SNS COLLEGE OF TECHNOLOGY

Coimbatore-35
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DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

19ECT301- COMMUNICATION NETWORKS

III YEAR/ V SEMESTER

UNIT 3 - TRANSPORT LAYER & APPLICATION LAYER

TOPIC – TRANSPORT LAYER PROTOCOLS

PROCESS-TO-PROCESS DELIVERY

The transport layer is responsible for process-to-process delivery—the delivery of a packet, part of a message, from one process to another. Two processes communicate in a client/server relationship, as we will see later.

Note

The transport layer is responsible for process-to-process delivery.

Figure 23.1 *Types of data deliveries*

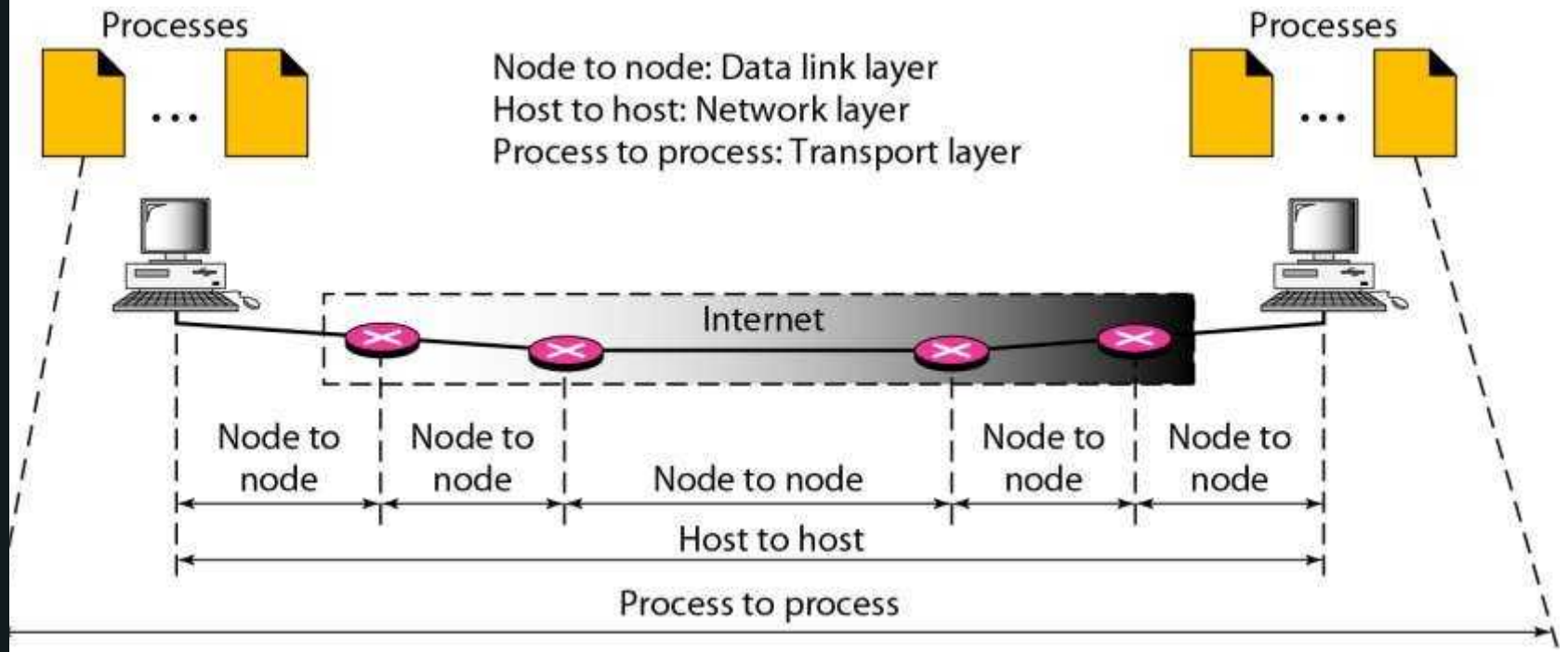


