SGI™ OpenGL Vizserver™ User's Guide

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CONTRIBUTORS

Written by Ken Jones, Jenn Byrnes, and Alan Stein

Edited by Susan Wilkening

Production by Karen Jacobson

Engineering contributions by Michael Boccara, Phil Keslin, Peter Ostrin, Chikai Ohazama, Sonya Rikhtverchik, and Yochai Shefi-Simchon

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New Features in This Guide

Chapter 1 has been enhanced to document collaborative sessions.

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About This Guide

Welcome to OpenGL Vizserver!

With OpenGL Vizserver, you can interact with images and three-dimensional models utilizing the capabilities of a remote Silicon Graphics Onyx2 or SGI Onyx 3000 InfiniteReality server. OpenGL Vizserver transmits rendered images over a high-speed data pipe, running OpenGL applications with large RGB datasets at up to 30 Hz. Using your local workstation, you can take advantage of an Onyx2 or Onyx 3000 InfiniteReality server without leaving your desk.

There are two types of OpenGL Vizserver sessions: collaborative sessions and single-user sessions. Single-user sessions involve one client user (usually remote) using a free pipe on the server host. Collaborative sessions allow two distant users, one of them being a local client on the server host running an X server, to display and interact with the same applications in real time.

This user's guide consists of one chapter, "Running OpenGL Vizserver." This chapter provides step-by-step instructions for starting OpenGL Vizserver and interacting with images and three-dimensional models.

Obtaining Publications

To obtain SGI documentation, go to the SGI Technical Publications Library at the following URL:

`http://techpubs.sgi.com`

Conventions

The following conventions are used throughout this document:

Convention	Meaning
`command`	This fixed-space font denotes literal items such as commands, files, routines, path names, signals, messages, programming language structures, and URLs.
variable	Italic typeface denotes variable entries and words or concepts being defined.
`user input`	This fixed-space font denotes literal items that the user enters in interactive sessions. Output is shown in nonbold, fixed-space font.
interface	This font denotes the names of graphical user interface (GUI) elements such as windows, screens, dialog boxes, and menus.

Reader Comments

If you have comments about the technical accuracy, content, or organization of this document, please tell us. Be sure to include the title and document number of the manual with your comments. (Online, the document number is located in the front matter of the manual. In printed manuals, the document number is located at the bottom of each page.)

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Running OpenGL Vizserver

With OpenGL Vizserver, you can interact with images and three-dimensional models utilizing the capabilities of a remote Silicon Graphics Onyx2 or SGI Onyx 3000 InfiniteReality server. OpenGL Vizserver transmits rendered images over a high-speed data pipe, running OpenGL applications with large RGB datasets at up to 30 Hz. Using your local workstation, you can take advantage of an Onyx2 or Onyx 3000 InfiniteReality server without leaving your desk.

There are two types of OpenGL Vizserver sessions: collaborative sessions and single-user sessions. Single-user sessions involve one client user (usually remote) using a free pipe on the server host. Collaborative sessions allow two distant users, one of them being a local client on the server host running an X server, to display and interact with the same applications in real time.

This chapter provides step-by-step instructions for running OpenGL Vizserver. The following topics are covered:

- "Connecting to a Remote Server"
- "Reserving a Graphics Pipe"
- "Starting a Single-User Session"
- "Starting a Collaborative Session from a Local Client"
- "Joining a Collaborative Session from a Remote Client"
- "Configuring an Active Session from a Remote Client"
- "Starting an Application from a Client"
- "Interacting with a Rendered Image"
- "Stopping an Active Session"
- "Logging Out"

Connecting to a Remote Server

The remote host server is an Onyx2 or Onyx 3000 InfiniteReality system with one or more graphics subsystems. OpenGL applications installed on the server perform all image rendering. The server compresses a rendered image and transmits it to your local workstation for viewing.

To connect to the remote host server, follow these four steps:

1. Click the Vizserver icon on your desktop, as shown in Figure 1-1.

Figure 1-1 OpenGL Vizserver Icon

The **Vizserver** main window appears, as shown in the example in Figure 1-2.

The **Host name** field is blank.

The **Status** field indicates that you are currently disconnected from the remote host server.

Note: You can also enter the command `vizserver` in a command-line window to display the **Vizserver** main window.

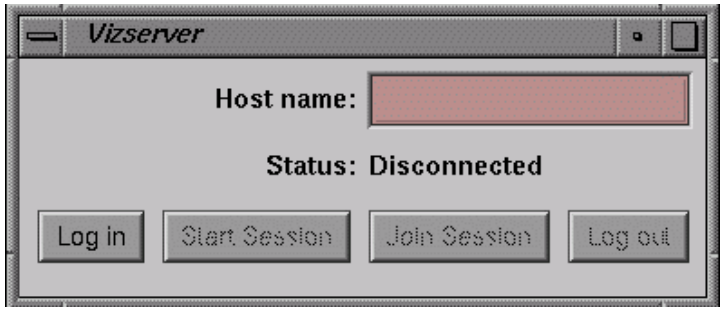

Figure 1-2 **Vizserver** Main Window

2. Type the name of any available host server in the **Host name** field.
3. Click the **Log in** button.

   If authentication is required, the **OpenGL Vizserver Login** window appears as shown in the example in Figure 1-3.

   In some cases, OpenGL Vizserver automatically logs you in, and you do not have to enter a user ID and password.

Figure 1-3 **OpenGL Vizserver Login** Window

4. Log in to the remote host server by entering your user name, password, and any other required information, then click the **OK** button.

   In the **Vizserver** main window, the **Status** field now indicates that you are connecting to the remote host server. Then the **Status** field confirms that you are connected; the **Start Session**, **Join Session**, and **Log out** buttons are activated; and the **Log in** button is deactivated, as shown in Figure 1-4.

