



**Ganpat  
University**

॥ विद्यया समाजोत्कर्षः ॥

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**Branch: CBA**

**Batch:61**

## -----PRACTICAL 04-----

1. Create and format a partition such that it can be used as swap memory, Ensure that the swap memory is persistent change in your memory. The swap memory size must be 1.5 GB.

» Enter serverb as root user either directly or via ssh with workstation and check the disk details and space using **lsblk** :

```
[student@workstation ~]$ ssh root@serverb
Activate the web console with: systemctl enable --now cockpit.socket

This system is not registered to Red Hat Insights. See https://cloud.redhat.com/
To register this system, run: insights-client --register

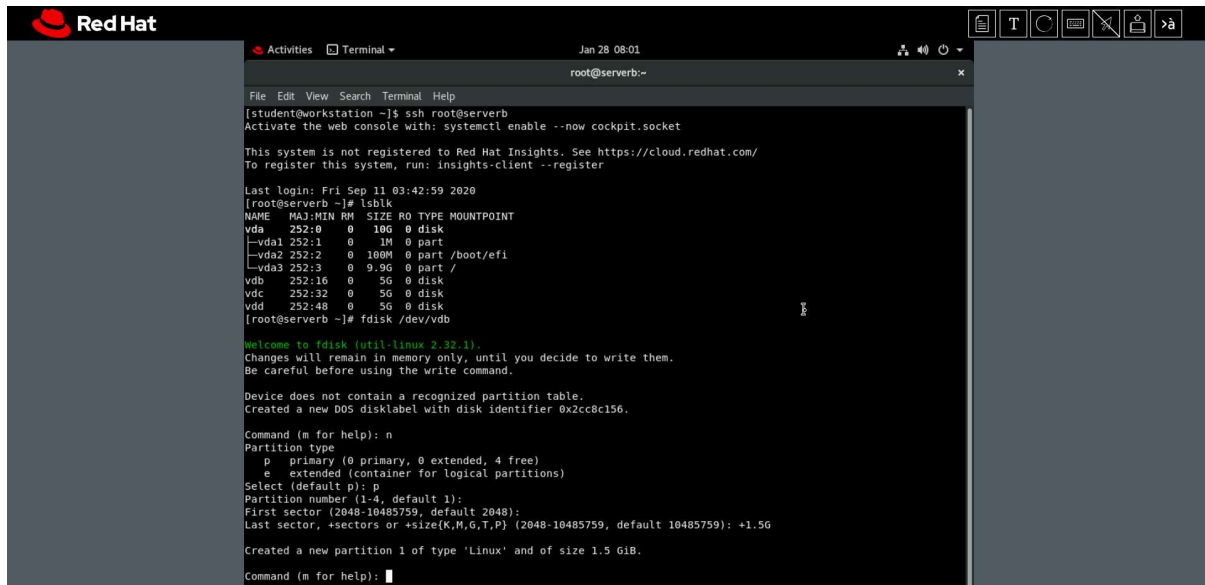
Last login: Fri Sep 11 03:42:59 2020
[root@serverb ~]# lsblk
NAME        MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT
vda         252:0    0   10G  0 disk
├─vda1      252:1    0    1M  0 part
├─vda2      252:2    0  100M  0 part /boot/efi
└─vda3      252:3    0   9.9G  0 part /
vdb         252:16   0    5G  0 disk
vdc         252:32   0    5G  0 disk
vdd         252:48   0    5G  0 disk
[root@serverb ~]#
```

Let's break down the commands we've executed:

The **lsblk** command is used in Unix-like operating systems to list information about block devices attached to the system. It stands for "list block devices." When you run the **lsblk** command

without any options or arguments, it provides a hierarchical view of block devices, which typically include hard drives, solid-state drives, and other storage devices.

## » Create swap partition using fdisk command :



```

Red Hat
Activities Terminal
Jan 28 08:01
root@serverb:~

File Edit View Search Terminal Help
[student@workstation ~]$ ssh root@serverb
Activate the web console with: systemctl enable --now cockpit.socket

This system is not registered to Red Hat Insights. See https://cloud.redhat.com/
To register this system, run: insights-client --register

Last login: Fri Sep 11 03:42:59 2020
[root@serverb ~]# lsblk
NAME MAJ:MIN RM SIZE RO TYPE MOUNTPOINT
vda 252:0 0 10G 0 disk
├─vda1 252:1 0 1M 0 part
├─vda2 252:2 0 100M 0 part /boot/efi
└─vda3 252:3 0 9.9G 0 part /
vdb 252:16 0 5G 0 disk
vdc 252:32 0 5G 0 disk
vdd 252:48 0 5G 0 disk
[root@serverb ~]# fdisk /dev/vdb

Welcome to fdisk (util-linux 2.32.1).
Changes will remain in memory only, until you decide to write them.
Be careful before using the write command.

Device does not contain a recognized partition table.
Created a new DOS disklabel with disk identifier 0x2cc8c156.

Command (m for help): n
Partition type
  p primary (0 primary, 0 extended, 4 free)
  e extended (container for logical partitions)
Select (default p): p
Partition number (1-4, default 1):
First sector (2048-10485759, default 2048):
Last sector, +sectors or +size(K,M,G,T,P) (2048-10485759, default 10485759): +1.5G
Created a new partition 1 of type 'Linux' and of size 1.5 GiB.

Command (m for help):

```

Let's break down the commands we've executed :

1. **fdisk /dev/vdb**: This command opens the **fdisk** utility and specifies the target device as **/dev/vdb**. The utility starts with a message about changes being in memory until you decide to write them.
2. **n**: This command is used to create a new partition. After entering **n**, **fdisk** prompts you for the partition type.
3. When prompted for the partition type, you chose **p** for primary partition.
4. **Partition number (1-4, default 1)**: You're prompted to specify the partition number. You selected the default, which is 1.

