Border Gateway Protocol

- Subnetting and CIDR reduced the number of forwarding table entries significantly
- Need to do more to reduce table size
- Organize Internet into Autonomous Systems
- Cost metrics may not be the same across the network;
  - Only reachability is important here
BGP

- Path Vector Protocol
- Does not use Interior Gateway Protocol (IGP) metrics
- Routing decision based on path, network policies/rules
- Is really a reachability protocol rather than routing protocol
Autonomous Systems

- Stub AS (only one connection to other AS)
- Multi homed AS (more than one connection, but no transit traffic)
- Transit AS (local and transit)
BGP Speakers and Gateways

- **Speakers:**
  - One node in AS is its Speaker
  - Spokesperson for AS
  - Establish BGP sessions to other BGP speakers (Other ASs) (Use TCP)
  - Exchange reachability information with other ASs.
  - 19-Byte keep alive message periodically

- **Gateways**
  - One/more nodes of an AS
  - All packets in/out of AS flow through one of these
Interior and Exterior BGP

- Running only inside an AS?
  - Interior BGP
- Running between ASs?
  - External BGP
Routing Protocol

- Not DV or LS
- Use/advertise complete paths
  - Enumerated list of ASs.
  - Can enable policies
    - Use only ISP A for my packets
    - Use path that crosses fewest number of ASs.
    - Do not route packets through ISP B
  - Can detect loops
Routes Advertised

- Advertise only those that are good enough for it
- No need to advertise all routes
  - Can conceal some routes
- Cancel previously advertised routes
  - Withdrawn routes (changes in topology)
- Classless (need length)
  - Example: 192.110.54/20