

Recitation Reviewer in System Administration and Maintenance

#resource #flashcards

Roles of an System Administrator

System Administrator manages and maintain computer systems and networks.

Network Administrator design and maintain network infrastructure.

Database Administrator design and maintain network infrastructure.

Security Administrator ensures compliance with the organization's IT security policies.

Cloud System Administrator ensure cloud-based services and resources run smoothly.

Application Administrator deploy and maintain applications within an organization.

Compliance Administrator ensure compliance with legal and regulatory requirement for IT system.

Storage Administrator optimize the performance of the organization's storage systems.

Help Desk Technicians resolve user issues and provide support.

IT Tools

Performance Monitoring Software primary tool used for monitoring system performance and health.

VMWare/VirtualBox used by system admin to manage virtual machines.

Log Analysis used for evaluating system records to mitigate risks.

Certifications

Cisco Certified Network Associate validates the ability to install, configure, operate, and troubleshoot routed and switched networks.

CompTIA Server++ is a globally recognized credential for proficiency in server management across platforms.

Microsoft Certified: Azure Administrator Associate demonstrates expertise in managing cloud services.

Networking

Data units of information that flow across a network.

Node end devices on a network.

Client requests services across a network.

Server supplies services across a network.

Peer can both request and supply services across a network.

Network Adapter used to gain access to the network and other devices on the network.

Protocols rules which govern how devices communicate with each other over networks.

Local Area Network a group of computers that are confined to a small geographic area.

Hub is the most basic central connecting device.

Switch can identify the intended recipient of the data.

Router device that enables computers to communicate and allow communication between two networks.

Network Interface Card device that enables you to send and receive data from your computer.

RJ45 Patch Cable most common type of network adapter connections.

Wireless Access Point central connecting device for a wireless network.

Serial Data Transfer transfer data one bit at a time.

Broadcast Data Transfer sends data to every other host on the network.

Unicast Data Transfer sends data to specific host.

Data Transfer Rate maximum bits per second that can be transmitted over a network.

Internet Protocol Address (IP) uniquely identifies your device and the associated network your device is on.

Network Topology defines the physical connections of hosts in a computer network.

Star Network Topology is the most common network topology.

Token Ring Network network that sends data logically in a ring fashion.

Ethernet de facto standard and most widely installed LAN technology.

Frame is a data packet residing on Layer 2 of OSI Model.

Open Systems Interconnection (OSI) defines how data communication occurs between devices.

Layer 7 - Application Layer enables users and application access to a network services.

Layer 6 - Presentation Layer translates data in to common format.

Layer 5 - Session Layer establishes communication session between devices.

Layer 4 - Transport Layer manages message fragmentation and reassembly. Segment.

Layer 3 - Network Layer manages data routing and creating sub networks. Packets.

Layer 2 - Datalink Layer provides error-free transfer of data frames. Frame.

Layer 1 - Physical Layer physical network media and signal methods. Bits

Media Access Control (MAC) unique device network identifier.

RAID Configuration

Redundant Array of Independent Disks (RAID) is a reliable way to improve the performance and reliability of servers. It stores data by using a collection of multiple drives.

