Java in Cellular IoT

JCP EC Meeting
Berlin May 2016

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The Internet of Things „Hype" is here

Growing Market

Gartner Says 4.9 Billion Connected "Things" Will Be in Use in 2015

In 2020, 25 Billion Connected "Things" Will Be in Use

50 billion connected IoT devices by 2020

Morgan Stanley: 75 Billion Devices Will Be Connected To The Internet Of Things By 2020

25 billion connected devices by 2020 to build the Internet of Things

News & Analysis
Internet of Things: 50 Billion Is Only the Beginning

Ericsson backs away from expectation of 50B connected devices by 2020, now sees 26B
June 3, 2015 | By Phil Goldstein

Internet of things: $8.9 trillion market in 2020, 212 billion connected things

IDC tries to put a number on the Internet of things and while you may quibble over the forecast, the numbers are huge assuming multiple hurdles can be overcome.

Secure Data to enable IoT

- Secure Fleet Access is Key
- Secure Payload
- Secure Device Management
→ **Security Solutions, Secure Element**

Smart Managed Devices for better efficiency

- Network Access Management
- MNO compliance
- Device performance optimization
→ **Lifecycle Management**

New Technology to address IoT needs

- Higher efficiency
- Reduced complexity, lower cost
- Future proof evolution path
→ **MTC Evolution, Cat 1, next Cat M1**

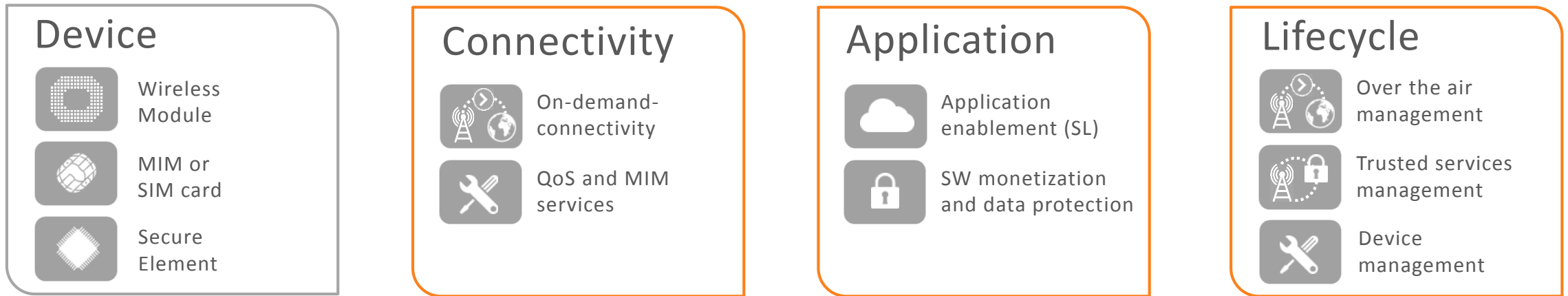gemalto

New Cellular Technologies for IoT – Big Naming Catfusion

Cat-1   Cat-0   Cat-M1   Cat-M2

Name	Also known as	3GPP Release	Description
MTC	-	-	Overall term, referring to Machine Type Communication
LTE Cat-1	-	Rel. 8	Reduce data speed LTE for M2M/IoT
LTE Cat-0	LTE-M	Rel. 12	First MTC standard with additional M2M/IoT extensions (e.g. power saving)
LTE Cat-M1	LTE-M, LTE Cat-M, eMTC	Rel. 13	Focused MTC standard with reduced system bandwidth, further extensions
LTE Cat-M2	NB-IoT Narrow Band	Rel. 13	Very focused MTC standard with very narrow system bandwidth Cat-M2 is the fusion of NB-CIoT and NB-LTE

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New 3GPP Technologies and their Sweet Spots

Cat-1	Cat-M1	Cat-M2
Broad Application Range		Focused Application Range
M2M	IoT	
Voice & Data	Data Focus	
Some Power Saving		Power Saving Focus
High Data Rate		Low Data Rate
Mobility		Static

examples sweet spots

- Automotive
- Tracking & Tracing
- Security
- POS
- Remote Monitoring
- Metering
- Connected Sensors
- Smart Buildings, Smart City
- Wearables

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Products

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Gemalto IoT offering

Device

- Wireless Module
- MIM or SIM card
- Secure Element

Connectivity

- On-demand-connectivity
- QoS and MIM services

Application

- Application enablement (SL)
- SW monetization and data protection

Lifecycle

- Over the air management
- Trusted services management
- Device management

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From simple connected machines to IoT
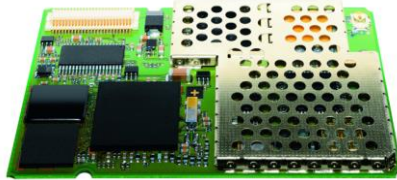
1996

