

CN Lab Assignment 5:
Set up a network - configure interfaces, IP addresses and routing protocols (RIP/OSPF/BGP) using Packet Tracer (Network Simulator)

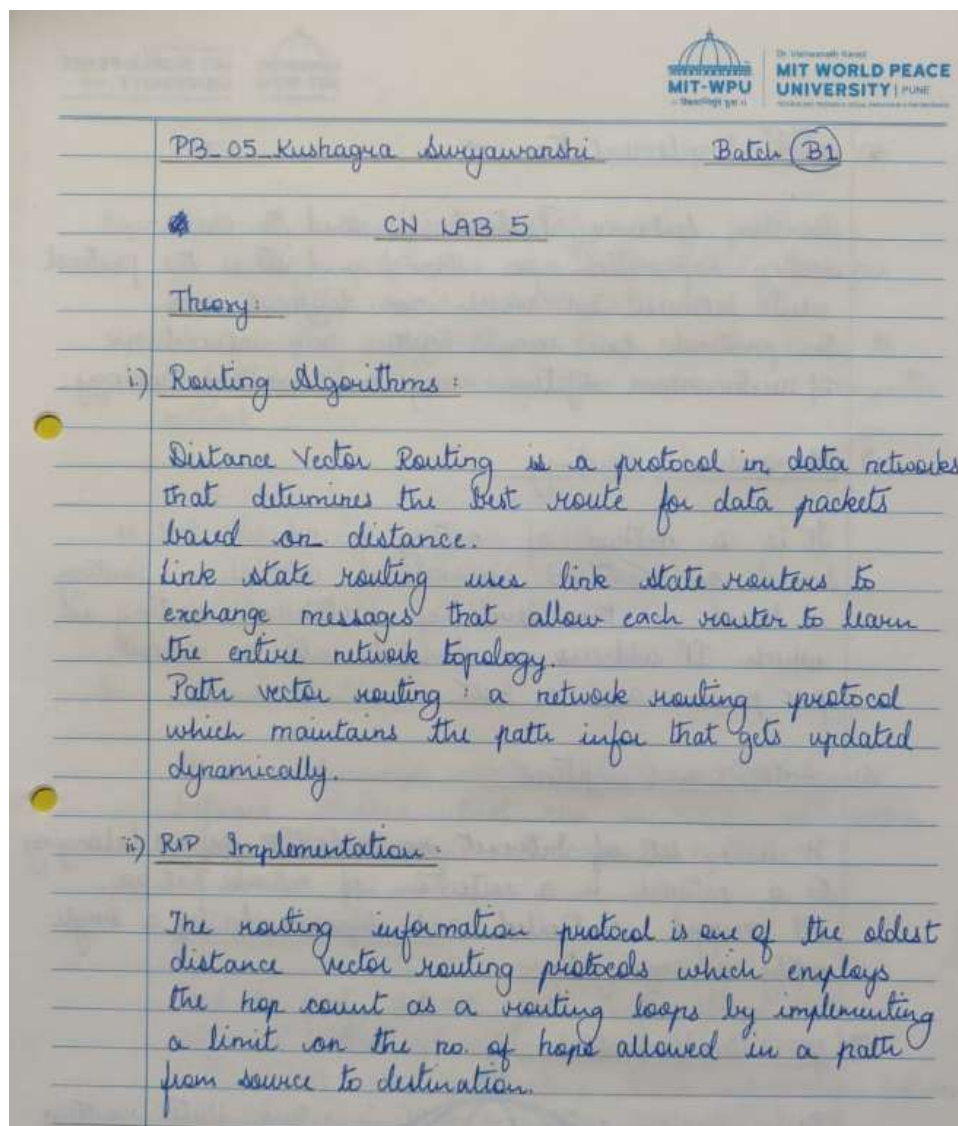
Title: Network setup

Aim: Set up a network-configure interfaces, IP addresses and routing protocols (RIP/OSPF/BGP) using Packet Tracer (Network Simulator)

Objectives:

1. To understand routing protocols (RIP/OSPF/BGP)

Theory:



iv) ~~OSPF~~^{BCP} Implementation:- →

Border Gateway Protocol is used to exchange routing information for internet and it is the protocol used between ISP which are different aces.

