

USN

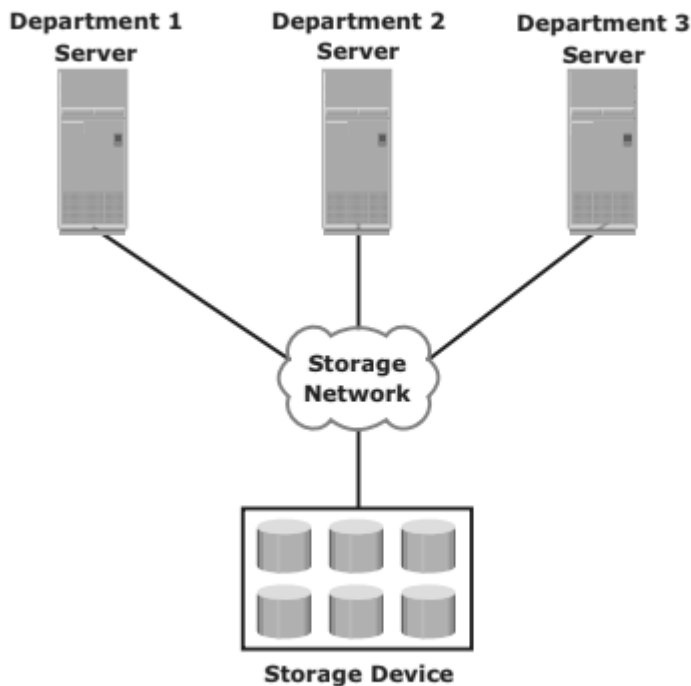
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Internal Assessment Test 1 – March 2023

Sub:	Storage Area Network(SAN)	Sub Code:	18CS822	Branch:	CSE
Date:	11/3/2023	Duration:	90 mins	Max Marks:	50
				Sem/Sec:	A/B/C
					OBE

Answer any FIVE FULL Questions

		MARKS	CO	RBT
1	<p>Explain with diagram difference between</p> <p>a) Server-Centric Storage Architecture – 5 Marks</p> <div style="text-align: center; margin: 20px 0;"> <p>(a) Server-Centric Storage Architecture</p> </div> <p>Server-centric storage architecture</p> <ul style="list-style-type: none"> ● Business units/departments to have their own servers and storage. ● each server has a limited number of storage devices, ● any administrative tasks, such as maintenance of the server or increasing ● Storage capacity might result in unavailability of information. ● resulted in unprotected, unmanaged, <p>Fragmented islands of information and increased capital and operating expenses.</p> <p>(b) Information-Centric Storage Architecture with neat diagram. 5 Marks</p>	[10]	L1	CO 1



(b) Information-Centric Storage Architecture

Storage devices are managed

- Centrally and **independent** of servers.
- Storage devices are **shared** with multiple servers.
- The **capacity** of shared storage can be **increased dynamically** without impacting information availability. Information **management** is **easier** and **cost-effective**.

2 (a)

What is Protocol? Explain the popular interface Protocols used for host to storage communication.

1) SCSI - **2 Marks**

- Connectivity protocol in high-end computers.
- supports parallel transmission
- Offers improved performance, scalability, and compatibility compared to ATA.

2) Fiber Channel -**2 Marks**

- Fibre Channel is a widely used protocol for high-speed communication to the storage device.
- The Fibre Channel interface provides gigabit network speed.
- Provides a serial data transmission that operates over copper wire and opticalfiber.
- The latest version of the FC interface (16FC) allows transmission of data up to 16 Gb/s.

Out of this two mentioned protocol which protocol used for **high-speed communication**. -1 Marks-Fiber Channel

[05]

L1

CO
1

(b)

Discuss Volume Manager and Computer Virtualization in detail-**VM-2Marks+ CV-3Marks**

[05]

L1

CO
1

- allocating the entire disk drive for the file system often resulted in underutilization of storage capacity.
- The evolution of **Logical Volume Managers (LVMs)** enabled dynamic extension of file system capacity and efficient storage management.

can **partition** a larger-capacity disk into virtual, smaller-capacity volumes (the process is called partitioning) or **aggregate** several smaller disks to form a larger virtual volume. (The process is called concatenation.)

