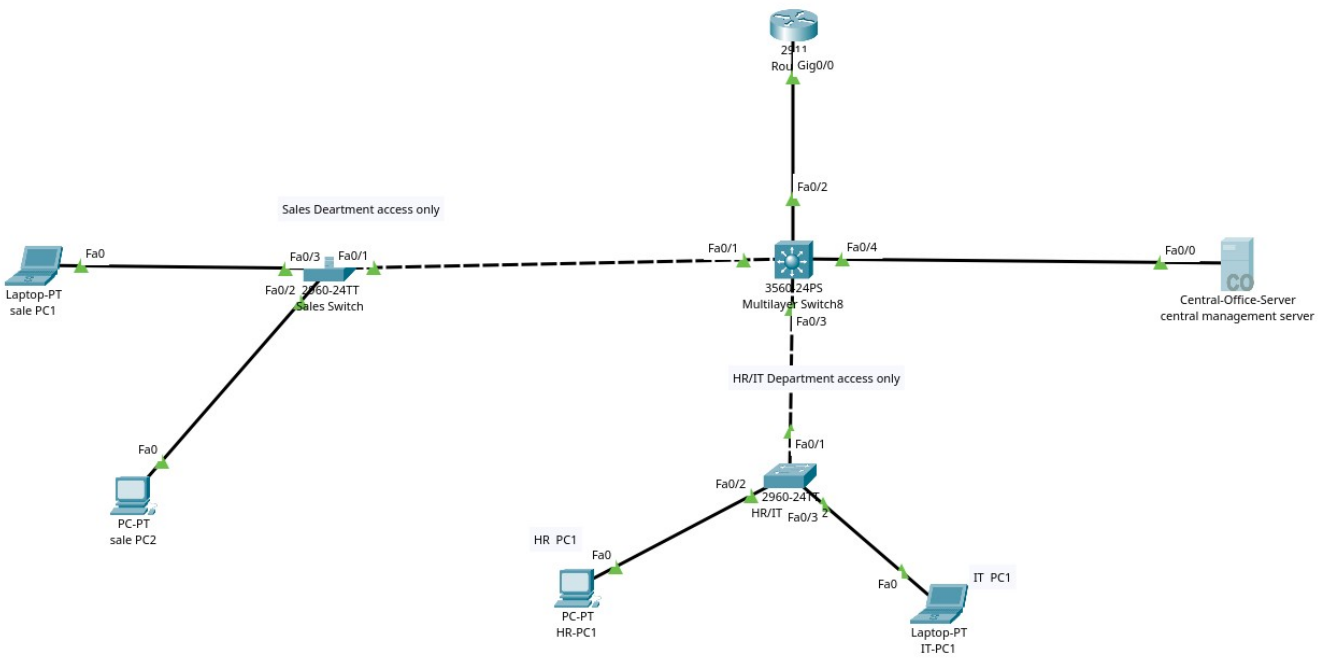
Excellent! I will provide you with a **comprehensive, step-by-step guide** for all five labs, including detailed topology diagrams, device lists, configurations, verification commands, and troubleshooting tips.

🔧 LAB 1: BASIC ENTERPRISE NETWORK

🎯 Objective

Build a foundational corporate network with department segmentation, automatic IP assignment, and internet connectivity.

