
Network Technology And Administration

CH:3

Network Protocols &
Network Routing

➤ Packet :

- Each piece of information transmitted on a Ethernet network is sent in something called a packet.
- A packet is simply a chunk of data enclosed in one or more wrappers that help to identify the chunk of data and route it to the correct destination.

➤ Packet :

- Packet is the unit of data that is routed between an origin and a destination on the internet or any other packet switched network.

➤ Protocol :

- The **internet protocol (IP)** is set of common communication rules by which data is sent from one computer to another on the internet.
- Each computer (each as host) on the internet has the least on IP address that uniquely identifies it from all the computer on the internet.
- When you send or receive data , the messages gets divided into little chunks called packet.

➤ TCP / IP Account :

- TCP / IP is the basic communication language or protocol of the internet.
- TCP / IP account use point to point protocol (PPP) and Serial line protocol (SLIP).
- This program connected PC with internet using modem.

➤ TCP / IP Account :

- TCP / IP is a two layer program , the **higher layer TCP** manages the assembling of a message or file into smaller packet that are transmitted over the internet and received by a TCP layer that resembles the packet into the original message at receiving end.
- **The lower layer IP** handles the address part of each packet so that it gets to the right destination.

➤ SPX / IPX :

- **SPX** : Sequential Packet Exchange operate at transport layer of OSI model provide connection oriented communication.
- **IPX** : Internet Packet Exchange which work at transport layer and network layer of OSI model.
- Which provide services such as network addressing and routing of messages.

➤ Apple Talk :

- Apple computer developed the apple talk protocol suite to implement file transfer , printer sharing and mail service.
- Apple talk is a multi layered protocol providing routing service , naming service, file and print sharing.
- Apple talk is only supported by window NT server.
- But window workstation and window 95 do not support Apple talk protocol suite.

➤ NetBIOS :

- Network Basic Input Output System it provides services related to the session layer of the OSI model allowing application on separate computer to communicate over a local area network.
- This result in each computer in the network having both a NetBIOS name and IP address corresponding to a host name.

➤ NetBIOS :

- A) **History & Terminology** : NetBIOS was developed in 1983 by Sytek INC. an API for software communication over IBM pc network LAN technology.
- PC network only supported up to 80 devices in it most accommodating mode , NetBIOS was itself designed with limited nodes in mide.

B) Services :

NetBIOS provides three distinct services:

- Name service for name registration & resolution.
- Session service for connection oriented communication.
- Datagram distribution service for connectionless communication.

C) Name service :

In order to start session or distribute datagram's an application must register its NetBIOS name using the name services.

- NetBIOS names are 16 octets in length and very based on the particular implementation.

➤ L2CAP :

- The Logical Link Control & Adaptation Layer Protocol (L2CAP) is layered over the base band protocol and resides in the data link layer .
- L2CAP permits higher level protocol and application to transmit and receive L2CAP data packet up to 64 kilobytes in length.

- Two link types are supported for the Base band layer:
- Synchronization Connection Oriented (SCO) links and Asynchronous Connection Less (ACL) links.

D) Session Services : Session mode lets two computer establish a connection for a "conversation" , allow larger messages to be handled and provide error detection and recovery.

E) NetBIOS Name : NetBIOS name is 16 ASCII characters however Microsoft limits the host name to 15 character as a NetBIOS.

➤ RFCOMM Protocol :

- The RFCOMM protocol emulation of serial ports over the L2CAP protocol.
- Only a subset of the TS 07.10 standard is used and some adaptation of the protocol are specified in the Bluetooth RFCOMM specification.

➤ Routing :

- In internetworking , the process of moving a packet of data from source to destination.
- Routing is usually performed by a dedicated device called a router.
- Routing is key feature of the internet because it enable message to pass from one computer to another.

➤ Routing :

- Each intermediary computer performs routing by passing along the message to the next computer.
- There are Three Types :
 - Static
 - Dynamic
 - Default

➤ Types Of Routing :

- 1) **Static Routing** : Static Routing the alternative to dynamic routing is the process in which the system network administrator would manually configure network router with all the information necessary for successful packet forwarding.
 - Static route to network destination are unchangeable.

