

## ProVision

## Comware

## Cisco

```
ProVision(config)# console inactivity-timer ?
ProVision# show tech
ProVision(config)# lldp run
Untagged
Tagged
Trunk
ProVision>
ProVision#
ProVision(config)#
enable
configure
show flash
show version
show run
show config
show history
show logging
show ip route
show ip
show interface brief
erase startup-config
show config
<filename>
reload
write memory
show tech
show
no
end
exit
erase
copy
hostname
logging
router rip
router ospf
ip route
access-list
```

```
[Comware]user-interface aux 0
<Comware>display diagnostic-information
[Comware7]lldp global enable
Access
Trunk
bridge aggregation
<Comware>
[Comware]
[Comware]
system-view
system-view
dir
display version
display current-configuration
display saved-configuration
display history
display info-center
display ip routing-table
display ip interface
brief
display interface brief
reset saved
more <filename>
reboot
save
display diagnostic-information
display
undo
return
quit
delete
copy/tftp
sysname
info-center
rip
ospf
ip route-static
acl
```

```
Cisco(config)#line console 0
Cisco#show tech-support
Cisco(config)#lldp run
Access
Trunk
Etherchannel
Cisco>
Cisco#
Cisco(config)#
enable
configure terminal
show flash
show version
show run
show start
show history
show logging
show ip route
show ip interface
brief
show interfaces status
erase start
more flash:./<filename>
reload
write memory
show tech-support
show
no
end
exit
erase
copy
hostname
logging
router rip
router ospf
ip route
access-list
```

## Management Access

ProVision> enable ProVision# ProVision# configure ProVision(config)# ProVision(config)# console baud-rate ? ProVision(config)# console inactivity-timer ?	<Comware> system-view System View: return to User View with Ctrl+Z. [Comware] No specific command, see note below [Comware] [Comware]user-interface aux 0 [Comware-ui-aux0]speed ? [Comware]user-interface aux 0 [Comware-ui-aux0]idle-timeout? [Comware]user-interface vty 0 [Comware-ui-vty0]idle-timeout?	Cisco> enable Cisco# Cisco# configure terminal Enter configuration commands, one per line. End with CNTL/Z. Cisco(config)# Cisco(config)#line console 0 Cisco(config-line)#speed ? Cisco(config)#line console 0 Cisco(config-line)#exec-timeout Cisco(config)#line vty 0 Cisco(config-line)#exec-timeout?
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## Reload & Timed Reload

ProVision# reload ProVision# reload ? ProVision# show reload ? ProVision(config)# no reload	<Comware7>reboot <Comware7>reboot ? <Comware7>scheduler reboot ? <Comware7>display scheduler ? <Comware7>undo scheduler reboot	Cisco#reload Cisco#reload ? Cisco#show reload Cisco#reload cancel
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## System and Environment

ProVision# show system information ProVision# show modules ProVision# show system fans ProVision# show system power-supply ProVision# show system temperature ProVision# show telnet	<Comware>display device manuinfo <Comware>display device verbose <Comware>display fan <Comware>display power <Comware>display environment <Comware>display users	Cisco#show inventory Cisco#show version Cisco#show env fan Cisco#show env power Cisco#show env temperature Cisco# show users
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## Filtering Output show running-config and display current-configuration and Mtd

Note: entering show running-config | ? does not reveal this command operation

ProVision# show running-config | include <text-tofind>

<Comware>display current-configuration| ?

<Comware>display current-configuration| include <text-to-find>

Cisco#show running-config | ?

Cisco#show running-config | include <text-to-find>

ProVision(config)# banner motd # Enter TEXT message. End with the character '#'

[Comware]header motd # Please input banner content, and quit with the character'#'.

Cisco(config)#banner motd # Enter TEXT message. End with the character '#'

## Source Interface for Management Communications

ProVision(config)# ip source-interface?  
ProVision(config)# ip source-interface all 192.168.1.100  
ProVision(config)# ip source-interface syslog vlan 1  
ProVision(config)# ip source-interface radius 192.168.1.100  
ProVision(config)# ip source-interface tacacs 192.168.1.100  
ProVision(config)# ip source-interface tftp vlan 1  
ProVision(config)# ip source-interface snmp vlan 1  
ProVision(config)# ip source-interface telnet vlan 1  
ProVision(config)# ip source-interface sflow 192.168.1.100  
ProVision(config)# snmpserver trap-source 192.168.1.100  
ProVision# show ip source-interface

[Comware]info-center loghost source Vlan-interface 1  
[Comware]radius nas-ip 192.168.1.101  
[Comware]hwtacacs nas-ip 192.168.1.101  
[Comware]ftp client source interface Vlan-interface 1  
[Comware]tftp client source interface Vlan-interface 1  
[Comware]ntp source-interface Vlan-interface 100  
[Comware]telnet client source interface Vlan-interface 1  
[Comware]ssh client source interface Vlan-interface 1  
[Comware]sflow source ip 192.168.1.101  
[Comware]snmp-agent trap source Vlan-interface 1

Cisco(config)#ip <service> source-interface ?  
Cisco(config)#<service> source-interface ?  
Cisco(config)#logging source-interface vlan 1  
Cisco(config)#ip radius source-interface vlan 1  
Cisco(config)#ip tacacs source-interface vlan 1  
Cisco(config)#ip ftp source-interface vlan 1  
Cisco(config)#ip tftp source-interface vlan 1  
Cisco(config)#ntp source vlan 1  
Cisco(config)#ip telnet source-interface vlan 1  
Cisco(config)#ip ssh source-interface vlan 1  
Cisco(config)#snmp-server source-interface traps vlan 1

## Local User ID and Password, and console access

ProVision(config)# password manager user-name <name>  
plaintext <password>  
ProVision(config)# password operator user-name <name>  
plaintext <password>

[Comware7]super password role network-admin simple  
password  
[Comware7]super password role network-admin hash  
<hashtextpassword>  
[Comware7]local-user manager  
[Comware7-luser-managemanager]password simple  
password  
[Comware7-luser-managemanager]authorization-attribute  
user-role networkadmin  
[Comware7-luser-managemanager]service-type terminal

Cisco(config)#enable password 0 <password>  
Cisco(config)#enable secret 0 <password>  
Cisco(config)#username <name> privilege 15 password  
<password>  
Cisco(config)#username <name> privilege 0 password  
<password>  
Cisco(config)#line console 0  
Cisco(config-line)#login local  
Cisco(config)#line console 0  
Cisco(config-line)#login  
Cisco(config-line)#password password

## Protect Local Password

ProVision(config)# no frontpanel-security password-clear  
ProVision(config)# no frontpanel-security factory-reset  
ProVision(config)# no frontpanel-security password-recovery  
ProVision# show front-panel-security

<Comware>undo startup bootrom-access enable  
<Comware>display startup

Cisco(config)#no service password-recovery  
Cisco#show version

## Role based management

```
ProVision(config)# aaa authorization commands local
ProVision(config)# aaa authorization group network-admin2
1 match-command "command:show interface brief" permit
log
ProVision(config)# aaa authorization group network-admin2
2 match-command "command:show ip" permit log
ProVision(config)# aaa authentication local-user test1 group
network-admin2 password plaintext New password for test1:
***** Please retype new password for test1: *****
ProVision# show authorization group network-admin2
```

```
[Comware7]role name networkadmin2
[Comware7-role-networkadmin2]rule 1 permit command
[Comware7-role-networkadmin2]display interface brief
[Comware7-role-networkadmin2]rule 2 permit command
[Comware7-role-networkadmin2]display ip interface brief
[Comware7]local-user test1 class manage
[Comware7-luser-managetest1]password simple password
[Comware7-luser-managetest1]service-type telnet
[Comware7-luser-managetest1]authorization-attribute user-
role network-admin2
[Comware7-luser-managetest1]undo authorization-attribute
user-role network-operator
[Comware7]display role name network-admin2
[Comware7]display local-user user-name test1 class
manage
```

```
Cisco(config)#aaa new-model
Cisco(config)#parser view network-admin2
Cisco(config-view)#secret 0 password
Cisco(config-view)#commands exec include show
interface summary
Cisco(config-view)#commands exec include show ip
interface brief
Cisco(config-view)#exit
Cisco(config)#username test1 privilege 15 view
networkadmin2 password 0 password
(no specific show commands)
```

## Password complexity

```
ProVision(config)# password minimum-length 10
ProVision(config)# password configuration-control
ProVision(config)# password configuration aging
ProVision(config)# password configuration history
ProVision(config)# password complexity all
ProVision# show password-configuration
```

```
[Comware]password-control enable
[Comware]password-control length 10
[Comware]password-control length enable
[Comware]password-control composition type-number 4
type-length 2
[Comware]password-control composition enable
[Comware]password-control complexity same-character
check
[Comware]password-control complexity user-name check
[Comware]display password-control
```

```
Cisco(config)#aaa new-model
Cisco(config)#aaa common-criteria policy pwcomplex
Cisco(config-cc-policy)#minlength 10
Cisco(config-cc-policy)#maxlength 10
Cisco(config-ccpolicy)#numeric-count 2
Cisco(config-ccpolicy)#special-case 2
Cisco(config-cc-policy)#uppercase 2
Cisco(config-cc-policy)#lowercase 2
Cisco(config-cc-policy)#exit
Cisco(config)# #username manager privilege 15
common-criteria-policy pwcomplex password PA55word!^
Cisco#show aaa common-criteria policy name
pwcomplex
```

