

## Cisco IOS Commands for CCNA Class

Task	IOS Command Examples
Enter privileged EXEC mode	<b>&gt;enable (en)</b>

Erase Settings and Reload	
Erase the startup-config file	<b>#erase startup-config</b>
Delete the vlan.dat file on the switch	<b>#delete vlan.dat</b>
Boot or Reload the Router or Switch OS <b>Always answer to auto configuration (y/n) with no!</b>	<b>#reload</b>

General Config Settings	
Configure from terminal	<b>#configure terminal (conf t)</b>
Disable DNS lookup	<b>(config)#no ip domain-lookup</b>
Set a router or switch name	<b>(config)#hostname &lt;name&gt;</b>
Set privileged (enable) mode secret	<b>(config)#enable secret &lt;enable password&gt;</b>
Set message of the day "text"	<b>(config)#banner motd # text #</b>
Exit config mode	<b>(config)#end</b>
Leave actual/move to next higher context	<b>(config)#exit</b>

Display Device Information	
Show running-config	<b>#show running-config (#sh run)</b>
List files in non-volatile RAM (NVRAM)	<b>#show flash:</b>
Display HW and SW information	<b>#show version (#sh ver)</b>
Display information of CDP connected neighbors (Cisco proprietary)	<b>#show cdp neighbor</b>

Console, VTY, and SSH Login	
<b>Configure console</b> Set password Enforce login Prevent logging info interruptions <u>Option:</u> Enforce local login <u>Option:</u> Log-out after 5 minutes	<b>(config)#line con 0</b> <b>(config-line)#password &lt;console password&gt;</b> <b>(config-line)#login</b> <b>(config-line)#logging synchronous</b> <b>(config-line)#login local</b> <b>(config-line)#exec-timeout 5 0</b>
<b>Configure VTY (Telnet, SSH) – 5 lines</b> Set telnet/ SSH password Enforce login Prevent logging info interruptions <u>Option:</u> Allow only SSH <u>Option:</u> Log-out after 5 minutes <u>Option:</u> Enforce local user (only when local user is configured!)	<b>(config)#line vty 0 4</b> <b>(config-line)#password &lt;vty password&gt;</b> <b>(config-line)#login</b> <b>(config-line)#logging synchronous</b> <b>(config-line)#transport input ssh</b> <b>(config-line)#exec-timeout 5 0</b> <b>(config-line)#login local</b>

General Security and SSH	
Encrypt clear text passwords	(config)# <b>service password-encryption</b>
Set domain name	(config)# <b>ip domain-name &lt;name.com&gt;</b>
Set min 10 characters for password	(config)# <b>security passwords min-length 10</b>
Configure crypto key	(config)# <b>crypto key generate rsa</b> ... modulus 1024
Configure local database user names	(config)# <b>username admin privilege 15 secret adminpass</b>
Enforce SSH version 2	(config)# <b>ip ssh version 2</b>
Set SSH retries to 2	(config)# <b>ip ssh authentication-retries 2</b>
Set SSH brute force time-out interval	(config)# <b>ip ssh time-out 60</b>
Block login against brute force attacks	(config)# <b>login block-for 30 attempts 2 within 120</b>
Start SSH client	<b>#ssh -l admin 192.168.1.1</b>
Switch to local machine	<b>#ctrl+shft+6</b>
Quit SSH	<b>#ctrl+shft+6 x</b>

Web Server	
Start Web Server	(config)# <b>ip http server</b>
Enforce Web Server login with local user	(config)# <b>ip http authentication local</b>