- Compute virtualization is a technique for masking or abstracting the physical hardware from the operating system.
- It enables multiple operating systems to run concurrently on single or clustered physical machines.

This technique enables creating portable virtual compute systems called **virtual machines (VMs)**.

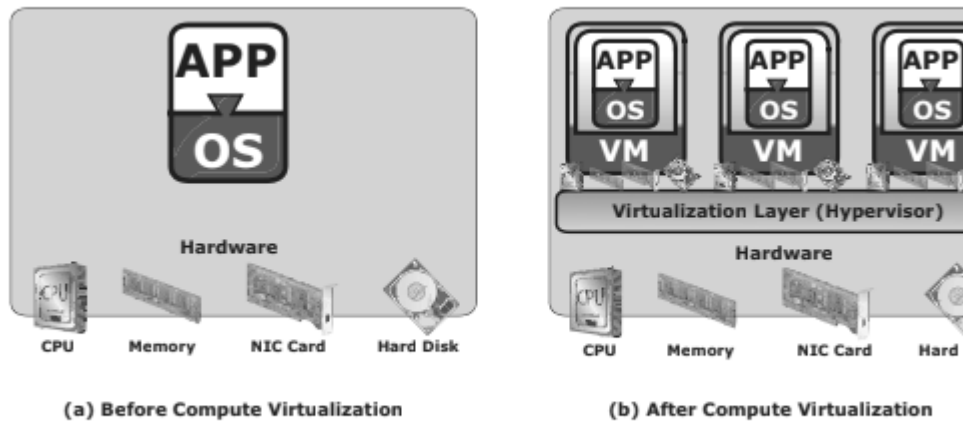


Figure 2-3: Server virtualization

3 (a)

What is a Data Center? Discuss key Characteristics of Data Center with neat Diagram-
5Characteristics – 5 Marks

Uninterrupted operation of data centers is critical times

Availability-information available

When required.

Security

Scalability

Performance

Data integrity

Capacity

[05]

L1

CO
1

Manageability

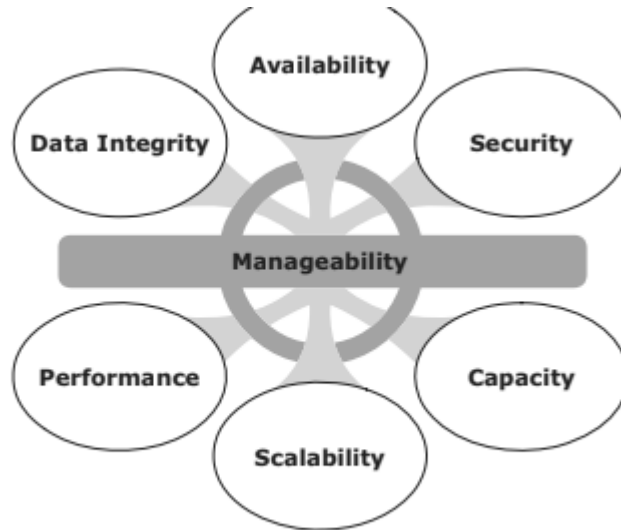


Figure 1-6: Key characteristics of a data center

(b) Explain with example of an “**online order transaction system**”, core elements of data center.