Figure 23.2 *Port numbers*

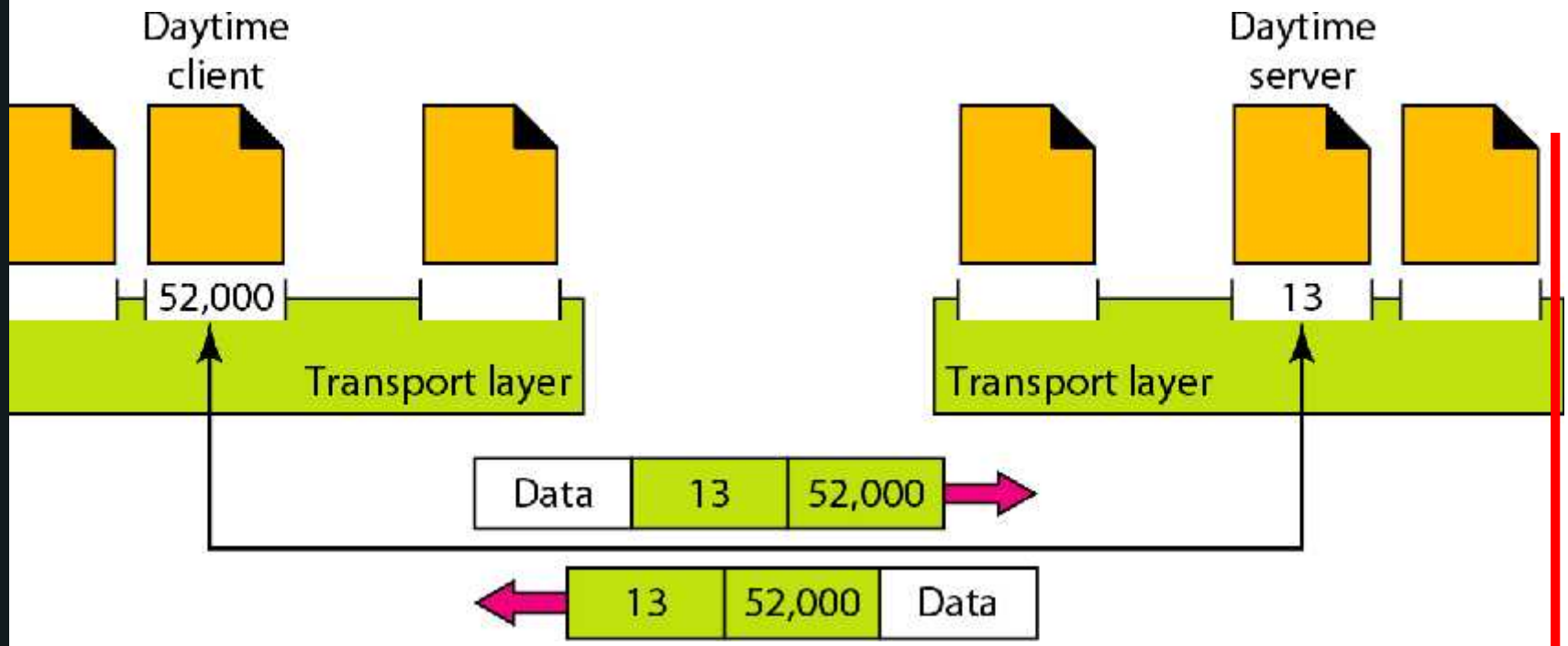


Figure 23.3 *IP addresses versus port numbers*

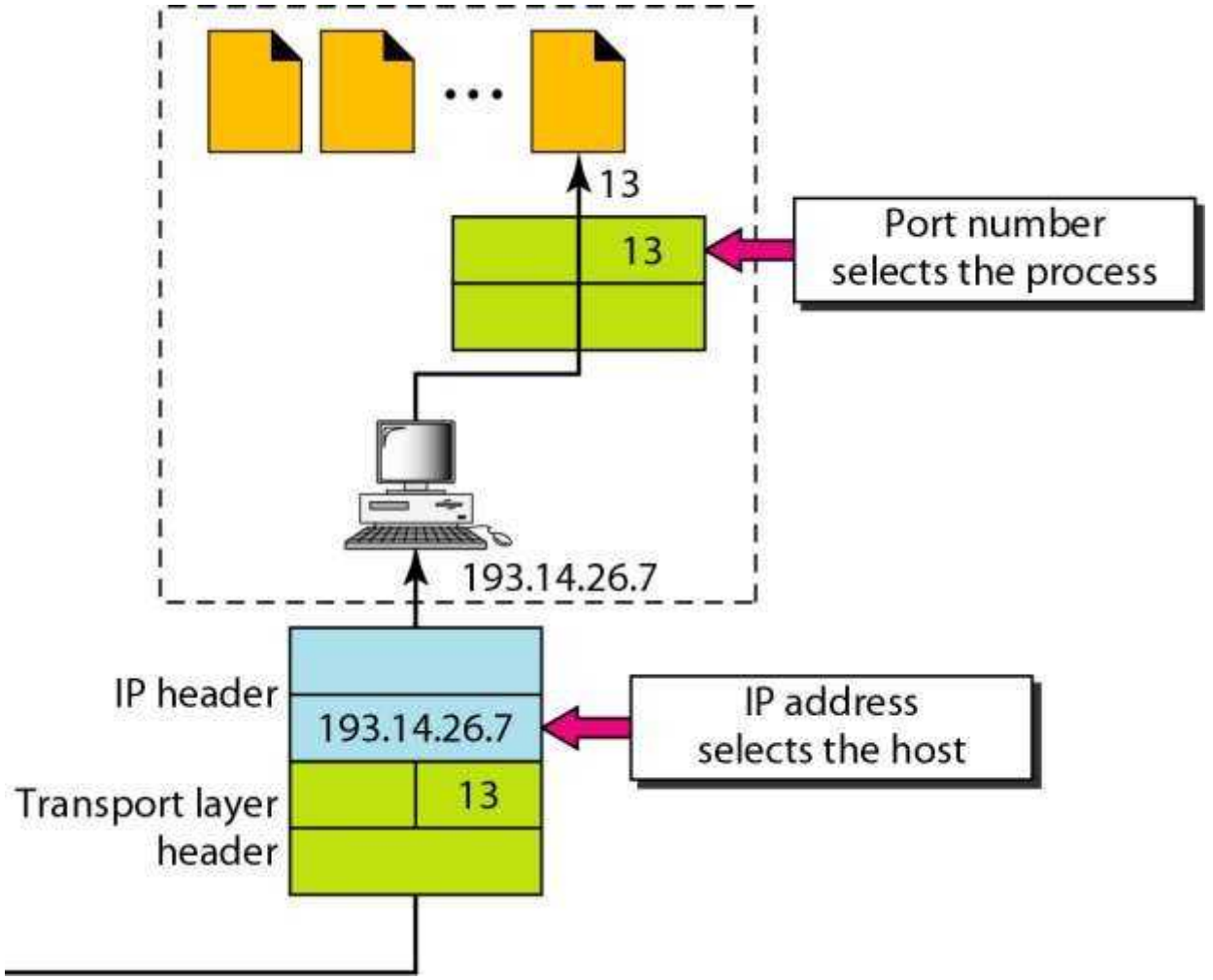


Figure 23.4 *IANA ranges*

