



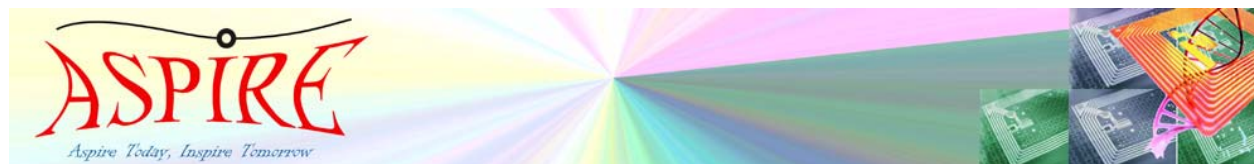
Overview of RFID Middleware Platforms and the ASPIRE OSS Project

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RFID Middleware

- RFID Middleware:
 - Key element of every non-trivial RFID Deployments, where:
 - Many distributed readers and antennas (e.g., in factories, warehouses, and distribution centres) capture RFID data
 - Data are conveyed to a variety of applications (e.g., ERP/WMS systems)
- Key Middleware Functions:
 - Data Collection, Filtering, Event Generation – Business Events, RFID Information Sharing
- Related EPC standards:
 - EPC-RP, EPC-LLRP, EPC-ALE, EPC-IS
- RFID Middleware Platform:
 - Alleviates Deployment and Integration Complexity



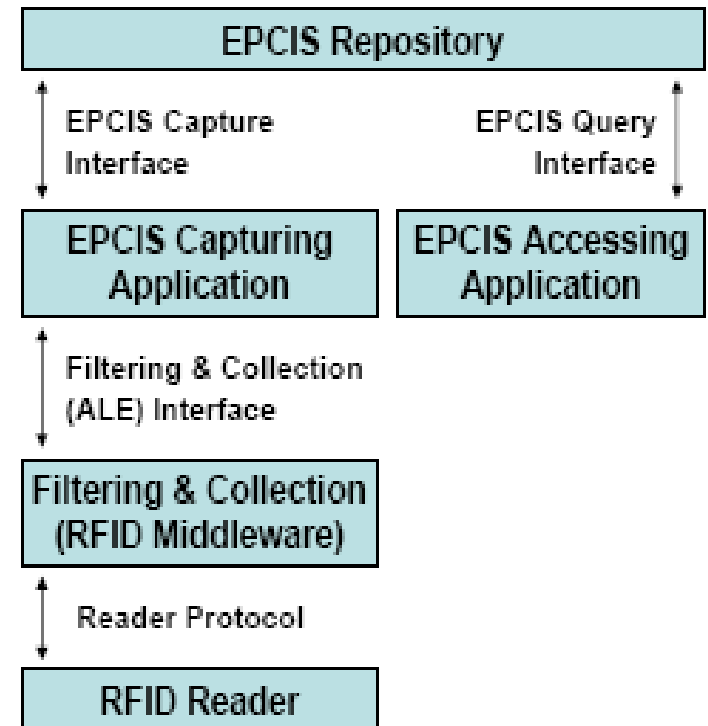
Taxonomy of RFID Middleware Platforms

- RFID Middleware Platforms:
 - Complex Landscape
- OSS / Research:
 - Currently over fifty (50) projects in sourceforge.org
 - Early Research Platforms:
 - WinRFID, RFIDStack,...
 - EPC Based:
 - Singularity, Accada, RadioActive, Mobitec, Logicalloy...
 - Some Representative Platform are illustrated in the next slides
- Proprietary / Commercial:
 - Leading technology vendors:
 - IBM, Oracle, Microsoft, SAP, Sun Microsystems, HP,...



