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| Software Engineering of Distributed Systems, KTH |
| Design an Agent Platform conformant to FIPA Specifications |
| Distributed AI and Intelligent Agents, Project 2007 |

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| Shanbo LI, Sike Huang  2007-12-10 |

## Complete design of your Agent Platform using GAIA AOSE Methodology

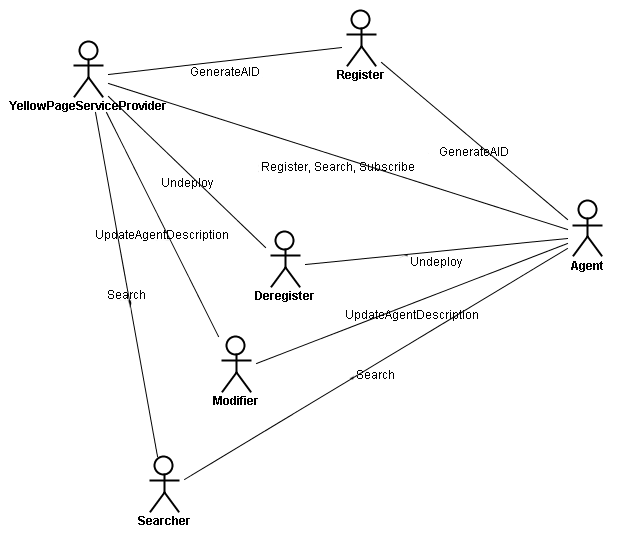
### Role Model

|  |  |  |
| --- | --- | --- |
| Role | | Register |
| Description | | It acts as a register and gives AIDs to agents |
| Protocols and Activities | | GenerateAID |
| Permissions | |  |
|  | reads | new AgentRequire |
|  | generates | AID |
| Responsibilities | |  |
|  | Liveness | GenerateAID = AgentLocalName@*hap\_name* |
|  | Safety | true |

|  |  |  |
| --- | --- | --- |
| Role | | Modifier |
| Description | | It acts as a modifier and edit agent description |
| Protocols and Activities | | UpdateAgentDescription |
| Permissions | |  |
|  | reads | AID |
|  | generates | description |
| Responsibilities | |  |
|  | Liveness | newDescription = Description·update |
|  | Safety | true |

|  |  |  |
| --- | --- | --- |
| Role | | YellopageServiceProvier |
| Description | | It behaves like a yellow page |
| Protocols and Activities | | Register, Search, Subscribe |
| Permissions | |  |
|  | reads | agentDescription |
|  | generates | searchResult |
| Responsibilities | |  |
|  | Liveness | GenerateResult = SearchRegistedAgent·filterAgentDescription |
|  | Safety | true |

### Interaction Model



We introduce a normal agent besides DF and AMS, since an agent communicates with both AMS and DF. YellowPageServiceProvider obtains its AID from Register, and asks Modifier to update its description as Directory Facilitator. A normal agent in the agent system registers to the YellowPageServiceProvide, more it can search other agents based on description or subscribe the notification to certain descriptions, if a agent searches another agent using a AID, the call directly goes to the Searcher, the agent obtains its AID from Register and it can update its description via Modifier.

### Agent Model

AMSAgent

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1

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Register Deregister Modifier Searcher

Agent Management System agent plays four different roles, register, deregister, modifier and searcher. Register registers an agent with its local name to agent platform, and gives the agent a global unique identifier. Deregister deregisters an agent and releases its global unique identifier assigned previously. Modifier modifies the agent description and agent service description. Searcher matches the requesting description to current stored ones.

DFAgent

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YelloPageServiceProvier

DFAgent plays only one role, which is the YellowPageServiceProvider.

