

IST 11696

Technical Description



*Flexible, mobile and remote working methods and tools*

*New methods of work and electronic commerce*

[www.angelo-project.net](http://www.angelo-project.net)

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## Angelo Overview

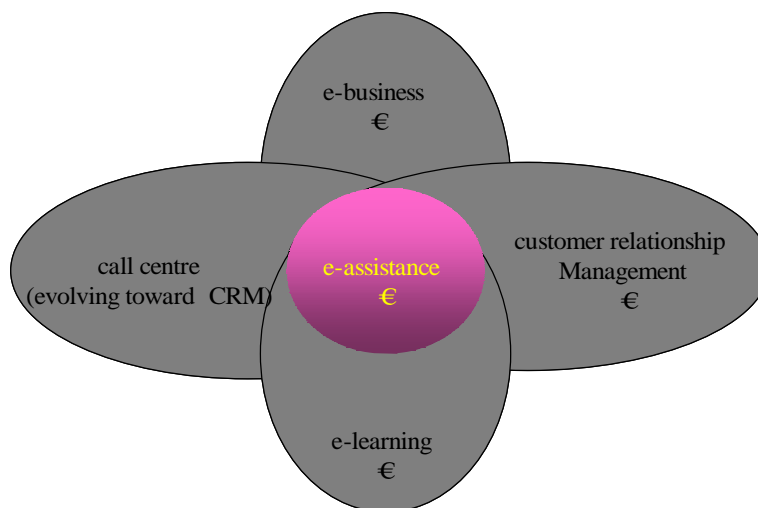
Angelo is an intelligent electronic assistant or e-Assistant, developed with the goal of offering transparent help and assistance to call centre agents and supervisors. ANGELO will provide full integration with call centre software. The guiding metaphor for the e-Assistant is that of a guardian Angel – in Italian an “Angelo” – looking over the user’s shoulder, volunteering helpful guidance and assistance, and monitoring her needs in term of knowledge resources. To this end ANGELO includes special mechanisms for stress detection and relief; the *Angelo control component* allows on-going optimisation of call centre process, both in real time, via adaptive Call Routing, and strategically, through management-oriented tools for reporting and analysis.

Angelo is designed for use in state of the art contact centres, where agents have to handle customer requests arriving via a number of different channels including on voice, e-mail and chat.

Angelo’s design is based on the ‘Knowledge Lifecycle Management Process Model’ (see the following box ‘*Knowledge Management for Call Centres – The ANGELO approach*’). The use of this model ensures that the system architecture is built on solid process-oriented, methodological foundations.

Angelo can be easily integrated with leading CTIs, CRM products and Learning Management Systems.

## Angelo Market Positioning



Angelo’s market lies at the intersection between e-business, CRM, traditional Call centres and the emerging e-learning solutions.

This white paper describes the functionality which Angelo will provide, either through its own pre-packaged components, and/ or via integration with market leading Call Centre platforms and other third party components.

The Angelo offering will also include the following services:

- Systems Integration Services – design and implementation of customized versions of Angelo. Development of interfaces towards customer IT environments
- Knowledge Base Services – assistance with the development of customer-specific knowledge bases
- Consultancy on socio-technical deployment issues: Work practice analysis, co-design /development and participatory deployment

## Knowledge Management for Call Centres: the ANGELO approach

### Towards a Knowledge management Process Model

The majority of modern organizations own knowledge repository systems, of varying degrees of sophistication.

Current systems focus on **management of knowledge**:

- knowledge is viewed as a set of defined or definable “*objects*”...
- stored in standardized documents and appropriately organized Data Bases.
- Technology is used primarily for data organization and classification.

### The Angelo Approach

The Angelo approach provides the methodologies and technological tools necessary to implement **management for knowledge**.

