6 Collaboration

Overview

Collaborative capabilities have been developed that allow users to share data analysis with collaborators on other machines running NCSA Collage. In order to use the capabilities described in this chapter, you must have a UNIX system properly configured with an Ethernet port connected to a network. There must be at least one additional machine running NCSA Collage that is connected to the network. This chapter assumes that one UNIX machine will act as the NCSA Collage server for all participants.

An optional capability is to use the telephone to exchange ideas while using NCSA Collage. To ease communication, you may want to establish a conference telephone call between users so that all users may have voice contact with one another. Although NCSA Collage provides text communication capabilities for all participants, telephone conversation is considered friendlier and easier.

Your UNIX machine can act as the server to many collaborators or your UNIX machine may collaborate with another server. Only one machine is designated as the server for a collaborative session. When you decide to establish a collaborative session, it is suggested that you choose a server that is fast and has a large amount of RAM installed.

NOTE: The NCSA Collage server is not the same process as the X server. The NCSA Collage server is a separate process that allows communication and data sharing between collaborative users.

Collaboration

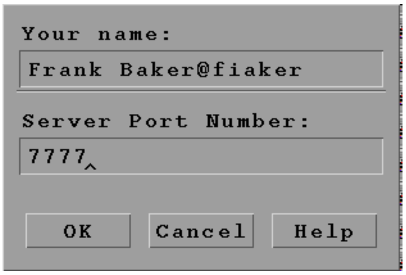
Collaboration is the process by which researchers communicate ideas and data. This program facilitates that process by providing the ability for data analysis performed on one machine to be distributed to other machines as well.

To see the collaborative functionality in operation, there must be another user to collaborate with. Two machines that are properly networked are required. The tutorials given in previous chapters and in this chapter are presented from a single-user perspective, as if one user were doing all the data analysis. True collaboration is an interactive process, a dialog between researchers. Feel free to improvise. Either participant can perform data analysis, annotations, or palette editing as described in previous chapters.

Beginning a Collaborative Session

Before collaboration can begin, one of the collaborators must start the collaborative session. This is done by selecting the Begin Session menu option from the Collaborate menu. When this item is selected, a dialog box appears. The first field will contain your user name and the name of your local machine. The second field contains the internal port number that other collaborators will use to connect to the collaborative session.

Figure 6.1 Begin Session Dialog Window



Your name:

Frank Baker@fiaker

Server Port Number:

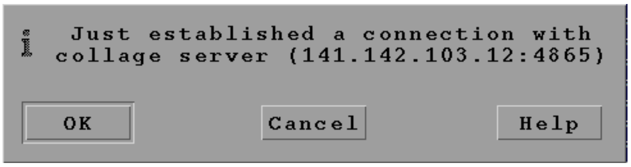
7777

Other collaborators will need to know the machine name and the server port number in order to be able to connect to the collaborative session. The combination of machine name and port number specifies the address where the server can be contacted in order to connect to the session. It is suggested that you choose a value between 2048 and 65535 for the port number. Port numbers lower than 2048 are generally reserved by other system functions.

Click the OK button in the Begin Session dialog window to create a collaborative server. The server is the communications hub for the entire collaborative session. All communication traffic between collaborative participants goes through the server.

When the server has started, a connection will be established with the local NCSA Collage application. A message dialog window is displayed informing you that a connection has been established with the server. Click OK to continue with the collaborative session.

Figure 6.2 Connection Established Dialog Window



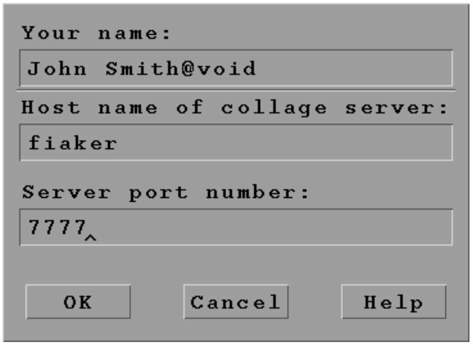
Just established a connection with collage server (141.142.103.12:4865)

Once the server has started, a list of collaborative users is displayed in the NCSA Collage Main window. Since your local NCSA Collage application is participating in the collaborative session, your user name and machine name will be listed. You will see other user names added to this list as collaborators join the session.