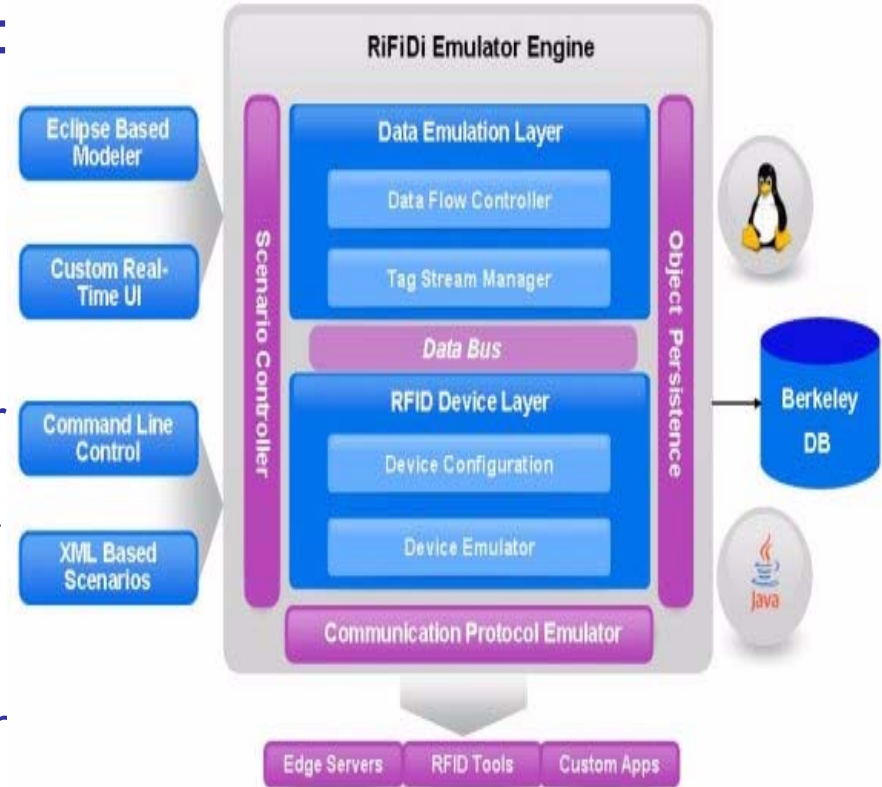
Accada OSS Platform

- Editor/Main contributor: ETH, CH (<http://www.accada.org>)
- Platform client: Web/Desktop Client
- License : LGPL, Language: Java
- Strengths:
 - Complete EPCglobal protocol stack
- Weaknesses:
 - Poor development community
 - Many bugs in the software
 - Currently in alpha version



RIFiDI OSS Platform

- <http://www.rifidi.org>
- License : LGPL, Languages: Java/C
- Strengths:
 - Edge Server Compatibility
 - Tag Streaming Utility to mimic flow of RFID data
 - Alien ALR 9800 Gen 2 Reader Emulation
 - Lightweight XML-RPC Reader Engine
- Weaknesses:
 - Limited configurability for busir semantics
 - No support for filtering and business events



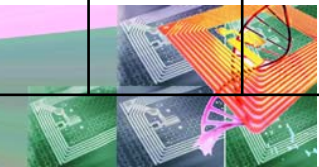
Logicalloy OSS Platform

- <http://www.logicalloy.com>
- License : Sleepycat / flexible OEM Commercial License,
- Language: Java
- Strengths:
 - Simple configuration and management tools
 - Integration with existing business systems



OSS Middleware Platform Features

Available Implementations	Applied EPCglobal Standards						
	ONS	EPCIS	ALE	RM	LLRP	RP	TP
Accada		X	X	X		X	
Rifidi			*		X		X
**Singularity		X	X	X			
RadioActive	X	X	X			X	
Mobitec			X	X			X
UJF RFID Suite	X	X	**	X		X	X
*Logicalloy		Partial (Capture)	X				X
			X				





Commercial Middleware Platforms

Product	Vendor	Key Features				
		Lightweight	User friendly	Affordable	Programmable	Privacy-friendly
iMotion	GlobeRanger	Y	Y	Y	N	N
WebSphere	IBM	lightweight version available	N	Low-cost version available	Y	N
Integration Platform	Manhattan Associates	N	Y	N	N	N
OAT Foundation Suit	OAT Systems	Y	Y	Y	N	N
Sensor capabilities	Oracle	N	N	N	Y	N
NetWeaver	SAP	N	Y	N	Y	N
SmartChain	Savi Technology	N	Y	N	Y	N
RFID Interchange	Tibco Software	Y	N	Y	N	N

