

Weak Workflows in FRODO TaskMan

– System Walkthrough and Evaluation

German Research Center for Artificial Intelligence
Knowledge Management Research Department
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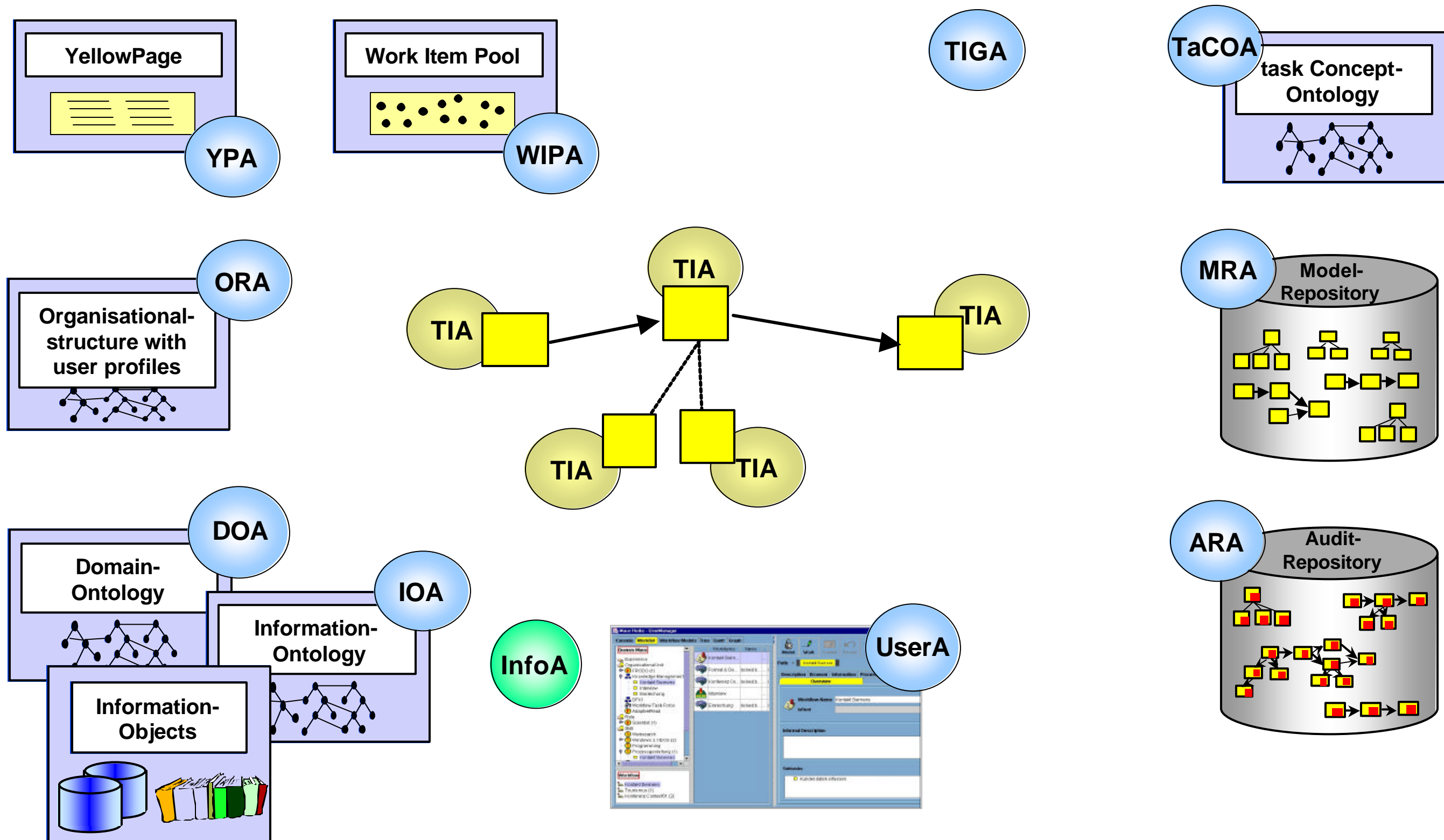
Remarks

- one result of the FRODO (Framework for distributed organizational Memories) project (Duration 2001-2003)
 - see <http://www.dfki.de/frodo>
- FRODO TaskMan is a prototype which is still under development
- The system is used to show important ideas – more to come ...
- The system will be used also in the successor project EPOS (Evolving Personal to Organizational Knowledge Spaces)
 - see <http://www.dfki.de/epos>
- state June 2003

Agenda

- System Architecture
- TaskMan Walkthrough
- Evaluation

FRODO WWf-System Architecture Supports Knowledge-Intensive Work by an Agent Society

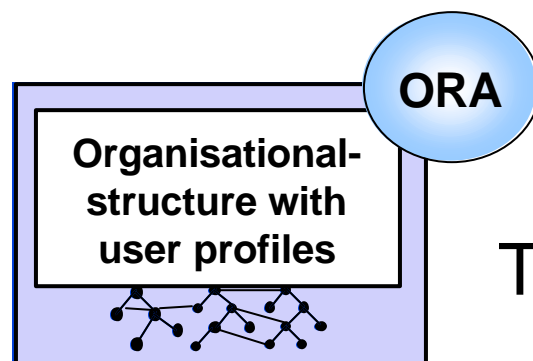
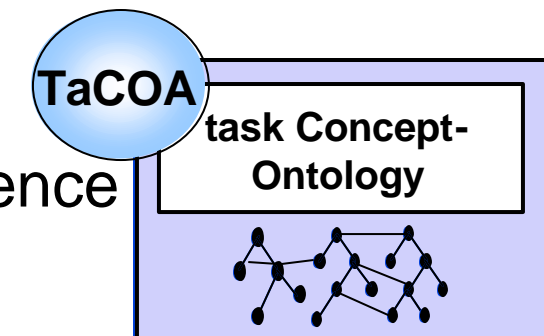


Repository agents manage the workflow-relevant knowledge about models and structures

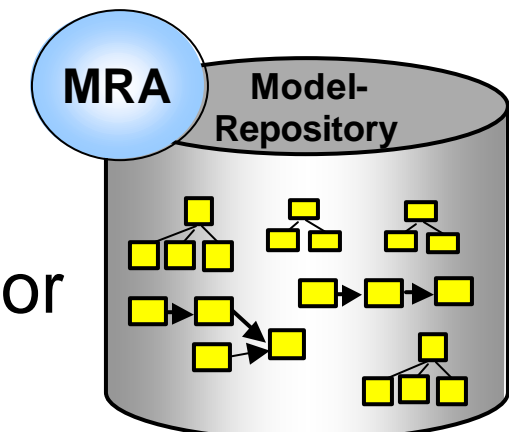
- The *organisational repository* manages enterprise-related information
 - users, departments, groups, projects, roles, competencies, skills, & their relationships
 - user profiles containing user information, skills, experience



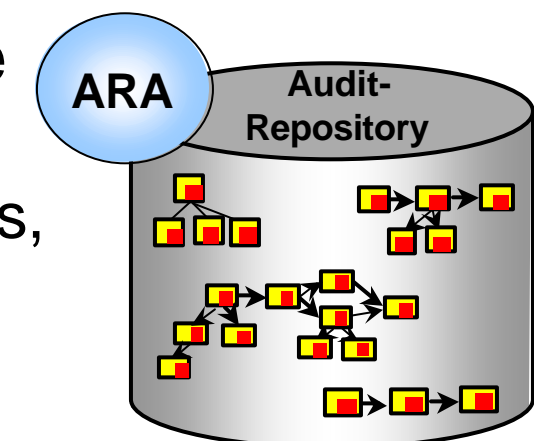
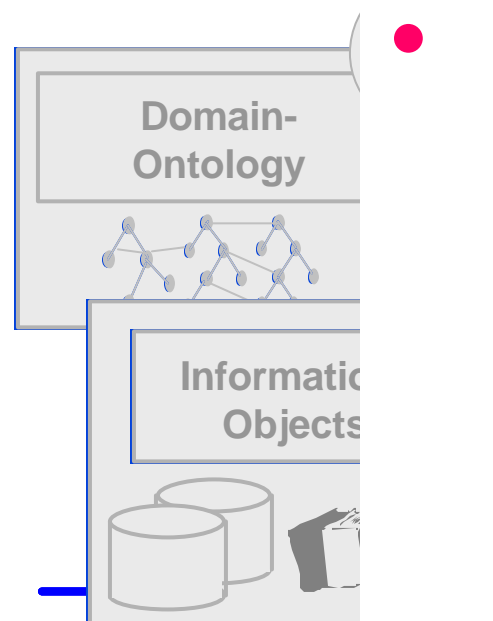
- The *task concept ontology* offers the concepts to describe tasks
 - ontology browsing supports modelling in finding appropriate task models, resp. 'building blocks' for a user's current tasks



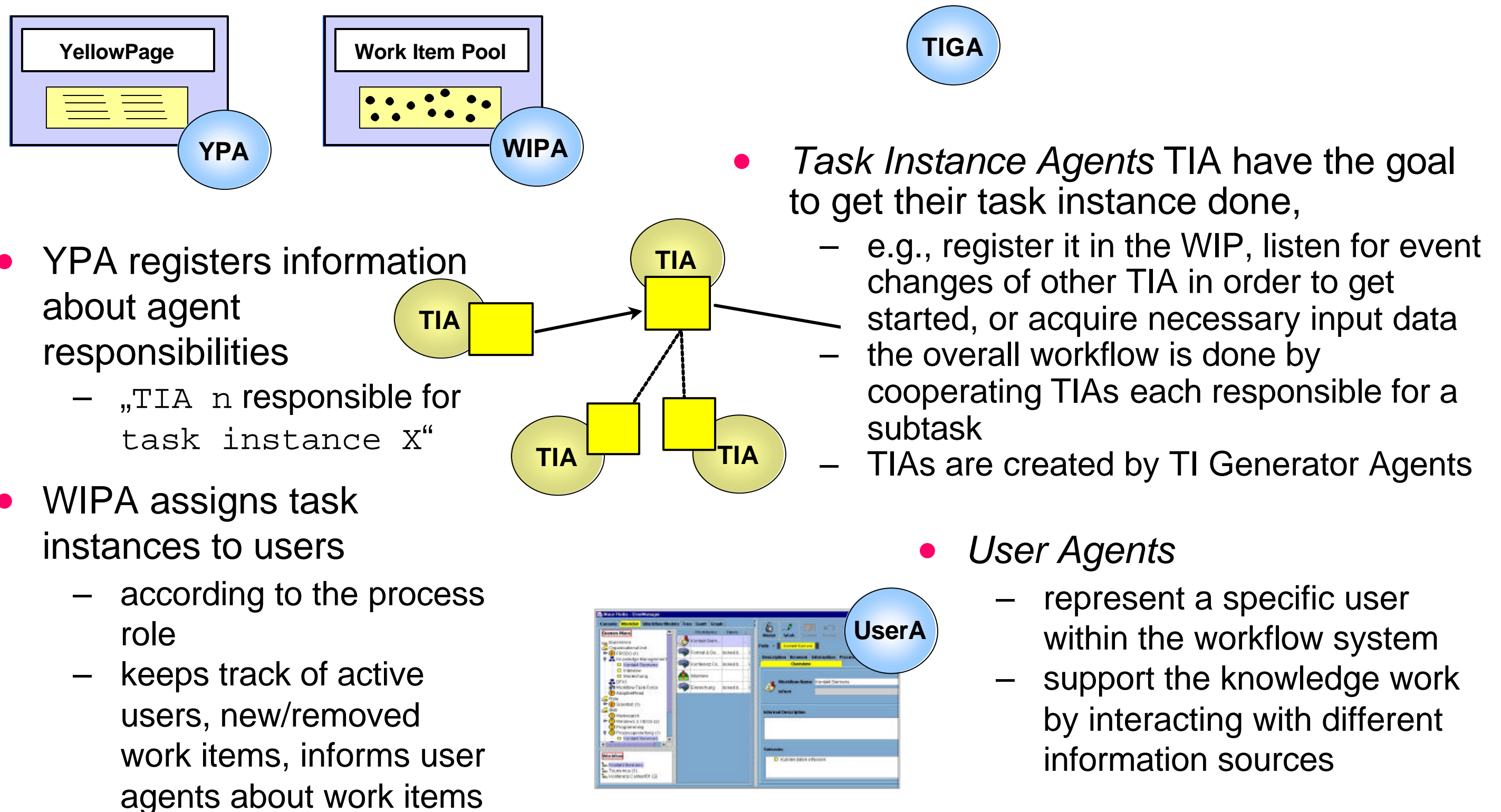
- The *model repository* acts as an information source for
- providing 'blue prints' of tasks
 - providing 'building blocks' for workflow modelling



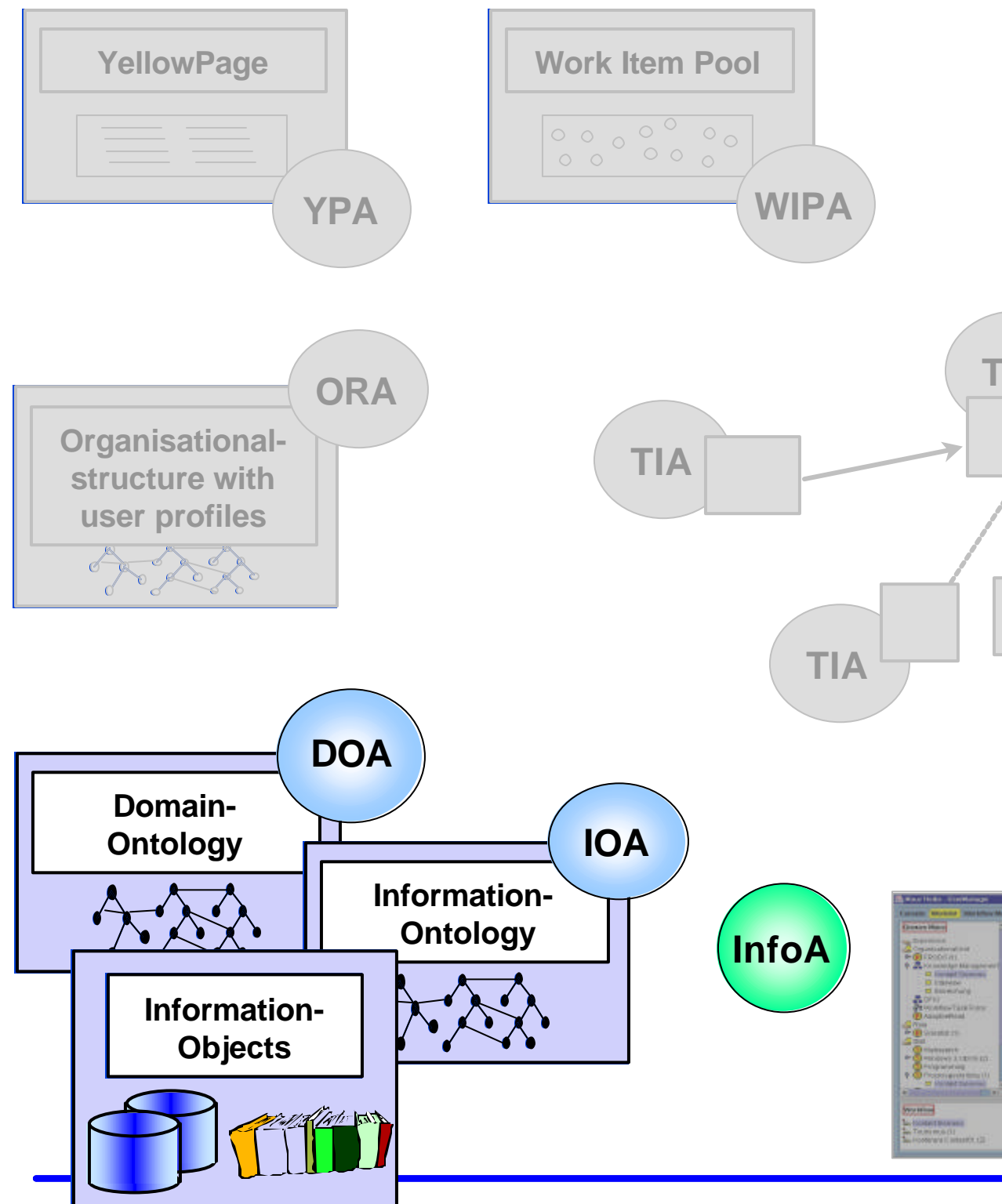
- The *audit repository* logs workflow actions within the workflow system
 - includes the audit trail of task instances, state changes, modifications...
 - observes the history of task instances and changing models
 - answers questions about former instances of a task (e.g. to find best/worst practice)



