Logical Volume Manager

ICD - Infraestruturas e Centros de Dados

2020/2021

The main goal of this guide is to understand how to use and configure Logical Volumes in Linux systems.

For the exercises described next, the following tools must be installed,

- VirtualBox - `https://www.virtualbox.org`

while useful LVM documentation is available at:

- LVM - `https://access.redhat.com/documentation/en-us/red_hat_enterprise_linux/7/html/logical_volume_manager_administration/lvm_overview`

Steps

VM Deployment and Configuration

1. Clone the template VM (centos 8) created at the Warmup exercise.

2. Add two disks to the VM (1 GiB for each disk - Virtualbox configuration).

3. Launch the VM.

4. Change the name of the machine to *lvm* with the *nmtui* tool.

5. Check that the two disks (*e.g., /dev/sdb and /dev/sdc*) have been created successfully (use *fdisk -l*).

Logical Volume Manager

1. Create a Physical Volume (PV) for each disk by using the *pvcreate* tool.

    With the command *pvdisplay* check that the PVs were created.

2. Create a Volume Group (VG), named AulaICD, for one of the disks (*e.g., vgcreate AulaICD /dev/sdb*).

    With the command *vgdisplay* check that the group was created. With the command *pvdisplay* check that the PV is now associated to that VG.

1

3. Create two Logical Volumes (lv1 and lv2), each with 200 MiB (*e.g., sudo lvcreate --size 200M --name lv1 /dev/AulaICD*).

   With the commands *lvdisplay* and *ls -la /dev/AulaICD* check that the volumes were created.

Filesystem

1. Create a filesystem for each LVM (*e.g., mkfs.xfs /dev/AulaICD/lv1*).

2. Create a mount point for each filesystem (*e.g., mkdir /mnt/lv1*).

3. Mount the partitions (*e.g., mount /dev/AulaICD/lv1 /mnt/lv1*).

   With the command *df -h* check that the filesystems were created.

4. Copy the folder */etc* to the mount point folders. Check the copied content at the mount points.

Resizing LVMs

1. Expand the storage size (increase 100MiB) of one of the LVMs
   (*e.g., lvextend -L+100M /dev/AulaICD/lv1*).

   Use *lvdisplay* to check the new size.

2. Resize the filesystem associated with thar LVM (*e.g., xfs_growfs /mnt/lv1*)

   Use *df -h* to check the new size.

LVM Snapshots

1. Create a snapshot, named lv1-s, of an LVM volume
   (*e.g., lvcreate -s /dev/AulaICD/lv1 -L 300M -n lv1-s*).

   use *lvdisplay* to check the operation completed successfully. Also check that the snapshot has read and write permissions.

2. create a new mount point (*e.g., mkdir /mnt/lv1-s*). Mount the partition (*e.g., mount -o nouuid /dev/AulaICD/lv1-s /mnt/lv1-s*).

3. Umount the filesystem (*e.g., umount /mnt/lv1-s*) and generate a new uuid for the snapshot volume
   (*e.g., xfs_admin -U generate /dev/AulaICD/lv1-s*).

4. Mount the volume again (*e.g., mount /dev/AulaICD/lv1-s /mnt/lv1-s*).

5. Check the mount point's content.

LVM Migration

1. Add another PV to the VG (*e.g., vgextend AulaICD /dev/sdc*).

   Use *pvdisplay* and *vgdisplay* to check the operation completed successfully.

2. *umount* all the filesystems associated with the created LVMs.

3. Migrate data from the old PV to the new one (*e.g., pvmove /dev/sdb /dev/sdc*).

4. Remove from the VG the old PV (*e.g., vgreduce AulaICD /dev/sdb*).

5. Check that LVMs still exist, mount the corresponding filesystems and browse their content.

Learning outcomes Experiment logical volume management deployment and configuration. Assess how LVM helps simplifying the management of storage resources. Revise LVM configuration parameters and deployment/management commands.