Week 8 – Lab – Routing

# Exercise 1: Routing Tables

## Instructions:

A router in a network has the following routing table and the following interfaces. You do not know the topology of the entire network. You have only been given visibility of this one router. You have been tasked with finding the next hop addresses for a set of destination IP addresses listed below. Detail the next hop address for each destination IP address and the line of the routing table that was used to decide this next hop.

For your additional information, the router interface IP address and subnet masks have been provided. It is not required to use the additional information if you deem that it is not necessary. i.e., you do not need to do anything with the interface details unless you think it is relevant.

## Routing Table and Interfaces

### Routing Table

|  |  |  |
| --- | --- | --- |
| Network | Netmask | Next hop |
| 131.175.21.0 | 255.255.255.0 | 131.17.123.254 |
| 131.175.16.0 | 255.255.255.0 | 131.17.78.254 |
| 131.56.0.0 | 255.255.0.0 | 131.17.15.254 |
| 131.155.0.0 | 255.255.0.0 | 131.17.15.154 |
| 131.56.45.9 | 255.255.255.255 | 131.17.45.78 |
| 0.0.0.0 | 0.0.0.0 | 131.17.123.254 |

### Interfaces: 131.56.45.9

#### Eth0

|  |  |
| --- | --- |
| 131.17.123.1 | IP address |
| 255.255.255.0 | Netmask |

#### Eth1

|  |  |
| --- | --- |
| 131.17.78.1 | IP address |
| 255.255.255.0 | Netmask |

#### Eth2

|  |  |
| --- | --- |
| 131.17.15.12 | IP address |
| 255.255.255.0 | Netmask |

## Questions:

Per the above instructions, how does the router manage the IP packets with the destination IP addresses below? Please list the following information:

What is the next hop?

Which line of the routing table is used to decide the next hop?

### Example

AAA.BBB.CCC.DDD

Next Hop: X.X.X.X

Line of Table: <paste line from table>

## Destination IP Addresses

### 131.17.123.88

Next Hop: 131.17.123.254

Line of Table: 131.56.45.9 255.255.255.255 131.17.45.78

### 131.56.78.4

Next Hop:

Line of Table:

### 190.78.90.2

Next Hop:

Line of Table:

### 131.17.123.255

Next Hop:

Line of Table:

# Advice for completing Exercise 1

The primary objective of this exercise is to enhance your understanding of routing tables and how a router will handle a given packet with a given destination IP address

In this exercise, you should use your understanding of IP addressing and subnetting to complete the exercise.

The main task to carry out is to **compare** the listed destination IP address with the IP networks that the router knows about in its routing table.

If the destination IP address is contained in one of the IP networks as listed in the routing table, then the next hop will be the IP address listed in the routing table.

If no network matches, then the default gateway will be used, along with its listed next hop address. If there is no match, then send all packets to the only available route that will accept all traffic destined to all networks.

Pay careful attention to the netmasks, as these will determine the network ID and thus whether a given IP address is a host within that network.

# My working out

|  |  |  |  |
| --- | --- | --- | --- |
| Network | Netmask | Next hop | CIDR |
| 131.175.21.0 | 255.255.255.0 | 131.17.123.254 | /24 |
| 131.175.16.0 | 255.255.255.0 | 131.17.78.254 | /24 |
| 131.56.0.0 | 255.255.0.0 | 131.17.15.254 | /16 |
| 131.155.0.0 | 255.255.0.0 | 131.17.15.154 | /16 |
| 131.56.45.9 | 255.255.255.255 | 131.17.45.78 | /32 |
| 0.0.0.0 | 0.0.0.0 | 131.17.123.254 | /0 |

## 131.17.123.88

**Network**: Default route (0.0.0.0/0)

**Next Hop**: 131.17.123.254

**Line of Table**: 0.0.0.0 - 0.0.0.0 - 131.17.123.254 - /0

## 131.56.78.4

**Network:** 131.56.0.0/16

**Next Hop:** 131.17.15.254

**Line of Table**: 131.56.0.0 - 255.255.0.0 - 131.17.15.254 - /16

## 190.78.90.2

**Network**: Default route (0.0.0.0/0)

**Next Hop**: 131.17.123.254

**Line of Table**: 0.0.0.0 - 0.0.0.0 - 131.17.123.254 - /0

## 131.17.123.255

**Network**: 131.175.21.0/24

**Next Hop**: 131.17.123.254

**Line of Table**: 131.175.21.0 - 255.255.255.0 - 131.17.123.254 - /24