An agent based architecture using XML for Mobile Federated Database Systems

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Abstract. We advocate the use of agents to model a system that allows us to integrate and protect information stored in both mobile and fixed devices, while trying to preserve a consistent authorization state. We propose a system called HAFS, which makes use of an object oriented access control data model to enforce security across the mobile federation and XML as a language to represent and exchange the common meta-data among agents.

1 Introduction

Having interoperability among information structures has become increasingly important for the research and industry communities to compete in a world where demand for new technology, services and information is growing. These information structures include database systems, data repositories and hardware devices. Unfortunately, many of these data repositories are still not widely accessible due to many unresolved security issues. In addition, new technological advances in mobile computing outpace the development of solutions for secured data sharing among users of these new technologies. We believe that these issues can be addressed in an environment where data sources (databases, devices and operating systems, etc.) can be connected and used without violating their security policies with the addition of a common distributed and Highly Available Federated System (HAFS).

2 HAFS

HAFS is proposed as an agent-based system whose main task is to enforce established security policies and protect the information found in different data sources. Agents are used because they are entities capable of carrying out goals, perform a great variety of activities and make part of a larger community of agents that have

mutual influence of each other [1]. In addition, HAFS employs object-oriented paradigm not only to describe security guidelines (i.e. policies, access controls, etc.) of the different Component Database Management Systems (CDBMS), but also to cope with the heterogeneity of them. Finally, HAFS makes use of the eXtensible Markup Language (XML) for the description of access control policies and the exchange of relevant data such as database schemas and messages.

3 Architecture

Each data source in HAFS (i.e. a fixed or mobile) is assigned to a security agent, - whose main function is to enforce security over the objects store in the data source. Each device that provides support or holds an agent is called an *agent server*. In mobile environments, agent servers would usually run on base stations and fixed hosts. However, in some occasions such as in ad-hoc networks, some mobile devices could host/run agents as well. In addition, an agent may protect one or more data sources. This allows the data stored in small and/or power constraint devices to be protected without requiring these devices to run their security agents. Finally, *agent servers* not only allow inter-agent communication through the use of an *information space*, but also provide functionality to locate and dynamically load agents on behalf of [mobile] users.

4 Conclusions

XML and Agent technologies in the recent years have created an environment where new ideas can be put together to create solutions for many problems in the database area. We believe that these tools in conjunction with the Object-Oriented Database Security framework can allow us to model a security mechanism for database federations that include mobile hosts.

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