

The Social Semantic Desktop



The Social Semantic Desktop

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DERI GALWAY

Project: SOKS: Self-Organising Knowledge Systems

April 29, 2010

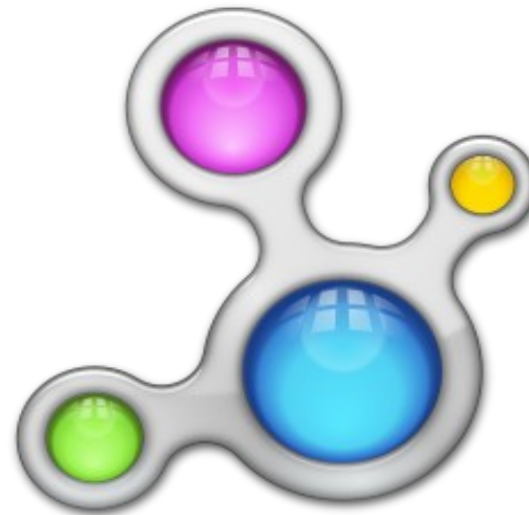
Amsterdam, Netherlands

<http://nepomuk.semanticdesktop.org>



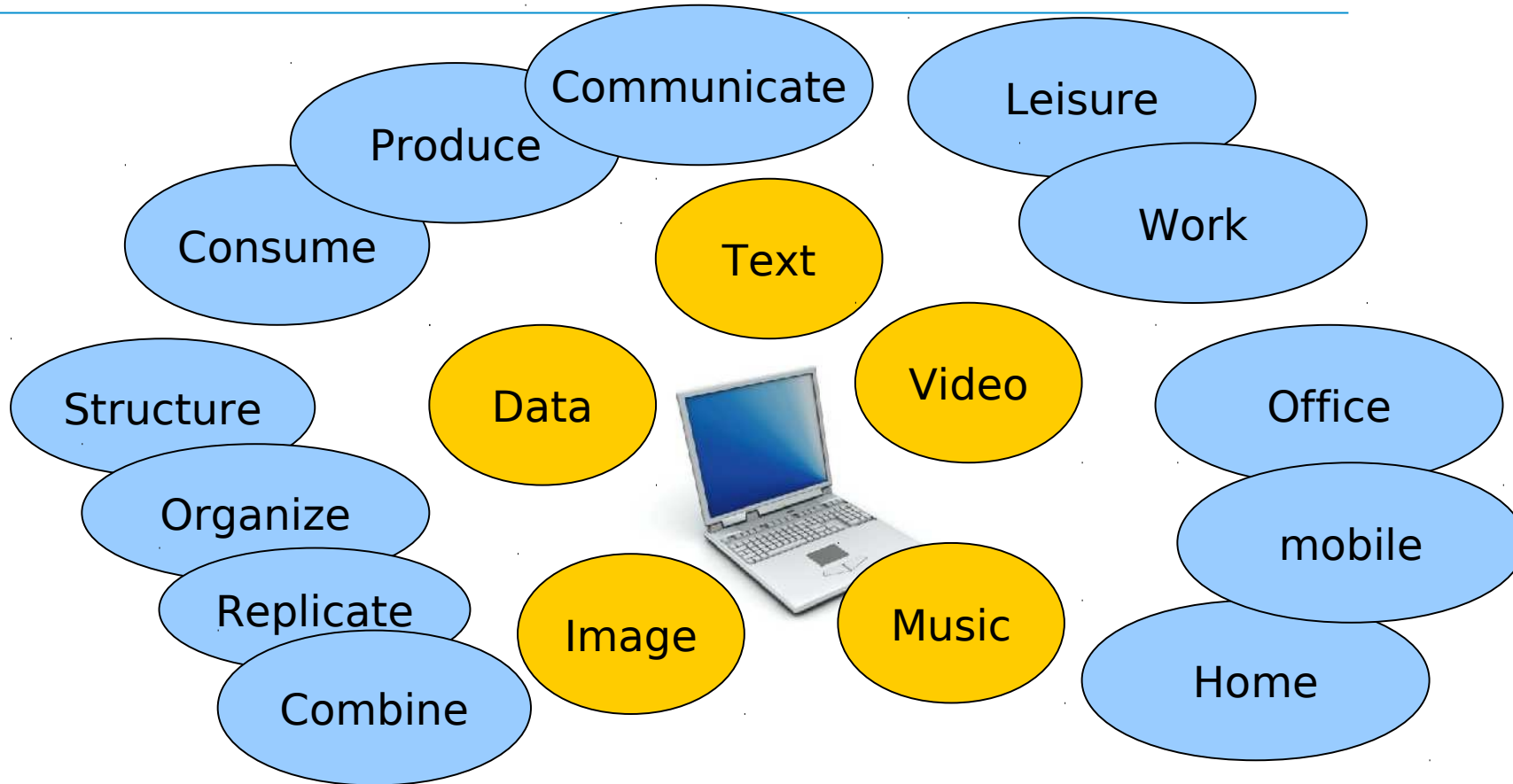
- **Motivation**
- **Vision**
- **Issues/Research Questions**
- **Collaboration**
- **Social Services**
- **Conclusion**

Semantic Desktop Motivation



The PC is our universal information companion - How to use it most effectively?

Our computer is a universal information device



Note & Remember

Store & Preserve

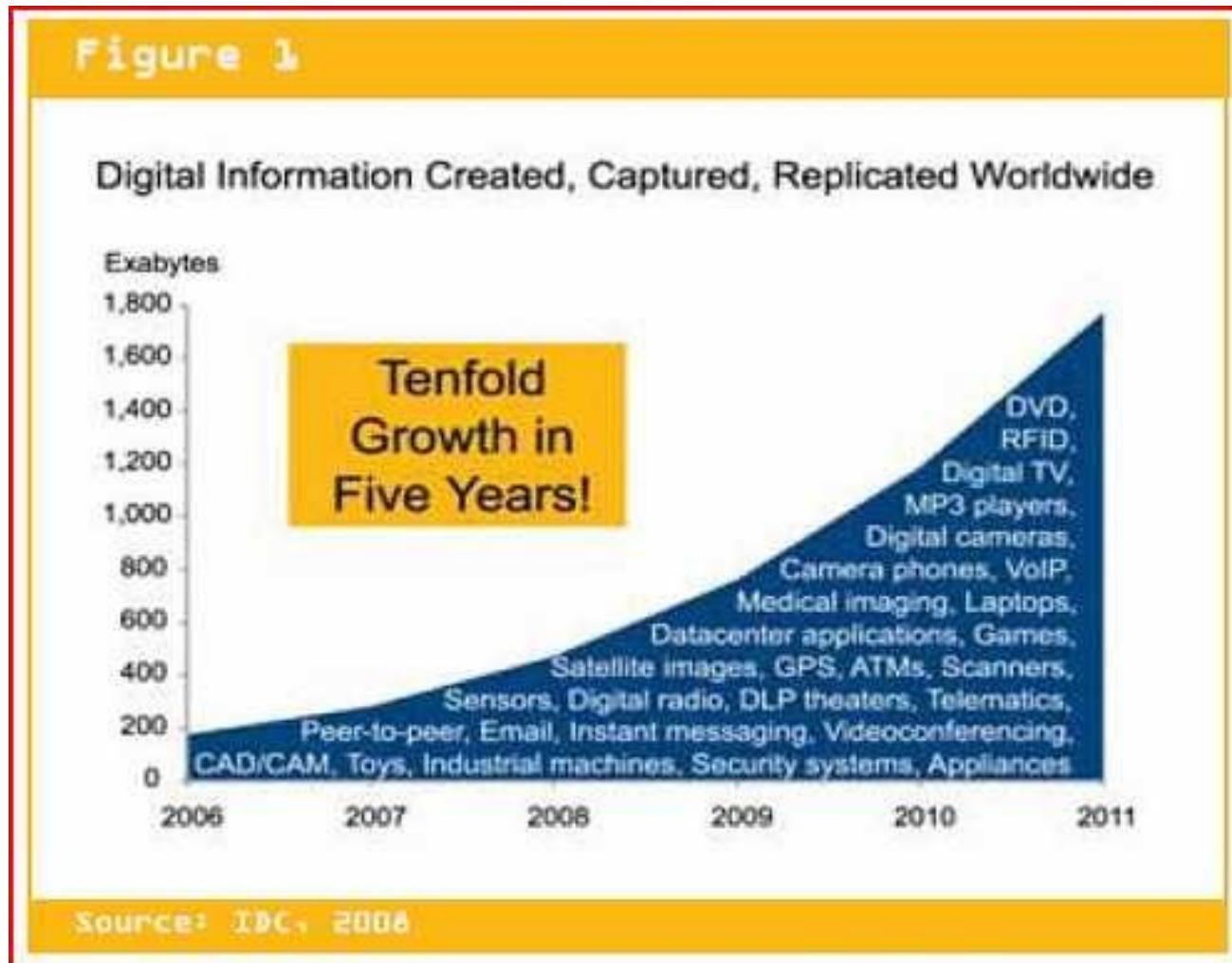
Search & Retrieve

Plan & Schedule

Share & Exchange

How do you manage Information?





