MBR v/s GPT Partition in OS

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A partitioning scheme in an operating system is a way of structuring and organizing data and partitions in the computer's storage devices like hard disk drives (HDD) or solid-state drives (SDD).

> *"To simply put, before we can allocate, store and manipulate data on our storage medium, we need to partition it. We can define the partitioning by using these partitioning schemes"*

In this article, we'll look at two commonly used partitioning schemes in OS: Master Boot Record (MBR) and GUID Partition Table (GPT).

What is MBR Partition?

MBR stands for – Master Boot Record. It is a partitioning scheme for storage medium of our computer system typically an HDD or SSD. It consist of crucial information to load the operating system and also locate partitions of the storage medium.

- MBR contains information about hard disk partitions, it also contains program which tells how to load the operating system.
- It is a term that represents the first sector of the storage medium.
- It uses 32-bit logical block address and allocates 512 bytes per unit of partitions which limits its capacity only up to 2 TB (Tera Bytes).

How Does MBR Work?

- The computer system is turned on, it loads the BIOS from ROM(Read Only Memory)
- BIOS contains the code to locate and execute the MBR and other partitions on hard disk.
- Now the control shifts to the MBR and it loads the OS and other hardware devices of our PC.

Limitations

- **Disk Capacity:** MBR can only handle up to 2 TB of data.
- **No in-built error detection:** Unlike GPT it doesn't have any inbuilt mechanism for error detection which can lead to data corruption
- **Compatibility with Legacy BIOS:** Unified Extensive Firmware (UEFI) is slowly replacing the BIOS, hence its generally compatible with older computers.

What is GPT Partition?

GPT stands for GUID (Globally Unique Identifier) Partition Table. It is a modern partition scheme that offers more versatile functionality compared to MBR partitioning scheme. Following are keypoints on GPT Partitioning scheme :-

- Unlike MBR, GPT uses a 64-bit logical block address and 128 bytes per unit for partitions that allows it to deal with capacity beyond 2 Tera bytes, and handle up to **9.4 zeta bytes** of data.
- It functions well along with the UEFI (Unified Extensible Firmware Interface) based modern systems.
- It uses a special partition on disk which is – EFI (Extensible Firmware Interface) to load the OS, unlike MBR which uses the master boot program.
- It also has an inbuilt mechanism to deal with error detection and resolve error on its own.

MBR v/s GPT Partition

Below is parameter based differences between MBR and GPT Schemes :-

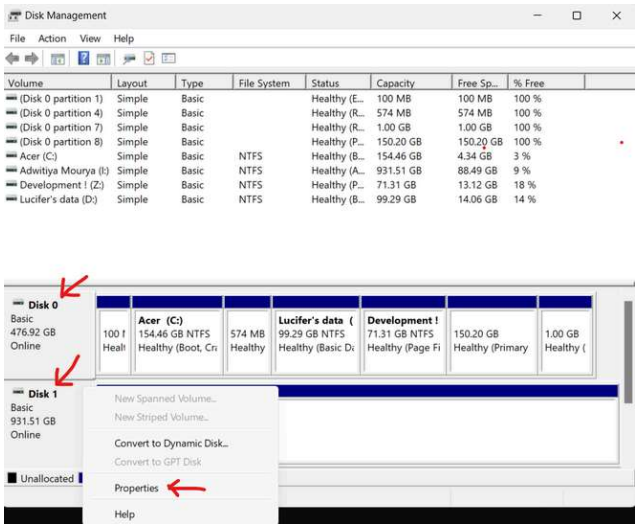
Parameter	MBR	GPT
Definition	MBR is an older partitioning scheme that divides the disk in two types of partitions – primary and extended	GPT is a modern partitioning scheme that theoretically doesn't have any limitations on number of partitions but is limited only by the OS.
Boot Loader used	Master Boot Program stored at first sector of the disk	A special partition called – EFI, especially allocated for loading the OS.
Addressing Scheme	It uses 32-bit addressing scheme limiting the storage capacity to at most 2TB	It uses 64-bit addressing capable of dealing with 9.4 zeta bytes of storage capacity
Compatibility	It is commonly used with Legacy BIOS based sytems	It is commonly used with modern UEFI based systems
Partition Limitation	It supports a maximum of 4 primary partitions	Upto 128 partitions
Data Integrity	It doesn't support error detection mechanism and is less secure	It supports CRC-32 error detection mechanism
Data Recovery	No built-in mechanism for data recovery in this scheme	GPT stores the identical copy at the end of the disk of the partition table which is allocated in the beginning of

Parameter	MBR	GPT
		the disk. It can be used incase of data corruption for recovery.

How to Check Windows OS Scheme?

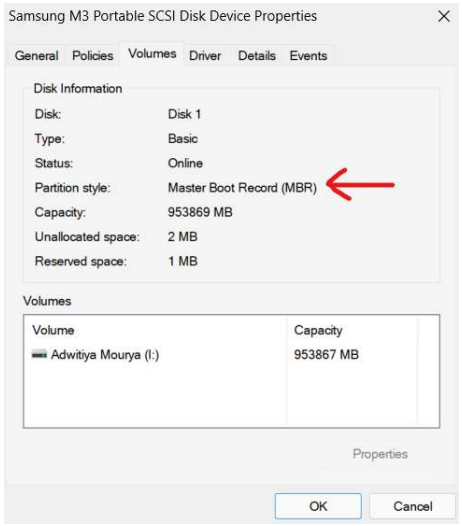
1. Go to Disk Management by pressing – Windows Key + X. Select Disk Management.

2. Right click on the disk, whose scheme you want to check and select 'properties' :-



Select Disk

3. Go to the "Volume" Tab, and there you'll see the Partition Scheme Section.



Conclusion

In conclusion, the partitioning schemes are by definition the process of dividing the partitions and organizing the structure of the storage device to effectively utilize the data storage on computer system. However, looking at benefits and modern evolving technology, we can say that GPT partitioning scheme is slowly replacing the MBR scheme.

- The need to store data keeps rising above and it is essential to have a larger base capacity of the system.
- The inbuilt security and data recovery mechanism of GPT partition makes it a better choice
- However, if you’re temporarily installing an experimental operating system in dual boot mode you can use the MBR scheme if you want.