



INFORMATION TECHNOLOGY FOR EUROPEAN ADVANCEMENT

## Trust 4All Trustworthiness 4 Your Daily Life

ITEA 2 Symposium 2008 – Rotterdam, the Netherlands  
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European leadership in Software-intensive Systems and Services. The Future of Embedded and Distributed Software.

### Introduction Presentation Overview

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Project Presentation Trust4All

- Introduction (state of the art, future & issues)
- Innovation (baseline & advancements)
- Solution (core of the achievements)
- Results (publications, demo's & transfers)





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## Introduction



European leadership in Software-intensive Systems and Services. The Future of Embedded and Distributed Software.

## Introduction

### The past



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#### Application area:

- Entertainment



#### Characteristics:

- Proprietary
- Standalone



#### Single Application:

- Single Core System
- Static Configuration



## Introduction

### The future (is now)



### Application areas:

- Entertainment



- Home M...

### Characteristics

- Proprietary
- Standard
- Single System
- Static Configuration



- Open
- Connected
- Multiple Applications
- Multi Core Systems
- Dynamic Configurations & Feature-rich



**Almost 'unlimited' & unforeseen opportunities ...  
Unfortunately also a lot of threats ...**

## Introduction

### The challenge

**→ To maintain a high level of dependability & reliability ←**

Imagine the impact of ...



A frame-skip during a DVD playback ...

... not a big deal for most of us.

A portable device running out of power just before ...

... quite annoying to most of us.

A navigation system that leads to no-man's land ...

... quite irritating to most of us.

A home-medicare / automotive service not being able to complete a life saving operation ...

... a 'killer' experience for some of us.

## Introduction

### What is Trust4All about

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- Trust4All = providing
  - trustworthiness (dependability, reliability, safety, ...)
    - at run time
    - & during the lifecycle of
      - Software intensive
      - Embedded systems
- Early observation: → focus on the non functional properties  
→ need for standardization



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## Innovation



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## Innovation Starting Point

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- ROBOCOP: Component Based Framework for High Volume Embedded Devices
  - Robust & Reliable operation (run-time)
  - Upgrading / Updating (life-time)
  - Component Trading (multiple suppliers)
- Space4U: Validate, mature and extend the architecture with
  - Fault Management (non functional)
  - Power Management (non functional)
  - Terminal Management (non functional)



## Innovation Innovation over the starting point

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- To allow for easy and late integration of software from multiple suppliers and still have a high level of confidence in the dependable and secure operation of the resulting system
- Solution space addressed in Trust4All:
  - improvement of the (existing) core architecture
  - introduce trustworthiness management
  - models of non-functional characteristics
    - resources (power, memory, compute, ...)
    - timing behavior
    - security / privacy classes
    - ...
  - composition of models
  - comparison of models



# Innovation The Project Partners



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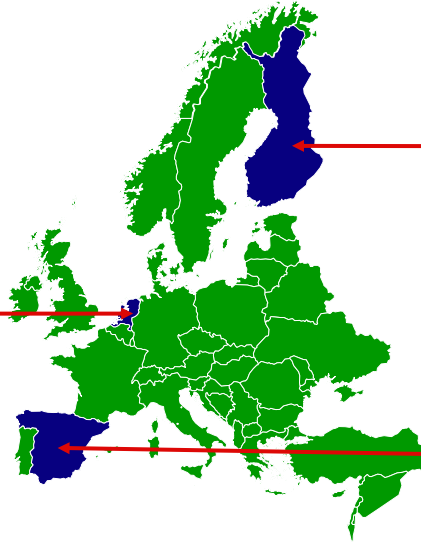
**The Netherlands**

Telematica  
Printing for Professionals

PHILIPS  
innovate and prosper

TU/e

CWI



**Finland**

NOKIA  
Connecting People

VTT

solid.

