By Maha Rana

IT601 Midterm Preparation File

Different components of a system have objectives?

The components of an ***IT system*** and their objectives include:

Computing Machines → Provide processing power (Servers, Workstations).
Software → Enable functionality (Operating Systems, Applications).
Network → Facilitates communication (Routers, Switches).
Services → Offer functionalities (Web, DNS, DHCP).
Users → Interact with the system.
Processes → Maintain operations (System updates, backups).

---

5 levels mai sy koi b level ho skta ha?

This refers to ***SAMM (System Administration Maturity Model)*** levels:

1. ***Initial (Ad-hoc processes)*** → No formal process.
2. ***Repeatable (Disciplined process)*** → Basic documentation.
3. ***Defined (Standard, Consistent process)*** → Well-documented procedures.
4. ***Managed (Predictable process)*** → Measured and controlled processes.
5. ***Optimizing (Continuously improving)*** → Ongoing refinement and automation.

MTTF and MTTR Stand For?

MTTF (Mean Time to Failure) → Average time before a system fails.
MTTR (Mean Time to Recovery) → Average time to fix and restore a failed system.

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Question tha k Windows ki operations bataen?

Windows Operating System performs various operations, including:

File Management → Organizes files and folders.
Process Management → Manages running applications and background processes.
Memory Management → Allocates RAM to active programs.
User Management → Creates and manages user accounts.
Networking → Provides network connectivity through TCP/IP.
Security Management → Includes firewalls, encryption, and user permissions.

CPU ki performance kaisi hai?

CPU performance depends on:

Clock Speed (GHz) → Higher GHz means faster processing.
Number of Cores → Multi-core CPUs handle tasks efficiently.
Cache Size → L1, L2, L3 cache improves processing speed.
Instruction Set → Advanced architectures (e.g., x86, ARM) optimize performance.

Ik level wla aya tha, yh jo next info ha yh table mai given thi or new users and software install sy btana tha k kon sa point kis heading sy related ha?

This relates to ***SAMM levels*** and ***common system administration tasks***:

Heading	Related Tasks
New Users	User Management, Account Creation
Software Installation	Package Management, System Configuration

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States wala bhi question tha ik?

This refers to ***Evard's Computer Machine Life Cycle*** which includes:

1. ***New*** → Freshly unpacked system.
2. ***Clean*** → OS installed, but not configured.
3. ***Configured*** → Ready for use, properly set up.
4. ***Unknown*** → Misconfigured, outdated, or compromised state.
5. ***Off*** → Shut down or removed from the system.

Buy in bulk allocate fraction waly ki advantages thi?

Advantages of ***buying in bulk and allocating fractions***:

Cost Efficiency → Discounts on large purchases.
Resource Optimization → Allocate only what is needed, reducing waste.
Scalability → Easily expand IT resources as needed.
Better Planning → Reduces frequent purchases and administrative overhead.

Log files location mai system logs and application logs btani thi with address?

Log Type	Location
System Logs	`/var/log/syslog` (General system messages)
Kernel Logs	`/var/log/kern.log` (Kernel-related logs)
Authentication Logs	`/var/log/auth.log` (User login and security logs)
Application Logs	`/var/log/<app_name>.log` (Logs for installed applications)
Boot Logs	`/var/log/boot.log` (Startup logs)

Summary

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- IT system components include ***machines, software, network, users, and processes***.

SAMM levels define system administration maturity.
MTTF/MTTR measure reliability.
Windows operations include file management, security, and networking.

CPU performance depends on cores, cache, and clock speed.
Evard's Life Cycle includes New, Clean, Configured, Unknown, Off states.
Bulk buying optimizes cost and resources.
Log files store system and application activity in /var/log/.

Server ki RAMs ke baray mein batana tha?

Server RAMs are different from desktop RAMs in terms of ***capacity, reliability, and performance***.

Types of Server RAM:
- ***ECC RAM (Error-Correcting Code RAM)***: Used in servers for ***error detection and correction***.
- ***Buffered/Registered RAM***: Used in high-performance servers to ***reduce electrical load*** on memory controllers.