The WWf Core Agents enact the processes



Ontology Agents and Information Agents cooperate to satisfy information needs



- *Domain / Information Ontology Agents*

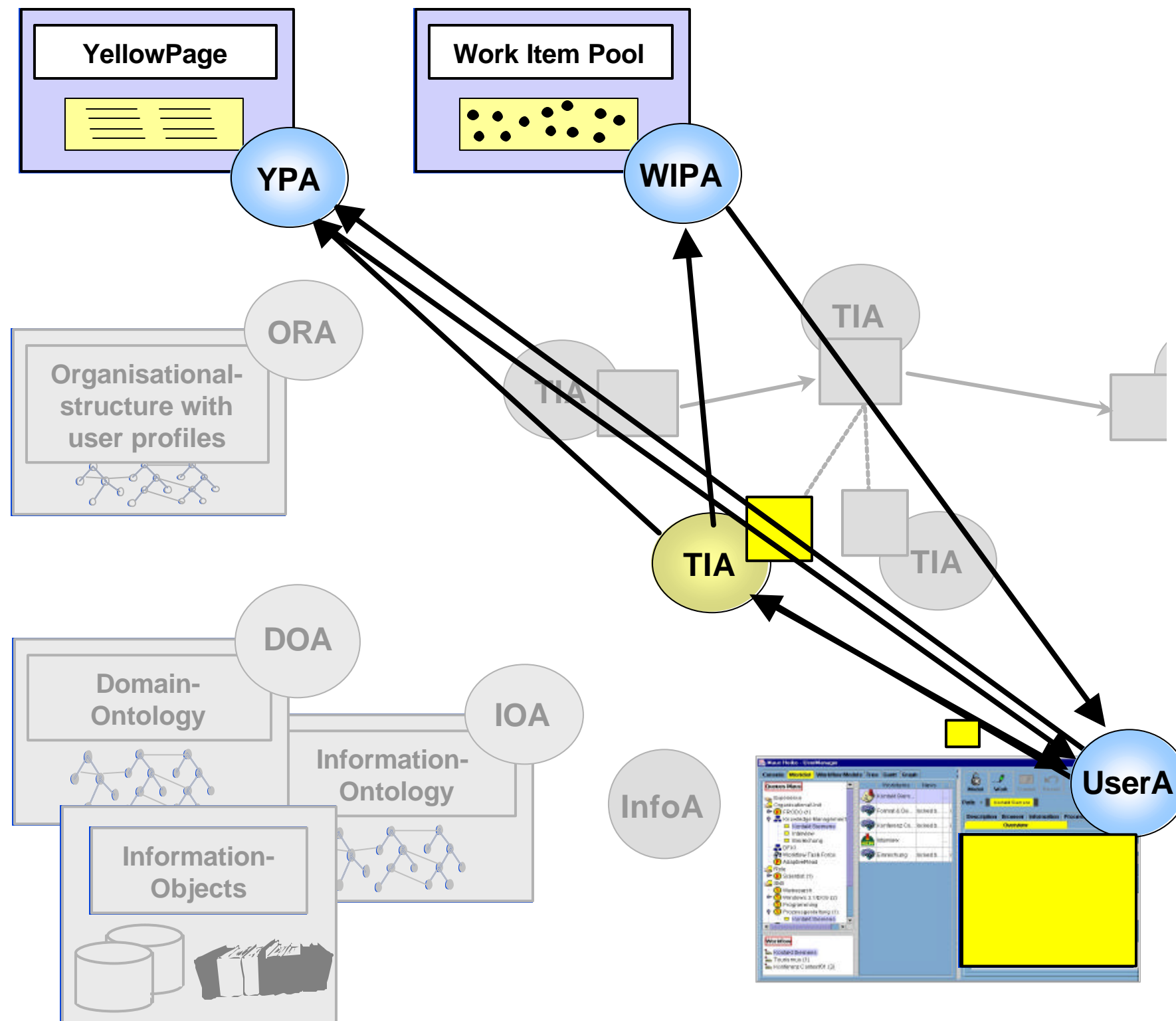
- manage their respective ontology
- provide typical ontology services
- assume multiple roles in a distributed, cooperative scenario
- offer the basis for information structuring

- *Information agents realize information access and delivery*

- make information objects accessible to the agent system (esp. wrapper agents for legacy systems)
- rely on ontologies to structure and access information objects
- satisfy information needs specified by User- / task Instance Agents

- All agents cooperate to perform distributed inferences for information retrieval

Example: A task instance reaches its responsible user, seen in a step-by-step communication



- TIA registers the responsibility for its task instance
- TIA registers process role at the work item pool
- if user is active, the user agent is informed about the new work item (`task instance id`)
- to get the task instance data, YPA is asked for the TIA responsible for the given id
- YPA answers with the `agentID` of the TIA
- UserA requests task instance data from TIA
- task instance is now available in the user manager

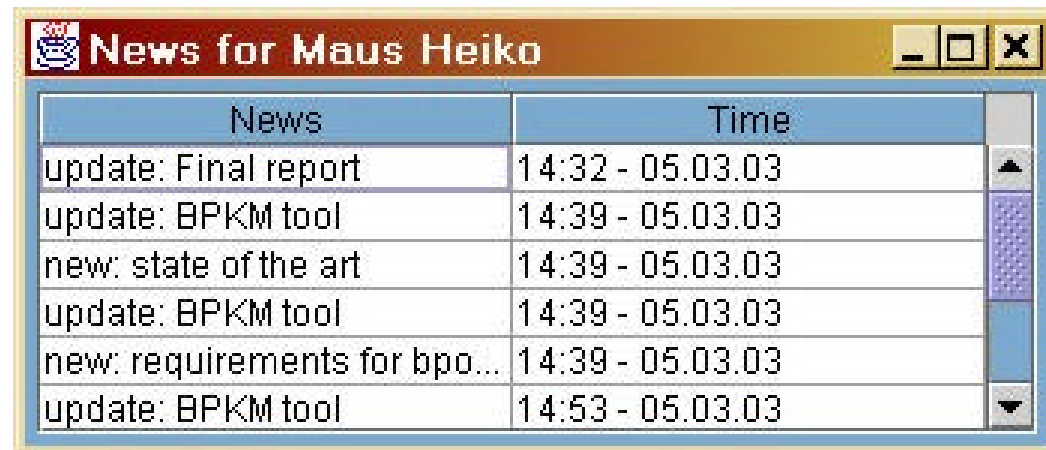
Agenda

- System Architecture
- TaskMan Walkthrough
- Evaluation

FRODO TaskMan Walkthrough

- UserManager Interface
- Modifying the Workflow Model
- Modelling & Executing a Task
- Working with Information Objects

FRODO TaskMan is used during the user's everyday work



News	Time
update: Final report	14:32 - 05.03.03
update: BPKM tool	14:39 - 05.03.03
new: state of the art	14:39 - 05.03.03
update: BPKM tool	14:39 - 05.03.03
new: requirements for bpo...	14:39 - 05.03.03
update: BPKM tool	14:53 - 05.03.03

- a tell tale window informs the user about news from tasks he is involved
- now, the user can access his UserManager

The Worklist shows task the users is involved in

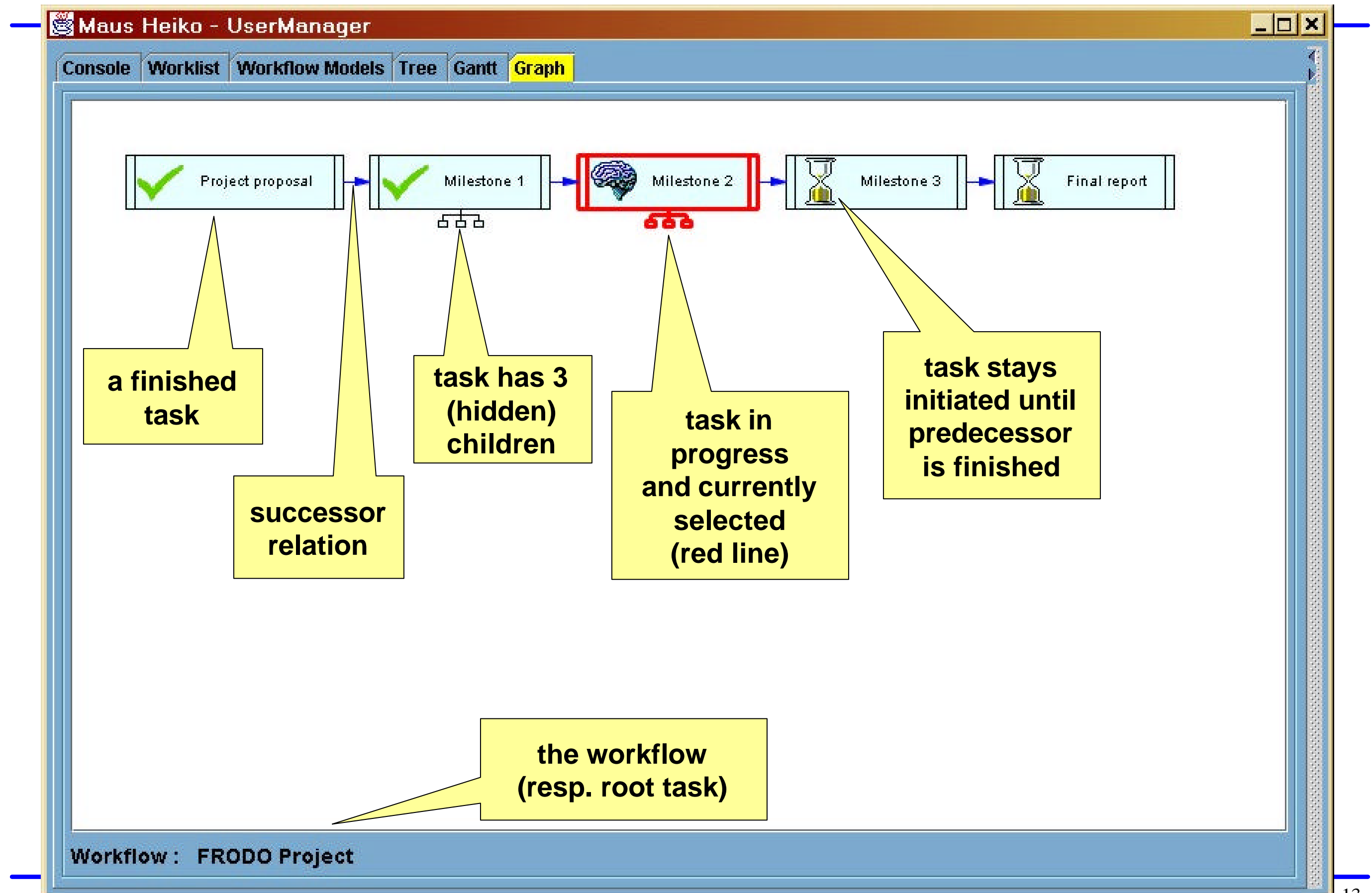
user's workitems

Workitems	State	Path	News
Conference WM Luzern	processable	Conference WM Luzern	locked by Maus
FRODO Project	active	FRODO Project	
Final report	active	FRODO Project Final report	
Agent framework	processable	FRODO Project Milestone 2 Agent frame...	
BPKM tool	processable	FRODO Project Milestone 2 BPKM tool	
Syntax, representation, semantics	processable	FRODO Project Milestone 2 Syntax, repr...	
rdf2java	processable	FRODO Project Milestone 2 Syntax, repr...	locked by Schwarz