Diagram – 3 Marks Explanation -2 marks

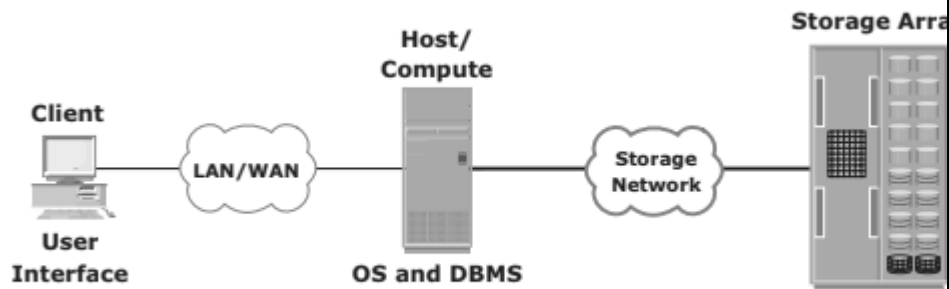


Figure 1-5: Example of an online order transaction system

- Application-logic
- Database management system
- Host or compute: platform
- Network: communication
- Storage

[05]

L1

CO
1

4

Explain the RAID levels **RAID 0, RAID 1** with neat diagrams
RAID0-5Marks

[10]

L1

CO
1

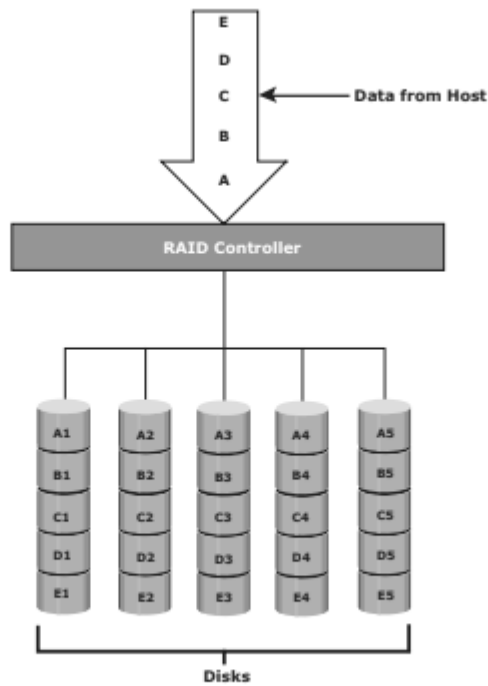


Figure 3-5: RAID 0

- **RAID 0** configuration uses **data striping techniques**
- where data is striped across all the disks within a RAID set.
- It utilizes the full storage capacity of a RAID set.
- RAID 0 is a good option for applications that need **high I/O throughput**.
- if these applications require high availability during drive failures, **RAID 0 does not provide data protection and availability**.

