

## Lecture 29: network layer summary

### addressing

- hierarchical address space
- classful addresses A,B,C
- CIDR classless interdomain routing

### one address per-interface

127.0.0.1/8 - loopback (localhost)

192.168.0.0/16 - private addresses

10.0.0.0/8 - private

172.0.0./12 - private

222.222/16 - (maybe) example address

some multicast range

0.0.0.0 - broadcast in local network

255.255.255.255 - broadcast in local net

sending a packet

based on prefix

- local subnet?
  - ARP (address resolution protocol)
  - send packet on local link
- not a local address
  - longest prefix match
    - send to next hop router
  - /0
- on next hop router
  - slice off the link layer header
  - repeat

nice network layer extras

ICMP - internet control message protocol

- ping
- errors (s.a. destination unreachable)

DHCP - dynamic host configuration protocol

- get an IP address, gateway, DNS, netmask
- used mostly for
  - address reuse (ISP would do this)
  - assigning private IP addresses

NAT - network address translation

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## proactive routing

- link-state routing
  - nice and stable, resilient to link failures
  - bit of extra overhead
  - OSPF - open shortest path first
- distance vector routing
  - RIP routing information protocol

## Autonomous systems (AS)

- BGP - border gateway protocol
- routes by prefix
- decided by policy
- based on AS path