**Part 1: Initial set up**

*hostnames, secret (type 9 and 5), configure user, configure local login, timeout and synchronous logging*

En

Conf t

Hostname <HOST NAME>

Do write

—----------------------------------------------------------------------------------------------------------

For type 5 secret…

En

Enable secret <SECRET>

Do sh run | include secret

\*if do en ? and receive “scrypt” option, do following command for type 9 hashing…

En algorithm-type scrypt secret <SECRET>

Do sh run | include secret

—--------------------------------------------------------------------------------------------------------

Username <USERNAME> algorithm-type ?

Username <USERNAME> algorithm-type scrpyt secret <SECRET>

*Note: layer 3 switches sit in between the core and distribution layers. They can run type 9 scrypt usernames/passwords*

*Routers run type 5 usernames/passwords*

—--------------------------------------------------------------------------------------------------------

En

Conf t

Line con 0

Login local

Exec-timeout 30

Logging synchronous

**Part 2: VLANs, Layer 2 EtherChannel**

*Configure L2 EtherChannnel, with name, using cisco propriety protocol, make switches actively try to form EtherChannel, repeat with standard protocol, configure all links between Access and Distribution switches as trunk links, disable DTP on all ports, set native VLAN 100, allow VLANs 10, 20, 30, 99 on trunks, create VLANs, configure Access ports, disable unused ports*

Do sh cdp neighbors

Int range <INT RANGE>

Channel–group <GROUP NUMBER> mode <MODE TYPE>

\*group number is port channel number given, usually 1\*

\*when organising channel-group to actively create trunk with PaGP,, mode is desirable\*

—--------------------------------------------------------------------------------------------------------

Int range <INT RANGE>

Channel-group <GROUP NUMBER> mode <MODE>

\*for LACP to actively try to form trunk, mode must be active\*

Do sh etherchannel summary

—--------------------------------------------------------------------------------------------------------

Do sh cdp neighbors

Int range <INT RANGE>

Switchport mode trunk

Switchport trunk native vlan <NUMBER>

Switchport trunk allowed vlan <NUMBERS SEPARATED WITH ,>

Int <int number for port channel “int po1”>

Switchport mode trunk

Switchport trunk native vlan <NUMBER>

Switchport trunk allowed vlan <NUMBERS SEPARATED WITH ,>

Switchport mode trunk

**Switrchport nonegotiate**

**Switchport trunk native vlan <NUMBER>**

**Switchport trunk allowed vlan <NUMBERS SEPARATED WITH ,>**

Exit

—--------------------------------------------------------------------------------------------------------

On switch:

Do sh vtp status

Vtp domain <name, case sensitive>

Vtp version <version number> \*2\*

Vtp mode <mode> \*client\*

—--------------------------------------------------------------------------------------------------------

On switch:

Vlan <vlan number>

Name <name>

Do sh vlan br

—--------------------------------------------------------------------------------------------------------

On switch:

Int <int number>

Sw mode access

Sw nonegotiate

Sw access vlan <vlan number>

—--------------------------------------------------------------------------------------------------------

On switch:

Int <int number>

Sw mode trunk

Sw trunk allowed vlan <vlan numbers with ,>

Sw trunk native vlan <vlan number>

Sw nonegotiate

—--------------------------------------------------------------------------------------------------------

On switch:

Do sh int status

Int range <range>

Shutdown

Exit

Do sh int status

\*int should be disabled\*

Do write \*to save config\*

ALWAYS SAVE CONFIG ON LAST STEP

—------------------------------------------------------------------------------------------------------------------------

**Part 3: Initial set up**

*Configure IP addresses, DHCP client, Loopback, enable IPv4 addressing, L3 etherchannel, cisco proprietary, configure IP settings on a server, management IP addresses, configure subnets, default gateways, HSRPv2 on subnets, active router priority*

On r1:

Int range <int range>

Ip address dhcp

No shutdown \*router int is disabled by default\*

Int <int number>

Ip address <ip> <mask>

No shutdown

Int loopback0

Ip address <ip> <mask>

Do sh ip int br

Do wr

—------------------------------------------------------------------------------------------------------------------------

On switch:

Ip routing

—------------------------------------------------------------------------------------------------------------------------

On switch:

Do sh cdp neighbors

Int range <range>

No switchport

Channel-group 1 mode desirable

Int po1

Ip address <ip> <mask>

Do ping <ip>

—------------------------------------------------------------------------------------------------------------------------

As step 1 was done

—------------------------------------------------------------------------------------------------------------------------

As step 1 was done

—------------------------------------------------------------------------------------------------------------------------

