



ALLEGRIA SOFTWARE, INC.

A Technical White Paper

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The Integration of ForReview with WorkCenter

Overview

In today's corporate world and global marketplace, the need to share, view, mark-up and manage office documents, images and technical drawings has become a growing challenge. To address this need, **Allegría Software, Inc.**, an innovator in image and documentation applications, has recently integrated *ForReview™ for Windows*, an enterprise-wide view and mark-up product, with *WorkCenter™*, a technical document management system designed for managing technical documents and drawings.

ForReview for WorkCenter is a separate integration module that seamlessly integrates *ForReview* with *WorkCenter*. This integration allows *WorkCenter* users to quickly and easily load documents directly into *ForReview* by utilizing *ForReview's* Graphical User Interfaces (GUI's), and *WorkCenter's* powerful search and select facilities. It should be emphasized that the integration module does not modify any of *ForReview's* underlying code. The module communicates between *ForReview* and *WorkCenter* by using *ForReview's* powerful Application Programming Interface (API) and via Dynamic Data Exchange (DDE).

The *ForReview for WorkCenter* module adds a **“WorkCenter”** menu entry to the *ForReview* menu bar, allowing users to quickly access *WorkCenter* tasks. The “drop down menu” from this entry allows the user to easily **“Get a document (from WorkCenter); Get a document's Mark-up file(s); Check-in a mark-up into WorkCenter; Cancel Check-out of a mark-up file and Export a native document and it's mark-ups”** from *ForReview* to *WorkCenter*. However, there are no menu changes to *WorkCenter* when integrated with *ForReview*. The user can **View, Redline** or **Print** a document by clicking on the respective buttons. *ForReview for WorkCenter* is automatically started when any of the above functions are chosen. If multiple documents are selected, the menu operation will apply to each individual document in a sequential manner.

ForReview always protects original documents by not allowing them to be edited in any way. Redlining is always performed on user defined layers, and saved in a separate file called a “Mark-up” file (recognized by the “.mkp” extension). To accommodate these mark-up files in *WorkCenter*, a new document-type known as MARKUP is defined. Using this new MARKUP type, *ForReview* can automatically check in or out documents/mark-ups to or from the database.

ForReview automatically creates and maintains the relationship between mark-up files and their corresponding base documents in the *WorkCenter* database. When accessing a base document stored in *WorkCenter*, the user can also access all related mark-up files. Once the mark-up file(s) have been loaded, the user can make use of *ForReview's* extensive mark-up and layer management functionalities.

The *ForReview for WorkCenter* module essentially provides two modes of operation: **View** and **Markup**.

- In **View** mode, the user can only *look* at drawings and mark-ups files. View mode restricts the user by not allowing changes to mark-up files, or creation of any new mark-up files.
- In **Markup** mode, the user *can* modify existing mark-up files, or create new mark-up files. Any modified or newly created mark-up file will be saved to the database when the base document is closed. Furthermore, the mark-up files loaded are actually *checked-out* from the database, so it is impossible for any two users to make modifications to the same file concurrently.

Functional Architecture

ForReview for WorkCenter seamlessly integrates *ForReview* with *WorkCenter*. Note that *ForReview for WorkCenter* is a true integration, not just a “launch”. This means that when a document from *WorkCenter* is opened in *ForReview*, *ForReview* will first automatically check it out of the *WorkCenter* database before displaying it in *ForReview*. Similarly, when you are done with the document or the mark-ups, *ForReview* will automatically check the document(s) back into the *WorkCenter* database.

When working in *WorkCenter*, *ForReview* is launched only when a selected document-type has *ForReview* registered as its viewer. However, *ForReview for WorkCenter* will always launch *WorkCenter* when *ForReview* is opened first. If *WorkCenter* cannot be started, *ForReview for WorkCenter* is aborted. In the event that the connection between *WorkCenter* and *ForReview* is lost (due to a network failure, for example), any work done in *ForReview* can be saved locally to the back-up directory “\DOCS” in *WorkCenter*’s working directory. Files saved locally for this reason can be checked back into the *WorkCenter* database after the connection is re-established. This offers an additional layer of protection for the user’s work.

