

# Storage Management Using Ansible

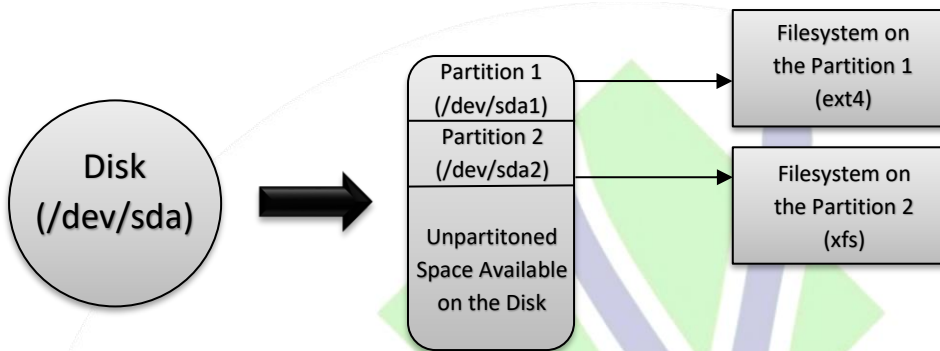
By: Er. Vikas Nehra (M. Tech, B. Tech), Experience: 15 + Years

## Session - 31 Agenda:

### 1. Storage Management Using Ansible

#### Storage Management in Linux:

In Linux we create partitions (e.g. /dev/sda1, /dev/sda2, etc.) on the disks (e.g. /dev/sda) to effectively utilize the disk space. On these partitions we create filesystems (e.g. ext4, xfs etc.) so that we can use this storage space to keep our data. Different filesystems support different types of features.



To create the partitions on a raw disk in Linux, we use fdisk, gdisk and parted commands.

```
# lsblk
# fdisk -l
# fdisk /dev/sda
# partprobe /dev/sda
# lsblk
# gdisk /dev/sda
# partprobe /dev/sda
# lsblk
# parted -l
# parted /dev/sda
print /dev/sda
# select /dev/sda
# mklable msdos
# mkpart
```

After creating the partitions, we can create the filesystem so that we can mount any directory on it to start using the partition space to keep our data.

```
# mkdir /data
# mount /dev/sda1 /data
# mkfs.ext2 /dev/sda1
# mount /dev/sda1 /data
# df -hT
# cd /data
# touch file{1..20}.txt
# ll ; cd
# umount /data
# mkfs.xfs /dev/sdb1
# mkfs. ext3 /dev/sdb2
```



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We can also make an entry for the same in the /etc/fstab file to mount it permanently.

```
# vim /etc/fstab
/dev/sda1 /data ext4 defaults 0 0
# df -hT
# mount -a
# df -hT
```

## Managing Storage Using Ansible:

We can manage storage on the managed nodes using Ansible by using:

1. Ansible Ad-hoc commands
2. Ansible Playbooks

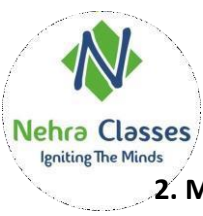
Before we proceed further first install the required ansible module collections:

```
$ ansible-galaxy collection install community.general
$ ansible-galaxy collection install ansible.posix
```

