

## **A Multiagent Based Secured Video Authentication Scheme Using Jade**

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### **ABSTRACT**

Agent-Oriented Programming (AOP) is a relatively new software paradigm that brings the concepts from the theories of artificial intelligence into the mainstream realm of distributed systems. JADE is a completely distributed middleware system with a flexible infrastructure allowing easy extension with add-on modules. This framework facilitates the development of complete agent-based applications by means of a run-time environment implementing the life-cycle support features required by agents, the core logic of agents themselves, and a rich suite of graphical tools. In this paper, we implemented a truly secure image/video authentication scheme is employed based on the users application required, and the threat on the channel and this is achieved by incorporating Multi Agent System. With the help of sniffer agent the proposed method is implemented. This makes the system to work more dynamically and efficiently. So the implemented system is more secure and efficient.

**Keyword:** authentication, JADE, JADE-S, sniffer agent.

### **1. INTRODUCTION**

Recently, in ubiquitous computing environment, it is an important issue for context-awareness, which is aware of context and reasons appropriate service according to the context. Particularly, it is expected that home network adopt ubiquitous computing first of all and provides variable context-aware services. Among context-aware services, location-aware service is one of the key contextaware computing[14].

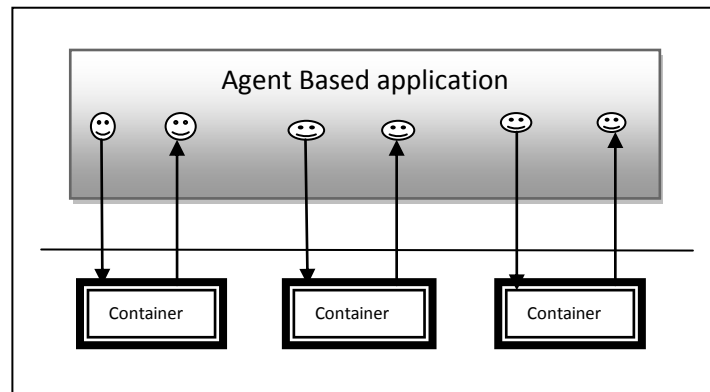
In digital home network, it is expected that multimedia service such as the watching of television programs or movies is major service. This multimedia service can be used with context-aware service[11]. Especially, an example of this service is to offer location-aware automated service for television channel seamlessly when the user roams from living room to another. To realize this service, adaptive multimedia service migration is required, which provides a service that is adequate for computing power of user device. Adaptive multimedia service migration using location-aware service decides a device for service according to user's location, and provides a multimedia service that is suitable for selected device.

## **2. IMPLEMENTATION TOOL**

Often, agent applications and multi-agent systems are supported by agent platforms. Also the above proposed scenario can be implemented in an agent platform. An agent platform is middleware (a software layer between the operating system and the application programs) that provides an execution environment for agents. Generally, an agent platform offers facilities and services to agents on the platform, for example facilities for communication and life-cycle support (starting, pausing, resuming, deleting agents) and services like a Directory Service (White and Yellow Pages to find agents and services). In addition, agent platforms can offer support for migration and security. Examples of agent platforms are AgentScape [4], SeMoa[5], JADE[6] and Cougaar[7].

### **JADE**

JADE [8, 9, 10] stands for Java Agent Development Environment and is a FIPA-compliant agent platform. Each instance of the JADE run-time environment is called a container (since it “contains” agents). A group of connected containers is called a platform; multiple containers can run simultaneously on one single computer system or per container on multiple network-connected machines. The JADE agent platform provides a homogeneous layer that hides the complexity and the diversity of the underlying tiers (hardware, operating systems, types of network, JVM) from users and developers. JADE supports weak agent migration, from container to container within the platform, by means of Java-serialization.



