

# EIGRP Exercise

Campus Network Design Workshop

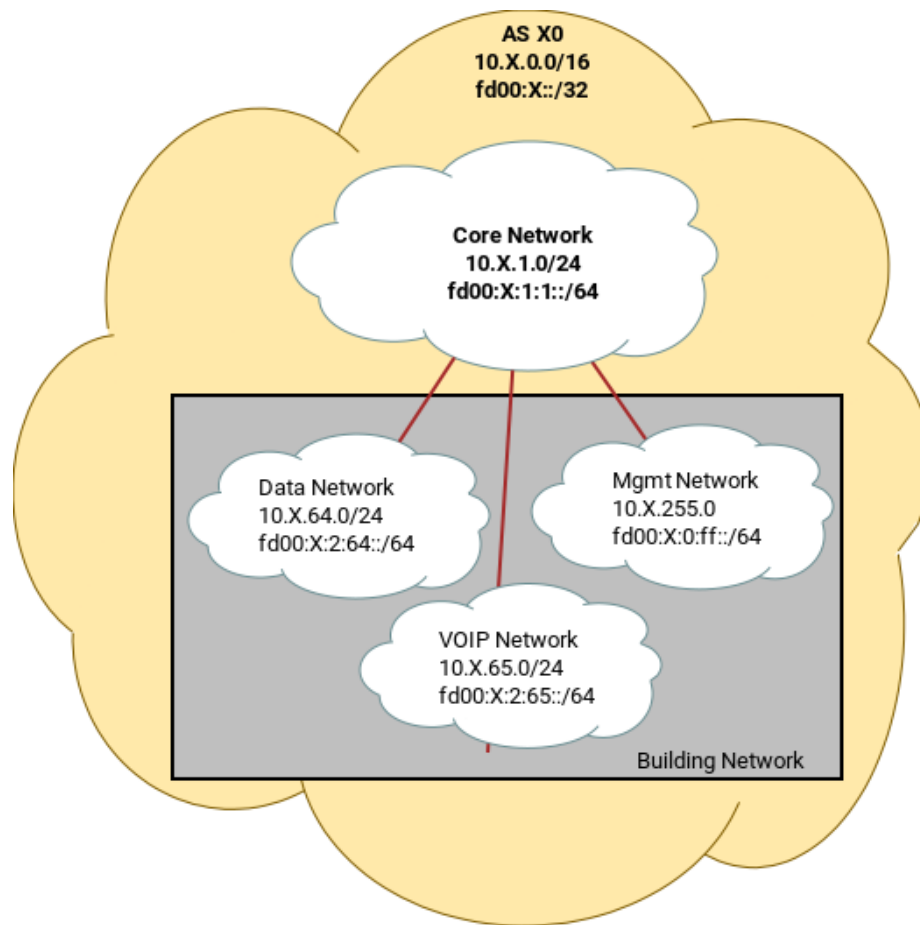


Figure 1: Logical Topology

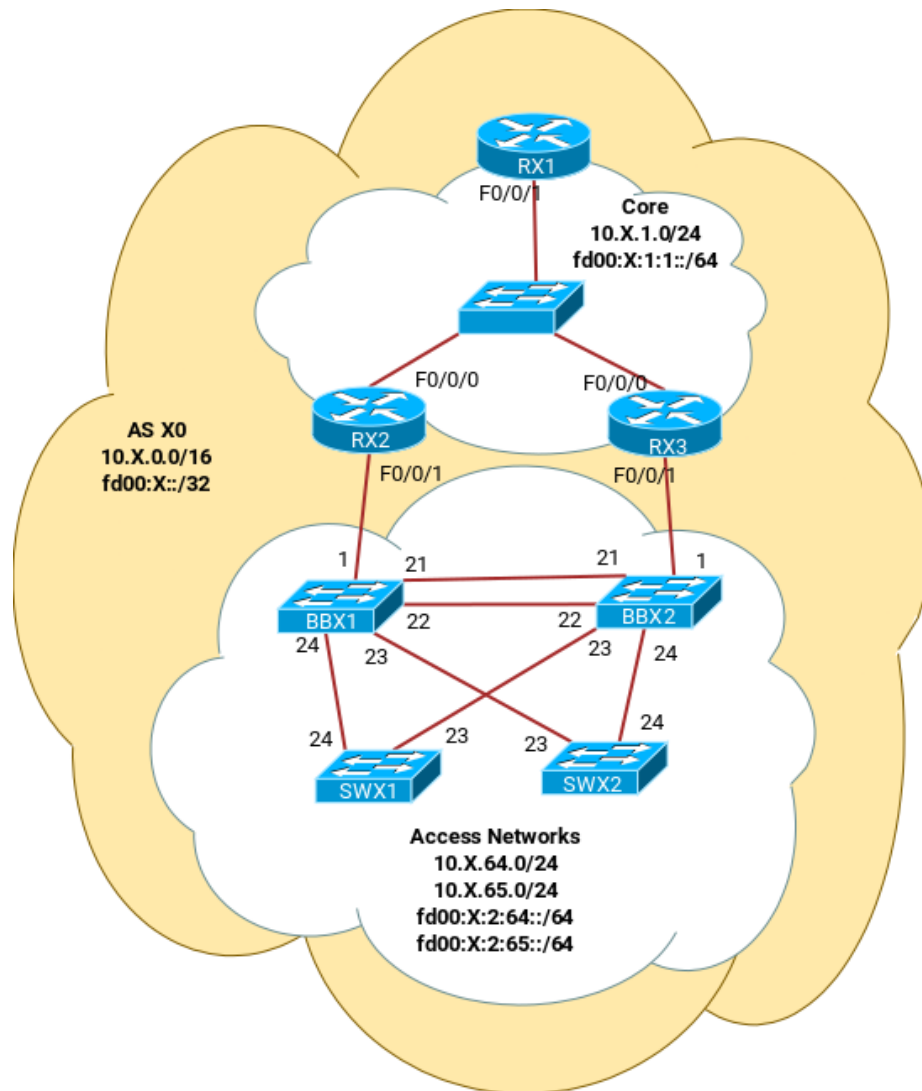


Figure 2: Physical Topology

## Introduction

The purpose of this exercise is to learn how to configure EIGRP on a group of Cisco routers so that they exchange network reachability information and maintain their own routing tables dynamically.

All participants will work within a group as a team. Each group has three routers and four switches to work with. There is a certain dependency between the labs as the exercises progress. Make sure to maintain your configuration unless otherwise instructed. All exercises will use a common IP addressing scheme and network topology. As you go through the exercises all the examples are given from the point of view of R11, the border router in group 1. **Make sure to take the examples and adapt them to your own router, network topology and addressing scheme.**

## Router types used in the lab

Cisco 2901

## Address Space Allocation

Group	IPv4 Block	IPv6 Block
1	10.1.0.0/16	fd00:1::/32
2	10.2.0.0/16	fd00:2::/32
3	10.3.0.0/16	fd00:3::/32
4	10.4.0.0/16	fd00:4::/32
5	10.5.0.0/16	fd00:5::/32

Each group will then further partition their space like this:

IPv4	IPv6	Description
10.X.1.0/24	fd00:X:1:1::/64	Core Network
10.X.64.0/24	fd00:X:2:64::/64	Data Subnet (VLAN 64)
10.X.65.0/24	fd00:X:2:65::/64	VOIP Subnet (VLAN 65)
10.X.254.0/24	fd00:X:0:FE::/64	Router Loopback Subnet
10.X.255.0/24	fd00:X:0:FF::/64	Switch MGMT Subnet (VLAN 255)

With X being your group number (1,2,3,4)

