OPAALS PROJECT

Contract n° IST-034824

WP5: Integration with the Digital Ecosystem Platform

D5.4 – First prototype of OPAALS DE

Project funded by the European Community under the "Information Society Technology" Programme

Contract Number: IST-034824

Project Acronym: OPAALS

Deliverable N°: D5.4 First prototype of OPAALS DE

Due date: Month 30

Delivery Date: Month 33

Short Description: First prototype of OPAALS Digital Ecosystem platform, supporting the future deployment of Knowledge Ecosystems, as well as Business Ecosystems.

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Partners contributed: TechIDEAS, SURREY

Made available to: OPAALS Consortium and Europan Community

Versioning		
Version	**Date**	**Name, organization**
1.0	Nov/08	Juanjo Aparicio, Jesús E. Gabaldón, TechIDEAS
2.0	Mar/09	Jesús E. Gabaldón, Pablo Hernández, TechIDEAS, Paul Krause, SURREY

Quality check

Internal Reviewers: Ossi Nykanen, TUT

TV Prabhakar, IITK

Dependences:

Achievements*	Technology upgrade
Work Packages	Depends on WP3
Partners	UNIS, ITA
Domains	Computer science
Targets	SMEs, all OPAALS domanis
Publications*	
PhD Students*	
Outstanding features*	Several communities of users of the EU Project DEN4DEK (Finland and Austria; *see* next chapters) have been demanding access to the previous version of Sironta and are extremely interested in using this new version. This document describes such an upgrade, as well as the present state-of-the-art.
Disciplinary domains of authors*	All authors are under the Computer Science domain

The information marked with an asterisk (*) is provided in order to address Recommendation n. 4 from the Year 2 review report

D5.4 First prototype of OPAALS DE

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1 Introduction

This report describes the development procedure followed in WP5 *("Integration with the Digital Ecosystem Platform")* during the last part of Phase II of the OPAALS in order to release the first prototype of OPAALS DE (Digital Ecosystem). WP5 receives inputs from WP2, WP3 and WP10.

The present deliverable has been categorized as Prototype in the DoW. Therefore, this report essentially describes the prototyping process accomplished in WP5 and complements the more than 84.000 lines of code that are the actual deliverable. It is also necessary to emphasize that the text of the present deliverable is not aimed to fully and comprehensively describe the interaction with other WP's, indeed, these are described in the deliverables of the respective WP's.

Shifting from Business Ecosystems to Knowledge Ecosystems

One of the main changes in SIRONTA has been to move away from Business Ecosystems towards a Knowledge Ecosystems paradigm. The motivation for this shift has been to broadening the impact of Digital Ecosystems in the society. SIRONTA goes beyond Post-Industrial Economy based on goods and services, and going towards the Knowledge Economy based on ideas, knowledge and information.

The initial foundation for the Knowledge Economy was first introduced in 1966 in a book by Peter Drucker. *The Effective Executive [1]* described the difference between the manual worker (page 2) and the knowledge worker. He differentiated between the two by describing a manual worker who works with his hands and produces goods or services. In contrast, a knowledge worker (page 3) works with his or her head not hands, and produces ideas, knowledge, and information.

The knowledge economy term was popularized if not invented by *Peter Drucker* as the title of Chapter 12 in his book *The Age of Discontinuity [2]*. The term refers either to an economy of knowledge focused on the production and management of knowledge in the frame of economic constraints, or to a knowlege-based economy.

Improved usability based on the Room Metaphor

In order to improve the usability of SIRONTA we adopted the *Room Metaphor* introduced in 1998 by *Saul Greenberg* and *Mark Roseman* in the paper *Using a Room Metaphor to Ease Transitions in Groupware [3]*.

Many team collaboration systems contain gaps that hinder or block natural social interaction or that does not let people easily move between different styles of work. We believe that the adoption of a room metaphor in SIRONTA can ease people's transitions across these gaps, allowing them to work together more naturally.

Market opportunity and industrial applications

In October, 2007 Gartner Group publish the first Magic Quadrant for Team Collaboration and Social Software, estimating a market of $4.4 billion.

The collaboration and social software market is evolving in response to the demand for a coherent set of capabilities, processes and services to span communication, coordination, communities and informal social interactions. Buyers in the collaboration support market are looking for persistent virtual environments where participants can create, organize and share information, as well as interact with each other.

SIRONTA is targeting this market opportunity and looking for industrial applications that demonstrate the commercial viability of our product.

