CCNA 200-301

Command Reference

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Enable mode EXEC command

EXEC Command

```
SW1# undebug all

SW1# no debug all

SW1# reload

SW1# copy running-config startup-config

SW1# copy startup-config running-config

SW1# enable

SW1# configure terminal

SW1# write erase

SW1# erase startup-config

SW1# erase nvram:
```

Show Command

```
SW1# show running-config

SW1# show startup-config

SW1# show mac address-table dynamic
```

Configuration Command

```
hostname SW1
enable secret cisco
line console 0
  password kibria
  login
int f0/1
  speed 100
```

Special Types

```
exit (Moves back to the next higher mode)
end (Exits configuration mode and goes back to enable mode)
ctrl+z (Same as end)
disable (Moves the user from enable mode to user mode)
quit (Disconnects the user from the CLI session)
```

Volume-01 Chpater-05

Configuration Command

```
mac address-table aging-time 40 [vlan 2]
```

Here 40 is seconds.

Show Command

```
sh mac address-table

sh mac address-table dynamic

sh mac address-table dynamic int g0/1

sh mac address-table dynamic vlan 2

sh mac address-table dynamic address 1111.2222.3333

sh mac address-table count

sh mac address-table aging-time


clear mac address-table dynamic

clear mac address-table dynamic int g0/1

clear mac address-table dynamic vlan 2

celar mac address-table address 1111.2222.3333


sh int status

sh int g0/1 counters
```

Volume-01 Chapter-06

Securing User Mode and Privileged Mode with Simple Passwords

Configuration Command

```
line console 0
  password cisco
  login

line vty 0 15
  password cisco2
  login

enable secret kibria
```

Show Command

```
sh run
sh run | begin line vty
```

Securing User Mode Access with Local Usernames and Passwords

Configuration Command

```
username rahim password dhaka
username karim password cumilla

line console 0
  login local
  no password

line vty 0 15
  login local
  no password
```

Show Command

```
#telent 10.9.9.10
```

Securing Remote Access with Secure Shell (SSH)

Configuration Command

```
hostname SW1
ip domain-name example.com
crypto key generate rsa [modulus 360..2048]
1024
ip ssh version 2

username rahim password dhaka
username karim password cumilla
line vty 0 15
  transport input {all | ssh | ssh telnet | none}
  login local
```

Show Command

```
sh ip ssh
sh ssh
sh crypto key mypubkey rsa
```

Configuring IPv4 on a Switch

Configuration Command

```
int vlan 1
  ip address 192.168.1.200 255.255.255.0
  no shut

ip default-gateway 192.168.1.1
ip name-server 8.8.8.8 [9.9.9.9]
```

Show Command

```
sh ip default-gateway
sh int vlan 1
```

Configuring a Switch to Learn Its IP Address with DHCP

Configuration Command

```
int vlan 1
ip address dhcp
```

Show Command

```
sh dhcp lease
```

logging synchronous, exec-timeout, no ip domain-lookup

Configuration Command

```
no ip domain-lookup

line console 0
  exec-timeout 0 0
  logging synchronous
  history size 20
line vty 0 15
  exec-timeout 0 0 (minutes [seconds])
  logging synchronous
  history size 20

[no] logging console
```

Show Command

```
sh history
terminal history size 10
```

Volume-01 Chapter-07

Configuring Speed, Duplex and Description

Configuration Command

```
int g0/1
  duplex {auto | full | half}
  speed {auto | 10 | 100 | 1000}
  description Link to SW2
```

Show Command

```
sh int status
```

Configure multiple interfaces with the int range command

Configuration Command

```
int range f0/1-10
  description Link to end user
```

Show Command

```
sh run
```

Administrative disabling an interface with shutdown

Configuration Command

```
int g0/1
  shut
```

Show Command

```
sh int g0/1
sh int g0/1 status
```

Removing configuration with the no command

Configuration Command

```
int g0/1
  no shut
  no speed
  no duplex
  no description
```

Show Command

```
sh run | int g0/1
```

Interface status code

Show Command

```
sh int
sh int description
sh mac address-table static [int g0/1]
```

Volume-01 Chapter-08

Creating VLANs and Assigning Access VLANs to an Interface

Configuration Command

```
SW1(config)# vlan 2
SW1(config-vlan)# name Freds-vlan
SW1(config-vlan)# exit
SW1(config)# interface range fastethernet 0/13 - 14
SW1(config-if)# switchport mode access
SW1(config-if)# switchport access vlan 2
```

Show Command

```
show vlan brief
show vlan id 2
```

Shorter VLAN Configuration

Configuration Command

```
SW1(config)# interface range Fastethernet 0/15 - 16
SW1(config-if-range)# switchport access vlan 3
% Access VLAN does not exist. Creating vlan 3
```

