**Networking**

**Date: 29/09/22**

Section 7: IP Addressing

Outline:-

Ip Addresses overview

Address Classes

* Class A - Class D
* Class B - Class E
* Class C - CIDR

Special address

* Loopback address
* Local broadcast address

Network masks

What is an IP Address?

* Layer 3 logical address assigned by an administrator
* Resides at layer 3 of OSI Model
* Used to identify specific devices on a network
* Every device on the internet has a unique IP address

RFC1918 Addresses

* 10.1.1.1
* 12.1.1.1 // Network Address Translation
* Needs to be unique

PS C:\Users\Prade> ping www.yahoo.com

Pinging new-fp-shed.wg1.b.yahoo.com [202.165.107.50] with 32 bytes of data:

IP Address with ping command

Reply from 202.165.107.50: bytes=32 time=66ms TTL=50

Reply from 202.165.107.50: bytes=32 time=66ms TTL=50

Reply from 202.165.107.50: bytes=32 time=66ms TTL=50

Reply from 202.165.107.50: bytes=32 time=66ms TTL=50

Ping statistics for 202.165.107.50:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds:

Minimum = 66ms, Maximum = 66ms, Average = 66ms

Command = nslookup

IP Characteristics:

IPv4

* Layer 3 or network Layer Protocol
* Connectionless Protocol
  + TCP is connection Oriented
* Packets treated independently
  + May take different paths
* Hierarchial addressing structure
  + Network and Host portion
* Best effort delivery
* No data recovery features
* No built in session
* No retransmission

TCP

* Handle dropped, corrupted and misdirected packets

Format Overview:

IP address

* 10.1.1.1 x.x.x.x – 8bits octets
* Has a hierarchial structure to enable routing
* Routing
  + Like DHL or FedEx routing Parcel based on an address
  + Routers route traffic to destination address
    - DA in the packet

Network Address Portion(Network ID)

* Identifies a specific network
* Routers maintain routing tables that contain the network
* Look at destination of IP address and match to network address

Host Address Portion(host ID)

* Identifies a specific endpoint on a network
* Server, printers, PCs, Iphone, Ipad, etc.

1. IP Address is a 32-bit binary number.
2. Divided into four octets(8 bits or 1 byte)

00001010.00000001.00001000.00000010

Which is 10.1.8.2

1. Octet

* 8 binary bits/1byte

1. IPv4 address

* 4 octets X.X.X.X where X is an octet.

Address Classes

* 1981 until introduction of classless in Domain routing in 1993.
* Divide IPv4 Address into 5 class.

Class A - Unicast Traffic

Class B - Unicast Traffic

Class C - Unicast Traffic

Class D - Multicast

Class E - reserved for future or experimental purposes

IPv6 – does not use address classes

IPv4 – address classes was replaced by CIDR

* Accommodate different sizes of networks
* Aids in classifying networks
* Determined by the internet assigned numbers authority(IANA)

Class Address Format

* Network command -RIP