Speed and Cost:
- Server RAMs have higher speeds, typically ***2400MHz to 6400MHz***.
- ***More expensive*** than desktop RAM due to ***error correction*** and higher reliability.

RISC and x86 Processors ka Difference?

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Feature	RISC (Reduced Instruction Set Computing)	x86 (CISC - Complex Instruction Set Computing)
Instruction Set	Small, simple instructions	Large, complex instructions
Performance	Faster execution, low power usage	More powerful but consumes more power
Example	ARM, PowerPC	Intel, AMD
Use Cases	Mobile devices, embedded systems	Desktops, servers

4. Virtualization vs. Containers

Feature	Virtualization	Containers
Definition	Runs multiple OS instances on a single machine	Runs multiple lightweight applications in isolated environments
Performance	More resource-intensive	Uses fewer resources
Isolation	Full OS isolation	Shares OS kernel
Example	VMware, VirtualBox	Docker, Kubernetes

Linux Operating System main System Logs Kahan hotay hain aur Kuch Types likhni thi?

Linux log files are stored in:

```bash
/var/log/
```

Log Type	Location
System Logs	`/var/log/syslog`
Kernel Logs	`/var/log/kern.log`
Authentication Logs	`/var/log/auth.log`
Boot Logs	`/var/log/boot.log`
Application Logs	`/var/log/<app_name>.log`

Server ki Konsi RAMs hoti hain, unki Speed aur Cost ke hawalay se batana tha?

Types of Server RAMs:
- o ***ECC RAM***: Expensive but reliable, prevents system crashes.
- o ***Buffered RAM***: Used in ***enterprise servers*** for stability.

Speed:
- o Starts from ***2400MHz to 6400MHz*** depending on the architecture.
- o ***DDR5 RAM*** provides higher bandwidth than ***DDR4***.

- ***Cost***:
  - o Server RAM is ***costly*** because of ***high reliability and durability***.
  - o ECC and Registered RAM are ***more expensive*** than regular desktop RAM.

Spare Capacity (N+1, N+2, N+X) ka Question tha?

Spare capacity is used in redundancy planning for power, storage, and computing systems.

Spare capacity is used in redundancy planning for power, storage, and computing systems.

Redundancy Model	Description
N+1	One additional unit for backup (e.g., 4 servers + 1 spare).
N+2	Two additional units for backup (e.g., 4 servers + 2 spares).
N+X	X additional units for backup, where X depends on risk level.

Example:
If a ***data center has 10 power supplies*** and follows an ***N+1 model***, it will have ***1 extra power supply*** as a backup.

Summary

Server RAM → ECC, Buffered RAM with ***high speed (2400MHz - 6400MHz)***.

RISC vs. x86 → RISC is simpler and ***low power***, x86 is ***powerful but complex***.
Virtualization vs. Containers → Virtualization runs ***full OS***, containers are ***lightweight***.
Linux Logs → Found in /var/log/ with types like ***system logs, authentication logs, and kernel logs***.
Redundancy (N+1, N+2, N+X) → Used for ***backup planning in IT infrastructure***.

Short Questions

Formula of Availability?

Availability (A) is calculated as:

$$A = \frac{MTBF}{MTBF + MTTR}$$

Where:

MTBF (Mean Time Between Failures) → Average time between failures.
MTTR (Mean Time To Repair) → Time required to fix the failure.

Higher availability means better system uptime.

Advantage and Disadvantage of Snowball (Data Transfer Service)?

Advantages of Snowball

Large Data Transfer → Transfers petabytes of data efficiently.
Security → Encrypted storage prevents unauthorized access.
Offline Transfer → No internet dependency, reducing transfer time.
Cost-Effective → Reduces bandwidth costs for cloud migration.

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Disadvantages of Snowball

Physical Handling → Requires shipping hardware to cloud providers.
Limited Speed → Slower than high-speed fiber connections.
Not Real-Time → Cannot be used for live data synchronization.

