SNS COLLEGE OF ENGINEERING

Kurumbapalayam(Po), Coimbatore – 641 107
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Department of Computer Science and Engineering

Course Name – 19IT503 Internet of Things

III Year / V Semester

Unit 3 – EVOLVING IoT STANDARDS & PROTOCOLS

Topic 9 - RF4CE

Radio Frequency for Consumer Electronics (RF4CE)

- Radio Frequency for Consumer Electronics (RF4CE) is a protocol developed by a consortium that includes companies such as Freescale, Texas Instruments, OKI, Panasonic, Philips, Samsung, and Sony.

- It defines a standard specification for designing remote-control devices for the TV, VCR, and DVD.

- The RF4CE consortium merged with ZigBee to produce the ZigBee RF4CE standard. Whereas most remote controls currently are based on infrared (IR) technology that requires line of sight, RF4CE does not have that limitation.

Radio Frequency for Consumer Electronics (RF4CE)

- RF4CE protocol has been designed for simple, two-way device-to-device control applications that do not require the full-featured mesh networking capabilities offered by ZigBee 2007.

- ZigBee RF4CE offers lower memory size requirements, thereby enabling lower cost implementations

- RF4CE is based on ZigBee and was standardized in 2009 by four consumer electronics (CE) companies:
 - Sony,
  - Philips,
  - Panasonic, and
  - Samsung.

Radio Frequency for Consumer Electronics (RF4CE)
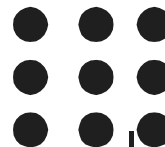
- The ZigBee RF4CE specification defines an RC network that defines a simple, robust, and low-cost communication network allowing wireless connectivity in applications for CE devices.

- The ZigBee RF4CE specification enhances the IEEE 802.15.4 standard by providing a simple networking layer and standard application layer that can be used to create a multivendor interoperable solution for use within the home.

- RF4CE's intended use is as a device RC system, for example for television settop boxes.

- The intention is that it overcomes the common problems associated with infrared (IR): interoperability, line-of-sight (LOS), and limited enhanced features.

- At least two-chip vendors supported RF4CE as of press time: Texas Instruments and Freescale Semiconductor, Inc.

