Computer Science & Engineering

Data Communication and Computer Networks

(MTCSE-101-A)

21-2   ICMP

The IP protocol has no error-reporting or error-correcting mechanism. The IP protocol also lacks a mechanism for host and management queries. The Internet Control Message Protocol (ICMP) has been designed to compensate for the above two deficiencies. It is a companion to the IP protocol.
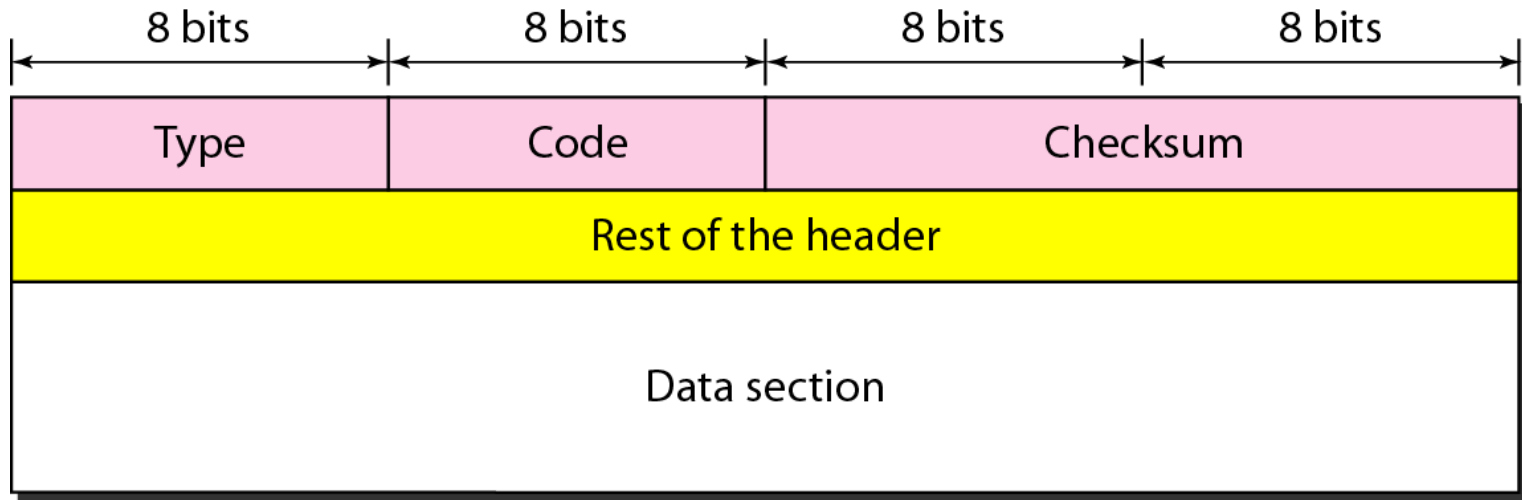
Topics discussed in this section:

Types of Messages
Message Format
Error Reporting and Query
Debugging Tools

Figure 21.8 *General format of ICMP messages*

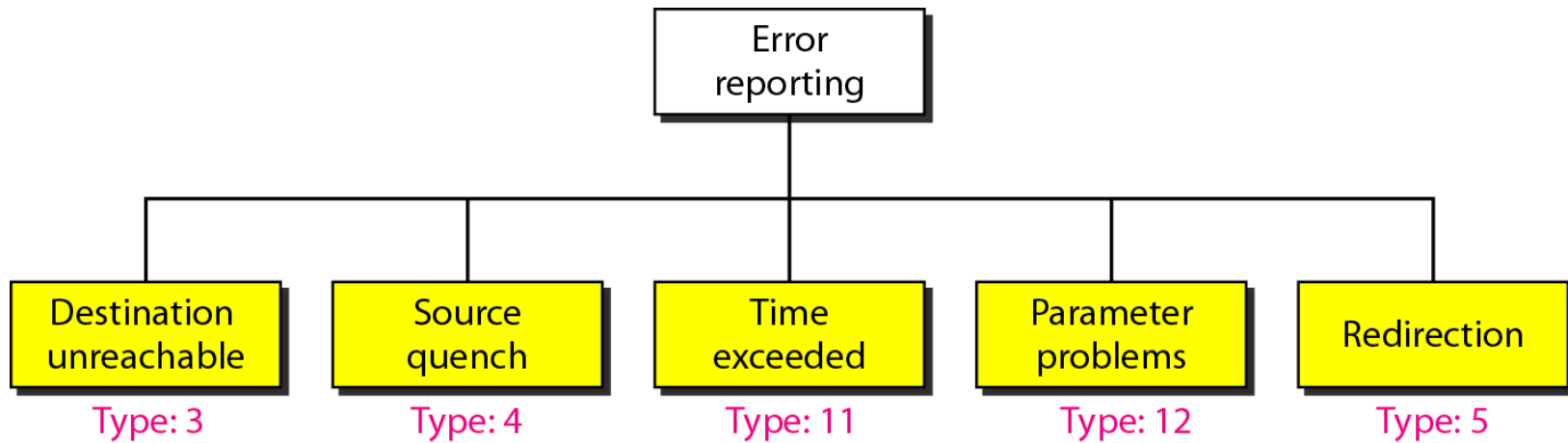| 8 bits	8 bits	8 bits	8 bits
Type	Code	Checksum	
Rest of the header			
Data section			

Note

ICMP always reports error messages to the original source.

21.4

Figure 21.9 *Error-reporting messages*

Important points about ICMP error messages:

❑ No ICMP error message will be generated in response to a datagram carrying an ICMP error message.

❑ No ICMP error message will be generated for a fragmented datagram that is not the first fragment.

❑ No ICMP error message will be generated for a datagram having a multicast address.

❑ No ICMP error message will be generated for a datagram having a special address such as 127.0.0.0 or 0.0.0.0.

