

CCNP – Multi-Layer Switching Command Summary

Basic Commands

IOS-Based Commands	CLI-Based Commands
<p>Switch(config)#hostname <i>hostname</i></p> <p>The switch in-band management, management vlan Switch(config)#interface <i>vlan 1</i> Switch(config-if)#ip address <i>ip-address netmask</i> Switch(config-if)#ip default-gateway <i>ip-address</i></p> <p>Ends and Exits Switch(config-if)#end Switch#</p> <p>Switch(config-if)#exit Switch(config)#</p> <p>Switch(vlan)#end Switch#</p> <p>Session Timeouts Switch(config-line)#exec-timeout <i>minutes</i></p> <p>Saving the config Switch#copy running-config startup-config</p> <p>Switch#copy running-config tftp Switch#copy tftp running-config</p> <p>Show config Switch#show running-config</p> <p>Switch#show ip interface</p> <p>Erase the config Switch#erase startup-config</p> <p>1900 Switches: 1900-SW#(config)#delete nvram 1900-SW#(config)#delete vtp</p> <p>1900-Switch#show ip</p>	<p>Switch> (enable) set system name <i>name-string</i> Switch> (enable) set prompt <i>name</i> (for different prompt)</p> <p>The switch in-band management, management vlan Switch> (enable) set interface sc0 up Switch> (enable) set interface sc0 ip-address netmask broad Switch> (enable) set interface sc0 vlan (default = 1) Switch> (enable) set ip route default gateway-address</p> <p>Session Timeouts Switch> (enable) set logout <i>minutes</i></p> <p>Saving the config {Config saved automatically}</p> <p>Switch> (enable) write net (upload) Switch> (enable) configure net (download) Switch> (enable) copy config [flash file-id tftp] Switch> (enable) copy flash [flash file-id config]</p> <p>Show the config Switch> (enable) show config [all]</p> <p>Switch> (enable) show port mod/num Switch> (enable) show interface Switch> (enable) show module</p> <p>Erase the config Do Both of these: Switch> (enable) clear config all Switch> (enable) clear vtp</p>

<p><u>Passwords</u></p> <p>Set EXEC level password Switch(config)#enable password level 1 <i>password</i></p> <p>Set privileged level password Switch(config)#enable password level 15 <i>password</i></p> <p>vty and con passwords Switch(config)#line vty vty-first vty-last Switch(config-line)#password password</p> <p>Switch(config)#line con 0 Switch(config-line)#password password</p>	<p><u>Passwords</u></p> <p>Set privileged level password Switch> (enable) set enablepass</p> <p>vty and con passwords Switch> (enable) set password</p>
<p><u>Interface Commands</u></p> <p>Switch(config)#interface fastethernet 0</p> <p>Switch(config-if)#description <i>description-string</i></p> <p>Switch(config-if)#speed [10 100 auto] (Ether only)</p> <p>Switch(config-if)#duplex [auto full half] (Ether only)</p> <p><u>Show commands</u> Switch#show ip</p>	<p><u>Interface Commands</u></p> <p>Switch> (enable) set port enable mod/num (enable a port or a range of ports)</p> <p>Switch> (enable) set port name mod/num <i>description</i></p> <p>Switch> (enable) set port speed mod/num [10 100 auto]</p> <p>Switch> (enable) set port duplex mod/num [auto full half] (auto sets speed and duplex)</p> <p><u>Show commands</u> Switch> (enable) show interface Switch> (enable) show port name mod/num</p> <p><u>Tokenring</u> Switch> (enable) set tokenring portmode <i>mod/num</i> {auto fdxcport hdxcpport fdxstation hdxstation}</p>
<p><u>CDP</u></p> <p>Switch(config-if)#cdp enable</p> <p><u>Show commands</u> Switch#show cdp inteface type mod/num Switch#show cdp neighbors type mod/num [detail]</p>	<p><u>CDP</u></p> <p>Switch> (enable) set cdp {enable disable} <i>mod/port</i></p> <p><u>Show commands</u> Switch> (enable) show cdp neighbors [<i>mod/port</i>] [vlan duplex capabilities detail]</p>

