**ASSIGNMENT #1**

**Subject: Computer Network**

**Topic:Question,answer**



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**Q1:Unicast .**

* Define unicast communication and explain how it works in networking.
* List and describe at least three unicast protocol.
* Explain the advantages and disadvantages of unicast communication.
* Provide real-world examples of unicast protocol uasage.

**Definition of Unicast Communication:**

Unicast communication is a type of communication where a single sender sends data to a single receiver. In other words, the data is transmitted from one point to another point, and only one device receives the data.

**How Unicast Works in Networking:**

1. The sender and receiver devices are connected through a network.

2. The sender device sends a packet of data to the receiver device.

3. The packet contains the sender's IP address, the receiver's IP address, and the data being transmitted.

4. The packet is routed through the network to the receiver device.

5. The receiver device receives the packet and processes the data.

**Unicast Protocols:**

Here are three unicast protocols:

**1. TCP (Transmission Control Protocol):** TCP is a connection-oriented protocol that ensures reliable data transfer between devices. It establishes a connection between the sender and receiver before data transfer begins.

**2. UDP (User Datagram Protocol):** UDP is a connectionless protocol that does not guarantee reliable data transfer. It sends data packets without establishing a connection between the sender and receiver.

**3. HTTP (Hypertext Transfer Protocol):** HTTP is a protocol used for transferring data over the web. It is a request-response protocol, where the client sends a request to the server, and the server responds with the requested data.

**Advantages of Unicast Communication:**

**1. Reliability:** Unicast communication ensures that data is delivered to the intended receiver.

**2. Security:** Unicast communication allows for encryption and authentication, making it more secure.

**3. Efficient use of bandwidth:** Unicast communication only sends data to the intended receiver, reducing bandwidth usage.

**Disadvantages of Unicast Communication:**

**1. Scalability:** Unicast communication can become inefficient when sending data to multiple receivers.

**2. Latency:** Unicast communication can introduce latency, especially when sending large amounts of data.

**3. Resource-intensive:** Unicast communication requires more resources (e.g., bandwidth, processing power) than multicast or broadcast communication.

**Real-World Examples of Unicast Protocol Usage**

**1. Web browsing:** When you request a webpage, your browser sends a unicast request to the web server, which responds with the requested webpage.

**2. Email:** When you send an email, your email client sends a unicast message to the recipient's email server.

**3. File transfer:** When you transfer a file over the internet, your device sends a unicast request to the recipient's device, which responds with the requested file.

**Q2: Multi cast**

* Define multicast communication and how it differs from unicast.
* List and describe the at least multicast protocol (IQMP, PIM, RTP).
* Explain how multicast routing works and its benefits.
* Provide real-world example where multicast protocols are used (e. g, video, streaming, IPTV).

**Definition of Multicast Communication:**

Multicast communication is a type of communication where a single sender sends data to multiple receivers. The data is transmitted from one point to multiple points, and multiple devices receive the same data.

**Difference from Unicast:**

Multicast communication differs from unicast communication in that it sends data to multiple receivers, whereas unicast sends data to only one receiver. Multicast communication is more efficient than unicast when sending data to multiple receivers, as it reduces the amount of data transmitted.

**Multicast Protocols:**

Here are three multicast protocols:

**1. IGMP (Internet Group Management Protocol):** IGMP is a protocol used for managing multicast groups. It allows devices to join or leave multicast groups, and it helps routers to determine which devices are part of a multicast group.

**2. PIM (Protocol-Independent Multicast):** PIM is a protocol used for routing multicast data. It allows routers to forward multicast data to devices that are part of a multicast group. PIM comes in two flavors: PIM-SM (Sparse Mode) and PIM-DM (Dense Mode).

**3. RTP (Real-time Transport Protocol):** RTP is a protocol used for transmitting real-time data, such as audio and video. It provides timestamping and sequencing of data packets, which helps to ensure that data is delivered in the correct order.

**Multicast Routing:**

Multicast routing is the process of forwarding multicast data from a sender to multiple receivers. Here's how it works:

**1. Multicast group formation:** Devices join a multicast group by sending an IGMP join message to the router.

**2. Multicast routing protocol:** The router uses a multicast routing protocol, such as PIM, to forward multicast data to devices that are part of the multicast group.

**3. Multicast data forwarding:** The router forwards multicast data to devices that are part of the multicast group.

**Benefits of Multicast Routing:**

Multicast routing provides several benefits:

**1. Efficient use of bandwidth:** Multicast routing reduces the amount of data transmitted, as data is sent to multiple receivers over a single transmission path.

**2. Scalability:** Multicast routing allows for efficient transmission of data to a large number of receivers.

**3. Reduced latency:** Multicast routing reduces latency, as data is transmitted simultaneously to multiple receivers.

**Real-World Examples:**

Multicast protocols are used in various applications:

**1. Video streaming:** Multicast protocols are used to transmit video streams to multiple receivers, reducing bandwidth usage and latency.

**2. IPTV (Internet Protocol Television):** Multicast protocols are used to transmit TV channels to multiple receivers, providing efficient use of bandwidth.

**3. Online gaming:** Multicast protocols are used to transmit game data to multiple players, reducing latency and improving gaming experience.