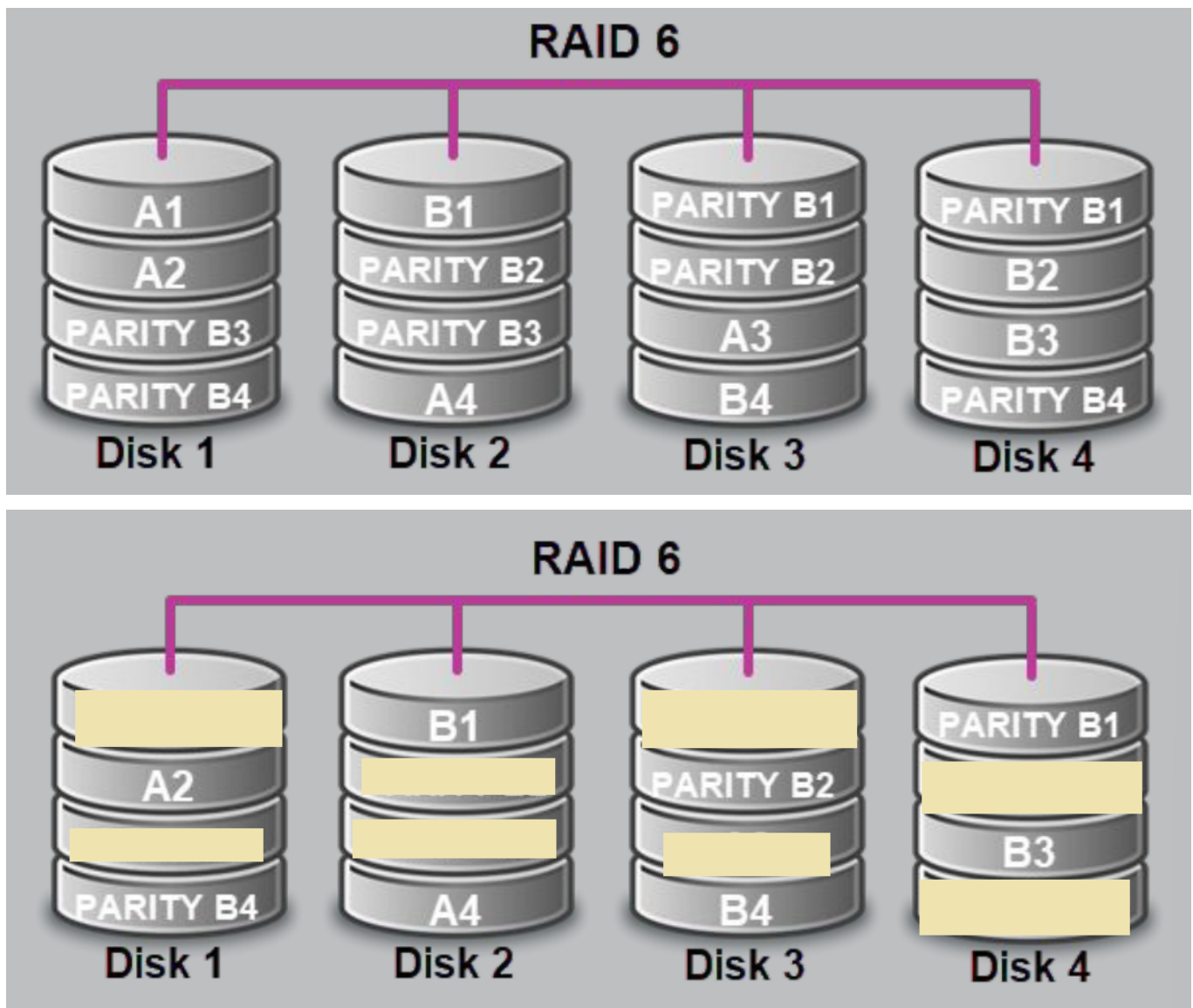
RAID 0 Striping RAID config that splits data evenly across two or more drives. Faster performance

because data is written and read simultaneously. No redundancy.

RAID 1 Mirroring RAID config that copies identical data onto two or more drives. High reliability because you have an exact copy. No performance gain.