Show Command

```
show vlan brief
```

Changes from Dynamic Auto to Dynamic Desirable

Configuration Command

```
SW1(config)# interface gigabit 0/1
SW1(config-if)# switchport mode dynamic desirable
```

Show Command

```
show interfaces gigabit 0/1 switchport
show interfaces trunk
```

Configuring the Voice and Data VLAN on Ports Connected to Phones

Configuration Command

```
SW1(config)# vlan 10
SW1(config-vlan)# vlan 11
SW1(config-vlan)# interface range FastEthernet0/1 - 4
SW1(config-if)# switchport mode access
SW1(config-if)# switchport access vlan 10
SW1(config-if)# switchport voice vlan 11
```

Show Command

```
show interfaces FastEthernet 0/4 switchport
show interfaces trunk
show interfaces F0/4 trunk
```

Troubleshooting VLANs and VLAN Trunks

Configuration Command

```
SW2(config)# no shutdown vlan 10
SW2(config)# shutdown vlan 20
SW2(config)# vlan 30
SW2(config-vlan)# no shutdown
SW2(config-vlan)# vlan 40
SW2(config-vlan)# shutdown
```

Show Command

```
sh vlan brief
show interfaces gigabit0/2 switchport
```

Additional Commands

Configuration Command

```
vtp mode {server | client | transparent | off}
int g0/1
  switchport mode {access | dynamic {auto|desirable} | trunk}
  switchport trunk encapsulation {dot1q | isl | negotiate}
  switchport nonegotiate
  switchport trunk allowed vlan {all | add | except | remove}
vlan-list
```

Show Command

```
sh vlan [brief | id 2 | name eng | summary]
sh vtp status
```

Volume-01 Chapter-10

Configuring a Manual Layer 2 EtherChannel

Configuration Command

```
SW1(config)# interface fa 0/14
SW1(config-if)# channel-group 1 mode on
```

Show Command

```
sh spanning-tree vlan 10
sh etherchannel 1 summary
```

Configuring Dynamic EtherChannels (Using PAgP)

Configuration Command

```
On SW1:
int range g0/1-2
channel-group 1 mode desirable
On SW2:
int range g0/1-2
channel-group 1 mode {desirable | auto}
```

Show Command

```
show etherchannel 1 port-channel
show etherchannel summary
```

Configuring Dynamic EtherChannels (Using LACP)

Configuration Command

```
On SW1:
int range g0/1-2
  channel-group 1 mode active
On SW2:
int range g0/1-2
  channel-group 1 mode {active | passive}
```

Show Command

```
show etherchannel 1 port-channel
show etherchannel summary
```

Etherchannel Load Balance

Configuration Command

```
SW1(config)# port-channel load-balance src-dst-mac
```

Show Command

```
SW1# show etherchannel load-balance
EtherChannel Load-Balancing Configuration:
src-dst-mac

SW1# test etherchannel load-balance interface po1 mac
0200.0000.0001 0200.1111.1111
Would select Gi1/0/22 of Po1

SW1# test etherchannel load-balance interface po1 mac
0200.0000.0001 0200.1111.1112
Would select Gi1/0/24 of Po1

SW1# test etherchannel load-balance interface po1 mac
0200.0000.0001 0200.1111.1113
Would select Gi1/0/23 of Po1
```

Additional commands

Configuration Command

```
spanning-tree mode {pvst | rapid-pvst | mst}
spanning-tree vlan 10 root primary
spanning-tree vlan 11 root secondary
spanning-tree vlan 12 priority priority
spanning-tree vlan 13 cost cost
spanning-tree vlan 14 port-priority priority
```

Show Command

```
sh spanning-tree
sh spanning-tree vlan 10
sh etherchannel [channel-group-number]
sh etherchannel {brief | detail | port | port-channel | summary}
```

Volume-01 Chapter-15

Router Interface

Configuration Command

```
interface ethernet 0
interface fastethernet 0/1
interface gigabitethernet 0/0
interface gigabitethernet 0/1/0
interface serial 1/0/1
```

Show Command

```
sh ip int brief
sh int g0/1
```

Configuring IP Addresses on Cisco Routers

Configuration Command

```
interface G0/0
  ip address 172.16.1.1 255.255.255.0
  no shutdown
```

Show Command

```
sh protocols
```

Volume-01 Chapter-16

Connected and Local Routes

Configuration Command

```
[no] ip routing

interface GigabitEthernet0/1/0
  ip address 172.16.5.1 255.255.255.0
  no shut
```