## Configuration File Management

```
ProVision# show running-config ?
ProVision# copy running-config tftp 192.168.1.1 config2.cfg
ProVision# copy running-config sftp 192.168.1.1 config2.cfg
Attempting
username/password
```

```
Cisco#show running-config ?
Cisco#copy running-config tftp://192.168.1.1/Cisco.cfg
Cisco#copy running-config scp:
Address or name of remote host []? 192.168.1.1
```

```
username/password authentication...
Enter
manager@192.168.1.1's
password: *****
ProVition# copy running-config usb config2
ProVition# copy running-config xmodem
ProVition# copy startup-config tftp 192.168.1.1
ProVition_startup-config.cfg
ProVition# copy startup-config sftp 192.168.1.1
ProVition_startup-config.cfg
Attempting
username/password authentication...
Enter
manager@192.168.1.1's
password: *****
ProVition# copy config config1 config config2
ProVition# copy config config1 tftp 192.168.1.1 config1.cfg
ProVition# copy config config1 sftp 192.168.1.1 config1.cfg
Attempting
username/password authentication...
Enter
manager@192.168.1.1's
password: *****
ProVition# erase startup-config
ProVition# copy tftp startup-config 192.168.1.1 config6.cfg
ProVition# copy sftp startup-config 192.168.1.1 config6.cfg
Attempting
username/password authentication...
Enter
manager@192.168.1.1's
password: *****
ProVition# copy tftp config config3 192.168.1.1 config3.cfg
ProVition# copy sftp config config3 192.168.1.1 config3.cfg
Attempting
username/password authentication...
Enter
```

```
<Comware>display current-configuration ?
<Comware>backup startup-configuration to 192.168.1.1
comware_startup-config.cfg
<Comware>copy flash:/comware_main.cfg
flash:/comware_main2.cfg
<Comware>tftp 192.168.1.1 put comware_main.cfg
comware_startup-config.cfg
<Comware>sftp 192.168.1.1 Input
Username: manager Trying 192.168.1.1 ...
Press CTRL+K to abort
Connected to 192.168.1.1 ...
Enter password:
sftp-client>put comware_main.cfg comware_startup-config.cfg
sftp-client>bye
<Comware>reset savedconfiguration main
<Comware>tftp 192.168.1.1 get comware_main.cfg startup.cfg
<Comware>sftp 192.168.1.1 Input
Username: manager
Trying 192.168.1.1 ...
Press CTRL+K to abort
Connected to 192.168.1.1 ...
Enter password:
sftp-client>get comware_main.cfg startup.cfg
sftp-client>bye
<Comware>tftp 192.168.1.1 get comware_main3.cfg
comware_main3.cfg
<Comware>sftp 192.168.1.1
Input Username: manager
Trying 192.168.1.1 ...
Press CTRL+K to abort
Connected to 192.168.1.1 ...
Enter password:
sftp-client>get comware_main3.cfg comware_main3.cfg
sftp-client>bye
<Comware>dir
<Comware>display startup
<Comware>display boot-loader
<Comware>startup saved-configuration comware_main.cfg
main
```

```
Destination username
[manager]?
Destination filename [ciscoconfig]? Cisco.cfg
Writing Cisco.cfg
Password:
Cisco#copy startup-config tftp://192.168.1.1/Cisco_startup-
config.cfg
Cisco#copy startup-config scp:
Address or name of remote
host []? 192.168.1.1
Destination username
[manager]?
Destination filename [ciscoconfig]? Cisco_startupconfig.cfg
Writing Cisco_startup-config.cfg
Password:
Cisco#copy flash:Cisco.cfg flash:Cisco_2.cfg
Cisco#copy flash:Cisco.cfg tftp://192.168.1.1/Cisco_2.cfg
Cisco#copy flash:Cisco.cfg scp:
Address or name of remote
host []? 192.168.1.1
Destination username
[manager]?
Destination filename[Cisco.cfg]? Writing Cisco.cfg
Password:
Cisco#erase startup-config
Cisco#copy tftp://192.168.1.1/Cisco_config3.cfg config.text
Cisco#copy scp: startup-config
Address or name of remote
host []? 192.168.1.1
Source username [manager]?
Source filename []?
Cisco_startup-config.cfg
Destination filename[startup-config]?
Password:
Cisco#copy tftp://192.168.1.1/Cisco_config2.cfg
flash:Cisco_config2.cfg
Cisco#copy scp: flash:
Address or name of remote
host []? 192.168.1.1
Source username [manager]?
```

```
manager@192.168.1.1's
password: *****
ProVision# show config files
ProVision# startup-default config config1
ProVision# startup-default primary config config1
ProVision# boot system flash primary config
```

```
Destination filename[Cisco_config2.cfg]?
Password:
Cisco#show flash
Cisco#show boot
Cisco(config)#boot config-file flash:Cisco.cfg
```

## Syslog Services

```
ProVision(config)# logging 192.168.1.2
ProVision(config)# logging facility ?
ProVision(config)# logging severity ?
ProVision# show logging ?
```

```
[Comware]info-center loghost 192.168.1.2
[Comware]info-center loghost 192.168.1.2 facility ?
[Comware]info-center timestamp loghost date
[Comware]display logbuffer ?
```

```
Cisco(config)#logging 192.168.1.2
Cisco(config)#logging facility ?
Cisco(config)#logging console ?
Cisco(config)#service timestamps log datetime localtime
Cisco#show logging ?
```

## SNMP Version 1 and Version 2c

```
ProVision(config)# snmp-server host 192.168.1.3 community
private trap-level all
ProVision(config)# snmp-server community public operator
restricted
ProVision(config)# snmp-server community private manager
unrestricted
ProVision(config)# snmp-server location Lab
ProVision(config)# snmp-server contact Lab_Engr
ProVision(config)# snmp-server enable
ProVision# show snmp-server
```

```
[Comware]snmp-agent targethost trap address udp-domain
192.168.1.3 udp-port 161 params securityname private
[Comware]snmp-agent community read public
[Comware]snmp-agent community write private
[Comware]snmp-agent sys-info location Lab
[Comware]snmp-agent sys-info contact Lab_Engr
[Comware]snmp-agent sys-info version v1 v2c
[Comware]undo snmp-agent sysinfo version v3
[Comware]snmp-agent trap enable
[Comware]snmp-agent
[Comware]display snmp-agent sys-info
[Comware]display snmp-agent community
```

```
Cisco(config)#snmp-server host 192.168.1.3 version 2c
private
Cisco(config)#snmp-server community public ro
Cisco(config)#snmp-server community private rw
Cisco(config)#snmp-server location Lab
Cisco(config)#snmp-server contact Lab_Engr
Cisco(config)#snmp-server enable traps
Cisco#show snmp
Cisco#show snmp host
```

## SNMP Version 3

```
ProVision(config)# snmpv3 enable
ProVision(config)# snmpv3 user test auth md5 password priv
des password
ProVision(config)# snmpv3 group managerpriv user test sec-
model ver3
ProVision(config)# snmpv3 targetaddress NMS params all
192.168.1.3
ProVision(config)# snmpserver location Lab
```

```
[Comware]snmp-agent group v3 <name> privacy
[Comware]snmp-agent usm-user v3 test managerpriv
authentication-mode md5 password privacy-mode des
password
[Comware]snmp-agent targethost trap address udp-domain
192.168.1.3 params securityname test v3 privacy
[Comware]snmp-agent sys-info location Lab
```

```
Cisco(config)#snmp-server group <name> v3 priv
Cisco(config)#snmp-server user test managerpriv v3 auth
md5 password priv des password
Cisco(config)#snmp-server host 192.168.1.3 version 3 priv
test
Cisco(config)#snmp-server location Lab
```

```
ProVision(config)# snmp-server contact Lab_Engr
ProVision(config)# snmp-server enable
ProVision# show snmp-server
```

```
[Comware]snmp-agent sys-info contact Lab_Engr
[Comware]snmp-agent sys-info version v1 v2c
[Comware]undo snmp-agent sysinfo version v3
[Comware]snmp-agent trap enable
[Comware]snmp-agent
[Comware]display snmp-agent sys-info
[Comware]display snmp-agent community
```

```
Cisco(config)#snmp-server contact Lab_Engr
Cisco(config)#snmp-server enable traps
Cisco#show snmp
Cisco#show snmp host
```

## Telnet

Telnet is enabled by default and is available as soon as an IP addr is assigned to a VLAN, without UID/PW access control. To control access with UID/PW or PW(only), see Ch2 for configuring UID/PW or PW only.

```
ProVision# show telnet
```

```
[Comware7]telnet server enable
[Comware7]local-user <name>
[Comware7-lusermanager] service-type telnet
[Comware7]user-interface vty 0 63
[Comware7-ui-vty0-63]authentication-mode scheme
[Comware7]user-interface vty 0 63
[Comware7-ui-vty0-63]authentication-mode password
[Comware7-line-vty0-63]userrole network-admin
[Comware7-ui-vty0-63]set authentication password simple
password
[Comware]display users
[Comware]display users all
```

```
Cisco(config)#line vty 0 15
Cisco(config-line)#login local
Cisco(config)#line vty 0 15
Cisco(config-line)#login
Cisco(config-line)#password 0 password
Cisco#show users
```

## SSH

```
ProVision(config)# crypto key generate ssh
ProVision(config)# ip ssh
ProVision(config)# no telnetserver
ProVision# show ip ssh
ProVision# show crypto hostpublic-key
ProVision# show ip hostpublic-key
```

```
[Comware7]public-key local create rsa
[Comware7]ssh server enable
[Comware7]user-interface vty 0 63
[Comware7-ui-vty0-63]authentication-mode scheme
[Comware7-ui-vty0-63]protocol inbound ssh
[Comware7]local-user <name>
[Comware7-luser-sshmanager]password simple password
[Comware7-luser-sshmanager]service-type ssh
[Comware7-luser-manage-sshmanager]authorization-
attribute user-role networkadm in
[Comware7]undo telnet server enable
[Comware]display ssh server status
[Comware]display ssh server session
[Comware]display public-key local rsa public
```

```
Cisco(config)#hostname Cisco
Cisco(config)#ip domain-name test
Cisco(config)#crypto key generate
Cisco(config)#ip ssh version 2
Cisco(config)#line vty 0 15
Cisco(config-line)#login local
Cisco(config-line)#transport input ssh
Cisco(config)#username <name> privilege 15 password
<password>
(NOTE: by configuring
'transport input ssh' on the
vty interfaces, telnet access is disabled)
Cisco#show ip ssh
Cisco#show ssh
Cisco#show crypto key mypubkey rsa
```

## HTTP

ProVision(config)# web-management plaintext	[Comware7]local-user <name> [Comware7-luser-managemanager] password simple <password> [Comware7-luser-managemanager] authorizationattribute user-role networkadmin [Comware7-luser-managemanager] service-type http [Comware7]ip http enable [Comware7]display web users	Cisco(config)#username <name> privilege 15 password <password> Cisco(config)#ip http authentication local Cisco(config)#ip http server Cisco#show ip http server connection
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## HTTPS – SSL

ProVision(config)# crypto pki enroll-self-signed certificate-name localcert subject ProVision(config)# web-management ssl ProVision(config)# no web-management plaintext ProVision# show crypto pki local-certificate ProVision# show crypto pki local-certificate localcert	[Comware7]local-user manager [Comware7-luser-managemanager] password simple password [Comware7-luser-managemanager] authorization-attribute user-role network-admin [Comware7-luser-managemanager] service-type https [Comware7]ip https enable [Comware7]undo ip http enable [Comware7]display web users	Cisco(config)#crypto key generate rsa Cisco(config)#ip http secure-server Cisco(config)#no ip http server Cisco#show crypto pki certificates verbose Cisco#show ip http server connection
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## RADIUS Authentication

