

EIGRP Overview

EIGRP is a Cisco proprietary routing protocol loosely based on their original IGRP (Interior Routing Protocol). EIGRP is an advanced distance-vector routing protocol, it can only use it in an all-Cisco network, but EIGRP more than makes up for this deficiency by being easy to configure, fast, and reliable.

Like RIP, EIGRP is based on a distance vector algorithm that determines the best path to a destination. But EIGRP uses a more complex metric than RIP's simple hop count. The EIGRP metric is based on the minimum bandwidth and net delay along each possible path, which means that EIGRP can accommodate larger networks than RIP.

Cisco included so many useful features such as automatic two-way redistribution that make the migration from IGRP to EIGRP relatively straightforward.

EIGRP operates very efficiently over large networks. It achieves this efficiency in part by sending non-periodic updates. This means that, unlike RIP, EIGRP only distributes information about routes that have changed, and only when there is a change to report. The rest of the time, routers only exchange small "Hello" packets to verify that routing peers are still available. So, in a relatively stable network, EIGRP uses very little bandwidth. This is especially useful in WAN configurations.

It is also extremely efficient over LAN portions of a network. On each network segment, routers exchange routing information using multicast packets, which helps to limit bandwidth usage on segments that hold many routers.

Every router in an EIGRP network includes a topology table, which is a central feature of the DUAL algorithm. Every time a router receives a new piece of routing information from one of its neighbors, it updates the topology table. This helps to give it a reliable and up-to-date image of all of the connections in the network that are currently in use. Every destination subnet known to EIGRP appears in the topology table.

EIGRP includes many of the features such as Classless Inter-Domain Routing (CIDR) and Variable Length Subnet Masks (VLSM) that are needed in larger networks.

Features of EIGRP

EIGRP is an advanced distance vector or hybrid routing protocol that includes the following features:

Rapid convergence: EIGRP uses the Diffusing Update Algorithm (DUAL) to achieve rapid convergence. A router that uses EIGRP stores all available backup routes for destinations so that it can quickly adapt to alternate routes. If no appropriate route or backup route exists in the local routing table, EIGRP queries its neighbors to discover an alternate route.

Reduced bandwidth usage: EIGRP does not make periodic updates. Instead, it sends partial updates when the path or the metric changes for that route. When path information changes, DUAL sends an update about only that link rather than about the entire table.

Classless routing: Because EIGRP is a classless routing protocol, it advertises a routing mask for each destination network. The routing mask feature enables EIGRP to support discontinuous subnetworks and variable-length subnet masks (VLSM).

Multiple network layer support: EIGRP supports AppleTalk, IP version 4 (IPv4), IP version 6 (IPv6), and Novell Internetwork Packet Exchange (IPX), which use protocol-dependent modules (PDM). PDMs are responsible for protocol requirements that are specific to the network layer.

Less overhead: EIGRP uses multicast and unicast rather than broadcast. As a result, end stations are unaffected by routing updates and requests for topology information.