Show Command

```
show ip route
show ip arp
sh arp
clear ip arp 10.1.1.1
```

Static Network Routes

Configuration Command

```
ip route 172.16.2.0 255.255.255.0 S0/0/0
ip route 172.16.3.0 255.255.255.0 172.16.5.3
```

Show Command

```
sh ip route
show ip route {static | ospf | connected}
```

Static Host Routes

Configuration Command

```
ip route 10.1.1.0 255.255.255.0 10.2.2.2
ip route 10.1.1.9 255.255.255.255 10.9.9.9
```

Show Command

```
sh ip route
show ip route {static | ospf | connected}
```

Floating Static Routes

Configuration Command

```
ip route 172.16.2.0 255.255.255.0 172.16.5.3 130
```

Show Command

```
show ip route 172.16.2.0
```

Static Default Routes

Configuration Command

```
ip route 0.0.0.0 0.0.0.0 g0/1
```

Show Command

```
show ip route
```

Permanently Adding Static Routes to the IP Routing Table

Configuration Command

```
ip route 172.16.2.0 255.255.255.0 S0/0/0 permanent
ip route 172.16.3.0 255.255.255.0 172.16.5.3 permanent
```

Show Command

```
show ip route ospf
```

Volume-01 Chapter-17

Router Configuration for the 802.1Q Encapsulation

Configuration Command

```
interface gigabitethernet 0/0.10
  encapsulation dot1q 10
  ip address 10.1.10.1 255.255.255.0

interface gigabitethernet 0/0.20
  encapsulation dot1q 20
  ip address 10.1.20.1 255.255.255.0
```

Show Command

```
sh ip int brief | include 0/0
sh vlans
```

Router Configuration Using Native VLAN 10

Configuration Command

First option: put the native VLAN IP address on the physical interface

```
interface gigabitethernet 0/0
  ip address 10.1.10.1 255.255.255.0
  no shut
interface gigabitethernet 0/0.20
  encapsulation dot1q 20
  ip address 10.1.20.1 255.255.255.0
```

Second option: add the native keyword

```
interface gigabitethernet 0/0.10
  encapsulation dot1q 10 native
  ip address 10.1.10.1 255.255.255.0
interface gigabitethernet 0/0.20
  encapsulation dot1q 20
  ip address 10.1.20.1 255.255.255.0
```

Show Command

```
sh ip int brief | include 0/0
sh vlans
```

Configuring Routing Using Switch SVIs

Configuration Command

```
sdm prefer lanbase-routing
reload
ip routing

interface vlan 10
  ip address 10.1.10.1 255.255.255.0
  no shut
interface vlan 20
  ip address 10.1.20.1 255.255.255.0
  no shut

SW1(config)# no vlan 20
SW1(config)# vlan 30
SW1(config-vlan)# shutdown
```

Show Command

```
sh ip route
sh int status
show ip interface brief | include Vlan
```

Configuring Interface G0/1 on Switch as a Routed Port

Configuration Command

```
ip routing

interface vlan 10
  ip address 10.1.10.1 255.255.255.0
  no shut
interface vlan 20
  ip address 10.1.20.1 255.255.255.0
  no shut

interface gigabitethernet 0/1
  no switchport
  ip address 10.1.30.1 255.255.255.0
  no shut
```

Show Command

```
sh int g0/1
sh int status
sh ip route
sh int g0/1 switchport
```

Implementing Layer 3 EtherChannels

Configuration Command

On SW1 interface g0/1 and g0/2:

```
int g0/1
  no switchport
  no ip address
  channel-group 1 mode on
  no shut
int g0/2
  no switchport
  no ip address
  channel-group 1 mode on
  no shut

int port-channel 1
  no switchport
  ip address 10.1.10.1 255.255.255.0
  no shut
```

Show Command

```
sh int status
sh int port-channel 1
sh ip route
sh etherchannel 12 summary
```

Volume-01 Chapter-18

Standard ping

```
ping 172.16.2.101
```

Testing the Reverse Route Using the Extended Ping

```
R1# ping
Protocol [ip]:
Target IP address: 172.16.2.101
Repeat count [5]:
Datagram size [100]:
Timeout in seconds [2]:
Extended commands [n]: y
Source address or interface: 172.16.1.1
```

Standard traceroute

```
traceroute 172.16.2.101
```

Extended traceroute Command

```
R1# traceroute
Protocol [ip]:
Target IP address: 172.16.2.101
Source address: 172.16.1.1
Numeric display [n]:
Timeout in seconds [3]:
```

