DAView: A Linux WebDAV Client Supporting Effective Distributed Authoring

Won-Joon Shin
School of CEIT
University of Ulsan
Nam-Gu, Ulsan, South Korea
+82-52-259-2223
mathpro@mail.ulsan.ac.kr

Dong-Ho Kim
School of CEIT
University of Ulsan
Nam-Gu, Ulsan, South Korea
+82-52-259-2223
herokom11@mail.ulsan.ac.kr

Myung-Joon Lee
School of CEIT
University of Ulsan
Nam-Gu, Ulsan, South Korea
+82-52-259-2223
mjlee@ulsan.ac.kr

ABSTRACT
Current authoring applications that support WebDAV, such as Word, Photoshop, or Dreamweaver, work by integrating WebDAV capabilities into the application. While this approach provides solid support for collaborative authoring, it is an expensive approach. To add remote authoring capabilities to WebDAV-unaware authoring tools with automatic lock management, we developed DAView running on Linux KDE. DAView provides a GUI view of a WebDAV server, similar to existing WebDAV-enabled file managers. Unique among WebDAV file managers, it also provides the ability to launch an authoring application from its WebDAV view with automatic lock management.

Categories and Subject Descriptors
H.5.3 Group and Organization Interfaces

General Terms
Management

Keywords
WebDAV, Linux, DAView

1. INTRODUCTION
WebDAV is an application layer network protocol designed to extend HTTP with features for remote collaborative authoring [1, 2]. Current authoring applications that support WebDAV, such as Word, Photoshop, or Dreamweaver, do so by integrating WebDAV capabilities into the application. While this approach provides solid support for collaborative authoring, it is an expensive approach. Ideally we would like to add remote authoring capabilities to WebDAV-unaware authoring tools.

The two traditional approaches for adding WebDAV capabilities to authoring tools are to make a file system driver, or to use a download-edit-upload replication strategy. The file system approach is exemplified by the file system mapper that is built-in to Mac OS X. The replication approach is used by the Subversion and sitecopy tools. In addition, WebDAV client applications such as DAVExplorer[3] or Independent DAV[4] have been developed to handle WebDAV resources, supporting full WebDAV functions.

Existing approaches have many drawbacks. The file system mapper provides remote authoring to a wide range of applications, but often uses the protocol inefficiently. Worse, safe-save algorithms for many applications (make dup, delete original, move dup to original) have the net result of destroying an object's identity, which makes it impossible to also support the automatic versioning feature of WebDAV's successor DeltaV[5]. For their part, the replication software requires the user to manually initiate replication activities, a tedious and error-prone process that is complicated to explain to technically untrained users. Also, the client applications do not associate WebDAV resources with the appropriate authoring tools in an automatic way whereas they support full WebDAV functions.

We would like to have the universal access benefits of the file system approach, but preserve object identity and use the protocol efficiently. Our system, DAView, achieves this goal. DAView provides a GUI view of a WebDAV server, showing hierarchies of files and folders, similar to existing WebDAV client applications such as DAVExplorer or Independent DAV and also similar to WebDAV-enabled file managers such as MS Internet Explorer or Linux Konqueror[6]. Unique among WebDAV file viewers, it also provides the ability to launch an authoring application from its WebDAV view, automatically locking, and downloading the content to be edited. DAView monitors the authoring process; once it terminates, DAView uploads the final state of the file to the WebDAV server, then unlocks the file.

2. STRUCTURE AND BASIC FUNCTIONS
DAView consists of a user interface section and an execution section of WebDAV commands. The user interface section is implemented on the top of Linux KDE, using a signal/slot event handling. The execution section of WebDAV commands uses the DAVon WebDAV client library, which performs the actual communication with the server using the WebDAV protocol. The structure of DAView is shown in Figure 1.

DAVon is a C++ WebDAV client library based on Linux QT class library [7]. DAVon provides an object-oriented API using QT, which helps developing a WebDAV client without complexity. In addition, concurrent behaviors of the client can be provided through asynchronous HTTP requests/responses supported by signal/slot methods in QT.

