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Architecture Design of a System for Collaborative Policy Modelling

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Motivation, goals

- Innovative solutions in eGovernment:
  - knowledge economy (Lisbon strategy, 2000)
  - ICT facilitating efficiency and quality of services
  - interoperability of services
- Current challenge: from services to strategies / policies, which includes:
  - Collaboration - involvement of general public and relevant stakeholders in the process of policy development
  - Increasing the level of understanding of strategies / policies by service consumers (e.g. by means of policy models, visualisations, narrative scenarios, etc.)
  - Provision of proper ICT support for collaborative policy creation

Related research

Projects:

- PADGETS, http://www.padgets.eu
- COCKPIT, http://www.cockpit-project.eu
- +SPACES, http://www.positivespaces.eu
- CROSSROAD, http://crossroad-eu.net, a support action project
- etc...
- ... and OCOPOMO, http://www.ocopomo.eu

Technologies / frameworks:

- Policy modelling & simulation:
  - agent-based, multi-agent systems
  - frameworks: JADE, Repast, ...
- Visualisation of public services
- Opinion mining, policy scenarios
- CMS (+ semantic technologies)
- Collaboration platforms (groupware):
  - sharing of artefacts, active communication between participants
  - frameworks: Hipergate, Open-Xchange, eGroupWare, ...
- eParticipation platforms:
  - Web 2.0 based
  - social networks - discussions, wikis, blogs, chats, podcasts
  - frameworks: LEX-IS, VoicE, LexiPation, ...

OCOPOMO Project - Basic facts

- Full title: **Open Collaboration for Policy Modelling**
- STReP EU project, FP7 ICT,
  Objective ICT-2009.7.3 "*ICT for Governance and Policy Modelling*",
  Contract no.: 248128

OCOPOMO | Open COllaboration for POlicy MOdelling

- Duration: 01/2010 – 12/2012 (36 months)
- Planned effort: 425 person-months
- Project consortium: 10 partners (universities, private companies, government institutions) from 5 countries (GE,UK,PL,IT,SK)
- Coordinator: University of Koblenz-Landau, Germany
  - 2 pilot applications - Italy and Slovakia

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Objectives

- To enable a collaborative policy formation in public organisations, integrating scenario generation, policy modelling, and open collaboration, supported by a suite of ICT tools for:
  - Ø Iterative development of policies in a form of narrative scenarios
  - Ø Policy modelling, creation of agent-based formal policy models
  - Ø Open and transparent collaboration in the process of policy development
  - Ø Seamless, goal-oriented information exchange between all the stakeholders (policy analysts, operators, decision makers, wider interest groups, general public, etc.)
  - Ø Simulation and visualisation of policy alternatives and their consequences

Pilot applications

- Pilot Campania
  - Location: Campania Region (http://www.regione.campania.it), Italy.
  - Target: support in policy decisions in respect to an optimal allocation of EU Structural funds in the region.

- Pilot KSR
  - Location: Kosice Self-governing Region (KSR, http://www.vucke.sk), Slovakia.
  - Target: development of a sustainable long-term strategy for exploitation of renewable energy resources.

