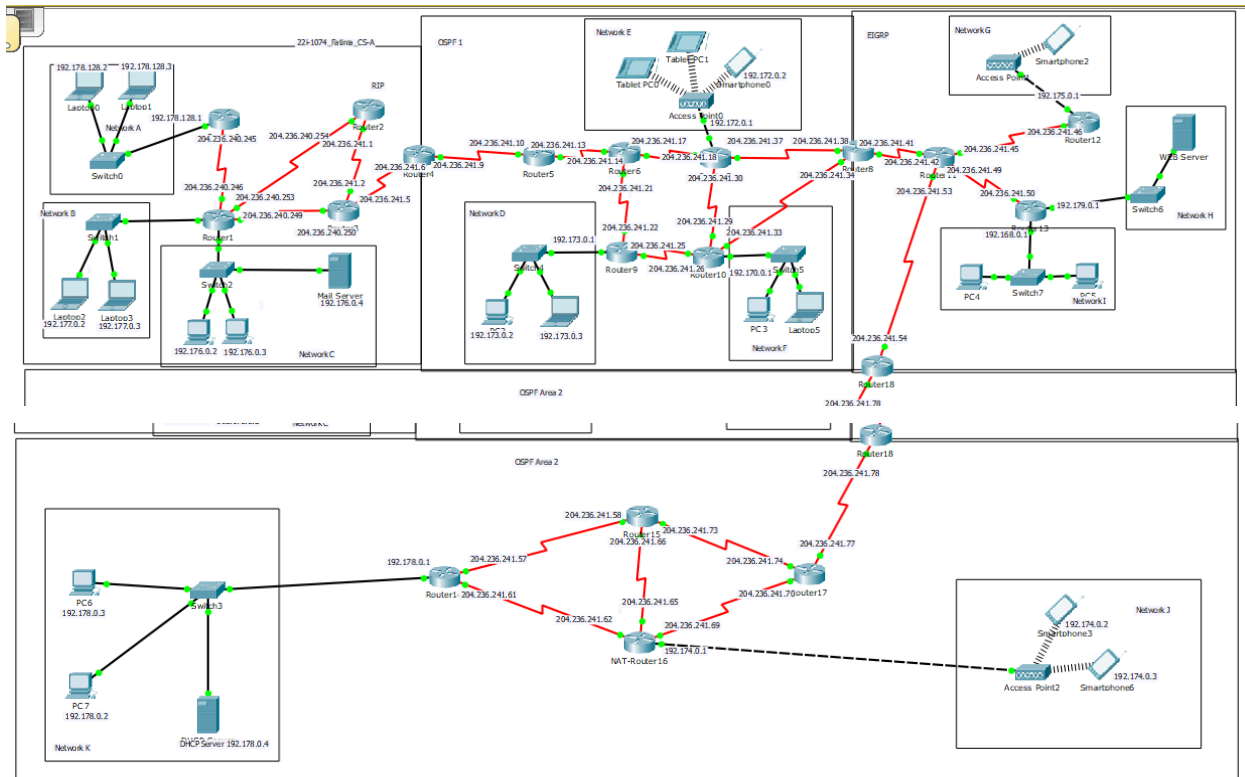


Name: Fatima Roll No. 22i-1074 CNet - A Project

## Topology:



## Assigned IPs

- **Public IP:** 204.236.240.246
- **Private IP:** 192.168.1.14

## 1. VLSM Calculations

### Public IP Addressing (Router-to-Router)

Name: Fatima 22i-1074 BS (cs) - K

CNet - A Project

VLSM Public IP Address

Step 1: Public IP address: 204.236.240.246

class: C

subnet mask: 255.255.255.0

required subnets: 25

Step 2: Required hosts: 2

( $32 - 2 = 30$  networks)

