

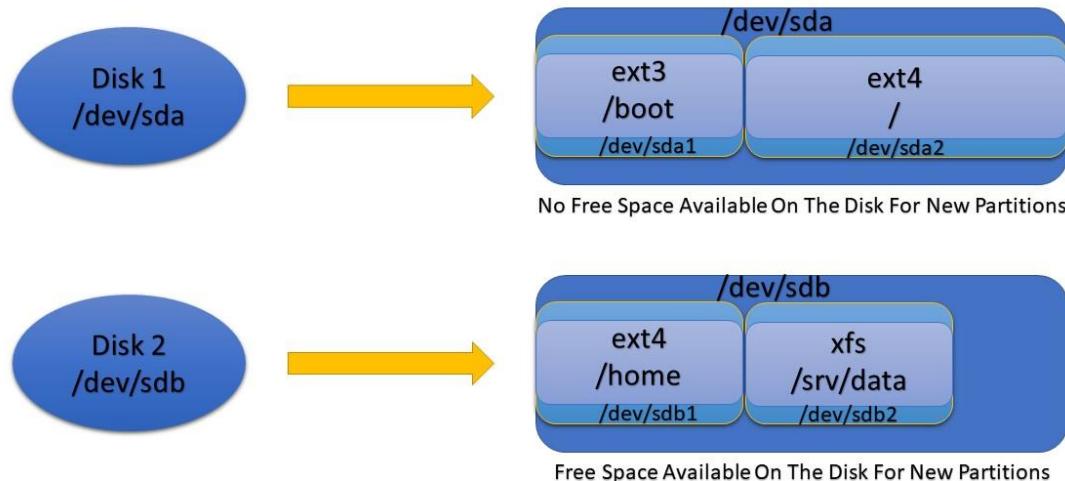
Using LVM With Ansible

By: Er. Vikas Nehra (M. Tech, B. Tech), Experience: 15 + Years

Session - 32 Agenda:

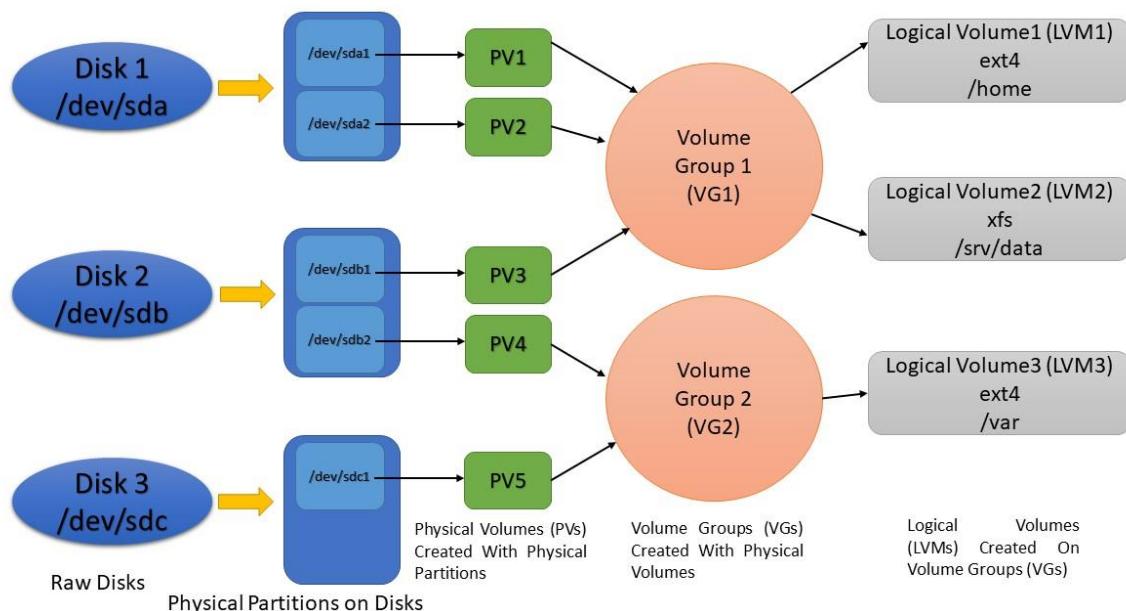
1. Using LVM With Ansible

Problems With Standard Partitions



Suppose you want to enlarge the space available for /srv/data on disk 2, What can you do? The solution will always force you to unmount the file system, take a backup of the data, remove and recreate partitions, and then restore the data and remount the file system.

