Astra® LoadTest™
Controller User's Guide
Version 4.5

Online Guide

Table of Contents

PART II: DESIGNING A SCENARIO

Find

Find Again

Top of Chapter

Back

PART III: EXECUTING A SCENARIO

Find

Find Again

Top of Chapter

Back

PART IV: MONITORING A SCENARIO

Find

Find Again

Top of Chapter

Back

PART V: APPENDIXES

Find

Find Again

Top of Chapter

Back

Welcome to Astra LoadTest

Welcome to Astra LoadTest, Mercury Interactive's tool for testing the performance of Web-based applications. Astra LoadTest stresses your entire Web-based application to isolate and identify bottlenecks and optimize the end user experience.

Astra LoadTest enables you to test your system under controlled and peak load conditions. To generate load, Astra LoadTest runs hundreds of Virtual Users that are distributed over a network. Using a minimum of hardware resources, these Virtual Users provide consistent, repeatable, and measurable load to exercise your Web-based application just as real users would. Astra LoadTest's in-depth reports and graphs provide the information that you need to evaluate the performance of your Web-based application.

Online Resources

Astra LoadTest includes the following online tools:

Read Me First provides last-minute news and information about Astra LoadTest.

Books Online displays the complete documentation set in PDF format. Online books can be read and printed using Adobe Acrobat Reader 4.0, which is included in the installation package. Check Mercury Interactive's Customer Support Web site for updates to Astra LoadTest online books.

Astra LoadTest Context Sensitive Help provides immediate answers to questions that arise as you work with Astra LoadTest. It describes dialog boxes, and shows you how to perform Astra LoadTest tasks. To activate this help, click in a window and press F1. Check Mercury Interactive's Customer Support Web site for updates to Astra LoadTest help files.

Technical Support Online uses your default Web browser to open Mercury Interactive's Customer Support Web site.

Support Information presents the locations of Mercury Interactive's Customer Support Web site and home page, the e-mail address for sending information requests, the name of the relevant news group, the location of Mercury Interactive's public FTP site, and a list of Mercury Interactive's offices around the world.

Mercury Interactive on the Web uses your default Web browser to open Mercury Interactive's home page.

Astra LoadTest Documentation Set

Astra LoadTest is supplied with a set of documentation that describes how to:

- install Astra LoadTest

- create Vuser scripts using the Virtual User Recorder

- use the Astra LoadTest Controller to run and analyze load test scenarios

Using the Astra LoadTest Documentation Set

The Astra LoadTest documentation set consists of an Installation Guide, Controller User's Guide, and a Virtual User Recorder User's Guide.

Installation Guide

For instructions on installing Astra LoadTest, refer to the *Astra LoadTest Installation* guide.

Controller User's Guides

For a description of how to create and run Astra LoadTest scenarios using the Astra LoadTest Controller, refer to the *Astra LoadTest Controller User's Guide*. The Controller User's Guide presents an overview of the Astra LoadTest testing process.

Guide for Creating Vuser Scripts

The *Virtual User Recorder User's* guide describes how to create Vuser scripts that you will use in your load testing.

Note: The Virtual User Recorder is also used to create functional tests for Astra QuickTest.

Throughout this guide, the use of the term *script* is synonymous with the term *test* for the Virtual User Recorder.

Typographical Conventions

This book uses the following typographical conventions:

1, 2, 3	Bold numbers indicate steps in a procedure.
●	Bullets indicate options and features.
>	The greater than sign separates menu levels (for example, **File > Open**).
Bold	**Bold** text indicates function names and the elements of the functions that are to be typed in literally.
Italics	*Italic* text indicates variable names and book names.
Helvetica	The *Helvetica* font is used for examples and statements that are to be typed in literally.
[ ]	Square brackets enclose optional parameters.
{ }	Curly brackets indicate that one of the enclosed values must be assigned to the current parameter.
...	In a line of syntax, three dots indicate that more items of the same format may be included. In a program example, three dots are used to indicate lines of a program that have been intentionally omitted.
|	A vertical bar indicates that either of the two options separated by the bar should be selected.

Find

Find Again

Top of Chapter

Back

Understanding Astra LoadTest

To load test your Web-based application, Astra LoadTest emulates an environment where multiple users work concurrently. While the Web-based application is under load, Astra LoadTest accurately measures, monitors, and analyzes a system's performance and functionality.

About Load Testing

Modern Web-based architectures are complex. While they provide an unprecedented degree of power and flexibility, these systems are difficult to test. Whereas single-user testing focuses primarily on functionality and the user interface of a single application, Web-based testing focuses on performance and reliability of an entire Web-based application.

For example, a typical Web-based testing scenario might depict 100 Web Users that login simultaneously to a system: What is the response time of the system? Does the system crash? To be able to answer these questions—and more—a complete Web-based application testing solution must:

- test a system that combines a variety of software applications and hardware platforms
- determine the suitability of a Web server for any given application

- emulate an environment where multiple users interact with a single server application

- test a Web-based application under the load of tens or hundreds of potential users

Manual Testing Limitations

Traditional or manual testing methods offer only a partial solution to load testing. For example, you can test an entire system manually by constructing an environment where many users work simultaneously on the system. Each user works at a single machine and submits input to the system. However, this manual testing method has the following drawbacks:

- it is expensive, requiring large amounts of both personnel and machinery

- it is complicated, especially coordinating and synchronizing multiple testers

- it involves a high degree of organization, especially to record and analyze results meaningfully

- the repeatability of the manual tests is limited

The Astra LoadTest Solution

The Astra LoadTest automated solution addresses the drawbacks of manual performance testing:

- Astra LoadTest reduces the personnel requirements by replacing human users with virtual users or *Vusers*. These Vusers emulate the behavior of real users—operating real applications.

- Because numerous Vusers can run on a single computer, Astra LoadTest reduces the hardware requirements.

- The Astra LoadTest Controller allows you to easily and effectively control all the Vusers—from a single point of control.

- Astra LoadTest monitors the Web-based performance online, enabling you to fine-tune your system during test execution.

- Astra LoadTest automatically records the performance of the Web-based application during a test. You can choose from a wide variety of graphs and reports to view the performance data.

- Astra LoadTest checks where performance delays occur: network or client delays, CPU performance, I/O delays, or other issues at the database or Web server. Astra LoadTest monitors the Web resources to help you improve performance.

- Because Astra LoadTest tests are fully automated, you can easily repeat them as often as you need.

Astra LoadTest Terminology

Scenarios

Using Astra LoadTest, you divide your Web-based performance testing requirements into *scenarios*. A scenario defines the events that occur during each testing session. Thus, for example, a scenario defines and controls the number of users to emulate, the actions that they perform, and the machines on which they run their emulations.

Vusers

In the scenario, Astra LoadTest replaces human users with *virtual users* or *Vusers*. When you run a scenario, Vusers emulate the actions of human users—operating your Web-based application. While a workstation accommodates only a single human user, many Vusers can run concurrently on a single workstation. In fact, a scenario can contain tens or hundreds of Vusers.

To emulate conditions of heavy user load, you create a large number of Vusers that perform a series of tasks. For example, you can observe how a Web-based banking system behaves when one hundred Vusers simultaneously check account information. To accomplish this, you create 100 Vusers, and each Vuser:

1 enters a User ID number into the system

2 enters the PIN number for the account

3 request a list of recent transactions for the account

4 checks the balance of the account

5 repeats the process numerous times

Vuser Scripts

The actions that a Vuser performs during the scenario are described in a Vuser script. When you run a scenario, each Vuser executes a *Vuser script*. The Vuser scripts include actions that measure and record the performance of your Web application.

Transactions

To measure the performance of the server, you define *transactions*. A transaction represents an activity or a set of activities that you are interested in measuring. You define transactions within your Vuser script by enclosing the appropriate sections of the script with *start* and *end* transaction statements. For example, you can define a transaction that measures the time it takes for the server to process a request to view the balance of an account and for the information to be displayed in the Web browser.

