Basis and objectives of the MILK project

User’s observation and knowledge needs

The MILK system

Overview, architecture and KM Engine

MILK Components

- Office Environment
- Mobile Access Environment
- Social Environment

Scenario of use

Conclusion
The MILK Consortium
The collective process of knowing, learning and creating knowledge is the relevant aspect, and not just knowledge per se (Brown J.S. and Duguid P.; Wenger E.)

The community of practice is the organizational place where people share their work experience and create and share a distinctive knowledge (Argyris C. and Schoen D.A.; Nonaka I. and Takeuchi H.; Senge P.)
MILK – Multimedia Interaction for Learning and Knowing

A Knowledge Management solution to support professional work in any situation anywhere anytime

- Make knowledge flow smoothly through different work situations, practices and knowledge processes
- Support interaction among people and objects through “Knowledge in context”
- Build and manage communities of practices in their interaction over space and time
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Italian consultancy firm

- More than 30 years old
- Addresses the areas of change management, HR, CRM, KM
- Projects are “tailor-made” and require in depth understanding of customer needs
- ~50 consultants and 9 staff
- Growing with 50% in the last two years
- Two sites
German software house

✓ Digital Asset Management services
  • Software development
  • Managed service provider
  • Hotline and support
  • Consulting services

✓ Founded in 1992
✓ ~60 employees and growing
✓ Heterogeneous population of workers
  • Technicians
  • Supporting staff
  • Project managers
  • Sales

✓ 3 offices in 2 sites
• Activities are project based
• Each employee typically works on different projects, with different customers located in different sites
• Workers who are mobile keep working while on the move
• Also during meetings they are connected via the cellular phones to process urgent requests which are very frequent
• Working documents and their versions are exchanged using email making difficult the visibility from the outside
Focused Interviews (all top management)

Focus group (knowledge portfolio) (3 sessions with 12 people for each organisation)

Ethnographic Observation (3 sessions for each organisation)

Survey for the assessment of KM needs (30 interviews)

Analysis of the users’ needs: the methodology
WORKING ON TRAVEL

At home before leaving, synchronizing
At the airport, a meeting with the CEO
During meetings at customer site, staying connected
A call conference with colleagues in the office

Needs

✓ Accessing organisational knowledge in different situation by using different communication media
✓ Tracing of the informal exchange of information within project teams in the organisational system

Requirements

✓ System should support the nomadicity of users
✓ System should capture, organise and make available formal and informal knowledge to team members and other communities

From the user observation-1
Needs

✓ Knowing people and documents in the organisation that can support a professional to carry out his/her current working activities

✓ Making other related communities aware (about people involved and content) of new knowledge produced by a team or a community during working activities

Requirements

✓ System should support knowledge discovery by making visible related people and documents

✓ System should support innovation through cross-fertilization among different projects and communities
• Knowledge should be accessible through different devices and communication media (e.g., email, mobile phone)

• Documents should be presented to users how, where and when they may need them

• Knowledge network should be visible. Knowledge should be presented together with people and other objects related to it. Innovation through cross-fertilization and communication should be supported:
  ✓ making visible common efforts
    • During individual working activities
    • During social activities
  ✓ across people located in different places
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An integrated solution made of different interfaces supporting different working situations
• At the desktop
  ✓ Promote discovering of related knowledge
  ✓ Promote publishing and sharing of documents

• While mobile
  ✓ Make documents accessible when needed
  ✓ Keep people informed about ongoing processes
  ✓ Provide availability & reachability services about colleagues

• While in shared office places
  ✓ Provide an overview of ongoing activities in the organization
  ✓ Promote important contents
  ✓ Provide availability & reachability services about colleagues
  ✓ Provide support for on-the-fly communication even across sites

• ALL INTEGRATED
  ✓ Same information presented in different ways on different media
  ✓ Consistent interaction style to encourage cross-media usage

Overview of the System
**MI LK Architecture**

- **PC Office Environment**
- **Social Environment**
- **Mobile Access Environment**

**Access to KM Engine via Internet**

**Interaction Managers**
- **Meta Data Management System**
- **System Event Scheduler**
- **BSCW - Document Management System**
- **Avail&Reach. Service**
- **Mobile Access Service**

**Archiving Systems**
- **Ontology**
- **Meta Data Database**
- **BSCW Store**
- **LDAP User Data Directory**
• Common profiles for all MILK elements (i.e., documents, projects, people and communities)

• The Metadata Management System computes and maintains profiles and relationships

• Three metadata categories: generic, content and qualifying metadata

• Ontology management
  ✓ Terms + definitions + dependencies
  ✓ Synonyms
  ✓ Multilanguage terms
• MILK supports both communities and organization’s projects
• Projects are defined by the organization; communities reflect people’s interests and/or expertise
• Communities and projects are complementary views on knowledge
• To better support content-based correlations, communities are organized around ontology’s concepts
• A project might be related to various communities and a community might have correlations with many projects
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• Discovering Knowledge - View with Context
  show any element surrounded by all knowledge related to it

• Stimulating the Sharing – Limbo
  integrate personal and shared workspaces

• Bookmarks – Bookmarker
  grab information from anywhere and from any MILK interface for later use
• Discovering information while using the system versus searching information
• Any MILK element is shown immersed in its related information to support awareness and stimulate discovering
• Contextual information is personalized and situation-dependent thanks to profiling
• Best available representations of documents are selected (a document is more than a file)
Any MILK element

Ontology

Related elements

View with Context
There are not effective rewards and benefits in making personal knowledge available to others:

- Possibly, heavy overload in publishing information
- Organizations rely on sense of responsibility of employees or introduce norms forcing people to publish
- Do-ut-des is a too weak and uncertain rewarding mechanism
• Limbo introduces a more effective rewarding mechanism

• Limbo makes publishing integrated in working practices
  ✓ Providing a personal workspace integrated with shared organizational workspaces
  ✓ Providing MILK services on user private data (e.g., View with Context)
  ✓ Supporting gradual publishing via three document states:
    • Private: available to owner only
    • Metadata: sharing document metadata – the document itself is not yet available to other people
    • Public: sharing both the document and its metadata
  ✓ Supporting collection and organization of personal documents and bookmarks
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• I need to contact someone who helps me – who’s available and how?
• I am on the move a lot – how can I keep track of what’s up in the office?
• I need to access a document from my office – can I print it or send it to a nearby fax?
• I found some interesting info – how can I keep it in mind for later reference?

