RAID
(Redundant Array of independent Disks)

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Abstract—The full form of RAID is Redundant Array of independent disks. Basically, the RAID was defined as redundant array of inexpensive disks, but as of now it is known as redundant array of independent disks. RAID is storage system which uses multiple disks combined into one, to improve overall performance, and to increase storage capacity in a system. Before RAID there was only single disk drive is used for storage. But RAID allows you to store the same data redundantly in a balanced way to improve overall performance. RAID mainly used on server side.

Keywords: Disk, RAID, Computers, Storage

I. INTRODUCTION

Raid allows you to have group of disks that frame as one logical disk on your system, this provides magic background in the system. So you can have speed, redundancy, etc. There is different configuration for hardware and software. RAID [1] has level 0, level 1, level 2, level 3, level 4, level 5, level 6, level 10 (It is an nested RAID level (1+0) or hybrid. Hence, RAID [2] is used multiple hard disk so if one disk fails it doesn’t affect on another disk. RAID is used in all kind of critical applications like Aircraft Control System. It saves your business from critical data lost and it is considered as protection for your data. Some RAID terminology is as follow:

a) MIRRORING
b) STRIPING
c) FAULT TOLERANCE

II. OVERVIEW

Raid is method of combining multiple hard disks into single logical array for better data availability, this gives high level of performance and reliabilities. Redundant disks are used to store parity bits. Raid architecture is shown in Fig. 1

This is some advantages of RAID:
-Data mirroring allows faults tolerant data access
-Data striping allows high speed data access
-data mirroring also enables reliability and data recovery
-error and parity bits are also used

These are some disadvantages of RAID:

- It is expansive
-mainly raid is very complex to implement
-Data mirroring results in redundancy disks
-writes are lower then read operations

Fig. 1 Raid architecture

RAID 0:

DISK STRIPING:
Fig. 2 Shows disk stripping. Disk stripping is used in RAID level 0 that allows system to write data across multiple hard disks not only in one single drive. This method divides each storage drive into partitions (vary size from 8KB to 1024 KB).

RAID 0

Fig. 2 Disk stripping.
- RAID 0 is a type of stripping; it doesn’t consist of mirroring or parity
Non redundant data striping: data is stripped and written across different disk. It has a high transform rate and easy to implement but it is non redundant and no fault tolerance hence its not fully raid. This method is used only for non critical data. If one disk fails all the disks of the raid stops to work with lesser use of redundancy as it is a stripping raid zero roughly the data, distributed in all the disks on all disk in the raid zero which makes read and write operations in raid zero which makes possible use of concurrent read and write operations in the RAID 0 , this improves the level of performance of the system.

RAID 1:

Fig. 3 Mirroring

Fig. 3 shows a type called mirroring,
In Raid 1 data is duplicated like one or more disks. It is a bit fast and , a bit slow as well, if in any circumstances or Any conditions the one of them disks fails another will be having the back up of the another one though we can say this type is having more tolerance then the previous one. If in case any conditions arises and the once a disk fails the data will be remain safe in the other one. The write operations is expensive just because the operation had to be done twice so, this is the reason of more expensiveness, the most important contains can be saved among the disk like this, as an e.g. big systems ,critical data and so on, which can’t be lost at any circumstances.
At the end of the day it improves the performance of the data safety.

RAID 2:

Fig. 4 RAID 2

Fig. 4 shows RAID 2[7]. It comes in a category in parallel access, redundant using hamming code. It is having a parity which we call hamming code, let us include some functionalities of hamming code which is as bellow. Hamming code is a linier array correcting code. It can detect 2 bit or error and correct or correct 1 bit of errors without detecting of one bit of errors, Hamming code parity can be calculated like this, the parity bit is inside any of the three disks, it was used in early stages and the past time, mostly it was useful in older days as thinking machine, but sadly now days it is not used at all

RAID 3:

Fig. 5 RAID 3

Fig. 5 shows RAID 3, consists of stripping but at the bit level and also having the bit level hamming code parity also , all disks can be fast and possibly slow at sometimes, multiple redundant disk it is having by the raid level 3 so it is more expensive
then the above disks, it is not used viral, Hamming code parity can be calculated like this, the parity bit is inside any of the three disks, it was used in early stages and the past time, mostly it was but sadly now days it is not used at all actually it is not used commonly.

**RAID 4:**

![Fig. 6 RAID 4](image)

Fig. 6 shows RAID 4 consists of stripping but at the bit level and also having the BLOCK level dedicated parity also this level was used by net app it has two parity disks, all disks can be fast and possibly slow at sometimes, it has only one disk for storing, it has poor performance to write, it is used for very large multimedia files like CAD, it can be executed parallel, it improved the performance of the disk.

**RAID 5:**

![Fig. 7 RAID 5](image)

Fig. 7 RAID 5

RAID [5] consists of stripping but at the bit level and also having the BLOCK level dedicated parity also this level was used by net app it has two parity disks it is fast and moderate and fault tolerant. Sad thing is its performance is average, all disks can be fast and possibly slow at sometimes, multiple redundant disk it is having by the raid level 5so it is more expensive than the previous disks, But still it is used at server side, if under any situation one disk fails then we can use the data base of any other disk.

**RAID 6:**

![Fig. 6 RAID 6](image)

Fig. 6 shows RAID 6. It consist of block interleaved parity, the calculation of this parities are stored on different disks, the data transfer speed is fast and moderate, it has advantage that it is highly fault tolerant, then the all the previous level disks, though it is more expensive than all than last disks, it is used in the application which require high data availabilities, it requires four disks, including functionality that it overcomes the faults of the RAID 5[5] functionalities.

**RAID 10:**

![Fig. 7 RAID 5](image)

Fig. 7 shows a nested (hybrid) RAID 5[8]

Many storage system allows this one level, RAID one and RAID zero are combined in this raid level 10. It creates a another stripped level set to the mirror of the parent or major set level the only disadvantage its having it if two of the data falls down then the main data is lost permanently.
CONCLUSION:

Because of the content of the shared disk bandwidth, the user input and output functionality can makeable effect the performance of the low-priority tasks running on the background, thus reducing the reliability and availability of RAID-pre-structured storage systems. In this paper, we The not heavyweight prototypes implementation of Works and impulsive traces-driven and benchmarks-driven assignments on this case studies we demonstrate that, compared with current approaches from the single side, work effectively improves the performance of the not so high-priority background tasks, such as RAID construction and RAID resynchronization most Important is, Work function is portable and can be easily cooperated into any humanly possible algorithms for RAID-structured storage systems

References