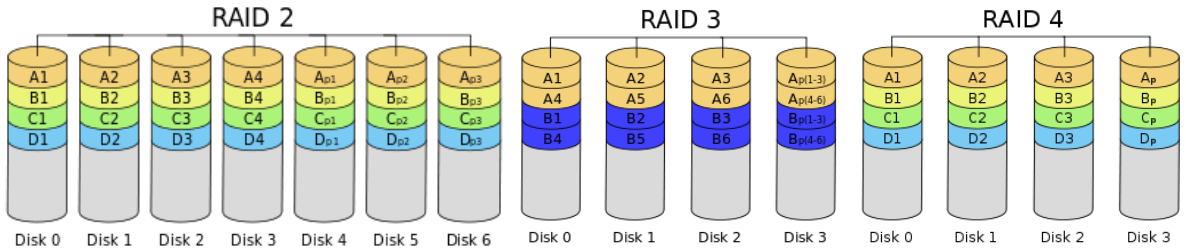
Striping increases data retrieval *performance* by allowing multiple data readers and writers to work on a single data set at the same time. **Mirroring** provides *redundancy* for recovery. **Parity** *ensures* that complete data can be retrieved from an array even if one or more disks fail

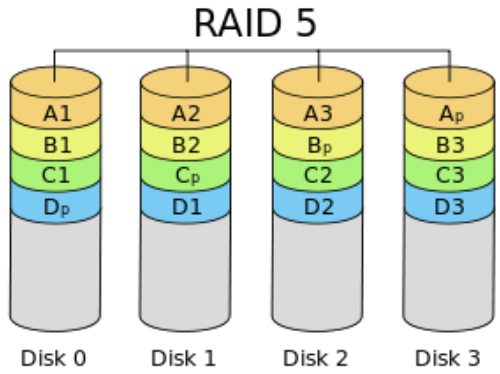
RAID 0: Disk striping
Multiple sources can access bits of data at the same time, performance can be improved.
No redundancy. One disk failure will result in lost data.

RAID 1: Disk mirroring - redundancy - no interruption of data availability
Description: Data is written to two or more disks. No master or primary, the disks are peers.
Performance: Fast read (simultaneous), slower write (writes twice)

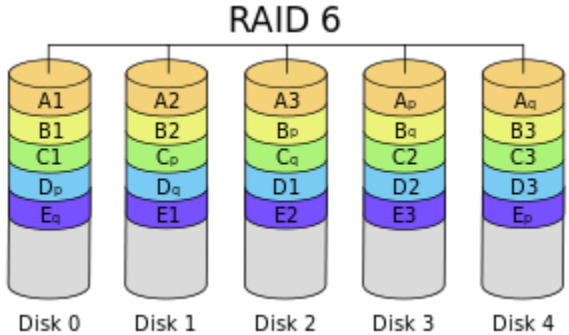


OBSOLETE! RAID2 and 3 - Byte-level striping; RAID4: Block level striping, dedicated parity disk
RAID3 used an additional disk for parity. Since every write touches multiple disks, Obsolete! Slow! All disks spin in synch (lockstep). For highest transfer rates in long sequential reads and writes Raid 4: Block-level striping, added a cache to increases performance over RAID3. **RAID5 killed off all three.**

RAID 5: Striped with distributed parity (3-5 drive minimum)
Description: A second drive failure during drive rebuild is fatal- need a hot spare.
Performance: No single parity disk bottleneck, but rebuilding drives will degrade performance. Balances data availability and read/write performance. During drive rebuilds, write performance suffers if cache isn't used.

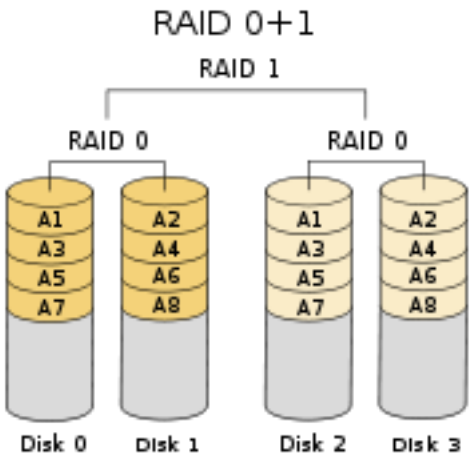


RAID 6: Dual parity
Description: RAID 5 with an additional drive to guard against a second drive failure during a drive rebuild. In the above example, it allows for 2 parity blocks per drive, instead of one.
Performance: Since each parity region is calculated separately, the RAID 5 performance impact is doubled. Some performance loss during multi-drive parity calculations and background drive rebuilds.



