Programming with JADE

Advanced Features
Ontologies and Content Languages

• Content information is represented using Java objects inside an agent and as a sequence of bytes in a content slot of an ACL message

When exchanging messages:
  – The sender needs to convert its internal representation into the corresponding ACL content expression representation, and the receiver needs to perform the opposite conversion
  – The receiver should perform a number of semantic checks to verify that the received information complies with the rules of the ontology shared by the communicating agents
Support for Ontologies provided by JADE

ContentManager class provides an interface to access the conversion functionality and delegates the conversion and check operations to an instance of the ontology class included in the jade.content.onto package and an instance of the Codec interface included in the jade.content.content.lang package.
Content Reference Model

• FIPA’s Acl requires the content of each ACL message to have proper semantics according to the performative of the ACL message. At the highest level we distinguish between:
  – Predicates: expressions that say something about the status of the world and can be either T or F
  – Terms: expressions identifying entities that “exist” in the world and that agents may reason about
Terms

- Primitives
- Concepts
- Agent actions
- Identifying referential expressions (IRE) are expressions that identify the entity for which a given predicate is true
- Aggregates
- ContentElement
Steps to allow discourse among agents

1. Define an ontology including the schemas for types of predicate, agent action and pertinent concepts (Sec 5.1.3.1)
2. Develop proper Java classes for all types of predicate, agent action and concept in the ontology (Sec 5.1.3.2)
3. Select a suitable content language among those directly supported by JADE (Sec 5.1.3.3)
4. Register the defined ontology and the selected content language with the agent (Sec 5.1.3.4)
5. Create and handle content expression as Java objects that are instances of the classes developed in step 2 and let JADE translate these objects to/from strings or sequences of bytes that fit the content slot of ACL messages (Sec 5.1.3.5)