The protocol can connect together any internetwork of autonomous system using an arbitrary topology.

v) Hierarchical Routing:-

It is a method of routing in networks that is based on ~~hierarchical~~ hierarchical addressing. Routing is based on two levels of hierarchical routing in which IP address is divided into a network, ~~per~~ person and a host.

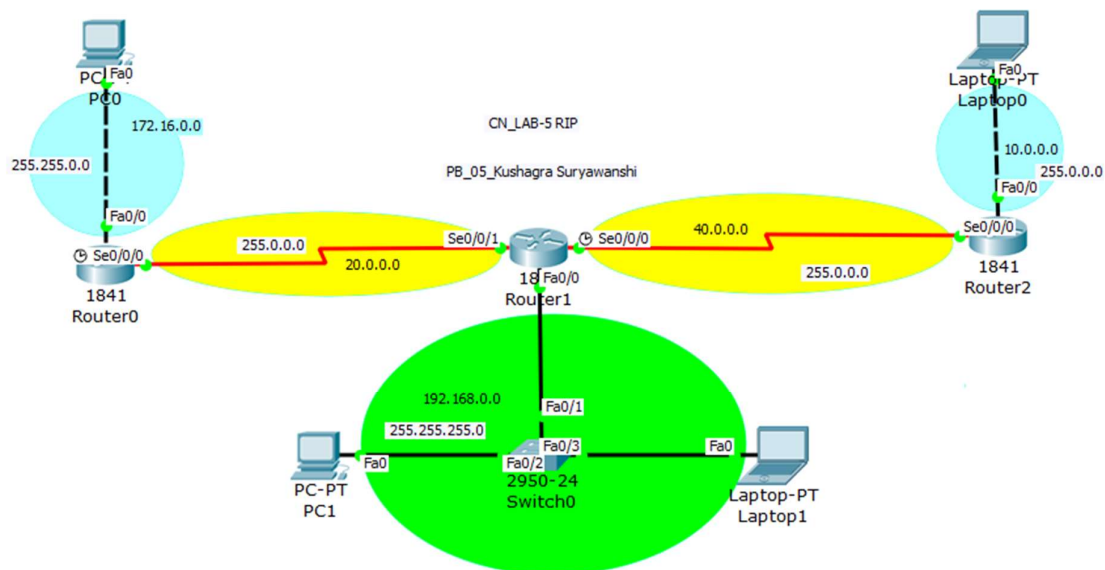
vi) Autonomous Systems:-

It is a set of Internet routable IP prefixes belonging to a network or a collection of networks that are all managed, controlled and supervised by a single entity or organization.

iii) OSPF Implementation:-

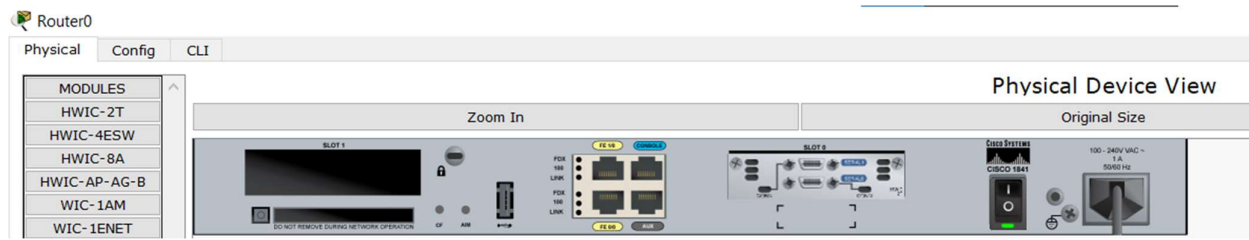
Open shortest path first OSPF is a link state routing protocol that is used to find the best path between the source and the destination router using its own shortest path first.