2 Supporting the Knowledge Economy

The OPAALS Digital Ecosystems (DE) are a transition toward a knowledge ecosystem in which their participants are not trading with goods or services but with information.

2.1 Digital Business Ecosystems

Digital Business Ecosystems (DBE) have some well-known constraints that can be summarized:

- API centric: design & implementation based on java
- Bootstrapping: difficult to spread the installation of new nodes
- Standards: low use of standards
- Firewall & NAT problem
- Lack of identity & security built-in

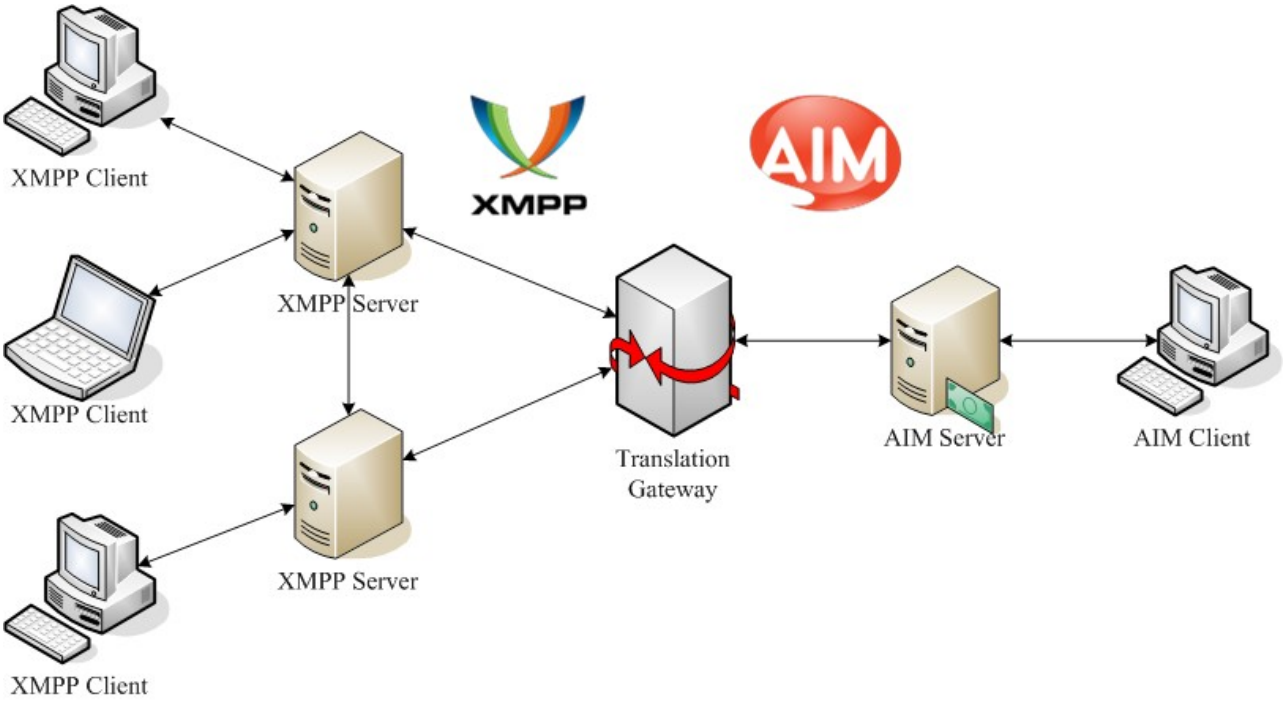
2.2 OPAALS Digital Ecosystems

OPAALS Digital Ecosystems have some improvements that can be summarized as follows:

- Protocol based: XMPP has been selected as the option for being simple and effective at the same time
- Bootstrapping: very easy and base on the widespread XMPP server network, initiated by jabber.org and adopted by Google, Apple, SUN.
- Standards: extensive use of a set of standards for the key points:
    - XMPP (Extensible Messaging and Presence Protocol) as a networking overlay as the session level to simplify [4]
    - OSGi framework as a complete and dynamic component model to improve the openess of the ecosystems and future development of new applications [5]
    - SOAP over XMPP: XMPP can be the ideal transport protocol for many of the application fields of web services, since it can carry efficiently and reliably both types of messages, synchronous and asynchronous. Moreover, XMPP-based web services will not need complex support protocols, such as WS-Routing and WS-Referral , in order to deliver messages to entities that cannot be identified by static public IP addresses. [6]
- Firewall & NAT problem: it has been solved by using XMPP protocol and some extensions, like STUN, HTTP binding.