Information is tightly confined

- **The computer desktop is our universal workspace**

- All kinds of information in different formats
- Used for various purposes in different applications



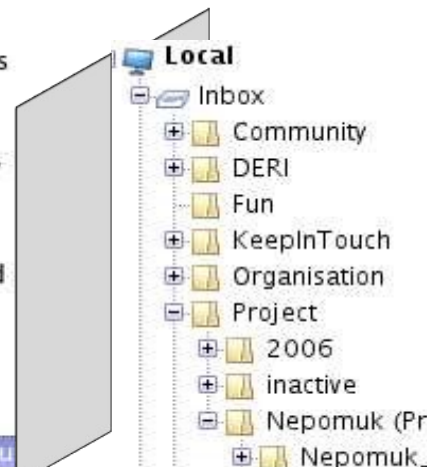
- **But**

- Not always suitable structured
- Data are trapped/imprisoned in applications → Data Silos

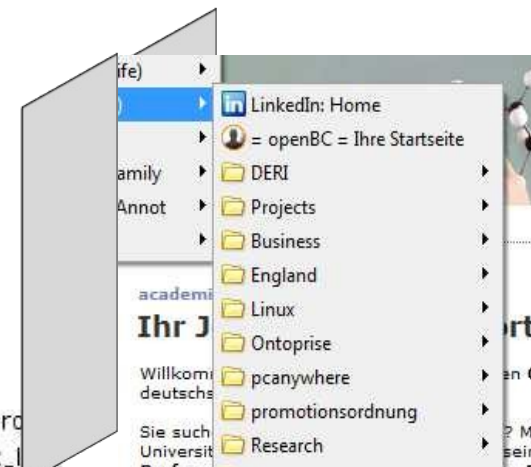
File System



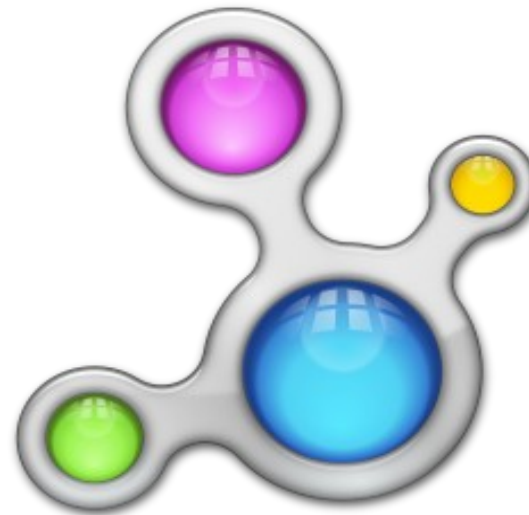
Email Folders



Bookmarks



Semantic Desktop Vision



Vision: Networked Collaborative Knowledge



- Free the Silos - Bridge the Islands
- Interconnected Knowledge
- Ensure local and global Collaboration



Memex (Vannevar Bush) **1945**

A memex is “a device in which an individual stores all his books, records, and communications.”

NLS oN-Line System (Doug Engelbart) **1962**

NLS system was the first to employ the practical use of hypertext links, the mouse, information organized by relevance, screen windowing, presentation programs, and other modern computing concepts.

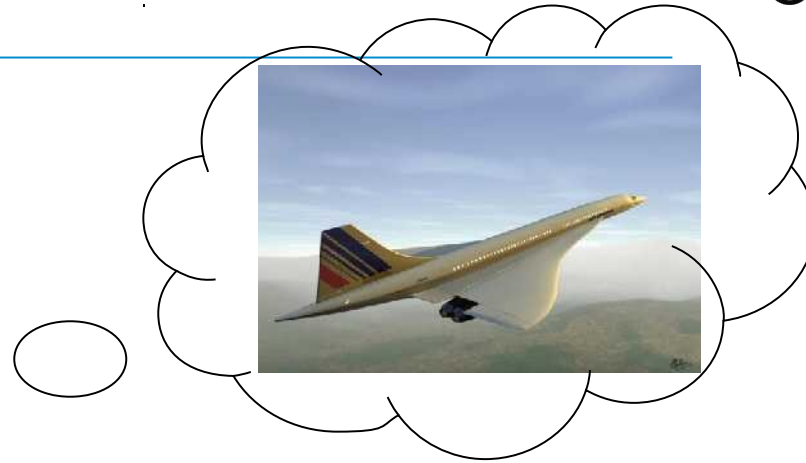
<http://sloan.stanford.edu/MouseSite/1968Demo.html>

WWW (Tim Berners-Lee) **1991**

“There was a second part of the dream [...] we could then use computers to help us analyse it, make sense of what we re doing, where we individually fit in, and how we can better work together.”



It wasn't the time...



Today necessary technologies & communities exist:

- Standardised metadata: [Semantic Web](#)
- Scalable distributed infrastructure: [P2P Computing](#)
- Knowledge articulation and interaction: [Desktop/Wiki](#)

Technology

- Processing of unstructured and legacy information: [NLP](#)
- Human centric information exchange: [Online Social](#)

Networks

Issues, Methodologies Research Questions



Goal: Overcome the problem of data overload and data silos

SD methodology:

- put the data into the centre of attention, not the applications
- SD is a infrastructure like the WWW -> needs Standardisation

- What to represent (scope)?
- How to represent (ontologies)?
- How to create data (applications)?
- How to utilise data (added-benefit for users)?

- **Think about scenarios you encounter every day, and where the SSD can make your work easier?**

Architecture - background



Alistair: Prepare for a sales meeting

Goal: Make a successful sales pitch

Search

Functionality Name	Description
Search	Retrieve relevant things from a specified set of repositories of information (different sources).
Input	Output
List of sources (web, intranet, crm, other desktops, etc.), list of ordering restrictions	(Personalised) Information matching



Alistair
meeting
some b
starts to
can view
uses th
added t
rified
present

Category	Functionalities
Desktop	Annotation, Offline Access, Desktop Sharing, Resource Management, Application Integration, Notification Management
Search	Search, Find Related Items
Social	Social Interaction, Resource Sharing, Access Rights Management, Publish/Subscribe, User Group Management
Profiling	Training, Tailor, Trust, Logging
Data Analysis	Reasoning, Keyword Extraction, Sorting and Grouping

- Knowledge Articulation and Visualization.
- Standard Desktop Classification Structures.
- Mapping and Aligning of Information Schemes.
- Wrapping of Legacy Information.
- Metadata Storage and Querying.
- Linking of Data Items and Relational Metadata.
- Social Aspects.
- Open Architecture.

- How to establish a common knowledge representation with the required level of **expressivity** across multiple desktop systems?
- How to cope with the **heterogeneity of knowledge models**, especially multiple knowledge modules with potentially different interpretation schemes?
- How to support the **tailoring of knowledge models** towards different needs in various exploiting applications?
- How to represent existing **legacy data on the desktop** and express both **complex application-level annotations** and **simple end-user oriented** annotations in one coherent model?

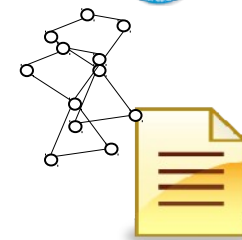
Collaborative Semantic: Technical Research Issues

- **To achieve the overall vision of “semantic collaborative information management” a number of technological issues need to be addressed:**

- Knowledge Representation, Standards
- Lifting, and Information Extraction & Annotation
- Visual Interfaces for the Social Semantic Space
- Collaboration and knowledge exchange
- Collected intelligence (Web 2.0) → Collective Intelligence (Social Semantic Space)

Doug Engelbart, 1968:

"The grand challenge is to boost the collective IQ of organizations and of society."



Semantic Collaboration on the Desktop



Motivation - How do you...?

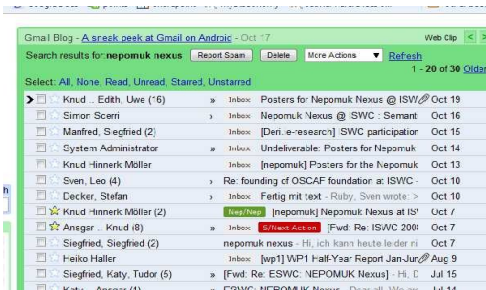
- How do you manage and structure your **personal information**?
- How do you **share and exchange data & knowledge** with your colleagues?
- How do you **find an expert** in your organization?



Human burden to hold everything together

Organising a project showcase at a conference:
 involved Documents, contacts, time-schedule

E-Emails



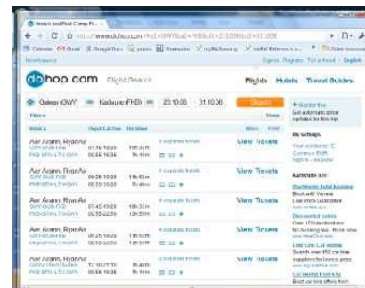
Time Schedule



Meeting Presentations



Travel Website



Conference Website



**Enhance available information
by formal semantic annotation
to build explicit
personal information models
and facilitate automated services**

