GEMALTO M2M

Benefits of Java to the embedded Ecosystem

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2013-02-05

Today's connected, digital world

Massive potential

6 billion mobile subscribers

2 billion internet users

50 billion connected devices

…with certain issues

Lacking in security

Services often hard to use

Support costs growing

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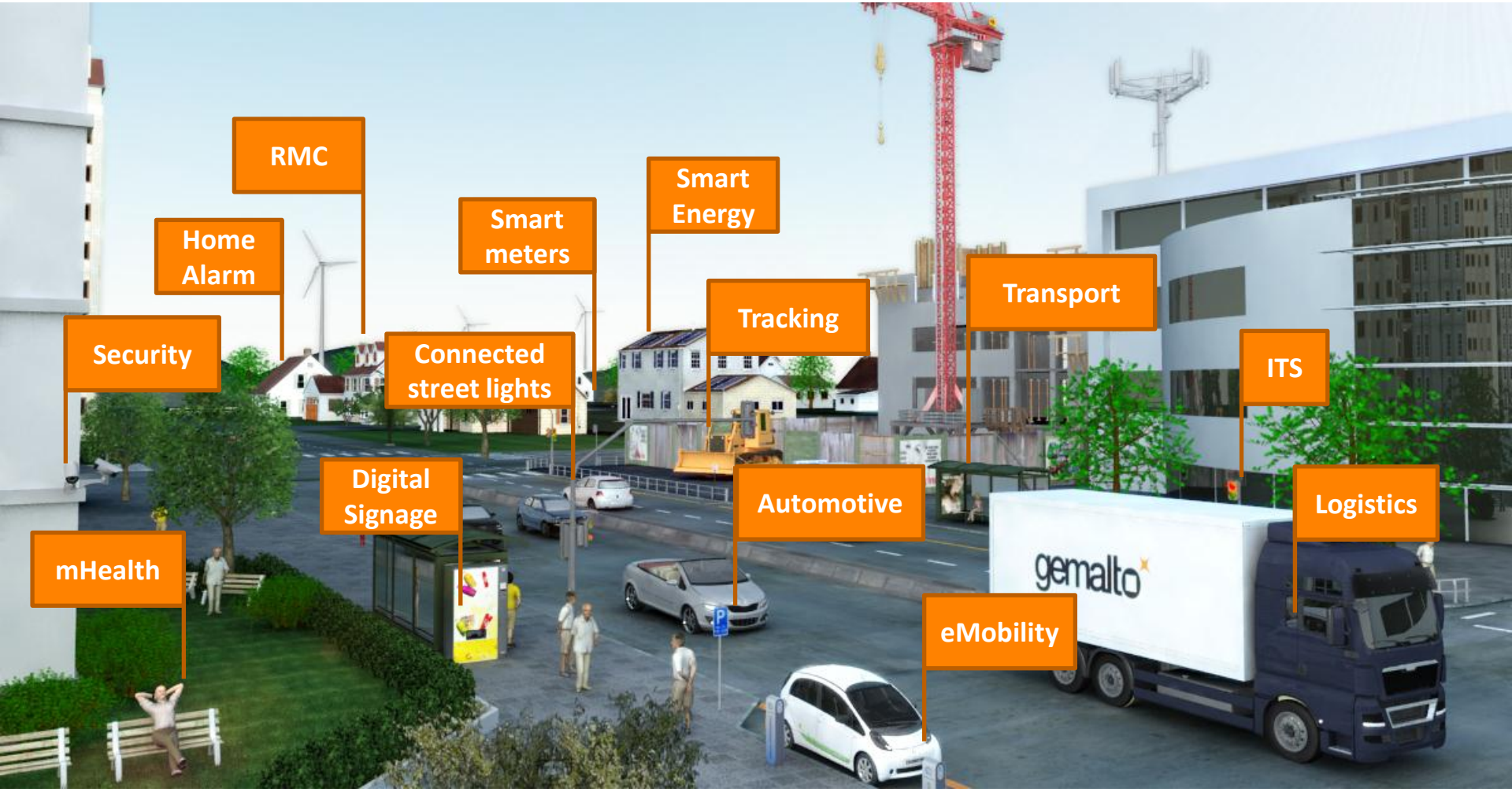
Gemalto M2M solutions enable a connected world



