Java™ 2 Platform, Micro Edition

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Overall Presentation Goal

Learning Objectives

- As a result of this presentation, you will be able to:
  - Understand the components of the J2ME™ architecture
  - Understand the options available for an author of a specification for the J2ME™ platform
  - Understand how specifications are reused
  - Determine when a new specification is necessary
  - Build devices from J2ME™ specifications and so on
  - Understand the issues in authoring applications for J2ME™ platform-enabled devices

About the Speaker

- Jon Courtney
  - Senior Staff Engineer
    Emerging Technologies AND Standards
    Consumer AND Mobile Systems Group
    Sun Microsystems
  - Specification Lead — JSR-68:
    J2ME™ Architecture
  - Specification Lead for
    - Personal Profile (JSR-62)
    - Personal Basis Profile (JSR-129)
    - Java TV™ API

The J2ME™ Platform: Mission

Balancing flexibility against fragmentation in a rapidly developing world of consumer technologies and markets

Presentation Agenda

- The Challenges for Java™ Technology in Consumer Devices
- The J2ME™ Architecture and Solution
- The Role of JSR-68: J2ME™ Architecture EG
- The Technologies of the J2ME™ Platform

Consumer Device Challenges

- Complex Device Landscape
  - Smart Cards, Phones (small), PDAs (small)
  - Phones (big) PDAs (big), TVs, Game Consoles
  - Cameras, MP3 Players, Printers…
- Widely Varying Characteristics
  - Processor, Flash, RAM, ROM, Disk, I/O
  - Screen size and depth, buttons/keys/pointers/styli
  - Connected, disconnected, unconnected…
  - Power consumption, peripheral connection

Consumer Application Challenges

- Portability
  - Interoperability among class of devices
  - Your content: Always and Everywhere
- Security
  - Your content and not mine!
  - Have you paid for it?
  - Can you be hacked?
- Provisioning
  - Content from different providers
  - With different security requirements
  - And different billing models

Fragmentation vs. Flexibility

- Devices
  - A number of potential and immature markets
  - Continuum of device capabilities
  - Very footprint sensitive
  - Rapid incorporation of new features
- Content
  - WORA: At least per device class
  - Small number of APIs and platforms
  - Stability, over time, of platform definition

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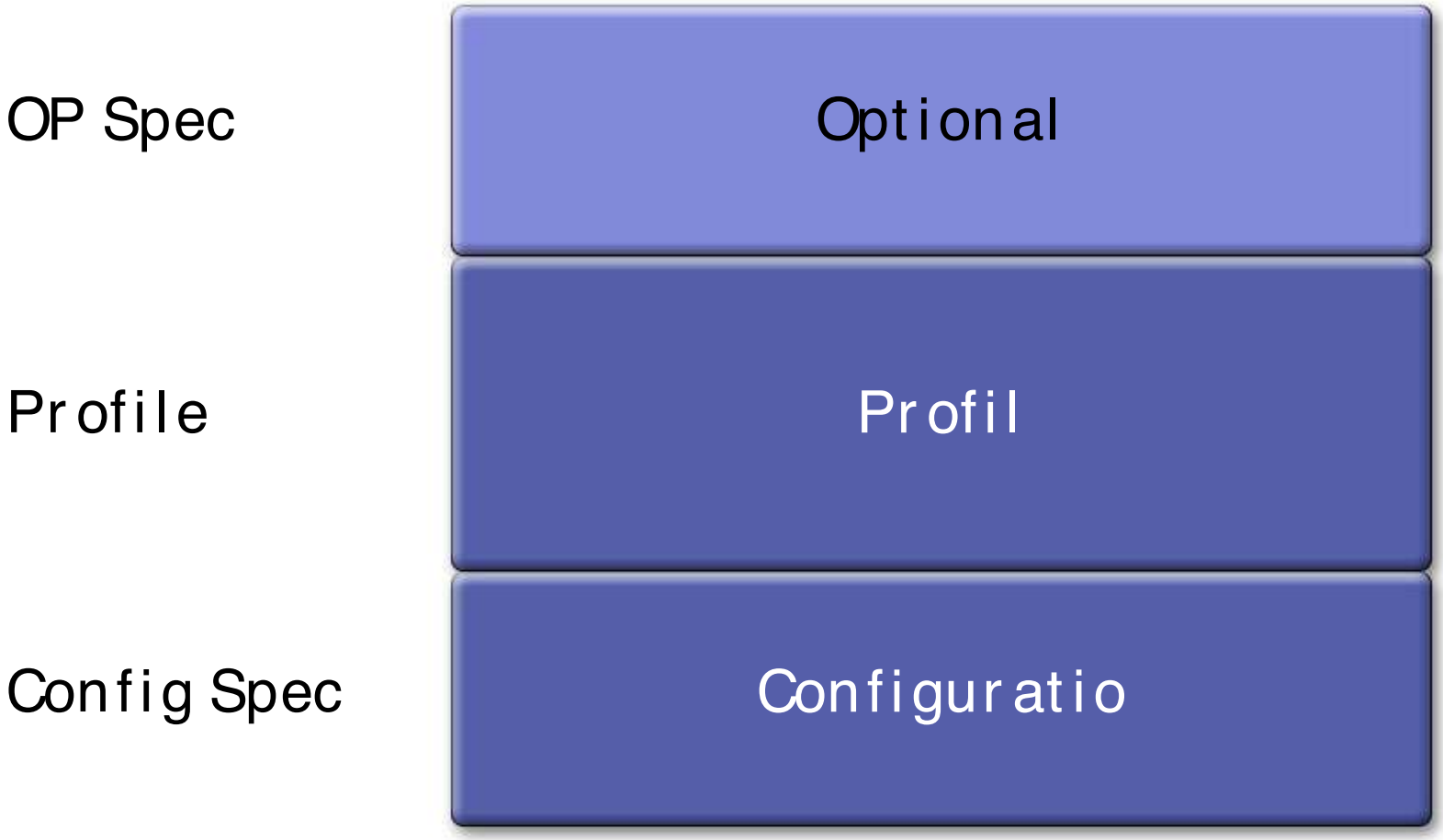
The J2ME™ Platform: The Solution

