ICMPv6
Internet Control Message Protocol version 6

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Use Cases

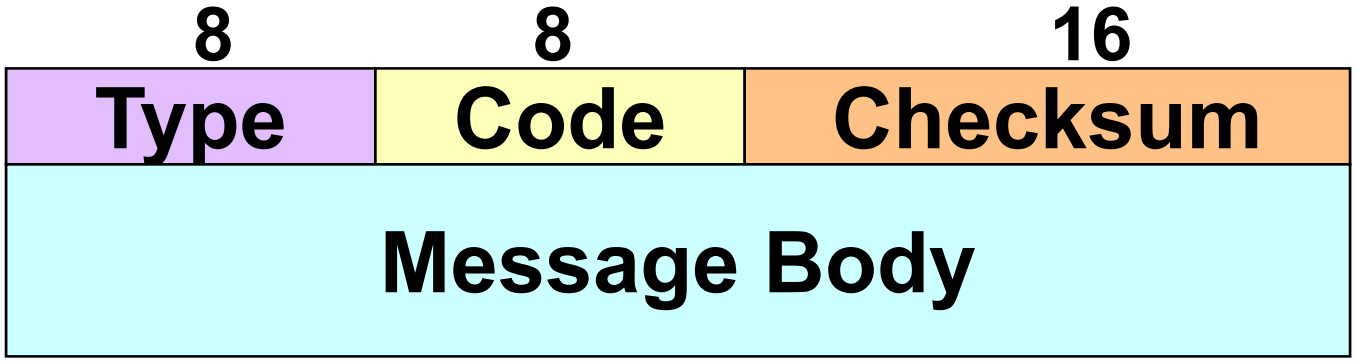
- Diagnostics 诊断学
- Neighbor Discovery
- Multicast group management 多播组管理
- Issue notification 问题通知

Includes functions that in IPv4 were in

  - ARP (Address Resolution Protocol)
  - IGMP (Internet Group Membership Protocol)

Message Format

- Encapsulated in IP packets
- At most 576 bytes

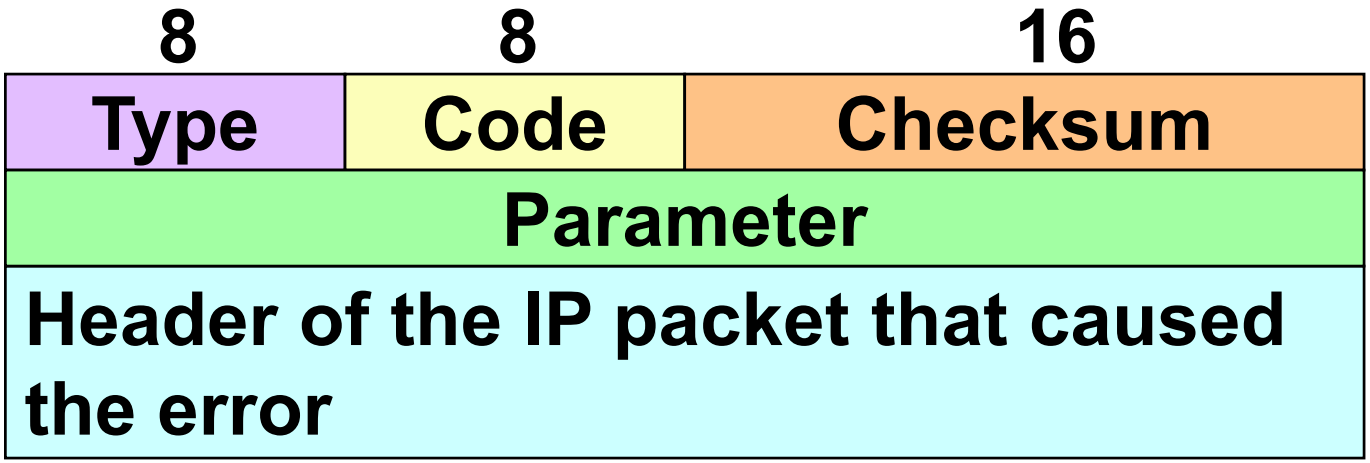


Type Field

1	Destination Unreachable
2	Packet too big
3	Time exceeded
4	Parameter Problem
128	Echo Request
129	Echo Reply
130	Multicast Listener Query
131	Multicast Listener Report
132	Multicast Listener Done
133	Router Solicitation
134	Router Advertisement
135	Neighbor Solicitation
136	Neighbor Advertisement
137	Redirect