RAID1-5Marks

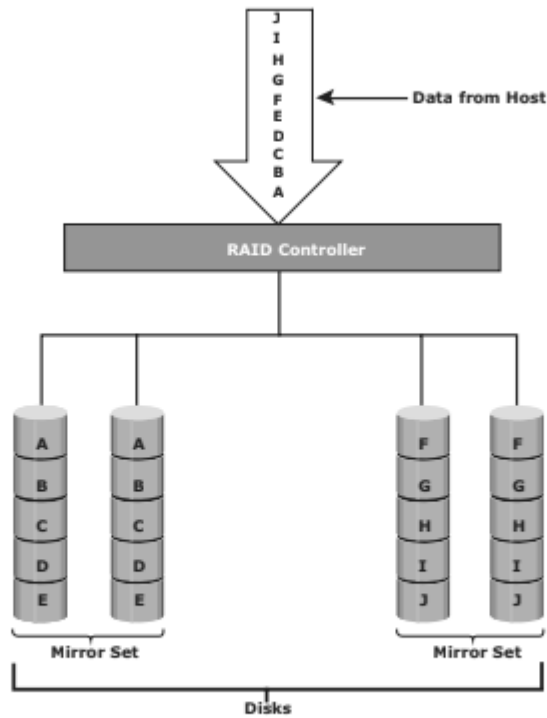


Figure 3-6: RAID 1

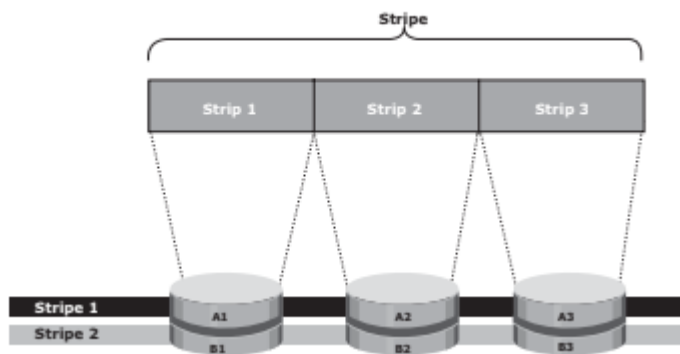
- **RAID 1 is based on the mirroring technique.**
- Provides fault tolerance.
- **On failure data recovery is fast.**
- RAID 1 is suitable for applications that require **high availability and cost is no constraint.**

5 (a) **Identify the type of RAID technique** used in the below shown diagram.

[8]

L2

CO1



List and Explain the advantages and disadvantages.

Identification -2 marks-Striping

Advantages- 4 marks

- Striping is a technique to **spread data across multiple drives** (more than one) to use the drives in **parallel**.

	<ul style="list-style-type: none"> All the read-write heads work simultaneously, allowing more data to be processed in a shorter time and increasing performance, compared to reading and writing from a single disk. addressable disk blocks are defined as a strip. Within each disk in a RAID set, a predefined number of contiguously <p>Disadvantages – 2 Marks No fault tolerance</p>			
(b)	<p>What is the importance of RAID controller in RAID Array explains.-2marks</p> <ul style="list-style-type: none"> Management and control of disk aggregations. Translation of I/O requests between logical disks and physical disks Data regeneration in the event of disk failures. 	[2]	L1	CO1

6 What are the *two disadvantages of allotting the entire disk drive* for the file system? How to overcome these disadvantages explain with diagram.
Disadvantage -2 marks
 Allocating the entire disk drive for the file system often resulted in underutilization of storage capacity or lack of space or lack of flexibility.
Explanations of solution 8marks

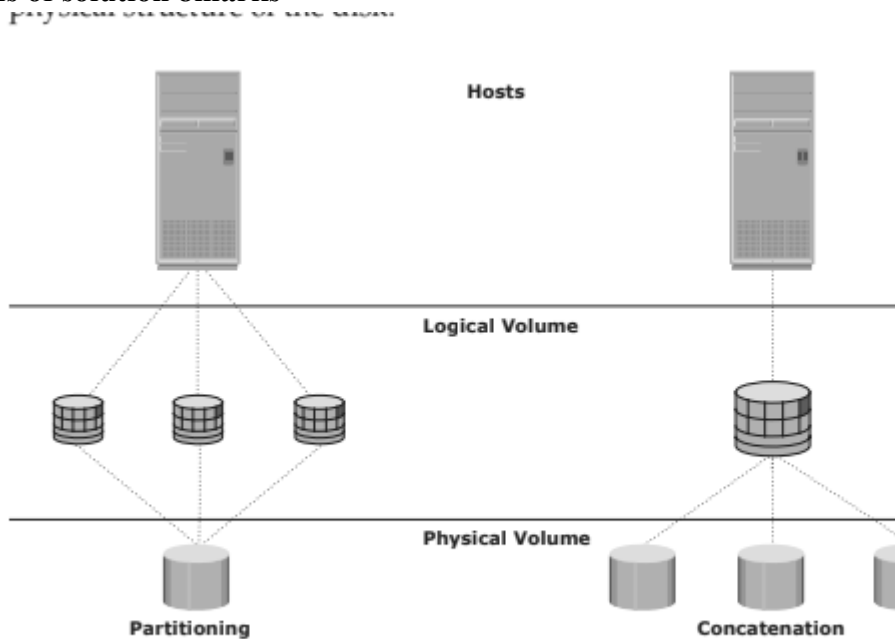


Figure 2-1: Disk partitioning and concatenation

Disk partitioning

- Improve the flexibility and utilization of disk drives.
- a disk drive is divided into logical containers called logical volumes (LVs)

Concatenation is the process of grouping several physical drives and presenting them to the host as one big logical volume

HOD

CCI

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