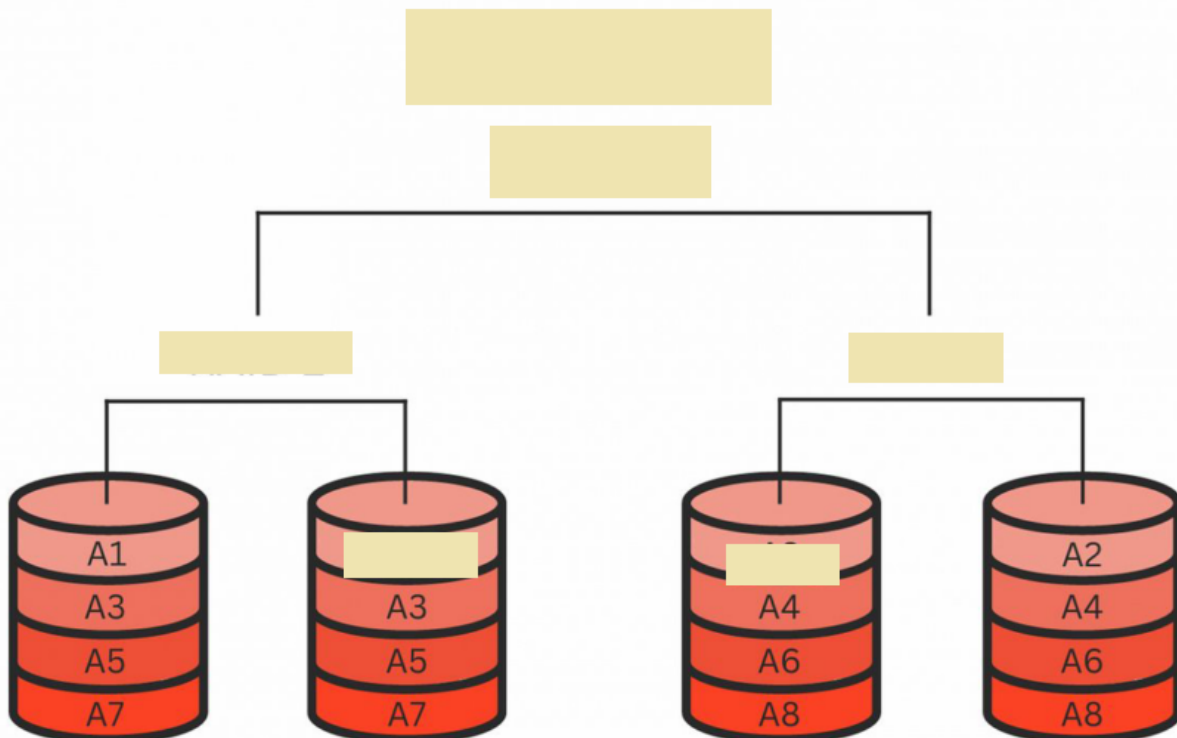
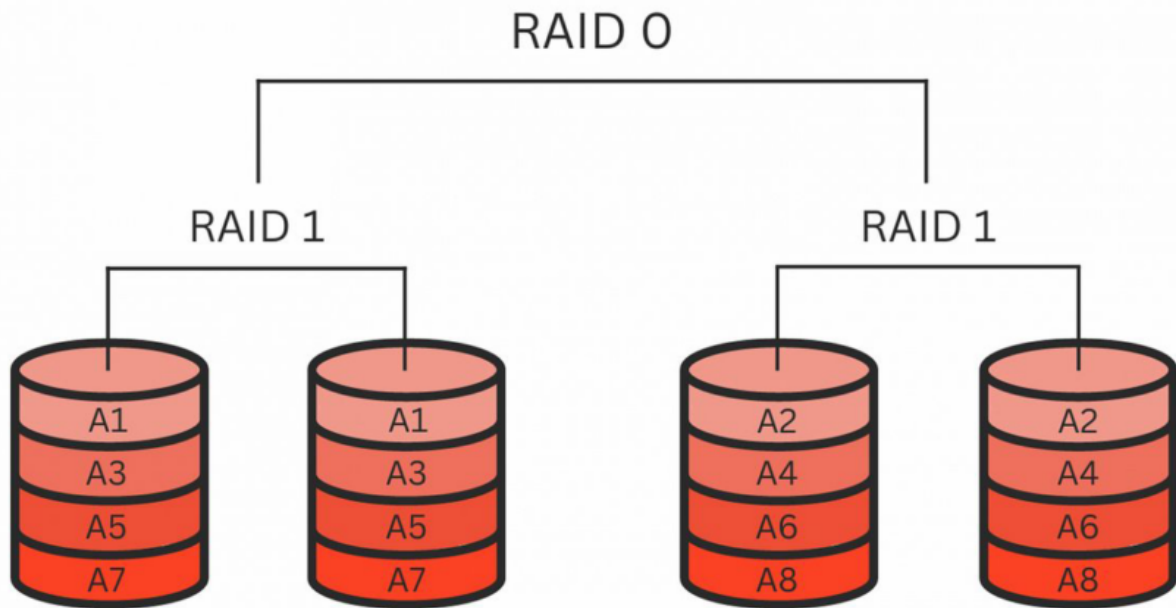
RAID 5 Striping with Parity RAID config that splits data across at least three drives and adds a parity block to help rebuild data if one of the drives fails. Balanced performance and reliability. Lose all your data if more than one drive fails.

RAID 6 Striping with Double Parity RAID config that is similar with RAID config 5 but with two parity blocks to help rebuild data if two of the drives fails. Greater reliability than RAID config 5. Slightly slower and lower storage due to extra parity.