Used for AWS Snowball, Google Transfer Appliance, etc.

Long Question

Types of Server Architecture?

Architecture Type	Description	Example
Monolithic	Single system with all services combined.	Legacy mainframes
Client-Server	Clients request services from a central server.	Web applications
Peer-to-Peer (P2P)	All nodes act as both clients and servers.	BitTorrent
Clustered Servers	Multiple servers work together for high availability.	Google Cloud, AWS
Microservices	Small, independent services communicate over a network.	Netflix, Amazon

Micro services and Clustered architectures are popular in cloud computing.

Types of Buses?

Bus Type	Function	Example
Address Bus	Carries memory addresses.	32-bit, 64-bit CPU buses
Data Bus	Transfers actual data.	PCIe, USB
Control Bus	Sends control signals between CPU and peripherals.	Interrupt signals
System Bus	Connects CPU, RAM, and motherboard components.	Front-Side Bus (FSB)

Modern systems use high-speed PCIe and USB buses for data transfer.

Formula of Reliability?

Reliability (R) is calculated as:

$$R(t) = e^{-\lambda t}$$

Where:

- λ (Failure Rate) → Number of failures per time unit.
- t (Time) → Duration over which reliability is measured.

✅ Higher reliability means fewer failures in a system.

Ring Buffer (Circular Buffer)?

Definition:

A ***ring buffer*** (circular buffer) is a ***fixed-size*** data structure that ***wraps around when it reaches the end***, avoiding data loss.

Key Features:

FIFO (First In, First Out) mechanism.
Used in ***network buffering, audio processing, and data streams***.
Prevents ***buffer overflow*** by overwriting old data when full.

Example in Linux:

Keyboard input buffer.
Audio streaming applications (Spotify, YouTube).

Efficient for real-time applications like networking and OS processes.

Summary

Availability Formula → $A = \frac{MTBF}{MTBF+MTTR}$

Reliability Formula → $R(t) = e^{-\lambda t}$

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Snowball → Large ***offline data transfer***, but ***physical handling required***.
Server Architectures → Monolithic, Client-Server, P2P, Clustered, Microservices.
Types of Buses → Address, Data, Control, System Bus.
Ring Buffer → Used in ***networking, OS buffers, and real-time applications***.

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Short Questions

Definition of Availability and Its Formula?

Definition:
Availability refers to the percentage of time a system is operational and accessible when needed.

📌 **Formula:**

$$A = \frac{MTBF}{MTBF + MTTR}$$

Where:

- **MTBF (Mean Time Between Failures)** → Time before failure.
- **MTTR (Mean Time to Repair)** → Time taken to restore the system.

Higher availability means better uptime and reliability.

One Advantage and Disadvantage of Snowflake?

Advantage:

Scalability → Snowflake allows ***automatic scaling of storage and compute resources*** without downtime.

Disadvantage:

Costly for Large Queries → Snowflake charges based on compute usage, which ***increases cost for frequent queries***.

Situation Given – Commands Were Required?

Situation	Command
View system logs	`cat /var/log/syslog`
Find a specific error in logs	`grep "error" /var/log/syslog`
Check running processes	`ps aux`
Monitor system performance	`top` or `htop`
Restart SSH service	`sudo systemctl restart ssh`

Benefits of Live Migration and Load Balancer?

Live Migration Benefits:

Zero Downtime → VMs can move between servers without stopping.
Efficient Resource Usage → Move workloads dynamically.
Disaster Recovery → Shift workloads in case of failure.

Load Balancer Benefits:

Distributes Traffic → Prevents overloading a single server.
Increases Performance → Optimizes response times.
Ensures High Availability → Redirects traffic if a server fails.

Both help improve system uptime and performance.

Long Questions

Types of System Buses and Their Definition?

Bus Type	Definition
Address Bus	Carries memory addresses from CPU to RAM.
Data Bus	Transfers data between components.
Control Bus	Sends control signals for operations.
System Bus	Connects CPU, RAM, and motherboard components.