Solution With Logical Volume (LVM)



Managing Storage With LVM:

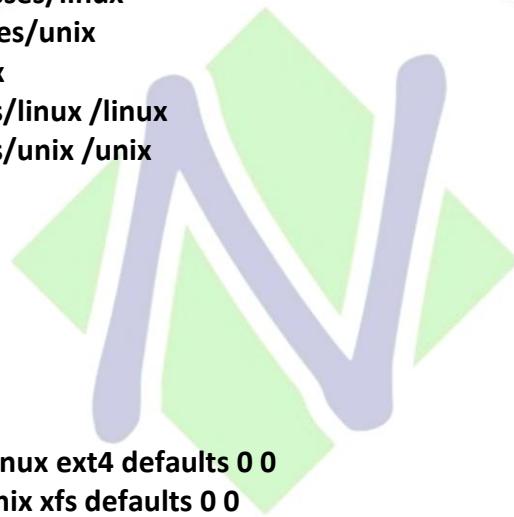
To create the logical volumes, we create the partitions on the raw disk(s) first and then we create the physical volumes with the help of these partitions. After that we create the volume groups by using the physical volumes created earlier and then we create the logical volumes on these volume groups. After that filesystems can be created on these logical volumes. These filesystems which are created on the logical volumes can be easily extended on the go without doing any extra efforts.



Using LVM With Ansible

By: Er. Vikas Nehra (M. Tech, B. Tech), Experience: 15 + Years

```
# fdisk -l
# lsblk
# fdisk /dev/sda
# partprobe /dev/sda
# fdisk -l
# lsblk
# pvcreate /dev/sda1 /dev/sda2
# vgcreate nehraclasses /dev/sda1 /dev/sda2
# lvcreate -l 200 -n linux nehraclasses
# lvcreate -L 1G -n unix nehraclasses
# mkfs.ext4 /dev/nehraclasses/linux
# mkfs.xfs /dev/nehraclasses/unix
# mkdir /linux ; mkdir /unix
# mount /dev/nehraclasses/linux /linux
# mount /dev/nehraclasses/unix /unix
# df -hT
# cd /linux
# touch file{1..20}.txt
# ls -lh
# cd
# umount /linux
# vim /etc/fstab
/dev/nehraclasses/linux /linux ext4 defaults 0 0
/dev/nehraclasses/unix /unix xfs defaults 0 0
# mount -a
# df -hT
# ls -lh /linux
# lsblk -f
# lvextend -l +200 /dev/nehraclasses/linux
# lsblk -f
# df -hT
# resize2fs /dev/nehraclasses/linux
# lsblk -f
# df -hT
# lvextend -L 2G /dev/nehraclasses/unix
# lsblk -f
# df -hT
# xfs_growfs /dev/nehraclasses/linux
# lsblk -f
# df -hT
```



Using LVM With Ansible:

There are two ways of managing LVM in Ansible using:

1. Ansible Ad-hoc Commands
2. Ansible Playbooks

1. Ansible Ad-hoc Commands:

We can use ansible ad-hoc commands to create/manage the logical volumes with the help of lvg, lvol, filesystem & mount modules in ansible to get our job done on the managed nodes. In order



Using LVM With Ansible

By: Er. Vikas Nehra (M. Tech, B. Tech), Experience: 15 + Years

to use these modules, we need to install their collections from ansible galaxy because ansible-core doesn't provide these modules in RHEL9 by default.

\$ ansible-galaxy collection install ansible.posix

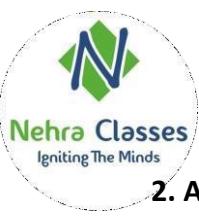
\$ ansible-galaxy collection install community.general

