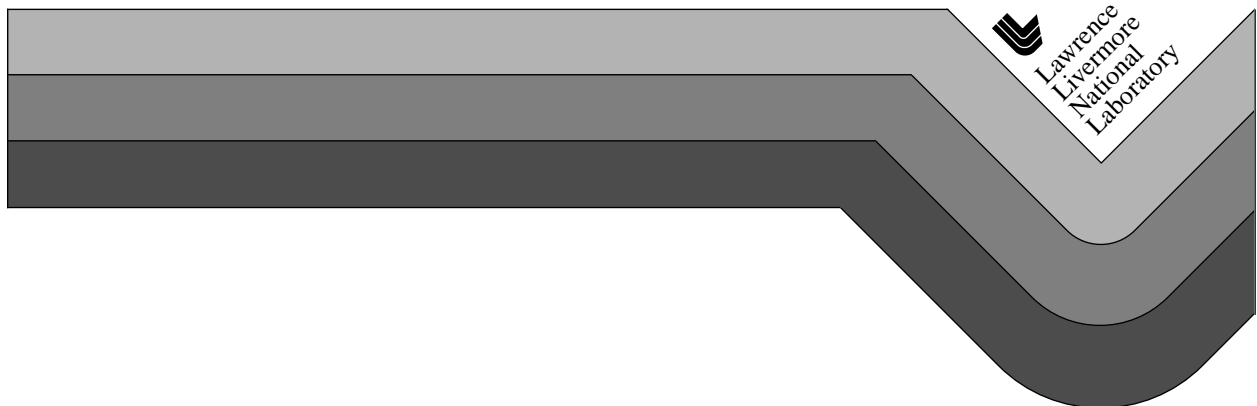


VisIt Getting Started Manual

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VisIt Getting Started Manual

1.0 Introduction

1.1 Overview

VisIt is a distributed, parallel, visualization tool for visualizing data defined on two- and three-dimensional structured and unstructured meshes. VisIt's distributed architecture allows it to leverage both the compute power of a large parallel computer and the graphics acceleration hardware of a local workstation. Another benefit of the distributed architecture is that VisIt can visualize the data where it is generated, eliminating the need to move the data. VisIt can be controlled by a Graphical User Interface (GUI) or through the Python scripting language.

This document introduces you to the VisIt GUI. You will be given a brief overview on how VisIt works and then be shown how to start VisIt and use the various controls in the *VisIt Main* and popup windows.

1.2 Conventions Used in this Document

- References to other documents and sections are in “quotation marks.”
 - Names of windows, buttons, labels, text fields, scrolling lists, etc. are in *italics*.
 - Names of menu options are in “quotation marks.”
 - Keyboard keys are in **<courier bold>**.
 - User input is in **courier bold**.
- Sections with user actions are in shaded boxes.

1.3 What You Need to Know to Use VisIt

Before starting to use VisIt, you should be familiar with your windowing system and the basics of traversing a file system.

2.0 Understanding How VisIt Works

The basic paradigm used by VisIt to visualize data is to create one or more plots in a visualization window, also known as a vis window. Examples of plots include Mesh plots, Contour plots and Pseudocolor plots. Plots take as input one or more variables. VisIt supports both scalar and vector variables. It is possible to modify the variables by applying one or more operators to the variables before passing them to a plot. Examples of operators include arithmetic operations or taking slices through the mesh. It is also possible to restrict the visualization of the data to subsets of the mesh.

VisIt supports up to 16 visualization windows. Each vis window is independent of the other vis windows. VisIt uses an active window concept; all changes made in the *VisIt Main* window or one of its popup windows apply to the currently active window.

VisIt reads its data and performs most of its processing in compute engine processes. A compute engine is launched on each machine where data to be visualized is located. The *Host profiles* window is used to specify properties about the compute engines for different machines, such as the number of processors to use when running the engine. The status of a compute engine is displayed in the *Compute engines* window. It is also possible to interrupt the current operation on the *Compute engines* window.

3.0 Starting VisIt

3.1 On a UNIXTM System

You can invoke VisIt from the command line by typing **visit**.

For a complete list of the command line options, see Appendix A. It is best to have VisIt in your default search path instead of specifying the absolute path to VisIt when starting it. This isn't important when VisIt is run locally, but VisIt will not run properly in a distributed manner if it isn't in your default search path on all the machines on which you are running VisIt, or portions of VisIt.

3.2 On a Windows System

You can invoke VisIt by selecting “All Programs->VisIt 1.1” from the Windows *start* menu.

When you first start VisIt, it will open two windows that fill as much of the screen as possible. Figure 1 contains the most common layout.