### 1. Managing Storage Using Ansible Ad-hoc Commands:

We can execute ansible ad-hoc commands on the managed nodes to create/manage the partitions.

```
$ ansible node1 -m command -a 'sudo lsblk'
$ ansible node1 -m command -a 'sudo fdisk -l'
$ ansible node1 -m raw -a 'echo -e "n\np\n1\n\n\nnw" | sudo fdisk /dev/sda'
$ ansible node1 -m command -a 'sudo partprobe /dev/sda'
$ ansible node1 -m command -a 'sudo lsblk'
$ ansible node1 -m command -a 'sudo fdisk -l'
$ ansible node1 -m command -a 'sudo mkfs.xfs /dev/sda1'
$ ansible node1 -m filesystem -a 'dev=/dev/sda1 fstype=ext4 state=present force=true' -b
$ ansible-galaxy collection install community.general
$ ansible node1 -m filesystem -a 'dev=/dev/sda1 fstype=ext4 state=present force=true' -b
$ ansible node1 -m command -a 'sudo mkdir /testdir'
$ ansible node1 -m command -a 'sudo mount /dev/sda1 /testdir'
$ ansible node1 -m command -a 'sudo df -hT'
$ ansible node1 -m command -a 'sudo touch /testdir/test.txt'
$ ansible node1 -m command -a 'sudo ls -lh /testdir/'
$ ansible node1 -m command -a 'sudo umount /testdir/'
$ ansible node1 -m command -a 'sudo df -hT'
$ ansible node1 -m lineinfile -a 'path=/etc/fstab line="/dev/sda1 /testdir xfs defaults 0 0" state=present' -b
$ ansible node1 -m command -a 'sudo tail -1 /etc/fstab'
$ ansible node1 -m command -a 'sudo mount -a'
$ ansible node1 -m command -a 'sudo df -hT'
$ ansible node1 -m command -a 'sudo umount /testdir/'
$ ansible node1 -m lineinfile -a 'path=/etc/fstab line="/dev/sda1 /testdir xfs defaults 0 0" state=absent' -b
$ ansible node1 -m command -a 'sudo tail -1 /etc/fstab'
$ ansible-galaxy collection install ansible.posix
$ ansible node1 -m mount -a 'path=/testdir/ src=/dev/sda1 fstype=xfs opts=rw state=present' -b
$ ansible node1 -m command -a 'sudo df -hT'
$ ansible node1 -m command -a 'sudo tail -1 /etc/fstab'
$ ansible node1 -m mount -a 'path=/testdir/ src=/dev/sda1 fstype=xfs opts=rw state=mounted' -b
$ ansible node1 -m command -a 'sudo df -hT'
$ ansible node1 -m command -a 'sudo umount /testdir/'
$ ansible node1 -m raw -a 'echo -e "d" | sudo fdisk /dev/sda'
```



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## 2. Managing Storage Using Ansible Playbooks:

### Parted Module:

We can use parted module in Ansible playbooks to manage the storage space on the disks present on the managed nodes.

```
$ vim storage.yml
```

```
---
```

```
- name: Managing Storage Space Using Ansible
```

```
hosts: node1
```

```
become: true
```

```
tasks:
```

```
- name: Create a new ext4 primary partition on /dev/sda disk
```

```
parted:
```

```
device: /dev/sda
```

```
number: 1
```

```
state: present
```

```
fs_type: ext4
```

```
...
```

```
$ ansible-playbook storage.yml
```

```
$ ansible node1 -m command -a 'lsblk'
```

```
$ ansible node1 -m command -a 'sudo fdisk -l /dev/sda'
```

```
$ vim storage2.yml
```

```
---
```

```
- name: Managing Storage Space Using Ansible
```

```
hosts: node1
```

```
become: true
```

```
tasks:
```

```
- name: Remove partition number 1 created in the previous task
```

```
parted:
```

```
device: /dev/sda
```

```
number: 1
```

```
state: absent
```

```
...
```

```
$ ansible-playbook storage2.yml
```

```
$ ansible node1 -m command -a 'sudo lsblk'
```

```
$ ansible node1 -m command -a 'sudo fdisk -l /dev/sda'
```

```
$ vim storage3.yml
```

```
---
```

```
- name: Managing Storage Space Using Ansible
```

```
hosts: node1
```

```
become: true
```

```
tasks:
```

```
- name: Create a new primary partition with a size of 1GiB
```

```
parted:
```

```
device: /dev/sda
```

```
number: 1
```

```
state: present
```

```
part_end: 1GiB
```

```
...
```



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```
$ ansible-playbook storage3.yml
$ ansible node1 -m command -a 'sudo lsblk'
$ ansible node1 -m command -a 'sudo fdisk -l /dev/sda'
```

```
$ vim storage4.yml
```

```
---
```

```
- name: Managing Storage Space Using Ansible
  hosts: node1
  become: true
  tasks:
    - name: Create a new primary partition for LVM
      parted:
        device: /dev/sda
        number: 2
        flags: [ lvm ]
        state: present
        part_start: 1GiB
```

```
...
```

```
$ ansible-playbook storage4.yml
$ ansible node1 -m command -a 'sudo lsblk'
$ ansible node1 -m command -a 'sudo fdisk -l /dev/sda'
```

```
$ vim storage5.yml
```

```
---
```

```
- name: Managing Storage Space Using Ansible
  hosts: node1
  become: true
  tasks:
    - name: Remove partition number 2 created in the previous task
      parted:
        device: /dev/sda
        number: 2
        state: absent
    - name: Create a new primary partition with a size of 1GiB at disk's end
      parted:
        device: /dev/sda
        number: 3
        state: present
        fs_type: ext3
        part_start: -1GiB
```