Personal Information Management

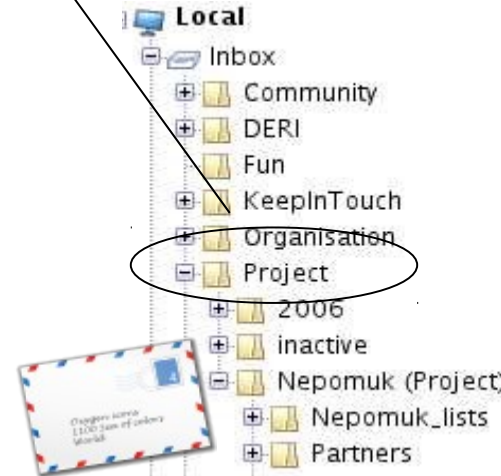
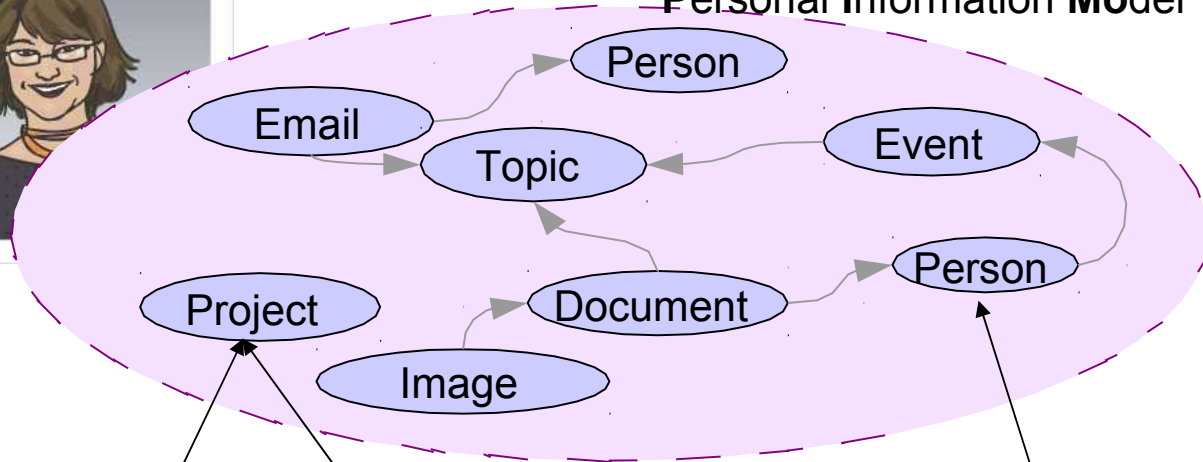
- **folders** \approx **email**
 \approx **bookmarks**
- **Projects,**
Meetings
People, Topics,
etc.
- **representing**
“mental
models”
explicitly.



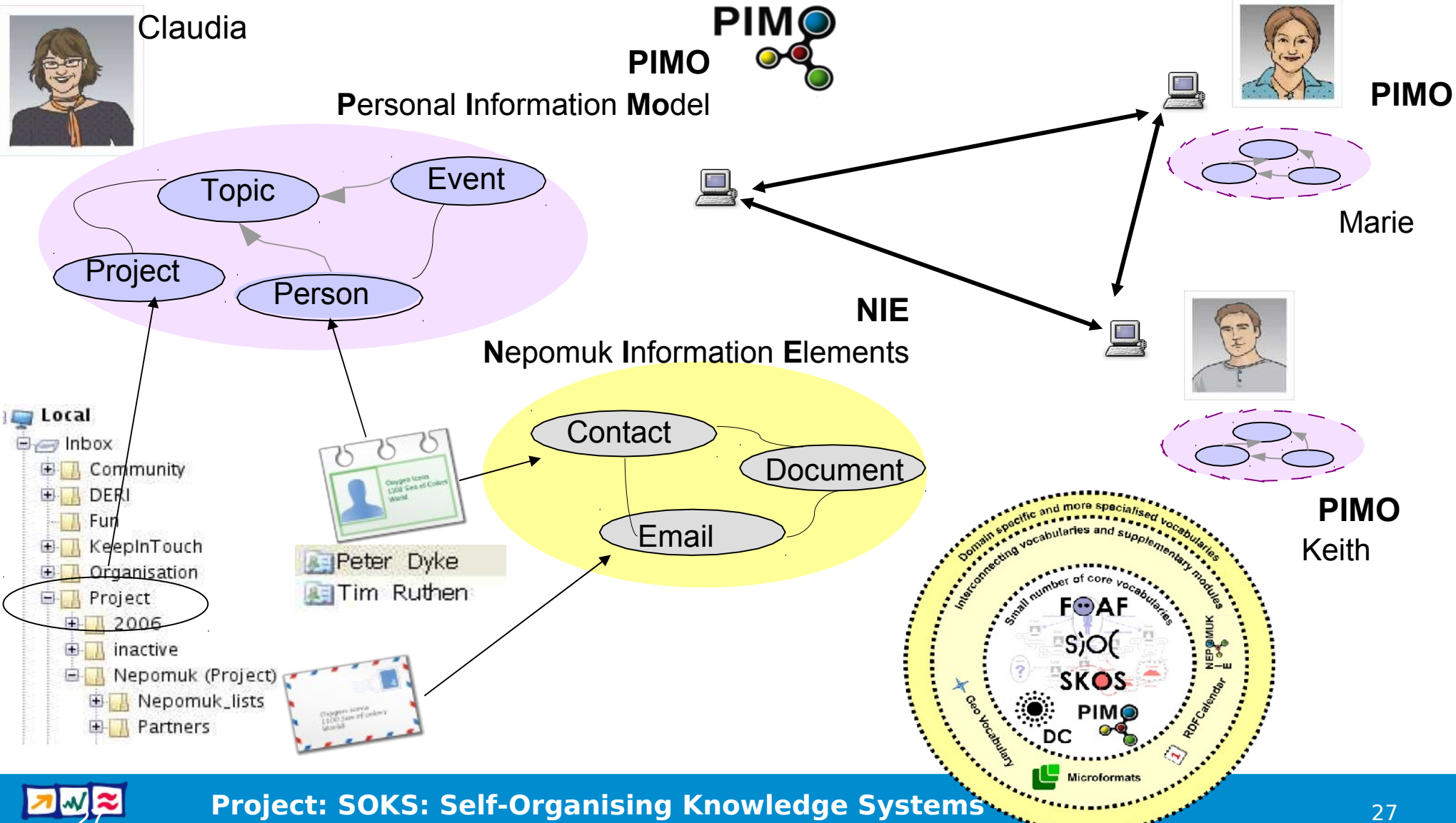
Claudia

PIMO

Personal Information Model



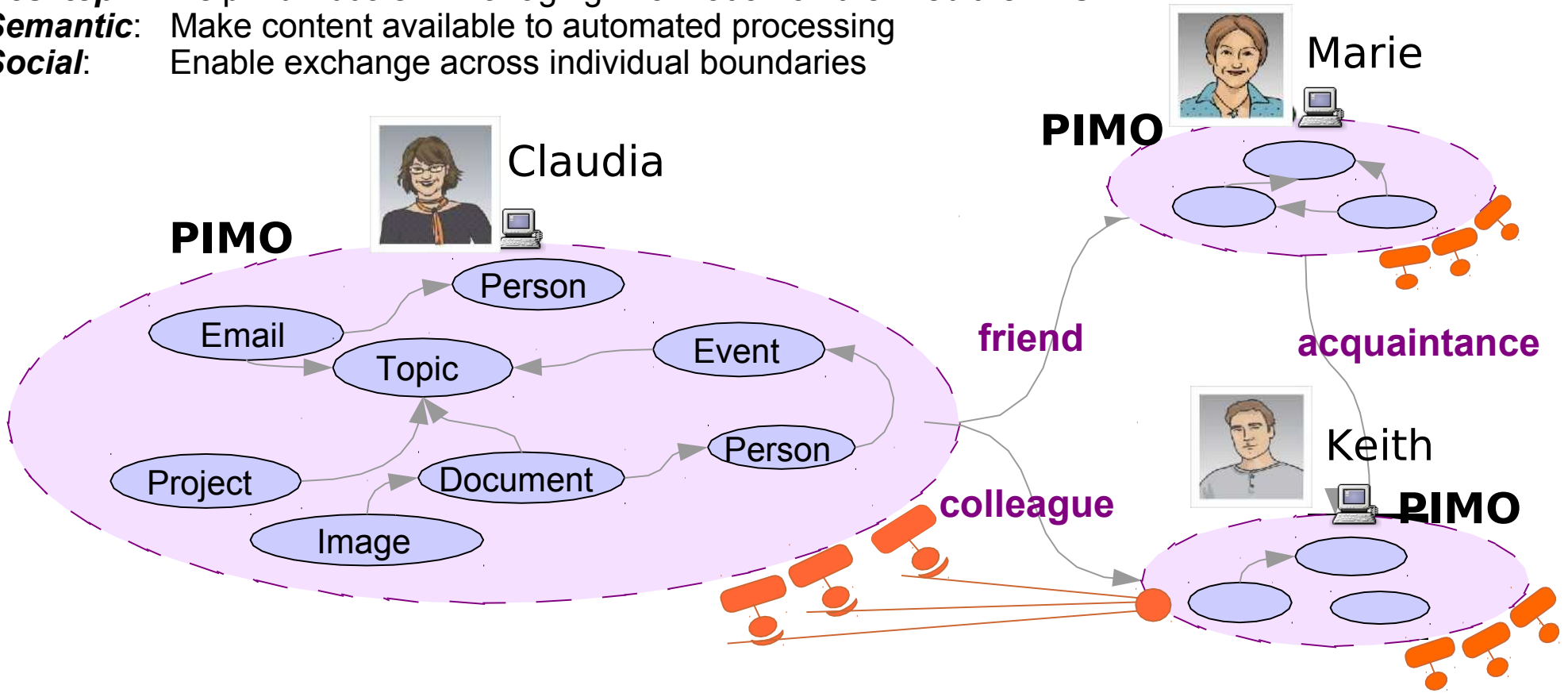
How can we achieve that?