Design Screenshots:

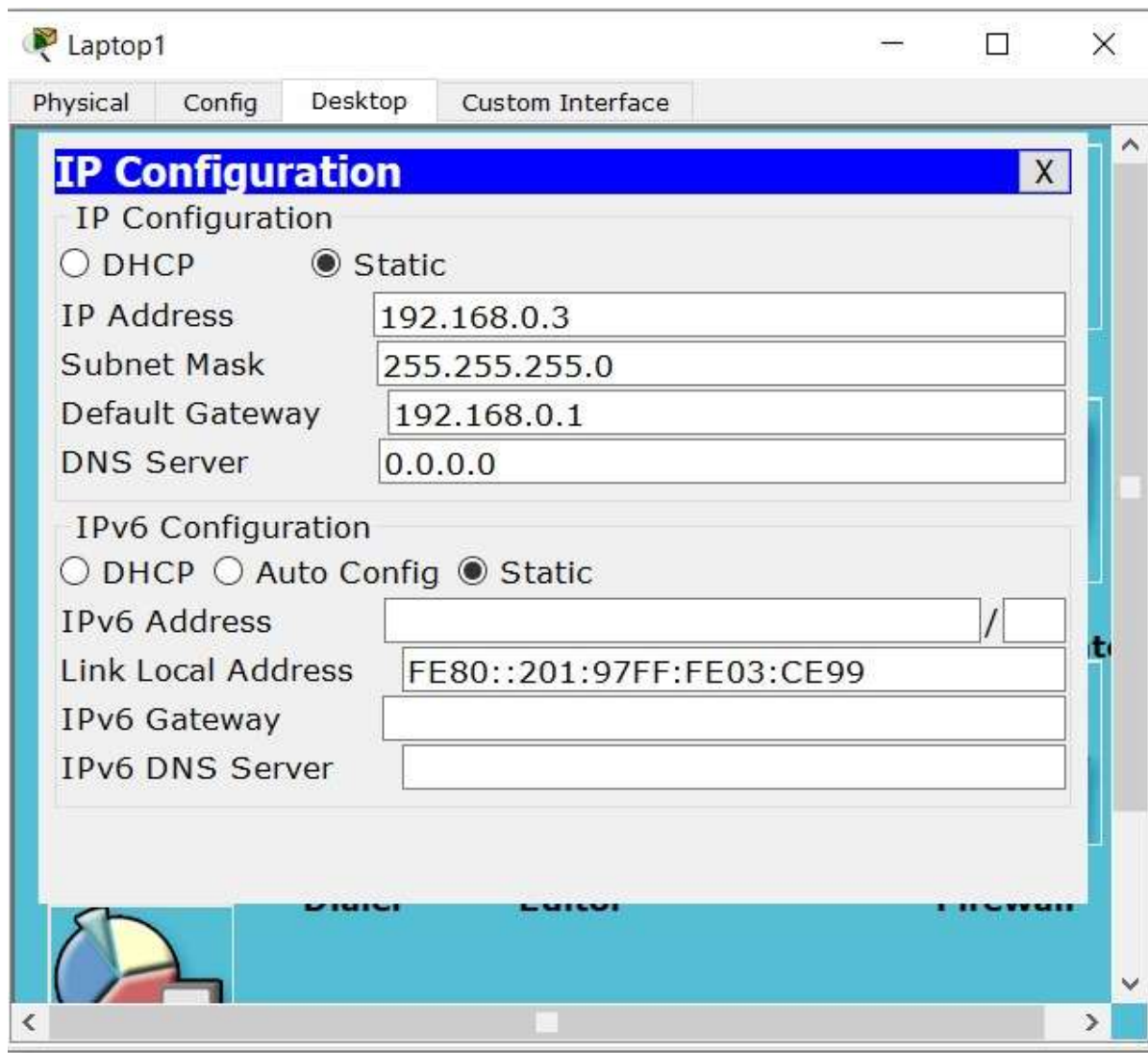


Steps followed for the Configuration:

- The HWIC-2T is a Cisco 2-Port Serial High-Speed WAN Interface Card, providing 2 serial ports.



