# **RAID: Redundant Array of Independent Disks**

* RAID is a collection of disks in a pool to become a logical volume.
* Earlier, RAID was called Redundant Array of Inexpensive Disks.
* Redundant: RAID provides redundancy for data.
* Array: Independent disks are combined together to make a logical volume and group of disks are called an array. This array appears to the system as a single logical volume.
* Independent Disks: Each and every disk is independent.
* The main purpose of RAID is to provide data redundancy and higher performance by combining two or most disks in different patterns to achieve desired outcome.

## **Who should use RAID:**

* System administrators and others who manage large amount of data who needs
* Enhanced speed
* Bigger storage capacity using a single virtual disk
* Minimized disk failure.

## **Advantages:**

1. Redundancy:

* Redundancy means to increase availability of data.
* In certain failure conditions, RAID allows to access data even in disk failures and allows the system to continue function as it does in normal condition until false part gets replaced.
* Note that it is not a backup mechanism.
* For achieving higher redundancy, same data is stored on more than one disks to avoid data loss in disk failures.

1. Performance:

* With RAID, data is redundant and distributed, multiple disks can be consulted for reading/writing operations so it will result into higher output.
* For achieving higher performance, data is striped into chunks and stored on more than one disks.

## **Disadvantages:**

1. Increased Management complexity:

* It will increase burden on managing different RAID levels.

1. Reduction in available capacity:

* As same data is stored on more than one disks, it will reduce total free space of disks.

1. Higher risk of total data loss:

* Depending on different RAID levels and having much focus on performance without concerning redundancy, it will increase risk of total data loss.
* In case, data is not redundant, data is divided into chunks and stored on multiple disks, in such a scenario, total data will be lost during disk failures if no backup mechanism is set for data.

## **How Data is accessed in RAID:**

* RAID consistently distributes data across each disk in the array.
* RAID then breaks down the data into chunks.
* Each chunk is then written to a hard disk in the array according to RAID level.
* When data is read, RAID gives illusion to system that multiple disks in the array are actually one large disk (volume).

## **Hardware and software RAID**

## **Terminology:**