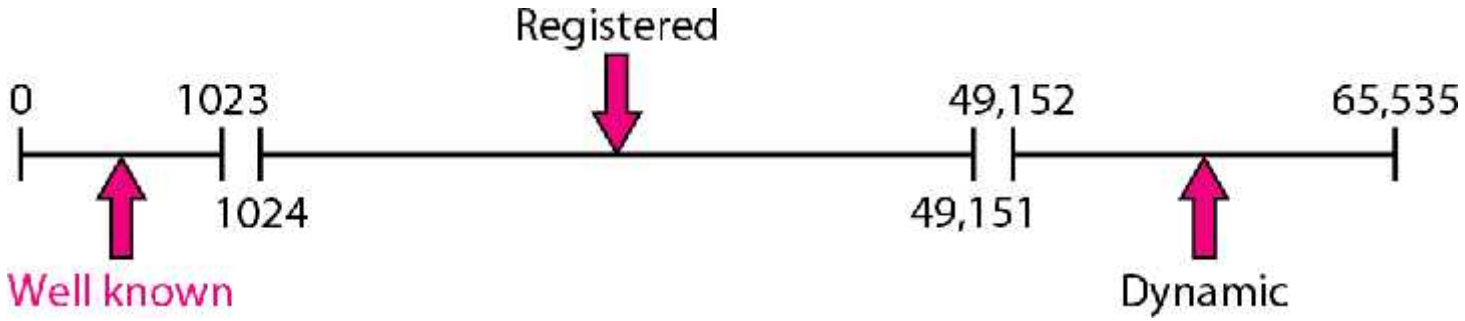


Figure 23.5 *Socket address*

Figure 23.6 *Multiplexing and demultiplexing*

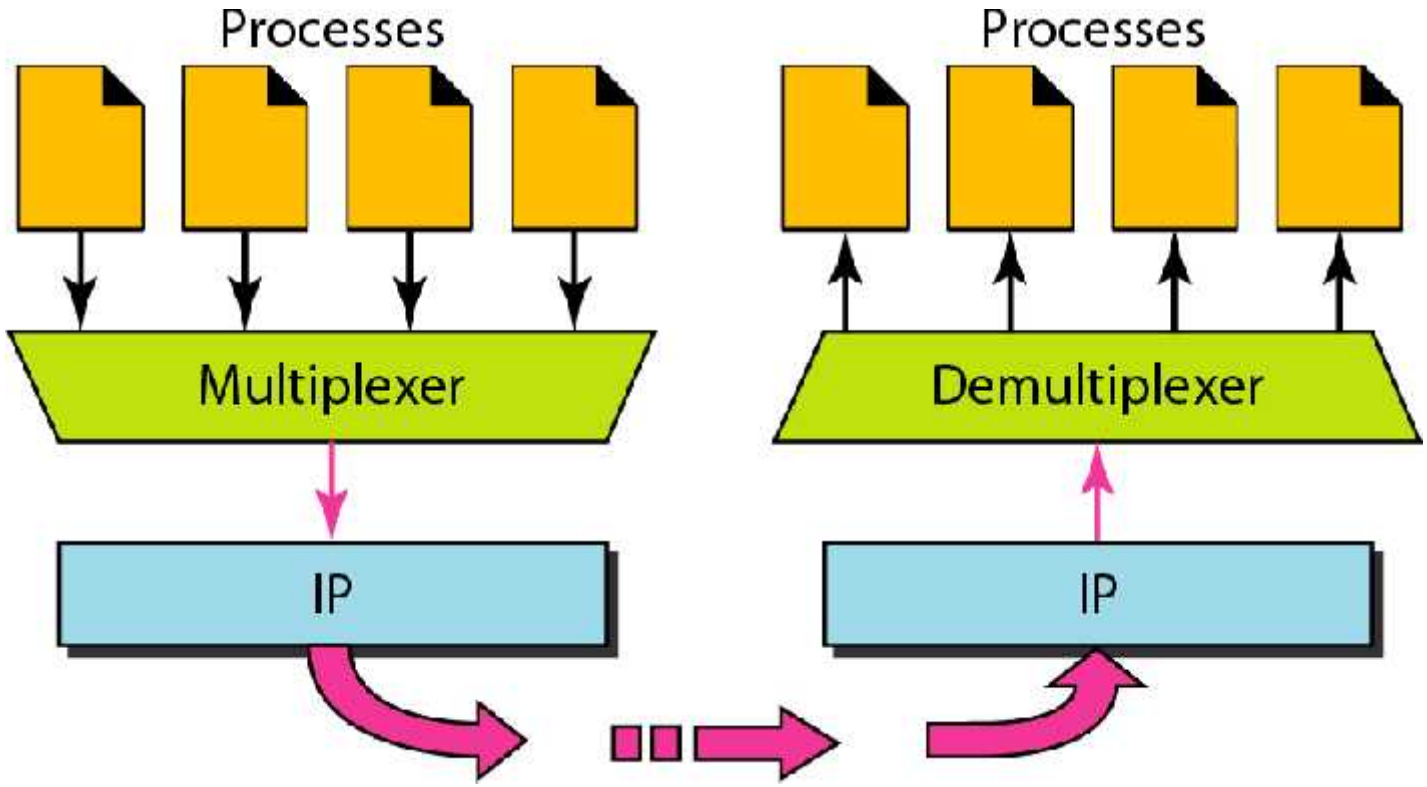
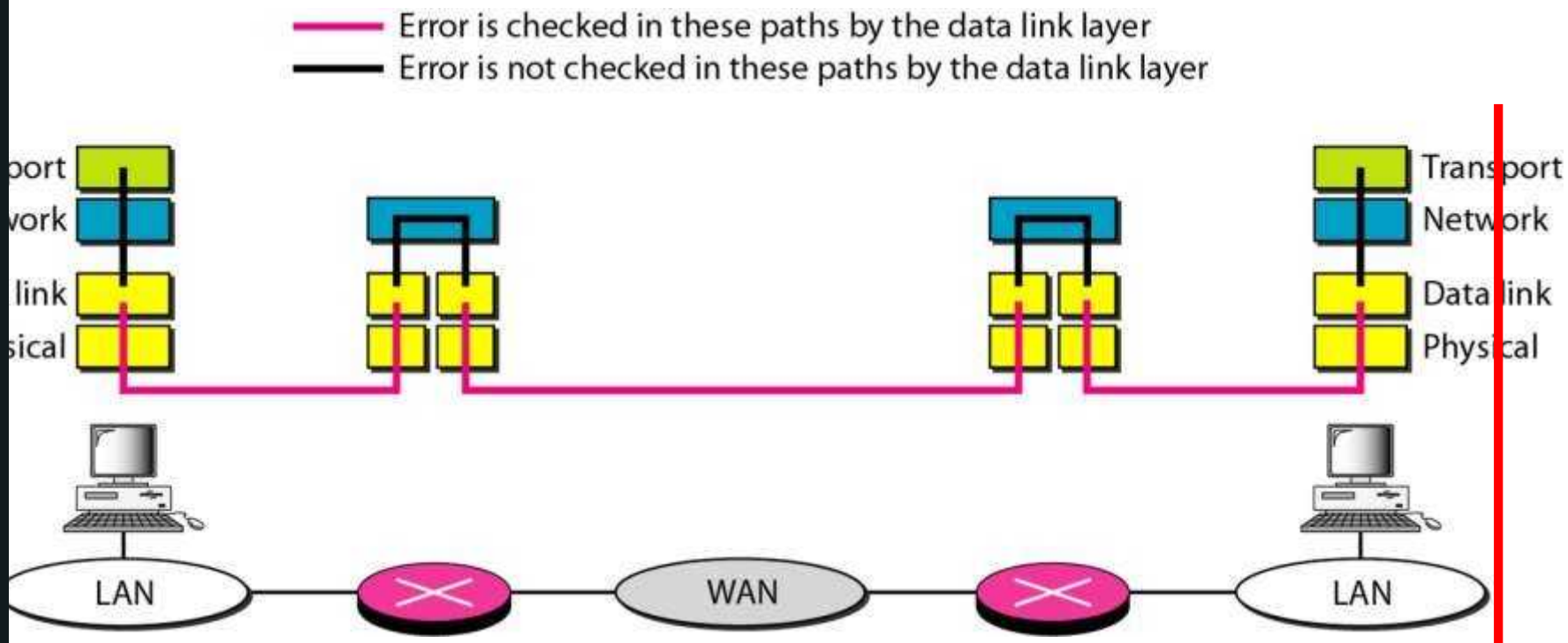
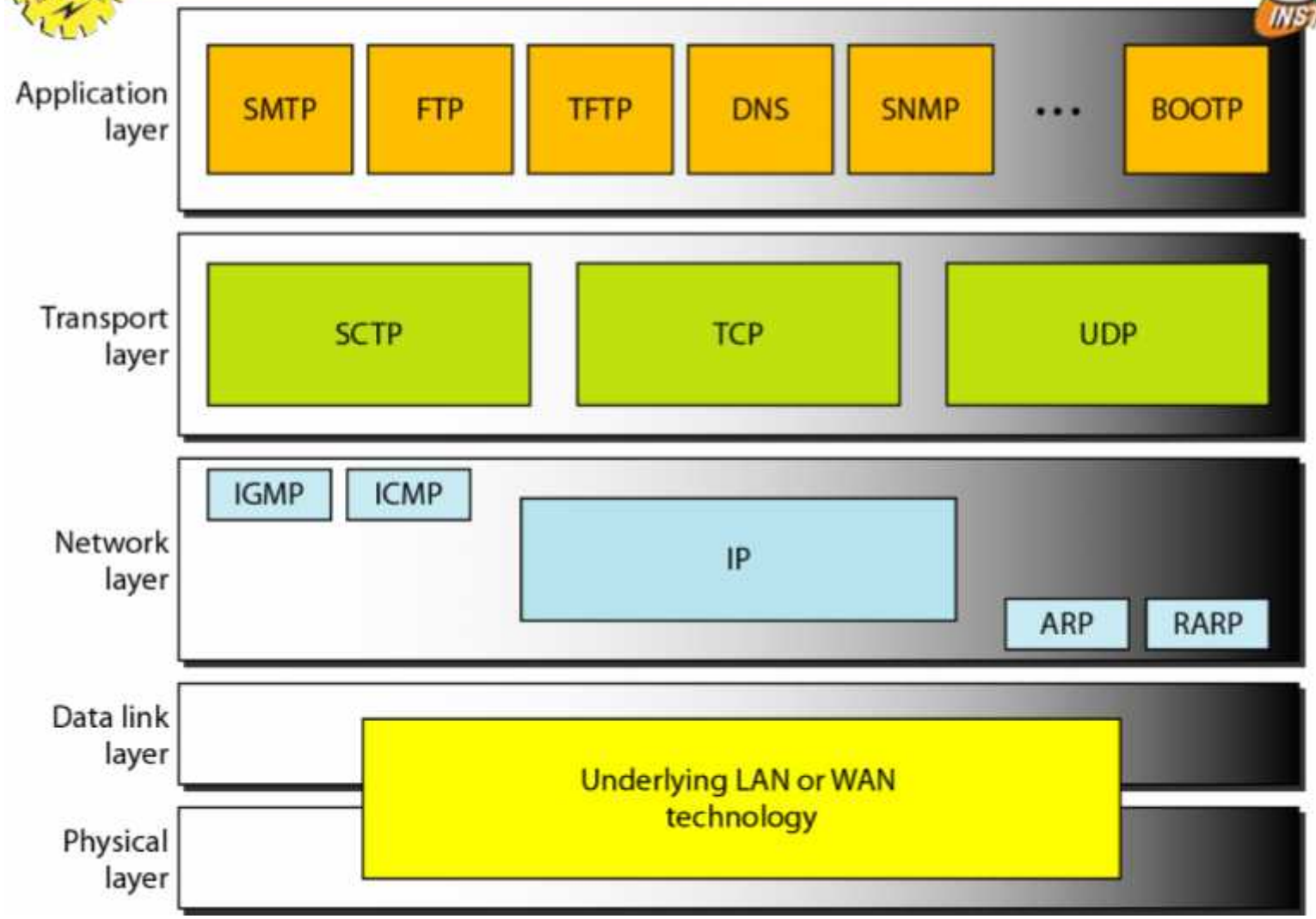