Steps 7, 8, 9 same as bove

—------------------------------------------------------------------------------------------------------------------------

Go into server and enter details into appropriate areas

—------------------------------------------------------------------------------------------------------------------------

On switch:

Ip default-gateway <ip>

Int vlan <number>

Ip address <ip> <mask>

Exit

Do write

—------------------------------------------------------------------------------------------------------------------------

Steps 12 - 15:

On switch:

Int vlan <number>

Ip address <ip> <mask>

Standby ver 2

Standby 1 ip <ip address>

Standby 1 priority <number> \*105 to make active\*

Standby 1 preempt

On standby router:

Int vlan <number>

Ip address <ip> <mask>

Standby ver 2

Standby 1 ip <ip address>

—------------------------------------------------------------------------------------------------------------------------

**Part 4: Rapid Spanning Tree Protocol**

*Configure rapid pvst+, root bridge, hsrp configure lowest possible stp priority, enable PortFast and BPDU Guard, configure in interface config mode*

On switch:

Do sh spanning-tree

Spanning-tree mode rapid-pvst

Spanning-tree vlan <number> priority <number> 0 \*one increment above 0 is 4096\*

Do sh spanning-tree vlan <vlan number>

Do write

—------------------------------------------------------------------------------------------------------------------------

Int <int number>

Spanning-tree portfast

Spanning-tree bpduguard enable

—------------------------------------------------------------------------------------------------------------------------

**Part 5: Static and Dynamic Routing**

*Configure ospf, process ID, RID, network command, enable on loopback interfaces, passive interfaces, no DR/BDR (point to point), Layer 3 Port Channel, recursive routes, floating static routes, ASBR*

On router 1:

Router ospf 1

Do sh ip ospf \*to find router id\*

Router-id <id>

Passive-interface l0

Int l0

Ip ospf 1 area 0

Int range g0/0 - 1

Ip ospf 1 area 0

Ip ospf network point-to-point

On switch:

Router ospf 1

Router-id <id of loopbakc int>

Passive-interface l0

Do sh ip int br

Network <ip> <0.0.0.0 subnet mask> area 0

\*repeat for all IPs\*

Int range <range>

Ip ospf network point-to-point

Exit

Do write

—------------------------------------------------------------------------------------------------------------------------

On router:

Do sh ip int <int>

\*to find next hop\*

Ip route 0.0.0 0.0.0 <next hop ip>

Ip route 0.0.0 0.0.0 <next hop ip> <ad> \*2 as default for above ip is 1\*

Router ospf 1

default-information originate

—------------------------------------------------------------------------------------------------------------------------

**Part 6: Network Services: DHCP, DNS, NTP, SNMP, Syslog, FTP, SSH, NAT**

*DHCP pools, SHCP server, DHCP clients, excluded address ranges, helper address, ntp server and client, authenticate, get messages, set messages, syslog, ftp, ios version, rsa keys, remote access, SSHv2, ACL, VTY lines, static NAT, local user acc, synchronous logging*

On r1:

Ip dhcp excluded-address <ip - range>

—------------------------------------------------------------------------------------------------------------------------

Ip dhcp pool <name>

Network <network address> <network subnet mask>

Default-router <default gateway ip>

Domain-name <domain name>

Dns-server <server ip>

Option <option number> \*43> <ip>

—------------------------------------------------------------------------------------------------------------------------

On interface for L3:

Ip helper-address <ip>

Ipconfig /renew

Ping <ip>

—------------------------------------------------------------------------------------------------------------------------

-

—------------------------------------------------------------------------------------------------------------------------

Ip domain name <name>

Ip name-server <ip>

—------------------------------------------------------------------------------------------------------------------------

Ntp master 5

Ntp server <server ip>

—------------------------------------------------------------------------------------------------------------------------

Ntp authentication-key <key number> \*1\* md5 <password>

Ntp trusted-key number \*1\*

Ntp server <ip> key <number> \*1\*

—------------------------------------------------------------------------------------------------------------------------

On r1:

Snmp-server community <string> ro

Logging 10.5.0.4

Logging trap debugging \*enables all logging levels\*

Logging buffered 8192

—------------------------------------------------------------------------------------------------------------------------

Ip ftp username <username>

Ip ftp password <password>

—---------------------------------------------------------------------------------------------------------------------

On router:

Conf t (global config mode)

Crypto key generate rsa

\*size\* = 4096

Do sh ip ssh

Ip ssh version 2

Access-list 1 permit <ip> <mask>

Line vty 0 15

Access-class <acl name/number> \*1\* in

Transport input ssh

Login local

Logging synchronous

Exit

—---------------------------------------------------------------------------------------------------------------------