5. **First sector (2048–10485759, default 2048)**: This is the starting sector for the new partition. The default is 2048, and you chose to use the default.
6. **Last sector, +sectors or +size{K,M,G,T,P} (2048–10485759, default 10485759)**: Here, you're asked to specify the ending sector of the new partition. You specified **+1.5G**, indicating that the partition should be 1.5 gigabytes in size.
7. **Created a new partition 1 of type 'Linux' and of size 1.5 GiB.:**  
This message confirms that you've successfully created a new primary partition (partition number 1) of type 'Linux' with a size of 1.5 gigabytes.

» **Now, change its type to Linux swap using subcommand of `fdisk, t` :**

```
Command (m for help): p
Disk /dev/vdb: 5 GiB, 5368709120 bytes, 10485760 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: dos
Disk identifier: 0x2cc8c156

Device            Boot Start      End Sectors  Size Id Type
/dev/vdb1          2048 3123199 3121152   1.5G 83 Linux
```

```

Red Hat
Activities Terminal
root@serverb:~
File Edit View Search Terminal Help

Device      Boot Start      End Sectors  Size Id Type
/dev/vdb1    2048 3123199 3121152   1.5G 83 Linux

Command (m for help): t
Selected partition 1
Hex code (type L to list all codes): L

0 Empty                24 NEC DOS             81 Minix / old Lin      bf Solaris
1 FAT12                 27 Hidden NTFS Win     82 Linux swap / Solar
2 XENIX root            39 Plan 9              83 Linux
3 XENIX usr             3c PartitionMagic      84 OS/2 hidden or c6 DRDOS/sec (FAT-
4 FAT16 <32M           40 Venix 80286          85 Linux extended      c7 Syrix
5 Extended              41 PPC PReP Boot       86 NTFS volume set da Non-FS data
6 FAT16                 42 SFS                 87 NTFS volume set db CP/M / CTOS / .
7 HPFS/NTFS/exFAT       4d QNX4.x               88 Linux plaintext     de Dell Utility
8 AIX                   4e QNX4.x 2nd part     8e Linux LVM           df BootIt
9 AIX bootable          4f QNX4.x 3rd part     93 Amoebs              e1 DOS access
a OS/2 Boot Manag       50 OnTrack DM          94 Amoebs BBT           e3 DOS R/O
c W95 FAT32             51 OnTrack DM6 Aux     9f BSD/OS              e4 SpeedStor
e W95 FAT32 (LBA)       52 CP/M                a0 IBM Thinkpad hi    ea Rufus alignment
f W95 Ext'd (LBA)       54 OnTrackDM6          a5 FreeBSD            eb BeOS fs
10 OPUS                 55 EZ-Drive            a7 NextSTEP            ef EFI (FAT-12/16/
11 Hidden FAT12         56 Golden Bow         a8 Darwin UFS          f0 Linux/PA-RISC b
12 Compaq diagnost     5c Priam Edisk         a9 NetBSD              f1 SpeedStor
14 Hidden FAT16 <3     61 SpeedStor          ab Darwin boot        f4 SpeedStor
16 Hidden FAT16         63 GNU HURD or Sys    af HFS / HFS+          f2 DOS secondary
17 Hidden HPFS/NTFS     64 Novell Network     b7 BSDI fs             fb VMware VMFS
18 AST SmartSleep       65 Novell Network     b8 BSDI swap           fc VMware VMKCORE
1b Hidden W95 FAT3      70 DiskSecure Mult    bb Boot Wizard hid     fd Linux raid auto
1c Hidden W95 FAT3      75 PC/IX              bc Acronis FAT32 L    fe LANstep
1e Hidden W95 FAT1      80 Old Minix           be Solaris boot        ff BBT

Hex code (type L to list all codes): 82
Changed type of partition 'Linux' to 'Linux swap / Solaris'.

Command (m for help):

```

Let's break down the commands we've executed :

1. **p**: This command prints the current partition table. It shows information about the newly created partition.
2. **Hex code (type L to list all codes): L**: You are prompted to specify the partition type in hexadecimal format. You enter **L** to list all available codes.
3. After listing all available codes, you change the type of the partition to "Linux swap / Solaris" by entering **82**. This is a common type for swap partitions.