This advanced approach:

- focuses on *knowledge-related activity* ...
- encourages *cultural and motivational change*
- and highlights the *subjective and contextual aspects*...
- of *individual experience*

The benefits of the Angelo approach include:

- faster and more effective management of the explicit information and knowledge that already exists within an organization
- improved access to existing repositories
- identification and optimal access to actors' knowledge
- skill gap analysis
- access to a sophisticated multi-level reporting system; the reporting system can be activated by actors and provides:
  - ⇒ tactical support: suggestions concerning individual training needs and required action in critical situations;
  - ⇒ strategic support: planning of long term training schedules, generation of policies and recommendations;
  - ⇒ automated assessment of the effectiveness of communications

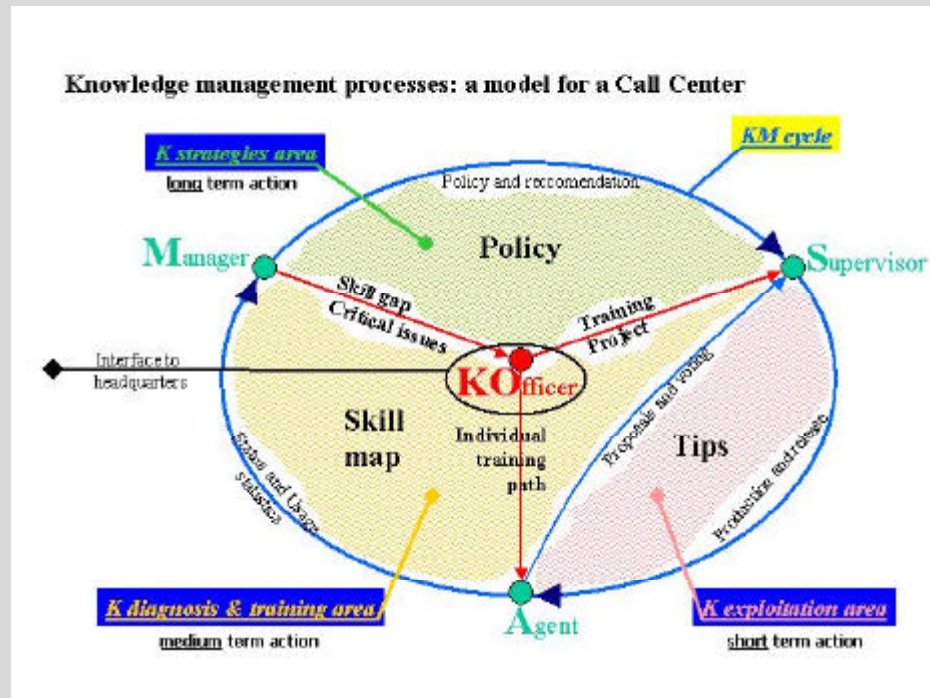
### The Angelo knowledge management methodology

The Angelo knowledge management methodology covers all the phases of the KM cycle. The methodology:

- detects, focuses on and monitors specific **elements** in each of these phases;
- facilitates and controls **knowledge flows**
- applies specific **tools** to make the most of detected elements and to develop knowledge flows.

The Angelo KM model includes three main elements

## Tips –the Skill Map – Policy (TSP)



**k explicitation area**

<b>elements</b>	Knowledge items (Tips) ; real time interactions (cooperation)
<b>flows</b>	proposals-validation-consulting-tip voting/selection; conferences involving actors
<b>tools</b>	Angelo Knowledge component ; cooperation tools

*The k explication area favours information flow and is highly usable and customisable. The tools in this area ensure fast and effective communications and guarantee information uniformity*

### k diagnosis & training area

<b>elements</b>	Skill map, Critical issues, training plans
<b>flows</b>	reporting, needs analysis, training planning and management, on line training
<b>tools</b>	Skill gap analysis, e-Learning system, traditional learning methods

*The k diagnosis and training area provides on-demand diagnosis and training, detects critical situations and alerts management*

### k strategies area

<b>elements</b>	policies for verifying and updating technological and human resources
<b>flows</b>	Management and development activities, organizational analysis, information structure update
<b>tools</b>	Knowledge status report ; User feedback collector

*The k strategies area is highly flexible and can be easily tailored to meet the needs of Customer organizations*



