

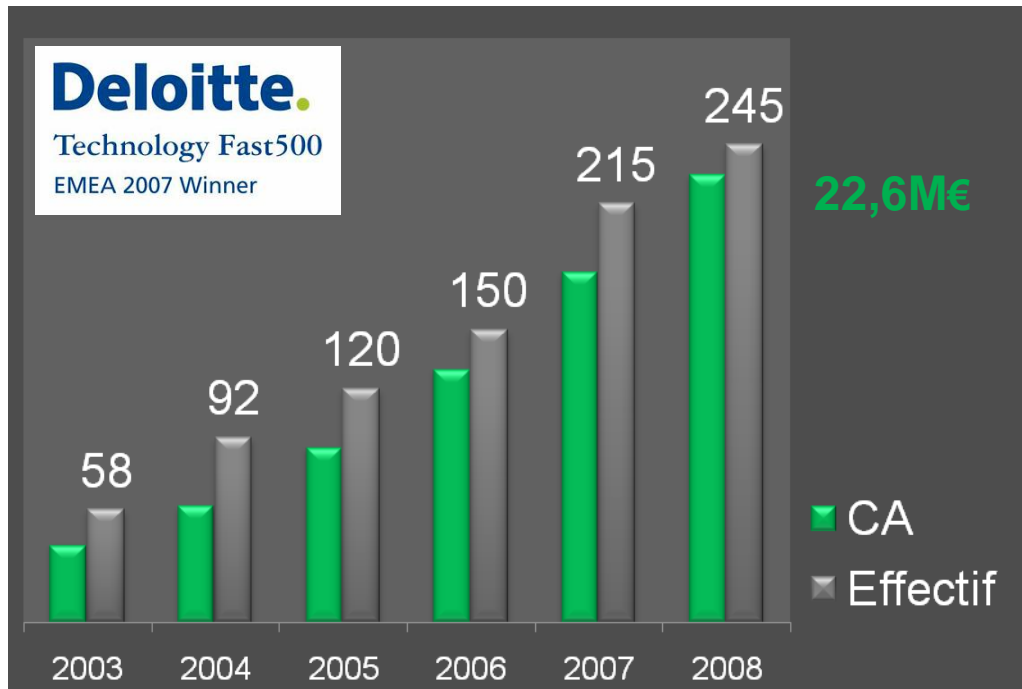
An Open OSGI Embedded Platform: a new Perspective for Intelligent Transport

Eliane Fourgeau, Geensys

The logo for "e-nove" features the word "e-nove" in a blue, lowercase, sans-serif font. The letter "o" is highlighted in green. Above the "e" are three curved lines representing a signal or wireless connection.

- ① **Introduction: Geensys, RDTL**
- ① **E-bus project**
- ① **From E-Bus to E-Nove**
- ① **Beyond Public Transportation**