Figure 23.7 *Error control*



Position of UDP, TCP, and SCTP in TCP/IP suite



USER DATAGRAM PROTOCOL (UDP)

The User Datagram Protocol (UDP) is called a connectionless, unreliable transport protocol. It does not add anything to the services of IP except to provide process-to-process communication instead of host-to-host communication.

Table 23.1 *Well-known ports used with UDP*

Port	*Protocol*	*Description*
7	Echo	Echoes a received datagram back to the sender
9	Discard	Discards any datagram that is received
11	Users	Active users
13	Daytime	Returns the date and the time
17	Quote	Returns a quote of the day
19	Chargen	Returns a string of characters
53	Nameserver	Domain Name Service
67	BOOTPs	Server port to download bootstrap information
68	BOOTPc	Client port to download bootstrap information
69	TFTP	Trivial File Transfer Protocol
111	RPC	Remote Procedure Call
123	NTP	Network Time Protocol
161	SNMP	Simple Network Management Protocol
162	SNMP	Simple Network Management Protocol (trap)

Example 23.1

In UNIX, the well-known ports are stored in a file called /etc/services. Each line in this file gives the name of the server and the well-known port number. We can use the
grep utility to extract the line corresponding to the desired application. The following shows the port for FTP. Note that FTP can use port 21 with either UDP or TCP.

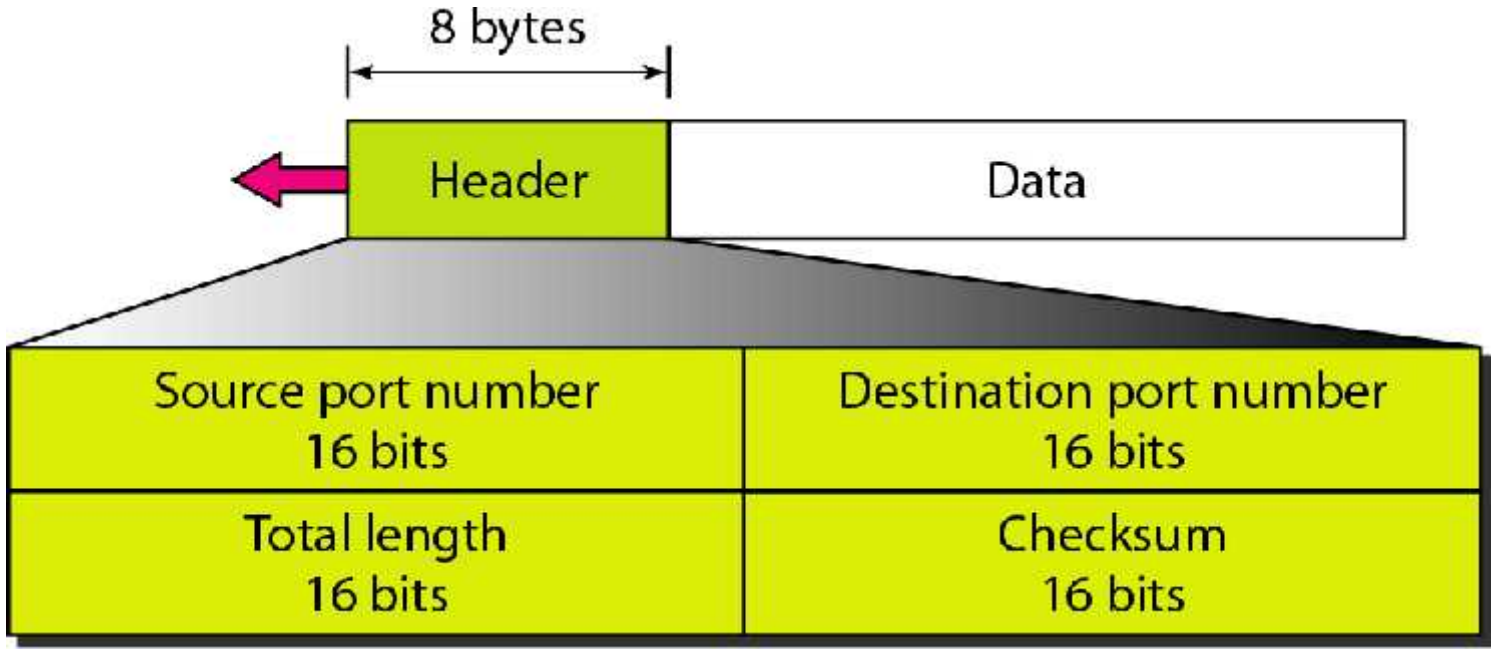
```
$ grep    ftp   /etc/services
ftp         21/tcp
ftp         21/udp
```