IPv4 Interfaces	
<b>Configure interfaces</b> GigEth (e.g. g0/0), FastEth (e.g. f0/0) m/n: chassis/port l/m/n: row/chassis/port	(config)# <b>int g0/1</b> (config-if)# <b>description Connection to R1</b> (config-if)# <b>ip address &lt;ip address&gt; &lt;mask&gt;</b> (config-if)# <b>no shutdown (no shut)</b>
Configure interfaces ranges (Switch) e.g. shutdown interface range	(config)# <b>int range f0/1-24</b> (config-if)# <b>shutdown</b>
<b>Configure serial interfaces s0/0/0</b> l/m/n: row/chassis/port  Set clock rate on DCE (128 kbps)	(config)# <b>int s0/0/0</b> (config-if)# <b>description Connection to R1</b> (config-if)# <b>ip address &lt;ip address&gt; &lt;mask&gt;</b> (config-if)# <b>no shutdown (no shut)</b> (config-if)# <b>clock rate 128000</b>
Configure trunk interfaces on routers example VLAN 10  Activate physical interface	(config)# <b>interface g0/1.10</b> (config-subif)# <b>encapsulation dot1Q 10</b> (config-subif)# <b>ip address 192.168.10.1 255.255.255.0</b> (config-subif)# <b>exit</b> (config-if)# <b>no shutdown</b>
Display <b>summary</b> of interfaces and status	<b>#show ip interface brief (#sh ip int br)</b>
Display <b>detailed</b> information of serial interfaces x/y/z	<b>#show controller sx/y/z</b>
Display detailed interface information like MAC, operational status	<b>#show interface gx/y (or fx/y or sx/y/z)</b>
Display detailed interface IP information	<b>#show ip interface gx/y (or fx/y or sx/y/z)</b>

IPv6 interfaces	
Configure global unicast address	(config-if)# <b>ipv6 address</b> <ip address>/<mask>
Configure fe80::1/64 link local address	(config-if)# <b>ipv6 address fe80::1 link-local</b>
Display a <b>summary</b> of IPv6 interface	<b>#show ipv6 interface brief</b>
Display <b>detailed</b> IPv6 information	<b>#show ipv6 interface gx/y (or fx/y or sx/y/z)</b>

Static Routing	
Configure recursive static route	(config)# <b>ip route &lt;network address&gt; &lt;subnet mask&gt; &lt;ip-address&gt;</b>
Configure directly connected static route	(config)# <b>ip route &lt;network address&gt; &lt;subnet mask&gt; &lt;exit-intf&gt;</b>
Configure static default route	(config)# <b>ip route 0.0.0.0 0.0.0.0 &lt;ip-address or exit-intf&gt;</b>
Enable IPv6 routing	(config)# <b>ipv6 unicast-routing</b>
Configure IPv6 static default route	(config)# <b>ipv6 route ::/0 &lt;ipv6 address or exit-intf&gt;</b>
Display the IPv4 routing table.	<b>#show ip route</b>
Display the IPv6 routing table.	<b>#show ipv6 route</b>

RIPv1, RIPv2	
Configure RIP routing	(config)# <b>router rip</b> <process ID >
Select version 2	(config-router)# <b>version 2</b>
Advertise directly connected networks	(config-router)# <b>network</b> <ip-address>
Disallow any RIP messages	(config-router)# <b>passive-interface default</b>
Allow RIP messages on single interface	(config-router)# <b>no passive-interface</b> g0/0
Disallow RIP messages, single interface	(config-router)# <b>passive-interface</b> g0/0
Redistribute default route	(config-router)# <b>default-information originate</b>
Prevent route auto-summarization	(config-router)# <b>no auto-summary</b>

OSPF	
Configure OSPF routing	(config)# <b>router ospf</b> <process ID >
Set OSPF router ID	(config-router)# <b>router-id</b> 1.1.1.1
Advertise networks in area	(config-router)# <b>network</b> <ip-add.> <wildcard> area <n>
Disallow OSPF messages on interface	(config-router)# <b>passive-interface</b> g0/0
[Disallow any OSPF messages	[(config-router)# <b>passive-interface</b> default
Allow OSPF messages on one interface]	(config-router)# <b>no passive-interface</b> s0/0/0]
Redistribute default route	(config-router)# <b>default-information</b> originate
Change reference BW to 10Gb/s	(config-router)# <b>auto-cost</b> reference-bandwidth 10000
Config summary route for one area	(config-router)# <b>area</b> <no> <b>range</b> <ip-address> <mask>
OSPF Option: advertise network at interface in area (not to be advertised in router process again)	(config)# <b>interface</b> s0/0/0 (config-if)# <b>ip ospf</b> <process-id> area 0

