

# ICMP

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- ▶ **Internet Control Message Protocol**
- ▶ Runs on top of IP but still within the network layer
- ▶ Examples:
  - ping - Echo Request/Reply
  - traceroute - Time Exceeded
  - “No route to host” - Destination Unreachable
  - Source Quench

# IPv6 - Motivation

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- ▶ What's wrong with IPv4?
  - not enough addresses
  - too complex to process in routers
  - autoconfiguration
  - security
- ▶ Can we avoid switching to IPv6?
  - Network Address Translation (NAT)

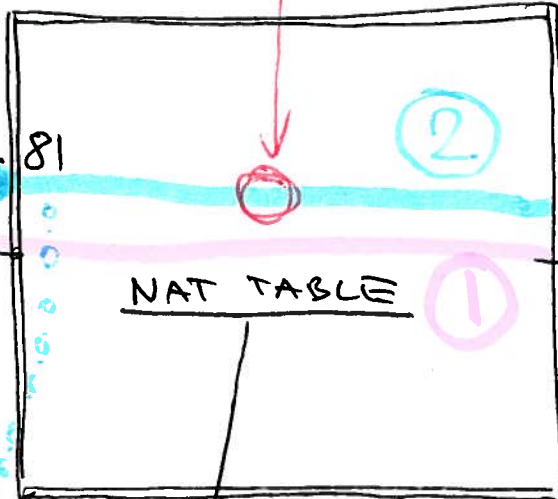
	S 24.16.72.81	1234	
	D 132.177.4.32	80	

ADDR. TRANSLATION

S 132.177.4.32	80
D 192.168.1.13	1234

REPLACED WITH

NAT (HOME ROUTER)

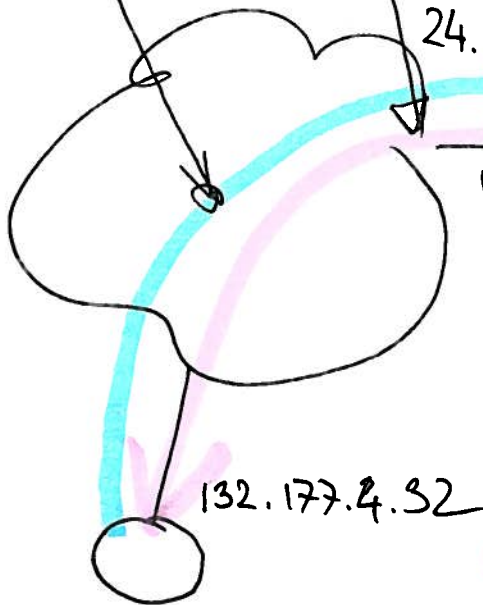


IP	PORT
S 192.168.1.13	1234
D 132.177.4.32	80

SRC IP	SRC PORT	DST IP	DST PORT
192.168.1.13	1234	132.177.4.32	80

PACKETS REC'D FROM SHOULD BE SENT TO ON THE LOCAL NET

S 132.177.4.32	80
D 24.16.72.81	1234



192.168.1.1

192.168.1.13 XBOX

# IPv6 - Protocol Design

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- ▶ Keep the good stuff...
  - unreliable datagram service
  - TTL, TOS (for compatibility)
- ▶ Eliminate the unnecessary...
  - no fragmentation (only as an option)
  - no header checksums
- ▶ Address the issues...
  - longer addresses and more

# IPv6 header

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Ver.	Traffic class	Flow label	
Payload length		Next hdr.	Hop limit
Source address			
Destination address			

# IPv6 - Deployment Issues

- ▶ An IPv6 address is represented by 8 groups of 16-bit hexadecimal values separated by colons (:)
- ▶ Can be abbreviated:
  - omit leading zeroes in a 16-bit value
  - replace one group of consecutive zeroes by a double colon
- ▶ Example:
  - 2606:4100:38c0:9::5 vs  
2606:4100:38c0:0009:0000:0000:0000:0005