Advanced Topics in Wireless Networks

Low Power Local Area Networks

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Introduction to IoT Communication

- Multitude and variaty
  - diverse Quality of Service (QoS)
  - huge amount of traffic
  - huge address space
- Self-organization
- Reliability and robustness
- Security and privacy

Introduction to IoT Communication

- Capillary M2M
  - low power
  - low cost
  - short range
- Cellular M2M
  - long distance

Introduction to IoT Communication

- LPWAN
  - NB-IoT
  - LoRaWAN
  - Sigfox
- LPLAN
  - BLE
  - Zigbee

IEEE 802.15.1/Bluetooth

- Robustness
- Low Power
- Low Cost

IEEE 802.15.1/Bluetooth

Piconets

- Bluetooth enabled electronic devices connect and communicate wirelessly through short-range, ad hoc networks known as *piconets*.
- Each device can simultaneously communicate with **up to seven other devices** within a single piconet.

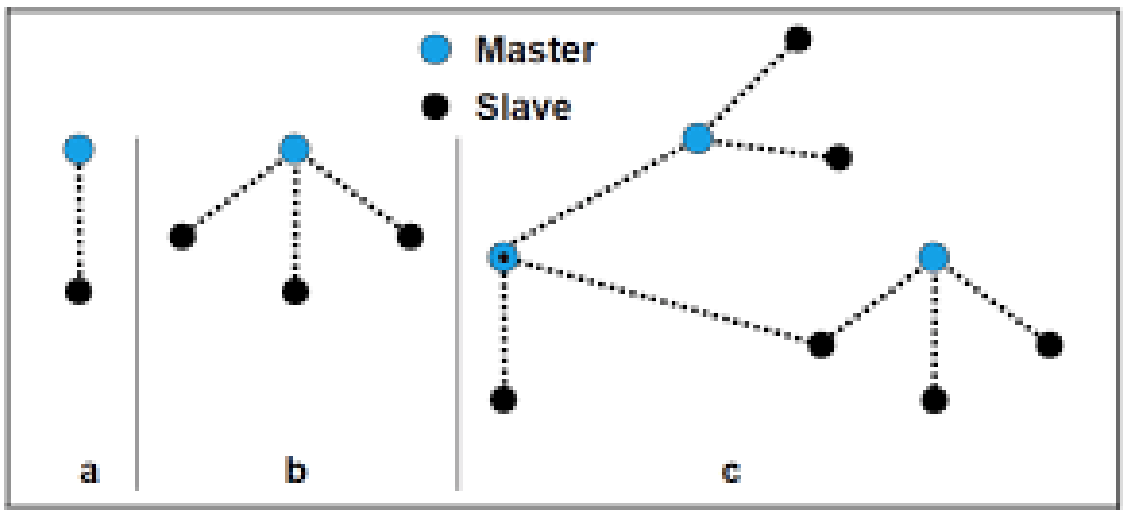
Features

- Bluetooth wireless technology is geared towards voice and data applications and able to penetrate solid objects.
- It is omni-directional and does not require line-of-sight positioning of connected devices.

IEEE 802.15.1/Bluetooth

PHY Layer

- 2.4 GHz frequency band
- 79 Channels, each channel has 1 MHz bandwidth
- 3 Power class for 1, 10 and 100 meter transmission distance
- Physical Links
  - Data Link: Asynchronous Connectionless (ACL)
  - Voice Link: Synchronous Connection Oriented (SCO)



IEEE 802.15.4

- IEEE 802.15 serial standards are established by IEEE 802.15 Working Group for Personal Area Network or short distance wireless networks.