

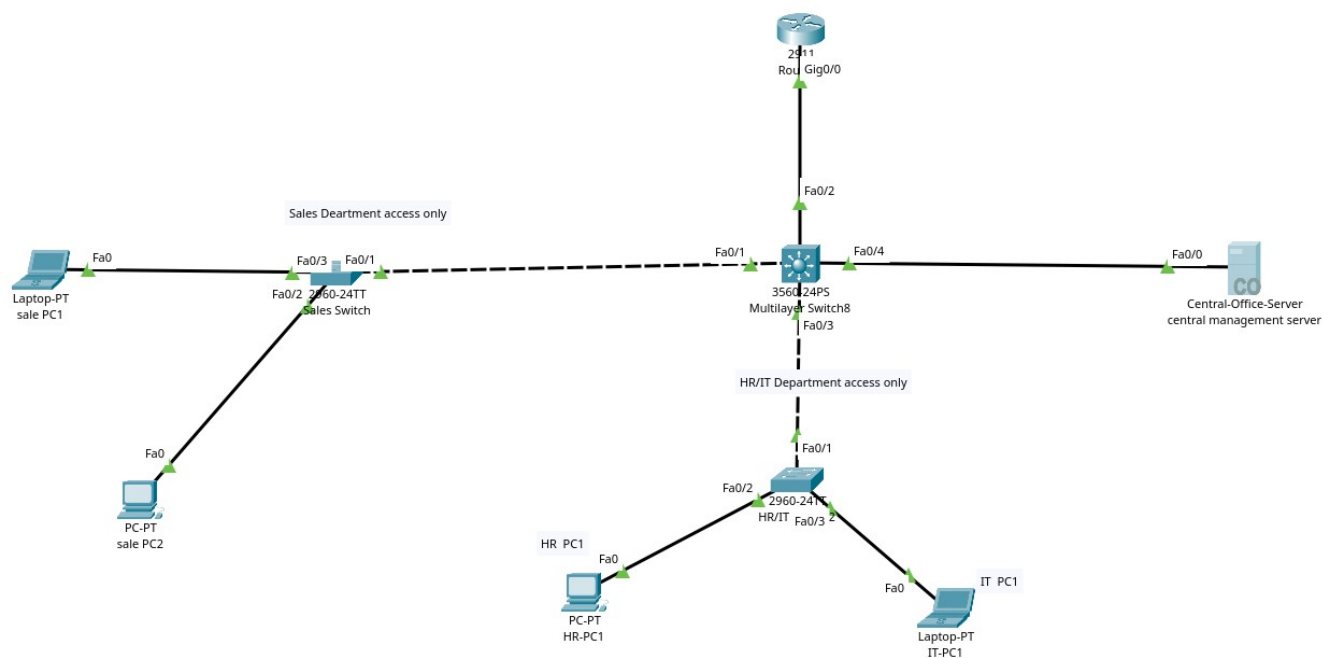
Excellent! I will provide you with a **comprehensive, step-by-step guide** for all five labs, including detailed topology diagrams, device lists, configurations, verification commands, and troubleshooting tips.

## 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

```
IOS Command Line Interface

Switch>en
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname MAIN-SWITCH
MAIN-SWITCH(config)#
MAIN-SWITCH(config)#vlan 10
MAIN-SWITCH(config-vlan)#name sales
MAIN-SWITCH(config-vlan)#ex
MAIN-SWITCH(config)#
MAIN-SWITCH(config)#vlan 20
MAIN-SWITCH(config-vlan)#name HR
MAIN-SWITCH(config-vlan)#ex
MAIN-SWITCH(config)#
MAIN-SWITCH(config)#vlan 30
MAIN-SWITCH(config-vlan)#name IT
MAIN-SWITCH(config-vlan)#ex
MAIN-SWITCH(config)#
MAIN-SWITCH(config)#vlan 99
MAIN-SWITCH(config-vlan)#name NATIVE
MAIN-SWITCH(config-vlan)#ex
MAIN-SWITCH(config)#
```