Rendezvous points

You insert *rendezvous points* into Vuser scripts to emulate heavy user load on the application. *Rendezvous points* instruct Vusers to wait during test execution for multiple Vusers to arrive at a certain point, in order that they may simultaneously perform a task. For example, to emulate peak load on the bank application, you can insert a rendezvous point instructing 100 Vusers to transfer funds within their accounts at the same time.

Controller

You use the *Astra LoadTest Controller* to manage and maintain your scenarios. Using the Controller, you control all the Vusers in a scenario from a single workstation.

Hosts

When you execute a scenario, the Astra LoadTest Controller distributes each Vuser group in the scenario to a *host*. The host is the machine that executes the Vuser script, enabling the Vuser to emulate the actions of a human user.

Performance analysis

Vuser scripts include functions that measure and record system performance during load-testing sessions. During a scenario run, you can monitor the network and server resources. Following a scenario run, you can view performance analysis data in reports and graphs.

Find

Find Again

Top of Chapter

Back

Astra LoadTest Vuser Technology

On each Windows host, you install a *Remote Command Launcher* and an *Agent*.
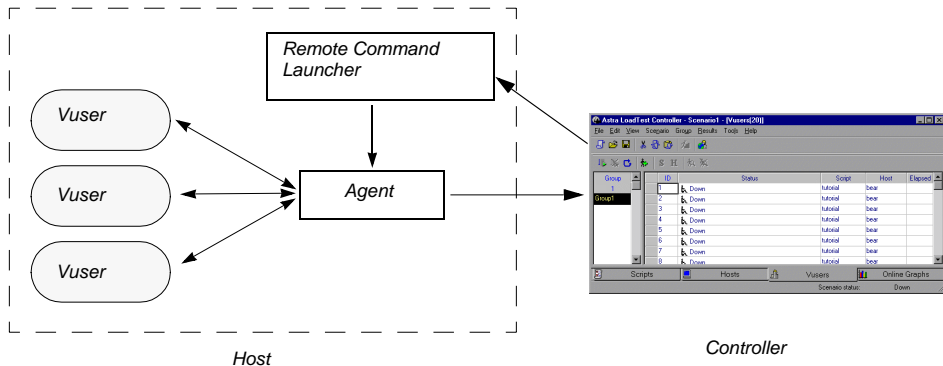
Host

Controller

Remote Command Launcher

The Remote Command Launcher enables the Controller to start applications on the host machine.

Agent

The Agent enables the Controller and the host to communicate with each other. When you run a scenario, the Controller instructs the *Remote Command Launcher* to launch the Astra LoadTest *Agent*. The Agent receives instructions from the Controller to initialize, run, pause, and abort Vusers. At the same time, the Agent also relays data on the status of the Vusers back to the Controller.

Working with Astra LoadTest

Suppose you want to test an online banking Web server that is accessed by many Internet users. The Web site provides a full range of banking services to the customers—such as the ability to transfer funds and check account balances. To test this server using Astra LoadTest, you create a scenario. The scenario defines the actions that are performed on the server during the load test.

During the scenario that loads and monitors the Web server, you want to:

● emulate conditions of controlled load on the server

● emulate conditions of maximum load on the server

● measure server performance under load

● check where performance delays occur: network or client delays, CPU performance, I/O delays, database locking, or other issues at the server

● monitor the network and server resources under load

Understanding Astra LoadTest
The Astra LoadTest Testing Process

You can easily create and run load-test scenarios by following the Astra LoadTest testing process below. The following illustration outlines the testing process:

Step I	**Planning the Test**
Step II	**Creating Vuser Scripts**
Step III	**Creating the Scenario**
Step IV	**Running the Scenario**
Step V	**Analyzing Test Results**
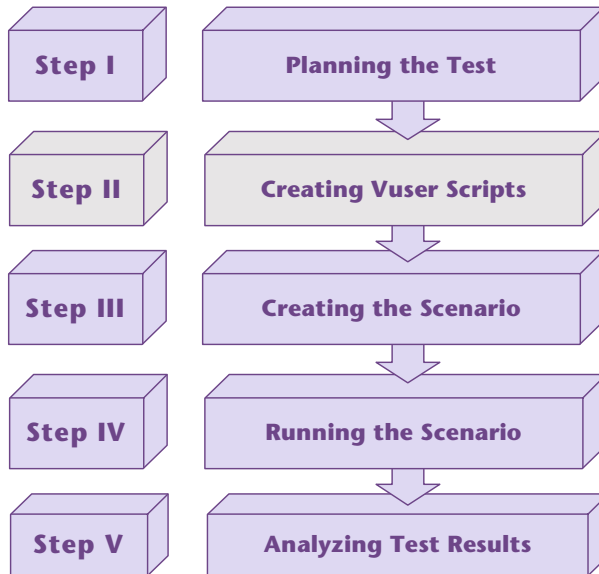
This chapter gives you an overview of Astra LoadTest's five–step process for testing your Web-based application under load.

Step I: Planning the Test

Successful load testing requires that you develop a thorough test plan. A clearly defined test plan will ensure that the Astra LoadTest scenarios that you develop will accomplish your load testing objectives. For more information, see Chapter 3, **Load Test Planning**.

Step II: Creating the Vuser scripts

Vusers emulate human users interacting with your Web-based application. A Vuser script contains the actions that each virtual user performs during scenario execution.

In each Vuser script you determine the tasks that will be:

- performed by each Vuser
- performed simultaneously by multiple Vusers
- measured as transactions

For more information on creating Vuser scripts, refer to the *Virtual User Recorder* guide.

Step III: Creating the Scenario

A scenario describes the events that occur during a testing session. A scenario includes a list of machines that "host" Vusers; a list of scripts that the Vusers run; and a list of Vusers and Vuser groups that run during the scenario. You create scenarios using the Astra LoadTest Controller. For an introduction to the Controller, see Chapter 4, **The Astra LoadTest Controller at a Glance**.

Creating the List of Hosts to Run Vusers

For each scenario, you create a list of hosts—machines configured to execute Vuser scripts. For more information, see Chapter 5, **Creating a Scenario**.

Creating the List of Vuser Scripts

For each scenario, you create a list of scripts that Vusers run during scenario execution. For more information, see Chapter 5, **Creating a Scenario**.

Creating the Vuser Groups

To each Vuser group in a scenario, you assign a quantity of individual Vusers, a script, and a host to run the script. For more information, see Chapter 5, **Creating a Scenario**.

Step IV: Running the Scenario

You emulate user load on the server by instructing multiple Vusers to perform tasks simultaneously. You can set the level of load by increasing and decreasing the number of Vusers that perform tasks at the same time. For more information, see Chapter 6, **Using Rendezvous Points**.

Before you run a scenario, you set the scenario configuration and scheduling. This determines how all the hosts and Vusers behave when you run the scenario. For more information, see Chapter 7, **Configuring a Scenario** and Chapter 8, **Setting the Scenario Scheduling**.

You can run the entire scenario, groups of Vusers (Vuser groups), or individual Vusers. While a scenario runs, Astra LoadTest measures and records the transactions that you defined in each Vuser script. You can also monitor your system's performance online. For more information, see Chapter 11, **Running a Scenario**.

Step V: Analyzing Test Results

During scenario execution, Astra LoadTest records the performance of the application under different loads. You use Astra LoadTest's graphs and reports to analyze the application's performance. For more information about Astra LoadTest's reports and graphs, see the *Astra LoadTest Analysis User's Guide*.

Understanding Astra LoadTest
Load Test Planning

Developing a comprehensive test plan is a key to successful load testing. A clearly defined test plan ensures that the Astra LoadTest scenarios you develop will accomplish your load testing objectives.

