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Overview of the TCP/IP Model:

The TCP/IP model is a networking model used to describe the protocols and communication processes on the Internet and other interconnected networks.

Four layers of TCP/IP:

1. Network Interface Layer
2. Internet Layer
3. Transport Layer
4. Application Layer.

1. Network Interface Layer:

- The Network Interface Layer deals with the physical transmission of data between devices and the local network.
- It includes protocols like Ethernet, Wi-Fi, and Bluetooth, which handle the physical connection, data framing, and media access control.

2. Internet Layer:

- The Internet Layer is responsible for addressing, routing, and fragmenting data packets across different networks.
- The main protocol in this layer is the Internet Protocol (IP), which assigns unique IP addresses to devices and routes packets between networks.

3. Transport Layer:

- The Transport Layer ensures reliable end-to-end communication between devices.
- Transmission Control Protocol (TCP) provides reliable, connection-oriented communication with features like sequencing, error detection, and flow control.
- User Datagram Protocol (UDP) offers connectionless, unreliable communication suitable for real-time applications.

4. Application Layer:

- The Application Layer includes protocols and services that enable specific application functionalities.
- It encompasses a wide range of protocols such as HTTP, FTP, SMTP, DNS, and DHCP.
- HTTP is used for web browsing, FTP for file transfer, SMTP for email, DNS for domain name resolution, and DHCP for dynamic IP address assignment.

Interaction between Layers:

- The layers of the TCP/IP model interact with each other to facilitate communication.
- Data generated at the Application Layer is encapsulated into TCP or UDP segments, which are further encapsulated into IP packets.

- The Network Interface Layer then transmits the packets over the physical network.

Comparison with OSI Model:

- The TCP/IP model is often compared to the OSI model, but it is simpler and more closely reflects real-world protocols.
- The TCP/IP model combines the functionality of multiple OSI layers into fewer layers.
- While the OSI model has seven layers, the TCP/IP model focuses on the key layers necessary for Internet communication.

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