**Spain**

ESI  
European Software Institute

robotiker

VISUAL TOOLS

ikerlan  
TECHNOLOGICAL RESEARCH CENTRE

FAGOR  
FAGOR ELECTRONICA



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## Solution

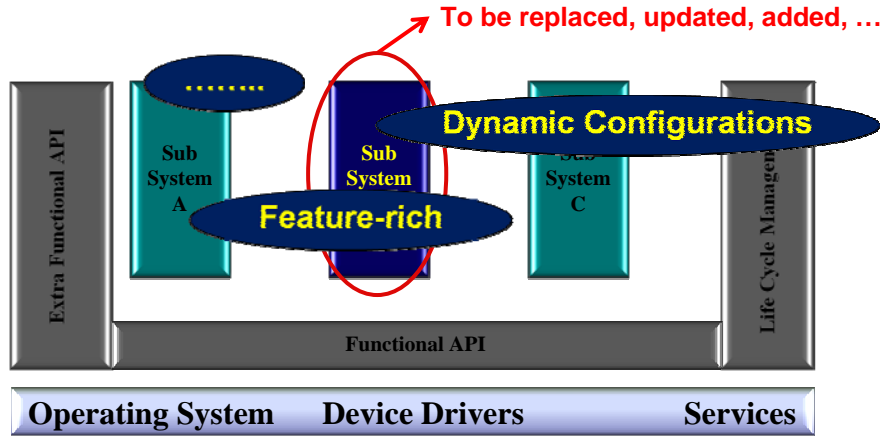


**Solution**  
**How (to maintain...) ... (Change Request)**

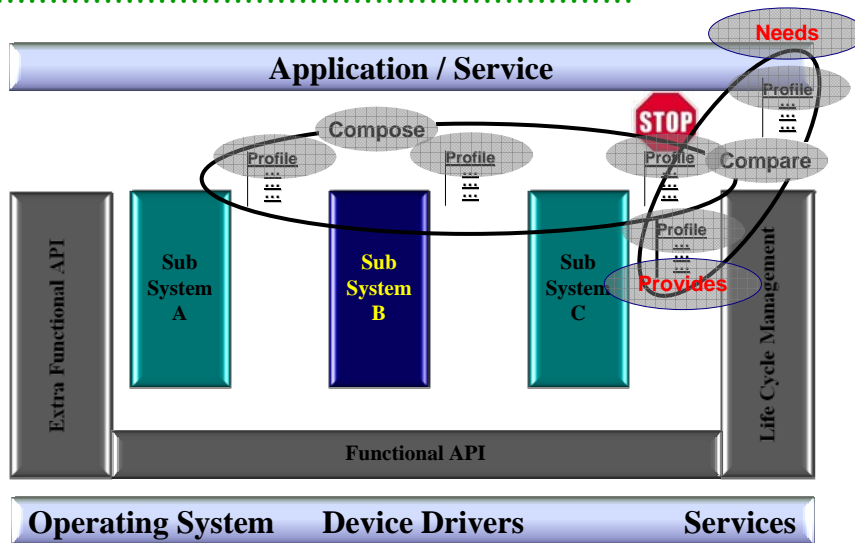
**Multiple Applications**

Application / Service

**Open**

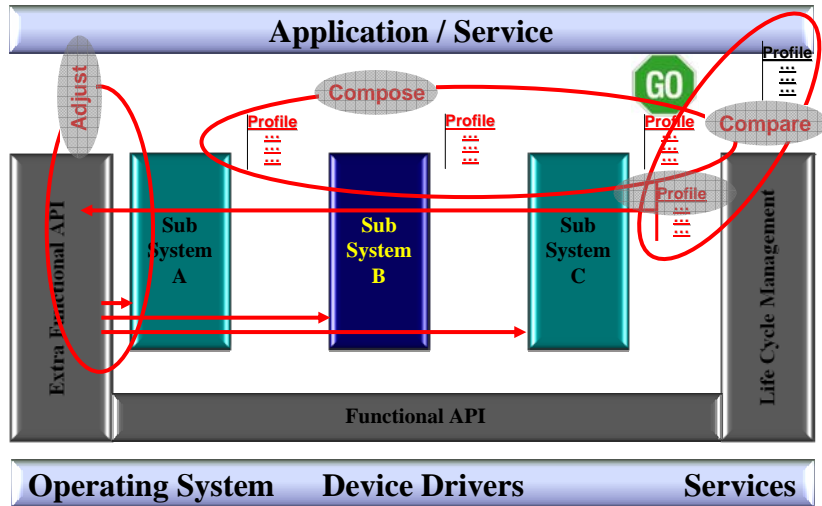


**Solution**  
**How (to maintain...) ... (Check → STOP)**



## Solution

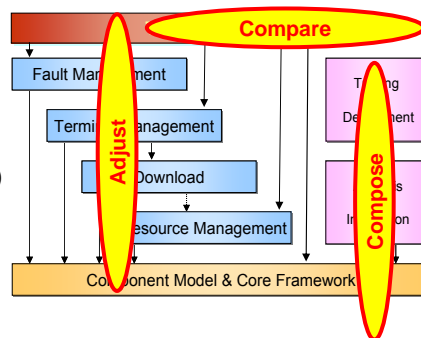
How, (to maintain...) ... (from STOP to GO)