Modern systems use PCIe and USB for faster communication.

2. Evard's Computer States and Their Processes

State	Processes
New	Unpacking, physical setup.
Clean	OS installation, driver setup.
Configured	User setup, security configuration.
Unknown	Debugging, troubleshooting.
Off	Data backup, system decommissioning.

✅ Each state transitions through processes like install, update, and troubleshoot.

Purpose of Ring Buffer and Its Events?

Purpose:

A ***ring buffer (circular buffer)*** is a fixed-size data structure used in real-time computing.
It allows continuous ***data storage and retrieval*** without performance loss.

Events in Ring Buffer:

1. ***Write Event*** → New data is added to the buffer.
2. ***Read Event*** → Data is retrieved from the buffer.
3. ***Overwrite Event*** → When full, old data is replaced with new data.

4. ***Wraparound Event*** → The buffer loops back to the beginning when full.

Used in networking, audio processing, and real-time systems.

Summary

Availability → A=MTBFMTBF+MTTRA = \frac{MTBF}{MTBF + MTTR}A=MTBF+MTTRMTBF, measures system uptime.
Snowflake Advantage → Scalable.
Snowflake Disadvantage → High cost for large queries.
Live Migration & Load Balancer → Improve uptime and resource efficiency.

System Buses → Address, Data, Control, System Bus.
Evard's States → New, Clean, Configured, Unknown, Off.
Ring Buffer → Handles continuous data flow in ***networking and OS buffers***.

Short Questions

In SAMM, what is the Process Area of the Initial Level?

Answer:

In ***SAMM (System Administration Maturity Model)***, the ***Initial Level*** is ***unstructured and lacks formal processes***.

Process Area of Initial Level:

- ***No formal policies*** → Tasks are done in an ad-hoc manner.
- ***No documentation*** → Everything relies on administrator experience.
- ***No monitoring tools*** → Issues are handled reactively, not proactively.
- ***Example*** → A new company with no established IT procedures.

This level has high risks due to lack of structure.

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Write Commands?

Configuration of IP Address (Temporary Assignment)
Assigning an IP address temporarily in Linux:

```bash
sudo ip addr add 192.168.1.100/24 dev eth0
```

Assigning an IP in Windows (Command Prompt - Admin Mode)***:***

```powershell
netsh interface ip set address "Ethernet" static 192.168.1.100 255.255.255.0 192.168.1.1
```

Clear All IP Configuration of Network
Linux:

```bash
sudo ip addr flush dev eth0
```

Windows:

```powershell
netsh interface ip reset
ipconfig /release
ipconfig /renew
```

Write Three Names of ATX Power Supplies?

Common ATX Power Supply Types:

1. ***Standard ATX Power Supply*** → Used in most desktops.
2. ***SFX (Small Form Factor ATX)*** → Used in mini-PCs.
3. ***EPS12V (Extended ATX Power Supply)*** → Used in servers and high-performance workstations.

ATX power supplies differ in size, connectors, and wattage capacity.

Long Questions

In SAMM, What is the Process of Fire Alarm System?

Fire Alarm Systems in SAMM follow these processes:

Process	Description
Detection	Sensors detect smoke, heat, or gas.
Alerting	System sends an alert (visual, sound, or network notification).
Response	System administrators take action (shut down critical systems, evacuate).
Recovery	IT teams restore affected systems and data.

Fire alarm systems ensure system safety in case of emergencies.

1. Write Benefits of Live Migration?

Answer:

Live Migration allows virtual machines (VMs) to move between servers without downtime.

Benefits:

Zero Downtime → Users don't experience interruptions.
Hardware Maintenance → Move workloads without shutting down the server.

Better Resource Utilization → Distribute workloads dynamically.
Disaster Recovery → Shift workloads to another server during failure.
Energy Efficiency → Move VMs to fewer servers to save power.

Used in cloud computing, data centers, and virtualization.