2.3 DE Architecture

The architecture of OPAALS DE is based on XMPP for the network layer and inherit some features that are considered key for Digital Ecosystems and more recently for Cloud Computing:



Some of the Key Features in OPAALS DE can be summarize in the following table:

Key Feature	*Description*
Universal	Each user can create his own account (user@domain) and collaborate with any other user on the internet.
Resilience (No single point of failure)	Each organization (company, university, ...) can have his own server controlling all his activities and working cooperatively with servers in others domains as equals peers.
Extensible	XMPP support extensions
Cloud Computing	The OPAALS ecosystems arrives to the edge of the network, by supporting Any Device & Any Network, thanks to the versatility of XMPP and the availability of multiple implementations for many different languages and OS's.
Scalable	The OPAALS distributed architecture is highly scalable and resillience.
Multimedia Streaming	Support for rich media applications and services, including voice and video in streaming, using P2P connections for optimizing bandwith use on server-side.
Identity, Security & Presence	Identity, security and presence natively supported.

Further research is needed to demonstrate that this architecture overcome some known limitations of Web 2.0 architecture:

- Polling doesn't scale and isn't real-time
- Need two-way data exchange with easy firewall traversal
- Web services are feature poor (presence, binary data, etc...)
- SOAP is needed for complex services, but is overly complicated

In order to be universal, we include in OPAALS DE the support for the integration of Web 2.0 architecture by using the extensions to support RPC or SOAP calls over XMPP and by using the HTTP binding to route XMPP traffic over HTPP.

Furthermore the universality could be accomplished by the implementation and deployment of Translation Servers for legacy protocols and applications.

3 The Room-Metaphor in SIRONTA

Many group-ware systems contain gaps that hinder or block natural social interaction or that does not let people easily move between different styles of work. We believed that the adoption of a room metaphor in SIRONTA can ease people's transitions to team collaboration, allowing them to work together more naturally.

3.1 Gaps in Team Collaboration Applications

We show how particular gaps in Team Collaboration applications has been removed in SIRONTA:

- We ease a person's transition between single user and team collaboration applications by making rooms suitable for both individual and team activity.
- People can move fluidly between asynchronous and synchronous work because room artifacts persist.
- We ease the difficulty of initiating real time work by providing people with awareness of others who may be available for real-time interactions, and by automatically establishing connections as users enter a common room.
- We transform a technical space into a social place, a room metaphor's seamless support of everyday activities will foster an environment where groups naturally share their expertise.

3.2 Features supported in SIRONTA

Feature	Description	How is supported in SIRONTA
Bounded space		
Partitioning	Rooms are collections of bounded spaces, separated by walls.	The space is partitioned as a set of discrete rooms, individually presented within a large window. Individual people and objects can be in only one room at a time.
Containment	Rooms can contain people, tools and artifacts.	Rooms contain generic tools for communication (e.g., chat) and work (e.g., shared whiteboard and the drawings created on it). Rooms also contain any number of applet instances and the artifacts created within them.
Permeability	People can enter and leave rooms, look inside them through doors and windows, and bring things in and out of them.	People can navigate between rooms. Doorways to other rooms can be placed within a room. People can also see sho is in other rooms and their levels of activity. However, people cannot see what is going on in a room unless they enter it, and people can only copy to items to other rooms.
Container		
Persistence	Objects left in a room persist over time in the same spatial location.	All rooms and their current state persist over time, even when the server is shut down and turned on again. This includes mark on the whiteboard, and applets and their contents. However, for privacy reasons, people can only see the chat text typed while they were in the room.
Customization	People can customize a room by bringin	People customize a room by creating it, by adding