subnet mask: 255.255.255.0

|||||||. |||||. |||||. 00000000

|||||||. |||||. |||||. |||||100

255.255.255.252 /30

→ Subnet # 0 hosts available: 2

Network Address: 204.236.240.244 /30

Mask: 255.255.255.252 /30

Usable range: 204.236.240.245 - 204.236.240.246

Broadcast ~~ran~~: 204.236.240.247 /30

→ subnet # 1 hosts available: 2

Network Address: 204.236.240.248 /30

Mask: 255.255.255.252 /30

Usable range: 204.236.240.249 /30 - 204.236.240.250 /30

Broadcast: 204.236.240.251 /30

→ Subnet # 2 hosts: 2

Network Address: 204.236.240.252 /30

Mask: 255.255.255.252 /30

Usable range: 204.236.240.253 /30 - 204.236.240.254 /30

Broadcast: 204.236.240.255 /30

→ Subnet # 3 hosts: 2

Network Address: 204.236.241.0 /30

Mask: 255.255.255.252 /30

Usable range: 204.236.241.1 /30 - 204.236.241.2 /30

Broadcast: 204.236.241.3 /30

→ Subnet #4 hosts: 2

Network Address: 204.236.241.4/30

Mask: 255.255.255.252/30

Usable range: 204.236.241.5/30 - 204.236.241.6/30

Broadcast: 204.236.241.7/30.