ProVision(config)# radius-server host 192.168.1.4 key password ProVision(config)# aaa authentication console login radius local ProVision(config)# aaa authentication console enable radius local ProVision(config)# aaa authentication telnet login radius none ProVision(config)# aaa authentication telnet enable radius none ProVision(config)# aaa authentication ssh login radius none ProVision(config)# aaa authentication ssh enable radius none ProVision(config)# aaa authentication web login radius none	[Comware7] radius scheme radius-auth [Comware7-radius-radiusauth] primary authentication 192.168.1.4 key simple password [Comware7-radius-radiusauth] primary accounting 192.168.1.4 key simple password [Comware7-radius-radiusauth] user-name-format without-domain [Comware7]domain lab [Comware7-isplab] authentication default radius-scheme radius-auth [Comware7-isplab] authorization default radius-scheme radius-auth [Comware7-isp-lab]accounting default radius-scheme radius-auth	Cisco(config)#radius server radius-auth Cisco(config)#radius-server host 192.168.1.4 auth-port 1812 acct-port 1813 key password Cisco(config)#aaa authentication login default group radius local Cisco(config)#aaa authentication enable default group radius local Cisco(config)#aaa authentication login default group radius Cisco(config)#aaa authentication enable default group radius Cisco(config)#aaa authentication login default group radius Cisco(config)#aaa authentication enable default group radius
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ProVision(config)# aaa authentication web enable radius none	[Comware7]domain default enable lab	radius
ProVision(config)# aaa authentication login privilege-mode	[Comware7]user-interface aux 0	Cisco(config)#line vty 0 15
ProVision(config)# aaa authorization commands radius	[Comware7-lineaux0] authentication-mode scheme	Cisco(config-line)#login authentication default
ProVision# show authorization	[Comware7]user-interface vty 0 63	Cisco#show aaa servers
ProVision# show radius	[Comware7-ui-vty0-63]authentication-mode scheme	Cisco#show radius server-group radius
ProVision# show authentication	[Comware7-line-vty0-63]user-role network-admin	Cisco#show radius statistics
ProVision# show radius authentication	[Comware7]display radius scheme	Cisco(config)#aaa authorization console
ProVision# show radius host 192.168.1.4	[Comware7]display radius statistics	Cisco(config)#aaa authorization exec default group radius
	[Comware5-ui-vty0-63]command authorization	

## RADIUS Accounting

ProVision(config)# aaa accounting exec start-stop radius		Cisco(config)#aaa accounting exec default start-stop group radius
ProVision(config)# aaa accounting network start-stop radius		Cisco(config)#aaa accounting network default start-stop group radius
ProVision(config)# aaa accounting system start-stop radius		Cisco(config)#aaa accounting system default start-stop group radius
ProVision(config)# aaa accounting commands stop-only radius	(Basic support only; no other specific feature support)	Cisco#show aaa user all
ProVision# show radius accounting		
ProVision# show accounting		
ProVision# show accounting sessions		

## TACACS+/HWTACACS Authentication

		Cisco(config)#aaa new-model
		Cisco(config)#tacacs-server host 192.168.1.4 key password
	[Comware7]hwtacacs scheme tacacs-auth	Cisco(config)#aaa authentication login default group tacacs+ local
	[Comware7-hwtacacs-tacacsauth] primary authentication 192.168.1.4 key simple password	Cisco(config)#aaa authentication enable default group tacacs+ local
ProVision(config)# tacacsserver host 192.168.1.4 key password	[Comware7-hwtacacs-tacacsauth] primary authorization 192.168.1.4 key simple password	Cisco(config)#aaa authentication login default group tacacs+
ProVision(config)# aaa authentication console login tacacs local	[Comware7-hwtacacs-tacacsauth] primary accounting 192.168.1.4 key simple password	Cisco(config)#aaa authentication enable default group tacacs+
ProVision(config)# aaa authentication console enable tacacs local	[Comware7-hwtacacs-tacacsauth] user-name-format without-domain	Cisco(config)#aaa authentication login default group tacacs+
ProVision(config)# aaa authentication telnet login tacacs none	[Comware7]domain tacacs	Cisco(config)#aaa authentication enable default group tacacs+
ProVision(config)# aaa authentication telnet enable tacacs none	[Comware7-isptacacs] authentication default hwtacacs-scheme tacacs-auth	Cisco(config)#line vty 0 15
ProVision(config)# aaa authentication ssh login tacacs none	[Comware7-isptacacs] authorization default hwtacacs-scheme tacacs-auth	Cisco(config-line)#login authentication default

```
ProVision(config)# aaa authentication ssh enable tacacs none
ProVision(config)# aaa authentication login privilege-mode
ProVision# show tacacs
ProVision# show authentication
ProVision# show authentication
```

```
[Comware7-isptacacs] accounting default hwtacacs-scheme tacacs-auth
[Comware7]domain default enable tacacs
[Comware7]user-interface aux 0
[Comware7-lineaux0] authentication-mode scheme
[Comware7]user-interface vty 0 63
[Comware7-line-vty0-63]authentication-mode scheme
[Comware7]display hwtacacs
[Comware7]display hwtacacs scheme tacacs-auth statistics
```

```
Cisco(config)#aaa authorization console
Cisco(config)#aaa authorization exec default group tacacs+
Cisco(config)#aaa accounting exec default start-stop group tacacs+
Cisco(config)#aaa accounting network default start-stop group tacacs+
Cisco(config)#aaa accounting system default start-stop group tacacs+
Cisco(config)#aaa accounting commands 15 default stop-only group tacacs+
Cisco#show aaa user all
Cisco#show tacacs
```

## LLDP

```
ProVision(config)# lldp run
ProVision# show lldp info remote-device
ProVision# show lldp info remote-device 1
```

```
[Comware7]lldp global enable
[Comware7]interface g1/0/1
[Comware7-GigabitEthernet1/0/1]lldp enable
[Comware7]display lldp neighbor-information list
[Comware7]display lldp neighbor-information interface g1/0/1
[Comware7]display lldp neighbor-information interface g1/0/1 verbose
```

```
Cisco(config)#lldp run
Cisco#show lldp neighbors
Cisco#show lldp neighbors g1/0/1 detail
```

## CDP

```
ProVision(config)# cdp run
ProVision# show cdp
ProVision# show cdp neighbors
ProVision# show cdp neighbors 5
ProVision# show cdp neighbors 5 detail
```

```
[Comware7]lldp compliance cdp
[Comware7-GigabitEthernet1/0/5]lldp compliance admin-status cdp txrx
[Comware7] display lldp neighbor-information
[Comware7] display lldp neighbor-information interface g1/0/5 verbose
```

```
Cisco(config)#cdp run
Cisco#show cdp
Cisco#show cdp neighbors
Cisco#show cdp neighbors g1/0/5
Cisco#show cdp neighbors g1/0/5 detail
```

## Job Schedule

```
ProVision(config)# job save-config at 01:00 "copy run tftp 10.0.100.111 provision.cfg"
```

```
[Comware7]scheduler job save-config
[Comware7-job-save-config] command 1 tftp 10.0.100.111 put startup.cfg
[Comware7]scheduler schedule save-config
```

```
Cisco(config)#file prompt quiet
Cisco(config)#kron policylist save-config
Cisco(config-kron-policy)#cli copy run tftp://10.0.100.111/ciscostartup.cfg
```

ProVision# show job  
ProVision# show job save-config

[Comware7-schedulesave-config] time once at 01:45  
[Comware7-schedulesave-config] job save-config  
[Comware7]display scheduler job  
[Comware7]display scheduler schedule

Cisco(config)#cron occurrence save-config at 09:30  
onshot  
Cisco(config-kronoccurrence)# policy-list save-config  
Cisco#show kron schedule

## Interface or Port Information

ProVision# show interfaces brief  
ProVision# show interfaces brief 1  
ProVision# show interfaces 1  
ProVision(config)# interface 1  
ProVision(eth-1)# name link-to-core  
ProVision(eth-1)# speedduplex auto  
ProVision(eth-1)# disable  
ProVision(eth-1)# enable

<Comware> display interface brief  
<Comware> display interface g1/0/1 brief  
<Comware> display interface g1/0/1  
[Comware] interface g1/0/1  
[Comware-GigabitEthernet1/0/1] description link-to-core  
[Comware-GigabitEthernet1/0/1] duplex auto  
[Comware-GigabitEthernet1/0/1] speed auto  
[Comware-GigabitEthernet1/0/1] shutdown  
[Comware-GigabitEthernet1/0/1] undo shutdown

Cisco#show interfaces status  
Cisco#show interfaces g1/0/1 status  
Cisco#show interfaces g1/0/1  
Cisco(config)#interface g1/0/1  
Cisco(config-if)#description link-to-core  
Cisco(config-if)#duplex auto  
Cisco(config-if)#speed auto  
Cisco(config-if)#shutdown  
Cisco(config-if)#no shutdown

## VLAN Management

untagged  
tagged  
trunk  
ProVision(config)# vlan 220  
ProVision(vlan-220)# name test  
ProVision# show vlans  
ProVision(config)# vlan 220  
ProVision(vlan-220)# tagged 6  
ProVision(vlan-220)# untagged 4  
ProVision# show vlans 220  
ProVision# show vlans 1  
ProVision# show vlans ports 6 detail  
ProVision# show vlans ports 5 detail

access  
trunk  
Note: some display views  
will denote tagged)  
bridge aggregation  
[Comware] vlan 220  
[Comware-vlan220] name test  
[Comware] display vlan  
[Comware] display vlan all  
[Comware] interface g1/0/6  
[Comware-GigabitEthernet1/0/6] port link-type trunk  
[Comware-GigabitEthernet1/0/6] port trunk permit vlan 220  
[Comware] vlan 220  
[Comware-vlan220] port g1/0/4  
[Comware] display vlan 220  
[Comware] display vlan 1  
[Comware] display interface g1/0/6  
[Comware] display interface g1/0/5

access  
trunk  
etherchannel  
Cisco(config)# vlan 220  
Cisco(config-vlan)# name test  
Cisco# show vlan brief  
Cisco(config)# interface g1/0/6  
Cisco(config-if)# switchport trunk encapsulation dot1q  
Cisco(config-if)# switchport trunk allowed vlan 220  
Cisco(config-if)#switchport mode trunk  
Cisco(config-if)#switchport nonegotiate  
Cisco(config)# interface g1/0/4  
Cisco(config-if)# switchport access vlan 220  
Cisco(config-if)# switchport mode access  
Cisco#show vlan id 220  
Cisco#show vlan id 1  
Cisco#show interfaces g1/0/6 switchport  
Cisco#show interfaces g1/0/5 switchport