Feature	Description	How is supported in SIRONTA
	in their own artifacts and arranging them in the space.	applets to it, by setting access controls, and by using the applets. Customizations persist over time.
Privacy and ownership	The way rooms are customized often indicates its ownership and who is allowed in them.	Rooms are given names, and have an owner. Access control rights can be set explicitly.
Spatial location		
Spatial relations	Objects can be organized within a room when a person spatially relates them to one another.	Applet in a room can be placed close together, and their positions persist until they are moved. Marks on the whiteboard can also be situated next to applets.
Proximity and action	Collaborators can interpret each other's actions by how close they are to one another.	People's position in a room, its whiteboard marks, and its applets and contents are indicate
Common reference and orientation	People see and reference the room, its objects, and its inhabitants from a similar orientation.	A room appears identically to all the people within it. Even though people may see different portions of the room, all have a small radar overview that proves a birds-eye view of the entire room.
Reciprocity	Collaborators know that others can see their actions and objects in the same way.	When people are in the same room, all objects and the fine grained action taken over them appear inmediately on all displays.
Inhabitation of the space		
Presence and awareness	We sense other's presence and activities as we navigate between rooms.	You can see a list of rooms, and when you enter you can see the people and documents that are in the room.
Encounters	We meet and occasionally initiate encounters with people that is in our room.	People that enter the room can communicate with anyother in the same room.
Habitation	Different rooms can be inhabited by one or more people, or be empty.	As with physical rooms, rooms ca be empty, or populated by any number of people at any time.
Real time meeting definition	A meeting occurs merely by having two or more people in a room.	As with physical rooms, a meeting occurs whenever two or more people are in a room. Communication channels are automatically opened, and people can collaborate over all items within a room.
Asynchronous definition	Asynchronous collaboration occurs when people leave things for others in a room.	As with physical rooms, asynchronous collaboration occurs whenever a person leaves a note or artifact in a room. Because items persist, anyone later entering the room can see them.

3.3 SIRONTA abstractions and XMPP

The SIRONTA are mapped onto XMPP entities in the following way:

- A sironta user is an XMPP user
- A sironta room can be modelled in one of two ways
    - Persistent rooms in the server
        - It takes up space in the server
        - It may be easier to implement, if an XMPP room information can hold the list of users, the list of documents, etc
    - Non-persistent rooms whose information is held by the owner/inhabitants of the room
        - No information can be recovered from the room if none of its inhabitats is online
    - A mixture of the two
        - Try to get the BEST of both worlds, without paying a much too high a price
- A sironta document is just a bunch of bytes that is associated to a room.
    - It is stored in the disk of an inhabitant of a room
    - It is replicated among the inhabitants of the room
    - Information about the available documents can be held in the room information data structure
        - It may be stored in the server
        - It may be stored in the disk of the room inhabitants
- The registration of a user into an XMPP server is performed in the usual way (XMPP wise). It is important to track the number and information about registered users, so it makes sense to allow a user to register for free, but not let its account to be active until a nonce is sent by email. Inactive accounts expire after a period (say, 24 hours)
- The logging of a user into an arbitrary XMPP server is performed in the usual way (XMPP wise). The validation of the user must be synchronized with the registration process.

