

contributors, i.e., the manager application **214** and the contributor application **218** are in one executable file and a second executable file for the external contributor application, e.g., **132** or **142**. The first executable file can be opened in either Manager Mode or (Internal) Contributor Mode. This first executable file interfaces directly to the DMS **118** which stores both the internal contributors' and manager's files. Both the manager application **214** and the contributor application **218** have access to the DMS **118**. In an alternative embodiment the (internal) contributor application **218** and the manager application **214** are in separate executable files rather than being combined into one.

[**0038**] Both the first and second executable files further include the EDF editor. For an external contributor the second executable, having the EDF editor, allows users who do not have access to the DMS, e.g., those outside of a corporate firewall, to participate. In order to allow such a user to work on the collaboration having a first original document, a first managing author using the first executable file in the manager mode sends an EDF document (having a replica of the first original document) to an external contributor. The contributing author then edits the file and submits an RDF, having the proposed changes, to the first executable file for incorporation into the DMS. The first executable file also includes the functionality of the EDF Editor, so that if a second managing author (i.e., a managing author of a second original document) sends an EDF document (having a replica of the second original document) to the first managing author with the above first executable file (but without access to the second managing author's DMS), the first managing author can edit the replica of the second original document without needing to install the EDF Editor.

[**0039**] The (internal) contributor mode allows an internal contributing author to interact with the managing author and the other internal contributing authors dynamically without using the EDF and RDF files, because of the common access to the files stored in the DMS.

[**0040**] In accordance with an embodiment of the present invention, local contributors have common access to an object-oriented database or local file system. The access to a shared storage area is the major aspect of the present invention, not the type of storage used, e.g., relational database, objected oriented database, flat file, DMS. Thus embodiments of the present invention apply to any type of shared storage. In the internal contributor mode, a contributing author opens a replica of a document stored in the DMS and edits the replica. The replica is also stored in the DMS. At any time the contributing author may make a "Save as Draft" of his/her work. This saves the current edited replica as a draft (DFT) file in the DMS, so that the contributing author, for example, can return to continue editing the draft in the future. When the contributing author is ready to submit the proposed changes, he/she selects "Submit Changes and Exit" from a dialog box. Whereas an external contributor's submits an RDF file (which includes an encrypted difference file and encrypted XML metadata), an internal contributor submits this data as a response or "RSP" file. This RSP file is stored in the DMS, associated with the appropriate revision or REV file. In an alternative embodiment the REV and RSP files are stored on the local file system.

[**0041**] FIG. 3 is an example of the collaboration process performed on an original document of an embodiment of the

present invention. The managing author **310** selects an original document (not shown) from the DMS and requests edits or comments from N contributing authors, for example, contributing authors **312**, **314**, **318**, where N is a natural number. The original document becomes revision **320**, when the managing author requests at least one contributing author for review, e.g., for edits and/or comments. The managing author **310** has control of who can access the replicas of the original document for editing, commenting, or a combination thereof, by using the DMS. Hence, for example, managing author can restrict access by allowing only contributing authors **312** and **314** to edit (and/or comment) on revision **320**, and allow only contributing author **312** to edit revision **322**. Contributing author **312** edits (or make comments to) a replica of the original document and sends back a response **330**. Contributing author **314** edits (or make comments to) another replica of the original document and sends back a response **332**. The managing author **310** then reviews and accepts or rejects the proposed changes by the contributing authors **312** and **314** to revision **320**. The modified revision **320** becomes revision **322**. If the managing author **310** is satisfied with the changes, then revision **322** is the final document **328** and the collaboration process is finished. If the managing author decides on another round of review, then revision **322** is sent to the contributing authors, e.g., contributing author **312** for edits/comments. Contributing author **312** edits a replica of revision **322** and sends back response **334**. Then contributing author **312** edits the replica again and sends back a second response **336**. The managing author then reviews and accepts or rejects changes from each response to revision **322**. Again revision **322** becomes the final document **328**, if the managing author **310** is satisfied. Otherwise the managing author **310** may request another round of review and modified revision **322** becomes a revision **324** for review by the contributing authors. For revision **324** contributing authors **312**, **314**, and **318** edit replicas of the revision **324** document and send responses **338**, **340**, and **342**, respectively back to the managing author **310**, and so forth until a final document **328** is produced.

[**0042**] In a preferred embodiment of the present invention the revision and response data is stored in the DMS, object database, or local file system as a series of files rather than in the XDF file. The relationships between the series of files is based on the evolution of an original document as described above in FIG. 3. There are a series of revision files, e.g., revision **320**, revision **322**, revision **324**, where each revision file has a series of response files associated with it, e.g., revision **320** has responses **330** and **332** associated with it. Thus either the DMS relationship mechanism or a separate function based on the above, maintains the relationships of the revision files and the response files. The revision and associated response files form an audit trail by which all changes to an original document can be tracked.

[**0043**] Thus the structure of files held within the DMS includes each document having a collaboration associated with it. In each collaboration, there may be zero or more revisions. For each revision there are zero or more responses. And for each response there are zero or more drafts.

[**0044**] The revision file includes information about the version or revision of the evolving document and its location. This file takes the form of a ".REV" file. The REV file