



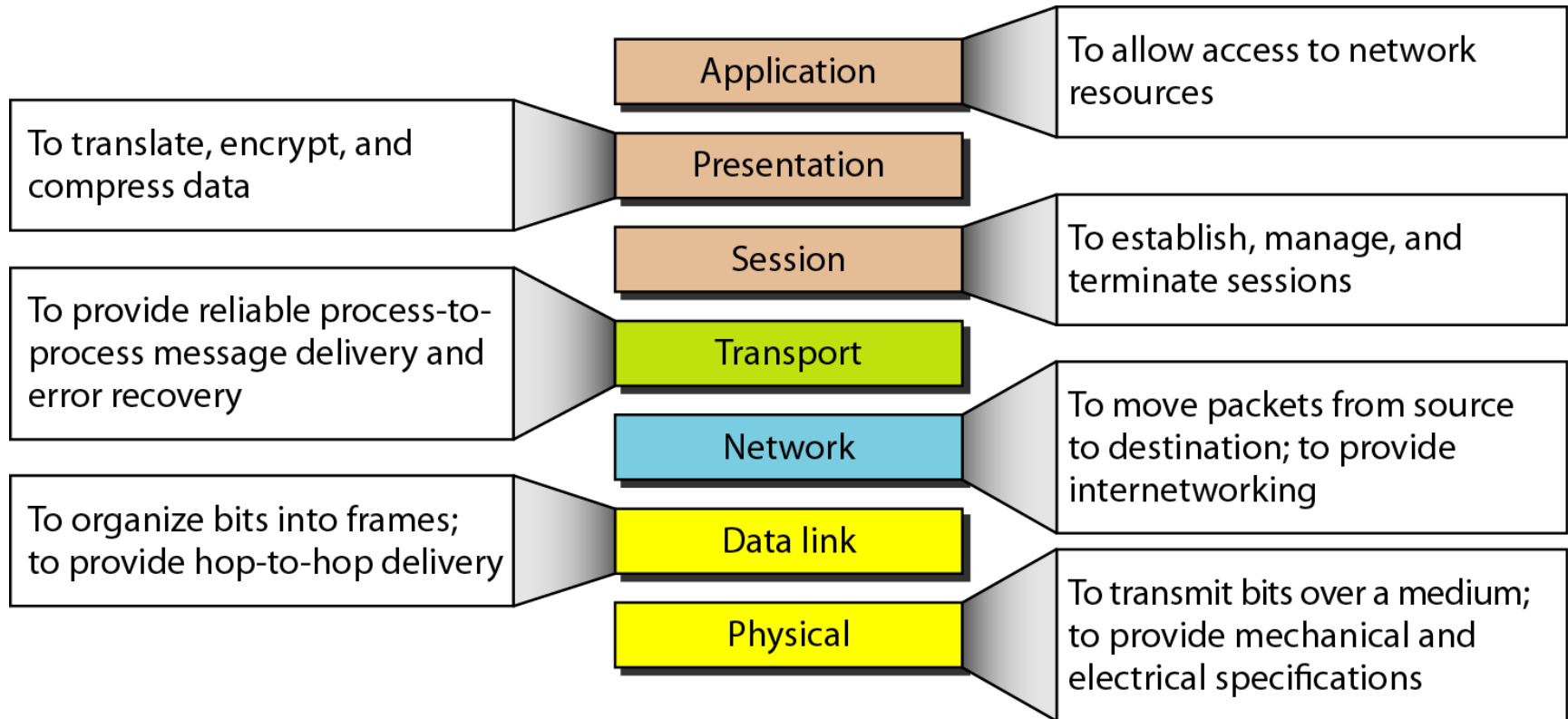
DATA COMMUNICATION

CSE 225/233

WEEK-2, LESSON-2

NETWORK MODEL

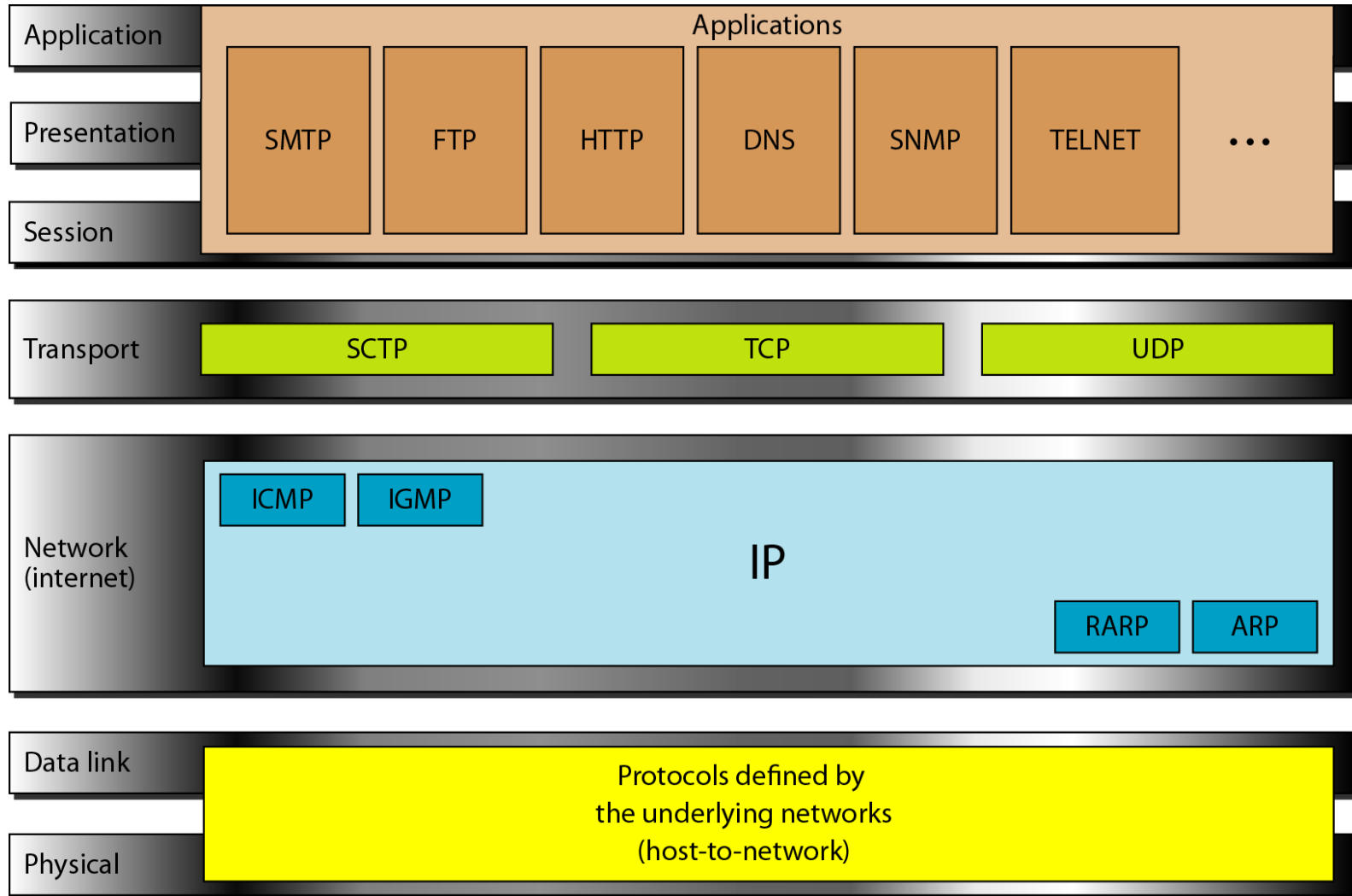
Summary of the layers



TCP/IP Protocol Suite

The layers in the **TCP/IP protocol suite** do not exactly match those in the OSI model. The original TCP/IP protocol suite was defined as having four layers: **host-to-network**, **internet**, **transport**, and **application**. However, when TCP/IP is compared to OSI, we can say that the TCP/IP protocol suite is made of five layers: **physical**, **data link**, **network**, **transport**, and **application**.

TCP/IP and OSI Model



Difference between TCP/IP and OSI

OSI(Open System Interconnection)	TCP/IP(Transmission Control Protocol / Internet Protocol)
1. OSI is a generic, protocol independent standard, acting as a communication gateway between the network and end user.	1. TCP/IP model is based on standard protocols around which the Internet has developed. It is a communication protocol, which allows connection of hosts over a network.
2. In OSI model the transport layer guarantees the delivery of packets.	2. In TCP/IP model the transport layer does not guarantees delivery of packets. Still the TCP/IP model is more reliable.
3. Follows vertical approach.	3. Follows horizontal approach.
4. OSI model has a separate Presentation layer and Session layer.	4. TCP/IP does not have a separate Presentation layer or Session layer.
5. Transport Layer is Connection Oriented.	5. Transport Layer is both Connection Oriented and Connection less.
6. Network Layer is both Connection Oriented and Connection less.	6. Network Layer is Connection less.
7. OSI is a reference model around which the networks are built. Generally it is used as a guidance tool.	7. TCP/IP model is, in a way implementation of the OSI model.
8. Network layer of OSI model provides both connection oriented and connectionless service.	8. The Network layer in TCP/IP model provides connectionless service.
9. OSI model has a problem of fitting the protocols into the model.	9. TCP/IP model does not fit any protocol
10. Protocols are hidden in OSI model and are easily replaced as the technology changes.	10. In TCP/IP replacing protocol is not easy.
11. OSI model defines services, interfaces and protocols very clearly and makes clear distinction between them. It is protocol independent.	11. In TCP/IP, services, interfaces and protocols are not clearly separated. It is also protocol dependent.
12. It has 7 layers	12. It has 4 layers

Addressing

Four levels of addresses are used in an internet employing the TCP/IP protocols: **physical**, **logical**, **port**, and **specific**.