Joining a Collaborative Session

In order to join an existing collaborative session, select Join Session from the Collaborate menu. A dialog window is displayed allowing you to fill in the information necessary to join a session. You will need to enter your user name and machine name, the host name of the NCSA Collage server, and the server port number.The server name and port information can be obtained from the user who created the server session. To properly establish the connection with the server, make sure that the information is the same as the machine that created the session.

Figure 6.3 Join Session Dialog Window



Your name:
John Smith@void
Host name of collage server:
fiaker
Server port number:
7777

Exercise 6.1 Joining a collaborative session

1. Select the Join Session option from the Collaborate menu. A dialog window as described above appears.
2. In the field labeled Your Name, enter your user name, the @ character, and your machine name.
3. In the field labeled Host name of Collage Server, enter the name of the Collage server machine.
4. In the Port field, enter the port number entered on the machine that began the session, if it is not already there.
5. Click OK. The program now attempts to connect to the server. If it can connect, the message window described in Figure 6.2, Connection Established Dialog Window, appears. If it cannot, an error message appears.

Ending a Collaborative Session

To end a collaborative session, all participants should quit NCSA Collage with the server collaborator being the last user to quit. To quit NCSA Collage, select Quit from the File menu of the main NCSA Collage window.

NOTE: Quitting a locally originated NCSA Collage session that still has participants is highly discouraged. Removing the server from other participants will cause their machines to crash. When a collaborative server has no more participants, it will cease execution automatically.

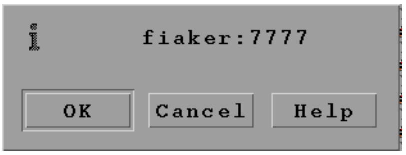
Using a Local Server

If the user selects Begin Session from the Collaborate menu, a collaborative server will be start locally. Various information about the server and collaborative users can be displayed.

Viewing the Server Location

To view the name of the server and the port designated for communication, select the Server Location option from the Collaborate menu. This option will display a window containing the information.

Figure 6.4 Server Location window



fiaker:7777

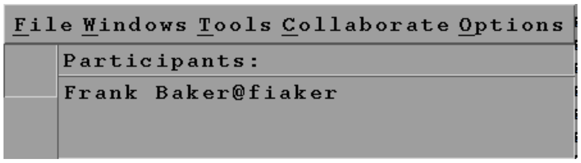
Viewing Collaborative Participants and Activity

The main NCSA Collage window provides information about collaborative users and activity on the server. The main NCSA Collage window is always displayed during a session and you can bring the window to the foreground by clicking on the title bar or moving the window until it is not obstructed by other windows.

The main NCSA Collage window contains an area that lists the collaborative users. The list contains the user name and the machine name separated by the @ character. This list may be turned on and off by selecting the Show Participants option in the Collaborate menu.

To the left of the collaborative user list there is an area that displays an icon representing activity on the server. This icon will change to reflect different data as data is sent or received by the server. This function may be turned on and off by selecting the Show Local Activity option in the Collaborative menu.

Figure 6.5 NCSA Collage Main Window



Participants:
Frank Baker@fiaker

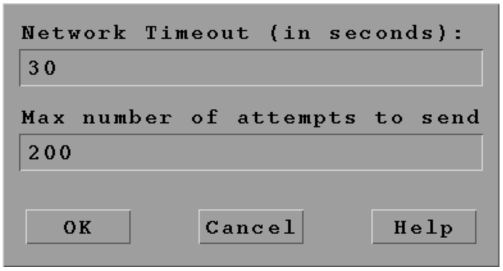
Network Controls

Depending on the physical size of the network, network communications may take several seconds to travel between the NCSA Collage server and a collaborator's machine. You can adjust two variables associated with network communications:

- The timeout delay
- The maximum number of attempts to send information

To adjust these variables, select Network Controls from the Collaborate menu. If you are on a large scale network that spans several cities, you may have to increase the network timeout value from the default of 30 seconds to a higher number. If DTM packet transmission is failing, NCSA Collage will attempt to resend the packet up to the maximum number of attempts to send. This number may also be increased if there are communication difficulties.