- Goals
  - Identifiable Platform Targets
  - Reuse of Existing APIs
  - Subsets of Existing APIs
  - Clear Targets for Optional Elements
- Non-Goals
  - Composition of implementations
  - Proscription of necessary/desired functionality

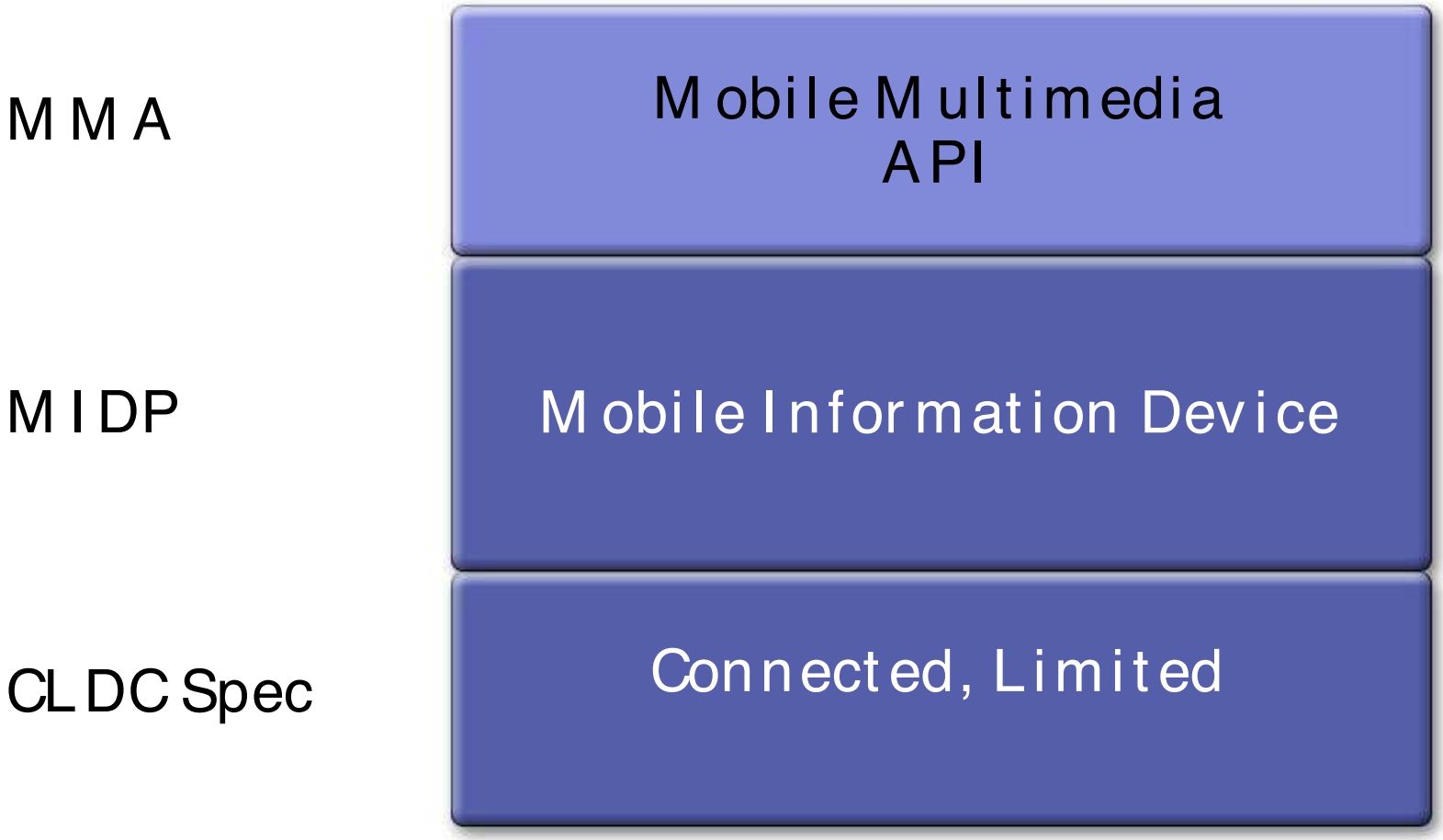
Elements of J2ME™ Architecture

- Profile: Defines the Environment
  - API exposing the functionality of a specific class of target devices, and necessary to support a particular set of services
- Optional Package: Augments the Environment
  - APIs exposing specific functionality—Deployment determined by the Platform Vendor
- Configuration: Defines the VM
  - API exposing the minimal sized, preexisting profile defined for the specific VM it is deployed against