Realising the Social Semantic Desktop



- Desktop:** Help individuals in managing information on the Web/their PC
- Semantic:** Make content available to automated processing
- Social:** Enable exchange across individual boundaries



Personal Semantic Web: *a semantically enlarged intimate supplement to memory*

Social protocols and distributed search

Social semantic peers peers

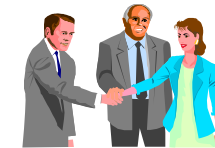
Flexible Information processing is at the heart of all knowledge work

• Knowledge work comprises

- Collecting, structuring, connecting information
- Articulation of new ideas, observations, insight thus generating information
- Sharing, exchange, and communication



according to multiple, individual goals, perspectives, and processes

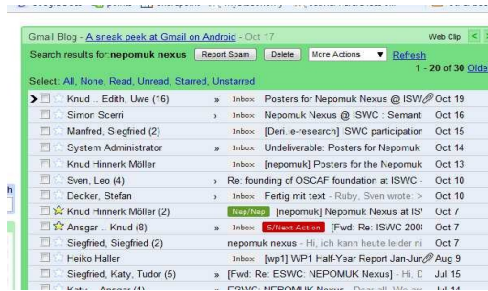


- **Modern work requirements ask for flexibility and collaboration within networks across traditional boundaries**

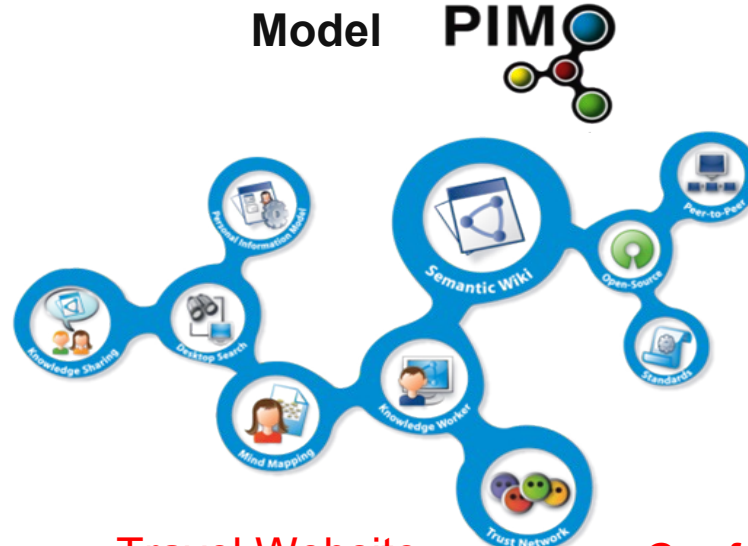
Personal Information Model



E-Emails



Model **PIMO**



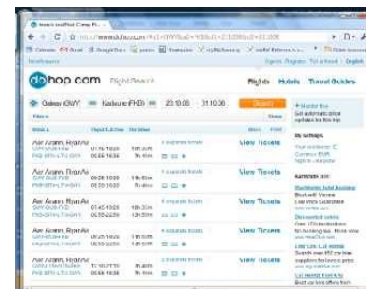
Time Schedule



Meeting Presentations



Travel Website

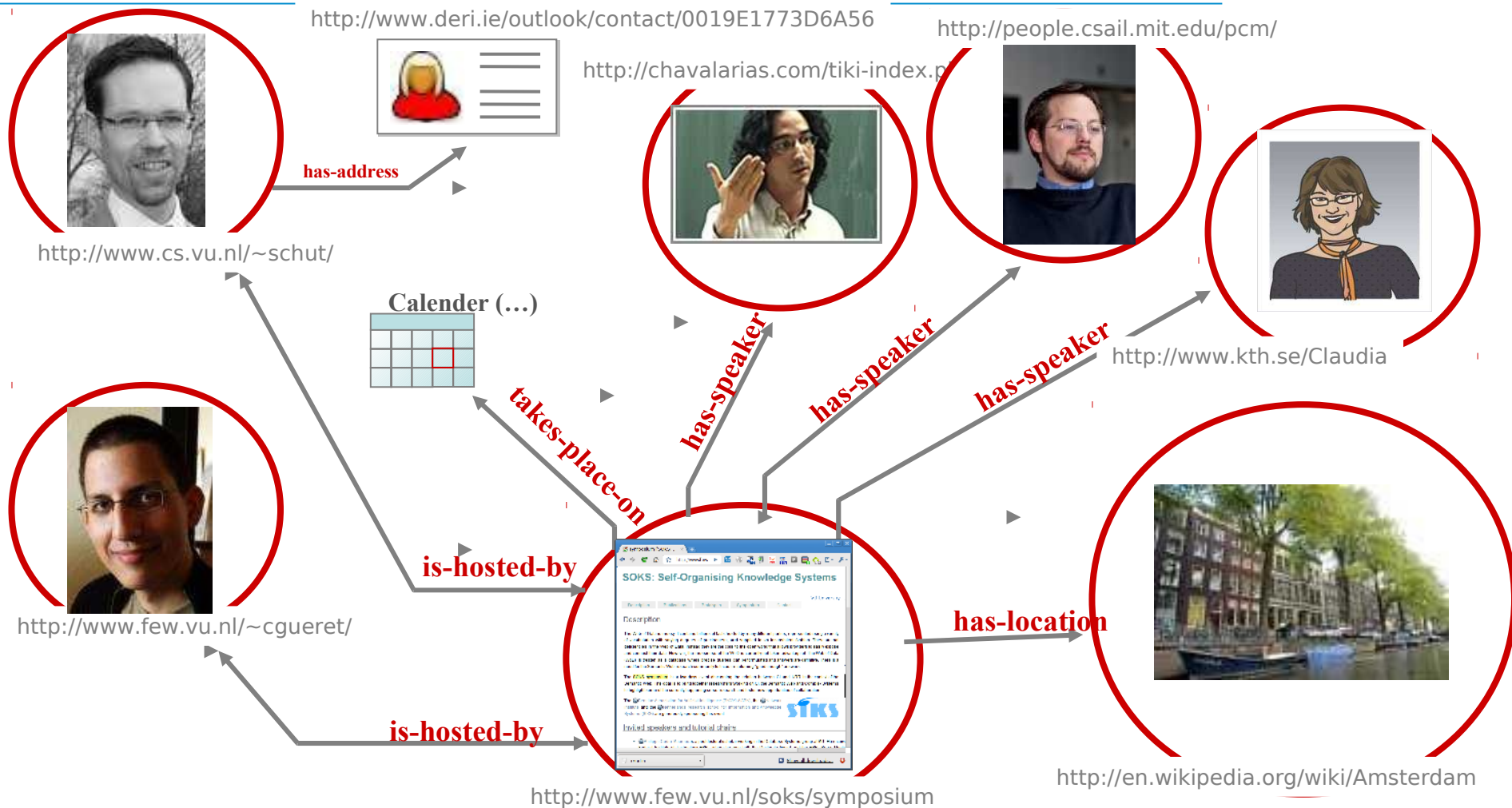


Conference Website

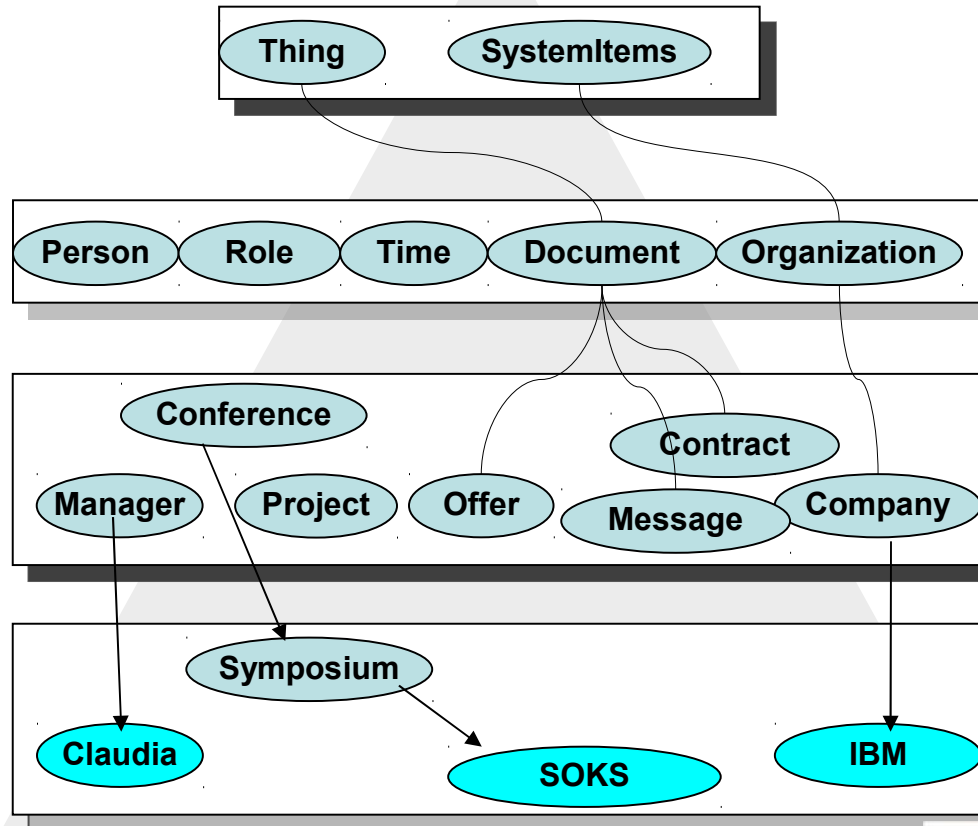


Interconnect disperse Information

Example: PIMO about SKOS



A hierarchy of models and ontologies facilitates the handling of global and personal views



Representational Level

Upper Level

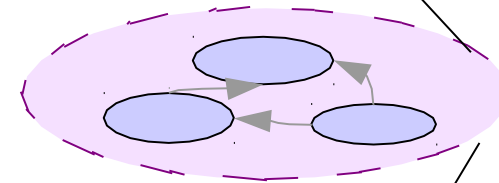
Domain independent

Mid Level

Adopted to Organization
(i.e. IBM, Cisco, DERI,
University)

