Java ME Update

JCP EC Meeting May, 2012

Agenda

- Directions for Java ME evolution
- Java ME 7 Overview
- Roadmap
- Next Steps

Towards a common Java

Ensure close alignment between ME/SE

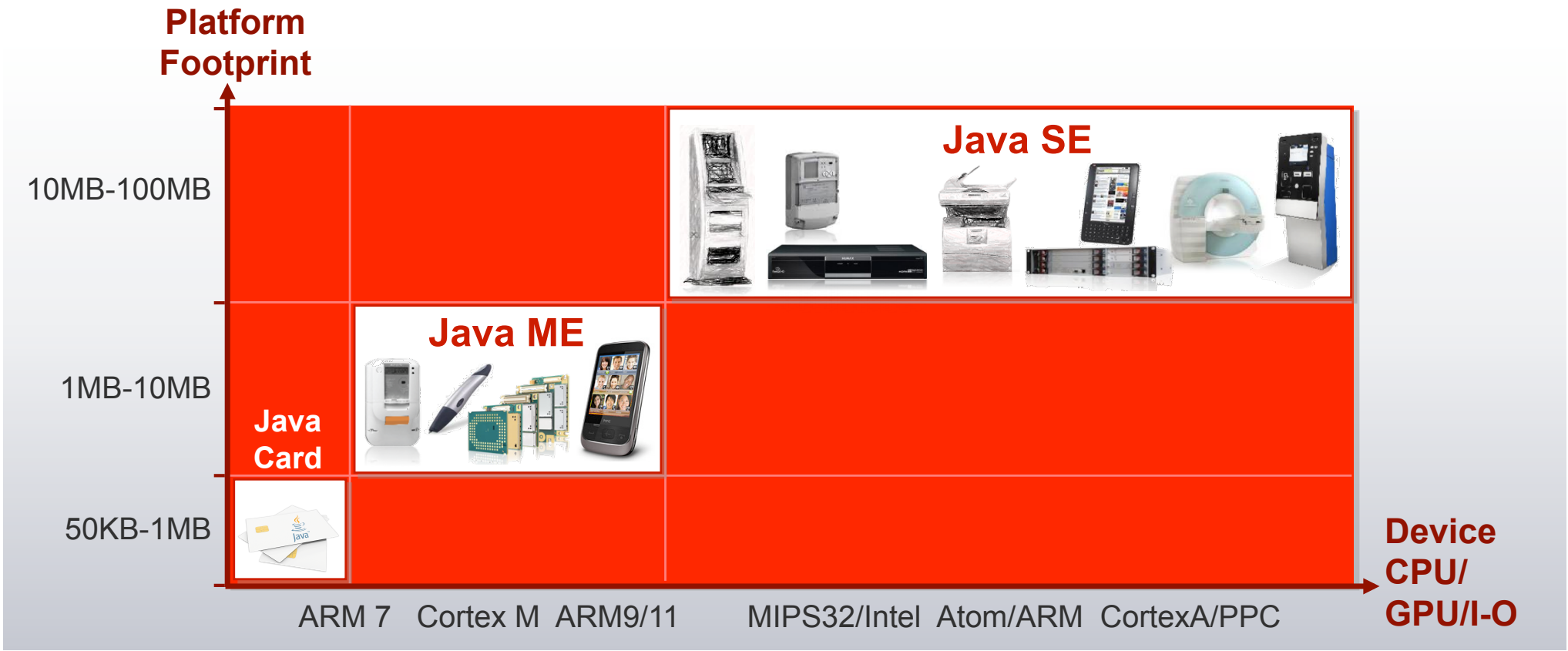
Key Principles

- ME is the “little sibling” of SE.
- CLDC is a strict subset of SE
- Any ME app/library works on SE.
- ME vs. SE is a footprint/functionality tradeoff.
- ME & SE release cycles are in sync

Benefits

- Unified development experience & community
- Align language, core APIs, development and management tools
- Enable value in SE by reusing ME APIs : Location, Messaging, Sensors, Payment, Bluetooth, ….
- Enable value in ME by reusing SE tools and management features

Java technology for Embedded Device - 2013



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Java ME7 in Phones and Embedded Devices