Figure 6.6 Network Control window



Network Timeout (in seconds): 30

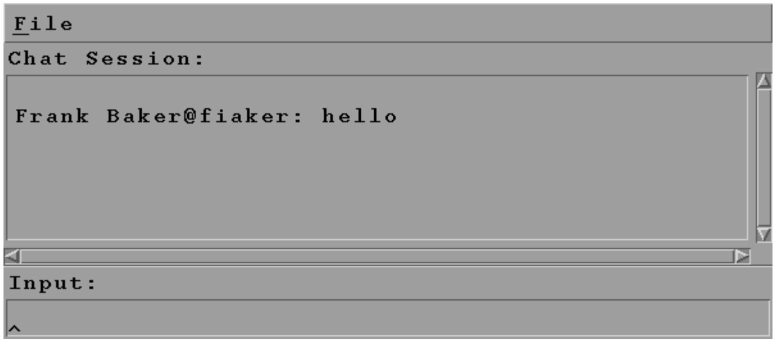
Max number of attempts to send 200

Talking to Collaborators

When a collaborative session has been established, a message passing facility can be used to send messages to other collaborators. Although it is recommended to communicate via the telephone when using NCSA Collage, the chat box may be used when the use of a telephone is not an option. To use the chat box, select Chat Box from the Tools menu in the main NCSA Collage window. Alternatively, the chat box will open automatically when another participant sends a message.

To send a message, click the cursor in the input field and enter a message. After pressing the enter key, the message will be displayed in the chat session area of the window preceded by the user name of the collaborator who sent the message. You can use the scroll bars to view messages that have scrolled past the viewing area.

Figure 6.7 Chat Window

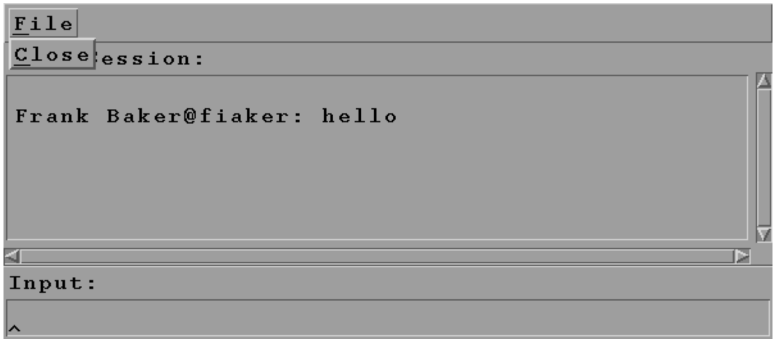


Frank Baker@fiaker: hello

Chat Box Menu

The File Menu in the Chat Box contains one option, Close, to allow you to hide the Chat Box window.

Figure 6.8 Chat Box File Menu



Frank Baker@fiaker: hello

Exercise 6.2 Sending messages to other collaborators

1. Type in the message "Hello collaborators" in the Input field of the Chat Box window.
2. Press the enter key. The message will be sent to the other collaborators.

Publishing Images, Palettes, and Data

The previous chapters of this manual have described how to use NCSA Collage as a single-user application. To use NCSA Collage collaboratively, users must publish their data for others users to view and manipulate. Once data has been published, changes made to the data and in the way the data is viewed are made available to all other collaborators.

To publish data to other users, select the Publish option from the File menu in the window you want to publish. The Publish option exists in the Raster Image window, the Spreadsheet window, the Whiteboard window, and the Text Tool window. Depending on the time to send the information over the network, other users will see the same window displayed on their machines after you select the Publish option.

The Chat Box tool is automatically published to all collaborative users.

Images

Following is a list of functions performed on raster images that are transmitted to other collaborators if the image has been published:

- The original image and its color table are transmitted at the time it is published.
- If a histogram of the image is displayed, it is also displayed on the other collaborators' machines.
- If an X-Y graph is displayed, it is likewise displayed on other people's machines.
- Any color table modifications performed on the color table associated with the raster image cause the modified color table to be retransmitted.
- Any selections made on a raster image are transmitted to the other collaborators so that they will see the same selection. On Macintosh computers, NCSA Collage users can make arbitrary (non-rectangular) selections. If the selection is of an arbitrary region, the enclosing rectangle is sent to the other collaborators. Sending the rectangle ensures that other collaborators see the area of the selection.

Exercise 6.3 Operating on published raster images

1. Open an image from a sample HDF file.
2. Select Publish from the File menu in the raster image window. The image will soon appear on the other collaborators' machines.
3. Extract an X-Y graph from the image by selecting a data analysis tool and drawing a line on the image. This same X-Y plot will be sent to the other collaborators.
4. Bring the Palette Editor window for the image to the front by choosing the Palette Editor option from the Window menu of the main NCSA Collage window.
5. Using the Fiddle tool, modify the color table display portion of the Palette Editor window as described in Chapter 5, “Color Tables and the Palette Editor." The color table changes appear on the other participants' machines.
6. Perform a component draw function, such as the square, to point out an area on the image. The drawing appears on the other participants’ machines.