Write Logs and Their Location?

Answer:

Linux Log Files and Their Locations:

Log Type	Location	Purpose
System Logs	`/var/log/syslog`	General system events.
Kernel Logs	`/var/log/kern.log`	Kernel-related messages.
Authentication Logs	`/var/log/auth.log`	User login and authentication attempts.
Boot Logs	`/var/log/boot.log`	System startup logs.
Application Logs	`/var/log/<app_name>.log`	Logs for installed software.

✅ Logs help in troubleshooting and system monitoring.

Summary

SAMM Initial Level → Unstructured, no documentation, high risk.
IP Commands → Assign and clear IP configurations in Linux and Windows.

ATX Power Supplies → Standard ATX, SFX, EPS12V.
Fire Alarm System in SAMM → Detection, Alerting, Response, Recovery.
- ***Live Migration Benefits → Zero downtime, resource efficiency, disaster recovery.***

□*Logs & Locations → System logs in* `/va r/log/` *used for troubleshooting.*

Short Questions

1. Table Given – Identify the State?

Answer:

Possible states based on Evard's Computer Machine Life Cycle:

State	Description
New	Freshly unpacked system.
Clean	OS installed but no configuration done.
Configured	Fully set up and operational.
Unknown	System with misconfigurations or issues.
Off	System shutdown or decommissioned.

The correct state is determined by matching the table's details with these descriptions.

2. Table Given – Identify the Redundancy Type?

Answer:

Types of Redundancy in IT Systems:

📌 Types of Redundancy in IT Systems:

Redundancy Type	Description
N+1	One extra backup unit (e.g., 4 servers + 1 spare).
N+2	Two extra backup units (e.g., 4 servers + 2 spares).
N+X	X number of additional backup units, based on risk assessment.
2N (Full Redundancy)	Every component has a complete backup.
2N+1	Full redundancy + one extra backup.

✅ The correct redundancy type depends on the table's configuration details.

4. There Architecture Where Ubuntu Runs On?

Answer:

Ubuntu can run on multiple architectures, including:

1. ***x86 (32-bit and 64-bit)*** → Most common architecture for PCs and servers.
2. ***ARM*** → Used in mobile devices, Raspberry Pi, and cloud servers.
3. ***PowerPC*** → Older IBM-based systems and some embedded devices.

Ubuntu supports x86, ARM, and PowerPC architectures.

Server Architecture – Other Approaches?

Answer:

Different approaches in Server Architecture:

Approach	Description
Monolithic	All server services are combined in one system.
Client-Server	Clients request services from a centralized server.
Peer-to-Peer (P2P)	All devices share resources equally.
Clustered Servers	Multiple servers work together for load balancing.
Microservices	Applications are broken into independent, lightweight services.

✅ Modern servers use Microservices and Clustered Architectures for efficiency.

Long Questions

IT System Tasks?

Answer:

Common IT system administration tasks include:

User Management → Adding, removing, and managing user accounts.
Security Administration → Configuring firewalls, monitoring threats.

Network Management → Managing IPs, configuring routers, troubleshooting.
Backup & Recovery → Scheduling backups and restoring data.
System Monitoring → Using tools like Nagios to monitor performance.
Software Updates → Installing security patches and updates.

IT tasks ensure security, efficiency, and uptime.

3. Server Hardware Features?

Answer:

📌 Important features of server hardware:

Feature	Description
Processor (CPU)	High-performance CPUs like Intel Xeon or AMD EPYC.
Memory (RAM)	ECC RAM for reliability, typically 32GB+ in servers.
Storage (HDD/SSD)	RAID support for redundancy and fast access.
Power Supply	Redundant PSUs for high availability.
Networking	High-speed Ethernet (10Gbps+), Fiber Optics.
Cooling System	Advanced cooling to prevent overheating.

✅ Enterprise servers use redundant hardware to ensure 24/7 uptime.

