

Configuring Storage for LVM



Andrew Mallett

LINUX AUTHOR AND TRAINER

@theurbanpenguin www.theurbanpenguin.com



Overview



Physical volumes

Working with complete disks

Partitioning disks

Working with raw files

Creating a service to link loop devices

Partitioning disks with Ansible



Physical Volumes

Physical volumes in LVM are the actual block storage devices where data is stored. Physical volumes can be disks, partitions or raw disk files as we have seen.



```
$ lsblk
sda      8:0    0   25G  0 disk
├─sda1   8:1    0    1M  0 part
└─sda2   8:2    0   25G  0 part /
```

```
$ lsblk -s
sda1     8:1    0    1M  0 part
└─sda    8:0    0   25G  0 disk
sda2     8:2    0   25G  0 part /
└─sda    8:0    0   25G  0 disk
```

Listing Block Devices

The command `lsblk` will list known block devices on a system. Using the option `-s` we can invert the dependencies, showing partitions before the disk.



```
$ lsblk /dev/sdb  
NAME MAJ:MIN RM SIZE RO TYPE MOUNTPOINT  
sdb    8:16    0  10G  0 disk
```

All Nodes Have /dev/sdb

All three of my nodes have an empty 10GB disk attached as /dev/sdb. If we want to use this as an LVM PV we can use the complete disk, there is no need to break it down into partitions.



```
# On controller
```

```
$ sudo parted /dev/sdb print
```

```
$ sudo parted /dev/sdb mklabel msdos
```

```
$ sudo parted /dev/sdb print
```

Creating Partitions

Typically, on courses, disks are broken down into partitions to easily allow for multiple PVs when perhaps extra disks are not available. The GNU parted tool can be used to create partitions. First we add a partition table.



```
$ sudo parted /dev/sdb mkpart primary 0% 25%
```

```
$ sudo parted /dev/sdb print
```

```
# Units can be in percentage of disk using % or
```

```
s sectors
```

```
B bytes
```

```
MiB/GiB/TiB powers of 2
```

```
MB,GB,TB powers of 10
```

Creating Partitions

Next we create partitions, we will create 4 so we allocate 25% of disk space to each partition.



```
$ sudo parted /dev/sdb set 1 lvm on
```

Creating Partitions

The default partition type is type 83 a Linux partition. We want to designate these partitions for LVM. We set the flag on each of the 4 partitions changing the partition type to 8e for LVM.



Demo



Working on the controller node we will create partitions on the disk `/dev/sdb`



```
# On controller
```

```
$ sudo mkdir /img
```

```
$ sudo fallocate -l 100m /img/disk1
```

```
$ sudo losetup -f /img/disk1
```

```
$ sudo losetup
```

Creating Loop Devices

If we have available disk space we can also create raw disk files and link them to loop devices.



Demo



We can now create raw disk files linking them to loop devices



```
# On controller
```

```
$ sudo systemctl edit --force local_disk.service
```

```
...
```

```
$ sudo systemctl daemon-reload
```

```
$ sudo systemctl enable local_disk
```

Create Systemd Unit

To make the loop devices available on reboot we can create a systemd unit. Once edited we can reload systemd and enable the service.



Systemd Unit

local_disk.service

[Unit]

Description=Load local loop devices

DefaultDependencies=no

After=systemd-udev-settle.service

before=local-fs.service

[Service]

Type=oneshot

ExecStart=/sbin/losetup /dev/loop2 /img/disk1

ExecStart=/sbin/pvscan --cache

[Install]

WantedBy=local-fs.target

Demo



We will now create the service unit



Ansible Module Parted

We have configured partitions on the controller manually helping us understand the configuration. We will now automate the process using Ansible.



Parted Module

site.yml

- **name:** partition table
 - parted:**
 - device:** /dev/sdb
 - label:** msdos
- **name:** Partition 1
 - parted:**
 - device:** /dev/sdb
 - number:** 1
 - part_end:** 25%
 - flags:** [lvm]
 - state:** present

Demo



The managed nodes will now be configured with partitions via Ansible



Overview



Physical volumes in LVM can use the complete disk or disk partitions

These can be on a physical storage device or raw disk file

The GNU parted command can be used to manage DOS and GPT partition tables

The Ansible parted module can be used to partition disks remotely

Using Ansible ad-hoc command we can easily list the resulting partitions



Configuring Volume Groups and Logical Volumes

