Freescale Use of Java
Secure, Connected IoT

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Agenda

• Freescale Vision – IoT
• Freescale – Edge Node Java Based
• Freescale – Gateway Java Based
SECURE EMBEDDED PROCESSING SOLUTIONS for the INTERNET of TOMORROW
Secure.
Infrastructure of the IoT
IoT: Data Flow

- Data
- Information
- Knowledge

- Edge Node
- Gateway
- Cloud Processing
Available Online – Java ME 8.1 Developer Preview
Gateway Software Architecture

Web App (running on the gateway) (Eg: connected home, home health, etc)

Java ME Sensor Node
- Accelerometer
- Temperature
- Touch
- Ambient Light
- Java ME demo library
- CoAP Java ME
- Java ME Embedded

Web REST API
Device Management Platform
Java SE

Java Apps / Services
- Local Directory
- Oracle Event Processing for Java Embedded
- Application/ WebServer
- Data Communication Module
- Device Management Module

Networking Protocols: IoT Gateway Image
- MPX Yocto Linux BSP Software Drivers
  - ZigBee Pro
  - ZigBee IP
  - Bluetooth 4.0
  - Gb Enet
  - Wi-Fi

Database
- Sensor Data
- ZigBee Data
- Wi-Fi Data
- Bluetooth Data
- Storage
IoT Concept: Software / Hardware Platform

- HA1.2, SE1.x, ZLL, ZigBee PRO
- FSL KW2x 2.4GHz, 802.15.4 development platform
- ARM
  - NanoService
  - Java ME
  - FSL IPv6 Stack with 6LoWPAN
  - FSL KW2x 2.4GHz / KW01 Sub-Gig, 802.15.4 development platform
- Freescale
  - ThinkEco
  - USB
  - USB2.0, USB, USB, GMII, SDIO, Micro-SD, 8 GB Flash

Local Directory:

- OEP for Java Embedded
- App / Web Server
- Data Communication Module

Java Apps/Service:

- Java ME
- FSL IPv6 Stack with 6LoWPAN
- FSL mBed™ development platform

FSL IoT Gateway Image:

- VLAN, DNS, IPS
- Data Encryption (Open SSL, DTLS)
- JAVA VM (SE Embedded)

MPU Yocto Linux BSP Software Drivers:

- ZigBee Pro
- ZigBee IP
- Bluetooth 4.0
- Gb Enet
- Wi-Fi

ARM Sensinode NanoServices:

- USB2.0
- USB2.0
- USB2.0
- GMII
- SDIO
- Micro-SD

Sensor

ZigBee Data

Wi-Fi Data

Bluetooth Data

JAVA Database

Data Encryption

Open SSL, DTLS

MPU Yocto Linux BSP
Software Drivers

USB

USB2.0

USB

USB2.0

GMII

SDIO

Micro-SD

8 GB Flash

DATA COMMUNICATION MODULE

JAVA VM

ENSEMBLE

JAVA ME

NETRONIC

FSL mBed™

FSL MPU Board Design

PHY Interface

Inside Box Modules

External Use | 8
Prototype Implementation of i.MX6 IoT Healthcare Gateway

IOT Home Healthcare Gateway

Java 8 SE

DB-Derby Database Manager

LNI - IoT Gateway Services

USB BlueTooth Low Energy Driver (BLE)

BLE Devices:
- Pulse-Ox
- Blood Pressure Cuff
- Medical Scale

Media Interfaces:
- Ethernet
- WiFi

Laptop

Healthcare Home Web Browser Application

Operating Systems:
- Linux BSP on i.MX6 (3.10.17 kernel)
- BSD Sockets
- TCP
- IGMP
- ARP
- UDP
- IPv4
- ICMP
- ND

Other Devices:
- Blood Pressure Cuff
- Medical Scale

USB Dongles:
- Bluetooth Low Energy USB Dongle
Evolution of Java for IoT

Java ME 8: What it does it mean to the IoT developer community?

Convergence of ME and SE API’s
  • Maximize code reuse across devices with varying capabilities

Compact Profiles enable Java to run on resource-constrained devices
  • ~1/3 reduction in runtime footprint from previous Java version
  • Connected Limited Device Configuration provides configurability and many new features for embedded applications

Lambda expressions allows easy leverage of multi-cores

Java ME 8 security domains – support for device- and client- specific security policies