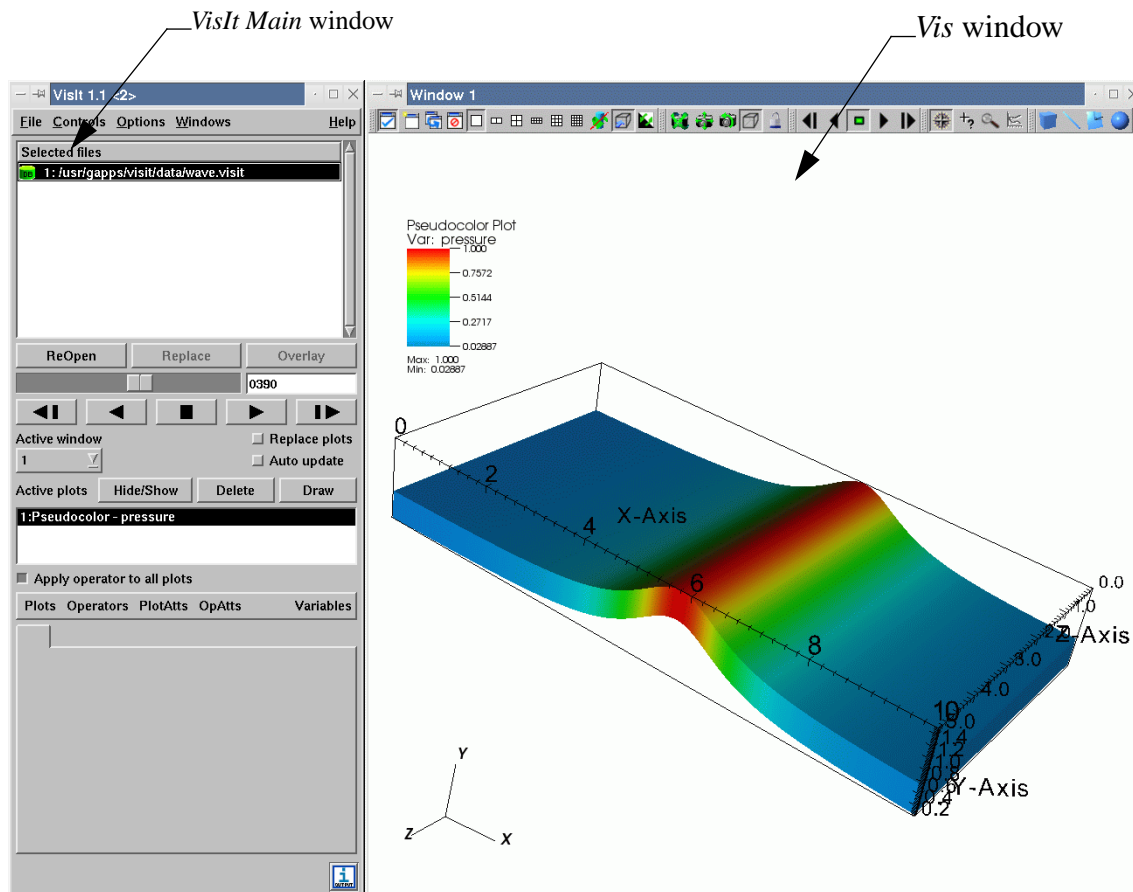


Figure 1: VisIt windows

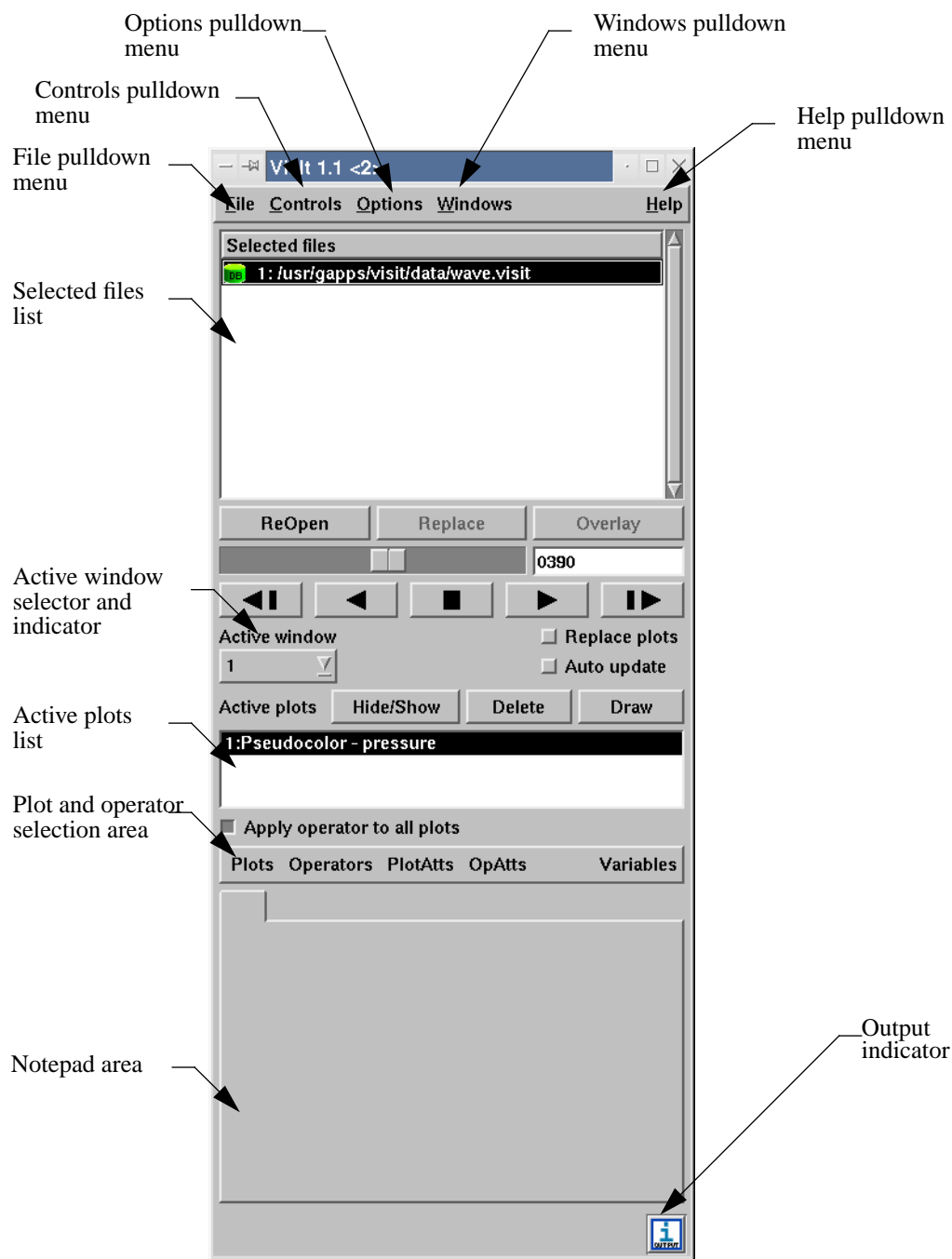


Figure 2: VisIt Main window

4.0 Tutorial 1: The Basics

In this tutorial, you will learn how to select files, generate different kinds of plots, modify plot properties, apply operators, modify operator properties, manipulate the 3D view, manipulate 3D tools, and save an image.

4.1 Changing the Selected File List

One of the first things you must do after starting VisIt is select the files you want work with. By default the files you can work with are all the files in the directory you were in when you started VisIt that match the filter “*”. To change the selected file list, you must bring up the *File selection* window.

- On a UNIX system, start VisIt by typing **visit** at the prompt.
- On a Windows system, start VisIt by selecting “All Programs->VisIt 1.1” from the Windows *start* menu.
- Select “Select file...” from the *File* pulldown menu on the *VisIt Main* window.

