

ARGUGRID vision

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<http://www.argugrid.eu>

Outline

- | ARGUGRID: vision, platform, scenarios, components
- | The case for argumentation: decision-making, contract negotiation
- | Assumption-based argumentation, ArguGRID scenario
- | Contracts/SLAs and platform evaluation

General overview

Goals

- | Develop *argumentation-based foundations* for the GRID, populated by rational decision-making *agents* within *virtual organisations*
- | Incorporate argumentation models into *service-oriented architecture*
- | Develop underlying *platform* using P2P computing
- | Validate ArguGRID by way of industrial application *scenarios*

Imperial College
London

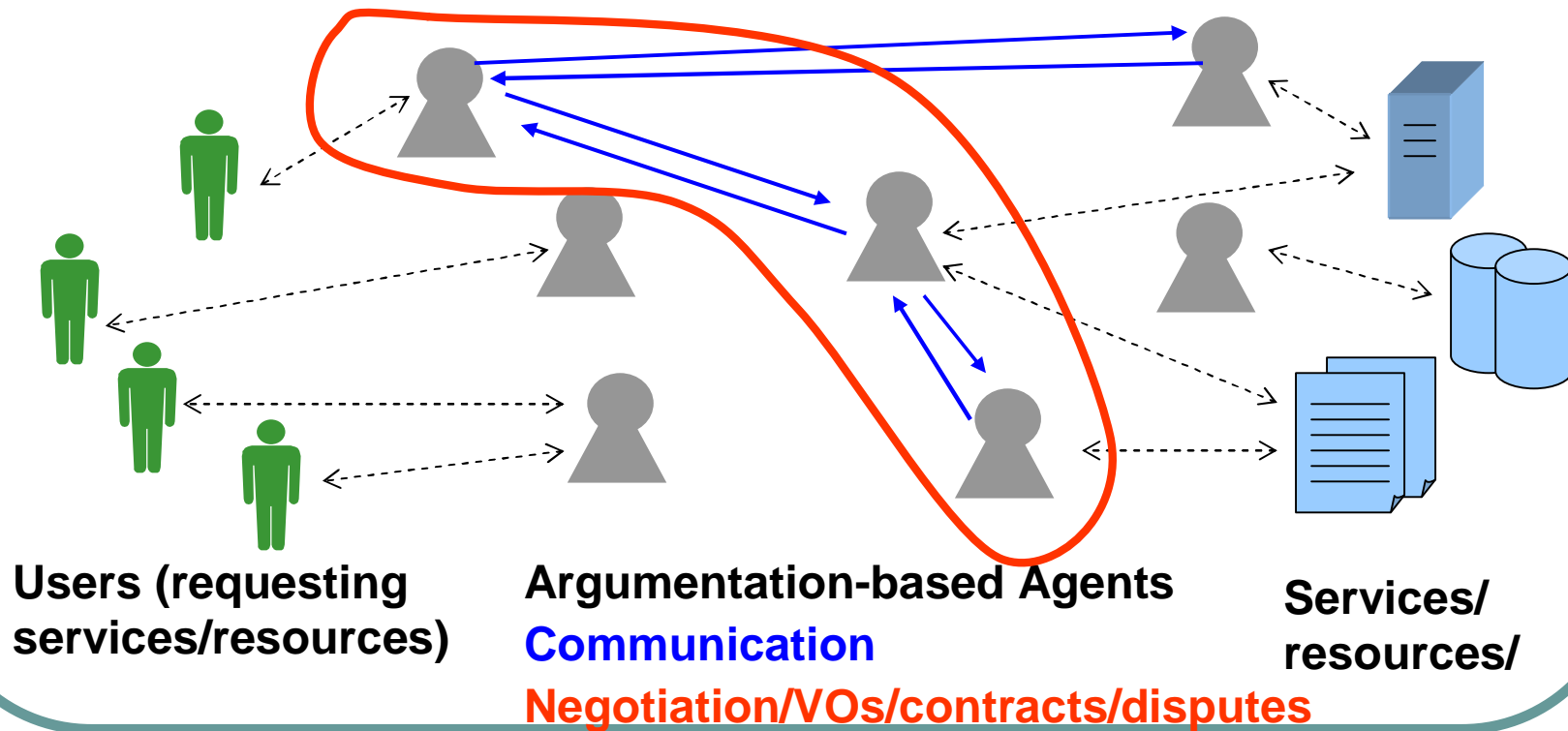


InforSense
The Integrative Analytics Company



ARGUGRID vision

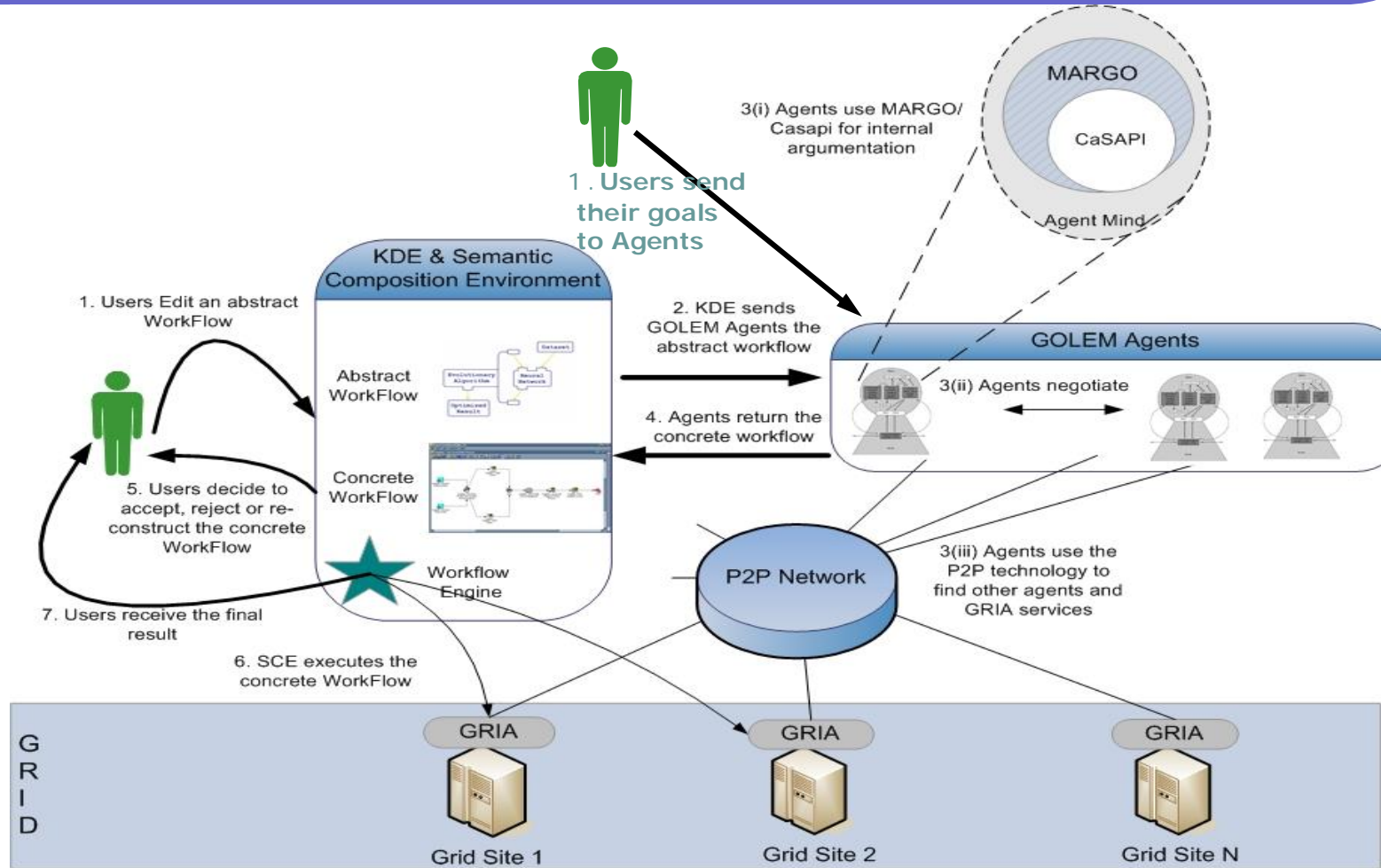
- I Develop a *semantic grid/service-oriented architecture* to support applications



