



SNS COLLEGE OF ENGINEERING

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

COURSE NAME :19IT401 COMPUTER NETWORKS
II YEAR /IV SEMESTER

Unit 4-Transport layer

Topics 3 : UDP: Datagram-Services-Applications



USER DATAGRAM PROTOCOL(UDP)



UDP is an example of the connectionless simple protocol with the exception of an optional checksum added to packets for error detection.

No attempt to fragment message

No reassembly

No ack

Unreliable transport protocol.

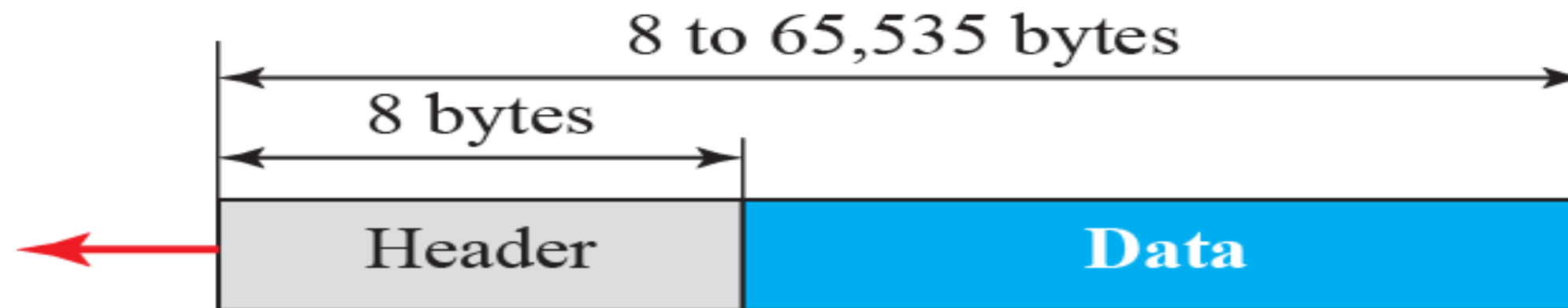
If UDP is so powerless, why would a process want to use it?

UDP is a very simple protocol using a minimum of overhead.

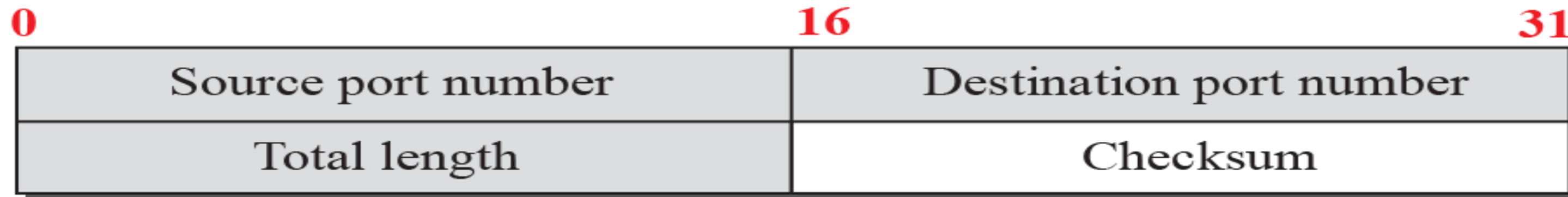


User datagram packet format

- UDP packets, called user datagrams, have a fixed-size header of 8 bytes made of four fields, each of 2 bytes .
- 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.



a. UDP user datagram



b. Header format



The following is the contents of a UDP header in hexadecimal format.

CB84000D001C001C

- a. What is the source port number?
- b. What is the destination port number?
- c. What is the total length of the user datagram?
- d. What is the length of the data?
- e. Is the packet directed from a client to a server or vice versa?
- f. What is the client process?



Solution



- a. The source port number is the first four hexadecimal digits $(CB84)_{16}$ or 52100
- b. The destination port number is the second four hexadecimal digits $(000D)_{16}$ or 13.
- c. The third four hexadecimal digits $(001C)_{16}$ define the length of the whole UDP packet as 28 bytes.
- d. The length of the data is the length of the whole packet minus the length of the header, or $28 - 8 = 20$ bytes.
- e. Since the destination port number is 13 (well-known port), the packet is from the client to the server.
- f. The client process is the Daytime .



Pseudoheader for checksum calculation

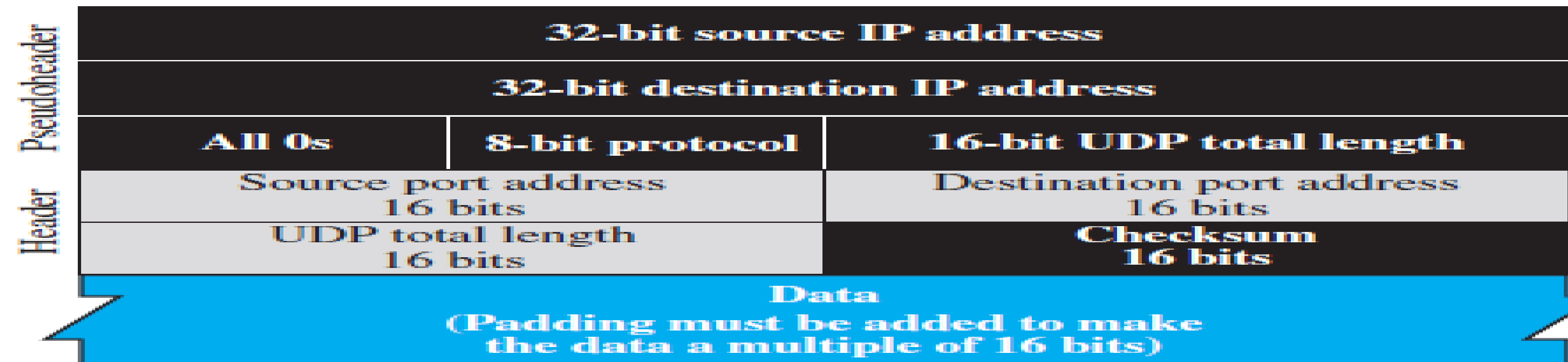


The *pseudoheader* is the part of the header of the IP packet in which the user datagram is to be encapsulated with some fields filled with 0s

if the IP header is corrupted, it may be delivered to the wrong host.

The protocol field is added to ensure that the packet belongs to UDP, and not to TCP.

The value of the protocol field for UDP is 17. If this value is changed during transmission, the checksum calculation at the receiver will detect it and UDP drops the packet. It is not delivered to the wrong protocol.





UDP Services



Process-to-Process Communication

Connectionless Services

Flow Control

The lack of flow control means that the process using UDP should provide for this service, if needed.

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. The lack of error control means that the process using UDP should provide for this service, if needed.

Checksum

Congestion Control - No

Encapsulation and Decapsulation

To a message from one process to another, the UDP protocol encapsulates and decapsulates messages.

Queuing

In UDP, queues are associated with ports.



Typical applications



The following shows some typical applications that can benefit more from the services of UDP than from those of TCP.

- 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 (simple network management protocol)
- UDP is used for some route updating protocols such as Routing Information Protocol (RIP)
- UDP is normally used for interactive real-time applications.



Assessment



- a) List UDP services.
- b) What is UDP?
- c) List the applications of UDP?





Reference



TEXT BOOKS

Behrouz A. Forouzan, Data Communications and Networking, Fifth Edition TMH, 2013.

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