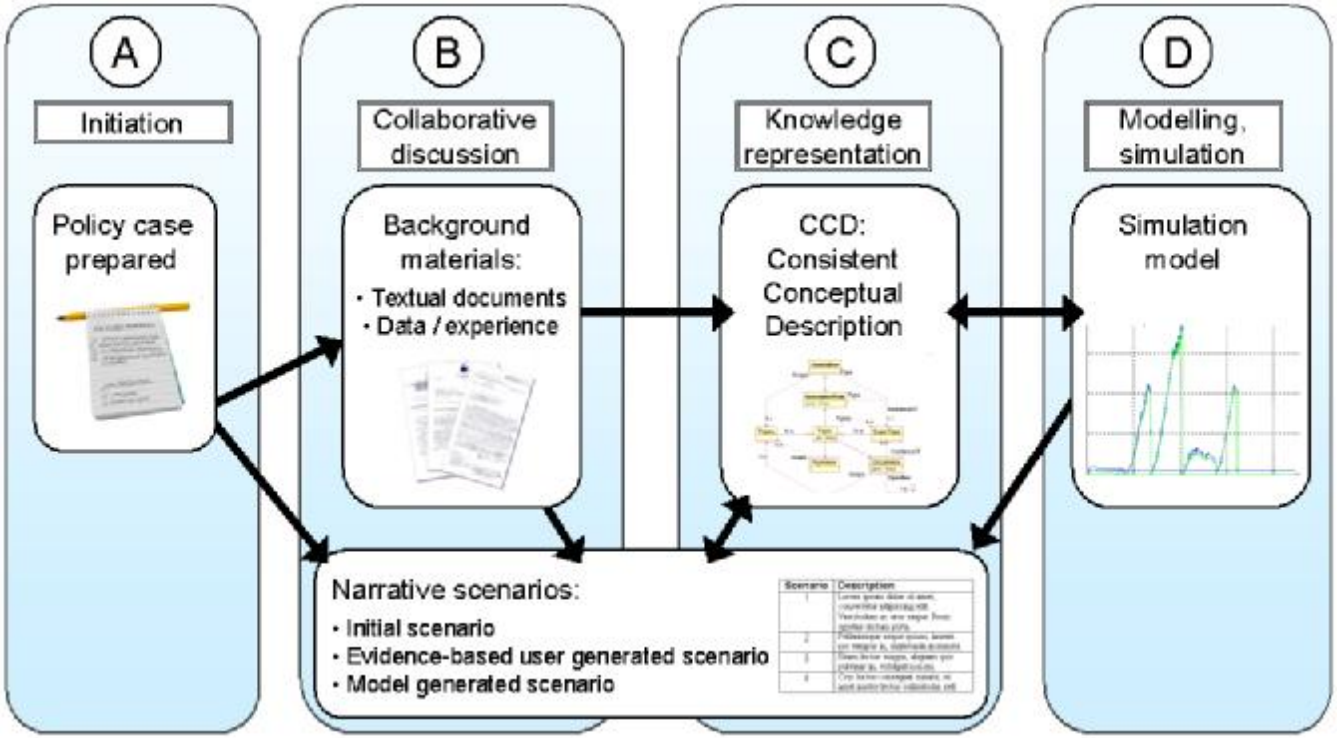
Methodological concept

Information artefacts:

- Scenarios:
  - Initial
  - User-generated
  - Model-generated
- Simulation model
- CCD

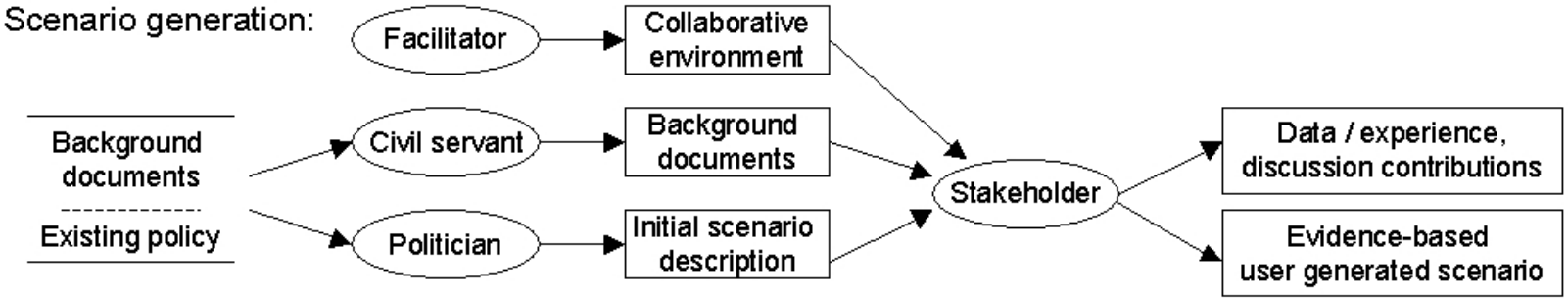
User roles:

- Direct participants:
  - Politician
  - Civil servant
  - Stakeholder
- Support:
  - Facilitator
  - Analyst
  - Modeller

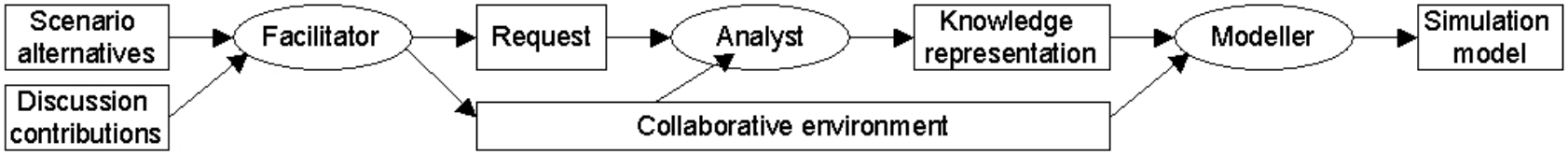


Data flow processes

a) Scenario generation:

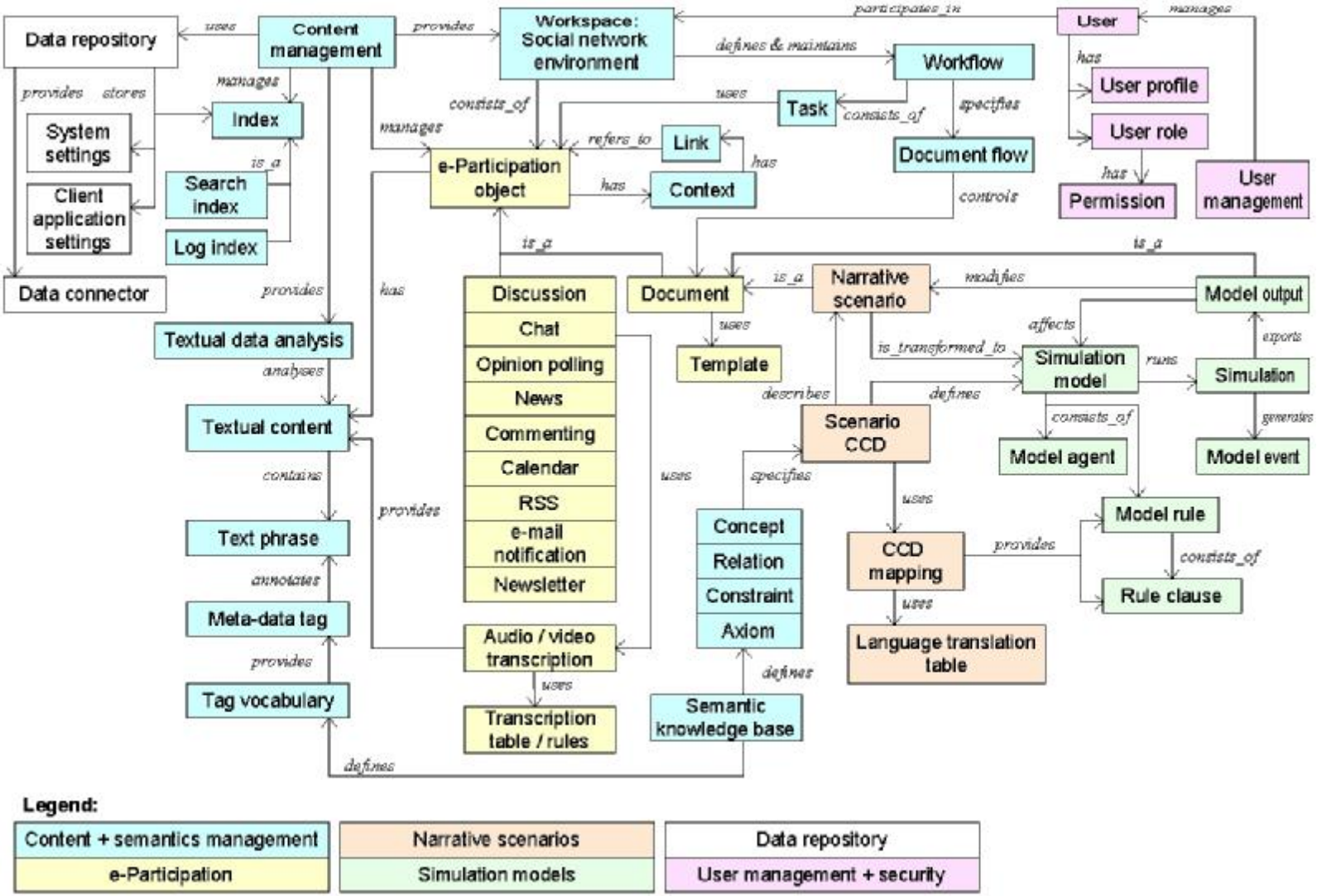


b) Scenario analysis and transformation:



c) Simulation, evaluation, validation:

Data objects



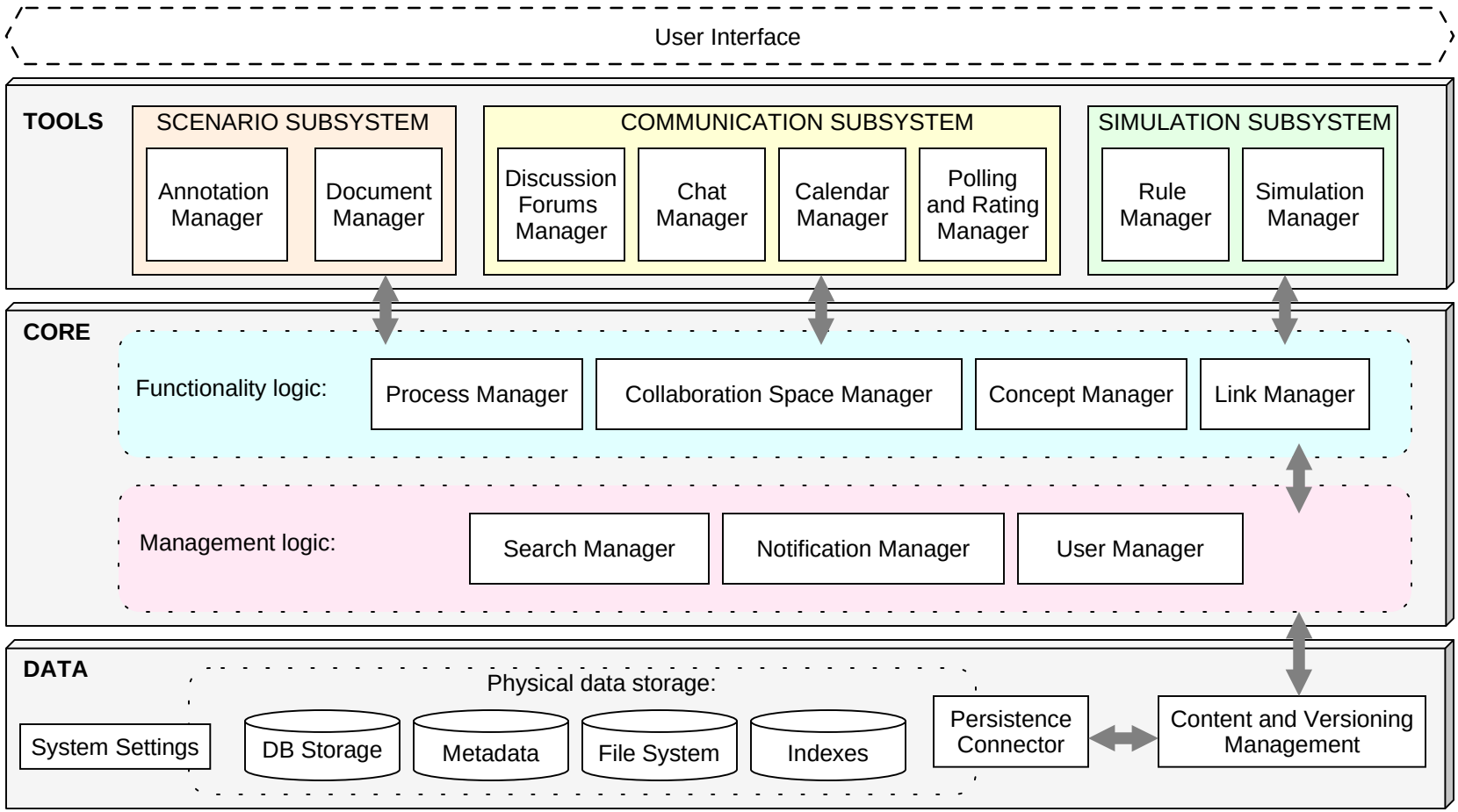
Technology identification

- Web application, open source, Java-based
- Collaboration environment, e-Participation tools:
  - Alfresco/Alfresco Share CMS (www.alfresco.com) - integration infrastructure, open source Enterprise Content Management System, compatible with CMIS (*Content Management Interoperability Services*) OASIS standard
- Agent-based simulation platform:
  - Repast (repast.sourceforge.net), an open source agent-based modelling and simulation toolkit
  - DRAMS, a rule engine (under development by one of project partners)
- Scenario generation and analysis:
  - a new tool will be developed on the CAQDAS (*Computer-Assisted Qualitative Data Analysis Software*) principles