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Java ME 7 Overview

- **Release Themes**
  - Modernized mobile platform
  - Standard APIs for mobile services
  - Standard APIs for embedded
- **Target Markets**
  - Feature phones
  - Small Embedded
- **Key Features**
  - Align language/tooling with SE7
  - Redesigned MSA / MIDP to address usability issues
  - New or updated mobile APIs: AMS, JAX/RS, SATSA…
  - Dedicated APIs for small embedded

Java ME 7 Platform Architecture

Device APIs

- Small Embedded
  - Core Device APIs
  - Future vertical profiles
- Mobile
  - MSA Entry Profile APIs
  - MSA Standard Profile APIs

Core Platform

- IMP 7
- MIDP 7

Java VM

- CLDC 7

Language

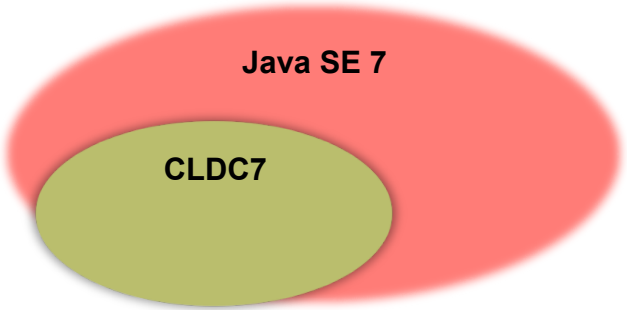
- Java Language

ME7 - JSRs overview

JSRs	Description
CLDC7 (Major Revision)	New JVM Spec. aligned with JavaSE 7 language features
MIDP7 (Major Revision)	Refine MIDP to address usability issues and feature gaps New Application Management APIs
IMP7 (Major Revision)	Evolution of IMP for the small embedded market
MSA7 (Major Revision)	Umbrella JSR specifying two API profiles for mobile devices
JAX-RS (New)	Generic restful API framework
SATSA (Maint. Release)	Multiple SIM / Secure Elements interfaces
CHAPI (Maint. Release)	Light weight invocation API

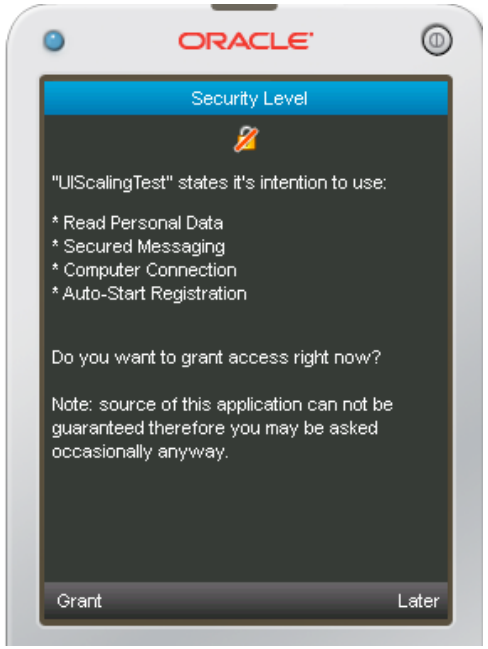
CLDC7 High-level overview

- CLDC7 is an evolutionary update for CLDC 1.1.1 to bring the VM, Java Language and libraries in alignment with Java SE 7
- Key Features
  - Synchronize with Java SE 5/6/7 Language Features into ME
  - Virtual Machine Update
  - Remain as small as possible - footprint optimizations
- Specification Requirements
  - CLDC7 to be an extended strict subset of SE7
  - Consolidated Generic Connection Framework
  - Backward binary compatibility



MIDP High-level overview

- **Description :**
  - Core ME platform specification update to address usability issues and feature gap identified through developer panels
- **Key Features:**
  - Critical MIDP 3 features
  - Simplified security model
  - Align LIBlets with SE 8 modules
  - Service Loader framework
  - Gesture API, AMS API
  - Multiple-SIM support



MIDP7: Simplifying and Improving MIDP3

- All features from MIDP3 are considered, except:
  - Application Level Access Authorization
  - RMS interchange format
- Changes to Security
  - Installation of signed unverified applications is allowed
  - Implementation is suggested to minimize the amount of user interventions related to security (security prompts)
- Shared Libraries
  - Descriptor format to be reassessed to align with module system in Java SE

