**Internet – Cyber**

**Communication**

**Rules**

1. **Language - common**
2. **Speed**
3. **Acknowledgement – yes/no**

**Protocols**

**Internet**

**Network of networks**

**LAN**

**Connection of 2 or more devices**

**Billions of devices**

**End - PC’s, laptops, smart phones, printers, smart watches**

**Dell, HP, oneplus, iphone, macbook**

**Connecting devices –**

**Switches, routers, hubs, gateways**

**Cisco, dlink,**

**Lenovo ----hp**

**Linux ----windows --- mac--- android**

**100 mbps ---500 mbps**

**Airtel---jio**

**Mandatory condition**

**Standard model of communication**

1. **OSI --- Open System Interconnection**
2. **TCP/IP – Transmission Control Protocol/Internet Protocol**

|  |  |
| --- | --- |
| **OSI** | **TCP/IP** |
| **Conceptual** | **Practically used for internet** |
| **7 layers** | **4 layers** |
|  |  |

**OSI- 7 layers**

**Working of internet**

**Big task**

**Sub tasks 7 layers**

**Every layer has 4 things**

**Name, functions, protocols, devices**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Functions** | **Protocols** | **Devices** |
| **Application- User data** | **Connect users to the internet** | **http, https, dns, dhcp, ftp, email** | **PC’s, laptops, smart phones, printers, smart watches** |
| **Presentation** | **Compress, decompress, encrypt, decrypt** | **-** | **PC’s, laptops, smart phones, printers, smart watches** |
| **Session** | **Connect, data transfer, disconnect** | **---** | **PC’s, laptops, smart phones, printers, smart watches** |
| **Transport layer - segments** | **Segmentation, sequence numbering, process to process delivery, ack** | **TCP, UDP** | **Port numbers** |
| **Network layer- packets** | **Addressing- Static and DHCP protocol, Routing – google map, Packetization** | **IPv4, IPv6, ICMP- error messages** | **Routers, layer 3 switch** |
| **Data Link layer- Frames- collection of bits** | **Error detection and control** | **Error detection and correction techniques – odd and even parity, hamming distance, CRC** | **Switch** |
| **Physical** | **Define the meaning of 0 and 1, data will be travelled in the form signals** | **Encoding and decoding** | **Media- wired (ethernet) and wireless, air- wifi, wimax, Bluetooth, zigbee, infrared** |

**Benefits Session layer-**

**Case study-**

**22nd dec 2024 is the last date to fill online exam form**

**Huge traffic is generated—exam server is unable to handle load**

1. **Exam server is responding very slow**
2. **Server is crashed –**

**Students- logged in---they are idle**

**Session layer- 5 mins idle---log out—exam server**

**Segmentation, sequence numbering**

**Larger data is divided into small size segments – segmentation**

**2 GB ---10 MBPS**

**100 segments – 1-2-3-4-5----100**

**10 segments—12-17-34-78-**

**Process to process delivery – port numbers**

**How my laptop comes to know hdfc data should go to hdfc tab ?**

**Transport layer**

|  |  |
| --- | --- |
| **TCP** | **UDP** |
| **Transmission Control Protocol** | **User Datagram Protocol** |
| **Connection oriented** | **Connectionless** |
| **Reliable – guarantee of successful delivery** | **Unreliable- no guarantee of successful delivery** |
| **retransmissions** | **no retransmission** |
| **Slow** | **fast** |
| **Internet banking** | **Live streaming of the match, webex** |

**100 – 10 are lost**

**TCP – retransmissions –till all 100 are received ---reliability**

**UDP – lost ok..i will not do anything**

**1100011 ----1100010**

|  |  |
| --- | --- |
| **OSI** | **TCP/IP** |
| **Application** | **Application** |
| **Presentation** |
| **Session** |
| **Transport** | **Transport** |
| **Network- L3** | **Internet** |
| **Data link – L2** | **Network Access layer** |
| **Physical** |

**3 way handshake-**

**TCP sender -----TCP receiver**

1. **Hi, my speed is 10 MBPS, my sequence number is starting from 100, 101, 102**
2. **Hi, my speed is 5 MBPS, my sequence number is 500**

**501,502,503**

1. **Ok I agree**

**Actual data transmission will start**