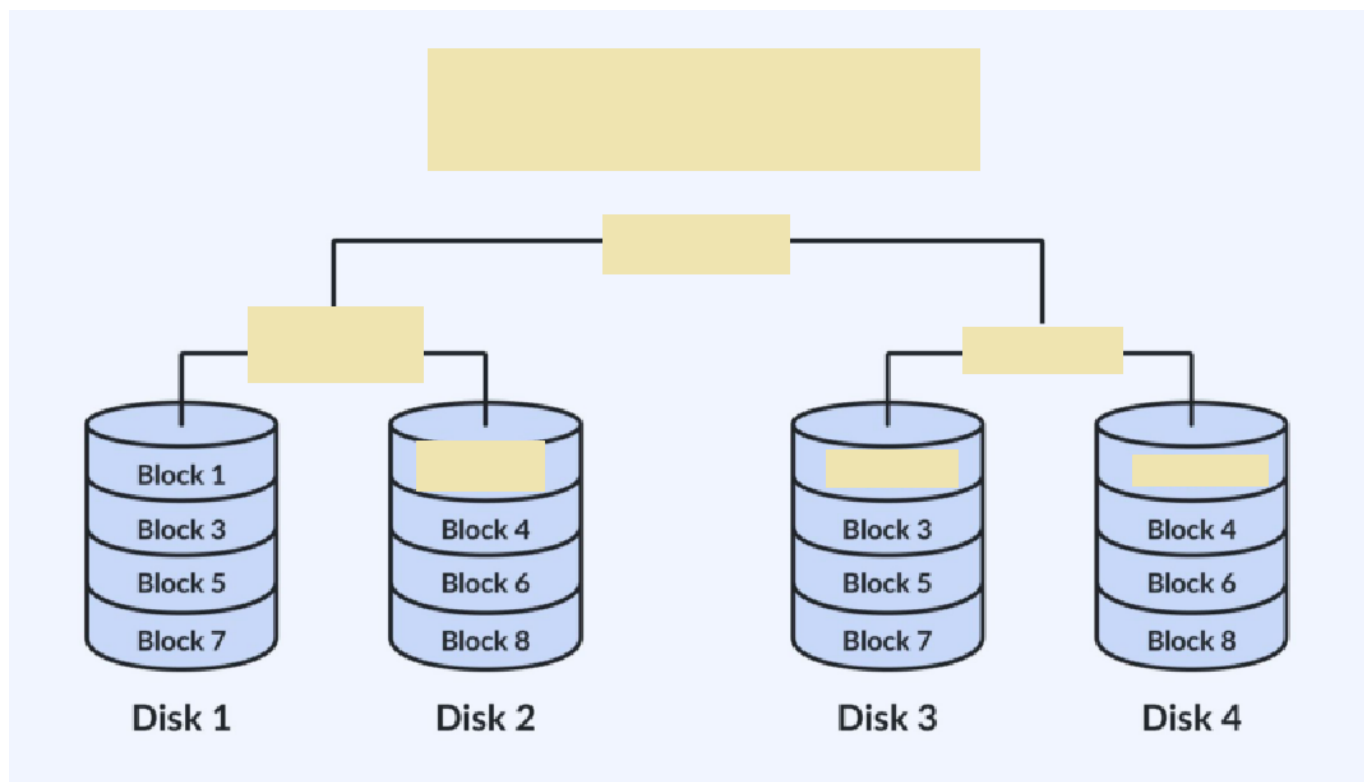
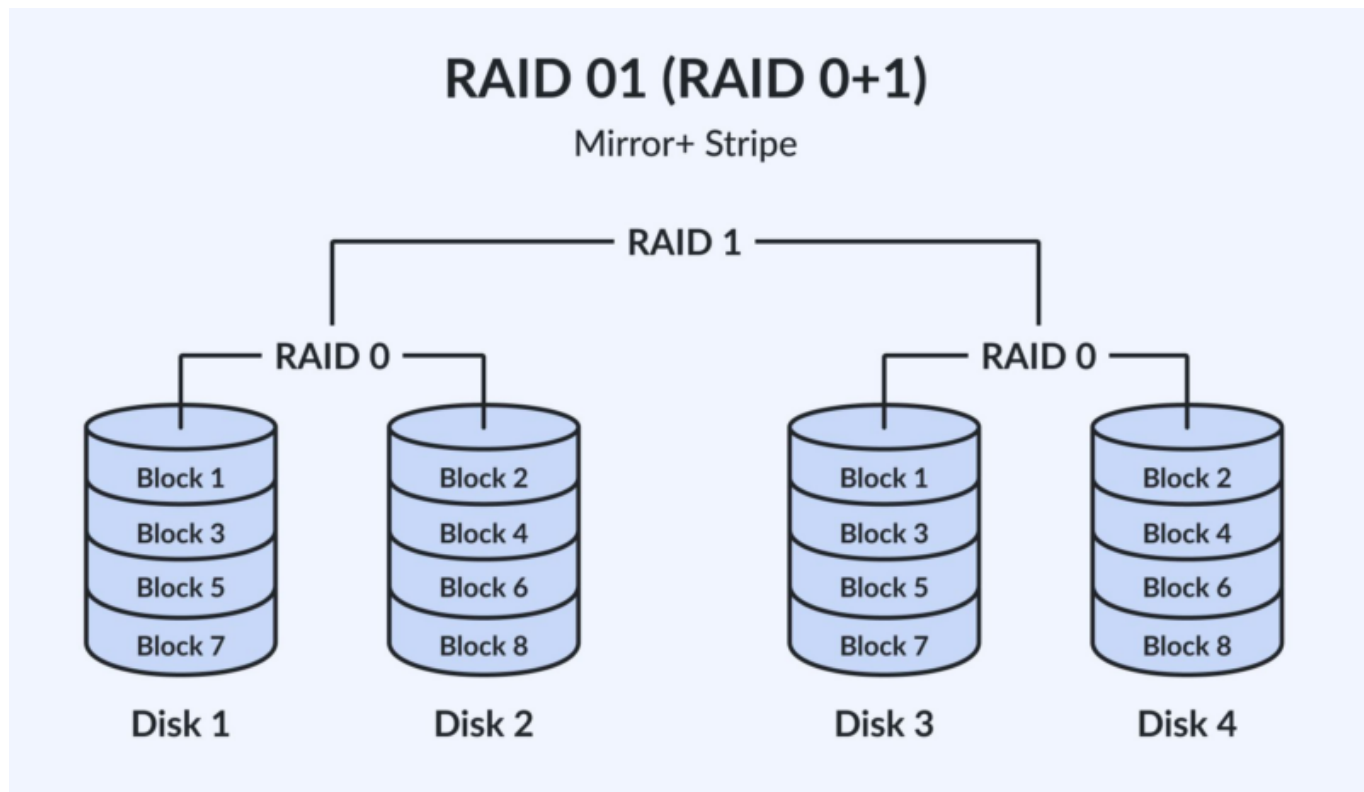
RAID 10 Mirroring with Striping RAID config that combines RAID 1 and RAID 0 by first mirroring data and then striping it. High speed and reliability. Requires more drives with a minimum of four and you lose half of your storage due to mirroring.