- Configure serial and fast ethernet interfaces. For serial port, set clock rate and no shutdown.
- Do this for all routers.
- Configure IP addresses of all devices.



- Setup RIPv2 protocol for the routers and use the network command to advertise its table to other routers.
- Send packets and check for successful transmission.

CLI code:

ROUTER 2:

System Bootstrap, Version 12.3(8r)T8, RELEASE SOFTWARE (fc1)

Cisco 1841 (revision 5.0) with 114688K/16384K bytes of memory.

Readonly ROMMON initialized

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Cisco 1841 (revision 5.0) with 114688K/16384K bytes of memory.

Processor board ID FTX0947Z18E

M860 processor: part number 0, mask 49

2 FastEthernet/IEEE 802.3 interface(s)

191K bytes of NVRAM.

63488K bytes of ATA CompactFlash (Read/Write)

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--- System Configuration Dialog ---

Continue with configuration dialog? [yes/no]: System Bootstrap, Version 12.3(8r)T8, RELEASE SOFTWARE (fc1)

Initializing memory for ECC

..

c2811 processor with 524288 Kbytes of main memory

Main memory is configured to 64 bit mode with ECC enabled

Readonly ROMMON initialized

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--- System Configuration Dialog ---

Continue with configuration dialog? [yes/no]: n

Press RETURN to get started!

Router>enable

Router#;

Translating ";"...domain server (255.255.255.255)

% Unknown command or computer name, or unable to find computer address

Router#config term

Enter configuration commands, one per line. End with CNTL/Z.

```
Router(config)#interface Se0/0/0
```

```
Router(config-if)#
```

```
Router(config-if)#ip address 40.0.0.2 255.0.0.0
```

```
Router(config-if)#no shutdown
```

```
Router(config-if)#
```

```
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up
```

```
Router(config-if)#exit
```

```
Router(config)#
```

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up
```

```
Router(config)#interface fa0/0
```

```
Router(config-if)#ip address 10.0.0.1 255.0.0.0
```

```
Router(config-if)#no shutdown
```

```
Router(config-if)#
```

```
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up
```

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
```

```
Router(config-if)#exit
```

```
Router(config)#router rip
```

```
Router(config-router)#version 2
```

```
Router(config-router)#network 40.0.0.0
```

```
Router(config-router)#network 10.0.0.0
```

Router(config-router)#exit

Router(config)#

ROUTER 0:

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--- System Configuration Dialog ---

Continue with configuration dialog? [yes/no]: System Bootstrap, Version 12.3(8r)T8, RELEASE SOFTWARE (fc1)

Initializing memory for ECC

..

c2811 processor with 524288 Kbytes of main memory

Main memory is configured to 64 bit mode with ECC enabled

Readonly ROMMON initialized

Self decompressing the image :

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Cisco 1841 (revision 5.0) with 114688K/16384K bytes of memory.

Processor board ID FTX0947Z18E

M860 processor: part number 0, mask 49

2 FastEthernet/IEEE 802.3 interface(s)

2 Low-speed serial(sync/async) network interface(s)

191K bytes of NVRAM.

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--- System Configuration Dialog ---

Continue with configuration dialog? [yes/no]: n

Press RETURN to get started!

Router>enable

Router#config term

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#interface Se0/0/0

Router(config-if)#ipaddress 20.0.0.1 255.0.0.0

^

% Invalid input detected at '^' marker.

Router(config-if)#ip address 20.0.0.1 255.0.0.0

Router(config-if)#clock rate ?

Speed (bits per second

1200

2400

4800

9600

19200

38400

56000

64000

72000

125000

128000

148000

250000

500000

800000

1000000

1300000

2000000

4000000

<300-4000000> Choose clockrate from list above

Router(config-if)#clock rate 64000

Router(config-if)#no shutdown

^

% Invalid input detected at '^' marker.

Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down

Router(config-if)#exit

Router(config)#interface Fa0/0

Router(config-if)#ip address 172.16.0.1 255.255.0.0

Router(config-if)#no shutdown

Router(config-if)#

%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up

%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up

Router con0 is now available

Press RETURN to get started.

Router>enable

Router#router rip

^

% Invalid input detected at '^' marker.

Router#router rip

^

% Invalid input detected at '^' marker.

Router#config term

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#router rip

```
Router(config-router)#version 2

Router(config-router)#network 172.16.0.0

Router(config-router)#network 20.0.0.0

Router(config-router)#exit

Router(config)#
```

Router 1:

System Bootstrap, Version 12.3(8r)T8, RELEASE SOFTWARE (fc1)
Cisco 1841 (revision 5.0) with 114688K/16384K bytes of memory.

Readonly ROMMON initialized

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191K bytes of NVRAM.

63488K bytes of ATA CompactFlash (Read/Write)

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--- System Configuration Dialog ---

Continue with configuration dialog? [yes/no]: System Bootstrap, Version 12.3(8r)T8, RELEASE
SOFTWARE (fc1)

Initializing memory for ECC

..

c2811 processor with 524288 Kbytes of main memory

Main memory is configured to 64 bit mode with ECC enabled

Readonly ROMMON initialized

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--- System Configuration Dialog ---

Continue with configuration dialog? [yes/no]: n

Press RETURN to get started!

Router>enable

Router#config term

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#interface Se0/0/1

Router(config-if)#ip address 20.0.0.2 255.0.0.0

Router(config-if)#clock rate 64000

This command applies only to DCE interfaces

Router(config-if)#no shutdown

Router(config-if)#

%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up

exit

Router(config)#

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, changed state to up

Router(config)#interface Se0/0/0

Router(config-if)#ip address 40.0.0.1 255.0.0.0

Router(config-if)#clock rate 64000

Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down

Router(config-if)#exit

Router(config)#interface Fa0/0

```
Router(config-if)#ip address 192.168.0.1
```

```
% Incomplete command.
```

```
Router(config-if)#ip address 192.168.0.1 255.255.0.0
```

```
Router(config-if)#ip address 192.168.0.1 255.255.255.0
```

```
Router(config-if)#no shutdown
```

```
Router(config-if)#
```

```
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up
```

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
```

```
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up
```

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up
```

```
Router(config-if)#exit
```

```
Router(config)#router rip
```

```
Router(config-router)#version 2
```

```
Router(config-router)#network 20.0.0.0
```

```
Router(config-router)#network 40.0.0.0
```

```
Router(config-router)#network 192.168.0.0
```

```
Router(config-router)#exit
```