4. Names of Log System and Their Location?

Answer:

Linux log files and their storage locations:

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Log Type	Location	Purpose
System Logs	`/var/log/syslog`	General system events.
Kernel Logs	`/var/log/kern.log`	Kernel-related messages.
Authentication Logs	`/var/log/auth.log`	User login and security logs.
Boot Logs	`/var/log/boot.log`	System startup logs.
Application Logs	`/var/log/<app_name>.log`	Logs for installed applications.

✅ Log files are essential for troubleshooting and system monitoring.

Summary

System States → New, Clean, Configured, Unknown, Off.
Redundancy Types → N+1, N+2, N+X, 2N, 2N+1.
Ubuntu runs on → x86, ARM, PowerPC architectures.
Server Architectures → Monolithic, Client-Server, P2P, Clustered, Microservices.

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- ***IT System Tasks → User management, security, networking, monitoring.***
- ***Server Hardware Features → ECC RAM, RAID storage, redundant power, high-speed networking.***
- ***Log Files & Locations → System logs in /var/log/, useful for troubleshooting.***

IT System Tasks?

Answer:

- IT system tasks involve managing and maintaining an organization's IT infrastructure. These tasks ensure the ***smooth operation, security, and efficiency*** of IT systems.

Key IT System Tasks:

Task	Description
User Management	Creating, modifying, and deleting user accounts, setting permissions.
Security Administration	Configuring firewalls, monitoring threats, managing antivirus software.
Network Management	Assigning IP addresses, setting up routers, ensuring network connectivity.
Backup & Recovery	Performing data backups, ensuring disaster recovery plans are in place.
System Monitoring	Using tools like **Nagios** to track CPU usage, disk space, and system health.
Software Updates & Patch Management	Installing security patches, updating OS and applications.
Troubleshooting & Issue Resolution	Diagnosing hardware/software issues, ensuring system uptime.

✅ **IT system tasks help maintain security, performance, and reliability in an organization.**

5. Server Hardware Features?

Answer:

Servers require ***powerful and reliable hardware*** to handle large-scale computing and storage.

Key Features of Server Hardware

Answer:

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Feature	Description
Processor (CPU)	High-performance processors like **Intel Xeon** or **AMD EPYC** for multitasking.
Memory (RAM)	Uses **ECC RAM (Error-Correcting Code RAM)** for stability and performance.
Storage (HDD/SSD)	**RAID (Redundant Array of Independent Disks)** for data redundancy.
Power Supply	**Redundant Power Supplies (RPS)** ensure uninterrupted power.
Networking	**High-speed Ethernet (10Gbps+), Fiber Optic connections** for fast data transfer.
Cooling System	Advanced cooling (fans, liquid cooling) to prevent overheating.

✅ **Enterprise servers use redundant and scalable hardware to ensure 24/7 operation.**

6. Names of Log Systems and Their Locations?

Answer:

Linux servers store log files in the /var/log/ directory, which helps in system monitoring and troubleshooting.

Log Type	Location	Purpose
System Logs	`/var/log/syslog`	Stores general system messages.
Kernel Logs	`/var/log/kern.log`	Logs related to kernel operations.
Authentication Logs	`/var/log/auth.log`	Records user login attempts and security events.
Boot Logs	`/var/log/boot.log`	Stores system startup logs.
Application Logs	`/var/log/<app_name>.log`	Contains logs of specific installed applications.

✅ **Logs help administrators troubleshoot issues and enhance security monitoring.**

RAM Types & Their Characteristics?

Answer:

RAM Type	Speed	Cost	Usage
FBDIMM (Fully Buffered DIMM)	High speed (up to DDR2-800)	Higher due to advanced features	Enterprise servers
UDIMM (Unbuffered DIMM)	Moderate to high speed (up to DDR4-3200)	Lower	Desktops
RDIMM (Registered DIMM)	Moderate to high speed (up to DDR4-3200)	Higher	Servers
LRDIMM (Load-Reduced DIMM)	High speed (up to DDR4-3200)	Higher	High-capacity server applications
SODIMM (Small Outline DIMM)	Moderate to high speed (up to DDR4-3200)	Moderate	Laptops
MicroDIMM	Moderate speed (up to DDR3-1600)	Moderate to high	Ultra-compact devices (embedded systems, small laptops)

✅ RDIMM and LRDIMM are preferred in servers due to their stability and capacity handling.