To modify or create a mark-up: This can be done in one of two ways: 1) Selecting a document from *WorkCenter* or, 2) Through *ForReview for WorkCenter*’s **WorkCenter** menu. In both cases, once a document is selected, the integration module in the form of a DLL is loaded into memory and connects to the *WorkCenter* database. This is accomplished by invoking the appropriate API functions provided by *WorkCenter*.

The object ID of the selected document is then retrieved from the *WorkCenter* database, and a copy of the file is made and stored in a temporary directory on the local disk. The file is then loaded in *ForReview*. Next, a list of mark-up files associated with the base document is retrieved from the database, and the user is given a choice of including “**All markup files; Selected markup files** or **None**”. The mark-up files are organized according to their version trees. If the “**selected markup files**” option is chosen, the user can decide whether to load all versions on the tree or only the latest one, for any mark-up file. For those mark-up files selected by the user, a temporary copy of the file is made and stored in the same temporary directory as the base document.

The user can now proceed to “mark-up” the base document using facilities provided in *ForReview for WorkCenter*. When finished redlining, the user can either close the base document, or explicitly unload (*check back in*) the mark-up file(s). The integration module is then notified of this action through callback functions set in *ForReview for WorkCenter*. The integration module either updates the database for an existing mark-up object, or creates a relationship between the base document and the new mark-up file and stores the new mark-up object in the database. In either case, the user is prompted with a *WorkCenter*-native dialog to change or set any relevant attribute of the mark-up file. After all of the mark-ups are unloaded and the document is closed, copies in the temporary directory are automatically deleted.

ForReview for WorkCenter keeps track of base documents (from the *WorkCenter* database) and their mark-ups by coding them as “external”. This help to distinguish them from “native” mark-ups, or files and mark-ups that are not from the *WorkCenter* database.

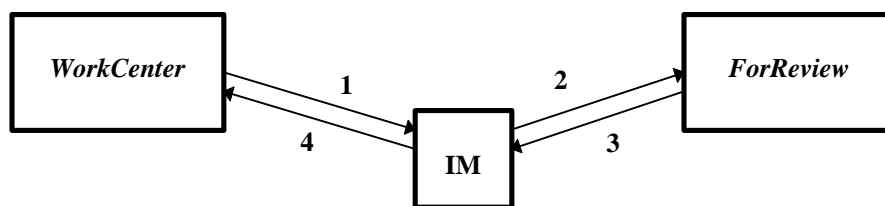


Fig. 1

1: Object information retrieved from *WorkCenter*, and passed to the Integration Module (IM). 2: After processing the information, the integration module loads the base document and associated mark-ups into *ForReview*. 3: When the user is finished redlining the base document, *ForReview* informs the integration module of the changes using callback functions that the integration module has set in *ForReview*. 4: The integration module stores the new or modified mark-ups in the *WorkCenter* database by calling the appropriate *WorkCenter* APIs.

Modules in Action

Following is a demonstration of the integration modules in action. There are no menu changes to *WorkCenter* when integrated with *ForReview*. However, *ForReview for WorkCenter* adds a **WorkCenter** menu to *ForReview* to quickly access *WorkCenter* tasks. These entries include **Get a Document**, **Get Markups**, **Check-in Markup**, **Cancel Markup**, **Add to WorkCenter** and **Help** (Fig. 2).

