ZigBee, Short Range Wireless & Wireless Sensor Network

Applications, Technologies and Challenges

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Content

- Introduction
- Application and scenarios
- Technical development and challenges
- ZigBee/SRW/WSN in China
Short Range Wireless

- An important one of wireless family
- Outstanding Features
  - Short range coverage
  - Low cost for variety market
  - Easy to install and deploy
  - Power efficient
- Including
  - RFID
  - Bluetooth
  - UWB
  - ZigBee
  - …
ZigBee and wireless sensor network (1)

- **ZigBee** is low rate short range wireless technology with:
  - Low cost/low power for end devices
  - Supporting star, tree and mesh network
  - Global certification assuring interoperability

- **Wireless sensor network** is an important application for ZigBee and other short range wireless technologies.
ZigBee and wireless sensor network (2)

- Wireless sensor networks application
  - Environment monitoring
  - Asset tracking
  - Science research
  - Military scenario

- New evolution of wireless sensor network
  - For home/personal market
  - For industry market
  - For telecom value-added services
  - For ubiquitous computing/communication
Applications and scenarios (1)

**Home/Personal**

- Home lighting control system
- Automatic meter reading system
- Home safety surveillance
- Interactive home appliances
- E-health - ZigBee gateway collecting data from the body sensors and forwarding to hospital
Applications and scenarios (2)

**Telecom-based**

### Use Cases

- Mobile payment in self-service POS, parking lots, ticket office, etc.
- Small data sharing between two ZigBee-enable mobile phones.
- Municipal information delivery in public area, such as weather, traffic and guide.
- Zone billing service, that is, operator can use a discounted rate when subscribers entering some specific area.
Applications and scenarios (3)

- **Integrated service platform**
  - The AAA server provides authentication for ZigBee end devices using identity items such as SIM card, phone number, etc.
  - The billing system can collect the bill for certain services. Operator can provide charging service to other service providers (SP).
  - The simple network management function can be implemented in operator networks.
  - The application servers can be owned by operators or other service providers (SP).
Technical development

เฉ IEEE 802.15.4 – PHY/MAC standard
   First release in 2003 (802.15.4-2003)
   New update in 2006 (802.15.4-2006)
   Now pending in 4c/4d task group

เฉ Great acceptance in global market
   Over 10 chip vendors all around the world
   New spectrum consideration in different region besides 2.4GHz ISM
   Protocol and application development by ZigBee Alliance and other organizations
Technical development

• ZigBee Alliance in promoting technology
  • Stack protocol development
  • Interoperability guarantee
  • Application profile and certification
    • Home automation
    • Industry automation
    • Automatic Metering Infrastructure
    • Telecom value-added services
    • Personal health care
Challenges

- Many wireless technologies emerging
  - UWB, RFID, ZigBee, WiFi, ...

- Interference problem in 2.4GHz
  - ISM spectrum shared by any devices
  - ZigBee is lower power than others

- Low cost for large scale deployment
  - Chipset cost is still high for most end devices
  - Deployment and maintenance cost

- Combine with Tele-network
  - Internet & Mobile network is widespread
  - E-commerce
ZigBee in China (1)

- **Domestic standard development**
  - **CWPAN group since 2005**
    - **LowRate WPAN standard**
      - Adopted by IEEE 802.15 as 4c
    - **UWB standard**
    - **WSN standard**
  - **CCSA WG3 activity**
    - **Short range wireless research report**
    - **Standard: Telecom-based short range wireless requirements**
ZigBee in China (2)

- ZigBee Alliance involvement
  - Chinese Academy of Sciences
  - Huawei Technologies
  - Helicomm Beijing

- IEEE 802.15
  - TG 4c: for Chinese WPAN standard
    - Attended by Hisilicon, Vinnotech
Conclusion

- There is an enormous market for Short Range Wireless & Wireless Sensor Network applications (including ZigBee) in China.

- In China, Short Range Wireless is included as an important part of the long-term plan on wireless technology developments.

- We expect good collaboration between ZigBee Alliance and China companies, institutes, domestic standard bodies, and etc.

- A good many collaboration aspects can be considered.
  - Applications, standardization, devices, testing, and so on.
Thank you all!

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