Cheat Sheet for comprehensive Cisco Certified Network Professional (CCNP) - Service Provider

MPLS (Multiprotocol Label Switching)

Key Concepts

- **Label Switching**: Uses labels to forward packets.

- **Label Distribution Protocol (LDP)**: Used to exchange labels between LSRs.

- **Label Switched Path (LSP)**: A path through the MPLS network.

Configuration

- **Enable MPLS on Interface**:

```
interface GigabitEthernet0/1
  mpls ip
```

- **Enable MPLS on Router**:

```
mpls ldp router-id Loopback0 force
```

Verification Commands

- **Show MPLS LDP Neighbor**:

```
show mpls ldp neighbor
```

- **Show MPLS LDP Binding**:

```
show mpls ldp binding
```

BGP (Border Gateway Protocol)

Key Concepts

- **Autonomous System (AS)**: A collection of routers under a single administrative domain.

- **Path Attributes**: Used to influence route selection.

- **BGP Peering**: Establishment of BGP sessions between routers.

Configuration
- **Enable BGP**:

```
router bgp 65001
  neighbor 192.168.1.2 remote-as 65002
```

- **Advertise Networks**:

```
network 10.0.0.0 mask 255.255.255.0
```

Verification Commands
- **Show BGP Summary**:

```
show ip bgp summary
```

- **Show BGP Routes**:

```
show ip bgp
```

QoS (Quality of Service)

Key Concepts
- **Classification**: Identifying traffic types.

- **Marking**: Setting DSCP or CoS values.

- **Policing and Shaping**: Controlling traffic rates.

Configuration
- **Classify Traffic**:

```
class-map match-all VOICE
  match access-group name VOICE_ACL
```

- **Mark Traffic**:

```
policy-map VOICE_POLICY
  class VOICE
    set dscp ef
```

- **Apply Policy**:

```
interface GigabitEthernet0/1
  service-policy output VOICE_POLICY
```

Verification Commands
- **Show Policy-Map**:

```
show policy-map
```

- **Show Class-Map**:

```
show class-map
```

VPN (Virtual Private Network)

Key Concepts
- **Site-to-Site VPN**: Secure connection between two networks.

- **Remote Access VPN**: Secure connection for individual users.

- **GRE (Generic Routing Encapsulation)**: Tunnel protocol.

Configuration
- **GRE Tunnel**:

```
interface Tunnel0
  ip address 10.10.10.1 255.255.255.0
  tunnel source 192.168.1.1
  tunnel destination 192.168.2.1
```

- **IPSec VPN**:

```
crypto isakmp policy 10
  encryption aes
  hash sha
```

```
   group 2
   lifetime 86400
```

- **Show Tunnel Interface**:

```
show interfaces tunnel 0
```

- **Show Crypto Session**:

```
show crypto session
```

IPv6

Key Concepts
- **Addressing**: 128-bit addresses.

- **NDP (Neighbor Discovery Protocol)**: Replaces ARP.

- **SLAAC (Stateless Address Autoconfiguration)**: Automatic address configuration.

Configuration
- **Assign IPv6 Address**:

```
interface GigabitEthernet0/1
  ipv6 address 2001:db8::1/64
```

- **Enable IPv6 Routing**:

```
ipv6 unicast-routing
```

Verification Commands
- **Show IPv6 Interface**:

```
show ipv6 interface GigabitEthernet0/1
```

- **Show IPv6 Route**:

```
show ipv6 route
```

OSPF (Open Shortest Path First)

Key Concepts

- **Link-State Routing Protocol**: Uses LSAs to build a topology map.

- **Area Types**: Backbone, standard, and stub areas.

- **DR/BDR (Designated Router/Backup Designated Router)**: Elected in multi-access networks.

Configuration
- **Enable OSPF**:

```
router ospf 1
  network 192.168.1.0 0.0.0.255 area 0
```

- **Configure Loopback**:

```
interface Loopback0
  ip address 1.1.1.1 255.255.255.255
```

Verification Commands
- **Show OSPF Neighbor**:

```
show ip ospf neighbor
```

- **Show OSPF Database**:

```
show ip ospf database
```

EIGRP (Enhanced Interior Gateway Routing Protocol)

Key Concepts

- **Hybrid Routing Protocol**: Combines features of both distance-vector and link-state protocols.

- **DUAL (Diffusing Update Algorithm)**: Determines best and backup paths.

- **Autonomous System (AS)**: Identifier for EIGRP domain.

- **Enable EIGRP**:

```
router eigrp 1
  network 192.168.1.0 0.0.0.255
```

- **Configure Passive Interface**:

```
passive-interface GigabitEthernet0/1
```

Verification Commands
- **Show EIGRP Neighbors**:

```
show ip eigrp neighbors
```

- **Show EIGRP Topology**:

```
show ip eigrp topology
```

VRF (Virtual Routing and Forwarding)

Key Concepts
- **Multiple Routing Tables**: Allows multiple instances of routing tables.

- **VRF Lite**: VRF without MPLS.

- **Route Distinguisher (RD)**: Unique identifier for each VRF.

Configuration
- **Create VRF**:

```
ip vrf CUSTOMER_A
  rd 100:1
```

- **Assign Interface to VRF**:

```
interface GigabitEthernet0/1
  ip vrf forwarding CUSTOMER_A
  ip address 192.168.1.1 255.255.255.0
```

- **Show VRF**:

```
show ip vrf
```

- **Show VRF Interface**:

```
show ip vrf interface GigabitEthernet0/1
```

Summary of Key Commands

Feature	Configuration Command	Verification Command
MPLS	`mpls ip`	`show mpls ldp neighbor`
BGP	`router bgp <ASN>`	`show ip bgp summary`
QoS	`service-policy output <POLICY_NAME>`	`show policy-map`
VPN	`crypto isakmp policy <PRIORITY>`	`show crypto session`
IPv6	`ipv6 address <ADDRESS>/<PREFIX>`	`show ipv6 interface <INTERFACE>`
OSPF	`router ospf <PROCESS_ID>`	`show ip ospf neighbor`
EIGRP	`router eigrp <ASN>`	`show ip eigrp neighbors`
VRF	`ip vrf <VRF_NAME>`	`show ip vrf`

Tips and Tricks

- **Use `no shutdown`**: Always ensure interfaces are up.

- **Backup Configurations**: Regularly save configurations using `copy running-config startup-config`.

- **Use `ping` and `traceroute`**: For basic connectivity checks.

- **Monitor Logs**: Use `show logging` to check for errors.

- **Use `debug` Wisely**: Only use `debug` when necessary as it can impact performance.

Conclusion

This cheat sheet provides a comprehensive overview of key concepts, configurations, and verification commands for the CCNP Service Provider exam. Mastering these commands and concepts will help you effectively manage and troubleshoot service provider networks.

By Ahmed Baheeg Khorshid

ver 1.0