Elements of J2ME™ Architecture



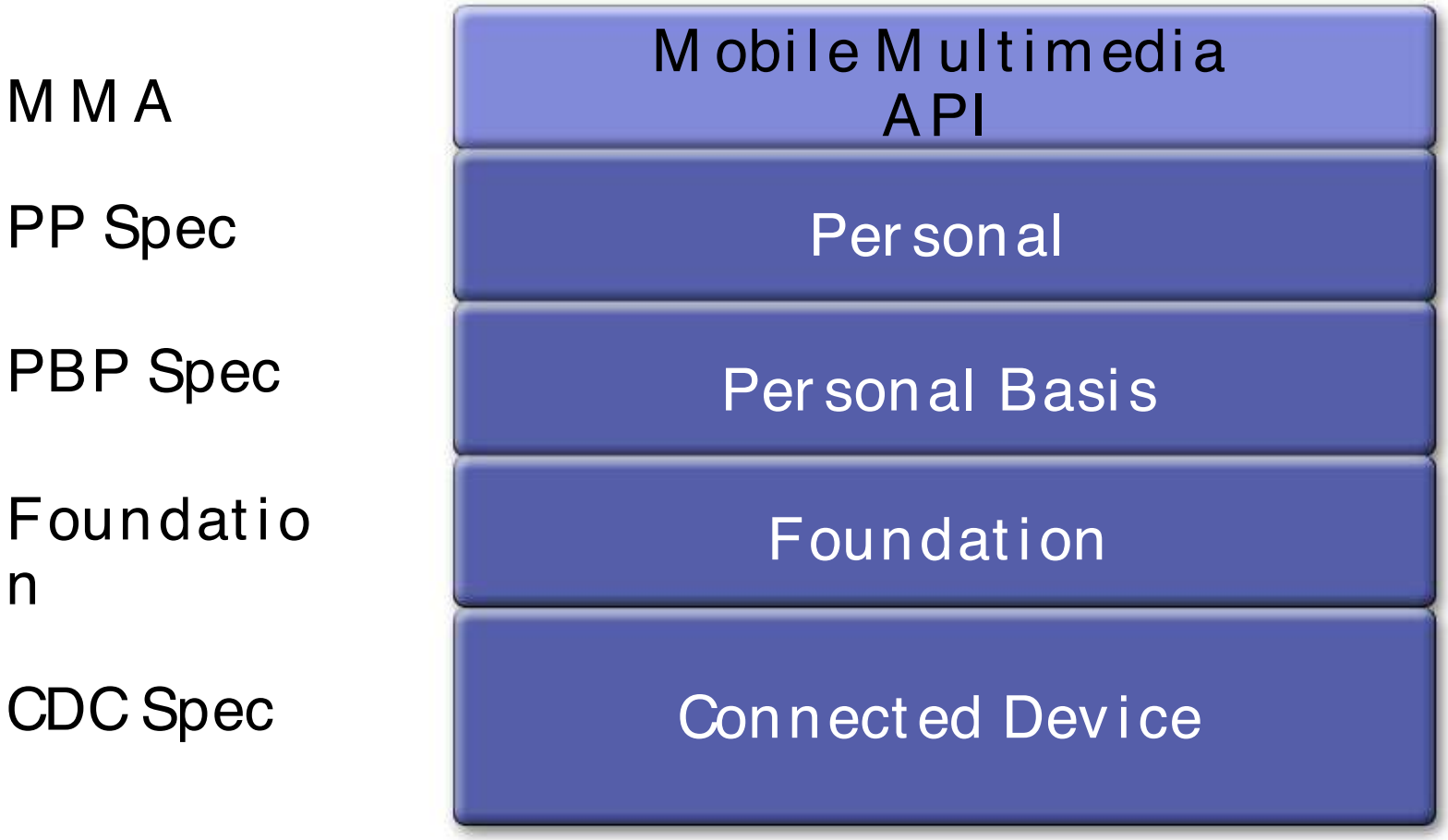
Elements of J2ME™ Architecture



Composition of Elements

- Profiles
  - Reference existing Profiles
  - Reference existing Optional Packages
  - Create new APIs™
- Optional Packages
  - Reference Existing Optional Packages
  - Create new APIs

Elements of J2ME™ Architecture



Dependencies

- Profiles
  - All signature dependencies met by Config
  - Practically: CLDC or CDC
- Optional Packages