Topology Diagram

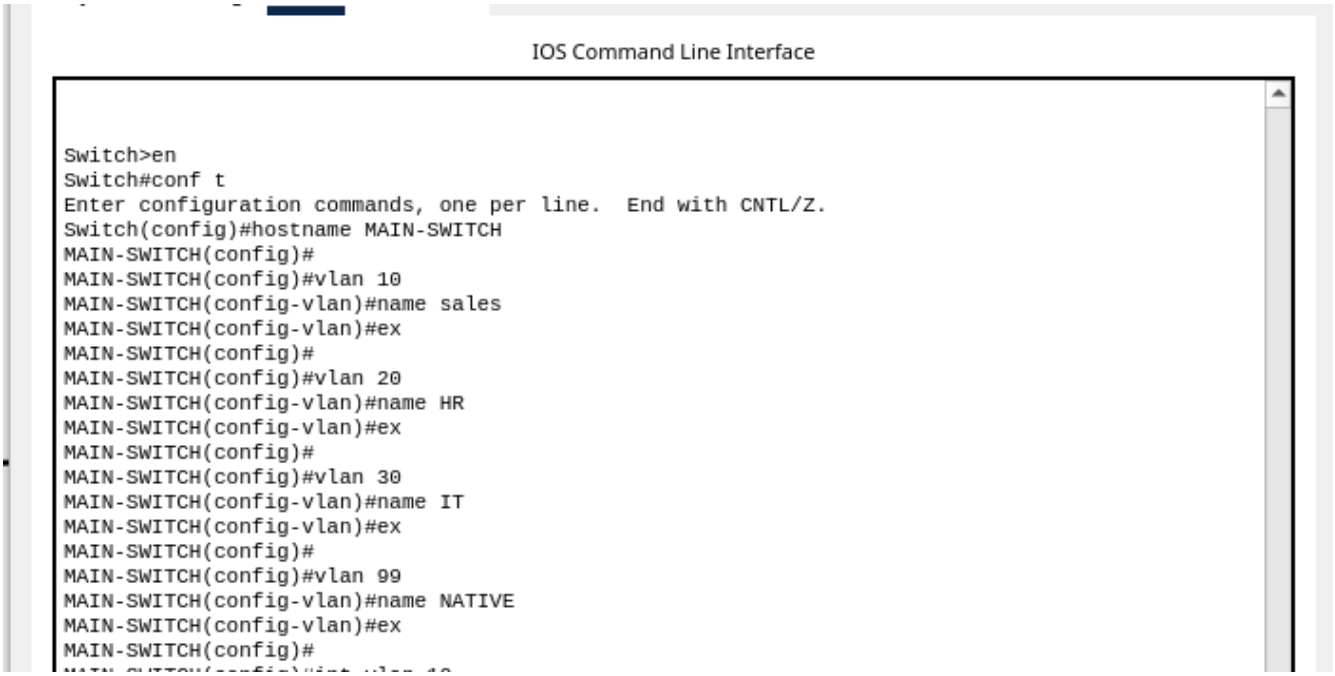


Device List

Device	Model	Host name	IP Address	Role
Router0	2911	Router3	192.168.10.1/24	Core Router
Switch0	3560-24PS	Core-SW	VLANs: 10,20,30,99	Core Switch
Switch1	2960-24TT	Access-SW1	192.168.10.0/24	Sales Access
Switch2	2960-24TT	Access-SW2	192.168.20.0/24	HR/IT Access
Server0	Server-PT	DHCP-Server	192.168.30.10/24	DHCP/DNS Server
PC1	PC-PT	Sales-PC1	DHCP	Sales Department
PC2	PC-PT	Sales-PC2	DHCP	Sales Department
PC3	PC-PT	HR-PC1	DHCP	HR Department
PC4	PC-PT	IT-PC1	DHCP	IT Department

Step by Step Configuration

Step 1: VLAN Configuration on Core Switch and changing the switch name to MAIN-SWITCH



Step 2: Access Switch Configuration by entering each vlans and assign it an ip address

Step 3: creating the pipeline or root to allow the vlans to be accessed and routed by the router via a specific port for specific computer under their departments

```
MAIN-SWITCH(config)#int f0/2
MAIN-SWITCH(config-if)#swit
MAIN-SWITCH(config-if)#switchport mode access
MAIN-SWITCH(config-if)#switchport trunk
% Incomplete command.
MAIN-SWITCH(config-if)#switchport mode trunk
MAIN-SWITCH(config-if)#switchport trunk native vlan 99
MAIN-SWITCH(config-if)#switchport trunk allowed vlan 10,20,30,99
MAIN-SWITCH(config-if)#no sh
MAIN-SWITCH(config-if)#
MAIN-SWITCH(config-if)#ex
MAIN-SWITCH(config)#do wr
Building configuration...
[OK]
MAIN-SWITCH(config)#
```

Step 3: Router Configuration (Router-on-a-Stick)

