing point-in-time restore from the default subclient, include the data/folders under the root directory as the subclient content.

* **Symptom**

Restore fails when trying to restore to a Unix FAT32 directory.

**Solution**

You may be restoring the full contents of a Unix directory that contains more than 32,767 files to a single Unix FAT32 directory.

The number of entries in a single FAT32 directory cannot exceed 32,767.

* **Symptom**

Restores from UNIX to Windows fails.

**Solution**

Restores from UNIX to Windows may fail in the following circumstances:

If the files contain UNIX-specific device files such as block, character, or named pipe.

If the UNIX files contain the "?" character in their filename.

Windows allows 1024 characters for filenames, including the path. A filename, including the path, with more than 1024 (1023 for AIX) characters will not be restored from a UNIX computer to a Windows computer.

If the UNIX files contain hard links.

Make sure to avoid these while restoring the file system from UNIX to Windows.

* **Case-Sensitive Filenames Will Not Restore from UNIX to Windows**

Case-sensitive filenames will not restore from UNIX to Windows because Windows does not maintain case-sensitive filenames. For example, if you are trying to restore files named "CASE\_SENSITIVE" and "case\_sensitive" from UNIX to Windows, then whichever file is restored last will overwrite the first one that was restored.

* **Symptom**

ACLs and other extended attributes may not be restored.

**Solution**

Sometimes, when you restore data to an NFS-mounted file system, ACLs and other extended attributes may not be restored.

* **Symptom**

Restore fails when trying to restore a running executable file.

**Solution**

Ensure that you are not including any running executable files in the restore operation.

* LNX0002**: Example of Linux full system restore on an LVM based server**

This example will show an In-Place Restore of a complete Linux operating system that was installed using LVM based storage.

Prior to performing a restore of this nature the existing operating system must be examined to capture file system sizes and disk partition layouts.

This can be done using the following commands:

cat /etc/fstab

cat /proc/partitions

fdisk -l

df

lvm

* 1. pvdisplay sub command within lvm
  2. vgdisplay
  3. lvdisplay

The following is the captured output from these commands run on a Linux computer that will be used to demonstrate this restore:

# cat /etc/fstab

/dev/VolGroup00/LogVol00 / ext3 defaults 1 1  
/dev/VolGroup00/LogVol03 /var ext3 defaults 1 2  
/dev/VolGroup00/LogVol02 /usr ext3 defaults 1 2  
LABEL=/boot /boot ext3 defaults 1 2  
tmpfs /dev/shm tmpfs defaults 0 0  
devpts /dev/pts devpts gid=5,mode=620 0 0  
sysfs /sys sysfs defaults 0 0  
proc /proc proc defaults 0 0  
/dev/VolGroup00/LogVol01 swap swap defaults 0 0

# cat /proc/partitions

major minor #blocks name  
  
8 0 10485760 sda  
8 1 104391 sda1  
8 2 10377990 sda2  
253 0 1572864 dm-0  
253 1 1441792 dm-1  
253 2 5242880 dm-2  
253 3 2097152 dm-3

# fdisk -l

Disk /dev/sda: 10.7 GB, 10737418240 bytes  
255 heads, 63 sectors/track, 1305 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 1305 10377990 8e Linux LVM

# df

Filesystem 1K-blocks Used Available Use% Mounted on  
/dev/mapper/VolGroup00-LogVol00 1523568 476028 968900 33% /  
/dev/mapper/VolGroup00-LogVol03 1396600 101824 1222688 8% /var  
/dev/mapper/VolGroup00-LogVol02 5078656 2892516 1923996 61% /usr  
/dev/sda1 101086 12634 83233 14% /boot  
tmpfs 1029784 0 1029784 0% /dev/shm