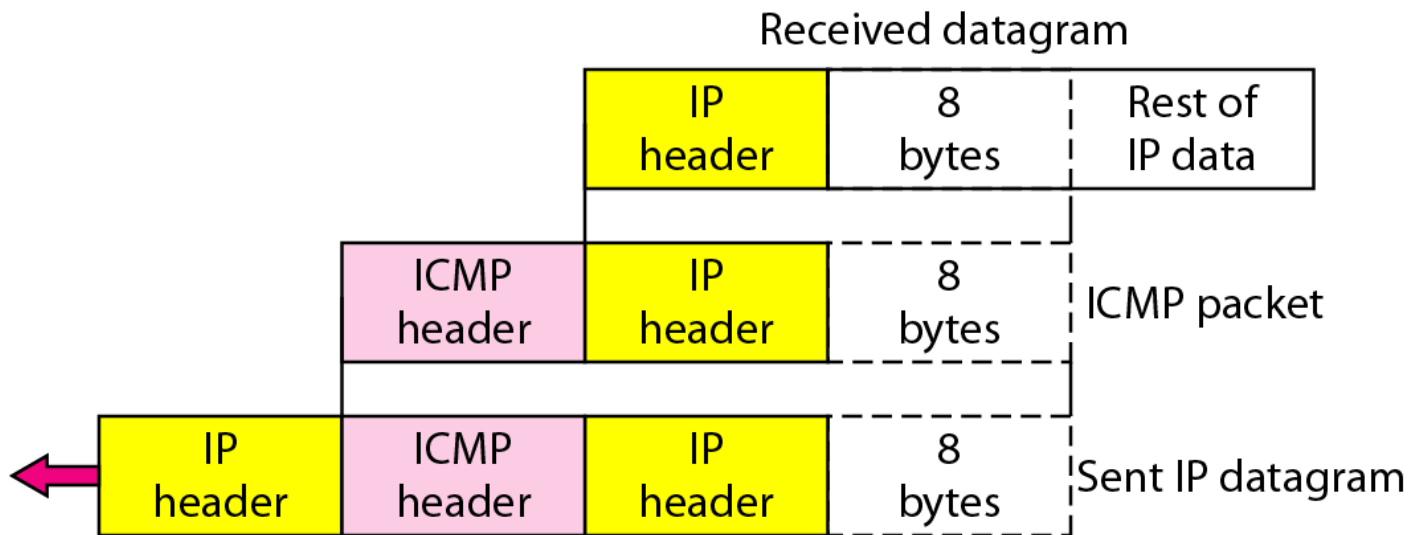# Figure 21.10 *Contents of data field for the error messages*
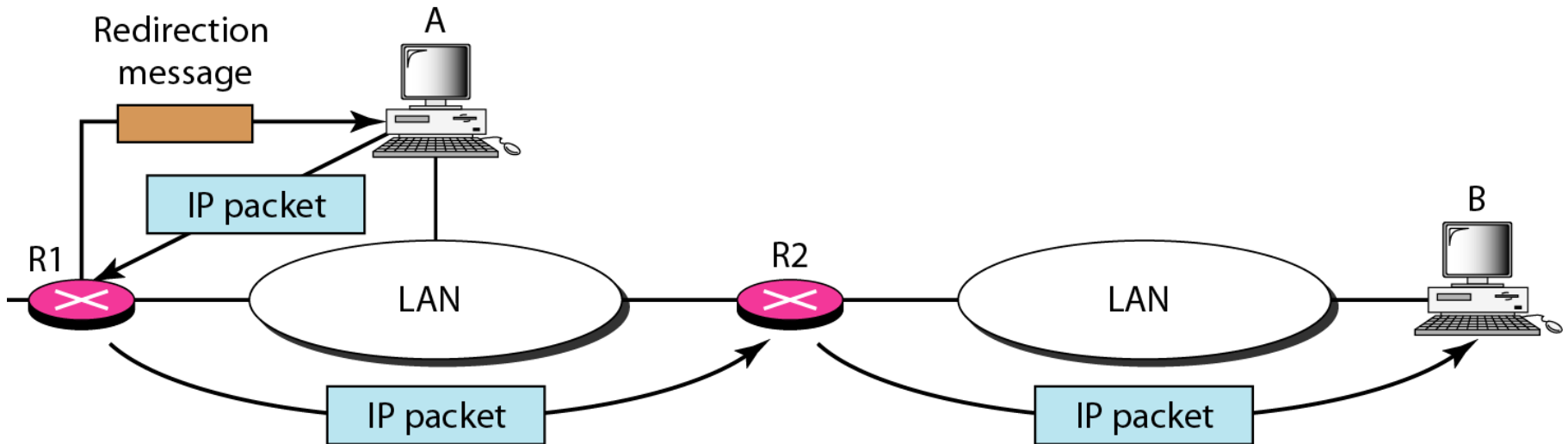
Figure 21.11 *Redirection concept*
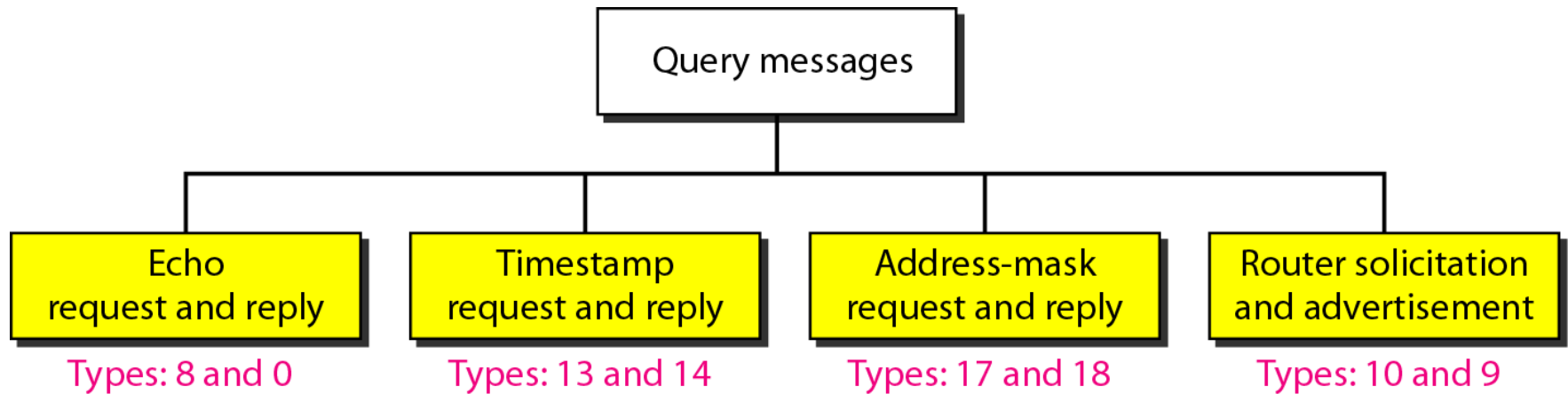
Figure 21.12 *Query messages*