» Now, check the partition table using subcommand **p**, and write the changes using **w**, then use **partprobe** to force kernel re-read partition changes :

```

Red Hat
Activities Terminal Jan 28 08:16 root@serverb:~
File Edit View Search Terminal Help
9 AIX bootable 4f ONX4.x 3rd part 93 Amoeba e1 DOS access
a 05/2 Boot Manag 50 OnTrack DM 94 Amoeba BBT e3 DOS R/O
b W95 FAT32 51 OnTrack DM6 Aux 9f BSD/OS e4 SpeedStor
c W95 FAT32 (LBA) 52 CP/M a0 IBM Thinkpad hi ea Rufus alignment
e W95 FAT16 (LBA) 53 OnTrack DM6 Aux a5 FreeBSD eb BeOS fs
f W95 Ext'd (LBA) 54 OnTrackDM6 a6 OpenBSD ee GPT
10 OPUS 55 EZ-Drive a7 NextSTEP ef EFI (FAT-12/16/
11 Hidden FAT12 56 Golden Bow a8 Darwin UFS f0 Linux/PA-RISC b
12 Compaq diagnost 5c Priam Edisk a9 NetBSD f1 SpeedStor
14 Hidden FAT16 <3 61 SpeedStor ab Darwin boot f4 SpeedStor
16 Hidden FAT16 63 GNU HURD or Sys af HFS / HFS+ f2 DOS secondary
17 Hidden HPFS/NTF 64 Novell Network b7 BSDI fs fb VMware VMFS
18 AST SmartSleep 65 Novell Network b8 BSDI swap fc VMware VMKCORE
1b Hidden W95 FAT3 70 DiskSecure Mult bb Boot Wizard hid fd Linux raid auto
1c Hidden W95 FAT3 75 PC/IX bc Acronis FAT32 L fe LAMstep
1e Hidden W95 FAT1 80 Old Minix be Solaris boot ff BBT
Hex code (type L to list all codes): 82
Changed type of partition 'Linux' to 'Linux swap / Solaris'.

Command (m for help): p
Disk /dev/vdb: 5 GiB, 5368709120 bytes, 10485760 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: dos
Disk identifier: 0x2cc8c156

Device Boot Start End Sectors Size Id Type
/dev/vdb1 2048 3123199 3121152 1.5G 82 Linux swap / Solaris

Command (m for help): w
The partition table has been altered,
calling ioctl() to re-read partition table.
Syncing disks.

[root@serverb ~]# partprobe
[root@serverb ~]#

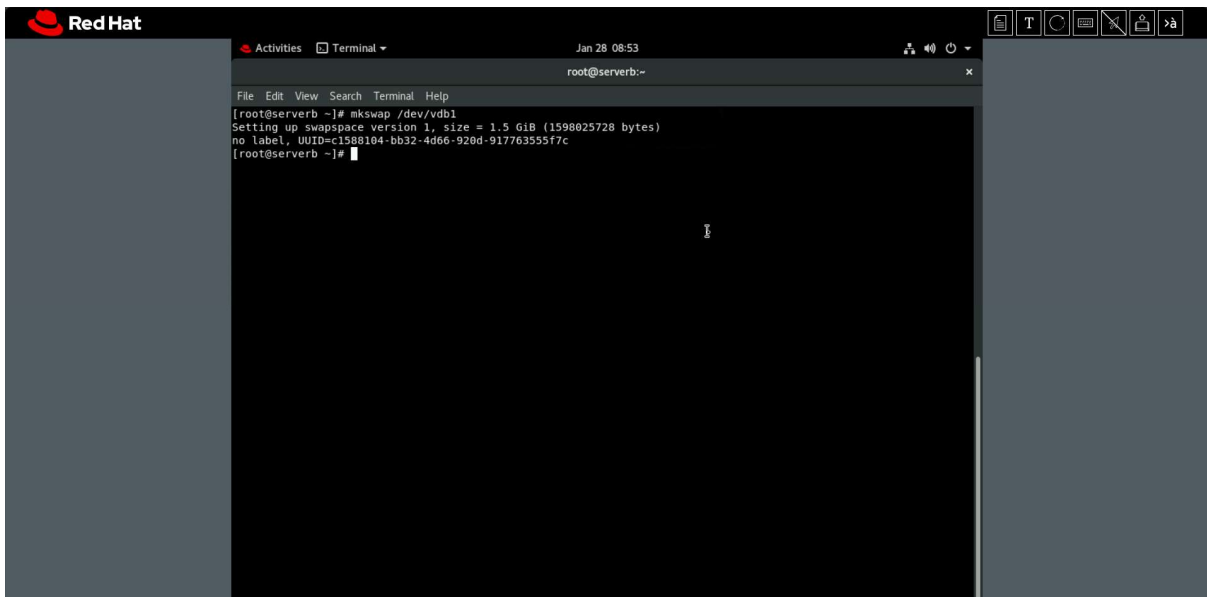
```

Let's break down the commands we've executed :

1. **p**: This command, when entered in **fdisk**, prints the current partition table for the specified device (**/dev/vdb** in this case). The output shows information about the partitions on the disk, including their start and end sectors, size, and type. The partition table displayed confirms that you've created a new partition (**/dev/vdb1**) with the type "Linux swap / Solaris" and a size of 1.5 gigabytes.
2. **w**: This command is used to write the changes to the disk and exit **fdisk**. After you've made the necessary changes to the partition table (in this case, creating a new partition), you use **w** to save those changes. Upon executing this command, the partition table is altered, and **fdisk** calls **ioctl()** to re-read the partition table. The **Syncing disks** message indicates that the changes are being synchronized and written to the disk.

3. **partprobe**: After using **fdisk** to modify the partition table, the **partprobe** command is often used to inform the operating system kernel about the changes. This ensures that the kernel recognizes the new or modified partitions without requiring a system reboot. In your case, it seems like you entered the **partprobe** command, but the output is not shown. After running **partprobe**, the system should be aware of the changes made to the partition table.

» **Afterwards, assign swap partition to the system and write entry in fstab :**



```

Red Hat
Activities Terminal Jan 28 08:53 root@serverb:~
File Edit View Search Terminal Help
[root@serverb ~]# mkswap /dev/vdb1
Setting up swapspace version 1, size = 1.5 GiB (1598025728 bytes)
no label, UUID=c1588104-bb32-4d66-920d-91776355f7c
[root@serverb ~]#

```

Let's break down the commands we've executed :

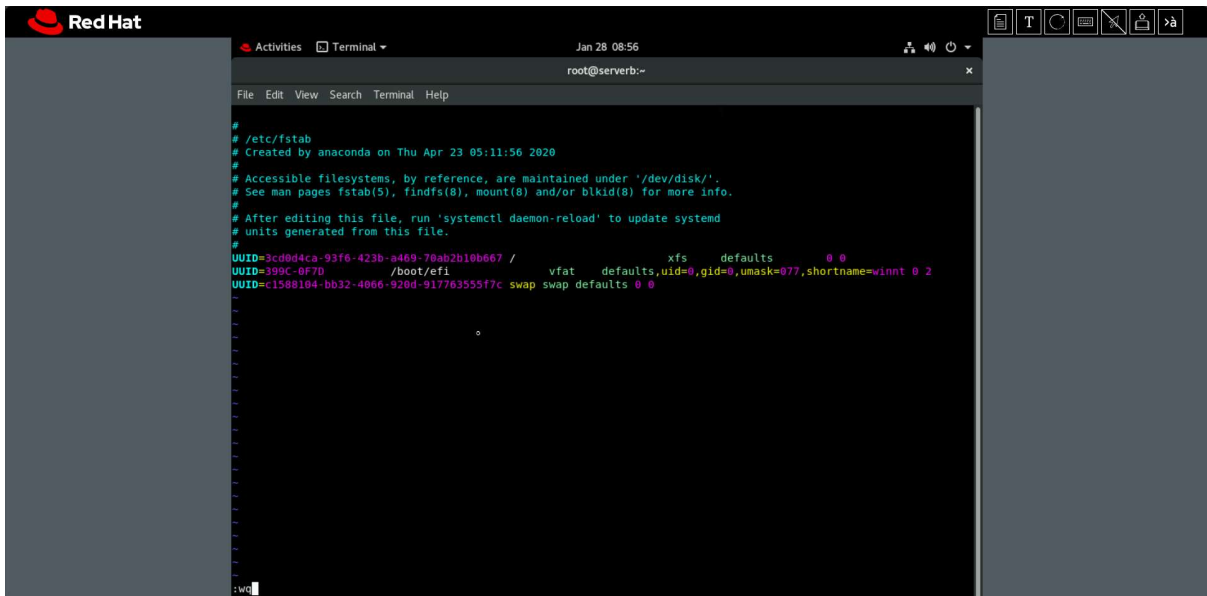
The command **mkswap /dev/vdb1** is used to set up a Linux swap area on the specified partition, **/dev/vdb1**. Here's an explanation of the output :