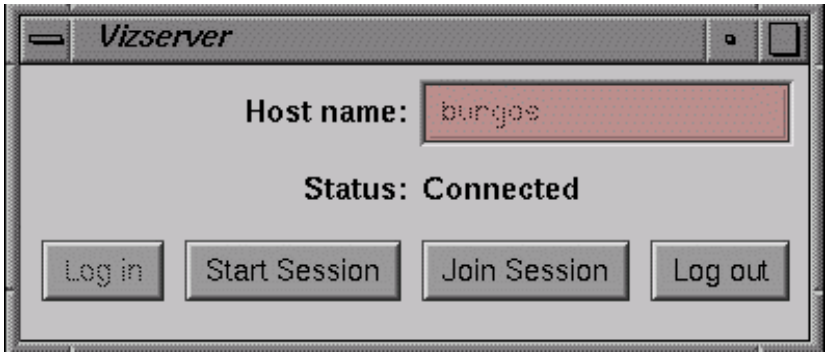

Figure 1-4 **Vizserver** Main Window (after Logging In)

Reserving a Graphics Pipe

Note: This is pertinent only for starting a single-user session.

If the reservation system on the remote host is enabled, you need to reserve a pipe on this host before you start a session. Otherwise, the start session operation will fail, with the following error message:

```
Pipe not reserved.
```

A pipe reservation is defined by a time slot (start time and end time) and a user name. In order to add a reservation, you need to use a reservation client. A sample reservation web interface can be started from the following URL:

`http://`*remotehost*`/vizserver`

The path element *remotehost* is the full name of the remote host where the server is running. For more information about this web interface, see Appendix A, “Reservation Web Interface”.

Once you have started a session for which you have made a reservation, this session will be available for use until the end of the time slot. A warning message will be sent to you before the end of the reservation time slot.

Starting a Single-User Session

To start a single-user session, perform the following three steps.

1. Click the **Start Session** button in the **Vizserver** main window.

   The **Status** field indicates that the session is starting, as shown in Figure 1-5, and the **Vizserver Session Start** window is opened, as shown in Figure 1-6.

Figure 1-5 **Vizserver** Main Window (Session Starting)

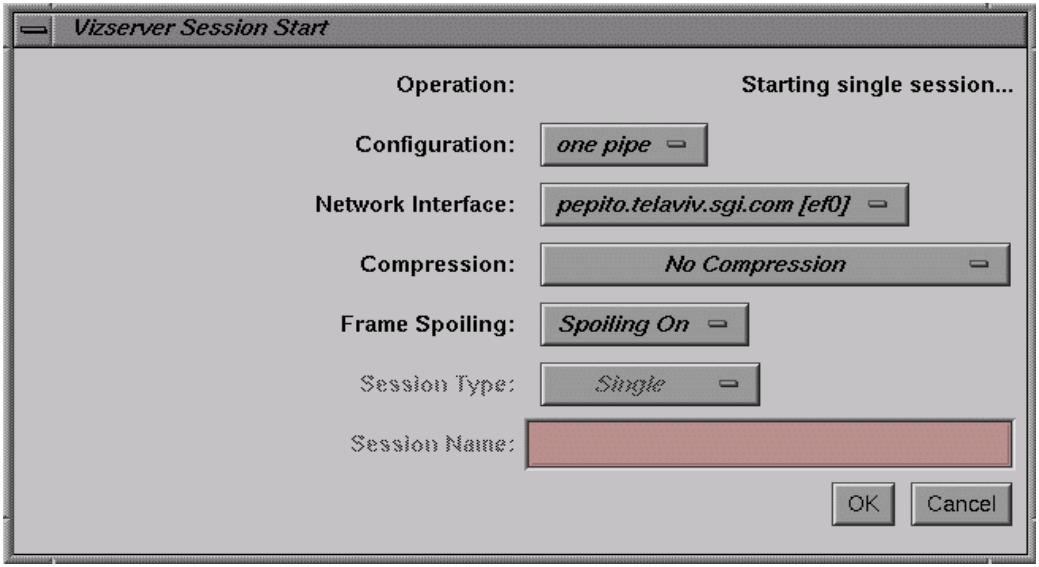

Figure 1-6 **Vizserver Session Start** Window (Single-User Session)

2. In the **Vizserver Session Start** window, ensure that the option menu **Session Type** is set to `Single`.
3. In the **Vizserver Session Start** window, click the **OK** button.

   The **Status** field confirms that the session is active, as shown in Figure 1-7.

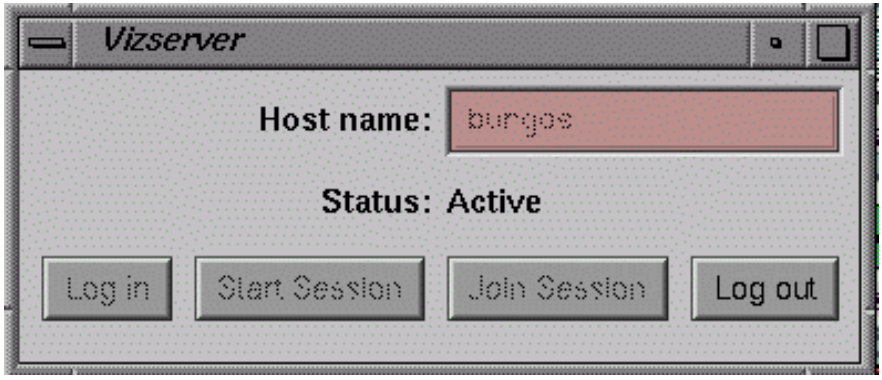

Figure 1-7 **Vizserver** Main Window (Session Active)

After the Vizserver session start dialog is dismissed, the **OpenGL Vizserver Console** window, which identifies the current host, appears at the lower left corner of your screen, as shown in the example in Figure 1-8.

