



Managing Internal Drives

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Internal Storage

Internal storage is the RAID-protected storage that is directly attached to the system. The internal drives can be of different sizes and use different technologies. The IBM Storwize, IBM Storage Array, and IBM SAN Volume Controllers support a range of enterprise-class, nearline-class, or flash drives and they automatically detect internal drives that are attached to them.

Internal drives can be designated as either a member, a candidate, or a spare.

- **Member**—The drive that is in used state.
- **Candidate**—The drive can be used to create an array or changed to a spare drive.
- **Spare**—The system uses this drive to replace a failed drive. Spares can also be used to replace faulty drives.

You can view the list of internal drives and their properties in the **Internal Drives** report for that selected account in Cisco UCS Director. The report displays the following physical and logical properties of all internal drives, and the details of drive slots of an IBM Storwize, IBM Storage Array, or IBM SAN Volume Controller:

- **Drive ID**—The system assigned identifier for the drive.
- **Status**—Reports the availability between the system and the drive.
- **Use**—The current use or role of the drive. This attribute determines if the drive can be formed into an array.
- **Technology Type**—The technology type of the drive as either flash, enterprise, and nearline drives.
- **Capacity**—The total amount of usable space that is available on the drive.
- **MDisk ID**—The identifier for the MDisk.
- **MDisk Name**—The name of the MDisk that uses the drive.

- Member ID—The position of the drive in the array.
- Enclosure ID—The identifier for the enclosure that contains the drive slot.
- Slot ID—The location of the drive within its enclosure.

Internal Storage RAID Configurations

Internal drives are configured into RAID (Redundant Array of Independent Disks) arrays and presented as MDisks to the system. When a RAID member (drive) of an array fails, the system automatically replaces the failed member with a hot-spare drive and re-synchronizes the array to restore its redundancy.

- RAID-0—Provides no protection against drive failures which can be used for only temporary volumes. You require a minimum of two drives for this RAID level.
- RAID-1—Mirrors data for good performance and provides protection against drive failures. You require a minimum of two drives for this RAID level.
- RAID-5—Protects against a single drive failure. Data and one strip of parity are striped across all array members. You require a minimum of three drives for this RAID level and a maximum of 16 drives.
- RAID-6—Protects against two drive failures. Data and two strips of parity are striped across all array members. You require a minimum of five drives for this RAID level and a maximum of 16 drives.
- RAID-10—Provides good performance and protects against at least one drive failure. All data is mirrored on two array members. You require a minimum of two drives for this RAID level and a maximum of 16 drives.