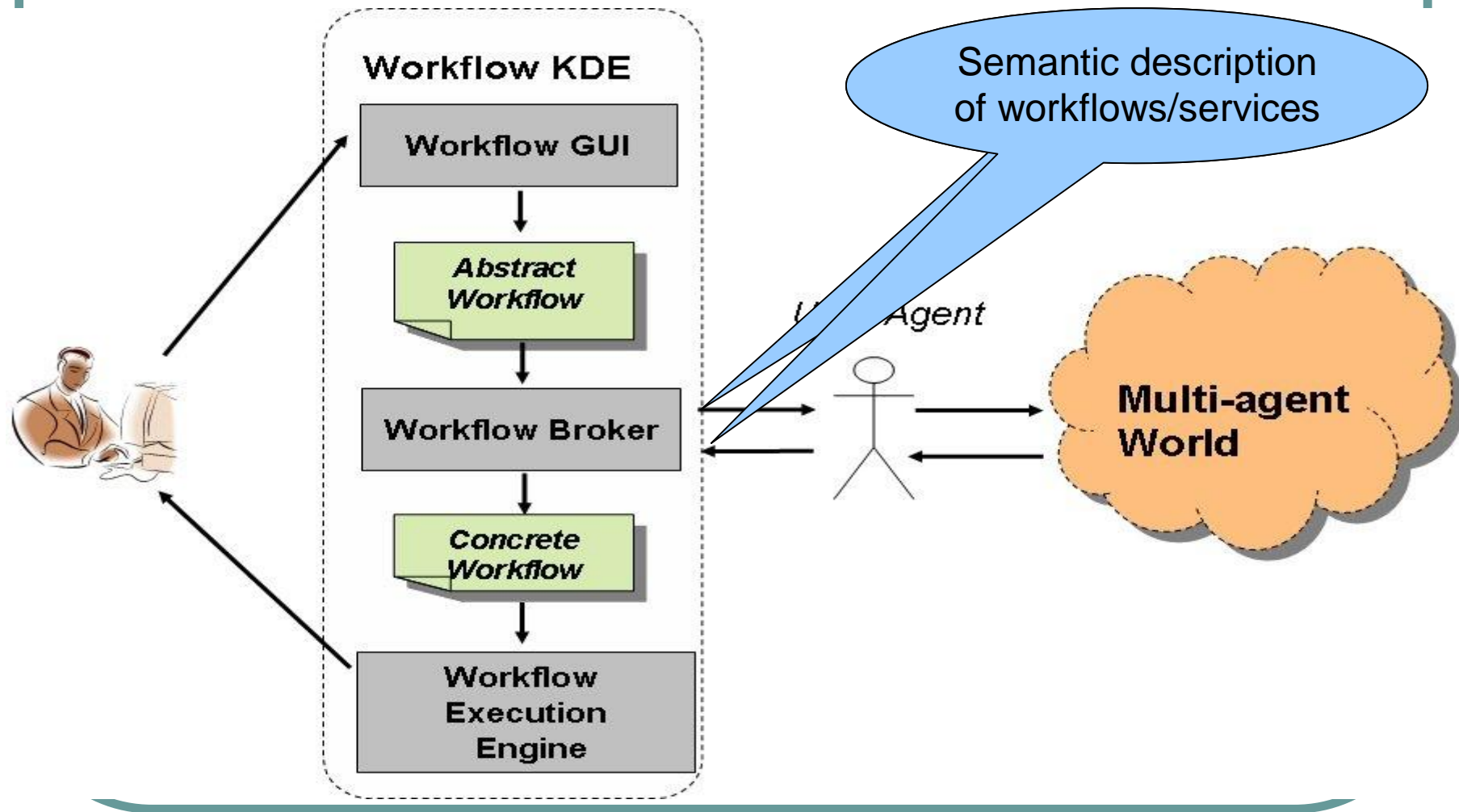
Industrial scenarios

- | Earth observation (**GMV – Spain**)
 - | Select appropriate sensors/satellites e.g. for dealing with oil spill
 - | Combine sensors/satellites + other services (weather) e.g. for fire monitoring
- | E-procurement (**CosmoONE – Greece**)
 - | Select (combinations of) appropriate products/service to purchase
 - | Features of products/services influence business strategic benefits for the buyer