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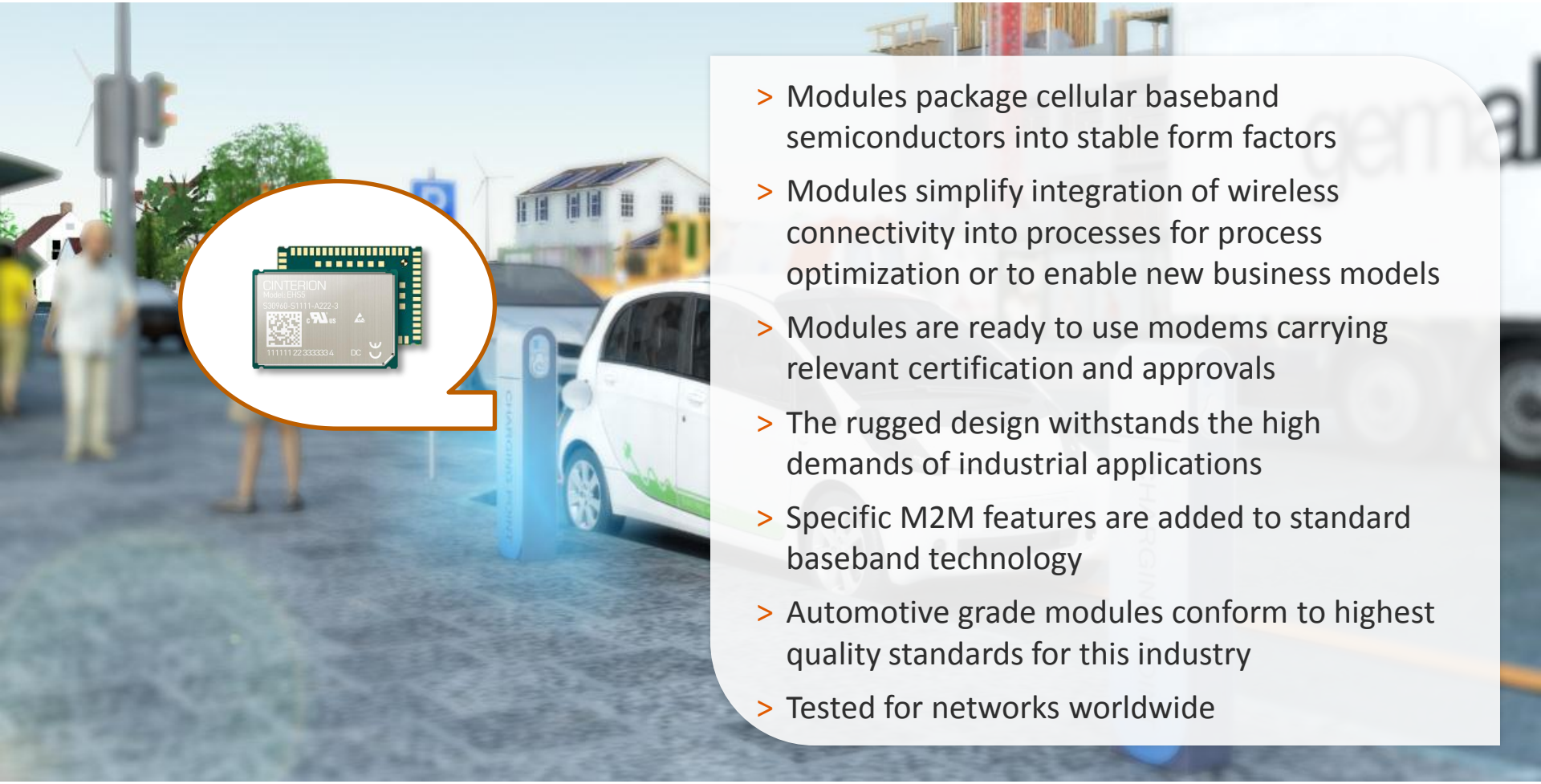
Gemalto‘s M2M Modules take the complexity out of embedding mobile and connecting solutions



- Modules package cellular baseband semiconductors into stable form factors
- Modules simplify integration of wireless connectivity into processes for process optimization or to enable new business models
- Modules are ready to use modems carrying relevant certification and approvals
- The rugged design withstands the high demands of industrial applications
- Specific M2M features are added to standard baseband technology
- Automotive grade modules conform to highest quality standards for this industry
- Tested for networks worldwide

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10 Years of M2M Java!