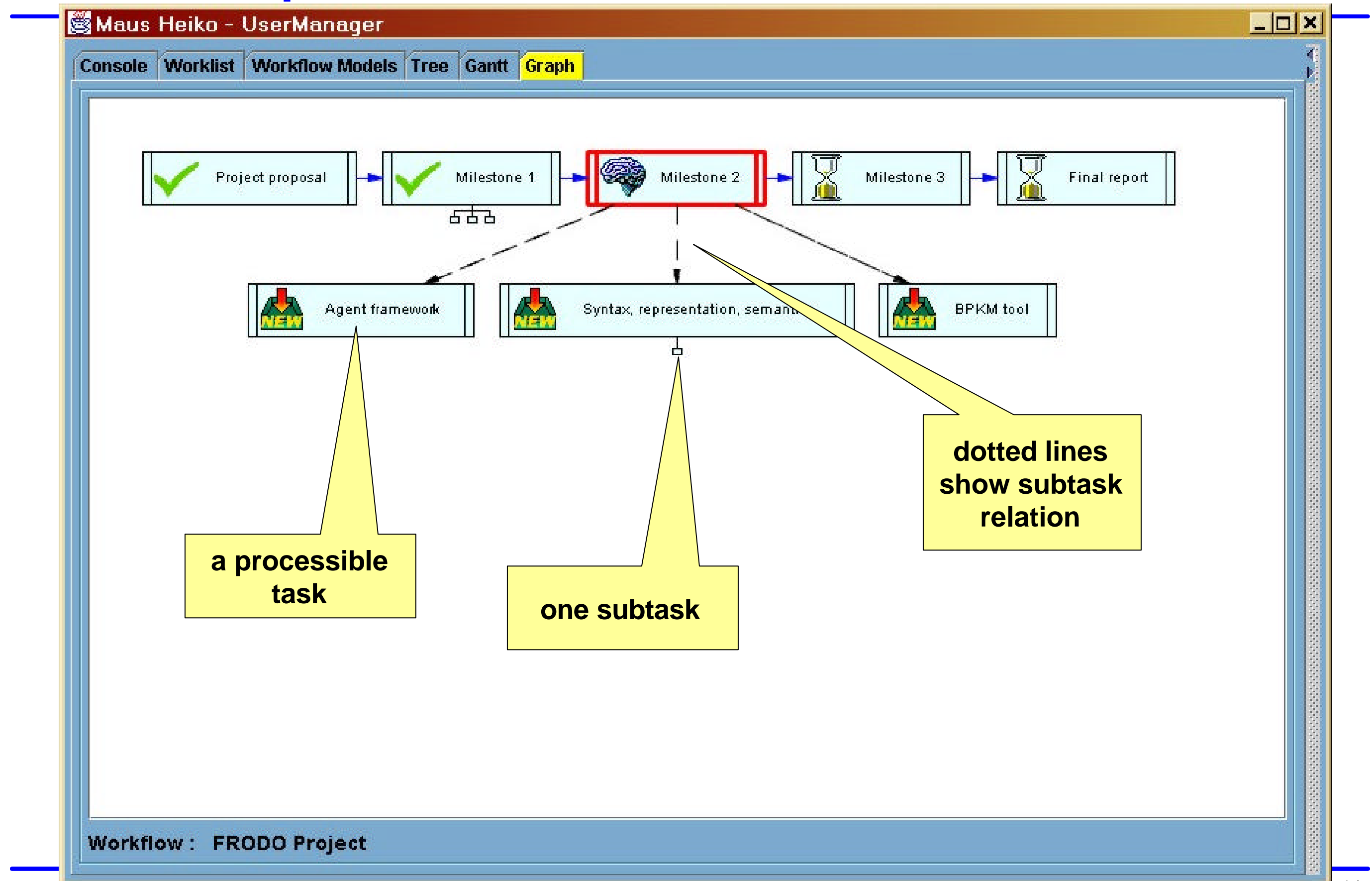
an organisational view on the worklist

all workflows with open tasks the user is involved

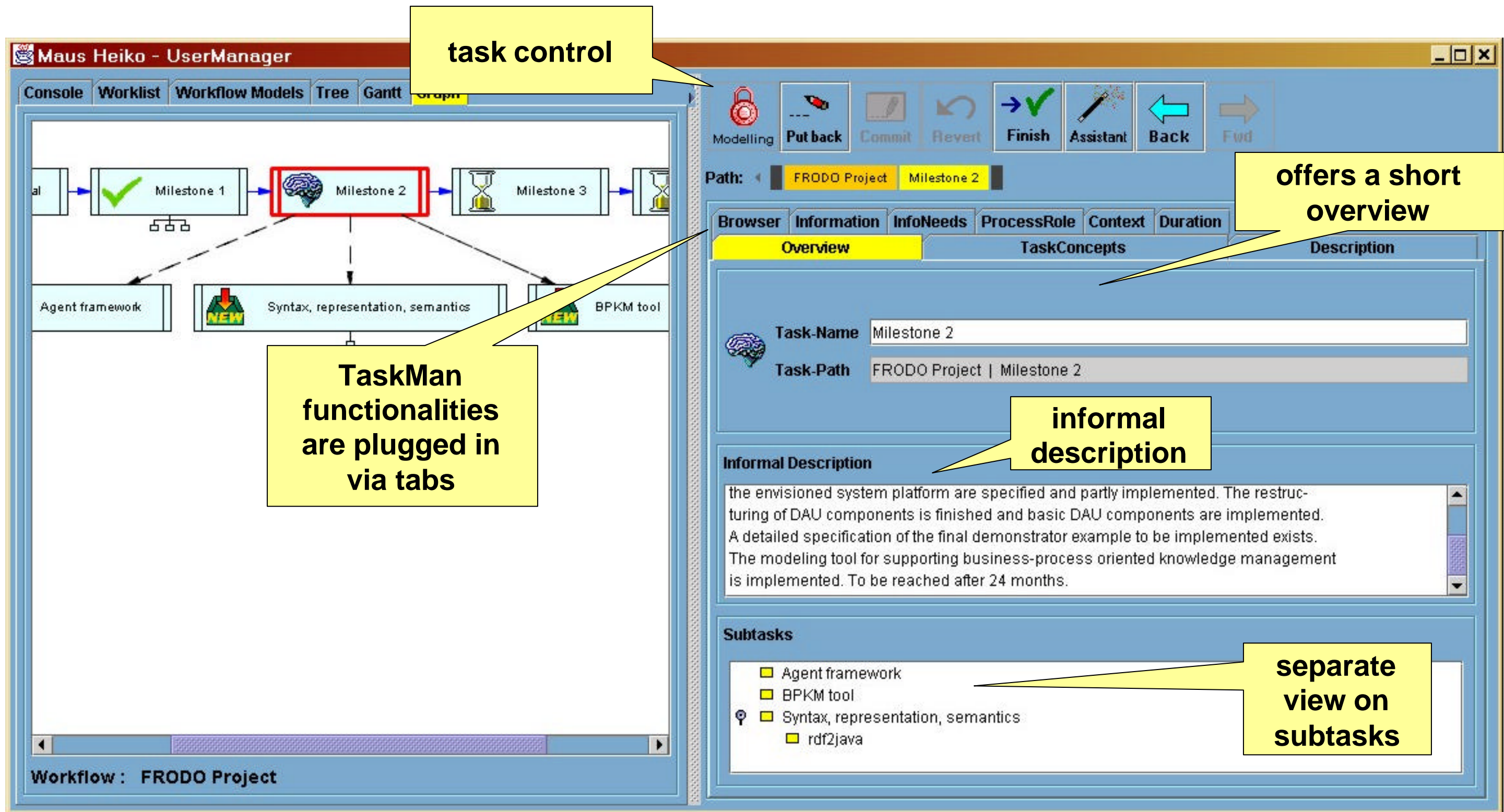
The graph view shows the workflow model



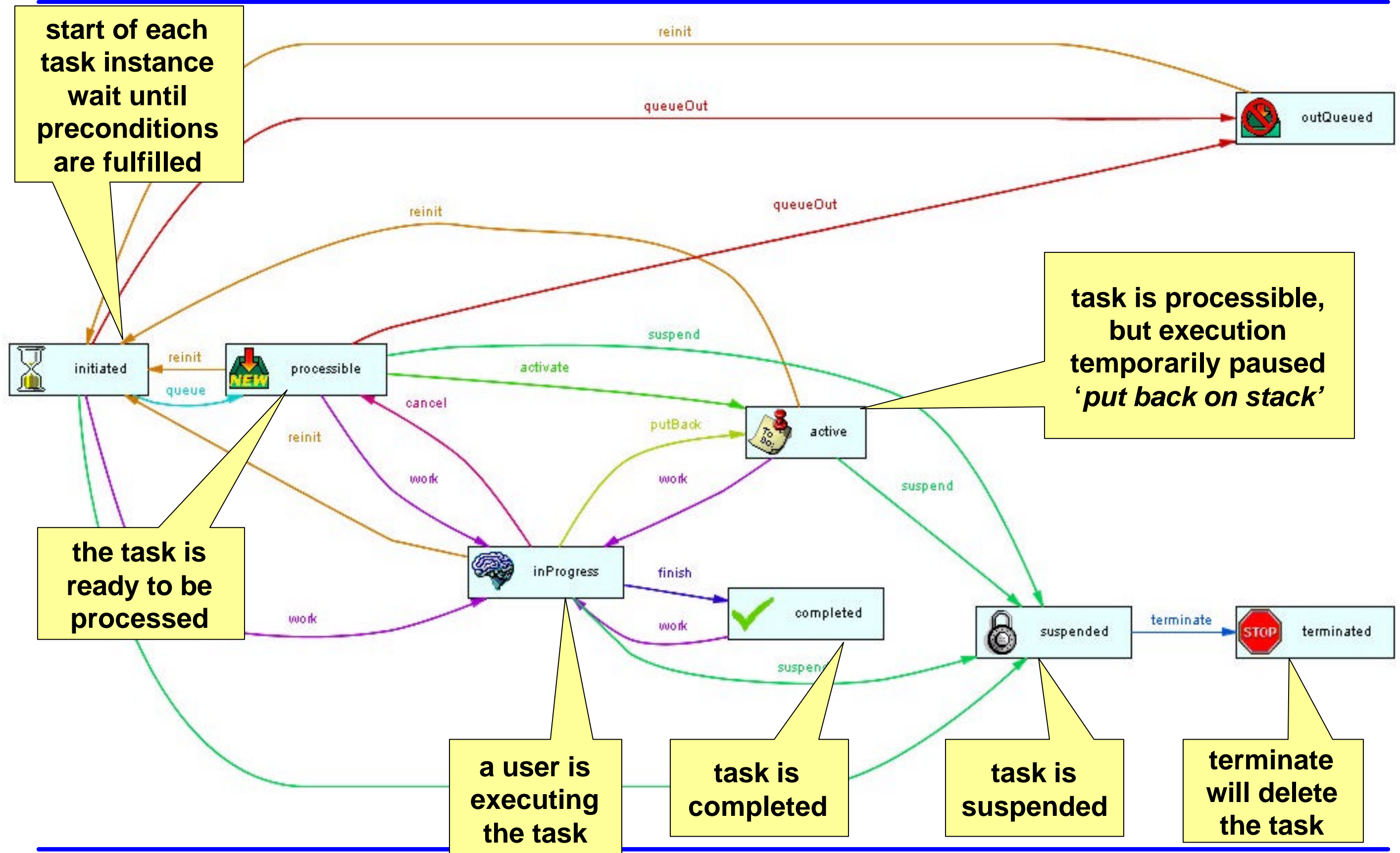
The graph allows task navigation showing also subtasks and interdependencies



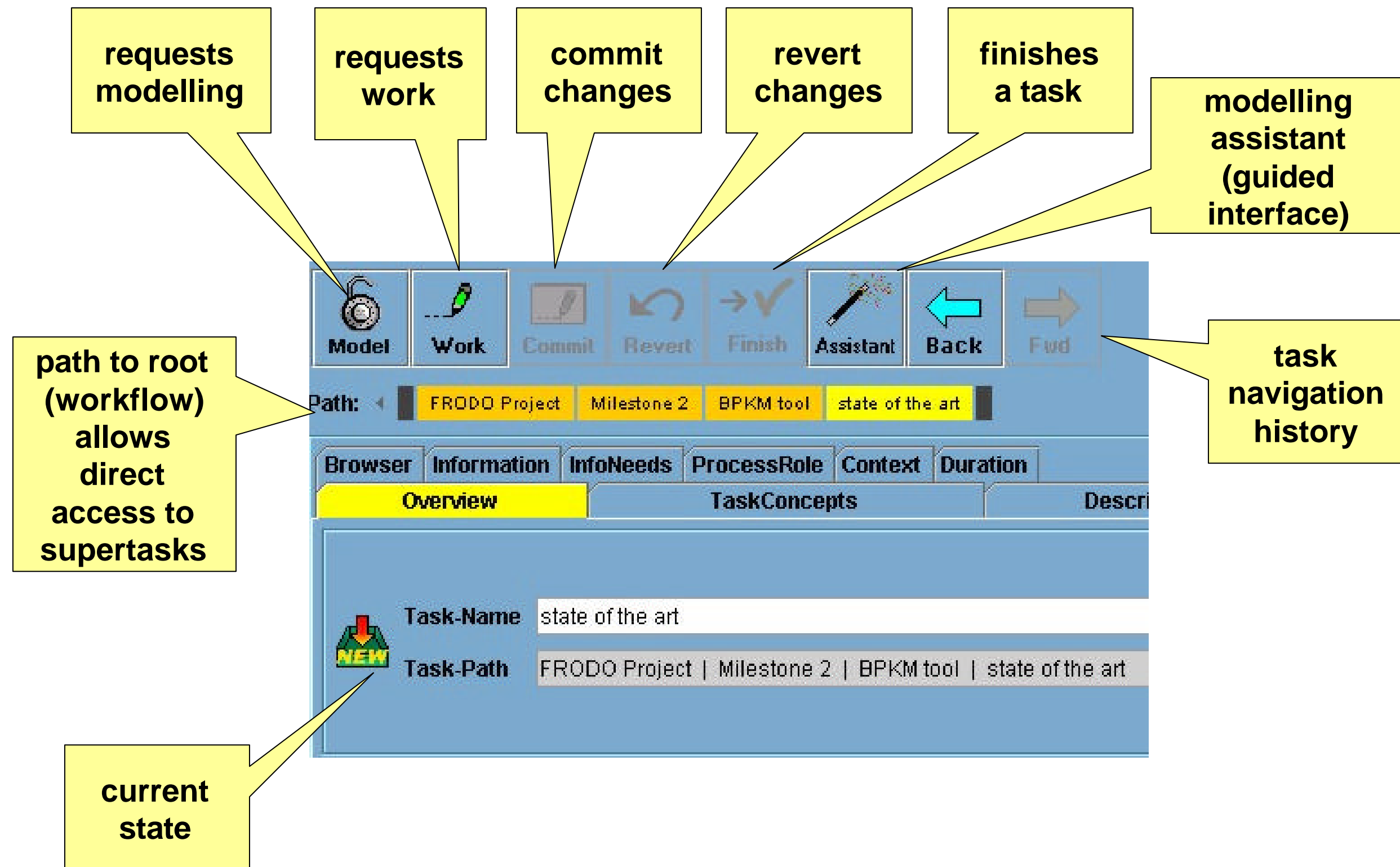
An integrated task manager enables the user to get informed about a task and to model and work



During its lifetime, a task instance has different states



The task control bar



FRODO TaskMan Walkthrough

- UserManager Interface
- **Modifying the Workflow Model**
- Modelling & Executing a Task
- Working with Information Objects

Refinement during runtime via the modelling assistant: adding subtasks which are in sequence

The screenshot displays the 'Maus Heiko - UserManager' application. The main window shows a workflow graph with tasks: 'Milestone 2' (brain icon), 'Milestone 3' (hourglass icon), and 'Final report' (hourglass icon). A 'BPKM tool' (NEW icon) is being added to the workflow. The 'ModellingAssistant' dialog is open, showing 'Choosable ModellingAssistant actions:' with three options: 'Add new subtasks' (selected), 'Create new workflow', and 'new Variable'. The 'Add new subtasks' dialog is also open, showing a text input for 'Name of the new subtask' and a list of added subtasks: 'state of the art' and 'requirements for bpokm'. The 'Refine new subtasks' dialog is open, showing 'Dependencies of subtasks:' with three options: 'Series (A -> B -> C)' (selected), 'Options/Parallel (each subtask can arbitrarily processed)', and 'Alternatives (only one of the subtasks can/must be processed) (not yet)'. The 'Assistant' button in the top toolbar is circled in red.

Maus Heiko - UserManager

Console Worklist Workflow Models Tree Gantt **Graph**

Model Work Commit Revert Finish Assistant Back Fwd

Path: FRODO Project Milestone 2 BPKM tool

Browser Information InfoNeeds ProcessRole Context Duration

Overview TaskConcepts Description

Task-Name BPKM tool

Task-Path FRODO Project | Milestone 2 | BPKM tool

ModellingAssistant

Choosable ModellingAssistant actions:

- ☒ Add new subtasks
- ☐ Create new workflow
- ☐ new Variable

Next

Add new subtasks

Name of the new subtask

List of added subtasks

- state of the art
- requirements for bpokm

Add Remove Next Back Quit

Refine new subtasks

Dependencies of subtasks:

- ☒ Series (A -> B -> C)
- ☐ Options/Parallel (each subtask can arbitrarily processed)
- ☐ Alternatives (only one of the subtasks can/must be processed) (not yet)

Back Next Quit

This results in two tasks added which are ready to be executed

The screenshot displays the 'Maus Heiko - UserManager' application. The main window is divided into two panes. The left pane shows a workflow diagram with nodes: 'Milestone 3', 'Final report', 'BPKM tool', 'state of the art', and 'requirements for bpokm'. A red oval highlights the 'BPKM tool' node and its two outgoing arrows to 'state of the art' and 'requirements for bpokm'. The right pane shows the details for the selected task 'BPKM tool'. The 'Path' is 'FRODO Project | Milestone 2 | BPKM tool'. The 'Task-Name' is 'BPKM tool' and the 'Task-Path' is 'FRODO Project | Milestone 2 | BPKM tool'. The 'Informal Description' is 'Business Knowledge Management Tool "FRODO TaskMan" implemented'. The 'Subtasks' list includes 'state of the art' and 'requirements for bpokm'.

Maus Heiko - UserManager

Console Worklist Workflow Models Tree Gantt **Graph**

Model Work Commit Revert Finish Assistant Back Fwd

Path: FRODO Project Milestone 2 BPKM tool

Browser Information InfoNeeds ProcessRole Context Duration

Overview TaskConcepts Description

Task-Name BPKM tool

Task-Path FRODO Project | Milestone 2 | BPKM tool

Informal Description

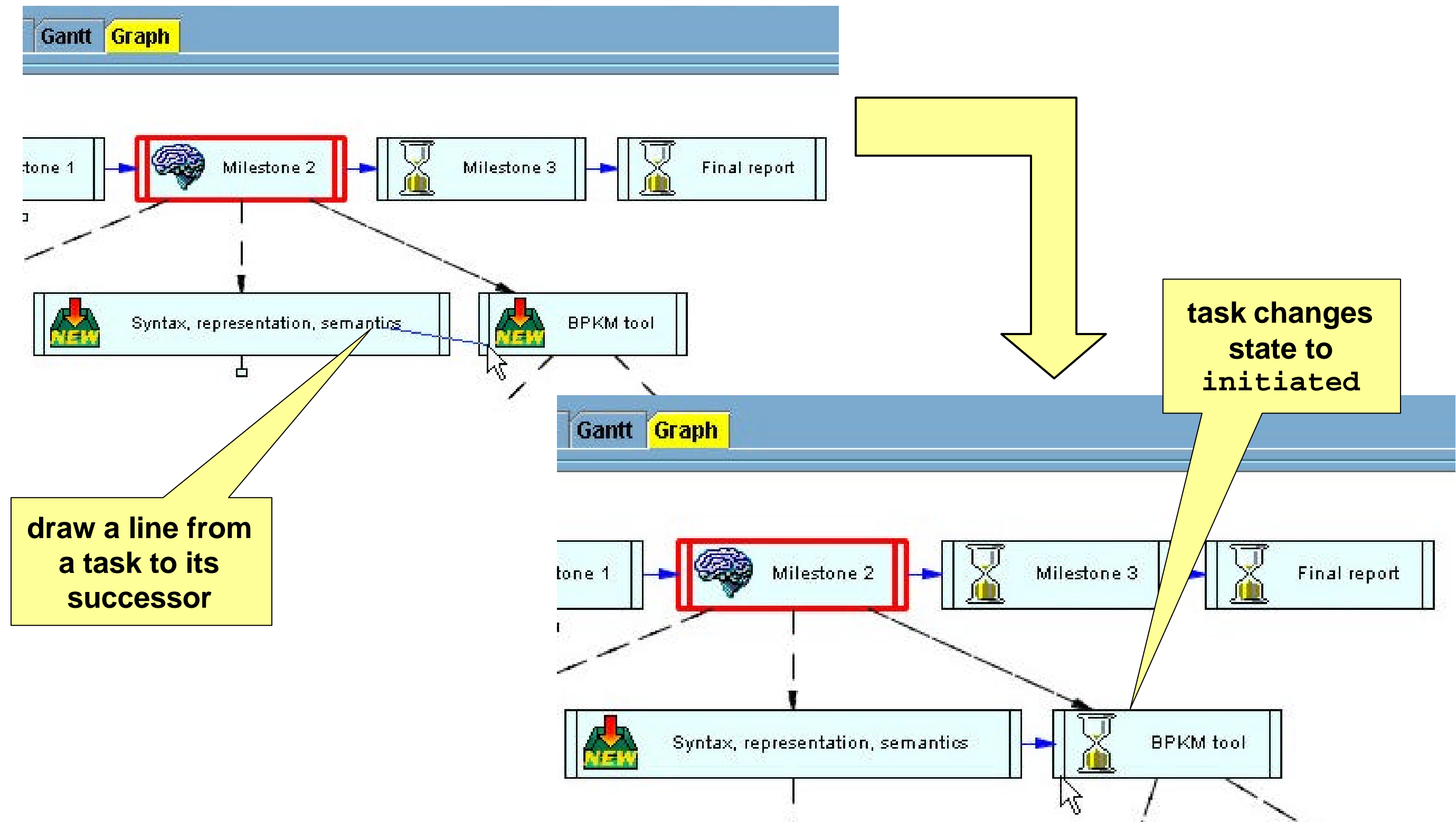
Business Knowledge Management Tool
"FRODO TaskMan" implemented