RAID 10



RAID 01 Striping with Mirroring RAID config that is opposite to RAID 10, it first stripes data across drives, then mirrors them. High speed and

reliability. Slightly less reliable than RAID 10 because if one drive fails then that entire set becomes vulnerable.



Advantages of RAID Configuration

Advantages	RAID 0 Redundant Array of Independent Disk level 0	RAID 1 Redundant Array of Independent Disk level 1	RAID 5 Redundant Array of Independent Disk level 5	RAID 6 Redundant Array of Independent Disk level 6	RAID 10 Redundant Array of Independent Disk level 10
Process	Data Striping	Disk Mirroring	Striping+Parity	Striping +Double Parity	Mirroring+Striping
Minimum of Number of Disk	2	2	3	4	4
Read Performance	High	High	High	High	High
Write Performance	High	Medium	Low	Low	High
Fault Tolerance	Not Fault- Tolerant	Fault- Tolerant	Fault- Tolerant	Fault- Tolerant	Fault- Tolerant
Storage Efficiency	100%	50%	65%-95%	50%-90%	50%
Cost	Cheap	Expensive	Expensive	Very Expensive	Expensive

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Process	Data Striping	Disk Mirroring	Striping+Parity	Striping +Double Parity	Mirroring+Striping
Minimum of Number of Disk	2	2		4	4
Read Performance	High	High	High	High	High
Write Performance	High		Low		High
Fault Tolerance		Fault- Tolerant	Fault- Tolerant	Fault- Tolerant	Fault- Tolerant
Storage Efficiency	100%	50%		50%-90%	50%
Cost		Expensive	Expensive		Expensive

RAID Monitoring helps you manage storage capacity and efficiently allocate it for various application and processes.