→ Subnet #5 hosts: 2

Network Address: 204.236.241.8/30

Mask: 255.255.255.252/30

Usable range: 204.236.241.9/30 - 204.236.241.10/30

Broadcast: 204.236.241.11/30

→ Subnet #6 hosts: 2

Network Address: 204.236.241.12/30

Mask: 255.255.255.252/30

Usable range: 204.236.241.13/30 - 204.236.241.14/30

Broadcast: 204.236.241.15/30

→ Subnet #7 hosts: 2

Network Address: 204.236.241.16/30

Mask: 255.255.255.252/30

Usable range: 204.236.241.17/30 - 204.236.241.18/30

Broadcast: 204.236.241.19/30

→ Subnet #8 hosts: 2

Network Address: 204.236.241.20/30

Mask: 255.255.255.252/30

Usable range: 204.236.241.21/30 - 204.236.241.22/30

Broadcast: 204.236.241.23/30

→ Subnet #9 hosts: 2

Network Address: 204.236.241.24/30

mask: 255.255.255.252/30



Usable range: 204.236.241.25/30 - 204.236.241.26/30

Broadcast: 204.236.241.27/30

→ Subnet # 10 hosts: 2

Network address: 204.236.241.28/30

Mask: 255.255.255.252/30

Usable range: 204.236.241.29/30 - 204.236.241.30/30

Broadcast: 204.236.241.31/30

→ Subnet # 11 hosts: 2

Network Address: 204.236.241.32/30

Mask: 255.255.255.252/30

Usable range: 204.236.241.33/30 - 204.236.241.34/30

Broadcast: 204.236.241.35/30

→ Subnet # 12 hosts: 2

Network Address: 204.236.241.36/30

Mask: 255.255.255.252

Usable range: 204.236.241.37/30 - 204.236.241.38/30

Broadcast: 204.236.241.39/30

→ Subnet # 13 hosts: 2

Network Address: 204.236.241.40/30

Mask: 255.255.255.252/30

Usable range: 204.236.241.41/30 - 204.236.241.42/30

Broadcast: 204.236.241.43/30

→ Subnet # 14 hosts: 2

Network Address: 204.236.241.44/30

Mask: 255.255.255.252

Usable range: 204.236.241.45/30 - 204.236.241.46/30

Broadcast: 204.236.241.47/30

→ Subnet # 15 hosts: 2

Network Address: 204.236.241.48/30

Mask: 255.255.255.252/30

Usable range: 204.236.241.49 /30 - 204.236.241.50 /30

Broadcast: ~~204.236.241.50 /30~~ 204.236.241.51 /30

→ Subnet # 16 hosts: 2

Network Address: 204.236.241.52 /30

Mask: 255.255.255.252 /30

Usable range: 204.236.241.53 /30 - 204.236.241.54 /30

Broadcast: 204.236.241.55 /30

→ Subnet # 17 hosts: 2

Network Address: 204.236.241.56 /30

Mask: 255.255.255.252 /30

Usable range: 204.236.241.57 /30 - 204.236.241.58 /30

Broadcast: 204.236.241.59 /30

→ Subnet # 18 hosts: 2

Network Address: 204.236.241.60 /30

Mask: 255.255.255.252 /30

Usable range: 204.236.241.61 /30 - 204.236.241.62 /30

Broadcast: 204.236.241.63 /30

→ Subnet # 19 hosts: 2

Network Address: 204.236.241.64 /30

Mask: 255.255.255.252 /30

Usable range: 204.236.241.65 /30 - 204.236.241.66 /30

Broadcast: 204.236.241.67 /30

→ Subnet # 20 hosts: 2

Network Address: 204.236.241.68 /30

Mask: 255.255.255.252 /30

Usable range: 204.236.241.69 /30 - 204.236.241.70 /30

Broadcast: 204.236.241.71 /30

→ subnet # 21 hosts: 2

Network Address: 204. 236. 241. 72 /30

Mask: 255. 255. 255. 252 /30

Usable range: 204. 236. 241. 73 /30 - 204. 236. 241. 74 /30

Broadcast: 204. 236. 241. 75 /30

→ subnet # 22 hosts: 2

Network Address: 204. 236. 241. 76 /30

Mask: 255. 255. 255. 252 /30

Usable range: 204. 236. 241. 77 /30 - 204. 236. 241. 78 /30

Broadcast: 204. 236. 241. 79 /30

→ subnet # 23 hosts: 2

Network Address: 204. 236. 241. 80 /30

Mask: 255. 255. 255. 252 /30

Usable range: 204. 236. 241. 81 /30 - 204. 236. 241. 82 /30

Broadcast: 204. 236. 241. 83 /30

→ subnet # 24 hosts: 2

Network Address: 204. 236. 241. 84 /30

Mask: 255. 255. 255. 252 /30

Usable range: 204. 236. 241. 85 /30 - 204. 236. 241. 86 /30

Broadcast: 204. 236. 241. 87 /30 .



## Private IP Addressing (Networks)

Date \_\_\_\_\_

Name: Fatima 22i-1074 B6(cs)-R  
CNet - A Project

VLSM

Step 1: private IP address: 192.168.1.14 /24, class: C  
Subnets required: 11, subnet: 255.255.255.0

Step 2:

→ Class: A no. of hosts: ~~2799~~ 119167

Network Address: 192.168.0.0 /15

Mask: 255.254.0.0

Usable Range: 192.168.0.1 /15 - 192.168.255.254 /15

Broadcast: 192.168.255.255

→ Class F hosts: 96224

Network Address: 192.170.0.0 /15

Mask: 255.254.0.0 /15

Usable Range: 192.170.0.1 /15 - 192.170.255.254 /15

Broadcast Range: 192.170.255.255 /15

→ Class E hosts: 57485

Network Address: 192.172.0.0 /16

Mask: 255.255.0.0

Usable Range: 192.172.0.1 - 192.172.255.254

Broadcast: 192.172.255.255

→ Class D hosts: 55007

Network Address: 192.173.0.0 /16

Mask: 255.255.0.0

Usable Range: 192.173.0.1 - 192.173.255.254

Broadcast: 192.173.255.255

→ class J hosts: 50618

Network Address: 192.174.0.0/16

Mask: 255.255.0.0/16

Usable Range: 192.174.0.1 - 192.174.255.254

Broadcast: 192.174.255.255/16

→ class G hosts: 48535

Network Address: 192.175.0.0/16

Mask: 255.255.0.0/16

Usable Range: 192.175.0.1 - 192.175.255.254

Broadcast: 192.175.255.255/16

→ class C hosts: 44086

Network Address: 192.176.0.0/16

Mask: 255.255.0.0/16

Usable Range: 192.176.0.1 - 192.176.255.254

Broadcast: 192.176.255.255/16

→ class B hosts: 37799

Network Address: 192.177.0.0/16

Mask: 255.255.0.0/16

Usable Range: 192.177.0.1 - 192.177.255.254

Broadcast: 192.177.255.255/16

→ class K hosts: 30635

Network Address: 192.178.0.0/17

Mask: 255.255.128.0/17

Usable Range: 192.178.0.1 - 192.178.127.254

Broadcast: 192.178.127.255/17



Date \_\_\_\_\_

→ Class A hosts: 21799

Network Address: 192.178.128.0 /17

Mask: 255.255.128.0 /17

Usable Range: 192.178.128.1 - 192.178.255.254

Broadcast: 192.178.255.255 /17.

→ Class H hosts: 9538

Network Address: 192.179.0.0 /18

Mask: 255.255.192.0 /18

Usable Range: 192.179.0.1 - 192.179.63.254.

Broadcast: 192.179.63.255 /18.