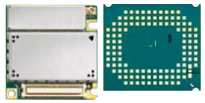
2003
TC45

1st Generation
- C166

2005
TC65

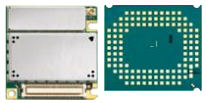
2nd Generation
- ARM 7

2008
EGS5/TC65i



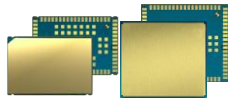
3rd Generation
- ARM 9

2011
TC65i-X/EGS5-X



4th Generation
- ARM 9
- Extended Memory

2012
NextGen Evolution



5th Generation
- Full product family
- ARM 11
- Enriched Java Architecture

Java

Extended Role of Java

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Why Java for M2M Modules?

Perfect match with module system architecture:

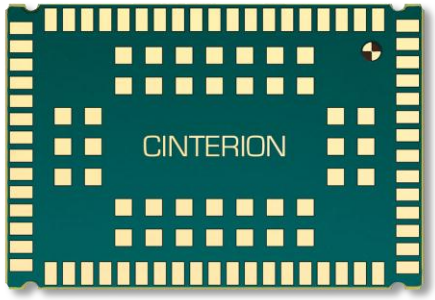
> Matching modules resources & performance
> Separating vertical application and approval relevant cellular part

A complete package:

> Broad feature set / JSR‘s
> Easy memory and resource access
> Remote application management and update
> Proven tools, development kits
> Large existing code base and building blocks

Java is Future proof:

> Broad adoption
> Confirmed roadmap & community process



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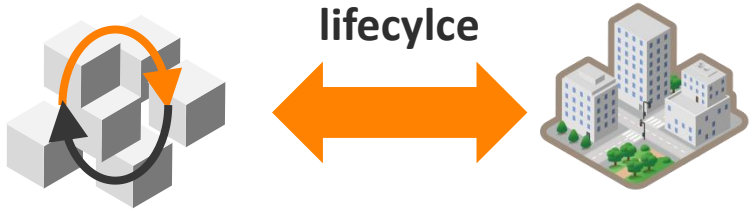
Java turns dumb devices into smart assets

Moving from ...

- Point to point architecture
- Single purpose, fixed set up – no flexibility over lifetime
- Constant data ping

... to

- Network of data sources
- Flexibility to update and optimize over lifetime for future use cases
- Data - only when you need it
- Data - only what you need
- Local logic for preprocessing
- Seamless integration of data to enterprise IT



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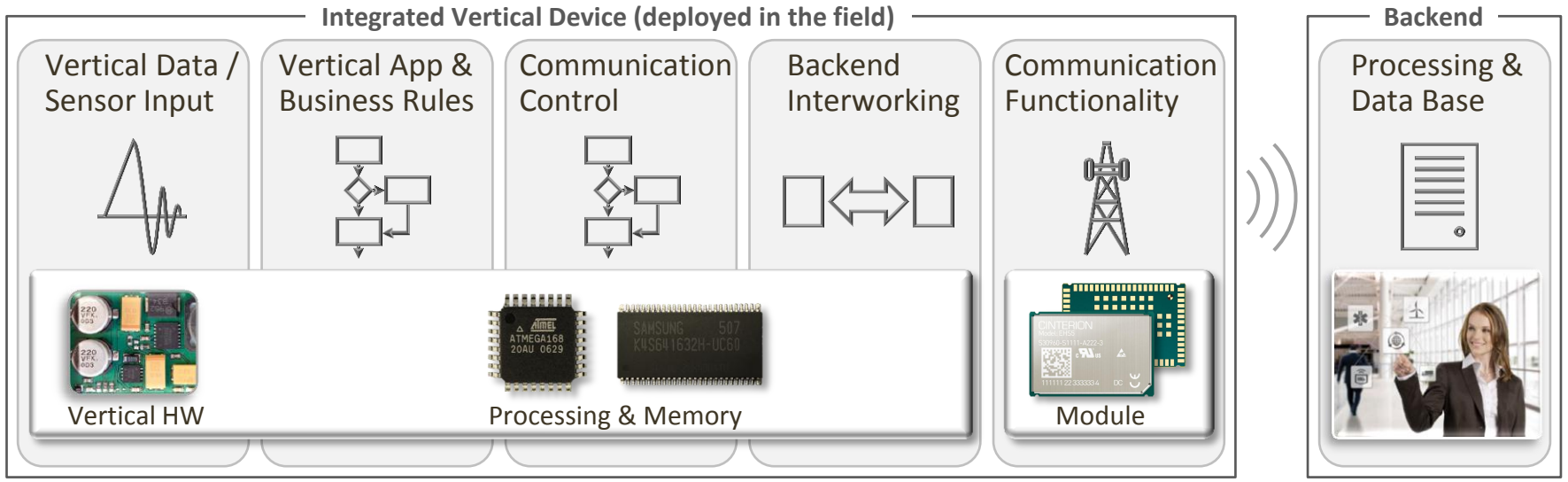
Microcontroller Centric Solution