This chapter introduces the load test planning process:

- **Analyzing the Web-based Application**
- **Defining Testing Objectives**
- **Planning Astra LoadTest Implementation**
- **Examining Load Testing Objectives**

Find

Find Again

Top of Chapter

⇐ Back

About Load Test Planning

As in any type of system testing, a well-defined test plan is the first essential step to successful testing. Planning your load testing helps you to:

- Build test scenarios that accurately emulate your working environment.

  Load testing means testing your Web-based application under typical working conditions, and checking for system performance, reliability, capacity, etc.

- Understand which resources are required for testing.

  Load testing requires hardware, software, and human resources. Before you begin testing, you should know which resources are available and decide how to use them effectively.

- Define success criteria in measurable terms.

  Focused testing goals and test criteria ensure successful testing. For example, it's not enough to define vague objectives like "Check server response time under heavy load." A more focused success criteria would be "Check that 50 customers can check their account balance simultaneously, and that the server response time will not exceed one minute."

Load test planning is a three-step process:
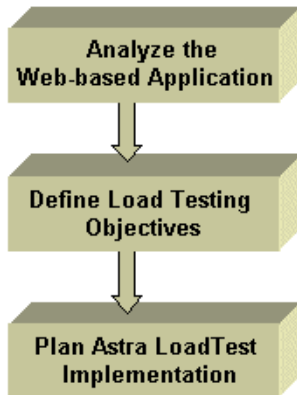
Analyzing the Web-based Application

The first step to load test planning is analyzing the Web-based application. You should become thoroughly familiar with the hardware and software components, the system configuration, and the typical usage model. This analysis ensures that the testing environment you create using Astra LoadTest will accurately reflect the environment and configuration of the system under test.

Identifying System Components

Draw a schematic diagram to illustrate the structure of the Web-based application's architecture. If possible, extract a schematic diagram from existing documentation. If the system under test is part of a larger network system, you should identify the components of the system to be tested. Make sure the diagram includes all system components, such as application clients (GUI), source systems, databases, firewalls, network, middleware, and servers.

Find

Find Again

Top of Chapter

Back

The following diagram illustrates an online banking system which is accessed by many Web users. The Web users each connect to the same database to transfer funds and check balances. The customers connect to the database server through the Web, using multiple browsers.
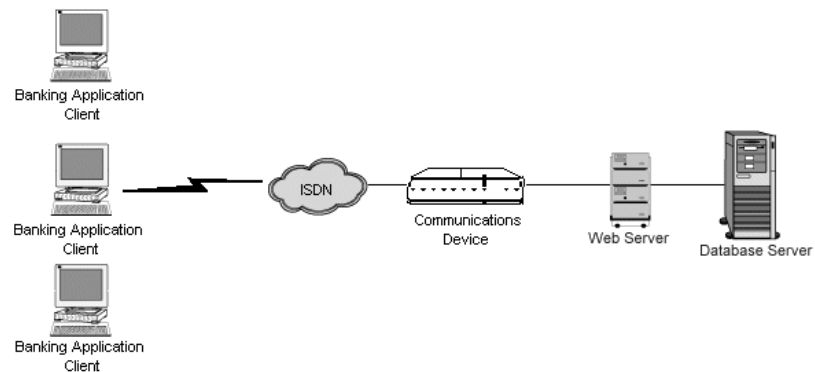
Find

Find Again

Top of Chapter

Back

Describing the System Configuration

Enhance the schematic diagram with more specific details. Describe the configuration of each system component. You should be able to answer the following questions:

- How many users are anticipated to connect to the system?

- What is the application client's machine configuration? (hardware, memory, operating system, software, development tool, etc.)

- What types of Database and Web servers are used? (hardware, database type, operating system, file server etc.)

- How does the server communicate with the application client?

- What is the middleware configuration and application server between the front-end client and back-end server?

- What other network components may affect response time? (modems etc.)

- What is the throughput of the communications devices? How many concurrent users can each device handle?

For example, the schematic diagram above specified that there are multiple application clients accessing the system.

Front-End Client Configuration	
Anticipated number of application clients	50 concurrent application clients
Hardware / Memory	586 / 32MB
Operating system & version	Windows NT 4.0
Client browser	Internet Explorer 4.0

Analyzing the Usage Model

Define how the system is typically used, and decide which functions are important to test. Consider the system interface, the multiple browsers and modems of the application clients, and each client's common tasks. In addition, consider any background load that might affect the system response time.

For example, suppose between 9:00 - 9:15 each business day, 200 application clients log on to check their account balance. During the same time period, 50 application clients log on to transfer funds between accounts. You could create an Astra LoadTest scenario with 250 virtual users signing in to the Web-based application, and check the server response time.

To check how background load affects the response time, you could run your scenario on a network where you also simulate the load of application clients performing various account transactions.

Task Distribution

In addition to defining the common user tasks, examine the distribution of these tasks. For example, suppose the bank uses a central database to serve clients across many states and time zones. The 250 application clients are located in two different time zones, all connecting to the same Web server. There are 150 in Chicago and 100 in Detroit. Each begins their business day at 9:00 AM, but since they are in different time zones, there should never be more than 150 users signing in at any given time.

You can analyze task distribution to determine when there is peak Web activity, and which activities typically occur during *peak load* time.

Find

Find Again

Top of Chapter

Back

Defining Testing Objectives

Before you begin testing, you should define exactly what you want to accomplish.

Following are common Web-based application testing objectives that Astra LoadTest helps you test, as described in Robert W.Buchanan Jr's *The Art of Testing Network Systems* (John Wiley & Sons, Inc., 1996).

Objective	Answers the Question
Measuring end-user response time	How long does it take to complete a business process?
Defining optimal hardware configuration	Which hardware configuration provides the best performance?
Checking reliability	How hard or long can the system work without errors or failures?
Checking hardware or software upgrades	How does the upgrade affect performance or reliability?
Evaluating new products	Which server hardware or software should you choose?
Measuring system capacity	How much load can the system handle without significant performance degradation?
Identifying bottlenecks	Which element is slowing down response time?

A more detailed description of each objective appears at the end of this chapter.

Stating Objectives in Measurable Terms

Once you decide on your general load testing objectives, you should provide more focused goals by stating your objectives in measurable terms. To provide a baseline for evaluation, determine exactly what constitutes acceptable and unacceptable test results.

For example:

General Objective - Product Evaluation: choose hardware for the Web server.

Focused Objective - Product Evaluation: run the same group of 300 virtual users on two different servers, HP and NEC. When all 300 users simultaneously browse the pages of your Web application, determine which hardware gives a better response time.

Find

Find Again

Top of Chapter

Back

Deciding When to Test

Load testing is necessary throughout the product life cycle. The following table illustrates what types of tests are relevant for each phase of the product life cycle:

Planning and Design	Development	Deployment	Production	Evolution
Evaluate new products	Measure response time	Check reliability	Measure response time	Check HW or SW upgrades
Measure response time	Check optimal hardware configuration	Measure response time	Identify bottlenecks	Measure system capacity
	Check HW or SW upgrades	Measure system capacity		
	Check reliability			

Find

Find Again

◀ ▶

Top of Chapter

⬅ **Back**

Planning Astra LoadTest Implementation

The next step is to decide how to use Astra LoadTest to achieve your testing goals.

Defining Vuser Activities

Create Vuser scripts based on your analysis of Vuser types, their typical tasks and your test objectives. Since Vusers emulate the actions of a typical end-user, the Vuser scripts should include a browse sequence that a typical end-user would follow. For example, to emulate an online banking client, you should create a Vuser script that performs typical banking tasks. You would browse the pages that you normally visit to transfer funds or check balances.

You decide which tasks to measure based on your test objectives and define *transactions* for these tasks. Transactions measure the time that it takes for the server to respond to tasks submitted by Vusers (end-to-end time). For example, to check the response time of a bank Web server supplying an account balance, define a transaction for this task in the Vuser script.

In addition, you can emulate peak activity by using *rendezvous* points in your script. *Rendezvous points* instruct multiple Vusers to perform tasks at exactly the same time. For example, you can define a rendezvous to emulate 70 users simultaneously updating account information.