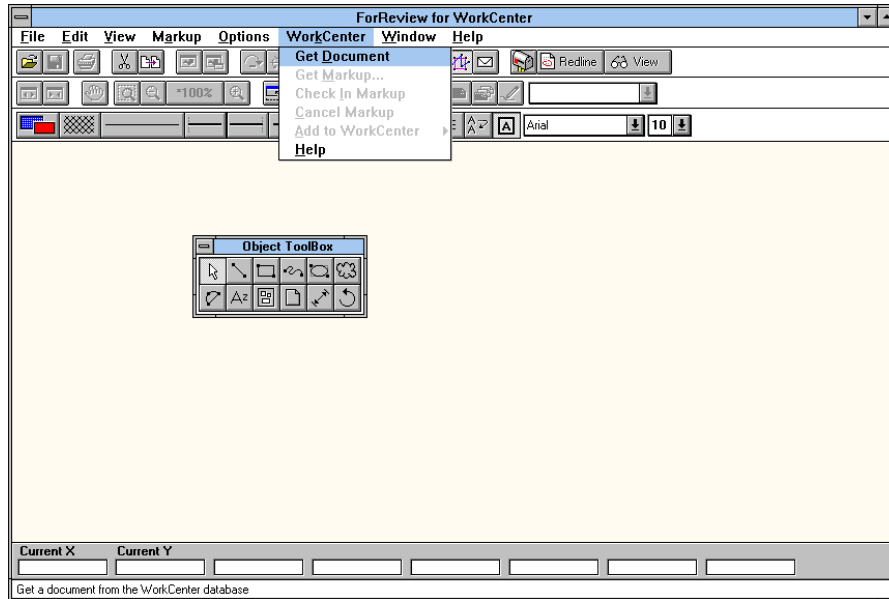


Fig. 2

To mark-up a base document from *WorkCenter*, in this case - **astro (astro.gif)**, highlight the base document and click on the **redline** button (Fig. 3).

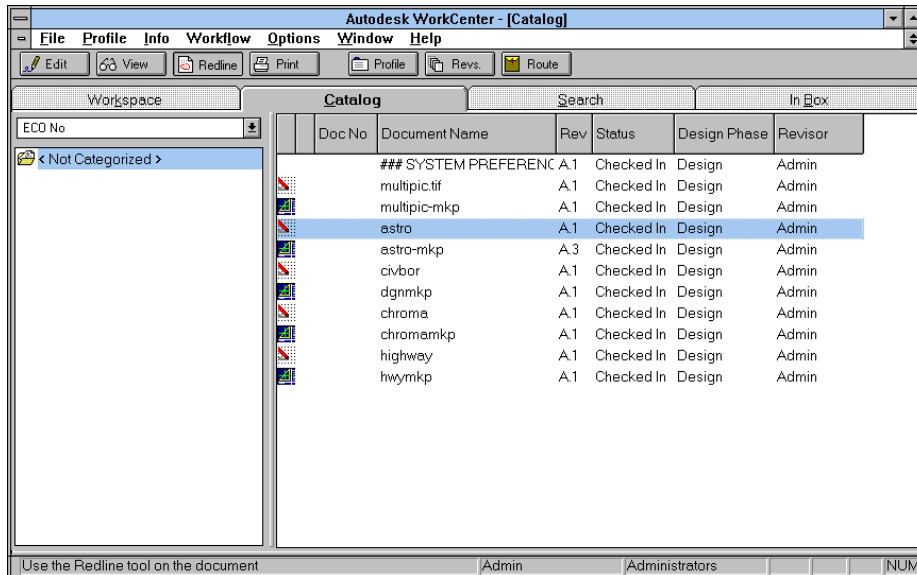


Fig. 3

ForReview for WorkCenter is automatically launched (if it is not already running) and the base document, **astro.gif** is loaded.

The *Include Markup Files* dialog appears (Fig. 4), allowing the user to decide if any mark-up files are to be loaded.

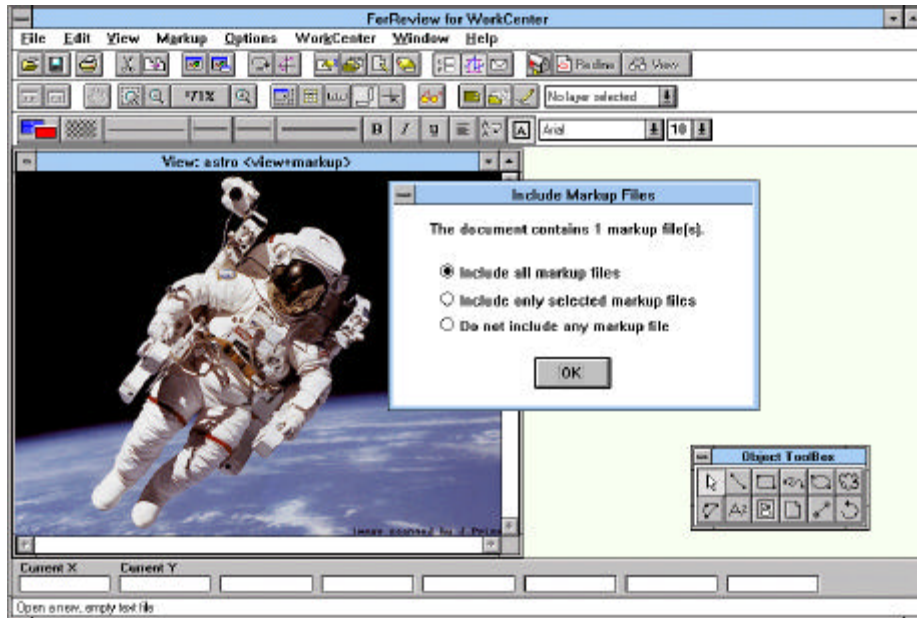


Fig. 4

If the user chooses to select which mark-up files are to be included, the “Autodesk WorkCenter Related Documents” dialog comes up (Fig. 5). The mark-up files are organized according to their version numbers. This allows the user to easily select what version of mark-up file to included.