Telnet

```
telnet 10.1.2.2
```

SSH

```
ssh -l wendell 10.1.2.2
```

Volume-01 Chapter-20

OSPF Single-Area Configuration

Configuration Command

```
router ospf 1
  network 10.0.0.0 0.255.255.255 area 0
```

Show Command

```
sh ip route
sh ip route ospf
sh ip route subnet mask
sh ip route | section subnet
sh ip ospf rib
sh ip ospf neighbor
sh ip ospf neighbor g0/1
sh ip ospf database
sh ip ospf interface
sh ip ospf interface g0/1
sh ip ospf interface brief
sh run
sh ip protocols
```

Configuring the OSPF Router ID

Configuration Command

R1 Configuration first

```
router ospf 1
  router-id 1.1.1.1
  network 10.1.0.0 0.0.255.255 area 0
```

R2 Configuration next

```
interface Loopback2
  ip address 2.2.2.2 255.255.255.255
```

Show Command

```
sh ip ospf
```

Implementing Multiarea OSPF

Configuration Command

```
router ospf 1
  network 10.1.1.1 0.0.0.0 area 0
  network 10.1.2.1 0.0.0.0 area 0
  network 10.1.12.1 0.0.0.0 area 23
  network 10.1.13.1 0.0.0.0 area 23
  network 10.1.14.1 0.0.0.0 area 4
```

Show Command

```
sh ip ospf
```

OSPF Interface Configuration

Configuration Command

```
R1(config)# router ospf 1
R1(config-router)# no network 10.0.0.0 0.255.255.255 area 0

R1(config-router)# interface g0/0.1
R1(config-subif)# ip ospf 1 area 0
R1(config-subif)# interface g0/0.2
R1(config-subif)# ip ospf 1 area 0

R1(config-subif)# interface g0/0/0
R1(config-if)# ip ospf 1 area 0
```

Show Command

```
sh ip protocols
sh ip ospf int g0/0/0
```

OSPF Default Routes

Configuration Command

```
ip route 0.0.0.0 0.0.0.0 192.0.2.1
default-information originate
```

Show Command

```
sh ip route ospf
sh ip route static
```

OSPF Passive Interfaces

Configuration Command

First, make each subinterface passive directly

```
router ospf 1
  passive-interface GigabitEthernet0/0.1
  passive-interface GigabitEthernet0/0.2
```

Or, change the default to passive, and make the other interfaces not be passive

```
router ospf 1
  passive-interface default
  no passive-interface GigabitEthernet0/0/0
  no passive-interface GigabitEthernet0/1/0
  no passive-interface GigabitEthernet0/2/0
```

Show Command

```
sh ip ospf int brief
sh ip ospf int g0/0
```

Confirming OSPF Interface Costs

Configuration Command

```
R1(config)# interface g0/0/0
R1(config-if)# ip ospf cost 4
R1(config-if)# interface g0/1/0
R1(config-if)# ip ospf cost 5

router ospf 1
  auto-cost reference-bandwidth ref-bw-mbps
int g0/1
  bandwidth bw-kbps
```

Show Command

```
show ip ospf interface brief
```

OSPF Load Balancing

Configuration Command

```
route ospf 1
  maximum-paths 6
```

Volume-01 Chapter-21

Influencing DR/BDR Election Using OSPF Priority

Configuration Command

```
R1(config)# interface g0/0
R1(config-if)# ip ospf priority 99
```

Show Command

```
show ip ospf interface g0/0 | include Priority
show ip ospf neighbor
show ip ospf interface brief
```

OSPF Network Type Point-to-Point

Configuration Command

```
R1(config)# interface g0/0/0
R1(config-if)# ip ospf network point-to-point
```

Show Command

```
show ip ospf interface g0/0/0
sh ip ospf int brief
sh ip ospf neighbor
```

Shutting Down the OSPF Process

Configuration Command

```
router ospf 1
  shutdown
```

Show Command

```
sh ip ospf int brief
sh ip ospf
sh ip ospf neighbor
sh ip ospf databse
```

Additional Commands

Configuration Command

```
router ospf 1
  passive-interface g0/1
int g0/1
  ip ospf hello-interval seconds
  ip ospf dead-interval seconds
```

Volume-01 Chapter-24

Configuring the full 128-bit address

Configuration Command

```
ipv6 unicast-routing
int g0/1
  ipv6 address 2001:db8:1:1::1/64
  no shut
```

Show Command

```
sh ipv6 int
sh ipv6 int brief
sh ipv6 int g0/1
sh ipv6 route connected
```

Configuring IPv6 using eui-64

Configuration Command

```
int g0/1
  ipv6 address 2001:db8:1:1::1/64 eui-64
```

Dynamic Unicast address configuration

Configuration Command

```
int g0/1
  ipv6 address dhcp
int g0/1
  ipv6 address autoconfig
```