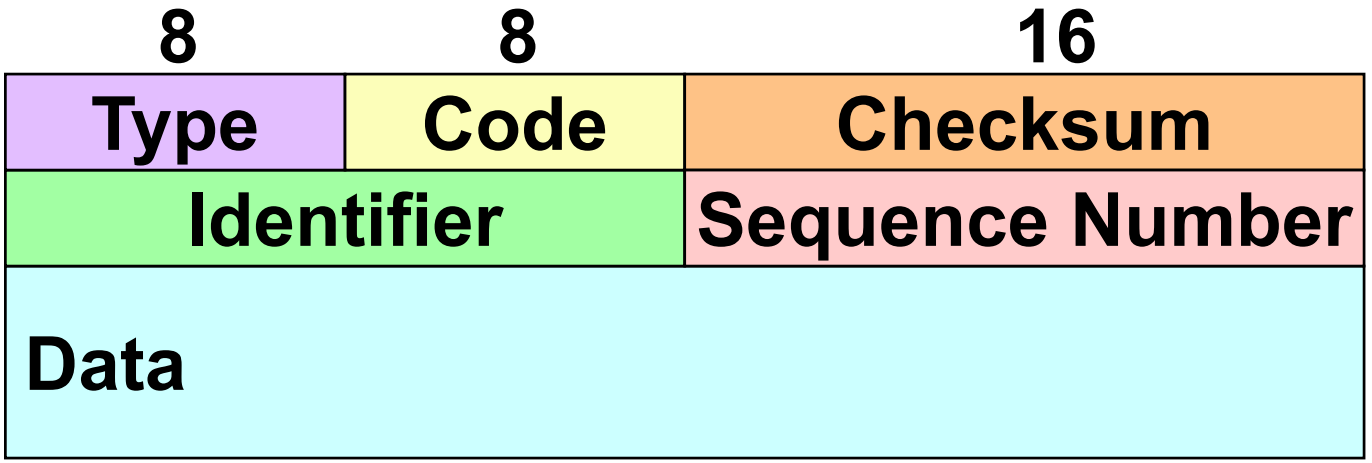
Error Messages

- Destination Unreachable (type = 1)
- Packet too big (type = 2)
- Time exceeded (type = 3)
- Parameter Problem (type = 4)

