BASIC MPLS - Defining VPNs

MPLS based VPNs reduce customer networking complexity, costs and totally do away with the requirement of in-house technical work force. Rather than setting up and managing individual point-to-point circuits between each office using pair of Leased Lines, MPLS VPN customers need to provide only one connection from their office router to a service provider edge router. The IP virtual private network (VPN) feature for Multiprotocol Label Switching (MPLS) allows a service provider to deploy scalable IPv4 Layer 3 VPN backbone services.

An MPLS VPN is the foundation companies use for deploying or administering value-added services including applications and data hosting network commerce, and telephony services to business customers.

Configuration

VPN efficiently connects Intranet sites which are distributed over wide areas. Internet based VPN has lots of merits, such as flexibility in network configuration, expansibility, and low operational cost compared to existing leased line private network. Since the request of reliable information exchange through Internet is increasing explosively, and the MPLS network can offer efficient traffic-engineering function, the necessity of MPLS VPN is also increasing rapidly.

BGP is used to set the path for MPLS packet forwarding across different autonomous system, exchanges eBGP (exterior BGP) routing information between PE and CE, and uses iBGP (interior BGP) between PE and PE in BGP/MPLS VPN. PE router receives IP prefix from CE and add 8 bytes RD (Route Distinguisher) to the IP prefix . VPN is established with defining VRF that is consisted of route distinguisher (RD) and route target (RT).

MPLS Virtual Private Networks - Defining VPNs

```
NetStepByStep-R2(config)# ip vrf ?????
```

- Used to enter VRF configuration mode
- ????? specifies a vrf name

```
NetStepByStep-R2(config-vrf)# rd XX:YY
```

- An RD must be configured for a VRF to be functional.
- This creates routing and forwarding tables and specifies the default route-distinguisher for a VPN.
- It is added to the beginning of the customer's IPv4 prefixes to change them into globally unique VPN-IPv4 prefixes.

```
NetStepByStep-R2(config-vrf)# route-target export ZZ:WW
```

- Used to configure route-target
- It specifies VPN route-target export communities.

```
NetStepByStep-R2(config-vrf)# route-target import ZZ:WW
```

- Specifies VPN route-target import communities.
- Used to configure an additional import route-target

```
NetStepByStep-R2(config-if)# ip vrf forwarding ?????
```

- It is used to associate a VRF with an interface or subinterface.
- Also to disassociate a VRF, use the **no** form of this command.

Verification

```
show ip vrf VPN-A
```

- Display the set of defined VRFs and interfaces.
- Used to verify the configuration.
- It is used to display the set of defined Virtual Private Network (VPN) routing/forwarding instances (VRFs) and associated interfaces
- Used this in EXEC mode

```
NetStepByStep-R2# show ip vrf VPN-A
  Name                           Default RD          Interfaces
  VPN-A                          2.2.2.2:2           Et0/3
```

```
show ip vrf interfaces
```

- This command provides the listing of interfaces that are activated for a particular VRF.

```
NetStepByStep-R2# show ip vrf interfaces
Interface            IP-Address       VRF
Protocol
Et0/3                12.12.12.2       VPN-A                                   up
```

Troubleshoot

NONE

Video Cheat Sheet

R2

```
conf t
ip vrf VPN-A
 rd 2.2.2.2:2
 route-target export 2.2.2.2:2
 route-target import 6.6.6.6:6

interface e0/3
 ip vrf forwarding VPN-A
 ip add 12.12.12.2 255.255.255.0
```

R6

```
conf t
ip vrf VPN-A
 rd 6.6.6.6:6
 route-target export 6.6.6.6:6
 route-target import 2.2.2.2:2

interface e0/3
 ip vrf forwarding VPN-A
 ip address 67.67.67.6 255.255.255.0
```