Over 30% Growth y2y



Capital: 7 389 746 Euros

Worldwide Presence



Geensys Offices

Brest, Paris, Nantes, Nancy,
Toulouse, China, Germany,
Japan, Vietnam

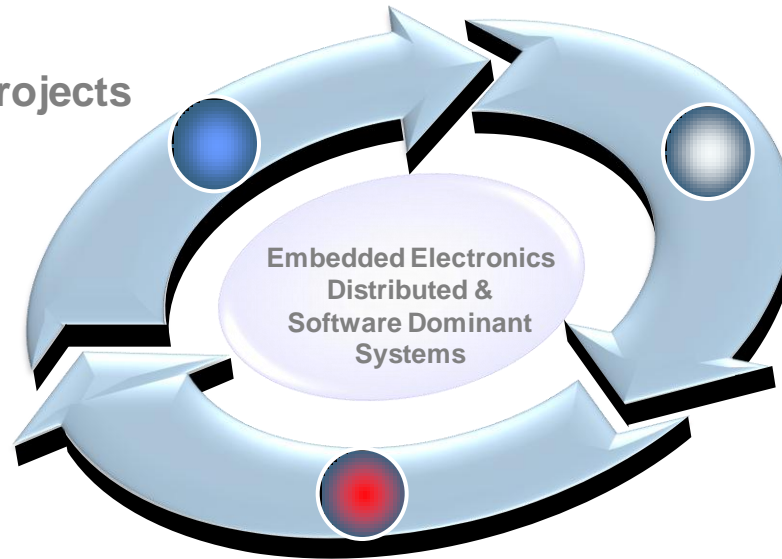


Distribution

UK, Israel, USA, Italy,
Australia

Engineering

EE & Mechatronics Projects

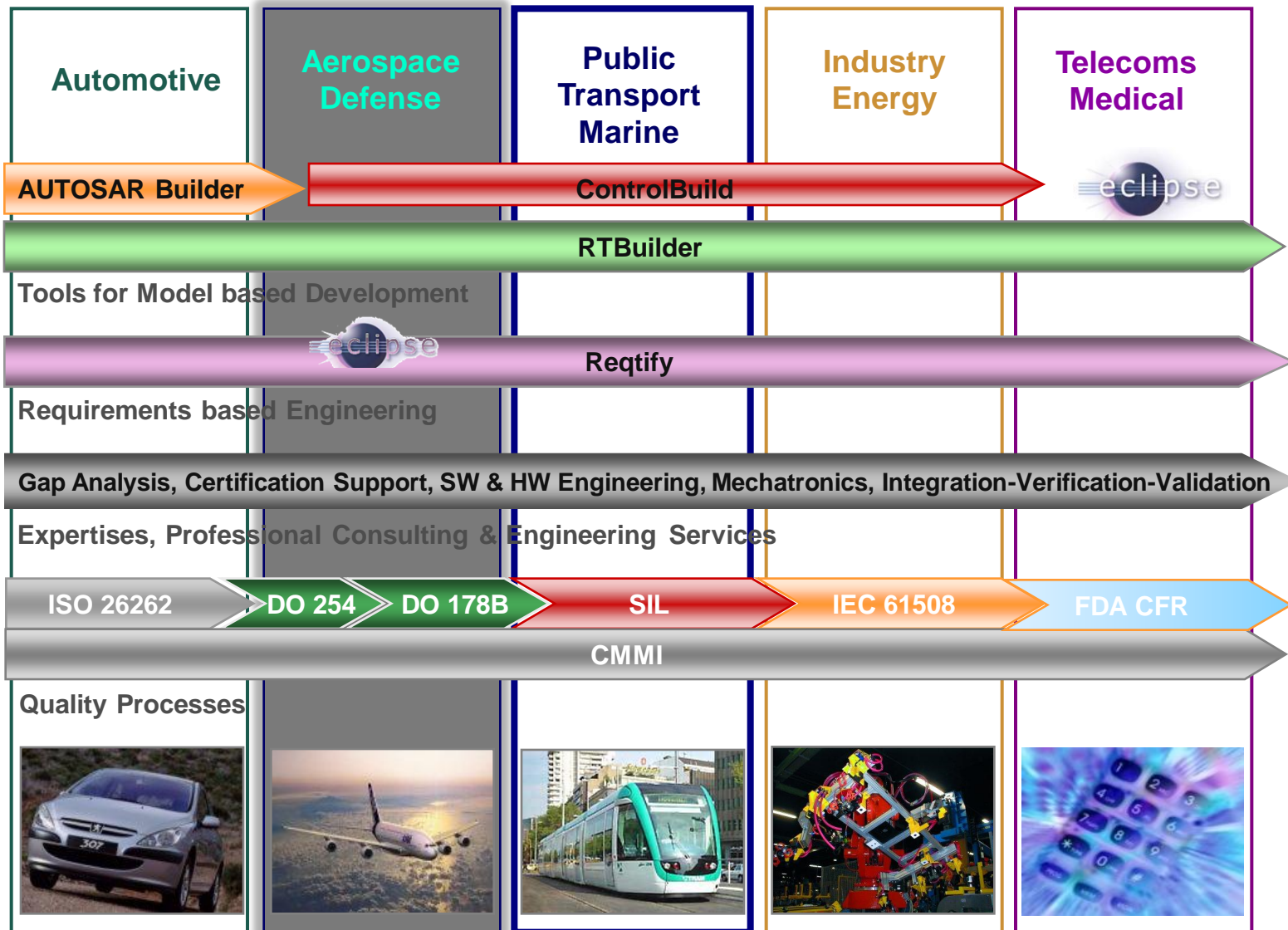


**Off-the-shelf
& custom Tools**
Requirement based
& Model based
Solutions

RECTIFY™
CONTROLBUILD™
AUTOSAR | BUILDER™
RT | BUILDER™

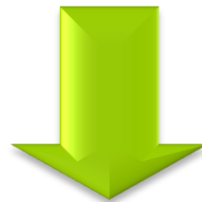
Professional Services

Consulting services on EE Projects & Processes

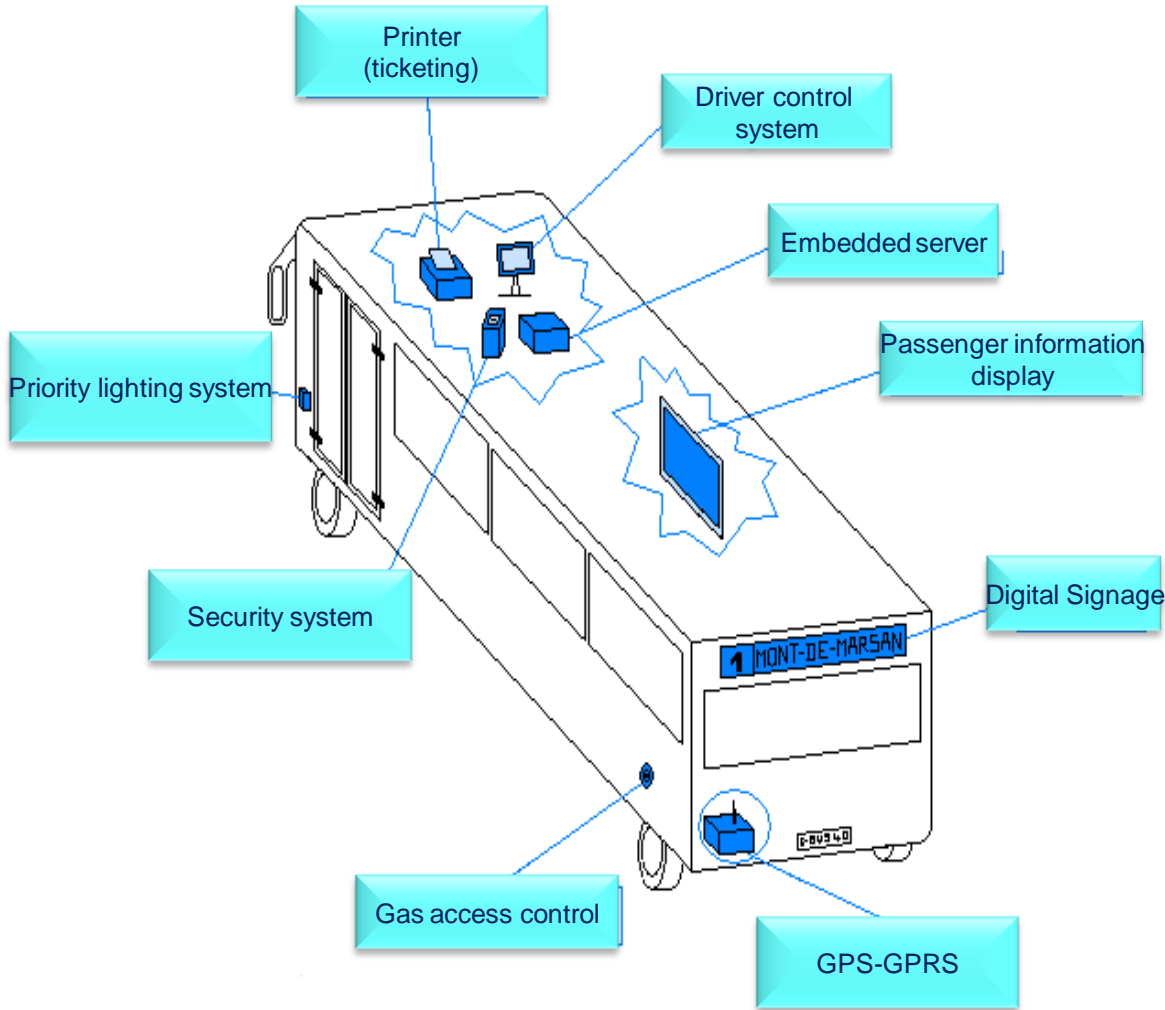




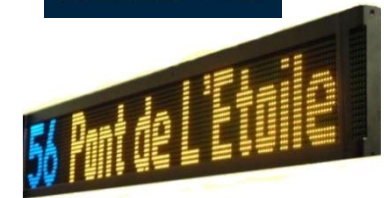
- ① **Core business : public transportation (180 buses)**
 - City, inter-city, school, tourism
- ① **80% of client employees are on the road (drivers)**
- ① **100 % of RDTL customers are mobile and need « on time » information.**



- ✓ Keep in touch with employees
- ✓ Deliver services to customers on the field (ticketing, timetables,)
 - ✓ Improve QoS
 - ✓ Get data from the field



Mobile equipments



Fixed equipments

① Re-use capability

- from one activity to another one (school, inter-city, urban, tourism)

① Large mobile infrastructure management

① Old and obsolete ticketing system

① Gasoline cost increase

① Environmental impact on vehicle systems

① Impact of political decisions & regulations

- ① **Heterogeneous, non-interoperable systems**
 - Ticketing, customers information,...
- ② **Non scalable “Black box” systems**
 - proprietary system, mono-application system, difficulty with inter-operability,...
- ③ **Tied to, or “prisoner of ”, manufacturers**
- ④ **High cost of investment and maintenance**