Creating Link-local address

Configuration Command

```
int g0/1
  ipv6 address fe80::1 link-local
int g0/1
  ipv6 enable
```

Show Command

```
sh ipv6 int brief
```

Configuring and verifying IPv6 anycast address

Configuration Command

```
int g0/1
  ipv6 address 2001:1:1:1::/64
  ipv6 address 2001:1:1:2::99/128 anycast
```

Show Command

```
sh ipv6 int g0/1
sh ipv6 int g0/1 brief
```

Volume-01 Chapter-25

Static Routes Using the Outgoing Interface

Configuration Command

```
ipv6 route 2001:db8:1111:2::/64 S0/0/0
```

Show Command

```
show ipv6 route static
show ipv6 route 2001:db8:1111:2::22
```

Static Routes Using Next-Hop IPv6 Address

Configuration Command

```
ipv6 route 2001:db8:1111:2::/64 2001:DB8:1111:4::2
```

Show Command

```
show ipv6 route static
show ipv6 route 2001:db8:1111:2::22/64
```

Static Route with a Link-Local Next-Hop Address

Configuration Command

```
ipv6 route 2001:db8:1111:2::/64 S0/0/0 FE80::FF:FE00:2
```

Show Command

```
show ipv6 route static
show ipv6 route 2001:db8:1111:2::22
```

Static Default Route

Configuration Command

```
ipv6 route ::/0 S0/0/1
```

Show Command

```
show ipv6 route static
```

Static Host IPv6 Routes

Configuration Command

with R2's link-local address as next-hop, with an outgoing interface.

```
R1(config)# ipv6 route 2001:db8:1111:2::22/128 S0/0/0 FE80::FF:FE00:2
```

but with R2's global unicast address as next-hop, and no outgoing interface.

```
R1(config)# ipv6 route 2001:db8:1111:2::22/128 2001:DB8:1111:4::2
```

Show Command

```
show ipv6 route
```

Floating Static IPv6 Routes

Configuration Command

```
ipv6 route 2001:db8:1111:7::/64 2001:db8:1111:9::3 130
```

Show Command

```
show ipv6 route static
show ipv6 route 2001:db8:1111:7::/64
show running-config | include ipv6 route
show ipv6 neighbors
```

Volume-02 Chapter-02

Matching the Exact IP Address

Configuration Command

```
access-list 1 permit host 10.1.1.1
```

Finding the Right Wildcard Mask to Match a Subnet

Configuration Command

```
access-list 1 permit 172.16.8.0 0.0.3.255
access-list 1 deny 10.1.1.0 0.0.0.255
```

Matching Any/All Addresses

Configuration Command

```
access-list 1 permit any
```

Standard Numbered ACL Example-01

Configuration Command

```
R2(config)# access-list 1 permit 10.1.1.1
R2(config)# access-list 1 deny 10.1.1.0 0.0.0.255
R2(config)# access-list 1 permit 10.0.0.0 0.255.255.255
R2(config)# interface S0/0/1
R2(config-if)# ip access-group 1 in
```

Show Command

```
R2# show running-config
sh access-lists
sh ip access-lists
sh ip int s0/0/1
```

Standard Numbered ACL Example-02

Configuration Command

```
access-list 2 remark This ACL permits server S1 traffic to host A's subnet
access-list 2 permit 10.2.2.1
access-list 3 remark This ACL permits server S2 traffic to host C's subnet
access-list 3 permit 10.2.2.2
interface F0/0
  ip access-group 2 out
interface F0/1
  ip access-group 3 out
```

Creating Log Messages for ACL Statistics

Configuration Command

```
access-list 2 permit 10.2.2.1 log
interface F0/0
  ip access-group 2 out
```

Show Command

```
R2# show running-config
```

Volume-02 Chapter-03

Extended access-list Commands

Configuration Command

```
access-list 101 deny tcp any any
access-list 101 deny udp any any
access-list 101 deny icmp any any
access-list 101 deny ip host 1.1.1.1 host 2.2.2.2
access-list 101 deny udp 1.1.1.0 0.0.0.255 any
```

Matching TCP and UDP Port Numbers

Configuration Command

```
access-list 101 deny tcp any gt 49151 host 10.1.1.1 eq 23
access-list 101 deny tcp any host 10.1.1.1 eq 23
access-list 101 deny tcp any host 10.1.1.1 eq telnet
access-list 101 deny udp 1.0.0.0 0.255.255.255 lt 1023 any
```