Figure 21.13 *Encapsulation of ICMP query messages*

21-3   IGMP

The IP protocol can be involved in two types of communication: unicasting and multicasting. The Internet Group Management Protocol (IGMP) is one of the necessary, but not sufficient, protocols that is involved in multicasting. IGMP is a companion to the IP protocol.

Topics discussed in this section:

Group Management
IGMP Messages and IGMP Operation
Encapsulation
Netstat Utility

21.11
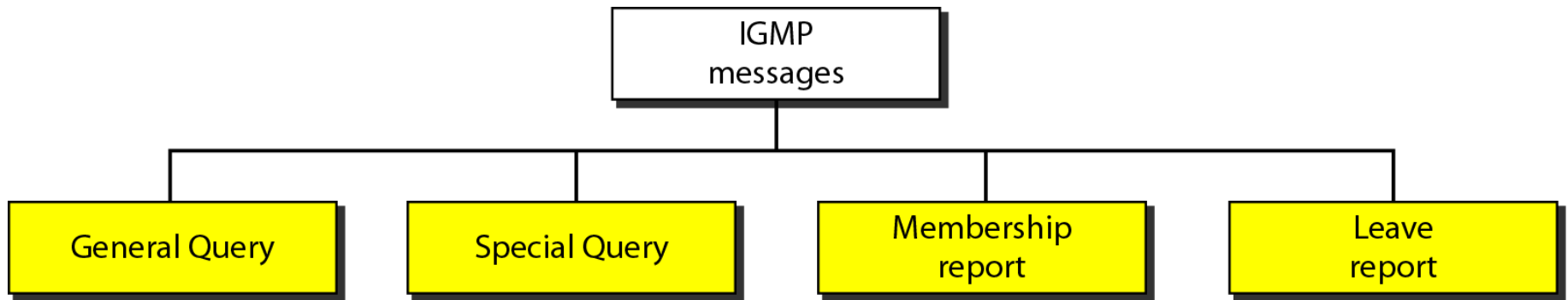
Figure 21.16 *IGMP message types*
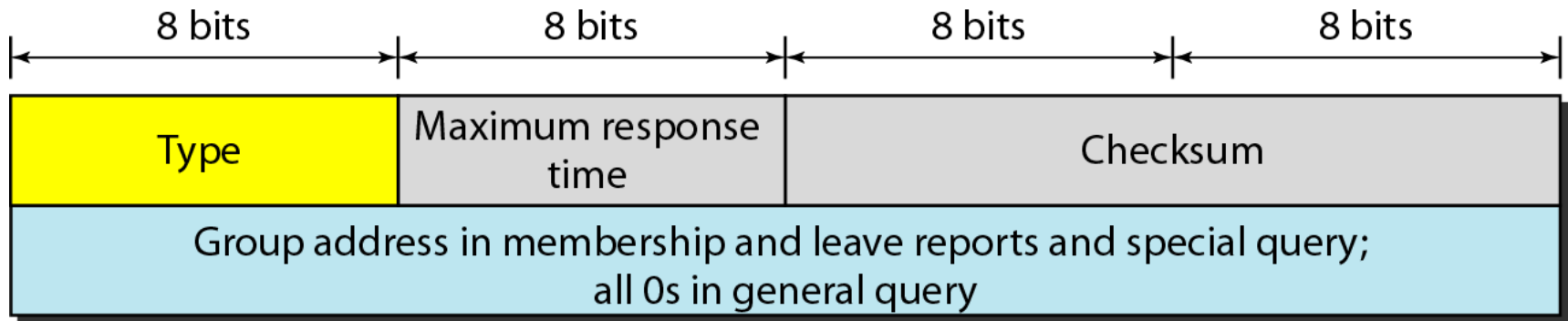
# Figure 21.17 *IGMP message format*