Information system

Ticketing system



Maintenance system

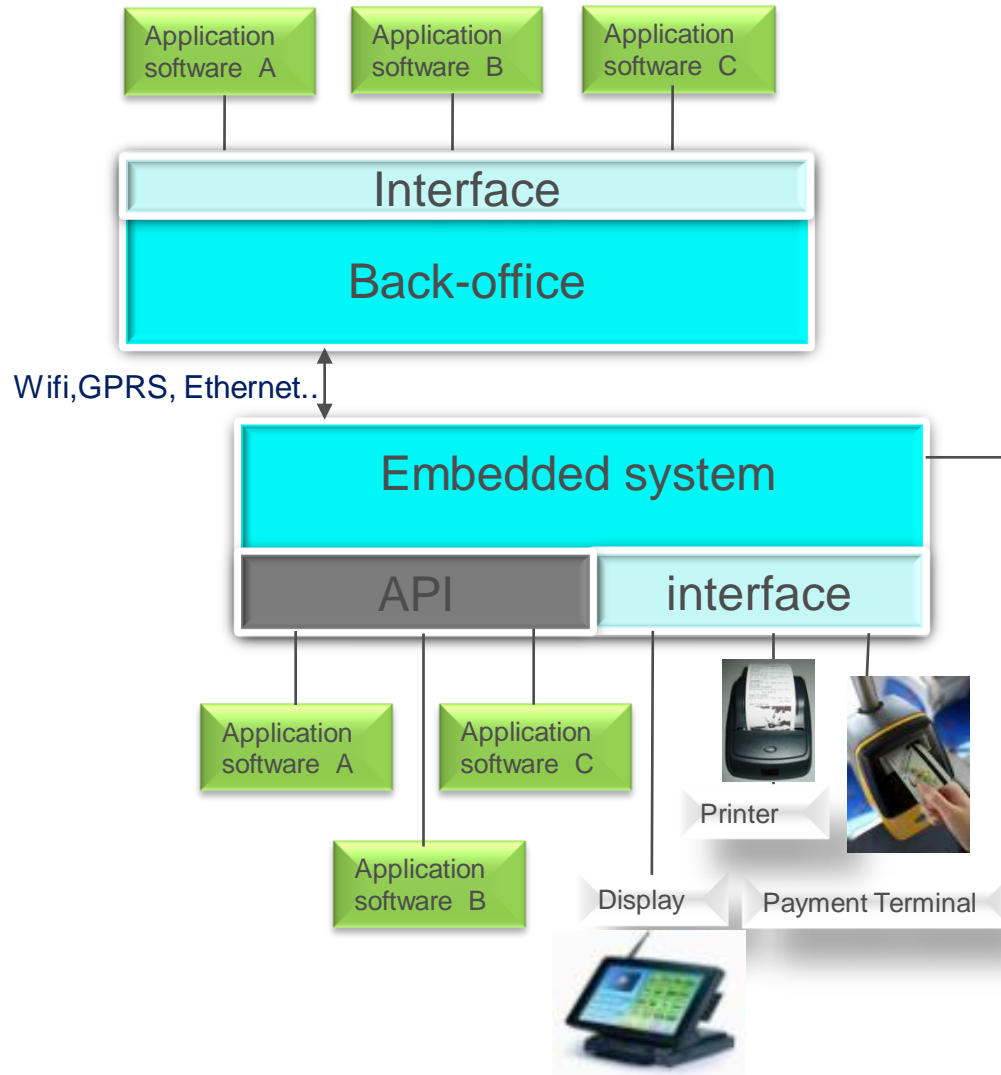
- Driver's acceptance : ☹️☹️☹️☹️
- Investment costs: ☹️☹️☹️
- Set-up cost : ☹️☹️☹️
- Maintenance cost : ☹️☹️☹️.....
- Upgradability : ☹️☹️☹️☹️.....
- Independency : ☹️☹️☹️
- Customization : ☹️☹️☹️
- QoS ☹️☹️☹️
-

② RDTL strategic objectives :

- Compliance with the law
 - Law for Disabled People (2015)
 - Law for school transport
 - ...
- Build an homogeneous Information System
- Reduce gas consumption
- Be independent from HW manufacturers and SW providers
- Get capabilities to manage the information system (versus the “black box” approach).