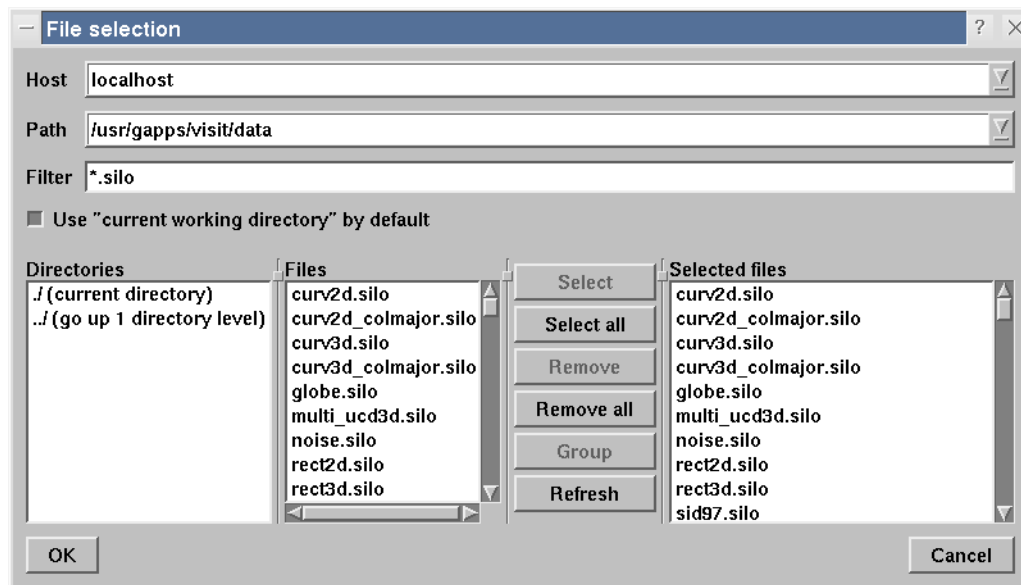


Figure 3: File selection window

The *File selection* window is used to define the list of files you want to use by allowing you to move files from the *Files* list to the *Selected files* list. Once the *Selected files* list contains the files you want to work with, you would press the *OK* button to transfer the contents of the *Selected files* list in the *File selection* window to the *Selected files* list on the *VisIt Main* window, which would also close the window.

To add entries to the *Selected files* list:

- Highlight the entries to be added from the *Files* list.
- Press the *Select* button. The highlighted entries will be added to the *Selected files* list.

To delete entries from the *Selected files* list:

- Highlight the entries to be deleted from the *Selected files* list.
- Press the *Remove* button. The highlighted entries will be deleted from the *Selected files* list.

The *Files* list contains all the files in the directory specified in the *Path* text field that match the filter specified in the *Filter* text field. The *Path* text field contains the current location within your directory structure. To change the *Path* text field:

- Edit the *Path* text field and press the **<Return>** key.

or

- Double click on an entry in the *Directories* list. The *Path* text field will be concatenated with the double clicked entry to form a new *Path* text field.

The *Filter* text field recognizes the wildcard characters * and ?. The * character matches zero or more characters. The ? character matches exactly one character. To change the *Filter* text field:

- Edit the *Filter* text field and press the **<Return>** key.

Changing the *Path* or *Filter* text fields will cause the *Directories* and *Files* lists to be updated.

- Position yourself in the VisIt data directory. This directory contains sample data files that VisIt can visualize. On a UNIX system, this directory will typically be **/usr/gapps/visit/data**. On a Windows system this directory will typically be **C:\Program Files\LLNL\VisIt 1.1\data**.
- Press the *Remove all* button to delete all the files from the *Selected files* list.
- Highlight all the entries in the *Files* list.
- Press the *Select* button to transfer the highlighted files from the *Files* list to the *Selected files* list.
- Highlight the entry *ucd3d.silo* in the *Selected files* list.
- Press the *Remove* button to delete the *ucd3d.silo* entry from the *Selected files* list.
- Press the *OK* button.

You can change the selected files at any time while you are using VisIt.

4.2 Opening a File

VisIt fully supports the Exodus/Nemesis, Silo, and VTK file formats. VisIt partially supports the Alias|WavefrontTM obj file format. VisIt can also read most ASCII text files representing lines. VisIt automatically detects the file type based on the file extension¹.

A file can be opened in either of the two following manners:

- Double click on the desired file in the *Selected files* list on the *VisIt Main* window.

or

- Highlight the desired file in the *Selected files* list on the *VisIt Main* window.
- Press the *Open* button below the *Selected files* list on the *VisIt Main* window.

When a file is highlighted in the *Selected files* list, the *Open* button below the list becomes active. This indicates that the button may be pressed and the file will be opened. Once the button is pressed, it will change to *ReOpen*. Pressing *ReOpen* will force VisIt to flush its cache and read the file again.

- Double click on the entry *globe.silo* in the *Selected files* list.

4.3 Error Messages

All error messages are displayed in the *Error message* window that automatically pops up when an error occurs. You can either dismiss the window via the *Dismiss* button, or leave it up for future reference. All errors are also logged to the *Output* window. To open the

1. Supported file extensions are “.exodus”, “.exII”, “.obj”, “.silo”, and “.vtk”

Output window press on the *Output indicator* in the lower right hand corner of the *VisIt Main* window.

4.4 Creating a Plot

To select plots to be plotted in the vis window, use the *Plots* pulldown menu in the *VisIt Main* window. Pulling right from an entry in the *Plots* pulldown menu will bring up a list of all the variables in the current file appropriate for the given plot type.

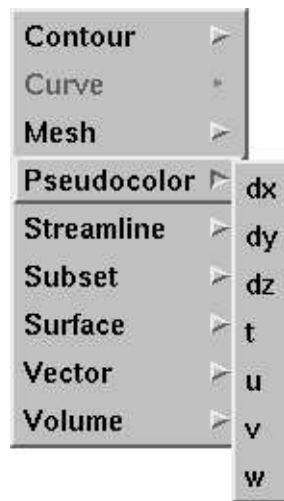


Figure 4: The plots pulldown menu

- Select “mesh1” from the pullright menu from the “Mesh” entry from the *Plots* pulldown menu.
- Select “v” from the pullright menu from the “Pseudocolor” entry from the *Plots* pulldown menu.

As you make selections from the *Plots* pulldown menu you will see corresponding entries appear in the *Active plots* scrolling list. Each entry in the *Active plots* consists of a file number, a plot type, and a plot variable. When a plot is initially added to the *Active plots* list it is entered in green, indicating that the plot is ready to be plotted.

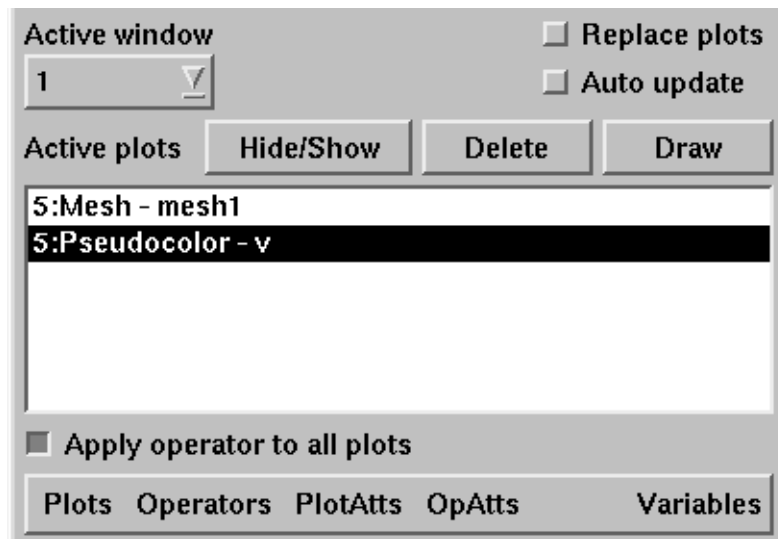


Figure 5: The Active plots list

Even though you have selected plots to draw, nothing appears in the vis window. To make plots appear, you must tell VisIt that you want them drawn.

