Routing and Switching

**Routing** is the process of selecting a path for traffic in a [network](https://en.wikipedia.org/wiki/Network_theory) or between or across multiple networks.

Routing is done with the help of protocols.

Protocols: the rules and regulation followed by the data while transmission from source to destination and vice-versa.

Routing Protocols

1. Routed protocols
2. Routing protocols
3. Routed protocol

* By default configured.
* Not configured by the user.
* Universally accessible.
* Example: IP, IPX, AppleTalk.

1. Routing Protocol

* Configuration is done by user.
* Routing protocols decide which path should selected.
* It will take care of path and delivery of message.

Types of routing

Static routing

* Routing in which network administrator decide the path for data transmission.
* Fixed path.
* Transmission happen over specified path only.

Dynamic routing

* We have number of routing algorithms in dynamic routing.
* Routing protocol uses the couple of algorithm to find best path to transmission.
* Automatic selection.

We have different protocols in dynamic routing they are as mentioned below.

1. RIP – routing information protocol
2. OSPF – Open Shortest Path First
3. EIGRP – Enhanced Interior Gateway Routing Protocol
4. IGRP – interior gateway routing protocol
5. BGP – border gateway routing protocol
6. IS-IS – Intermediate System-IS

Algorithm used by the all protocols

1. Distance Vector Algorithm.
2. Link State Algorithm.

Static Routing

Syntax : # ip route destination subnet mask next-hop address

Static routing protocol characteristics

* Highly secured(no unknown ports)
* Highly reliable

Configuration of routers

Configuration is done on 3 different modes.

1. User execution mode

Allow user to login into configuration environment of router.

1. User privileged mode

In this mode a basic troubleshooting of router can be performed.

1. Global configuration mode

Where extended configuration performed. Router complete configuration.

Basic Commands

How to navigate in between modes

Router > enable : allow you to enter configuration environment.

# configuration terminal : means you want to enter global configuration environment.

To select a interface

# interface fastethernet 0/0 – interface number

(we have fastethernet interface and serial interface for routers)

To assign ip address to interface

# ip address <ip address (10.1.1.10)> subnet mask 255.255.255.0

# no shutdown – to turn on ports.

To verify configuration

In user mode: # do show running config

In Privileged Mode: # show running config

Dynamic Routing Protocols

1. Distance Vector Algorithm. (Bellman ford algorithm)
2. Link State Algorithm. (Dijkstras’s algorithm)

Protocols

|  |  |  |  |
| --- | --- | --- | --- |
|  | RIP | OSPF | EIGRP |
| Metric | Number of hops  (max hops – 15) | Band width and number of hops  (max hops -255) | Cost, delay and hop count  Max hops - 255 |
| Convergence rate | Every 30 secs  (Hello packets will sent between routers) | 10 secs | 90 secs |
| Syntax | #router rip  #version 2  #network ip adderess | # router ospf id  #net ip wild card subnet area id | # router eigrp AS no  #net ip address |
|  |  |  |  |