**Figure 1: JADE Architecture**

### JADE-S

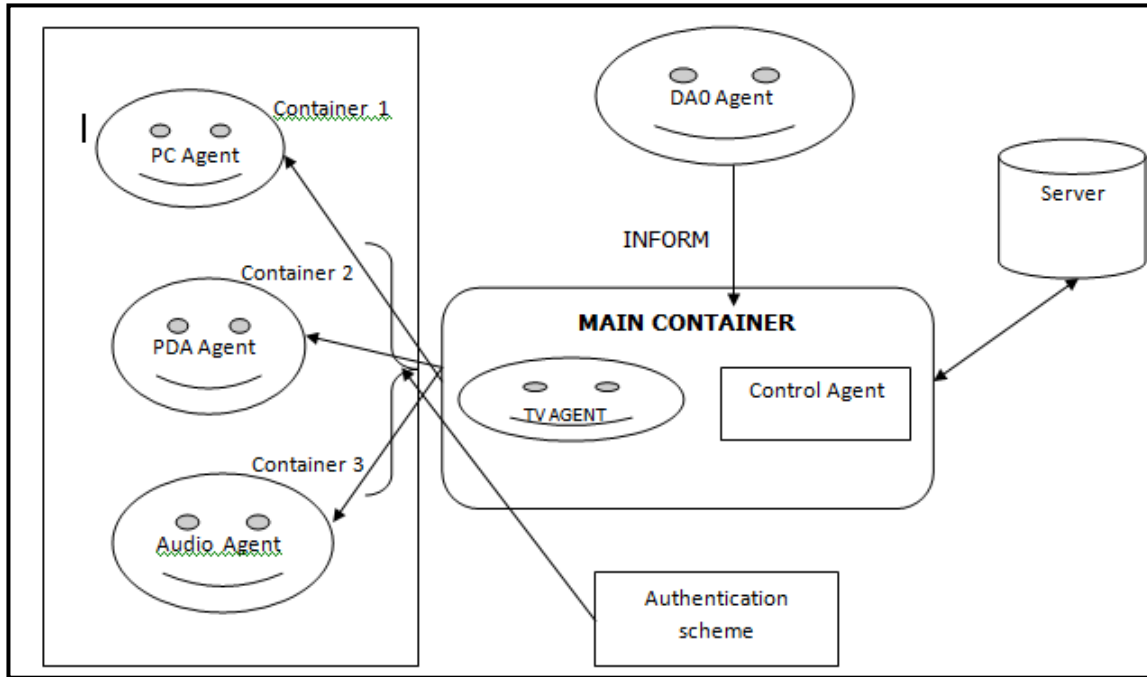
JADE-S (Version 2) add-on of the JADE platform that provides support for security in multi agent systems. JADE-S [9], the secured version of JADE, supports multiple users on the platform, user authentication, agent actions authorization and message signing and encryption.

Authentication provides a guarantee that a user starting a JADE platform, and thereby generates containers and agents within that platform, is considered legitimate within the secured scope of the computational system hosting the main container of that platform. Legitimate in the case of the JADE authentication process implies that the user is known to the system by having at least one valid identity and associated password.

In general, an authentication system is composed of two main elements: a "CallbackHandler" that allows the user to provide its username and password and a "LoginModule" that checks if these username and password are valid.

### 3. SYSTEM ARCHITECTURE

The following figure shows message flow during each agent is working.

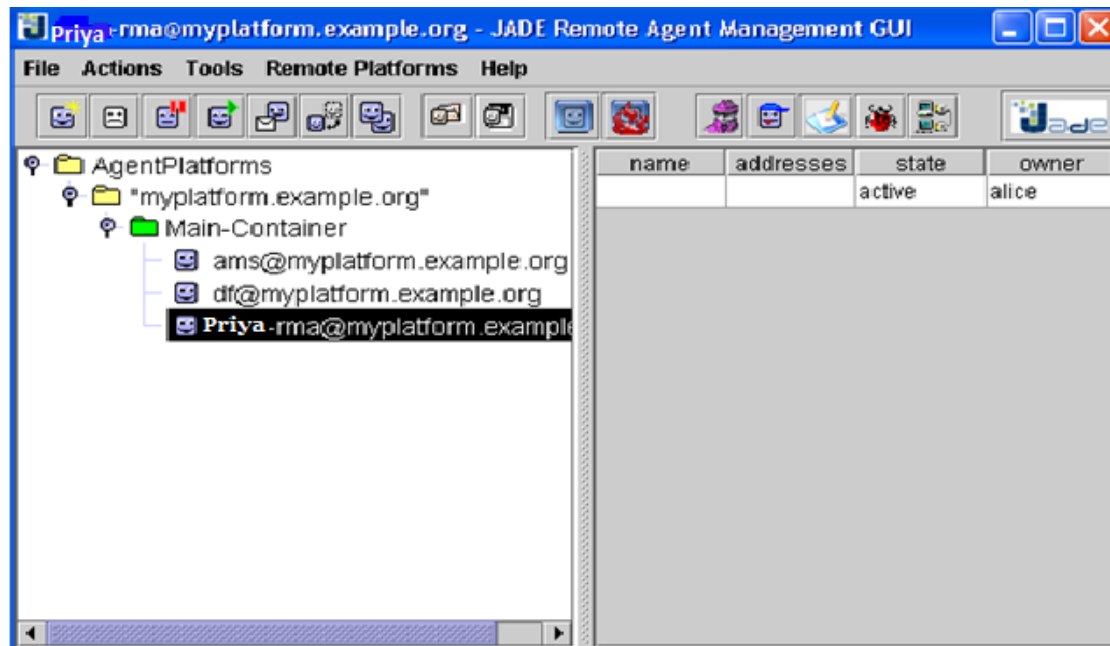


**Figure 2: System Architecture**

A television agent belongs to main container, a PC agent belongs to container-1, a PDA agent belongs to container-2, and a audio agent belongs to container-3. 'da0' agent is locationaware agent, which transmits changed location information (INFORM) to control agent. Control agent negotiates with device agent in a container of each agent (sending/receiving of CFP, PROPOSE, and INFORM), and then selected device receives appropriate multimedia stream from multimedia database in server.