Let's understand the working of these modules with the help of ansible ad-hoc commands:

```
$ ansible node1 -m raw -a 'echo -e "n\np\nn1\nn\nnw" | sudo fdisk /dev/sda' -b
$ ansible node1 -m command -a 'lsblk -f'
$ ansible node1 -m lvg -a 'vg=nehraclasses pvs=/dev/sda1 pesize=32' -b
$ ansible node1 -m lvol -a 'vg=nehraclasses lv=test size=100m' -b
$ ansible node1 -m command -a 'pvs' -b
$ ansible node1 -m command -a 'vgs' -b
$ ansible node1 -m command -a 'lvs' -b
$ ansible node1 -m filesystem -a 'dev=/dev/nehraclasses/test fstype=ext4 state=present' -b
$ ansible node1 -m command -a 'lsblk -f'
$ ansible node1 -m mount -a 'path=/opt/ src=/dev/nehraclasses/test fstype=ext4 opts=defaults state=mounted' -b
$ ansible node1 -m command -a 'tail -1 /etc/fstab'
$ ansible node1 -m command -a 'df -HT'
$ ansible node1 -m command -a 'lvs' -b
$ ansible node1 -m command -a 'lsblk -f'
$ ansible node1 -m lvol -a 'vg=nehraclasses lv=test size=+1G resizefs=true' -b
$ ansible node1 -m command -a 'df -HT'
$ ansible node1 -m command -a 'lvs' -b
$ ansible node1 -m command -a 'lsblk -f'
$ ansible node1 -m filesystem -a 'dev=/dev/nehraclasses/test2 fstype=xfs state=present' -b
$ ansible node1 -m command -a 'lvs' -b
$ ansible node1 -m command -a 'lsblk -f'
$ ansible node1 -m lvol -a 'vg=nehraclasses lv=test2 size=+1G resizefs=true' -b
$ ansible node1 -m command -a 'lvs' -b
$ ansible node1 -m filesystem -a 'dev=/dev/nehraclasses/test2 state=absent' -b
$ ansible node1 -m command -a 'lsblk -f'
$ ansible node1 -m lvol -a 'vg=nehraclasses lv=test2 state=absent force=true' -b
$ ansible node1 -m command -a 'lvs' -b
$ ansible node1 -m mount -a 'path=/opt/ src=/dev/nehraclasses/test fstype=ext4 opts=defaults state=absent' -b
$ ansible node1 -m command -a 'df -HT' -b
$ ansible node1 -m command -a 'tail -1 /etc/fstab' -b
$ ansible node1 -m command -a 'lsblk -f'
$ ansible node1 -m filesystem -a 'dev=/dev/nehraclasses/test state=absent' -b
$ ansible node1 -m lvol -a 'vg=nehraclasses lv=test state=absent force=true' -b
$ ansible node1 -m command -a 'lvs' -b
$ ansible node1 -m command -a 'lsblk -f'
$ ansible node1 -m lvg -a 'vg=nehraclasses pvs=/dev/sda1 state=absent' -b
$ ansible node1 -m command -a 'vgs' -b
```

(Revert node1 machine from snapshot and add 3 raw disks to use Ansible Playbook examples.)

\$ ansible node1 -m command -a 'lsblk -f' -b



Using LVM With Ansible

By: Er. Vikas Nehra (M. Tech, B. Tech), Experience: 15 + Years

2. Ansible Playbooks:

Let's create some ansible playbooks using lvg, lvol, filesystem & mount modules to manage the logical volumes at the node1 machine.

\$ vim partition.yml

```
---
```

```
- name: Managing partitions on the disk(s)
hosts: node1
become: true
tasks:
  - name: Create a new primary partition with a size of 1GiB on /dev/sda disk
    community.general.parted:
      device: /dev/sda
      number: 1
      state: present
      part_end: 1GiB
...
```

```
$ ansible-playbook partition.yml
$ ansible node1 -m command -a 'lsblk -f' -b
```

\$ vim volgrp.yml

```
---
```

```
- name: Managing Volume Groups
hosts: node1
become: true
tasks:
  - name: Create a volume group on top of /dev/sda1 with physical extent size = 32MB
    community.general.lvg:
      vg: nehraclasses
      pvs: /dev/sda1
      pesize: 32
...
```

```
$ ansible-playbook volgrp.yml
$ ansible node1 -m command -a 'pvs' -b
$ ansible node1 -m command -a 'vgs' -b
```

\$ vim volgrp2.yml

```
---
```

```
- name: Managing Volume Groups
hosts: node1
become: true
tasks:
  - name: Create a volume group on top of /dev/sdb with physical extent size = 128KiB
    community.general.lvg:
      vg: nehraclasses
      pvs: /dev/sdb
      pesize: 128K
...
```