MIDP7: Additions

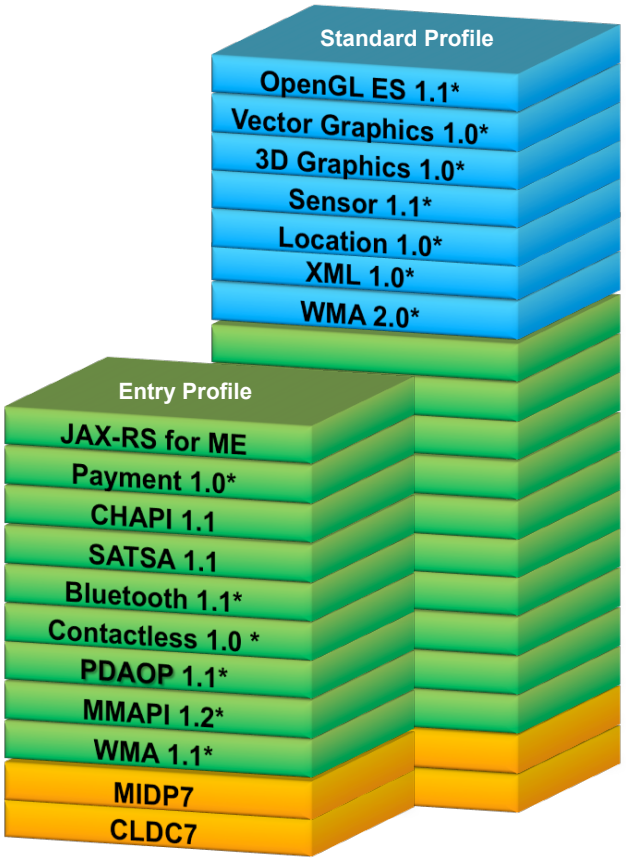
- ServiceLoader framework
  - Allows to bind two applications in form of service client-service provider
  - Virtually dynamic binding
  - SPI defined by application, not platform
  - Service provider executed in context of client application
- Connectivity API
  - SIM selection for packet data network connections
  - SIM properties for multi-SIM device
  - Connection profile selection (WiFi AP, Network I/F, etc.)

MIDP7: Updated Support

- Touch/Gesture API
  - Higher-order pointer events
- AMS API
  - Install, remove, update, start, stop, monitor,…
  - Trusted applications can use all AMS functions
  - All necessary callbacks provided
    - Status
    - Security
  - Useful to provide a customized application storefront or manage applications on the device

MSA7 High-level overview

- Evolved from MSA 2.0
- Focus on 2 profiles:
  - Revised EP focus on ARM7-2G (above) low end phone
  - Revised SP focus on ARM9/11-3G (above) feature phone
  - Drop/defer AP – not targeting high end device
- Removal of not required JSRs
  - Legacy UI and Networking related JSRs
- Adding key in-demand JSRs
- Adding new services-related JSR improvements
- MSA 7 JSRs designed to be able to work on SE



Note: * refers to unchanged JSRs

MSA Clarifications

- JSR 120/205 Clarifications for Multi-SIM support
  - Extended SMS and CBS URL connection strings to be used by application to receive/send messages via particular SIM card
  - Receive messages (SMS) from all "active" SIM cards
  - Send messages (SMS) via "preferred" SIM card
- JSR 75 Clarifications
  - JSR75 PIM implementation must support all fields of the standard types supported by the native Address Book, Calendar and Task.
  - All these fields must be accessible to Java application via predefined or extended PIM fields/attributes

JSR Maintenance Releases

- JSR 211 MR
  - Simple methods to invoke system applications
  - Email, Browser, SMS, Settings, Contact, etc.
  - Standard way of invoking installed Java ME applications
- JSR 177 MR
  - Support discovery of various static slots for secure elements present at a time
  - Notifications for insertion & removal of Secure Element
  - Retrieve dynamic features of each Secure Element

JAX – RS

New JSR to be submitted by Oracle

- Provide Client APIs for Java ME to easily access RESTful web resources / services from mass market mobile phones and small embedded devices
- Subset of JSR 339
  "JAX-RS 2.0: The Java API for RESTful Web Services"
  - javax.ws.rs.client
  - javax.ws.rs.core (subset required by javax.ws.rs.client)
  - javax.ws.rs.ext (subset required by javax.ws.rs.client)

APIs for Small Embedded

Dedicated set of APIs for sub 10MB embedded devices

- IMP7
  - Evolution of IMP2
  - App start, stop, system properties, etc
  - AMS, IO and multitasking
  - Enable diverse UI implementations
- Device Access APIs (tentative)
  - APIs to enable access from/to device interfaces and peripherals
  - For example, GPIO, MMIO, AT Commands, I2C, SPI, etc…