- Vertical oriented microcontroller does it all
- Module remains unused in terms of application support

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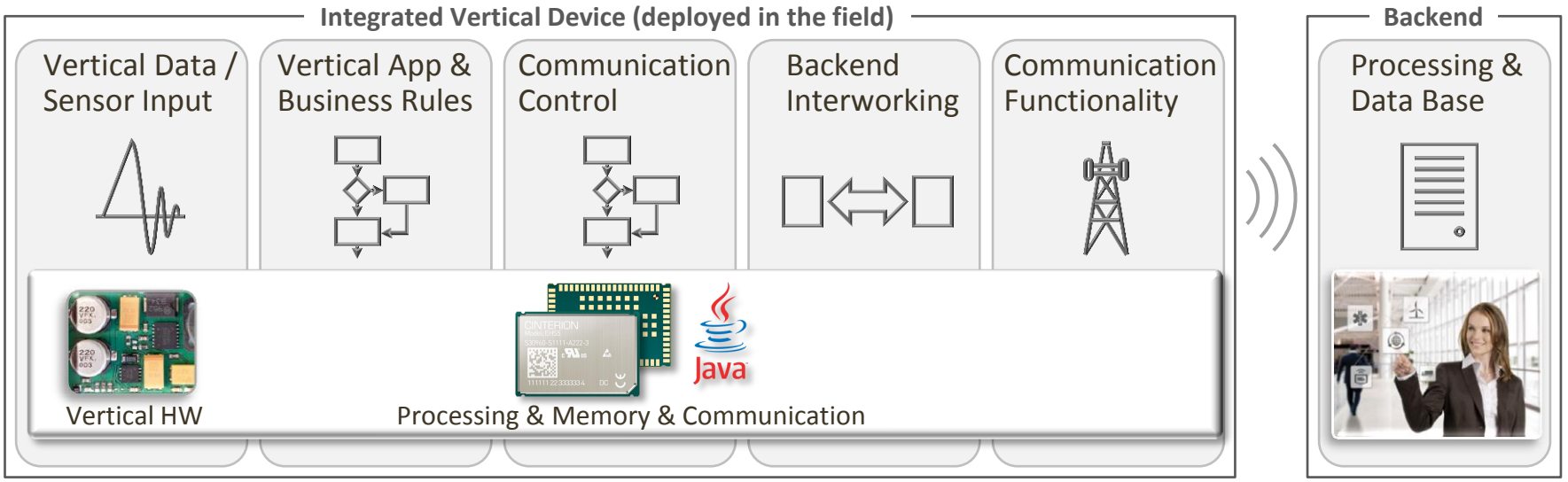
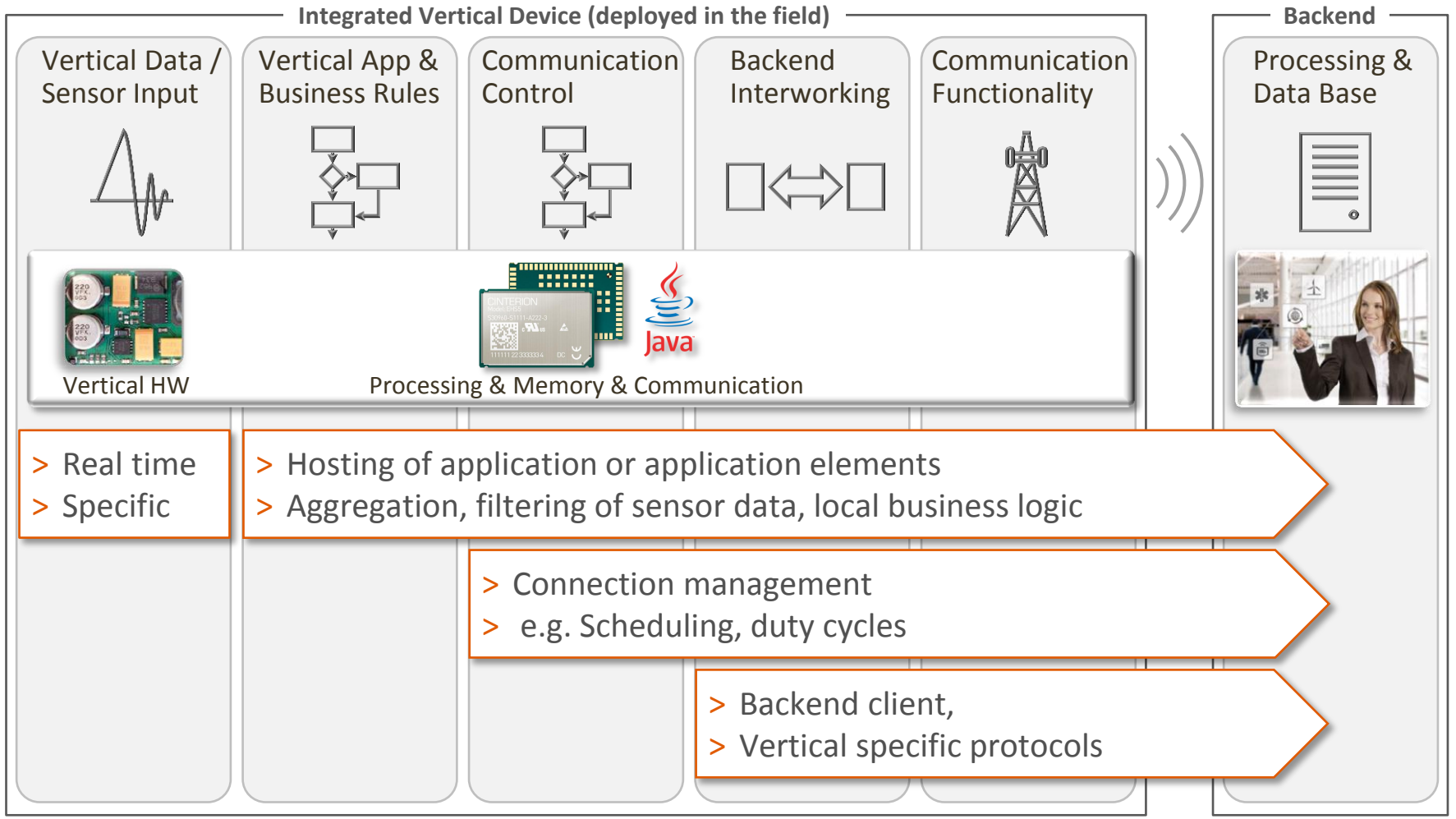
Java enhanced Solution