Subtasks

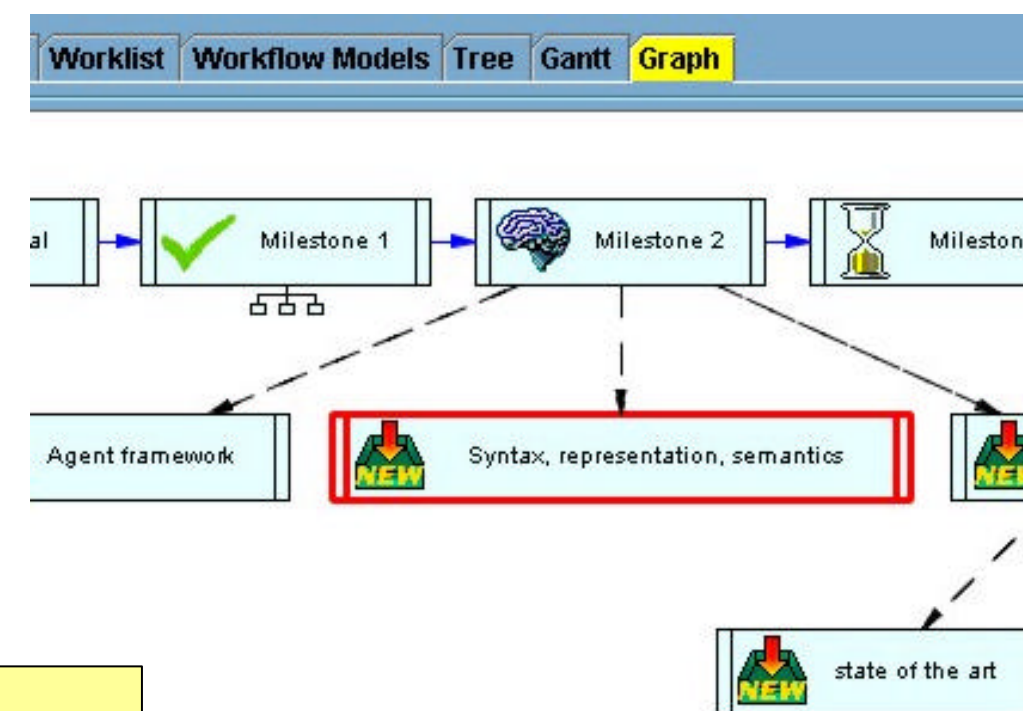
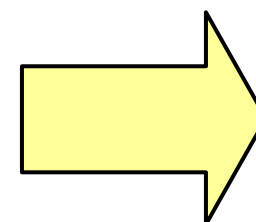
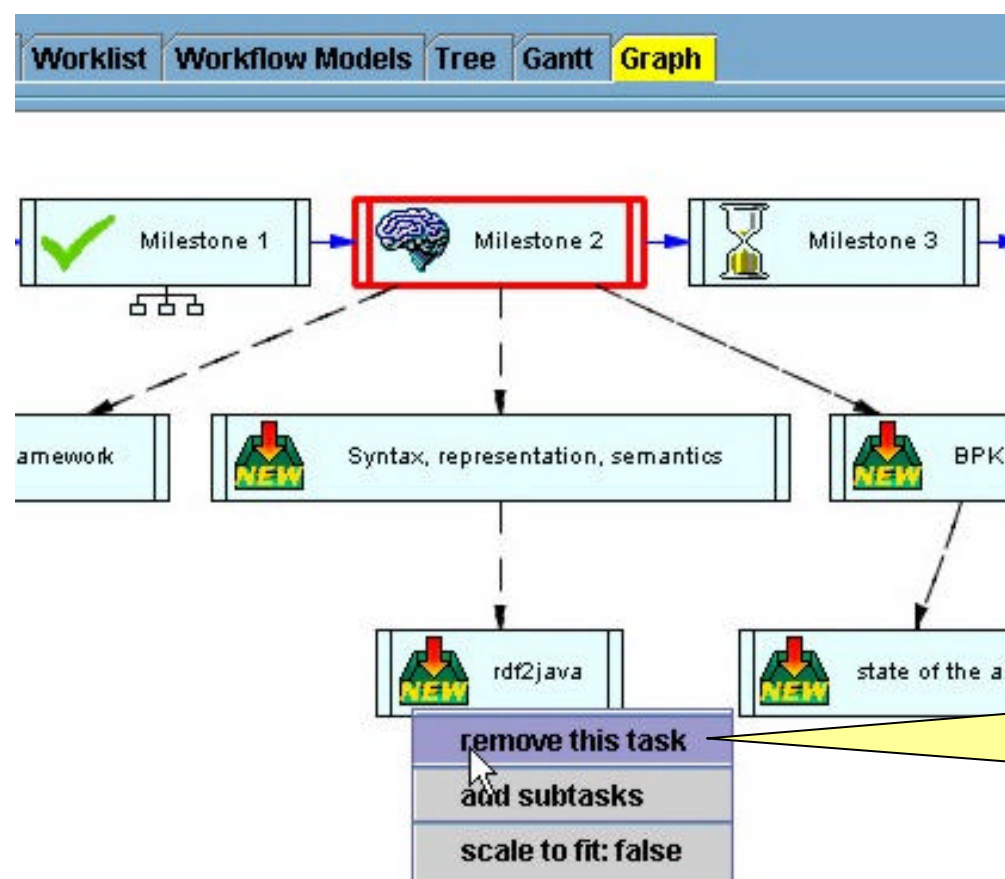
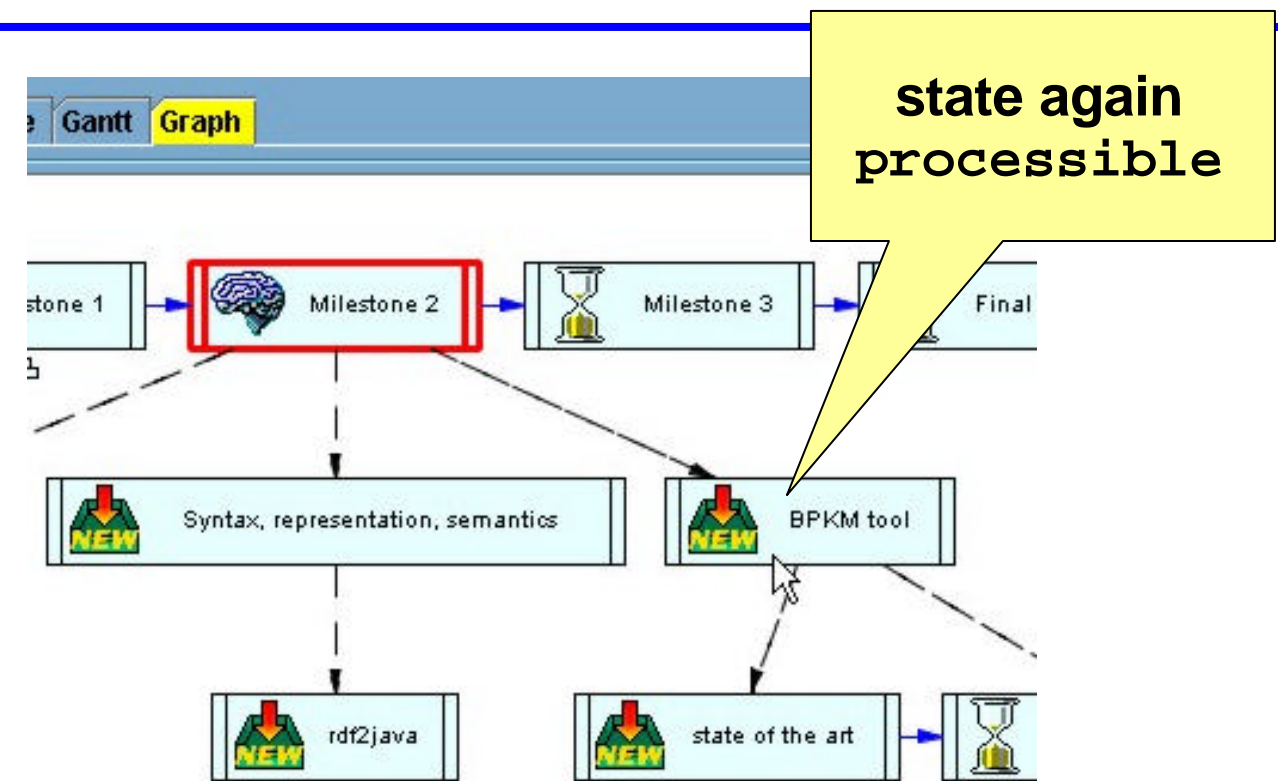
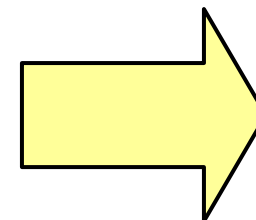
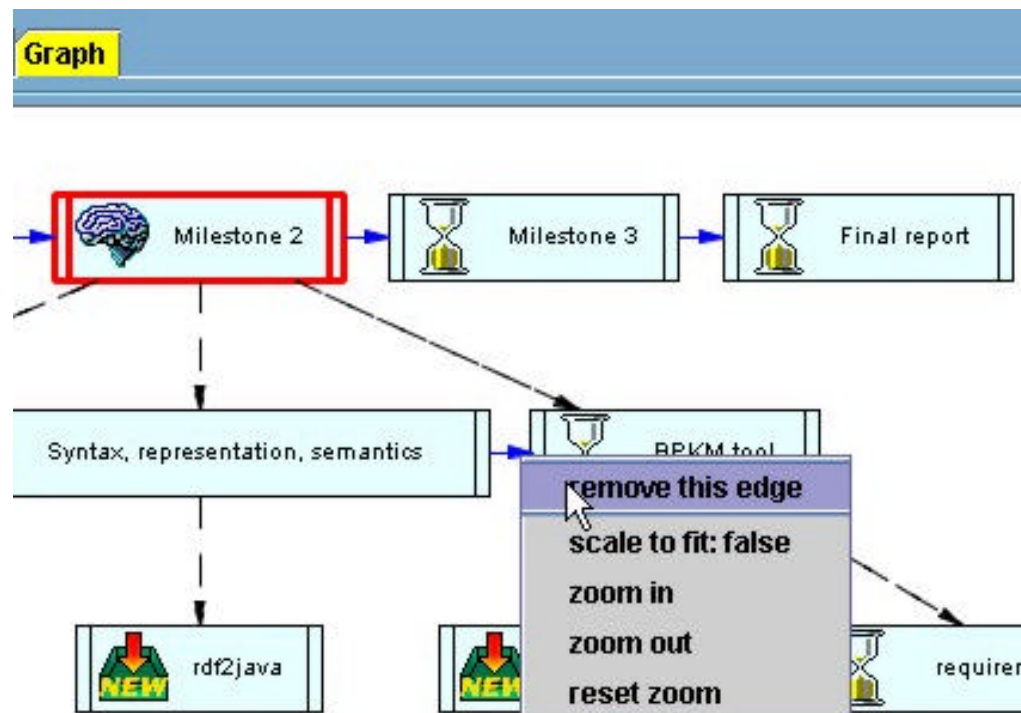
- state of the art
- requirements for bpokm

Workflow : FRODO Project

Defining successors



Modification means also removing edges and deleting tasks

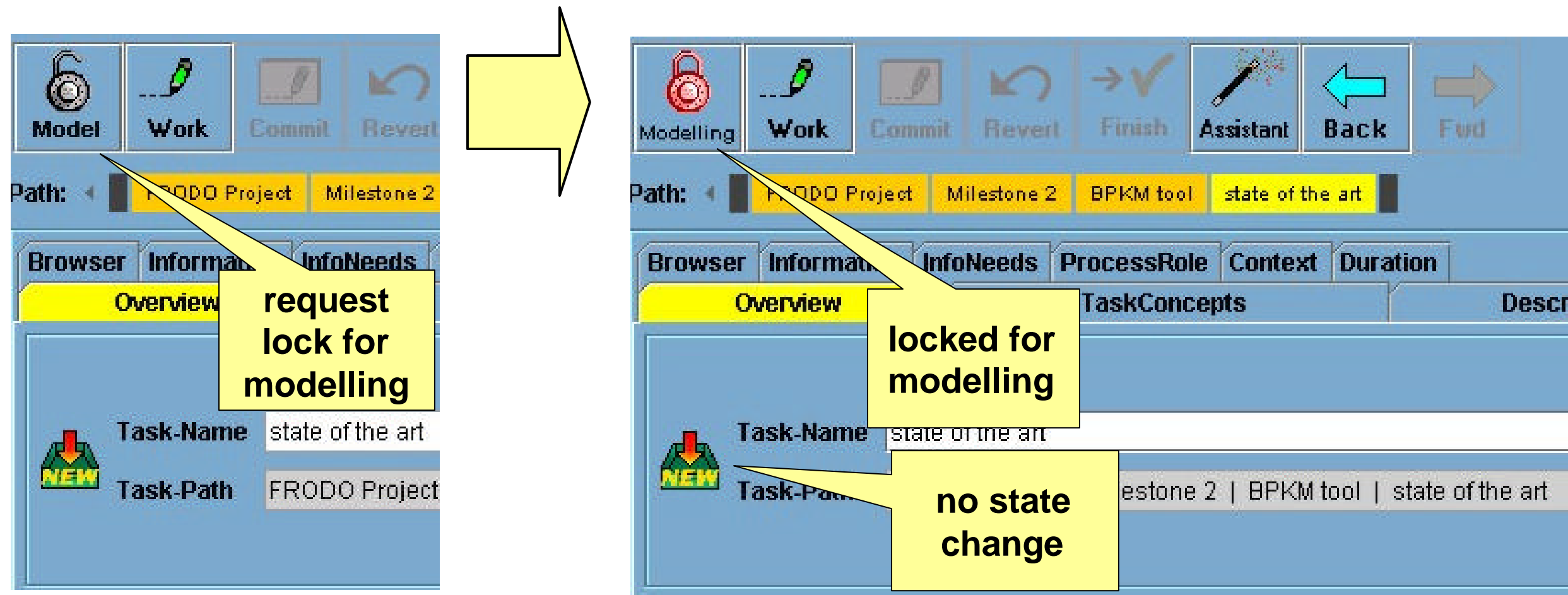


allowed only for task leaves

FRODO TaskMan Walkthrough

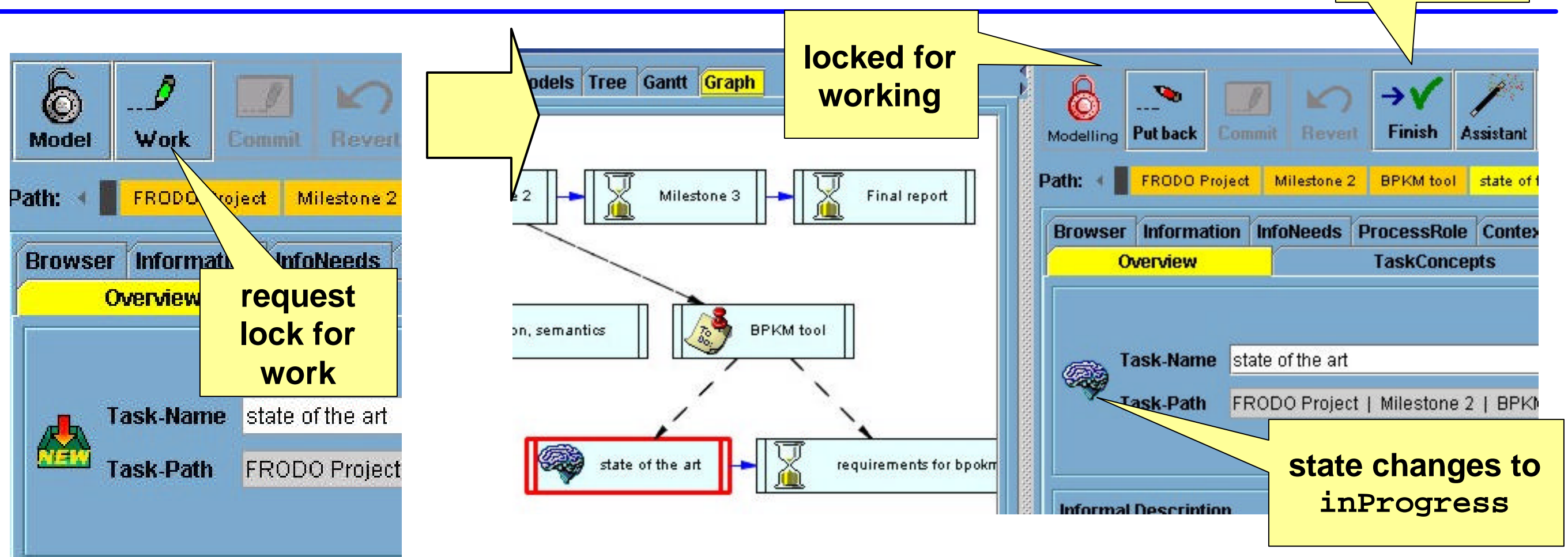
- UserManager Interface
- Modifying the Workflow Model
- **Modelling & Executing a Task**
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Modelling a task



- there is a logical difference between just modelling a task vs. working on it (e.g. finish only in *work* available)
- changes to the task model are allowed: informal description, process role, information objects, ...
- because of this we depend on the user's discipline not to work if he just requested modelling

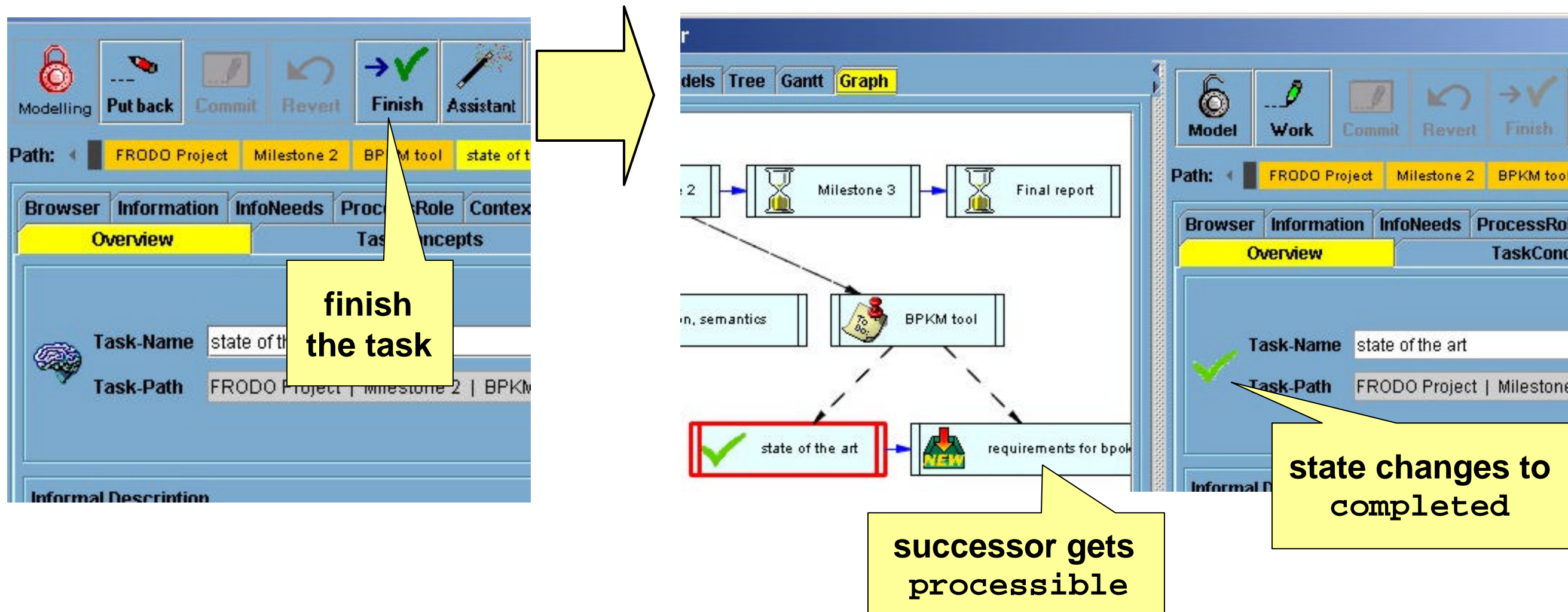
Working on a task



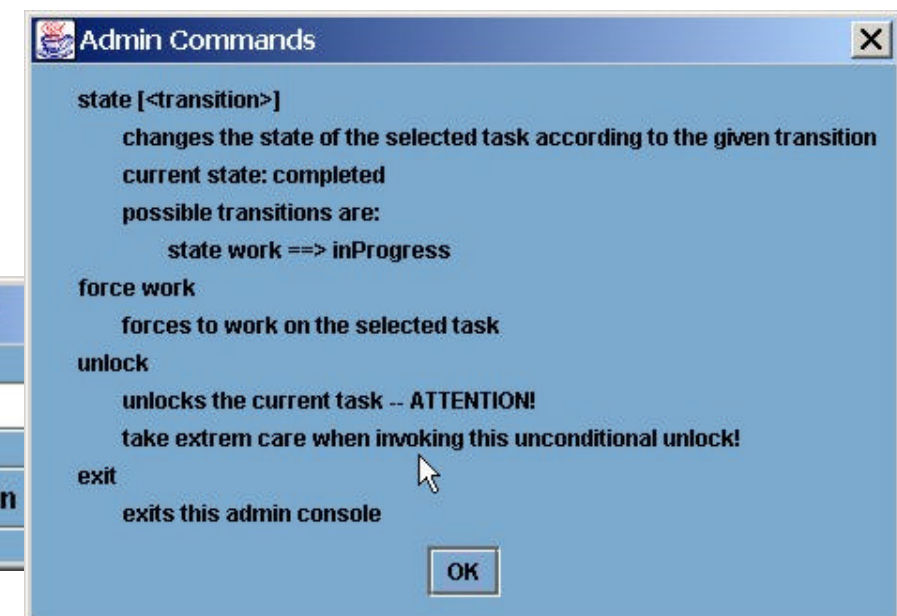
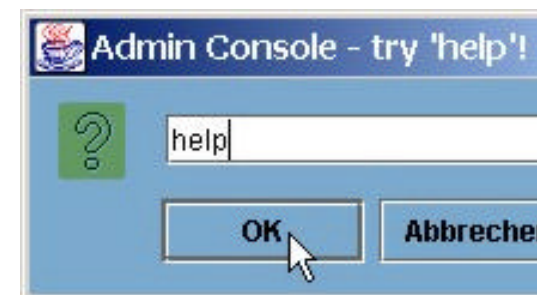
- in the work-mode task model changes are also allowed
- Put back, means that the users has temporarily stopped working on this task, the task is unlocked and can be requested by others
- the state changes to *active*: the task is processible again, however, this reflects that someone has already done some work