Choosing Testing Hardware/Software

The hardware and software should be powerful and fast enough to emulate the required number of virtual users.

To decide on the number of machines and correct configuration, consider the following:

- It is advisable to run the Astra LoadTest Controller on a separate machine.

- Configuration of the test machine for Vusers should be as similar as possible to the actual user's machine.

Refer to the following table to estimate the required hardware for each Astra LoadTest testing component. These requirements are for optimal performance.

Find

Find Again

Top of Chapter

Back

Windows Configuration Requirements

Requirement	Controller	Web Vuser
Hardware	Pentium 90 or higher	Pentium 120 Mhz or higher recommended for running large numbers of users (more than 30).
Memory	24 MB or more on Controller machine	At least 2 MB per Vuser
Swap Space	Two times the total physical memory	Two times the physical memory
Software	tcp/ip support	HTTP support
1 CPU* supports *x* users	n/a	~250 in multithreaded mode

Note: The results file requires a few MB of disk space for a long scenario run with many transactions. The host machines also require a few MB of disk space for temporary files if there is no NFS. See Chapter 7, **Configuring a Scenario** for more information about run-time file storage.

* Pentium Pro 200 MHz may have multiple CPUs per machine.

Examining Load Testing Objectives

Your test plan should be based on a clearly defined testing objective. This section presents an overview of common testing objectives:

- Measuring end-user response time

- Defining optimal hardware configuration

- Checking reliability

- Checking hardware or software upgrades

- Evaluating new products

- Identifying bottlenecks

- Measuring system capacity

Measuring End-user Response Time

Check how long it takes for the application client to perform a business process and receive a response from the Web server. For example, suppose that you want to verify that while your system operates under normal load conditions, the application client receives responses to all requests within 20 seconds. The following graph presents a sample load vs. response time measurement for a banking application:
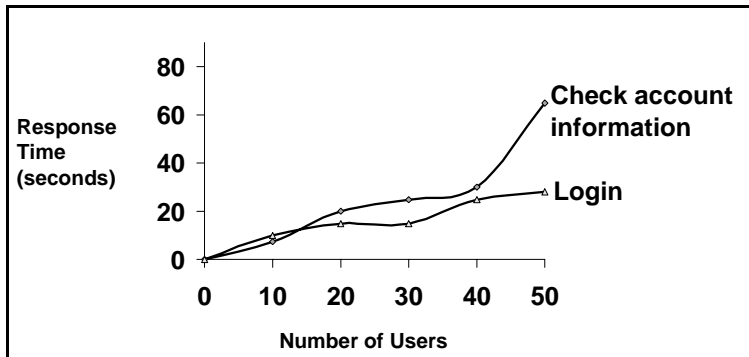
Defining Optimal Hardware Configuration

Check how various system configurations (memory, CPU speed, cache, adaptors, modems) affect performance. Once you understand the system architecture and have tested the application response time, you can measure the application response for different system configurations to determine which settings provide the desired performance levels.

For example, you could set up three different server configurations and run the same tests on each configuration to measure performance variations:

- Configuration 1: 200MHz, 64MB RAM

- Configuration 2: 200MHz, 128MB RAM

- Configuration 3: 266MHz, 128MB RAM

Checking Reliability

Determine the level of system stability under heavy or continuous work loads. You can use Astra LoadTest to create stress on the system: force the system to handle extended activity in a compressed time period to simulate the kind of activity a system would normally experience over a period of weeks or months.

Checking Hardware or Software Upgrades

Perform regression testing to compare a new release of hardware or software to an older release. You can check how an upgrade affects response time (benchmark) and reliability. Regression testing does not check new features of an upgrade; rather it checks that the new release is as efficient and reliable as the older release.

Evaluating New Products

You can run tests to evaluate individual products and subsystems during the planning and design stage of a product's life cycle. For example, you can choose the hardware for the Web server machine or the database package based on evaluation tests.

Identifying Bottlenecks

You can run tests which identify bottlenecks on the system to determine which element is causing performance degradation, for example, file locking, resource contention and network overload. Use Astra LoadTest in conjunction with the new network and host monitoring tools to create load and measure performance at different points in the system. For more information, see Part IV of this manual, *Monitoring Resources*.
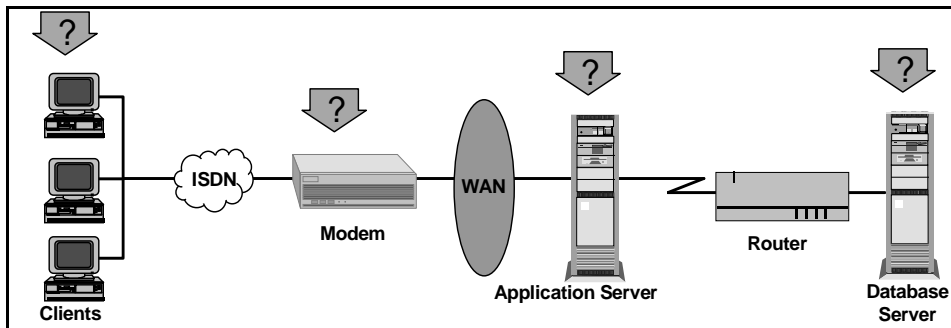
Measuring System Capacity

Measure how much excess capacity the system can handle without performance degradation. To check capacity, you can compare performance versus load on the existing system, and determine where significant response-time degradation begins to occur. This is often called the "knee" of the response time curve.
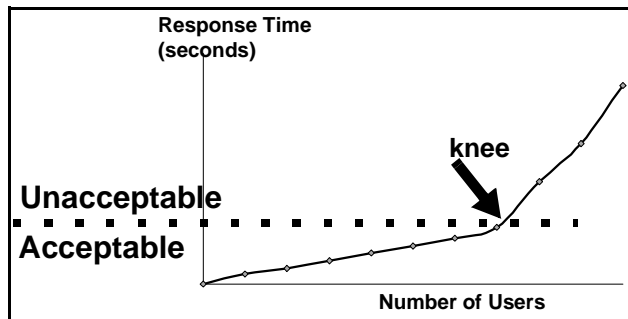
Once you determine the current capacity, you can decide if resources need to be increased to support additional users.

Understanding Astra LoadTest
The Astra LoadTest Controller at a Glance

This chapter introduces the Controller window and explains how to perform basic scenario operations.

This chapter describes:

- **Opening the Controller**
- **Introducing the Astra LoadTest Controller**
- **Selecting Astra LoadTest Commands**
- **Managing Scenario Files**
- **Running a Scenario**

Find
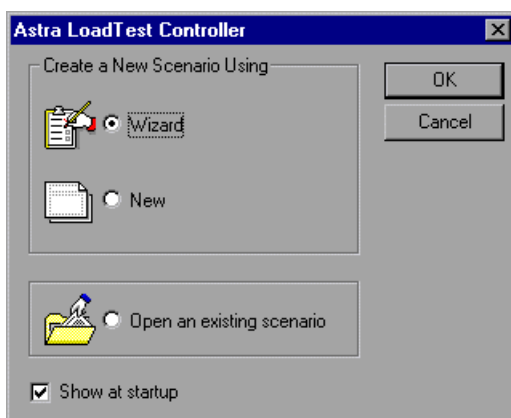
Find Again

Top of Chapter

Back

Opening the Controller

Set up the Astra LoadTest environment according to the instructions in the *Astra LoadTest Installation Guide.*

To open the Controller:

Select **Start > Programs >Astra LoadTest > Products > Controller**.

The Controller window opens with the Astra LoadTest Controller dialog box inside.

The Astra LoadTest Controller dialog box includes the following options:

Wizard: Creates a scenario with the aid of the Astra LoadTest Scenario wizard, an interactive, step-by-step guide to creating a scenario.

New: Creates a new scenario.

Note: You can also create a scenario using the Virtual User Recorder's Open Scenario dialog box. See the *Virtual User Recorder* guide for instructions.

