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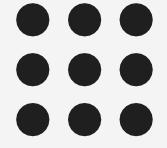
# **Department of Information Technology**

**Course Name – 19IT401 Computer Networks** 

II Year / IV Semester

**Unit 4 – Transport Layer** 

**Topic 1 – Services, UDP** 





# **Services**



#### **Services**

UDP – User Datagram Protocol

UDP is an unreliable connectionless transport-layer protocol used for its simplicity and efficiency
in applications where error control can be provided by the application-layer process.

#### TCP – Transmission Control Protocol

 TCP is a reliable connection-oriented protocol that can be used in any application where reliability is important.

#### SCTP – Stream Control Transmission Protocol

- SCTP is a new transport-layer protocol that combines the features of UDP and TCP.
- Process to Process Communication Port Numbering, End to End connection
- Multiplexing and De-multiplexing, Congestion Control, Error Control
- Flow Control



## **UDP**



- UDP is connectionless, unreliable transport protocol.
- It does not add anything to the services of IP except for providing process-to-process communication instead of host-to-host communication.
- UDP does not implement flow control or reliable/ordered delivery.
- UDP ensures correctness of the message by the use of a checksum.
- If a process wants to send a small message and does not require reliability, UDP is used.

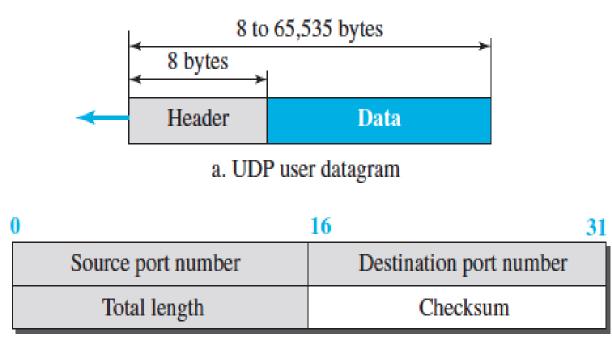


### **UDP**



### **User Datagram**

- UDP packets, called user datagrams, have a fixed-size header of 8 bytes made of four fields, each
  of 2 bytes (16 bits).
- The first two fields define the source and destination port numbers.
- The third field defines the total length of the user datagram, header plus data.
- The 16 bits can define a total length of 0 to 65,535 bytes
- The last field can carry the optional checksum



b. Header format





#### **Process-to-Process Communication**

UDP provides process-to-process communication using socket addresses, a combination of IP addresses and port number.

#### **Connectionless Services**

- This means that each user datagram sent by UDP is an independent datagram.
- There is no relationship between the different user datagrams even if they are coming from the same source process and going to the same destination program.
- The user datagrams are not numbered.
- Only those processes sending short messages, messages less than 65,507 bytes (65,535 minus 8 bytes for the UDP header and minus 20 bytes for the IP header), can use UDP.





#### **Flow Control**

UDP is a very simple protocol. There is no flow control, and hence no window mechanism. The receiver may overflow with incoming messages.

#### **Error Control**

There is no error control mechanism in UDP except for the checksum.

This means that the sender does not know if a message has been lost or duplicated.

When the receiver detects an error through the checksum, the user datagram is silently discarded.

#### Checksum

UDP checksum calculation includes three sections: a pseudoheader, the UDP header, and the data coming from the application layer.

#### **Congestion Control**

Since UDP is a connectionless protocol, it does not provide congestion control.



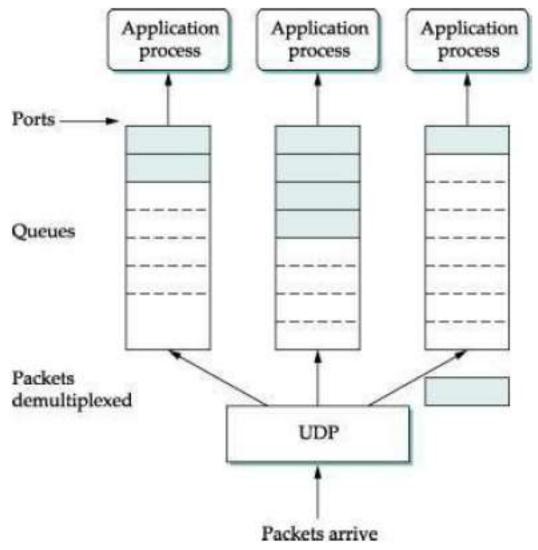


### Queuing

In UDP, queues are associated with ports.

### **Multiplexing and Demultiplexing**

In a host running a TCP/IP protocol suite, there is only one UDP but possibly several processes that may want to use the services of UDP. To handle this situation, UDP multiplexes and demultiplexes



**UDP/ Computer Networks /IT / SNSCE** 





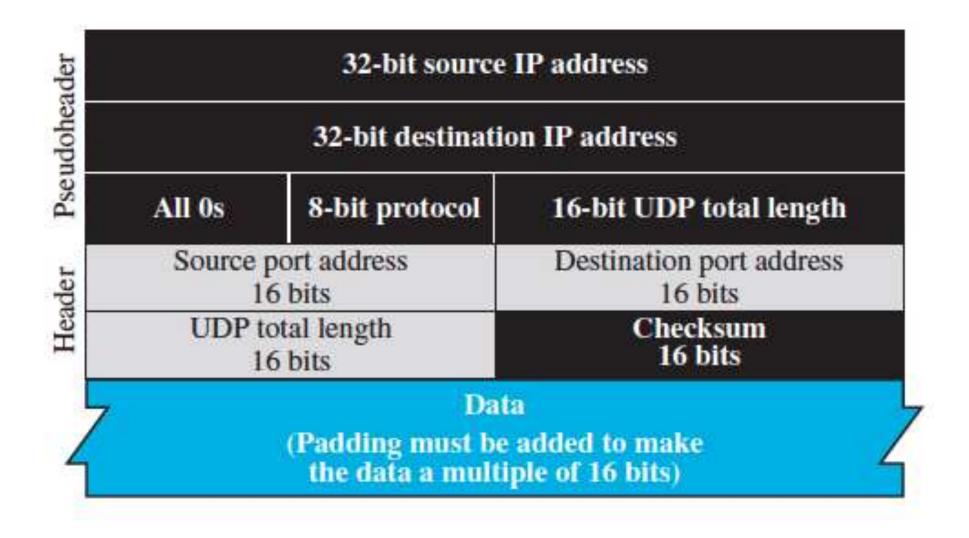
### **Typical Applications**

- UDP is suitable for a process that requires **simple request-response** communication with little concern for flow and error control. It is not usually used for a process such as FTP that needs to send bulk data.
- UDP is suitable for a process with internal flow- and error-control mechanisms. For example, the Trivial File Transfer Protocol (TFTP) process includes flow and error control. It can easily use UDP.
- UDP is a suitable transport protocol for multicasting. Multicasting capability is embedded in the UDP software but not in the TCP software.
- UDP is used for management processes such as SNMP.
- UDP is used for some route updating protocols such as Routing Information Protocol (RIP)
- UDP is normally used for interactive real-time applications that cannot tolerate uneven delay between sections of a received message





#### **Packet Format**







# **THANK YOU**