DEVICES AND COMMUNICATION BUSES FOR DEVICES NETWORK–

Lesson-25: ETHERNET PROTOCOL

Ethernet

- Inventor of Ethernet LAN─ Robert Metcalfe
- About one third of the LANs in the world ─ Ethernet LANs.
- Ethernet is a protocol for local network of computers, workstations and devices.
- LAN─ Service sharing by the local computers, systems and sharing of local resources like printers, hard disk space, software and data
- Each frame has a header like in a packet.
- IEEE 802.2 (ISO 8802.2) Standard data-link MAC Media Access control) layer

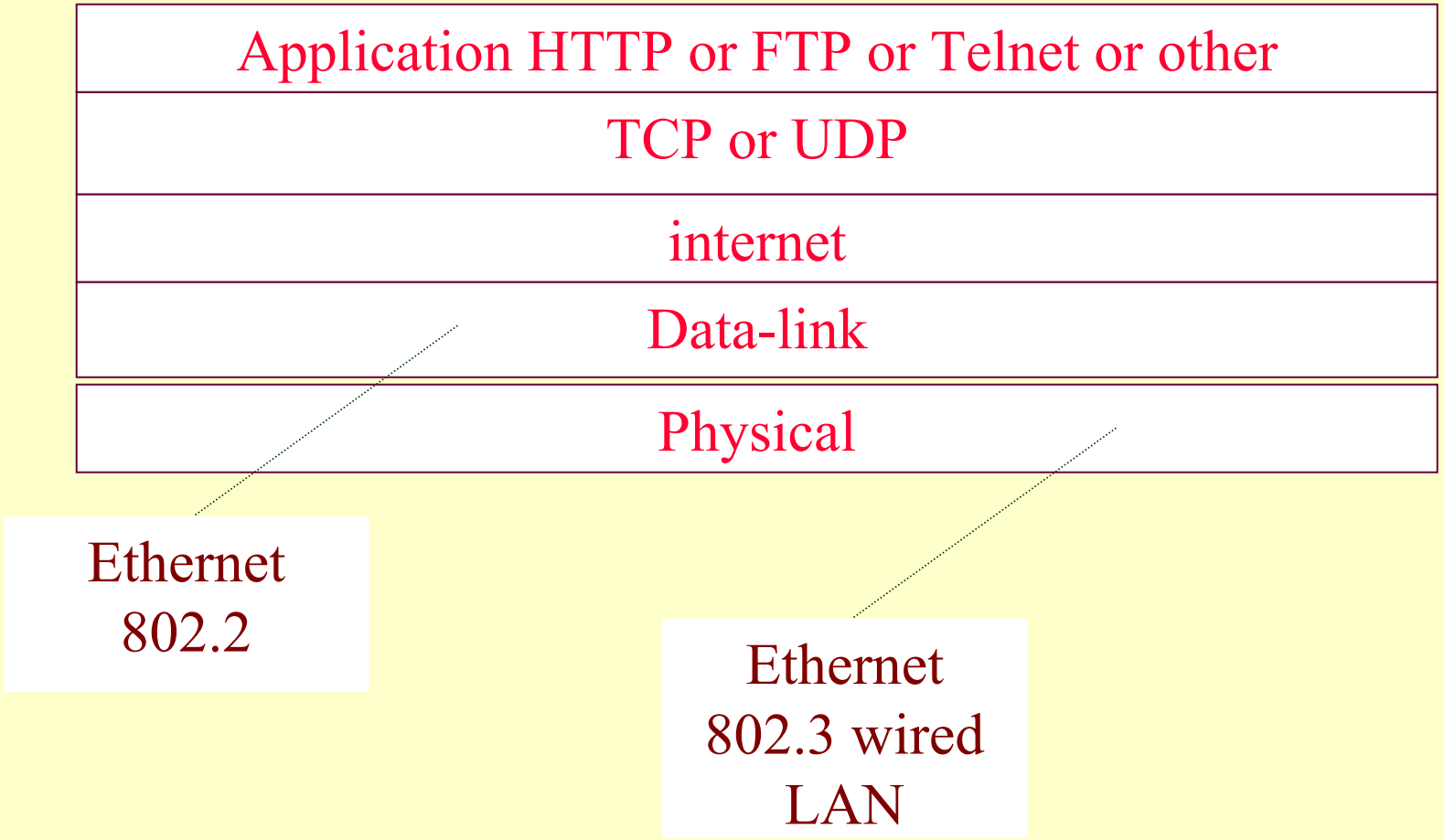
Ethernet LAN Features

- Bus topology, Wired LAN in IEEE 802.3 physical layer standard
- 10 Mbps, 100 Mbps (Unshielded and Shielded wires) and 4 Gbps (in twisted pair wiring mode)
- Broadcast medium─ Passive, Wired connections based.
- Frame format like the IEEE 802.2