Using LVM With Ansible

By: Er. Vikas Nehra (M. Tech, B. Tech), Experience: 15 + Years

```
$ ansible-playbook volgrp2.yml  
$ ansible node1 -m command -a 'pvs' -b  
$ ansible node1 -m command -a 'vgs' -b
```

```
$ vim volgrp_res.yml
```

```
---  
- name: Managing Volume Groups  
hosts: node1  
become: true  
tasks:  
- name: Create or resize a volume group on top of /dev/sdc.  
community.general.lvg:  
vg: nehraclasses  
pvs: /dev/sdc  
...
```

```
$ ansible-playbook volgrp_res.yml  
$ ansible node1 -m command -a 'pvs' -b  
$ ansible node1 -m command -a 'vgs' -b
```

```
$ vim volgrp_rem.yml
```

```
---  
- name: Managing Volume Groups  
hosts: node1  
become: true  
tasks:  
- name: Remove a volume group with name nehraclasses  
community.general.lvg:  
vg: nehraclasses  
state: absent  
...
```

```
$ ansible-playbook volgrp_rem.yml  
$ ansible node1 -m command -a 'pvs' -b  
$ ansible node1 -m command -a 'vgs' -b
```

```
$ vim volgrp3.yml
```

```
---  
- name: Managing Volume Groups  
hosts: node1  
become: true  
tasks:  
- name: Create a volume group on top of /dev/sda1 and resize the volume group /dev/sda1  
to the maximum possible  
community.general.lvg:  
vg: resizableVG  
pvs: /dev/sda1  
pvresize: true  
...
```



Using LVM With Ansible

By: Er. Vikas Nehra (M. Tech, B. Tech), Experience: 15 + Years

```
$ ansible-playbook volgrp3.yml  
$ ansible node1 -m command -a 'pvs' -b  
$ ansible node1 -m command -a 'vgs' -b
```

```
$ vim volgrp_deact.yml
```

```
---  
- name: Managing Volume Groups  
hosts: node1  
become: true  
tasks:  
  - name: Deactivate a volume group  
    community.general.lvg:  
      state: inactive  
      vg: resizableVG
```

```
...  
  
$ ansible-playbook volgrp_deact.yml  
$ ansible node1 -m command -a 'pvs' -b  
$ ansible node1 -m command -a 'vgs' -b
```

```
$ vim volgrp_act.yml
```

```
---  
- name: Managing Volume Groups  
hosts: node1  
become: true  
tasks:  
  - name: Deactivate a volume group  
    community.general.lvg:  
      state: active  
      vg: resizableVG
```

```
...  
  
$ ansible-playbook volgrp_act.yml  
$ ansible node1 -m command -a 'pvs' -b  
$ ansible node1 -m command -a 'vgs' -b
```

```
$ ansible node1 -m command -a 'vgdisplay' -b  
$ vim volgrp_uuid.yml
```

```
---  
- name: Managing Volume Groups  
hosts: node1  
become: true  
tasks:  
  - name: Reset a volume group UUID  
    community.general.lvg:  
      state: inactive  
      vg: resizableVG  
      reset_vg_uuid: true
```

```
...
```



Using LVM With Ansible

By: Er. Vikas Nehra (M. Tech, B. Tech), Experience: 15 + Years

```
$ ansible-playbook volgrp_uuid.yml  
$ ansible node1 -m command -a 'vgdisplay' -b
```

```
$ ansible node1 -m command -a 'pvdisplay' -b  
$ vim volgrp_uuid_pv.yml
```

```
---
```

```
- name: Managing Volume Groups  
hosts: node1  
become: true  
tasks:  
  - name: Reset both volume group and pv UUID  
    community.general.lvg:  
      state: inactive  
      vg: resizableVG  
      pvs: /dev/sda1  
      reset_vg_uuid: true  
      reset_pv_uuid: true
```

```
...
```

```
$ ansible-playbook volgrp_uuid_pv.yml  
$ ansible node1 -m command -a 'pvdisplay' -b  
$ ansible node1 -m command -a 'vgdisplay' -b
```

```
$ ansible node1 -m lvg -a 'vg=resizableVG pvs=/dev/sda1 state=absent' -b
```

```
$ vim lvm.yml
```

```
---
```

```
- name: Managing Volume Groups  
hosts: node1  
become: true  
tasks:  
  - name: Create a logical volume of 512m  
    community.general.lvol:  
      vg: nehraclasses  
      lv: test  
      size: 512
```

```
...
```

```
$ ansible-playbook lvm.yml  
$ ansible-playbook volgrp.yml  
$ ansible-playbook lvm.yml  
$ ansible node1 -m command -a 'pvs' -b  
$ ansible node1 -m command -a 'vgs' -b  
$ ansible node1 -m command -a 'lvs' -b  
$ ansible node1 -m command -a 'lsblk -f' -b
```