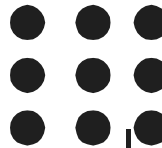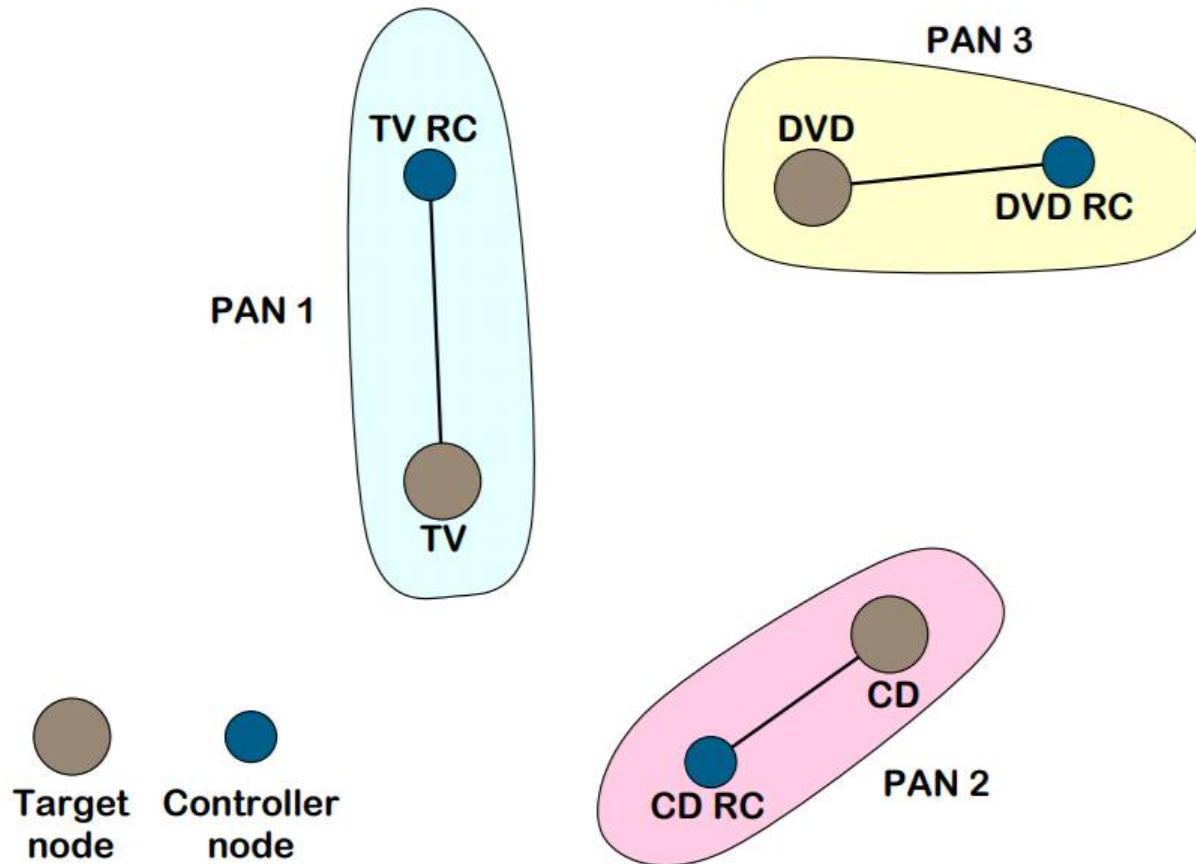# Architecture
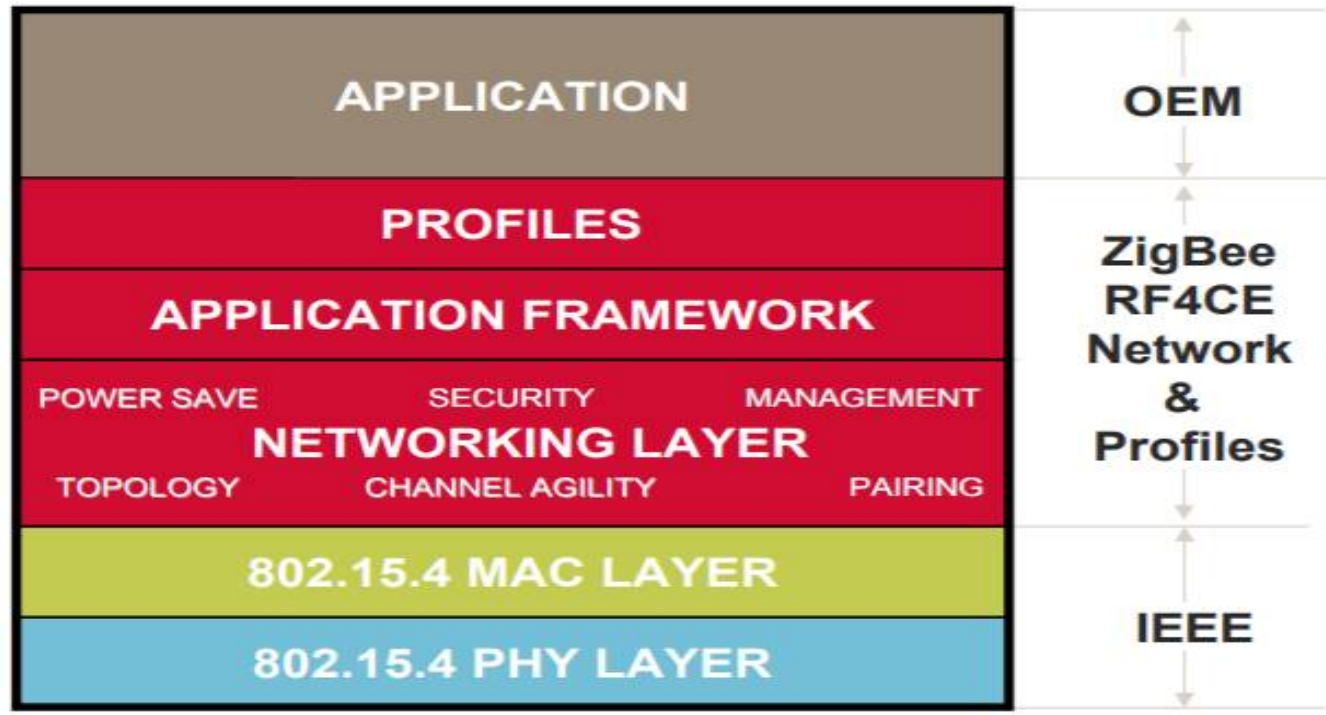
Architecture

- The ZigBee RF4CE specification is designed to be built on top of the IEEE 802.15.4 standard MAC and PHY layers. It provides networking functionality,

- while the ZigBee Remote Control and/or ZigBee Input Device can interface to the end-user application.

- Manufacturer specific extensions to standards can be defined by sending vendor-specific data frames within the standard.