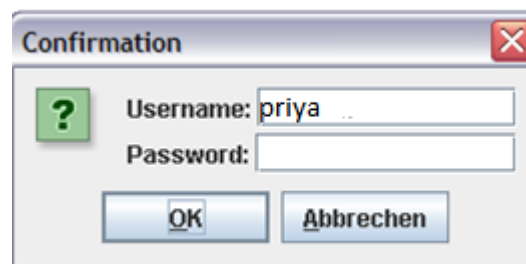
#### 4. EXPERIMENTAL RESULTS

The following snapshot show the JADE GUI,



**Figure 3. The JADE GUI**

The following dialog shows the authentication process of each agent with control agent,



**Figure 4. Authentication process**

We implemented one control agent (for authentication purpose and also controlling to all other agents) and four different agents namely; television agent, PDA agent, PC agent, and audio agent for accessing videos from different sources. To explore ACL messages among agents, we use message sniffing agent from JADE. Location-aware agent is implemented using dummy agent, which transmits user location to control agents using Context slot of ACL message, and then it confirms behavior of each agent.

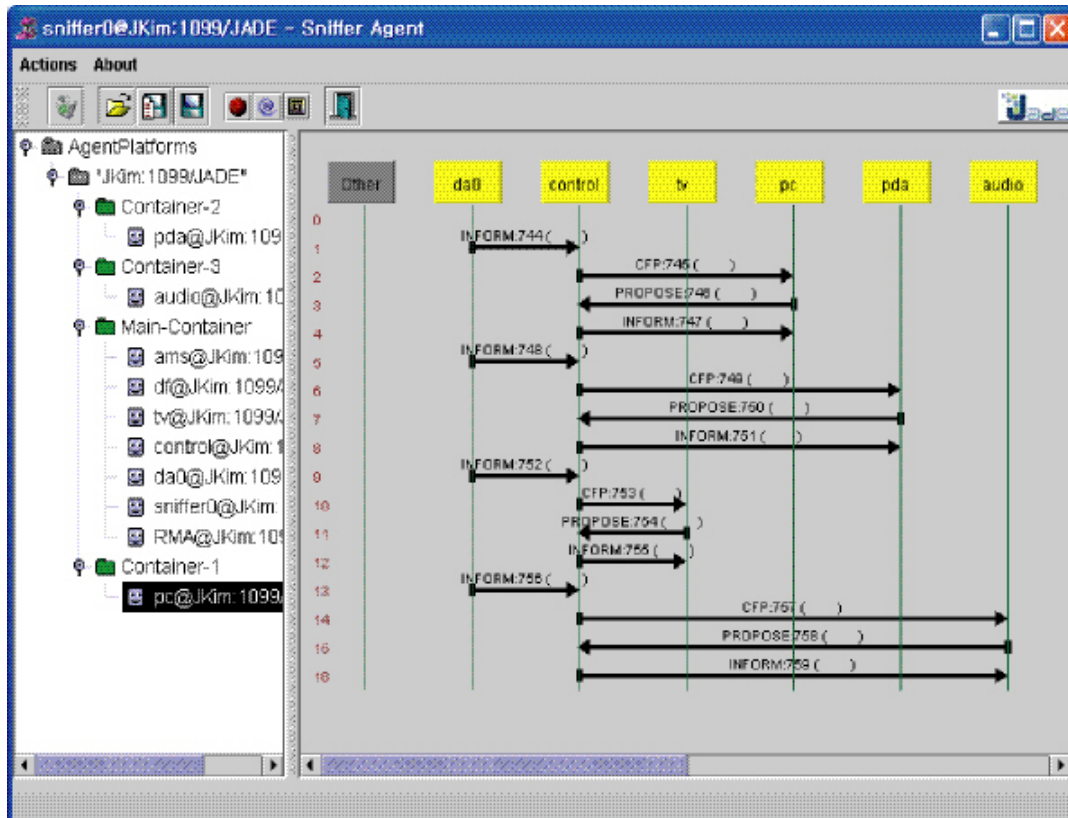


Figure 5. Implemented Sniffer Agent

## 5. CONCLUSION

In this paper, we implemented prototype system using JADE following to FIPA standard, and evaluate ACL message exchange among agents to provide locationaware and context-aware multimedia services. However, this method is not enough to implement the service for complex context. To provide multimedia service intelligently, we propose and implement middleware system to support adaptive multimedia service migration using ontology-based agents.

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