




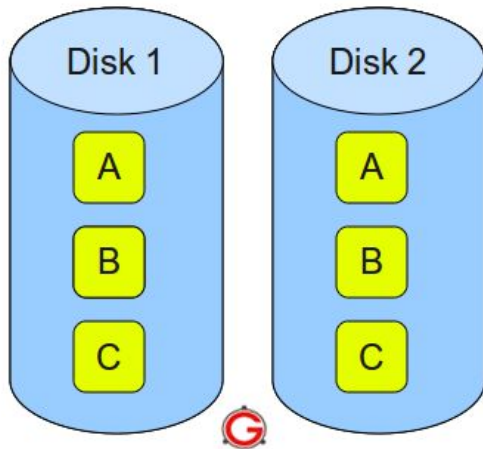
Problem Solving Session

Disk, RAID & File Systems

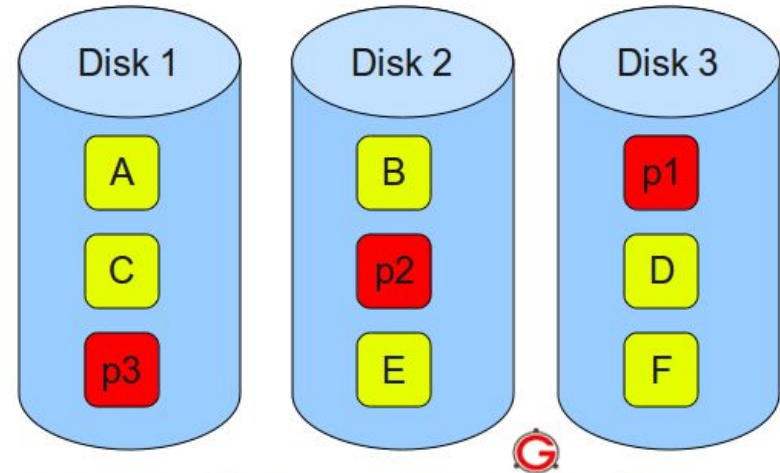


RAID-1 vs RAID-5

How do RAID 1 and RAID 5 compare? (Assume min. no. of disks for each)



RAID 1 – Blocks Mirrored. No Stripe. No parity.



RAID 5 – Blocks Striped. Distributed Parity.

Answers: RAID-1 vs RAID-5

How do RAID 1 and RAID 5 compare? (Assume min. no. of disks for each)

	RAID 1	RAID 5
Min. No. of Disks		
Processing Power		
Failures Tolerated (failure probability p)		
Storage Utilization		
Write Performance		
Read Performance		

Answers: RAID-1 vs RAID-5

How do RAID 1 and RAID 5 compare? (Assume min. no. of disks for each)

	RAID 1	RAID 5
Min. No. of Disks	2	3
Processing Power	Negligible	Needed for Parity Calculation
Failures Tolerated (failure probability p)	1 disk ($p'=2p$)	1 disk ($p'=3p$)
Storage Utilization	50%	66%
Write Performance	Faster	Slower
Read Performance	Comparable	

I-Nodes

Suppose you have a Terabyte partition on a disk. To be precise, the partition has 2^{40} bytes on it, subdivided into blocks of 8 Kbytes ($8192 = 2^{13}$ bytes).

How many blocks are on the partition?

Each i-node is $128 = 2^7$ bytes. You want to have enough i-nodes to store 2^{20} files. How many i-node blocks do you need to store all the i-nodes?

Answers: I-Nodes

Suppose you have a Terabyte partition on a disk. To be precise, the partition has 2^{40} bytes on it, subdivided into blocks of 8 Kbytes ($8192 = 2^{13}$ bytes).

How many blocks are on the partition?

$$(2^{40}) / (2^{13}) = 2^{27}$$

Each i-node is $128 = 2^7$ bytes. You want to have enough i-nodes to store 2^{20} files. How many i-node blocks do you need to store all the i-nodes?

$$\text{i-nodes per block} = (2^{13}) / (2^7) = 2^6$$

$$\text{No. of i-node blocks needed} = (2^{20}) / (2^6) = 2^{14}$$