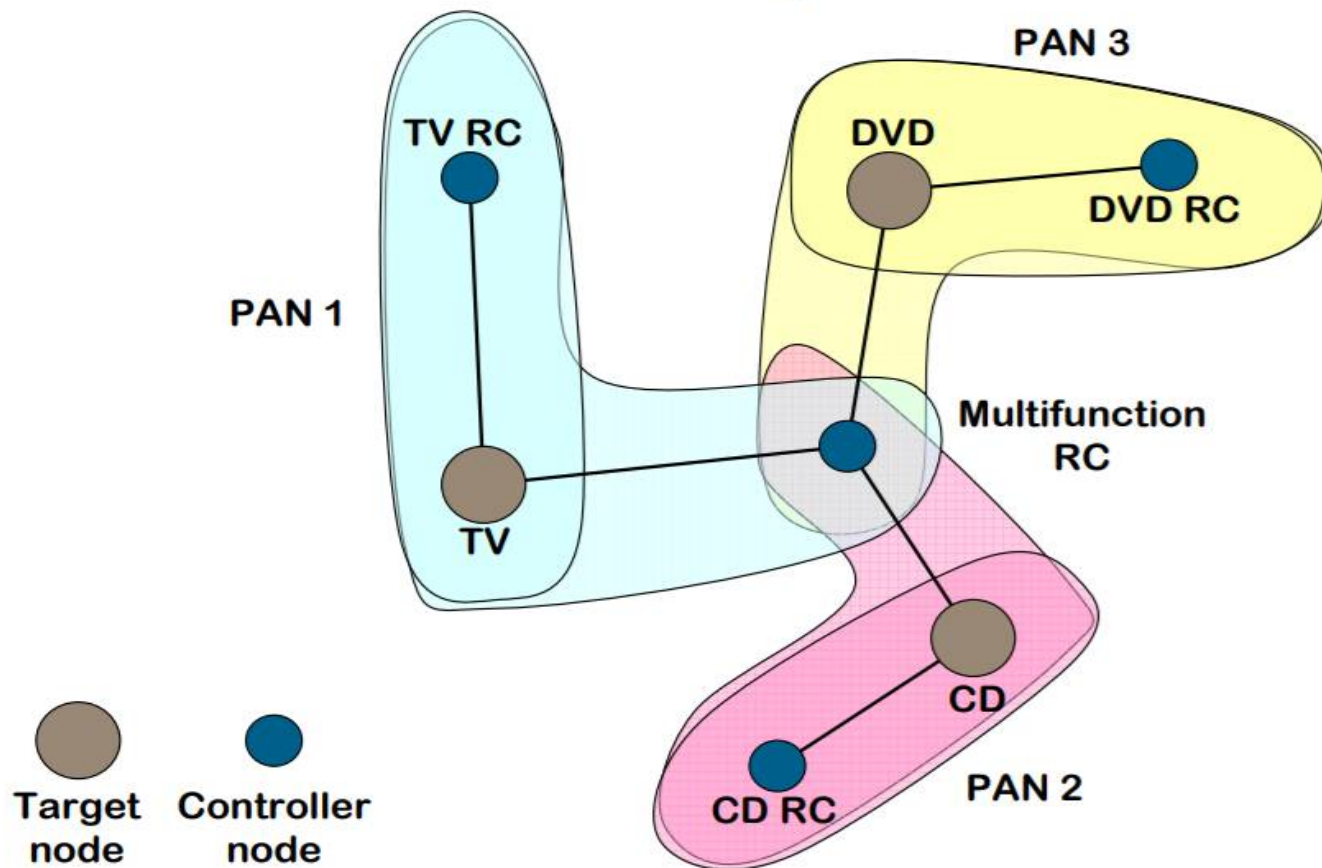- In addition, manufacturer specific profiles can also be defined.
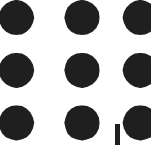
Network Topology

Network Topology

ZigBee RF4CE Network Topology

Radio Frequency for Consumer Electronics (RF4CE)

Characteristics of ZigBee RF4CE include the following

- Operation in the 2.4 GHz frequency band according to IEEE 802.15.4;
- Frequency agile solution operating over three channels;
- Incorporates power-saving mechanisms for all device classes;
- Discovery mechanism with full application confirmation;
- Pairing mechanism with full application confirmation;
- Multiple star topology with inter-PAN communication;
- Various transmission options including broadcast;
- Security key generation mechanism;
- Utilizes the industry standard AES-128 security scheme;
- Specifies a simple RC control profile for CE products;
- Support alliance-developed standards or manufacturer-specific profiles.

THANK YOU

RF4CE/ Internet of Things /CSE / SNSCE