Finishing a task enables successors to be processible



- remember, the system is flexible, therefore, work is still allowed
- other state changes can be done via an admin console (right mouse click on work button)

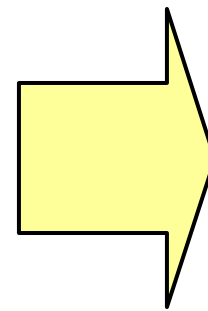


The worklist reflects these changes and allows further investigation

The screenshot shows a software interface with a 'Worklist' tab selected. The worklist table has columns for 'Workitems', 'State', and 'Path'. The 'State' column is filtered to show only 'active' tasks. The tasks listed are: FRODO Project, Milestone 2, Agent framework, BPKM tool, requirements for b..., Syntax, representati..., and rdf2java. A 'TellTale' menu is open, showing 'State-Filter' with options: Default (selected), All, processible, inProgress, active, initiated, completed, outQueued, suspended, and terminated. A yellow callout points to the 'active' state filter.

Workitems	State	Path
FRODO Project	active	FRODO Project
Milestone 2	inProg...	FRODO Projec...
Agent framework	proce...	FRODO Projec...
BPKM tool	active	FRODO Projec...
requirements for b...	proce...	FRODO Projec...
Syntax, representati...	proce...	FRODO Projec...
rdf2java	proce...	FRODO Projec...

by default, only 'interesting' states

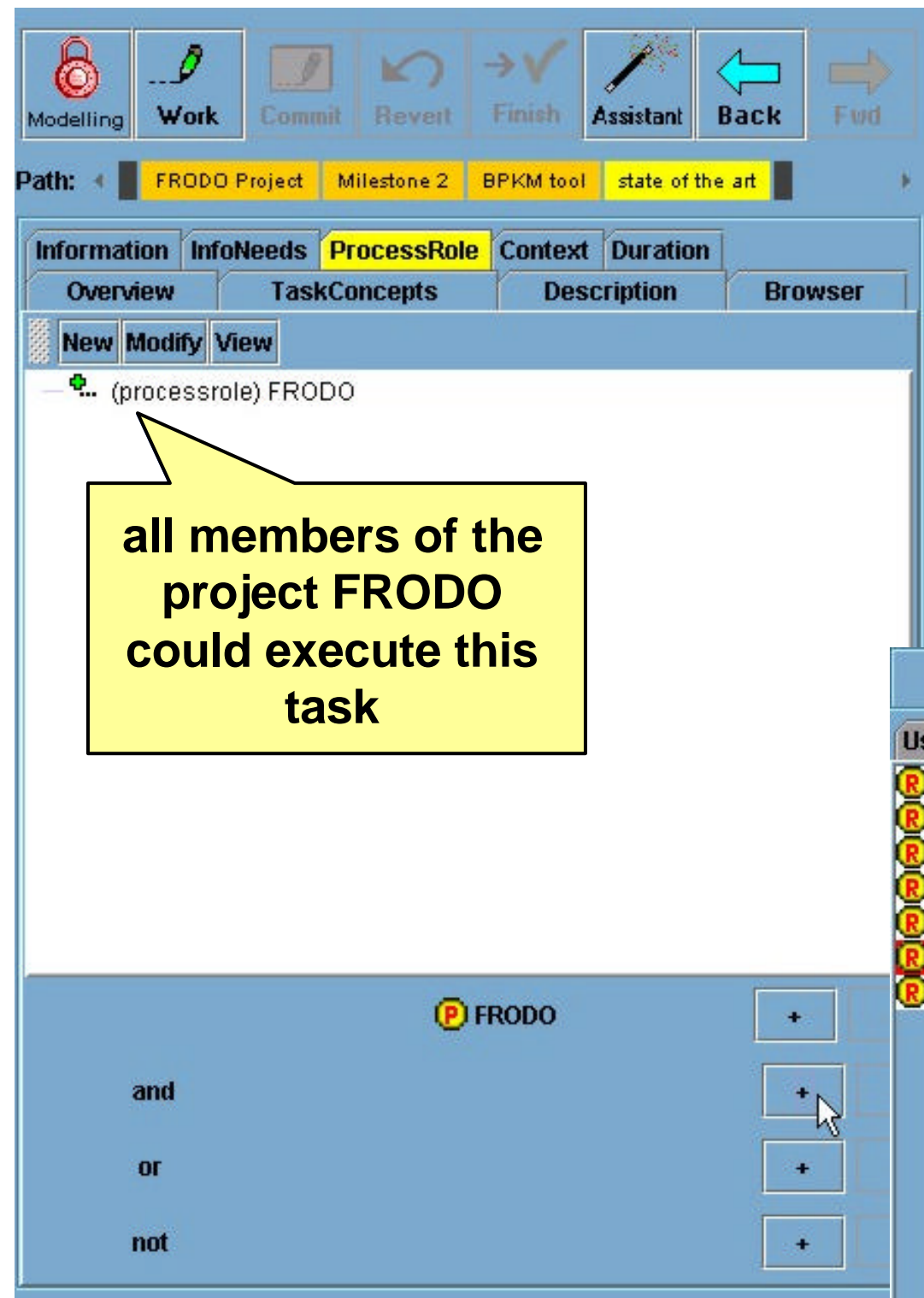


The screenshot shows the same software interface, but the 'State' column is now filtered to show 'All' tasks. The tasks listed are: Requirements an..., Milestone 2, Final report, requirements for ..., Milestone 3, Milestone 1, Milestone paper, BPKM tool, FRODO Project, Agent framework, state of the art, Project proposal, rdf2java, and Related work. The 'TellTale' menu is open, showing 'State-Filter' with options: Default, All (selected), processible, inProgress, active, initiated, completed, outQueued, suspended, and terminated. A yellow callout points to the 'All' state filter.

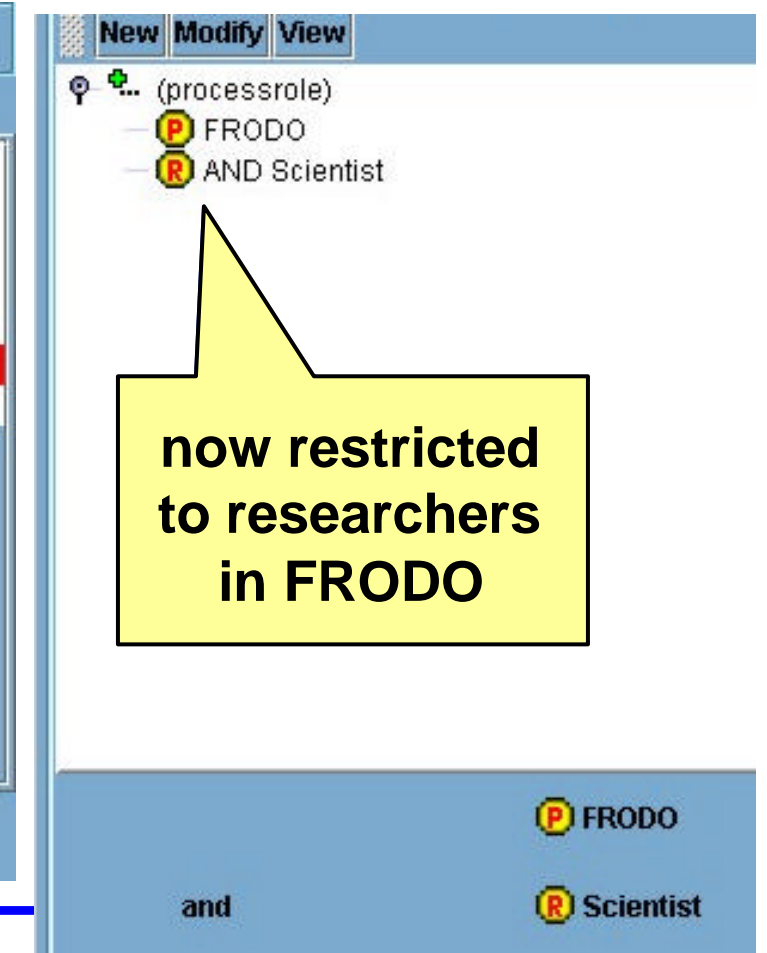
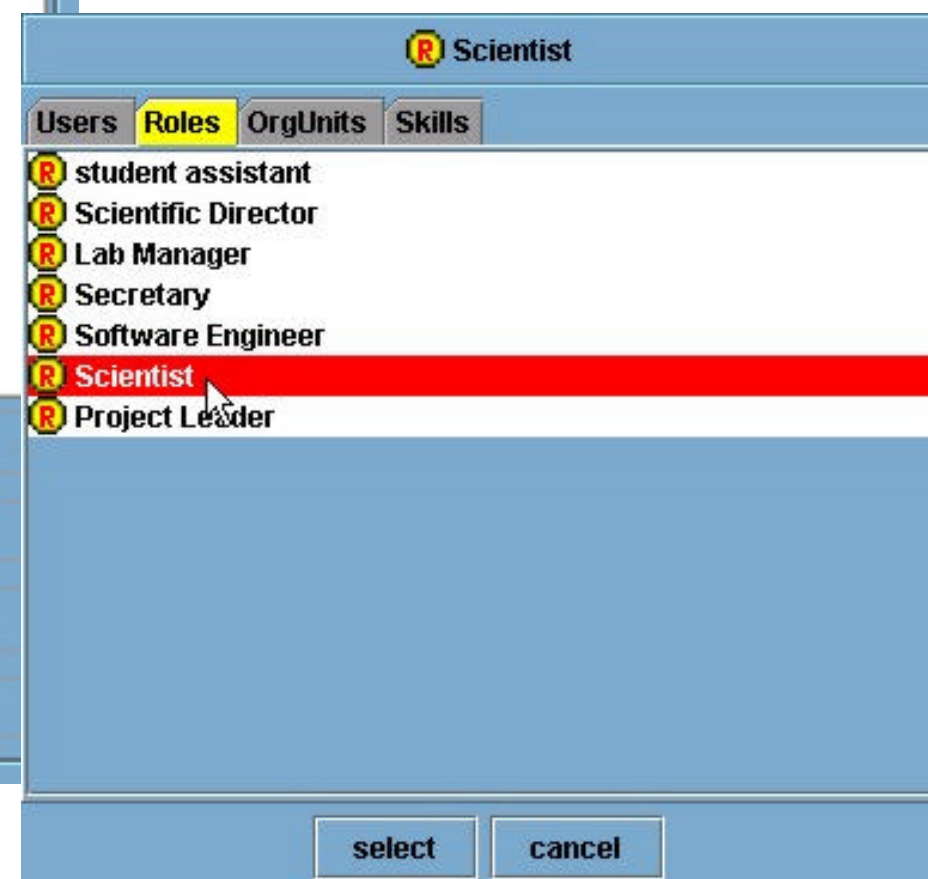
Workitems	State	Path
Requirements an...	comp...	FRODO Proj...
Milestone 2	inPro...	FRODO Proj...
Final report	initiat...	FRODO Proj...
requirements for ...	proce...	FRODO Proj...
Milestone 3	initiat...	FRODO Proj...
Milestone 1	comp...	FRODO Proj...
Milestone paper	comp...	FRODO Proj...
BPKM tool	active	FRODO Proj...
FRODO Project	active	FRODO Proj...
Agent framework	proce...	FRODO Proj...
state of the art	comp...	FRODO Proj...
Project proposal	comp...	FRODO Proj...
rdf2java	proce...	FRODO Proj...
Related work	comp...	FRODO Proj...

now, other tasks can be accessed

Specifying who actually should do the work



- a process role defines the potential workflow participants
- we allow
 - user
 - department, group, project
 - skill
 - role
 - experience
- in the combinations and, or, not



The worklist reflects this after committing the changes

The screenshot displays a software interface with a top toolbar containing icons for Modelling, Work, Commit, Revert, Finish, Assistant, Back, and Fwd. A yellow arrow points from the 'Commit' icon to the main interface.

The main interface is divided into several sections:

- Left Panel (Queues Maus):** A tree view showing a hierarchy of items. A red circle highlights the 'FRODO (7)' folder, which contains 'Syntax, representation, sem', 'Milestone 2', 'rdf2java', 'BPKM tool', 'FRODO Project', 'Agent framework', and 'state of the art'. Another red circle highlights the 'Scientist (1)' role under the 'Workflow Task' section.
- Center Panel (Worklist):** A table with columns 'Workitems', 'State', and 'Path'. It lists items like 'Syntax, represen...', 'Milestone 2', 'rdf2java', 'BPKM tool', 'FRODO Project', 'Agent framework', and 'state of the art'.
- Right Panel (ProcessRole):** A section titled 'ProcessRole' with tabs for 'Information', 'InfoNeeds', 'Context', and 'Duration'. It shows a list of roles: 'FRODO' and 'AND Scientist'. A yellow callout box points to this list with the text: 'now restricted to researchers in FRODO'.

A yellow callout box points to the 'Scientist (1)' role in the left panel with the text: 'this user is FRODO member and has the role scientist'.

At the bottom of the right panel, there is a section for 'FRODO' and 'Scientist' with a '+' button next to each, and a 'Workflow' section below it.

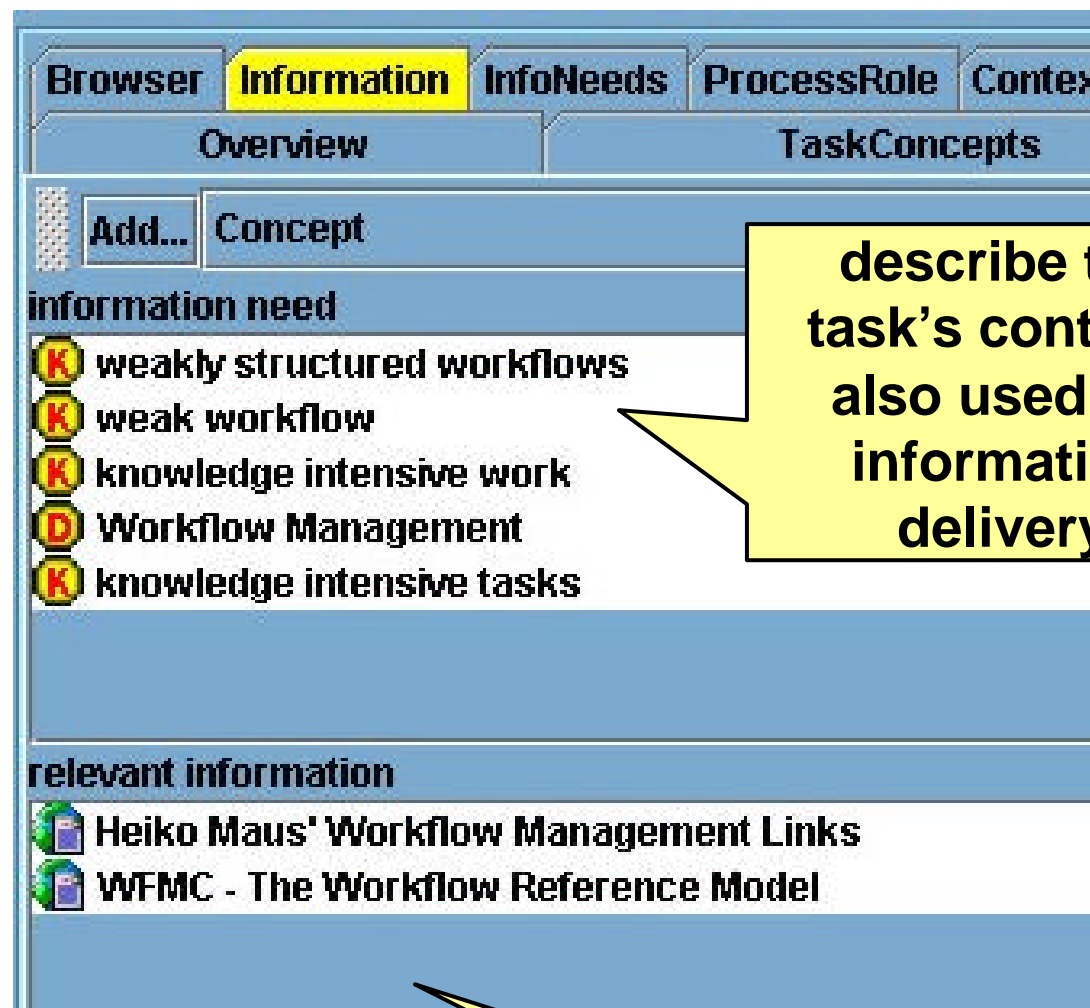
FRODO TaskMan Walkthrough

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Attaching information objects to a task