### Service Model

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Service | Inputs | Outputs | Pre-condition | Post-condition |
| GenerateAID |  | *AID* | *no same localName* | *true* |
| UpdateAgentDescription | *AID* | *Description* | *AID ≠ nil* | *true* |
| Register | *AID* |  | *true* | *true* |
| Search | *ServiceDescription* | *SearchResult* | *true* | *true* |
| Subscribe | *ServiceDescription* | *SubscribeResult* | *true* | *true* |

### Acquaintance Model

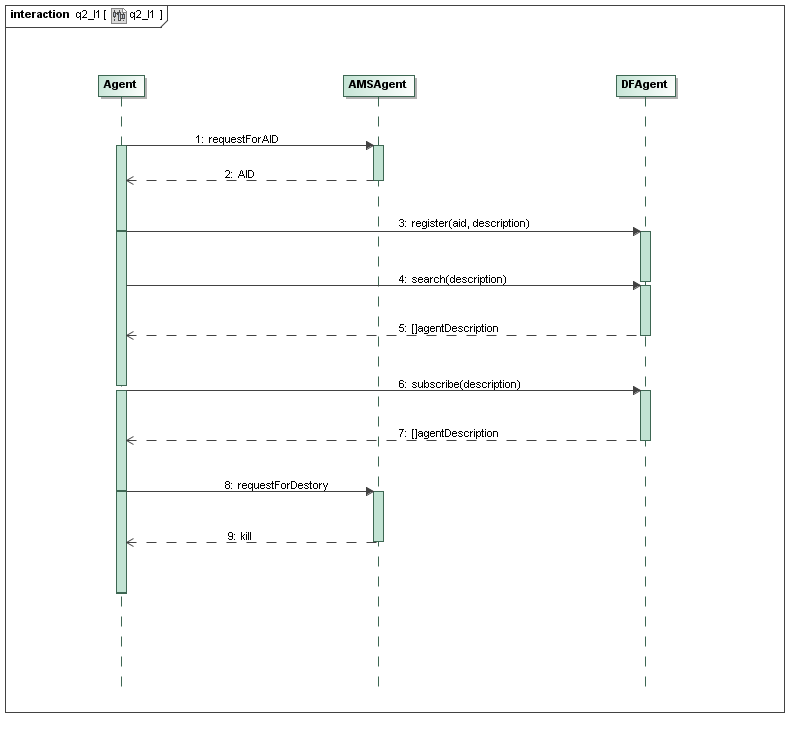
AMSAgent

DFAgent

AMSAgent and DFAgent negotiate with each other directly if necessary.

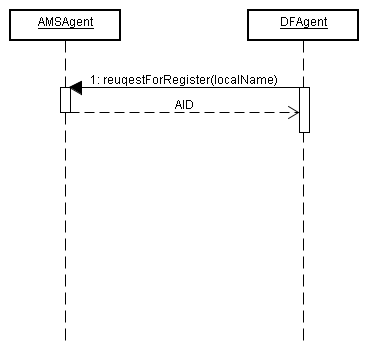
## Represent agent interaction protocols in UML.

### Level 1: Representing the Overall Protocol



First and foremost, agent obtains its AID from AMSAgent, and then it can optionally register itself at DFAgent providing its AID and description. Agent can search other agents from DFAgent based on descriptions, it can also subscribe to notification by DFAgent if any matching description is found. At last, it’s AMSAgent’s job to kill Agent, if such Agent terminates its execution.

### 2.2 Level 2: Representing Interactions among agents



We consider two significant functional agents, AMSAgent and DFAgent in the agent platform (though DFAgent is an optional component of agent platform). AMSAgent is the agent who maintains the life cycles of all agents in the platform, and give each agent a global unique identifier. DFAgent acts a yellow page, which keeps a table of AID-description pair. However, DFAgent first has to obtain an AID for itself from AMSAgent, so that other agents are able to find Directory Facilitator.

## Use role-based modeling method to model FIPA specified roles for Agent Platform

## Re-modeling the above using MESSAGE UML.

## Assume your agent platform is distributed over two machines, thus you need mobility and cloning et al services to maintain your agent platform