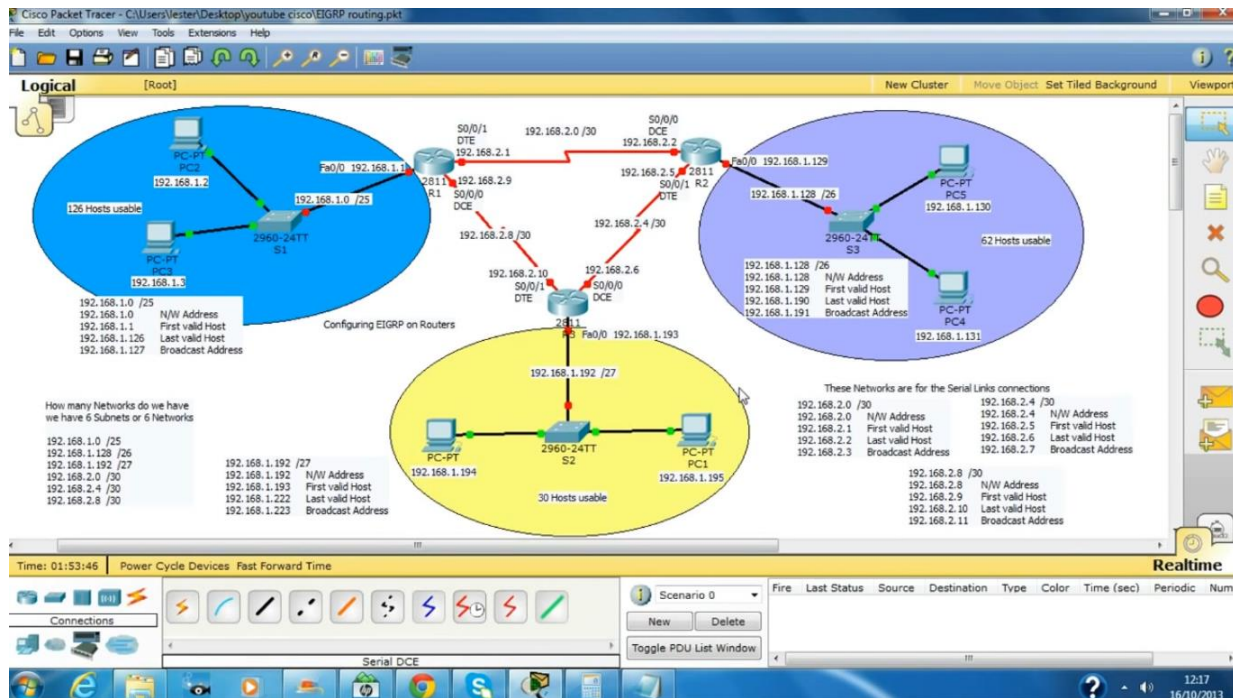
Load balancing: EIGRP supports unequal metric load balancing, which allows administrators to better distribute traffic flow in their networks.

Easy summarization: EIGRP enables administrators to create summary routes anywhere within the network rather than rely on the traditional distance vector approach of performing classful route summarization only at major network boundaries.

Software used: cisco packet tracer

Procedure :

First create a network as shown in the below screenshot



To configure EIGRP on a network use the following command

Configuration:-

For class full addresses:-

```
R1>enable
R1#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#router eigrp 1
R1(config-router)#network <I.P address>
R1(config-router)#network <I.P address>
R1(config-router)#network <I.P address>
R1(config-router)#
R1(config-router)#exit
R1(config)#
R1#
```

```
R1#copy running-config startup-config
```

For class-less address:-

```
R1(config)#router eigrp 1
R1(config-router)#network <I.P address> <Wildcard mask>
R1(config-router)#network <I.P address> <Wildcard mask>
R1(config-router)#network <I.P address> <Wildcard mask>
R1(config-router)#no auto-summary
R1(config-router)#exit
R1(config)#
```

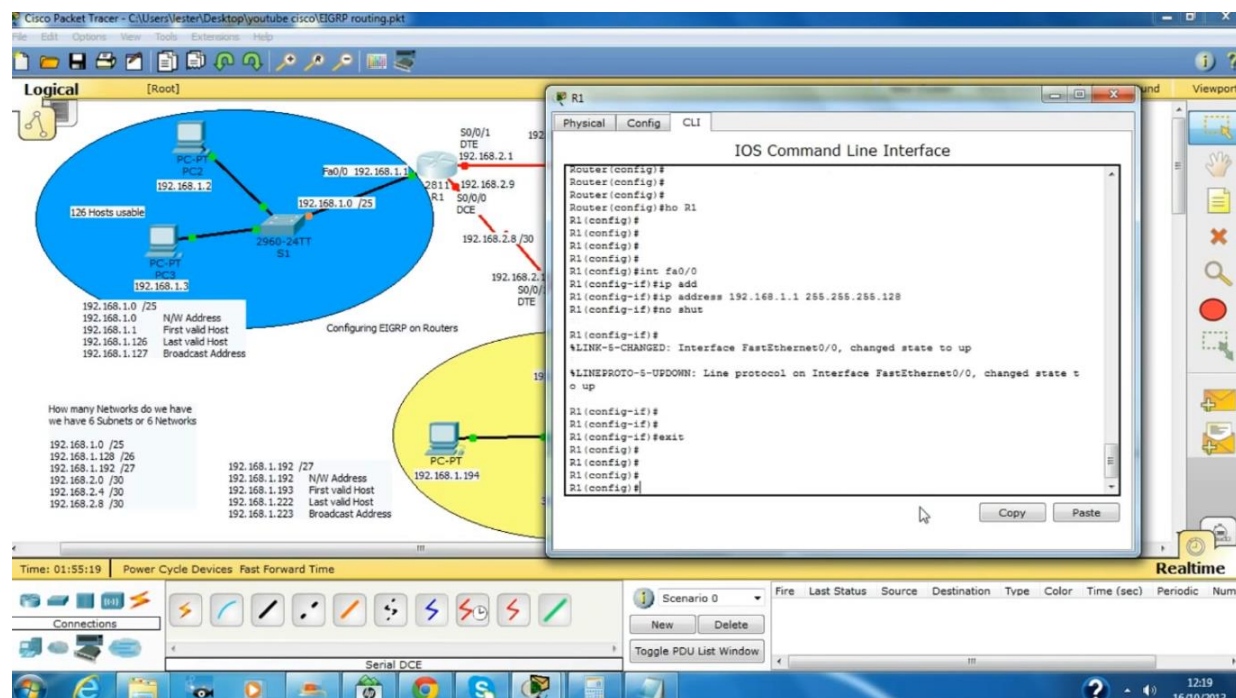
show ip eigrp neighbors : to check neighbor table
show ip eigrp topology : to check topology table
show ip route : to check routing table

