

**GETTING STARTED
WITH
VIRTUAL MEMORY**

➤ VIRTUAL MEMORY:

- Virtual Memory also be called as **swap space**.
- In Linux, a swap space is used as a “**scratch space**” for the system.
- Swap space in Linux is used when the amount of physical memory (RAM) is full. If the system needs more memory resources and the RAM is full, inactive pages in memory are moved to the swap space.
- While swap space can help machines with a small amount of RAM, it should not be considered a replacement for more RAM.
- Swap space is located on hard drives, which have a slower access time than physical memory.
- Swap space can be a dedicated:
 - swap partition (recommended)
 - swap file, or a combination of swap partitions and swap files.

RECOMMENDED SYSTEM SWAP SPACE:

- The recommended size of a swap partition depends on the amount of RAM in your system and whether you want sufficient memory for your system to hibernate.
- The recommended swap partition size is set automatically during installation.

Amount of RAM in the system	Recommended swap space
≤ 2 GB	2 times the amount of RAM
> 2 GB – 8 GB	Equal to the amount of RAM
> 8 GB – 64 GB	At least 4 GB
> 64 GB	At least 4 GB

SWAP PARTITION:

- Swap Space is a space on hard disk which is a **substitute of physical memory**.
- It is located on **hard drives**, which have a slower access time than physical memory. Swap space can be a dedicated swap partition (recommended).

→ **Create a partition with 2GB:**

```
#fdisk /dev/nvme0n1
```

Changed type of partition 'Linux filesystem' to 'Linux swap'

→ **Format the new swap space:**

```
#mkswap -f /dev/nvme0n1p6
```

→ **Add the following entry to the /etc/fstab file:**

```
/dev/nvme0n1p6 none swap defaults 0 0
```

→ **Regenerate mount units so that your system registers the new configuration:**

```
#systemctl daemon-reload
```

```
#mount -v /dev/nvme0n1p6
```

→ **Verification of the swap:**

```
#cat /proc/swaps
```

```
#free -h
```

(or)

→ **To turn off all swaps and turn on it:**

```
#swapoff -a
```

```
#swapon -a
```

→ **To turn off only particular swap:**

```
#swapoff /dev/nvme0n1p6
```

```
#swapon /dev/nvme0n1p6
```

SWAP FILE:

- You can create a swap file to create a temporary storage space on a hard disk when the system runs low on memory.
- The size of the new swap file in Megabytes and Multiply by 1024 to determine the number of blocks.
- Example, the block size of a **64 MB** swap file is **65536**.

→ **Create an empty swap file:**

```
#dd if=/dev/zero of=/opt/swap-file bs=1024 count=1000000  
#ls -l /opt/swap-file
```

→ **Change the security of the swap file so it is not world readable.**

```
#chmod 0600 /opt/swap-file
```

→ **Set up the swap file with the command:**

```
#mkswap /opt/swap-file
```

→ **Edit “/etc/fstab” file with the following entries at boot time:**

```
/opt/swap-file    none    swap    defaults    0 0  
#systemctl-daemon reload  
#mount -a
```

→ **To turn a swapfile:**

```
#swapon /opt/swap-file  
#cat /proc/swaps  
#free -h
```

→ **To turn off all swaps and turn on it:**

```
#swapoff -a  
#swapon -a  
#free -h
```