

CASCOM

Context-Aware Business Application Service Co-ordination in Mobile Computing Environments

Specific Targeted Research Project

SIXTH FRAMEWORK PROGRAMME
PRIORITY [FP6-2003-IST-2]
INFORMATION SOCIETY TECHNOLOGIES

Contract no.: 511632

<http://www.ist-cascom.org>



- 6th Framework Programme – Priority 2 “Information Society Technologies”
- Call identifier: FP6–2003–IST–2
- Strategic objective: “Applications for the Mobile User and Worker”
- Contract No.: 511632 – CASCOM
- Instrument Type: Specific Targeted Research Project



- Duration: 36 months from 1st September 2004
- Community financial contribution: 2.693.476 € (max.)
- Project Management: German Research Centre for Artificial Intelligence (DFKI)
- Technical Management: TeliaSonera AB
- 8 Partners



- German Research Centre for Artificial Intelligence – DFKI (Germany)
- TeliaSonera AB (Sweden/Finland)
- Associação para o Desenvolvimento das Telecomunicações e Técnicas de Informática – ADETTI (Portugal)
- Universidad Rey Juan Carlos – URJC (Spain)
- Ecole Polytechnique Federal de Lausanne – EPFL (Switzerland)
- FRAMETech S.R.L. (Italy)
- EMA Group Ltd. (Finland)
- Universität Basel – UNIBAS (Switzerland)



CASCOM Consortium





Main objective

To develop, implement, validate, and trial of agent-based service coordination infrastructure for innovative Semantic Web service discovery, composition, execution across mobile and fixed P2P service networks.

Driving vision

Ubiquitous business application services are flexibly coordinated and pervasively provided to the mobile worker/user by intelligent agents in dynamically changing contexts of open, large-scale, and pervasive environments.

At the end of the project there will be a fully functional proof-of-concept system showing how business application services for mobile users and workers can be developed using secure agent-based intelligent P2P approach



- To understand the requirements, behavior, and needs of mobile users and workers.
- To investigate detailed requirements for, and available technical support of the implementation and execution of agents and multi-agent systems in next-generation intelligent P2P (IP2P) environments.
- To develop and deploy an open, coherent, secure, and scalable IP2P network infrastructure including different types of pervasive (mobile computing) devices, with the intent to exploit it as an environment for generic agents, services, and tools to be developed and deployed in CASCOM.
- To develop a generic, secure and reliable service execution platform for IP2P environments.



- To develop and deploy generic agents and advanced mechanisms for service co-ordination in open IP2P environments. That includes service discovery, composition planning, execution monitoring, and failure recovery, using state of the art technologies such as distributed constraint satisfaction.
- To investigate concepts, architectures, and methods to incorporate context-sensitivity and context-awareness into service co-ordination in IP2P environments.
- To practically evaluate how the system meets the business needs of multiple service providers and network operators (in a competitive environment) and the relationship between them.



- Context-aware service co-ordination in mobile/wireless P2P environments
- Generic Service Agent Architecture and Prototype Demonstrator
 - Service Coordination Means
 - Declarative Service Description
 - Flexible Service Matching
 - Dynamic Service Composition
 - Secure Service Execution & Monitoring
 - Intelligent Service Agents
 - Service Agent Platform for Nomadic Computing and P2P Communication
 - Context-Aware Service Provisioning
 - Dynamic Service Agent Coalitions



CASCOM – Main Expected Outcome



- (a) Innovative research results and techniques for context-aware, agent-based business application service co-ordination and secure provision in IP2P environments
- (b) Implemented context-aware agents using these techniques, and basic co-ordination infrastructure services
- (c) Service co-ordination architecture and specifications, and guidance for using (a) and (b) to develop context-aware business applications services in nomadic computing environments
- (d) CASCOM service coordination demonstrator for selected health care use case scenario



