UDP Protocol

User Datagram Protocol (UDP) is a Transport Layer protocol. UDP is a part of the Internet Protocol suite, referred to as UDP/IP suite. Unlike TCP, it is an unreliable and connectionless protocol**.** So, there is no need to establish a connection before data transfer. The UDP helps to establish low-latency and loss-tolerating connections over the network.

Common uses:

1. Used for simple request-response communication when the size of data is less and hence there is lesser concern about flow and error control.
2. VoIP (Voice over Internet Protocol) services, such as Skype and WhatsApp, use UDP for real-time voice communication. The delay in voice communication can be noticeable if packets are delayed due to congestion control, so UDP is used to ensure fast and efficient data transmission.
3. DHCP (Dynamic Host Configuration Protocol) uses UDP to dynamically assign IP addresses to devices on a network.

Advantages	Disadvantages
Speed: UDP is fast because it does not have the overhead of establishing a connection and ensuring reliable data delivery.	**No congestion control:** UDP does not have congestion control, which means that it can send packets at a rate that can cause network congestion.
Simplicity: UDP has a simple protocol design, making it easier to implement and manage.	**No reliability:** UDP does not guarantee delivery of packets or order of delivery, which can lead to missing or duplicate data.
Smaller packet size: UDP uses small packet sizes, which can reduce network congestion and improve overall network performance.	**Limited use cases:** UDP is not suitable for applications that require reliable data delivery, such as email or file transfers, and is better suited for applications that can tolerate some data loss, such as video streaming or online gaming.

CAN Protocol

Controller Area Network protocol (CAN) is a standard protocol that allows the microcontroller and other devices to communicate without any host computer. The broadcast type allows the information to be transmitted to all the nodes. The CAN is a message-based protocol, which means that message carries the message identifier, and based on the identifier, priority is decided. There is no need for node identification in the CAN network, so it becomes easy to insert or delete it from the network. It is a serial half-duplex and asynchronous type of communication protocol.

Common uses:

CAN protocol was designed to target the communication issue that occurs within the vehicles. But then, it is used in various other fields

1. Medical instruments and equipment: X-ray generators and measurement systems.
2. Automotive (passenger vehicles, trucks, buses)
3. Industrial automation and mechanical control
4. Elevator and escalators

Advantages	Disadvantages
Low Cost: Reduced wiring, weight, and errors are three features that make CAN an economical option for network development and maintenance.	**Limited devices:** Because of electrical loading, the number of connected devices is limited to a maximum of 64 nodes.
Flexible: Since every network device has a CAN controller chip, modifications can be made faster and easier, with minimal overall impact.	**Simple:** ECUs communicate via a single CAN system instead of multiple direct, complex analog signal lines.
Efficient: CAN frames are prioritized by ID so that top priority data gets immediate bus access, without causing interruption of other frames.	**Noise:** CAN produces excessive electric noise.