Course Name: A Level (2nd Sem) Subject: DCN

Topic: Bluetooth Date: 29-05-20

Bluetooth:

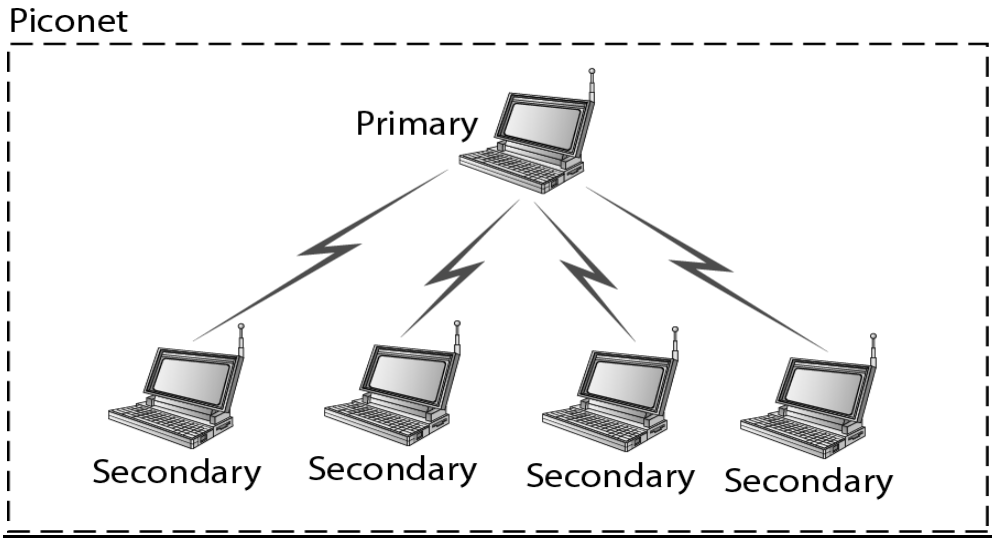
- Bluetooth is a wireless LAN technology designed to connect devices of different functions such as phones, notebooks, computers (desktop and laptop), cameras, printers and so on.
- Bluetooth technology has several **applications**:
  - Peripheral devices such as a wireless mouse or keyboard can communicate with the computer through this technology.
  - Monitoring devices can communicate with sensor devices in a small health care centre.
  - Home security devices can use this technology to connect different sensors to the main security controller. Conference attendees can synchronize their laptop computers at a conference.
  - A Bluetooth LAN can even be connected to the Internet if one of the gadgets has this capability.
- A Bluetooth LAN is an **ad hoc network**, which means that the network is formed spontaneously; the devices, sometimes called gadgets, find each other and make a network called a **piconet**.
- A Bluetooth LAN, by nature, cannot be large. If there are many gadgets that try to connect, there is some complexity.
- Bluetooth was originally started as a project by the **Ericsson Company**. It is named for Harald Blaatand, the king of Denmark (940-981) who united Denmark and Norway. *Blaatand* translates to *Bluetooth* in English.
- Today, Bluetooth technology is the implementation of a protocol defined by the **IEEE 802.15 standard**. The standard defines a **wireless personal-area network (PAN)** operable in an area the size of a room or a hall.
- A Bluetooth device has a built-in short-range radio transmitter. The current data rate is 1 Mbps with a 2.4-GHz bandwidth.
- Bluetooth devices are low-power and have a range of **10 m**.
- Bluetooth uses a 2.4-GHz ISM band divided into 79 channels of 1 MHz each.
- Bluetooth uses the frequency-hopping spread spectrum (FHSS) method in the physical layer to avoid interference from other devices or other networks.
- The access method is TDMA.
- To transform bits to a signal, Bluetooth uses a sophisticated version of FSK, called GFSK (FSK with Gaussian bandwidth filtering).

Architecture:

Bluetooth defines **two** types of networks: **Piconet** and **Scatternet**.

Piconets:

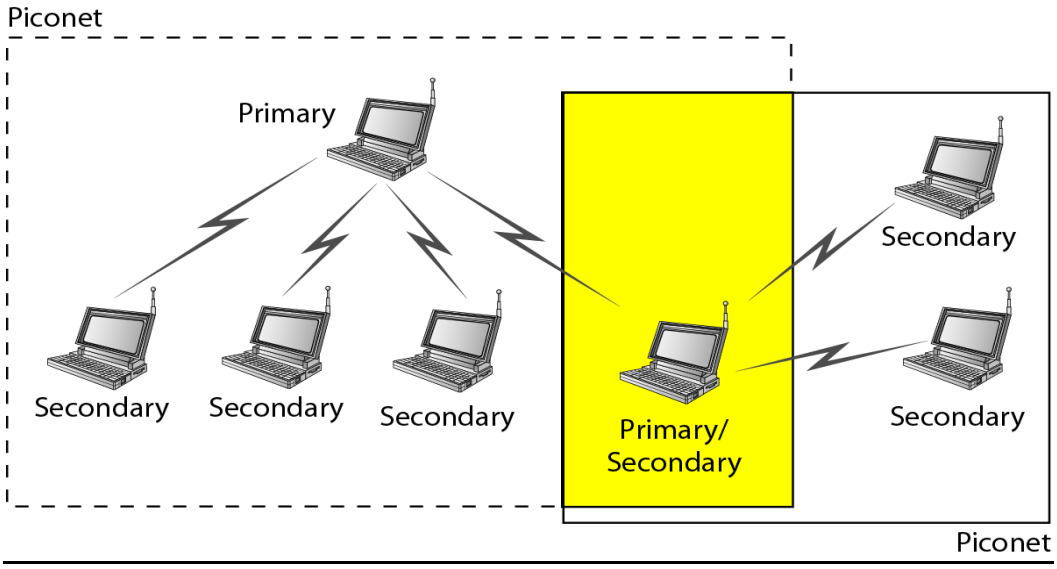
- A Bluetooth network is called a **piconet**, or a small net.
- A **piconet** can have up to **eight** stations, one of which is called the **primary**; the rest are called **secondaries**.
- All the secondary stations synchronize their clocks and hopping sequence with the primary.
- A piconet can have only **one** primary station. The communication between the primary and the secondary can be one-to-one or one-to-many. Figure shows a piconet.



- Although a piconet can have a maximum of seven secondaries, an additional eight secondaries can be in the **parked state**.
- A secondary in a parked state is synchronized with the primary, but cannot take part in communication until it is moved from the parked state.
- Because only eight stations can be active in a piconet, activating a station from the parked state means that an active station must go to the parked state.

Scatternet:

- Piconets can be combined to form what is called a **scatternet**.
- A secondary station in one piconet can be the primary in another piconet.
- This station can receive messages from the primary in the first piconet (as a secondary) and, acting as a primary, deliver them to secondaries in the second piconet. A station can be a member of two piconets. Figure shows a scatternet.



Scatternet

Exercises:

A. **What do you understand by Bluetooth technology? Write its applications.**
B. **What are the main features of Bluetooth technology? Compare a Piconet and a Scatternet.**