Personal Level

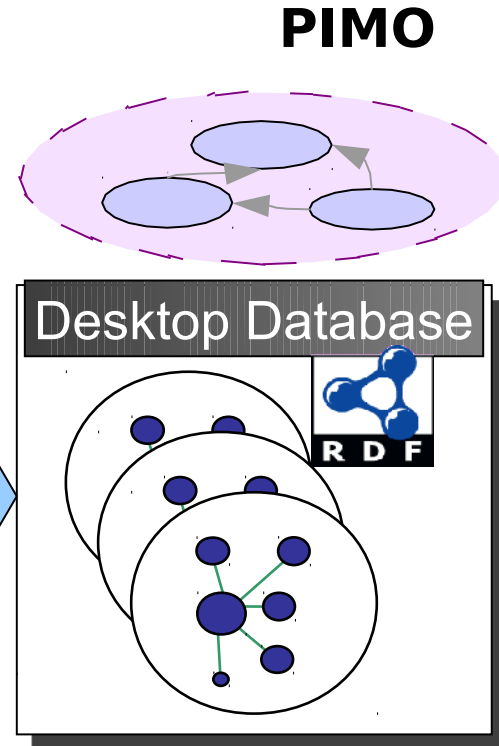
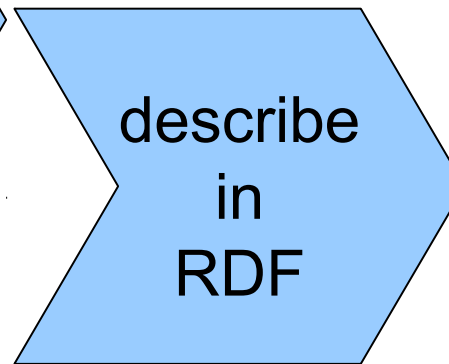
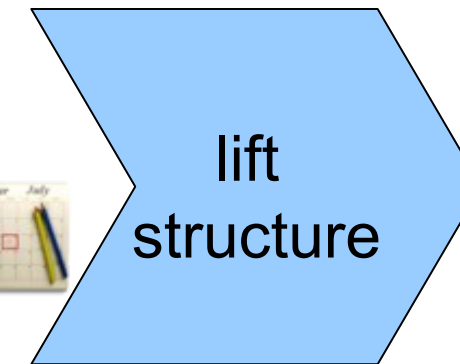
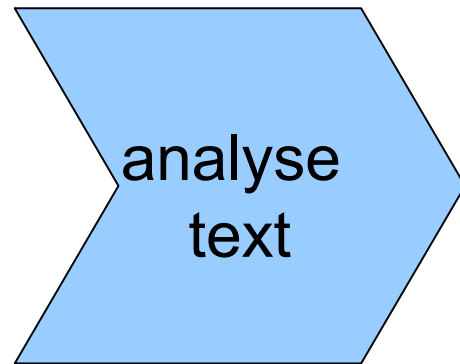
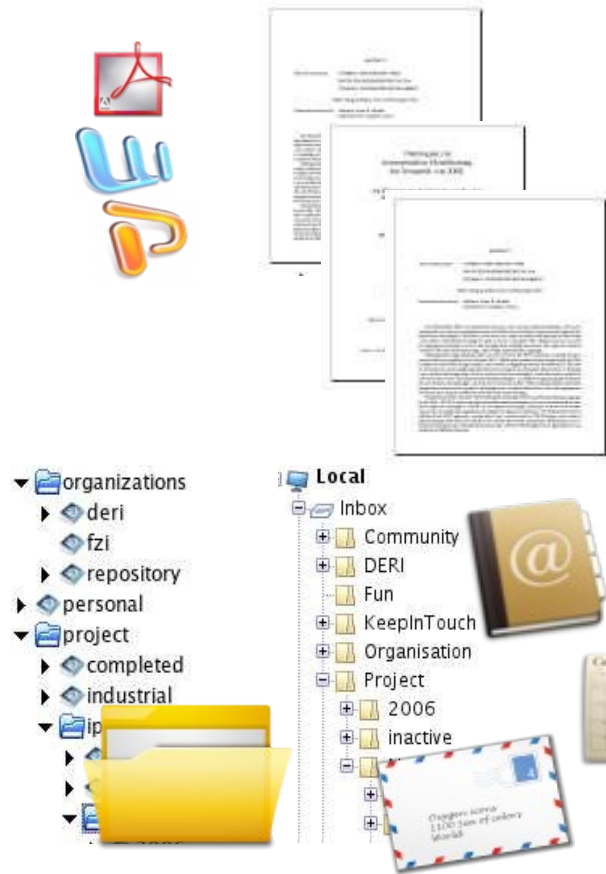
Personal concepts and Data,
e.g. from Claudia



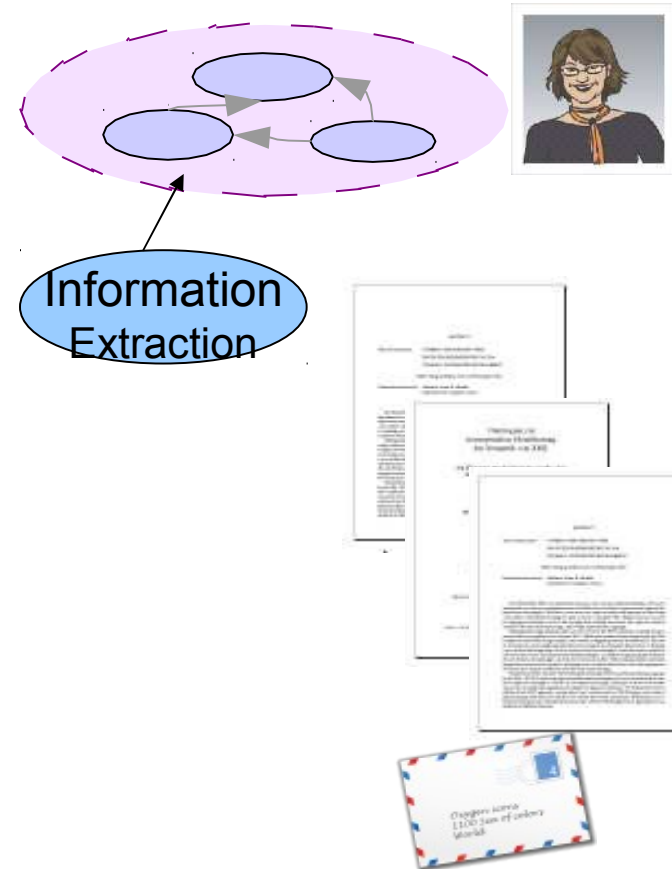
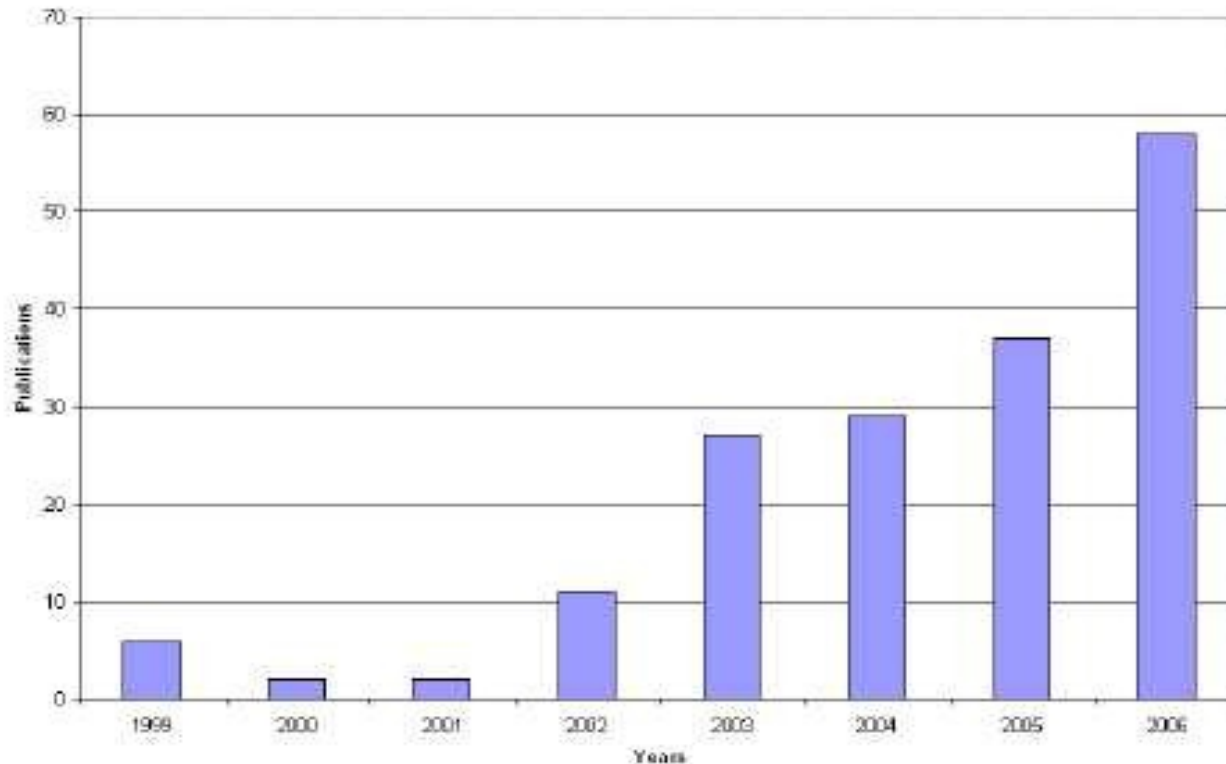
Data Lifting to RDF



