IoT Device Development Challenges and Solutions

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Outline

- IoT Bigger Picture
- IoT Current Challenges
- WyzBee® IoT Platform – What Is Unique?
- Development Process -- Product Synthesis
- Solution Demonstration
- QA
IoT Bigger Picture

Key Characteristics

- No or minimal human intervention during operation
- Minimal human intervention during configuration
- Long life time
- Security

Connecting and networking physical assets to Solve and Increase Business Efficiency
Challenges

- Integration of hardware and software from several vendors
- Interaction with devices using multiple wireless protocols
- Real time data collection and Analytics
- Seamless and secure connection to Cloud
- Cost of design and deployment
- Remote device management and diagnosis
- Development tools
WyzBee® Platform Overview

- Single Source Solution (Technology, Chipset, Module, Device and Cloud)
- Multi-Protocol Wireless Connectivity (DB Wi-Fi, BT EDR, BLE, ZigBee)
- Optimal cost of design and deployment: Product Synthesis with THING Interface
- Embedded Protocol, TCP/IP, SSL, HTTP, REST, SSL, PUF with seamless APIs
- Future proof devices

![Diagram of WyzBee THING™ Expansion Interface and Wireless Secure MCU – WiSeMCU™: Multi-protocol wireless (Wi-Fi, BT 4.1, ZigBee Pro) Microcontroller (Cortex-M4)]

WyzBee® Workbench
(Product Synthesis, Enhanced Debugger, Power Profiler)
WyzBee® Platform Unique Features- Single Source Solution

- All hardware and software for end to end application development
- Availability of 40+ THINGS for various sensor, audio, video and Locationing applications
- Connectivity using Wi-Fi, Bluetooth, BLE, ZigBee, GSM/GPRS, LTE
- Integrated stack components (Thread, 6LoWPAN, MQTT, CoAP, DTLS etc.) with APIs for seamless cloud connectivity
- Complete cloud infrastructure for visualization, device management, device monitoring and control
- Connectivity APIs to third party cloud solutions
- Application development kit for Android and iOS devices
WyzBee® Platform Unique Features – Multi-Protocol Wireless

WyzBee® based IoT Device

- RS9113
- Wi-Fi Client with Enterprise Security
- BT 4.1
- SSL

Cloud S/w

- Cloud connection with SSL

Network connection
With Enterprise Security

Alarm system
Connection

Smartphone connection
with BT LE

MCU
WyzBee® Platform Unique Features – Product Synthesis

Redpine Cloud Platform

WyzBee® Workbench

Synthesized Product

Library of components
Complete initial design using WyzBee

► Choose WyzBee “Things” to complete hardware and software design

► Choose WyzBee Cloud platform to complete the cloud integration (analytics, visualization, management etc.)

► Choose WyzBee Application platform to complete the application development
WyzBee® Platform Unique Features – Product Synthesis

2. Analyze and converge on system design
   - Define power, performance, cost targets
   - Define physical parameters (e.g. dimensions)
   - Choose from library of components
   - Complete trade-off analysis and finalize on components
   - Choose the cloud integration elements
   - Choose the application components

Wireless Secure MCU – WiSeMCU™ M4, Multi-protocol wireless (Wi-Fi, BT 4.1, ZigBee Pro)

- 14mm x 15mm Multi-protocol, Fully Certified connectivity wireless module
- 8.6 mm * 8.6mm M4/512KB Flash
- 14 mm * 15mm M4/512KB Flash
- 15 mm * 21mm M4/1MB

Redpine Library Components (connectivity and WiSeMCU™ modules)
Synthesize the final design

- Schematics, Gerbers
- PCB stack-up
- Mechanical drawing
- Bill of Materials
- Final performance, cost, power numbers
- Firmware image for WyzBee
- Cloud software
- Application software
Embedded multi-wireless protocol stacks for Wi-Fi, BT 4.1 Dual Mode and ZigBee with advanced security

Support for advanced IoT stack components including Thread, 6LoWPAN, MQTT, CoAP and DTLS

Support for 6LoWPAN over BLE and 802.15.4

Complete networking stack including IPV6, SSL, TLS, HTTPS for secured connectivity

REST APIs for cloud connectivity

Embedded Oauth 2.0
WyzBee® Platform Summary

► WyzBee is a single stop shop for an IOT application development
  • Provides significant reduction in time to market
  • Reduces cost of development and deployment
  • THING boards supported for realizing applications for all IoT market segments (connectivity, sensors, audio and video).
  • Seamless interface to Third-party cloud services
  • Easy application development framework

► WyzBee provides secured connectivity with multi-wireless protocols
  • Support for Wi-Fi, Bluetooth 4.1 Dual Mode, ZigBee
  • Advanced On-Chip PUF security for Device Authentication and hardware / software binding

► WyzBee synthesizes the final product for you!
  • Includes all hardware and software
Product demo: Driving Wireless Convergence (Wi-Fi + BLE)

1. Configuration using BT-LE
   - Scan for available APs
   - Configure and connect using BT-LE application
   - Concurrent Wi-Fi + BLE operation
   - SSL/TLS security
Product demo: Voice Controlled Thermostat

2. Thermostat operation over WyzBee Cloud
   - Set contact information over the cloud
   - Set threshold using voice or over the cloud
   - Visualize and Analyze thermostat data
   - MQTT, Rest APIs
WyzBee® - Tweeting

Network

WyzBee Client
- REST
- HTTP
- SSL
- TCP/IP
- 802.11 MAC
- 802.11 PHY

HTTPS Request

Twitter Server
- REST
- HTTP
- SSL
- TCP/IP
- MAC
- PHY

HTTPS Response
WyzBee® : Authentication for Twitter

Resource Owner(User): WyzBee platform running twitter application
Client: Registered Twitter application (ex: WyzBeelIoT)
Authorization Server (AS): Authenticates user credentials
Resource Server (RS): Grants access to resources after authentication
AS and RS constitute Twitter service provider.
Product demo: Driving Wireless Convergence (Wi-Fi + ZigBee)

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Alerts and AC/Heater Control

- Twilio phone call and Twitter (Oauth) alerts
- ZigBee for AC/heater control
- Concurrent Wi-Fi + ZigBee operation
- Multiple simultaneous sockets
THANK YOU

Redpine Signals, Inc.