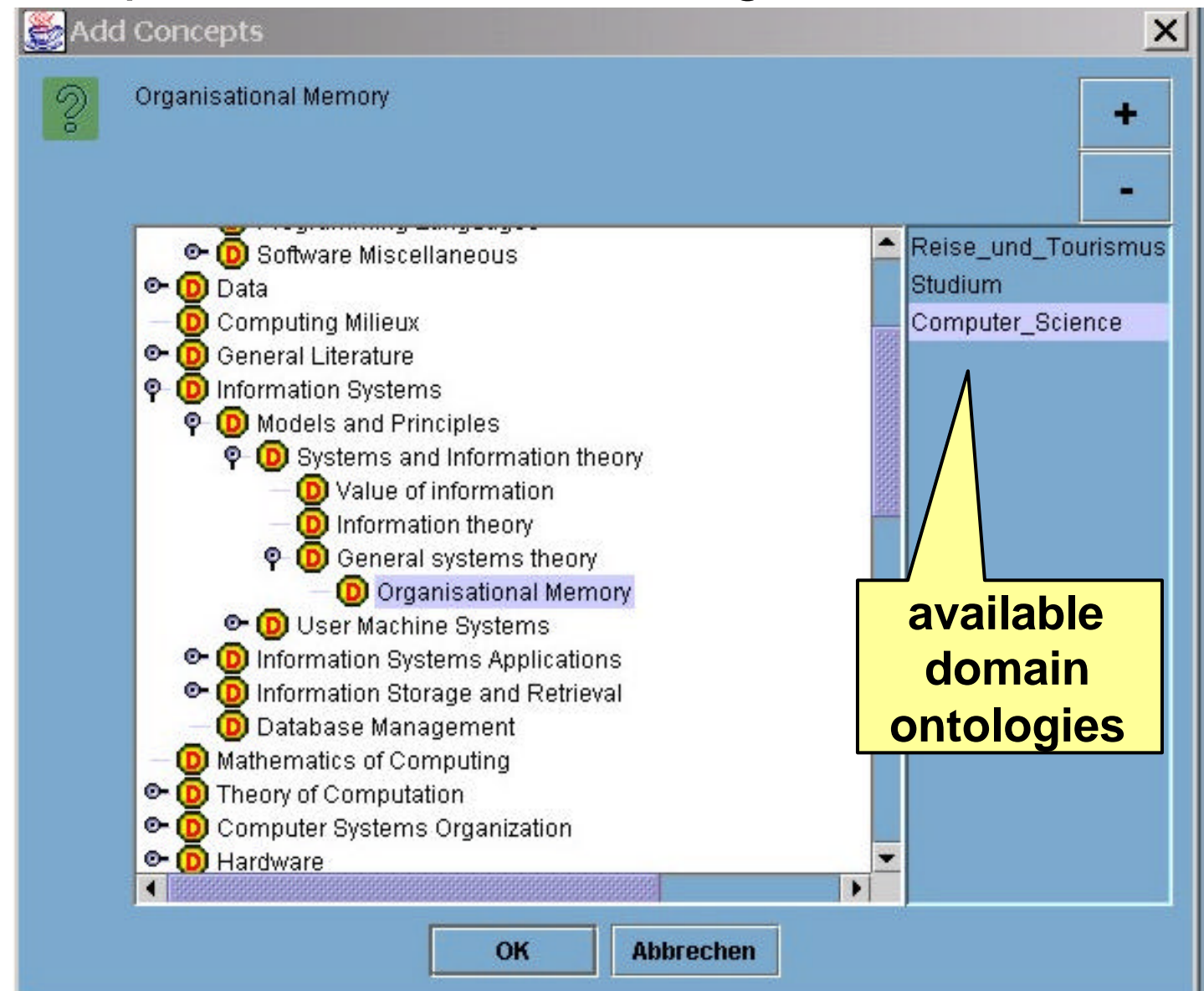
in the information tab several objects can be added:

- keywords, specified by the user
- documents (by URLs)
- concepts from domain ontologies



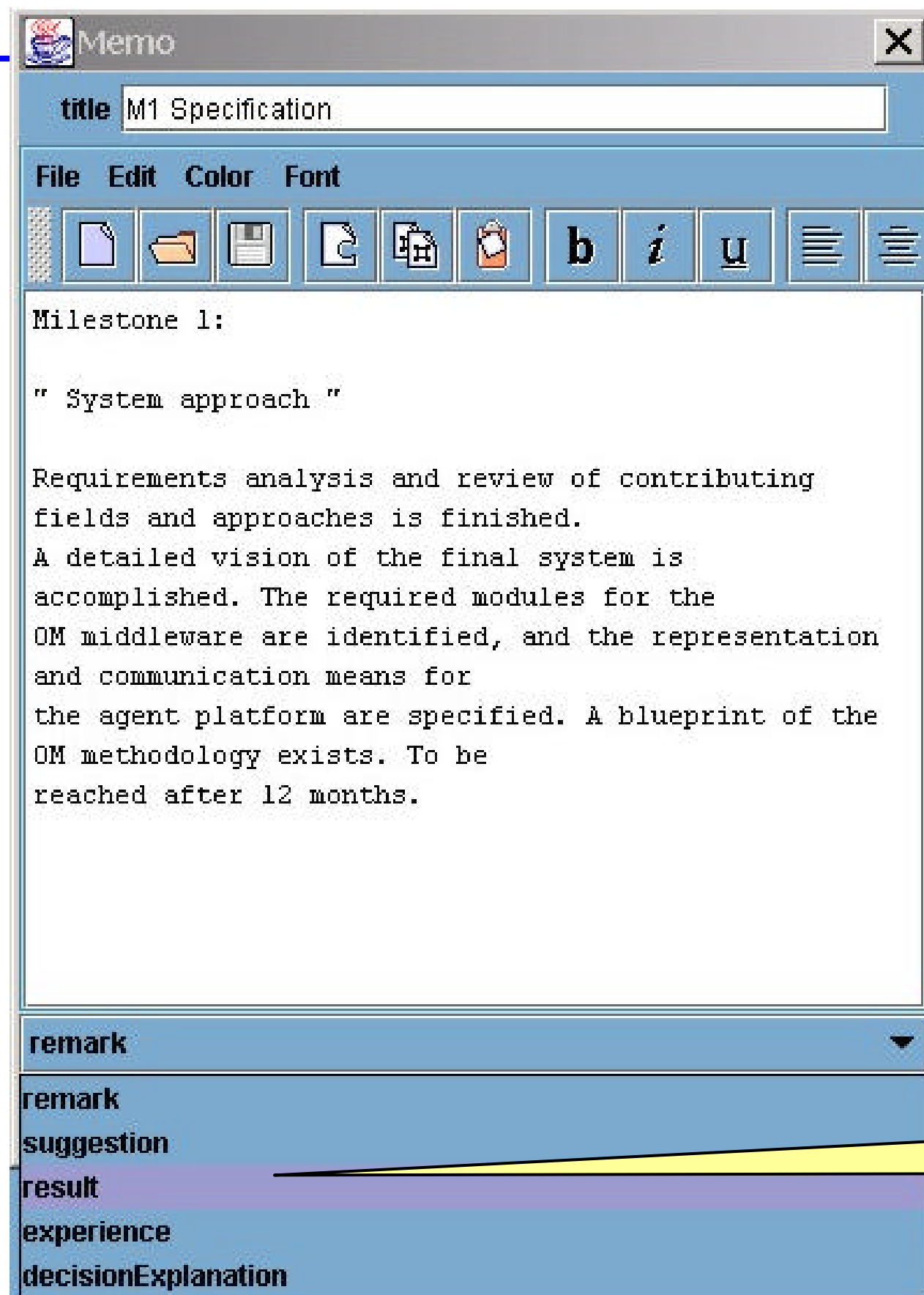
describe the
task's content;
also used for
information
delivery

Provide/collect
relevant
information



available
domain
ontologies

The user can also create memos



- memos allow to attach relevant textual information to a task
- the author is logged
- different message types for the memo are available
- the memos will be a part of the OM (as process knowledge)

The TaskMan gives task specific information support in a browser tab

this comprises

- attached documents, domain concepts, keywords, memos
- inherited information from supertasks
- attached information need
- attached & inferenced task concepts

currently implemented

- internet search with concepts
- find related pages (via Google)
- related documents in the organisational memory (via MindAccess™ from Insiders Inc.)

The screenshot displays the TaskMan browser interface. At the top, there are tabs for 'Browser', 'Information', 'InfoNeeds', 'ProcessRole', 'Context', and 'Duration'. Below these are sub-tabs for 'Overview', 'TaskConcepts', and 'Description'. A 'Search Engines' section is visible with a 'Search' button. The main content area is titled 'Information Support for Task: Related work'. It features an 'i' icon and the heading '>RelevantInformation'. Below this, there are two bullet points: '• (HtmlDocument) Heiko Maus' Workflow Management Links link related' and '• (HtmlDocument) WFMC - The Workflow Reference Model link related'. A yellow callout box points to the 'inherited' section, stating 'inherited from super tasks'. The 'inherited' section includes 'Milestone 1' and a bullet point: '• (Memo) MI Specification' followed by a detailed remark. Below this is the 'FRODO Project' section with three bullet points: '• (HtmlDocument) The FRODO Project Homepage link related', '• (HtmlDocument) KnowMore: Knowledge Management for Learning Organisations link related', and '• (HtmlDocument) FRODO Publications link related'. A yellow callout box points to the 'FRODO Publications' link, stating 'related search'. Below the 'FRODO Project' section is a '?' icon and the heading '>InformationNeed'. Under this heading is a 'combined search' section with six bullet points: '• (Keyword) weakly structured workflows link', '• (DomainConcept) Organisational Memory link', '• (Keyword) weak workflow link', '• (Keyword) knowledge intensive work link', '• (Keyword) knowledge intensive tasks link', and '• (DomainConcept) Workflow Management link'. A yellow callout box points to the 'weakly structured workflows' link, stating 'internet search'.

An integrated task-enabled web browser allows task specific handling of documents

Browser for Task Related work

File Search History

Open URL file:///infosupport%3ARelated%20work

Information Support for Task: Related work

RelevantInformation

- ([HtmlDocument](#)) Heiko Maus' Workflow Management Links [link related](#)
- ([HtmlDocument](#)) WFMC - The Workflow Reference Model [link related](#)

inherited

Milestone 1

- ([Memo](#)) M1 Specification

remark of Sven Schwarz: Milestone 1: " System approach "

FRODO Project

- ([HtmlDocument](#)) KnowMore: Knowledge Management for Learning Organisations [link related](#)
- ([HtmlDocument](#)) The FRODO Project Homepage [link related](#)
- ([HtmlDocument](#)) FRODO Publications [link related](#)

InformationNeed

[combined search](#)

- ([Keyword](#)) weakly structured workflows [link](#)
- ([Keyword](#)) weak workflow [link](#)
- ([DomainConcept](#)) Organisational Memory [link](#)
- ([Keyword](#)) knowledge intensive work [link](#)
- ([DomainConcept](#)) Workflow Management [link](#)
- ([Keyword](#)) knowledge intensive tasks [link](#)

[search Organisational Memory](#)

inherited

file:///C:/java/profinder/html/2839e360/MAResults.html

Mozilla webclient

browse to the results page of the information agent

An InfoAgent has found relevant documents in the OM

Browser for Task Related work

File Search History

Open URL file:///C:/java/profinder/html/2839e360/Workflow%20Manage

Deutsches Forschungszentrum für Künstliche Intelligenz GmbH

Overview

all topics

- Workflow Management
- weakly structured workflows
- knowledge intensive tasks
- knowledge intensive work
- weak workflow
- Organisational Memory

Topic: Workflow Management

direct hits

1Title : Integration of a DAU-System in Workflow Management Systems

2Title : Integration of a DAU-System in Workflow Management Systems

3Title : Semantik für Dokumente in Workflow Management Systemen

overview documents

1Title : UML Summary

2Title : UML Semantics

3Title : Workflow Management Coalition - Terminology & Glossary

4Title : Supporting Information Extraction from Printed Documents by Lexico-Semantic Pattern Matching

5Title : Integrating Information Extraction into Workflow Management Systems

6Title : Lexicon-Driven Information Extraction from a Document Analysis View

7Title : On the Evaluation of Document Analysis Components by Recall, Precision, and Accuracy

8Title : An experimental evaluation of OCR text representations for learning document classifiers

9Title : Evaluating OCR and Non-OCR Text Representations for Document Classification

10Title : Basic Support for Cooperative Work on the World Wide Web

11Title : not available in DB

Done.

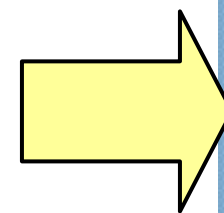
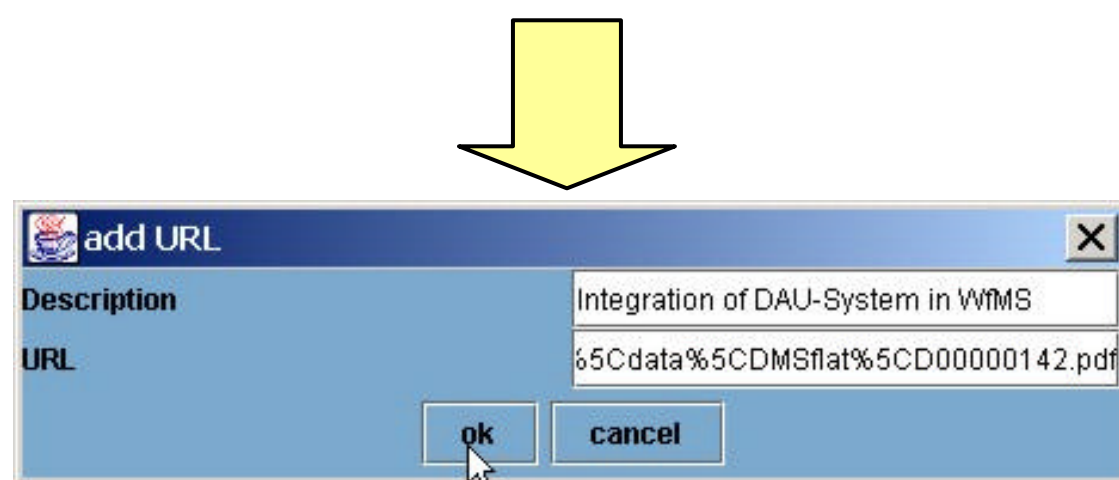
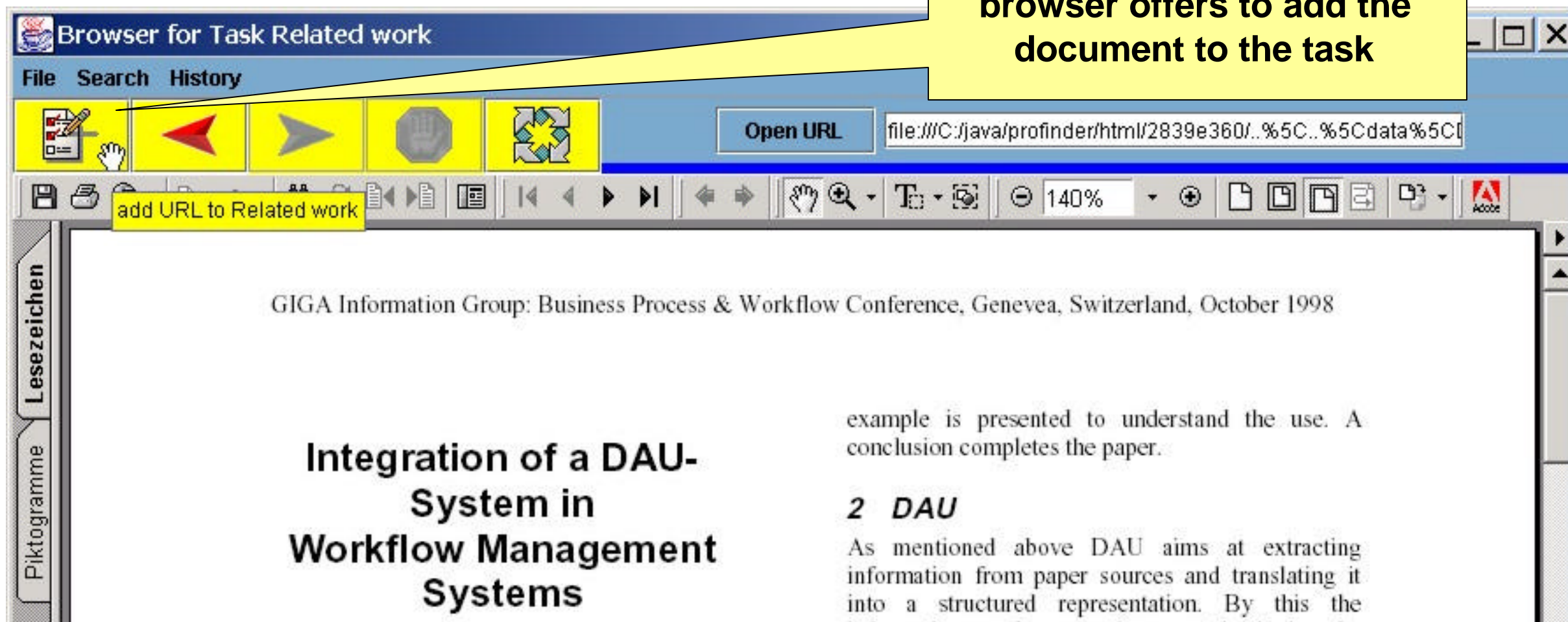
endURL: file:///C:/java/profinder/html/overview.jpg