IOS Command Line Interface

```
Router>en
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#int gig0/0
Router(config-if)#no sh

Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up

Router(config-if)#ex
Router(config)#
Router(config)#int gig0/0.10
Router(config-subif)#
%LINK-3-UPDOWN: Interface GigabitEthernet0/0.10, changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0.10, changed state to up

Router(config-subif)#encap
Router(config-subif)#encapsulation dot
Router(config-subif)#encapsulation dot1Q 10
Router(config-subif)#ip add 192.168.10.1 255.255.255.0
Router(config-subif)#no sh
Router(config-subif)#ex
Router(config)#
Router(config)#int gig0/0.20
Router(config-subif)#
%LINK-3-UPDOWN: Interface GigabitEthernet0/0.20, changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0.20, changed state to up

Router(config-subif)#encapsulation dot1Q 20
Router(config-subif)#ip add 192.168.20.1 255.255.255.0
Router(config-subif)#no sh
Router(config-subif)#ex
Router(config)#
```

Step 5: configuring DHCP for each vlan so that each device under it can get a unique ip address automatically

```
Router>
Router>en
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#int gig0/0.10
Router(config-subif)#ip dhcp pool sales
Router(dhcp-config)#network 192.168.10.0 255.255.255.0
Router(dhcp-config)#defaul
Router(dhcp-config)#default-router 192.168.10.1
Router(dhcp-config)#dns
Router(dhcp-config)#dns-server 192.168.30.10
Router(dhcp-config)#ex
Router(config)#
Router(config)#
Router(config)#int gig0/0.20
Router(config-subif)#ip dhcp pool HR
Router(dhcp-config)#network 192.168.20.0 255.255.255.0
Router(dhcp-config)#defau
Router(dhcp-config)#default-router 192.168.20.1
Router(dhcp-config)#dns
Router(dhcp-config)#dns-server 192.168.30.10
Router(dhcp-config)#ex
Router(config)#
Router(config)#int gig/0/0.30
                  ^
% Invalid input detected at '^' marker.

Router(config)#int gig0/0.30
Router(config-subif)#ip dhcp pool IT
Router(dhcp-config)#network 192.168.30.0 255.255.255.0
Router(dhcp-config)#defau
Router(dhcp-config)#default-router 192.168.30.1
Router(dhcp-config)#dns
Router(dhcp-config)#dns-server 192.168.30.10
Router(dhcp-config)#ex
Router(config)#
```

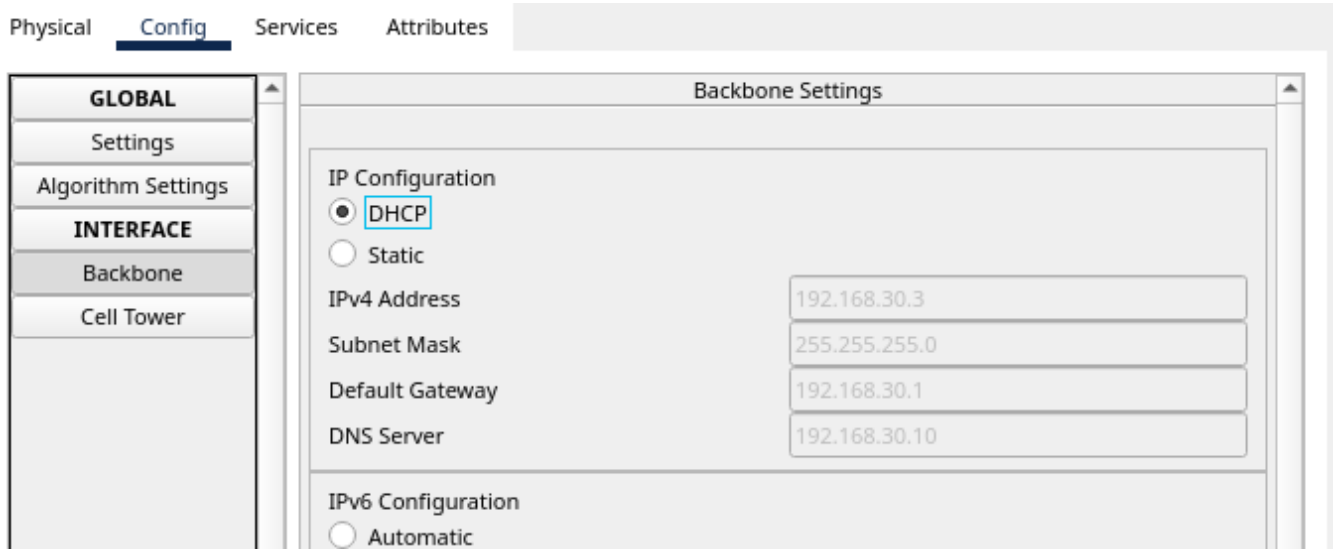
Step: 4 configuring other switches A. sales

```
Switch>en
Switch#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#hostname sales-switch
sales-switch(config)#
sales-switch(config)#vlan 10
sales-switch(config-vlan)#name sales
sales-switch(config-vlan)#ex
sales-switch(config)#
sales-switch(config)#int range f0/2-3
sales-switch(config-if-range)#switchport mode access
sales-switch(config-if-range)#switchport access vlan 10
sales-switch(config-if-range)#ex
sales-switch(config)#
sales-switch(config)#int f0/1
sales-switch(config-if)#switchport mode trunk

sales-switch(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up

sales-switch(config-if)#switchport trunk NATIVE vlan 99
sales-switch(config-if)#switchport trunk allowed vlan 10,99
sales-switch(config-if)#ex
sales-switch(config)#do wr
Building configuration...
[OK]
sales-switch(config)#
%CDP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on FastEthernet0/1 (99), with
MAIN-SWITCH FastEthernet0/1 (1).
```