1. **Setting up swapspace version 1, size 1.5 GiB (1598025728 bytes)**: This message indicates that the **mkswap** command is creating a swap space with version 1 of the swapspace format. The size of the swap space is specified

as 1.5 gigabytes (GiB), and the corresponding size in bytes is given as 1598025728 bytes.

2. **no label, UUID=c1588104-bb32-4066-920d-917763555f7c :**

This part of the output provides information about the swap space. It mentions that there is no label assigned to the swap space, and it provides a Universally Unique Identifier (UUID) for the swap space. The UUID is a unique identifier that can be used to reference the swap space, and it is useful for system configuration.



```

# /etc/fstab
# Created by anaconda on Thu Apr 23 05:11:56 2020
#
# Accessible filesystems, by reference, are maintained under '/dev/disk/'.
# See man pages fstab(5), findfs(8), mount(8) and/or blkid(8) for more info.
#
# After editing this file, run 'systemctl daemon-reload' to update systemd
# units generated from this file.
#
UUID=3cd8d4ca-93f6-423b-a468-78ab2b10b667 / xfs defaults 0 0
UUID=389c-0f7d /boot/efi vfat defaults,uid=0,gid=0,umask=077,shortname=winnt 0 2
UUID=c1588104-bb32-4066-920d-917763555f7c swap swap defaults 0 0

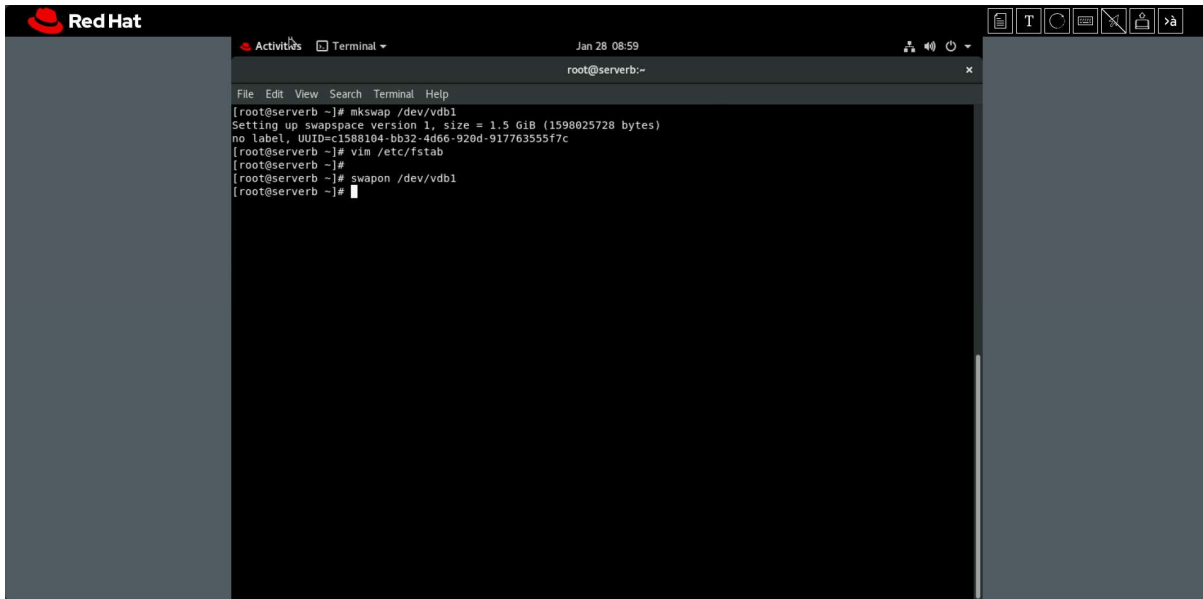
```

**By using command:** `vim /etc/fstab`

**Enter below line as per your UUID :**

**UUID=c1588104-bb32-4066-920d-917763555f7c swap swap defaults 0 0**

## » Turn on the swap usage using the command swapon :

A terminal window from a Red Hat system. The window title is "Terminal" and it shows the user is root at a server. The terminal output shows the execution of the 'mkswap' command on '/dev/vdb1', which sets up a swap space of 1.5 GiB. It then shows the execution of the 'swapon' command on '/dev/vdb1' to activate the swap space. The terminal text is as follows:

```
File Edit View Search Terminal Help
[root@serverb ~]# mkswap /dev/vdb1
Setting up swapspace version 1, size = 1.5 GiB (1598025728 bytes)
no label, UUID=c1588104-bb32-4d66-920d-917763555f7c
[root@serverb ~]# vim /etc/fstab
[root@serverb ~]#
[root@serverb ~]# swapon /dev/vdb1
[root@serverb ~]#
```

Let's break down the commands we've executed :

The **swapon /dev/vdb1** command is used to activate a swap partition on a Linux system. Here's what this command does:

- **swapon:** This command is used to enable swapping on a specified device or file.
- **/dev/vdb1:** This argument specifies the device (in this case, a partition) on which the swap space is located. In the context of your command, **/dev/vdb1** refers to the swap partition you previously created and formatted using the **mkswap** command.