Ip nat inside source static <inside static ip> <inside global address>

Int range <ints>

Ip nat outside

Int rant <ints>

Ip nat inside

exit

—---------------------------------------------------------------------------------------------------------------------

Access-list <number> permit <ip> <inverted mask>

Ip nat pool <name> <ip range> netmask <netmask>

Ip nat inside source list <number> pool <pool name> overload

—---------------------------------------------------------------------------------------------------------------------

Router:

Int <int> shutdown \*removes ip from routing table to enable floating route instead\*

Default-information originate \* to make router advertise new route to routers\*

Do sh ip route

Int <int>

No shutdown

No default-information originate

Default-information originate

—---------------------------------------------------------------------------------------------------------------------

Router and core/dis switches:

No cdp run

Lldp run

Do write

On switch:

Int <int>

No lldp transmit

—---------------------------------------------------------------------------------------------------------------------

**Part 7: Security**

*Port security, dhcp snooping, dai, acl, icmp, allow, mac addresses, best practice, extended acls, standard acls, port security, trust ports, ipv6, interface ID, recursive rate, full specified route, floating route*

On switch closest to destination (extended acl):

Ip access-list extended <name of destination>\_to\_<name of source>

Permit icmp <subnet and inv subnet mask of destination> <subnet and inv subnet mask of source>

Deny ip <subnet and inv subnet mask of destination> <subnet and inv subnet mask of source>

Int vlan <number>

Ip access-group <name of dest>\_to\_ <name of source> in

Exit

Do write

—---------------------------------------------------------------------------------------------------------------------

Switch:

Int <int>

Switchport port-security

Switchport port-security violation restrict

Switchport port-security mac-address sticky

—---------------------------------------------------------------------------------------------------------------------

Switch:

Ip dhcp snooping

Ip dhcp snooping vlan <vlan numbers>

Int range <range>

Ip dhcp snooping trust

Ip dhcp snooping limit rate <rate number>

—---------------------------------------------------------------------------------------------------------------------

Ip arp inspection vlan <vlan numbers>

Ip arp inspection validate dst-mac src-mac ip

Int range <range> ip arp inspection trust

Exit

Do write

—---------------------------------------------------------------------------------------------------------------------

**Part 8: IPV6**

*ipv6, interface ID, recursive rate, full specified route, floating route*Router:

Ipv6 unicast-routing

Int <int>

Ipv6 address <address>

Int <int>

Ipv6 address <address> eui-64

Do sh ipv6 int br

Int po1

Ipv6 enable

Do write

—---------------------------------------------------------------------------------------------------------------------

Ipv6 route ::/0 2001:db8:a::1

Ipv6 route ::0/ g0/1/0 <ipv6 route> <AD>

**Part 9: Wireless**

*GUI, dynamic interface, Wi-Fi LAN*

*-*

**Command Cheat Sheet:**

**En:***enable mode*

**Conf t:** *global configuration mode*

**Do write:** save the running configuration of a device and its commands

**Copy run start:** *required to save running config on all CCNA labs!!*

**Hostname <hostname>:** *sets hostname for router/switch*

**Enable secret <secret>:** *sets has 5 password for config mode*

**Do sh run | include secret:** *shows secret and hash number, also shows username and hash number if set*

**Username <username> secret <secret>:** *sets username and has 5 password on router*

**Enable algorithm-type scrypt secret <secret>:** *sets hash 9 encrypted password on L3 switch*

**Username <username> algorithm-type scrypt secret <secret>:** *sets a username and hash 9 encrypted password on a L3 switch*

**Line con 0:** *configures console line*

**Login local:** *requires users to login with username/password set*

**? in (config-line):** *provide list of options for line con*

**Exec-timeout <minutes> <seconds>:** *prevents auto timeout on console*

**Logging synchronous:** *prevents commands from being cut off by log messages*

*Notes: cisco proprietary protocol = PAgP, two modes - desirable, auto*

*Notes: open standard protocol = LACP, two modes - active, passive*

**Do sh cdp neighbours:** *shows device ID, interfaces (interfaces on current switch), port ID (interfaces on connected switch), holdtime*

**Int range <interface letter x-x>:** *to configure a certain range of interfaces between two numbers (x)*

**Channel-group <number> mode <desirable/auto>:** *configures specified interfaces as part of the port channel number specified for PAgP (cisco proprietary protocol)*

*Notes: the port channel group number will be specified in the ether channel name given*