8 bits	8 bits	8 bits	8 bits
Type	Maximum response time	Checksum	
Group address in membership and leave reports and special query; all 0s in general query			

Table 21.1 *IGMP type field*

Type	Value
General or special query	0x11 or 00010001
Membership report	0x16 or 00010110
Leave report	0x17 or 00010111

Figure 21.18 *IGMP operation*

List of groups
having loyal members

225.70.8.20
231.24.60.9
⋮
229.60.12.8
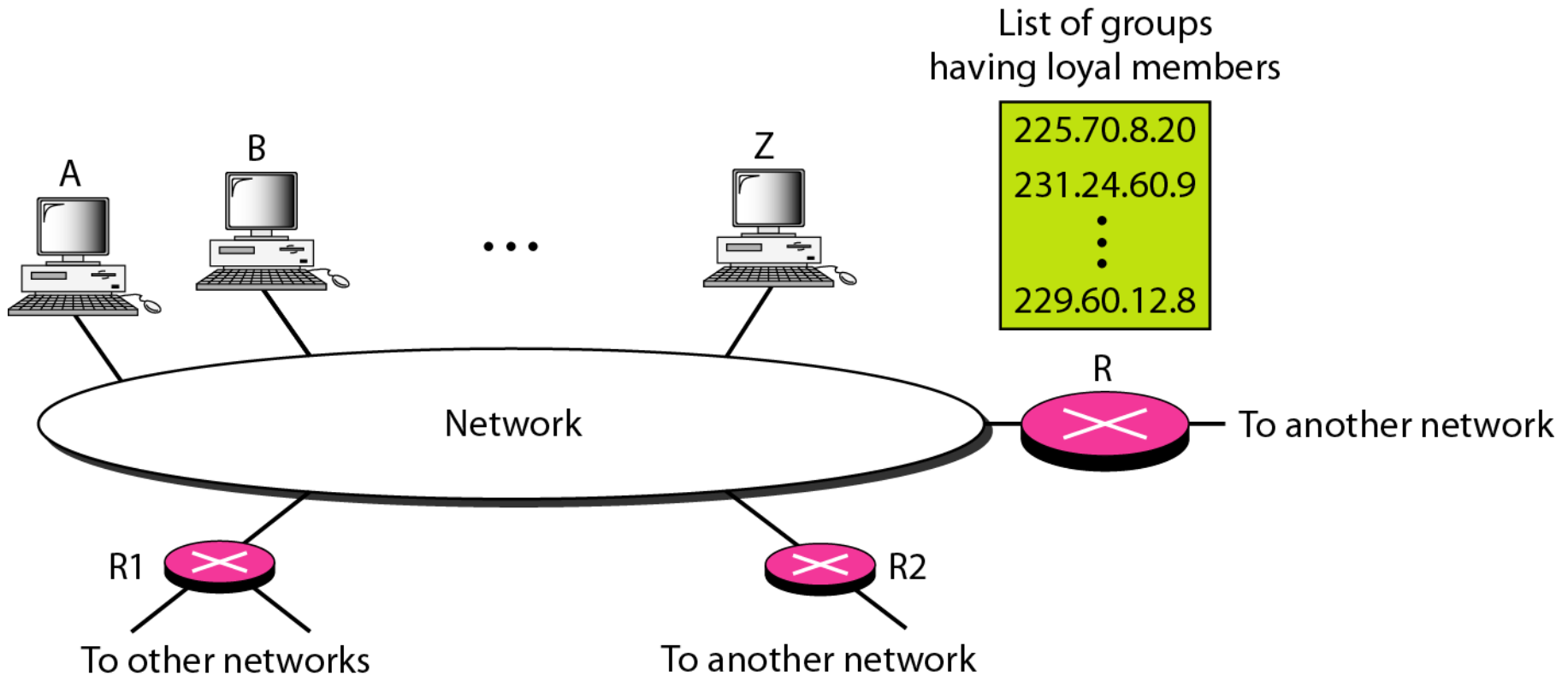
Note

In IGMP, a membership report is sent twice, one after the other.

The general query message does not define a particular group.