Open an existing scenario: Opens an existing scenario.

Show at Startup: If you do not want this window to appear the next time you start Astra LoadTest, clear the "Show at Startup" check box. When you open the Controller, the window layout from the last time you worked with the Controller appears.

If you want to display this dialog box when the Controller starts, select **View** > **Show Startup Dialog** from the Controller's main menu.

Introducing the Astra LoadTest Controller

The Astra LoadTest Controller window contains the following elements:

Title bar   Displays the name of the scenario on which you are
                    currently working.

Menu bar   Displays the menus from which you select commands.

Tool bar   Provides shortcuts for selecting commands. Clicking on a
                    button executes a command.

Status bar   Provides information on the current state of the scenario.
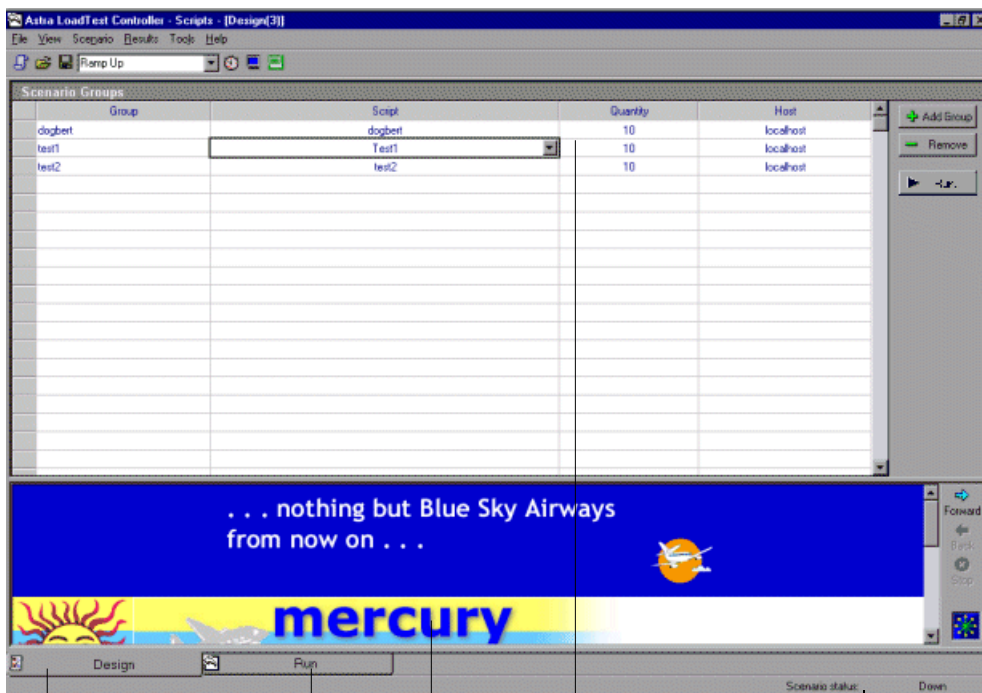
Find

Find Again

Top of Chapter

Back

Design tab　　　*Run tab*　　　*Scenario Groups window*　　*Status Bar*

Browser pane

The Controller window has two tabs which correspond to two views:

Design view
Displays the Scenario Groups window with a list of all the Vuser groups in a scenario (default view), and the Vuser scripts, host machines, and Vusers assigned to each group. This view also displays the Browser pane in which you can preview a script. Select **View > Show Preview Script** to view the Browser pane.

Run view
Displays information on the running Vusers and Vuser groups, as well as online monitor graphs showing transaction, server resource, Web server resource, and Web application server information.

🔍 Find

Find Again

◀ ▶

🔲 Top of Chapter

⬅ Back

In addition, if you select **View > Output**, the Controller opens the **Output** window which displays error and notification messages generated by Vusers during scenario execution.
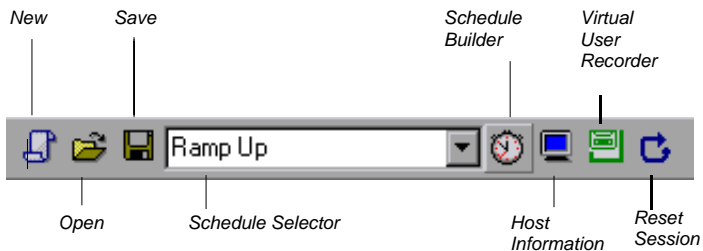
Selecting Astra LoadTest Commands

You select Astra LoadTest commands from the menu bar or on the toolbar.

Choosing Commands from a Menu

You select Astra LoadTest commands from the menus on the menu bar. Some commands use standard Microsoft Windows shortcut conventions.

Choosing Commands from the Toolbar

You can execute many Astra LoadTest commands by clicking a button on the toolbar in the Astra LoadTest Controller.

New   *Save*   *Schedule Builder*   *Virtual User Recorder*

Ramp Up

Open   *Schedule Selector*   *Host Information*   *Reset Session*

Find

Find Again

Top of Chapter

← Back

Managing Scenario Files

A scenario describes the events that occur during each load testing session. A scenario contains lists of hosts, Vuser groups, Vusers, tests, transactions, and rendezvous points. You create a scenario using the Design view of Astra LoadTestController.

After you create the scenario, Astra LoadTest saves the information in a scenario file (.*lrs*). You use the commands in the File menu to create, open, save, and close scenario files. Some of these commands are available from the toolbar.

Creating a New Scenario

You record tests for your scenario with the Virtual User Recorder. You can automatically include a recorded test in a new scenario by opening the Controller from the Virtual User Recorder (see the *Virtual User Recorder* guide for further instructions). Click the **Controller** button from the Virtual User Recorder tool bar.

The New command creates a completely new scenario. Note that the New command clears all the information displayed in the Controller windows. To create a new scenario, choose **File** > **New**, or click the **New** button.

You can also create a new scenario by using the Scenario wizard. The wizard is an interactive, step-by-step guide to creating a scenario. To create a new scenario by using the Scenario wizard, select **Tools** > **Scenario Wizard**.

Opening an Existing Scenario

The Open command opens any existing scenario.

To open an existing scenario:

1 Choose **File** > **Open**, or click the **Open** button. The Open Scenario dialog box opens.

Open Scenario

Look in: scenario

test.lrs

File name: test.lrs

Files of type: Astra Scenarios(*.lrs)

Open

Cancel

2 Click a file in the **File Name** list or type a file name in the **File Name** box.

3 Click **OK**. The File Open dialog box closes and the scenario appears in the Astra LoadTest Controller.

Saving a Scenario

The Save command saves the current scenario.

To save a scenario:

1 Choose **File** > **Save**, or click the **Save** button. The Save Scenario dialog box opens the first time you save a scenario.

2 Type a scenario name in the **File Name** text box. Note that by default scenario files have the extension *.lrs*.

3 Click **OK**. The scenario is saved in the location you specified.

Closing a Scenario

Closing a scenario closes all the Controller windows. To close the scenario, choose **File** > **Close**. If you made changes to the scenario, a Save Changes message appears. Choose **Yes** to save the changes you made. All open windows and icons in the Controller close.

Running a Scenario

Once you have designed your scenario, you are ready to run it. You can control the Vusers and Vuser groups and monitor their performance online using the Run view of the Astra LoadTest Controller.