## Redistribution Configurations:

### Router 4 (RIP to OSPF Area 1):

```
router rip
version 2
Redistribute ospf 1 metric 1
network 204.236.241.4

router ospf 1
redistribute rip subnets
network 204.236.241.8 0.0.0.3 area 0
```

### Router 8 (OSPF Area 1 to EIGRP):

```
router ospf 1
network area 204.236.241.36 0.0.0.3 0
network area 204.236.241.32 0.0.0.3 0
redistribute eigrp 100

router eigrp 100
network 204.236.241.40 0.0.0.3
Redistribute ospf 1 metric 1544 2000 255 1 1500
```

### Router 18 (EIGRP to OSPF Area 2):

```
router ospf 1
network 204.236.241.76 0.0.0.3 area 1
redistribute eigrp 100 subnets

router eigrp 100
network 204.236.241.53 0.0.0.3
redistribute ospf 1 metric 1544 2000 255 1 1500
```

## NAT Configurations

### Router 7 (Network E):

For network: ip nat inside  
For routers : ip nat outside

```
ip nat inside source static 192.172.0.2 204.236.241.37
```

```
Router>en
Router#show ip nat translations
Pro  Inside global    Inside local    Outside local    Outside global
---  204.236.241.37     192.172.0.2     ---              ---
```

## Router 16 (Network J):

For network: ip nat inside

For routers : ip nat outside

ip nat inside source static 192.174.0.2 204.236.241.69

```
Router>en
Router#show ip nat translations
Pro  Inside global      Inside local      Outside local      Outside global
---  204.236.241.68      192.174.0.0       ---                ---
---  204.236.241.69      192.174.0.2       ---                ---
```

## ACL Configurations:

```
Router#config t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#access-list 100 deny ip host 192.172.0.2 host 192.179.0.2
Router(config)#access-list 100 deny ip host 192.174.0.2 host 192.179.0.2
Router(config)#access-list 100 deny ip host 192.178.128.3 host 192.179.0.2
Router(config)#access-list 100 deny ip host 192.173.0.0 0.0.255.255 host
192.179.0.2
% Invalid input detected at '^' marker.

Router(config)#access-list 100 deny ip 192.173.0.0 0.0.255.255 host 192.179.0.2
Router(config)#
Router(config)#exit
Router#

Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface FastEthernet0/1
Router(config-if)#ip access-group 100 in
Router(config-if)#ip access-group 100 out
Router(config-if)#
Router(config-if)#exit
Router(config)#

Router#show access-lists
Extended IP access list 100
 10 deny ip host 192.178.128.3 host 192.179.0.2 (3 match(es))
 20 deny ip host 192.172.0.2 host 192.179.0.2
 30 deny ip host 192.174.0.2 host 192.179.0.2
 40 deny ip 192.173.0.0 0.0.255.255 host 192.179.0.2
 50 permit ip any any (31 match(es))
 60 deny ip host 192.172.0.9 host 192.179.0.2
 70 deny ip host 192.174.0.3 host 192.179.0.2
Router#
```