Palettes

Color palettes are published indirectly by the publishing of a raster image. Any color palette associated with the raster image is automatically transmitted to other collaborators when the raster image is published. Consequently, any changes made to a published color palette are transmitted to other collaborators.

Spreadsheet Data

Floating-point data displayed in a spreadsheet can also be published to a collaborative session. To publish floating-point data, select the Publish option from the File menu in the Spreadsheet window.

Once a floating-point dataset has been published:

- Any selections made in the spreadsheet are reflected on other collaborators machines.
- Images computed from the spreadsheet are published automatically, and these images behave as if published manually.
- Any changes made to the floating-point data are transmitted (currently, modifications of spreadsheet data are not supported).

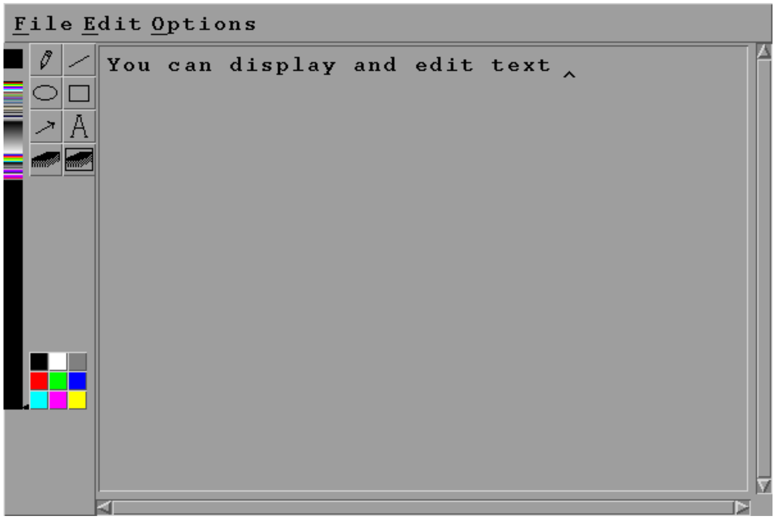
Any images published before the spreadsheet data was published will not be published unless they are published manually.

NOTE: Since selections made in raster images generated from spreadsheets are reflected in the spreadsheet, the selection will be transmitted. If the image is published, the selection in the image is also transmitted.

Collaborative Text Editing

Collaborators have the ability to edit a shared document together. To display the collaborative text editor, select Text from the Windows menu in the NCSA Collage Main Window.

Figure 6.9 Collaborative Text Editor



You can display and edit text

As a collaborator edits text, changes are passed along either every few seconds, when the internal buffer fills up, or when the user has not entered a character for some period of time.

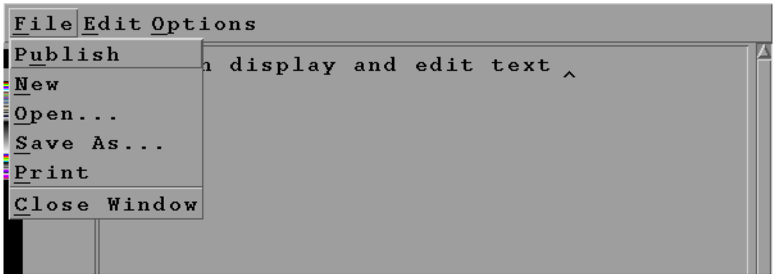
The cut and paste features are supported by the Collaborative Text Editor, just as in other text editors. Text formatting is not supported.

Text Edit File Menu

The Text Edit File menu contains the following options:

- Publish, to publish the text to a collaborative session
- New, to start a new Text Edit window
- Open, to open a file
- Save As..., to save the text into a file
- Print, to print the text
- Close, to close the Text Edit window

Figure 6.10 Text Edit File Menu



n display and edit text

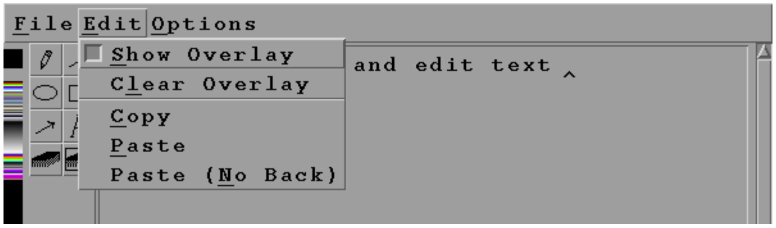
Text Edit Edit Menu

The Text Edit Edit menu contains the following options:

- Show Overlay, to display the overlay layer
- Clear Overlay, to clear all annotations from the overlay layer
- Copy, a screen capture tool that copies any portion of the screen image to a cut buffer (the text is copied as an image)

- Paste, to paste the image captured by Copy into the current NCSA Collage image
- Paste (No Back), same as Paste, but without the background of the X window

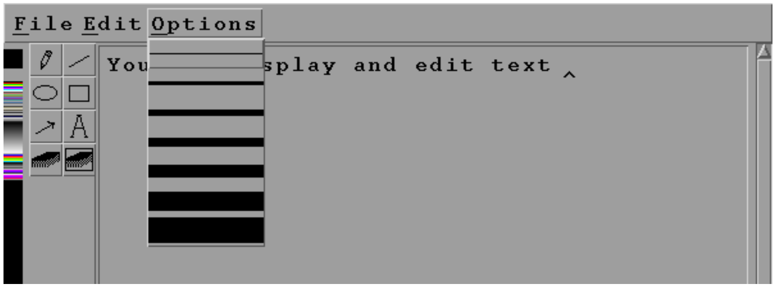
Figure 6.11 Text Edit Edit Menu



Text Edit Options Menu

The Text Edit Options menu allows you to select different line thicknesses for the drawing tools.

Figure 6.12 Text Edit Options Menu



Exercise 6.4 Editing shared text

1. Select Text from the Windows menu. The shared text editor window appears.
2. Enter “Hello World” in the Text Editor.
3. Select the text “Hello.”
4. Enter the text “Hi.” The text “Hello” will be changed to the text “Hi” on the other machines.

Screen Capture

Snapshots of your computer screen can also be sent to other collaborators in the form of raster images. To capture a portion of the screen, select the Screen Capture option from the Tools menu. The cursor changes to a crosshair allowing you to select a rectangular area on the screen. To select an area for capture, position the cursor at the upper left-hand corner of the area you want to select. Then click and hold the mouse button down as you drag to cursor to the lower right-hand corner of the area. Release the mouse button when you have selected the area. The image contained within the rectangular area will be copied into a Raster Image window. The contents of the Raster Image window can be published by selecting the Publish option from the File menu.

The Screen Capture tool can be used to send images created by applications that don't have collaborative capabilities built in. For example, an image of the contents of a text edit document or a statistical analysis package can be transmitted to other collaborators once the image is captured in a Raster Image window.

Exercise 6.5 Capturing a portion of your screen

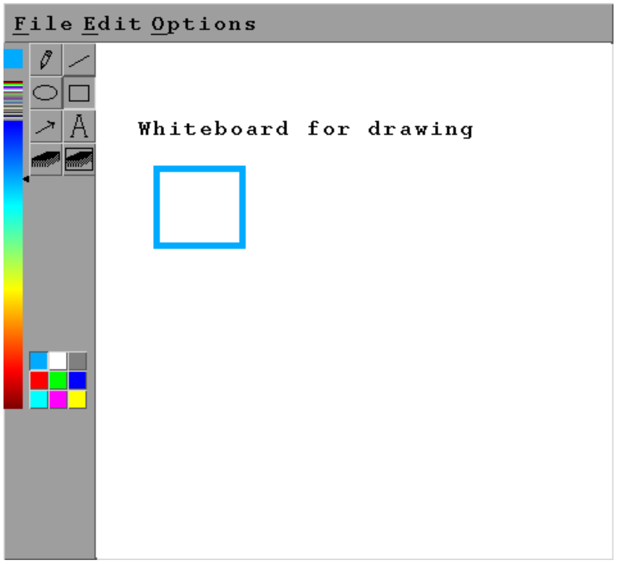
1. Select Screen Capture from Tools menu.
2. Select an area on the screen by dragging the cursor from the upper-left to lower-right corner of the image area.
3. Release the mouse button to capture the image.
4. Publish the captured image by selecting Publish from the File menu.

The White Board

Another feature of collaboration is the White Board. This window operates much like a physical white board used when communicating ideas, only the mouse is used to draw on the whiteboard window just like you would use a colored marker. Also, each collaborator can chose a different color for drawing on the White Board.

To display the White Board, select White Board from the Tools menu in the NCSA Collage Main window. A White Board window will be displayed, as shown below.

Figure 6.13 Whiteboard window



One collaborator must publish the Whiteboard so that other collaborators can use the tool together. To publish the Whiteboard, select the Publish option from the File menu in the Whiteboard window.

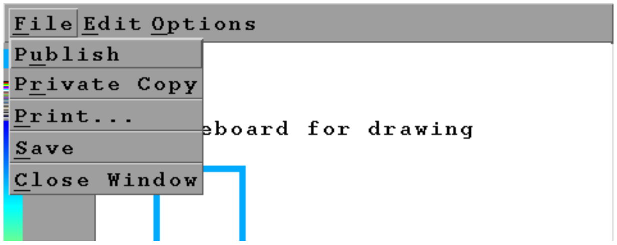
All the regular drawing tools are available for use with the Whiteboard window. When a collaborator draws a figure or text on the whiteboard, all other participants will see what was drawn.

White Board File Menu

The File menu contains the following options:

- Publish, to publish data to a collaborative session so that other participants may view the data
- Private Copy, to make a private copy of the data (other collaborative participants will not be able to see the Whiteboard)
- Print, to print the Whiteboard to a device or file
- Save, to save the Whiteboard to a file
- Close Window, to hide the Whiteboard window from view

Figure 6.14 Whiteboard File Menu

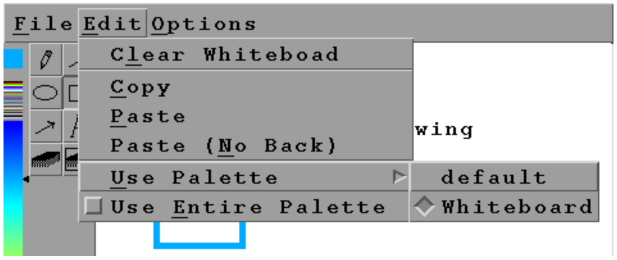

File
Edit
Options
Publish
Private Copy
Print...
Save
Close Window
eboard for drawing

Whiteboard Edit Menu

The Whiteboard Edit menu contains the following options:

- Clear Whiteboard, to clear all annotations from the overlay layer
- Copy, a screen capture tool that copies any portion of the screen image to a cut buffer
- Paste, to paste the image captured by Copy into the current NCSA Collage image
- Paste (No Back), same as Paste, but without the background of the X window
- Use Palette, to select a palette to for displaying the Whiteboard
- Use Entire Palette, to map the raster image pixel values onto the entire range of color table values including the system colors

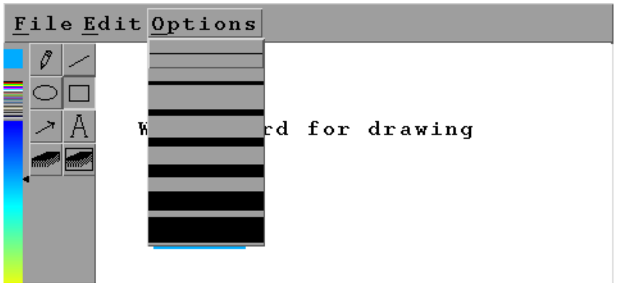
Figure 6.15 Whiteboard Edit Menu


File
Edit
Options
Clear Whiteboad
Copy
Paste
Paste (No Back)
Use Palette
☐ Use Entire Palette
default
◇ Whiteboard
wing

Whiteboard Options Menu

The Whiteboard Options menu allows you to select different line thicknesses for the drawing tools.

Figure 6.16 Whiteboard Options Menu



Associations and Collaborative Sessions

Whenever a data object is published to a collaborative session, the session depends on the data to notify it of changes. When any changes are made to the data associated with a published data object, the session is notified and then updates the data on the other collaborators' machines.

In addition to updating the data, the session directs changes in the way it is viewed to be transmitted to the other participants. For example, if an X-Y plot of a published data object is displayed, the other participants in the session will have the same plot on their machines. This is also true of histogram plots and selections. When a raster image is published, the color table used to display it is also inherently published, so any changes to the color table that affect the raster are also transmitted to the other collaborators.

When a movie is published to a collaborative session, all of the frames that comprise the animation are sent to the other collaborators. Beyond this difference, a published movie behaves just like a raster image.