VLANs

IOS-Based Commands	CLI-Based Commands
<p><u>VLANs</u> The switch in-band management, management vlan Switch(config)#interface vlan 1 Switch(config-if)#ip address ip-address netmask Switch(config-if)#ip default-gateway ip-address</p> <p>Create VLAN Switch#vlan database Switch(vlan)#vlan vlan-num name vlan-name</p> <p>Switch(config)#interface fastethernet 0 Switch(config-if)#switchport access vlan vlan-num</p> <p>Switch(config-if)#no switchport access vlan vlan-num</p> <p>1900 Switches 1900-SW(config-if)#vlan-membership static vlan-num <i>(Doesn't exist)</i></p> <p><u>Show commands</u> Switch#show vlan brief Switch#show ip</p>	<p><u>VLANs</u> The switch in-band management, management vlan Switch> (enable) set interface sc0 ip-address netmask broad Switch> (enable) set interface sc0 vlan (default = 1) Switch> (enable) set ip route default gateway-address</p> <p>Create VLAN Switch> (enable) set vlan vlan-num [name name] Switch> (enable) set vlan vlan-num mod/num,list</p> <p>Switch> (enable) clear vlan vlan-</p> <p><u>Show commands</u> Switch> (enable) show vlan Switch> (enable) show interface</p>
<p><u>VLAN Trunks</u></p> <p><u>Create Trunk</u> Switch(config)#interface fastethernet 0 Switch(config-if)#switchport mode [access multi trunk] Switch(config-if)#switchport trunk encapsulation {isl dot1q}</p> <p>Other commands Switch(config-if)#switchport trunk allowed vlan remove vlan-list (must remove as all trunked by default)</p> <p>Switch(config-if)#switchport trunk allowed vlan add vlan-list (then add vlans to be trunked)</p> <p>1900 Switches Switch(config-if)#trunk on Switch(config-if)#no trunk-vlan vlan-list</p> <p><u>Show commands</u> Switch#show interface mod/num switchport Show port capabilities</p>	<p><u>VLAN Trunks</u></p> <p><u>Creat Trunk</u> Switch> (enable) set trunk mod/port [on off desirable auto nonegotiate] [isl dot1q dot10 lane negotiate] vlan-range Switch> (enable) clear trunk mod/port vlan-range (must remove as all vlans trunked by default)</p> <p><u>Show commands</u> Switch> (enable) show trunk Switch> (enable) show port capabilities mod/num</p>

<p><u>VTP (VLAN Trunking Protocol)</u></p> <p>Enable VTP Switch#vlan database Switch(vlan)#vtp domain <i>domain-name</i> Switch(vlan)#vtp {server client transparent} Switch(vlan)#vtp password <i>password</i> Switch(vlan)#vtp v2-mode (<i>version2</i>)</p> <p>VTP Pruning Switch(vlan)#vtp pruning Switch(config-if)#switchport trunk pruning vlan remove <i>vlan-list</i> <i>(remove vlans from pruning)</i></p> <p>Show commands Switch#show vtp Switch#show vtp status Switch#show vtp counters</p>	<p><u>VTP (VLAN Trunking Protocol)</u></p> <p>Enable VTP Switch> (enable) set vtp [<i>domain domain-name</i>] [mode {<i>server</i> <i>client</i> <i>transparent</i>}] [password <i>password</i>]</p> <p>Switch> (enable) set vtp v2 enable (<i>version 2</i>)</p> <p>VTP Pruning Switch> (enable) set vtp pruning enable Switch> (enable) set vtp pruneeligible <i>vlan-range</i> Switch> (enable) clear vtp pruning <i>vlan-range</i></p> <p>Show commands Switch> (enable) show vtp domain Switch> (enable) show vtp statistics Switch> (enable) show vlan</p>
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Spanning Tree Protocol