• PeopleFinder
• NewsBroker
• KnowledgeBrowser
• Bookmarker
• **People** – **PeopleFinder**
  find and contact people depending on their Availability and Reachability (A&R)

• **Events** – **NewsBroker**
  find out what’s new in MILK, provide awareness of system events, people and objects

• **Knowledge** – **KnowledgeBrowser**
  find knowledge in the MILK system, browse document database

• **Bookmarks** – **Bookmarker**
  grab information from anywhere and store it for later use
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• I am on the move a lot – how can I keep track of what’s up in the office?
• I need to contact someone who helps me – who’s available and how?
• I have seen that someone else is at the other site – how can I start a discussion with him?
• I have interesting info on the mobile – how can I see it on the large screen?

• News/Thematic Channel
• People Channel
• Video Channel
• Bookmarker
• **Knowledge – Thematic Channel**
  find out what are the active projects and communities

• **Events – News Channel**
  find out what’s new in the organization

• **People – People Channel**
  visualize who is where

• **Bookmarks – Bookmarker**
  grab information from the screen and store it for later use or visualize for collaborative work
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Writing an Offer to a Customer

Starring

*John* – The Project Manager of the CRM area

*Roberta, Thomas* – Members of his team

*Mauro* – A member of the team who joined recently the organization
John is going to a meeting at the customer site.

While waiting at the airport connects to the system to check emails.

He needs to talk to his colleague Roberta.
John checks if Roberta can be phoned...
… but she is already in a meeting therefore he sends her an SMS.
John attends the meeting.

It goes well, an offer has to be put together.
John updates the project space with the meeting notes…

KnowledgeBrowser: Browse the MI LK Database
NewsBroker

...and the colleagues are notified about the news ... the team has to produce an offer quickly.
A few hours later Roberta and Mauro meet by chance in the printer area equipped with a large interactive screen.
They check together John’s notes, and Mauro bookmarks some documents indicated by Roberta...
…they see that Thomas is connected on the large screen on the other site…
...and they decide to call him for hearing his opinion on some details.
... Mauro is back to the office to write the first draft of the commercial offer. He logs on the PC.
He read the useful documents pointed out by Roberta in his bookmark area, ...
Mauro creates a new document in the **Limbo area**, ...
...filling some metadata, the View with Context shows him related elements he might exploit in writing the offer.
At the end of the afternoon Mauro publishes the document in the project space.

Roberta, John, and Thomas are notified about the new document.

John, who is at the airport coming home, goes to an hot spot and prints the document on a Bluetooth printer.
• MILK aims supporting professional work in any situation anywhere anytime
• MILK provides situated-contextualized activities
• MILK attempts to stimulate:
  ✓ discovering of knowledge to enhance cross-fertilization among different projects
  ✓ sharing of knowledge
I prossimi lucidi NON sono da studiare
(sono per gli studenti interessati a sapere qualche dettaglio tecnico aggiuntivo)
• The Web is the glue

• XML-RPC
  ✓ For distributed computing

• XML and XLTC
  ✓ For content manipulation and adaptation of representation

• Flash
  ✓ For engaging end user interfaces
Web Based DMS

☑ XML-RPC API to manipulate
  - Projects and Communities
  - Documents, annotations and versions
  - Bookmarks
  - Discussion threads
  - User information
Event Scheduler receives and propagates system events

- Event Scheduler integrated in BSCW
- Access to Event Scheduler via XML-RPC
- KME components register with Event Scheduler
- KME components subscribe for specific events
- KME components submit (post) events
Provide information about how to contact people:

✓ User defines personal profiles of contact

✓ A&R service provides
  • current activity
  • availability depending on activity and profile

✓ Activity of people is monitored
  • by sensors (PC activity, Bluetooth device detector close to large screens,...)
  • using public calendars
  • triggered by users themselves

✓ A&R „learns“ work rhythms and habits of users
  • using Bayesian networks
  • statistical results are used (when no data available, to forecast future activities)
Provide access to devices of three different categories:

- **Mobile Web** (provides simple web browser - e.g. PDA with internet access)
- **Smartphone** (allows installation of customized applications)
- **Mobile Phone** (only basic services like SMS and WAP)
Design goal:

- flexible, dynamic user interfaces for different output formats
- support HTML (mobile Web) and WML/WAP (mobile Phone)

Method:

- use common framework for content generation and transformation
- based on XML / XSLT technology
  (eXtensible Stylesheet Language Transformations)
• Interactive display boards
  ✓ To collaborative work on content locally or over the Web
• Web cams
  ✓ To host lightweight conferencing
• Sensing infrastructures
  ✓ To provide awareness of remote activities
• Wireless and mobile networking
  ✓ To use notebooks and PDA wherever needed
• Web protocols
  ✓ To glue different services and communication standards

The World of Technology is Getting Ready