## Advanced VLAN Features

```
ProVision(config)# vlan 150 private-vlan primary
ProVision(config)# vlan 150 private-vlan isolated 151
ProVision(config)# vlan 150 private-vlan community 152
ProVision(config)# interface 10 private-vlan promiscuous
ProVision(config)# vlan 150 untag 10
ProVision(config)# vlan 151 untag 12,13
ProVision(config)# vlan 152 untag 14,15
ProVision(config)# vlan 150 ip address 10.150.1.1/24
ProVision# show vlans private-vlan
ProVision# show vlans 150 private-vlan
ProVision# show vlans 150
ProVision# show vlans 151
ProVision# show vlans 152

[Comware7] vlan 150
[Comware7-vlan150] private-vlan primary
[Comware7-vlan150] quit
[Comware7] vlan 151
[Comware7-vlan151] private-vlan isolated
[Comware7-vlan151] quit
[Comware7] vlan 152
[Comware7-vlan152] private-vlan community
[Comware7-vlan152] quit
[Comware7] vlan 150
[Comware7-vlan150] private-vlan secondary 151 to 152
[Comware7-vlan150] quit
[Comware7] interface g1/0/10
[Comware7-GigabitEthernet1/0/10] port private-vlan 150
promiscuous
[Comware7-GigabitEthernet1/0/10] interface g1/0/12
[Comware7-GigabitEthernet1/0/12] port private-vlan host
[Comware7-GigabitEthernet1/0/12] port access vlan 151
[Comware7-GigabitEthernet1/0/12] interface g1/0/14
[Comware7-GigabitEthernet1/0/14] port private-vlan host
[Comware7-GigabitEthernet1/0/14] port access vlan 152
[Comware7-GigabitEthernet1/0/14] quit
[Comware7] interface vlan 150
[Comware7-Vlan-interface150] ip address 10.150.2.1 24
[Comware7-Vlaninterface150] private-vlan secondary 151
to 152
[Comware7] display private-vlan

Cisco(config)# vtp mode transparent
Cisco(config)# vlan 150
Cisco(config-vlan)# privatevlan primary
Cisco(config-vlan)# exit
Cisco(config)# vlan 151
Cisco(config-vlan)# privatevlan isolated
Cisco(config-vlan)# exit
Cisco(config)# vlan 152
Cisco(config-vlan)# privatevlan community
Cisco(config-vlan)# exit
Cisco(config)# vlan 150
Cisco(config-vlan)# private
vlan association add 151-152
Cisco(config-vlan)# exit
Cisco(config)# interface g1/0/10
Cisco(config-if)# switchport mode private-vlan
promiscuous
Cisco(config-if)# switchport private-vlan mapping 150 add
151-152
Cisco(config)#interface g1/0/12
Cisco(config-if)# switchport mode private-vlan host
Cisco(config-if)# switchport private-vlan hostassociation
150 151
Cisco(config)# int g1/0/14
Cisco(config-if)# switchport mode private-vlan host
Cisco(config-if)# switchport private-vlan hostassociation
150 152
Cisco(config)# interface vlan 150
Cisco(config-if)# ip addr 10.150.3.1 255.255.255.0
Cisco(config-if)# private-vlan mapping add 151-152
Cisco# show vlan private-vlan
Cisco# show vlan private-vlan type
Cisco# show interface private-vlan mapping
```

## Assigning an IP Address to a VLAN

```
ProVision(config)# vlan 220
ProVision(vlan-220)# ip address 192.168.16.1/24
ProVision# show ip
```

```
[Comware]interface Vlan-interface 220
[Comware-Vlan-interface220]ip address 192.168.16.1 24
[Comware]display ip interface brief
```

```
Cisco(config)#interface vlan 220
Cisco(config-if)#ip address 192.168.16.1 255.255.255.0
Cisco(config-if)#no shutdown
Cisco#show ip interface brief
```

## VxLAN

```
ProVision(config)# vxlan enable
ProVision(config)# vxlan udp 12345
ProVision(config)# interface tunnel 1
ProVision(tunnel-1)# tunnel mode vxlan
ProVision(tunnel-1)# tunnel source 10.222.1.2
ProVision(tunnel-1)# tunnel destination 10.222.1.1
ProVision(tunnel-1)# exit
ProVision(config)# virtualnetwork 1 10 virtual-net1
ProVision(config)# vxlan tunnel 1 overlay-vlan 10
```

```
[Comware7] l2vpn enable
[Comware7] vsi vpna
[Comware7-vsi-vpna] vxlan 200
[Comware7-vsi-vpna-vxlan200] quit
[Comware7-vsi-vpna] quit
[Comware7] interface tunnel 1 mode vxlan
[Comware7-Tunnel1] source 10.222.2.2
[Comware7-Tunnel1] destination 10.222.2.1
[Comware7-Tunnel1] quit
[Comware7] vsi vpna
[Comware7-vsi-vpna] vxlan 200
[Comware7-vsi-vpna-vxlan200] tunnel 1
[Comware7-vsi-vpna-vxlan200] quit
[Comware7-vsi-vpna] quit
[Comware7] interface g1/0/1
[Comware7-GigabitEthernet1/0/1] service-instance 1000
[Comware7-GigabitEthernet1/0/1-srv1000] encapsulation s-vid 2
[Comware7-GigabitEthernet1/0/1-srv1000] xconnect vsi vpna
[Comware7-GigabitEthernet1/0/1-srv1000] quit
[Comware7-GigabitEthernet1/0/1] quit
```

```
Cisco-vtep-1(config)# feature pim
Cisco-vtep-1(config)# ip pim rp-address 10.0.111.22
group-list 224.0.0.0/4
Cisco-vtep-1(config)# interface loopback0
Cisco-vtep-1(config-if)# ip pim sparse-mode
Cisco-vtep-1(config-if)# exit
Cisco-vtep-1(config)# interface e2/1
Cisco-vtep-1(config-if)# ip pim sparse-mode
Cisco-vtep-1(config-if)# exit
Cisco-vtep-1(config)# feature nv overlay
Cisco-vtep-1(config)# feature vn-segment-vlan-based
Cisco-vtep-1(config)# interface nve1
Cisco-vtep-1(config-if)# no shutdown
Cisco-vtep-1(config-if)# source-interface loopback0
Cisco-vtep-1(config-if)# member vni 10000 mcast-group 230.1.1.1
Cisco-vtep-1(config-if)# exit
Cisco-vtep-1(config)# vlan 200
Cisco-vtep-1(config-vlan)# vn-segment 10000
Cisco-vtep-1(config-vlan)# exit
Cisco-vtep-1(config)# exit
```

## IP Helper to Relay / Forward DHCP Requests

```
ProVision(config)# vlan 220
ProVision(vlan-220)# ip helper-address 10.0.100.251
ProVision# show ip helper-address vlan 220
```

```
[Comware7] dhcp enable
[Comware7] interface Vlan-interface 220
[Comware7-Vlan-interface220] dhcp select relay
[Comware7-Vlan-interface220] dhcp relay server-address 10.0.100.251
```

```
Cisco(config)# interface vlan 220
Cisco(config-if)# ip helper-address 10.0.100.251
Cisco# show ip interface vlan 220
```

```
ProVision# show dhcp-relay
```

```
[Comware7] display dhcp relay server-address  
[Comware7]display dhcp relay statistics interface Vlan-  
interface 220
```

## PoE (Power over Ethernet)

```
ProVision# show power-overethernet  
ProVision# show power-overethernet brief  
ProVision# show power-overethernet 5  
ProVision(config)# interface 5  
ProVision(eth-5)# no powerover-ethernet  
ProVision(eth-5)# power-overethernet
```

```
[Comware-GigabitEthernet1/0/5] poe enable  
[Comware] display poe device  
[Comware] display poe interface  
[Comware] display poe interface g1/0/5  
[Comware] interface g1/0/5  
[Comware-GigabitEthernet1/0/5] undo poe enable  
[Comware-GigabitEthernet1/0/5] poe enable
```

```
Cisco#show power inline  
Cisco#show power inline f1/0/5  
Cisco(config)#interface f1/0/5  
Cisco(config-if)#power inline never  
Cisco(config-if)#power inline auto
```

## VoIP Support

```
ProVision(config)# vlan 230  
ProVision(vlan-230)# voice  
ProVision(vlan-230)# vlan 220  
ProVision(vlan-220)# untagged 5  
ProVision(vlan-220)# vlan 230  
ProVision(vlan-230)# tagged 5  
ProVision# show vlans 230  
ProVision# show vlan ports 5 detail
```

```
[Comware7] voice-vlan macaddress 0013-6000-0000 mask  
ffff-ff00-0000 description Cisco-7960  
[Comware7] vlan 230  
[Comware7-vlan230] name voice  
[Comware7]interfaceg1/0/5  
[Comware7-GigabitEthernet1/0/5] port link-type access  
[Comware7-GigabitEthernet1/0/5] port link-type hybrid  
[Comware7-GigabitEthernet1/0/5] port hybrid vlan 220  
untagged  
[Comware7-GigabitEthernet1/0/5] port hybrid pvid vlan 220  
[Comware7-GigabitEthernet1/0/5] voice vlan 230 enable  
[Comware7-GigabitEthernet1/0/5] poe enable  
<Comware7> display vlan 230  
<Comware7> display interface g1/0/5  
<Comware7> display voice-vlan state  
<Comware7>display voice-vlan mac-address
```

```
Cisco(config)# vlan 230  
Cisco(config-vlan)# name voice  
Cisco(config)# interface g1/0/5  
Cisco(config-if)# switchport  
Cisco(config-if)# switchport access vlan 220  
Cisco(config-if)#switchport mode access  
Cisco(config-if)#switchport voice vlan 230  
Cisco#show interfaces g1/0/5 switchport
```