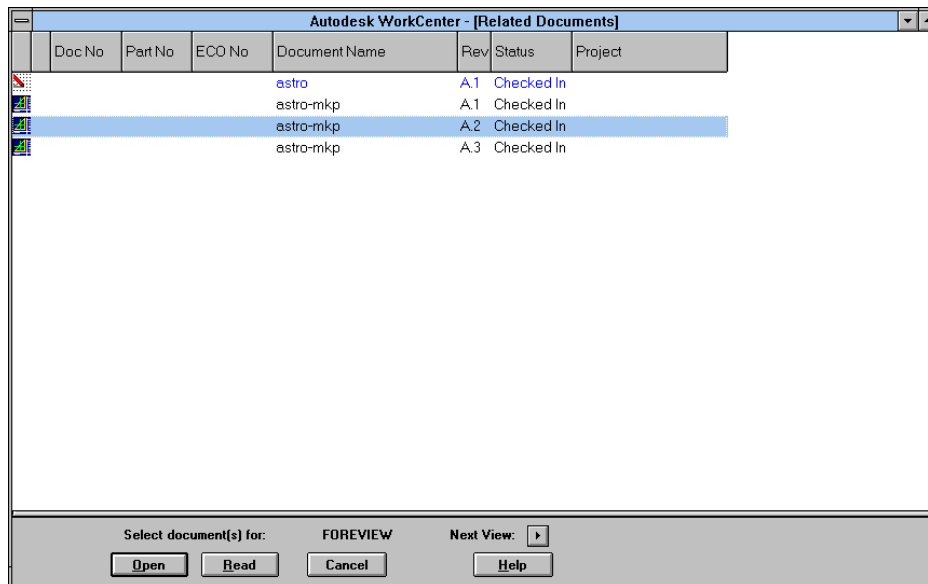


Fig. 5

The base document can be redlined either by modifying an existing mark-up file or creating a new one. If a new one is created, upon completion, the user is prompted with a *WorkCenter*-native “*Create Autodesk WorkCenter Document*” dialog to set any relevant attributes of the mark-up file (Fig. 6) before it is checked into the *WorkCenter* database.