# lvm  
lvm>  
lvm> pvdisplay

--- Physical volume ---  
PV Name /dev/sda2  
VG Name VolGroup00  
PV Size 9.90 GB / not usable 22.76 MB  
Allocatable yes (but full)  
PE Size (KByte) 32768  
Total PE 316  
Free PE 0  
Allocated PE 316  
PV UUID BmTTrd-Tpe9-Lf6D-ic0f-HGCj-4E31-FrWJ7y

lvm> vgdisplay

--- Volume group ---  
VG Name VolGroup00  
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 9.88 GB  
PE Size 32.00 MB  
Total PE 316  
Alloc PE / Size 316 / 9.88 GB  
Free PE / Size 0 / 0  
VG UUID x94Vk1-MeGP-TTGG-FRhb-jUdZ-WA7q-SujSiy

lvm> lvdisplay

--- Logical volume ---  
LV Name /dev/VolGroup00/LogVol00  
VG Name VolGroup00  
LV UUID XAFA3v-1D3k-S646-7Hzg-AC8c-2Xjt-mT6fW0  
LV Write Access read/write  
LV Status available  
# open 1  
LV Size 1.50 GB  
Current LE 48  
Segments 1  
Allocation inherit  
Read ahead sectors auto  
- currently set to 256  
Block device 253:0  
  
  
--- Logical volume ---  
LV Name /dev/VolGroup00/LogVol03  
VG Name VolGroup00  
LV UUID jDCqyo-0r0A-UbiM-wmZi-jdf7-4g3U-JPqiJN  
LV Write Access read/write  
LV Status available  
# open 1  
LV Size 1.38 GB  
Current LE 44  
Segments 1  
Allocation inherit  
Read ahead sectors auto  
- currently set to 256  
Block device 253:1  
  
  
--- Logical volume ---  
LV Name /dev/VolGroup00/LogVol02  
VG Name VolGroup00  
LV UUID F7ZuKi-Jn1C-sRxG-rw4F-unNy-o3ls-WE9r2Y  
LV Write Access read/write  
LV Status available  
# open 1  
LV Size 5.00 GB  
Current LE 160  
Segments 1  
Allocation inherit  
Read ahead sectors auto  
- currently set to 256  
Block device 253:2  
  
  
--- Logical volume ---  
LV Name /dev/VolGroup00/LogVol01  
VG Name VolGroup00  
LV UUID JtwYci-7RhO-JPvC-ZGSN-u1Zq-qeTz-c9KsCF  
LV Write Access read/write  
LV Status available  
# open 1  
LV Size 2.00 GB  
Current LE 64  
Segments 1  
Allocation inherit  
Read ahead sectors auto  
- currently set to 256  
Block device 253:3

lvm> exit

**Solution**

Once this information has been gathered, and a full backup has been run on the Linux computer, the client needs to be powered off, and the system disk has to be replaced with a same sized disk. In addition to this disk, another disk also needs to be added to install a basic Linux operating system which will be used to restore the original disk. Be sure to replace the original system disk with the same type of disk using the same target ID. Add the additional new disk to a different SCSI ID from the original system disk. This will ensure that reconfiguring the restored operating system goes smoothly.

On this computer, the original 10GB sda disk is replaced with another sda disk (SCSI target 0), and a new 4GB sdb disk (SCSI target 1) is added. A bare minimum Linux operating system will be installed onto the sdb disk which will then get Commvault file system agent installed on to it. At that point a restore will be performed, restoring the data back on to sda (as it was originally installed).

From the output above it can be noted that the root (/) partition was located on /dev/VolGroup00/LogVol00, a swap partition was located on /dev/VolGroup00/LogVol01, /usr was located on /dev/VolGroup00/LogVol02, /var was located on /dev/VolGroup00/LogVol03, and the /boot partition was located on a regular non-LVM /dev/sda1 partition. The VolGroup00 was located on disk partition /dev/sda2.

Here is a table showing the original disk layout:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Device** | **Mount Point** | **Volume Group** | **Logical Volume** | **Size** |
| /dev/sda1 | /boot | - | - | 100MB |
| /dev/sda2 | - | VolGroup00 | LogVol00 | 9.88GB |
| /dev/VolGroup00/LogVol00 | / | VolGroup00 | LogVol01 | 1.5GB |
| /dev/VolGroup00/LogVol01 | swap | VolGroup00 | LogVol02 | 2GB |
| /dev/VolGroup00/LogVol02 | /usr | VolGroup00 | LogVol03 | 5GB |
| /dev/VolGroup00/LogVol03 | /var | VolGroup00 | LogVol04 | 1.38GB |

The disk layout on /dev/sda will be re-created during the installation of Linux operating system onto the second disk (sdb).