Extended IP Access Lists: Example 1

Configuration Command

```
interface Serial0
  ip address 172.16.12.1 255.255.255.0
  ip access-group 101 in
interface Serial1
  ip address 172.16.13.1 255.255.255.0
  ip access-group 101 in
access-list 101 deny tcp host 172.16.3.10 172.16.1.0 0.0.0.255 eq ftp
access-list 101 deny tcp host 172.16.2.10 host 172.16.1.100 eq www
access-list 101 permit ip any any
```

Extended IP Access Lists: Example 2

Configuration Command

```
interface ethernet 0
  ip access-group 110 in
access-list 110 deny ip host 10.1.2.1 10.1.1.0 0.0.0.255
access-list 110 deny ip 10.1.2.0 0.0.0.255 10.1.3.0 0.0.0.255
access-list 110 permit ip any any
```

Named IP Access Lists

Configuration Command

```
Router(config)# ip access-list extended barney
Router(config-ext-nacl)# permit tcp host 10.1.1.2 eq www any
Router(config-ext-nacl)# deny udp host 10.1.1.1 10.1.2.0 0.0.0.255
Router(config-ext-nacl)# deny ip 10.1.3.0 0.0.0.255 10.1.2.0 0.0.0.255
Router(config-ext-nacl)# deny ip 10.1.2.0 0.0.0.255 10.2.3.0 0.0.0.255
Router(config-ext-nacl)# permit ip any any
Router(config-ext-nacl)# interface serial1
Router(config-if)# ip access-group barney out
```

Show Command

```
Router# show running-config
```

Removing One Command from a Named ACL

Configuration Command

```
Router(config)# ip access-list extended barney
Router(config-ext-nacl)# no deny ip 10.1.2.0 0.0.0.255 10.2.3.0 0.0.0.255
```

Show Command

```
Router# show access-list
```

Editing ACLs Using Sequence Numbers

Configuration Command

Step 1: The 3-line Standard Numbered IP ACL is configured.

```
R1(config)# ip access-list standard 24
R1(config-std-nacl)# permit 10.1.1.0 0.0.0.255
R1(config-std-nacl)# permit 10.1.2.0 0.0.0.255
R1(config-std-nacl)# permit 10.1.3.0 0.0.0.255
```

Step 2: Displaying the ACL's contents, without leaving configuration mode.

```
R1(config-std-nacl)# do show ip access-lists 24
Standard IP access list 24
10 permit 10.1.1.0, wildcard bits 0.0.0.255
20 permit 10.1.2.0, wildcard bits 0.0.0.255
30 permit 10.1.3.0, wildcard bits 0.0.0.255
```

Step 3: Still in ACL 24 configuration mode, the line with sequence number 20 is deleted.

```
R1(config-std-nacl)# no 20
```

Step 4: Displaying the ACL's contents again, without leaving configuration mode. Note that line number 20 is no longer listed.

```
R1(config-std-nacl)#do show ip access-lists 24
Standard IP access list 24
10 permit 10.1.1.0, wildcard bits 0.0.0.255
30 permit 10.1.3.0, wildcard bits 0.0.0.255
```

Step 5: Inserting a new first line in the ACL.

```
R1(config-std-nacl)# 5 deny 10.1.1.1
```

Step 6: Displaying the ACL's contents one last time, with the new statement.

```
R1(config-std-nacl)# do show ip access-lists 24
Standard IP access list 24
5 deny 10.1.1.1
10 permit 10.1.1.0, wildcard bits 0.0.0.255
30 permit 10.1.3.0, wildcard bits 0.0.0.255
```

Adding to and Displaying a Numbered ACL Configuration

Configuration Command

```
R1# show running-config
access-list 24 deny 10.1.1.1
access-list 24 permit 10.1.1.0 0.0.0.255
access-list 24 permit 10.1.3.0 0.0.0.255
```

Adding a new access-list 24 global command

```
R1(config)# access-list 24 permit 10.1.4.0 0.0.0.255

R1# show ip access-lists 24
5 deny 10.1.1.1
10 permit 10.1.1.0, wildcard bits 0.0.0.255
30 permit 10.1.3.0, wildcard bits 0.0.0.255
40 permit 10.1.4.0, wildcard bits 0.0.0.255
```

Volume-02 Chapter-05

Sample Login Security Configuration

Configuration Command

```
enable secret ccna

line vty 0 15
  transport input telent
  password kibria
  login

username rahim password dhaka
hostname SW1
ip domain-name example.com
crypto key generate rsa [modulus 512|768|1024]
line vty 0 15
  transport input {telnet|ssh|all|none}
  login local
```