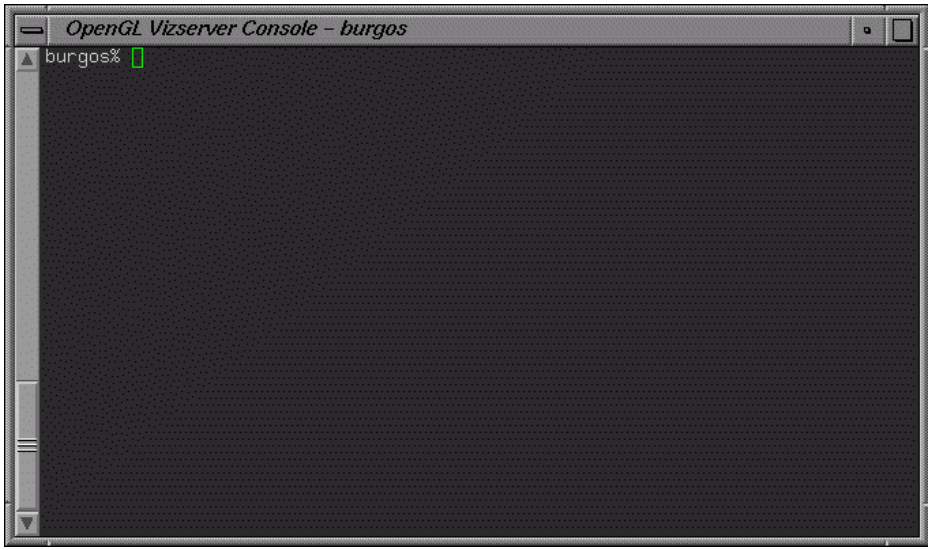

Figure 1-8 **OpenGL Vizserver Console** Window

Starting a Collaborative Session from a Local Client

A collaborative session is a session where the applications are displayed on both a local and a remote client and users at both clients can interact in a random fashion with the applications. The pipe being used is one that is already allocated to a running X server. The collaborated application will then be shared by both a local user (working on the server's host) and a remote user. In order for a collaborative session to be active, it must be first started by the local user's client, and then *joined* by the remote user's client.

To start a collaborative session, perform the following four steps.

1. Click the **Start Session** button in the **Vizserver** main window.

   The **Status** field indicates that the session is starting, as shown in Figure 1-9, and the **Vizserver Session Start** window is opened.

Figure 1-9 **Vizserver** Main Window (Session Starting)

2. In the **Vizserver Session Start** window, ensure that the option menu **Session Type** is set to `Collaboration`, as shown in Figure 1-10.

   This enables the **Session Name** text field.

Note: The **Session Type** option menu is enabled only in the case where the client is connected to the local server. Remote clients cannot start a collaborative session.

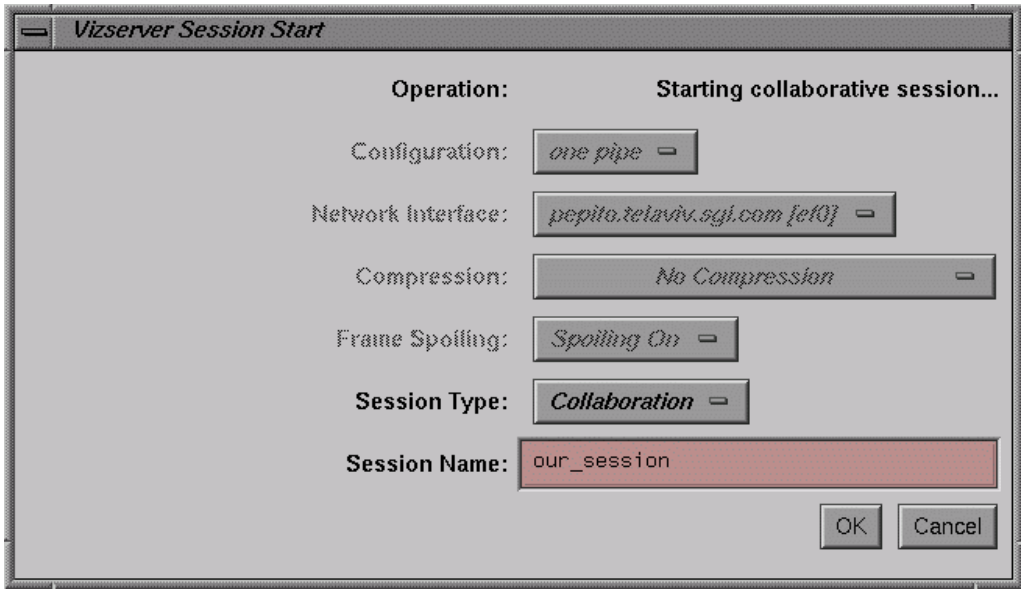

Figure 1-10 **Vizserver Session Start** Window (Starting Collaborative Session)

3. In the **Session Name** text field, enter a non-empty name for the collaborative session.

   The remote user must use this session name to join the session.

   The client who starts a collaborative session has the session configurations fields in the **Vizserver Session Start** window disabled, because the display will be local and no network or bandwidth setting is needed.

4. Click the **OK** button in the **Vizserver Start Session** window.

   The session will not be active until the remote user joins the session. The **Status** field in the **Vizserver** main window confirms this state of waiting for the second user, as shown in Figure 1-11.

Figure 1-11 **Vizserver** Main Window (Waiting for Remote User)

Joining a Collaborative Session from a Remote Client

To join a collaborative session from a remote client, perform the following three steps.

1. Click the **Join Session** button in the **Vizserver** main window.

   The **Status** field indicates that the session is starting, as shown in Figure 1-12, and the **Vizserver Session Start** window opens.

Figure 1-12 **Vizserver** Main Window (Session Starting)

   In the **Vizserver Session Start** window, the option menu **Session Type** is set to `Collaboration` and disabled, as shown in Figure 1-13. The **Session Name** text field is enabled.