IOS-Based Commands	CLI-Based Commands
<p><u>Spanning Tree Protocol</u></p> <p>Enable Spanning Tree (Enabled by default) Switch(config)#spantree <i>vlan-list</i> (Enabled by default)</p> <p>Other Configuration Commands</p> <p><i>Bridge Priority</i> Switch(config)#spanning-tree [vlan <i>vlan-list</i>] priority <i>prty</i></p> <p><i>Port Cost</i> Switch(config-if)#spanning-tree [vlan <i>vlan-list</i>] cost <i>cost</i></p> <p><i>Port Priority</i> Switch(config-if)#spanning-tree [vlan <i>vlan-list</i>] port-priority <i>port-priority</i></p> <p><i>Root Bridge</i> N/A</p>	<p><u>Spanning Tree Protocol</u></p> <p>Enable Spanning Tree (Enabled by default) Switch> (enable) set spantree enable [<i>all</i> <i>mod/num</i>]</p> <p>Other Configuration Commands</p> <p><i>Bridge Priority</i> Switch> (enable) set spantree priority <i>priority</i> <i>vlan</i> (Lower wins, Priority default = 32,768)</p> <p><i>Port Cost</i> Switch> (enable) set spantree portcost <i>mod/num</i> <i>cost</i> (Lower wins) Switch> (enable) set spantree portvlancost <i>mod/num</i> [<i>cost</i> <i>cost</i>] [<i>vlan-list</i>]</p> <p><i>Port Priority</i> Switch> (enable) set spantree portpri <i>mod/num</i> <i>cost</i> (Lower wins, Priority default = 32, range 0-63) Switch> (enable) set spantree portvlanpri <i>mod/num</i> <i>priority</i> <i>vlan-list</i></p> <p><i>Root Bridge</i> Switch> (enable) set spantree root [secondary] [<i>vlan-list</i>][dia <i>diameter</i>] [hello <i>hellotime</i>] (Reduces default priority of 32,768 to 8,192)</p>
<p><u>STP Timers</u></p> <p>Switch(config)#spanning-tree [vlan <i>vlan-list</i>] [hello-time <i>seconds</i>] (Default = 2 secs)</p> <p>Switch(config)#spanning-tree [vlan <i>vlan-list</i>] [forward-time <i>seconds</i>] (Default = 15 secs)</p> <p>Switch(config)#spanning-tree [vlan <i>vlan-list</i>] [max-age <i>seconds</i>] (Default = 20 secs)</p>	<p><u>STP Timers</u></p> <p>Switch> (enable) set spantree hello <i>interval</i> [<i>vlan</i>]</p> <p>Switch> (enable) set spantree fwddelay <i>delay</i> [<i>vlan</i>]</p> <p>Switch> (enable) set spantree maxage <i>agingtime</i> [<i>vlan</i>]</p> <p>Switch> (enable) set spantree root [secondary] [<i>vlan-list</i>] [dia <i>diameter</i>] [hello <i>hellotime</i>] (Lower wins, Priority default = 32,768)</p>

<p><u>STP PortFast, UplinkFast, BackboneFast</u></p> <p>Switch(config)#spanning-tree portfast or Switch(config)#spanntree start-forwarding (For server and workstation ports)</p> <p>Switch(config)#spanning-tree uplinkfast [max-update-rate <i>pkts-per-sec</i>] (For access switches when direct knowledge of failure)</p>	<p><u>STP PortFast, UplinkFast, BackboneFast</u></p> <p>Switch> (enable) set spantree portfast [<i>mod/num</i>] [enable disable]</p> <p>Switch> (enable) set spantree uplinkfast [enable disable] [rate <i>update-rate</i>] [all-protocols off on]</p> <p>Switch> (enable) set spantree backbonefast [enable disable] (Must be on all switches, when receives inferior BPDU)</p>
<p><u>Show commands</u></p> <p>Switch#show spanning-tree [<i>vlan</i>] Switch#show spanning-tree <i>mod/num</i></p>	<p><u>Show commands</u></p> <p>Switch> (enable) show spantree [<i>vlan</i>] Switch> (enable) show spantree <i>mod/num</i></p>