When installing Linux operating system on the second disk, the grub boot loader will get installed onto /dev/sda, and will point to /dev/sda1 for the boot information. A swap partition will be created on /dev/sda2 in LogVol1, which will be what is used for the Linux install to sdb, so no swap partition will be needed on /dev/sdb.

For the install to the sdb disk, the following partitions should be configured on /dev/sda and /dev/sdb during the installation. Make sure to size the partitions and logical volumes appropriately using the output gathered in the beginning of this example.

Below is a table showing the disk layout and mount points of sda & sdb prior to restore:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Device** | **Mount Point** | **Volume Group** | **Logical Volume** | **Size** |
| /dev/sda1 | /boot | - | - | 100MB |
| /dev/sda2 | - | VolGroup00 | - | 9.88GB |
| /dev/VolGroup00/LogVol00 | /mnt/restore | VolGroup00 | LogVol00 | 1.5GB |
| /dev/VolGroup00/LogVol01 | swap | VolGroup00 | LogVol01 | 2GB |
| /dev/VolGroup00/LogVol02 | /mnt/restore/usr | VolGroup00 | LogVol02 | 5GB |
| /dev/VolGroup00/LogVol03 | /mnt/restore/var | VolGroup00 | LogVol03 | 1.38GB |
| /dev/sdb1 | / | - | - | 4GB |

1. After the operating system is installed onto the sdb disk, renew the client certificates. See [Renewing a Revoked Certificate](http://documentation.commvault.com/commvault/v11/article?p=7521.htm) for step-by-step instructions.
2. Install the File System *i*DataAgent (using the standard defaults).
3. Unmount the /dev/sda1 partition from /boot and re-mount it under the /mnt/restore/boot directory to restore the original boot files.

For example:

# mkdir /mnt/restore/boot

# umount /boot

# mount /dev/sda1 /mnt/restore/boot

1. Initiate a restore from the CommCell Console to restore / (the entire system) to the /mnt/restore directory. Select the **UnconditionallOverwrite** option to force the restore to overwrite the files in /mnt/restore/boot.
2. After the restore completes, a /proc directory needs to be created in the restored root partition. This can be completed using the command

mkdir /mnt/restore/proc

1. Set up the boot loader to boot from the newly restored disk sda. The following procedure will accomplish this task..
   1. Mount proc & dev to the top level of the restored root file system
   2. Run the chroot command to point to the /restore partition/directory
   3. Run the grub install on the sda device.

Here is an example execution of this procedure:

# mount -t proc none /mnt/restore/proc

# mount -o bind /dev /mnt/restore/dev

# chroot /mnt/restore

# grub-install /dev/sda  
Installation finished. No error reported.  
This is the contents of the device map /boot/grub/device.map.  
Check if this is correct or not. If any of the lines is incorrect,fix it and re-run the script `grub-install'.  
  
# this device map was generated by anaconda  
(fd0) /dev/fd0  
(hd0) /dev/sda

1. Copy the operating system files that have hardware information in them to the /mnt/restore directory if the hardware on the computer is different from that of the source computer.

For example, on RHEL compatible operating systems like CentOS and Oracle Linux, you need to copy the following files:

cp –rp /etc/udev/rules.d/70-persistent-net.rules /mnt/restore/etc/udev/rules.d/70-persistent-net.rules  
cp –rp /etc/sysconfig/network-scripts/ifcfg-ethX /mnt/restore/etc/sysconfig/network-scripts/ifcfg-ethX  
cp –rp /etc/fstab /mnt/restore/etc/fstab

Remove the /mnt/restore/etc/blkid/blkid.tab file if present.

For example, on RHEL compatible operating systems like CentOS and Oracle Linux, you need to exclude the following files:

1. Edit the /mnt/restore/etc/fstab file to remove /mnt/restore from the mount points:

For example:

/mnt/restore -> /

/mnt/restore/usr -> /usr

/mnt/restore/var -> var

1. At this point the computer can be powered off, and the sdb disk can be removed. After removing the second disk, the computer will boot normally using the newly restored LVM partitioned sda disk.
2. Renew the client certificates again. See [Renewing a Revoked Certificate](http://documentation.commvault.com/commvault/v11/article?p=7521.htm) for step-by-step instructions.