

The Sharing Palette: A User Interface for File and Service Sharing

Stephen Voida, W. Keith Edwards
GVU Center, Georgia Institute of Technology
Atlanta, GA 30332-0760, USA
E-mail: {svoida, keith}@cc.gatech.edu

Mark W. Newman
Palo Alto Research Center
Palo Alto, CA 94304, USA
E-mail: mnewman@parc.com

ABSTRACT

We present the *sharing palette*, a desktop user interface for sharing files and services. The UI design was informed by a study of existing file sharing practices and two findings in particular: (1) sharing interfaces need to provide flexible, intuitive mechanisms for specifying which *individuals* and *groups* can see and use files and services, and (2) they should provide a *visually persistent record* of which files and services are being shared and with whom.

KEYWORDS: user interface design, sharing, CSCW

INTRODUCTION

File sharing is very common among users of networked computers and has enabled new forms of communication and collaboration. Users share many kinds of files using numerous mechanisms including email, peer-to-peer services like Napster and KaZaA, shared folders, and domain-specific applications like Apple's iTunes.

Additionally, many desktop operating systems now feature network services that can be configured to "share" the capabilities of one computer with other computers and devices and can allow users to access information remotely. FTP and web servers are widely available, as are "remote desktop" services.

Although file and service sharing provide clear benefits to users, they also exact a cost – *what* is shared and *with whom* must be specified and kept up to date. Doing so is often a complex task and is aggravated by the fact that each sharing mechanism typically has its own interface and means for exerting control over sharing. Unintentional file sharing has been demonstrated to be a significant problem [3] and system security breaches are often caused by users inadvertently making a system service available to others.

The Speakeasy infrastructure was created to simplify connectivity among diverse and ever-changing network devices and services [2]. However, Speakeasy also provides the opportunity for a wide variety of sharing to be specified, controlled and monitored using a central user

interface. Previous work presented the Casca application as one interface through which files and Speakeasy-enabled components could be shared with specific individuals and groups of users [1]. However, Casca focused on enabling file sharing only within persistent groups and had no easy means for sharing files or services with all users at once.

Other interfaces for enabling informal collaboration and file sharing have been proposed (e.g. [4]). However, these interfaces do not generally include means for managing the sharing of system services.

We have begun to explore the design of alternative user interfaces that support the informal sharing of files and services based on users' existing sharing practices. We have conducted a user study to identify how users currently share files on a day-to-day basis, identified two main implications from the study, and produced an initial desktop interface prototype for sharing files and services.

FILE SHARING IN PRACTICE

We distributed a questionnaire on work-related file sharing practices to 10 users, all of whom used computers regularly as part of their work. The users included researchers (6), students (3), and the administrative director of a library.

The respondents reported sharing files at work regularly with an average of 7 individuals or groups. In most cases, the participants indicated that they determined what files to share and how to share them on a person-by-person basis. However, the respondents indicated that in about a third of the cases, their sharing practices were determined based on groups or classes of individuals.

While most participants reported that they agreed with the statement, "I am generally aware of all of the files that I am sharing, and with whom I am sharing them" (average of 3.7 on a 5 point Likert scale), most of the sharing problems reported were related to respondents' discovering that they had forgotten to or incorrectly set file permissions or did not have awareness of the state of shared or published files.

The study led to two important design implications for supporting sharing practices: (1) sharing interfaces need to provide flexible, intuitive mechanisms for specifying which *individuals* and *groups* can see and use files and services and (2) they should provide a *visually persistent record* of which files and services are being shared and with whom.



Figure 1. (a) A prototype of the sharing palette UI. (b) Using the sharing palette to discover with whom the *MP3 Player* resource is currently shared.

THE SHARING PALETTE INTERFACE

As a result of our findings in the user study and our previous experiences in developing the Casca application, we have designed a two-pane, palette-style user interface for managing shared files and services. The sharing palette prototype enables users to quickly and easily specify the visibility of and permissions for files and services without having to maintain access control lists and allows users to maintain awareness of the files and services they have shared with others.

The sharing palette presents local files and services in the left pane, and other users on the network and the files and services that they are currently sharing on the right (figure 1a). The left pane is divided into three sections, *public*, *shared*, and *private*. Icons in the *public* section represent files and services available for anyone else on the network to use. Icons in the *shared* section represent resources that are being shared with one or more individuals. Icons in the *private* section represent services that are not currently visible to or shared with other individuals; files that are not currently shared are not displayed in the sharing palette.

The right pane represents files and services that have been shared with the local user by others on the network. These icons can be sorted by the *user* who is making the resource available (the configuration shown in Figure 1), the *computer* on which the file or service resides, or the *physical location* of the hosting computer. We envision the third option to be most useful for public and semi-public resources such as conference room projectors or shared file servers.

Users can drag files or folders from their desktop onto the sharing palette to share them with others. Files or folders dropped in the *public* section of the left pane are shared

with all other users; files or folders dropped onto other users' icons are made available only to that user. (These files then also appear in the *shared* section of the left pane, to promote persistent visibility of all shared objects.) File and service icons can also be dragged within the sharing palette. For example, resources in the *private* section of the left pane can also be shared by dragging them into the *public* section or onto another user, and files and services anywhere in the interface can be dragged onto one another to initiate a Speakeasy connection between them, such as displaying a file on a projector.

Initially, no local files or services are shared with any other user or group; when the sharing palette starts up, only services are displayed in the left pane, and these are all indicated to be *private*. This default configuration constitutes a secure starting point for sharing files and services, as no file or service is shared with other users until explicit action is taken to enable the sharing behavior [5].

Finally, the sharing palette helps users to maintain awareness about what they have shared and with whom. When the mouse cursor is held over an icon in the left pane (figure 1b), detailed information about the object it represents is displayed in a tooltip and all users with whom the object has been shared are highlighted in the right pane. Different highlighting colors are used to distinguish between users with whom the object has been shared and those currently using it.

FUTURE WORK

We are in the process of iterating on our initial design and adding additional capabilities, such as *ad hoc* specification of sharing groups. We are also interested in addressing the scalability problems that users will encounter when using the sharing palette in workgroups larger than a few people.

REFERENCES

1. Edwards, W.K., Newman, M.W., Sedivy, J.Z., Smith, T.F., Balfanz, D., Smetters, D.K., Wong, H.C., and Izadi, S. Using Speakeasy for ad hoc peer-to-peer collaboration. In *Proceedings of CSCW 2002*, ACM Press, NY, 2002, 256–265.
2. Edwards, W.K., Newman, M.W., Sedivy, J.Z., Smith, T.F., and Izadi, S. Challenge: Recombinant computing and the Speakeasy approach. In *Proceedings of Mobicom 2002*, ACM Press, NY, 2002, 279–286.
3. Good, N.S. and Krekelberg, A. Usability and privacy: A study of KaZaA P2P file sharing. In *Proceedings of CHI 2003*, ACM Press, NY, 2003, 137–144.
4. Izadi, S., Brignull, H., Rodden, T., Rogers, Y., and Underwood, M. Dynamo: A public interactive surface supporting the cooperative sharing and exchange of media. In *Proceedings of UIST 2003*, ACM Press, NY, 2003, 159–168.
5. Yee, K. User Interaction Design for Secure Systems. In *Proceedings of the 4th International Conference on Information and Communications Security*, Springer-Verlag, Berlin, 2002, 278–290.