

Computer Networks

Error Handling with ICMP (§5.6.4)



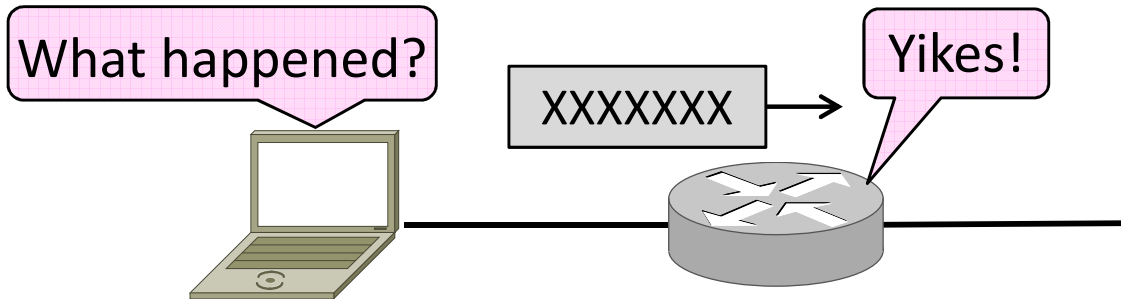
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Topic

- What happens when something goes wrong during forwarding?
 - Need to be able to find the problem

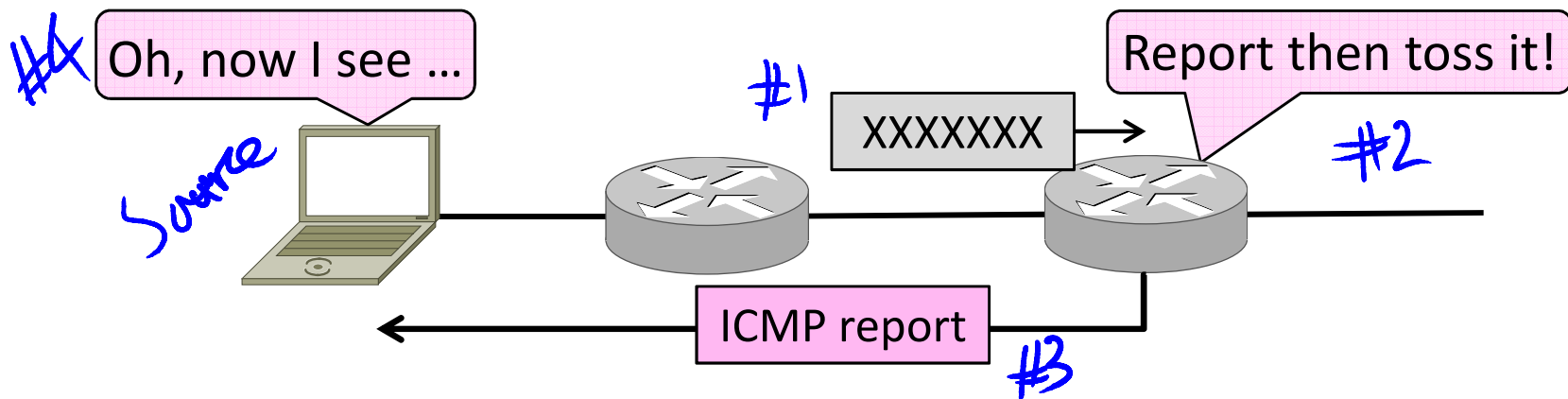


Internet Control Message Protocol

- ICMP is a companion protocol to IP
 - They are implemented together
 - Sits on top of IP (IP Protocol=1)
- Provides error report and testing
 -  Error is at router while forwarding
 - Also testing that hosts can use

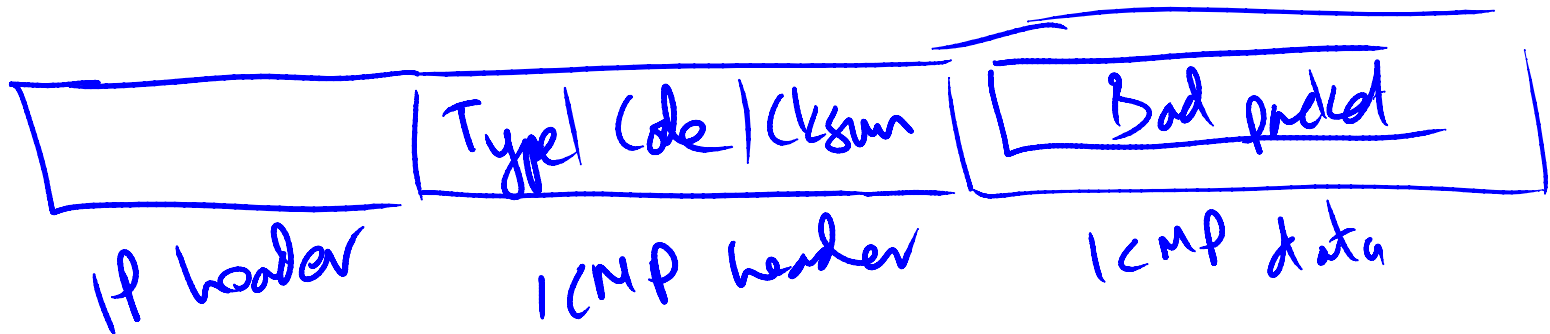
ICMP Errors

- When router encounters an error while forwarding:
 - It sends an ICMP error report back to the IP source address
 - It discards the problematic packet; host needs to **rectify**