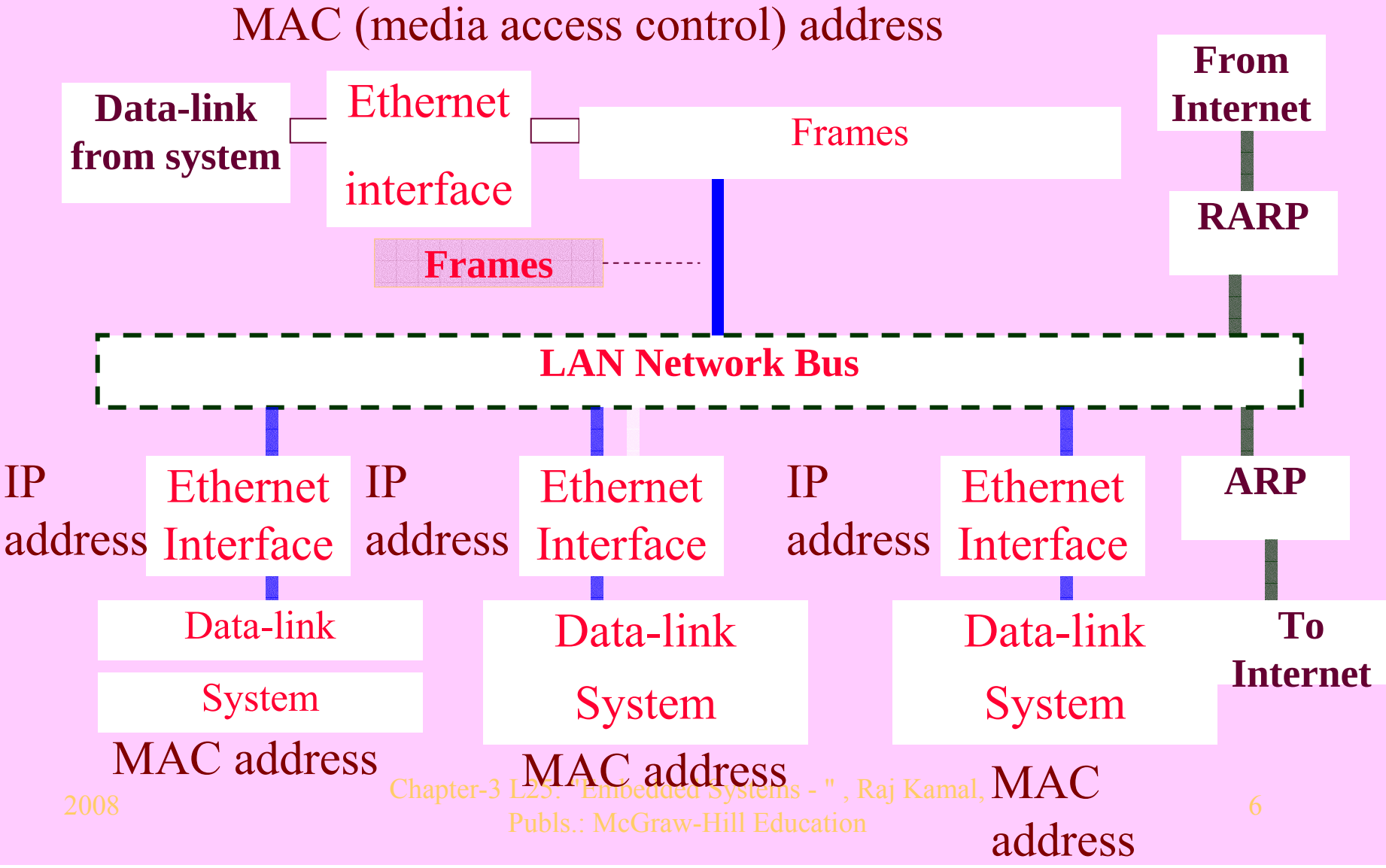
Ethernet LAN Features

- SNMP (Simple Network Management Protocol)
- Open system (therefore allows equipment of different specifications)
- Each one connected to a common communication channel in the network listens and if the channel is idle then transmits. If not idle, waits and tries again. Multi access is like in a Packet switched network

TCP/IP Network 5 layers



Ethernet LAN Network between data-link layers of devices/systems



Ethernet LAN

- Passive, connection based
- Media access control (MAC) 48-bit address for transmitting and forwarding frames on same LAN only.
- Can also use multicast addressing—for sending frames to all or few select types of Ethernet devices

Connectivity to Internet

- Outside a LAN the Internet Protocol addresses sent
- Address Resolution Protocol (ARP) for resolving 32 bits Internet protocol addresses with the 48 bit destination host media address. RARP (reverse ARP) for vice versa

Header Bytes in Ethernet Frame

- A data for transmission fragments into the frames.
- Frame has a header.
- Firstly, the header has eight bytes, which defines a preamble.
- The preamble is for indicating start of a frame and is used for synchronization.
- Then the header has six bytes (48-bits) of destination MAC address.
- Six bytes (48-bits) of the source MAC address follow the destination MAC.

Data in Ethernet Frame

- Then there are six bytes. These are for the type field. These are meaningful only for the higher network layers and the length definition.
- Minimum 72 bytes and maximum 1500 bytes of data follow the length definition.
- Lastly, there are 4 bytes for CRC check for the frame sequence check

Summary

We learnt

- Ethernet LAN protocol for local network of computers, workstations and devices
- Data-link layer protocol
- Each of the frames has a header like in a packet.
- IEEE 802.2 (ISO 8802.2) Standard
- Bus topology
- MAC addresses of 48-bit

End of Lesson 25 of Chapter 3