USER DATAGRAM PROTOCOL - AN INTRODUCTION

Two transport layer protocols, TCP and UDP, build on the best-effort service provided by IP to support a wide range of applications. In this section we discuss the details of UDP.

The User Datagram Protocol (UDP) is an unreliable, connectionless trans- port layer protocol. It is a very simple protocol that provides only two additional services beyond IP: demultiplexing and error checking on data. Recall that IP knows how to deliver packets to a host, but does not know how to deliver them to the specific application in the host. UDP adds a mechanism that distinguishes among multiple applications in the host. Recall also that IP checks only the integrity of its header. UDP can optionally check the integrity of the entire UDP datagram. Applications that use UDP include Trivial File Transfer Protocol, DNS, SNMP, and Real-Time Protocol (RTP).

The UDP checksum field detects errors in the datagram, and its use is optional. If a source host does not want to compute the checksum, the checksum field should contain all 0s so that the destination host knows that the checksum has not been computed. What if the source host does compute the checksum and finds that the result is 0? The answer is that if a host computes the checksum whose result is 0, it will set the checksum field to all 1s. This is another representation of zero in 1s complement. The checksum computation procedure is similar to that in computing IP checksum except for two new twists. First, if the length of the datagram is not a multiple of 16 bits, the datagram will be padded out with 0s to make it a multiple of 16 bits. In doing so, the actual UDP datagram is not modified. The pad is used only in the checksum computation and is not transmitted. Second, UDP adds a pseudoheader (shown in Figure 8.17) to the beginning of the

datagram when performing the checksum computation. The pseudoheader is also created by the source and destination hosts only during the checksum computation and is not transmitted. The pseudoheader is to ensure

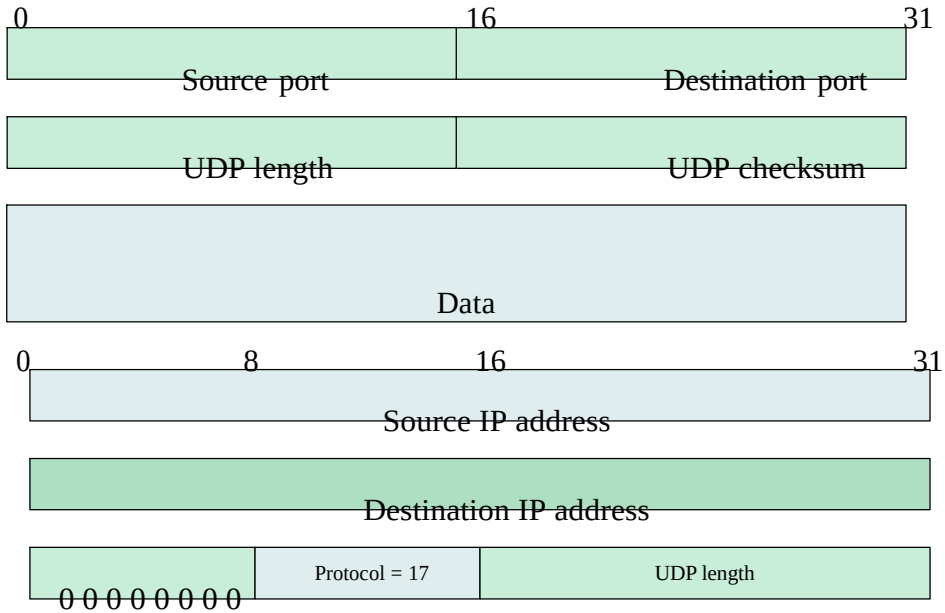

FIGURE 3.17 UDP pseudoheader

that the datagram has indeed reached the correct destination host and port. Finally, if a datagram is found to be corrupted, it is simply discarded and the source UDP entity is not notified.

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