DEVICES AND COMMUNICATION BUSES FOR DEVICES NETWORK–

Lesson-26: WIRELESS AND MOBILE SYSTEM PROTOCOLS– IrDA

Wireless Personal Area Protocols

- IrDA (Infrared Data Association)
- Bluetooth 2.4 GHz
- 802.11 WLAN and 802.11b WiFi
- ZigBee 900 MHz

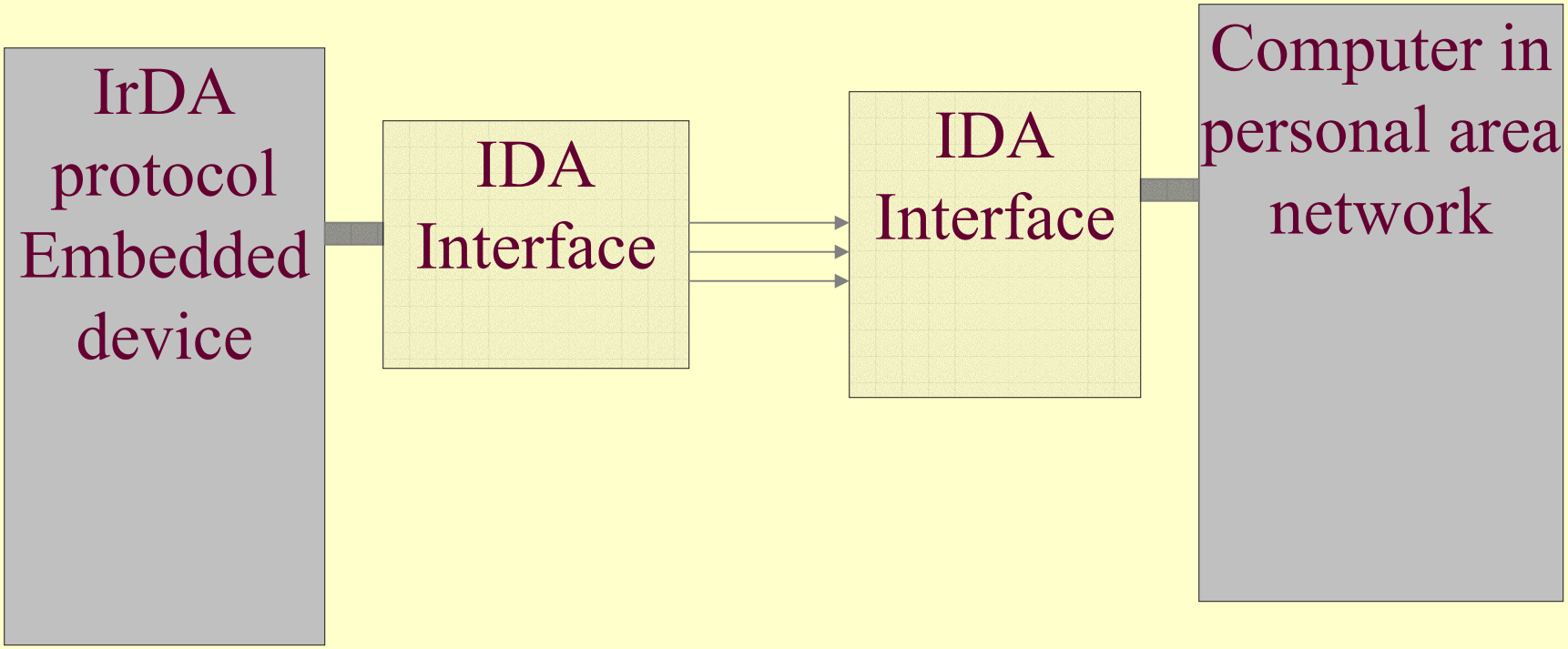
IrDA

- Used in mobile phones, digital cameras, keyboard, mouse, printers to communicate to laptop computer and for data and pictures download and synchronization.
- Used for control TV, air-conditioning, LCD projector, VCD devices from a distance

IrDA devices

- Use infrared (IR) after suitable modulation of the data bits.
- Communicates over a line of sight
- Phototransistor receiver for infrared rays

Infrared Data Association (IrDA)



IrDA protocol suite

- Supports data transfer rates of up to 4 Mbps
- Supports bi-directional serial communication over viewing angle between ± 15° and distance of nearly 1 m
- At 5 m, the IR transfer data can be up to data transfer rates of 75 kbps
- Should be no obstructions or wall in between the source and receiver

Five levels of communication

- Level 1— minimum required communication.
- Level 2 — access-based communication.
- Level 3 —index-based communication.

Five levels of communication

- Level 4 — sync communication. Synchronisation software, for example, ActiveSync or HotSync is used.
- Level 5 — SyncML (synchronisation markup language) based communication. A SyncML protocol is used for device management and synchronization with server and client devices connected by IrDA.

IrDA Physical Layer

- Lower layer– physical layer 1.0 or 1.1.
- 1.0– supports data transfer rates of 9.6 kbps to 115.2 kbps
- 1.1– 115.2 kbps to 4 Mbps

IrDA 5 layers

Application for example, IrDA Alliance Sync protocol
Session Layer IrLAN, IrBus, IrMC, IrTran, IrOBEX (Object Exchange) and standard serial port emulator protocol IrCOMM (IR communication). IrBus
Transport Layer Tiny TP or IrLMIAS
Data-link IrLMP and IrLAP Sublayers
Physical 1.0 (9.6 kbps to 115.2 kbps) or 1.1 (115.2 kbps to 4 Mbps)

Two sub-layers at IrDA data-link layer

- IrLMP (IR link management protocol) upper sub-layer
- IrLAP (IR link access protocol) lower sub-layer.
- IrLAP– HDLC synchronous communication

IrDA upper layer protocols

- for Transport
- for Session
- for Application

IrDA Transport layer protocol

- During transmission specifies ways of flow control, segmentation of data and packetization.
- During reception, specifies assembling of the segments and packets.
- Tiny TP (transport protocol).
- IrLMIAS (IR Link Management Information Access Service Protocol).

Session Layer

- IrLAN
- IrBus
- IrMC
- IrTran
- IrOBEX (Object Exchange) and
- IrCOMM (IR communication) standard serial port emulator protocol
- IrBus to provide serial bus access to game ports, joysticks, mice and keyboard.

IrDA Application layer protocol

- Specifies security and application
- For example, IrDA Alliance Sync protocol used to synchronize mobile devices personal information manager (PIM) data–supports Object Push (PIM) or Binary File Transfer.

Windows and the several operating systems support

- Infrared Monitor in Windows monitors the IR port of the IR device.
- Detects a nearby IR source.
- Controls, detects and selects the IR communication activity.
- On command, the device sets up connection using IrDA.
- On command starts the IR communication.
- When IR communication is inactive, the Monitor enables plug and play (unless disabled).

IrDA features

- IrDA protocol overhead between 2% to 50% of Bluetooth device overhead.
- Communication setup latency is just few milliseconds.

IrDA limitation

- Line of sight and unobstructed communication

Summary

We learnt

- IrDA used when IR source and receiver interface present in the devices
- Line of sight and unobstructed up to 5 m 75 kpbs and up to 1 m 4 Mbps communication

End of Lesson 26 of Chapter 3