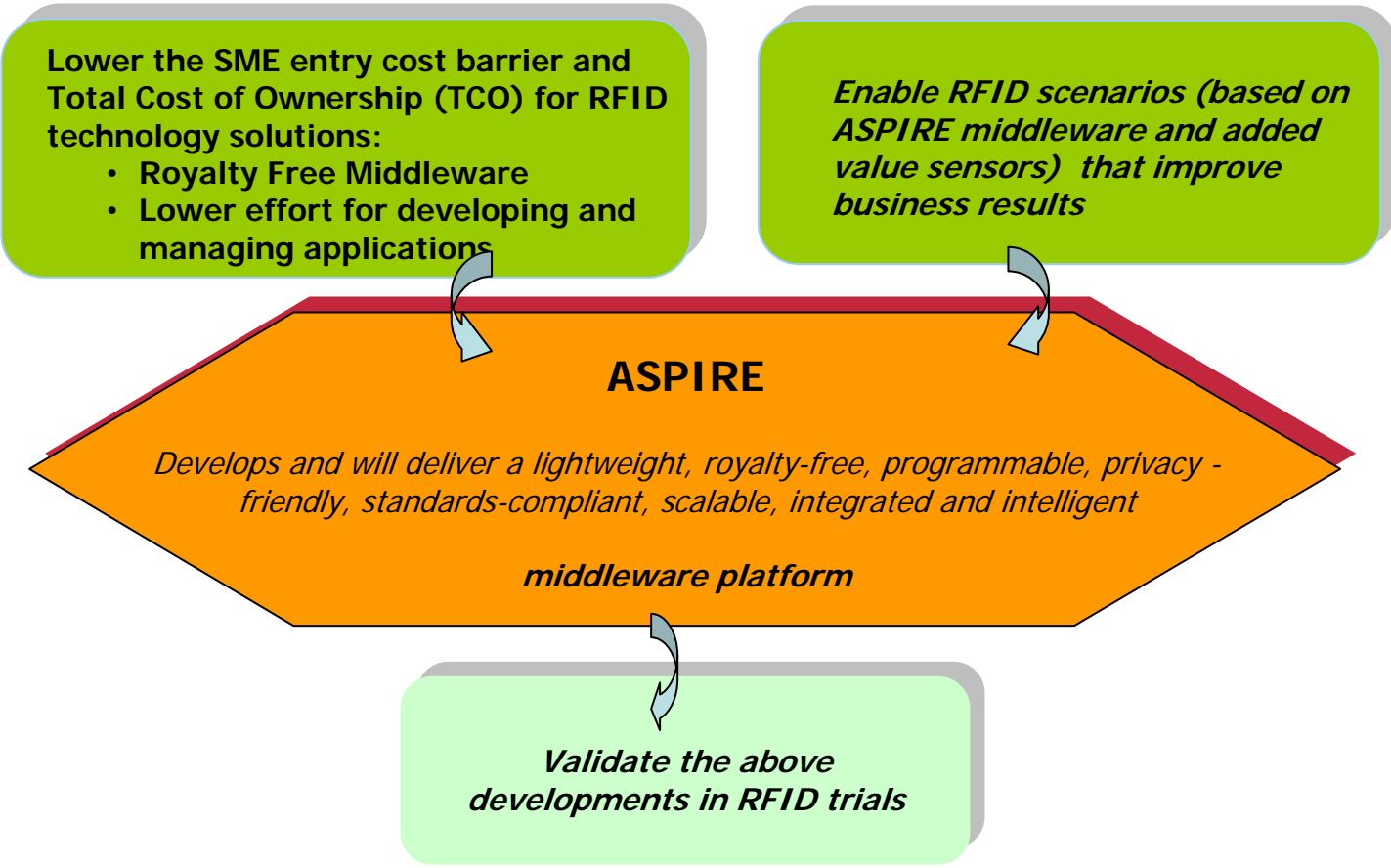


OSS Platforms: Missing Pieces

- General Remark: Most OSS platforms are in their infancy
 - Not suitable/appropriate for large scale deployments
- No support for:
 - Configurable Business Events Generation
 - Integration of sensor data (e.g., temperature)
 - Integration of Actuators
 - End-to-End Infrastructure Management
 - Privacy Friendly RFID
 - Programmability and (Visual) Integrated Development Environments
 - Business Process Management (RFID-enabled Processes)
- The ASPIRE Project attempts to remedy these limitations:
 - OSS platform to appear as “AspireRfid” OSS Projects in OW2.org