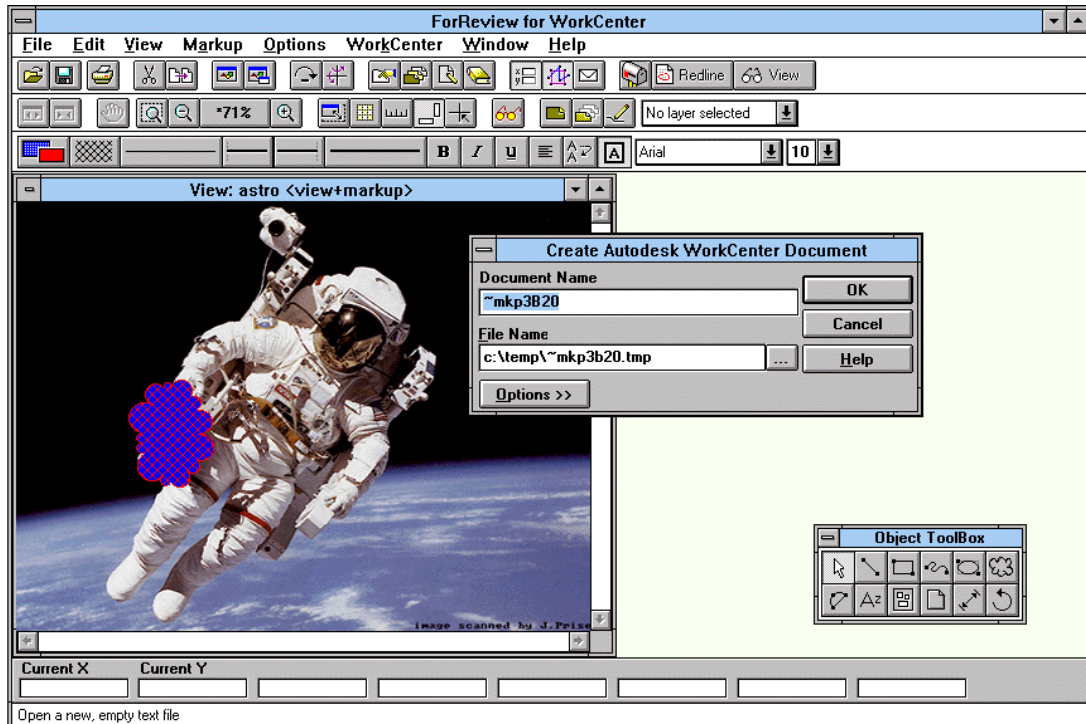


Fig. 6

If an existing mark-up is edited, upon completion, it is checked-into the *WorkCenter* database with only the version number changed.

This completes the steps involved in a **Markup** operation. The **View** and **Print** operations are essentially the same, but the user is not allowed to make any modifications to the mark-up files. These three functions are the basic operations that can be performed on a base document and its mark-up files.

In some cases, users might want to export a “native” document (and its mark-up files), to the *WorkCenter* database. To do this, load the drawing in *ForReview*, click on the **Add to WorkCenter** sub-menu under the **WorkCenter** menu item (Fig. 7). A *WorkCenter* native “*Autodesk WorkCenter Create Document*” dialog is brought up to enter relevant information about the drawing. Clicking on the **OK** button registers the drawing as a document in the *WorkCenter* database.

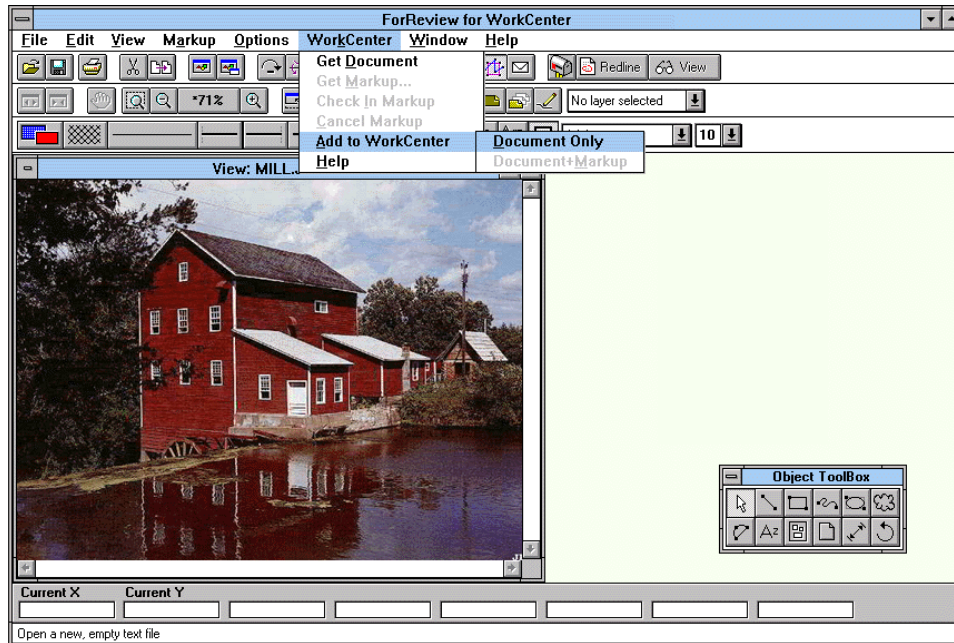


Fig. 7

Finally, the **Check-in markup** option allows the user to easily register a modified or a new mark-up file and the **Cancel Markup** option allows the user to easily unload any mark-up file, without having to close the base document.

Conclusion

In conclusion, we have demonstrated that *ForReview*, a state-of-the-art view and mark-up tool has been tightly integrated with *WorkCenter*, a Technical Document Management system. We believe this integration will meet the challenge of viewing and managing office documents, images and technical drawings in a demanding way. The integration can also serve as a template architecture to be followed by other integration work.