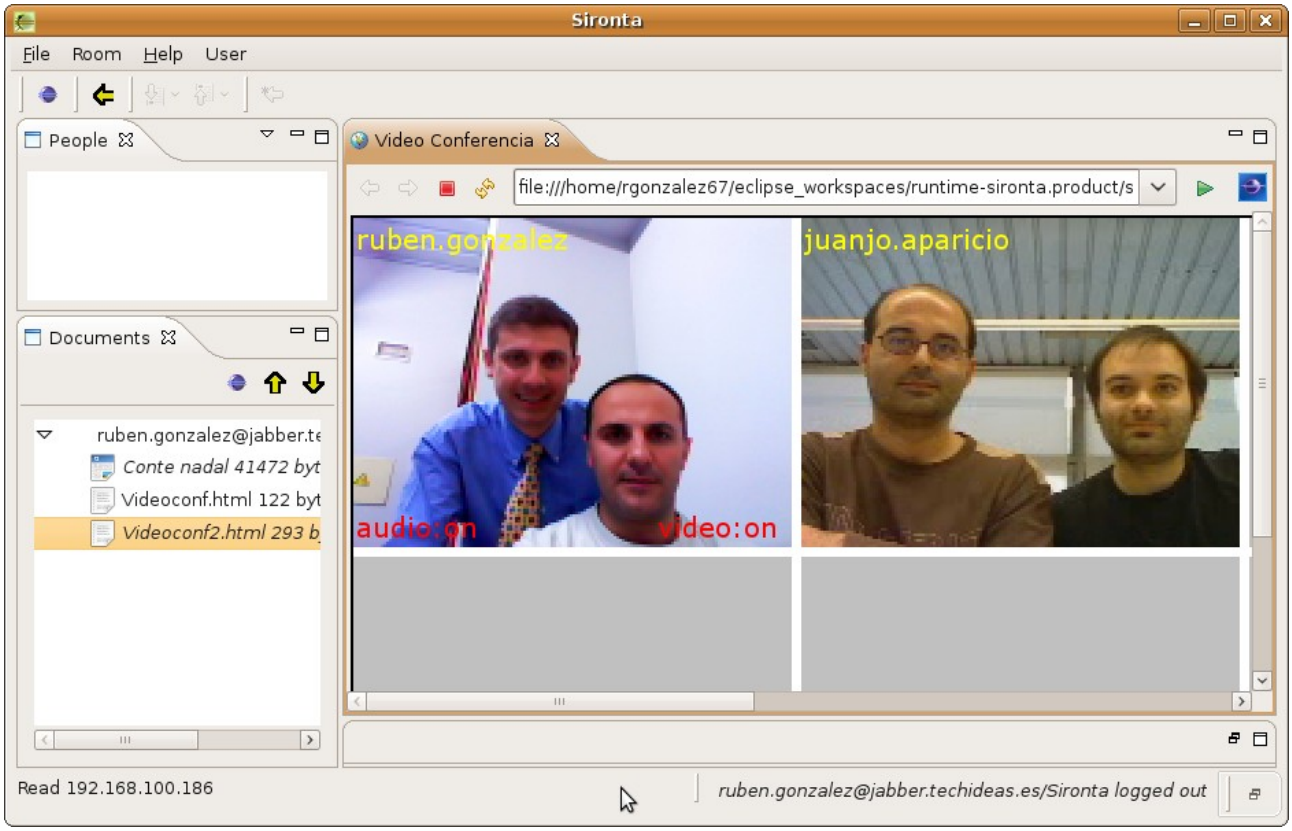
4 Industrial Projects

As an example of industrial applications based on SIRONTA that TechIDEAS has developed in the last year, we can mention BBVA Video-conference and CAIFOR Maps.

4.1 BBVA Videoconference

BBVA [1] Video-conference system is a project to communicate their offices in Spain with their offices in Mexico using video.

Here you can see a screen-shot of the application:



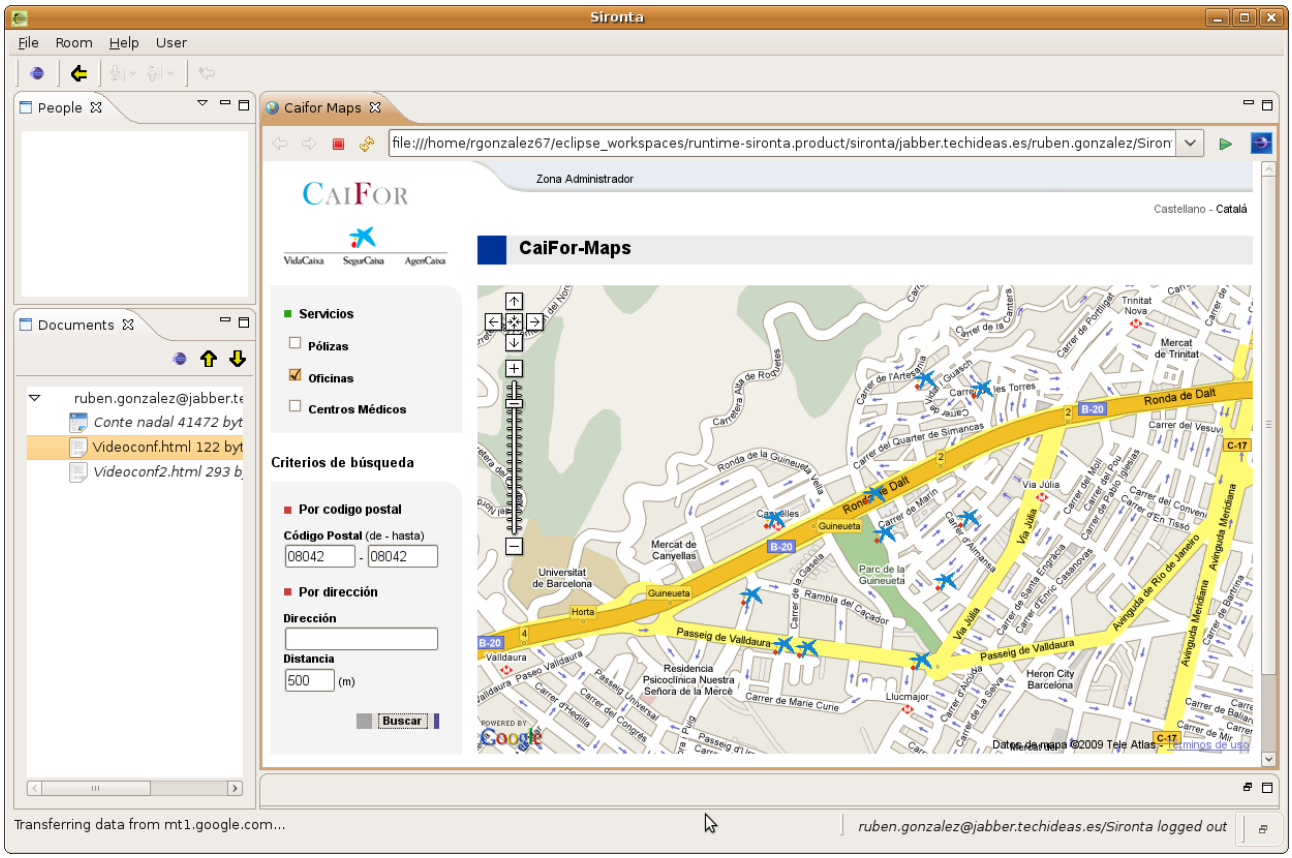
1 BBVA is a multinational financial services group based on people: more than 110,000 people, 47 million customers and 1 million shareholders – in more than 30 countries. It follows an innovative management model that focuses on the customer and that considers society in general. The key features are innovation, growth and the generation of profit. Its cornerstones are people, teamwork, ethical principles and technology.

