# CSC411: Advanced Networks

## ICMP and IP Multicast

Note: **This class lecture will be recorded!**
If you do not consent to this recording, please do not ask questions via your video,
audio or public chat; send your question to the instructor using the private chat.

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# ICMP

- Internet Control Message Protocol
- Error reporting
  - Reported back to source – why?
- Ping
  - Echo Request and Echo Reply messages
- Traceroute

- How is Traceroute implemented??

# ICMP Message Format

- TYPE field – 8 bits
- CODE field – 8 bits
- CHECKSUM field – 16 bits
- If reporting errors:
  - Header of datagram causing error
  - First 64 data bits of datagram causing error
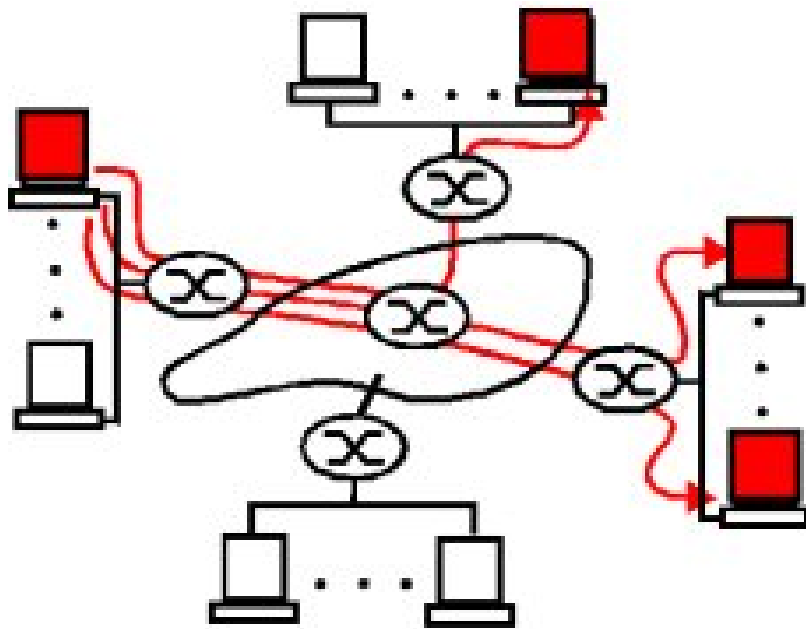
# ICMP Type Field – common ones

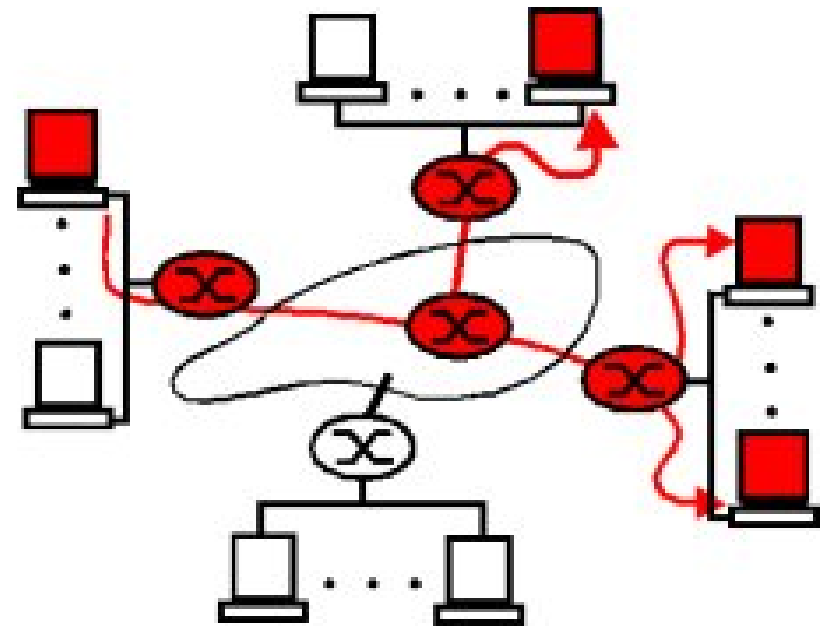| Type field | ICMP Message Type |
| --- | --- |
| 0 | Echo reply (ping response) |
| 3 | Destination unreachable |
| 4 | Source quench |
| 8 | Echo request (ping) |
| 9 | Router advertisement |
| 10 | Router solicitation |
| 11 | TTL = 0 |