Latency is the time it takes for data to be read from or written to a disk.

Capacity and utilization determines the disk space used up and in forecasting when the disk might run

out.

IOPS refers to the number of read and write operations performed on a disk per second.

Server Log is a log file automatically created and maintained by a server. It records all the changes and activities happening on a server.

Server Admins usually go through server logs to ascertain what erroneous events took place.

OPManager is an agent-based server logs monitoring and management solution that monitors logs for errors defined by the admin.

IT Workflow Automation helps you automate repetitive laborious IT tasks and first level troubleshooting.

Virtualization

Virtualization is a technology that enables the installation of multiple operating systems on a single hardware platform.

Non-Virtualized Systems a single OS controls all hardware resources.

Virtualized Systems allows running multiple virtual containers on a physical platform.

Virtual Machines enables a single platform to host numerous application.

Hypervisor enables virtualization by creating and running virtual machines.

Host Machine the physical computer that runs one or more virtual machine.

Guest Machine the virtual machine running on the host.

Type 1 Native or Baremetal Hypervisor runs directly on a server hardware without an underlying OS.

Type 2 Hosted Hypervisor runs on top a traditional operating system.

Features of Virtualization

Partitioning supports multiple applications and operating systems.

Isolation if one VM crashes, others and the host system remain unaffected.

Encapsulation treats each VM as an independent software configuration.

Interposition actions are taken without the knowledge of the underlying OS.

Types of Virtualization

Server Virtualization divides one physical machine into many virtual servers.

Client & Desktop Virtualization similar to server virtualization but applied to users' desktops.

Services and Applications Virtualization increases compatibility and manageability (e.g., Docker).

Network Virtualization creates multiple virtual network components like VLANs and NAT.

Storage Virtualization used in data centers to manage large storage systems by creating and allocating virtual storage across hardware.

Dynamic Host Configuration Protocol

DHCP (Dynamic Host Configuration Protocol) is a protocol that automatically provides an IP host with its IP address and other related configuration information (subnet mask, default gateway, DN

Scope a range of IP addresses that are available to be leased to DHCP clients by the DHCP Server service.

Lease the length of time for which DHCP client can use DHCP assigned IP address config.

Reservation a specific IP address within a scope permanently assigned against MAC address.

Exclusion Range ensures that the specified IP addresses will not be offered to clients by the DHCP

server.

Domain Name System (DNS) maps hostnames to IP addresses (e.g., `google.com` → `142.250.190.78`) and IP addresses to hostnames.

Host Aliasing allows multiple names for one server.

MX Records indicates mail servers for a domain.

Load Balancing associates multiple IP addresses with a single hostname.

Hierarchical and Distributed Database is structured with root, top-level domains (TLDs), and specific domains.

Root Name Servers are top-level DNS servers that direct queries to the appropriate TLD servers.

TLD Servers handle queries for domain-specific extensions like `.com`, `.org`, etc.

Local Name Servers are ISP-provided servers that cache DNS queries locally to improve response times.

Iterative Query is a DNS query where the server provides the best response it can without contacting others directly.

Recursive Query is a DNS query where the server handles all queries for the client by contacting other servers.

Caching temporarily stores DNS query results, governed by TTL (Time-to-Live).

Dynamic DNS (DDNS) automatically updates DNS records as changes occur.

Manual Updates are DNS record changes made by admins using configuration tools.

Host Configurations can be done manually (e.g., `/etc/hosts`) or automatically using DHCP.

Proxy Server acts as an intermediary for requests between a client and a server.

Forward Proxy represents clients and forwards their requests to external servers.

Reverse Proxy represents servers and manages incoming client requests.

Web Security filters content, restricts access, and masks user IP for security.

Caching in Proxy speeds up responses by storing frequently requested content.

Load Balancing distributes incoming traffic evenly across multiple servers.

Protocol Support in Proxy includes protocols like HTTP, HTTPS, SOCKS, and FTP.

Proxy Performance enhances speed by reducing bandwidth consumption through caching.