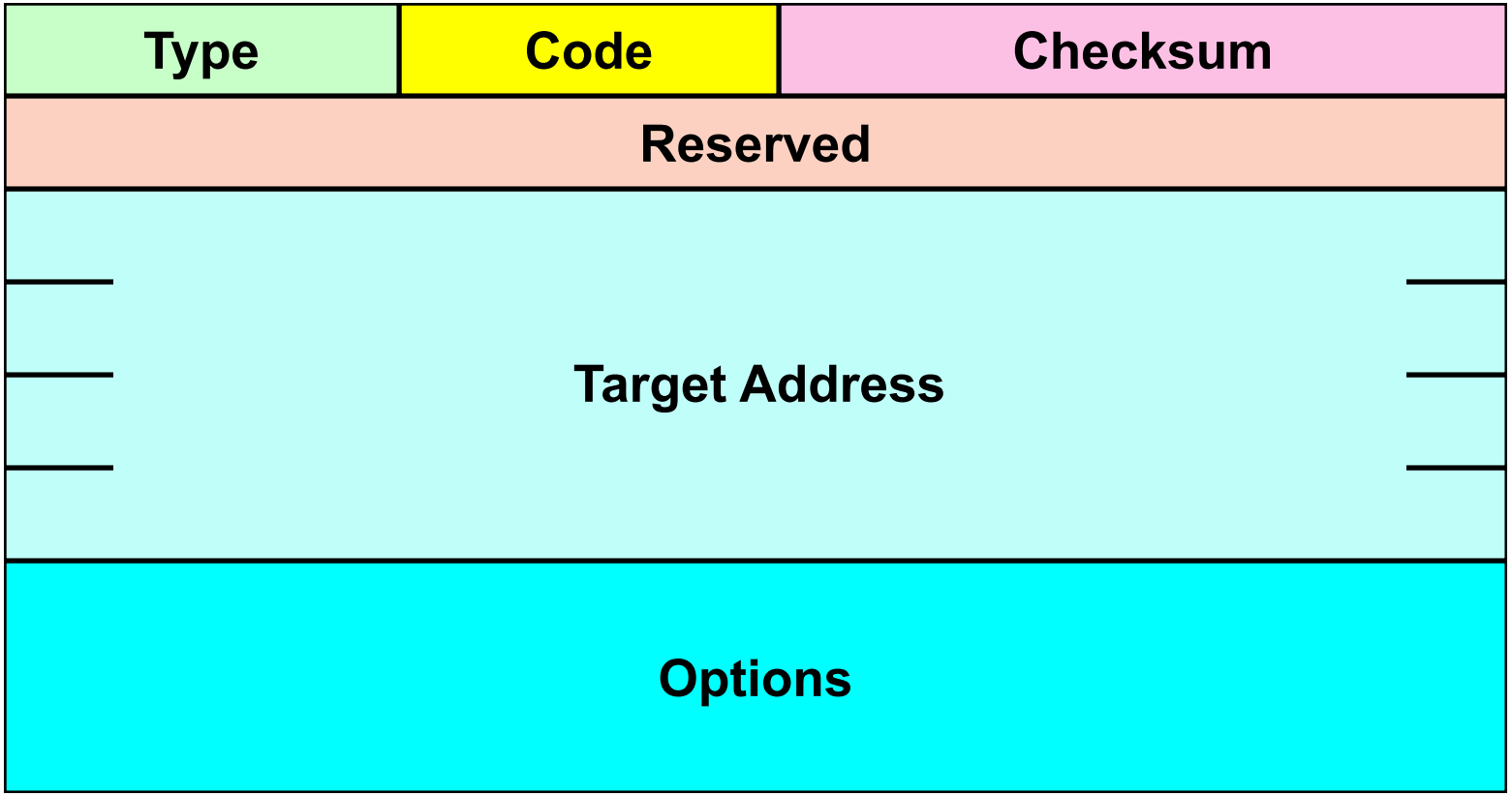


Echo Messages

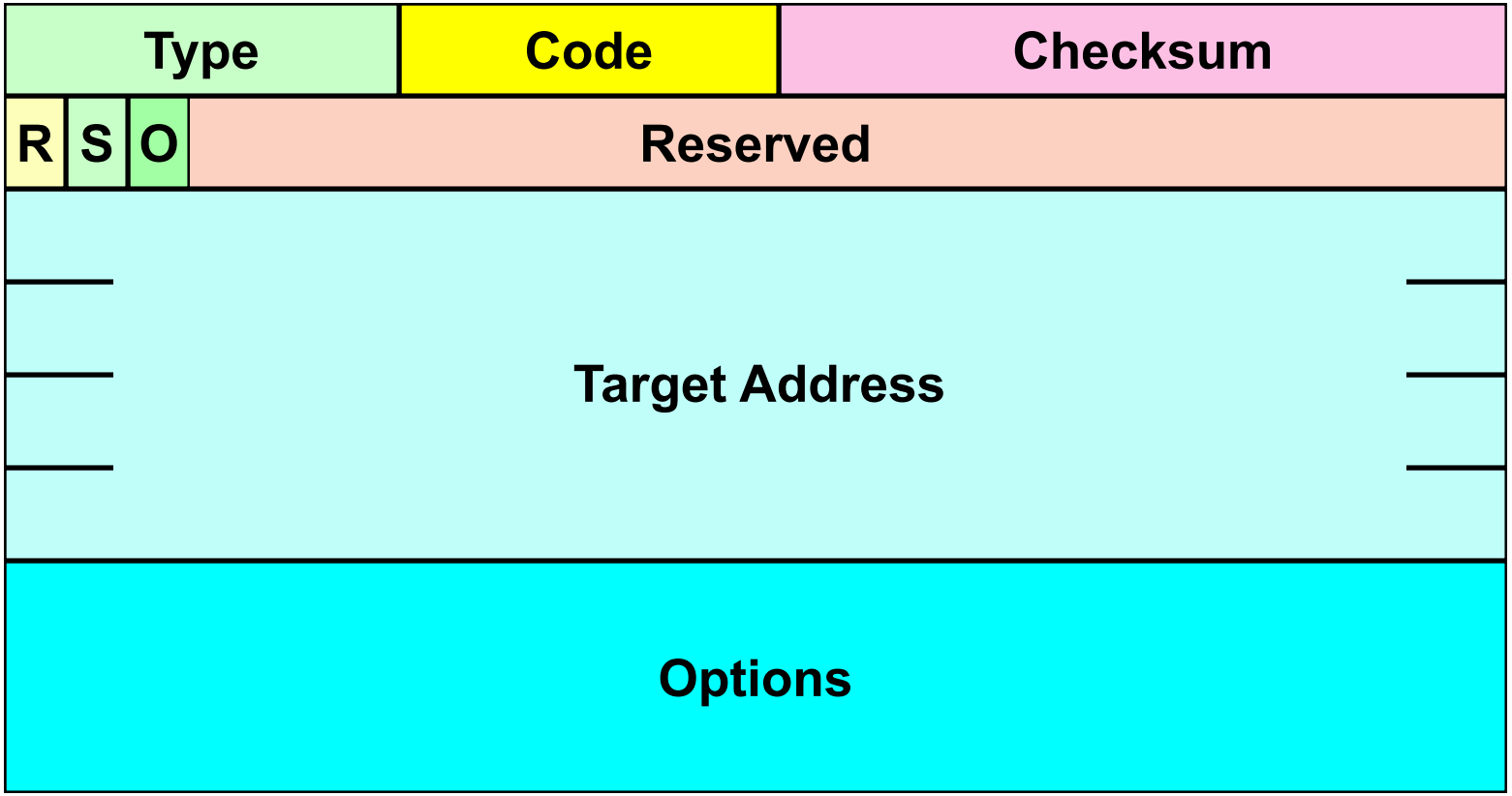
- Echo request (type= 128)
- Echo reply (type= 129)