Claudia's files and emails

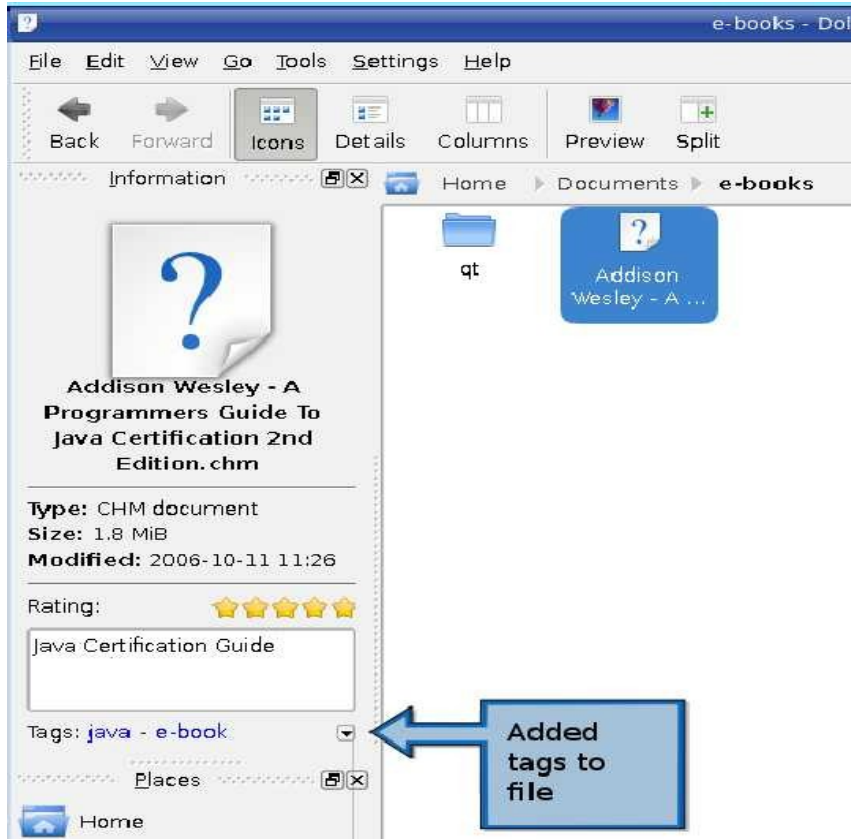


Document Analysis wrt. time

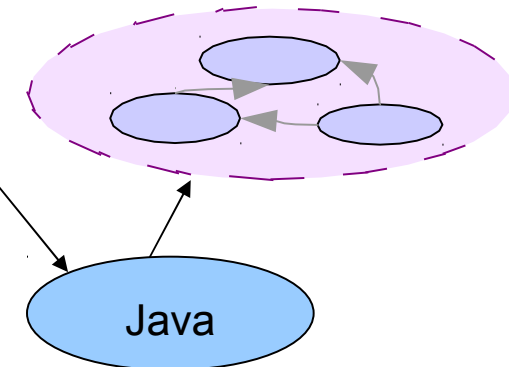


- **Example of document data distribution on Claudia's Desktop for Topic: "Information Retrieval"**

Manual tagging

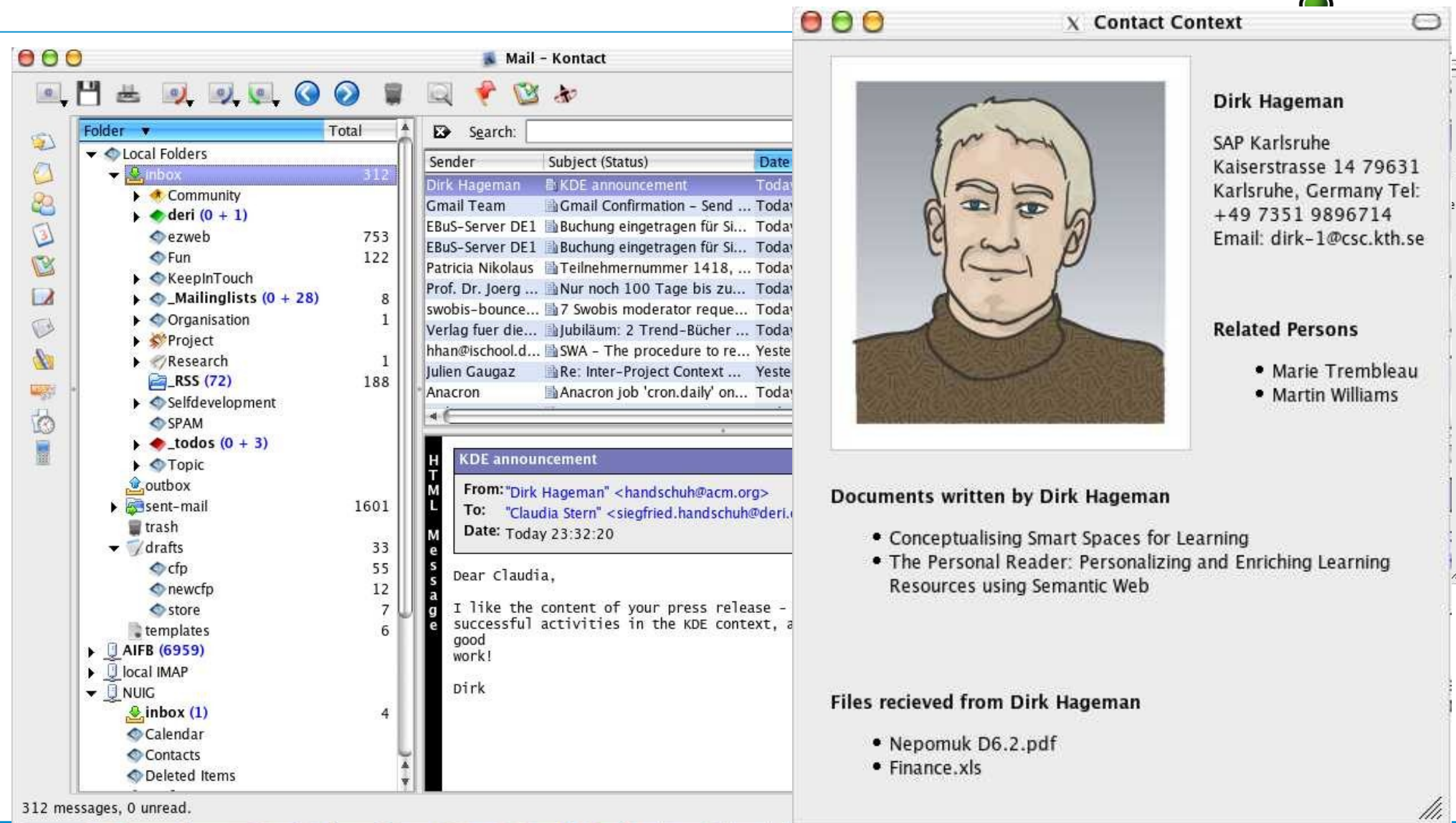


PIMO



- manual tagging of files, folders, emails, etc.
- Representation of tags within PIMO

Application: Contextual Info



The screenshot shows a KDE mail client window titled "Mail - Kontakt" with a sidebar of folders and a main pane displaying a list of messages. A "Contact Context" window is open, showing a portrait of Dirk Hageman and his contact information. Below the portrait, there are sections for "Documents written by Dirk Hageman" and "Files recieved from Dirk Hageman".

Folder

Folder	Total
Local Folders	
inbox	312
Community	
deri (0 + 1)	
ezweb	753
Fun	122
KeepInTouch	
_Mailinglists (0 + 28)	8
Organisation	1
Project	
Research	1
_RSS (72)	188
Selfdevelopment	
SPAM	
_todos (0 + 3)	
Topic	
outbox	
sent-mail	1601
trash	
drafts	33
cfp	55
newcfp	12
store	7
templates	6
AIFB (6959)	
local IMAP	
NUIG	
inbox (1)	4
Calendar	
Contacts	
Deleted Items	

Search: []

Sender	Subject (Status)	Date
Dirk Hageman	KDE announcement	Today
Gmail Team	Gmail Confirmation - Send ...	Today
EBuS-Server DE1	Buchung eingetragen für Si...	Today
EBuS-Server DE1	Buchung eingetragen für Si...	Today
Patricia Nikolaus	Teilnehmernummer 1418, ...	Today
Prof. Dr. Joerg ...	Nur noch 100 Tage bis zu...	Today
swobis-bounce...	7 Swobis moderator reque...	Today
Verlag fuer die...	Jubiläum: 2 Trend-Bücher ...	Today
hhan@school.d...	SWA - The procedure to re...	Yesterday
Julien Gaugaz	Re: Inter-Project Context ...	Yesterday
Anacron	Anacron job 'cron.daily' on...	Today

HTML Message

KDE announcement

From: "Dirk Hageman" <handschuh@acm.org>
To: "Claudia Stern" <siegfried.handschuh@deri...>
Date: Today 23:32:20

Dear Claudia,

I like the content of your press release - successful activities in the KDE context, a good work!

