

# Module 2 Project

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## Executive Summary

I designed and implemented a routed network using the address block 192.168.0.0/24, subdivided into purpose-built subnets for a PCs LAN, a servers LAN, and a /30 point-to-point link between two routers. Infrastructure devices (routers and servers) use static IPs; client PCs use addresses via a DHCP server with Router 1 acting as a DHCP relay. The routing is provided by RIPv2 with no auto-summary. Verification shows a successful DHCP leases, dynamic routing between subnets, DNS name resolution, and end-to-end connectivity across the network.

## 1- Typology Overview:

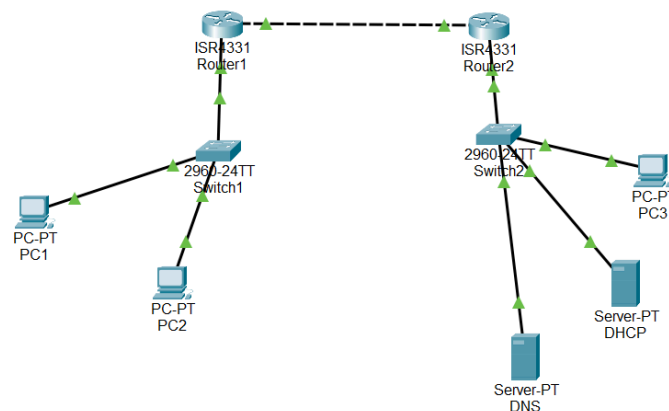
Devices used: 2 routers (Router 1, Router2), 2 switches (Switch 1, Switch 2), 2 servers (DHCP, DNS) and PCs (PC1, PC2, PC3)

Physical Layout:

Left: PC1/PC2→Switch1→Router1

Right: Router2→Switch2→DHCP Server (192.168.0.2), DNS Server (192.1168.0.3)→PC3

Router1↔Router2 connected by a /30 link.



## 2-IP Subnetting Plan (all carved from 192.168.0.0/24)

Purpose	Network	Prefix/Mask	Usable Host Range	Gateway
<b>Servers LAN</b>	192.168.0.0	/27 (255.255.255.224)	192.168.0.1-192.168.0.30	192.168.0.1 (Router2 g0/0/1)
<b>PCs LAN</b>	192.168.0.3.2	/27 (255.255.255.224)	192.168.0.33-192.168.0.62	192.168.0.33 (Router1 g0/0/0)
<b>Router↔Router</b>	192.168.0.8.0	/30 (255.255.255.252)	192.168.0.81-192.168.0.82	

Router 1: g0/0/0 192.168.0.33/27, g0/0/1 192.168.0.82/30

Rouer 2: g0/0/1 192.168.0.1/27, g0/0/0 192.168.0.1

DHCP Server: 192.168.0.2/27, gateway 192.168.0.1

DNS Server: 192.168.0.3.27, gateway 192.168.0.1

### 3- Services Configuration:

DHCP (on server 192.168.0.2)

Service: on

Pool "PCs":