## Link Aggregation Control Protocol (LACP)

```
ProVision(config)# trunk 20-23 trk1 lacp
ProVision(config)# vlan 220 tagged trk1
ProVision# show trunks
ProVision# show lacp
ProVision# show lacp peer
ProVision# show lacp peer
ProVision# show lacp counters
ProVision# show vlans 220
ProVision# show vlans ports trk1 detail
```

```
[Comware] interface Bridge-Aggregation 1
[Comware-Bridge-Aggregation1] description LACPlink-to-
ProVision
[Comware-Bridge-Aggregation1] link-aggregation mode
dynamic
[Comware] interface g1/0/23
[Comware-GigabitEthernet1/0/23] port link-aggregation
group 1
[Comware-GigabitEthernet1/0/23] interface g1/0/24
[Comware-GigabitEthernet1/0/24] port link-aggregation
group 1
[Comware] interface Bridge-Aggregation 1
[Comware-Bridge-Aggregation1] port link-type trunk
[Comware-Bridge-Aggregation1] port trunk permit vlan 220
[Comware] display linkaggregation summary
[Comware] display linkaggregation verbose
[Comware] display linkaggregation member-port
[Comware] display vlan 220
```

```
Cisco(config)#interface port-channel 1
Cisco(config-if)# switchport trunk encapsulation dot1q
Cisco(config-if)# switchport trunk allowed vlan 220
Cisco(config-if)# switchport mode access
Cisco(config-if)# switchport nonegotiate
Cisco(config)# interface range g1/0/23 – 24
Cisco(config-ifrange)# switchport trunk encapsulation
dot1q
Cisco(config-ifrange)# switchport trunk allowed vlan 220
Cisco(config-ifrange)# switchport mode access
Cisco(config-ifrange)# switchport nonegotiate
Cisco(config-ifrange)# channel-group 1 mode active
Cisco#show lacp 1 internal
Cisco#show interfaces etherchannel
Cisco#show vlan name test
```

### Trunk

```
ProVision(config)# trunk 19-20 trk1 trunk
ProVision(config)# vlan 220 tagged trk1
ProVision# show trunks
ProVision# show vlans 220
ProVision# show vlans ports trk1 detail
```

```
[Comware] interface Bridge-Aggregation 1
[Comware-Bridge-Aggregation1] description Trunklink-to-
ProVision
[Comware] interface g1/0/23
[Comware-GigabitEthernet1/0/23] port link-aggregation group
1
[Comware-GigabitEthernet1/0/23] interface g1/0/24
[Comware-GigabitEthernet1/0/24] port link-aggregation group
1
[Comware] interface Bridge-Aggregation 1
[Comware-Bridge-Aggregation1] port link-type trunk
[Comware-Bridge-Aggregation1] port trunk permit vlan 220
[Comware] display linkaggregation summary
[Comware] display linkaggregation verbose
[Comware] display linkaggregation member-port
[Comware] display vlan 220
```

```
Cisco(config)#interface port-channel 1
Cisco(config-if)#switchport trunk encapsulation dot1q
Cisco(config-if)#switchport trunk allowed vlan 220
Cisco(config-if)#switchport mode access
Cisco(config-if)#switchport nonegotiate
Cisco(config)#interface range g1/0/23 – 24
Cisco(config-ifrange)# switchport trunk encapsulation dot1q
Cisco(config-ifrange)# switchport trunk allowed vlan 220
Cisco(config-ifrange)# switchport mode access
Cisco(config-ifrange)# switchport nonegotiate
Cisco(config-ifrange)# channel-group 1 mode on
Cisco#show etherchannel 1 summary
Cisco#show interfaces etherchannel
Cisco#show vlan name test
```

## RSTP

```
ProVision(config)# spanning-tree
ProVision(config)# spanning-tree force-version rstpoperation
ProVision(config)# spanning-tree priority 2
ProVision(config)# spanning-tree 4 admin-edge-port
ProVision(config)# spanning-tree 4 path-cost 10000
ProVision(config)# spanning-tree 4 priority 6
ProVision# show spanning-tree

[Comware7] stp mode rstp
[Comware7] stp priority 16384
[Comware7] interface g1/0/4
[Comware7-GigabitEthernet1/0/4] stp edged-port enable
[Comware7-GigabitEthernet1/0/4] stp cost 10000
[Comware7-GigabitEthernet1/0/4] stp port priority 96
[Comware7] display stp
[Comware7] display stp brief
```

(Not an available feature)

## MSTP

```
ProVision(config)# spanning-tree
ProVision(config)# spanning-tree config-name ProVision-Comware-Cisco
ProVision(config)# spanning-tree config-revision 1
ProVision(config)# spanning-tree instance 1 vlan 220
ProVision(config)# spanning-tree instance 2 vlan 100
ProVision(config)# spanning-tree instance 3 vlan 240
ProVision(config)# spanning-tree priority 2
ProVision(config)# spanning-tree instance 1 priority 3
ProVision(config)# spanning-tree instance 2 priority 4
ProVision(config)# spanning-tree instance 3 priority 5
ProVision(config)# spanning-tree 9 admin-edge-port
ProVision(config)# spanning-tree 9 path-cost 10000
ProVision(config)# spanning-tree 9 priority 10
ProVision(config)# spanning-tree instance 1 9 path-cost 10000
ProVision(config)# spanning-tree instance 1 9 priority 10
ProVision# show spanning-tree
ProVision# show spanning-tree mst-config
ProVision# show spanning-tree instance ist
ProVision# show spanning-tree instance 1

[Comware7] stp region-configuration
[Comware7-mst-region] regionname ProVision-Comware-Cisco
[Comware7-mstregion] revision-level 1
[Comware7-mst-region] instance 1 vlan 220
[Comware7-mst-region] instance 2 vlan 100
[Comware7-mst-region] instance 3 vlan 240
[Comware7-mst-region] active region-configuration
[Comware7] stp priority 16384
[Comware7] stp instance 1 priority 20480
[Comware7] stp instance 2 priority 8192
[Comware7] stp instance 3 priority 12288
[Comware7] interface g1/0/9
[Comware7-GigabitEthernet1/0/9] stp edged-port
[Comware7-GigabitEthernet1/0/9] stp cost 10000
[Comware7-GigabitEthernet1/0/9] stp port priority 160
[Comware7-GigabitEthernet1/0/9] stp instance 1 cost 10000
[Comware7-GigabitEthernet1/0/9] stp instance 1 port priority 160
[Comware7] display stp
[Comware7] display stp brief
[Comware7] display stp region-configuration
[Comware7] display stp instance 0
[Comware7] display stp instance 1
[Comware7] display stp instance 2

Cisco(config)# spanning-tree mode mst
Cisco(config)# spanning-tree mst configuration
Cisco(config-mst)# name ProVision-Comware-Cisco
Cisco(config-mst)# revision 1
Cisco(config-mst)# instance 1 vlan 220
Cisco(config-mst)# instance 2 vlan 100
Cisco(config-mst)# instance 3 vlan 240
Cisco(config)# spanning-tree mst 0 priority 20480
Cisco(config)# spanning-tree mst 1 priority 16384
Cisco(config)# spanning-tree mst 2 priority 12288
Cisco(config)# spanning-tree mst 3 priority 8192
Cisco(config)# interface g1/0/9
Cisco(config-if)# spanning-tree portfast
Cisco(config-if)# spanning-tree cost 10000
Cisco(config-if)# spanning-tree port-priority 160
Cisco(config-if)# spanning-tree mst 1 cost 10000
Cisco(config-if)# spanning-tree mst 1 port-priority 160
Cisco# show spanning-tree
Cisco# show spanning-tree mst
Cisco# show spanning-tree mst configuration
Cisco# show spanning-tree mst 0
Cisco# show spanning-tree mst 1
Cisco# show spanning-tree mst 3
```



## PVST/PVST+/RPVST/RPVST+

ProVision(config)# spanning-tree mode rapid-pvst	[Comware7] stp mode pvst	Cisco(config)#spanning-tree mode rapid-pvst
ProVision(config)# spanning-tree vlan 1 priority 2	[Comware7] stp vlan 1 priority 16384	Cisco(config)#spanning-tree vlan 1 priority 20480
ProVision(config)# spanning-tree vlan 220 priority 3	[Comware7] stp vlan 220 priority 20480	Cisco(config)#spanning-tree vlan 220 priority 16384
ProVision(config)# spanning-tree vlan 100 priority 4	[Comware7] stp vlan 100 priority 8192	Cisco(config)#spanning-tree vlan 100 priority 12288
ProVision(config)# spanning-tree vlan 240 priority 5	[Comware7] stp vlan 240 priority 12288	Cisco(config)#spanning-tree vlan 240 priority 8192
ProVision(config)# spanning-tree	[Comware7] stp global enable	Cisco# show spanning-tree root
ProVision # show spanning-tree	[Comware7] display stp root	Cisco# show spanning-tree summary
	[Comware7] display stp	

## RIP – v1 and v2

ProVision(config)# router rip	[Comware] rip 1	Cisco(config)# router rip
ProVision(rip)# enable	[Comware-rip-1] network 10.1.220.0	Cisco(config-router)# network 10.1.220.0
ProVision(rip)# vlan 220 ip rip	[Comware-rip-1] version 2	Cisco(config-router)# version 2
ProVision(rip)# redistribute connected	[Comware-rip-1] import-route direct	Cisco(configrouter)# redistribute connected
ProVision# show ip rip	[Comware] display rip	Cisco# show ip rip database
ProVision# show ip rip interface vlan 220	[Comware] display rip 1 interface Vlan-interface 220	Cisco# show ip rip database 10.1.220.0 255.255.255.0
ProVision# show ip rip redistribute	[Comware] display rip 1 database	

## OSPFv2-Single Area

ProVision(config)# ip routerid 10.0.0.21		
ProVision(config)# router ospf	[Comware] ospf 1 router-id 10.0.0.31	Cisco(config)# router ospf 1
ProVision(ospf)# enable	[Comware-ospf-1] area 0	Cisco(config-router)# routerid 10.0.0.41
ProVision(ospf)# area 0	[Comware-ospf-1-area-0.0.0.0] network 10.1.220.0	Cisco(config-router)#network 10.1.220.0 0.0.0.255 area 0
ProVision(ospf)# vlan 220	0.0.0.255	Cisco(configrouter)# redistribute connected
ProVision(vlan-220)# ip ospf area 0	[Comware-ospf-1] import-route direct	
ProVision(vlan-220)# router ospf		
ProVision(ospf)# redistribute connected		

## OSPFv2-Multiple Areas

ProVision(config)# router ospf	[Comware] ospf 1	Cisco(config)# router ospf 1
ProVision(ospf)# area 1	[Comware-ospf-1] area 1	Cisco(config-router)# network 10.1.100.0 0.0.0.255 area
ProVision(ospf)# area 2	[Comware-ospf-1-area-0.0.0.1] network 10.1.100.0	1
ProVision(ospf)# vlan 100	0.0.0.255	

```
ProVision(vlan-100)# ip ospf area 1
ProVision(vlan-100)# vlan 230
ProVision(vlan-230)# ip ospf area 2
```

```
[Comware-ospf-1-area-0.0.0.1] area 2
[Comware-ospf-1-area-0.0.0.2] network 10.1.230.0
0.0.0.255
```

```
Cisco(config-router)# network 10.1.230.0 0.0.0.255 area
2
```