Nested RAID Levels

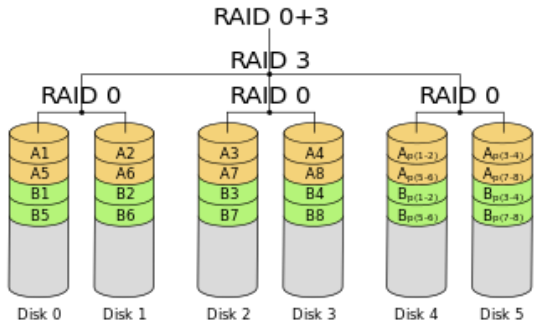
RAID01 (RAID 0+1): Mirror of Stripes - A RAID0 array is Mirrored



RAID01 uses mirror of stripes, achieving both replication and sharing of data between disks. Better performance than RAID1, and better redundancy than RAID0. Data is mirrored and then striped. If you lose a drive in a stripe set, all access to data must be from the other stripe set. Read operations are better because of striping, but write operations mirror the performance degradation of RAID 1.

The usable capacity of a RAID 01 array is the same as in a RAID 1 array made of the same drives, in which one half of the drives is used to mirror the other half. At least four disks are required in a standard RAID 01 configuration, but larger arrays are also used.

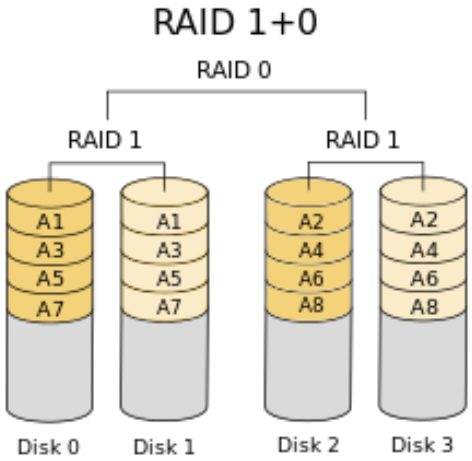
RAID03



RAID 03, also called **RAID 0+3** is byte-level striping with dedicated parity is used. Essentially, a RAID3 array is striped across RAID0 elements

RAID 53 is an accepted term for a series of RAID-5 arrays (striping with distributed parity) striped across a RAID-3 array. For all practical definition it is mostly the same thing, and it's benefits aren't important with other major types.

RAID 10 (RAID 1+0) - Stripe of Mirrors - a RAID0 array is striped across RAID1 elements

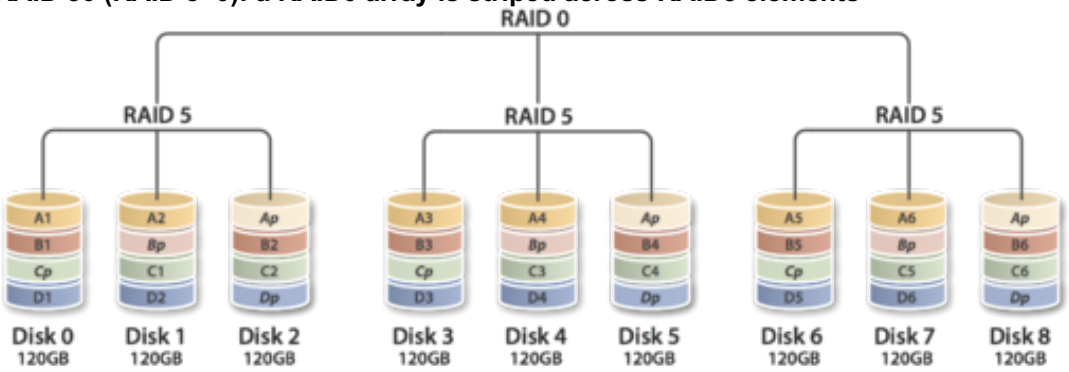


RAID10 is similar to RAID01 with an exception that two used standard RAID levels are layered in the opposite order; thus, RAID 10 is a stripe of mirrors (RAID0 array of RAID1s), which may be two- or three-way mirrors and requires a minimum of four drives.

A nonstandard Linux "RAID10" can be implemented with as few as two disks, and arrays of more than four disks are also possible.