## Features and Functionality

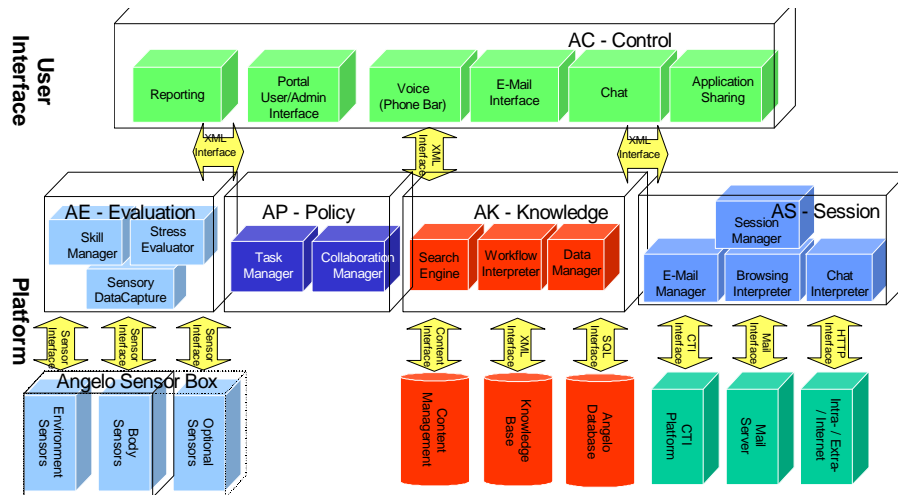
Angelo features – described in detail in the tables at the end of this document - can be grouped into the following functional areas:

- *Integrated Resource Management* – Angelo provides an integrated set of tools making it possible to configure, monitor, and analyse optimal utilization of all call centre resources, including knowledge, operators and infrastructure
- *Performance Support* – Angelo includes specific tools for improving agent productivity. These include tools for skill monitoring and skill gap analysis as well as innovative mechanisms for stress detection and relief
- *Knowledge Management* – Angelo provides tools for collaborative knowledge capture, validation and sharing. Additional analysis tools make it possible to monitor the effectiveness of knowledge captured in the knowledge base and in the company intranet
- *E-Mail Management* – Angelo packages a tool for automated or semi-automated e-mail handling. The tool is fully integrated both with the CTI and with knowledge management tools
- *Agent Interface* – the unified agent console
- *Live Collaboration* – for agent/ supervisor collaboration, and for customer/ agent interactions

All the functionalities are fully integrated based on a modular architecture.

## Angelo Architecture

The main elements in the Angelo System Architecture are the Angelo Control, Angelo Evaluation, Angelo Policy, Angelo Knowledge and Angelo Session components. Planned integration activities will make it possible to incorporate additional 3<sup>rd</sup> party components and to interface with 3<sup>rd</sup> party CRM, e-Commerce and e-Learning systems



Key functionality provided by individual components are described below:

### Angelo Control

- Portal administration
- Agent interface for the management of incoming traffic via voice, e-mail, chat
- Access to report and knowledge base

### Angelo Evaluation

- Stress evaluation based on body sensor input
- Evaluation and dynamic update of agent's skill map
- Detection of cognitive fatigue and raising of cognitive stress alerts

### Angelo Policy

- Policy based task assignment to agent
- Policy based collaboration management

### Angelo Knowledge

- Collaborative, adaptive knowledge capture, validation, and sharing
- Flexible session interpretation by rule based event-action dispatching

### Angelo Session

- Tight integration with CTI and with the intranet / data warehouse
- Automatic assistance to agents performing information search during interactive sessions
- Automated management of e-mail requests
- Session Wrap-Up/ Questionnaires