## Stub – totally stubby

```
ProVision(ospf)# area 1 stub 11
ProVision(ospf)# area 2 stub no-summary 11
ProVision(config)# vlan 230
ProVision(vlan-230)# ip ospf cost 10
```

```
[Comware-ospf-1] area 1
[Comware-ospf-1-area-0.0.0.1] stub
[Comware-ospf-1]area 2
[Comware-ospf-1-area-0.0.0.2] stub no-summary
[Comware]interface Vlaninterface 230
[Comware-Vlaninterface230] ospf cost 10
```

```
Cisco(config-router)# area 1 stub
Cisco(config-router)# area 2 stub no-summary
Cisco(config-if)# interface vlan 230
Cisco(config-if)# ip ospf cost 10
```

## Show or Display OSPF Commands

```
ProVision# show ip ospf interface
ProVision# show ip ospf neighbor
ProVision# show ip ospf linkstate
```

```
[Comware] display ospf interface
[Comware] display ospf peer
[Comware] display ospf lsdb
```

```
Cisco# show ip ospf interface brief
Cisco# show ip ospf neighbor
Cisco# show ip ospf database
```

## BGP version 4

```
ProVision(config)# router bgp 64502
ProVision(bgp)# bgp router-id 10.0.0.2
ProVision(bgp)# neighbor 10.0.101.31 remote-as 64503
ProVision(bgp)# neighbor 10.0.101.41 remote-as 64504
ProVision(bgp)# neighbor 10.0.101.51 remote-as 64505
ProVision(bgp)# redistribute connected
ProVision(bgp)# redistribute static
ProVision(bgp)# enable
ProVision(bgp)# network 10.0.221.0/24
ProVision# show ip bgp summary
```

```
[Comware7] bgp 64505
[Comware7-bgp] router-id 10.0.0.5
[Comware7-bgp] peer 10.0.101.21 as-number 64502
[Comware7-bgp] address-family ipv4 unicast
[Comware7-bgp-ipv4] peer 10.0.101.21 enable
[Comware7-bgp-ipv4] importroute direct
[Comware7-bgp-ipv4] network 10.0.251.0 24
[Comware7] display bgp peer ipv4
```

```
Cisco(config)# router bgp 64504
Cisco(config-router)# bgp router-id 10.0.0.4
Cisco(config-router)# neighbor 10.0.101.21 remote-as
64502
Cisco(configrouter)# redistribute connected
Cisco(config-router)# network 10.0.241.0 mask
255.255.255.0
Cisco# show ip bgp summary
```

## iBGP & eBGP

### iBGP router:

```
ProVision-2(config)# router bgp 64502
ProVision-2(bgp)# bgp router-id 10.0.0.12
```

### iBGP router:

```
[Comware7-2] bgp 64505
[Comware7-2-bgp] router-id 0.0.0.15
[Comware7-2-bgp] peer 0.0.115.254 as-number 64505
[Comware7-2-bgp] address-family ipv4 unicast
```

### iBGP router:

```
Cisco-2(config)# router bgp 64504
Cisco-2(config-router)# bgp router-id 10.0.0.14
Cisco-2(config-router)# neighbor 10.0.114.254 remote-as
```

```

ProVision-2(bgp)# neighbor 10.0.112.254 remote-as 64502
ProVision-2(bgp)# redistribute connected
ProVision-2(bgp)# enable
ProVision-2(bgp)# network 10.0.222.0/24
ProVision-2# show ip bgp summary
eBGP router:
ProVision(config)# router bgp 64502
ProVision(bgp)# neighbor 0.0.112.1 remote-as 64502
ProVision(bgp)# neighbor 0.0.112.1 next-hop-self
ProVision# show ip bgp ummary

```

```

[Comware7-2-bgp-ipv4] peer 10.0.115.254 enable
[Comware7-2-bgpiipv4] import-route direct
[Comware7-bgp-ipv4] network 10.0.252.0 24
[Comware7-2] display bgp peer ipv4
eBGP router:
[Comware7] bgp 64505
[Comware7-bgp] peer 10.0.115.1 as-number 64505
[Comware7-bgp] address-family ipv4 unicast
[Comware7-bgp-ipv4] peer 10.0.115.1 enable
[Comware7-bgp-ipv4] peer 10.0.115.1 next-hop-local
[Comware7-2] display bgp peer ipv4

```

```

64504
Cisco-2(configrouter)# redistribute connected
Cisco-2(config-router)# network 10.0.242.0 mask
255.255.255.0
Cisco-2# show ip bgp summary
eBGP router:
Cisco(config)# router bgp 64504
Cisco(config-router)# neighbor 10.0.114.1 remote-as
64504
Cisco(config-router)# neighbor 10.0.114.1 next-hop-self
Cisco# show ip bgp summary

```

## VRRP

```

ProVision(config)# router vrrp
ProVision(vrrp)# ipv4 enable
ProVision(vrrp)# vlan 220
ProVision(vlan-220)# vrrp vrid 220
ProVision(vlan-220-vrid-220)# virtual-ip-address 10.1.220.1
ProVision(vlan-220-vrid-220)# priority 254
ProVision(vlan-220-vrid-220)# enable
ProVision# show vrrp
ProVision# show vrrp vlan 220

```

```

[Comware7] interface Vlaninterface 100
[Comware7-Vlaninterface100] vrrp vrid 100 virtual-ip
10.1.100.1
[Comware7-Vlaninterface100] vrrp vrid 100 priority 254
[Comware7-Vlaninterface100] vrrp version 2
[Comware7] display vrrp verbose
[Comware7] display vrrp
[Comware7] display vrrp interface vlan 100 verbose

```

```

Cisco(config)# interface vlan 100
Cisco(config-if)# vrrp 100 ip 10.1.100.1
Cisco(config-if)# vrrp 100 priority 100
Cisco# show vrrp
Cisco# show vrrp brief
Cisco# show vrrp interface vlan 100

```

## ACL Fundamental Configuration Options

### Standard/Basic

```

ProVision(config)# ip access-list standard 1
ProVision(config-std-nacl)# permit 10.0.100.111 0.0.0.0
ProVision(config)# ip access-list standard std_acl
ProVision(config-std-nacl)# permit 10.0.100.111/32

```

### Extended/Advanced

```

ProVision(config)# ip access-list extended 100
ProVision(config-ext-nacl)# deny ip 10.1.220.0 0.0.0.255
10.0.100.111 0.0.0.0
ProVision(config-ext-nacl)# permit ip any any
ProVision(config)# ip access-list extended ext_acl
ProVision(config-ext-nacl)# deny ip 10.1.100.0/24
10.0.100.111/32
ProVision(config-ext-nacl)# permit ip any any

```

### Standard/Basic

```

[Comware] acl number 2000
[Comware-acl-basic-2000] rule permit source 10.0.100.111
0.0.0.0

```

```

[Comware] acl number 2001 name std_acl
[Comware-acl-basic-2001-std_acl] rule permit source
10.0.100.111 0

```

### Extended/Advanced

```

[Comware] acl number 3000
[Comware-acl-adv-3000] rule deny ip source 10.1.220.0
0.0.0.255 destination 10.0.100.111 0.0.0.0
[Comware] acl number 3001 name ext_acl
[Comware-acl-adv-3001-ext_acl] rule deny ip source
10.1.100.0 0.0.0.255 destination 10.0.100.111 0

```

### Standard/Basic

```

Cisco(config)# ip access-list standard 1
Cisco(config-std-nacl)# permit 10.0.100.111 0.0.0.0
Cisco(config)# ip access-list standard std_acl
Cisco(config-std-nacl)# permit 10.0.100.111 0.0.0.0

```

### Extended/Advanced

```

Cisco(config)# ip access-list extended 100
Cisco(config-ext-nacl)# deny ip 10.1.220.0 0.0.0.255
10.0.100.111 0.0.0.0
Cisco(config-ext-nacl)# permit ip any any
Cisco(config)# ip access-list extended ext_acl
Cisco(config-ext-nacl)# deny ip 10.1.100.0 0.0.0.255
10.0.100.111 0.0.0.0
Cisco(config-ext-nacl)# permit ip any any

```

## Routed/Layer 3 ACL (ACL)

### Standard or Basic ACL

```
ProVision(config)# ip access-list standard 1
ProVision(config-std-nacl)# permit 10.0.100.111 0.0.0.0
ProVision(config)# ip access-list standard std_acl
ProVision(config-std-nacl)# permit 10.0.100.111/32
ProVision(config-std-nacl)# vlan 220
ProVision(vlan-220)# ip access-group 1 in
ProVision(config)# vlan 100
ProVision(vlan-100)# ip access-group std_acl in
```

### Extended or Advanced ACL

```
ProVision(config)# ip access-list extended 100
ProVision(config-ext-nacl)# deny ip 10.1.220.0 0.0.0.255
10.0.100.111 0.0.0.0
ProVision(config-ext-nacl)# permit ip any any
ProVision(config)# ip access-list extended ext_acl
ProVision(config-ext-nacl)# deny ip 10.1.100.0/24
10.0.100.111/32
ProVision(config-ext-nacl)# permit ip any any
ProVision(config)# vlan 220
ProVision(vlan-220)# ip access-group 100 in
ProVision(vlan-220)# vlan 100
ProVision(vlan-100)# ip access-group ext_acl in
```

### Standard or Basic ACL

```
[Comware] acl number 2000
[Comware-acl-basic-2000] rule permit source 10.0.100.111
0.0.0.0
[Comware]acl number 2001 name std_acl
[Comware-acl-basic-2001-std_acl] rule permit source
10.0.100.111 0
[Comware-acl-basic-2001-std_acl] quit
[Comware] interface Vlan-interface 220
[Comware-Vlan-interface220] packet-filter 2000 inbound
[Comware] interface Vlan-interface 100
[Comware-Vlan-interface100] packet-filter 2001 inbound
```

### Extended or Advanced ACL

```
[Comware] acl number 3000
[Comware-acl-adv-3000] rule deny ip source 10.1.220.0
0.0.0.255 destination 10.1.100.111 0
[Comware] acl number 3001 name ext_acl
[Comware-acl-adv-3001-ext_acl] rule deny ip source
10.1.100.0 0.0.0.255 destination 10.0.100.111 0
[Comware-acl-adv-3001-ext_acl] quit
[Comware] interface Vlan-interface 220
[Comware-Vlan-interface220] packet-filter 3000 inbound
[Comware] interface Vlan-interface 100
[Comware-Vlan-interface100] packet-filter 3001 inbound
```

### Standard or Basic ACL

```
Cisco(config)#ip access-list standard 1
Cisco(config-std-nacl)#permit 10.0.100.111 0.0.0.0
Cisco(config)#ip access-list standard std_acl
Cisco(config-std-nacl)#permit 10.0.100.111 0.0.0.0
Cisco(config-stdnacl)# interface vlan 220
Cisco(config-if)#ip access-group 1 in
Cisco(config)#interface vlan 100
Cisco(config-if)#ip access-group std_acl in
```