Encrypting IOS Password

Configuration Command

```
SW1(config)# service password-encryption [no]
```

Show Command

```
Switch3# show running-config | section line con 0
```

Encoding the Enable Passwords with Hashes

Configuration Command

```
SW1(config)# enable secret fred
SW1# show running-config | include enable secret
enable secret 5 $1$ZGMA$e8cmvkz4UjiJhVp7.maLE1
SW1(config)# no enable secret [no enable password]

enable [algorithm type md5] secret dhaka01
enable algorithm-type sha256 secret dhaka02
enable algorithm-type scrypt secret dhaka03
```

Show Command

```
R1# show running-config | include enable
```

Encoding Types for the username secret Command

Configuration Command

```
username rahim [algorithm type md5] secret dhaka01
username karim algorithm type sha256 secret dhaka02
username abdul algorithm type scrypt secret dhaka03
```

VTY Access Control Using the access-class Command

Configuration Command

```
access-list 1 permit 10.1.1.0 0.0.0.255
line vty 0 4
  password cisco
  login
  access-class 1 in
```

Show Command

```
sh run | section vty
sh run | section con
sh run | include enable
```

Volume-02 Chapter-06

Variations on Port Security Configuration

Configuration Command

```
interface FastEthernet0/1
  switchport mode access
  switchport port-security
  switchport port-security mac-address 0200.1111.1111
interface FastEthernet0/2
  switchport mode access
  switchport port-security
  switchport port-security mac-address sticky
interface FastEthernet0/3
  switchport mode access
  switchport port-security
interface FastEthernet0/4
  switchport mode trunk
  switchport port-security
  switchport port-security maximum 8
  switchport portsecurity violation {protect | restrict | shutdown}
```

Show Command

```
SW1# show running-config
SW1# show running-config interface f0/2
SW1# show port-security interface fastEthernet 0/1
SW1# show mac address-table secure interface F0/2
SW1# show mac address-table dynamic interface F0/2
SW1# show mac address-table static interface F0/2
SW1# show port-security
SW1# show interfaces Fa0/13 status
```

Port-security automatic recovery

Configuration Command

```
errdisable recovery cause psecure-violation
errdisable recovery interval seconds
```

Volume-02 Chapter-07

Configuring DHCP Relay on Router

Configuration Command

```
int g0/1
  ip helper-address 172.16.2.11
```

Show Command

```
sh int g0/1
```

Configuring a Switch as DHCP Client

Configuration Command

```
int vlan 1
  ip address dhcp
  no shut
```

Show Command

```
sh int vlan 1
sh dhcp lease
sh ip default-gateway
sh arp
sh ip arp
```

Configuring a Router as DHCP Client

Configuration Command

```
int g0/1
  ip address dhcp
```

Show Command

```
sh ip route static
```

Host IP Settings on Windows

```
ipconfig
ipconfig /all
netstat -rn (shoe ip routing table)
```

Host IP Settings on MAC

```
ifconfig (similar to windows ipconfig /all)
networksetup -getinfo Ethernet
networksetup -getdnsservers Ethernet
netstat -rn
```

Host IP Settings on Linux

```
ifconfig wlan0
ip address
netstat -rn
ip route
```

arp -a (windows, mac, linus list the host ARP table)

Volume-02 Chapter-08

Configuring DHCP Snooping on a Layer 2 Switch

Configuration Command

```
ip dhcp snooping
ip dhcp snooping vlan 11
no ip dhcp snooping information option
interface GigabitEthernet1/0/2
  ip dhcp snooping trust [no]
```

Show Command

```
SW1# show ip dhcp snooping
```

Limiting DHCP Message Rates

Configuration Command

```
errdisable recovery cause dhcp-rate-limit
errdisable recovery interval 30
interface GigabitEthernet1/0/2
  ip dhcp snooping limit rate 10(number) [no]
```

Show Command

```
sh ip dhcp snooping
```

Configuring Dynamic ARP Inspection on a Layer 2 Switch

Configuration Command

```
ip arp inspection vlan 11
interface GigabitEthernet1/0/2
  ip arp inspection trust
```

Show Command

```
sh ip arp inspection
sh ip dhcp snooping binding
sh ip arp inspection statistics
sh ip dhcp snooping statistics
```

Limiting DAI Message Rates

Configuration Command

```
errdisable recovery cause arp-inspection
errdisable recovery interval seconds
interface GigabitEthernet1/0/2
  ip arp inspection limit rate 8
  ip arp inspection limit rate none
interface GigabitEthernet1/0/3
  ip arp inspection limit rate 8 burst interval 4
```

Show Command

```
sh ip arp inspection interfaces
```

Configuring Optional DAI Message Checks

Configuration Command

```
ip arp inspection validate {dst-mac | ip |src-mac}
```