## DHCP Configuration:



PhysicalConfigServicesDesktopCustom Interface

SERVICES

HTTP

DHCP

DHCPv6

TFTP

DNS

SYSLOG

AAA

NTP

EMAIL

FTP

DHCP

InterfaceFastEthernet0ServiceOnOff

Pool NameK

Default Gateway192.178.0.1

DNS Server192.178.0.4

Start IP Address :19217805

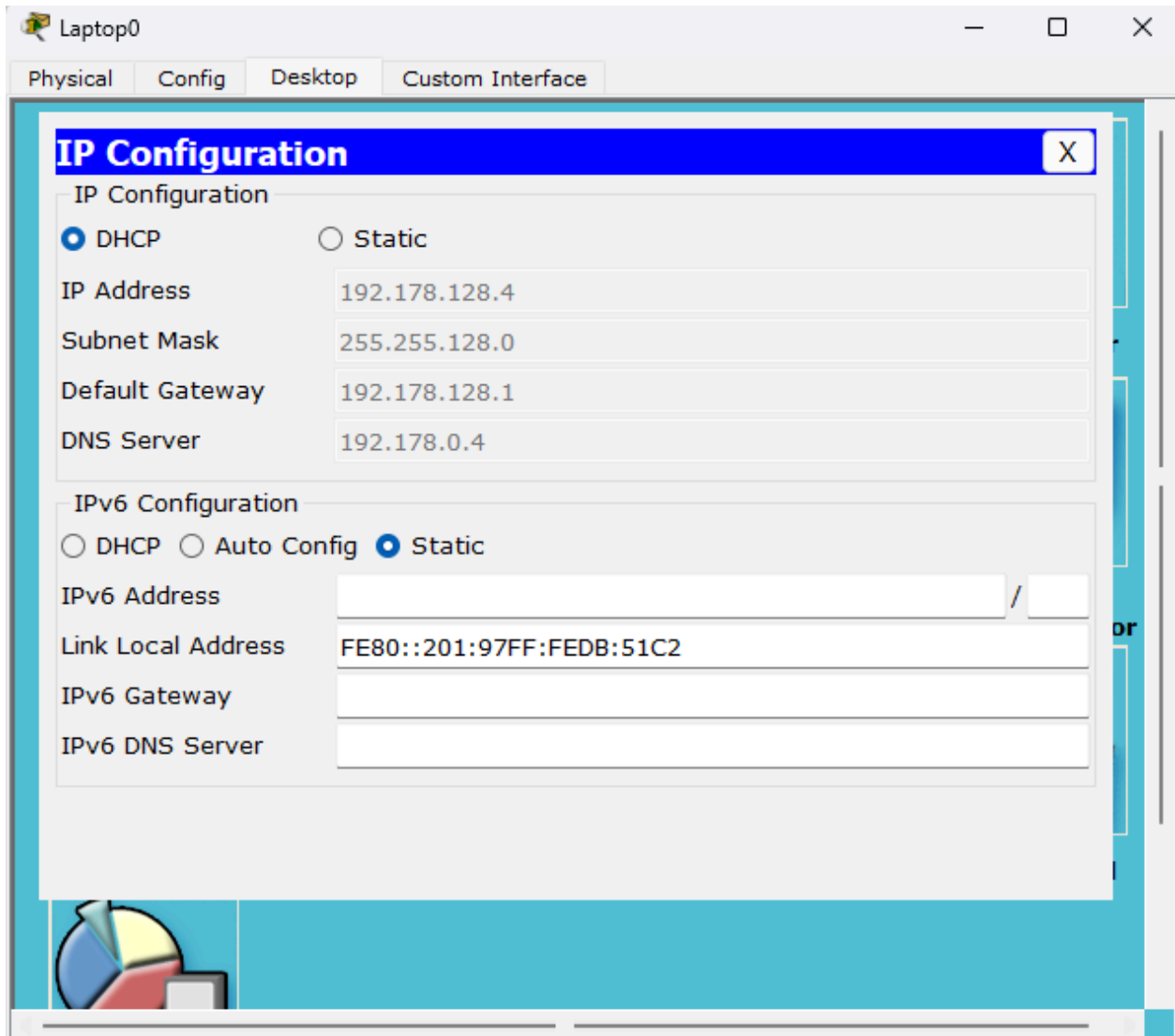
Subnet Mask:2552551280

Maximum number of Users :256

TFTP Server:0.0.0.0

AddSaveRemove

Pool Name	Default Gateway	DNS Server	Start IP Address	Subnet Mask	Max User	TFTP Server
B2	192.177.0.1	192.178.0.4	192.177.0.3	255.255.0.0	256	0.0.0.0
A2	192.178.128.1	192.178.0.4	192.178.128.3	255.255.0.0	256	0.0.0.0
K	192.178.0.1	192.178.0.4	192.178.0.5	255.255.0.0	256	0.0.0.0
D2	192.173.0.1	192.178.0.4	192.173.0.3	255.255.0.0	256	0.0.0.0
I2	192.174.0.1	192.178.0.4	192.174.0.3	255.255.0.0	256	0.0.0.0