Topics discussed in this section:

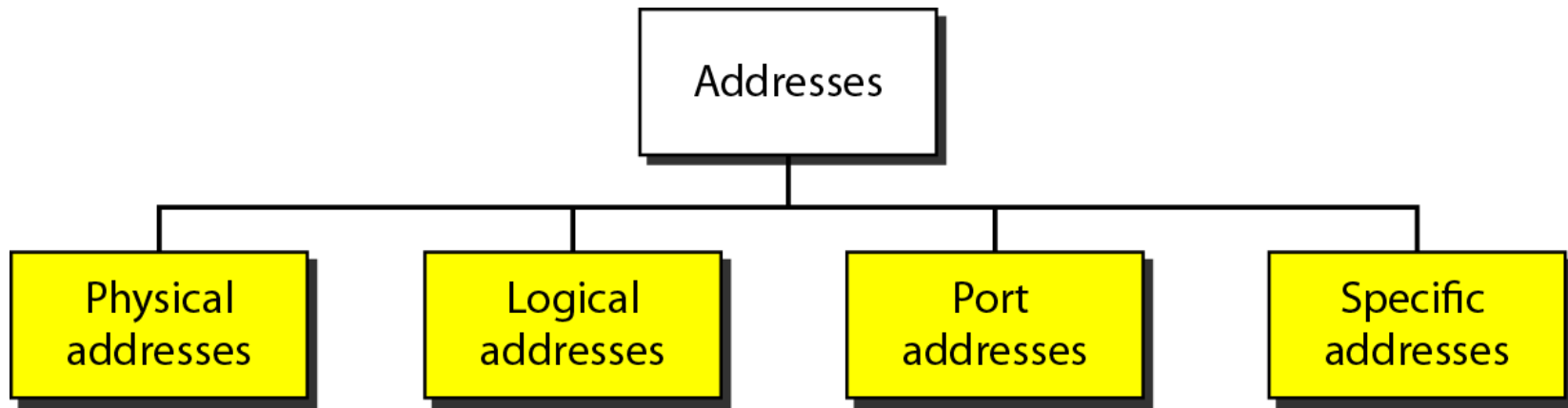
Physical Addresses

Logical Addresses

Port Addresses

Specific Addresses

Addresses in TCP/IP



Physical Addresses

- The physical address, also known as the **link address**, is the address of a node as defined by its LAN or WAN.
- The size and format of these addresses vary depending on the network. For example, Ethernet uses a **6-byte (48-bit)** physical address.
- Physical addresses can be either **unicast** (one single recipient), **multicast** (a group of recipients), or **broadcast** (to be received by all systems in the network).
- Example: Most local area networks use a 48-bit (6-byte) physical address written as 12 hexadecimal digits; every byte (2 hexadecimal digits) is separated by a colon, as shown below: A 6-byte (12 hexadecimal digits) physical address **07:01:02:01:2C:4B**

Logical Addresses

- Logical addresses are used by networking software to allow packets to be independent of the physical connection of the network, that is, to work with different network topologies and types of media.
- A logical address in the Internet is currently a **32-bit/128-bit** address that can uniquely define a host connected to the Internet. An internet address in IPv4 in decimal numbers 132.24.75.9
- No two publicly addressed and visible hosts on the Internet can have the same IP address.
- The physical addresses will change from hop to hop, but the logical addresses remain the same.
- The logical addresses can be either unicast (one single recipient), multicast (a group of recipients), or broadcast (all systems in the network). There are limitations on broadcast addresses.

Port Addresses

- There are many application running on the computer. Each application run with a port no.(logically) on the computer.
- A port number is part of the addressing information used to identify the senders and receivers of messages.
- Port numbers are most commonly used with TCP/IP connections.
- These port numbers allow different applications on the same computer to share network resources simultaneously.
- The physical addresses change from hop to hop, but the logical and port addresses usually remain the same.
- Example: a port address is a **16-bit address** represented by one decimal number 753

Specific Addresses

- Some applications have user-friendly addresses that are designed for that specific application.
- Examples include the e-mail address (for example, `narayan@daffodilvarsity.edu.bd`) and the Universal Resource Locator (URL) (for example, `www.daffodilvarsity.edu.bd`). The first defines the recipient of an e-mail; the second is used to find a document on the World Wide Web.

Exercises

- Go through the exercises given at the end of the chapter. Note that, we are following the 4th Edition of Forouzan Book for this chapter.