Inter-VLAN Routing

External Route Processor Commands	5000 Integrated Route Processor Commands
<p>VLANs – created at the switch level, but controlled at the route processor level.</p> <p>External Route Processor Router(config)#interface ethernet 0 Router(config-if)#encapsulation [isl dot1q] <i>vlan-number</i> Router(config-if)#ip address <i>ip-address</i> <i>subnet-mask</i></p> <p>Routing Configuration Router(config)#ip routing Router(config)#router <i>routing-protocol</i> Router(config-router)#network <i>network</i></p>	<p>Integrated Route Processor Switch> (enable) session <i>module-number</i></p> <p>*Router(config)#interface <i>vlan-interface-number</i> Router(config-if)#ip address <i>ip-address</i> <i>subnet-mask</i></p> <p>Routing Configuration Router(config)#ip routing Router(config)#router <i>routing-protocol</i> Router(config-router)#network <i>network</i></p> <p>* Differs from: Switch(config)#interface <i>vlan 1</i> Switch(config)#assigns ip address to switch mngt interface Router(config)#configures vlan interface on RSM</p>
<p>IOS-Based Commands</p> <p>Default Gateway Switch(config)#ip default-gateway <i>ip-address</i></p> <p>Show commands Switch#show ip</p>	<p>CLI-Based Commands</p> <p>Default Gateway Switch> (enable) set ip route <i>destination gateway metric</i></p> <p>Show commands Switch> (enable) show module <i>mod-number</i></p>

Multi-Layer Switching Commands

Router Commands	Switch Commands (Catalyst 5000 and 6000)
<p>1) Enable MLS on route processor Router(config)#mls rp ip</p> <p>2) Place external route processor in same VTP domain as switch first, then enable MLS on specific interface (or null domain is created) Router(config)#interface vlan <i>vlan-number</i> Router(config-if)#ip address <i>ip-address</i> <i>subnet-mask</i> Router(config-if)#mls rp vtp-domain <i>domain-name</i> Router(config-if)#mls rp ip</p> <p>3) Specify single MLS management interface for all VLANs (MLSP packets) Router(config-if)#mls rp management-interface</p> <p>Note: Router and Switch should normally be in same domain</p> <p>-----</p> <p>For External Router only – Assign VLAN ID Router(config)#interface ethernet 0 Router(config-if)#ip address <i>ip-address</i> <i>subnet-mask</i> Router(config-if)#mls rp vlan-id <i>vlan-id-num</i> Router(config-if)#mls rp vtp-domain <i>domain-name</i> Router(config-if)#mls rp ip</p> <p>-----</p> <p>Enable MLS to cooperate with input access lists Router(config)#mls rp input-acl</p> <p>Show commands Router#show mls rp interface <i>interface num</i></p>	<p>Enable MLS on switch – default enabled Switch> (enable) set mls enable</p> <p>Amount of time MLS entry in cache Switch> (enable) set mls agingtime <i>seconds</i> (default 256 seconds)</p> <p>Specified number of packet in a certain amount of time Switch> (enable) set mls agingtime fast <i>fastagetime pkt-thres</i></p> <p>To recognize external router (MLS-RP) Switch> (enable) set mls include <i>ip-address</i></p> <p>Show commands Switch> (enable) show mls Switch> (enable) show mls include Switch> (enable) show mls entry Switch> (enable) set mls flow [<i>destination</i> <i>destination-source</i> <i>full</i>]</p>

HSRP (Hot Standby Routing Protocol)

HSRP virtual router presents a consistently available router (ip-add and mac-add) to end-user using the ip-add for virtual router for default gateway.

```
Router(config)#interface fastethernet num
```

Disable redirects so end-users do not discover actual MAC address of the router

```
Router(config-if)#no ip redirects
```

Configure router as a member of an HSRP standby group

```
Router(config-if)#standby group-num ip virtual-ip-add (Group-num default = 0)
```

Options

Set HSRP priority value

```
Router(config-if)#standby group-num priority priority  
(default 100, winner = highest; if tie highest ip address)
```

Make a router resume the forward router role

```
Router(config-if)#standby group-num preempt
```

Configure Timers

```
Router(config-if)#standby group-num timers hellotime holdtime  
(default hello = 3 secs, hold = 10 secs; holdtime at least 3 times hellotime)
```

Enable HSRP to track a link and assume active role

```
Router(config-if)#standby group-num track type num decremented-priority
```

Show commands

```
Router#show ip arp
```

```
Router#show standby type group brief
```

```
Router#show standby brief
```

```
Router#debug standby
```

IP Multicast Commands

Note: Multicasts are normally flooded by a switch, but can be filtered using CGMP