4.2 CAIFOR Maps

CAIFOR[2] Maps is a project for the geo-localization of different stakeholders and assets involved in the insurance sector, such as insurance broker office, insured asset (home address), etc...

In this project we have integrated SIRONTA with Google Maps and with other internal applications and databases in our customer.

Here there is a screen-shot:



2 SegurCaixa Holding (CAIFOR) is one of the largest groups in Spain and occupies first place in terms of managed resources (life insurance and pension funds), with more than 3 million clients. Insurance group that designs, runs and commercialises both life and non-life insurance products.

5 Regional Deployment

SIRONTA is also been used as a collaboration framework in DEN4DEK project, in which TechIDEAS is the coordinator.

DEN4DEK is also setting up a collaboration framework with several projects aligned with the main objectives of Digital Ecosystems. We have established a first round of contacts with the coordinators of the projects COIN (http://www.coin-ip.eu) and KASSETTS (website not yet available; the project has just started). Furthermore, DEN4DEK also goes along and aligned with some other related projects: ONE, CONTRACT, SEAMLESS, E-NVISION, LEKTOR and VISP.

Although we are still at an early development stage during the first half year DEN4DEK has been already present at different international meetings in 2008: ERISA (Cardiff, UK), EISCO (Naples, Italy) and ICT2008 (Lyon, France). The presentations given at the first two meetings will be available at the DEN4DEK information repository (SIRONTA) that is already installed in our server.

5.1 Implementation Plan of DEs

European Software Institue (Spain) is committed to develop a roadmap to be used a reference for the future DE implementation plans. This will be an extremely useful implementation guide for less experienced partners, and a valuable tool even outside the context of this project. Such a guide will be able to be iteratively improved taking into account the feedback provided by the increasing number of interested and affiliated institutions.

5.2 Helsinki School of Economics & Vorarlberg Living-Lab demands

These two long experienced and highly qualified partners independently acknowledged the lack of a middleware infrastructure in their regions. This kind of technological infrastructure is of fundamental importance to enable SME clusters to exchange services among them.
As far as one of the opportunities of the DEN4DEK project is the availability of a technological infrastructure of this kind, both partners have shown a manifest interest regarding its availability and customization possibilities.

5.3 Pilot Project

In consequence of the interest arisen for the availability of SIRONTA, it has been suggested to possibility of setting up a pilot project for evaluating the capabilities of this software in a real context. Prior the setup of the pilot project it will requested to the partners interested in hosting the pilot to provide a short summary and guidelines.

6 Business Plan

TechIDEAS has developed a business plan in October 2008, that is now presenting to potential investors to get funding for the commercial launching and future development of the product. Hereby you can see a short summary of the business plan.

