Digital Laboratory

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Jawaban

1. Network devices are physical devices that are required for communication and interaction between hardware on a computer network. Network devices can be divided into two parts :
    a) **End Devices:** the interface that are used to interact with communication network, below is the example
        - **Computers**
        - **Network Printers**
        - **Mobile Handheld Devices**

    b) **Intermediary Devices :** a devices that have a purposes to connect one end device to another end devices, below is the example :
        - **Switch :** have a function to get additional port because switch is a multiport bridge, it also have have a buffer and a design that can boosts its efficiency
        - **Router :** have a purposes to transmit packets to their destinations by charting a path through the sea of interconnected networking devices using different network topologies.
        - **Gateway :** network device used to connect two or more dissimilar networks. In networking parlance, networks that use different protocols are dissimilar networks. A gateway can also be configured completely using software. As networks connect to a different network through gateways, these gateways are usually hosts or end points of the network.
        - **NIC :** Network Interface Card is an important hardware component used to provide network connections for devices like computers, servers, etc. With its wide applications, there are various types of network interface cards emerging in the market like PCIe card and server network card.

    Referensi :
    - https://www.geeksforgeeks.org/network-devices-hub-repeater-bridge-switch-router-gateways/

2. A Network can be classified with its scalability :
    a. **LAN :** stands for local area network. It is a group of network devices that allow communication between various connected devices. Private ownership has control

over the local area network rather than the public. It covers smaller areas such as colleges, schools, hospitals, and so on.

b. **MAN :** MAN stands for metropolitan area network. It covers a larger area than LAN such as small towns, cities, etc. MAN connects two or more computers that reside within the same or completely different cities. MAN is expensive and should or might not be owned by one organization.

c. **WAN :** WAN stands for wide area network. It covers a large area than LAN as well as a MAN such as country/continent etc. WAN is expensive and should or might not be owned by one organization. PSTN or satellite medium is used for wide area networks.

Referensi :

- https://www.geeksforgeeks.org/difference-between-lan-man-and-wan

3. OSI Model is a logical and conceptual model that defines network communication used by systems open to interconnection and communication with other systems. While TCP/IP helps you to determine how a specific computer should be connected to the internet and how you can transmit data between them. It helps you to create a virtual network when multiple computer networks are connected together. Below is the difference :
   - OSI header is 5 bytes whereas TCP/IP header size is 20 bytes.
   - OSI has 7 layers whereas TCP/IP has 4 layers.
   - OSI follows a vertical approach whereas TCP/IP follows a horizontal approach.
   - OSI refers to Open Systems Interconnection whereas TCP/IP refers to Transmission Control Protocol.
   - OSI model, the transport layer, is only connection-oriented whereas the TCP/IP model is both connection-oriented and connectionless.

   Referensi :

   - https://www.javatpoint.com/osi-vs-tcp-ip

4. A subnet, or subnetwork, is a network inside a network. Subnets make networks more efficient. Through subnetting, network traffic can travel a shorter distance without passing through unnecessary routers to reach its destination. Below is the benefit of subnetting :
   - A subnet mask ensures that traffic remains within its designated subnet. This reduces major congestion and reduces the load imparted on the network. With sub-networks, less distance needs to be traveled by data packets, enhancing network performance.

- Subnetting divides broadcast domains, meaning that traffic is routed efficiently, improving speed and network performance.
- Sound organization is crucial within large businesses. This extends to your newtork and routers. With subnetting, companies have full control over their traffic and data packets.

Referensi :

- https://www.cloudflare.com/en-gb/learning/network-layer/what-is-a-subnet/

5. CIDR (Classless Inter-Domain Routing) also known as supernetting is a method of assigning Internet Protocol (IP) addresses that improves the efficiency of address distribution and replaces the previous system based on Class A, Class B and Class C networks. The initial goal of CIDR was to slow the increase of routing tables on routers across the internet and decrease the rapid exhaustion of IPv4 addresses. As a result, the number of available internet addresses has greatly increased. he classful design included such as Class A with over 16 million identifiers, Class B with 65,535 host identifiers, Class C with 254 host identifiers. For example if an If an organization needed more than 254 host machines, it would be switched into Class B. However, this could potentially waste over 60,000 hosts if the business didn't need to use them, thus unnecessarily decreasing the availability of IPv4 addresses. CIDR was introduced by the Internet Engineering Task Force (IETF) in 1993 to fix this problem.

   How CIDR work is routers using CIDR use a destination address to route a packet toward a gateway, which can then take care of further unpacking the address based on its understanding of the details of the supernetwork also called the supernet. If a router knows routes for different parts of the same supernet, then it will use the most specific one or the one with the longest network address.In IPv6, a CIDR block always gets 64 bits for specifying network addresses.

   Referensi :

   - https://www.keycdn.com/support/what-is-cidr

6. A Variable Length Subnet Mask (VLSM) is a numerical masking sequence, or IP address subset, based on overall network requirements. A VLSM allows a network administrator to use long masks for networks with few hosts and short masks for networks with multiple hosts. A VLSM is used with a VLSM router and must have routing protocol support. Key VLSM features include:
   - Streamlined routing, where a router functions only with a VLSM sequence, versus a full IP address
   - Greater efficiency than fixed-length subnet masks (FLSM)

- Network IP addressing through empty subnet filling
- Simple network configuration

Referensi :

- https://www.geeksforgeeks.org/introduction-of-variable-length-subnet-mask-vlsm/