## Exercises

### Basic Router Configuration

Configure each router based on the following example for R11:

```
hostname R11
!
aaa new-model
aaa authentication login default local
aaa authentication enable default enable
username nsr secret nsr
enable secret nsr
service password-encryption
line vty 0 4
  transport preferred none
line console 0
  transport preferred none
!
no logging console
logging buffered 8192 debugging
no ip domain-lookup
ipv6 unicast-routing
```

### Interface Configuration

Configure each router's interface according to the diagram (where **X** represents your group):

RX1: use Y=1

```
interface loopback 0
  ip address 10.X.254.Y 255.255.255.255
  ipv6 address fd00:X:0:fe::Y/128
!
interface FastEthernet0/0/1
  ip address 10.X.1.Y 255.255.255.0
  description Link to Core
  ipv6 address fd00:X:1:1::Y/64
  no ip redirects
  no ip directed-broadcast
  no ip proxy-arp
  no shutdown
```

Use address .2 for RX2 and .3 for RX3.

On the access side, where you will use VLANs:

RX2:

```
interface FastEthernet0/0/1
  no ip address
  no shutdown
!
interface Fast0/0/1.64
  encapsulation dot1Q 64
  ip address 10.X.64.2 255.255.255.0
  description Link VLAN 64
  ipv6 enable
  ipv6 address fd00:X:2:64::2/64
  no ip redirects
  no ip directed-broadcast
  no ip proxy-arp
  no shutdown
```

Do the same for VLANs 65 and 255.

RX3:

```
interface FastEthernet0/0/1
  no ip address
  no shutdown
!
interface FastEthernet0/0/1.64
  encapsulation dot1Q 64
  ip address 10.X.64.3 255.255.255.0
  description Link VLAN 64
  ipv6 enable
  ipv6 address fd00:X:2:64::3/64
  no ip redirects
  no ip directed-broadcast
  no ip proxy-arp
  no shutdown
```

Do the same for VLANs 65 and 255.

## Testing Connectivity

Ping your neighbor routers:

```
R11# ping 10.X.1.2
R11# ping 10.X.1.3
R11# ping fd00:X:1:1::2
R11# ping fd00:X:1:1::3
```

And verify the output of the following commands:

```
show ip arp          : Shows ARP cache
show interface <int> : Shows interface state and configuration
show ip interface    : Shows interface IP state and config
show ipv6 neighbors   : Shows IPv6 neighbors
show ipv6 interface <int> : Shows interface state and configuration
show ipv6 interface   : Shows interface state and configuration
```

Now try pinging these other addresses in your network:

```
R11# ping 10.X.254.2
R11# ping 10.X.254.3
R11# ping 10.X.64.2
R11# ping 10.X.64.3
R11# ping 10.X.65.2
R11# ping 10.X.65.3
R11# ping 10.X.255.2
R11# ping 10.X.255.3
R11# ping ipv6 fd00:X:0:FE::2
R11# ping ipv6 fd00:X:0:FE::3
R11# ping ipv6 fd00:X:2:64::2
R11# ping ipv6 fd00:X:2:64::3
R11# ping ipv6 fd00:X:2:65::2
R11# ping ipv6 fd00:X:2:65::3
R11# ping ipv6 fd00:X:0:FF::2
R11# ping ipv6 fd00:X:0:FF::3
```

What is happening? Why can we not ping some of the addresses?

## Dynamic Routing with EIGRP

1. Configure a new EIGRP routing process and configure networks on the routing process.

Notice that we will use the number “10” as the EIGRP autonomous number for routers R11, R12 and R13. This number needs to match the number of a neighboring router. However, it is strongly recommended that you use the same number throughout your network.

R11:

```
router eigrp 10
  eigrp log-adjacency-changes
  network 10.x.x.x
```

2. STOP – Checkpoint.

```
show ip eigrp neighbor      : show adjacencies
show ip route               : show routes in routing table
show ip eigrp topology      : shows general information
show ip eigrp interface     : shows the status of EIGRP in an interface
```

- a. How many routes do you have on R11 for each access network?
- b. Is there a preferred path? Why?