6.1 Description

SIRONTA is an application that allow the collaboration with any other user, in any place and in any time, as if the people where together in the same room. Collaboration are classified using the following taxonomy:

	Same Time	Different Time
Same Place	*Face to face interactions* • conference tables with embedded computers • public displays • dedicated tools for e.g., voting and brainstorming	*Ongoing tasks* • team rooms • group displays • shift work groupware • project management
Different Places	*Distributed real time interactions* • chat systems • transparent sharing of single user applications • collaboration-aware groupware • video conferencing • media spaces	*Communication and coordination* • unstructured or semi-structured electronic mail • electronic bulletin boards • asynchronous conferencing • list servers • workflow systems • schedulers • collaborative hypertext

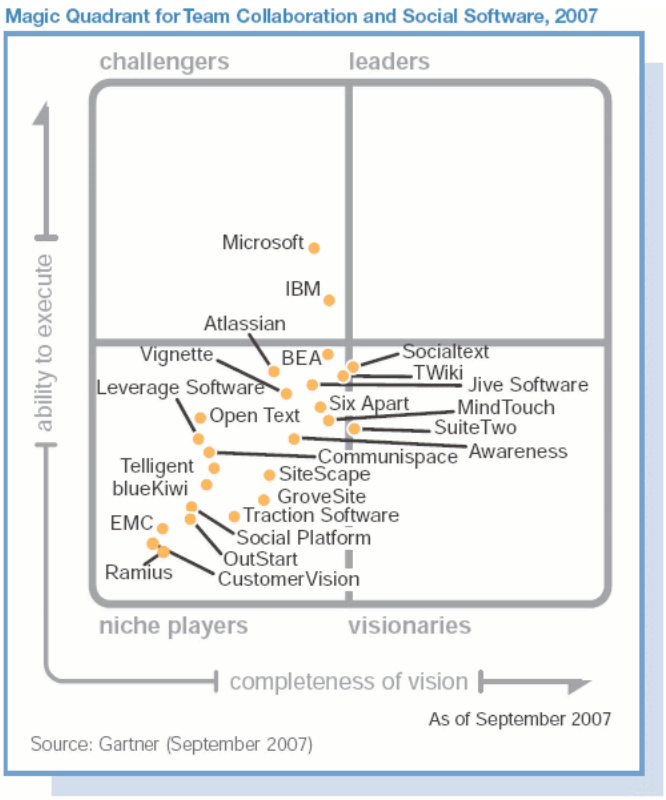
Table 1. A typical space/time matrix (after Baecker, Grudin Buxton and Greenberg 1995 p.742)

and Sironta has been designed to cover the interaction between people in different places working at same time and at different time, covering the whole picture.

6.2 Market Opportunity (Gartner Group)

The collaboration support market is evolving in response to the demand for a coherent set of capabilities, processes and services that support a broad range of collaborative activities, including communication, coordination, communities and informal social interactions. Buyers in the collaboration support market are looking for persistent virtual environments where participants can create, organize and share information, as well as interact with each other.

Gartner estimate a potential **market** of $4.4 billion in the next three years.



Most of SIRONTA competitors are based in Silicon Valley (USA).

One of our main competitors, Jive Software, has received $15 million from Sequoia Capital in August 2007 and is using a similar technology approach based on XMPP.

6.3 Competitive advantages

SIRONTA has some important competitive advantages, who are the following:

- ●Optimized operating costs: Skype vs Telcos
- ●Universal solution: e-mail vs MS. Exchange
- ●Improved user experience: based on the room metaphor

SIRONTA's main competitive advantage is based in his networking framework, that could reduce the operation costs by 80% aprox. incrementing the quality of service. This competitive advantage form the basis for a viral growth of users without a significant increment in operational costs.

7 References

[1] Peter Drucker (1966) , “The Effective Executive”, HarperCollins

[2] Peter Drucker (1968), “The Age of Discontinuity”, HarperCollins

[3] Greenberg S. and Roseman, M. (2003), Using a Room Metaphor to Ease Transitions in Groupware. In M. Ackerman, V. Pipek, V. Wulf (Eds), Sharing Expertise: Beyond Knowledge Management, 203-256, January, Cambridge, MA, MIT Press.

[4] XMPP Standards Foundation: http://xmpp.org/

[5] OSGi: http://www.osgi.org/

[6] SOAP over XMPP: http://xmpp.org/extensions/xep-0072.html

[7] Sironta: http://www.sironta.com/