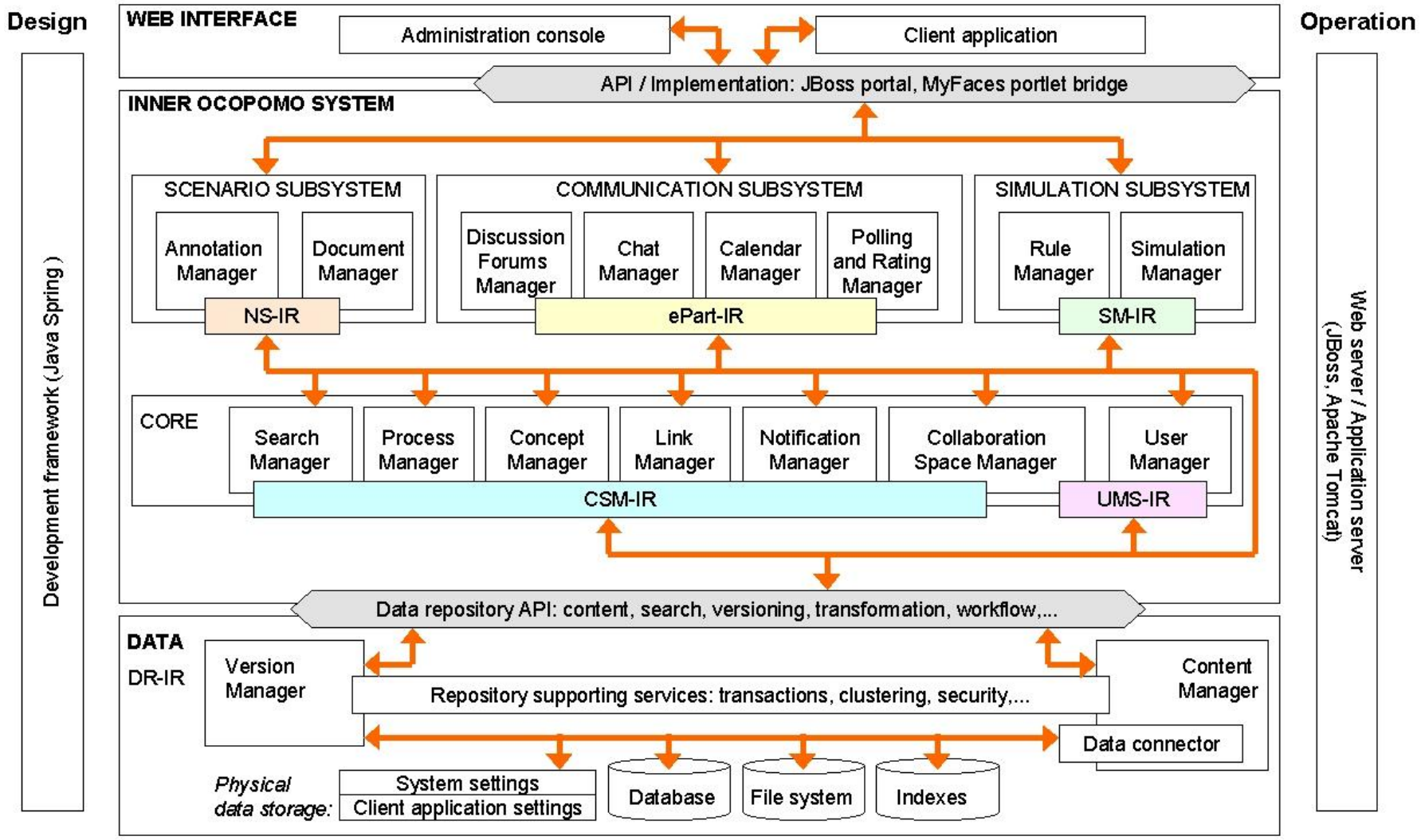
Architecture design

- Architecture:
  - 3-tier: presentation, middleware (business logic), data
  - communication: standard API (Web service interfaces as alternative)
  - design method: architecture views vs. perspectives
- Component groups:
  - TOOLS: client-side tools and middleware objects for:
    - e-Participation - collaborative work, social networks
    - Scenario development and analysis
    - Policy modeling and simulation
  - CORE: business logic for functionality and management of whole platform:
    - Functionality Logic: inner software components for client applications
    - Management Logic: data access, communication infrastructure, user management, security
  - DATA: repository for persistent data resources - documents, indexes, knowledge structures, metadata

