Introduction to Computer Systems and Platform Technologies

Study Period 3, 2021 – CPT160

Week 11 – RAID Systems

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Task:

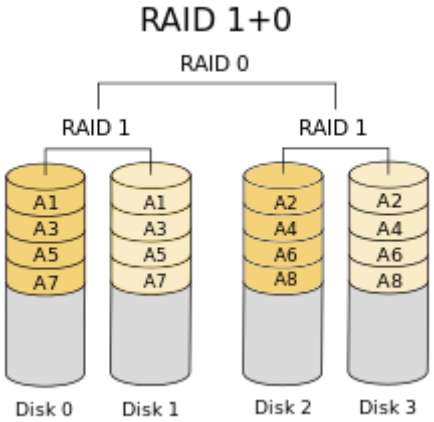
Explain the difference between RAID 10 (1+0) and RAID 01 (0+1).

- Which is better in terms of fault tolerance?

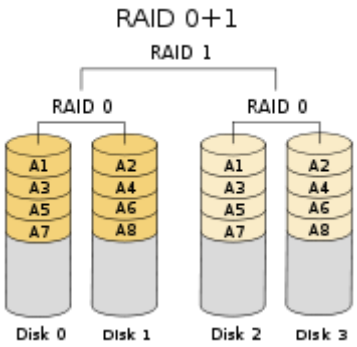
Firstly, before I dive into explaining which of the two RAID configurations is better in fault tolerance, lets define RAID and each of the two RAID configurations mentioned in the question. Keep in mind there are many more RAID configurations each with their own characteristics such as redundance, performance and storage space availability.

RAID: Raid stands for **R**edundant **A**rray of **I**nexpensive **D**isks and is a technology that allows us to combine multiple physical disks in to a virtual disk for redundancy or performance or even both.

RAID10: Raid10 also known as RAID 1+0 is a nested configuration which involves a minimum for 4 disks. The disks are split in to groups of two, each of the two drives in a group are treated as RAID1 (mirrored) then all the groups combined are treated as RAID0 (stripped) to make a large volume.



RAID01: RAID01 also known as RAID 0+1 is a nested configuration involving a minimum 4 disks however it is possible to only use 3 disks but this is nonstandard. The disks are then split in to groups of two, each of the two drives in a group are then treated as RAID0(Stripped) then all the groups combined are treated as RAID1(Mirrored) to make a large volume.



Which is better in terms of fault tolerance? RAID10 (1 + 0)

RAID 10 is more fault tolerant as you are able to lose 1 disk from every group of 2 drives and would be able to rebuild the array and data would be recoverable.

Where as in RAID 01 if you were to lose 1 disk from every group of 2 drives rebuilding of the array to recover data would not be possible.

Note as the number in nested raid configurations name increases so does the level of redundancy.

Personally, I use RAID 10 at home in an 8x 4TB (16TB) array in any given year I replace 1 – 3 Drives in the array while its online and in use and had successful rebuilds with no data loss. Raid 10 also gives me the advantage of 8x read and 4x write speed gain over a single disk.

This RAID configuration has been extremely reliable that it will be getting replaced with a RAID10 30x8TB (120TB) configuration before the year is out (30x read and 15x write speed gains)

Sources:

Raid10 Image:
https://upload.wikimedia.org/wikipedia/commons/thumb/e/e6/RAID_10_01.svg/220px-RAID_10_01.svg.png

Raid01 Image:
https://upload.wikimedia.org/wikipedia/commons/thumb/a/ad/RAID_01.svg/180px-RAID_01.svg.png