CSE 588 Lecture Notes – 4/16/02, Second Half

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There are two kinds of router:
- Exterior routers:
    o Routing network packets between different autonomous systems (ASes)
    o Make routing decision based on policy
    o Use BGP
- Interior routers:
    o Route network packets within a domain.
    o Since the traffic is within a domain, policy-based routing is not needed. So, the primary responsibility of interior routers is to find the shortest path with a domain.

Border Gateway Protocol (BGP)
- Interdomain routing protocol used by border gateways for exchanging update information when network topology or routing policy changes.
- Path vector routing. A path is a sequence of intermediate autonomous systems (ASes) between source and destination routers that form a directed route for packets to travel.
- Policy knobs: described below
- It makes routing decision independent of the overall network topology

Policy knobs
- Links (where/who do I buy the link?)
- Link advertisement: BGP advertises complete paths as an list of ASes.
- Preferences on which link is used for outgoing traffic
- "meds": Multi-exit descriptors, an attribute with BGP packet

Issues with BGP
- Updates between border routers are often unnecessary.
- A lot of oscillations and advertisement between border routers
- Border routers often find routes that are locally optimal. However, this local optimality doesn't guarantee global stability

In the business world of ISP …
- Transit Carrier: A company that have backbone networks which have global connectivity. Example: AT&T, Sprint.
- Regional ISPes send their network packets via transit carriers. Regional ISPes pay transit carrier based on their usage (burst-able circuits).
- Since ISPes is charged on usage-basis, they often cache contents when possible.
- Transit carriers also exchange traffic among themselves. Unlike regional ISPes, transit carriers exchange traffic without charging each others. They are "peers".
- Since transit carriers exchange packets without charge, transit carriers often use "early-exit" routing or "hot potato" routing in order to put their own network packets on other transit carriers' network as early as possible.