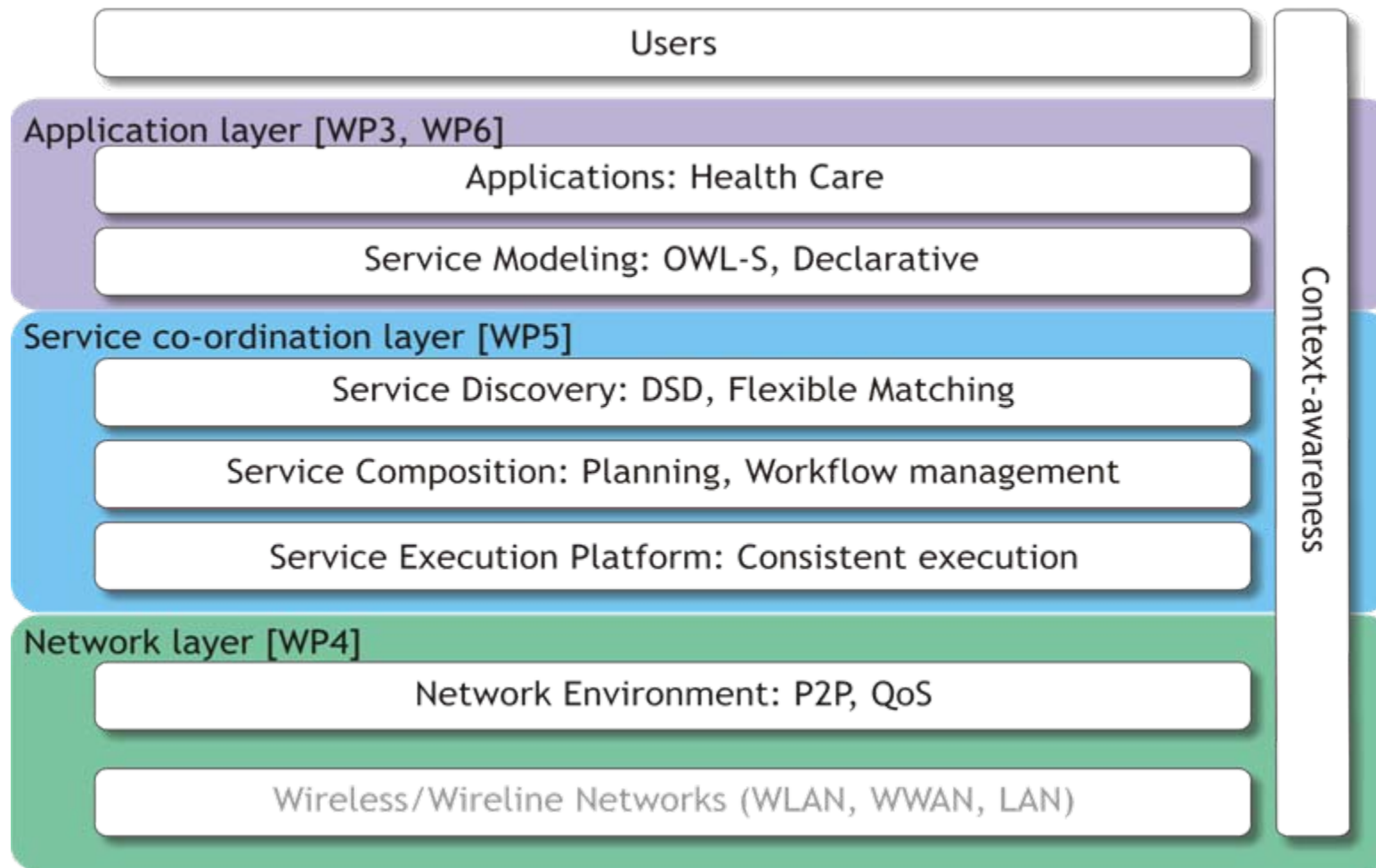
CASCOM – Technologies




- The IP2P network environment situated on top of the combination of various wireless and wireline access networks (e.g, GPRS, UMTS, WLAN, Internet)
- The IP2P service agent and multi-agent system architecture situated on top of the IP2P network infrastructure
- IP2P business application services are built on top of the service agent system architecture