Show Command

```
sh ip arp inspection
```

Volume-02 Chapter-09

Disabling Timestamps and Enabling Sequence Numbers

Configuration Command

```
R1(config)# no service timestamps
R1(config)# service sequence-numbers
```

Syslog Configuration

Configuration Command

All global conf command:

```
logging console 7 [no]
logging monitor debug [#terminal monitor] [no]
logging buffered 4 [no]
logging host 172.16.3.9 [no]
logging trap warning | debugging
```

Show Command

```
sh logging
sh log
clear logging
sh process
sh process cpu
```

NTP Configuration - Setting the Date/Time

Configuration Command

```
clock timezone EST -5
clock summer-time EDT recurring
#clock set 20:50:42 5 March 2024

ntp master 2
ntp server 172.16.3.3
```

Show Command

```
sh clock
sh ntp status
sh ntp associations
```

NTP Using a Loopback Interface

Configuration Command

```
ntp server 172.16.9.9
int loopback 0
  ip address 172.16.9.9 255.255.255.0
ntp master 4
ntp source loopback 0
```

Show Command

```
sh int loopback 0
```

CDP

Configuration Command

```
cdp run
no cdp run
int g0/1
  cdp enable [no]
cdp timer sec
cdp holdtime sec
```

Show Command

```
sh cdp
sh cdp int g0/1
sh cdp traffic
sh cdp neighbors
sh cdp neighbors detail
sh cdp entry host-name
```

LLDP

Configuration Command

```
lldp run
no lldp run
interface gigabitEthernet1/0/19
  lldp transmit
  lldp receive
interface gigabitEthernet1/0/20
  lldp receive
lldp timer sec
lldp holdtime sec
```

Show Command

```
sh lldp
sh lldp int g0/1
sh lldp traffic
sh lldp neighbors
sh lldp neighbors details
sh lldp entry host-name
```

Volume-02 Chapter-10

Static NAT

Configuration Command

```
interface GigabitEthernet0/0
  ip address 10.1.1.3 255.255.255.0
  ip nat inside
interface Serial0/0/0
  ip address 200.1.1.251 255.255.255.0
  ip nat outside
ip nat inside source static 10.1.1.2 200.1.1.2
ip nat inside source static 10.1.1.1 200.1.1.1
```

Show Command

```
sh ip nat translations
sh ip nat statistics
```

Dynamic NAT

Configuration Command

```
interface GigabitEthernet0/0
  ip address 10.1.1.3 255.255.255.0
  ip nat inside
interface Serial0/0/0
  ip address 200.1.1.251 255.255.255.0
  ip nat outside
ip nat pool fred 200.1.1.1 200.1.1.2 netmask 255.255.255.252
ip nat inside source list 1 pool fred
access-list 1 permit 10.1.1.2
access-list 1 permit 10.1.1.1
```

Show Command

```
sh ip nat translations
sh ip nat statistics
debug ip nat
```

NAT Overload (PAT) Configuration

Configuration Command

```
interface GigabitEthernet0/0
  ip address 10.1.1.3 255.255.255.0
  ip nat inside
interface Serial0/0/0
  ip address 200.1.1.249 255.255.255.252
  ip nat outside
ip nat inside source list 1 interface Serial0/0/0 overload
access-list 1 permit 10.1.1.2
access-list 1 permit 10.1.1.1
```

Show Command

```
sh ip nat translations
sh ip nat statistics
clear ip nat translation {*|[inside global-ip local-
ip]|[outside local-ip global-ip]}
```

Volume-02 Chapter-12

Cisco IOS File Systems on a Router

```
sh file systems
```

Copying a New IOS Image from tftp

```
R2# copy tftp flash
Address or name of remote host []? 2.2.2.1
Source filename []? c2900-universalk9-mz.SPA.152-4.M1.bin
Destination filename [c2900-universalk9-mz.SPA.152-4.M1.bin ]?

sh flash
#dir flash0:
```

Verifying IOS Code Integrity with MD5

```
#verify /md5 flash0:c2900-universalk9-mz.SPA.154-3.M3.bin [MD5-hash]
```

Installing a New IOS with FTP

```
R1#copy ftp://wendell:odom@192.168.1.170/c2900-universalk9-
mz.SPA.155-2.T1.bin flash
Destination filename [c2900-universalk9-mz.SPA.155-2.T1.bin]?
```

If I set up username and password then: (global command)

```
ip ftp username wendell
ip ftp password odom
#copy ftp://192.168.1.170/...
```

Additional Command

```
boot system flash [flash-fs:][filename]
boot system {ftp|tftp} filename [ip-address]
```

[The End]