Obtaining IP Addresses

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Idea

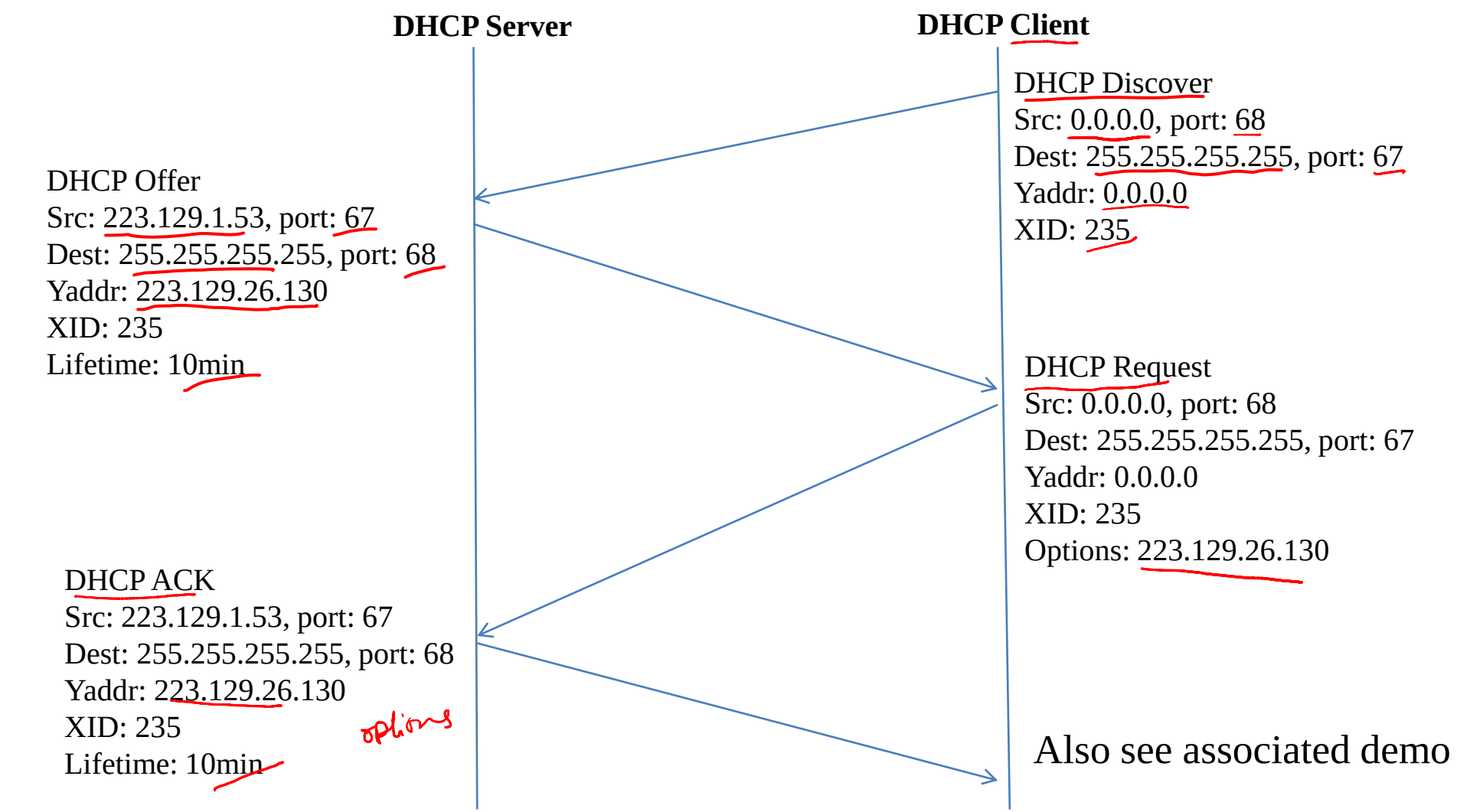
- DHCP server maintains a pool of available addresses
  - IP Prefix
- Addresses handed out on demand (leased for some specific time)
  - Small
  - Host periodically needs to renew the lease
- Advantages: Ease of configuration (automated), reuse of IP addresses, supports portability
- But how does the host know address of DHCP server?

DHCP Operation

- Operates at application layer using UDP protocol
- A newly booted/attached host 'broadcasts' DHCP discover message
  - IP address: 255.255.255.255 goes as link-layer broadcast (broadcast restricted to physical network)
  - Received by all hosts/routers in the physical network
- DHCP Server replies to host (others ignore message)

Message Exchange

- Host broadcasts “DHCP discover” msg
- DHCP server responds with “DHCP offer” msg
- Host requests IP address: “DHCP request” msg
- DHCP server confirms address: “DHCP ack” msg
- DHCP server also passes subnet mask, default router, domain name, DNS server info etc if host asks for it


DHCP Server
DHCP Client
DHCP Discover
Src: 0.0.0.0, port: 68
Dest: 255.255.255.255, port: 67
Yaddr: 0.0.0.0
XID: 235
DHCP Offer
Src: 223.129.1.53, port: 67
Dest: 255.255.255.255, port: 68
Yaddr: 223.129.26.130
XID: 235
Lifetime: 10min
DHCP Request
Src: 0.0.0.0, port: 68
Dest: 255.255.255.255, port: 67
Yaddr: 0.0.0.0
XID: 235
Options: 223.129.26.130
DHCP ACK
Src: 223.129.1.53, port: 67
Dest: 255.255.255.255, port: 68
Yaddr: 223.129.26.130
XID: 235
Lifetime: 10min
options
Also see associated demo

Router Configuration

- How are router interface addresses configured?
- By a system administrator manually via a network management tool

Summary

- IP addresses crucial for communication
- Organizations get IP prefixes from ISPs
- ISPs get from RIRs
- Hosts gets from DHCP server
- Ahead: Supporting Protocols – ARP, ICMP

Demo in Linux

- Run a packet capture tool like wireshark or tcpdump
- Run “dhclient eth0” (replace eth0 with whatever is the correct interface).
- Stop packet capture and analyze captured packets