

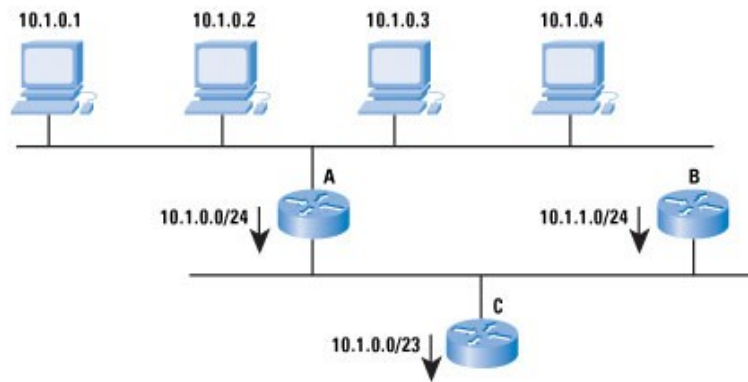
CSE 461 - Module 10: IP Routing (cont.)

Routing Table Entries - CIDR

- The size of router tables is an issue
 - Router table maintenance requires exchanging table contents
 - Each packet routing decision requires a lookup
- Original scheme: static network classes
 - One router table entry per network
 - All IPs on one network must be “in the same place”
 - Organizations are allocated a network
 - Class A networks begin 0xxxxxxx – up to 2^7 class A networks of 2^{24} hosts each
 - Class B begin 01xxxxxx.xxxxxxxx
 - Class C begin 011xxxxx.xxxxxxxx.xxxxxxxx
 - Too inflexible / fragmented
 - Limited IP address space is poorly used
- CIDR – classless inter-domain routing
 - Similar enough to classful routing to allow incremental migration from it
 - Intended as a temporary (3-5 year) solution (in 1993)
 - Idea: explicitly indicate IP network prefix in all routing table information
 - 128.208.1.0/24 (subnet mask 255.255.255.0)
 - or.... 128.208.0.0/16 (subnet mask 255.255.0.0)
 - Routing table entries contain CIDR addresses, packets contain IP addresses

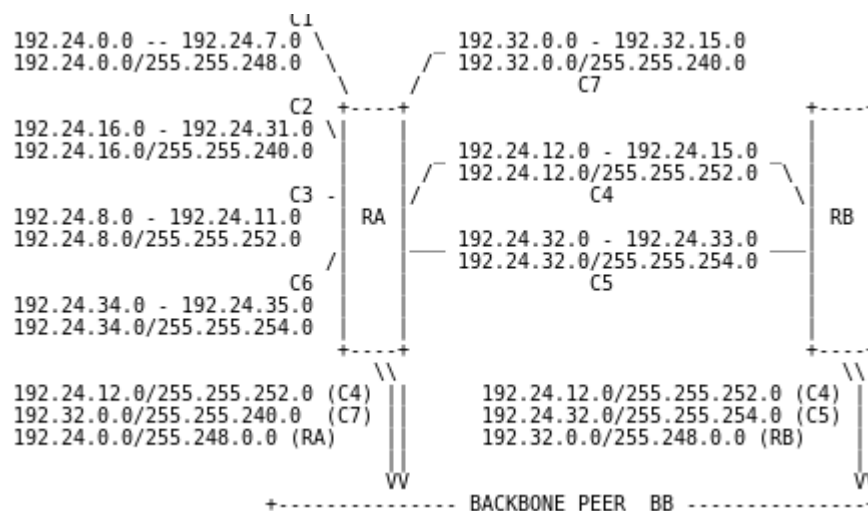
Routing Table Lookup / subnets / supernets

- “Longest prefix match”
 - Suppose a packet with destination address 128.208.1.207 is received. How do you process it?
 - Choose the rule that is most specific to the destination addresses
 - E.g., a rule for 128.208.1.0/24 is a longer match than a rule for 128.208.0.0/16
- Subnet – having been allocated a large address range, break it into subintervals
 - Advertise only the large address range routing table entry externally
 - Advertise subranges (subnets) internally
- Supernet – aggregate multiple “nearly consecutive” routing table entries into one entry with a shorter prefix



http://www.cisco.com/web/about/ac123/ac147/archived_issues/ipj_9-1/ip_addresses.html

- More complicated example from RFC 1519 (<http://www.ietf.org/rfc/rfc1519.txt>)
 - RA and RB are ISPs
 - RA has been allocated address range 192.24.0.0 through 192.31.255.255
 - RB has been allocated 192.32.0.0 through 192.39.255.255
 - RA allocates subranges to clients C1-C6
 - Clients C4 and C5 are “multi-homed” (with RA and RB)
 - C4 has RA as primary, RB as secondary
 - C5 has RB as primary, RA as secondary
 - Client C7 was originally a client of RB, but moved to RA
 - C7 kept its allocated IP address range, which came out of RBs allocation



Movie Break

- <https://courses.cs.washington.edu/courses/cse461/14sp/csenetid/youtube-censored.html>