Default Gateway: 192.168.0.33

DNS Server: 192.168.0.34

Subnet Mask: 255.255.255.224

Max users: 28

NIC on server: 192.168.0.2/27, GW 192.168.0.1



## 4- Routing (RIPv2)

Router1

Physical Config CLI Attributes

IOS Command Line Interface

```
Router>show ip interface brief
Interface      IP-Address      OK? Method Status      Protocol
GigabitEthernet0/0/0  192.168.0.33    YES manual up          up
GigabitEthernet0/0/1  192.168.0.82    YES manual up          up
GigabitEthernet0/0/2  192.168.0.65    YES manual administratively down down
Vlan1          unassigned      YES unset  administratively down down

Router>show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

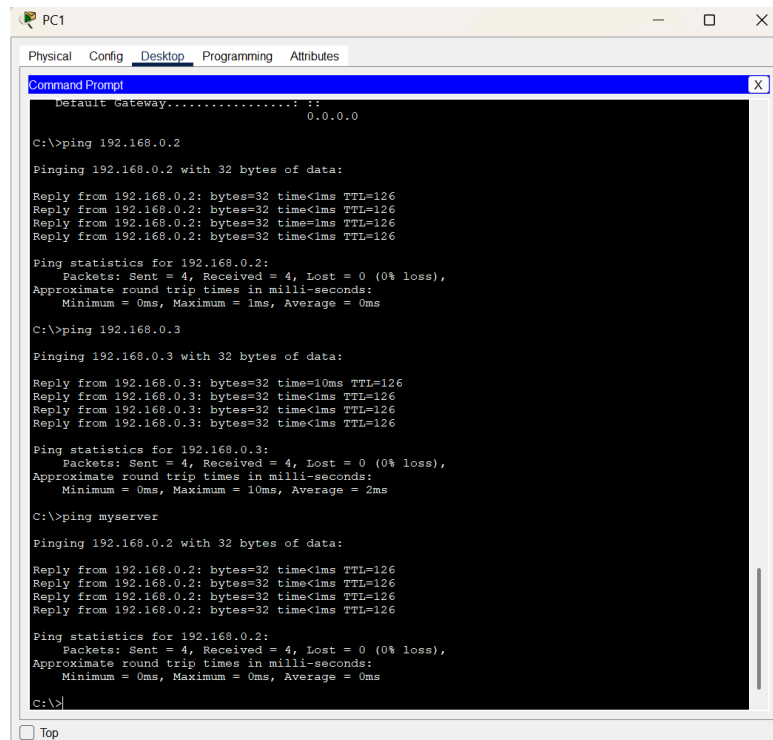
      192.168.0.0/24 is variably subnetted, 5 subnets, 3 masks
R       192.168.0.0/27 [120/1] via 192.168.0.81, 00:00:11, GigabitEthernet0/0/1
C       192.168.0.32/27 is directly connected, GigabitEthernet0/0/0
L       192.168.0.33/32 is directly connected, GigabitEthernet0/0/0
C       192.168.0.80/30 is directly connected, GigabitEthernet0/0/1
L       192.168.0.82/32 is directly connected, GigabitEthernet0/0/1

Router>show ip protocols
Routing Protocol is "rip"
Sending updates every 30 seconds, next due in 0 seconds
Invalid after 180 seconds, hold down 180, flushed after 240
Outgoing update filter list for all interfaces is not set
Incoming update filter list for all interfaces is not set
Redistributing: rip
Default version control: send version 2, receive 2
  Interface        Send Recv Triggered RIP Key-chain
  GigabitEthernet0/0/0  22
  GigabitEthernet0/0/1  22
Automatic network summarization is not in effect
Maximum path: 4
Routing for Networks:
  192.168.0.0
Passive Interface(s):
Routing Information Sources:
  Gateway         Distance      Last Update
```

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## 5-Verification and Test Results



```
PC1
Physical Config Desktop Programming Attributes
Command Prompt
Default gateway.....: 0.0.0.0

C:\>ping 192.168.0.2

Pinging 192.168.0.2 with 32 bytes of data:

Reply from 192.168.0.2: bytes=32 time<1ms TTL=126
Reply from 192.168.0.2: bytes=32 time<1ms TTL=126
Reply from 192.168.0.2: bytes=32 time<1ms TTL=126
Reply from 192.168.0.2: bytes=32 time<1ms TTL=126

Ping statistics for 192.168.0.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>ping 192.168.0.3

Pinging 192.168.0.3 with 32 bytes of data:

Reply from 192.168.0.3: bytes=32 time=10ms TTL=126
Reply from 192.168.0.3: bytes=32 time<1ms TTL=126
Reply from 192.168.0.3: bytes=32 time<1ms TTL=126
Reply from 192.168.0.3: bytes=32 time<1ms TTL=126

Ping statistics for 192.168.0.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 10ms, Average = 2ms

C:\>ping myserver

Pinging 192.168.0.2 with 32 bytes of data:

Reply from 192.168.0.2: bytes=32 time<1ms TTL=126
Reply from 192.168.0.2: bytes=32 time<1ms TTL=126
Reply from 192.168.0.2: bytes=32 time<1ms TTL=126
Reply from 192.168.0.2: bytes=32 time<1ms TTL=126

Ping statistics for 192.168.0.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>
```

## 6- Troubleshooting Notes (What I fixed)

- Router Interface naming: used 3 part names (g0/0/0, g0/0/1, g0/0/2)
- Line Protocol up/down: ensured router uplinks connect to switch Gi ports and ports are no shutdown
- DHCP not reaching PCs: added ip helper-address 192.168.0.2 on Router1 g0/0/0 and set server NIC GW to 192.168.0.1.
- DNS not resolving: enabled DNS service and added myserver → 192.168.0.2