» **Reboot the device and check if the changes are successful :**

```

Red Hat
Activities Terminal Jan 28 09:03
root@serverb:~

File Edit View Search Terminal Help

[root@serverb ~]# mkswap /dev/vdb1
Setting up swapspace version 1, size = 1.5 GiB (1598025728 bytes)
no label, UUID=c1588104-bb32-4d66-920d-917763555f7c
[root@serverb ~]# vim /etc/fstab
[root@serverb ~]#
[root@serverb ~]# swapon /dev/vdb1
[root@serverb ~]# reboot
Connection to serverb closed by remote host.
Connection to serverb closed.
[student@workstation ~]$ ssh root@serverb
ssh: connect to host serverb port 22: No route to host
[student@workstation ~]$ ssh root@serverb
ssh: connect to host serverb port 22: No route to host
[student@workstation ~]$ ssh root@serverb
Activate the web console with: systemctl enable --now cockpit.socket

This system is not registered to Red Hat Insights. See https://cloud.redhat.com/
To register this system, run: insights-client --register

Last login: Sun Jan 28 08:50:17 2024 from 172.25.250.9
[root@serverb ~]# lsblk
NAME MAJ:MIN RM SIZE RO TYPE MOUNTPOINT
vda 252:0 0 10G 0 disk
├─vda1 252:1 0 1M 0 part
├─vda2 252:2 0 180M 0 part /boot/efi
├─vda3 252:3 0 9.9G 0 part /
vdb 252:16 0 5G 0 disk
├─vdb1 252:17 0 1.5G 0 part
vdc 252:32 0 5G 0 disk
vdd 252:48 0 5G 0 disk
[root@serverb ~]#

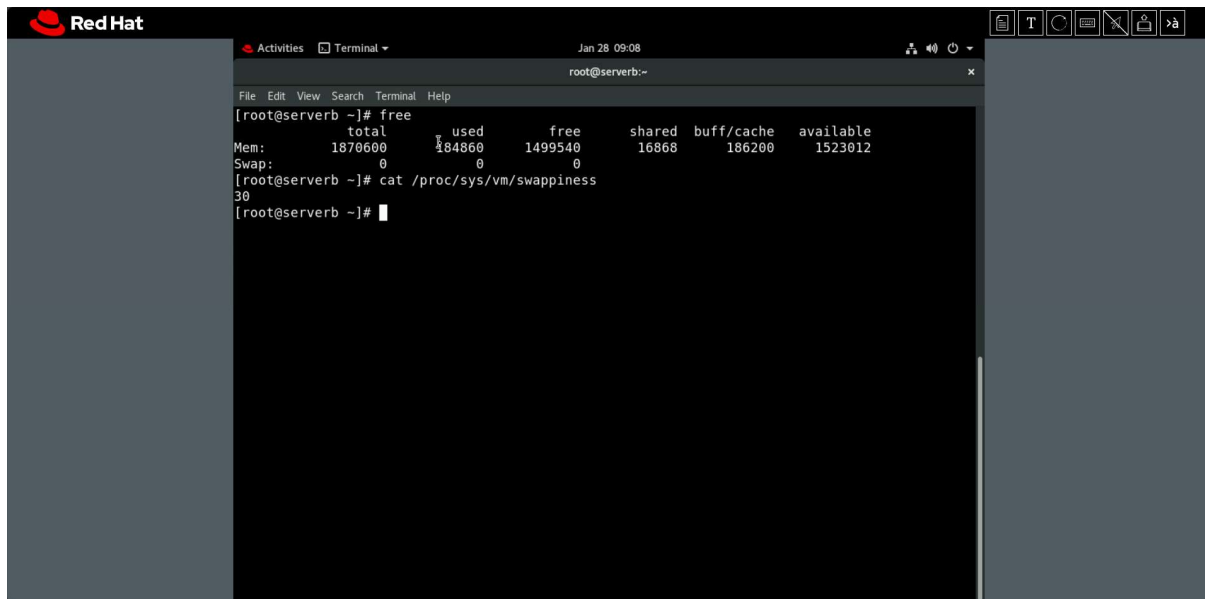
```

**command:** `reboot`

**command:** `ssh root@serverb`

**command:** `lsblk`

## 2. Demonstrate how to check the swap memory usage details.



```

[root@serverb ~]# free
              total        used        free      shared  buff/cache   available
Mem:      1870600      184860      1495540       16868       186200      1523012
Swap:              0              0              0
[root@serverb ~]# cat /proc/sys/vm/swappiness
30
[root@serverb ~]#

```

Let's break down the commands we've executed:

### 1. **free** :

- **free** is a command used to display information about the system's total, used, and free memory. The output typically shows both physical (RAM) and swap memory usage.
- The output is divided into two sections: "Mem" for physical memory and "Swap" for swap space.

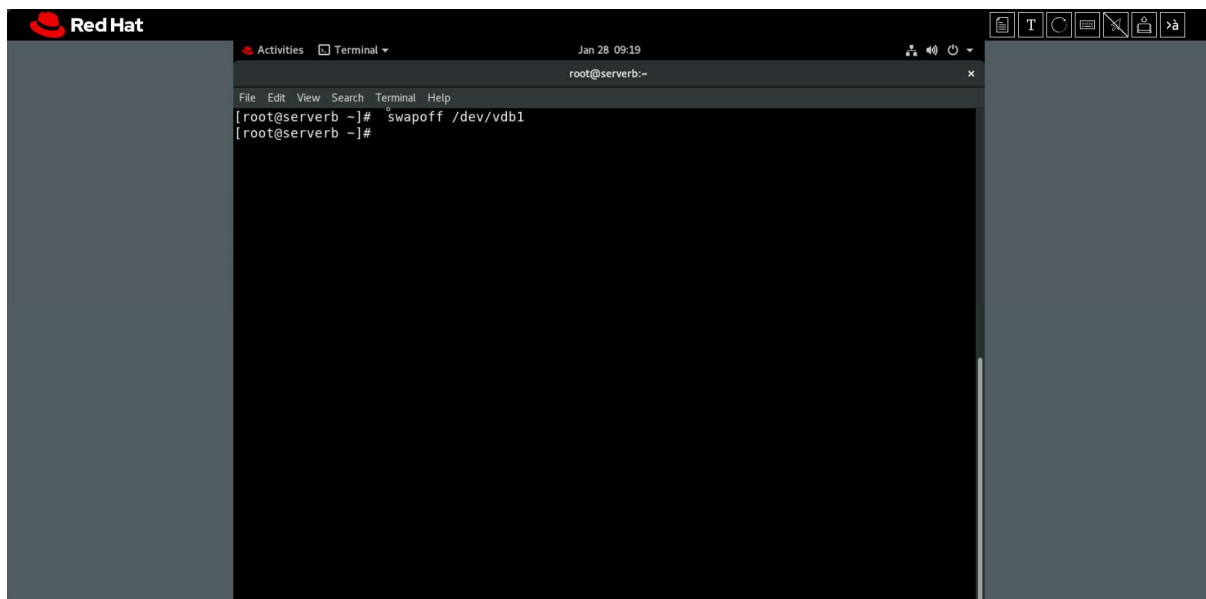
### 2. **cat /proc/sys/vm/swappiness** :