CGMP Commands	
IOS-Based Commands	CLI-Based Commands
<p>Enable CGMP Switch(config)#cgmp {CGMP enabled by default}</p> <p>Optional: Enable fast-leave processing Switch(config)#cgmp leave-processing</p> <p>Switch(config)#cgmp hold-time secs (Default = 600 seconds) Switch#show cgmp</p>	<p>Enable CGMP Switch> (enable) set cgmp enable</p> <p>Optional: Enable fast-leave processing Switch> (enable) set cgmp leave enable</p> <p>Switch> (enable) show cgmp leave Switch> (enable) show cgmp statistics <i>vlan</i> Switch> (enable) show multicast group cgmp <i>vlan</i></p>
<p><u>Enabling CGMP on a Router</u></p> <p>Router(config-if)#ip cgmp</p>	
<p><u>IGMP Commands - Router</u></p> <p><u>Multicast Routing</u></p> <p>Enable Multicast on router Router(config)#ip multicast-routing</p> <p>Routers forward multicasts on a per-interface basis Router(config)#ip pim { dense-mode sparse-mode sparse-dense-mode }</p> <p><u>Options</u></p> <p>For pim sparse-mode, choose a rendezvous point Router(config)#ip pim rp-address ip-address [group-acl-num] [override]</p> <p>For pim sparse-mode, enable Auto-RP, send announce message Router(config)#ip pim send-rp-announce type number scope ttl group-list acl-number</p> <p>For pim sparse-mode, to send discover messages Router(config)#ip pim send-rp-discover scope ttl</p> <p>Define whether multicasts get forwarded, only multicasts with ttl greater than the interface ttl are forwarded Router(config-if)#ip multicast ttl-threshold ttl</p> <p><u>Show commands</u> Router#show ip pim interface [type number] [count] Router#show ip pim neighbor [type] [number] Router#show ip mroute [group-name group-address] [source] [summary] [count] [active kbps] Router#debug ip mpacket [detail] [acl] [group]</p>	

Joining a Multicast Group	
Router(config)# ip igmp join-group <i>group-address</i>	
Router# show ip igmp interface <i>type-number</i>	
Show and debug commands	
Router# show ip mroute [<i>group-name</i> <i>group-address</i>] [<i>source</i>] [summary] [count] [active <i>kbits</i>]	
Router# show ip pim rp mapping	
Router# show ip pim rp [<i>group-name</i> <i>group-address</i>] [mapping]	
Router# debug ip mpacket [detail] [<i>access-list</i>] [<i>group</i>]	
Etherchannel	
IOS-Based Commands	CLI-Based Commands
Switch(config-if)# port group <i>group-number</i> [distribution { <i>source</i> <i>destination</i> }]	Switch> (enable) set port channel <i>module/port-range</i> mode { <i>on</i> <i>off</i> <i>desirable</i> <i>auto</i> }
Show commands Switch# show interface port-channel <i>group-number</i>	Show commands Switch> (enable) show channel
Switch# show port group [<i>group-number</i>]	Switch> (enable) show port channel [<i>mod/port</i>] [info statistics]
	Switch> (enable) show port capabilities [<i>mod/port</i>]
Port Mirroring	
IOS-Based Commands	CLI-Based Commands
Switch(config-if)# port monitor [<i>interface</i> vlan <i>vlan-id</i>]	Switch> (enable) set span [<i>source-port</i> <i>destination-port</i>] [rx tx both] [enable disable]
Show commands Switch# show port monitor	Show commands Switch> (enable) show span
ATM LANE	
IOS-Based Commands	CLI-Based Commands
Switch(config)# interface atm <i>number.subint</i> multipoint Switch(config-subif)# ip address <i>ip-address subnet-mask</i> Switch(config-subif)# lane server-bus ethernet <i>elan-name</i> Switch(config-subif)# lane client ethernet <i>vlan-num elan-num</i>	(ATM LANE only accessible from IOS-based interface) Switch> (enable) session <i>module-num</i> Same as IOS Commands

```
Switch(config)#lane database db-name  
Switch(lane-config-database)#name elan-  
name server-atm-address les-nsap-address
```

```
Switch(config)#interface atm number  
Switch(config-if)#lane config-database  
db-name  
Switch(config-if)#lane config-auto-atm-  
address
```

Show commands

```
Switch#show lane default  
Switch#show lane server  
Switch#show lane bus  
Switch#show lane database  
Switch#show lane client
```