RAID 10 provides better throughput and latency than all other RAID levels except RAID 0 (which wins in throughput). Thus, it is the preferable RAID level for I/O-intensive applications such as database, email, and web servers, as well as for any other use requiring high disk performance.

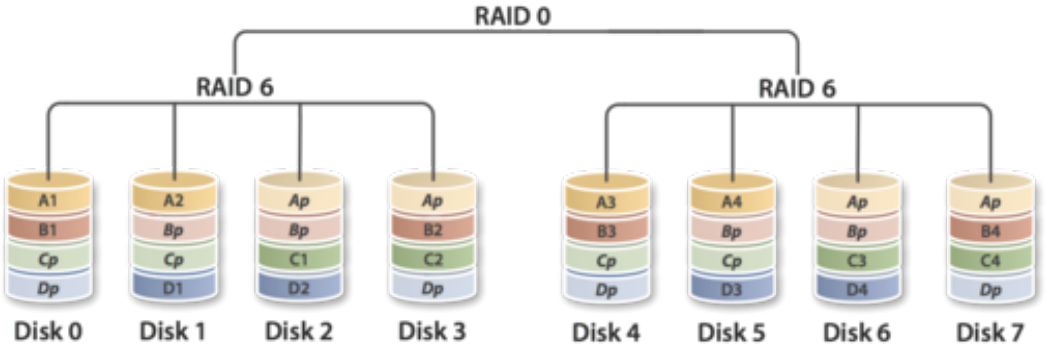
RAID 50 (RAID 5+0): a RAID0 array is striped across RAID5 elements



RAID50 aka **RAID 5+0**, combines the straight block-level striping of RAID0 with the distributed parity of RAID5. As a RAID0 array is striped across RAID5 elements, minimal RAID50 configuration requires six drives. Example shows collections of 120 GB RAID5s striped together to make 720 GB of total storage space.

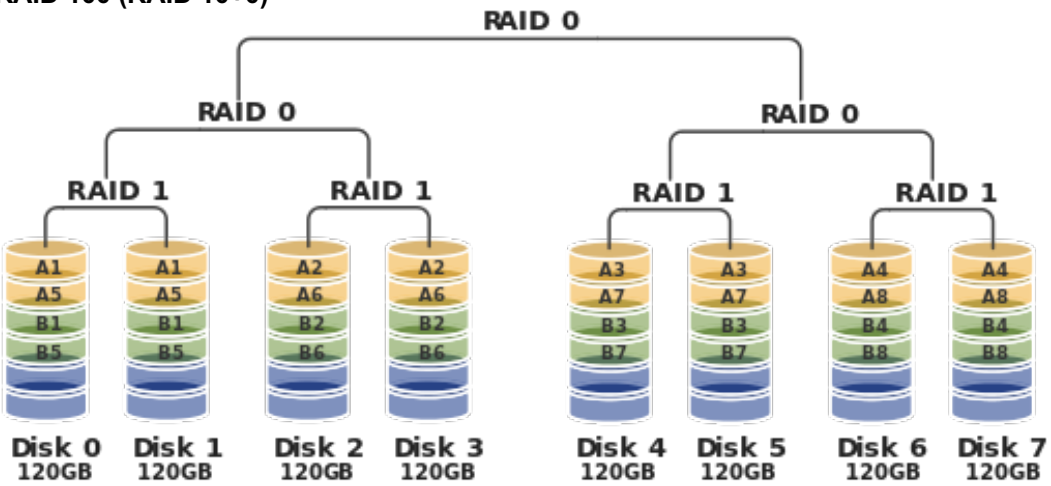
One drive from each of the RAID5 sets could fail without loss of data; for example, a RAID50 configuration including three RAID5 sets can only tolerate three maximum potential drive failures. There is still RAID5's inherent strain to rebuild a drive. As RAID5 was improved by RAID6, so was its nested counterpart, RAID 60

RAID 60 (RAID 6+0): a RAID0 array is striped across RAID6 elements



RAID 60, also called **RAID 6+0**, combines the straight block-level striping of RAID 0 with the distributed double parity of RAID 6, resulting in a RAID 0 array striped across RAID 6 elements. It requires at least eight disks.

RAID 100 (RAID 10+0)



RAID100, sometimes also called **RAID 10+0**, is a stripe of RAID10s. This is logically equivalent to a wider RAID10 array, but is generally implemented using software RAID0 over hardware RAID 10. Being "striped two ways" a RAID100 is described as a "plaid RAID"