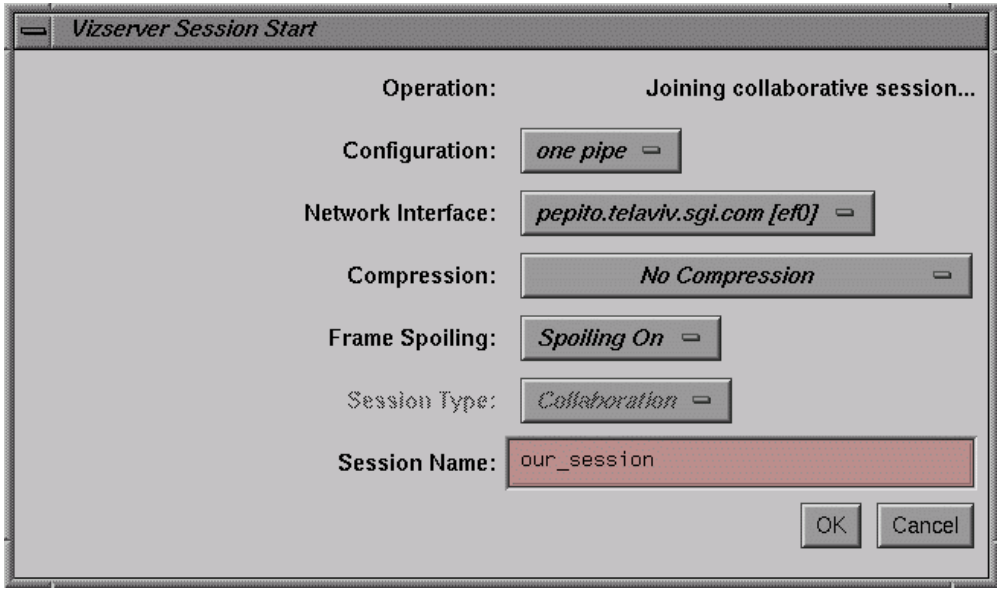

Figure 1-13 **Vizserver Session Start** Window (Joining Collaborative Session)

2. Enter the name of the collaborative session to join in the **Session Name** text field of the **Vizserver Session Start** Window.

   This session name must match exactly the session name chosen by the local user who started the session.

3. Click the **OK** button in the **Vizserver Start Session** window.

   The **Status** field in the **Vizserver** main window confirms that the session is active on both clients, as shown in Figure 1-14.

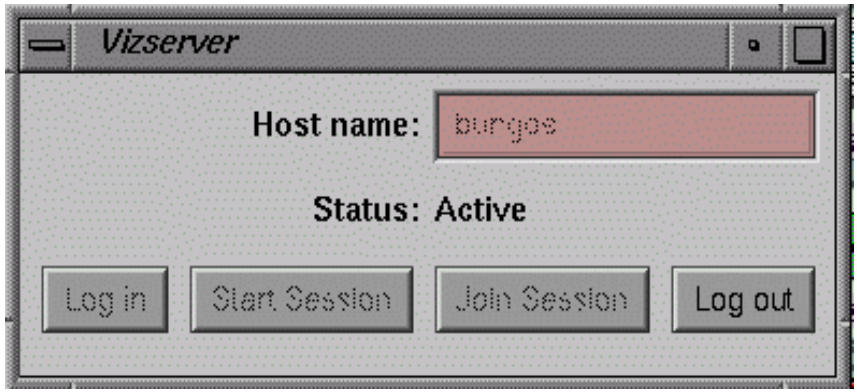

Figure 1-14 **Vizserver** Main Window (Session Active)

After the Vizserver session start dialog is dismissed, the **OpenGL Vizserver Console** window, which identifies the current host, appears at the lower left corner of **only** the local client's screen, as shown in the example in Figure 1-15.

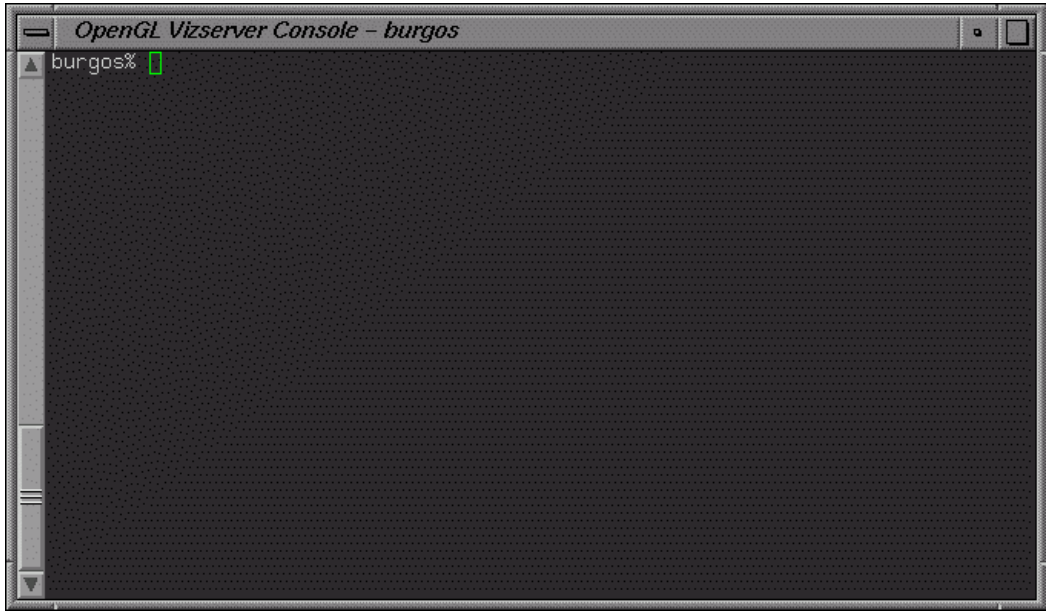

Figure 1-15 **OpenGL Vizserver Console** Window

Note: This console window is not displayed on the remote display. Consequently, only the local client can start an application that can be shared between the clients.