➤ Types Of Routing :

- 2) **Dynamic Routing** : Dynamic Routing is a networking technique that provides optimal data routing.
- Unlike static routing , dynamic routing enables routers to select paths according to real time logical network layout change.
 - In dynamic routing the routing protocol operating on the router is responsible for the creation , maintenance and updating of the dynamic routing table.

➤ Types Of Routing :

3) **Default Routing** : Default Route of a computer that is participating in computer networking is the packet forwarding route taking effect when no other route can be determined for a given IP destination address.

➤ Routing Protocol :

1) Exterior Routing Protocol :

- BGP

2) Interior Routing Protocol :

-> Distance Vector routing :

- RIP (Routing information Protocol)

- IGRP (Interior Gateway Routing Pro.)

- EIGRP (Enhance IGRP)

-> Link state routing :

- OSPF (Open Shortest Path First)

➤ Exterior Routing Protocol :

- BGP :The Border Gateway Protocol (BGP) is the routing protocol used to exchange routing information across the internet.
- BGP is the only protocol that is designed to deal with a network of the internet's size , and the only protocol that can deal well with having multiple connection to unrelated routing domains.

➤ Exterior Routing Protocol :

- BGP has proven to be scalable ,stable & provide the mechanism needed to supports complex routing policies.
- The BGP is an inter Autonomous System routing Protocol.

➤ Interior Routing Protocol :

- The internet is a collection of network connected by routers which deliver IP datagram based on the routing tables.
- Two issues are important on routing tables : what data should be kept in the table and how to get those data.
- The routing within an autonomous system called interior routing.

Interior Routing Protocol :

- Distance Vector Routing Protocol :
 - 1) RIP (Routing Information Protocol) :
 - The RIP is one of the oldest distance vector routing protocol which employ the hop count as a routing metric.
 - RIP prevents routing loops by implementing a limit on the number of hops allowed in a path from source to destination.

Interior Routing Protocol :

- The maximum number of hops allowed for RIP can support.
- RIP implements the split horizon, route poisoning and hold-down mechanism to prevent incorrect routing information from being propagated.
- There are three versions available in RIP : RIPv1 , RIPv2, RIPv3

Interior Routing Protocol :

- 2) EIGRP (Enhance Interior Gateway Routing Protocol) :
 - EIGRP is an advance Distance Vector Routing Protocol that is used on a computer network to help was designed by “Cisco System” as a proprietary protocol, available only on Cisco routing.

Interior Routing Protocol :

- Partial functionality of EIGRP was converted to an Open Standard in 2013 is available as an IETF draft.
- EIGRP only sends incremental updates, reducing the workload on the router and the amount data that needs to be transmitted.
- The EIGRP replace IGRP in 1993.

Interior Routing Protocol :

- 3) IGRP (Interior Gateway Routing Protocol) :
 - IGRP is a distance vector Interior Routing Protocol(IRP) developed by Cisco. It is used by router to exchange routing data within an autonomous system.
 - IGRP is a proprietary protocol. IGRP was created in part to overcome the limitation of RIP when used within large network.

Interior Routing Protocol :

- Link State Routing:

- 1) OSPF (Open Shortest Path First) :

- OSPF is a routing protocol for internet protocol(IP) network. It uses a link state routing algorithm and falls into the group of interior routing protocols, operating within a single autonomous system (AS) .
 - OSPF is perhaps the most widely used interior gateway p.rotocol (IGP)

Interior Routing Protocol :

- ❑ 2) IS – IS (Intermediate System to Intermediate System):
 - IS –IS is a routing protocol designed to move information efficiently within a computer network.
 - The protocol was defined in ISO/IEC 10589:2002 as an international standard within the Open Systems Interconnection (OSI) reference design.

Interior Routing Protocol :

- IS – IS has been called the de facto standard for large service provider network back-bones. And it will design for use within an administrative domain or network. And it was operate by network router.

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