

Cheat Sheet for comprehensive Cisco Certified Internetwork Expert (CCIE)

- Service Provider

General Tips and Best Practices

- Understand the Exam Blueprint:

- Focus on core technologies: MPLS, Segment Routing, BGP, OSPF, IS-IS, QoS, Multicast, IPv6, and Security.

- Practice Regularly:

- Use Cisco's official labs and platforms like Cisco Modeling Labs (CML) and Packet Tracer.

- Time Management:

- Allocate time effectively across different sections of the lab exam.

- Documentation:

- Keep up-to-date with Cisco's official documentation and release notes.

MPLS (Multiprotocol Label Switching)

MPLS Fundamentals

- Label Distribution Protocol (LDP):

- ``mpls ldp router-id Loopback0 force``
- ``mpls ldp discovery transport-address interface``

- MPLS VPN:

- ``ip vrf <name>``
- ``rd <rd-value>``
- ``route-target both <rt-value>``

MPLS Traffic Engineering (MPLS-TE)

- RSVP-TE:

- ``mpls traffic-eng tunnels``
- ``interface Tunnel0``
- ``tunnel mode mpls traffic-eng``
- ``tunnel destination <ip-address>``
- ``tunnel mpls traffic-eng path-option 1 explicit name <path-name>``

Segment Routing (SR)

- **SR-MPLS:**

- `segment-routing mpls`
- `segment-routing global-block <start> <end>`
- `segment-routing node-msd <value>`

- **SR Policies:**

- `segment-routing policy <policy-name>`
- `color <color-value> end-point ipv4 <ip-address>`
- `candidate-path preference <preference-value>`

BGP (Border Gateway Protocol)

BGP Basics

- **BGP Configuration:**

- `router bgp <as-number>`
- `neighbor <ip-address> remote-as <as-number>`
- `neighbor <ip-address> update-source Loopback0`

- **BGP Attributes:**

- `local-preference <value>`
- `weight <value>`
- `community <community-value>`

BGP Route Reflector

- **Route Reflector Configuration:**

- `neighbor <ip-address> route-reflector-client`
- `no neighbor <ip-address> next-hop-self`

BGP Confederations

- **Confederation Configuration:**

- `bgp confederation identifier <as-number>`
- `bgp confederation peers <peer-as-number>`

OSPF (Open Shortest Path First)

OSPF Basics

- **OSPF Configuration:**

- `router ospf <process-id>`
- `network <ip-address> <wildcard-mask> area <area-id>`

- OSPF Authentication:

- `area <area-id> authentication`
- `ip ospf authentication-key <password>`

OSPFv3

- OSPFv3 Configuration:

- `ipv6 router ospf <process-id>`
- `interface <interface>`
- `ipv6 ospf <process-id> area <area-id>`

IS-IS (Intermediate System to Intermediate System)

IS-IS Basics

- IS-IS Configuration:

- `router isis <process-id>`
- `net <iso-address>`
- `interface <interface>`
- `isis circuit-type level-1-2`

IS-IS Authentication

- IS-IS Authentication:

- `area-password <password>`
- `domain-password <password>`

QoS (Quality of Service)

QoS Models

- Classification and Marking:

- `class-map match-all <class-name>`
- `match access-group <acl-number>`
- `policy-map <policy-name>`
- `class <class-name>`
- `set precedence <value>`

Congestion Management

- Queuing Mechanisms:

- `queue-limit <packets>`
- `random-detect`

Multicast

PIM (Protocol Independent Multicast)

- PIM Configuration:

- `ip pim sparse-mode`
- `ip pim rp-address <ip-address>`

- PIM-SM:

- `ip pim ssm range <range>`

MSDP (Multicast Source Discovery Protocol)

- MSDP Configuration:

- `router msdp`
- `neighbor <ip-address> connect-source Loopback0`

IPv6

IPv6 Basics

- IPv6 Configuration:

- `ipv6 unicast-routing`
- `interface <interface>`
- `ipv6 address <ipv6-address>/<prefix-length>`

IPv6 Routing Protocols

- OSPFv3:

- `ipv6 router ospf <process-id>`
- `interface <interface>`
- `ipv6 ospf <process-id> area <area-id>`

- BGP4+:

- `router bgp <as-number>`
- `address-family ipv6`
- `neighbor <ipv6-address> activate`

Security

Access Control Lists (ACLs)

- Standard ACL:

- `access-list <acl-number> permit <source-ip> <wildcard-mask>`

- **Extended ACL:**

- `access-list <acl-number> permit <protocol> <source-ip> <wildcard-mask> <destination-ip> <wildcard-mask>`

AAA (Authentication, Authorization, and Accounting)

- **AAA Configuration:**

- `aaa new-model`
- `aaa authentication login default group <group-name>`
- `aaa authorization exec default group <group-name>`

VPN Technologies

- **IPsec VPN:**

- `crypto isakmp policy <priority>`
- `crypto isakmp key <key> address <peer-ip>`
- `crypto ipsec transform-set <set-name> esp-aes esp-sha-hmac`

Troubleshooting and Monitoring

Common Commands

- **Show Commands:**

- `show ip interface brief`
- `show ip route`
- `show mpls forwarding-table`
- `show bgp summary`

- **Debug Commands:**

- `debug ip packet`
- `debug mpls ldp`
- `debug bgp updates`

Monitoring Tools

- **SNMP:**

- `snmp-server community <community-string> RO`
- `snmp-server host <ip-address> version 2c <community-string>`

- **NetFlow:**

- `ip flow-export version 9`
- `ip flow-export destination <ip-address> <port>`

Configuration Management

Backup and Restore

- **Backup Configuration:**

- `copy running-config startup-config`
- `archive config`

- **Restore Configuration:**

- `copy <source> running-config`

Automation and Scripting

- **Python Scripting:**

- Use `netmiko` or `pyATS` libraries for automation.

- **Ansible:**

- Use Ansible playbooks for configuration management.

Example Configurations

MPLS VPN Configuration

```
ip vrf VRF1
  rd 100:1
  route-target export 100:1
  route-target import 100:1

interface GigabitEthernet0/0
  ip vrf forwarding VRF1
  ip address 10.1.1.1 255.255.255.0
```

BGP Configuration

```
router bgp 65001
  neighbor 192.168.1.2 remote-as 65002
  neighbor 192.168.1.2 update-source Loopback0
```

OSPF Configuration

```
router ospf 1
  network 10.0.0.0 0.0.0.255 area 0
```

Conclusion

- **Stay Updated:**

- Regularly review Cisco's official resources and community forums.

- **Practice, Practice, Practice:**

- The more hands-on experience, the better prepared you will be for the lab exam.

This cheat sheet provides a comprehensive overview of key concepts and commands for the CCIE Service Provider exam. Use it as a quick reference and ensure you practice these commands in a lab environment to reinforce your understanding.

By Ahmed Baheeg Khorshid

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