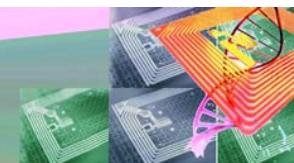
ASPIRE Project Overview and Goals



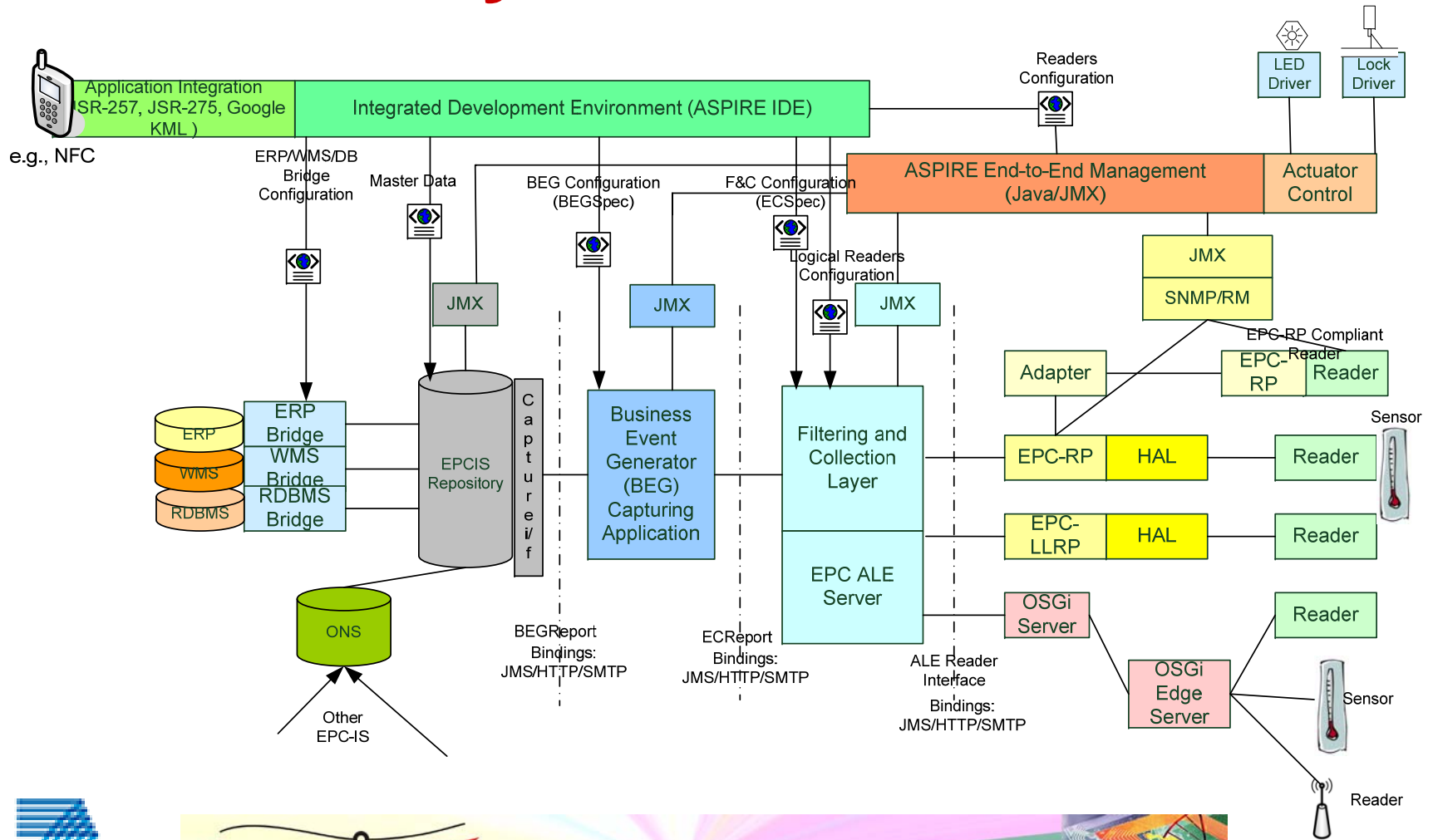


Project Fact sheet

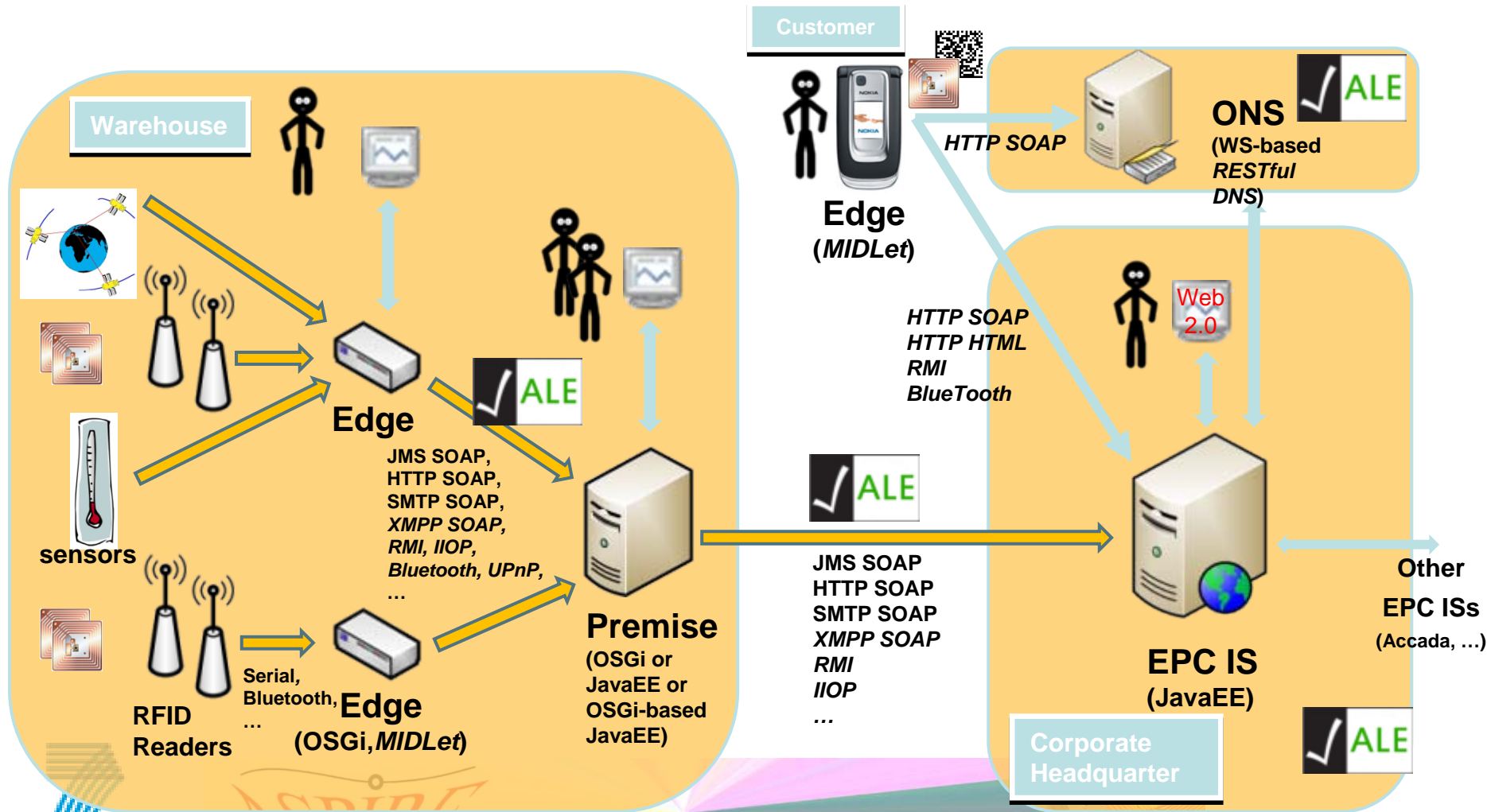
- Consortium:
 - Aalborg University – CtiF, Denmark
 - INRIA (ObjectWeb, POPS), France
 - Université Joseph Fourier – Grenoble University – LIG Laboratory, France
 - Athens Information Technology, Greece
 - Melexis technologies SA MELE, Switzerland
 - Open Source Innovation Ltd OSI UK
 - UEAPME, Belgium
 - Sensap S.A, Greece
 - Pole Traceability Valence, France
 - Instituto Telecomunicações IT, Portugal
- Timeframe: 01/01/2008 – 31/12/2010
- Budget: 6.7M€
- EC Contribution: 4.4M€
- Web Site: www.fp7-aspire.eu



Preliminary ASPIRE Architecture



ASPIRE Background: UJF Suite (1)



ASPIRE Background: UJF Suite (2)

RFID Middleware - Windows Internet Explorer

http://localhost:9000/epic/frm_map_adde_rfid_gwt_IndexModule/IndexModule.html

RFID Middleware

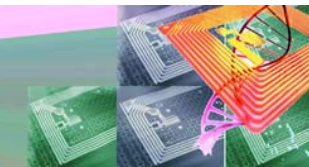
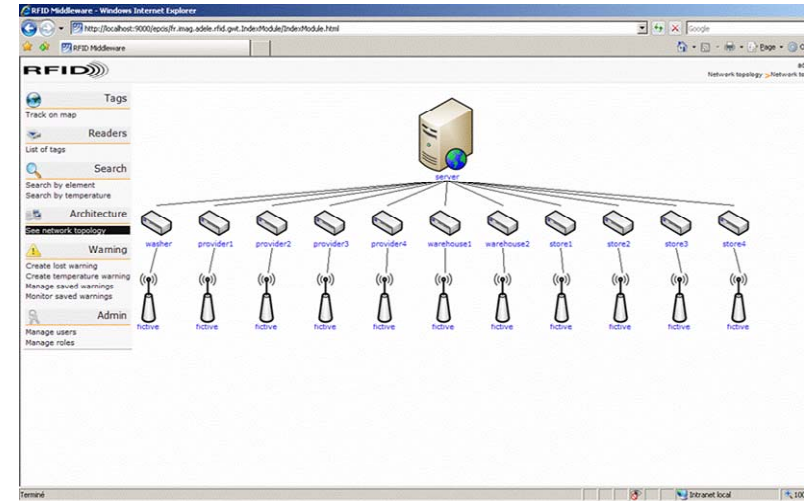
Tags: Tag [um.epc.id.gid.6543210.123456.12345678b] Valid Input helper Get general information

Tracking Complementary information

Temperature: 274.93 K
GPS: 45.95855, 12.195
Gateway: Gateway name
Reader: fictive
Date: mardi 7 août 2007 10:24:10

Temperature: 275.33 K
GPS: 45.95855, 12.195
Gateway: Gateway name
Reader: fictive
Date: mardi 7 août 2007 10:23:55

Pos	Gateway	Reader	Date
1	Gateway name	fictive	mardi 7 août 2007 10:25:34
2	Gateway name	fictive	mardi 7 août 2007 10:25:01
3	Gateway name	fictive	mardi 7 août 2007 10:24:40
4	Gateway name	fictive	mardi 7 août 2007 10:24:10
5	Gateway name	fictive	mardi 7 août 2007 10:23:55
6	Gateway name	fictive	mardi 7 août 2007 10:23:49





ASPIRE IDE Concept

Solution in ASPIRE Language

Company Data

Warehouses

DockDoors

Readers

...

Legacy Systems

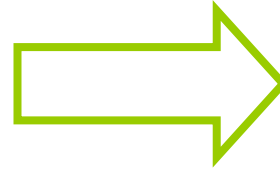
Business Process Description

```

<process name=".."
id="..">
  <warehouse>
  <dockdoors>
  <sequence>
    <isevent>
  </sequence>
</process>

```

Privacy constraints?



ASPIRE RFID Solution Description

Generate Specs



ECSpecs / BEGSpecs / etc.

1. Compile
2. Package
3. Deploy

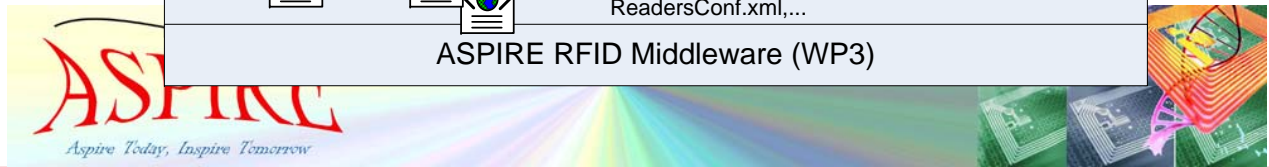
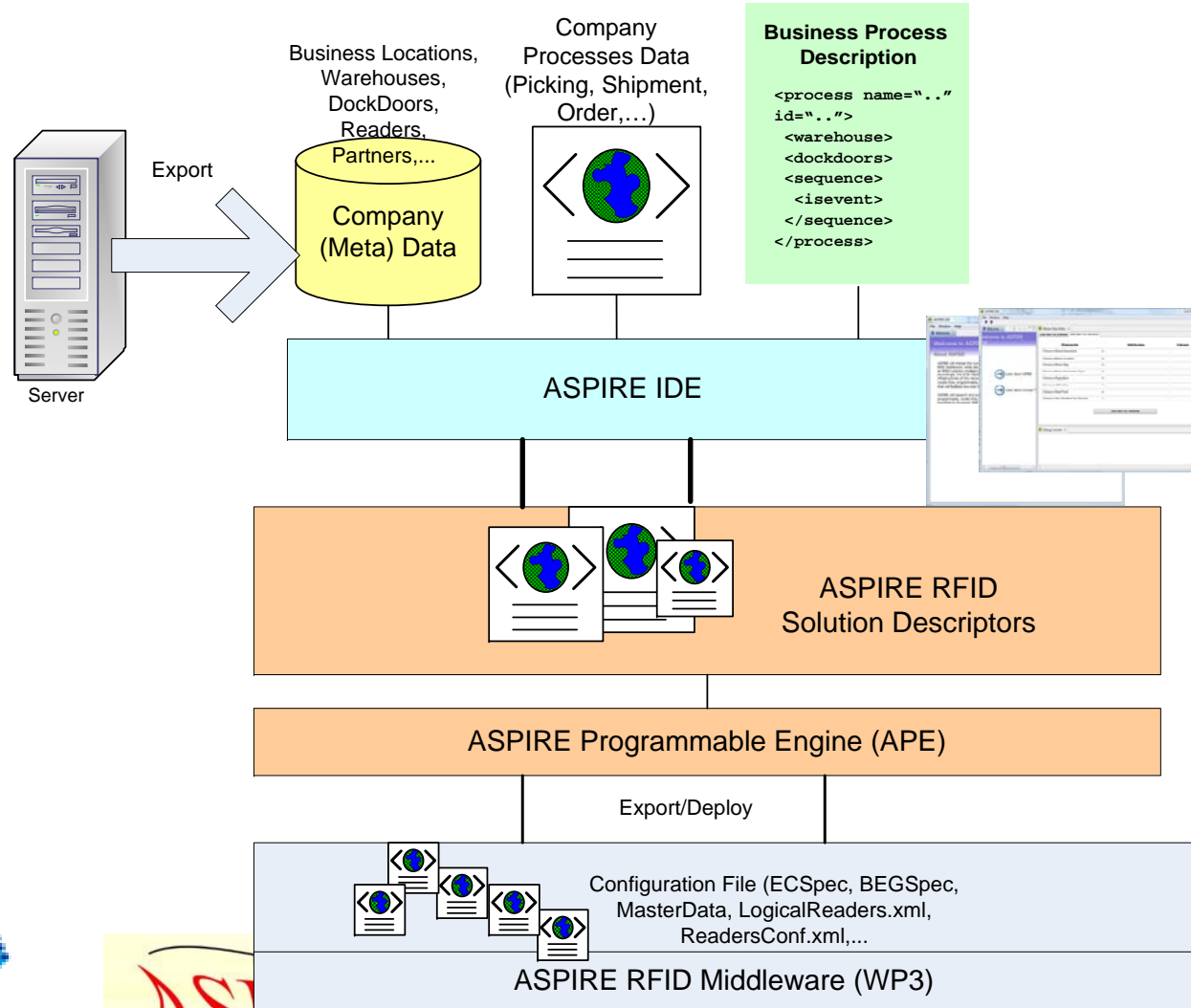


Deploy

ASPIRE Core Middleware Suite



ASPIRE IDE Concept





Participating in ASPIRE

- End-Users (notably SMEs) can:
 - Fill-in the on-line survey (5 min)
 - Participate in the RFID Information Days (1 day?)
 - Participate in ASPIRE trials
 - Download and test/use the ASPIRE RFID middleware
- RFID hardware and/or ERP/WMS vendors:
 - Pursue optimized integration of ASPIRE middleware with their products
- Community Developers:
 - Participate in “AspireRfid” @ OW2
- ASPIRE partners look forward to collaborating with you!