Design tab   *Run tab*   *Scenario Groups window*   *Status Bar*

Online Monitor Graphs   *Scenario Status window*
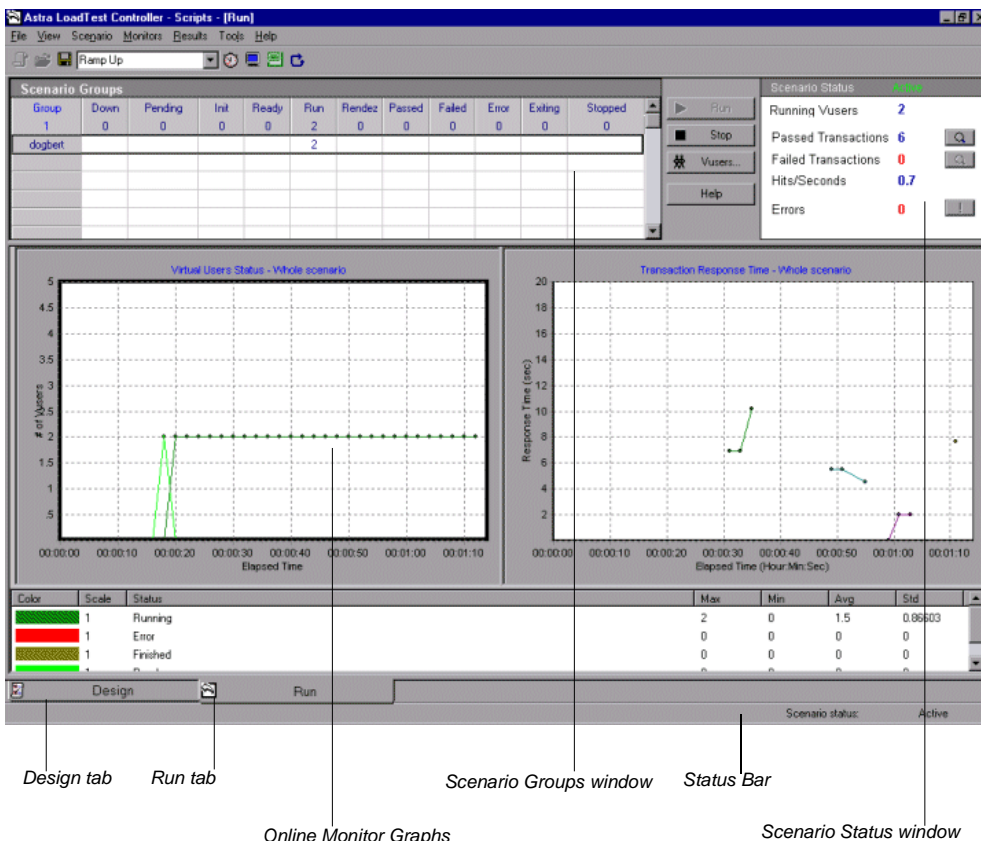
During scenario execution, you use the Scenario Groups window in the Run view to monitor the actions of all the Vusers and Vuser groups in the scenario. The Status field of each Vuser group displays the current state of each Vuser in the group.
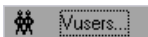
🐾 Vusers...

You can also manipulate individual Vusers within the Vuser groups you have defined by selecting a group and clicking the **Vusers** button. The Vusers dialog box appears, with a list of the **ID**, **Status**, **Script**, **Host**, and **Elapsed** time (since the beginning of the scenario) for each of the Vusers in the group.

ID	Status	Script	Host	Elapsed
1	🏃✓Done. Passed 2 2 0	dogbert	localhost	00:01:04
2	🏃✓Done. Passed 2 2 0	dogbert	localhost	00:01:05
3	🏃✓Done. Passed 2 2 0	dogbert	localhost	00:01:05
4	🏃✓Done. Passed 2 2 0	dogbert	localhost	00:01:05
5	🏃✓Done. Passed 2 2 0	dogbert	localhost	00:01:05
6	🏃✓Done. Passed 2 2 0	dogbert	localhost	00:01:05
7	🏃✓Done. Passed 2 2 0	dogbert	localhost	00:01:05
8	🏃✓Done. Passed 2 2 0	dogbert	localhost	00:01:05
9	🏃✓Done. Passed 2 2 0	dogbert	localhost	00:01:05
10	🏃✓Done. Passed 2 2 0	dogbert	localhost	00:01:05

Run

Stop

Reset

Close

Find

Find Again

Top of Chapter

Back

In addition, you can view a synopsis of the running scenario in the box at the top right-hand corner of the Run view.

While the scenario runs, the Vusers and hosts send error, notification, and warning messages to the Controller. You can view these messages in the Output window (**View > Show Output**).

You use the online monitors and online monitor graphs to monitor Vuser status, transactions, server resources, Web server resources, and Web application server resources while running a scenario.

Designing a Scenario

Designing a Scenario
Creating a Scenario

To build a scenario, you create groups and specify the script, the host, and the number of Vusers included in each group. This chapter describes how to add these items to a scenario.

This chapter discusses:

- **Selecting Scripts for a Scenario**
- **Creating Vuser Groups**
- **Configuring Hosts**
- **Configuring Scripts**
- **Using Relative Paths for Scripts**

About Creating a Scenario

To test your system with Astra LoadTest you must create a scenario, a file with information about the test session. The scenario is the means by which you emulate a real-life user. The scenario contains information about how to emulate real users: the groups of virtual users (Vusers), the test scripts the Vusers will run, and the host machines upon which to run the scripts.

To create a scenario, you first select the scripts you want to use in your scenario. Then you create Vuser groups and assign them a script, a number of virtual users, and a host machine.

Selecting Scripts for a Scenario

When you open the Controller and choose to create a new scenario, the New Scenario dialog box opens.
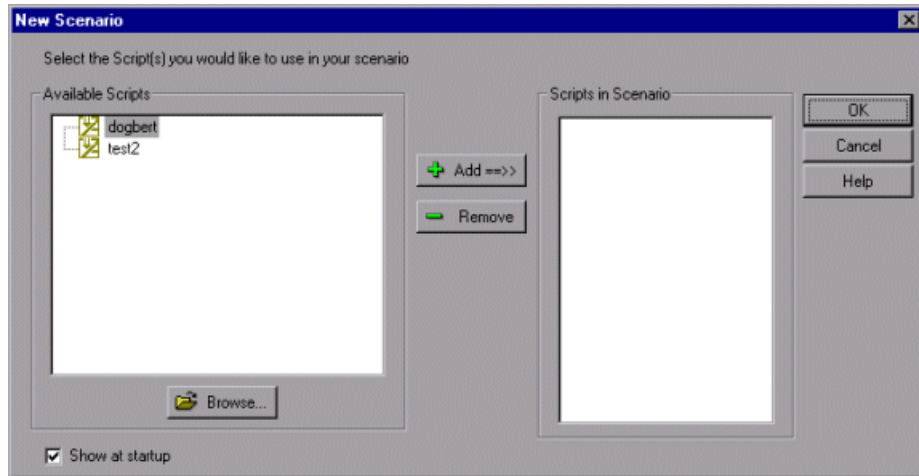
To select the script or scripts that you want to use in your scenario:

1 Select a script from the **Available Scripts** window, or **Browse** to locate the script you want to use.

2 Click the **Add** button to copy the script you selected to the **Scripts in Scenario** window.
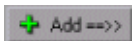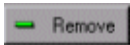
Remove

3 Click the **Remove** button to remove a script from the **Scripts in Scenario** window.

4 To bypass this dialog box the next time you create a new scenario, clear the **Show at startup** check box. You will be able to add scripts later on, while building your scenario. For further details, see **Creating a Scenario** on page 63.

5 Click **OK** to close the dialog box.

Creating Vuser Groups

A scenario consists of groups of Vusers which emulate human users interacting with your Web-based system. When you run a scenario, the Vusers generate load on the server, and Astra LoadTest monitors the server and transaction performance.

You create Vuser groups based on the different tasks you want to assign Vusers. Each group contains a specified number of Vusers that run the same script, and run on the same host machine.