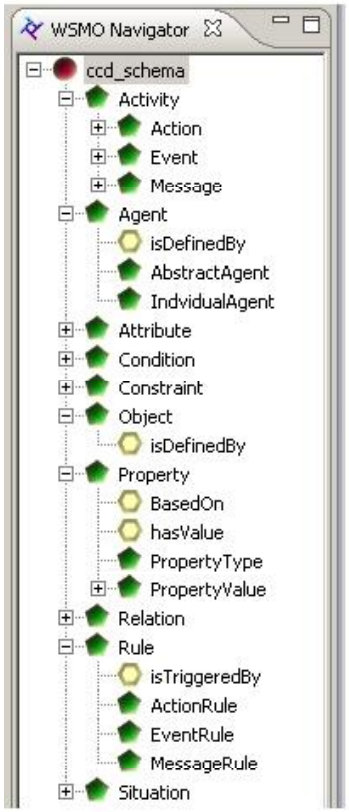
Functional components

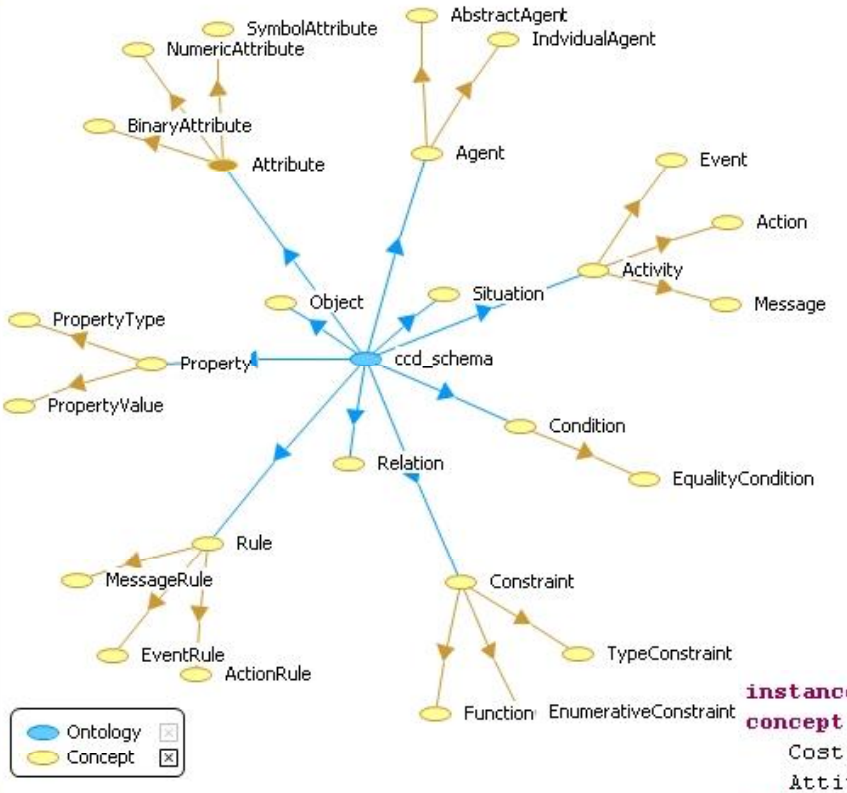


Information flow



CCD - meta-model ontology





WSMO ontology

Aim of CCD:

- a transformation of scenarios to respective simulation models

WSML listing of instances:

```
instance EnergyConsumer memberOf AbstractAgent
concept Technology subConceptOf Object
   Cost impliesType _float
   AttitudeLevel impliesType _integer
instance SelectTechnology memberOf Action
   Object hasValue Technology
instance TechnologyCostDifference memberOf Condition
instance ActionRule memberOf Rule
   Agent hasValue EnergyConsumer
   Condition hasValue TechnologyCostDifference
   Action hasValue SelectTechnology
```

Conclusion, future work

- Work done so far:
  - User requirements gathered and analysed
  - Functionality & architecture specified
  - Design and impementation of platform components (*ongoing*)
- Future work:
  - Platform components for first prototype : July 2011
  - First prototype - in autumn 2011
  - Testing on pilots:
    - 1st round of pilot applications: winter 2011
    - 2d pilot applications and evaluation: autumn 2012
- More info at www.ocopomo.eu

Thank you for your attention!

Questions, comments, suggestions?