

COMPLETE GUIDE TO SERVER RAID

A Basic Guide



Storage capacity is one of the most important factors related to server performance. RAID is essential for servers to provide greater data protection and storage performance. As storage needs increase, you may need RAID configuration to benefit your business.

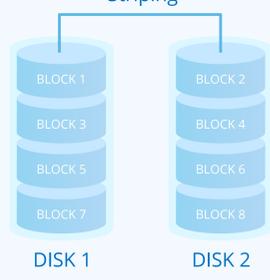
A Brief Introduction to RAID



RAID (Redundant Array of Independent Disks) is a data storage virtualization technology that integrates several separate drives for better storage performance and higher reliability. Server RAID can improve data throughput by increasing the number of drives used to hold and access data. The combination of multiple drives can provide data redundancy and improve the fault tolerance.

Types of RAID

Striping



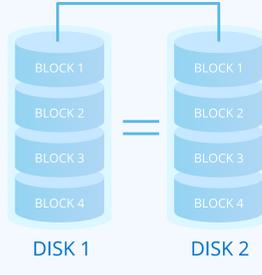
RAID 0

RAID 0 uses disk striping to improve server performance. It enables the data reading and writing to be handled by multiple disks, improving disk input and output performance. But it does not offer data redundancy or fault tolerance. Therefore, RAID 0 is only suitable for non-critical storage, such as temporary files back-ups.

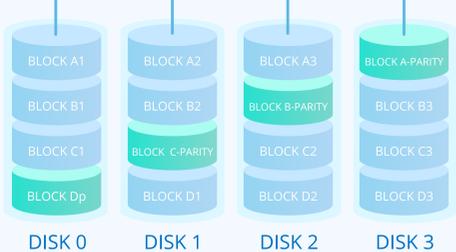
RAID 1

RAID 1 uses disk mirroring that is to replicate or mirror data to two or more disks, which provides the highest redundancy and increases read performance. But the disks write the same data twice, taking up more usable capacity on the drive. RAID 1 is suitable for small databases or other applications that require small capacities but need full data redundancy.

Mirroring



Striping with Parity



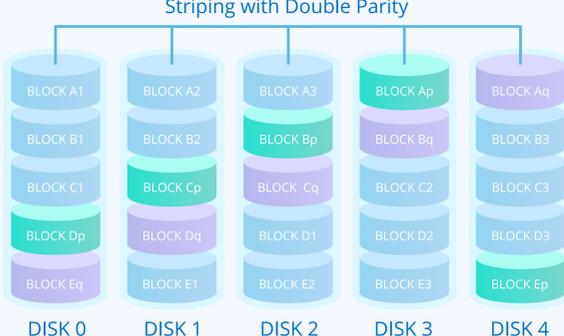
RAID 5

RAID 5 uses block-level striping with distributed parity, which is a great solution for fault tolerance. But the computation required for large amounts of data reading can affect server performance and cause latency. And RAID 5 requires long time to replace and restore data after drive failure. It is ideal for application and file servers with a limited number of drives.

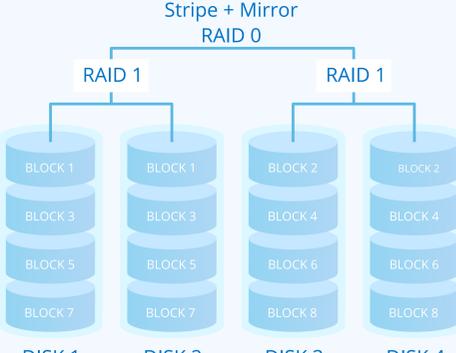
RAID 6

RAID 6 uses striping with double parity. Compared to RAID 5, RAID 6 provides higher redundancy and read performance. But for intensive write operations, it may suffer the same performance decrease due to dual parity calculations. Therefore, it is suitable for applications with high read request rates, but lower write requests.

Striping with Double Parity



Stripe + Mirror RAID 0



RAID 10

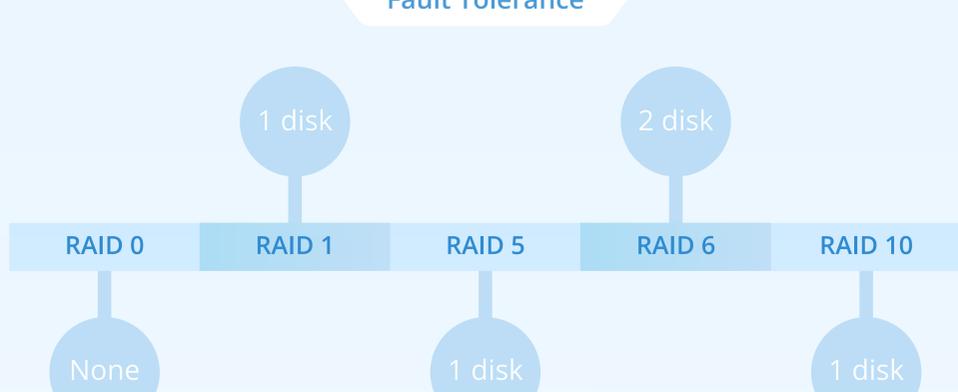
RAID 10 is a combination of RAID 1 and RAID 0, which stripes data across disks to speed up data transfer, and mirrors all data for complete redundancy. RAID 10 requires two or more mirror sets to work together. RAID 10 eliminates the delay caused by parity and allows for the fastest rebuilds in the event of a failure. But it's the most expensive of the RAID levels.

RAID Level Comparison

Write and Read Performance



Fault Tolerance



Capacity Utilization