In a collaborative session, the local and remote user names cannot be the same.

Configuring an Active Session from a Remote Client

After you start an active session, the **Vizserver Session Start** window appears. In this window from a remote client (for example, when starting a single-user session or joining a collaborative session), you can choose a configuration and a network interface, set the initial compression rate, and choose a frame-spoiling option, as shown in the example in Figure 1-16. When this window appears, the displayed compression defaults to the last selection you made during your previous session.

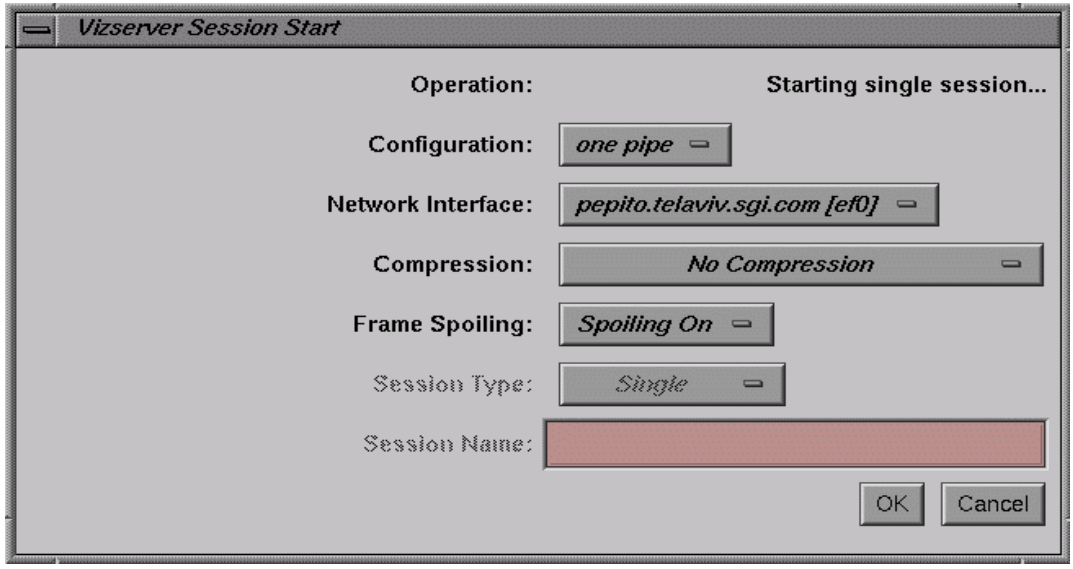

Figure 1-16 **Vizserver Session Start** Window (Single-User Session)

The **Operation** label on the top of the **Vizserver Session Start** window indicates the type of session that is to be started.

There is currently no multiplexing. Hence, only one user can connect to a server with a single pipe configured. Multiple users, each with an independent set of pipes, can connect to a server in a multiple-pipe configuration. In the following example, a one-pipe configuration is selected. This configuration allows a single user to access one graphics pipe on a server.

Note: Currently, OpenGL Vizserver does not support multiple active sessions for the same user nor multiple pipes in the same session. Hence, you cannot use more than one server pipe at a time.

To configure your session, perform the following steps.

1. Click the **Configuration** button, then choose a configuration in the drop-down menu.
2. Click the **Network Interface** button, then choose a network interface in the drop-down menu.

   This specifies which network interface the server uses to transmit window updates. For example, users on multi-homed systems can specify the fast network interface.
3. Click the **Compression** button, then choose a compression rate in the drop-down menu.

   When you set the compression rate, you reduce the amount of data that is required to transmit your image, trading off some image quality for greater interaction capability. Choose a compression rate that is consistent with the frame rate you want to achieve. OpenGL Vizserver compression runs globally; hence, all applications running under OpenGL use the selected compression scheme. If you run two applications simultaneously and you change the compression setting, both applications switch to the selected compression scheme.

   You can choose one of five compression options:

Compression Option	Description
`CCC`	Sets an 8:1 compression ratio (Color Cell Compression) .
`ICC`	Sets a 4:1 compression ratio (Interpolated Cell Compression).
`No Compression`	Turns off compression. In this mode, the server transmits an uncompressed image.

`SCC`	Sets a 32:1 compression ratio (Scaled Color Cell) .
`SICC`	Sets a 16:1 compression ratio (Scaled Interpolated Color Cell).

Note: `CCC` , `ICC`, `SCC`, and `SICC` are fixed latency compression schemes. For this type of compression, only the size of the image must be known to calculate compression time (not the contents, as with JPEG).

4. Click the **Frame Spoiling** button, then choose a frame spoiling option in the drop-down menu. Choosing the **Spoiling Off** option tells the server not to generate a new frame until the current frame is displayed on the client side. Choosing the **Spoiling On** option tells the server to generate new frames at the maximum rate. This option should be used in cases where OpenGL Vizserver is used over a low-bandwidth network link, where dropped frames are acceptable.
5. Click the **OK** button in the **VizServer Session Start** window.

   The **Vizserver Session Start** window disappears, and then the **Vizserver Session Control** window appears, as shown in Figure 1-17. The main window remains on your screen.

Figure 1-17 **Vizserver Session Control** Window

In this window, you can reset the compression rate, change the spoiling option, redraw your image, and stop the active session.

After you start an application, your image appears in an application window (as described in the next section). Clicking the **Redraw Windows** button in the **Vizserver Session Control** window redraws the image at the selected compression rate. You can reset the compression and redraw the image at any time.

Starting an Application from a Client

Start the desired application by typing commands in the console window, as shown in the example in Figure 1-18.