- Press the *Draw* button, which is located above the *Active plots* list.

The plot entries in the *Active plots* list will turn yellow after the *Draw* button is pressed, indicating that the plot is being created. When the plot has been created and is ready to be

rendered the plot entry in the *Active plots* list will turn black. Plot entries that cannot be generated because of errors turn red.

You will now hide the pseudocolor plot and then bring it back.

- First highlight the pseudocolor plot from the *Active plots* list.
- Press the *Hide/Show* button.

The plot entry will turn grey and the word “hidden” in parenthesis will show up after the variable name to indicate that the plot is hidden.

- Unhide the hidden pseudocolor plot by selecting it in the *Active plots* list and pressing the *Hide/Show* button again.

Finally, you will delete the mesh plot.

- Highlight the mesh plot from the *Active plots* list.
- Press the *Delete* button above the list.

When you delete a plot, hide a plot, or unhide a plot, the effect on the vis window is immediate (unlike adding a plot).

4.5 Using the Mouse in the Vis Window

The vis window supports two types of interactions. Initiating actions or setting modes through either the toolbar or the popup menu, or performing some type of direct manipulation on objects within the window. Direct manipulations are controlled by the mouse mode, which can be set through either the popup menu or the toolbar.

4.6 Using the Popup Menu

To use the popup menu:

- Press the right mouse button in the vis window. You will see a list of menu entries.
- Using the popup menu is now equivalent to using a pulldown menu.

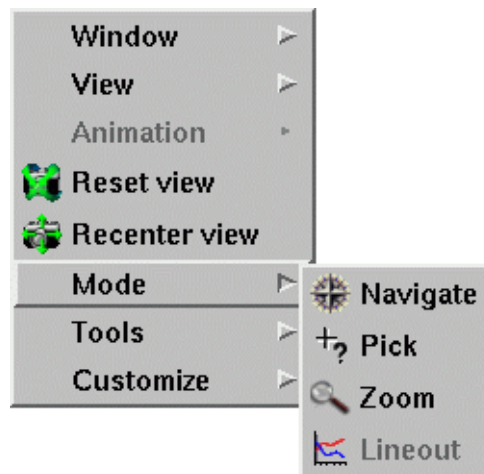


Figure 6: The popup menu in the vis window

The popup menu contains five pullright menus which correspond to the each of the five toolbars. It also contains controls for resetting the view, recentering the view, and a pullright menu for customizing the toolbars.

4.7 Using the Toolbars

The vis window supports multiple toolbars which contain controls which determine how the visualization window behaves as well as giving quick access to some of VisIt's controls. The toolbars may be turned on or off and may be placed anywhere along the top, bottom or sides of the window. The toolbars may be moved to other locations within the window by grabbing the tab on the right of the toolbar and dragging the toolbar to the new location. Holding the cursor over one of the icons in the toolbar for a couple of seconds will bring up a tool tip, which consists of a short text description of the icon. Once a tool tip has been brought up, moving the cursor over another icon will bring up the new tool tip immediately.

VisIt currently supports five toolbars. They consist of the Window toolbar, the View toolbar, the Animation toolbar, the Mode toolbar, and the Tools toolbar.



Figure 7: The toolbars in the vis window

The Window toolbar contains controls for setting the active window, adding new windows, cloning windows, deleting windows, setting the window layout, setting the spin mode, setting the bounding box navigation mode and inverting the window foreground, and background colors.

The View toolbar contains controls for resetting the view, recentering the view, undoing the last view, setting the perspective mode, and locking views between windows.

The Animation toolbar contains controls for stepping back one frame, playing an animation in reverse, stopping an animation, playing an animation, and stepping forward one frame.

The Mode toolbar contains controls for setting the window mode to one of navigate, pick, zoom, or lineout.

The Tools toolbar contains controls for enabling and disabling the box tool, the line tool, the plane tool, and the sphere tool.

You will now change the layout of the toolbars.

- Click on the small tab on the right of the View toolbar and drag the toolbar to the left edge of the vis window.
- Click on the small tab on top of the View toolbar and drag it between the Mode and Tool toolbars.
- Click the right mouse button in the vis window, select the “Customize” pull-right menu, select the “Toolbars” pullright menu and toggle the “Animation” button to hide the Animation toolbar.

4.8 Manipulating the 3D View with Navigate Mode

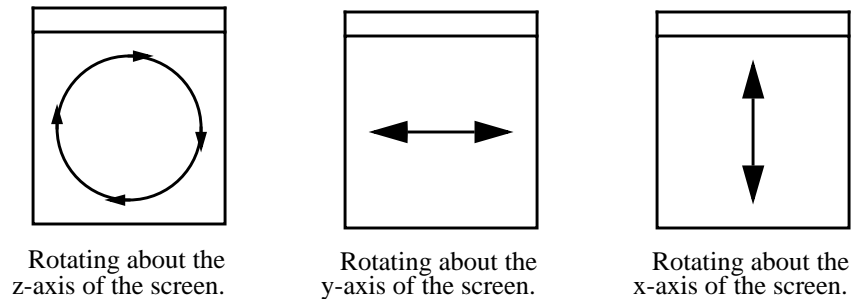


Figure 8: Mouse motions to perform rotations about various axes in Navigate mode

You can manipulate 3D images in Navigate mode. Try each of the following manipulations:

- To rotate the image about the center of the 3D data limits, press the left mouse button. The image will rotate by moving the mouse as shown in Figure 8.
- To pan the image, press and hold the **<Ctrl>** or **<Shift>** key. Press the left mouse button. The image will now follow the cursor.
- To zoom the image, press and hold the middle mouse button. The image will zoom as you move the mouse upwards.
- To de-zoom the image, press and hold the middle mouse button. The image will de-zoom as you move the mouse downwards.
- To reset the view to the default orientation, select “Reset view” from the visualization window popup menu. The image will now return to its default orientation.

4.9 Changing the Variable

Every plot in VisIt has a variable associated with it. The variable used by a plot or group of plots is changed by highlighting one or more plots from the *Active plots* list and selecting a new variable from the *Variable* pulldown menu on the *VisIt Main* window.

- Highlight the pseudocolor plot from the *Active plots* list.
- Select the entry “u” from the *Variable* pulldown list.

Changing the plot variable takes effect immediately.