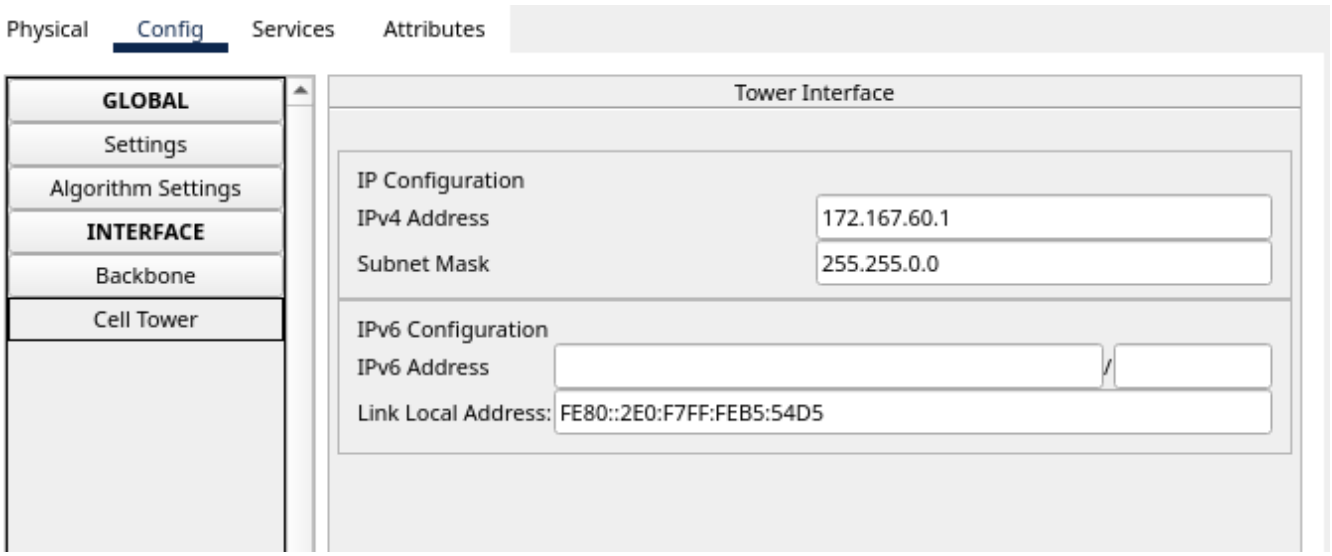
B. IT AND HR SWITCH

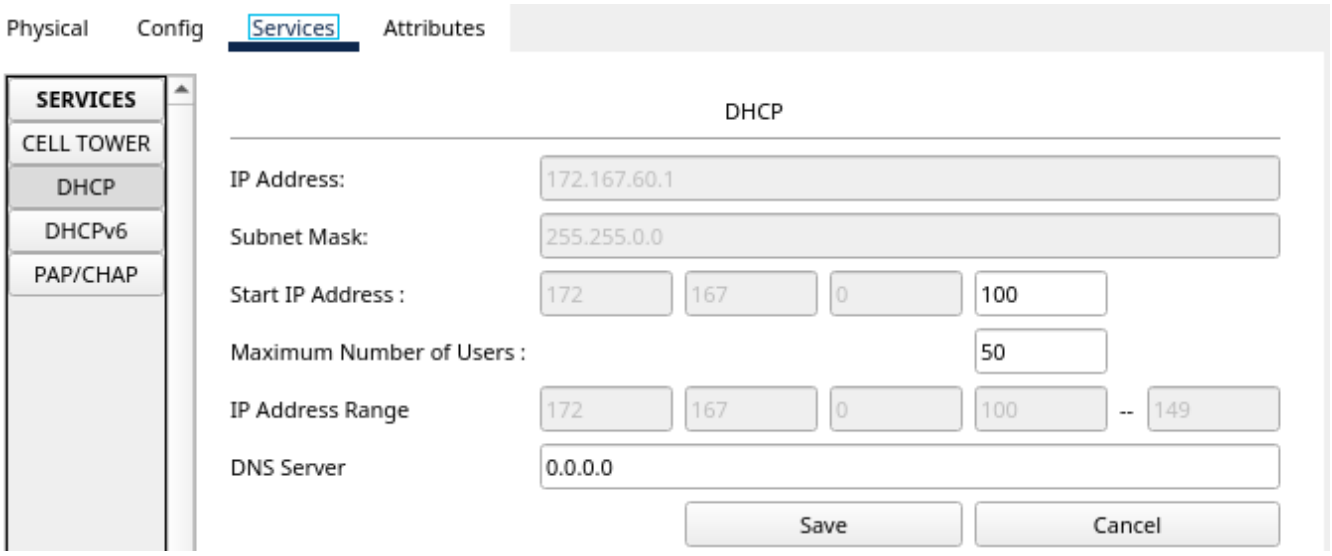
```
switch#en
switch#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
switch(config)#hostname HR-IT_SWITCH
HR-IT_SWITCH(config)#vlan 20
HR-IT_SWITCH(config-vlan)#name HR
HR-IT_SWITCH(config-vlan)#ex
HR-IT_SWITCH(config)#
HR-IT_SWITCH(config)#vlan 30
HR-IT_SWITCH(config-vlan)#name IT
HR-IT_SWITCH(config-vlan)#ex
HR-IT_SWITCH(config)#
HR-IT_SWITCH(config)#vlan 99
HR-IT_SWITCH(config-vlan)#name NATIVE
HR-IT_SWITCH(config-vlan)#ex
HR-IT_SWITCH(config)#
HR-IT_SWITCH(config)#
HR-IT_SWITCH(config)#switchport mode access
                     ^
% Invalid input detected at '^' marker.

HR-IT_SWITCH(config)#int f0/2
HR-IT_SWITCH(config-if)#switchport mode access
HR-IT_SWITCH(config-if)#switchport access vlan 20
HR-IT_SWITCH(config-if)#ex
HR-IT_SWITCH(config)#
HR-IT_SWITCH(config)#int f0/3
HR-IT_SWITCH(config-if)#switchport mode access
HR-IT_SWITCH(config-if)#switchport access vlan 30
HR-IT_SWITCH(config-if)#ex
HR-IT_SWITCH(config)#
HR-IT_SWITCH(config)#int f0/1
HR-IT_SWITCH(config-if)#switchport mode trunk

HR-IT_SWITCH(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
```

Step 4: Server



Installing tower interface





checking vlans

```
MAIN-SWITCH>
MAIN-SWITCH>sh vlan
%CDP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on FastEthernet0/3 (1), with HR-IT_SWITCH


VLAN Name                                Status    Ports
---- ----------------------------------- --------- -------------------------------
1    default                             active    Fa0/5, Fa0/6, Fa0/7, Fa0/8
                                                   Fa0/9, Fa0/10, Fa0/11, Fa0/12
                                                   Fa0/13, Fa0/14, Fa0/15, Fa0/16
                                                   Fa0/17, Fa0/18, Fa0/19, Fa0/20
                                                   Fa0/21, Fa0/22, Fa0/23, Fa0/24
                                                   Gig0/1, Gig0/2
10   sales                               active
20   HR                                  active
30   IT                                  active    Fa0/4
99   NATIVE                              active
1002 fddi-default                        active
1003 token-ring-default                  active
1004 fddinet-default                     active
1005 trnet-default                       active

VLAN Type  SAID       MTU   Parent RingNo BridgeNo Stp  BrdgMode Trans1 Trans2
---- ----- ---------- ----- ------ ------ -------- ---- -------- ------ ------
1    enet  100001     1500  -      -      -        -    -        0      0
10   enet  100010     1500  -      -      -        -    -        0      0
 --More-- |
```