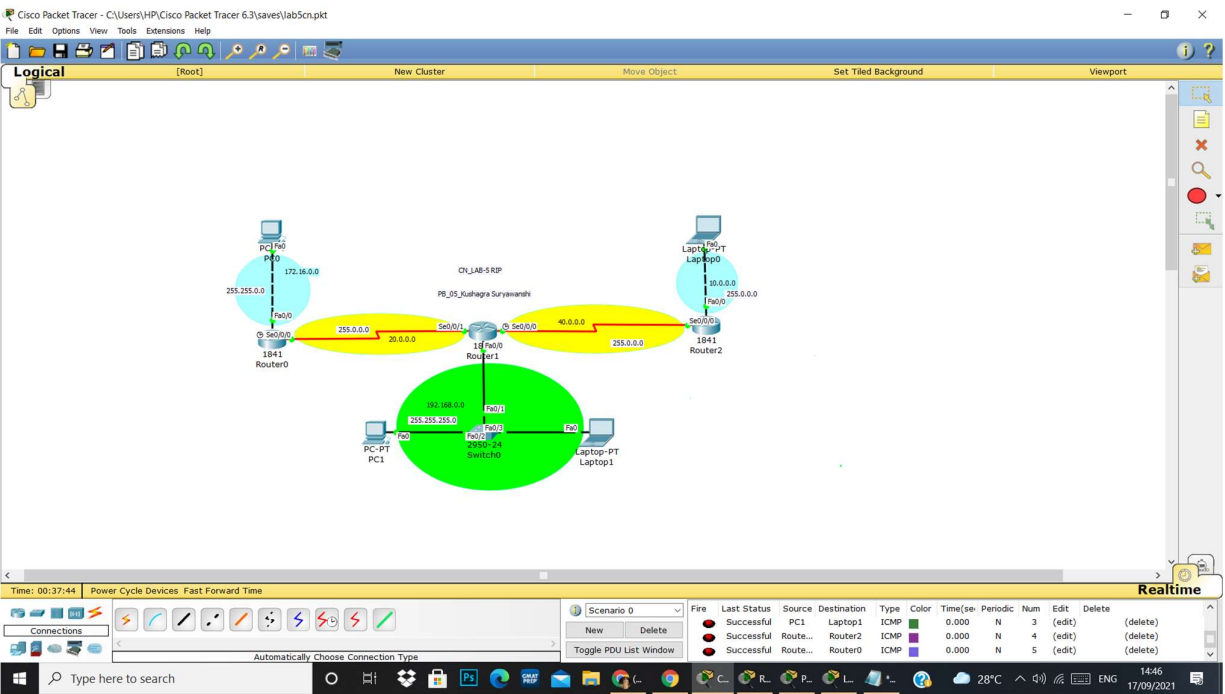
```
Router(config)#
```

```
Router#
```

```
%SYS-5-CONFIG_I: Configured from console by console
```

Output Screenshots:

Network:



Successful transmission:

Fire	Last Status	Source	Destination	Type	Color	Time(se)	Periodic	Num	Edit	Delete
	Successful	Lapto...	PC0	ICMP		0.000	N	0	(edit)	(delete)
	Successful	Lapto...	Laptop1	ICMP		0.000	N	1	(edit)	(delete)
	Successful	PC1	PC0	ICMP		0.000	N	2	(edit)	(delete)
Fire	Last Status	Source	Destination	Type	Color	Time(se)	Periodic	Num	Edit	Delete
	Successful	PC1	Laptop1	ICMP		0.000	N	3	(edit)	(delete)
	Successful	Route...	Router2	ICMP		0.000	N	4	(edit)	(delete)
	Successful	Route...	Router0	ICMP		0.000	N	5	(edit)	(delete)

Student Observation:

- Learned about various routing algorithms like OSPF, RIP, BGP etc and their implementation.
- Successfully configured network interfaces.

FAQ'S:

Q3. RIP:

- Based on distance vector routing protocol.
- Based on hop count.
- RIP protocol only allows you up to 15 hops.
- design used is flat network.

OSPF:

- Based on link state routing protocol.
- Based on bandwidth.
- No hop count restriction
- design used in hierarchical network.

Q4.

Command	Version	Reserved	} Repeated
Family		All 0s	
Network Address			
All 0s			
All 0s			
Distance			

command → 8 bit field used for request

reserved → this is reserved, filled with 0's.

version → protocol version in use.

family → 16 bit field. TCP/IP family so we put value 2

network address → 14 bytes field.

distance → specifies hop count.

FAQ's.

Q1. State the classification of routing protocols:-

→ A routing protocol is a protocol that specifies how routers communicate with each other, disseminating information that enables them to select routes between any two nodes on a computer network.

Classifications:

- static routing
- dynamic routing
- Interior
- Exterior

Q2. Interior Routing:

It is a dynamic route update protocol used between routers that run on TCP/IP hosts within hosts within single autonomous systems.

Exterior Routing:

Used to find network path information between different ~~network~~ networks. Commonly used in the Internet to exchange routing table information between two neighbour gateway hosts in a network of autonomous systems.