Advantages of Snowflake (Cloud Data Platform)

Answer:

Key Benefits:

1. ***Scalability*** → Automatically adjusts resources based on workload.
2. ***Performance Optimization*** → Uses separate storage and compute layers for faster queries.
3. ***Security*** → Supports role-based access control (RBAC) and encryption.
4. ***Multi-Cloud Compatibility*** → Runs on AWS, Azure, and Google Cloud.
5. ***Data Sharing*** → Enables easy data sharing across organizations.
6. ***Cost Efficiency*** → Pay-as-you-go pricing saves cost for variable workloads.

Snowflake is widely used for big data analytics, business intelligence, and cloud storage solutions

Disadvantages of Snowflake Architecture?
Answer
1. ***Increased Administrative Overhead:*** Managing unique machines increases administrative complexity.

2. ***Complex Asset Tracking:*** Detailed and up-to-date inventory management is challenging.

3. ***Standardization Issues***: Lack of standardization leads to inefficiencies and complexity.

4. ***Higher Training Costs:*** Diverse systems require extensive training and support.
5. ***Global Deoptimization***: Customizing each machine can reduce overall system efficiency.

Ways of IP Address Assignment

There are three main methods for assigning an IP address to a device in a network:

Method	Description	Example
Static IP Assignment	Manually assigned by an administrator, does not change.	Servers, printers, routers.
Dynamic IP Assignment (DHCP)	Automatically assigned by a DHCP server, changes over time.	Most client devices (PCs, smartphones).
APIPA (Automatic Private IP Addressing)	Assigned automatically when no DHCP is available. Uses `169.254.x.x` range.	Used when DHCP fails.

✅ **Static IP is used for critical devices, while DHCP is used for general devices to simplify management.**

Disadvantages of Snowflake Architecture?

Answer:

1. ***Increased Administrative Overhead***: Managing unique machines increases administrative complexity.
2. ***Complex Asset Tracking:*** Detailed and up-to-date inventory management is challenging.
3. ***Standardization Issues***: Lack of standardization leads to inefficiencies and complexity.

4. ***Higher Training Costs:*** Diverse systems require extensive training and support.
5. ***Global Deoptimization:*** Customizing each machine can reduce overall system efficiency.

Types of System Buses & Their Functions?

Answer:

📌 **System buses are responsible for communication between the CPU, memory, and peripherals.**

Bus Type	Function	Example Usage
Control Bus	Sends control signals to manage operations (e.g., read/write operations).	CPU controlling memory read/write operations.
Address Bus	Carries memory addresses from the processor to other components.	CPU accessing RAM locations.
Data Bus	Transfers actual data between the processor, memory, and peripherals.	Transferring data between CPU and RAM.

✅ **Modern systems use high-speed PCIe and USB buses for improved data transfer.**

"What is the purpose of the ring buffer in a Linux system, and what events are stored in it?"

Answer:
The ***ring buffer*** in Linux is used to ***store log messages generated by the kernel*** during system boot and operation. It ensures that important system events are recorded even before user logging starts.

Events stored in the ring buffer:

Errors in mounting a disk.
Driver loading messages.
Hardware detection logs.
Kernel panic or crash reports.

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Note!

May Allah grant you success, ease your efforts, and bless you with wisdom and perseverance. Keep your faith strong, for with prayer, every challenge becomes an opportunity. And please remember us in your prayers. I hope this file helps you a lot;

I have tried my best to find the most relevant and authenticated answers for the questions. However, in some cases, the questions might slightly differ from the ones in your slides. I recommend that every student kindly verify the answers on their own before using them. I am not responsible for any discrepancies.

Best wishes for Mids!

Maha Rana