  - Specifications must declare signature dependencies
  - All signature dependencies met by Profile and Configuration

Elements of J2ME™ Architecture

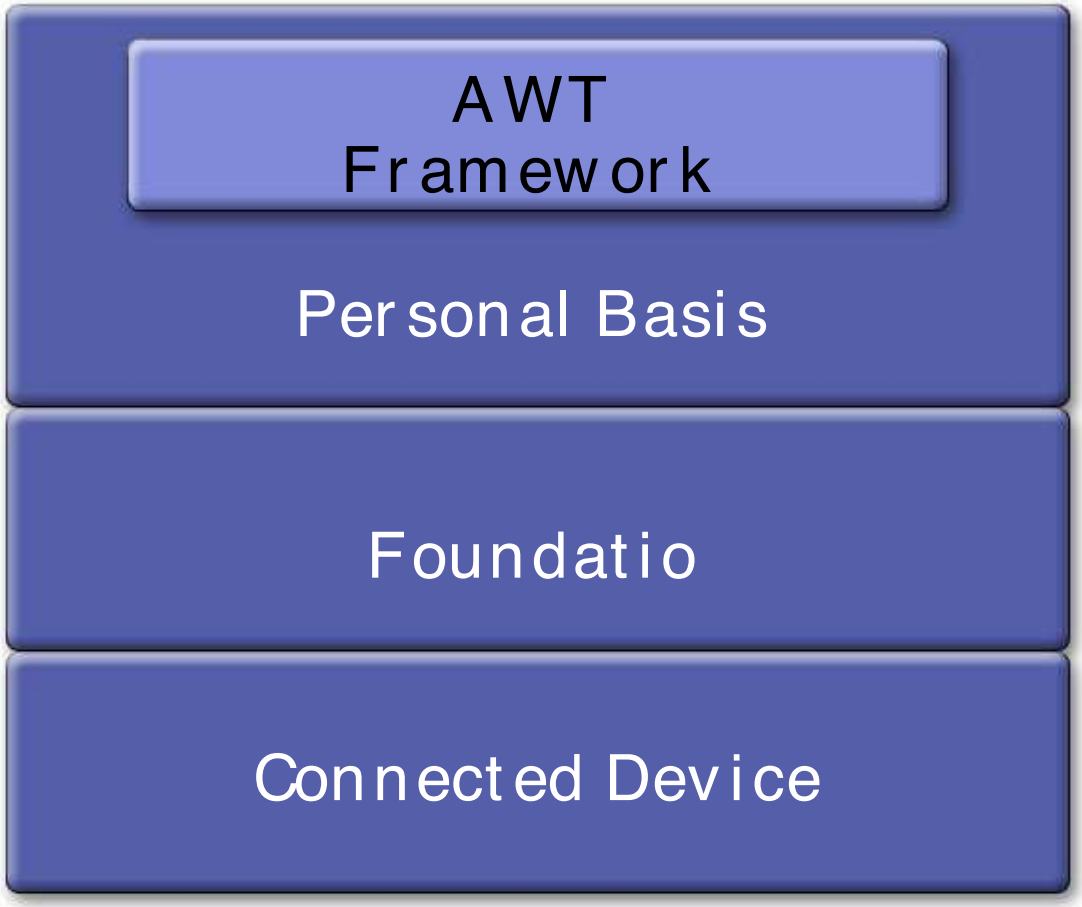
- Building Blocks: Subsets
  - API created from an Existing API, including J2SE™ APIs
  - Used only in a Profile or Optional Package specification
  - BB specification included by a specification
  - Building Blocks are never directly visible to application developers or platform vendors