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

```
IOS Command Line Interface

MAIN-SWITCH(config)#
MAIN-SWITCH(config)#int vlan 20
MAIN-SWITCH(config-if)#
%LINK-5-CHANGED: Interface Vlan20, changed state to up

MAIN-SWITCH(config-if)#ip add 192.168.20.0 255.255.255.0
Bad mask /24 for address 192.168.20.0
MAIN-SWITCH(config-if)#no sh
MAIN-SWITCH(config-if)#
MAIN-SWITCH(config-if)#ex
MAIN-SWITCH(config)#
MAIN-SWITCH(config)#int 30
MAIN-SWITCH(config)#
^
% Invalid input detected at '^' marker.

MAIN-SWITCH(config)#int vlan 30
MAIN-SWITCH(config-if)#
%LINK-5-CHANGED: Interface Vlan30, changed state to up

MAIN-SWITCH(config-if)#ip add 192.168.30.10 255.255.255.0
MAIN-SWITCH(config-if)#no sh
MAIN-SWITCH(config-if)#ex
MAIN-SWITCH(config)#
MAIN-SWITCH(config)#int vlan 99
MAIN-SWITCH(config-if)#
%LINK-5-CHANGED: Interface Vlan99, changed state to up

MAIN-SWITCH(config-if)#ip add 192.168.99.5 255.255.255.0
MAIN-SWITCH(config-if)#no sh
MAIN-SWITCH(config-if)#ex
MAIN-SWITCH(config)#
```

### 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)#  
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)#default
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 gig0/0.30
      ^
% 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).
```

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## Installing tower interface

Physical Config Services Attributes

GLOBAL	Tower Interface
Settings	IP Configuration
Algorithm Settings	IPv4 Address: 172.167.60.1
<b>INTERFACE</b>	Subnet Mask: 255.255.0.0
Backbone	IPv6 Configuration
Cell Tower	IPv6 Address: /
	Link Local Address: FE80::2E0:F7FF:FEB5:54D5

Physical Config Services Attributes

SERVICES	DHCP
CELL TOWER	IP Address: 172.167.60.1
DHCP	Subnet Mask: 255.255.0.0
DHCPv6	Start IP Address : 172 167 0 100
PAP/CHAP	Maximum Number of Users : 50
	IP Address Range 172 167 0 100 -- 149
	DNS Server 0.0.0.0
	Save Cancel

## checking vlans

```

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

```

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 Ethet 101005 1500 - - - 10M - 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)

IP Configuration

X

InterfaceFastEthernet0

IP Configuration

☒ DHCP

☐ Static

IPv4 Address

192.168.10.2

Subnet Mask

255.255.255.0

Default Gateway

192.168.10.1

DNS Server

192.168.30.10

HR

IP Configuration

X

InterfaceFastEthernet0

IP Configuration

☒ DHCP

☐ Static

IPv4 Address

192.168.20.2

Subnet Mask

255.255.255.0

Default Gateway

192.168.20.1

DNS Server

192.168.30.10

IT

IP Configuration

X

InterfaceFastEthernet0

IP Configuration

☒ DHCP

☐ Static

IPv4 Address

192.168.30.2

Subnet Mask

255.255.255.0

Default Gateway

192.168.30.1

DNS Server

192.168.30.10



Test connectivity for sales and the dns gateway

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.10.1

Pinging 192.168.10.1 with 32 bytes of data:

Reply from 192.168.10.1: bytes=32 time<1ms TTL=255
Reply from 192.168.10.1: bytes=32 time<1ms TTL=255
Reply from 192.168.10.1: bytes=32 time<1ms TTL=255
Reply from 192.168.10.1: bytes=32 time<1ms TTL=255

Ping statistics for 192.168.10.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.168.10.3

Pinging 192.168.10.3 with 32 bytes of data:

Reply from 192.168.10.3: bytes=32 time<1ms TTL=128
Reply from 192.168.10.3: bytes=32 time<1ms TTL=128
Reply from 192.168.10.3: bytes=32 time<1ms TTL=128
Reply from 192.168.10.3: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.10.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 192.168.30.1

Pinging 192.168.30.1 with 32 bytes of data:

Reply from 192.168.30.1: bytes=32 time<1ms TTL=255
Reply from 192.168.30.1: bytes=32 time=20ms TTL=255
Reply from 192.168.30.1: bytes=32 time<1ms TTL=255
Reply from 192.168.30.1: bytes=32 time<1ms TTL=255

Ping statistics for 192.168.30.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 20ms, Average = 5ms

C:\>|
```

Check my other configuration documentation

author name:

Giningakpio Stephen Paite Justin

+211925791177 | +256790087870

[cybergurus@hotmail.com](mailto:cybergurus@hotmail.com) | [cisco1011@proton.me](mailto:cisco1011@proton.me)