

A Scalable and Secure Peer-to-Peer Information Sharing Tool

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Summary

We are developing a Peer-to-Peer system to support secure, location independent information sharing in the scientific community. In our system the owners of information will be able to control how the information is stored, managed, and shared. Once complete, this system will allow seamless and secure sharing of information between multiple collaborators.

Groups collaborating on scientific experiments have a need to share information and data. This information and data is often represented in the form of files. In a typical scientific collaboration, there are many different locations where data would naturally be stored. This makes it difficult for collaborators to find and access the information they need. Our goal is to create a lightweight file-sharing system that makes it easy for collaborators to find and use the data they need. This system must be easy-to-use, easy-to-administer, and secure.

Current collaboration tools and environments provide a set of persistent services to users. However, they often rely on a centralized infrastructure. This makes the tools unusable when a specific resource, such as a server is unavailable. Ideally, the collaboration environment should not depend on any specific resource; instead, the presence of resources should add value to the system. A collaboration environment should be structured to support informal, spontaneous collaborations as well as highly structured environments. Using on-line tools, it should be easy to begin collaborating, and incrementally add users and services as needed.

A key distinguishing aspect of our information-sharing tool is that we designed every component for such an environment. We use group communication, in particular the InterGroup protocols, to reliably deliver each query to all of the current participants in a scalable manner, without having to discover all of their identities. We will use the Secure Group Layer (SGL) and Akenti to provide security to the participants of our environment. SGL provides confidentiality, integrity, authenticity, and authorization enforcement for the InterGroup protocols. Akenti provides access control to other resources.

We have developed an initial implementation of the information-sharing tool, called *scishare*. The implementation consists of a generic resource discovery component, a file-sharing specific application, a graphical user interface, and an authorization component.

We have developed the Resource Discovery Messaging Framework (RDMF) as a representation of a generic discovery model. The RDMF provides a messaging infrastructure for resource discovery that is easily configurable to a specific task. Other projects have showed interest in RDMF and

we have begun to design an enhanced version of the RDMF.

The file-sharing specific component of *scishare* provides a programmatic interface and command line tools for information sharing. This allows users to interact with the system without a graphical interface and developers to customize a user interface to their requirements.

The graphical user interface provides the user with access to the full functionality of *scishare*. The user can search for and download files (Figure 1), monitor the transfer of files, and manage locally-shared files (Figure 2).

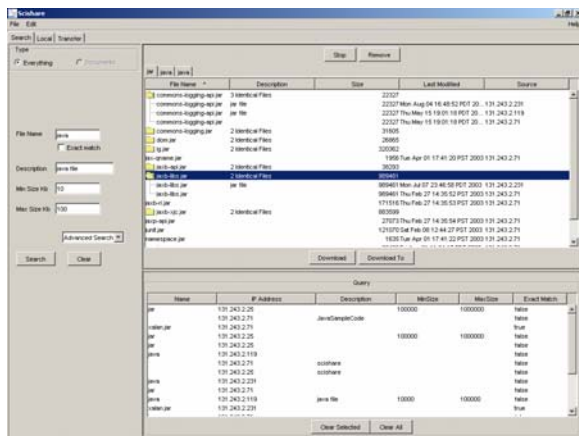


Figure 1. Performing a search in the *scishare* application.

The authorization component allows the user to specify fine-grained policies for access control to locally-shared files and provides enforcement of these policies.

We are planning an initial release of the secured version of *scishare* for April 2004.

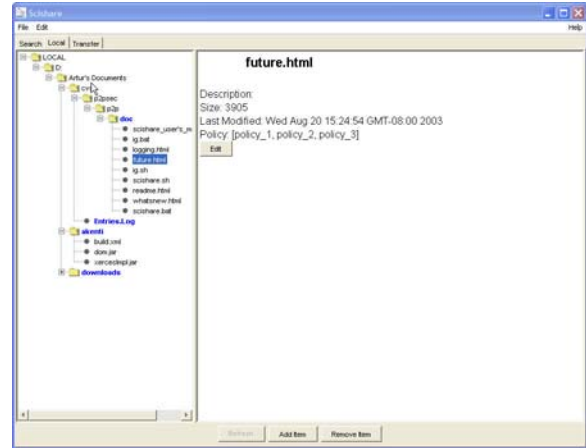


Figure 2. Managing locally-shared files in the *scishare* application.

In the next couple of years we will enhance the system by improving functionality and security mechanisms. We expect these enhancements to be driven by the needs of our users and collaborators.

We collaborate closely with the Reliable and Secure Group Communication and Distributed Security Architectures projects in realizing the group communication and security aspects of this project. We are collaborating with the eServices Infrastructure for Collaborative Science and Distributed Monitoring Framework (DMF) projects in designing the successor to RDMF. The Pervasive Collaborative Computing Environment project is planning to incorporate the *scishare* application into its environment. We are active in the GGF Peer-to-Peer area, especially the ogsap2p research group. We have also started participating in the newly formed IRTF Peer-To-Peer research group.

For further information on this subject contact:

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