4.10 Setting Plot Attributes

In this section, you will change the smoothing for the pseudocolor plot. Smoothing is based on the “centering” of the variable being plotted. Basically, a variable can be either “node-centered” (the data reside at the nodes), or “zone-centered” (the data reside at the zones.)

To change the attributes of the pseudocolor plot, you must bring up the *Pseudocolor plot attributes* window.

- Select “Pseudocolor...” from the *PlotAtts* (Plot Attributes) pulldown menu, or double-click on the pseudocolor plot from the *Active plots* list.

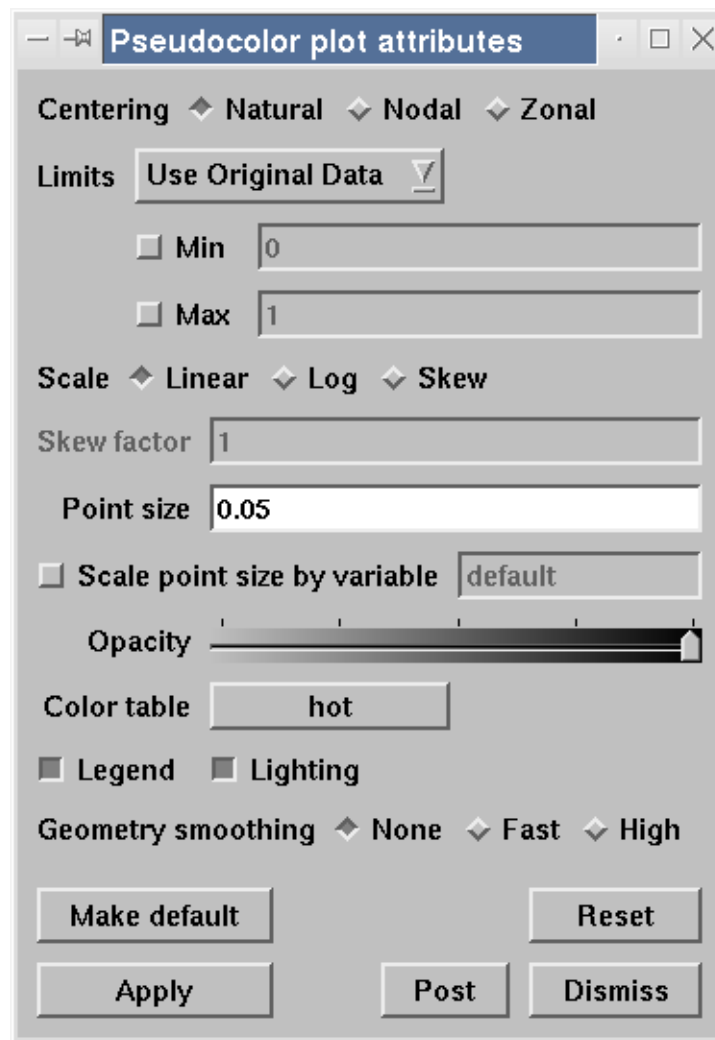


Figure 9: Pseudocolor plot attributes window

The *Pseudocolor plot attributes* window contains all the attributes for the pseudocolor plot, including the *Centering* toggle buttons, which you will use to change the centering.

The default for *Centering* is *Natural*. *Natural* uses the centering of the variable. If the variable is node-centered, the data are plotted at the nodes, and colors are interpolated between them, giving a smoothly-shaded plot. If the variable is zone-centered, one color is plotted for each zone, producing a “blocky” plot. If you select *Nodal* or *Zonal*, you instruct VisIt to interpolate your data (rather than just your colors) to the nodes or zones and to plot the data accordingly.

You will now switch from *Natural* to *Zonal*.

- Click the *Zonal* button so it is “pushed in.”
- Press the *Apply* button.

The change takes effect as soon as the *Apply* button is pressed.

- Return the *Centering* to the *Natural* setting and then press the *Apply* button.

You will now apply the *Color table* settings.

- Press the *Color table* button to reveal a pullright menu of colors.
- Select a color table by highlighting it and then press the *Apply* button.

You see the colors change.

- Return the *Color table* to the *Default* entry and then press the *Apply* button.

Pressing the *Make default* button makes the current setting in the window the default for any future pseudocolor plots during this session with *VisIt*. Pressing the *Reset* button changes the settings to match the current default attributes.

4.11 Using the Notepad

The notepad is a tabbed window you can use to post many of the popup windows. Post frequently used windows to the notepad to access them quickly, without having them present. All popup windows that can be posted will have a *Post* button located at the

bottom of the window. All the plot and operator attribute windows, along with several other windows, may be posted to the notepad.

- Press the *Post* button on the *Pseudocolor plot attributes* window. The window will be posted to the notepad, and the *Post* button will change to the *Unpost* button.

Windows can be unposted by pressing the *Unpost* button. Windows can also be dismissed directly from the notepad by pressing the *Dismiss* button.

- Press the *Unpost* button on the *Pseudocolor plot attributes* window.

To test the *Dismiss* button, repost the *Pseudocolor plot attributes* window.

- Press the *Post* button on the *Pseudocolor plot attributes* window.
- Press the *Dismiss* button on the *Pseudocolor plot attributes* window.

4.12 Applying Data Operators

The data operators are listed in the *Operators* pulldown menu on the *VisIt Main* window. By successively choosing operators from the *Operators* pulldown menu, one or more operations can be applied to the data before it is plotted. The operations applied to the data appear in the variable name section of a plot entry in the *Active plots* list. You will now apply the slice operator to the Pseudocolor plot.

To apply the slice operator to the present plot:

- Select the Pseudocolor plot in the *Active plots* list.
- Select “Slice” from the *Operators* pulldown menu.
- Rotate the image so that you can see the slice plane. In the default view you are looking at it end-on and can not see it.

The effects of applying a data operator are immediate. Now add a mesh plot to give context to the slice plane.

- Deselect the *Apply operator to all plots* toggle button below the *Active plots* list in the *VisIt Main* window.
- Select “mesh1” from the pullright menu from the “Mesh” entry from the *Plots* pulldown menu.
- Press the *Draw* button.

4.13 Setting Operator Attributes

Each operator has a set of attributes. To change the attributes of an operator associated with a plot, you must first highlight the plot in the *Active plots* list.

- Highlight the Pseudocolor plot in the *Active plots* list.

You will now bring up the *Slice operator attributes* window.

- Select “Slice...” from the *OpAtts* (Operator Attributes) pulldown menu.

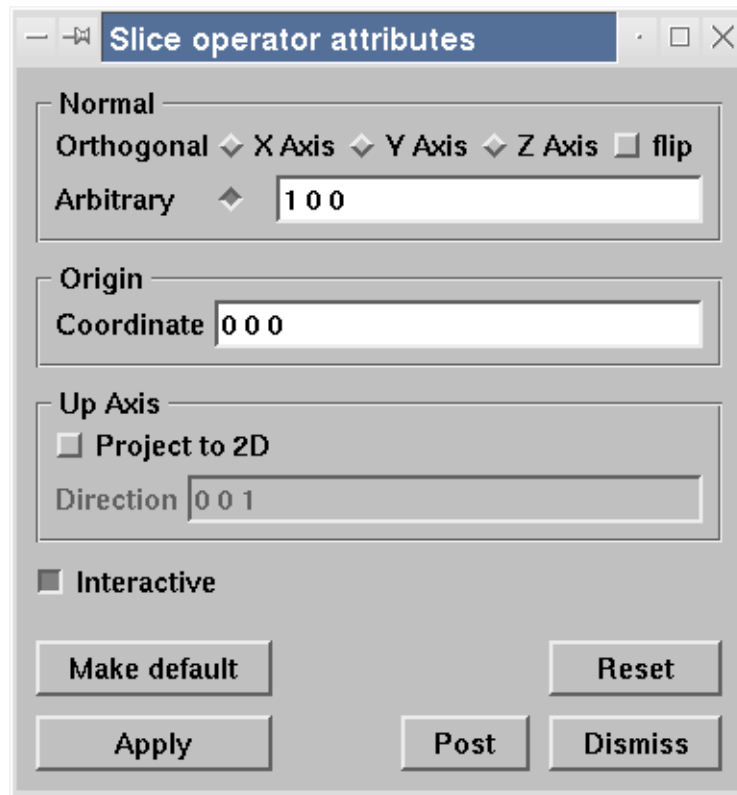


Figure 10: Slice operator attributes window

The *Slice operator attributes* window contains all the attributes for the Slice operator. The *Normal* and *Origin* specify the location of the slice plane. The *Up Axis* specifies the vector to map to the Y Axis if projecting the slice to two dimensions. Setting the *Project to 2D* toggle button indicates that the slice plane should be projected to two dimensions. Setting the *Interactive* toggle button indicates that the *Normal*, *Origin* and *Up Axis* should be set using the Plane Tool which is explained in Section 4.14 "Manipulating the Slice Plane with the Plane Tool".

You will now change the orientation of the slice plane so that it is perpendicular to the Z axis.

- Select the Z axis from the *Orthogonal* toggle buttons by pressing the *Z axis* button.
- Press the *Apply* button.

The slice plane will now be oriented perpendicular to the Z axis.

4.14 Manipulating the Slice Plane with the Plane Tool

A direct manipulation tool for positioning a plane in a 3D image can be brought up using the popup menu in the visualization window. To bring up the tool:

- Press the Plane Tool icon from the Tools toolbar at the top of the vis window.

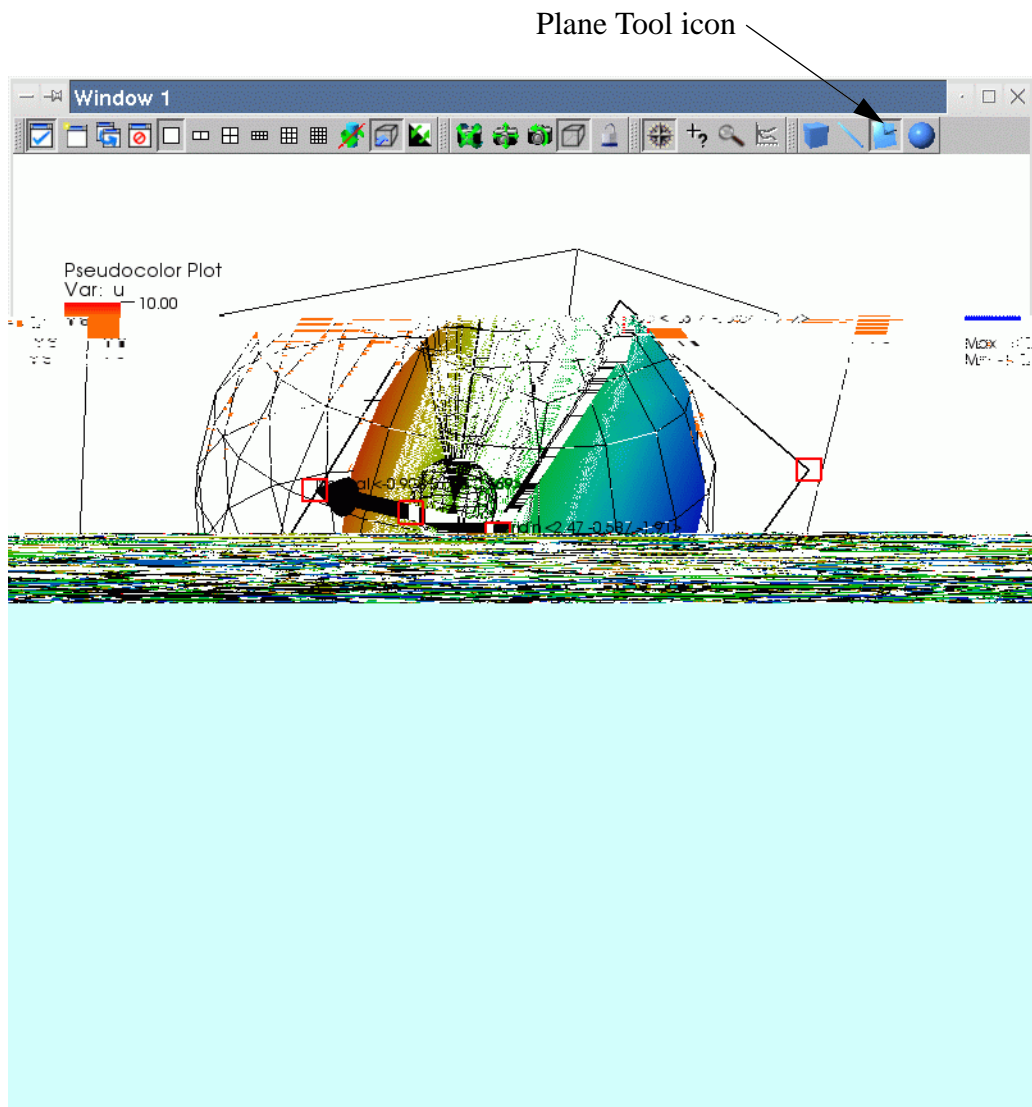


Figure 11: Vis window with plane tool on arbitrary slice

You will see a slice plane through the globe along with six small red rectangles which are called “hotspots”, used for manipulating the position and orientation of the plane. Pressing over the hotspot at the origin of the vectors and then moving that spot moves the slice plane and the vectors as a whole in the plane of the screen. Pressing over the hotspots at

the tips of the vectors defining the plane and then moving that spot rotates the plane about the other vector defining the plane. Pressing over the hotspot at the tip of the normal vector and then moving that spot rotates the plane about the origin of the vectors. Note that when the normal vector is oriented “into” the screen, its color changes from the foreground color to red. Pressing on the hotspot located along the length of the normal vector allows the plane to move along the normal, forward if the mouse is moved upwards, and backward if the mouse is moved downwards. Note that you can still manipulate the image as described in Section 4.8 “Manipulating the 3D View with Navigate Mode” if the Vis window is in Navigate mode and the cursor is not over a hotspot when a mouse button is pressed.

Note the display of the vectors as you move their origin through the globe.

- Press the left mouse button over the hotspot at the tip of the plane normal and move the mouse to change the orientation of the slice plane.
- Press the left mouse button over the hotspot at the origin of the vectors and move the mouse to move the slice plane in the plane of the screen.
- Press the left mouse button over the hotspot in the middle of the plane normal and move the mouse up and down to move the plane along the plane normal.
- Press the left mouse button over one of the hotspots at the tip of a vector defining the slice plane and move the mouse to rotate the normal about the other defining slice plane vector.
- Press on the right mouse button, then press on the “Tools”., then the “Plane” entry again to remove the Plane Tool.

4.15 Saving a Window

In this section, you will save the contents of a vis window to a disk file.

To save a window using the current save options, select “Save window” from the *File* pulldown menu on the *VisIt Main* window. This saves a window using the default options.

Many times, however, you might want to modify the defaults before you save. Let's change the default save options.

- Select “Set save options...” from the *File* pulldown menu on the *VisIt Main* window.

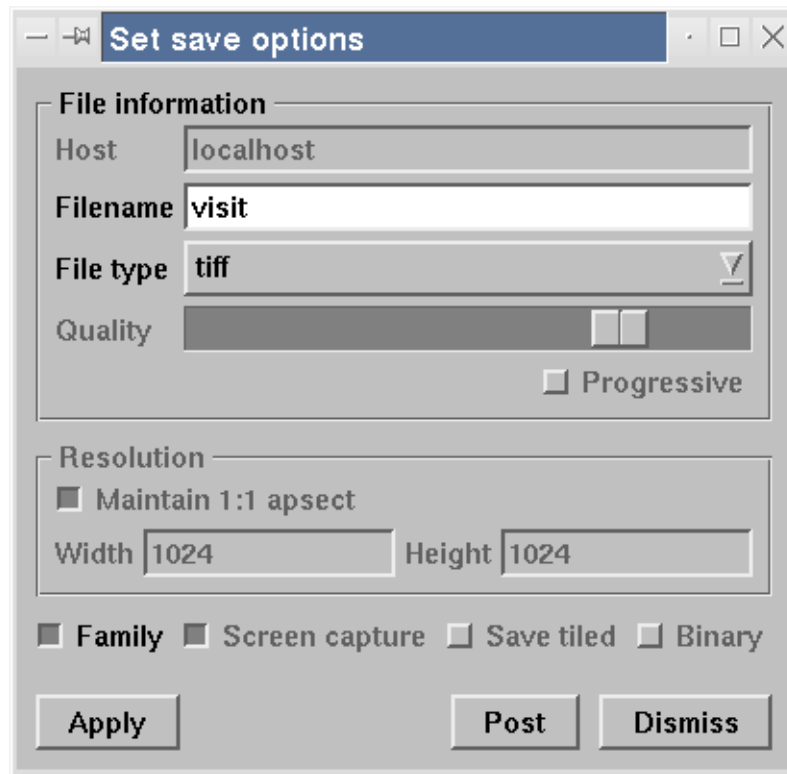


Figure 12: Set save options window

The *Set save options* window contains controls for specifying *File information*, including the *Filename* and *File type*, controls for specifying the *Resolution* when *Screen capture* is off, and toggle buttons for setting *Family* on/off, *Screen capture* on/off, and *Save tiled* on/off.

If the *Family* setting is not selected (“pushed in”), the name of the file used to store the image will match that in the *Filename* text field, otherwise the name of the file will be the *Filename* text concatenated with four digits. The digits start at 0000 and are incremented after each image is stored. If *Save tiled* is selected, VisIt saves all open vis windows to one image. If the *Screen capture* setting is selected, the image that is saved is captured from the screen, otherwise an image is created from the screen at the appropriate resolution and saved. If the *Screen capture* is not selected, the *Width* and *Height* text fields are used to set the size of the image in pixels. The *Quality* slider and *Progressive* toggle button are used to control the image compression and resulting image quality when saving images in jpeg

format. When a low quality image is requested, a lot of image compression is performed resulting in a small file size. When a high quality image is requested, a minimal amount of compression is performed, resulting in a large file size. (The *Host* text field, *Screen capture* toggle button, and *Save tiled* toggle button are not implemented in the beta version).

When you save an image with the *Screen capture* setting *On*, you should not have any windows obscuring the Vis window you are saving because they will appear in the saved image.

- Change the *File type* setting to *Tiff*.
- Press the *Apply* button.
- Press the *Dismiss* button.
- Select “Save window” from the *File* pulldown menu on the *VisIt Main* window.

The image has been saved in the directory from which VisIt was started, and the name of the file is “visit0000.tif”.

4.16 Interrupting an Engine Process

In this section you will go through the steps to interrupt the engine process. The engine process reads the data and performs most of the processing before rendering the image. You will first clear the vis window and open a new data file.

- Select the pseudocolor plot from the *Active plots* list and press the *Delete* button.
- Double click on the entry *multi_ucd3d.silo* in the *Selected files* list.

You will now perform all the steps to start the creation of a plot that you will then interrupt using the *Interrupt engine* button on the *Compute engines* window.

- Select “Compute engines...” from the *File* pulldown menu on the *VisIt Main* window.
- Press the *Post* button to post it to the notepad.
- Select “mat1 (mesh1)” from the pullright menu from the “Subset” entry from the *Plots* pulldown menu.

You are now ready to start the creation of the plot, which you will interrupt when it has partially completed the plot.

- Press the *Draw* button.
- Press the *Interrupt engine* button.

The creation of the plot is interrupted and the plot entry changes its color to red in the *Active plots* list to indicate that the plot was not completed. If you later decide that you want to create the plot, you can simply press the *Draw* button and VisIt will create it for you.

- Press the *Draw* button.

VisIt creates the plot for you and displays it once it is complete.

The *Compute Engines* window status bars report approximate percentages. When reporting the *Total status* it assumes that each stage takes the same amount of time to complete. It reports the *Stage status* based on the percent of domains processed out of the total number of domains. This means that the granularity for the status bar is based on the number of domains that the problem has been decomposed into for the purpose of running in parallel. In the extreme case of a single domain, the status bar will go from 0% to 100% in one jump.

4.17 Exiting

You are now ready to exit VisIt.

- Select “Exit” from the *File* pulldown menu on the *VisIt Main* window.

5.0 Tutorial 2: Visualizing Data on a Remote Machine

In this tutorial, you will learn how to visualize data on a remote machine. VisIt only supports visualizing data on remote machines running UNIX. If the remote machine is not running UNIX or you only have VisIt installed on your local machine you may skip this tutorial.

5.1 Setting up VisIt for Visualizing Data on Remote Machines

VisIt uses secure shell (**ssh**) to launch processes on remote machines. Secure shell can be set up to allow remote logins without supplying a password. If you have not set up secure shell to do so, it is highly recommended that you do so to avoid having to type your password whenever VisIt launches a remote process. Appendix B describes how to set up secure shell to allow password-less login.

In order to visualize data on remote machines, VisIt must be installed on each of the remote machines you will be using and the **visit** executable must be in your default search path on each of these machines. To determine if **visit** is in your search path:

- Login to the remote machine and type **which visit** in the shell window.

If the command prints out the path of an executable then **visit** is in your default search path, if the command prints out a message that begins with something like **visit not in** then you will need to edit your **.cshrc** file (or equivalent for the shell you are using) on the remote machine to add **visit** to your default search path. See your system administrator if you don't know how to do this.

5.2 Selecting a File on a Remote Machine

It is possible to select files on a remote machine simply by specifying the name of the remote machine in the *Host* text field in the *File selection* window.

- Select “Select file...” from the *File* pulldown menu on the *VisIt Main* window.
- Enter the name of a remote machine in the *Host* text field and press the **<return>** key.

The *File selection* window will now display the contents of your home directory on the remote machine. If you have not set up password-less login for the remote machine you will be prompted for a password before it displays the file system on the remote machine.

- Position yourself in the VisIt data directory. For most people, this directory will be `/usr/gapps/visit/data`.
- Press the *Remove all* button to delete all the files from the *Selected files* list.
- Press the *Select all* button to transfer all the files from the *Files* list to the *Selected files* list.
- Press the *OK* button.

5.3 Visualizing Data on a Remote Machine

You are now ready to visualize your data on the remote machine, just as you would data on your local machine.

- Double click on the entry *ucd3d.silo* in the *Selected files* list.

At this point VisIt will launch an engine process on the remote machine. The engine process is used to read in data and perform most of the data processing prior to rendering. If you have set up password-less login for the remote machine this will be transparent to you. If you have not, then VisIt will prompt you for a password.

- Select “d” from the pullright menu from the “Pseudocolor” entry from the *Plots* pulldown menu.
- Press the *Draw* button.

VisIt will now create a pseudocolor plot from the data on the remote machine.

Appendix A

VisIt Command Line Options

A.1 Command Line Options

The command line options are listed after the `visit` command when starting VisIt.

`visit [options]`

The options are listed below grouped by functionality and listed alphabetically within a group. The order in which these options are specified is unimportant; **`visit -gui -beta`** is the same as **`visit -beta -gui`**.

	Program options
<code>-cli</code>	Run with the Command Line Interface.
<code>-gui</code>	Run with the Graphical User Interface (default).

	Version options
<code>-beta</code>	Run the current beta version.
<code>-dir <directory></code>	Run the version in the given directory. For example, <code>-dir /usr/gapps/visit/1.0.7/sgi-irix6-mips2</code> would run the sgi 1.0.7 version of visit.
<code>-v <version></code>	Run the specified version.

	Window options
-background <color>	Background color for the graphical user interface. The color can consist of either a color name or an RGB triplet. For example, the color red could be specified as -background red or -background #ff0000 .
-foreground <color>	Foreground color for the graphical user interface. The color can consist of either a color name or an RGB triplet. For example, the color red could be specified as -foreground red or -foreground #ff0000 .
-nowin	Run without any windows. This option may be useful when running scripts.
-small	Use a smaller desktop area/window size.
-style <style>	The style to use for the graphical user interface. One of win-dows , cde , motif , or sgi .

	Scripting options
-s <scriptname>	Run the specified VisIt script. Note that this option only takes effect with the -cli option.

	Debugging options
-debug <level>	Run with <level> levels of output logging. <level> must be between 1 and 5 . A debug level of 1 provides the least amount of output logging, while a debug level of 5 provides the most output logging.
-timing	Run with timings. Timings are provided for the execution of each major portion of the execution pipeline on the viewer and each engine process.

Appendix B

Setting Up Password-less ssh

The following instructions describe how to set up **ssh** to allow password-less authentication among a collection of machines. These instructions apply to ssh1; the process for ssh2 is different. You should first read all the instructions before proceeding.

B.1 On the Local Machine

If you already have a `~/.ssh/identity.pub` file, you can skip these configuration steps. (Go to Section B.2 "On the Remote Machine")

```
cd
ssh-keygen
```

Accept default values by entering `<return>`. When asked for a passphrase enter a passphrase to gain a greater level of security. List the contents of the `.ssh` directory.

```
ls -l .ssh
```

The file `identity.pub` contains your public key in one very long line of text. The file `identity` contains your private key, which is non-readable data. The subdirectory `$HOME/.ssh` subdirectory must remain r-w-x permissions for the owner only. Check that this is the case.

```
ls -ld .ssh
```

B.2 On the Remote Machine

If you already have a `$HOME/.ssh/authorized_keys` file, append the contents of the local machine's `$HOME/.ssh/identity.pub` file to this file. If this isn't the case then create a `$HOME/.ssh` directory, if one does not exist, with r-w-x permission for the owner only.

```
cd
mkdir .ssh
```

```
chmod 700 .ssh
```

Check that the directory does not allow world or group access. SSH will not work if world or group access is allowed.

```
ls -ld ~
```

Copy the contents of the local machine's `$HOME/.ssh/identity.pub` file to the remote machine into the file `$HOME/.ssh/authorized_keys`. This provides the information for the remote machine to validate you. Remember that `identity.pub` contains a single long line. Either `ftp` the `identity.pub` file to the remote machine or edit it, being careful to avoid introducing carriage returns.

B.3 Completing the Process

You can then repeat the section “On the Remote Machine” for each remote machine for which you want to set up password-less ssh. You can repeat the above sections, reversing the local and remote machines, in order to allow password-less ssh to the local machine from the remote machine (i.e., copy the remote machine's `$HOME/.ssh/identity.pub` into the local machine's `$HOME/.ssh/authorized_keys` file).