domain
concepts
&
keywords
attached
to task

results listed
with respect to
their content

Documents can be added to the task

if modelling is allowed, the browser offers to add the document to the task



Information Support for Task: Related work



> Relevant Information

- [\(HtmlDocument\) Heiko Maus' Workflow Management Links](#) [link](#) [related](#)
- [\(HtmlDocument\) Integration of a DAU-System in WfMS](#) [link](#) [related](#)
- [\(HtmlDocument\) WFMC - The Workflow Reference Model](#) [link](#) [related](#)

inherited

Milestone 1

Agenda

- System Architecture
- TaskMan Walkthrough
- Evaluation

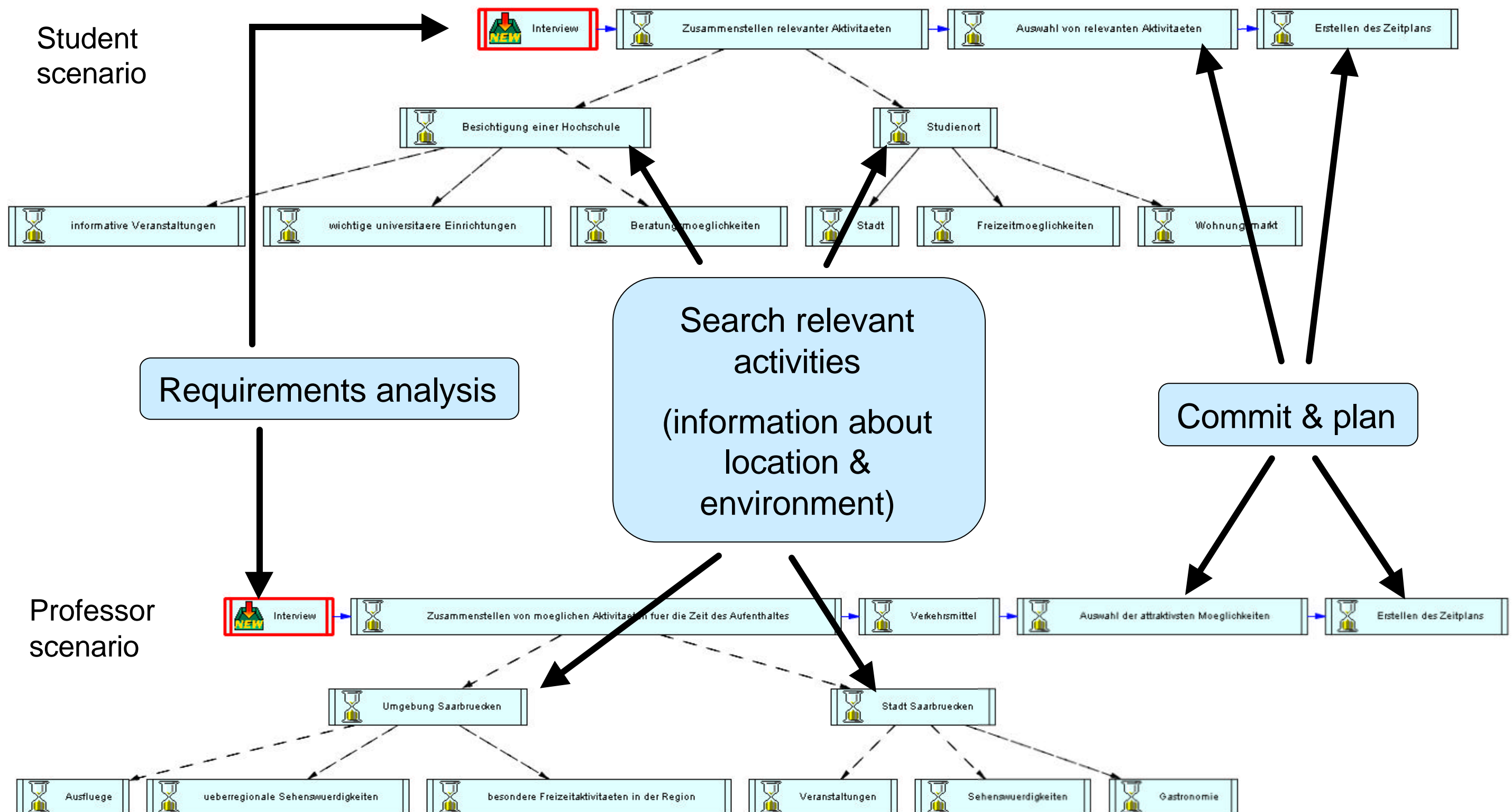
The experimental evaluation concentrates on core aspects of FRODO

- The experiments shall test whether
 - Weak Workflows are a useful basis for support of knowledge-intensive activities
 - Integration of process execution and information support is accepted and considered of benefit
 - Process-embedded information is a means of knowledge sharing and transfer

We chose visit planning as the knowledge-intensive activity to be supported

- Scenario 1: Prepare a visit for a prospective student to get familiar with the future work/living environment
- Scenario 2: Prepare a visit for a guest professor at the university, including tourism aspects
- The scenarios include room for flexible interpretation
- Ultimately a time schedule needs to be produced
- Both scenarios can be understood and processed in reasonably short time
- There is plenty of relevant information in the web

Both scenarios lead to structurally similar initial workflows



Four key elements of FRODO were employed in the evaluation trials

- Expressive power of the workflow language:
 - hierarchical decomposition
 - sequential dependency
- Dynamic refinement of workflows at execution time
 - integration of modeling & enactment
- Enriching workflow tasks with information needs
 - dynamic & static
- Support of task execution by linked information items
 - context-specific information support

The system demo illustrates these topics.

The Experimental Design Comprised Four Factors

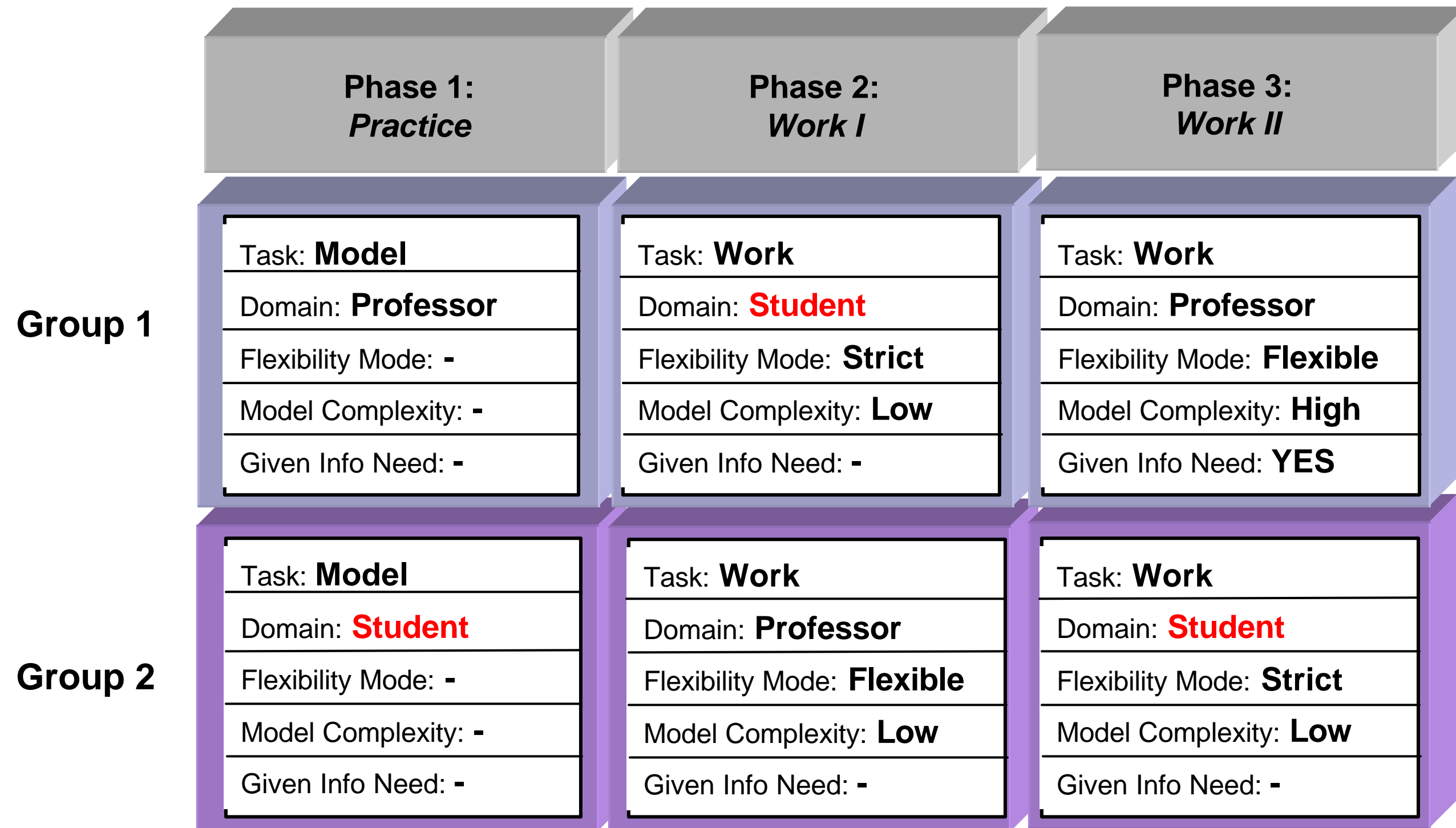
- Domain: Preparing a schedule for a professor in Saarbrücken
vs. for a student in Munich
- Flexibility mode of the workflow: Strict vs. weakly-structured
- Complexity of given workflows: “small” vs. “big” model
- Re-use of information: With/Without Given Information Items

A full (2x2x2x2)-factorial design was not feasible.

This led to a restricted design with two experimental groups and the following features:

- Both groups process both domains and both flexibility modes.
- Complexity and re-use of information is tested only in one domain and with flexible workflows (between groups).

The experiment comprises the model-work-refine phases of the workflow lifecycle



The evaluation trials gathered direct and indirect measurements

- direct measurements: The test persons were asked for subjective assessments via questionnaires
- indirect measurements: data collected during the experiment were evaluated
 - modified workflow models
 - attached information items
 - web logs, representing search activities

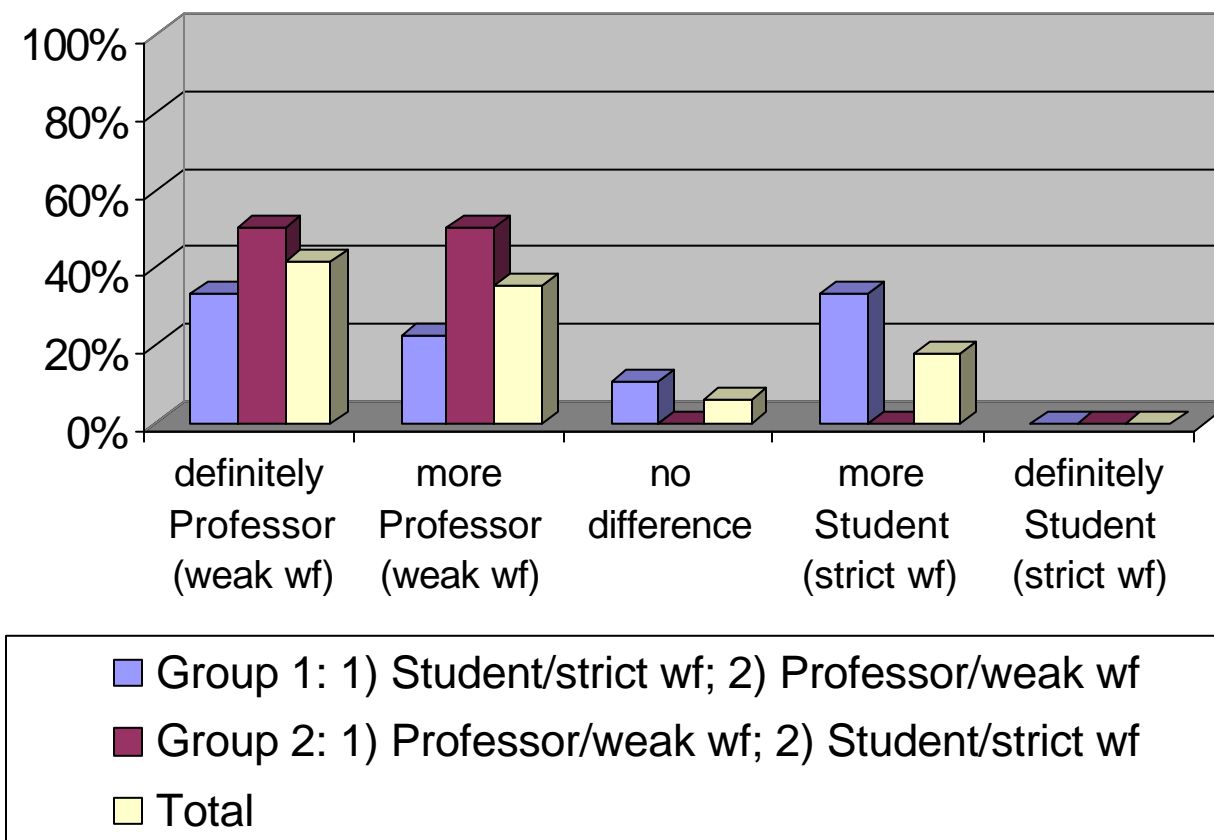
We performed 5 trial runs with 25 students in total.
The first run was considered a pre-study.

Four hypotheses were proven by the experiment

- Knowledge workers feel better supported with late/lazy modeling facilities
- Lazy/late modeling in weak workflows leads to a more precise classification of information items than strict workflows
- Proactive information support is (demonstrably) useful
- Weak workflows are better suited than strict ones to deal with unexpected task situations

Evaluation of the questionnaires proves: Knowledge workers feel better supported with late/lazy modeling facilities

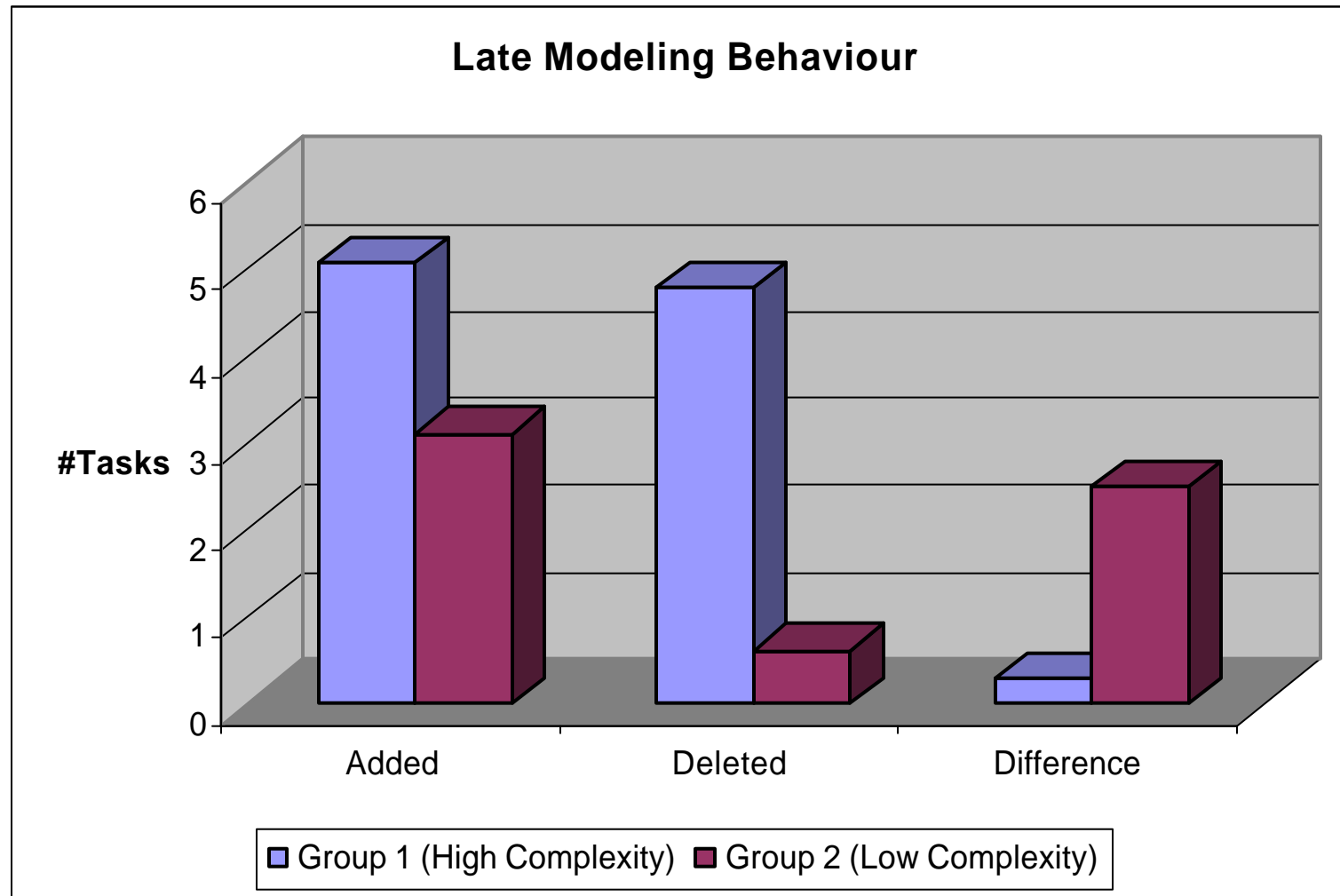
In which domain did you feel more flexibly supported?