Table1 - Architecture

Feature	Description	Benefit
Comprehensive e-Assistance Platform	<p>Supports multiple communication channels between the customer and the Call Centre representative:</p> <ul style="list-style-type: none"> <li>Voice (PSTN, VoIP)</li> <li>WEB-based</li> <li>E-mail</li> <li>Live Internet interaction</li> </ul>	<ul style="list-style-type: none"> <li>Provides an integrated strategy for managing multi-channel service delivery</li> <li>Enables companies to provide customers with a variety of service channel options.</li> <li>Simplifies the complexity and risk of integrating service across multiple channels.</li> </ul>
Single-Threaded Conversations	<p>Tracks all customer-agent interactions as a single thread even if the communications channel or agent changes during the conversation thread. If a customer initiates a e-mail or browsing session but escalates to a live interaction midway through the session, the incident is logged as a single conversation.</p>	<ul style="list-style-type: none"> <li>Reduces redundancy and gaps in records</li> <li>Enables companies to maintain an on-going dialogue with customers across multiple channels, multiple agents and time.</li> </ul>
Open Architecture	<p>Ability to integrate with:</p> <ul style="list-style-type: none"> <li>CRM software</li> <li>CTI software</li> <li>Learning Management software</li> </ul>	<ul style="list-style-type: none"> <li>Leverages existing service infrastructure.</li> <li>Simplifies system integration and deployment—saving time and money.</li> </ul>
Scalable e-Assistance	<p>Provides scalability via a distributed server architecture</p>	<ul style="list-style-type: none"> <li>Provides flexible implementation.</li> <li>Supports growth from entry-level to enterprise-wide solutions.</li> <li>Enables administrators to configure system components for optimal performance and maximum integration.</li> </ul>
Software Compatibility	<p>Based on industry standards including:</p> <ul style="list-style-type: none"> <li>Microsoft Windows NT Server</li> <li>Microsoft SQL Server</li> <li>Microsoft IIS</li> <li>Microsoft Transaction Server</li> <li>Oracle</li> </ul>	<ul style="list-style-type: none"> <li>Operates in conjunction with industry-standard software.</li> <li>Minimizes the administrator's learning curve by adhering to industry usability and operational standards. Ensures rapid access to skilled resources.</li> </ul>
Technology Standards	<p>Uses de-facto technology standards including:</p> <ul style="list-style-type: none"> <li>HTTP, ASP and Java (Web presentation)</li> <li>SMTP and POP3 (e-mail)</li> <li>XML, XMLP (SOAP)</li> <li>COM and DCOM</li> </ul>	<ul style="list-style-type: none"> <li>Builds on popular industry standards.</li> <li>Enables extensibility and integration with other components.</li> <li>Reduces integration and deployment time.</li> <li>Ensures reliable interaction.</li> </ul>



Table2 - Resource Management

Feature	Description	Benefit
<p>Centralized Administration Interface for:</p> <ul style="list-style-type: none"> <li>Operations</li> <li>Agents</li> <li>Knowledge</li> <li>Customer Interactions</li> </ul>	<p>Makes it possible to manage all Angelo features and components from a single, consolidated interface. Using the Administration Console, administrators can configure, manage and maintain:</p> <ul style="list-style-type: none"> <li>task assignment policies</li> <li>collaboration policies</li> <li>agent (or group) accounts, privileges and assignments</li> <li>knowledge authoring and workflow</li> </ul>	<ul style="list-style-type: none"> <li>Provides a single, consolidated system view.</li> <li>Eliminates the need to switch between multiple applications.</li> <li>Uses a consistent, easy-to-navigate user interface that reduces complexity.</li> <li>Provides flexible options for configuring operations via companies, queues, routing rules and agent/group accounts.</li> </ul>
Policy-Based Collaboration Management	Uses administrator-defined rules to select action to be taken when assistance to agent is required (e.g. find rep with appropriate skill, set up chat or voice session ..)	<ul style="list-style-type: none"> <li>Outperforms traditional tools for team working facilitation</li> </ul>
Policy-Based Queue Management	Assigns inbound and outbound tasks, to agents using administrator-defined rules. Agent Policies are based on combined evaluation of agent skills, cognitive status and other data received from the evaluation module. 'Global' policies allow task assignment based on service, customer and contact type	<ul style="list-style-type: none"> <li>Outperforms traditional management procedures</li> <li>Enables implementation of application specific policy rules</li> </ul>
Web-based Interface	Enables administrators to configure, manage, and maintain Angelo from any Java-compatible Web browser.	<ul style="list-style-type: none"> <li>Enables remote administration.</li> <li>Eliminates the need to install and maintain separate administration software.</li> </ul>
Proactive Monitoring of Call Centre processes	Enables real time monitoring of process metrics by administrators and designated agents. For example, administrators can assign service thresholds for individual queues. When service levels approach the thresholds, Angelo uses visual cues to alert the administrator to potential problems	<ul style="list-style-type: none"> <li>Supports individual queue thresholds.</li> <li>Identifies potential issues before they become serious incidents.</li> <li>Uses visual cues to highlight problems.</li> </ul>
Reporting / Process Analysis	<p>Provides pre-defined service reports as well as the ability to create custom reports.</p> <ul style="list-style-type: none"> <li>Pre-defined reports for resource optimisation including: company/queue lists, unassigned e-mails, active sessions, waiting lines, longest/average response time and agent/ queue statistics.</li> <li>Pre-defined reports for improved management of the knowledge lifecycle including: knowledge areas most frequently searched, agent skills by knowledge area, customer interactions by knowledge area.</li> </ul>	<ul style="list-style-type: none"> <li>Provides complete history data</li> <li>Supports custom reporting to meet specific customer requirements.</li> <li>Facilitates data collection for future planning.</li> </ul>