You create Vuser groups from the Scenario Groups window of the Controller.
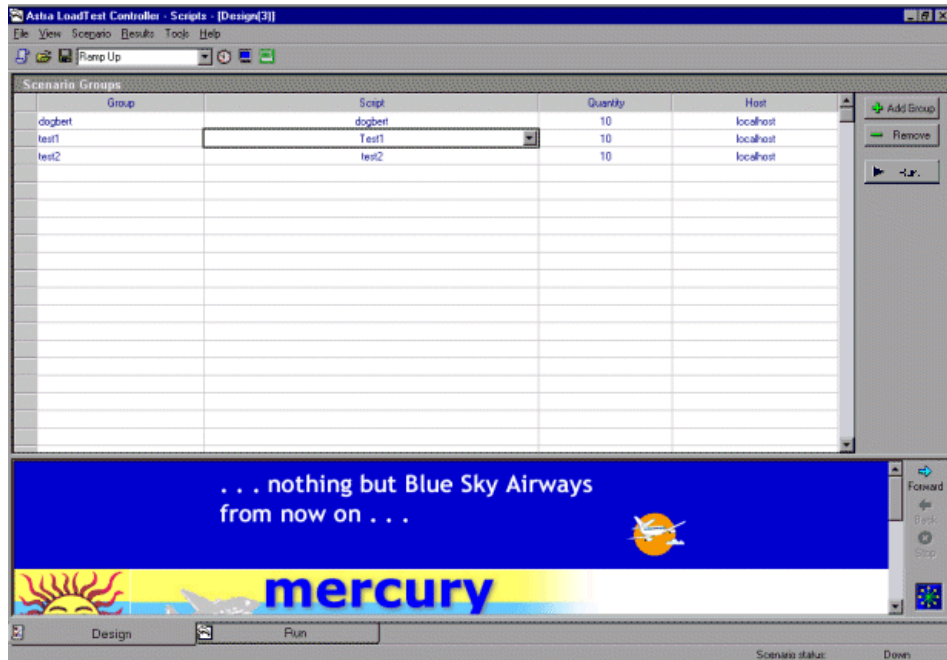
To create Vuser Groups:

1 Click the **Add Group** button on the right of the Scenario Groups window. The Add Group dialog box opens:
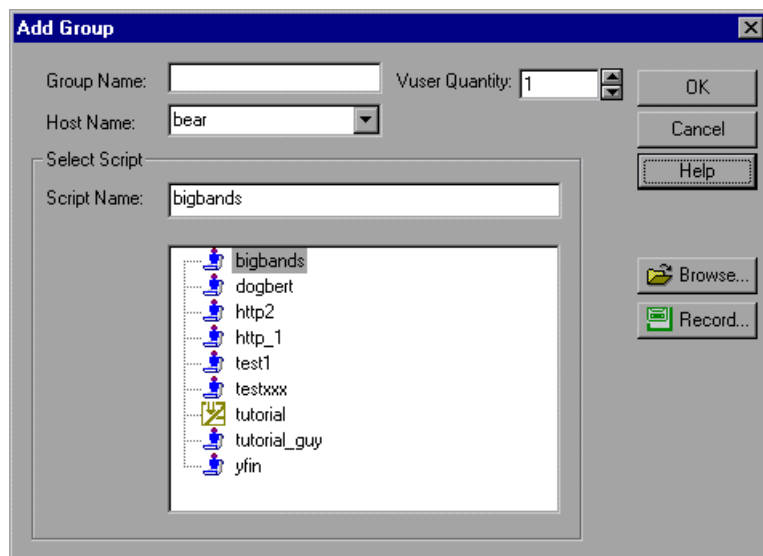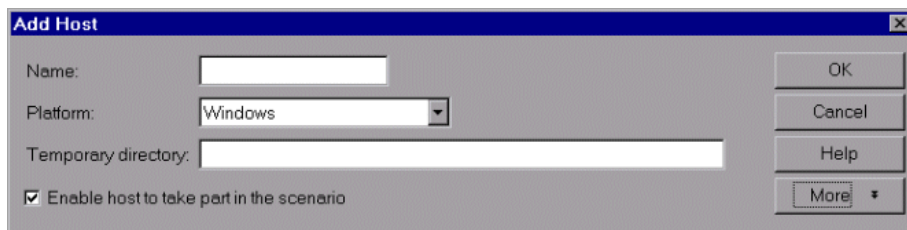
2 In the **Group Name** box, enter a name for the Vuser group.

3 From the **Vuser Quantity** box, select the number of Vusers that you want to create in the group.

4 Select a host from the **Host Name** list. The Host list contains all hosts that you previously added to the scenario.

To use a host that does not appear, select **Add...** from the **Host Name** list. The Add Host dialog box opens:

Type the name of the host in the **Name** box.

By default, Astra LoadTest stores temporary files on the host during scenario execution, in a temporary directory specified by the host's TEMP or TMP environment variables. To override this default for a specific host, type a location in the **Temporary Directory** box.

Click **More** to expand the dialog box and show the Add Host tabs. For information on configuring the Vuser quotas and display attributes, see **Configuring Hosts** on page 72.

Click **OK** to close the Add Host dialog box.

5 Select a script from the **Script Name** list. The Script list contains all scripts that you previously added to the scenario.

To use a script that does not appear, click the **Browse** button. Browse to select the path and file name of the new script.

In the **Script Name** box, type a name for the script. By default, Astra LoadTest uses the script's file name without an extension.

For information on configuring the Command Line, Rendezvous, Groups, and Files, see **Configuring Scripts** on page 76.

6 Click **OK** to close the Add Group dialog box. The new group's properties appear in the Scenario Groups window.

Modifying a Vuser Group from the Scenario Groups Window

You can modify the Script, Vuser Quantity, and Host for a Vuser group directly from the Scenario Groups window of the Controller, or by using the Group Information dialog box.

To modify a Vuser Group directly from the Scenario Groups window:

1 Select the **Group**, **Script**, **Vuser Quantity**, or **Host** you want to modify.

2 Enter or select another name or number for the property.

To modify a Vuser Group using the Group Information dialog box:

1 Double-click the property you want to modify, or right-click it and select **Details**. The Group Information dialog box opens.

2 In the **Group Name** box, enter the Vuser group name.

3 From the **Vuser Quantity** box, select the number of Vusers that you want to run in the group.

4 Select a host from the **Host Name** list. To use a host that does not appear, select **Add...** from the **Host Name** list and add a new host using the Add Host dialog box.

5 To change the script for the Vuser group, click **Change Script**. Select the script you want to use from the Add Scripts dialog box and click **OK**.

6 Click **OK** to close the Group Information dialog box.

Sorting Vuser Groups in the Scenario Groups Window

Once you have created your Vuser groups, you can sort them by group name, script name, host name, or quantity of Vusers assigned to the group.

To sort Vuser groups:

● Select the column by which you want to sort the groups. Double-click the column header.

● Alternatively, you can right-click anywhere within the column you want to sort, and select **Sort By Name**.

Configuring Hosts

You can set a host's attributes while adding it to the host list, or modify the attributes of an existing host at any time, using the Hosts dialog box.

To configure global settings for all hosts participating in the scenario, use Astra LoadTest's Options dialog box. For more information, see Chapter 7, **Configuring a Scenario**. To set properties specific for each host, use the Hosts dialog box as described below.

You can also indicate which hosts will run Vusers in the scenario. For example, if a host is unavailable for a particular scenario run, you can exclude it temporarily instead of removing it entirely from your list of hosts.

You select which hosts will take part in the scenario by using the Enable and Disable commands. Disabling a host temporarily removes it from the list. Enabling a host reinstates it. Disabling hosts is particularly useful if you want to isolate a specific machine to test its performance.