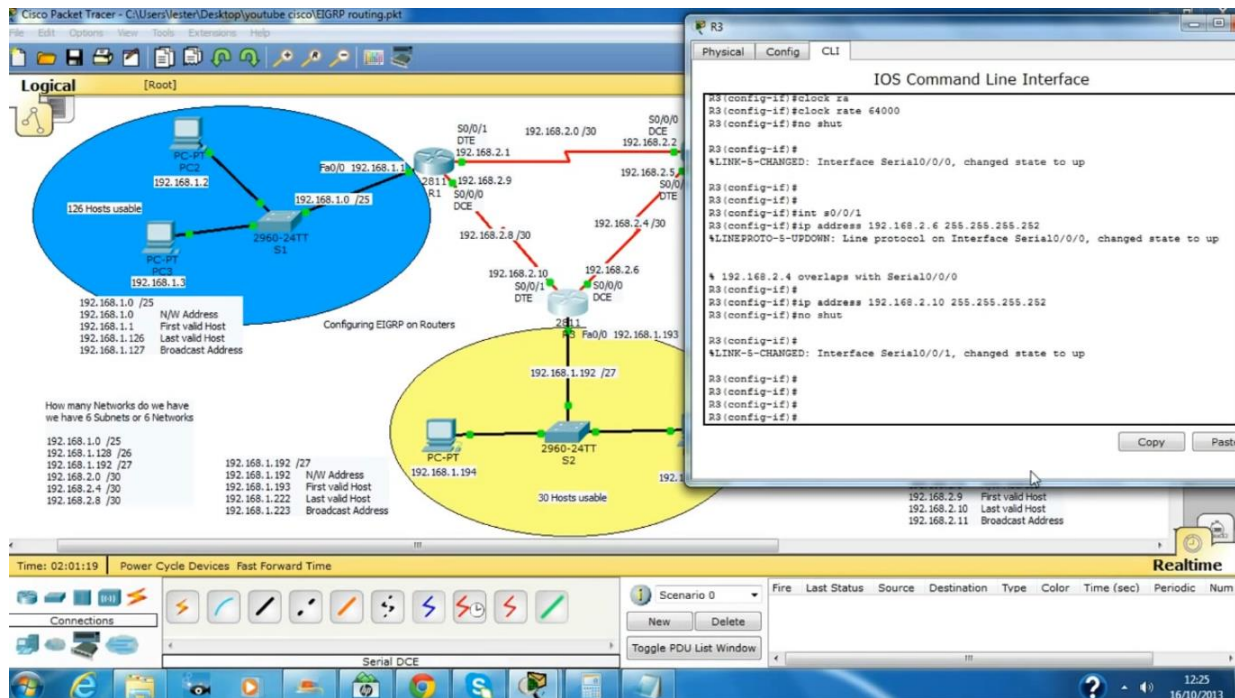
debug eigrp packets : to check hello events