checking trunk root

```
1005 trnet 101005     1500  -       -       -         ibm  -        0      0

VLAN Type  SAID       MTU   Parent RingNo BridgeNo Stp  BrdgMode Trans1 Trans2
---- ----- ---------- ----- ------ ------ -------- ---- -------- ------ ------

Remote SPAN VLANs
------------------------------------------------------------------------------

Primary Secondary Type              Ports
------- --------- ----------------- ------------------------------------------
MAIN-SWITCH>
MAIN-SWITCH>
MAIN-SWITCH>
MAIN-SWITCH>s
%CDP-4-NATIVE_VLAN_MISMATCH: Native VLAN mismatch discovered on FastEthernet0/1 (1), with
sales-switch FastEthernet0/1 (99).
h
% Incomplete command.
MAIN-SWITCH>sh int trunk
Port        Mode         Encapsulation  Status        Native vlan
Fa0/1       auto         n-802.1q       trunking      1
Fa0/2       on           802.1q         trunking      99
Fa0/3       auto         n-802.1q       trunking      1

Port        Vlans allowed on trunk
Fa0/1       1-1005
Fa0/2       10,20,30,99
Fa0/3       1-1005

Port        Vlans allowed and active in management domain
Fa0/1       1,10,20,30,99
Fa0/2       10,20,30,99
Fa0/3       1,10,20,30,99

Port        Vlans in spanning tree forwarding state and not pruned
Fa0/1       10,20,30
Fa0/2       10,20,30,99
Fa0/3       10,20,30

MAIN-SWITCH>
```

