

3560 LAYER 3 SWITCHING AND INTER-VLAN ROUTING WITH 3 2960 SWITCH 7 VLANS

INTER-VLAN is configured using a (3560) layer 3 switch which works as a switch, router and also a DHCP server which means it is capable of multitasking and such can be perfect for small or a medium size business who wants to save cost and still keep an active and modern device for their network environment. It has a layer 2 switch which can also convert into a layer 3 interface to serve purpose of routing.

The 3 layer switch will route through 3 (2960) switch, two will be connected with 2 department/VLAN each and one will be connected with 2 department/VLAN and the server on a separate VLAN. 7 VLANs will be created in this Lab which will consist of a server VLAN and six departments with two computers each. The configuration with consist of VLANs, assigning access ports, configuring Trunking, Assigning IP/IP routing, configuring DHCP. The project will be done using Cisco Packet Tracer.

Starting the configuration: Configuring Switch-A

```
# en
```

```
# conf t
```

```
# hostname SWITCH-A
```

```
# vlan2
```

```
# name Sales
```

```
# vlan3
```

```
# name ICT
```

```
# vlan 4
```

```
# name HR
```

```
# vlan 5
```

```
# name Marketing
```

```
# vlan 6
```

```
# name Server
```

```
# vlan 7
# name Production
# vlan 8
# name Finance
# end
# wr
# sh vlan
```

Assigning device to their dep/vlan and assigning them an access port (SWITCH-A)

```
# conf t
# int range f0/1-2
# Switchport mode access
# Switchport access vlan 2
# exit
# int range f0/3-4
# Switchport mode access
# switchport access vlan 3
# end
# wr
# sh vlan
```

Configuring Switch-B

```
# en
# conf t
# vlan 2
# name Sales
```

```
# vlan3
# name ICT
# vlan 4
# name HR
# vlan 5
# name Marketing
# vlan 6
# name Server
# vlan 7
# name Production
# vlan 8
# name Finance
# end
# wr
# sh vlan
```

Assigning device to their dep/VLAN and assigning them an access port (SWITCH-B)

```
# conf t
# int range f0/5-6
# Switchport mode access
# Switchport access vlan 4
# exit
# int range f0/7-8
# Switchport mode access
# Switchport access vlan 5
```

```
# exit
# int f0/9
# Switchport mode access
# Switchport access vlan 6
# exit
# wr
# sh vlan
```

Configuring Switch-C

```
# en
# conf t
# vlan2
# name Sales
# vlan3
# name ICT
# vlan 4
# name HR
# vlan 5
# name Marketing
# vlan 6
# name Server
# vlan 7
# name Production
# vlan 8
# name Finance
```

```
# end
```

```
# wr
```

```
# sh vlan
```

```
Assigning device to their dep/VLAN and assigning them an access port (SWITCH-C)
```

```
# conf t
```

```
# int range f0/10-11
```

```
# Switchport mode access
```

```
# Switchport access vlan 7
```

```
# exit
```

```
# int range f0/12-13
```

```
# Switchport mode access
```

```
# Switchport access vlan 8
```

```
# end
```

```
# wr
```

```
Configuring LAYER-3-SWITCH
```

```
# en
```

```
# conf t
```

```
# vlan2
```

```
# name Sales
```

```
# vlan3
```

```
# name ICT
```

```
# vlan 4
```

```
# name HR
```

```
# vlan 5
```

name Marketing

vlan 6

name Server

vlan 7

name Production

vlan 8

name Finance

end

wr

sh vlan

Assigning access point to VLAN (LAYER-3-SWITCH)

Conf t

int range f0/1-2

switchport mode access

switchport access vlan2

exit

int range f0/3-4

switchport mode access

switchport access vlan3

exit

int range f0/5-6

switchport mode access

switchport access vlan4

exit

```
# int range f0/7-8
# switchport mode access
# switchport access vlan5
# exit
# int f0/9
# switchport mode access
# switchport access vlan6
# exit
# int range f0/10-11
# switchport mode access
# switchport access vlan7
# exit
# int range f0/12-13
# switchport mode access
# switchport access vlan8
# end
# wr
# sh vlan
```

Configuring Trunking of (LAYER-3-SWITCH)

Trunking will allow a single traffic between the switches from VLANs

```
# Conf t
# int range f0/14-15
# switchport trunk encapsulation dot1q
```

The purpose of encapsulation is to identify the VLAN and to allow multiple VLANs to carry a single physical link among switches while separating traffic that are from different VLAN on a single trunk port

```
# switchport mode trunk
```

```
# exit
```

```
# int range f0/16-17
```

```
# switchport trunk encapsulation dot1q
```

```
# switchport mode trunk
```

```
# exit
```

```
# int range f0/18-19
```

```
# switchport trunk encapsulation dot1q
```

```
# switchport mode trunk
```

```
# end
```

```
# wr
```

```
# conf t
```

```
# Int range f0/14-15
```

```
# Switchport mode trunk
```

```
# Shutdown
```

```
# Channel-group 1 mode active
```

