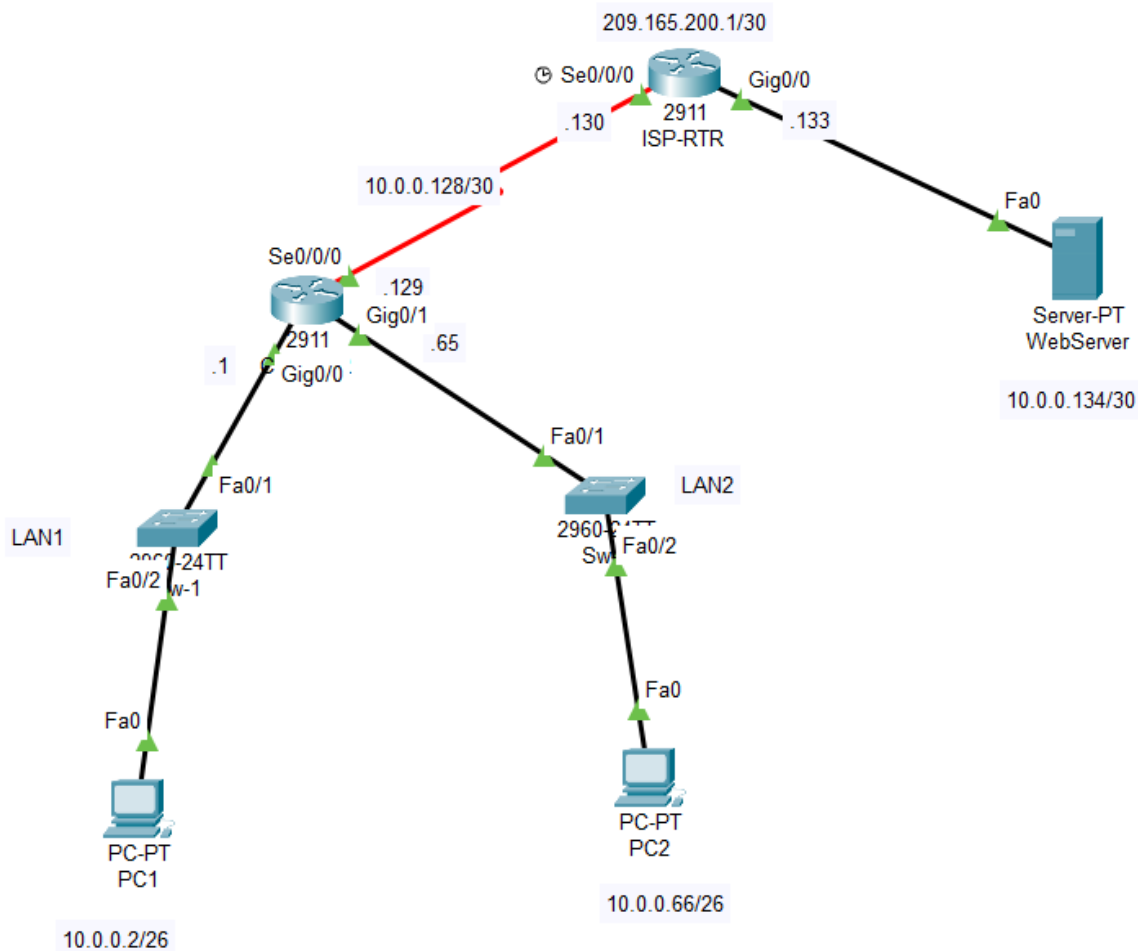


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Enterprise Network Configuration using DHCP, RIP, and NAT

Topology



Introduction

In this LAB provides the detailed design, configuration, and explanation of a small enterprise network implementation in Cisco Packet tracer. The topology consist of LANs a Core Router (Core-RTR) providing DHCP services, an ISP Router (ISP-RTR) providing NAT and internet connectivity and an internal web server. The network demonstrates the use of

- DHCP: to automatically assign IP address to LAN hosts.
- RIP: To enable dynamic routing between routers.

- NAT: To provide internet access to private hosts using public IPs.

Addressing Table

Subnetting

- LAN1 and LAN2 are divided into 10.0.0.0/26 subnet (64 hosts)
- The Core_RTR and ISP-RTR link uses a /30 subnet.
- The web Server uses an IP from another small /30 subnet.