Dirk

Contact Context

Dirk Hageman

SAP Karlsruhe
 Kaiserstrasse 14 79631
 Karlsruhe, Germany Tel:
 +49 7351 9896714
 Email: dirk-1@csc.kth.se

Related Persons

- Marie Trembleau
- Martin Williams

Documents written by Dirk Hageman

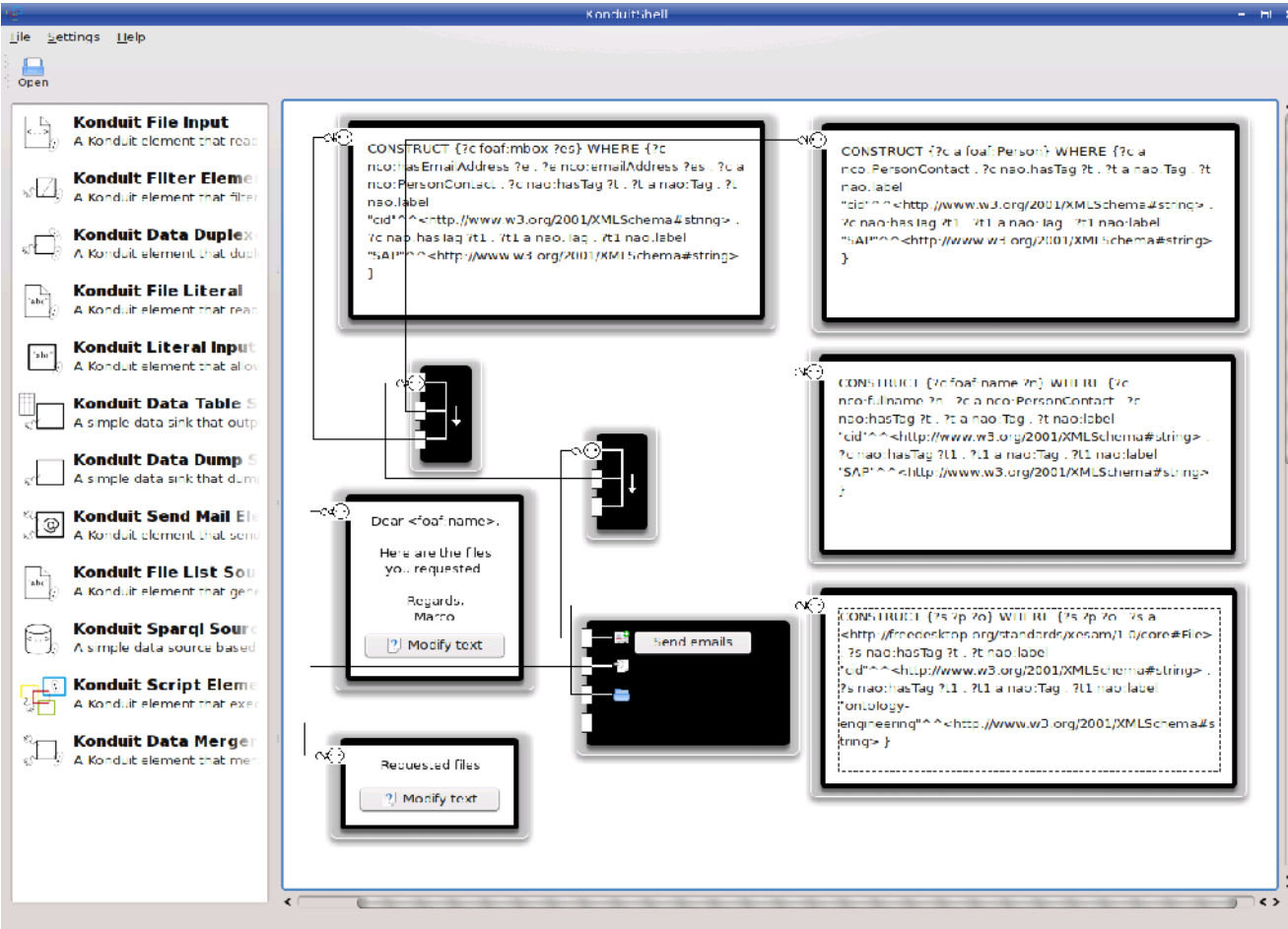
- Conceptualising Smart Spaces for Learning
- The Personal Reader: Personalizing and Enriching Learning Resources using Semantic Web

Files recieved from Dirk Hageman

- Nepomuk D6.2.pdf
- Finance.xls

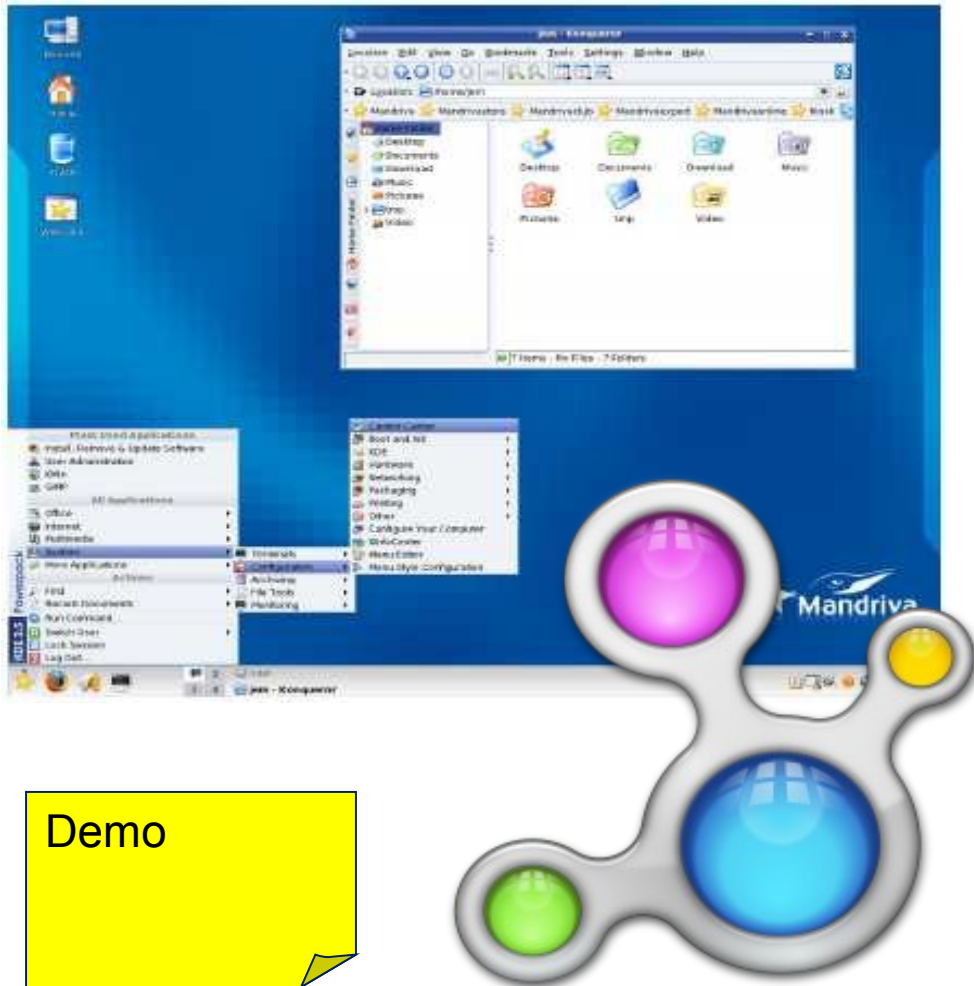
312 messages, 0 unread.

Application: Mashup Web+ Desktop Data



- Situational Programming for the Power-User
- Mashup of Desktop + Web data
- Semantic-Pipes on the Desktop
- No need to remember a script syntax.
- Stored SPARQL procedures
- Ready-made building blocks
- Re-usable blocks of Dataflows

Impact: KDE Semantic Desktop



- Open Source
 - Involvement of KDE developers – Early Adopters
 - Semantic OS
- Core Technology of the Semantic Desktop:
 - PIMO, RDF Data store, Wrapper
- Part of the official KDE 4
 - Millions of installations
 - Semantic Web Technology on every KDE computer
 - Virulent effect
 - Creation of a market

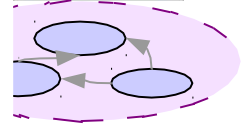
Beyond the single platform: Social Services

Services across desktops cover distributed search, community building, and semantic exchange



- **Sharing & exchange of knowledge (= annotated data)**

- Example: Delegation of a task invokes reminder service at the receiver's side

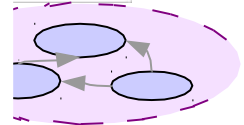
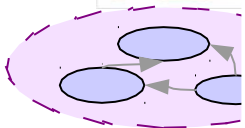


- **Semantic search across individual desktops**

- P2P network with distributed hash tables as index structure
- Security model & access control
- Mapping and merging of ontology concepts