Neighbor Solicitation



Neighbor Advertisement

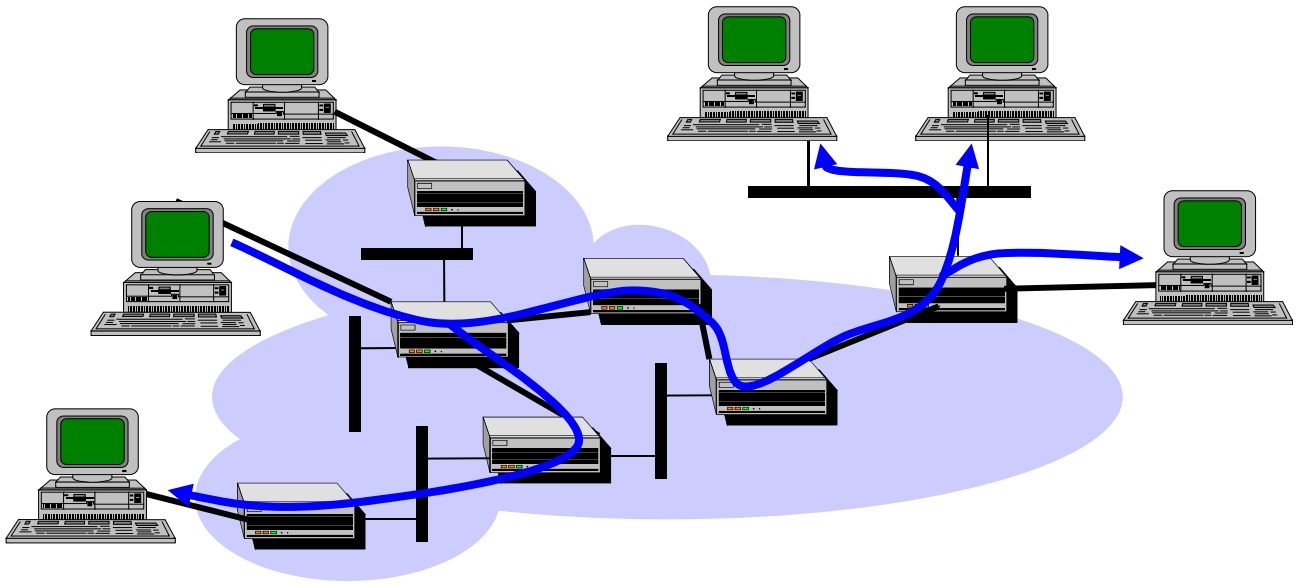


Multicast Communication in the Internet

[a digression]

What is it?