Java ME 8 Directions

- ME / SE architectural alignment
  - Introduce SE8 Modularity to mobile/embedded
  - Support more SE 8 APIs as modules
  - Alignment with JVMS 7
- Upper stack separated from the Core VM
  - Modularize ME 7 Profiles and Optional Packages
  - Relevant Mobile and Embedded APIs can run or ME or SE
  - ME vs SE becomes a footprint/functionality tradeoff
- New APIs for embedded, tablets, smartphones
- Mobile support from SE development and management tools

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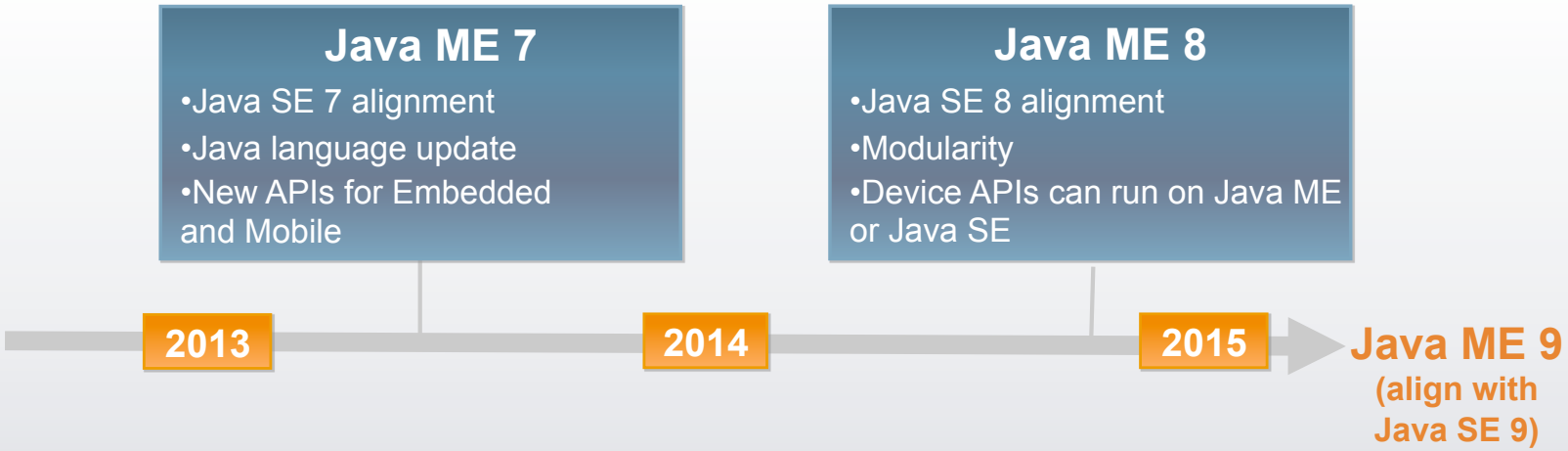
Java ME Roadmap

Java for Mobile and Small Embedded Devices



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Going forward

- Feedback on ME7 proposal
- JCP engagement
  - JSRs supporter
  - JSRs EG membership
  - Specleading JSRs

Backup slides

CLDC 7 new Java Language Features

- Assertions
- Generics
- Enhanced for Loop
- Autoboxing
- Enumerations
- Varargs
- Static imports
- Annotations

- JDK 7 features
  - Strings in switches
  - Binary integral literals and underscores in numeric literals
  - Multi-catch and more precise rethrow
  - Improved Type Inference for Generic Instance Creation (diamond)
  - Try-with-resources statement
  - Simplified Varargs Method Invocation

Library Updates for CLDC 7

- Subset of NIO Buffers
- StringBuilder and CharSequence, String formatter
- Collections update
  - Collection, List, Set, Map
  - Implementations including Hashtable and Vector
  - Iterable and Iterator
- Comparable interface
- Try with resources – Closeable and AutoCloseable
- Annotations – SuppressWarnings, Deprecated, Override

Development Tools for CLDC 7

- Standard JDK 7 tools are used for application development
- Additional tools
  - Used to target the application for CLDC platforms
  - Compiler → Preverifier
  - Integrated with ME SDK and IDEs

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