### Extended or Advanced ACL

```
Cisco(config)#ip access-list extended 100
Cisco(config-ext-nacl)#deny ip 10.1.220.0 0.0.0.255
10.0.100.111 0.0.0.0
Cisco(config-ext-nacl)#permit ip any any
Cisco(config)#ip access-list extended ext_acl
Cisco(config-ext-nacl)#deny ip 10.1.100.0 255.255.255.0
10.0.100.111 255.255.255.255
Cisco(config-ext-nacl)#permit ip any any
Cisco(config)#interface vlan 220
Cisco(config-if)#ip access-group 100 in
Cisco(config-if)#interface vlan 100
Cisco(config-if)#ip access-group ext_acl in
```

## VLAN/Layer 2 Based ACL (VACL)

### Standard or Basic ACL

```
ProVision(config)# ip access-list standard 10
ProVision(config-std-nacl)# deny 10.1.220.102 0.0.0.0
ProVision(config)# ip access-list standard std_vacl
ProVision(config-std-nacl)# deny 10.1.220.103/32
ProVision(config-std-nacl)# vlan 220
ProVision(vlan-220)# ip access-group 10 vlan
```

### Extended or Advanced ACL

```
ProVision(config)# ip access-list extended 110
ProVision(config-ext-nacl)# deny ip 10.1.220.0 0.0.0.255 10.
1.220.102 0.0.0.0
ProVision(config-ext-nacl)# permit ip any any
```

### Standard or Basic ACL

```
[Comware] acl number 4000
[Comware-acl-ethernetframe-4000]rule deny dest-mac
00aabb00-0000 00aa-bbff-ffff
[Comware] interface Vlaninterface 220
[Comware-Vlaninterface220] packet-filter 4000 in
```

### Extended or Advanced ACL

Note: only one ACL number for this type of ACL available.

### Standard or Basic ACL

```
Cisco(config)# access-list 10 permit host 10.1.220.102
Cisco(config)# vlan access-map vacl_1 10
Cisco(config-access-map)# match ip address 10
Cisco(config-access-map)# action drop
Cisco(config)# vlan filter vacl_1 vlan-list 220
```

### Extended or Advanced ACL

```
Cisco(config)#access-list 110 permit icmp any host
10.1.220.102
Cisco(config)#access-list 111 permit icmp any any
Cisco(config)#vlan access-map vacl_2 10
Cisco(config-access-map)# match ip address 110
```

```
ProVision(config)# ip access-list extended ext_vacl
ProVision(config-ext-nacl)# deny ip 10.1.220.0/24
10.1.220.103/32
ProVision(config-ext-nacl)# permit ip any any
ProVision(config)# vlan 220
ProVision(vlan-220)# ip access-group 110 vlan
```

```
Cisco(config-access-map)#action drop
Cisco(config)#vlan access-map vacl_2 20
Cisco(config-access-map)# match ip address 111
Cisco(config-access-map)# action forward
Cisco(config)#vlan filter vacl_2 vlan-list 220
```

## Port ACL (PACL)

### Standard or Basic ACL

```
ProVision(config)# ip access-list standard 11
ProVision(config-std-nacl)# permit 10.0.100.111 0.0.0.0
ProVision(config)# ip access-list standard std_pacl
ProVision(config-std-nacl)# permit 10.0.100.111/32
ProVision(config)# interface 4
ProVision(eth-4)# ip access-group 11 in
ProVision(eth-4)# ip access-group std_pacl in
```

### Extended or Advanced ACL

```
ProVision(config)# ip access-list extended 111
ProVision(config-ext-nacl)# deny ip 10.1.220.0 0.0.0.255
10.0.100.111 0.0.0.0
ProVision(config-ext-nacl)# permit ip any any
ProVision(config)# ip access-list extended ext_pacl
ProVision(config-ext-nacl)# deny ip 10.1.220.0/24
10.0.100.111/32
ProVision(config-ext-nacl)# permit ip any any
ProVision(config)# interface 4
ProVision(eth-4)# ip access-group 111 in
ProVision(eth-4)# ip access-group ext_pacl in
```

### Standard or Basic ACL

```
[Comware]acl number 2011
[Comware-acl-basic-2011]rule permit source 10.0.100.111
0
[Comware]acl number 2012 name std_pacl
[Comware-acl-basic-2012-std_pacl]rule permit source
10.0.100.111 0
[Comware]interface g1/0/4
[Comware-GigabitEthernet1/0/4] packet-filter 2011 inbound
[Comware-GigabitEthernet1/0/4] packet-filter 2012 inbound
```

### Extended or Advanced ACL

```
[Comware] acl number 3011
[Comware-acl-adv-3011] rule deny ip source 10.1.220.0
0.0.0.255 destination 10.0.100.111 0
[Comware] acl number 3012 name ext_pacl
[Comware-acl-adv-3012-ext_acl] rule deny ip source
10.1.220.0 0.0.0.255 destination 10.0.100.111 0
[Comware] interface g1/0/4
[Comware-GigabitEthernet1/0/4] packet-filter 3011 inbound
[Comware-GigabitEthernet1/0/4] packet-filter 3012 inbound
```

### Standard or Basic ACL

```
Cisco(config)# ip access-list standard 11
Cisco(config-std-nacl)# permit 10.0.100.111 0.0.0.0
Cisco(config)# ip access-list standard std_pacl
Cisco(config-std-nacl)# permit 10.0.100.111 0.0.0.0
Cisco(config)# interface g1/0/4
Cisco(config-if)# ip access-group 11 in
Cisco(config-if)# ip access-group std_pacl in
```

### Extended or Advanced ACL

```
Cisco(config)# ip access-list extended 121
Cisco(config-ext-nacl)# deny ip 10.1.220.0 0.0.0.255
10.0.100.111 0.0.0.0
Cisco(config-ext-nacl)# permit ip any any
Cisco(config)# ip access-list extended ext_pacl
Cisco(config-ext-nacl)# deny ip 10.1.220.0 255.255.255.0
10.0.100.111 255.255.255.255
Cisco(config-ext-nacl)# permit ip any any
Cisco(config)# interface g1/0/4
Cisco(config-if)# ip access-group 121 in
Cisco(config-if)# ip access-group ext_pacl in
```

## QoS

```
ProVision(config)# qos type-of-service diff-services
ProVision(config)# interface 5
ProVision(eth-5)# qos priority 6
ProVision(config)# vlan 230
```

```
[Comware] interface g1/0/5
[Comware-GigabitEthernet1/0/5] qos trust dscp
[Comware] interface g1/0/5
[Comware-GigabitEthernet1/0/5] qos priority 6
[Comware] traffic classifier any
[Comware-classifier-any] if-match any
[Comware] traffic behavior pri6
[Comware-behavior-pri6] remark dot1p 6
```

```
Cisco(config)# mls qos
Cisco(config)# interface g1/0/5
Cisco(config-if)# mls qos trust dscp
Cisco(config)# mls qos map dscp-cos 0 8 16 24 32 40 48
56 to 0
```

```
ProVision(vlan-230)# qos priority 6
ProVision# show qos ?
```

```
[Comware-behaviorpri6] accounting
[Comware] qos policy any-pri6
[Comware-qospolicy-anypri6] classifier any behavior pri6
[Comware] qos vlan-policy anypri6 vlan 230 inbound
[Comware] display qos ?
```

```
Cisco(config)# interface g1/0/5
Cisco(config-if)# mls qos cos 6
Cisco# show mls qos ?
```

## Rate Limiting

### ingress

```
ProVision(config)# interface
ProVision(eth-7)# rate-limit all in percent 10
```

### egress

```
ProVision(config)# interface
ProVision(eth-8)# rate-limit all out kbps 10000
```

### ingress

```
Comware7] interface g1/0/7
Comware7-GigabitEthernet1/0/7] qos lr inbound cir 10048
```

### egress

```
Comware7] interface g1/0/8
Comware7-GigabitEthernet1/0/8] qos lr outbound cir 10048
```

### ingress

```
Cisco(config)#ip access-list extended 130
Cisco(config-ext-nacl)#permit ip any any
Cisco(config)#class-map all_traffic
Cisco(config-cmap)#match access-group 130
Cisco(config)#policy-map rate_limit
Cisco(config-pmap)#class all_traffic
Cisco(config-pmap-c)#police 10000000 8000 exceed-
action drop
Cisco(config)#interface g1/0/7
Cisco(config-if)#service-policy input rate_limit
egress
Cisco(config)#interface g1/0/8
Cisco(config-if)#srr-queue bandwidth limit 10
```

## IGMP

```
ProVision(vlan-220)# ip igmp
```

```
[Comware-Vlaninterface220] igmp enable
```

Enabling PIM on an interface also enables IGMP operation on that interface.

## UDLD and DLDP

```
ProVision(config)# interface 17
ProVision(eth-17)# link-keepalive
ProVision# show link-keepalive
ProVision# show link-keepalive statistics
```

```
[Comware7] dldp global enable
[Comware7] interface g1/0/17
[Comware7-GigabitEthernet1/0/17] dldp enable
[Comware7] display dldp
[Comware7] display dldp statistics
```

```
Cisco(config)# interface g1/0/17
Cisco(config-if)# udld port
Cisco# show udld g1/0/17
```

## BPDU Protection and BPDU Guard

```
ProVision(config)# spanning-tree bpdu-protection-timeout
300
ProVision(config)# spanning-tree 17 bpdu-protection
ProVision(config)# spanning-tree 17 bpdu-filter
```

```
[Comware]stp bpdu-protection
```

```
Cisco(config)#interface g1/0/17
Cisco(config-if)#spanning-tree bpduguard enable
Cisco(config-if)#spanning-tree bpdufilter enable
```

## Loop Protection

```
ProVision(config)# loop-protect 17 receiver-action send-
disable
```

```
[Comware7]loopback-detection global enable vlan 1
[Comware7]interface g1/0/17
[Comware7-GigabitEthernet1/0/17] loopback-detection
enable vlan 1
[Comware7-GigabitEthernet1/0/17] loopback-detection
action shutdown
```

```
Cisco(config)#interface g1/0/17
Cisco(config-if)#spanning-tree guard loop
```

## Root Guard

```
ProVision(config)# spanning-tree 17 root-guard
ProVision(config)# spanning-tree 17 tcn-guard
```

```
[Comware] interface g1/0/17
[Comware-GigabitEthernet1/0/17] stp root-protection
```

```
Cisco(config)#interface g1/0/17
Cisco(config-if)#spanning-tree guard root
```