Table 3 - Performance Support

Feature	Description	Benefit
Physiological Evaluation	Monitors physiological parameters strongly correlated with operator fatigue.	<ul style="list-style-type: none"> <li>Minimizes operator stress and maximizes productivity.</li> </ul>
Cognitive Evaluation	Develops cognitive profiles of individual operators; detects cognitive fatigue and temporary decreases in attention.	<ul style="list-style-type: none"> <li>Enables the system to offer personal real time support through knowledge provisioning.</li> </ul>
Skill Evaluation and Management	Builds skill charts for individual agents, detects skill gaps and provides an interface for the E-learning management system.	<ul style="list-style-type: none"> <li>Allows the tracking of skill gaps and the way in which they affect the overall performance of the call centre.</li> <li>Improves the effectiveness of training management, identifying critical training areas and priorities</li> <li>Improves inter-agent knowledge exchange and support</li> </ul>
Environmental monitoring	Measures environmental parameters (e.g. CO2) detecting levels likely to affect working performance.	<ul style="list-style-type: none"> <li>Allows fast detection of physiological fatigue.</li> </ul>
Automatic support	Integrates the features above, allowing real time management of individual agent workflow in line with global call centre policies.	<ul style="list-style-type: none"> <li>Contributes simultaneously to quality of working life and working performance</li> </ul>

Table 4 - Knowledge Service

Feature	Description	Benefit
Knowledge Base Creation and Authoring	<p>Provides a Web-based environment for knowledge authoring. Companies can distribute knowledge authoring responsibilities throughout the extended organization to customers, partners and employees. Authors can choose from a range of different authoring tools:</p> <ul style="list-style-type: none"> <li>Power Authoring for Experienced Authors. A visual, object oriented tool for knowledge authoring and knowledge base design.</li> <li>Collaborative Authoring for Agents. A Web-based interface that agents can use to author content while assisting customers. Once submitted, this tool automatically routes the content through the defined authoring-to-publishing workflow.</li> <li>Web Authoring for Other Authors. A Web-based interface that can be used by other individuals.</li> </ul>	<ul style="list-style-type: none"> <li>Provides complete control over the knowledge authoring process.</li> <li>Distributes responsibility for knowledge authoring.</li> <li>Simplifies the knowledge authoring process.</li> <li>Speeds up knowledge collection and authoring.</li> <li>Allows more effective collaboration, improving the integrity of the knowledge authoring process</li> <li>Enables highly skilled agents to make new solutions instantly available to others.</li> </ul>
Workflow Definition and Management	<p>Enables companies to design their own authoring-to-publishing workflow and then automatically route content through a process of:</p> <ul style="list-style-type: none"> <li>Authoring</li> <li>Review</li> <li>Approval</li> <li>Publication</li> </ul>	<ul style="list-style-type: none"> <li>Ensures accuracy of knowledge.</li> <li>Provides a built-in control mechanism for knowledge creation and publication.</li> <li>Speeds the knowledge collection and authoring process.</li> <li>Minimizes inaccuracies and repetition in the knowledge base.</li> </ul>
Knowledge Learning	<p>Tracks solution usage statistics. Provides agents with prioritized lists of solutions based on usage frequency.</p>	<ul style="list-style-type: none"> <li>Helps agents sort through possible solutions and identify the "most likely" solution first. Speeds resolution.</li> <li>Provides analytical and decision-making information for administrators</li> </ul>
Supports Knowledge Stored in External Data Sources	<p>Enables companies to incorporate knowledge from other data sources into the knowledge base. Supports external data sources such as RDBMS and Lotus Notes</p>	<ul style="list-style-type: none"> <li>Enables companies to utilize existing content without reformatting/re-locating it.</li> <li>Simplifies knowledge management across multiple content repositories.</li> </ul>