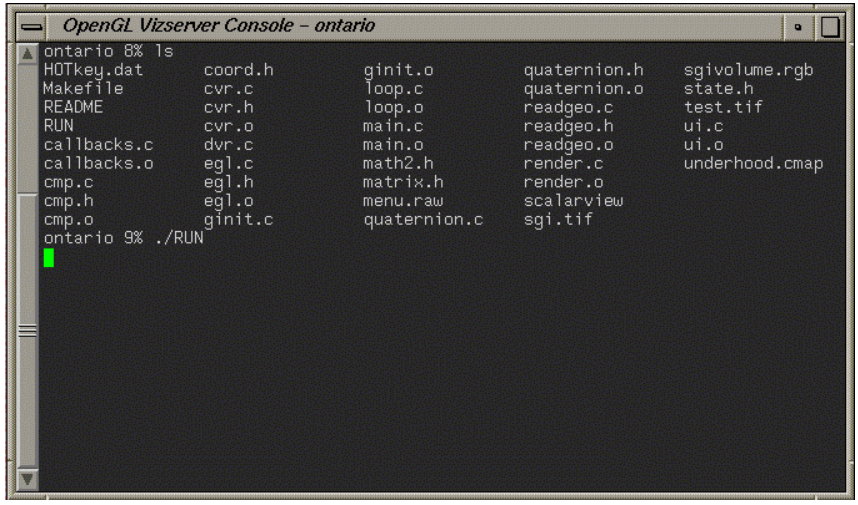

Figure 1-18 Starting an Application in the **OpenGL Vizserver Console** Window

Alternatively, you can start the desired application as follows:

1. Use the `telnet` or `rlogin` command to access the OpenGL Vizserver host machine.
2. Set the `DISPLAY` environment variable to point to the client.
3. Start the desired application using the `vsx` command.

The application renders the image. Then the host server transmits it to your local workstation and displays it on your screen in the application window, as shown in the example in Figure 1-19.

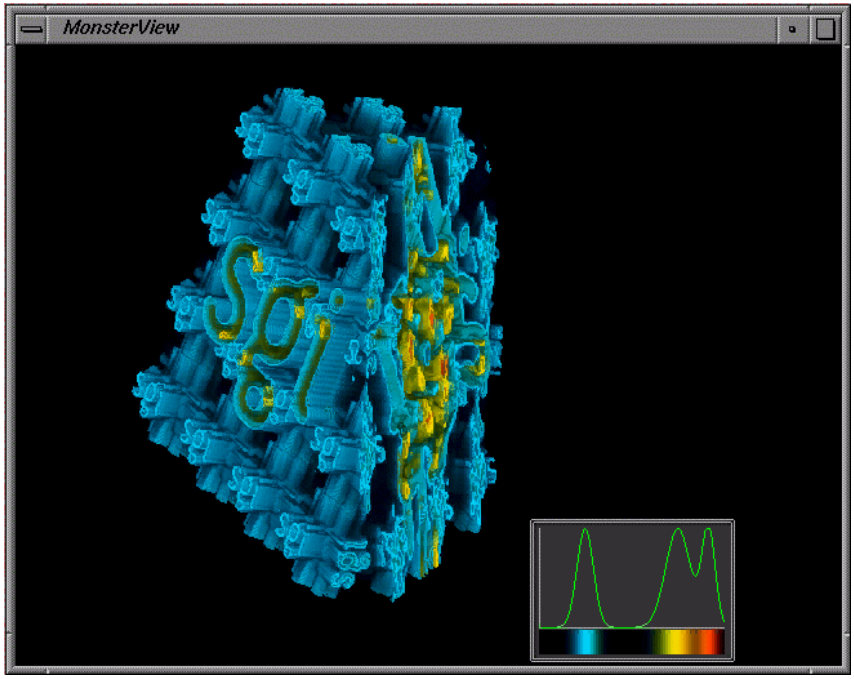

Figure 1-19 Displaying a Rendered Image in an Application Window

Interacting with a Rendered Image

Because OpenGL Vizserver provides an application-transparent service, your applications perform as if they are using the indirect rendering features of X11 and GLX. Interacting with one of your applications is the same as interacting with any other X-based application. The application is not aware that the OpenGL Vizserver system is rendering the image.

Stopping an Active Session

To stop an active session, click the **Stop session** button in the **Vizserver Session Control** window, shown in Figure 1-20.

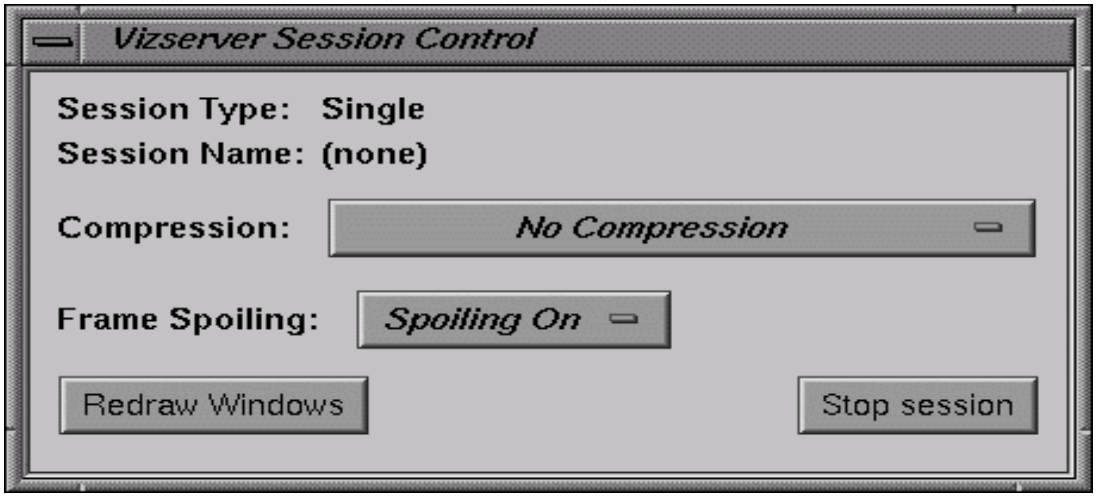

Figure 1-20 **Vizserver Session Control** Window

You can stop a session at any time. If you close the **Vizserver Session Control** window, it is the same as clicking the **Stop session** button.