debug ip rip : hello events in RIP

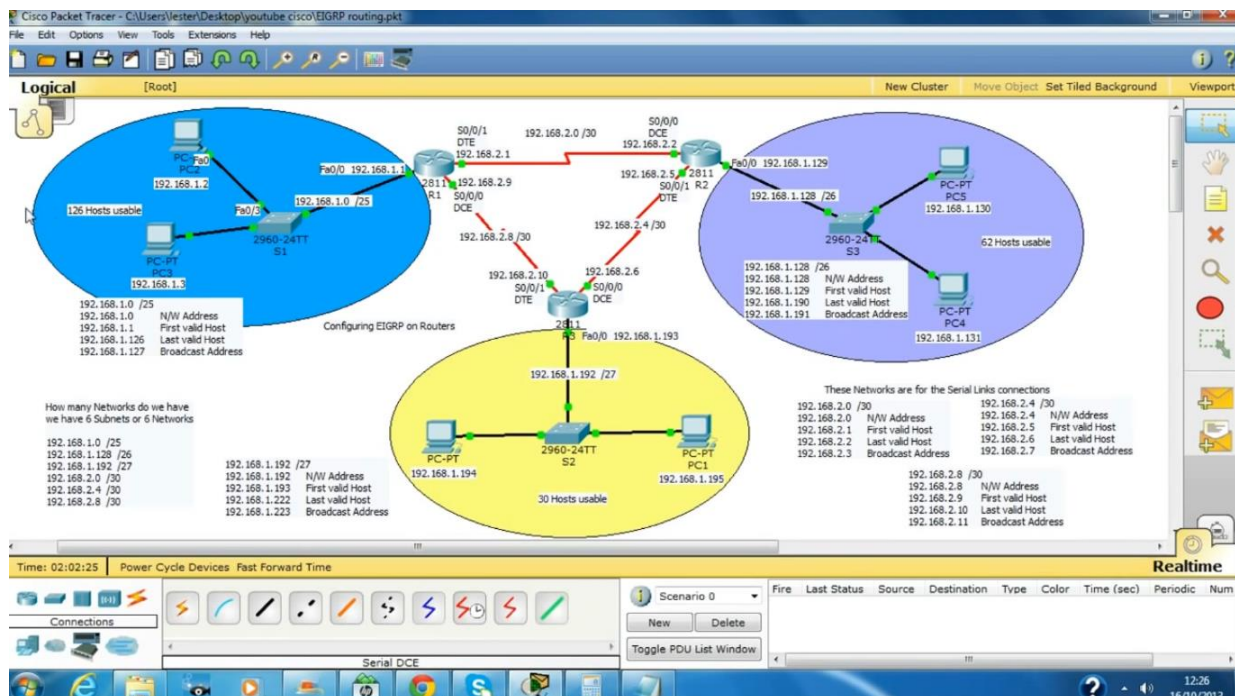
as shown in the above commands I have done the same in the below screen shots

configuring the first router





Now as you can see that all the connections are in green colour and we have successfully done
But the last step is we have to do EIGRP protocol



Configuring EIGRP for router 1

The screenshot shows the Cisco Packet Tracer interface with Router 1 selected. The CLI window displays the following configuration:

```

R1(config-if)#
R1(config-if)#exit
R1(config)#
R1(config)#
R1(config)#
R1(config)#
R1(config)#
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/1, 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

R1(config)#
R1(config)#
R1(config)#
R1(config)#
R1(config)#
R1(config)#no
R1(config)#router eigrp 1
R1(config-router)#network 192.168.1.0 0.0.0.127
R1(config-router)#network 192.168.1.0 0.0.0.127
  
```

The network diagram shows Router 1 (R1) connected to a network of 126 hosts (192.168.1.0/25) and a network of 30 hosts (192.168.2.0/30). The CLI window also shows the configuration for the 192.168.1.0/25 network, including the first valid host (192.168.1.128) and the last valid host (192.168.1.126).