## DHCP Snooping

```
ProVision(config)# dhcp-snooping
ProVision(config)# dhcp-snooping authorized-server
192.168.10.254
ProVision(config)# dhcp-snooping database file
tftp://192.168.10.1/ProVision_dhcp.txt
ProVision(config)# dhcp-snooping vlan 220
ProVision(config)# dhcp-snooping trust 1
ProVision# show dhcp-snooping
ProVision# show dhcp-snooping stats
```

```
[Comware7] dhcp snooping enable
[Comware7] dhcp snooping binding database filename url
tftp://192.168.10.1/Comware7_dhcp.txt
[Comware7] interface g1/0/6
[Comware7-GigabitEthernet1/0/6] dhcp snooping trust
[Comware7] interface g1/0/4
[Comware7-GigabitEthernet1/0/4] dhcp snooping binding
record
[Comware7] display dhcp snooping binding
[Comware7] display dhcp snooping trust
[Comware7] display dhcp snooping binding database
[Comware7] display dhcp snooping packet statistics
```

```
Cisco(config)# ip dhcp snooping
Cisco(config)# ip dhcp snooping database
tftp://192.168.10.1/Cisco_dhcp.txt
Cisco(config)# ip dhcp snooping vlan 220
Cisco(config)# interface g1/0/6
Cisco(config-if)# ip dhcp snooping trust
Cisco# show ip dhcp snooping
Cisco# show ip dhcp snooping database
Cisco# show ip dhcp snooping statistics detail
```





```
authentication event fail
action authorize vlan 99
Cisco#show dot1x all summary
Cisco#show dot1x interface
g1/0/14 details
Cisco#show vlan brief
```

```
[Comware-GigabitEthernet1/0/14] dot1x
[Comware-GigabitEthernet1/0/14] undo dot1x handshake
[Comware-GigabitEthernet1/0/14] dot1x auth-fail vlan 99
[Comware-GigabitEthernet1/0/14] dot1x max-user 1
[Comware-GigabitEthernet1/0/14] stp edged-port enable
[Comware] display dot1x sessions
[Comware] display dot1x interface g1/0/14
[Comware] display interface brief
[Comware] display vlan 220
```

```
Cisco# show dot1x all summary
Cisco# show vlan brief
```

### MAC Authentication

```
ProVision(config)# radius-server host 10.0.100.111 key
password
ProVision(config)# aaa port-access mac-based 16
ProVision(config)# aaa port-access mac-based 16 unauth-vid
99
ProVision# show port-access mac-based config 16
ProVision# show port-access mac-based
ProVision# show port-access mac-based clients
```

```
[Comware]radius scheme
<radius-auth>
[Comware-radius-radiusauth] primary authentication
10.0.100.111 1812
[Comware-radius-radiusauth] primary accounting
10.0.100.111 1813
[Comware-radius-radiusauth] key authentication password
[Comware-radius-radiusauth] user-name-format without-
domain
[Comware-radius-radiusauth] server-type extended
[Comware] mac-authentication
[Comware] interface g1/0/16
[Comware-GigabitEthernet1/0/16] mac-authentication
[Comware] mac-authentication domain 8021x
[Comware] mac-authentication user-name-format mac-
address without-hyphen
[Comware] display mac-authentication interface g1/0/16
[Comware] display mac-authentication
```

```
Cisco(config)# radius-server host 10.0.100.111 auth-port
1812 acct-port 1813 key password
Cisco(config)# interface g1/0/16
Cisco(config-if)# switchport mode access
Cisco(config-if)# dot1x pae authenticator
Cisco(config-if)# mab
Cisco(config-if)# authentication order mab
Cisco(config-if)# authentication host-mode single-host
Cisco(config-if)# authentication portcontrol auto
Cisco(config-if)# authentication event fail action authorize
vlan 99
Cisco# show dot1x interface g1/0/16 details
Cisco# show authentication interface g1/0/16
```

### Web or Portal Authentication

```
[Comware5] radius scheme
<radius-auth>
[Comware5-radius-radiusauth] primary authentication
192.168.11.1 1812
[Comware5-radius-radiusauth] primary accounting 192.168.11.1
1813
[Comware5-radius-radiusauth] key authentication password
[Comware5-radius-radiusauth] user-name-format without-
domain
[Comware5-radius-radiusauth] server-type extended
```

```
Cisco(config)# radius-server host 192.168.11.1 auth-port
1812 acct-port 1813 key password
Cisco(config)# radius-server attribute 8 include-inaccess-req
Cisco(config)# radius-server vsa send authentication
Cisco(config)# aaa new-model
Cisco(config)# aaa authentication login default group radius
Cisco(config)# aaa authorization auth-proxy default group
radius
Cisco(config)# ip device tracking
Cisco(config)# ip admission name web-auth-rule1 proxy http
```

```

ProVision(config)# radius-server host 192.168.11.1 key
password
ProVision(config)# aaa port-access web-based 18
ProVision(config)# aaa port-access web-based 18 unauth-vid 99
ProVision(config)# aaa port-access web-based 18 client-limit 5
ProVision# show port-access web-based
ProVision# show port-access web-based clients
ProVision# show port-access web-based config 18
[Comware5] domain web-auth
[Comware5-isp-webauth] authentication portal radius-scheme
radius-auth
[Comware5-isp-webauth] authorization portal radius-scheme
radius-auth
[Comware5-isp-webauth] accounting portal radius-scheme
radius-auth
[Comware5] interface LoopBack 12
[Comware5-LoopBack12] ip address 1.1.1.1 255.255.255.255
[Comware5] interface g1/0/18
[Comware5-GigabitEthernet1/0/18] port link-type hybrid
[Comware5-GigabitEthernet1/0/18] mac-vlan enable
[Comware5-GigabitEthernet1/0/18] portal local-server enable
[Comware5-GigabitEthernet1/0/18] portal domain web-auth
[Comware5-GigabitEthernet1/0/18] portal auth-fail vlan 99
[Comware5-GigabitEthernet1/0/18] stp edged-port enable
[Comware5] display portal user all
[Comware5] display connection access-type portal
[Comware5] display connection ucibindex 3
[Comware5] display portal connection statistics all
Cisco(config)# ip admission auth-proxy-banner http
Cisco(config)# ip access-list extended web-auth-policy1
Cisco(config-ext-nacl)# permit udp any any
Cisco(config-ext-nacl)# permit tcp any any eq www
Cisco(config-ext-nacl)# deny ip any any
Cisco(config)# fallback profile fallback1
Cisco(config-fallbackprofile)# ip access-group webauth-
policy1 in
Cisco(config-fallbackprofile)# ip admission webauth-rule1
Cisco(config)# interface g1/0/18
Cisco(config-if)# switchport mode access
Cisco(config-if)# switchport access vlan 220
Cisco(config-if)# dot1x pae authenticator
Cisco(configif)# authentication fallback fallback1
Cisco(configif)# authentication order webauth
Cisco(configif)# authentication portcontrol auto
Cisco(config-if)# ip access-group web-auth-policy1 in
Cisco(config-if)# ip admission web-auth-rule1
Cisco# show ip admission cache
Cisco# show authentication interface g1/0/18

```

## Port Mirroring or Port Span

<pre> <b>Local Mirror or SPAN</b> ProVision(config)# mirror 1 port 4 ProVision(config)# interface 11 monitor all both mirror 1 ProVision# show monitor ProVision# show monitor 1 <b>Remote Mirror or RSPAN</b> ProVision(config)# mirror endpoint ip 10.0.222.254 7922 10.0.111.21 port 4 ProVision# show monitor </pre>	<pre> <b>Local Mirror or SPAN</b> [Comware] mirroring-group 1 local [Comware] mirroring-group 1 mirroring-port g1/0/6 both [Comware] mirroring-group 1 monitor-port g1/0/4 [Comware] display mirroring-group all [Comware] display mirroring-group 1 <b>Remote Mirror or RSPAN</b> [Comware2]mirroring-group 1 remote-source [Comware2]mirroring-group 1 mirroring-port g1/0/1 both [Comware2]interface g1/0/1 [Comware2-GigabitEthernet1/0/1] mirroring-group 1 mirroring- port both [Comware2]mirroring-group 1 monitor-egress g1/0/6 [Comware]vlan 960 [Comware2-vlan960]quit [Comware2]interface g1/0/6 [Comware2-GigabitEthernet1/0/6]port linktype trunk [Comware2-GigabitEthernet1/0/6]port trunk permit vlan 960 </pre>	<pre> <b>Local Mirror or SPAN</b> Cisco(config)# monitor session 1 source interface g1/0/6 both Cisco(config)# monitor session 1 destination interface g1/0/4 encapsulation replicate Cisco# show monitor Cisco# show monitor session 1 Cisco# show monitor session 1 detail <b>Remote Mirror or RSPAN</b> Cisco2(config)#vlan 950 Cisco2(config-vlan)# remote-span Cisco2(config)# interface f1/0/6 Cisco2(config-if)# switchport trunk encapsulation dot1q Cisco2(config-if)# switchport trunk allowed vlan 950 Cisco2(config-if)# switchport mode trunk Cisco2(config-if)# switchport nonegotiate Cisco(config)# monitor session 1 source interface f1/0/1 Cisco2(config)# monitor session 1 destination remote vlan 950 </pre>
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```
ProVision# show monitor endpoint
ProVision2(config)# mirror endpoint ip 10.0.222.254 7922
10.0.111.21
ProVision2(config)# interface 1 monitor all both mirror 1
ProVision2# show monitor 1
```

```
[Comware2]mirroring-group 1 remote-probe vlan 960
[Comware2]display mirroring-group 1
[Comware]vlan 960
[Comware-vlan960]quit
[Comware]mirroring-group 1 remote-destination
[Comware]mirroring-group 1 monitor-port g1/0/4
[Comware]mirroring-group 1 remote-probe vlan 960
[Comware]interface g1/0/12
[Comware-GigabitEthernet1/0/12]port link-type trunk
[Comware-GigabitEthernet1/0/12]port trunk permit vlan 960
[Comware]display mirroringg-roup 1
```

```
Cisco2# show monitor
Cisco2# show monitor session 1 detail
Cisco(config)# vlan 950
Cisco(config-vlan)# remote-span
Cisco(config)# interface g1/0/12
Cisco(config-if)# switchport trunk encapsulation dot1q
Cisco(config-if)# switchport trunk allowed vlan 950
Cisco(config-if)# switchport mode trunk
Cisco(config-if)# switchport nonegotiate
Cisco(config)# monitor session 1 source remote vlan 950
Cisco(config)# monitor session 1 destination interface g1/0/4
encapsulation replicate
Cisco# show monitor
Cisco# show monitor session 1 detail
```