Using LVM With Ansible

By: Er. Vikas Nehra (M. Tech, B. Tech), Experience: 15 + Years

```
$ vim lvm2.yml
```

```
---
```

```
- name: Managing Volume Groups
hosts: node1
become: true
tasks:
  - name: Create cache pool logical volume
    community.general.lvol:
      vg: nehraclasses
      lv: lvcache
      size: 512m
      opts: --type cache-pool
...
```

```
$ ansible-playbook lvm2.yml
```

```
$ ansible node1 -m command -a 'pvs' -b
$ ansible node1 -m command -a 'vgs' -b
$ ansible node1 -m command -a 'lvs' -b
$ ansible node1 -m command -a 'lsblk -f' -b
```

```
$ vim lvm3.yml
```

```
---
```

```
- name: Managing Volume Groups
hosts: node1
become: true
tasks:
  - name: Create a logical volume the size of all remaining space in the volume group
    community.general.lvol:
      vg: nehraclasses
      lv: test2
      size: 100%FREE
...
```

```
$ ansible-playbook lvm3.yml
```

```
$ ansible node1 -m command -a 'pvs' -b
$ ansible node1 -m command -a 'vgs' -b
$ ansible node1 -m command -a 'lvs' -b
$ ansible node1 -m command -a 'lsblk -f' -b
```

```
$ vim lvm4.yml
```

```
---
```

```
- name: Managing Volume Groups
hosts: node1
become: true
tasks:
  - name: Remove the logical volume test2
    community.general.lvol:
      vg: nehraclasses
      lv: test2
```



Using LVM With Ansible

By: Er. Vikas Nehra (M. Tech, B. Tech), Experience: 15 + Years

```
state: absent  
force: true
```

...

```
$ ansible-playbook lvm4.yml  
$ ansible node1 -m command -a 'pvs' -b  
$ ansible node1 -m command -a 'vgs' -b  
$ ansible node1 -m command -a 'lvs' -b  
$ ansible node1 -m command -a 'lsblk -f' -b
```

```
$ vim lvm5.yml
```

```
- name: Managing Volume Groups  
hosts: node1  
become: true  
tasks:  
  - name: Create a logical volume with special options (Read ahead sectors)  
# Readahead is a system call of the Linux kernel that loads a file's contents into the page cache.  
  community.general.lvol:  
    vg: nehraclasses  
    lv: test3  
    size: 5g  
    opts: -r 16
```

...

```
$ ansible-playbook lvm5.yml  
$ ansible node1 -m command -a 'pvs' -b  
$ ansible node1 -m command -a 'vgs' -b  
$ ansible node1 -m command -a 'lvdisplay' -b  
$ ansible node1 -m command -a 'lsblk -f' -b
```

```
$ vim lvm6.yml
```

```
- name: Managing Volume Groups  
hosts: node1  
become: true  
tasks:  
  - name: Extend the logical volume to 1024m.  
  community.general.lvol:  
    vg: nehraclasses  
    lv: test  
    size: 1024
```

...

```
$ ansible-playbook lvm6.yml  
$ ansible node1 -m command -a 'pvs' -b  
$ ansible node1 -m command -a 'vgs' -b  
$ ansible node1 -m command -a 'lvs' -b  
$ ansible node1 -m command -a 'lsblk -f' -b
```



Using LVM With Ansible

By: Er. Vikas Nehra (M. Tech, B. Tech), Experience: 15 + Years

\$ vim lvm7.yml

```
---
```

- name: Managing Volume Groups

hosts: node1
become: true
tasks:

- name: Extend the logical volume to consume all remaining space in the volume group

community.general.lvol:
vg: nehraclasses
lv: test
size: +100%FREE

```
...
```

\$ ansible-playbook lvm7.yml

```
$ ansible node1 -m command -a 'pvs' -b  
$ ansible node1 -m command -a 'vgs' -b  
$ ansible node1 -m command -a 'lvs' -b
```

\$ vim lvm8.yml

```
---
```

- name: Managing Volume Groups

hosts: node1
become: true
tasks:

- name: Reduce the logical volume to 512m

community.general.lvol:
vg: nehraclasses
lv: test
size: 512
force: true

```
...
```

\$ ansible-playbook lvm8.yml

```
$ ansible node1 -m command -a 'pvs' -b  
$ ansible node1 -m command -a 'vgs' -b  
$ ansible node1 -m command -a 'lvs' -b
```

\$ vim lvm9.yml

```
---
```

- name: Managing Volume Groups

hosts: node1
become: true
tasks:

- name: Extend the logical volume by given space

community.general.lvol:
vg: nehraclasses
lv: test
size: +512M

```
...
```



Using LVM With Ansible

By: Er. Vikas Nehra (M. Tech, B. Tech), Experience: 15 + Years

```
$ ansible-playbook lvm9.yml
$ ansible node1 -m command -a 'pvs' -b
$ ansible node1 -m command -a 'vgs' -b
$ ansible node1 -m command -a 'lvs' -b
```

```
$ vim lvm10.yml
```

```
---
- name: Managing Volume Groups
  hosts: node1
  become: true
  tasks:
    - name: Resize the logical volume to % of VG
      community.general.lvol:
        vg: nehraclasses
        lv: test
        size: 20%VG
        force: true
...

```

```
$ ansible-playbook lvm10.yml
$ ansible node1 -m command -a 'pvs' -b
$ ansible node1 -m command -a 'vgs' -b
$ ansible node1 -m command -a 'lvs' -b
```

```
$ vim lvm11.yml
```

```
---
- name: Managing Volume Groups
  hosts: node1
  become: true
  tasks:
    - name: Reduce the logical volume by given space
      community.general.lvol:
        vg: nehraclasses
        lv: test
        size: -512M
        force: true
...

```

```
$ ansible-playbook lvm11.yml
$ ansible node1 -m command -a 'pvs' -b
$ ansible node1 -m command -a 'vgs' -b
$ ansible node1 -m command -a 'lvs' -b
```

```
$ vim lvm12.yml
```

```
---
- name: Managing Volume Groups
  hosts: node1
  become: true
  tasks:
    - name: Create a snapshot volume of the test logical volume.
```



Using LVM With Ansible

By: Er. Vikas Nehra (M. Tech, B. Tech), Experience: 15 + Years

```
community.general.lvol:  
  vg: nehraclasses  
  lv: test  
  snapshot: snap1  
  size: 100m  
...  
$ ansible-playbook lvm12.yml
```

```
$ ansible node1 -m command -a 'pvs' -b  
$ ansible node1 -m command -a 'vgs' -b  
$ ansible node1 -m command -a 'lvs' -b
```

```
$ vim lvm13.yml
```

```
---  
- name: Managing Volume Groups  
  hosts: node1  
  become: true  
  tasks:  
    - name: Deactivate a logical volume  
      community.general.lvol:  
        vg: nehraclasses  
        lv: test  
        active: false  
...  
$ ansible-playbook lvm13.yml
```

```
$ ansible node1 -m command -a 'pvs' -b  
$ ansible node1 -m command -a 'vgs' -b  
$ ansible node1 -m command -a 'lvs' -b  
$ ansible node1 -m command -a 'lvscan' -b
```

```
$ vim lvm14.yml  
---  
- name: Managing Volume Groups  
  hosts: node1  
  become: true  
  tasks:  
    - name: Create a deactivated logical volume  
      community.general.lvol:  
        vg: nehraclasses  
        lv: test4  
        size: 1g  
        active: false  
        force: true  
...  
$ ansible-playbook lvm14.yml
```

```
$ ansible node1 -m command -a 'pvs' -b  
$ ansible node1 -m command -a 'vgs' -b  
$ ansible node1 -m command -a 'lvs' -b
```

Classes
Igniting The Minds



Using LVM With Ansible

By: Er. Vikas Nehra (M. Tech, B. Tech), Experience: 15 + Years

```
$ ansible node1 -m command -a 'lvscan' -b
```

```
$ vim lvm15.yml
```

```
---
```

```
- name: Managing Volume Groups
hosts: node1
become: true
tasks:
  - name: Create a thin pool of 50m
    community.general.lvol:
      vg: nehraclasses
      thinpool: testpool
      size: 50m
...
```

```
$ ansible-playbook lvm15.yml
```

```
$ ansible node1 -m command -a 'pvs' -b
$ ansible node1 -m command -a 'vgs' -b
$ ansible node1 -m command -a 'lvs' -b
```

```
$ vim lvm16.yml
```

```
---
```

```
- name: Managing Volume Groups
hosts: node1
become: true
tasks:
  - name: Create a thin volume of 300m
    community.general.lvol:
      vg: nehraclasses
      lv: test6
      thinpool: testpool
      size: 300m
...
```

```
$ ansible-playbook lvm16.yml
```

```
$ ansible node1 -m command -a 'pvs' -b
$ ansible node1 -m command -a 'vgs' -b
$ ansible node1 -m command -a 'lvs' -b
```

Thank You