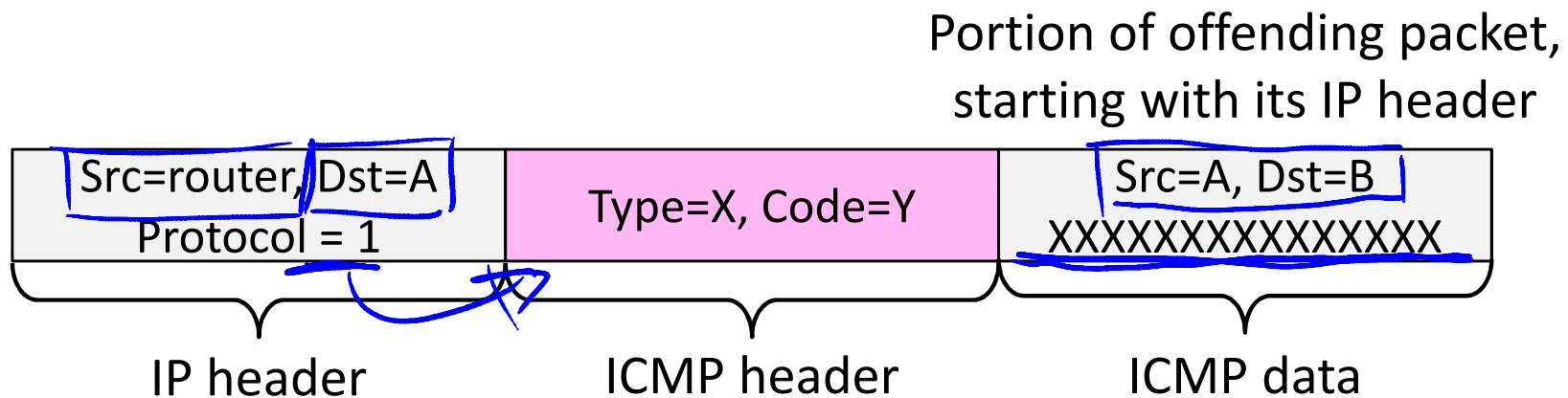
ICMP Message Format

- Each ICMP message has a Type, Code, and Checksum
- Often carry the start of the offending packet as payload
- Each message is carried in an IP packet



ICMP Message Format (2)

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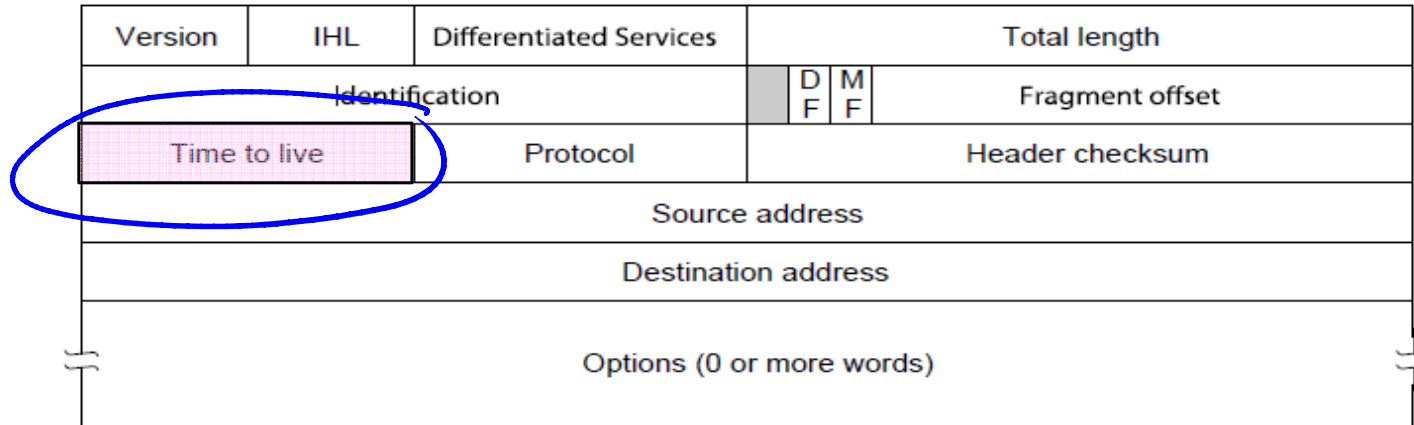
Example ICMP Messages

Name	Type / Code	Usage
Dest. Unreachable (Net or Host)	3 / 0 or 1	Lack of connectivity
Dest. Unreachable (Fragment)	3 / 4	<u>Path MTU Discovery</u>
Time Exceeded (Transit)	11 / 0	Traceroute
Echo Request or Reply	8 or 0 / 0	Ping

Testing, not a forwarding error: Host sends Echo Request, and destination responds with an Echo Reply

Traceroute

- IP header contains TTL (Time to live) field
 - Decrement every router hop, with ICMP error if it hits zero
 - Protects against forwarding loops



END

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