OSPF interface configurations	(config)# <b>interface s0/0/0</b>
OSPF costs ( <b>Preferred</b> )	(config-if)# <b>ip ospf cost 15</b>
Option: Bandwidth parameter	(config-if)# <b>bandwidth &lt;n&gt;</b>
OSPF priority (DR / BDR)	
Highest OSPF priority	(config-if)# <b>ip ospf priority 255</b>
Lowest OSPF priority	(config-if)# <b>ip ospf priority 0</b>
OSPF Hello interval	(config-if)# <b>ip ospf hello-interval &lt;sec&gt;</b>
OSPF Dead interval	(config-if)# <b>ip ospf dead-interval &lt;sec&gt;</b>
OSPF authentication (global + interface)	(config)# <b>router ospf 1</b> (config-router)# <b>area &lt;no&gt; authentication message-digest</b> (config)# <b>interface serial s0/0/0</b> (config-if)# <b>ip ospf message-digest-key 1 md5 &lt;key&gt;</b>
OSPF authentication (interface local only)	(config)# <b>interface serial s0/0/0</b> (config-if)# <b>ip ospf message-digest-key 1 md5 &lt;key&gt;</b> (config-if)# <b>ip ospf authentication message-digest</b>
Display OSPF interface settings	<b>#show ip ospf interface brief</b>
Display OSPF protocol settings	<b>#show ip protocols</b>
Display OSPF process information	<b>#show ip ospf</b>
Display OSPF neighbor	<b>#show ip ospf neighbor</b>
Display OSPF routing table and metrics	<b>#show ip route ospf</b>

<b>OSPFv3</b>	
Start OSPFv3 process no. 10	<b>#ipv6 router ospf 10</b>
Configure IPV6 OSPF routing Set OSPF router ID (plus any other command from OSPF, except network)	(config)# <b>ipv6 router ospf &lt;process ID &gt;</b> (config-router)# <b>router-id 1.1.1.1</b>
IPV6 OSPF routing on interface	(config)# <b>interface &lt;interface ID&gt;</b> (config-if)# <b>ipv6 ospf &lt;process-ID&gt; area &lt;no.&gt;</b>
Display OSPF IPv6 protocol settings	<b>#show ipv6 protocols</b>
Display OSPF IPv6 interface settings	<b>#show ipv6 ospf interface brief</b>
Display OSPF IPV6 neighbor	<b>#show ipv6 ospf neighbor</b>
Display IPv6 OSPF routing table / metrics	<b>#show ipv6 route ospf</b>

<b>Switch, VLAN and Trunk</b>	
Create VLAN	(config)# <b>vlan &lt;number&gt;</b> (config-vlan)# <b>name &lt;your name&gt;</b>
Assign VLAN to switch access ports	(config)# <b>interface &lt;number&gt;</b> (config-if)# <b>switchport mode access</b> (config-if)# <b>switchport access vlan &lt;number&gt;</b>
Enforce trunking on a switch port	(config-if)# <b>switchport mode trunk</b>
Change native VLAN on trunk	(config-if)# <b>switchport trunk native vlan 99</b>

Enforce trunking and allow only some VLAN on a switch port	(config-if)# <b>switchport trunk allowed vlan 10,20,99</b>
Enforce trunking without DTP negotiate	(config-if)# <b>switchport nonegotiate</b>
Set IP address for management VLAN	(config)# <b>interface vlan &lt;number&gt;</b> (config-if)# <b>ip address &lt;ip address&gt; &lt;mask&gt;</b> (config-if)# <b>no shutdown</b>
Set IP default gateway for switch management	(config)# <b>ip default-gateway &lt;ip address&gt;</b>
Enable IPv6 on switches	(config)# <b>sdm prefer dual-ipv4-and-ipv6 default</b> (config)# <b>end</b> <b># reload</b>
Display VLAN on devices	<b>#show vlan brief</b>
Display active trunks	<b>#show interfaces trunk</b>
Display interface switch behavior	<b>#show interfaces fx/y switchport</b>
Display SVI characteristics on VLAN 1	<b>#show interface vlan1</b>
Display IP properties of SVI VLAN 1	<b>#show ip interface vlan1</b>

<b>STP</b>	
Set a primary root switch per VLAN (e.g. VLAN 1,10,99)	(config)# <b>spanning-tree vlan 1,10,99 root primary</b>
Set a secondary root switch per VLAN	(config)# <b>spanning-tree vlan 1,10,99 root secondary</b>
Set a switch to Rapid PVST+	(config)# <b>spanning-tree mode rapid-pvst</b>
Switch edge ports	(config)# <b>int f0/3</b>
Set a switch port to PortFast mode	(config-if)# <b>spanning-tree portfast</b>
Set a switch port to BPDU Guard mode	(config-if)# <b>spanning-tree bpduguard enable</b>
Display spanning-tree information	<b>#show spanning-tree</b>