**Do sh etherchannel summary:** *shows channel-groups, aggregators, group, port-channel, protocol, ports*

*Notes: s = layer 2, U = in use*

**Channel-group <number> mode <active/passive>:** *configures specified interfaces as part of the port channel number specified for LACP*

**Switchport mode trunk:** *makes the desired interfaces/int range trunks*

**Switchport nonegotiate:** *disables DTP (dynamic trunking protocol)*

**Switchport trunk native vlan <number>:** *set the native vlan for the trunk*

**Switchport trunk allowed vlan <vlan numbers sep. with ,>:** *specify vlans allowed on the trunkipv4*

**Int po<number>\*1\*:** *to configure the interface of port channel <numbered>*

**Do sh vtp status:** *check vtp settings including vtp version, domain name, operating mode*

**Vtp domain <domain name>:** *assign a name to the vtp domain (case sensitive)*

**Vtp version 2:** *change the version of vtp running to 2*

*Notes: the above two commands will allow a switch to send vtp advertisements*

*Notes: vtp advertisements are only sent through trunk ports on a vlan*

**Vtp mode client:** *sets a switch as a vtp client (vtp client mode)*

**Vlan <vlan number>:** *creates a new vlan with the provided number*

**(config-vlan)#name <vlan name>:***gives a newly created vlan a desired name*

**Do sh vlan brief:** *shows interface ports, vlan numbers, vlan names, and status*

**Switchport mode access:** *to manually configure access mode, disabling DTP*

**Switchport access vlan <vlan number>:** *manually assign port to correct vlan*

**Do sh interfaces status:** *show status of all interfaces*

**(conf-if) shutdown:** *shutdown desired interfaces*

**Ip address dhcp:** *allows interfaces to learn their IP addresses through DHCP*

**No shutdown:** *enables interfaces - they are disabled by default*

*Notes: apply no shutdown after configuring each IP address*

**(conf-if) Ip address <ip address> <subnet mask>:** *creates an IPv4 address for an interface*

**Int L0:** *configure loopback interface*

**Do sh ip int br:** *shows interface and related IP address info, method, status, protocol*

**Ip routing:** *enables IPv4 routing on a device*

**No switchport:** *make a port a routed port to allow IPv4 routing*

*Notes: A layer 3 etherchannels IP address must be configured on the port channel’s interface*

*Notes: disable all unused interfaces*

*Notes; when configuring an IPv4 address for a server, do so through the config tab*

**Ip default-gateway <ip address>:** *to configure a L2 switch’s default gateway address*

**Int vlan <vlan number>, ip address <ip address>:** *to configure the interface VLAN SVI*

**Standby ver 2:** *enable HSRP version 2 on an interface vlan*

**Standby <group number> ip <ip address>:** *configure HSRP VIP*

**Standby <group number> pri <priority number> :** *increase a switch’s priority in HSRP to make it the active switch*

*Notes: default value for hsrp is 100, so anything higher than 100, say 105, makes it active router*

**Standby <group number> preempt:** *ensure a switch remains as the active switch as long as it runs*

*Notes: HSRP group number is usually specified in the instructions*

**Do sh spanning-tree:** *view current spanning tree mode and details of ports*

**Spanning-tree mode rapid-pvst:** *change spanning tree mode to rapid pvst*

**Spanning-tree vlan <vlan numbers> priority <value>:** *assigns a value of the stp on a device, 0 being the lowest priority*

*Notes: spanning tree protocol goes in increments of 4096*

**Do sh spanning-tree vlan <vlan number>:** *see details such as root id, bridge id, priority and timers*

**Interface <int number>, spanning-tree portfast:** *enable portfast on a device with stp*

**Interface <int number>, spanning-tree bpduguard enable:** *enable bpdugard on a device with stp*

*Notes: WLCs handle connection of L2 switches to VLANs, so must be connected via trunk ports*

**Spanning-tree portfast trunk:** *enables port fast on a trunk port between WLC and Switch*

**Router ospf <number>:** *enable ospf routing on a router*

**Sh ip ospf:** *shows ospf configurations on a device including ospf process and ID*

**Router-id <ip address>:** *manually configure the ospf ID of a device*

**Passive-interface L0:** *turns a loopback interface passive while setting up ospf on a device*

**Int L0:** *re-enable loopback interface to push through changes and activate it (enables ospf in int config mode on loopback interface)*

**Ip ospf <number> area 0:** *activate OSPF in area 0*

**Ip ospf network <network type>:** *configure ospf network type, such as point-to-point*

**Network <ip address> <wildcard mask> area <area #>:** *To active ospf on a network interface*

**Do sh ip ospf neighbors:** *view neighbour connections with ospf including ID, priority, state, IPs*