Device/ Interface	IP address	Subnet mask	Default Gateway
Core-Router/ G0/0	10.0.0.1	255.255.255.192	-
Core-Router/ G0/1	10.0.0.65	255.255.255.192	-
Core-Router/ S0/0/0	10.0.0.129	255.255.255.252	-
ISP-RTR/ S0/0/0	10.0.0.130	255.255.255.252	-
ISP-RTR/ S0/0/1	209.165.2001.1	255.255.255.252	-
ISP-RTR/ G0/0	10.0.0.133	255.255.255.252	-
PC1	10.0.0.2	255.255.255.192	10.0.0.1
PC2	10.0.0.66	255.255.255.192	10.0.0.65
Web Server	10.0.0.134	255.255.255.252	10.0.0.133

Core-RTR

DHCP Configuration

- DHCP automatically assigns IPs to LAN1 and LAN2.
- Excluded-address ensures gateway IPs (.1 and .65) are not assigned to clients.
- DNS server is set to 10.0.0.134 (Web Server)

```
ip dhcp excluded-address 10.0.0.1
ip dhcp excluded-address 10.0.0.65
```

```
ip dhcp pool LAN1_POOL
network 10.0.0.0 255.255.255.192
default-router 10.0.0.1
dns-server 10.0.0.134
domain-name write
```

```
ip dhcp pool LAN2_POOL
network 10.0.0.64 255.255.255.192
default-router 10.0.0.65
dns-server 10.0.0.134
domain-name write
```

Interface Configuration

- G0/0 is LAN1 gateway, G0/1 is LAN2 gateway.
- S0/0/0 is the WAN interface connecting to ISP.

```
interface GigabitEthernet0/0
ip address 10.0.0.1 255.255.255.192
no shutdown
```

```
interface GigabitEthernet0/1
ip address 10.0.0.65 255.255.255.192
no shutdown
```

```
interface Serial0/0/0
ip address 10.0.0.129 255.255.255.252
no shutdown
```

Routing Configuration (RIPv2)

- RIPv2 advertises LAN and WAN networks to ISP.
- No auto-summary ensures correct subnet advertisements.

```
router rip
version 2
network 10.0.0.0
no auto-summary
```

ISR-RTR

Interface configuration

- G0/0 and S0/0/0 are marked as NAT inside.
- S0/0/1 (toward internet) is NAT outside.

```
interface GigabitEthernet0/0
ip address 10.0.0.133 255.255.255.252
ip nat inside
no shutdown
```

```
interface Serial0/0/0
ip address 10.0.0.130 255.255.255.252
ip nat inside
no shutdown
```

```
interface Serial0/0/1
ip address 209.165.200.1 255.255.255.252
ip nat outside
no shutdown
```

NAT Configuration

- NAT pool defines 6 public IPs.
- Access-list allows private network 10.0.0.0/24 use NAT.
- Overload enable PAT, allowing multiple users to share public IPs.

```
ip nat pool NAT_POOL 209.165.200.225 209.165.200.230 netmask 255.255.255.248
```

```
access-list 1 permit 10.0.0.0 0.0.0.255
```

```
ip nat inside source list 1 pool NAT_POOL overload
```

Routing Configuration

- RIP used for internal route exchange with Core-RTR
- Static default route sends unknown traffic to next-hop ISP (109.165.200.2).

```
router rip
```

```
version 2
```

```
network 10.0.0.0
```

```
no auto-summary
```

```
ip route 0.0.0.0 0.0.0.0 209.165.200.2
```

