

## **Monograph on Routing**

Dr. Sunil Kumar M.I.E.T, Meerut, U.P

### **Routing:**

Routing of network is the process of choosing a path across one more available networks. The principles of networks are applicable to any type of network. In a packet-switching network, such as the Internet, routing selects the paths for Internet Protocol (IP) packets to travel from their source to their destination. These Internet routing decisions are made by specialized pieces of network hardware called routers.

### **How does routing work?**

Routers refer to internal routing tables to make decisions about how to route packets along network paths. A routing table records the paths that packet should take to reach every destination that the router is responsible for.

### **Working of router:**

When a router receives a packet, it reads the header of the packet to see its intended destination then it determines where to route the packet based on the information in its routing tables. Routers do this activity millions of times in a second with millions of packets. As a packet travels to its destination, it may be routed many times by different routers.

### **Routing Tables:**

Routing tables can be of two types: Static or Dynamic. As the name indicates, Static tables do not change. An administrator of network manually setup static routing tables. This essentially sets in stone the routes data packets take across the network, unless the administrator manually updates the table.

As the name indicates, Dynamic routing tables are updated automatically at regular time intervals. Dynamic routers uses various routing protocols to determine the shortest paths. It also make this determination based on how long it takes packets to reach its destination.

Dynamic routing requires more computing power that is why smaller networks may rely on static routing but for medium-sized and large-sized networks, dynamic routing is much more efficient.

### **Packet Header:**

Packet headers are small bundles of data attached to the packets that provide the useful information, including from where the packet is coming and where it is headed, like the packing slip stamped on the outside of a mail parcel.

### **Main routing protocols:**

In networking, a protocol is a standardized way of formatting the data so that any connected computer can understand the data. A routing protocol is a protocol that is used for identifying or announcing network paths.

The following protocols help data packets to find their way across the internet:

**IP:** The internet protocol (IP) specifies the origin and destination for each data packet. Routers inspect each packet's IP header to identify where to send them.

**BGP:** The Border Gateway Protocol (BGP) is a dynamic routing protocol used to announce which networks control which IP addresses, and which networks connect to each other.

**OSPF:** The Open Shortest Path First (OSPF) protocol is commonly used by network routers to dynamically identify the fastest and shortest available routers for sending packets to their destination.

**RIP:** The Routing Information Protocol (RIP) uses "hop count" to find the shortest path from one network to another network, where "hop count" means number of routers a packet must pass through on the way. One hop means a packet goes from one network to another network.