Paris, France
An OSGi Environment for Flexible Service Concepts

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Agenda

- Open Market for Telematics
- Global Systems for Telematics (GST)
- Test Site Aachen / Rüsselsheim
- Subprojects demonstrated in Test Site
- Test Site Architecture
- Test Cars
Telematics for what?

Safety/Security
Driver Assist
Personal Service
Entertainment

Warranty Cost reduction
Brand Differentiation
Vehicle Quality/Sales
Customer Relationship

Other:
Insurance
Special Svcs
Telco, etc...

Vehicle productivity
Tracking/Logistics
Anti-theft (Security)
Lower maint. Cost

Fleet

Government

Auto OEM

Consumer

Safety/Security
Traffic Management
Road Use toll/tax
Hazard reduction
From 2\textsuperscript{nd} to 3\textsuperscript{rd} Generation Telematics

2GT Fixed Services
- Fixed service portfolio
- No upgrade path
- Low perceived value
- New service = new development

3GT Open Configurable Services
- Unlimited "virtual" service portfolio
- End user configured download
- Subscribe / upgrade on-demand
- High Perceived Value ➔ Revenue

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Creating an Open Market

Ease of Market Access

- Open Telematics Market
- Avoid unduly high barriers of market entry
- Freedom of choice in service consumption

Service Provider
Service Provider
Service Provider
Service User
Service User
Service User
Purpose of GST Project

• Create an open market for telematics services
  – Create an environment in which innovative telematics services can be developed and delivered cost effectively
  – Increase the range of economic telematics services available to manufacturers and consumers
Fact sheet

- Integrated Project, co-funded by EC 6th framework
- Start: March 2004, end: February 2007 (36 months)
- Total budget: 21,5 M€, EC contribution: 11 M€
- 49 partners
Project Structure

Management layers:
- Steering Committee
- Core Team
- Core Architecture Group

Key results:
1. Architecture & Interface specifications
2. Reference implementation
3. Test suite

Technology oriented subprojects:
- Open Systems Certification Security Service Payment

Service oriented subprojects:
- Rescue Safety Channel Enhanced Floating Car Data

2004  2005  2006

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Cross Border Test Site Aachen / Rüsselsheim

- Open Systems
- EFCD
- Rescue
- Safety Channel
- Service Payment
Open Systems – GST Architecture
Protocols - Layer

Payload

Transport

Non OS

PHY/MAC

PHY/MAC

PHY/MAC

Safety Channel

Prop

HTTP

HTTP

HTTP

HTTP

TCP

TCP

TCP

SAML

SAML

SAML/WS

SyncML

Application

Application

Application

Application

802.11p

IP(v6)

IP(v6)

IP(v6)

TPEG

ASN.1

ASN.1

SyncML

SAML

Applic.

WS/SAML

SOAP

SOAP

SOAP

SOCAP

GSM

USSD

SAML/WS

HTTP1

HTTP1

HTTP1

HTTP1

HTTP1

HTTP1

HTTP1

HTTP1

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In Vehicle Framework

HMI/MMI/User Interface

mBedded Server

Browser Bundle
Protocol Bundles
Security Bundles
OSGi Bundles
Network Mgmt Bundles
User Interaction Bundles
Customized Bundles
Bundled Native Code

Other Java Applications
Other Native Applications

OSGi Framework ProSyst

Java VM

Operating System / RTOS

Processor

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EFCD Overview

Working domain of the EFCD project

Service center

Wireless carrier A

Roaming

Wireless carrier B

Secondary business (e.g. map updates)

EFCD messages

Protocol conversion

Open system

Information from various in-car sensors

traffic-related information via different transport media
EFCD Framework

Different levels of detection

Vehicle sensor technology

Standardized vehicle sensor interface

Complex algorithms using external service information

Complex algorithms using various in-vehicle sensors

Third Party Algorithms

SC information (e.g. traffic, weather)

Local danger information (e.g. V2V, V2I)

In-vehicle application interface (e.g. Navi, Rescue, ADAS)

Filtered sensor status exceeding thresholds (e.g. pollution data)

Third Party Algorithms

Status of sensor objects unfiltered (e.g. speed, rain)

Event-based data + information

Raw data

Third Party Algorithms

Communication Module

EFCD message generation and management

EFCD detection management

Possible implementation of 3rd Party algorithms
Rescue Overview
Rescue - Services

- **eCall**
  - Sending “Minimum Set of Data” (MSD) to a PSAP and forward that to the ambulance vehicle

- **Rescue Vehicle Navigation**
  - Supporting the ambulance driver with a detailed, dynamic navigation information to the place the accident occurs
Rescue Service Blue Wave

Blue Wave – warns vehicles ahead that an Emergency Services Vehicle is approaching.
Rescue Service Virtual Cones

Virtual Cones – warns vehicles that they are approaching a road traffic accident
Safety Channel

- Develop a bearer independent transmission channel for transporting safety related messages
- Provide Specifications
- Validation via a tested reference implementation
### Safety Channel - Message Types

<table>
<thead>
<tr>
<th>Driver ACTION + instruction</th>
<th>Location Specific</th>
<th>Location Non-specific</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obstructions, Closures, Spillages (leading to poor road surface conditions), Ghost Drivers, Flooding, Fires, Accidents causing obstructions</td>
<td>Fog Avalanche</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Driver WARNING + advice</th>
<th>Accidents, Lane restrictions, Queues, Road Closures, Facilities not working, wide loads, Road blocked</th>
<th>Road Surface conditions, Visibility, Animals / Pedestrians on the Road, Ice / Snow conditions, general weather warnings</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Driver AWARENESS</th>
<th>Traffic messages</th>
<th>Events</th>
</tr>
</thead>
</table>
Service Payment

- Service Payment intends to cover the required system components and functionalities for the GST payment and billing architecture, such as:
  - Secure transaction environment for payment or commercial transactions (the Trustable Running Environment)
  - Payment/billing agent in the in-car infrastructure
  - Payment/billing entities in the back-office infrastructure
  - Specific "wrappers" or connectors to existing payment solutions/payment infrastructure.
Test Car Focus C-MAX

- Hardware → Embedded Platform
- Extraction of specification for embedded platform
  - Positioning (GPS, Gyro, Speed-Sensor)
  - V2I /V2V communication (GPRS, WLAN)
  - Short range communication (Bluetooth)
  - In Car communication (CAN)
  - Serial Interfaces (for connecting external modules)
  - Broadcast communication (DAB receiver)
Test Car Focus C-MAX

- **Software**
  - Operating system
    - QNX
    - JVM (IBM J9)
  - OSGi framework
    - Prosyst mBedded Server
  - Reference Implementations
    - Provided by GST subprojects
Thank you for your attention!

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Research and Advanced Engineering