Elements of J2ME™ Architecture

PBP Spec

Foundation

CDC Spec



Elements of J2ME™ Architecture

MIDP

CLDC Spec

Dependencies

- Building Blocks
  - Dependencies must be declared
  - All signature dependencies met by Spec

Agenda

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J2ME™ Architecture Expert Group

- Creates the J2ME™ architecture specification
- Filters Building Block requests
- Manages the list of available Building Blocks

Building Block Requests

- Profile or Optional Package EG requests a Building Block
- JSR-68 filters requests to limit fragmentation
  - Encourages reuse of existing Building Blocks
  - Limits overall number of new Building Blocks
- Passes request to API maintenance lead
  - Filters request based on API design
  - Responsible for producing BB Spec
  - Responsible for providing Tests for TCK

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- The Challenges for Java™ technology in Consumer Devices
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- The Role of the Java Community Process℠ Initiative
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Configurations

- Connected, Limited Device Configuration (JSR-30,139)
  - Smallest mobile devices
    - Phones, Pagers, PDAs (small)
  - 128K to 2MB with Profile and Optional Packages
  - Network connectivity usually limited
- Connected Device Configuration (JSR-36)
  - Larger devices, some mobile, some not
    - TVs, PDAs(larger), Communicators, Cars, Gateways
  - 2MB and up with Profile and Optional Packages
  - Connectivity includes TCP/IP

Profiles for CLDC

- Mobile Information Device Profile (JSR-37, 118)
  - Will work with CLDC
  - Volume Wireless Handsets
  - LCDUI based GUI

Profiles for CDC

- Foundation (JSR-46)
  - Based on CDC
  - Headless (no GUI) devices
    - Gateways, routers,…
- Personal Basis Profile (JSR-129)
  - References Foundation
  - Alternative UI based on AWT
    - Tvs, Cars, other devices with non AWT GUI

Profiles for CDC

- Personal Profile (JSR-62)
  - Superset of Personal Basis Profile
  - Full AWT GUI
  - Applet support
  - TV's, PDAs, Web Pads

Optional Packages

- Mobile Multimedia API (JSR-135)
  - Will work with CLDC
  - Small Device Audio/Video Playback
- Wireless Messaging (JSR-120)
  - Will work with CLDC
  - Wireless data exchange (SMS, USSD, CBS)
- Java™ Bluetooth APIs (JSR-82)
  - Will work with CLDC
  - Bluetooth network access

Summary

- Predicting the future is difficult
- Balance fragmentation against flexibility
- Profiles: Device and content target
- Optional Packages: Room to grow
- Building Blocks: Reuse of API

If You Only Remember One Thing...

Q&A

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