<b>EtherChannel</b>	
Example: Set <b>LACP EtherChannel</b> active (passive) trunks  (trunk configured on port-channel <u>and</u> physical interface)	(config)# <b>interface range f0/1-f0/2</b> (config-if-range)# <b>channel-group 3 mode active (passive)</b> (config-if-range)# <b>switchport mode trunk</b> (config-if-range)# <b>switchport trunk native vlan 99</b> (config-if-range)# <b>switchport trunk allowed vlan 10,20,99</b> (config-if-range)# <b>exit</b>  (config-if)# <b>interface port-channel 3</b> (config-if)# <b>switchport mode trunk</b> (config-if)# <b>switchport trunk native vlan 99</b> (config-if)# <b>switchport trunk allowed vlan 10,20,99</b>
Set PAgP EtherChannel desirable (auto) links	(config)# <b>interface range f0/1-f0/2</b> (config-if-range)# <b>channel-group 1 mode desirable</b>
Display Etherchannel information	<b>#show interface etherchannel summary</b>
Display EtherChannel summary	<b>#show etherchannel summary</b>

DHCP	
Create DHCP Pool <if-name> Set network address and mask Set default router address Set DNS server address Set domain name Set lease time <days-hours-minutes-seconds (default 24 h)>	(config)# <b>ip dhcp pool</b> <if-name> (dhcp-config)# <b>network</b> 192.168.1.0 255.255.255.0 (dhcp-config)# <b>default-router</b> 192.168.1.1 (dhcp-config)# <b>dns-server</b> 209.165.200.225 (dhcp-config)# <b>domain-name</b> ccna-lab.com (dhcp-config)# <b>lease</b> 2
Exclude IP addresses from DHCP <optional address range>	(config)# <b>ip dhcp excluded-address</b> 192.168.0.1 <b>192.168.0.9</b>
Create DHCP Relay on an interface	(config)# <b>interface</b> g0/0 (config-if)# <b>ip helper-address</b> <dhcp server address>
Display DHCP bindings	<b>#show ip dhcp bindings</b>

Switch Port Security	
Static MAC address in MAC addr. table	<b># mac address-table static</b> < MAC address >vlan <n> <b>interface</b> <x>
Enforce port security on interface	(config-if)# <b>switchport port-security</b>
Enforce port security violation modes (default: shutdown, w/ notification restrict, w/o notification protect)	(config-if)# <b>switchport port-security violation</b> (protect   <b>restrict</b>   <b>shutdown</b> )
Restrict number of allowed MAC addresses on interface	(config-if)# <b>switchport port-security maximum</b> 2
Static secure MAC addresses	(config-if)# <b>switchport port-security mac-address</b> <b>abcd.ef01.0203</b>
Dynamic MAC addresses learned are saved in running config	(config-if)# <b>switchport port-security mac-address sticky</b>
Display the Layer 2 / 3 address mapping	<b>#show arp</b>
Display MAC address table	<b>#show mac address-table</b>
Erase MAC address table	<b>#clear mac address-table</b>

HSRP and GLBP	
Create HSRP preemptive interface	(config)# <b>int</b> g0/0 (config-if)# <b>standby 1 ip</b> <default GW IP address> (config-if)# <b>standby 1 priority</b> 150 (default : 100) (config-if)# <b>standby 1 preempt</b>
Create HSRP standby interface	(config)# <b>int</b> g0/0 (config-if)# <b>standby 1 ip</b> <default GW IP address>
Create GLBP preemptive interface	(config)# <b>int</b> g0/0 (config-if)# <b>glbp 1 ip</b> <default GW IP address> (config-if)# <b>glbp 1 priority</b> 150 (default: 100) (config-if)# <b>glbp 1 preempt</b> (config-if)# <b>glbp 1 load-balancing round-robin</b>

Create GLBP standby interface	(config)# <b>int g0/0</b> (config-if)# <b>glbp 1 ip &lt;default GW IP address&gt;</b> (config-if)# <b>glbp 1 load-balancing round-robin</b>
Display HSRP information	<b>#show standby</b>
Display HSRP information summary	<b>#show standby brief</b>