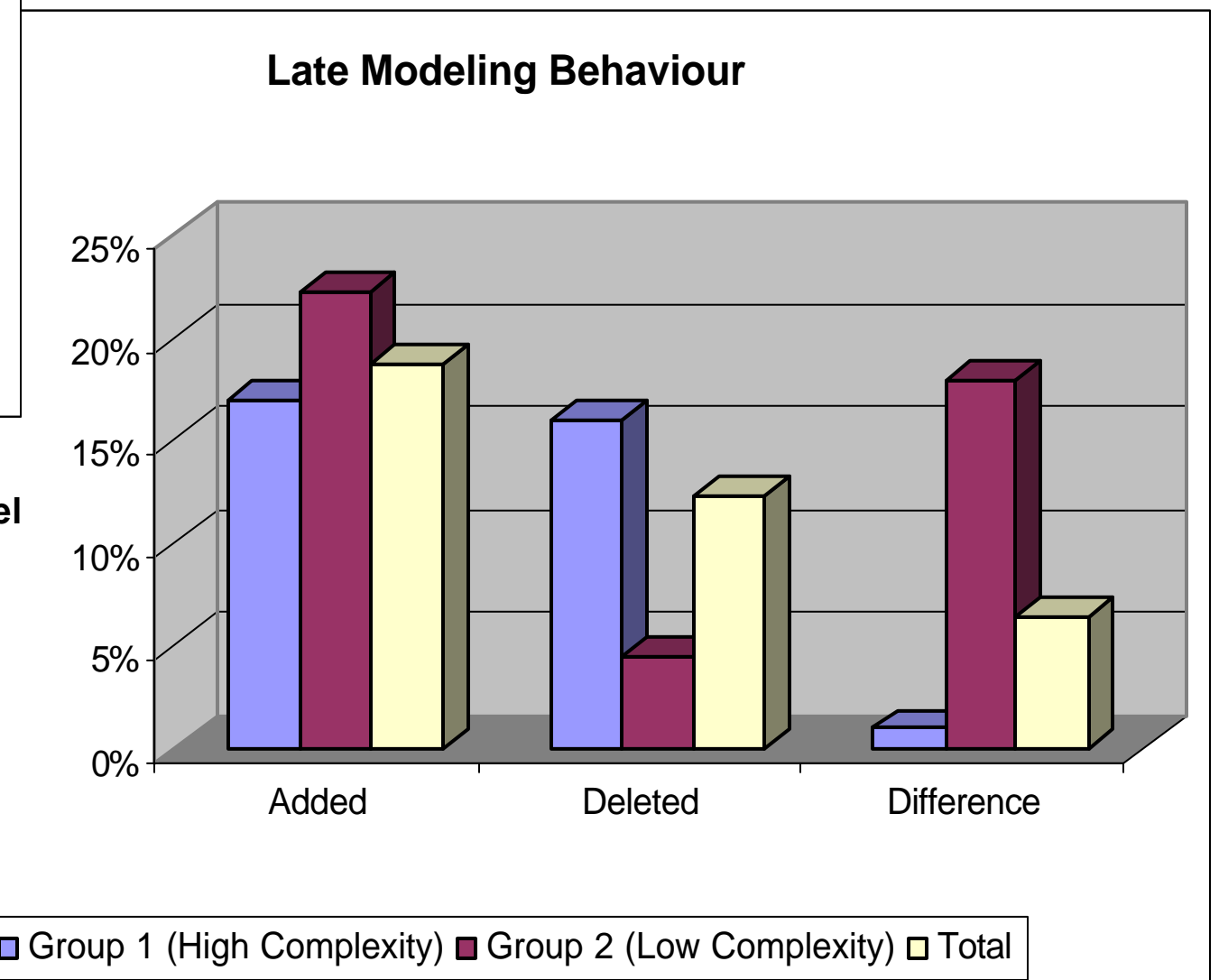
- All groups appreciate the flexibility of weak workflows
- Appreciation is significantly higher in the groups who started with the weak workflows
 - people appreciate the benefits after they lose them

The inverse question gave an identical result.

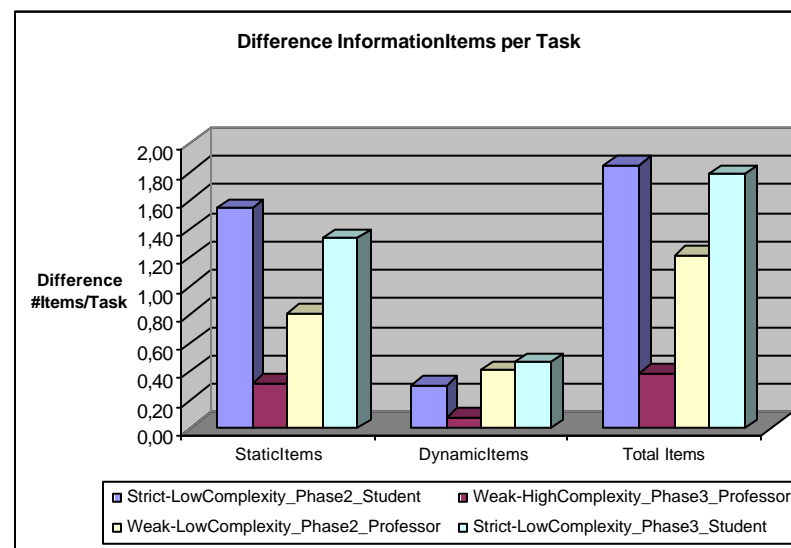
Analysis of the modified workflow models shows: Dynamic modeling is used intensively.



**#Tasks/
Given Model
Size**

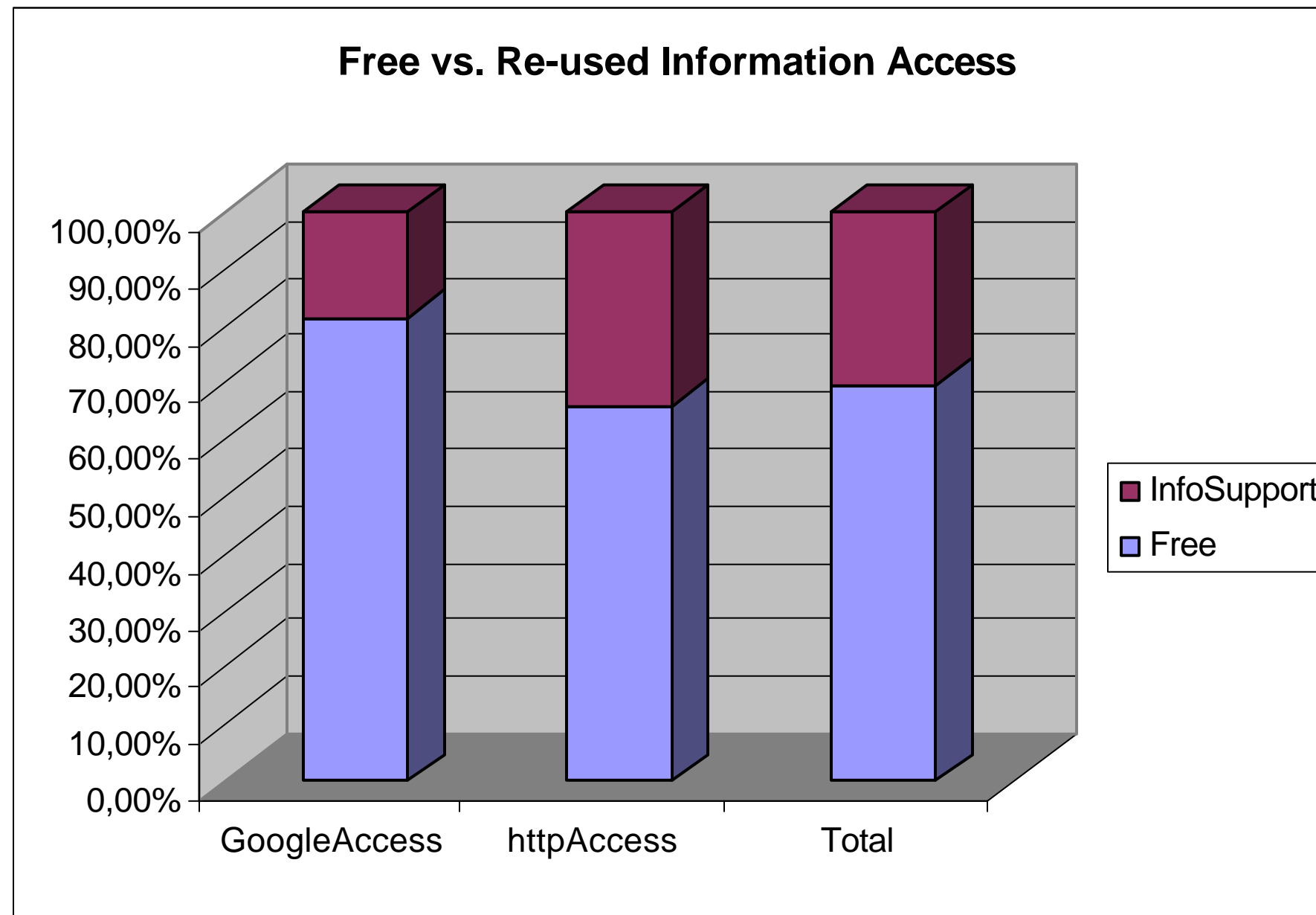


Analysis of enriched workflow models demonstrates: Lazy/late modeling in weak workflows leads to a more precise classification of information items than strict workflows



- weak workflows result in less information items / task
- this is interpreted as a more precise classification

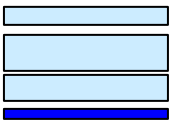
Proactive information support is (demonstrably) useful



Evaluation of web access logs shows:

- About 30% of all information access result from pre-given information
- ⇐ User profit from pre-given information elements
- ⇐ Nevertheless, additional information sources are visited

Weak workflows are better suited than strict ones to deal with unexpected task situations



- After 1 hour's work, an additional task was introduced in each case:
 - weak workflow: “The professor indicates that his wife intends to do sightseeing & wellness. Check possibilities and make relevant suggestions”
 - strict workflow: “The student intends to earn money by giving music instructions. Check possibilities and contacts”
- The analysis of the work results shows the advantage of weak workflows:
 - weak workflow: the task is integrated into the process
 - strict workflow: the task is
 - partially ignored
 - wrongly classified

Unexpected task in a weak workflow: Sound integration of the additional task and information related to it.

The screenshot displays the 'Eval - UserManager' application. The main window is divided into two panes. The left pane, titled 'Graph', shows a hierarchical workflow diagram. At the top, a box labeled 'von moeglichen Aktivitaeten fuer die Zeit des Aufenthaltes' (from possible activities for the duration of the stay) has a green checkmark and is connected to a box labeled 'Verkehrsmittel' (transportation). Below this, a box labeled 'Stadt Saarbruecken' (City of Saarbruecken) is connected to four sub-categories: 'Saarbruecken', 'Gastronomie' (Gastronomy), 'Wellness', and 'Sehenswuerdigkeiten' (Sights). The 'Wellness' category is further connected to a box labeled 'Erlebnisbad' (Experience Bath), which is highlighted with a red border. The right pane contains a toolbar with icons for 'Modelling', 'Put back', 'Commit', 'Revert', 'Finish', 'Assistant', 'Back', and 'Fwd'. Below the toolbar, a 'Path' bar shows the current path: 'Tourismus_Vorgabe' > 'Zusammenstellen von moeglichen Aktivitaeten fuer die Zeit des Aufenthaltes' > 'Stadt'. The right pane also has tabs for 'Overview', 'TaskConcepts', 'Description', 'Browser', 'Information', and 'ProcessRole'. The 'Information' tab is active, showing a large empty area. A 'Memo' window is open in the foreground, titled 'Memo', with a 'title' field containing 'adresse' and an 'author' field containing 'author of the memo'. The memo text area contains the address: 'Calypso', 'Deutschemühlental 7', '66117 Saarbrücken'. The 'remark' field is empty. The 'change' and 'cancel' buttons are at the bottom of the memo window.

Workflow: Tourismus_Vorgabe

Unexpected task in a strict workflow: Relevant information is (inadequately) linked to 'town'

The screenshot displays the 'Eval - UserManager' application interface. The main window is divided into several sections:

- Top Bar:** Contains tabs for 'Console', 'Worklist', 'Tree', and 'Graph'. The 'Graph' tab is active.
- Workflow Graph:** A hierarchical diagram showing tasks. The path 'Stadium_Vorgabe' -> 'Zusammenstellen relevanter Aktivitaeten' -> 'Auswahl von relevanten Aktivitaeten' -> 'Studienort' -> 'Stadt' is highlighted. The 'Stadt' node is enclosed in a red box.
- Right Panel:** Contains a toolbar with icons for 'Model', 'Work', 'Commit', 'Revert', 'Finish', 'Assistant', 'Back', and 'Fwd'. Below the toolbar is a 'Path' bar showing the current path. The 'Information' tab is selected, displaying a list of 'relevant information' items: 'Studentenwerk München', 'Münchner Nahverkehr', 'Tourismus München Info', and 'Musikunterricht geben' (highlighted in red).
- Bottom Panel:** A 'Browser for Task Stadt' window is open, showing a 'File Search History' bar and a list of tasks. The 'Gitarre' task is selected, showing details for Dominik Hanel, including a phone number and a website URL. The 'Violine' task is also listed, showing details for Unterricht von hochqualifiziertem Geiger in Würzburg und Herrsching bei München.

Workflow: Studium_

e-mail: sixtpena@aol.com

Gitarre Dominik Hanel, klassischer und moderner Gitarrenunterricht in München, Tel.: 089 - 74 37 37 07, <http://www.gitarrenkurse.de>

Violine Unterricht von hochqualifiziertem Geiger in Würzburg und Herrsching bei München. Tel.: 0177-5613826 e-mail: violinist@patrickschleuter.de

The results of the experiment answer further interesting questions

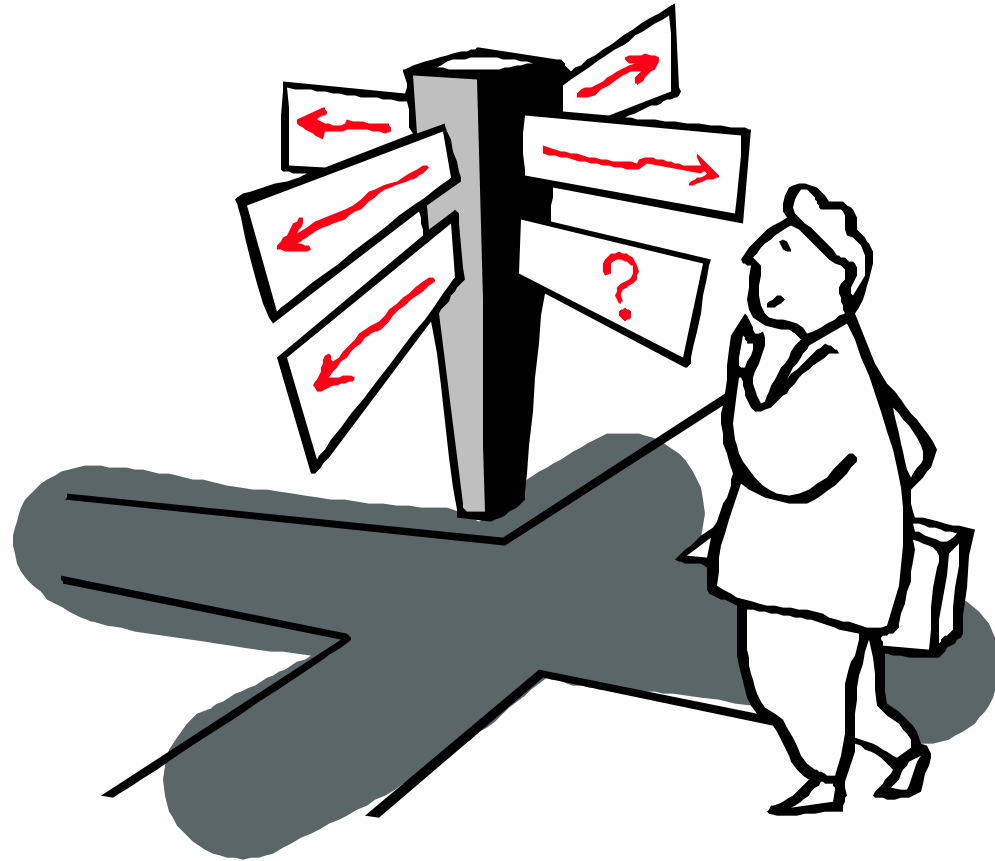
- Does pro-active information support hinder creativity?
 - No: Data show that more information is processed and innovative solutions can be carried out
- Can process models form a part of shareable individual and organizational knowledge?
 - Yes: The knowledge transfer via improved process models could be demonstrated

The experimental evaluation was harder than expected but delivered favorable results

- Long preparation
 - sound design of an experiment was difficult
 - sound example proved hard to construct
 - design, performance and evaluation were time-consuming
 - first experiment runs discovered previously unknown deficiencies in various tool implementations
- Benefits of the FRODO approach were clearly demonstrated
 - Hypotheses were positively proven
 - Further questions could be answered

The analysis of the experimental results continues.
A publication is submitted.

More questions ... ?



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recent publication

Weakly-structured Workflows for Knowledge-intensive Tasks: An Experimental Evaluation

Ludger van Elst, Felix-Robinson Aschoff, Ansgar Bernardi, Heiko Maus,
Sven Schwarz

in Knowledge Management for Distributed Agile Processes: Models,
Techniques, and Infrastructure ([KMDAP2003](#)) at [WETICE-03](#)

<http://www.dfki.uni-kl.de/~maus/publ.html#WET-ICE03>

FRODO TaskMan Version April 2003