- **cat** is a command that displays the content of a file. In this case, it's used to display the value of the **swappiness** parameter.
- **/proc/sys/vm/swappiness** is a kernel parameter that controls the tendency of the system to use swap space. It represents the willingness of the system to swap out programs from physical memory to swap space.

- The value **30** indicates the current swappiness value. Swappiness values range from 0 to 100, with lower values (e.g., 0) meaning the system is less likely to swap programs out of memory, and higher values (e.g., 100) meaning the system is more likely to use swap space.
- In this case, a swappiness value of 30 suggests a moderate level of willingness to use swap space.

3. **Delete the created swap memory partition on server B and ensure it is a persistent configuration .**

» **First, turn off the swap parition, if it is in use :**

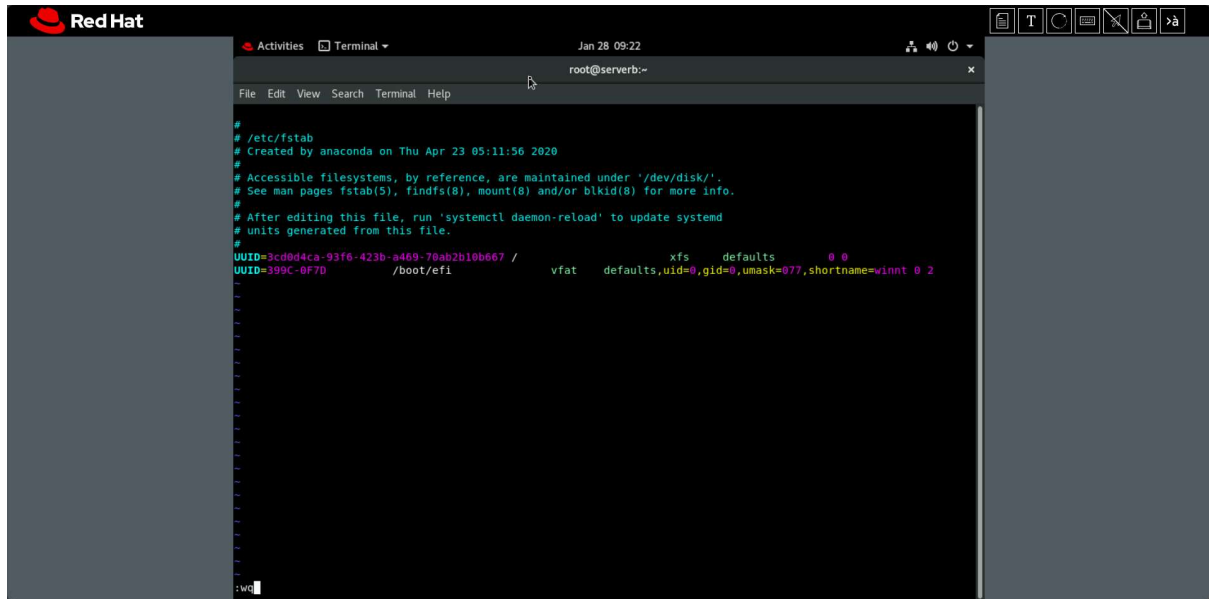
A screenshot of a Red Hat terminal window. The window title is "Red Hat" and "Terminal". The terminal shows the command `swapoff /dev/vdb1` being executed. The prompt is `[root@serverb ~]#`. The output is `[root@serverb ~]#`.

```
Red Hat
Activities Terminal Jan 28 09:19 root@serverb:~
File Edit View Search Terminal Help
[root@serverb ~]# swapoff /dev/vdb1
[root@serverb ~]#
```

Let's break down the commands we've executed :

The **`swapoff /dev/vdb1`** command is used to deactivate or turn off the swap space located on the specified device, in this case, **`/dev/vdb1`**