PPP Interface	
Configure PPP encapsulation	(config-if)# <b>encapsulation ppp</b>
Configure HDLC encapsulation	(config-if)# <b>encapsulation hdlc (default)</b>
a) PPP PAP authentication	(config)# <b>int s0/0/0</b> (config-if)# <b>ip address &lt;ip address&gt; &lt;mask&gt;</b> (config-if)# <b>encapsulation ppp</b> (config-if)# <b>ppp authentication pap</b> (config-if)# <b>ppp pap sent-username &lt;my router&gt; password &lt;someone&gt;</b> (config-if)# <b>no shutdown (no shut)</b>
b) add username and password of other Router in AAA database	(config)# <b>username &lt;other router&gt; password &lt;someone&gt;</b>
a) PPP CHAP authentication	(config)# <b>int s0/0/0</b> (config-if)# <b>ip address &lt;ip address&gt; &lt;mask&gt;</b> (config-if)# <b>encapsulation ppp</b> (config-if)# <b>ppp authentication chap</b> (config-if)# <b>no shutdown (no shut)</b>
b) add username and password of other Router in AAA database	(config)# <b>username &lt;other router&gt; password &lt;someone&gt;</b>
PPP quality threshold	(config-if)# <b>ppp quality 80</b>
PPP multilink a) create multilink	(config)# <b>int multilink 1</b> (config-if)# <b>ip address &lt;ip address&gt; &lt;mask&gt;</b> (config-if)# <b>ppp multilink</b> (config-if)# <b>ppp multilink group 1</b>
b) configure interface	(config)# <b>int s0/0/0</b> (config-if)# <b>no ip address</b> (config-if)# <b>encapsulation ppp</b> (config-if)# <b>ppp multilink</b> (config-if)# <b>multilink group 1</b>
Display PPP session information	<b>#show ppp session</b>
Debug any PPP packet	<b>#debug ppp packet</b>
Debug PPP negotiation and security	<b>#debug ppp negotiation</b>

ACL	
Create standard ACL (source IP address check)	(config)# <b>access-list &lt;1-99&gt; remark &lt;comment&gt;</b> (config)# <b>access-list &lt;1-99&gt; permit/deny &lt;address&gt; &lt;wildcard&gt;</b>

Create standard named ACL	(config)# <b>ip access-list standard &lt;NAME&gt;</b> (config-std-nacl)# <b>permit/deny &lt;address&gt; &lt;wildcard&gt;</b>
Create extended ACL (multi field check)	(config)# <b>access-list &lt;100-199&gt; remark &lt;comment&gt;</b> (config)# <b>access-list &lt;100-199&gt; {deny permit} {protocol} source source-wildcard [operator [port]] destination destination-wildcard [operator [port]]</b> operator: <b>eq   neq   gt   lt</b> add. options: <b>[echo   echo-reply] [established] [precedence precedence-value] [tos tos-value] [log   log-input] [time-range time-range-name]</b>
Create extended named ACL (e.g. TCP)	(config)# <b>ip access-list extended &lt;NAME&gt;</b> (config-ext-nacl)# <b>..see extended ACL..</b>
Apply ACL to interface	(config)# <b>interface &lt;if-name&gt;</b> (config-if)# <b>ip access-group {number / name} &lt;in/out&gt;</b>
Apply ACL to VTY lines 0 to 4	(config)# <b>line vty 0 4</b> (config-if)# <b>access-class {number / name} &lt;in/out&gt;</b>
Display ACLs	<b>#show access-lists</b>
Display specific ACL	<b>#show access-list 1</b>

<b>NAT</b>	
Static NAT mapping	(config)# <b>ip nat inside source static 192.168.1.20 209.165.200.225,</b> <b>or</b> (config)# <b>ip nat inside source static 192.168.1.20 interface s0/0/0</b>
Dynamic PAT with Pool: Pool definition  ACL to match inside IP Dynamic PAT with overload	(config)# <b>ip nat pool public_access 209.165.200.225 209.165.200.230 netmask 255.255.255.224</b> (config)# <b>access-list 1 permit 192.168.1.0 0.0.0.255</b> (config)# <b>ip nat inside source list 1 pool public_access overload</b>
Dynamic PAT to Interface IP  ACL to match inside IP	(config)# <b>ip nat inside source list 1 interface s0/0/1 overload</b> (config)# <b>access-list 1 permit 192.168.1.0 0.0.0.255</b>
Specify NAT inside and outside interfaces	(config)# <b>interface &lt;if-name&gt;</b> (config-if)# <b>ip nat &lt;inside/outside&gt;</b>
Display NAT translations	<b>#show ip nat translations</b>
Display NAT mappings	<b>#show ip nat statistics</b>
Clear NAT translations	<b>#clear ip nat translation *</b>
Clear NAT statistics	<b># clear ip nat statistics</b>