Logging Out

If you want to log out, click the **Log out** button in the **Vizserver** main window, shown in Figure 1-21.

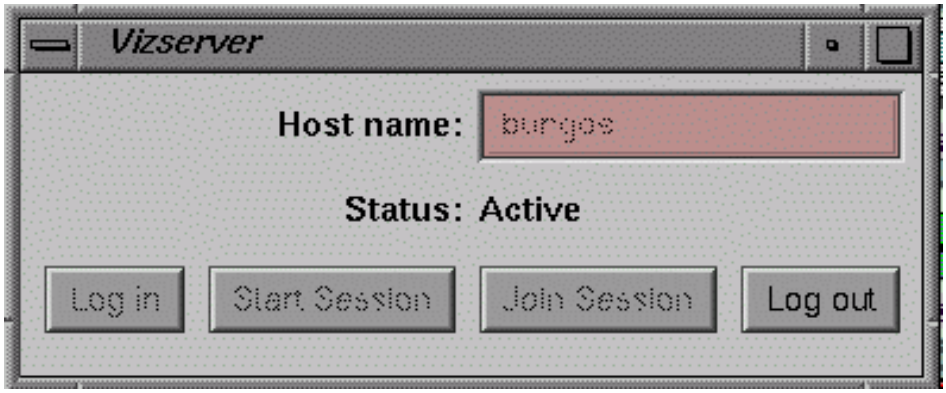

Figure 1-21 **Vizserver** Main Window

Reservation Web Interface

The Reservation Web Interface is a client of the Reservation Database on the remote server. It can be accessed through a URL that resides on the remote host. The URL is `http://`*remotehost*`/vizserver`, where *remotehost* is the full name of the remote host where the server is running.

To log into the reservation system, enter your authentication data (if needed) in the fields of the welcome screen, and press the **Login** button.

Common Header

All the following pages contain a header part, as shown in Figure A-1. This header shows—in addition to the SGI and OpenGL Vizserver logos—the name of the currently logged in user and the name of the remote host. On the left side is a **LOGOUT** link, that allows you to log out from the reservation server at any time and go back to the login page for the reservation system.

Figure A-1 Header

Login Screen

If needed by OpenGL Vizserver's authentication, fill in your authentication data in the login page. The name of the OpenGL Vizserver remote host is displayed at the top of the login page. Figure A-2 shows a typical UNIX login screen, with a user name and a password field. If login parameters are correct, you enter the daily view of the reservation database, as described in the following section.

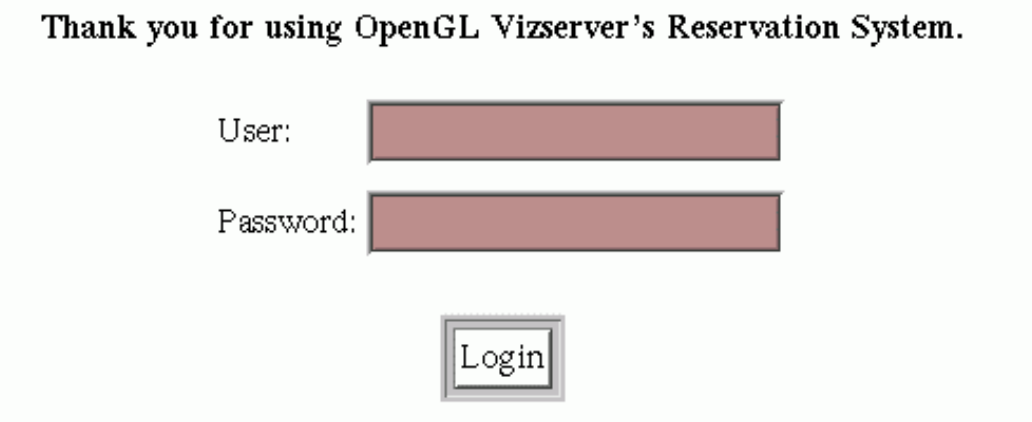

Figure A-2 Login Screen

Daily View

Once logged in, the first and main page of the reservation web interface is the daily view. The daily view shows a table of the reservations for a given day (the default is `today`), assigned to each pipe allocated for OpenGL Vizserver on the remote host. From this page you can select a reservation time slot to get its details (see, "Reservation View" on page 26); select a time on the table's vertical time scale to go to the Add Reservation page; or jump to another day through one of the day navigation links.

Day Table

The day table, as shown in Figure A-3, represents reservations as rectangles; the time scale is on the vertical axis and the associated pipe is on the horizontal axis. There are as many pipe columns as there are pipes on the remote server allocated for OpenGL Vizserver. The user name of the owner is written on the time slot. Depending on the browser's functionality, a yellow hint note is displayed when the mouse moves on the reservation time slot, showing details (start and end time) of the reservation. As color codes are used, one color is assigned to the reservations of the currently logged in user, and another color is assigned to all other users' reservations. Each user name in a time slot is a link to a more detailed view of this reservation's data (see "Reservation View" on page 26). Each hour item on the vertical time axis is a link to a form for adding a new reservation (see "Add Reservation Form" on page 25), starting by default at the selected time. All these links open a separate webpage browser window.