- Java enables easy accessibility of all elements which need to be managed
- Efficient design: smaller or no microcontroller

Java enhanced Solution



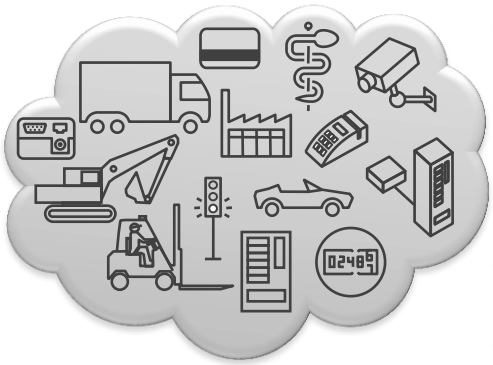
Edge to Enterprise Architecture

Vertical Elements

> Payload Data
> Management Data

Backend

> Diverse landscape
> Multiple parties



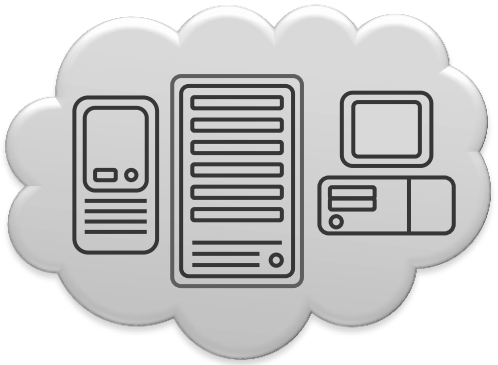
Communication Protocol

Vertical Protocols/Data Formats

Business Logic

Configuration & Controll

Update & Maintenance & Optimization



Security

Creating a smart and flexible solution
which can be fully managed over lifecycle

Benefits of Java and what our customers say

Eclipse Information Technologies*:

- *We spend our time for the right things*
- *New engineers can adopt more easily*
- *We can achive results more quickly with less effort*
- *We have much room for new functionality*
- *We heavily rely on OTAP during project lifecycles for updates, new features, disaster recovery, ...*
- *It is easy to calculate hardware costs but it is not as easy to estimate what comes after that...*
- *We strongly feel and experience that competitors going after other architectures fall behind and cannot keep up the pace*

Benefits of Java:

> Reduce Bill of Materials (BOM)

> More efficient development

> Enables next generation architectures

> Higher Flexibility, better management

*Mehmet Selçuk Ataç, Managing Partner, 4.12.2012

Technical Information on next Generation Java Modules

Content

> Module Platform

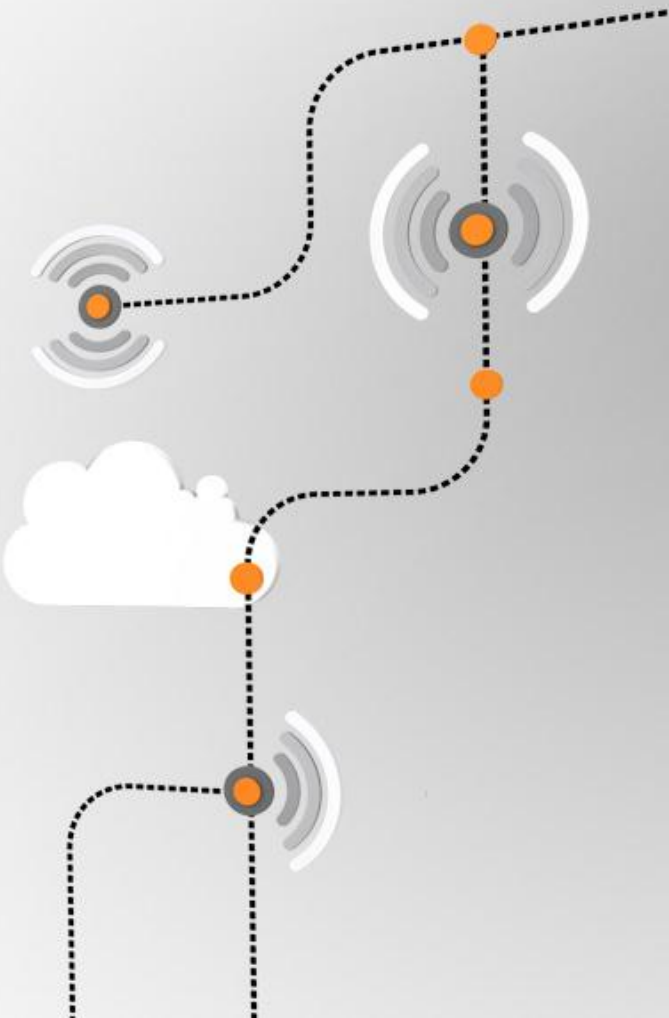
> Interfaces

> Java Release

> Available API‘s

> Architecture Enhancement

> Development Support and Training



Feature Scalability allows design to cost and footprint compatibility enables simple design

CPU:

> ARM11@520MHz (~4 times faster than previous generation)

RAM:

> 6MB (previous 400k-1,7MB)

Flash File System:

> 8MB (previous 4-8MB)