```
...
```

```
$ ansible-playbook storage5.yml
$ ansible node1 -m command -a 'sudo lsblk'
$ ansible node1 -m command -a 'sudo fdisk -l /dev/sda'
```



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```
$ vim storage6.yml
```

```
---
```

```
- name: Managing Storage Space Using Ansible
  hosts: node1
  become: true
  tasks:
    - name: Create first partition having GPT label
      parted:
        label: gpt
        state: present
        device: /dev/sda
        number: 6
        name: p1
        flags: [ lvm ]
        part_start: 0%
        part_end: 10%
        unit: '%'
```

```
...
```

```
$ ansible-playbook storage6.yml
```

```
$ ansible node1 -m command -a 'sudo lsblk'
```

```
$ ansible node1 -m command -a 'sudo fdisk -l /dev/sda'
```

## Filesystem Module:

We use filesystem module in Ansible playbooks to create/manage the filesystems on the partitions/disks present on the managed nodes.

```
$ vim filesystem.yml
```

```
---
```

```
- name: Managing Storage Space Using Ansible
  hosts: node1
  become: true
  tasks:
    - name: Create an ext2 filesystem on /dev/sda1
      filesystem:
        fstype: ext2
        dev: /dev/sda1
        force: true
```

```
...
```

```
$ ansible-playbook filesystem.yml
```

```
$ ansible node1 -m command -a 'sudo lsblk -f'
```

```
$ ansible node1 -m command -a 'sudo fdisk -l /dev/sda'
```

```
$ ansible node1 -m command -a 'sudo blkid /dev/sda1'
```

```
$ vim filesystem2.yml
```

```
---
```

```
- name: Managing Storage Space Using Ansible
  hosts: node1
  become: true
  tasks:
    - name: Blank filesystem signature on /dev/sda1
      filesystem:
```





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```
dev: /dev/sda1
state: absent
```

...

```
$ ansible-playbook filesystem2.yml
$ ansible node1 -m command -a 'sudo lsblk -f'
$ ansible node1 -m command -a 'sudo fdisk -l /dev/sda'
$ ansible node1 -m command -a 'sudo blkid /dev/sda1'
```

```
$ vim filesystem3.yml
```

---

```
- name: Managing Storage Space Using Ansible
  hosts: node1
  become: true
  tasks:
    - name: Set/Reset an xfs filesystem UUID on /dev/sda1
      filesystem:
        fstype: xfs
        dev: /dev/sda1
        uuid: generate
```

...

```
$ ansible-playbook filesystem3.yml
$ ansible node1 -m command -a 'sudo lsblk -f'
$ ansible node1 -m command -a 'sudo fdisk -l /dev/sda'
$ ansible node1 -m command -a 'sudo blkid /dev/sda1'
```

## Mount Module:

We use the mount module to make an entry in the /etc/fstab file for the permanent mounts as well as to mount the filesystems.

```
$ vim mount.yml
```

---

```
- name: Managing Storage Space Using Ansible
  hosts: node1
  become: true
  tasks:
    - name: Mount DVD read-only
      ansible.posix.mount:
        path: /tmp
        src: /dev/sr0
        fstype: iso9660
        opts: ro
        state: present
```

...

```
$ ansible node1 -m command -a 'sudo umount /mnt'
$ ansible node1 -m command -a 'sudo df -hT'
$ ansible node1 -m command -a 'sudo grep sr0 /etc/fstab'
$ ansible-playbook mount.yml
$ ansible node1 -m command -a 'sudo df -hT'
$ ansible node1 -m command -a 'sudo grep sr0 /etc/fstab'
```



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```
$ vim mount2.yml
```

```
---
```

```
- name: Managing Storage Space Using Ansible
```

```
hosts: node1
```

```
become: true
```

```
tasks:
```

```
- name: Mount DVD read-only
```

```
  ansible.posix.mount:
```

```
    path: /tmp
```

```
    src: /dev/sr0
```

```
    fstype: iso9660
```

```
    opts: ro
```

```
    state: mounted
```

```
...
```

```
$ ansible-playbook mount2.yml
```

```
$ ansible node1 -m command -a 'sudo df -hT'
```

```
$ ansible node1 -m command -a 'sudo grep sr0 /etc/fstab'
```

---

```
- name: Mount ephemeral SMB volume
```

```
  ansible.posix.mount:
```

```
    src: //192.168.1.200/share
```

```
    path: /mnt/smb_share
```

```
    opts: "rw,vers=3,file_mode=0600,dir_mode=0700,dom={{ ad_domain }},username={{ ad_username }},password={{ ad_password }}"
```

```
    fstype: cifs
```

```
    state: ephemeral
```

---

Thank You

Nehra Classes  
Igniting The Minds