First Cellular Connectivity for Machines

- Only voice and SMS
- Bulky system add-on
- High power consumption

2003

Java Applications running on Cellular Modules

- GPRS packet switched data
- Java enables optimized device design reducing hardware cost
- Reduced in size and snap in mounting
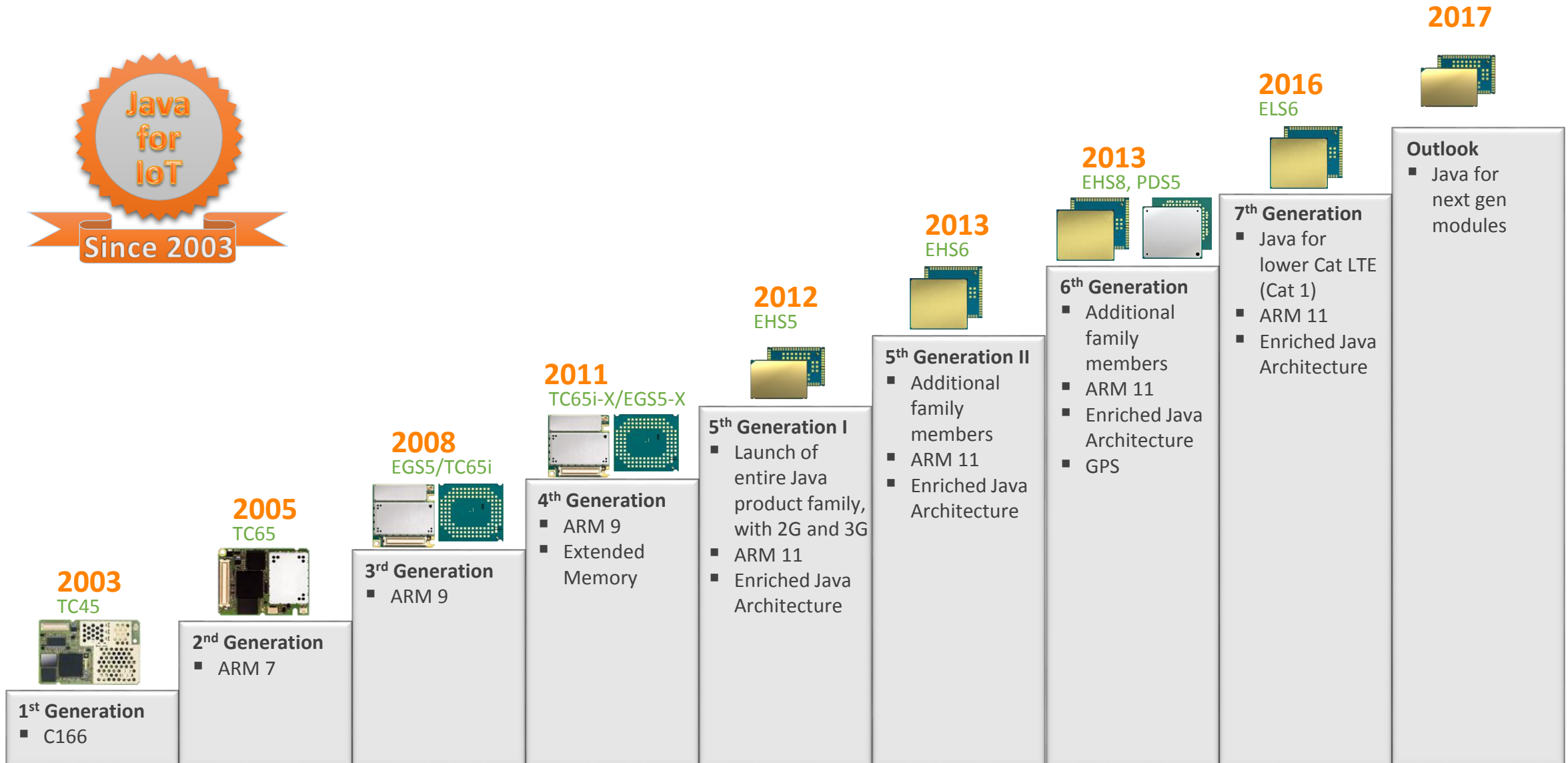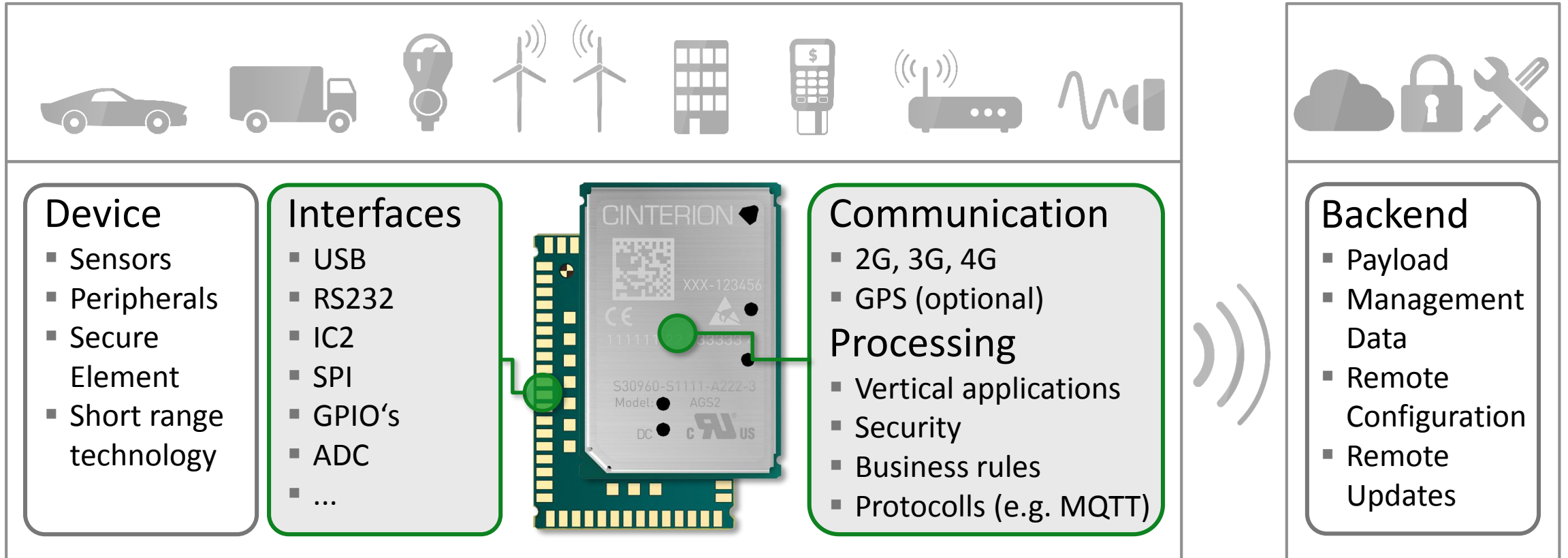- Improved power efficiency

