

# PE/CE OSPF in RFC2547 VPNs

- VPN-IP routes from BGP must be imported by OSPF
- Problem: OSPF treats BGP routes as second class citizens:
  - AS-external as opposed to inter-area or intra-area
  - OSPF decision procedure always prefers non-BGP routes
- May be appropriate when BGP routes are from Internet
- **Not** appropriate when BGP routes are from other sites in same VPN

# Requirements

- Routes from other VPN sites:
  - should appear to OSPF as intra-area or inter-area
  - should be preferable (at least optionally) to “direct connections” between sites
- VPN backbone should be able to connect two area 0 segments
- Stick as much as possible to basic principle of using BGP to distribute routes, not IGP through tunnels

# Solution for Inter-Area and AS-external

- PE router is Area 0 router
- PE receiving AS-external or inter-area routes from CE:
  - converts to VPN-IP routes and uses BGP to distribute
  - uses BGP attributes used to carry OSPF-specific information needed to recreate proper LSAs:
    - network identifier
    - area number
    - Metric

# Solution, Continued

- PE reoriginates inter-area LSAs and external LSAs, based on information from BGP
- Loop prevention needed to prevent re-originated LSAs from being received by other PEs
  - use route tag in external LSA
  - use flag bit in inter-area LSA
- IGP backdoor links now possible, as long as two sites are in different

# Special Intra-Area Links

- To support IGP backdoor links between two sites in same area:
  - need sort of virtual link between the two sites
  - BGP extended communities used to carry adequate information to auto-configure
  - Treat as demand circuit, suppress hellos and refreshes
- Only needed if IGP backdoor link can't be area 0 link