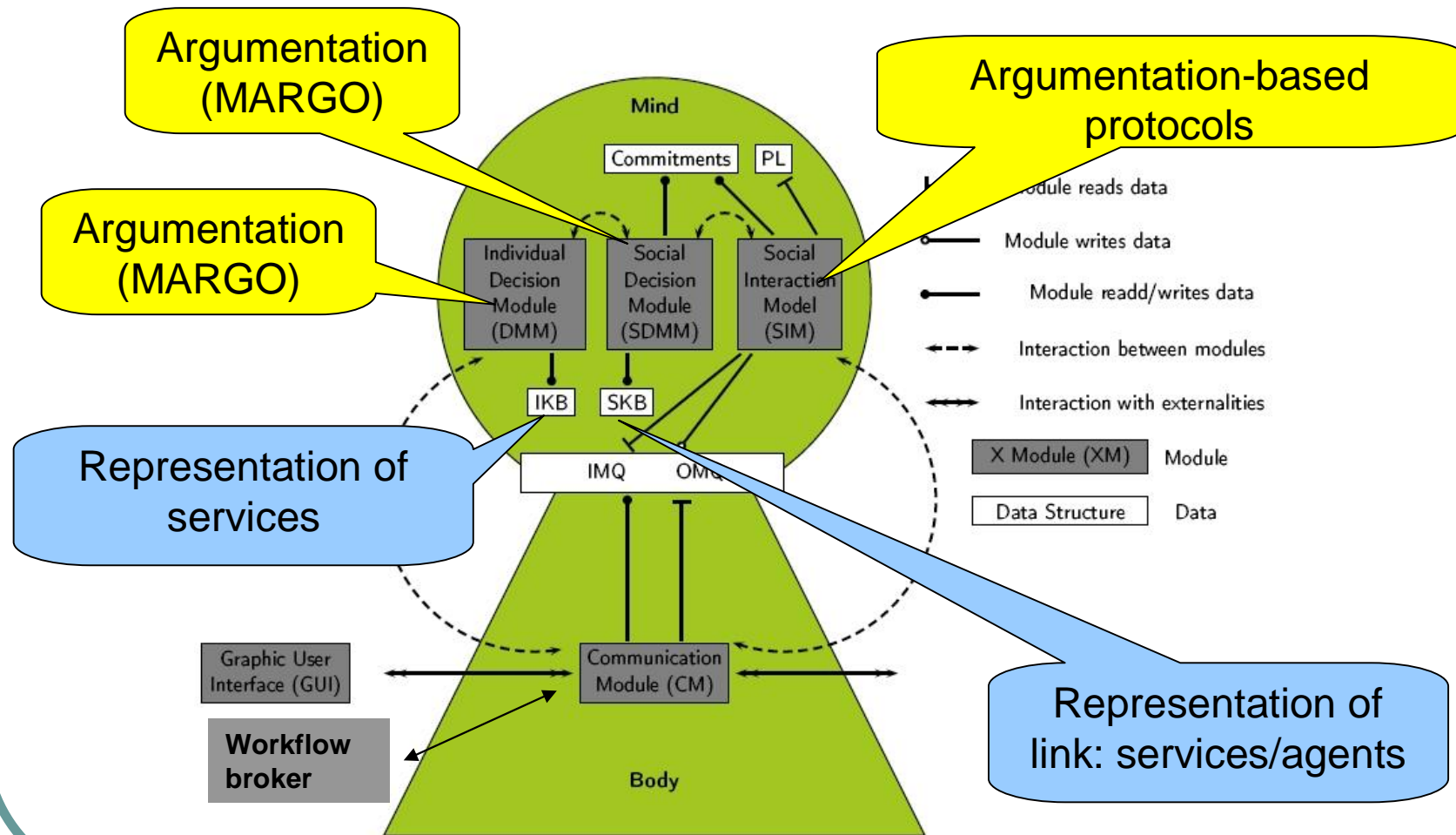
ARGUGRID platform



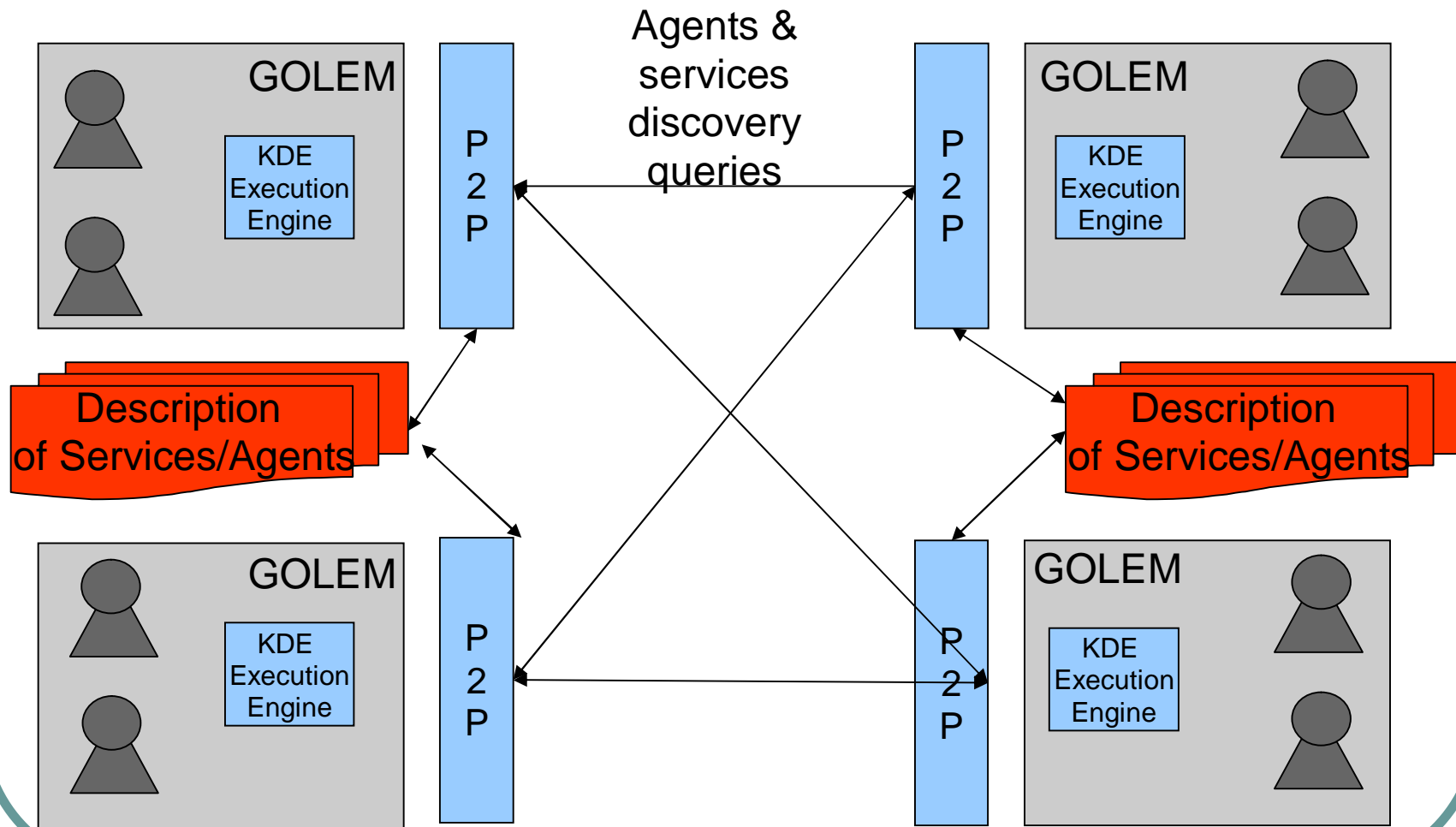
A workflow perspective



An agent perspective



A multi-agent perspective: GOLEM+P2P



Argumentation for the Grid

- | Argumentation system to model agent-based semantic Grid systems, by supporting:
 - | the reasoning/decision-making of agents over resources/ services
 - | the inter-agent negotiation process
 - | the formation phases in the life of a VO
 - | the definition of workflows and contracts in VOs
 - | the resolution of disputes amongst agents and VOs
 - | the identification of trust level of agents and VOs

Platform: components

- | SCE (Semantic Composition Environment)
 - | KDE
- | GOLEM (multi-agent platform)
- | MARGO agents:
 - | Hosted on GOLEM
 - | Use CaSAPI argumentation engine
- | ARGUGRID middleware:
 - | PLATON (P2P Platform)
 - | GRIA Grid platform

Semantic web technology

- | Choice: re-use and interface with existing standards:
 - | WSMO (extension of OWL-S) for describing
 - | Services
 - | Goals (requirements of requestors/providers)
 - | DPML+WSMO for describing workflows+annotations
 - | Mapping of WSMO/DPML descriptions into argumentation frameworks (in MARGO) and back

GOLEM

- | **GOLEM:** Generalized OntoLogical Environments for Multi-agent systems