## » Remove its entry from fstab :



```

# /etc/fstab
# Created by anaconda on Thu Apr 23 05:11:56 2020
#
# Accessible filesystems, by reference, are maintained under '/dev/disk/'.
# See man pages fstab(5), findfs(8), mount(8) and/or blkid(8) for more info.
#
# After editing this file, run 'systemctl daemon-reload' to update systemd
# units generated from this file.
#
UUID=3cd8d4ca-93f6-423b-a469-70ab2b10b667 / xfs defaults 0 0
UUID=399C-0F70 /boot/efi vfat defaults,uid=0,gid=0,umask=077,shortname=winnt 0 2

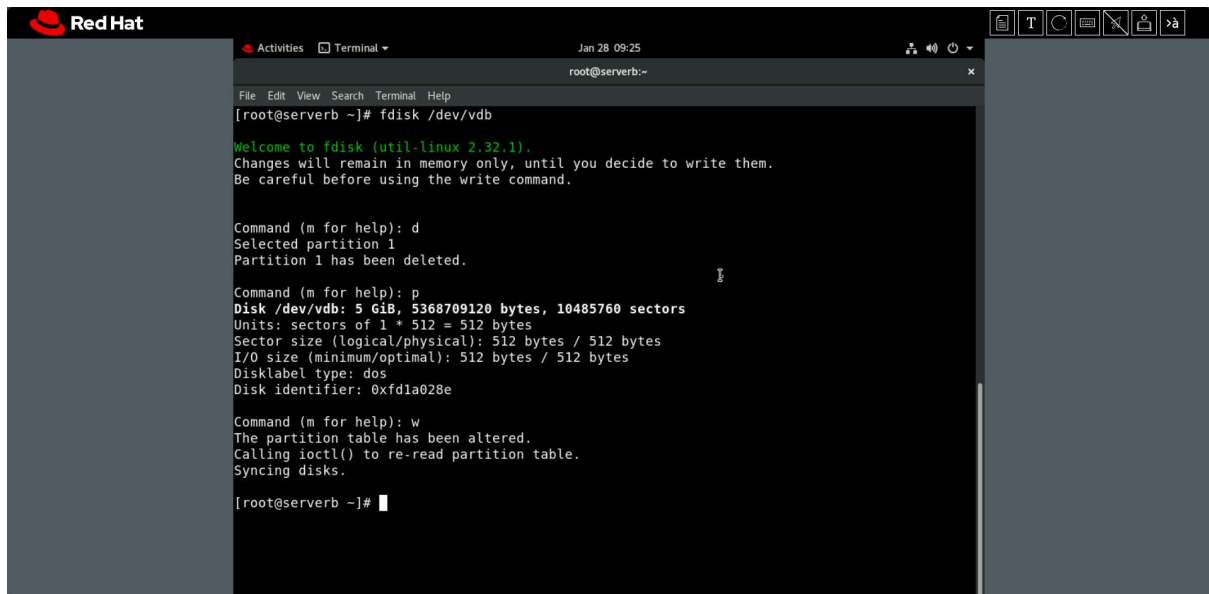
```

**By using command :** `vim /etc/fstab`

Remove below line :

**UUID=c1588104-bb32-4066-920d-917763555f7c swap swap  
defaults 0 0**

## » Delete the partition using fdisk :



```

[root@serverb ~]# fdisk /dev/vdb

Welcome to fdisk (util-linux 2.32.1).
Changes will remain in memory only, until you decide to write them.
Be careful before using the write command.

Command (m for help): d
Selected partition 1
Partition 1 has been deleted.

Command (m for help): p
Disk /dev/vdb: 5 GiB, 5368709120 bytes, 10485760 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: dos
Disk identifier: 0x1a028e

Command (m for help): w
The partition table has been altered.
Calling ioctl() to re-read partition table.
Syncing disks.

[root@serverb ~]#

```

**By using command :** `fdisk /dev/vdb`

Let's break down the commands we've executed :

### 1. **fdisk /dev/vdb:**

- This command launches the **fdisk** utility and specifies the device **/dev/vdb** for partitioning.

### 2. **d:**

- This is the **fdisk** command to delete a partition. After entering **d**, you are prompted to select which partition to delete. In this case, you selected partition 1.

### 3. **p:**

- After deleting the partition, you use **p** to print the updated partition table. This shows information about the disk, indicating that partition 1 has been deleted.

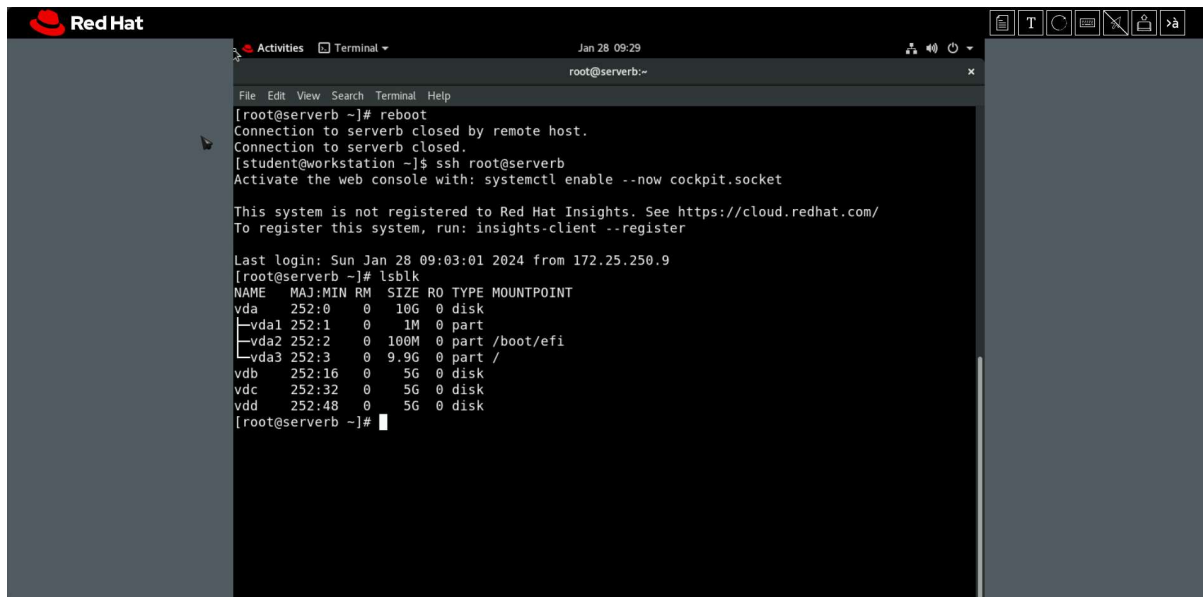
### 4. **W:**

- This command is used to write the changes to the disk and exit **fdisk**. It saves the changes made to the partition table. After entering **W**, **fdisk** alters the partition table, calls **ioctl()** to re-read the partition table, and then syncs disks.
- Note: The uppercase **W** is used for writing changes, while the lowercase **w** would be used for writing changes and immediately exiting **fdisk**.

### 5. The final output:

- The last lines of the output indicate that the partition table has been altered, and the system is syncing disks to ensure that the changes are written to the physical disk.