# Multicasting

- Unicast Protocols

- Broadcast

- Multicast
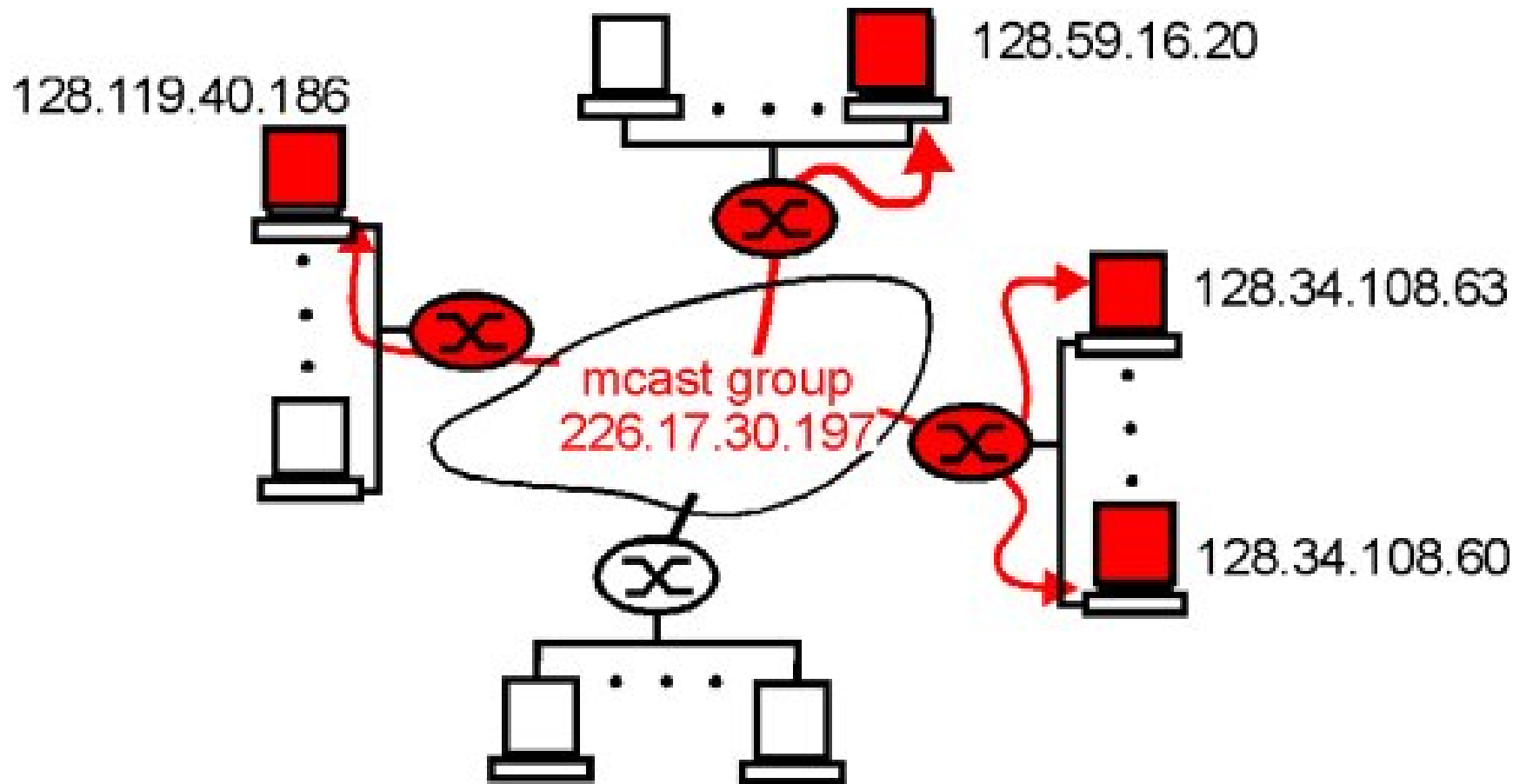
# Multicast Overview



multicast via unicast

network multicast

# IP Multicast

- Two problems
  - Identify receivers of multicast packet
  - Address a packet to those receivers
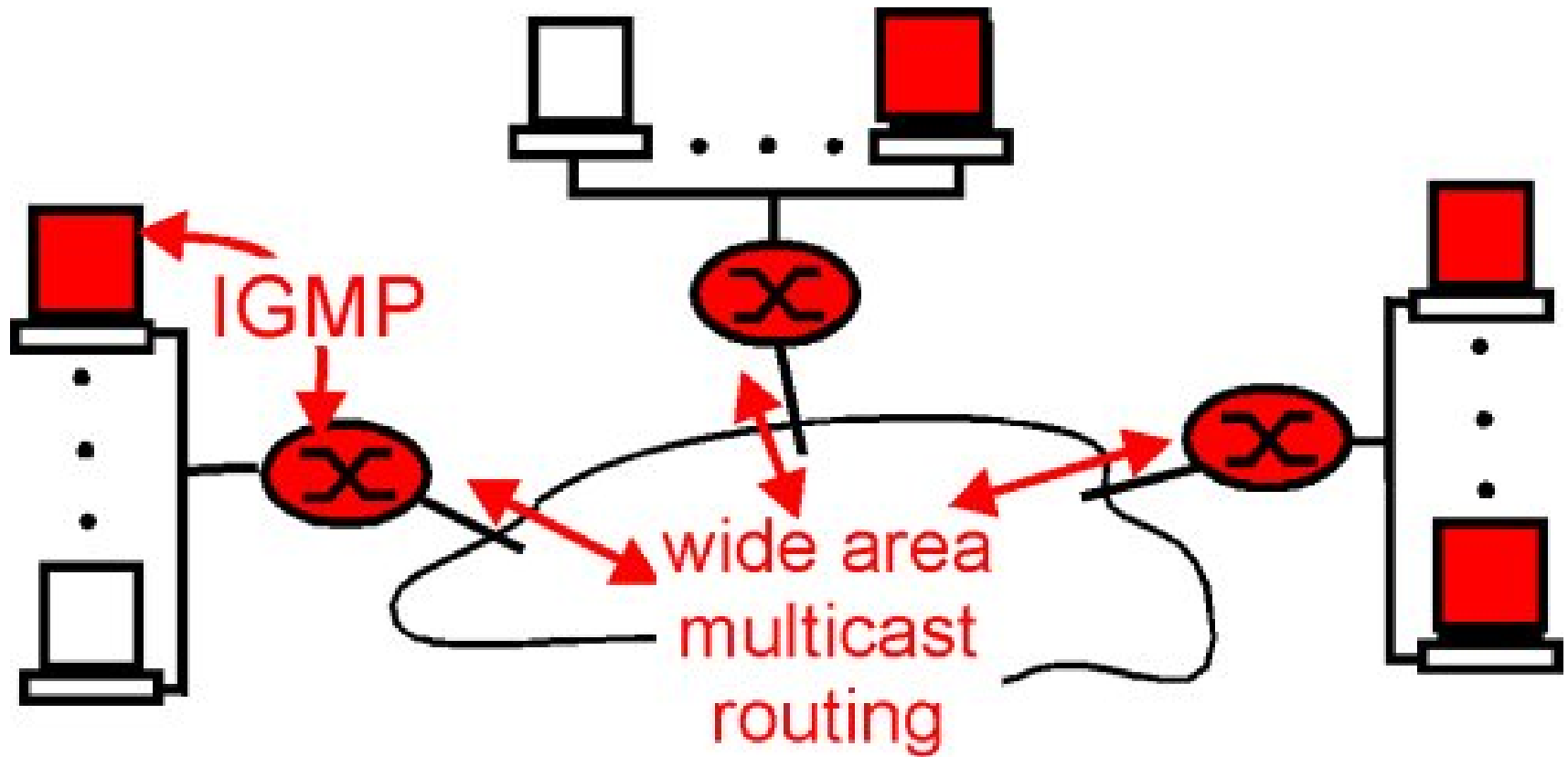
- Address indirection
- Multicast group

# Multicast Group



128.119.40.186

128.59.16.20

mcast group
226.17.30.197

128.34.108.63

128.34.108.60

# IGMP

- Internet Group Management Protocol
- Version 3
- Communicate group membership
- Like ICMP
  - How is IGMP data transferred across the Internet?

# IGMP



IGMP

wide area
multicast
routing

# IGMP Message Types

- Membership query
- Membership report
- Leave group

- If leave group message is not sent by host, how will router know that the host is no longer part of a multicast group?

# Multicast Routing

- Routers must exchange membership information
- Routers must ensure all members receive datagram

- Two most common
  - Distance-Vector Multicast Routing Protocol (DVMRP)
  - Protocol-Independent Multicast (PIM) routing protocol