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
• More complicated example from RFC 1519 ([http://www.ietf.org/rfc/rfc1519.txt](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](https://courses.cs.washington.edu/courses/cse461/14sp/csenetid/youtube-censored.html)