BGP – Border Gateway Protocol

What is BGP?
- Protocol for interlink domain communication
- Exchange information – path to every prefix. i.e. path vector routing
- Routing – shortest path preferable
- Endpoint – Atomic System (AS)
- Can have multiple AS per organization

Why BGP?
- Apply different policy on link to different AS
- Hierarchical routing
- Scalable

BGP Policy
Can program policy to:
- restrict usage
- use custom network

Policy knob describes:
- Who buy a link
• Which prefixes over which link
• “preferences” for which links to use for outgoing traffic
• meds – favor list for a set of prefix
• community – indicate prefixes that are direct customers, way to attract traffic
• peering – ASs that are paired up to do business

Transit Carrier
• Carrier provide connection between global network to ISP.
• Burst-able circuits charge on usage-basis
• ISP earn money by ensuring customer $ > transit carrier usage charge
• BGP is a way to apply policy to restrict use, network traffic flow control etc.

Packeteer
• Change receive window of packet on the way sending packing along
• Technique use to control rate of return traffic (by applying smaller receive window)
• Commonly used to control traffic on transit carrier charged on usage-basis

Economical view point
• Being a transit carrier is tough, and is a failure. (Example companies: 360, Global Crossing, Level 3, Qwest). Dominant company usually charge unreasonably
• Policy in BGP apply are mostly for financial purpose, such as to lower expenditure; or for political reason, such as to control traffic to/from peers/competitors

Weaknesses
• Lots of oscillation
• Lots of advertisement
• Policy implementation can eventually generate loops
• Complicated - Local optimal doesn’t imply global stability
• Many unnecessary and redundant updates on a complicated network

Common routing application
• Exterior – policy based routing
• Interior – shortest path
• Small AS: Gather packet to a centralize place to direct to the external network. Therefore, few router need to apply policy
• Large AS: Use router collector.
  Two steps: (1) use prefix advertised find exits; (2) use shortest path to exit