COMANCHE: A Knowledge Management Framework for Software Configuration Management

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Nikiforos Ploskas, TELETEL SA, N.Ploskas@TELETEL.eu
COMANCHE Main Objectives and Approach

- COMANCHE IST-STREP- 034909 “Software configuration management framework for networked services environments and architectures incorporating ambient intelligence”

- COMANCHE aims to develop and validate a generic framework for Software Configuration Management (SCM), which will pave the way to the realisation of technically and commercially viable private spaces incorporating ambient intelligence features

- The focus is set on:
  - The organisation and exploitation of the diverse knowledge pertaining to the management of ambient private spaces
  - Ensuring ambient service consistency and minimising service deployment risks
  - Ensuring adherence to user privacy preferences and policies
  - Practical adoption of the COMANCHE approach in real-world residential services environments
COMANCHE Main Target Market: The Intelligent Home

The intelligent home

Top ten home automation markets

- Multiple Phone Lines: 45%
- Structured Wiring: 45%
- Security System: 44%
- Energy Management: 42%
- Multi-Zone HVAC System: 37%
- Lighting Control System: 32%
- Monitored Security: 26%
- Home Theater: 24%
- Automated Lighting Control: 24%
- Distributed Audio: 18%
<table>
<thead>
<tr>
<th><strong>Name:</strong></th>
<th>COMANCHE</th>
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<tbody>
<tr>
<td><strong>Start Date:</strong></td>
<td>01/09/06</td>
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<td><strong>Duration:</strong></td>
<td>24 months</td>
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<td><strong>No of Partners:</strong></td>
<td>10</td>
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<td><strong>Strategic Objective:</strong></td>
<td>Priority: 2.5.5.1: “Research on the engineering, management and provision of services and software, incorporating ambient intelligence-based features such as dynamic compositability and adaptability, context awareness, autonomy and semantic interoperability”</td>
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<td><strong>Project Budget:</strong></td>
<td>4.89 million EUROS</td>
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COMANCHE project will carry out the following innovative research activities:

✓ Development of the COMANCHE knowledge management framework for the discovery/acquisition of the diverse knowledge required for SCM (user wants, business rules, technical interoperability rules, etc), and the effective resolving of potential knowledge conflicts.

✓ Development of the COMANCHE component-based software architecture to allow the efficient engineering, deployment, and run-time management of reconfigurable user-centric services.

✓ Development of the COMANCHE methodology for modelling software runtime aspects to address software configuration across today's distributed, complex, heterogeneous, and multi-vendor services environments.

✓ Development of the COMANCHE unified identity management and security framework will enable flexible and secure man-to-machine and machine-to-machine interactions, serving the purposes of software configuration management, across today's ambient intelligent private spaces.

✓ Design and development of the different instances (domestic appliances, digital entertainment equipment, etc) of the entities that will reside in the private services islands of the COMANCHE architecture. These will be the SCM Gateways and the SCM Device Agents.
The COMANCHE Framework Architecture

- **SCM Service Provider**: Manages the SW configuration of identity federation.
- **Identity Provider**: Manages identity federation and trusts SCM Service Provider.
- **Attribute Providers**: Discover and access knowledge from.
- **Software/Service Providers**: Publish SW specifications and trusts Identity Provider.
- **User-Centric Services Environment**: Obtains and installs software from SCM Gateway Application.

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Functional Architecture of the COMANCHE Knowledge Management Framework

**SCM Provider Infrastructure**

- **SCM Knowledge Repository**
  - Knowledge Manager
  - Attribute Knowledge Base
  - Context Knowledge Base
  - Requests for knowledge instantiations
  - Conflict-free knowledge delivery

- **Knowledge Registry**
  - Knowledge Discovery
  - Downloading of Ontology instantiations

- **Attribute Providers**
  - Knowledge Publishing
  - Attribute Providers

- **Context Providers**
  - Events

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Profiles for service discovery and filtering

Service behaviour

Service configuration

Service composition
✓ Home environment network configuration

✓ Device characteristics

✓ Service installations and status

✓ Events affecting service execution
✓ Business models
✓ Business-domain relationships
✓ User privileges
✓ User privacy preferences
✓ Identity management and security
The COMANCHE architecture and SCM infrastructure provide means for managing semantics in a Service Oriented Architecture.

The COMANCHE Ontology enables generic description of Software and Services and facilitates discovery/acquisition of the knowledge required for SCM.

The service ontology is a successful representation formalisms for representing services.

The Project has developed use cases that demonstrate the business value delivered from the adoption of semantics engineering.
The COMANCHE Approach in relation to Future Internet Cross Cutting Issues

<table>
<thead>
<tr>
<th>Services Architectures</th>
<th>Architecture and Infrastructure of the Future Internet</th>
<th>Trust at Scale and Granularity</th>
<th>Management and Governance of the Future Internet</th>
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<tbody>
<tr>
<td>Internet of Things</td>
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<td>Security</td>
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THANK YOU

Questions?