

Introduction to networking Section 3 E.M.A Medium

Medium Access Control (MAC), also known as Media Access Control, is a set of rules and procedures that govern how multiple devices share a single shared transmission medium in a network. It's a crucial component of the data link layer (Layer 2) of the OSI model. Function: Packages data into frames, adds error detection and correction mechanisms (like checksums), and controls access to the physical medium using protocols like Carrier Sense Multiple Access with Collision Detection (CSMA/CD).

Protocols: Defines the electrical, mechanical, and operational specifications for transmitting data, including voltage levels, cable pinouts, and signal encoding/decoding. Carrier Sense Multiple Access with Collision Avoidance (CSMA/CA): Used in Wi-Fi

and other wireless networks, where devices avoid collisions by sending a request to transmit (RTS) before sending data and waiting for a clear to send (CTS) response. Transmission Control Protocol (TCP): TCP is a connection-oriented protocol that offers greater reliability when it comes to transporting data than what UDP provides. With TCP, the application which sends the data receives acknowledgment or verification that the data was actually received. It is used for many protocols, including HTTP web browsing and email transfer where lossless data transfer is important. Individual units of data transmission in the TCP protocol are referred to as segments. Protocols: Ethernet, Wi-Fi (IEEE 802.11), Frame Relay, Point-to-Point Protocol (PPP).

User Datagram Protocol (UDP): UDP is a connectionless protocol that does not provide reliable data transport. No acknowledgments are retransmitted. This protocol gives a higher throughput and shorter latency and is often used for multicasting, broadcasting and real-time multimedia communication where occasional packet loss is acceptable. Messages sent with UDP are referred to as datagrams. The OSI 7-layer model

The OSI model, also known as the Open Systems Interconnection

connection model, model, is a conceptual framework used to describe network communication. It defines seven different layers, each with specific functionalities and responsibilities. The Session Layer provides process-to-process communications between two or more networked hosts. This layer is responsible for maintaining proper communication by establishing, managing, and terminating sessions (a property of TCP) between two nodes. It takes care of gracefully closing sessions and for session checkpointing and recovery. Connection-oriented: Guarantees in-order delivery of data packets and error-free transmission (e.g., TCP). Uses routing protocols like Open Shortest Path First (OSPF) or Border Gateway Protocol (BGP) to determine the best path for data to travel. Additional functionalities: Performs network address translation (NAT) to allow private IP addresses to communicate on the public internet. Additional functionalities: Provides logical addressing (MAC addresses) for identifying devices on the same network segment. Protocols: Transmission Control Protocol (TCP), User Datagram Protocol (UDP), port numbers. Uses routing protocols like Open Shortest Path First (OSPF) or Border Gateway Protocol addresses). Function: Establishes the physical connection between devices and transmits raw data bits through a physical medium like cables (copper, fiber optic) or wireless signals (radio waves). Unicast: one-to-one communication, where data is transmitted from a single source to a single destination. Multicast: One-to-many communication, where data is sent to a group of devices simultaneously. Broadcast: One-to-all communication, where data is sent to every device on the network. Transmission Types: Transmission types refer to the different methods used to transmit data between devices in a communication system. They define how information is packaged, sent, and received, ensuring reliable and efficient data exchange. ???