Verify the Show running-config Command on Both Router

The **show running-config** command is used to display the current active configuration that the device is using in RAM.

```
hostname Core-RTR
!
!
ip dhcp excluded-address 10.0.0.1
ip dhcp excluded-address 10.0.0.65
!
ip dhcp pool LAN1_POOL
network 10.0.0.0 255.255.255.192
default-router 10.0.0.1
dns-server 10.0.0.134
domain-name wirte

ip dhcp pool LAN2_POOL
network 10.0.0.64 255.255.255.192
default-router 10.0.0.65
dns-server 10.0.0.134
domain-name write
```

```
!  
!  
no ip cef  
no ipv6 cef  
!  
!  
license udi pid CISCO2911/K9 sn FTX152421KJ-  
!  
!  
spanning-tree mode pvst  
!  
!  
interface GigabitEthernet0/0  
ip address 10.0.0.1 255.255.255.192  
duplex auto  
speed auto  
!  
interface GigabitEthernet0/1  
ip address 10.0.0.65 255.255.255.192  
duplex auto  
speed auto  
!  
interface GigabitEthernet0/2  
no ip address  
duplex auto  
speed auto  
shutdown  
!  
interface Serial0/0/0  
ip address 10.0.0.129 255.255.255.252  
!  
interface Serial0/0/1  
no ip address  
clock rate 2000000  
shutdown  
!  
interface Vlan1  
no ip address  
shutdown  
!  
router rip  
version 2  
network 10.0.0.0  
no auto-summary  
!  
ip classless  
!  
ip flow-export version 9  
!  
line con 0  
!  
line aux 0  
!  
line vty 0 4  
login  
end
```



```
hostname ISP-RTR
!
!
no ip cef
no ipv6 cef
!
license udi pid CISCO2911/K9 sn FTX1524TH36-
!
!
spanning-tree mode pvst
!
!
interface GigabitEthernet0/0
ip address 10.0.0.133 255.255.255.252
ip nat inside
duplex auto
speed auto
!
interface GigabitEthernet0/1
no ip address
duplex auto
speed auto
shutdown
!
interface GigabitEthernet0/2
no ip address
duplex auto
speed auto
shutdown
!
interface Serial0/0/0
ip address 10.0.0.130 255.255.255.252
ip nat inside
clock rate 2000000
!
interface Serial0/0/1
ip address 209.165.200.1 255.255.255.252
ip nat outside
clock rate 2000000
!
interface Vlan1
no ip address
shutdown
!
router rip
version 2
network 10.0.0.0
no auto-summary
!
ip nat pool NAT_POOL 209.165.200.225 209.165.200.230 netmask 255.255.255.248
ip nat inside source list 1 pool NAT_POOL overload
ip classless
ip route 0.0.0.0 0.0.0.0 209.165.200.2
!
ip flow-export version 9
!
```

```

!
access-list 1 permit 10.0.0.0 0.0.0.255
!
!
line con 0
!
line aux 0
!
line vty 0 4
login
!
!
End

```

Verify the DHCP Configuration

The `show ip dhcp binding` command provides information on all currently assigned DHCP addresses.

```

Core-RTR>ena
Core-RTR#show ip dhcp binding

```

IP address	Client-ID/ Hardware address	Lease expiration	Type
10.0.0.2	0050.0FCA.BD6B	--	Automatic
10.0.0.66	000C.CF9E.47D9	--	Automatic

Verify the DHCP IP provides to the Client

This PC1 automatically received an IP (10.0.0.2) from the router's DHCP server. The router at 10.0.0.1 is the gateway, and DNS server 10.0.0.134 resolves websites.

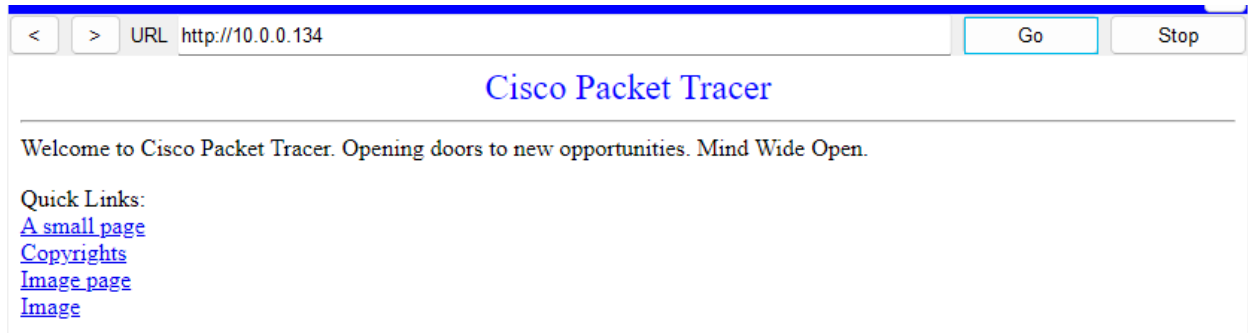
IP Configuration

☒ DHCP
 ☐ Static

IPv4 Address	10.0.0.2
Subnet Mask	255.255.255.192
Default Gateway	10.0.0.1
DNS Server	10.0.0.134

Verify the Connectivity Between to client PC1 and Web Server

The web page proves end-to-end connectivity is successful from PC → Switch → Core-RTR → ISP-RTR → Web Server.



Conclusion

The network design successfully demonstrates:

- The network connectivity using DHCP/
- WAN communication between enterprise and ISP
- Internet access using NAT
- A dedicated internal Web/DNS for enterprises use.