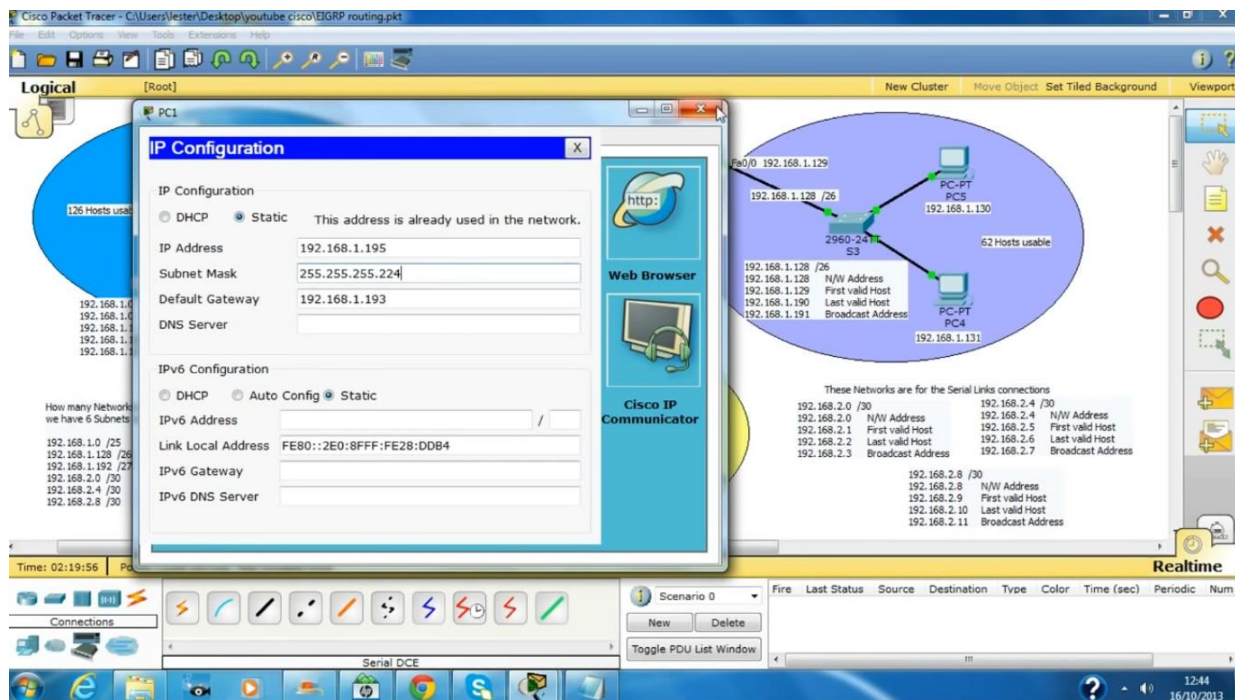
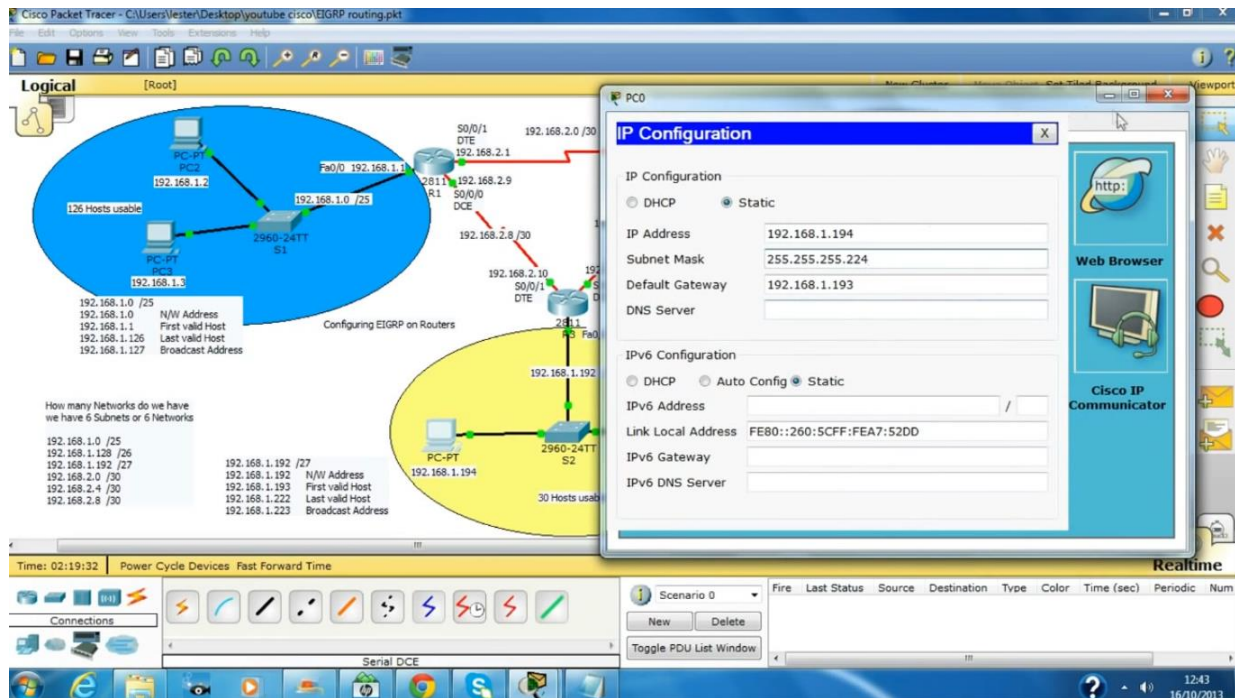
The screenshot shows the Cisco Packet Tracer interface with Router 2 selected. The CLI window displays the following configuration:

```

R2(config)#router eigrp 1
R2(config-router)#
R2(config-router)#network 192.168.1.128 0.0.0.63
R2(config-router)#network 192.168.2.0 0.0.0.3
R2(config-router)#
%DUAL-5-NBCHANGE: IP-EIGRP 1: Neighbor 192.168.2.1 (Serial0/0/0) is up: new adjacency
R2(config-router)#
R2(config-router)#network 192.168.2.4 0.0.0.3
R2(config-router)#no auto-summary
R2(config-router)#
%DUAL-5-NBCHANGE: IP-EIGRP 1: Neighbor 192.168.2.1 (Serial0/0/0) is up: new adjacency
R2(config-router)#
R2(config-router)#
R2(config-router)#
R2(config-router)#exit
R2(config)#
R2(config)#
R2(config)#
  