The purpose of the channel group mode active is to enable a port channel on the switch interface that has been set to trunk mode

```
# channel-protocol lacp
```

The channel protocol help to identify or show that the LACP (Link aggregation control protocol) should negotiate the port channel by identity that the port should only allow or form a channel with only devices that also have LACP in active mode

```
# no shutdown
```



```
# exit
# Int range f0/16-17
# Switchport mode trunk
# Shutdown
# Channel-group 1 mode active
# channel-protocol lacp
# no shutdown
# exit
# Int range f0/18-19
# Switchport mode trunk
# Shutdown
# Channel-group 1 mode active
# channel-protocol lacp
# no shutdown
# end
# wr
# sh etherchannel summary
```

Configuring switchport mode trunk on SWITCH-A

```
# en
# conf t
# Int range f0/14-15
# Switchport mode trunk
# Shutdown
# Channel-group 1 mode active
```

```
# channel-protocol lacp
# no shutdown
# end
# wr
# sh etherchannel summary
```

Configuring switchport mode trunk on SWITCH-B

```
# en
# conf t
# Int range f0/16-17
# Switchport mode trunk
# Shutdown
# Channel-group 1 mode active
# channel-protocol lacp
# no shutdown
# end
# wr
# sh etherchannel summary
```

Configuring switchport mode trunk on SWITCH-C

```
# en
# conf t
# Int range f0/18-19
# Switchport mode trunk
# Shutdown
# Channel-group 1 mode active
```

```
# channel-protocol lacp
# no shutdown
# end
# wr
# sh etherchannel summary
```

Configuring VLAN Trunking Protocol (VTP) on (LAYER-3-SWITCH)

We have to configure VTP on all the switches where Layer-3-Switch have to be server mode and other switches would be on client's mode. However, username and password in the server mode should be the same on the clients mode for the trunking to work

```
# en
# conf t
# vtp mode server
# vtp domain cisco.com
# vtp password Abc@123
# end
# wr
```

Configuring VLAN Trunking Protocol (VTP) on (SWITCH-A/ SWITCH-B/ SWITCH-C)

```
# en
# conf t
# vtp mode client
# vtp domain cisco.com
# vtp password Abc@123
# end
# wr
```

Assigning IP and IP Routing on (LAYER-3-SWITCH)

```
# conf t
# ip routing
# int vlan 2
# ip address 192.168.2.1 255.255.255.0
# int vlan 3
# ip address 192.168.3.1 255.255.255.0
# int vlan 4
# ip address 192.168.4.1 255.255.255.0
# int vlan 5
# ip address 192.168.5.1 255.255.255.0
# int vlan 6
# ip address 192.168.6.1 255.255.255.0
# int vlan 7
# ip address 192.168.7.1 255.255.255.0
# int vlan 8
# ip address 192.168.8.1 255.255.255.0
# end
# wr
```

Configuring DHCP Server for all devices to get IP automatically

```
# ip dhcp pool vlan2
# network 192.168.2.0 255.255.255.0
# default-router 192.168.2.1
# dns-server 8.8.8.8
```

```
# exit

# ip dhcp excluded-address 192.168.2.1 192.168.2.100

# ip dhcp pool vlan3

# network 192.168.3.0 255.255.255.0

# default-router 192.168.3.1

# dns-server 8.8.8.8

# exit

# ip dhcp excluded-address 192.168.3.1 192.168.3.100

# ip dhcp pool vlan4

# network 192.168.4.0 255.255.255.0

# default-router 192.168.4.1

# dns-server 8.8.8.8

# exit

# ip dhcp excluded-address 192.168.4.1 192.168.4.100

# ip dhcp pool vlan5

# network 192.168.5.0 255.255.255.0

# default-router 192.168.5.1

# dns-server 8.8.8.8

# exit

# ip dhcp excluded-address 192.168.5.1 192.168.5.100

# ip dhcp pool vlan6

# network 192.168.6.0 255.255.255.0

# default-router 192.168.6.1

# dns-server 8.8.8.8
```

```
# exit

# ip dhcp excluded-address 192.168.6.1 192.168.6.100

# ip dhcp pool vlan7

# network 192.168.7.0 255.255.255.0

# default-router 192.168.7.1

# dns-server 8.8.8.8

# exit

# ip dhcp excluded-address 192.168.7.1 192.168.7.100

# ip dhcp pool vlan8

# network 192.168.8.0 255.255.255.0

# default-router 192.168.8.1

# dns-server 8.8.8.8

# exit

# ip dhcp excluded-address 192.168.8.1 192.168.8.100

# end

# wr
```

That is the end of the configuration

You have to put all device on all department to auto get IP in order for DHCP server to assign IP to them all. Ping from each devices to see if they will communication with each other as it is important to check if all process are working fine. The fact that layer 3 switch have the ability to route with possibility of directing traffic between VLAN or network within IP address base, makes its cost efficient for organizations and not to make use of separate router.

NOTE: Port numbers in this Lab are the numbers of port we connected our cables, this can be different in your situation if you connect your cables to a different port. Therefore you have to use the port numbers during the configuration.