BGS5	EHS5	EHS6
2G + Java	**3G Optimized**	**Global 3G**
Cost and size optimized 2G connectivity for M2M	**World's Smallest 3G SMT module for M2M applications**	**Global roaming in extended footprint**
▪ GPRS ▪ Quad-Band 2G ▪ Digital Audio	▪ HSPA 7.2M/5.7M ▪ Dual-Band 3G (E/US) ▪ Digital Audio	▪ HSPA 7.2M/5.7M ▪ Five Bands 3G ▪ Quad-Band GSM ▪ Digital Audio ▪ eSE enabled
27.6 x 18.8 x 2.4 mm	27.6 x 18.8 x 2.4 mm	27.6 x 25.4 x 2.4 mm
		

Module Interfaces

All interfaces accessible via Java

USB	Com Connection, Slave Mode
Serial	Com Connection
I2C	Class I2cBusConnection
SPI	Class SpiConnection
GPIO	Class InPort / Class OutPort àGPIO
Pulse Counter	Class LimitPulseCounter / Class StartStopPulseCounter
PWM	Class DAC
ADC	Class ADC

Java Release Overview

- Latest Java ME 3.2 implementation
- Compatible to previous Java Modules
- Simultaneously Java and AT usage
- Multi threading
- Multiple application execution
- Optimized HotSpot Implementation
- New TLS/SSL engine (TLS 1.2)
- Additional JSR‘s
- Enhanced remote application update
- Extended Internet Services
- Firmware update via internal Flash

New API‘s available

JSR177 Security and Trust (Crypto Package)

> Supports symmetric and asymmetric ciphering

JSR280 XML

> XML parsing and processing

Location API

> Processing and storage of coordinates

> Import of data via interface

JSR75 FileConnection (same as TC65i)

> Access to Flash file system

Improved Security

MIDlet certificate store
> Cinterion certificate preinstalled
> If customer installs his certificate, only signed MIDlets may be executed

Application protection
> Application protection on the Flash File System
> Obfuscator protects know-how, and reduces size of class files

TLS/SSL certificate store
> Can hold multiple customer certificates
> Separation from MIDlet Cert Store to avoid conflicts when a VeriSign root cert is desired
> Mutual authentication (Client and Server authentication)

Internet Services
> HTTPS

Application Update
> Secure application update, OTAP over https:

Internet Services implemented in Java

TCP/UDP sockets

- client/server
- chunked mode/transparent mode
- NetExtension: Fine control over TCP stack, Ping, DNS resolver, LastNetError()

HTTP client

- http:
- https:

SMTP

- incl. attachments

FTP

- passive mode
- Binary
- Resume stream

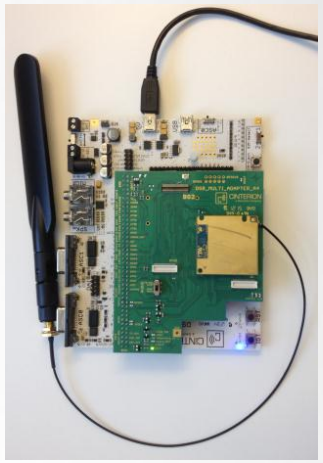
Live Demo

HW Setup:
Cinterion DSB Mini + TC65i + SIM Card

+46 70 166 46 49

Reject call

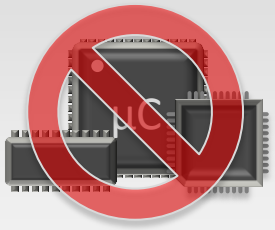
Send SMS



Summary Java Benefits

Device

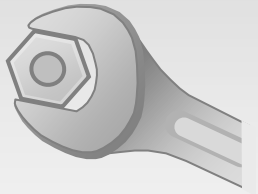
Reduced BOM costs



- No application controller, memory, components
- Less hardware development

Development

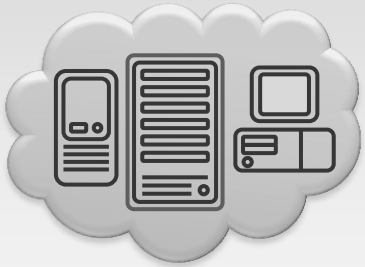
More efficient development



- Faster development
- Large base of existing code
- Large base of skilled developer

Solution

Enabling next Gen architectures



- Best support for modern end-to-end architectures
- Easy enabling of application security
- Flexible layer for protocols and clients

Lifecycle

Higher Flexibility, better management

- In life application extension and optimization
- Device management

Thank You

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