



Service Provider CCIE
Advanced Technologies Class

Internet Access Solutions
For MPLS VPNs

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Internet Access Design Problems

- MPLS VPNs imply that customer routing information is separated from global information via VRFs
- BGP Internet table is typically in the global routing table of the Service Provider
- Internet access from an MPLS VPN implies that traffic must be leaked between VRFs or from VRFs to global routing table

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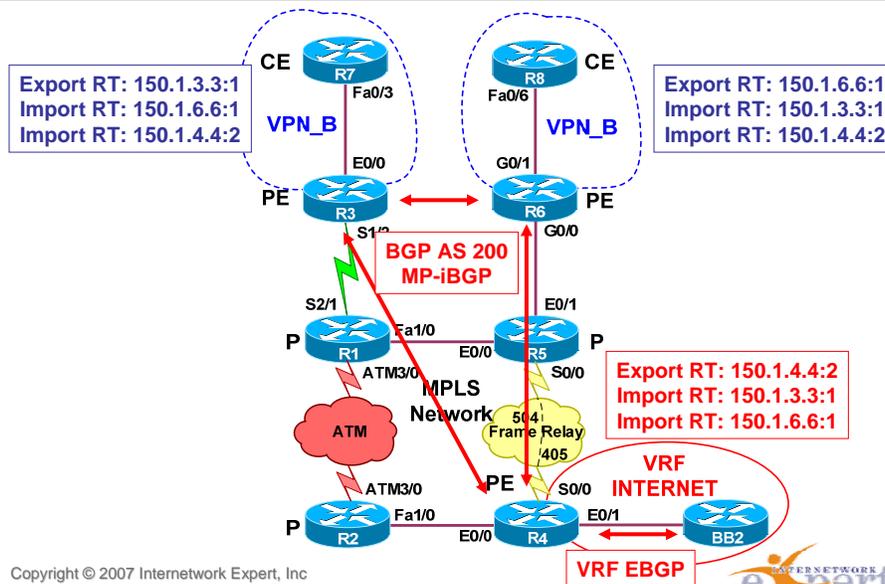
Option 1 : VRF "Internet"

- Similar to previous "Central Services" MPLS VPNs
- BGP peerings with Internet peers is configured inside a VRF (i.e. *INTERNET*)
- *INTERNET* export route target will be import route target into all VRFs that want Internet routes
- Other VRF routes must be imported into *INTERNET* or combined with NAT
 - More on NAT shortly...

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VRF "Internet" Example



Option 2 : Static to Global Table

- VRF static routes are assumed to recurse to interfaces or next hops within that VRF
- **global** option at the end of **ip route vrf** allows VRF lookup to occur in global table
- Simple way to insert default route to the Internet into a VRF

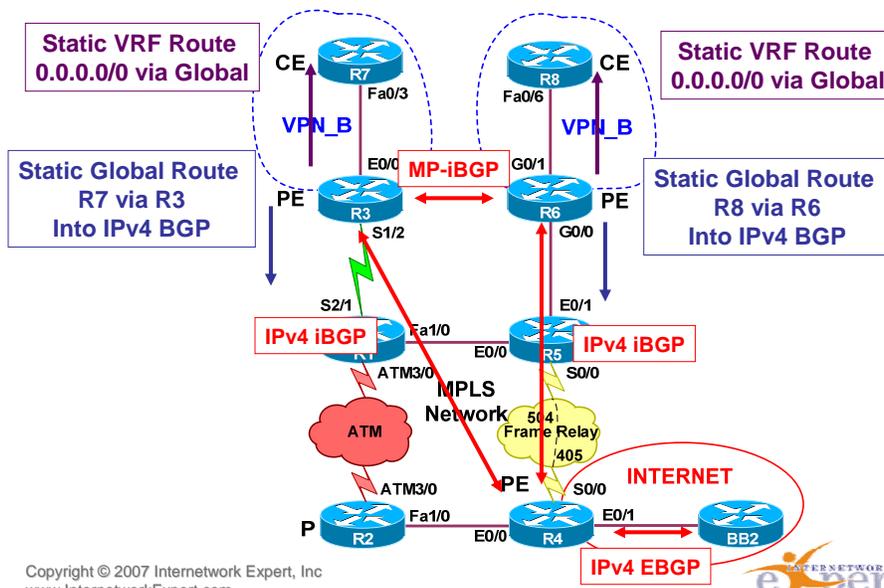
```
ip route vrf VPN_A 0.0.0.0 0.0.0.0 1.2.3.4 global
```

- Global table still needs a route back to VRF (or NAT)

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Static to Global Example



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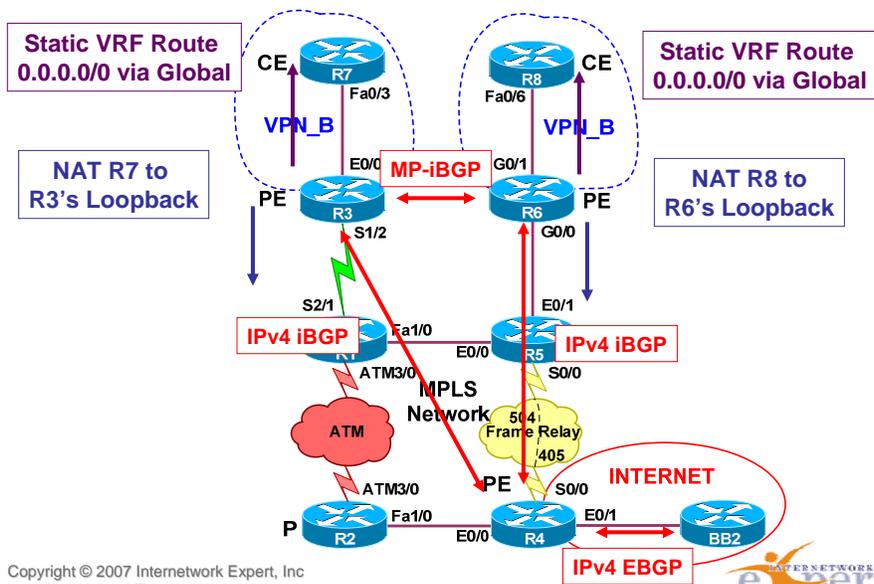
Option 3 : VRF Aware NAT

- VRF aware NAT allows CE traffic to be translated to global SP address space
- Option 3a : NAT at Local PE
 - Each PE NATs CE to separate global NAT pool
- Option 3b: NAT at Central PE
 - One central PE NATs multiple VRFs to single global NAT pool
 - **must use route-map**
 - Not documented

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NAT at Local PE Example



NAT at Central PE Example

