CLIENT SIDE LOCKING

RELATED APPLICATION

[0001] This application claims the benefit of U.S. patent application Ser. No. 11/938,082, filed Nov. 9, 2007, the entirety of which is hereby incorporated by reference.

BACKGROUND

[0002] Traditional collaborative editing tends to be performed serially. Users take turns accessing a document, editing the document, and storing their edits. The accessing user may place a lock on the file to inhibit other users from editing the document when the accessing user is editing the document. The iterative editing process can cause delays since each user may wait for a turn at editing the document. In addition, the iterative editing process may be difficult to manage. For example, each user may need to keep track of who is editing which portions of the document, which version of the document is the most recent, and when the user will have a turn.

[0003] In other types of traditional collaborative editing, each user can edit a different copy of a document. Subsequently, all of the edited copies may be merged into a single document. This large scale merge also may cause delays, lead to numerous editing conflicts, and/or be difficult to manage. For example, the user responsible for merging the documents may be required to track the relationship between the documents. The user also may be responsible for resolving conflicts among two or more of the edited copies.

[0004] It is with respect to these and other considerations that the present disclosure has been made.

SUMMARY

[0005] This summary is provided to introduce a selection of concepts in a simplified form that are further described below in the Detailed Description. This summary is not intended to identify key features or essential features of the claimed subject matter, nor is it intended as an aid in determining the scope of the claimed subject matter.

[0006] A collaborative authoring application provides an authoring environment in which two or more users can edit a document concurrently. Each user edits a copy of the document, periodically sends updates to a master copy of the document, and periodically receives updates from the master copy of the document. The authoring environment generally inhibits the users from providing conflicting editing instructions to the master copy of the document. In other embodiments, the authoring environment can inhibit editing conflicts if the users edit the document at different times.

[0007] According to aspects of the disclosure, each document being authored can be divided into one or more data units. Each user can generate a content lock about one or more of the data units. Generating a content lock about a data unit inhibits other users from editing the locked data unit. In one embodiment, content locks can grow and/or shrink automatically as the user edits the document.

[0008] According to other aspects of the disclosure, the authoring environment synchronizes both content and metadata among the user copies and the master copy of the document. In general, the authoring environment synchronizes metadata automatically and synchronizes content only at the request of one of the users. In one embodiment, the metadata includes content locks.

[0009] These and other features and advantages will be apparent from a reading of the following detailed description and a review of the associated drawings. It is to be understood that both the foregoing general description and the following detailed description are explanatory only and are not restrictive of aspects as claimed.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] FIG. **1** is a schematic block diagram illustrating an example authoring system having features that are examples of inventive aspects of the disclosure;

[0011] FIG. **2** is a schematic block diagram illustrating the authoring system of FIG. **1** in which a document stored on first computing device can include content and metadata in accordance with the principles of the present disclosure;

[0012] FIG. **3** is a flowchart illustrating an exemplary synchronization process by which an authoring system can synchronize a copy of a document stored on a user computing device with the master copy of the document in accordance with the principles of the present disclosure;

[0013] FIG. **4** is a schematic block diagram of a document having five units of data, the second of which is locked, in accordance with the principles of the present disclosure;

[0014] FIG. **5** is a schematic block diagram of the document of FIG. **4** in which a content lock has been added to the third data unit in accordance with the principles of the present disclosure;

[0015] FIG. **6** is a schematic block diagram of the document of FIG. **4** in which the content locks on the second and third data units have been released and a new content lock has been added to the fifth data unit in accordance with the principles of the present disclosure;

[0016] FIG. **7** is a schematic block diagram of a lock table in accordance with the principles of the present disclosure;

[0017] FIG. **8** is a flowchart illustrating an example synchronization processes implemented by an authoring application to share updates made by a user of the authoring application with other users in accordance with the principles of the present disclosure;

[0018] FIG. **9** is a flowchart illustrating another example synchronization process implemented by an authoring application to instantiate updates made by other users into the document being edited with the authoring application in accordance with the principles of the present disclosure;

[0019] FIG. **10** is a schematic block diagram of an authoring environment including a first computing device on which a master copy of a document to be authored is to be stored in accordance with the principles of the present disclosure;

[0020] FIG. **11** is a schematic block diagram of a user computing system configured to implement an authoring environment in accordance with the principles of the present disclosure;

[0021] FIG. **12** is a schematic block diagram of an authoring system illustrating a synchronization cycle implemented by the authoring application on the user computing device in accordance with the principles of the present disclosure;

[0022] FIG. **13** is a flowchart illustrating an operational flow for another exemplary synchronization process by which a user computing system can send and receive updates while editing a document in accordance with the principles of the present disclosure;

[0023] FIGS. **14-26** are schematic block diagrams of the caches stored on a first computing device, a first user computing device, and a second user computing device at differ-