

CSCI4211 Spring 2019
Assignment #4 Due date: April 17th

1. C may use selective route advertisement policy in policy routing to achieve that. For instance, C could not advertise the route through west coast. In this way, B has to go through the east coast.

2. solution:

- 1) Security: all OSPF messages authenticated (to prevent malicious intrusion)
- 2) Multiple same-cost paths allowed (only one path in RIP)
- 3) For each link, multiple cost metrics for different TOS (□Type-of-Services□)
 - a) – e.g., satellite link cost set □ low □ for best effort; high for real-time
- 4) Hierarchical OSPF in large domains.

3. solution (may vary):

In SDN network, a distinct (typically remote) controller interacts with local control agents (CAs) in switches to compute forwarding tables. Individual routing algorithm components in each and every router interact with each other in control plane to compute forwarding tables.

Main differences:

- 1) easier network management: avoid router misconfigurations, greater flexibility of traffic flows
- 2) table-based forwarding (recall OpenFlow API) allows “programming” routers
 - a) centralized “programming” easier: compute tables centrally and distribute
 - b) distributed “programming: more difficult: compute tables as result of distributed algorithm (protocol) implemented in each and every router
- 3) open (non-proprietary) implementation of control plane

4. solution:

- 1) Policy:
 - a) Inter-AS: admin wants control over how its traffic routed, who routes through its net.
 - b) Intra-AS: single admin, so no policy decisions needed
- 2) Scale:
 - a) hierarchical routing saves table size, update traffic
- 3) Performance:
 - a) Intra-AS: can focus on performance
 - b) Inter-AS: policy may dominate over performance

5. solution:

The advertisement of path vector could be used to implement the policy-based routing.

For instance:

- 1) each Border Gateway broadcast to neighbors(peers) entire path (i.e., sequence of ASes in Path Vector)
- 2) Receiving and filtering route advertisements from directly attached neighbor(s)
 - a) To accept or not accept route advertisements depends on policies (e.g., modify the Path Vector to choose path)
- 3) Route selection: (rank different routes to same destination network)
 - a) then it could do route selection based on policies (e.g., always prefer route advertisement from "good old" neighbor)
- 4) Filtering and sending route advertisements (modified path vector) to neighbors
 - a) what/whether to advertise to your neighbors also depends on policies (e.g., don't tell your neighbor that you know a route to a destination)
- 5) For instance, the example could be referred in slide Network Layer: Control Plane Part II, page 33.