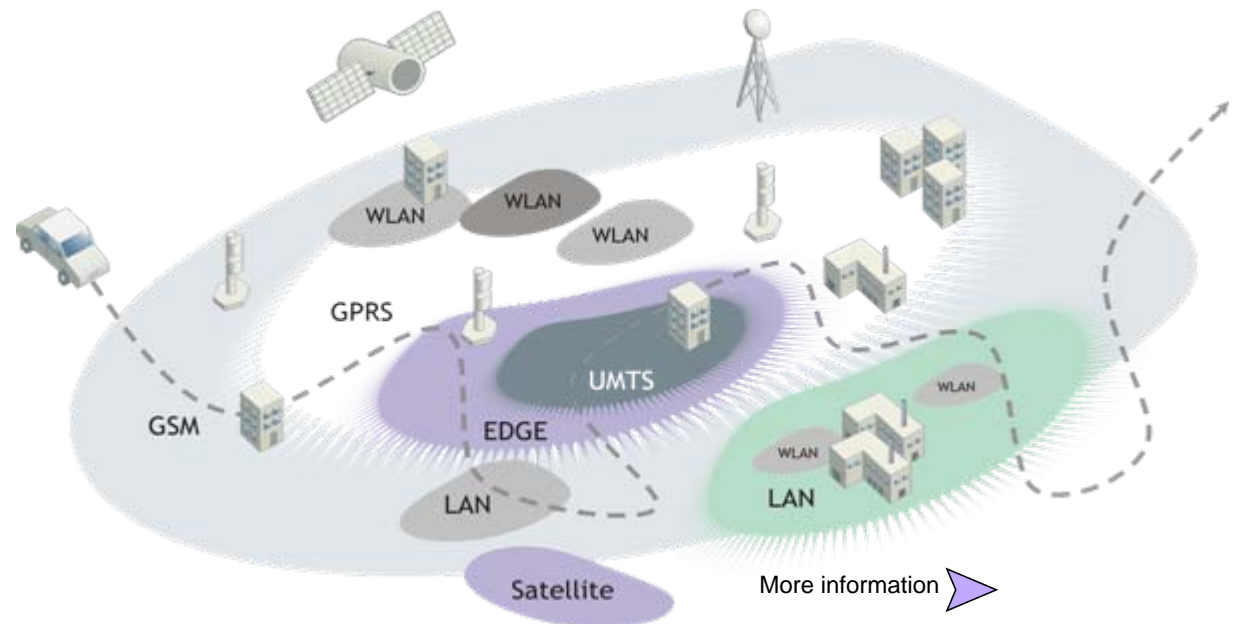


More information 

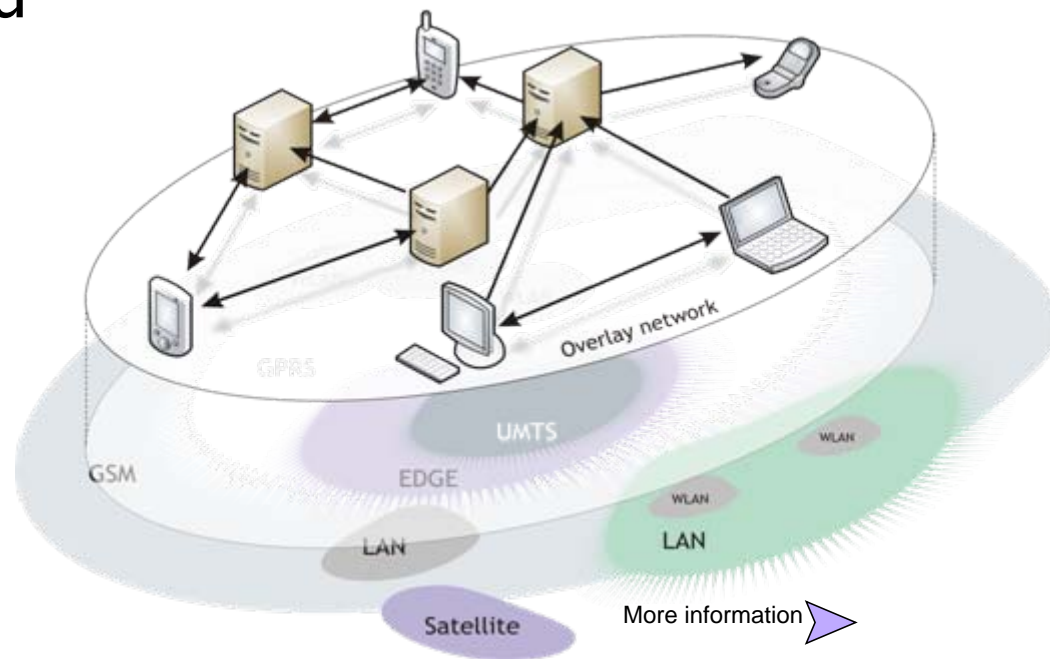


More information 

- Roaming from one location to another
 - Possibly switching the underlying network technology without causing inconvenience to the end-user or applications
- Important feature of future network architectures