② New IT capability for mobile applications required

RDTL Technical vision: E-Bus Project



✓ Plug-in applications

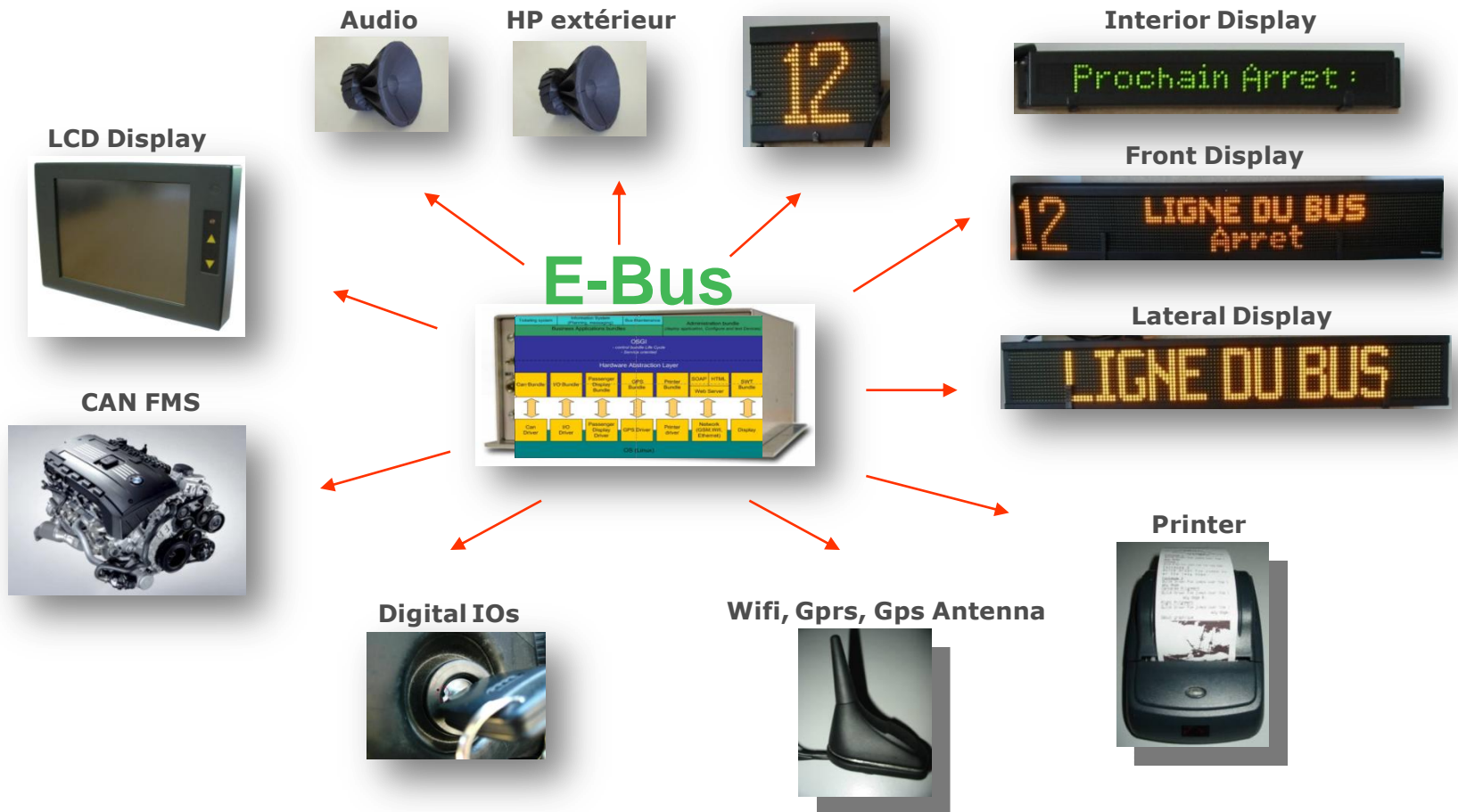
✓ Open Interfaces



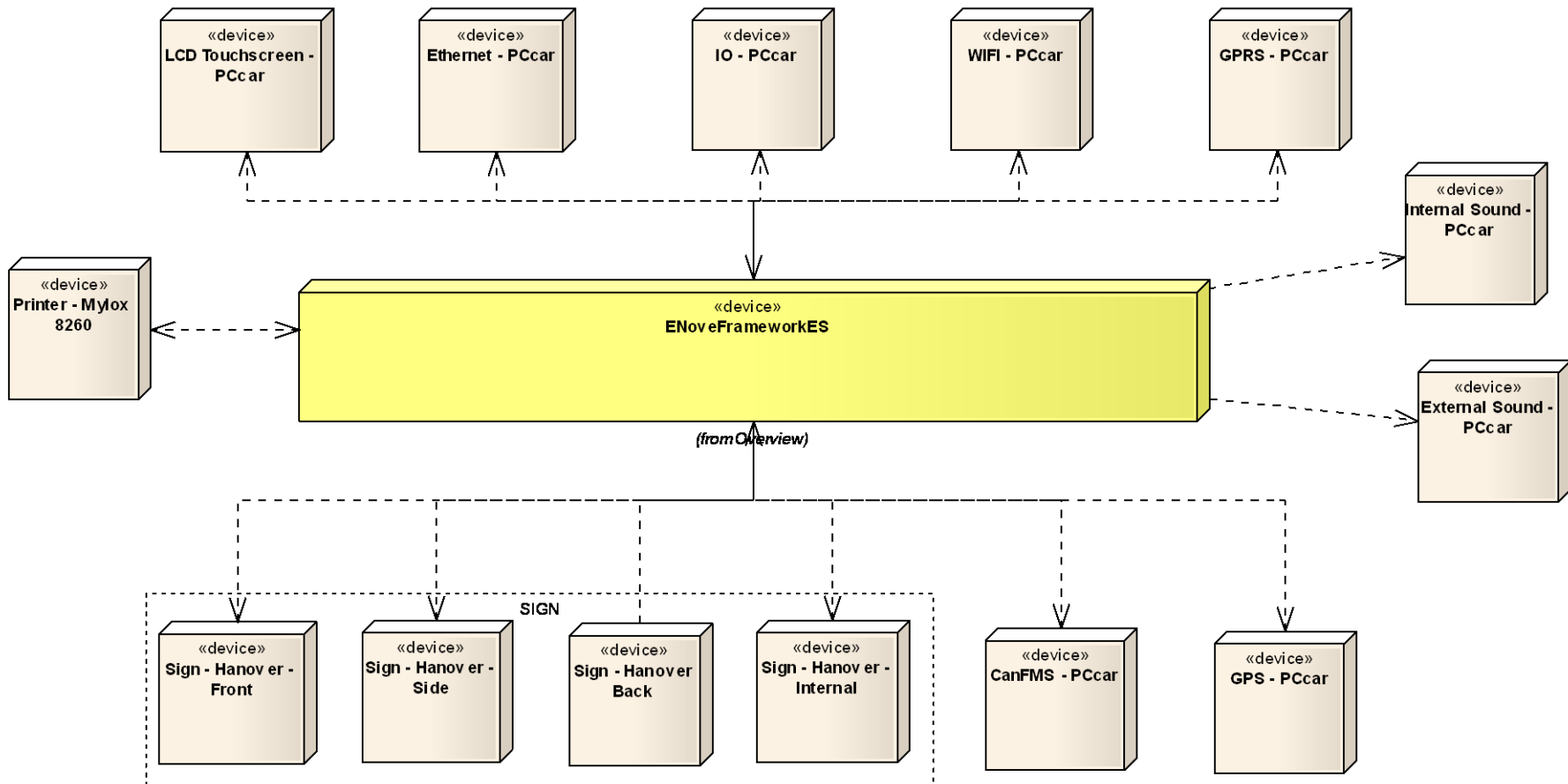
✓ Inter-operable applications

✓ HW independence

Complete E-Bus HW System



Hardware Architecture



② Aton PC (ACTIA):