- | An agent environment that can be used to create multi-agent system applications
- | Agents in several container environment communicate and take decisions

MARGO & CASAPI

- | **MARGO**: Multiattribute ARGumentation framework for Opinion explanation
- | It is written in Prolog
- | Implements the ArguGRID argumentation framework about service selection and composition
- | MARGO is built on top of CASAPI
- | **CASAPI**: Credulous and Sceptical Argumentation : Prolog Implementation
- | It is a general-purpose tool for assumption-based argumentation

Peer to Peer technology in ARGUGRID

- **PLATON** : P2P Load Adjusting Tree Overlay Networks
- A new load-balancing framework, PLATON, to support a distributed K-Dimensional tree system used for multi-attribute queries
- PLATON is developed in Java programming language and supports mechanisms for load-balancing of peer resources
- A simulator is implemented where PLATON has been evaluated in a large scale scenario of ~100K nodes
- PLATON prototype implementation has been integrated with GOLEM (Agent-platform)
- PLATON will be evaluated in emulation environment as well

GRID Platform

- | **GRIA** is the GRID middleware that ArguGRID uses to support the service – oriented infrastructure
- | Supports Business to Business collaborations
- | Provides an SLA module for ArguGRID needs

Contracts/SLAs in ARGUGRID

- | SLAs in ARGUGRID are based on the GRIA implementation at first, an extension is implementing for project purposes and components integration needs
- | Each SLA template refers to a specific service
- | Agents need the information to negotiate about services

Evaluation Methodology

- | The GOLEM and the PLATON platform need to be tested for scalability, load balancing and fault tolerance issues
 - | Extensive simulation studies have been conducted for testing scalability
 - | Simulation results will be validated over the real Internet using PlanetLab's emulation platform
 - | PlanetLab slices set up via the NTUA PlanetLab site/node
 - | Evaluation during the 3rd year of the project

The whole integrated system, i.e. the ARGUGRID platform, will be evaluated using a real Grid deployment environment

Conclusions

- ArguGRID and semantic web services
 - Argumentative agents interfaced with semantic descriptions
 - Given in existing standards
- Applications
- Ongoing:
 - Contract negotiation (versus SLAs) + VOs
 - Implementation of platform+applications
- Future: dispute resolution, trust-mediated negotiation