TDC 375 – Network Protocols

Border Gateway Protocol (BGP)
Path Vector Routing

ASN 65550

- BGP over TCP peering -

ASN 64510
198.51.100.0/24

ASN 64500
203.0.113.0/24
192.0.2.0/24

203.0.113.0/24 64510, 64500, i
192.0.2.0/24 64510, 64500, i
198.51.100.0/24 64510, i
BGP Peering over TCP

- One-to-one peering relationship
- Inherit TCP behaviors, advantages and threats
Common BGP Header
BGP message types

1 – OPEN
2 – UPDATE
3 – NOTIFICATION
4 – KEEPALIVE
5 – ROUTE-REFRESH
BGP OPEN

- Version
- My Autonomous System
- Hold Time
- BGP Identifier
- Opt Parm Len
- Optional Parameters (variable)
BGP UPDATE

- Withdrawn Routes Length
- Withdrawn Routes (var)
- Total Path Attribute Len
- Path Attributes (var)
- NLRI (var)
BGP NOTIFICATION

```
0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1

Error code  |  Err subcode  |  Data (variable)
```
Routing Information Base

• Adj-RIB-In
  • Routes from a peer, one for each peer
• Loc-RIB
  • Paths to use, one per system
• Adj-Rib-OUT
  • Routes advertised to a peer, one for each peer
Policy

• Inbound policy
  • Receiving routes from a peer
  • Receive, reject, modify certain attributes
• Outbound policy
  • Sending routes to a peer
  • Send, withhold, modify certain attributes
Affecting BGP Route Decisions

• Prefix length
• LOCAL_PREF
• ORIGIN
• AS_PATH length
• MULTI_EXIT_DISC
• Community tag
• … and more …
# Common BGP Path Attributes

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<tr>
<th>Attribute</th>
<th>Well-known mandatory</th>
<th>Well-known discretionary</th>
<th>Optional transitive</th>
<th>Optional non-transitive</th>
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<td>ORIGIN</td>
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Some Buzzwords

- Flap and damp (or dampen)
- Hot/cold potato
- Eyeballs/content
- Transit/peer
- Private/public peering
- Settlement-free interconnection / paid peering
- Open / restrictive peering policies
- 95th percentile