## Solution

Solution Architecture

- The Trust4All architecture:
  - Trust Management Framework
  - Non Functional extensions (←)
  - Support tools (→)
  - Baseline (CM&CF)



## Results



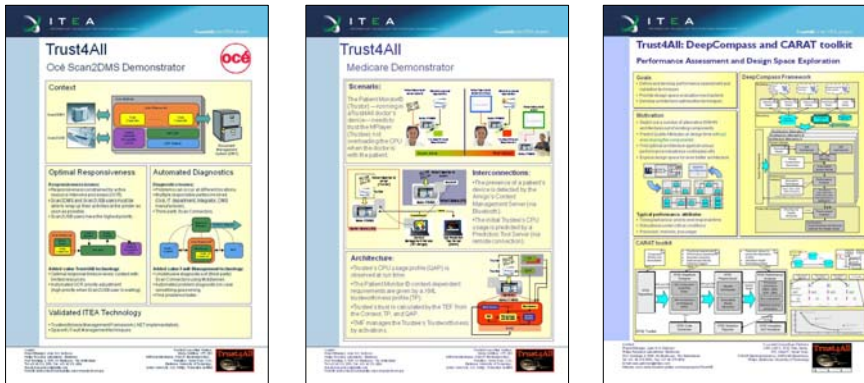
## Results

### Results - Demonstrators

- Trust4All has demonstrated that Trustworthiness evaluation and management is feasible and is a step forward over the current state of the art in (Component Based) (Embedded) Systems
- An overview of the application and tool demonstrators:
  - Mobile Campus Assistant Development
  - **Scan2DMS Development**
  - Elderly People Multimedia Monitoring System Development
  - The Taxi Driver Assistant Demonstrator Development
  - **Medicare Demonstrator Development**
  - Tools & technology demonstrators: Q-automata, RoboSCoPE, **Carat – component architectures analysis tool**, Visualization of Areas of Interest, Security Analysis for Component-based Systems, KumBangSec, Adaptive Fault Tolerance, ...

## Results

### Demonstrators - Exploitation



- Exploitation
  - 2 new product concepts (Open PLC, Customizable Media Server)
  - 4 new services for 'internal use' (DTV, Smartphone, Medical, Domotica)

## Results

### Dissemination (Papers and Tutorials)

- 74 publications / presentations at international conferences, magazines and books
- Half-day tutorials at:
  - Spring 2006 International Conference on Consumer Electronics (Las Vegas)
  - Fall 2006 EuroMicro SEAA conference (Dubrovnik)
- 6 presentations / demonstrations at conferences/fairs

## Results Dissemination (Standardisation)



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- The eighth parts of the ISO/IEC 23004 **M3W** standard:

– ISO/IEC 23004-1 Architecture	_____	<b>50%</b>	<b>Trust4All Contributions</b>
– ISO/IEC 23004-2 Multimedia API	_____	<b>0%</b>	
– ISO/IEC 23004-3 Component Model	_____	<b>90%</b>	
– ISO/IEC 23004-4 Resource and Quality Management	_____	<b>100%</b>	
– ISO/IEC 23004-5 Component Download	_____	<b>100%</b>	
– ISO/IEC 23004-6 Fault Management	_____	<b>100%</b>	
– ISO/IEC 23004-7 System Integrity Management	_____	<b>100%</b>	
– ISO/IEC 23004-8 Reference Software	_____	<b>90%</b>	

- Standard was finalized at the end of the Trust4All project, will be published as an International Standard in the fall of 2008.

- Considered for application in ITU-T IPTV and MPEG MXM\*



\* International Telecommunication Union: Internet Protocol TV / Moving Picture Experts Group MPEG eXtensible Middleware

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Thank you for your attention



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