**Network Servers and Infrastructure**

**Assignment 3**

**Q1: State the Ethernet generations**

**Q2: Draw the *Ethernet frame* and define its fields**

7 bytes 1byte 6byte 6bytes 2 byte min:46 bytes max:1500 bytes 4 bytes

min frame : 64 byte max frame:1518

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Preamble** | **SFD** | **Destination address** | **Source address** | **Len** | **Data and padding** | **CRC** |

**Preamble: This is a pattern of alternative 0’s and 1’s which indicates starting of the frame and allow sender and receiver to establish bit synchronization**

**SFD:** T**his is a 1-Byte field which is always set to 10101011**

**Destination address: MAC address of machine for which data is destined.**

**Source Address: MAC address of source machine**

**Type: indicates the length of entire Ethernet frame**

**Data: This is the place where actual data is inserted, also known as Payload**

**CRC: This field contains a 32-bits hash code of data**

**Q3: Define the type of the following destination addresses:**

1. **45:30:10:21:10:1A (multicast) because second bit is odd**
2. **4C:20:1B:2E:08:EE (unicast) because second bit C (12) is even**
3. **FF:FF:FF:FF:FF:FF (brodcast) because all the bits are F's**

**Q4: Define the flowing terms:**

**10Base2 [medium + medium Length]**

**10Base5 [medium + medium Length]**

**10Base-T [medium + medium Length]**

**10Base-F [medium + medium Length]**

|  |  |  |
| --- | --- | --- |
|  | Medium | medium Length |
| 10Base2 | Thin coaxial | 185m |
| 10Base5 | Thick coaxial | 500m |
| 10Base-T | 2 UTP | 100m |
| 10Base-F | 2 Fiber | 2000 |

**Collision domain**

A section of a network connected by a shared medium or through repeaters where data packets can collide with one another when being sent.

**Collision**

Superposition of two signals

**100Base-TX [medium + medium Length]**

|  |  |  |
| --- | --- | --- |
|  | Medium | medium Length |
| 100Base-TX | STP | 100m |

**100Base-FX [medium + medium Length]**

|  |  |  |
| --- | --- | --- |
|  | Medium | medium Length |
| 100Base-FX | Fiber | 185m |

**Q5: How the address below is sent out online?**

**47:20:1B:2E:08:EE**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Hexdecimal | 47 | 20 | 1B | 2E | 08 | EE |
| Binery | **01000111** | **00100000** | **00011011** | **00101110** | **00001000** | **11101110** |
| Transmitted | **11100010** | **00000100** | **11011000** | **01110100** | **00010000** | **01110111** |

**Q6: Compare between LS and DV algorithms**

|  |  |
| --- | --- |
| Distance vector | Link State |
| RIP, IGRP, EIGRP | OSPF, ISIS |
| Small-Domains | Hierarchical: large- domains |
| Use bellman-ford algorithm | Use Dijkstra's algorithm |
| Use broadcast | Use unicast and multicast for update |
| Traffic is less | Traffic is more |

**Q7: Compare between Inter-As routing and Intra-AS routing using examples**

|  |  |  |  |
| --- | --- | --- | --- |
|  | Performance | Policy | protocols |
| Intra-as | focus on performance | There is no policy because single admin | RIP  OSPF  IGPR |
| Inter-as | focus on policy rather than performance | NEED POLICY  EX:  ADMIN WANTS CONTROL OVER HOW ITS TRAFFIC ROUTED, WHO ROUTES THROUGH ITS NET | BGP (iBGP, eBGP) |