**Mail Server Configuration:**

Mail Server

PhysicalConfigServicesDesktopCustom Interface

SERVICES

HTTP

DHCP

DHCPv6

TFTP

DNS

SYSLOG

AAA

NTP

EMAIL

FTP

EMAIL

SMTP Service

ON

OFF

POP3 Service

ON

OFF

Domain Name: mail.com

Set

User Setup

UserIp1Password123

Ip1

Ip2

Ip3

Ip4

Ip0

pc0

pc1

pc2

pc3

Ip5

pc4

pc5

pc6

pc7

tb0

tb1

sp0

sp2

sp3

sp6

+

-

Change

Password



Physical

Config

Services

Desktop

Custom Interface

SERVICES

HTTP

DHCP

DHCPv6

TFTP

DNS

SYSLOG

AAA

NTP

EMAIL

FTP

DNS

DNS Service

On

Off

Resource Records

Name

mail.com

Type

A Record

Address

192.176.0.4

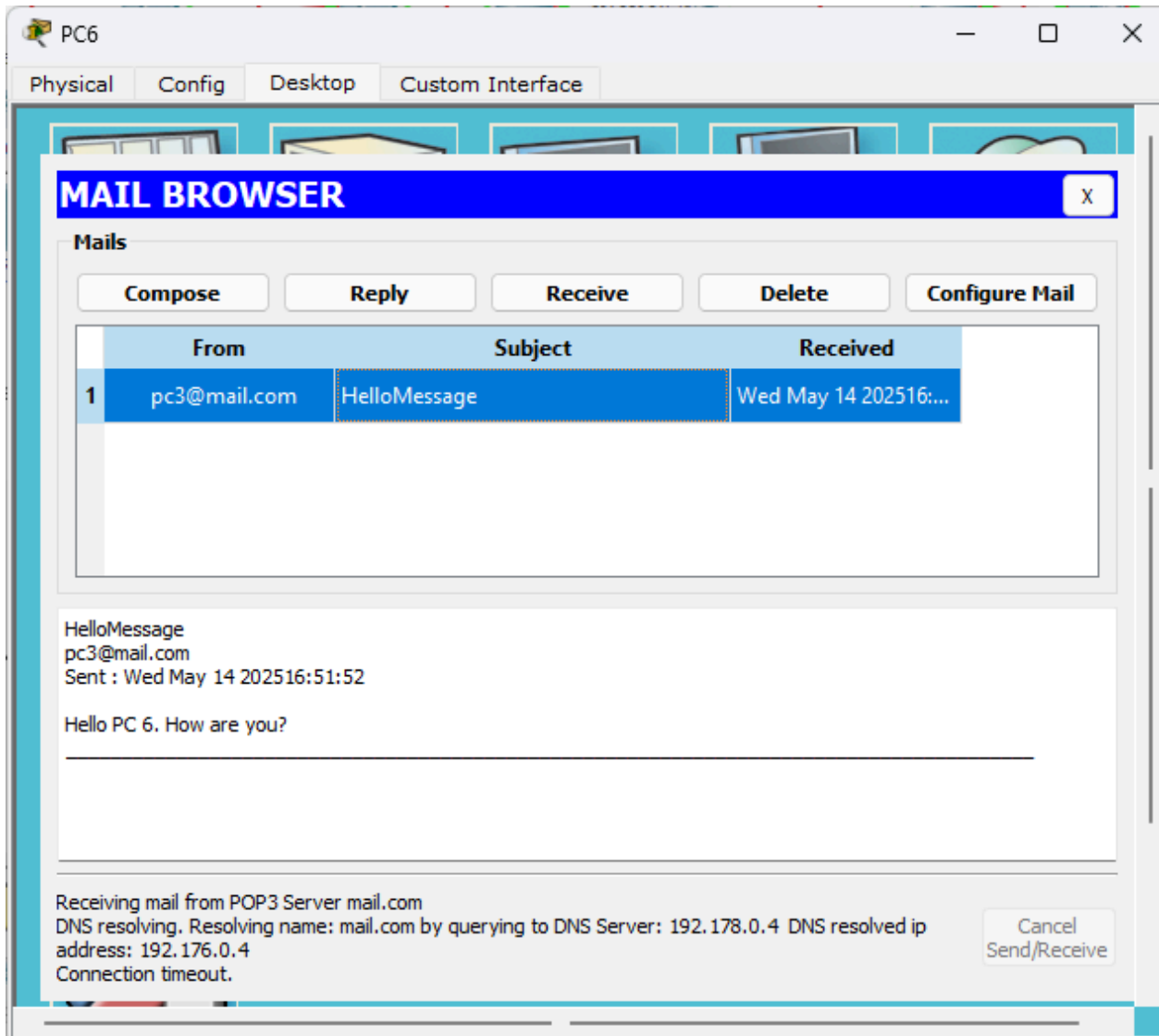
Add

Save

Remove

No.	Name	Type	Detail
0	mail.com	A Record	192.176.0.4

DNS Cache



## Routing Table Router 16:

Type	Network	Port	Next Hop IP	Metric
O	192.168.0.0/15	Serial0/2/0	204.236.241.70	110/20
O	192.170.0.0/15	Serial0/2/0	204.236.241.70	110/20
O	192.172.0.0/16	Serial0/2/0	204.236.241.70	110/20
O	192.173.0.0/16	Serial0/2/0	204.236.241.70	110/20
C	192.174.0.0/16	FastEthernet0/0	---	0/0
O	192.175.0.0/16	Serial0/2/0	204.236.241.70	110/20
O	192.176.0.0/16	Serial0/2/0	204.236.241.70	110/20
O	192.177.0.0/16	Serial0/2/0	204.236.241.70	110/20
O	192.178.0.0/17	Serial0/0/0	204.236.241.61	110/65

## Network Verifications:

- show ip route
- show ip protocols
- show ip eigrp neighbors

show ip ospf neighbor  
show ip rip database

## OSPF Area 1:

```
Router#show ip protocols

Routing Protocol is "ospf 1"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Router ID 204.236.241.21
  Number of areas in this router is 1. 1 normal 0 stub 0 nssa
  Maximum path: 4
  Routing for Networks:
    204.236.241.12 0.0.0.3 area 0
    204.236.241.16 0.0.0.3 area 0
    204.236.241.20 0.0.0.3 area 0
  Routing Information Sources:
    Gateway         Distance      Last Update
    204.236.241.9      110          00:03:49
    204.236.241.13     110          00:03:49
    204.236.241.21     110          00:03:48
    204.236.241.25     110          00:03:47
    204.236.241.33     110          00:03:48
    204.236.241.37     110          00:03:49
    204.236.241.41     110          00:03:48
  Distance: (default is 110)