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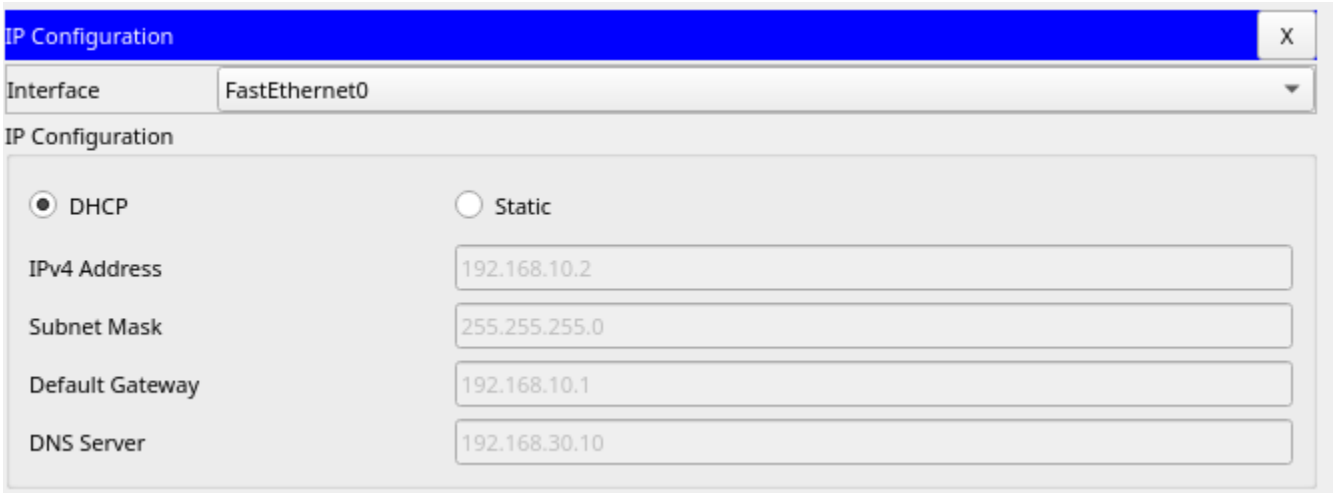
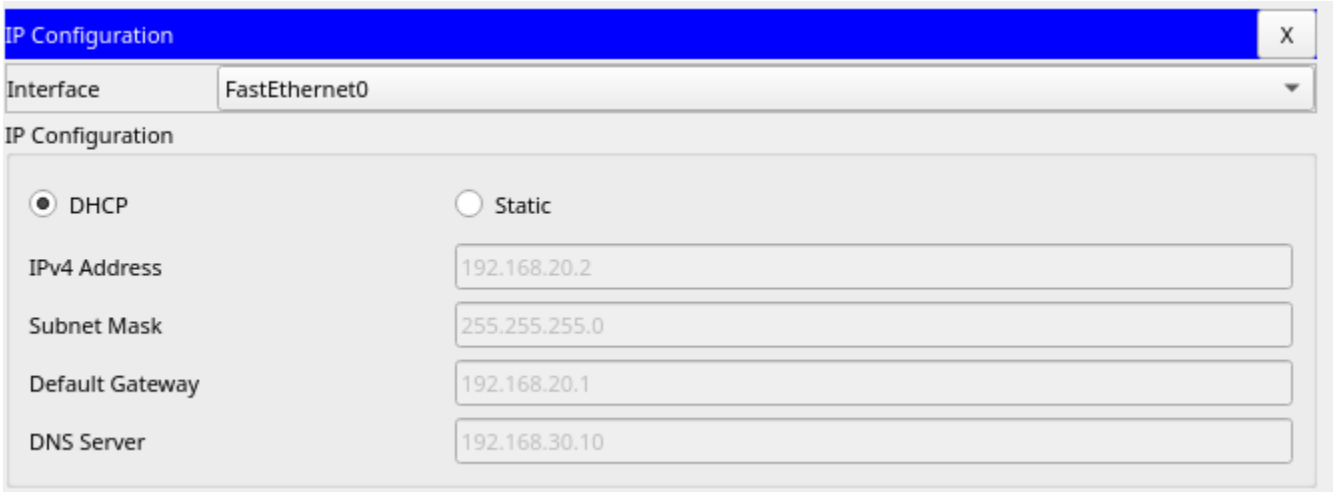
Check DHCP bindings

```
Router#sh ip dhcp binding
IP address       Client-ID/              Lease expiration        Type
                 Hardware address
192.168.10.2     00D0.FF1A.C97E           --                     Automatic
192.168.10.3     0002.16B5.CA5E           --                     Automatic
192.168.20.2     0030.F2C1.6A0D           --                     Automatic
192.168.30.2     00D0.BA8A.DA28           --                     Automatic
Router#
```

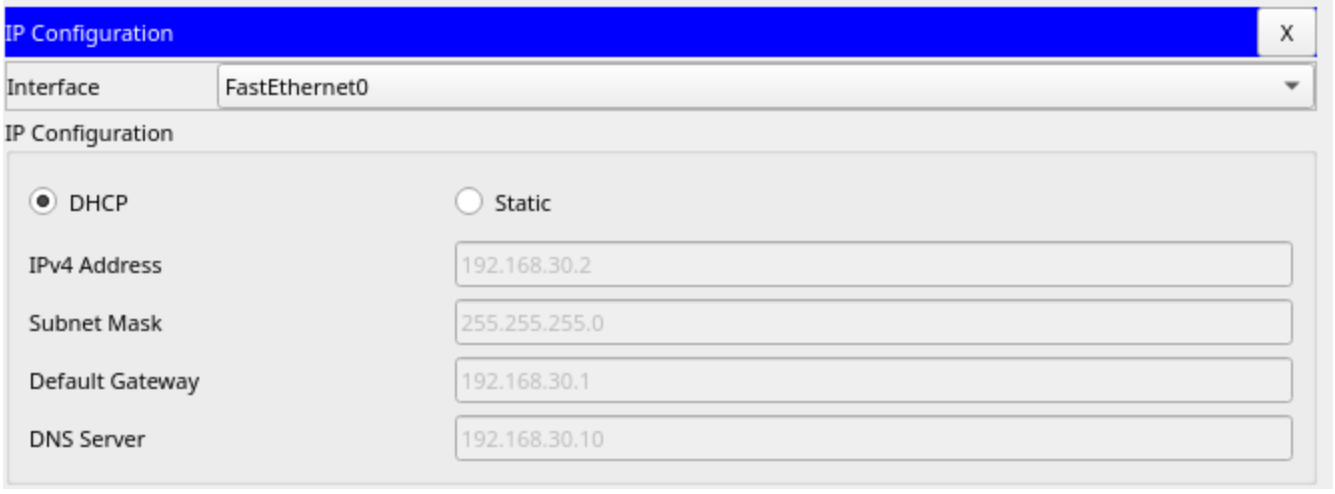
Enabling the DHCP on the computers to get it’s IP address(sales)



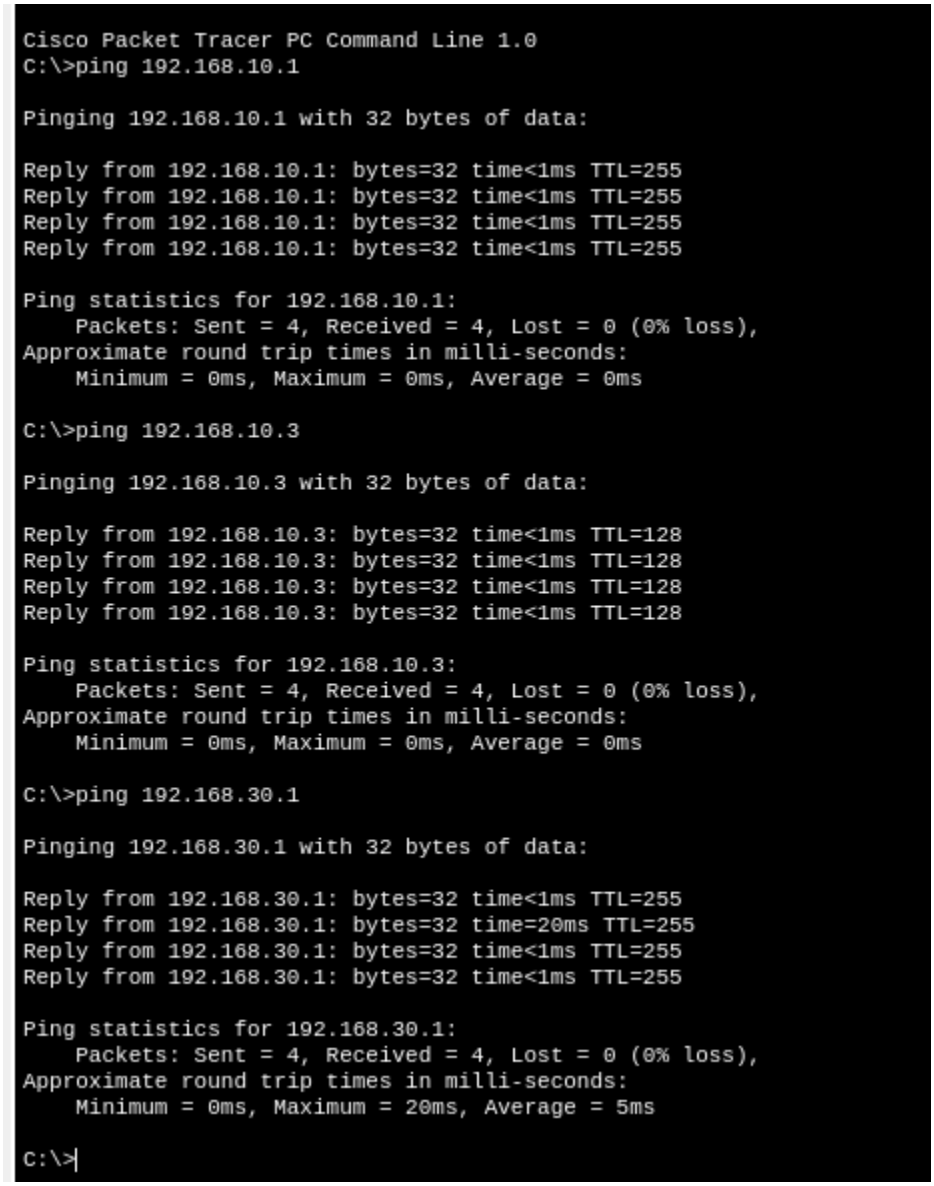
HR



IT



Test connectivity for sales and the dns gateway



Check my other configuration documentation
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