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Table 5 - Agent Interface

Feature	Description	Benefit
Consolidated, Centralized Agent Interface	Provides the agent with a single customer service tool from which she can manage all customer interactions.	<ul style="list-style-type: none"> <li>Minimizes the need to switch back and forth between different applications.</li> <li>Simplifies the agent's workflow.</li> <li>Makes it easy to define and communicate the agent's current service status.</li> </ul>
Web-based Interface	Enables agents to respond to customer inquiries from any Java-compatible Web browser.	<ul style="list-style-type: none"> <li>Eliminates the need to install and maintain separate client software</li> <li>Reduces the total cost of ownership (TCO).</li> <li>Makes it easy and inexpensive to maintain and upgrade system.</li> </ul>
Blended Queues	Provides agents with a single view of the incoming requests, regardless of origin. Agents can simultaneously view inbound e-mail requests, requests for live interaction and call-back requests.	<ul style="list-style-type: none"> <li>Provides a common, consolidated interface for all agent interactions.</li> <li>Maximizes agent productivity.</li> <li>Provides companies with the flexibility to assign agents to service single or multiple communications channels.</li> </ul>
Common Media Library	Provides agents with a single repository of resources to respond to customer inquiries. The Media Library can include reply templates, common text replies, documents, HTML brochures, URL links and knowledge base solutions.	<ul style="list-style-type: none"> <li>Guarantees consistent response over all channels.</li> <li>Improves response efficiency across all channels.</li> </ul>
Multiple Simultaneous Requests	Allows agents to simultaneously handle multiple customers. At any one time an agent could, for example, be involved in three live chat sessions or one chat session and two e-mail sessions.	<ul style="list-style-type: none"> <li>Maximizes agent productivity. While waiting for a customer response, an agent can respond to other requests.</li> </ul>
ACD Integration	Makes it possible to distribute e-mail requests and live interaction requests through leading ACD products along with PSTN calls.	<ul style="list-style-type: none"> <li>Leverages the company's existing telephony infrastructure, routing rules and reporting capabilities.</li> </ul>
Session Wrap-Up	<p>Questionnaires are presented to the agent to record session detail, including information related to the knowledge/ skills required to fulfil customer requests.</p> <p>Other session data is recorded automatically</p>	<ul style="list-style-type: none"> <li>Provides management with an integrated view of the work process, merging a number of different perspectives (e.g. CTI, business, knowledge)</li> </ul>
Assisted Knowledge Access	Provides agents with complete access to knowledge bases while assisting customers.	<ul style="list-style-type: none"> <li>Provides a single, consolidated interface for all knowledge and interaction activities.</li> </ul>