<b>GRE Tunnel</b>	
Create GRE tunnel interface (tunnel mode default is GRE IP)	(config)# <b>interface tunnel 0</b> (config-if)# <b>tunnel mode gre ip</b> (config-if)# <b>ip address &lt;ip address&gt; &lt;mask&gt;</b> (config-if)# <b>tunnel source &lt;interface name&gt;</b> (config-if)# <b>tunnel destination &lt;ip address&gt;</b>



Add tunnel network to routing	(config)# <b>router ospf 1</b> (config-router)# <b>network &lt;tunnel ip network&gt; &lt;wildcard mask&gt; area &lt;no&gt;</b> or any other routing means
Check GRE tunnel interface brief	<b># show ip interface brief   include Tunnel</b>
Check GRE tunnel interface	<b># show ip interface Tunnel 0</b>
Check GRE tunnel network routing	e.g. <b># show ip ospf neighbor</b>

SNMP	
Enable SNMP, here community string "cicolab", read only (ro), controlled by named ACL	(config)# snmp-server community cicolab ro SNMP_ACL
Set SNMP server address, here version 2c and community string "cicolab"	(config)# snmp-server host 192.168.1.3 version 2c cicolab
Set <string> for SNMP server location	(config)# snmp-server location snmp_manager_server
Set <name> for SNMP administrator	(config)# snmp-server contact cicolab_admin
Enable traps on UDP:162	(config)# snmp-server enable traps
Named ACL to limit SNMP request from known host	(config)# ip access-list standard SNMP_ACL (config-std-nacl)# permit host 192.168.1.3

NTP	
Set time	<b>#clock set 13:00:00 30 Oct 2013</b>
Display time	<b>#show clock</b>
Configure time master	(config)# <b>ntp master</b>
Set NTP master for NTP client Override HW clock by SW clock	(config)# <b>ntp server &lt;master's ip address&gt;</b> (config)# <b>ntp update-calendar</b>
Display NTP status	<b>#show ntp status</b>
Display NTP associations	<b>#show ntp associations</b>

Syslog	
Send Syslog messages to Syslog server	(config)# <b>logging host 172.16.1.1</b>
Set IP address in syslog messages	(config)# <b>logging source-interface g0/0</b>
Set severity level = 7 Set severity level = 4	(config)# <b>logging trap debugging</b> (config)# <b>logging trap warnings</b>
Start timestamp service	(config)# <b>service timestamps log datetime msec</b>
Display log messages	<b>#show logging</b>
Display log history	<b>#show logging history</b>

Debug Events	
Debug Spanning Tree information	<b>#debug spanning-tree events</b>
Debug any IP packet	<b>#debug ip packet</b>
Debug ICMP packets	<b>#debug ip icmp</b>

Debug any PPP packet	<b>#debug ppp packet</b>
Debug PPP negotiation and security	<b>#debug ppp negotiation</b>
Switch off all debugging	<b>#no debug all, or #undebug all</b>

<b>Save, Restore</b>	
Store running-config in non-volatile RAM (NVRAM)	<b>#copy running-config startup-config (#copy run start)</b>
Backup running-config at TFTP server	<b>#copy running-config tftp</b>
Restore running-config from TFTP server	<b>#copy tftp running-config</b>
Backup IOS at TFTP server	<b>#copy flash tftp</b> Source filename[]? <b>&lt;filename&gt;</b> Address or name of remote host []? <b>&lt;ip address&gt;</b> Destination filename <filename>?
Restore IOS from TFTP server	<b>#copy tftp flash</b> Source filename[]? <b>&lt;filename&gt;</b> Address or name of remote host []? <b>&lt;ip address&gt;</b> Destination filename <filename>?