Router#
```

## RIP:



Router1

PhysicalConfigCLI

IOS Command Line Interface

```

Router#show ip protocols
Routing Protocol is "rip"
Sending updates every 30 seconds, next due in 13 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
FastEthernet0/0      2     2
FastEthernet0/1      2     2
Serial0/2/0          2     2
Serial0/0/0          2     2
Serial0/3/0          2     2
Automatic network summarization is in effect
Maximum path: 4
Routing for Networks:
  192.176.0.0
  192.177.0.0
  192.178.128.0
  204.236.240.0
  204.236.241.0
Passive Interface(s):
Routing Information Sources:
  Gateway         Distance      Last Update
  204.236.240.250    120          00:00:11
  204.236.240.245    120          00:00:19
Distance: (default is 120)
Router#

```

CopyPaste

## EIGRP:

```

Router>en
Router#show ip eigrp neighbors
IP-EIGRP neighbors for process 100
H   Address           Interface      Hold Uptime    SRTT   RTO   Q   Seq
                               (sec)          (ms)                Cnt   Num
0   204.236.241.41     Se0/3/0       12   01:05:54    40    1000   0   143
1   204.236.241.50     Se0/2/0       12   01:05:54    40    1000   0   144
2   204.236.241.54     Se0/1/0       12   01:05:54    40    1000   0   149
3   204.236.241.46     Se0/0/0       12   01:05:53    40    1000   0   148
Router#

```

## OSPF Area 2:

```

Router>en
Router#show ip protocols

Routing Protocol is "ospf 1"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Router ID 204.236.241.69
  Number of areas in this router is 1. 1 normal 0 stub 0 nssa
  Maximum path: 4
  Routing for Networks:
    204.236.241.60 0.0.0.3 area 1
    192.174.0.0 0.0.255.255 area 1
    204.236.241.64 0.0.0.3 area 1
    204.236.241.68 0.0.0.3 area 1
  Routing Information Sources:
    Gateway         Distance      Last Update
    204.236.241.61   110          00:06:03
    204.236.241.69   110          00:06:03
    204.236.241.73   110          00:06:04
    204.236.241.77   110          00:06:03
    204.236.241.78   110          00:06:02
  Distance: (default is 110)

Router#

```

## Communications:

With ACL:

	Failed	WEB S...	Laptop1	ICMP		0.000	N	2
	Failed	PC2	WEB Server	ICMP		0.000	N	3

Simple:

