



EUROPEAN CONFERENCE ON **ICT**
THE **4** **TRANSPORT LOGISTICS** **←←**

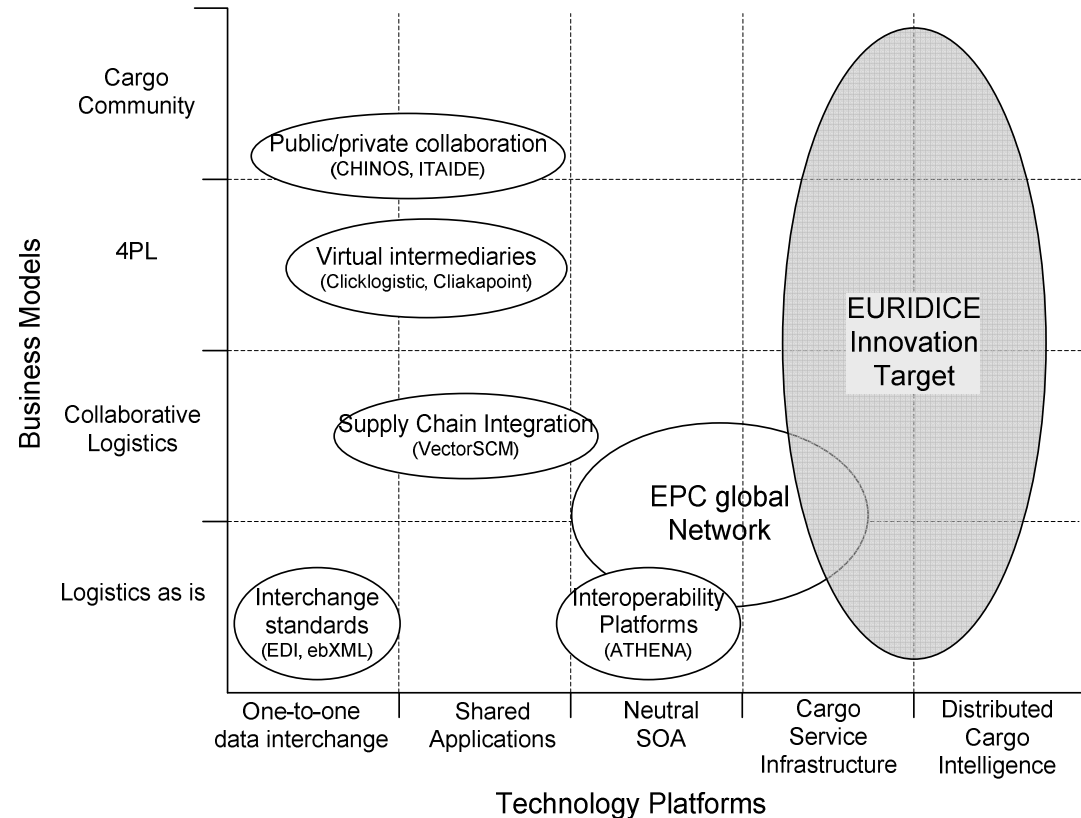
Margherita Forcolin (Insiel S.p.A.)
Thessaloniki, 13 October 2011

EURIDICE approach

EURIDICE intended to fill the existing gap between **technical feasibility and adoption of ICT services** platforms for goods mobility aiming at the intelligent cargo as unifying concept.

- **Structured approach** to technology innovation, harmonizing and filling gaps between existing technologies

- **Holistic perspective** on the business models, that considers both traditional and innovative logistic models, while looking explicitly at the cargo communities operating at the local and global levels.



Euridice

- Euridice goal was to build **a cargo centric information chain** that provides automated end-to-end information about the logistic supply chain based on existing technologies and standards combined with intermediating trusted third parties.
- Combining infrastructure, software, hardware, processes and data in order to provide **Cargo Centric Information services**

Euridice solution - objectives

- A solution capable to gather and use data coming from different sources (business process, environment and the cargo itself) in order to release the final user (e.g. logistic provider) from the burden of its own independent solution of IC
- Provide a platform where the user could easily use the IC functionalities integrated with its own processes by orchestrating and combining general purpose functionalities (horizontal components provided by the platform itself) with business specific functionalities
 - easy to use, customize and interface
 - secure

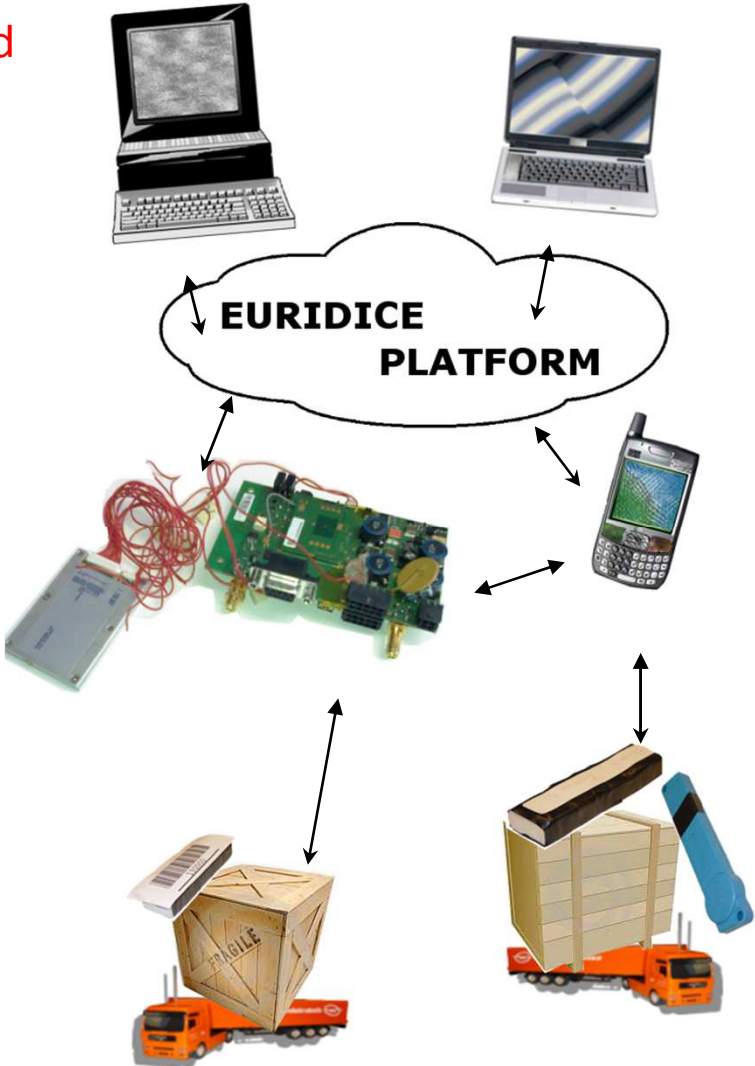
Euridice Integrated Platform

Business/user oriented

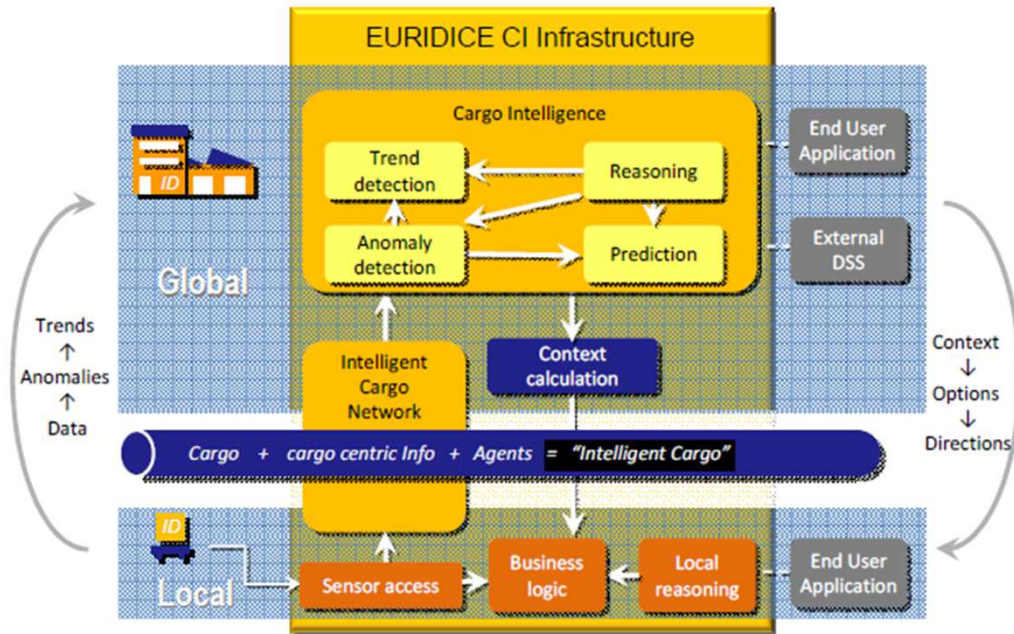
- Fixed platform: distributed set of nodes where services, user applications, software agents and system components are deployed

Cargo oriented

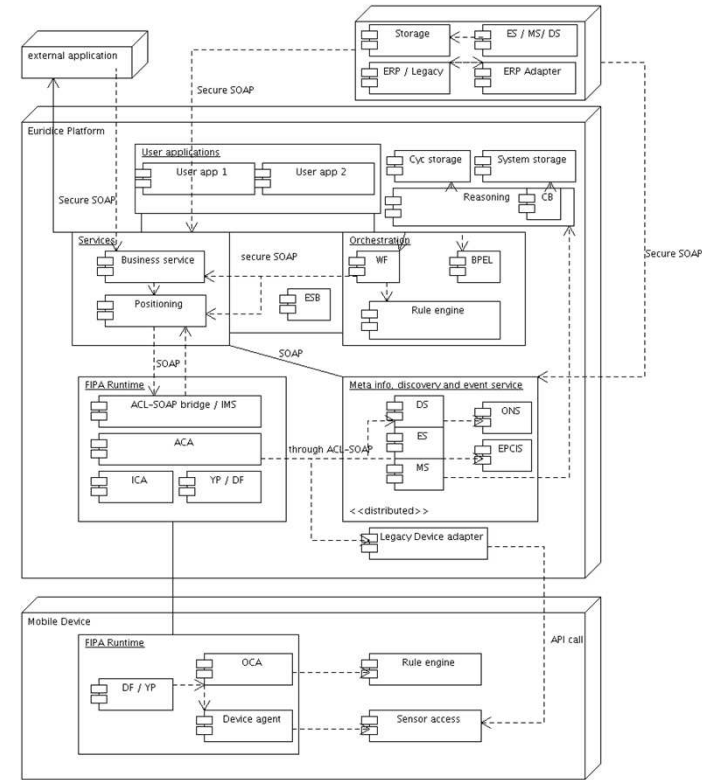
- Dynamically connected with Mobile Devices: different types of devices where mobile services are executed.



Euridice Integrated Platform – structure & content



Exploitation dimension



Development dimension

....let's start from the beginning

Multi domain distributed platform

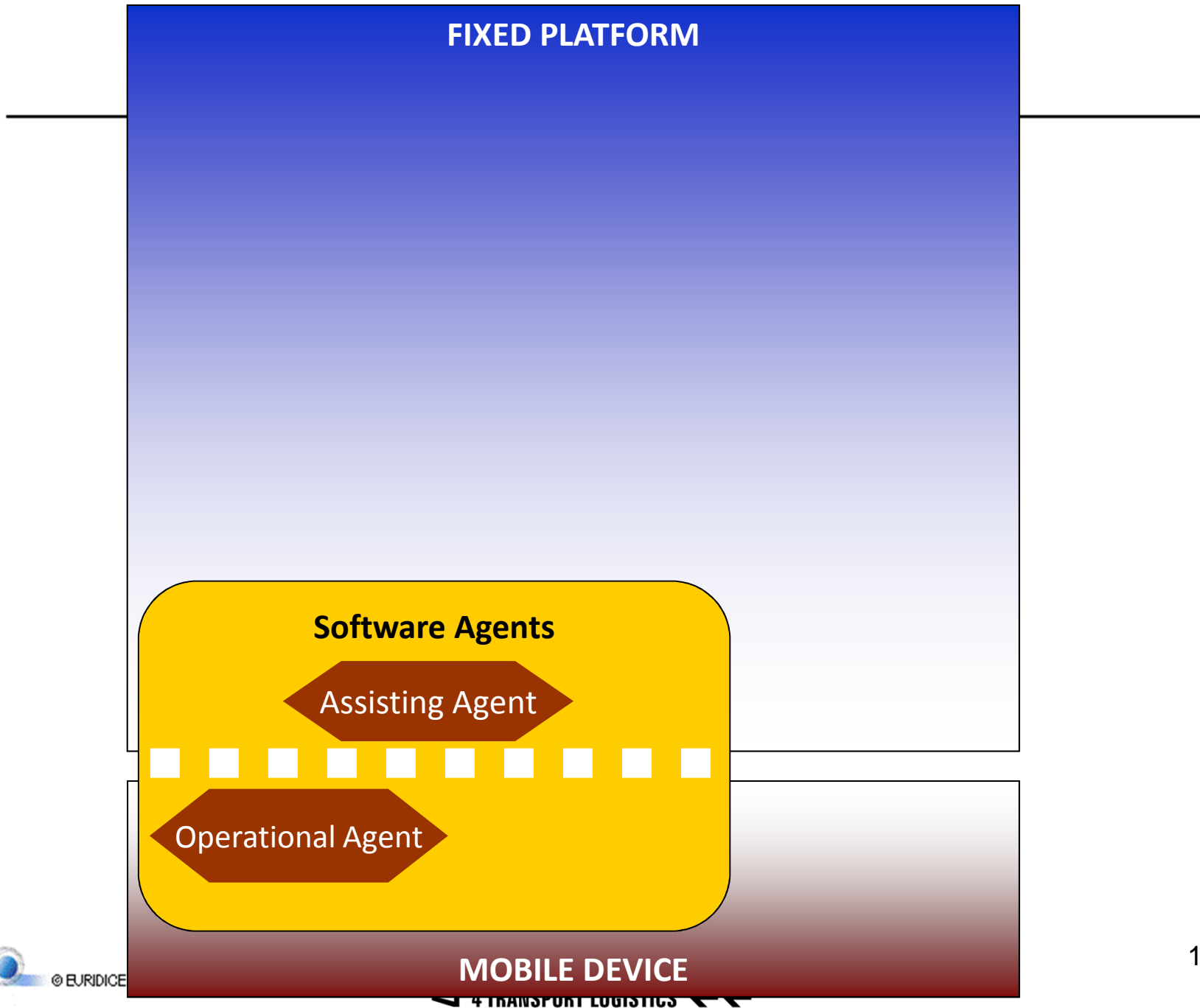
- Multi domain – can serve multiple users/stakeholders
- Distributed - across different locations
- Make use of different devices to deploy intelligence on the Cargo itself

FIXED PLATFORM

MOBILE DEVICE

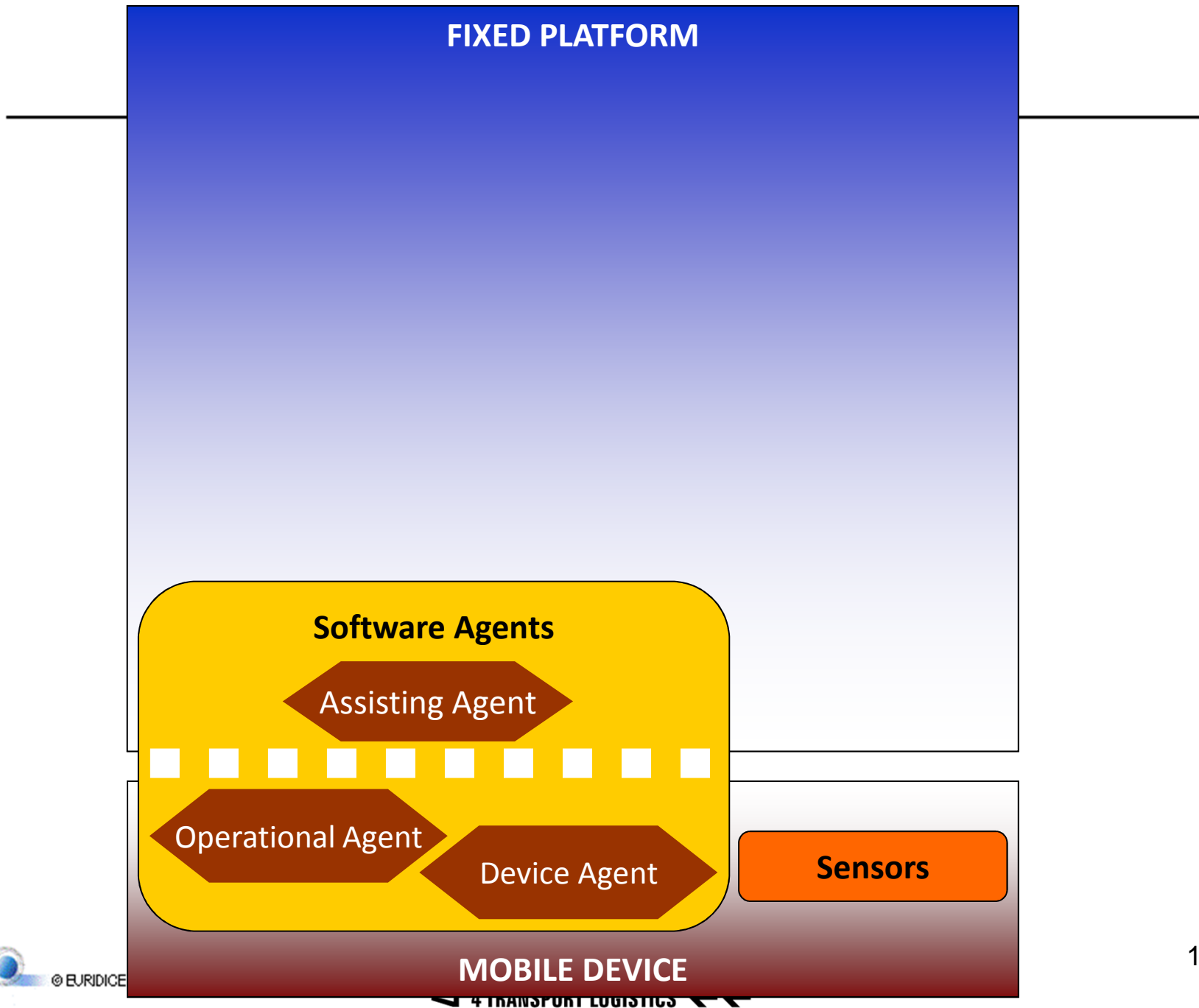
Multi Agent system

- Multi Agent technologies were used to glue the mobile and fixed world (FIPA, JADE)
- To implement the mobile side of the Intelligent Cargo Concept
 - Decouple the agent's behaviour to handle the network connectivity
 - Assisting Cargo Agent (ACA) on the fixed platform
 - Operational Cargo Agent (OCA) on mobile devices
 - Distribute context, rules and behaviours on the field



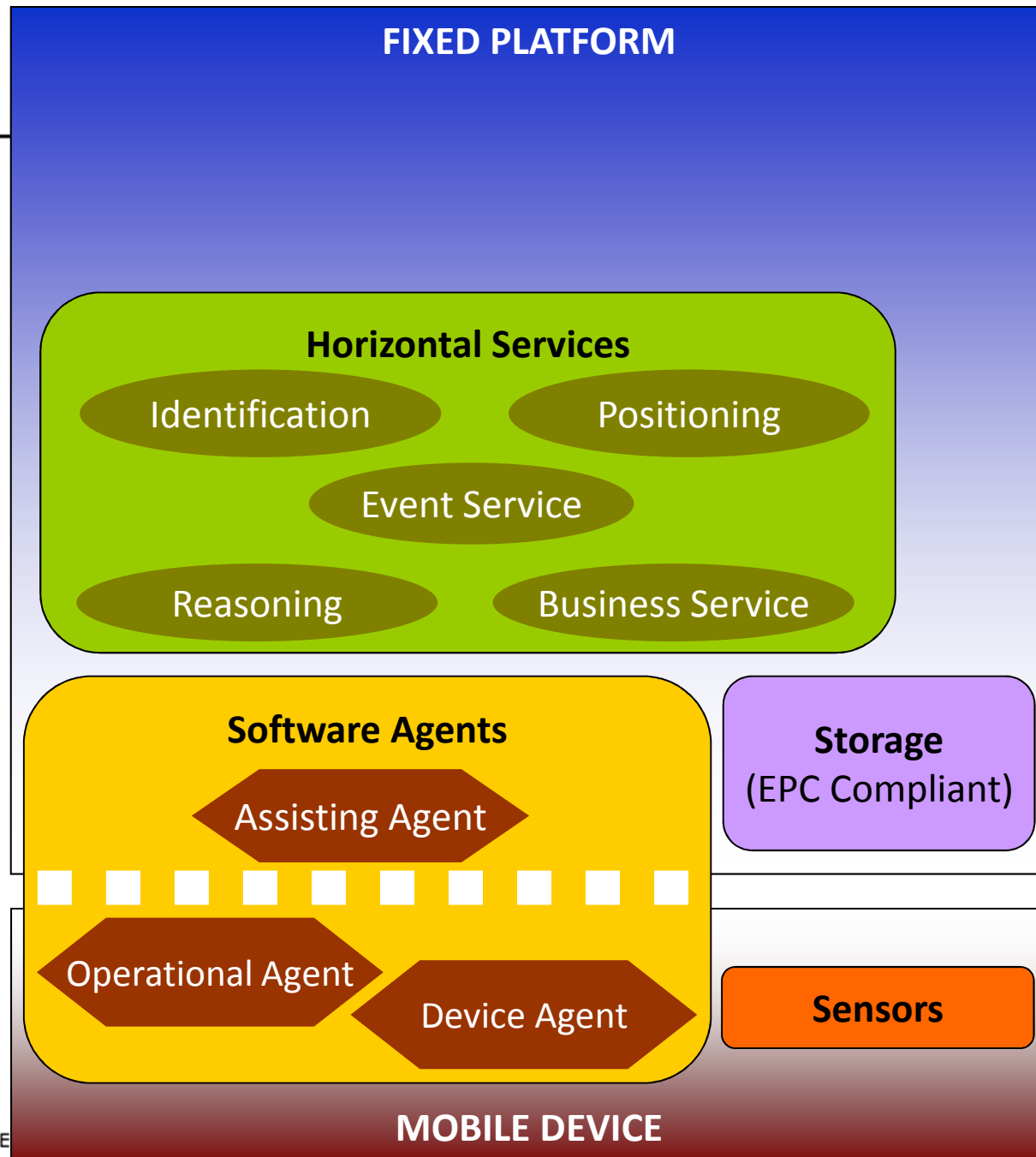
Cargo Monitoring - Sensors Management

- Although not a sensor network the device is capable to manage different types of sensors to become aware of its context
 - Identification (RFID)
 - Positioning (GPS)
 - Temperature / Humidity (RFID)
 - G-Shock (Accelerometer)
- A specific agent – the DeviceAgent - acts as a Gateway between agents and sensors
- OCAs can apply (locally) business rules on sensor data (*autonomous behaviour*)



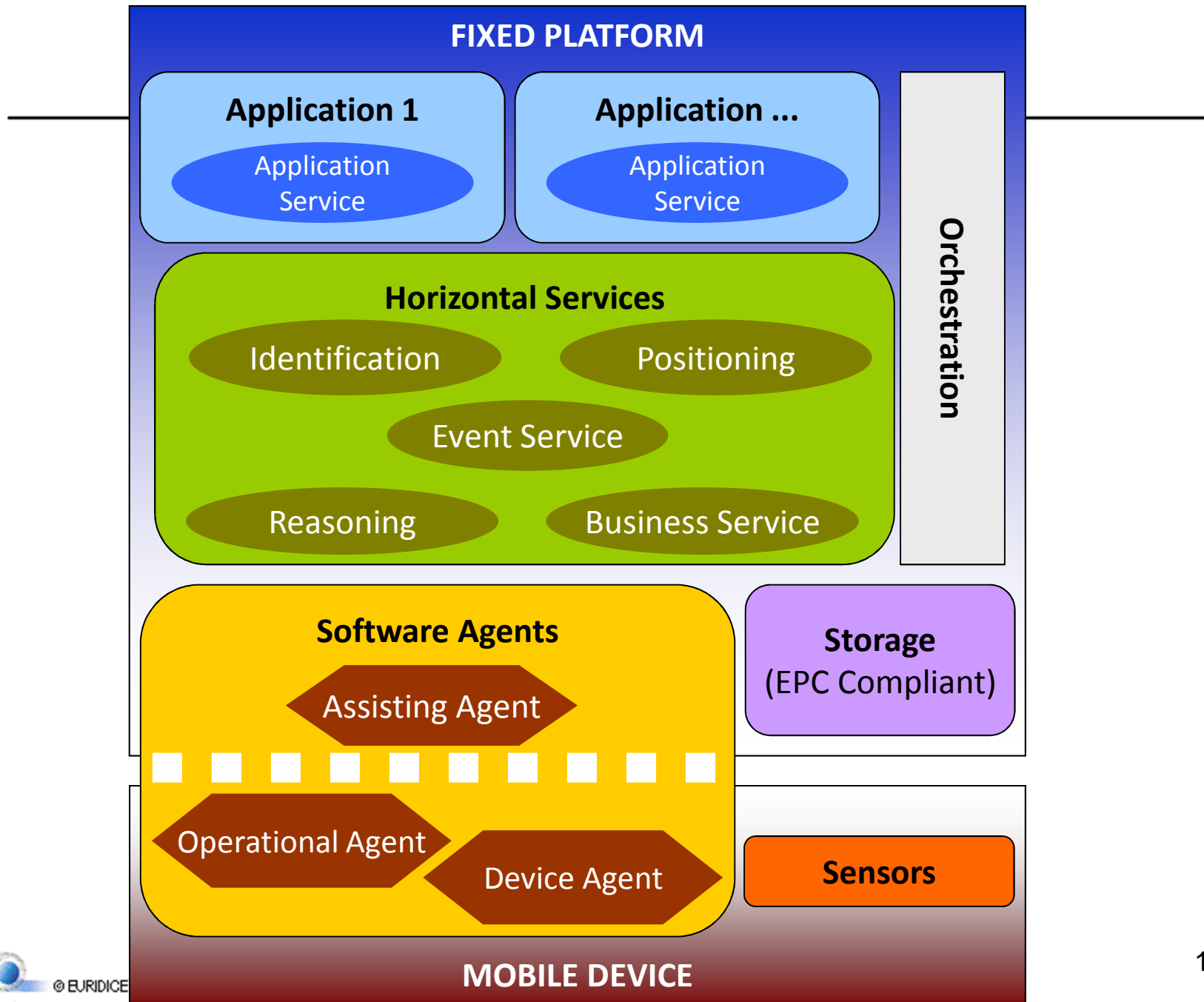
SOA based solution

- Accordingly with the SOA paradigm all functionalities are implemented as services
 - Horizontal services – provided by the platform itself
- Data can be maintained within the platform in a EPC Compliant storage
- A Publish/Subscribe interface is used to access storage via Event management service