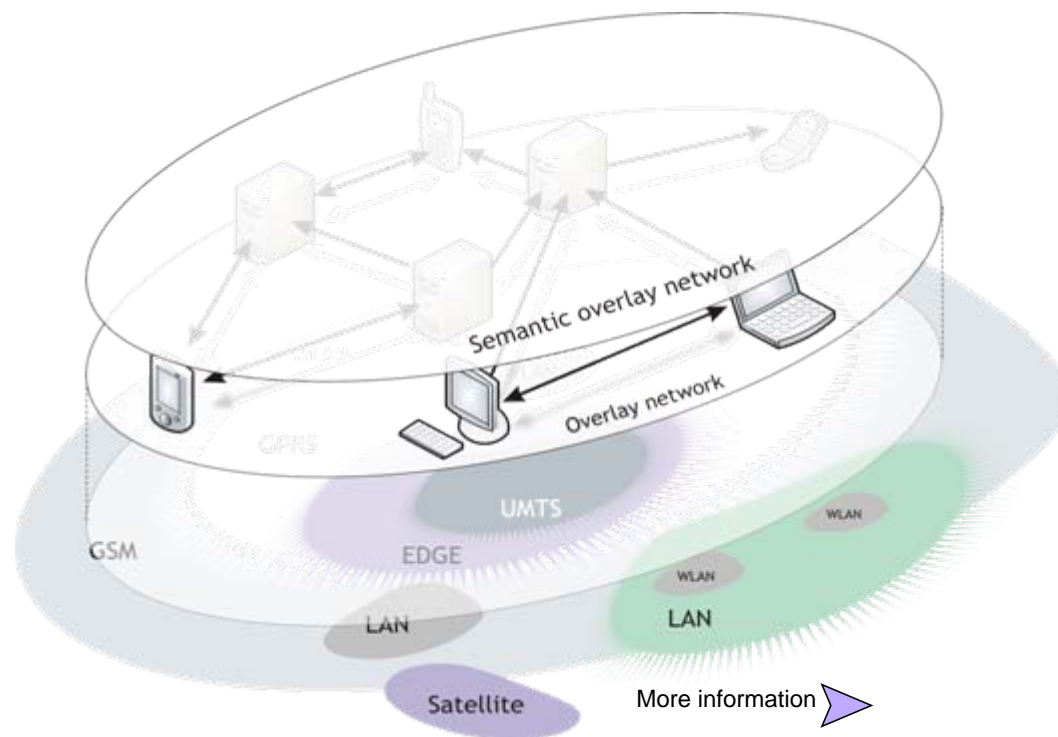


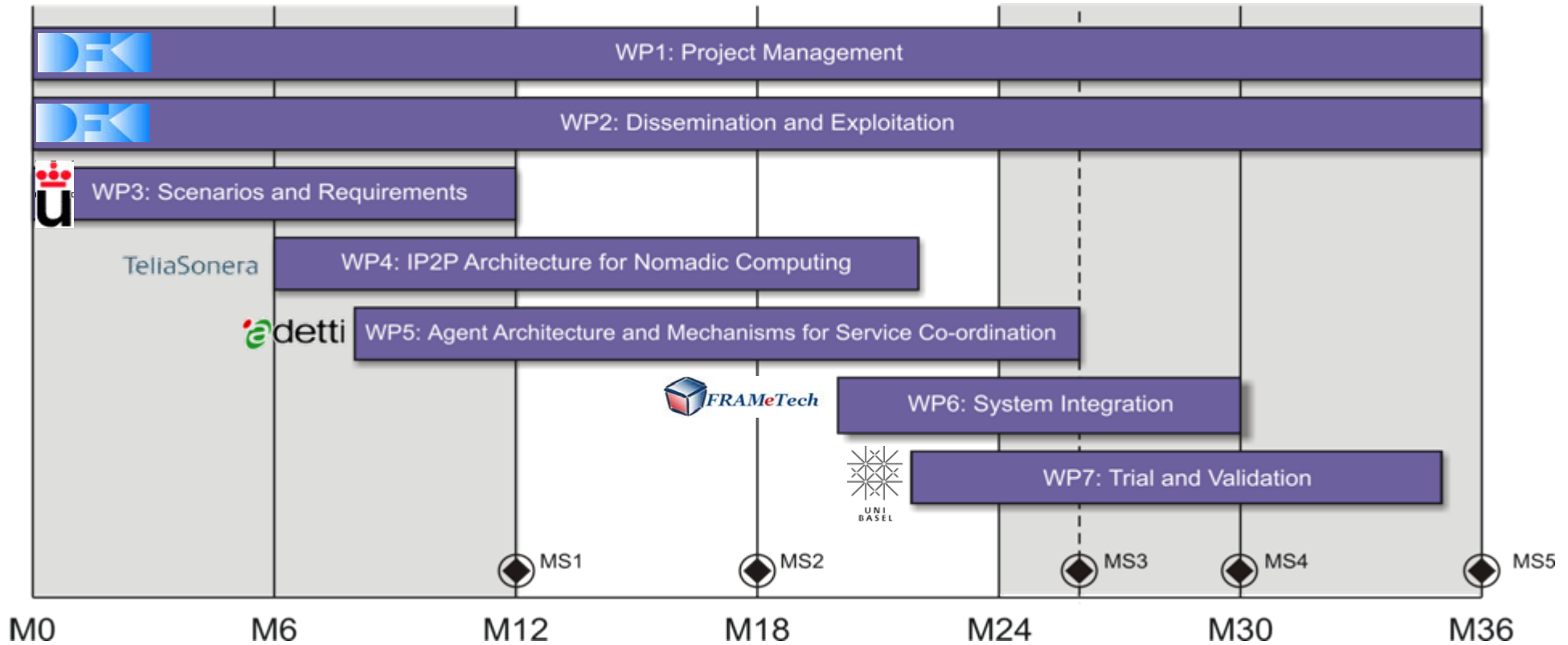
- Overlay network
 - An application layer network architecture implemented using P2P techniques
 - Pure vs. super-peer P2P architectures
- Support for different kind of devices
 - Desktops, laptops, PDAs, Mobile phones,...



