PECES Development tools

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Objectives

- Develop tools to facilitate the application development with the middleware
- Develop tools to model the context and networks dynamics
- Develop tools to test and analyse the middleware and applications
## Requirements (1/2)

<table>
<thead>
<tr>
<th>Requirement</th>
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<tbody>
<tr>
<td>The development tools should provide support for the devices of the</td>
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<tr>
<td>prototype applications</td>
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<td>The development tools should support the specification of policies to</td>
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<tr>
<td>limit the distribution of context information</td>
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<tr>
<td>The development tools should support the specification of static device</td>
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<tr>
<td>context</td>
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<tr>
<td>The development tools should support the programming language of the</td>
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<tr>
<td>middleware</td>
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<td>The development tools should support the configuration of encryption keys</td>
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<tr>
<td>The development tools should be integrated into an existing IDE</td>
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<tr>
<td>The development tools should use the context ontology to simplify the user</td>
</tr>
<tr>
<td>interface</td>
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<tr>
<td>The development tool should support the graphical user interfaces of</td>
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<tr>
<td>various devices and their interaction</td>
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</tbody>
</table>
## Requirements (2/2)

<table>
<thead>
<tr>
<th>Requirement</th>
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<tbody>
<tr>
<td>The development tools should support the testing of group specifications</td>
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<tr>
<td>The development tools should support the modeling of a set of networked smart spaces</td>
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PECES Development Tools

- Project Tool
- Device Definition Tool
- Ontology Instantiation Tool
- Security Configuration Tool
- Service Definition Tool
- Role Specification Definition Tool
- Hierarchical Role Specification Tool
- Event Editor Tool
- Event Diagram Editor Tool
- Testing Tool
Tools Interface

- **project.xml**
  - Device Definition Tool
  - Ontology Instantiation Tool
  - Role Specification Definition Tool
  - Service Definition Tool
  - Event Editor Tool
  - Testing Tool

- **project.owl**
  - Ontology Instantiation Tool
  - Role Specification Definition Tool
  - Service Definition Tool
  - Event Editor Tool

- **events.xml**
  - Event Diagram Editor Tool
  - Testing Tool
Project Tool

This project is used to provide links to other Tools

Three folders are generated
Device Definition Tool

Image based interface

Drag and Drop features

Java middleware project for each device

Generate project.xml file
Ontology Instantiation Tool

Provides protege like user interface but integrated with Eclipse

Loads device information from the project xml file

Supports PECES Ontologies as well as other ontologies
Integration of openssl toolkit with Eclipse

Root certificate

Certificate of chains

Client certificate
Service Definition Tool

Provides interface for code generation for use of a PECES-based service and hide development complexity.
Role Specification Definition

Tool

Ruleset: any device providing any service?

Supports AND/OR conditions

Generates Role Specification for smart space formation
Hierarchical Role Specification Tool

Provides feature to define smart spaces hierarchically
Event Editor Tool – Overview

<table>
<thead>
<tr>
<th>Type</th>
<th>Contributing Devices</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delay</td>
<td></td>
<td>This is a Peces event</td>
</tr>
</tbody>
</table>
Event Editor – Context Page

Loads from project.xml file
Add triplet
Remove triplet
Event Editor Tool – Connection Page

Loads device information from project.xml file

Two devices can be connected or disconnected
Event Diagram

Events are sequenced
Events can be used multiple times
Generates events.xml to be used by the testing tool
Simulation time can be specified

Internet Registry IP can be defined

Defined application can be executed

Device status will be shown during testing (Off/On)
Important events are logged

Absolute time is used

Device reference is in the log
Testing Tool – visualise page 1

Smart space established

Four devices are On

Role assigned

Devices are not connected
Testing Tool – visualise

Network Visualisation

List of Events

- Device 1 On
- Device 3 On
- Device 2 On
- Device 0 On
- SmartSpace_Establish
- 0 connects to 1
- 0 connects to 3
- 0 connects to 2
- 1 joins SmartSpace
- 3 joins SmartSpace
- 2 joins SmartSpace
- 1 Removing Context
- 1 leaves SmartSpace
- 0 disconnects from 1
- 0 disconnects from 2
- 2 leaves SmartSpace
- 0 connects to 2
- 2 joins SmartSpace

BoothNavigation

Time: 32273ms
Testing Tool – visualise page 3
Summary

- Many tools implemented
- Tools evaluated on non-PECES users and results currently analysed
- First indications are that using the tools speeds up productivity considerably
- Tools available online from the PECES project tools site: http://www.ict-peces.eu/eclipsetools.