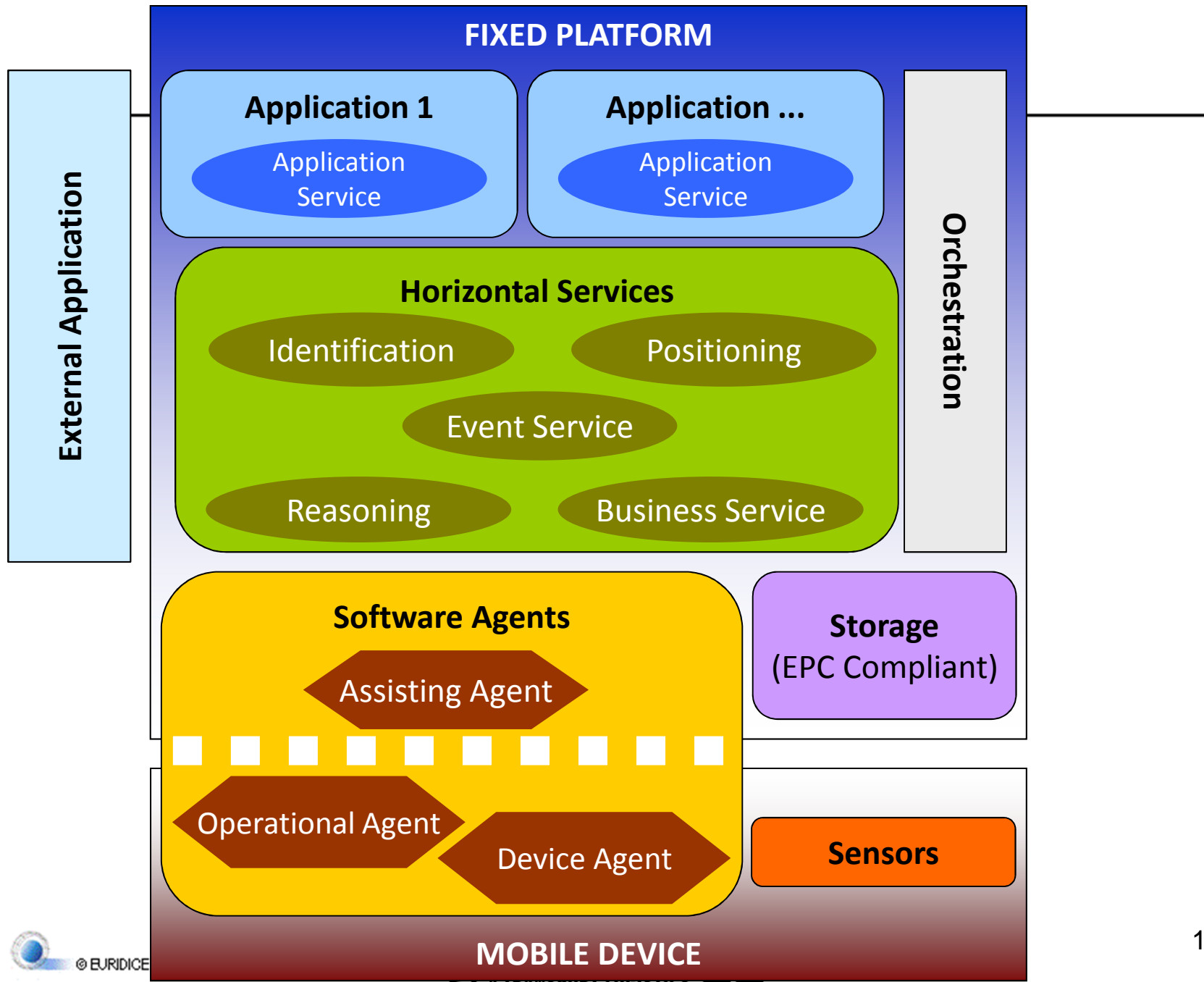
User applications and service orchestration

- User applications are built on top of the service layer and implement user-specific services
- The Orchestration component allows to combine user and platform services to fulfill the user business needs



Secure communication with external systems

- Integration with legacy or external systems is ensured by SOAP web-services
- The SOAP Message is secured by WS-Security
- SAML infrastructure is used for cross domain authentication (inter/intra domain)



To summarize

- Cargo-centric solution
- Open source
- Service oriented
- Multi Agent system
- EPCIS Compliant
- Context determination through sensors
- Local reasoning

Integrated Platform – enabling technologies

Technical details of architecture components:

- **OSGi container** by Karaf 1.4 + Pax Tools
- **ESB:** ServiceMix 4.2-fuse-02, with Apache
- Java **SOA toolkit**
- **Integrated Spring support:** Spring 2.5.6.SEC01
- **Web service support** by Apache CXF 2.2.9
- **Routing and messaging engine:** Apache Camel 2.2
- **Low level TCP/IP communication** by Apache Mina 2.0
- **Web service support** by Apache CXF2.2.9
- **Rule based routing and messaging engine** by Apache Camel 2.2.
- Raw, low level **TCP/IP communication** by Apache Mina 2.0
- **JMS queue implementation** used by the integrated platform is ActiveMQ 5.3.1
- **Database persistence** by Jboss Hibernate3.4.0.GA
- **Scheduling functionality** by OpenSymphony Quartz 1.6.1
- **Platform management** by the web console and the shell helper extension.
- **FIPA compatible agents** run on the platform via the Java Agent Development Framework (JADE) 4.0.
- **EPC Network specification for data sharing** (EPCIS 1.0.1) by Fosstrak 0.4.2
- **Packages** (JADE, ontologies, RFID reader drivers) **for mobile devices** running JAVA
- **Common packages** (utilities, agent-agent communication, agents administration) **for pilot application development**

Questions?



Thank you for your attention!