- Semantic Overlay Network
 - Builds on P2P overlay network
 - Using semantic web and software agent technologies

- Support for
 - Dynamic Service Composition
 - Declarative Service Description
 - Flexible Service Matching
 - Secure Service Execution & Monitoring







- D2.1 Project presentation*
- D2.2 Project web page*
- D3.1 Use Case Scenarios*
- D2.3.1 Dissemination and Use Plan, v1 *
- D3.2.1 Conceptual Architecture Design, v1 *
- D4.1 IP2P Network Architecture
- D5.1 Distributed Service Directories for IP2P Environments
- D2.3.2 Dissemination and Use Plan, v2
- D4.2 Technical Guide to the IP2P Service Network Environment
- D4.3 IP2P Network Implementation

* Available at www.ist-cascom.org



- D5.2 Service Composition and Execution in IP2P Environments
- D5.3 General-Purpose Mechanism for Situation Aware Agents in IP2P Environments
- D5.4 Service Agent Architecture Implementation
- D6.1 Use Case Scenario Implementation (Demonstrator v1)
- D6.2 System Integration Implementation (Final Demonstrator)
- D7.1 Validation and Trial Plan
- D2.3.3 Dissemination and Use Plan, v3
- D3.2.2 Conceptual Architecture Design, v2 (final)
- D7.2 Validation and Trial Results
- D2.3.4 Dissemination and Use Plan, Final



DFKI:

Expertise in innovative application oriented research and development of autonomous agents and multi-agent systems, intelligent information systems for the internet and Web, and knowledge based service discovery and mediation.

TeliaSonera:

Experience in wireless/mobile data communications, wireless/mobile service provisioning, mobile devices, and software agent technology in nomadic environments. Provision of mobile computing and wireless communication platform, and the test infrastructure for the CASCOM trial.

EPFL:

Expertise in automated matchmaking and directory services for Web services, for planning service composition, and for the execution monitoring and failure recovery.



ADETTI:

Expertise on facilitating the creation of personal agents, with multi-modal interfaces for their users, facilitating the creation of business representative agents, dynamic intelligent service representation, discovery and composition, adaptive situation aware mechanisms for the service discovery and reasoning mechanisms, agent negotiation, contract representation, contract enforcement mechanisms, and trust building mechanisms.

UNIBAS:

Experience in service composition, validation of composite services, and reliable infrastructures and platforms for the execution of composite services and processes. Experience in the field of medical informatics and health information systems.



FRAMeTech:

Expertise in for advancing the research in agent-based infrastructures taking into account various aspects related to service composition and co-ordination. Consideration of all security aspects of the infrastructure, of the services and of the applications.

URJC:

Experience in the field of multi-agent systems and knowledge modeling. Experiences in modeling and interoperability issues, including knowledge models, construction of a flexible ontology for the application domain, organizational models, and communication and coordination models.

EMA:

Knowledge and expertise of a demanding business application domain, namely pervasive healthcare, for the research and development of the CASCOM solutions.



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