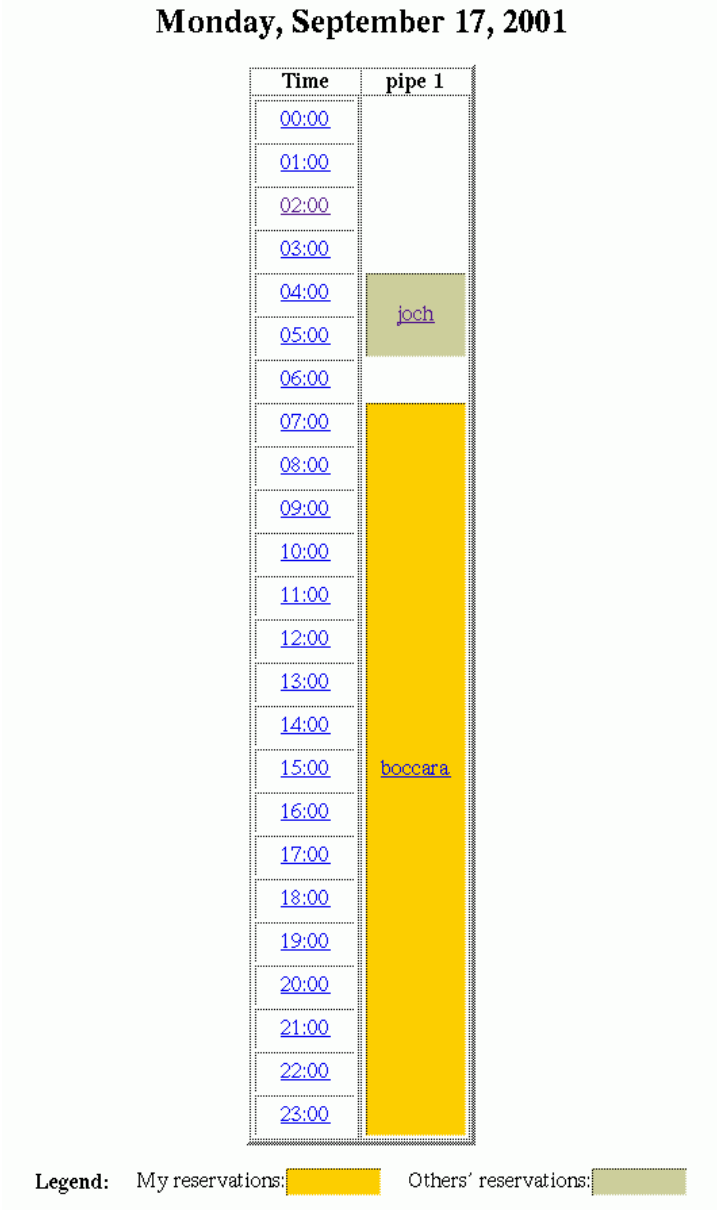

Figure A-3 Day Table

Day Navigation Links

Links are provided to jump to the previous, next, or current day, as shown in Figure A-4. Another form is provided to directly select the day you want to view, this day being defined by its year, month, and day of the month.

Figure A-4 Day Navigation

Add Reservation Form

The Add Reservation form, as shown in Figure A-5, contains fields to enter the day, start time, and duration of the reservation you want to add. The owner is always the user who is logged in. A reservation will then be added after checking that this does not create a pipe overallocation for the time slot. In case of such a conflict, the operation will fail. On success, the daily view will be updated with the new reservation.

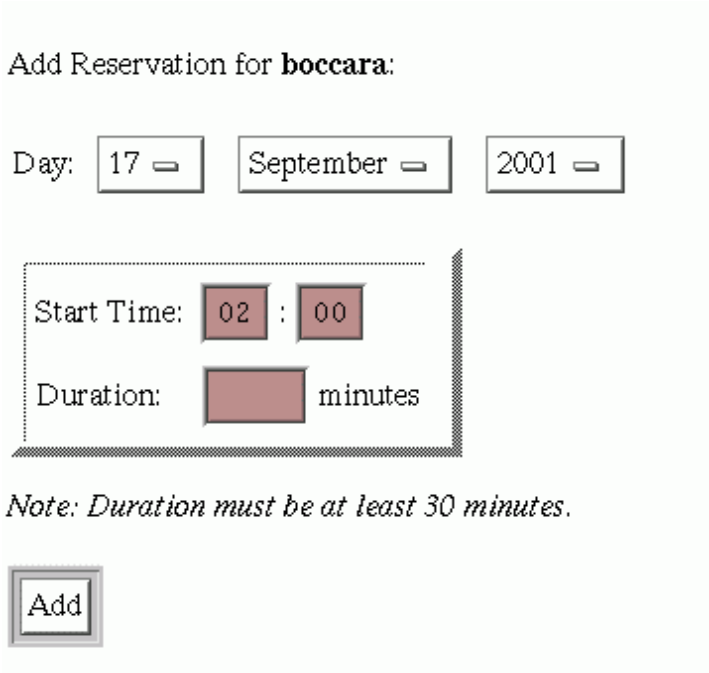

Figure A-5 Add Reservation Form

Reservation View

The reservation view provides the following details about a reservation: start time and date, end time and date, and owner user. If you are superuser, or the owner of the displayed reservation, you can delete this reservation by pressing the **Delete** button. If not, the deletion operation will fail and an error message will be displayed.

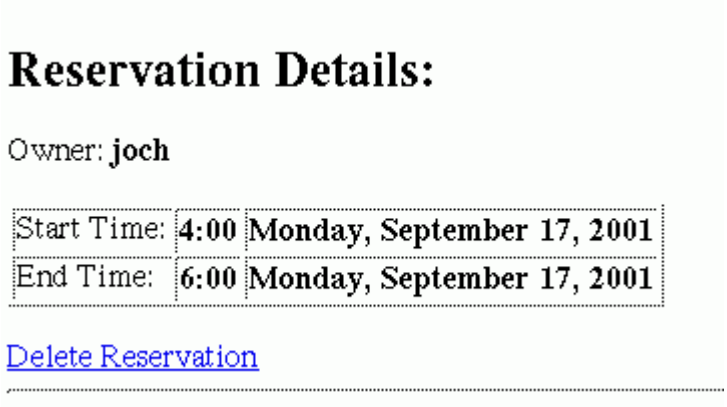

Figure A-6 Reservation View

Login Timeout

A timeout is defined in a configuration file and is reserved for an administrator's use. After a timeout has passed since your last operation on theReservation Web Interface, the login page will be displayed and you must log in again to the reservation system.

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