Table 6 - E-mail Management

Feature	Description	Benefit
E-mail editing Interface	The E-mail editing interface is fully integrated into the unified agent interface. Using the interface the agent can easily access all information (FAQ, reply templates, customer information, request related data, etc.) necessary to respond to customer requests	<ul style="list-style-type: none"> <li>Maximizes agent productivity by eliminating the need to flip back and forth between screens.</li> </ul>
Support for Free text & form-guided customer requests	Customers can submit requests using either a free-text e-mail client or by entering information into fields in a pre-defined form	<ul style="list-style-type: none"> <li>Provides new channels for customer access to the Call Centre</li> <li>Allows more effective, better documented, customer care</li> </ul>
Support for plain & HTML text formats	Both text and HTML text formats can be used for requests and replies from/to the customer	<ul style="list-style-type: none"> <li>Enables companies to brand outgoing customer correspondence.</li> <li>Improves response effectiveness and attractiveness by supporting graphics and customizable layout.</li> </ul>
Auto-Suggest Response	Customer requests are analysed and classified using advanced language technologies. Replies to similar requests are searched in the Knowledge Base and appropriate replies are presented to the agent. An automatic-reply mode is also supported, based on an estimation of the reliability of the reply-response matching process	<ul style="list-style-type: none"> <li>Maximizes agent productivity by reducing solution search time.</li> <li>Improves response accuracy and ensures customers receive consistent answers.</li> <li>Ensures consistent use of phrasing and terminology in responses.</li> </ul>
Response Template	Enables companies to personalize responses by automatically replacing fields with customer details at send time. Typical data managed in this way includes customer name, date, message ID and agent name.	<ul style="list-style-type: none"> <li>Personalizes responses.</li> <li>Improves agent productivity; reduces response time.</li> <li>Minimizes embarrassing errors in spelling and grammar.</li> </ul>

Table 7 - Live Collaboration

Feature	Description	Benefit
Text Chat	Agents and Supervisors can use text chat sessions for communicating and cooperating.	<ul style="list-style-type: none"> <li>Enables internal communications during a voice interaction with the customer</li> <li>Enables supervisors to provide the agent with useful text which she can paste directly into her response</li> </ul>
Desktop/Application Sharing	Supervisors can use Desktop/Application sharing to teach agents how to use an application or a procedure or to show them the location of useful information	<ul style="list-style-type: none"> <li>Allows supervisors to demonstrate rather than explain.</li> <li>Allows on the job training "at a distance"</li> </ul>
Automatic partner Assignment	Angelo uses its Automatic Support feature to recognize the need for collaboration. The Policy Manager assigns the optimal agent as a partner.	<ul style="list-style-type: none"> <li>Enables agents to find effective help in real time.</li> <li>Ensures efficient sharing of human experience/knowledge.</li> </ul>
Background Wrap-Up	Provides partners with all necessary background information	<ul style="list-style-type: none"> <li>Ensures the cooperating partner is aware of all relevant information.</li> <li>Speeds up the response to the customer</li> </ul>
Knowledge and training element creation	Supports reuse of cooperation contents as a feed for the knowledge base	<ul style="list-style-type: none"> <li>Allows optimal exploitation of case experience</li> <li>Ensures the complete documentation of cooperation sessions</li> <li>Allows multi-user training</li> </ul>
Integrated Voice	During chat and Desktop/Application sharing, supports and coordinates multiple voice sessions (PSTN, VoIP) between agents and customers, as well as among agents	<ul style="list-style-type: none"> <li>Enables stronger coordination among agents.</li> <li>Enables browsing customers to talk to an agent</li> <li>Reduces call-back</li> </ul>
Collaborative Browsing and Form Filling	Makes it possible for agents to <i>drive</i> the customer's Web browser. This enables both parties to view the same Web page simultaneously or to collaboratively fill in a Web form.	<ul style="list-style-type: none"> <li>Makes it possible for the customer or agent to demonstrate rather than trying to explain.</li> <li>Improves agent productivity.</li> <li>Enables the most-qualified individual to fill in the appropriate sections of a Web form.</li> <li>Improves customer satisfaction.</li> </ul>





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**Full Title:**

*Knowledge Based Virtual Facilitator in Team Working*  
 ANGELO

**Industrial Sectors:** *Call Centre*

**Supporting Technologies:** *Telecommunications*

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**Proposers:**

**Prime** *Telecom Italia (I)*

**Partners**

- Xerox Professional Services (UK)
- Rome International University (I)
- Linköping Universitet (S)
- Università di Roma Tor Vergata (I)

**Other involved companies**

- Atesia (I)
- Sodalìa (I)
- Applied Sensor (S)
- CISB (I)
- Kpeople (UK)

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