Example 23.1 (continued)

SNMP uses two port numbers (161 and 162), each for a different purpose, as we will see in Chapter 28.

```
$ grep      snmp /etc/services
snmp            161/tcp         #Simple Net  Mgmt Proto
snmp            161/udp         #Simple Net  Mgmt Proto
snmptrap        162/udp         #Traps for SNMP
```

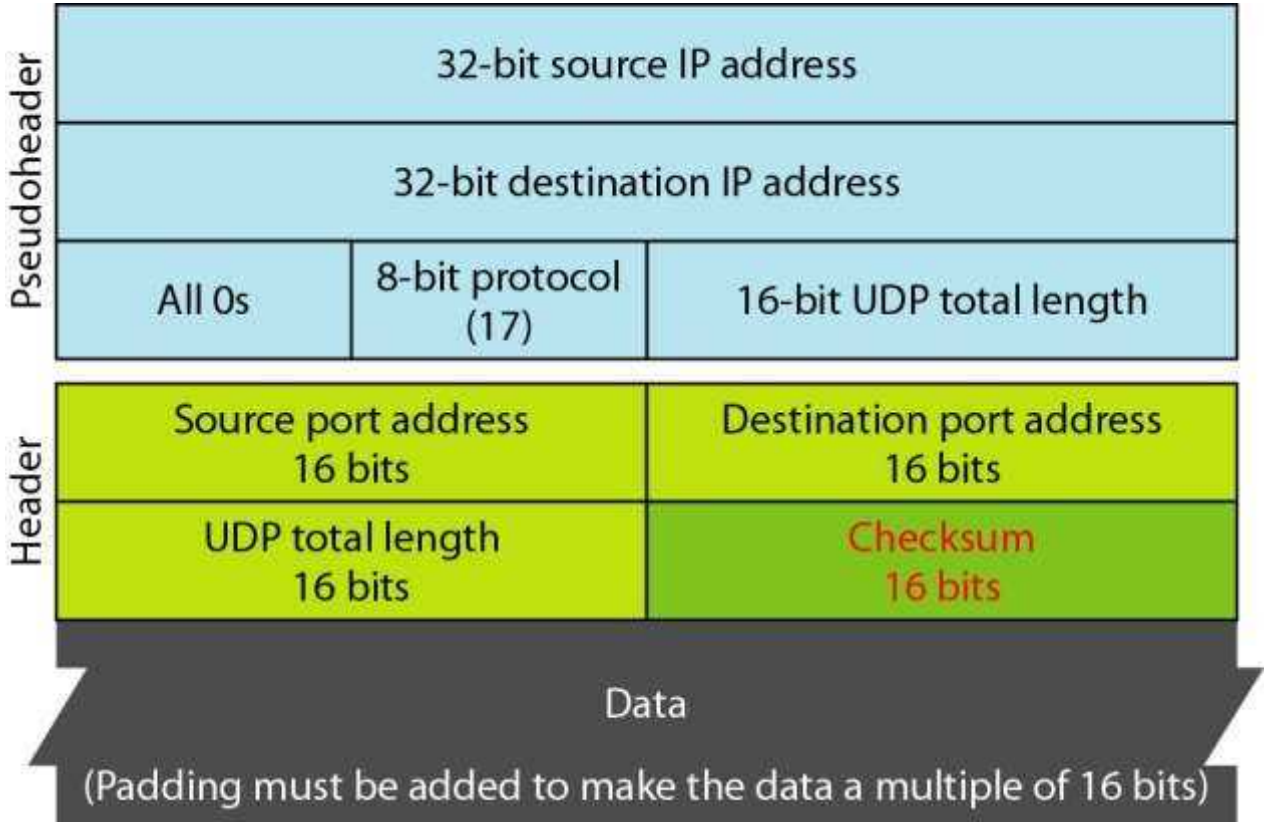
Figure 23.9 *User datagram format*



Note

UDP length
= IP length – IP header's length

Pseudoheader for checksum calculation



Example 23.2

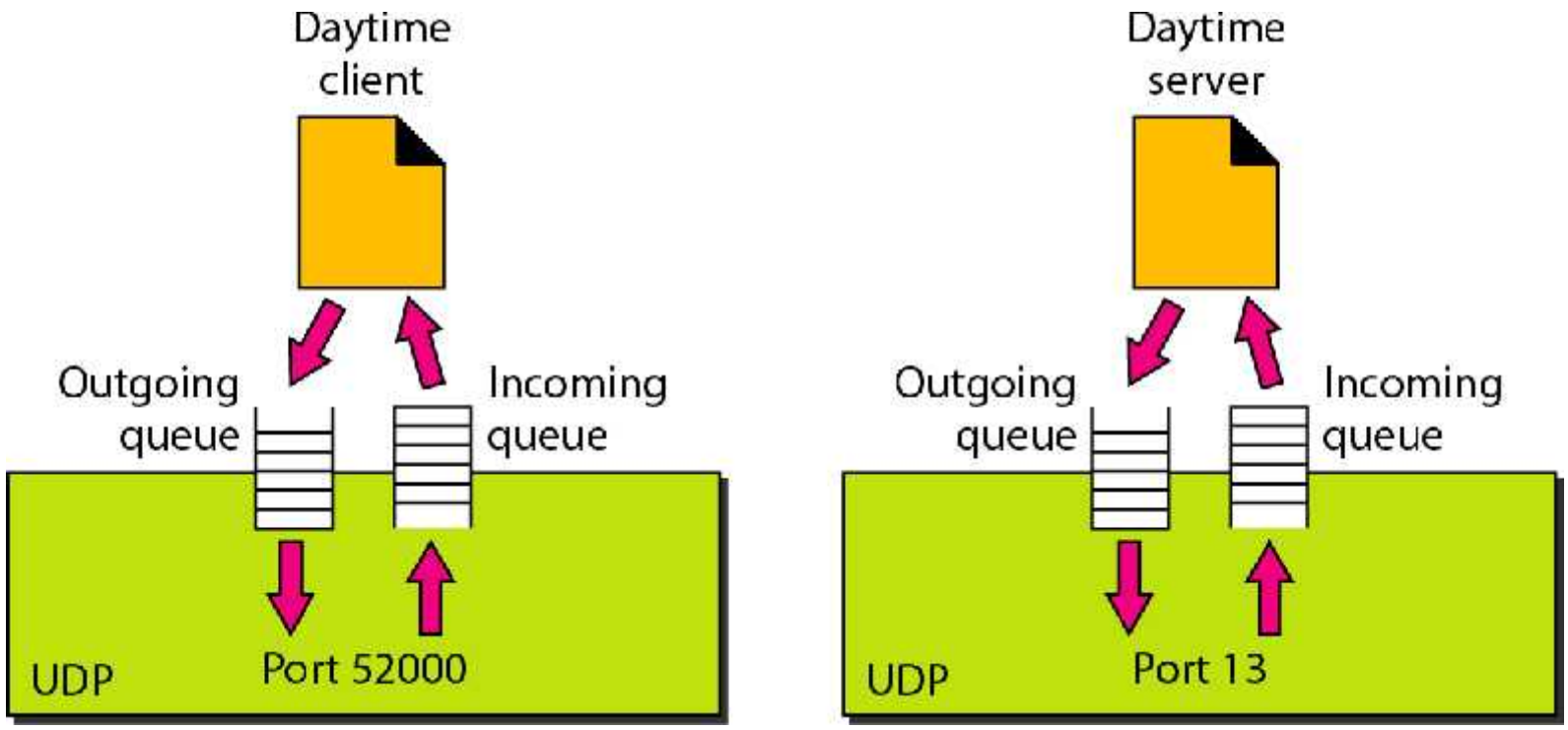
Figure 23.11 shows the checksum calculation for a very small user datagram with only 7 bytes of data. Because the number of bytes of data is odd, padding is added for checksum calculation. The pseudoheader as well as the padding will be dropped when the user datagram is delivered to IP.

Checksum calculation of a simple UDP user datagram

10011001 00010010 → 153.18
00001000 01101001 → 8.105
10101011 00000010 → 171.2
00001110 00001010 → 14.10
00000000 00010001 → 0 and 17
00000000 00001111 → 15
00000100 00111111 → 1087
00000000 00001101 → 13
00000000 00001111 → 15
00000000 00000000 → 0 (checksum)
01010100 01000101 → T and E
01010011 01010100 → S and T
01001001 01001110 → I and N
01000111 00000000 → G and 0 (padding)

10010110 11101011 → Sum
01101001 00010100 → Checksum

Figure 23.12 *Queues in UDP*



THANK YOU