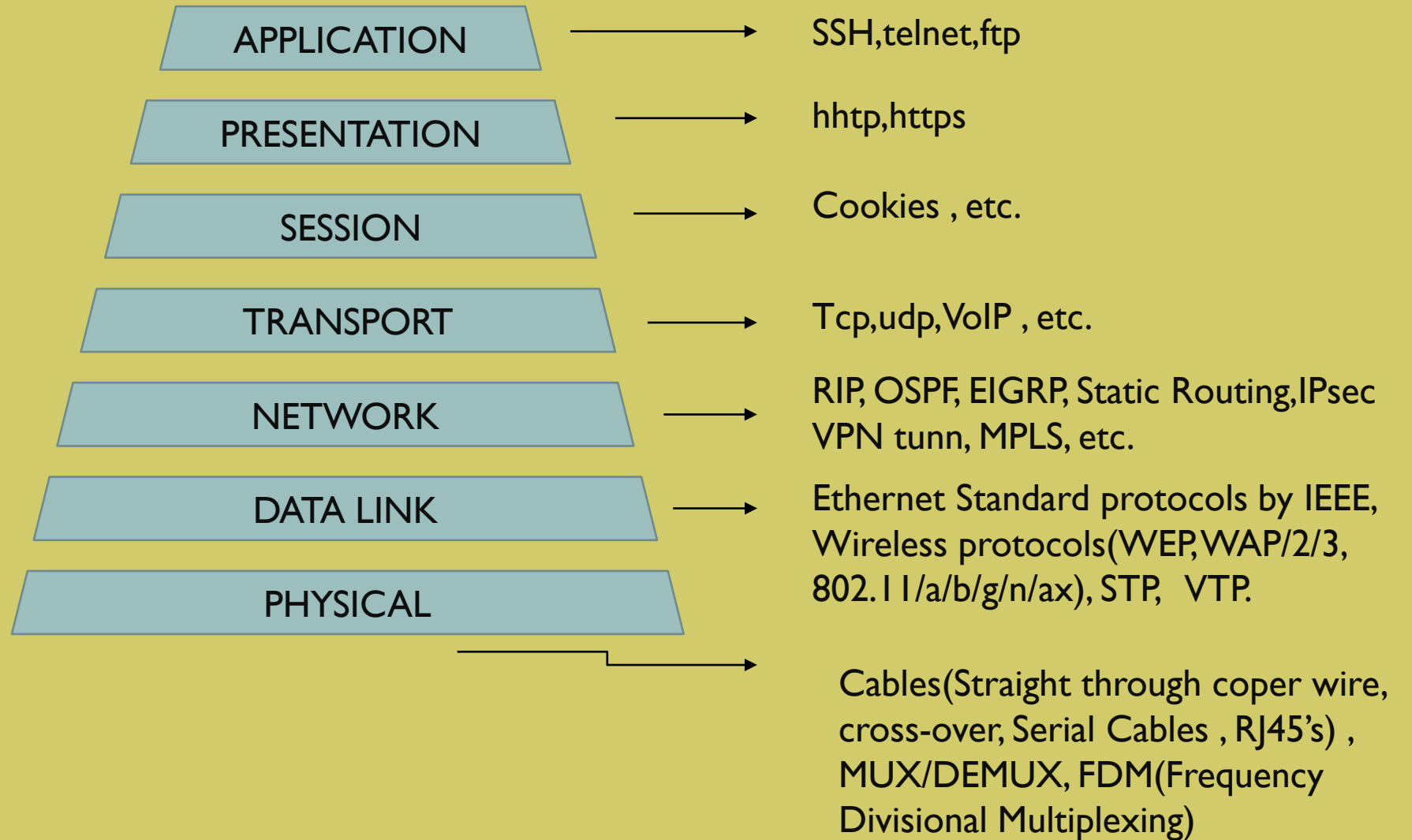


# Today's topic: Routing and Routing protocols

## Routing

- It is a layer 3 function in an OSI or any general used networking model
- It is used to forward the packets in the desired network or subnetwork , packets are not intelligent enough that they can go where they are being destined to So devices like routers , firewalls are used to analyse the packets and where to send them.
- It plays an important role in your home broadband connection or any company's web infrastructure.
- Web infrastructure means suppose a company A is located in India and a person from America wants to be a part of that infrastructure virtually as a user or admin. It requires some 1000 and 500 of switches and routers in between the User and Infrastructure

# OSI Model



## There are some popular or mostly used Routing Algorithms and Routing Protocols are based on them

### 1. Path Vector :

- It is based on AS paths (Autonomous Paths) selected by the ISP's to make sure from which other AS they want to send data through.
- It ensures AS (Autonomous System) Numbers routing between the different ISP's and Companies.
- Ex. BGP , and its versions.



### 2. Distance Vector:

- It uses the database of adjacent router to know about the information of the distances of the network paths.
- Ex. RIPv1 , RIPv2.



### 3. Link State:

- It uses Shortest Path Algorithm to detect the shortest path to reach the destination in lowest cost.
- It uses Dijkstra's Algorithm to find the shortest path and there's should not be any loop.
- Ex. OSPFv1 , OSPFv2 ,OSPFv3.



### 4. Hybrid:

- They follow both Distance vector as well as Link state path algorithm for packet forwarding
- Ex. EIGRP (Enhanced Interior Gateway Routing Protocol CISCO Proprietary now).

## Distance Vector Protocols

### RIP v1 and v2

#### RIP v1:

- RIP Routing Information Protocol v1 is a Standard protocol and performs classfull routing .
- RIP v1 is rarely used in today's networks
- It is used when it is already known that source and destination are at the same subnet.
- Hop count is limited , only 15 hop counts.
- AD is 120.

#### RIP v2:

- RIP v2 performs classless routing , means it doesn't require in v2 if sender and receiver are in same subnets.
- But it still not widely used in the network, because it is also compromised for SOHO or small Company Network only.
- Easy to implement.
- Subnet Masks are quite useful in RIP v2 to detect the subnet and to keep track of the HOPs. And are during route updates.

## Link State Protocol

### OSPF

#### OSPF:

- Open Shortest Path First is it what OSPF abbreviated to.
- OSPF is a Standard Protocol.
- as the name suggests OSPF use Shortest Path Algorithm or Dijkstra's Algorithm to detect the shortest path to reach the destination in less "cost".
- AD is 110.
- requires neighbour router's database information to gather the information about the neighbour networks and there respective shortest path.
- Unlimited hop counts and so it is the most popular Routing Protocol in the Industry.
- Broadcast Network
  - Multicast Address : 224.0.0.5
  - Multicast Probe Address is: 224.0.0.6
- Port Number for OSPF is 89.
- It works under Layer 3 of OSI Model or we can say It works in Network Layer.
- There are v2 ,v3, and v4 versions of OSPF but they only differ in authentication and authorization processes.
- OSPF has some "area's" and "state's" concept.
- Hello timer is 10 sec by default.

## Hybrid Protocol

### EIGRP

#### EIGRP:

- It's the Enhanced Interior Gateway Routing Protocol, based on RIP Interior Gateway Protocol.
- AD is 90.
- As EIGRP is hybrid routing protocol so it some times shows link state packets and some time distance vector's VLSM characteristics.
- During Broadcast:  
Multicast address : 224.0.0.10
- Default Hello packets timer is 5 seconds.
- EIGRP is reliable for big networks like WAN or , an ISP's connectivity.
- Its CISCO proprietary now and even standardised by CISCO in IEEE so can be used by other vendors to.