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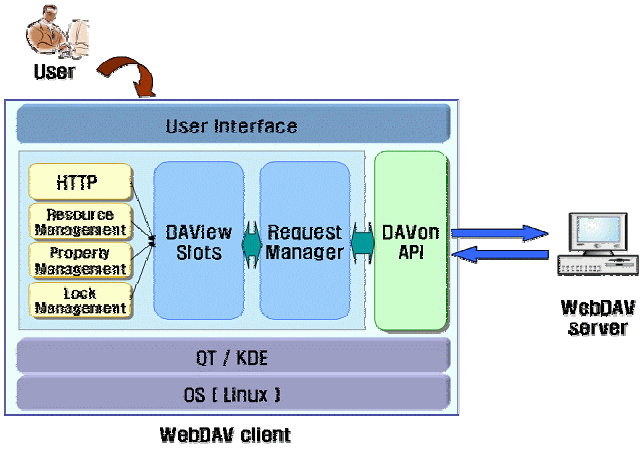

Figure 1. Structure of DAView

DAView provides all of the WebDAV functions, making connections to WebDAV servers, resource management, lock management, and property management. In addition, it supports file moving using a mouse drag and drop. Using DAView, users can download files from WebDAV servers to a KDE-based local file manager, or upload files to those servers through a simple mouse drag and drop from the file manager.

3. EFFECTIVE DISTRIBUTED AUTHORING

To support distributed authoring through WebDAV, current client applications manually handle the authoring process. For instance, in order to edit a document in a server, the document should be locked, and then downloaded into a local computer. Then, the downloaded document is edited with an authoring tool, and the edited document is uploaded to the server. In addition, the lock of the document should be removed. Since this manual process bothers the user with unimportant things, it is desirable to automate the process.

DAView enables the cumbersome process to be performed by a simple mouse double-click (or opening operation) on a WebDAV document. As shown in Figure 2, the automation process can be summarized as follows.

(1) Automatic launching of an authoring tool: When a user performs a mouse double-click operation on a resource in a WebDAV server, DAView sets the exclusive lock on the resource using the LOCK method, and downloads the resource into a local temporal storage. Then, DAView launches the application associated with the temporal resource.

(2) Observation of the process of an authoring tool: As soon as the associated application is launched, a monitoring thread begins observing the '/proc' directory periodically, which includes the information of the processes running in Linux. When the application is terminated, the thread generates a signal for completion.

(3) Finishing process of authoring: When DAView receives the signal for completion, it uploads the resource stored in the temporal storage into the WebDAV server using the PUT method, and unlocks the resource on the server using the UNLOCK method.

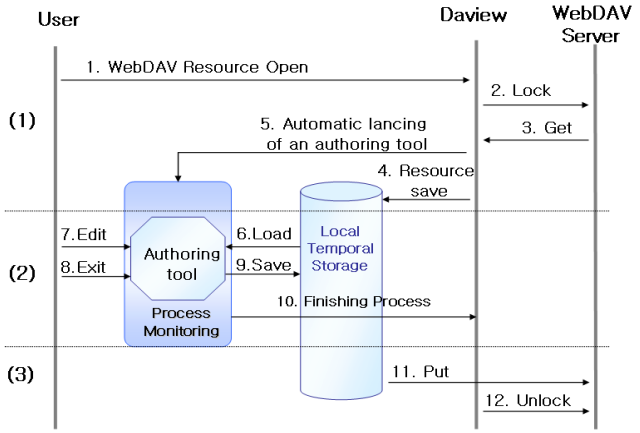

Figure 2. Automation process

4. CONCLUSIONS

To support effective distributed authoring through the Internet, we developed a WebDAV client application named DAView, which is running on Linux KDE. It was implemented using the DAVon library that provides an object-oriented API for WebDAV client development. DAView provides a GUI view of a WebDAV server, showing hierarchies of files and folders.

In addition to the general WebDAV functions, it singularly supports automatic launching of the applications associated with WebDAV resources, handling the locks on the resources appropriately. For convenience, it also supports systematic file moving between a local file system and a WebDAV server using a mouse drag and drop. We are planning to extend DAView to support group workspaces based on WebDAV.

5. ACKNOWLEDGMENTS

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