- ✓ Celeron 1GHz, 512 MO RAM, 1 GO Compact Flash
- ✓ 2 USB, 4 RS232, 15 I/O, 2 CAN HS
- ✓ Extension Boards: Wifi, Gprs, Gps.
- ✓ Compliant with Automotive standards

② 4 displays panels

- ✓ Hanover equipment : RS485

② Printer

- ✓ Mylox
 - RS485 thermal printer

② CAN FMS

- ✓ Read information from CAN bus through an FMS connection

② Multi-band Antenna:

- ✓ Wifi
- ✓ GSM / GPRS
- ✓ GPS

② LCD touch screen:

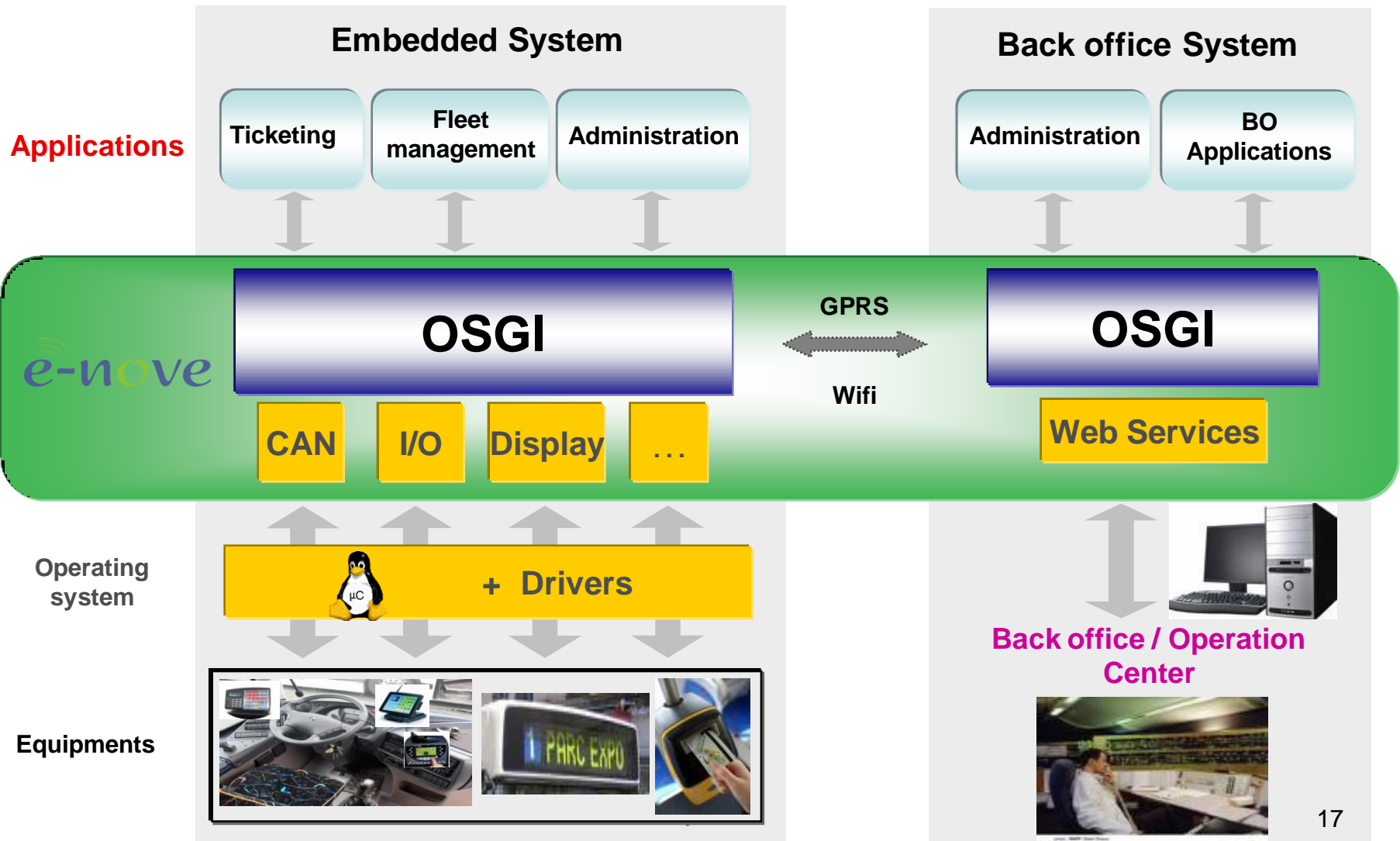
- ✓ 6,5" 640 * 480
- ✓ LVDS for Video support
- ✓ USB
- ✓ Day/night Management

② Audio IN / OUT:

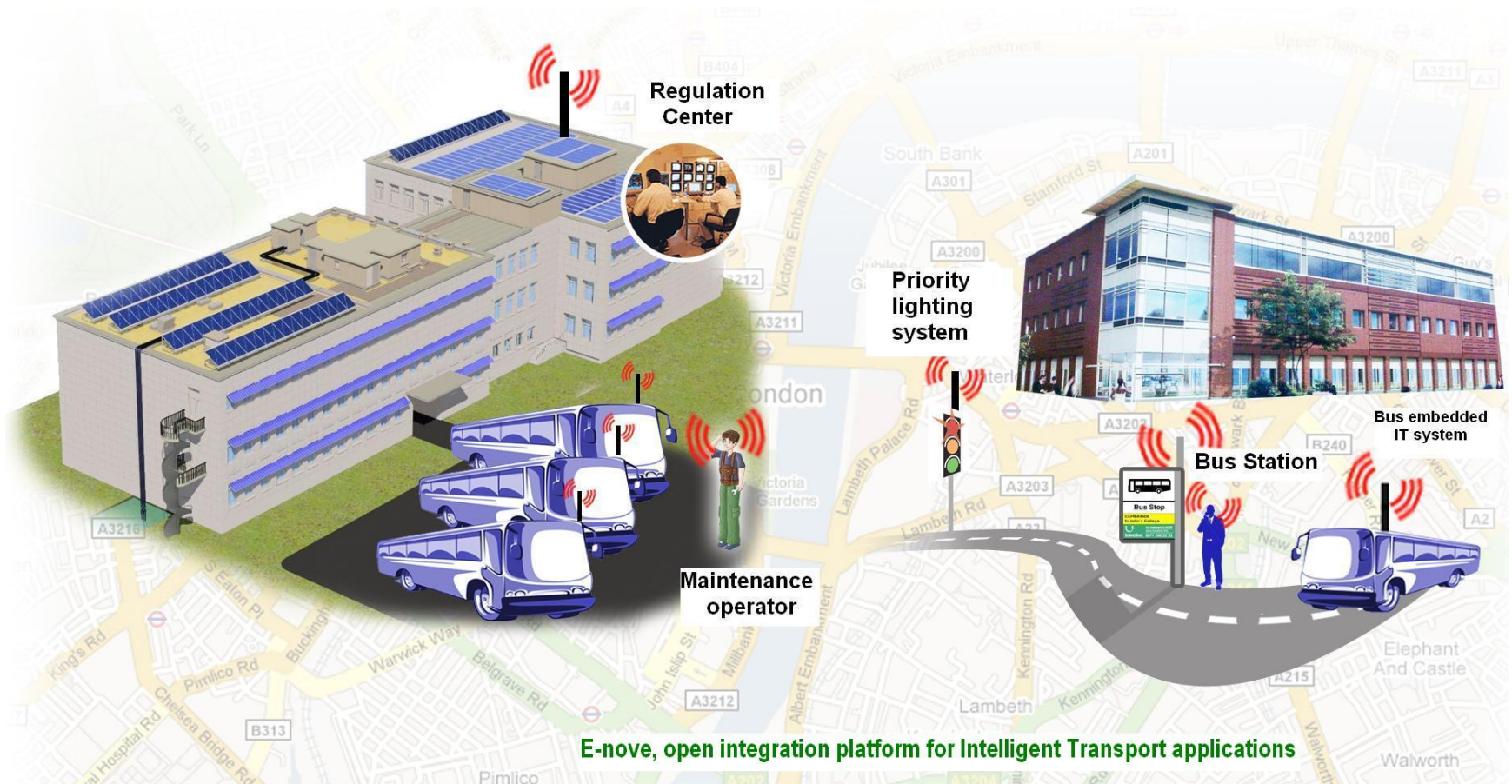
- ✓ AC'97 I/O

② Digital IOS:

- ✓ 11 protected inputs
- ✓ 4 outputs
- ✓ + APC



E-bus leads the way to e-nove



① **E-nove: What is it?**

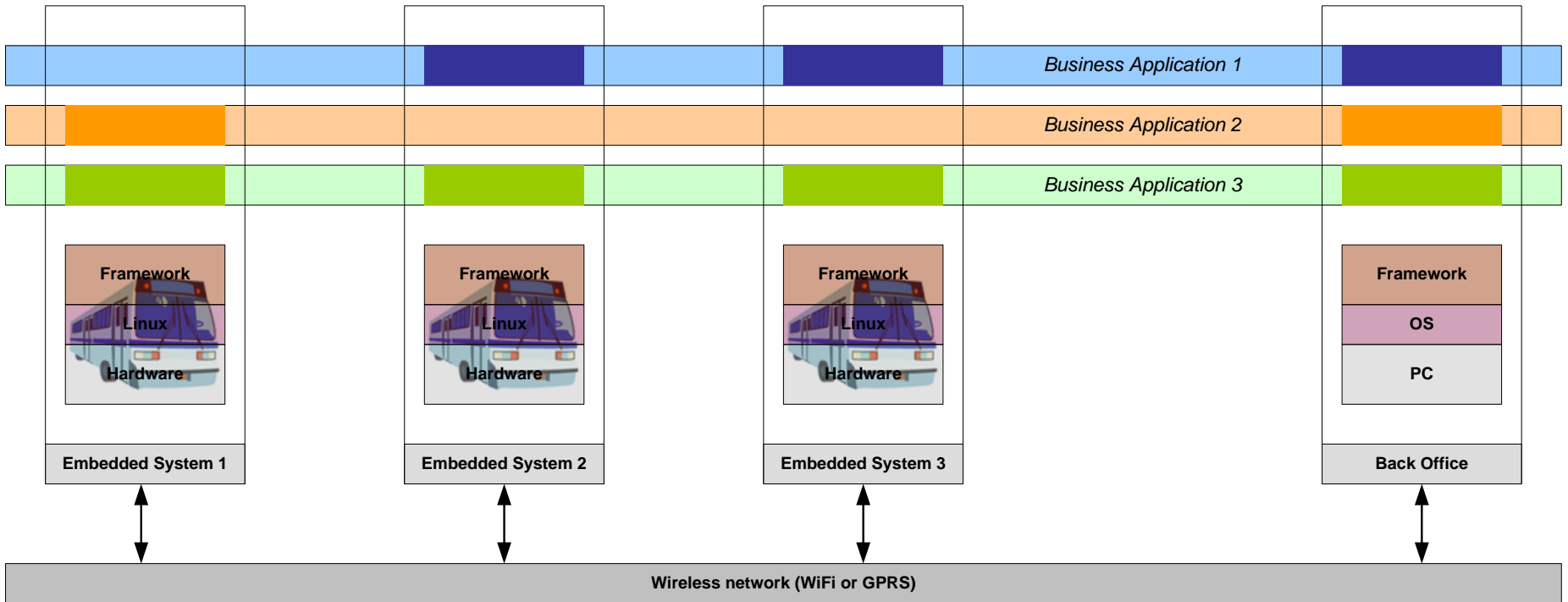
- An open, scalable & powerful platform providing infrastructure services to ITS applications
- Making applications reusable & HW independent

① **E-nove: Whom is it targeting?**

- Public Transport companies/operators
- Application providers, equipment manufacturers, integrators, service providers, ...

- ② **The first open, modular and scalable platform for ITS applications enabling HW & SW independence**
- ② **First ITS platform with a tool based development environment**

- ② **Economical constraints**
 - Gasoline costs
- ② **Legal constraints**
 - New EU law on PT accessibility (2015)
- ② **Societal & environmental trends**
 - Environmental constraints
 - Fewer private vehicles, increasing need for Public Transport
- ② **Technologies maturity:**
 - OSGI & ECLIPSE
 - SOA Architectures: Web Services
- ② **Strategic Shifts**
 - Collaborate on standards, compete on VA solutions & services

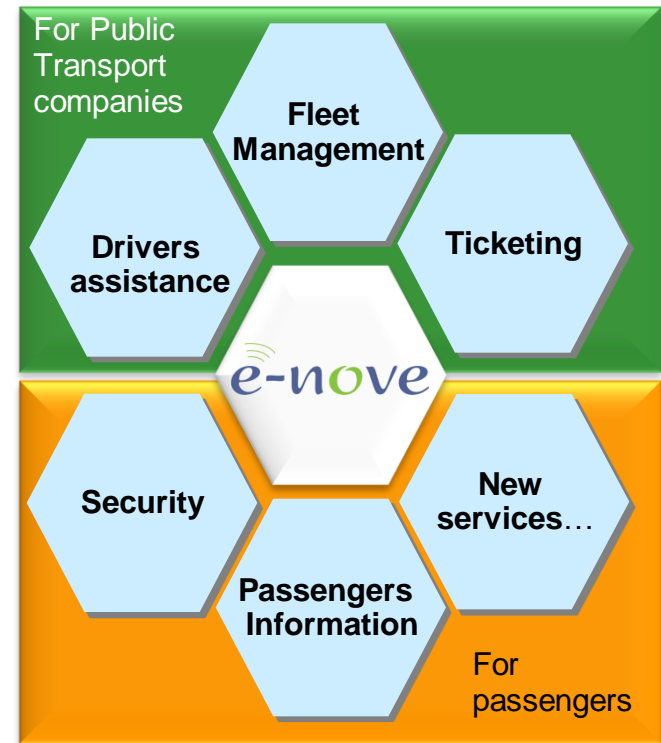


Standardization of an open SW architecture platform, to allow application suppliers to focus on their business expertise

Project objectives

- **Decrease costs** of possession, installation, and maintenance,
- **Allow interoperability** between equipments and applications,
- **Offer more services and ease application adaptation** for public transport exploitation companies
- **Facilitate evolutions** of systems and applications, **facilitate re-use**
- **Allow suppliers to focus on applications**, which bring added value, instead of on HW and SW infrastructures
- **For suppliers : facilitate access to other markets** in their own country, in Europe, ultimately worldwide.

Functional domains



- ① **Open architecture, allowing upgradability & flexibility**
- ① **Independent architectures from application providers & hardware providers**
- ① **Cost reduction of SW design**
 - Software designers can focus on their core business
 - SW reuse
- ① **Cost reduction for PT operators**
 - Lessening investments, maintenance costs,...
- ① **Increased quality, reusability & upgradability**
- ① **Community approach to offer win-win strategy between partners**

- ① **E-nove demonstrator ready March 2009**
- ① **E-nove platform installed at RDTL on April 2009**
- ① **The open architecture of the E-nove platform will lead to the setup of a dedicated eco-system interested in adding application content to the platform**



Questions?

Thank you for your attention