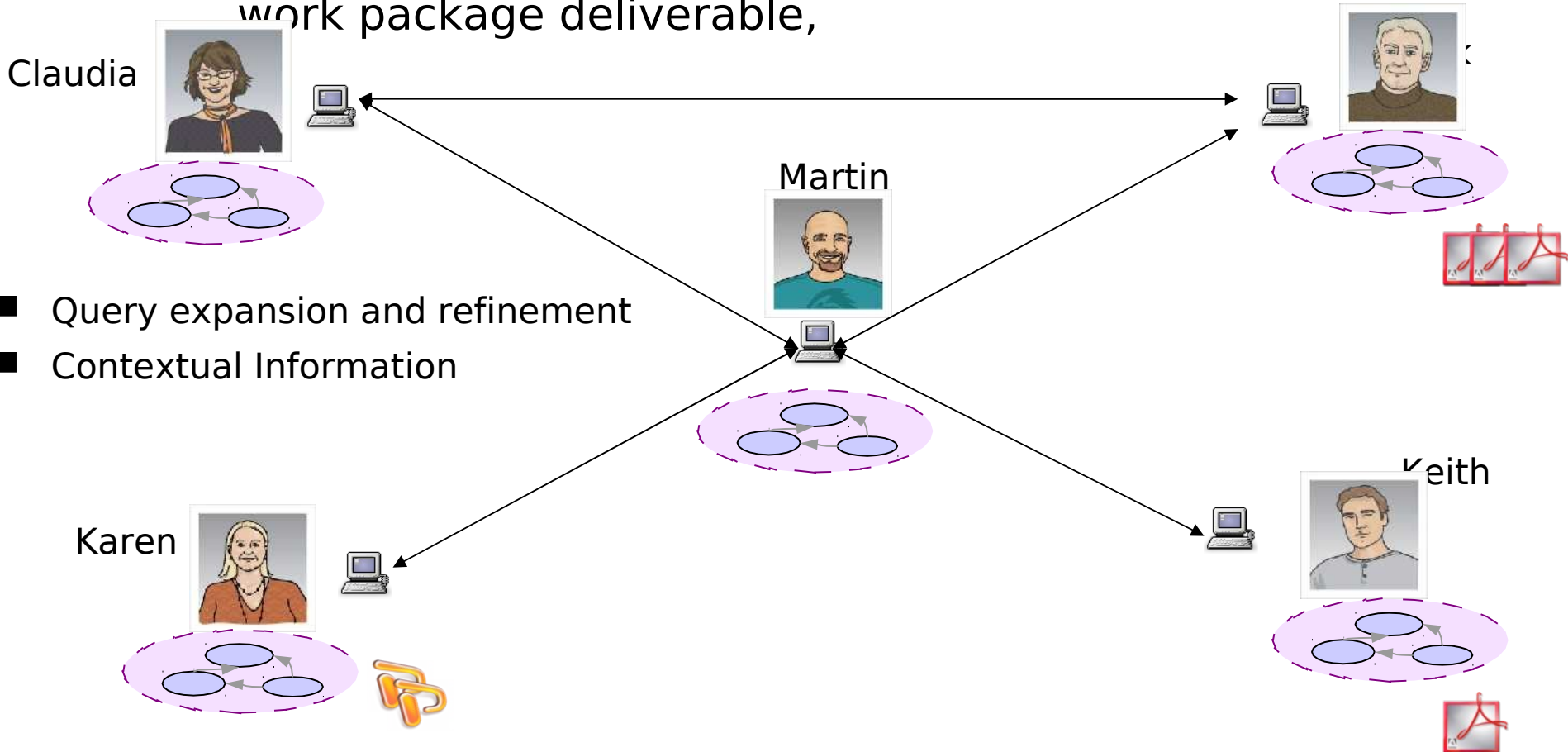
- **Community building in networks**

- Network & communication analysis
- Easy location of experts



Example: Distributed Expert Finding

Task: Claudia has to write a work package deliverable,



- Query expansion and refinement
- Contextual Information

Example: Expert Finding

Expert Search - Konqueror

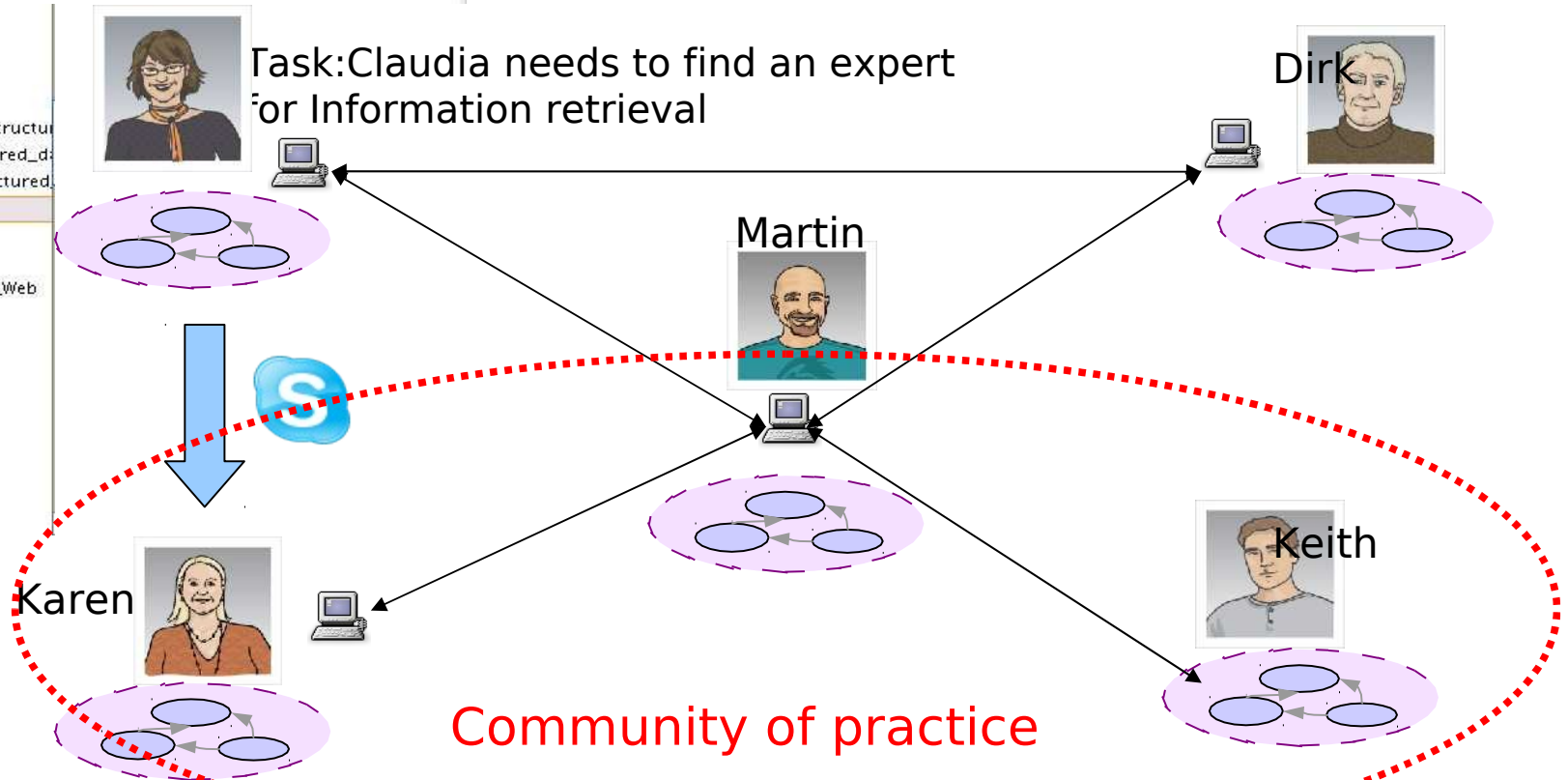
HomePage/community.html

Expert Search

Search Topic is: Information Extraction

Karen Kiersted	karen-1@csc.kth.se	Skype: k.kierstedt	Relevance 80%
Keith Morgan	karen-1@csc.kth.se	Skype: keith	Relevance 45%

- ◆ Graph_Partitioning
- ◆ Grid_Computing
- ◆ Image_Annotation
- ◆ Information_Extraction
- ◆ Information_Extraction_from_semi-structur
- ◆ Information_Extraction_from_structured_d
- ◆ Information_Extraction_from_unstructured
- ◆ Information_retrieval
- ◆ Information_Visualization
- ◆ Knowledge_Discovery
- ◆ Knowledge_Markup_in_the_Semantic_Web
- ◆ Knowledge_Representation
- ◆ Link_Analysis
- ◆ Logics
- ◆ Machine_Learning
- ◆ Mapping
- ◆ Mash_Ups
- ◆ Matching
- ◆ mathematical_logic
- ◆ Metadata_Management

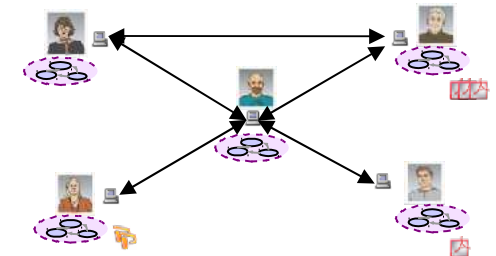
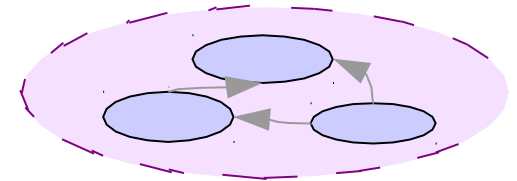


- **The Social Semantic Desktop is a universal platform for**
 - Personal Information Management
 - Distributed Information Management
 - Social Network and Community Services

- **Impact - dramatic time savings:**
 - filtering out **marginal information** and
 - **discovering vital** information.
 - Easy **information integration**.
 - Build and participate in **communities** of practice

Solutions - You can ...

- **How do you manage and structure your personal information?**
 - ⇒ "mental model", PIMO
 - ⇒ free data from their silos
- **How do you share and exchange data with your colleagues?**
 - ⇒ P2P network, Content-based routing
 - ⇒ "Link Routing" based on social connections
- **How do you find an expert in your organization?**
 - ⇒ using the PIMO topics to detect and classify experts and communities



- **Personal information models:**
 - Knowledge articulation, visualisation and utilisation
- **Semantic authoring, annotation and publishing environments:**
 - Articulation of new ideas
- **Collaboration and knowledge exchange:**
 - Collecting, structuring, connecting information
 - Link to, comment on, annotate and exploit other people's knowledge and articulations
- **Knowledge worker process support:**
 - Integrated task management support
 - Ad-hoc task planning
 - Collaborate on knowledge-intensive tasks



- Trust and Privacy
- Policies, User, group, and rights management.
- Semantic Desktop & Linked Open Data
- Ontology Expressivity vs. simplicity
 - Performance / scalability / development effort
- Ontology Mapping
 - i.e. mapping of PIMOs
- Ontologies and Intelligent Services
 - Ontology versioning, ontology evolution, import
 - Rules, Inferencing
- Context
- User Evaluation
- User Interaction, UI
- Non technical
 - psychological and sociological research