

# Routers And Routing Protocols

## **ROUTER:**

A Router is used to connect different networks and it is a device that extracts a destination of packet, select the best path for destination and forward packet to next device on selective path. A router is a microprocessor-controlled device that is connected to two or more data lines from different networks. When a data packet comes in on one of the lines, the router reads the address information in the packet to determine its ultimate destination. Then, using information in its routing table, it directs the packet to the next network.

## **ROUTING:**

Routing is always done on the network portion of destination IP address, and it is the process of selecting paths in a network along which to send network traffic. The routing process usually directs forwarding on the basis of routing tables which maintain a record of the routes to various network destinations.

There are two types of routing,

(1) Static Routing (2) Dynamic Routing.

## **Static Routing:**

Static routing used fixed tables. It is also called default routing because there is only one destination network where we want to send a message.

**Dynamic Routing** Router selects the best path for packet or data from routing table and also depends upon metric based calculation and hop count. Routing tables hold the data for making forwarding decisions. In order to route packets, a router communicates with other routers using routing protocols and using this information creates and maintains a routing table. The routing table stores the best routes to certain network destinations, the "routing metrics" associated with those routes, and the path to the next hop router.

## **Autonomous System (AS):**

An Autonomous system is a collection of connected Internet Protocol (IP) routing prefixes under the control of one or more network operator.

## **Administrative Distance:**

Administrative Distance is the measure used by routers to select the best path when there are two or more different routes to the same destination from two different routing protocols. A lower numerical value is preferred, e.g. an OSPF route with an administrative distance of 110 will be chosen over a RIP route with an administrative distance of 120.

Protocol	Administrative distance
Directly connected	0
Static route	1
EIGRP summary route	5

External BGP	20
Internal EIGRP	90
IGRP	100
OSPF	110
IS-IS	115
RIP	120
EGP	140
ODR	160
External EIGRP	170
Internal BGP	200
Unknown	255

## **Routing protocol:**

A routing protocol is a protocol that specifies how routers communicate with each other. Each router has a priori knowledge only of networks attached to it directly. A routing protocol shares this information first among immediate neighbors, and then throughout the network. This way, routers gain knowledge of the topology of the network. e.g. RIP, IGRP, EIGRP, OSPF, BGP.

### **Distance Vector Routing Protocol**

- Maintain routing table
- Update routing information after every 30 seconds
- Transmit routing table to neighboring node
- RIP, IGRP

### **Link State Routing Protocol**

- Contain routing table, topology table and neighboring table
- Forward the routing table whenever change occurs in network topology
- Fast convergence and better performance
- OSPF

### **RIP (Routing information protocol)**

- Distance vector routing protocol
- Metric is hop count
- Maximum hop count is 15
- Administrative distance is 120

### **IGRP (Interior Gateway Routing protocol)**

- CISCO proprietary protocol and runs on CISCO Routers
- Distance vector routing protocol
- Metric is Bandwidth, delay, reliability, load, MTU
- By default is BW and delay
- Administrative distance is 100

- The maximum hop count of IGRP-routed packets is 255
- Routing updates are broadcast every 90 seconds

### **EIGRP (Extended Interior Gateway Routing protocol)**

- CISCO proprietary protocol
- Hybrid protocol (contain functionality of both Link State and Distance Vector routing protocol)
- Metric is Bandwidth, delay
- Support IP, IPx, Apple Talk
- Administrative distance is 90

### **OSPF (Open Shortest Path First)**

- an adaptive routing protocol for Internet Protocol (IP) networks.
- Operate within a single autonomous system
- Metric is Cost based on BW (cost =  $108 / \text{BW}$ )
- Link State routing protocol
- Deployed in hierarchical design
- Suitable for large network
- Administrative distance is 110
- Decrease network overhead due to introduction of areas

### **BGP (Border Gateway Protocol)**

- The Border Gateway Protocol (BGP) is the protocol backing the core routing decisions on the Internet.
- It is described as a path vector protocol.
- BGP was created to replace the Exterior Gateway Protocol (EGP)
- Used to carry the data and reached to destination according to the best path.
- Operate all over the network
- IP, Apple Talk, IPx (internet packet exchange)

Source:

[http://datacombasic.blogspot.in/2011/04/routers-and-routing-protocols.html?utm\\_source=BP\\_recent](http://datacombasic.blogspot.in/2011/04/routers-and-routing-protocols.html?utm_source=BP_recent)