» **Reboot and check the block device details using lsblk, ensuring the partition is deleted successfully :**

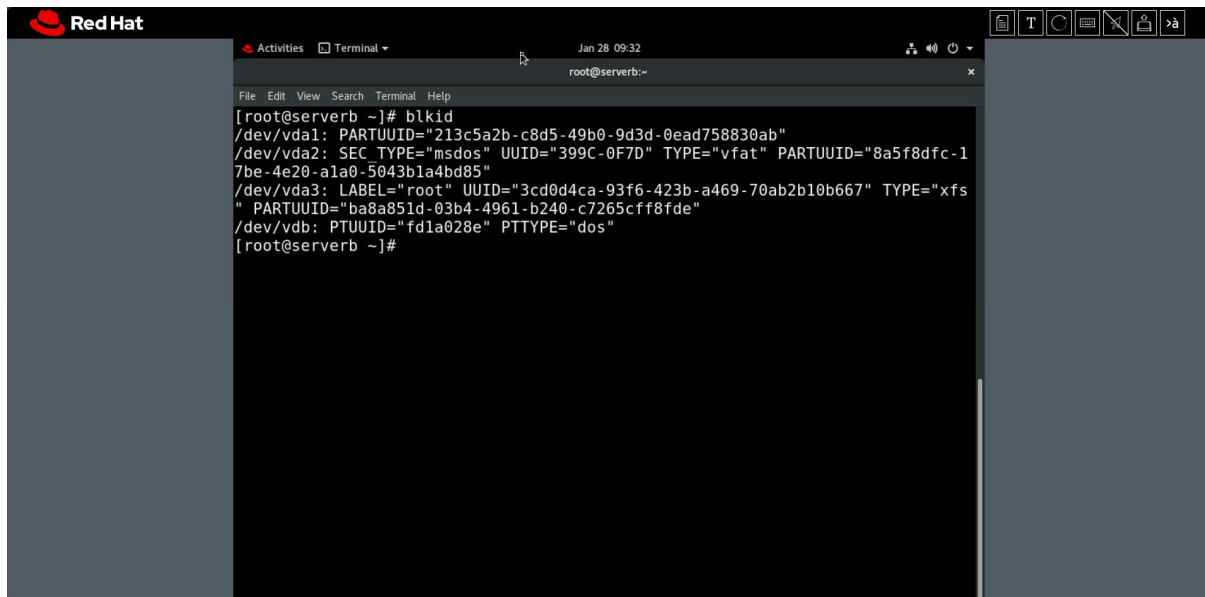
A terminal window titled 'Red Hat' with a menu bar (File, Edit, View, Search, Terminal, Help) and a status bar (Jan 28 09:29, root@serverb:~). The terminal shows a sequence of commands and their outputs: a 'reboot' command, connection closure messages, an SSH login from a workstation, a 'systemctl enable --now cockpit.socket' command, a Red Hat Insights registration notice, a login timestamp, and the execution of 'lsblk' which displays a table of block devices.

```
[root@serverb ~]# reboot
Connection to serverb closed by remote host.
Connection to serverb closed.
[student@workstation ~]$ ssh root@serverb
Activate the web console with: systemctl enable --now cockpit.socket

This system is not registered to Red Hat Insights. See https://cloud.redhat.com/
To register this system, run: insights-client --register

Last login: Sun Jan 28 09:03:01 2024 from 172.25.250.9
[root@serverb ~]# lsblk
NAME        MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT
vda         252:0    0   10G  0 disk
├─vda1      252:1    0    1M  0 part
├─vda2      252:2    0  100M  0 part /boot/efi
└─vda3      252:3    0   9.9G  0 part /
vdb         252:16   0    5G  0 disk
vdc         252:32   0    5G  0 disk
vdd         252:48   0    5G  0 disk
[root@serverb ~]#
```

#### 4. Using which command you will be able to get the partition ID of the created partition?



```

[root@serverb ~]# blkid
/dev/vda1: PARTUUID="213c5a2b-c8d5-49b0-9d3d-0ead758830ab"
/dev/vda2: SEC_TYPE="msdos" UUID="399C-0F7D" TYPE="vfat" PARTUUID="8a5f8dfc-17be-4e20-a1a0-5043b1a4bd85"
/dev/vda3: LABEL="root" UUID="3cd0d4ca-93f6-423b-a469-70ab2b10b667" TYPE="xfs" PARTUUID="ba8a851d-03b4-4961-b240-c7265cff8fde"
/dev/vdb: PTUUID="fd1a028e" PTTYPE="dos"
[root@serverb ~]#
  
```

Let's break down the commands we've executed :

The **blkid** command is used to display information about block devices, specifically their UUIDs (Universally Unique Identifiers) and other attributes. Here's the explanation of the output:

##### 1. **/dev/vda1:**

- This represents a block device, and its **PARTUUID** is "213c5a2b-c8d5-49b0-9d3d-0ead758830ab."

##### 2. **/dev/vda2:**

- This represents a partition on the first disk (**vda**). It has the following attributes:
  - **SEC\_TYPE:** "msdos" (indicating the partition table type).
  - **UUID:** "399C-0F7D" (a unique identifier for the file system).

- **TYPE:** "vfat" (indicating the file system type is FAT32).
- **PARTUUID:** "8a5f8dfc-17be-4e20-ala0-5043b1a4bd85" (a unique identifier for the partition).

### 3. **/dev/vda3:**

- This represents another partition on the first disk (**vda**). It has the following attributes:
  - **LABEL:** "root" (a label associated with the file system).
  - **UUID:** "3cd0d4ca-93f6-423b-a469-70ab2b10b667" (a unique identifier for the file system).
  - **TYPE:** "xfs" (indicating the file system type is XFS).
  - **PARTUUID:** "ba8a851d-03b4-4961-b240-c7265cff8fde" (a unique identifier for the partition).

### 4. **/dev/vdb:**

- This represents another block device (likely a whole disk), and it has the following attributes:
  - **PTUUID:** "fd1a028e" (a unique identifier for the partition table).
  - **PTTYPE:** "dos" (indicating the partition table type is MBR/DOS).