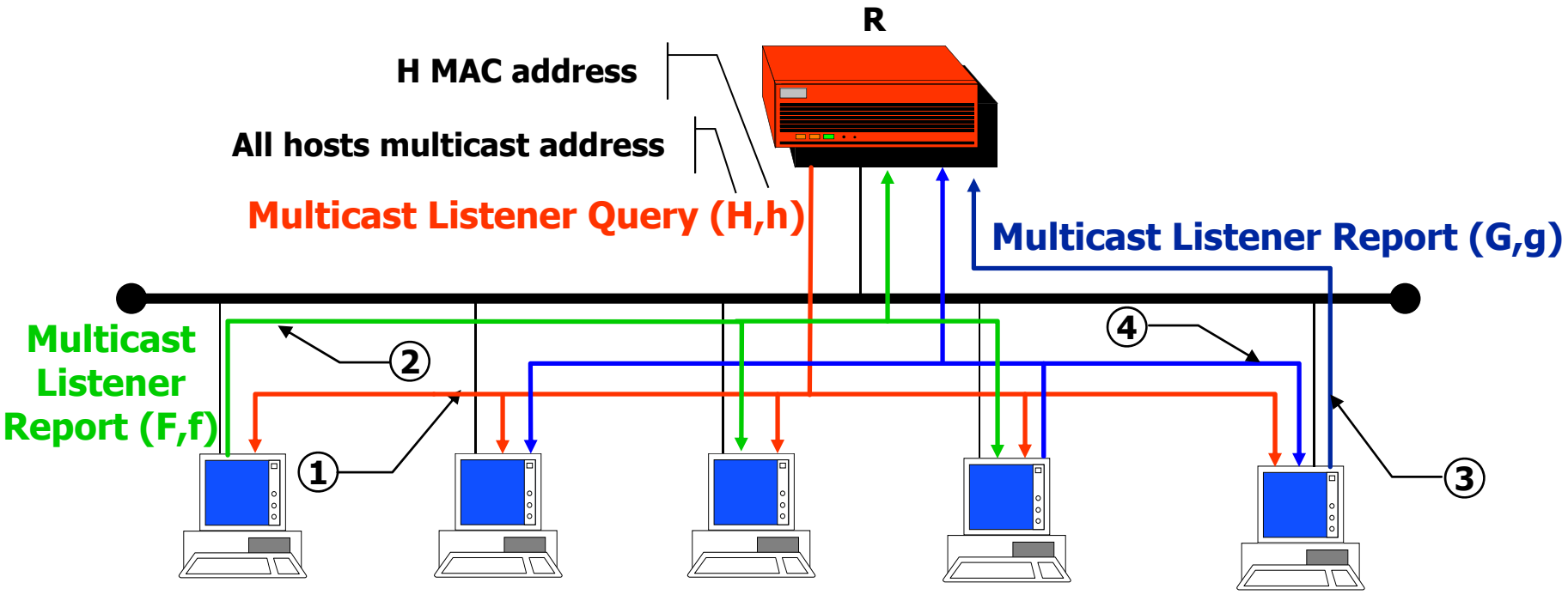
Packets addressed to a multicast address



How it works

- Within a link, rely on data link layer multicasting service
  - Mapping of IPv6 multicast addresses onto MAC multicast addresses
- Among links, packets routed by routers
  - ICMPv6 to know on-link members
    - Hosts interests in receiving packets
  - Multicast routing protocols to know where there are off-link members

Host Membership Discovery



- R to announce multicast groups G and F
- R to forward packets to G and F

ICMPv6: Group Management

- Multicast Listener Query (type=130)
  - General
  - Multicast group (address) specific
- Multicast Listener Report (type=131)
- Multicast Listener Done (type=132)