2016

Enabling cellular connected IoT with Java

- LTE Cat-1 packet switched data
- Java enables optimized device design reducing hardware cost as well as smart data and backend interoperability
- Miniaturized and solder-in mounting
- Power efficiency becomes a key functionality

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More than 10 Years of M2M Java!

Java for IoT

Since 2003

2017

Outlook
- Java for next gen modules

2016
ELS6

7th Generation
- Java for lower Cat LTE (Cat 1)
- ARM 11
- Enriched Java Architecture

2013
EHS8, PDS5

6th Generation
- Additional family members
- ARM 11
- Enriched Java Architecture
- GPS

2013
EHS6

5th Generation II
- Additional family members
- ARM 11
- Enriched Java Architecture

2012
EHS5

5th Generation I
- Launch of entire Java product family, with 2G and 3G
- ARM 11
- Enriched Java Architecture

2011
TC65i-X/EGS5-X

4th Generation
- ARM 9
- Extended Memory

2008
EGS5/TC65i

3rd Generation
- ARM 9

2005
TC65

2nd Generation
- ARM 7

2003
TC45

1st Generation
- C166

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What is a Cellular Module?

Device
- Sensors
- Peripherals
- Secure Element
- Short range technology

Interfaces
- USB
- RS232
- IC2
- SPI
- GPIO's
- ADC
- ...

Communication
- 2G, 3G, 4G
- GPS (optional)

Processing
- Vertical applications
- Security
- Business rules
- Protocolls (e.g. MQTT)

Backend
- Payload
- Management Data
- Remote Configuration
- Remote Updates

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Concept Board
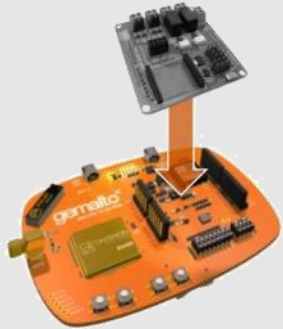
Flexible, Ready to Go development Board
Extendable development kit based on EHS6 module

- 5-Band HSPA (7.2M/5.7M)

- HW-extensions through Arduino-style Connector

- RS232 / USB Interface

- Power via USB or battery

- Integrated 5-band antenna

- User buttons and LEDs

- On board SIM holder

- All interfaces accessible

Dev-Zone support: *http://developer.gemalto.com/*