```

The network diagram shows Router 2 (R2) connected to a network of 62 hosts (192.168.1.128/26) and a network of 30 hosts (192.168.2.0/30). The CLI window also shows the configuration for the 192.168.1.128/26 network, including the first valid host (192.168.1.128) and the last valid host (192.168.1.190).

Configuring router 2 in EIGRP



Cisco Packet Tracer - C:\Users\vester\Desktop\youtube cisco EIGRP routing.pkt

Logical [Root]

PC3

Physical Config Desktop Software/Services

Command Prompt

```

Packet Tracer PC Command Line 1.0
PC>ping 192.168.1.130

Pinging 192.168.1.130 with 32 bytes of data:

Reply from 192.168.1.130: bytes=32 time=2ms TTL=126
Reply from 192.168.1.130: bytes=32 time=1ms TTL=126
Reply from 192.168.1.130: bytes=32 time=1ms TTL=126
Reply from 192.168.1.130: bytes=32 time=1ms TTL=126

Ping statistics for 192.168.1.130:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 2ms, Average = 1ms
PC>

```

126 Hosts usable

192.168.1.0 /25

192.168.1.1 N/W Address

192.168.1.126 First valid Host

192.168.1.127 Last valid Host

192.168.1.128 Broadcast Address

How many Networks do we have we have 6 Subnets or 6 Networks

192.168.1.0 /25

192.168.1.128 /26

192.168.1.192 /27

192.168.2.0 /30

192.168.2.4 /30

192.168.2.8 /30

192.168.2.12

192.168.2.16

192.168.2.20

192.168.2.24

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192.168.2.184

192.168.2.188

192.168.2.192

192.168.2.196

192.168.2.200

192.168.2.204

192.168.2.208

192.168.2.212

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192.168.2.224

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192.168.2.500

192.168.2.504

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192.168.2.692

192.168.2.696

192.168.2.700

192.168.2.704

192.168.2.708

192.168.2.712

192.168.2.716

192.168.2.720

192.168.2.724

192.168.2.728

192.168.2.732

192.168.2.736

192.168.2.740

192.168.2.744

192.168.2.748

192.168.2.752

192.168.2.756

192.168.2.760

192.168.2.764

192.168.2.768

192.168.2.772

192.168.2.776

192.168.2.780

192.168.2.784

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192.168.2.792

192.168.2.796

192.168.2.800

192.168.2.804

192.168.2.808

192.168.2.812

192.168.2.816

192.168.2.820

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192.168.3.1 N/W Address

192.168.3.2 First valid Host

192.168.3.3 Last valid Host

192.168.3.4 Broadcast Address

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192.168.4.1 N/W Address

192.168.4.2 First valid Host

192.168.4.3 Last valid Host

192.168.4.4 Broadcast Address

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192.168.6.0

192.168.6.1 N/W Address

192.168.6.2 First valid Host

192.168.6.3 Last valid Host

192.168.6.4 Broadcast Address

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As we cannot take every computer In a college network I took 2 computers in each department as our college has about 200 computers in every department I took 1/100th ratio of it and I have tried it in a cisco packet tracer

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