To configure a host:

1 Click the **Hosts** button. The Hosts dialog box opens. The **Name** of the host, its **Status**, and **Details** are displayed.
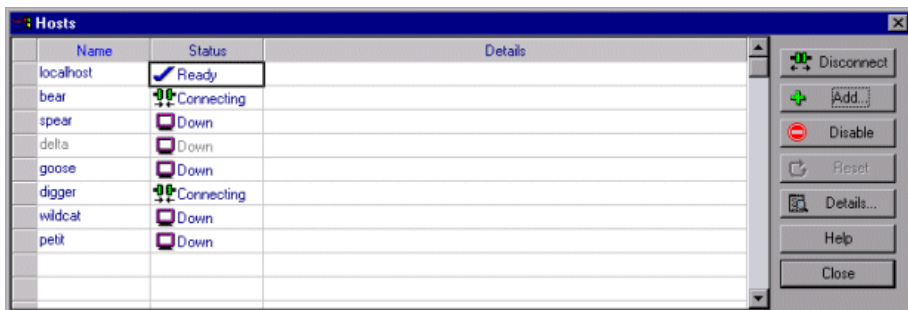
2 Click **Connect** to change the Status of the host from **Down** to **Ready**. Click **Disconnect** to change the Status of the host from **Ready** to **Down**.

3 To disable a host, select the host and click **Disable**. The host name changes from blue to gray, and the host is disabled.

4 To enable a host, select the host and click **Enable**. The host name changes from gray to blue, and the host is enabled.

5 To view details of a host, select the host and click **Details**. The Host Information dialog box opens with information about the host you selected.

6 To add a host, or modify information for an existing host, click **Add**. The Add Host dialog box opens.

Add Host	
Name:	[ ]
Platform:	Windows
Temporary directory:	[ ]

OK
Cancel
Help
Less ▲

Status | Runtime Quota
Host Status:
Details:

Type the name of the host in the **Name** box.

By default, Astra LoadTest stores temporary files on the host during scenario execution, in a temporary directory specified by the host's TEMP or TMP environment variables. To override this default for a specific host, type a location in the **Temporary Directory** box.

Click **More** to expand the dialog box and show the **Status** and **Runtime Quota** tabs.

The **Status** window displays details of the Host Status.

In the **Runtime Quota** window, you determine how many Vusers a host can initialize or stop at a time. Initializing or stopping a large number of Vusers simultaneously, places large stress on a host. To reduce stress on a host, you can initialize or stop smaller batches of Vusers.

In the **Vuser Quota** section, enter the maximum number of Vuser types that the host will initialize or stop simultaneously.

Click **Defaults** to use the Default values.

Click **OK** to close the dialog box.

7 Click **Close** to close the Hosts dialog box. The host name you entered appears in the Host list; its status is set to DOWN.

Configuring Scripts

You add a script to a Vuser group using the Add Group dialog box described above (see **Creating a Scenario** on page 63). Once you have created the Vuser group, you can select a different script for the group to run, or view the details of the script you selected, from the Group Information dialog box.

To select another script for a Vuser group:.

1 Double-click in the Script column, or right-click in the column and select **Details**. The Group Information dialog box opens with the **Path**, **Name**, and **Type** of the script you previously selected.
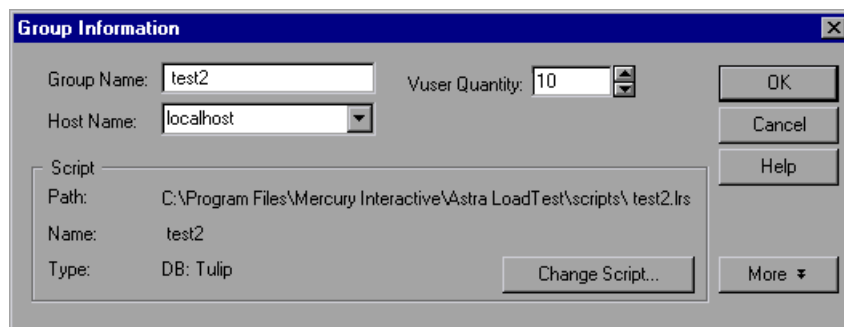
2 To select a different script for the Vuser group, click **Change Script**. The Add
Scripts dialog box opens.
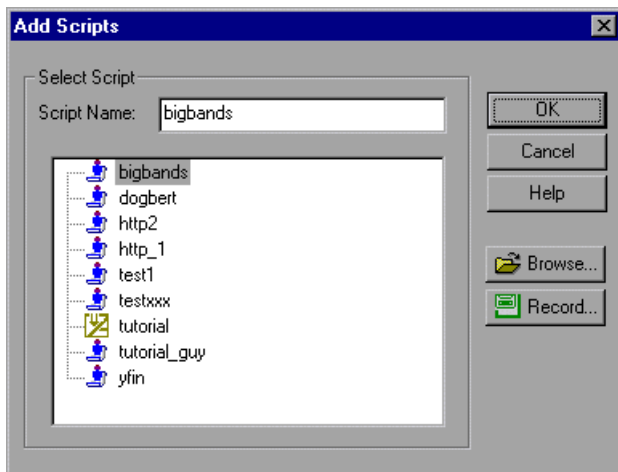
3 Click the Browse button to the right of the **Path** box. The Open Test dialog box
opens.

4 Select the path and file name of the new script.

Note: When you specify the location of a script, you can specify a location that is relative to the current scenario directory. For details, see **Using Relative Paths for Scripts** on page 81.

5 Click **Open** to select the files. The Open Test dialog box closes, and the new script name appears in the Add Scripts dialog box.

6 In the **Script Name** box, type a name for the script. By default, Astra LoadTest uses the script's file name without an extension.

7 Click **OK** to close the Add Scripts dialog box and enter the new script information.

To view script details:

1 Double-click in the Script column, or right-click in the column and select **Details**. The Group Information dialog box opens. You can view the **Path**, **Name**, and **Type** of the script you selected.

2 Click **More** to expand the Group Information dialog box and view additional script information.

3 In the **Command Line** box, type any command line options to use when running the script. For example: -**x** value -**y** value

For information about passing command line argument values to a script, refer to the *Virtual User Recorder* guide.

4 To see the rendezvous points declared in the selected script, click the **Rendezvous** tab.

5 To see the list of Vusers associated with the selected script, click the **Vusers** tab. If you have not yet created Vusers, the box will be empty.

6 To see the list of files used by the script, click the **Files** tab. By default this list shows all files in the script's directory (only after your script has been added to the script list). These files include the configuration settings file, the init, run, and end portions of the script, the parameterization definitions file, and the *usr* file. To exclude a file from the list, click on the check box adjacent to it. To add a file to the list, click **Add**.

7 Click **OK** to close the Group Information dialog box. The new script name and its details appear in the Script list.

Note: If you use the Virtual User Recorder to make changes to a script while the Controller is running, click the **Refresh** button in the Controller's Group Information dialog box to update the script details in the scenario.

Using Relative Paths for Scripts

When you specify the location of a script, you can specify a relative location. The location can be relative to the current scenario directory, or the Astra LoadTest installation directory.

You can specify a path relative to the current scenario directory by typing either of the following notations at the start of the script path:

.\   indicates that the path is relative to the location of the scenario directory.

..\   indicates that the path is relative to the location of the parent directory of the scenario directory.

For example, if the current scenario is located at F:\scenarios, to specify a script located at F:\scenarios\scripts\user.usr, you could type:

    .\scripts\user1.usr

You can specify a path relative to the Astra LoadTest installation directory by typing a percent sign (%) at the beginning of the script path. For example, if the Astra LoadTest installation directory is located at F:\LoadTest, to specify a script located at F:\LoadTest\scripts\user1.usr, you could type:

    %\scripts\user1.usr

Note: When specifying a relative path, you can include standard DOS notation
(.\ and ..\) inside the path, as shown in the following example:
M:\ALT\my_tests\..\..\test.usr.

When you run a scenario, by default, the script is copied to a temporary directory
on the Vuser group machine. This enables the Vuser group host to access the
script locally instead of over a network.

Designing a Scenario
Using Rendezvous Points

Astra LoadTest allows you to check your system's response under specific load. To do this, you can use *rendezvous points* to cause multiple Vusers to perform tasks at exactly the same time, thereby creating intense user load on the server.

This chapter describes:

- **Setting the Rendezvous Attributes**

- **Setting the Rendezvous Behavior**

- **Disabling and Enabling Rendezvous Points**

- **Disabling and Enabling Vusers at Rendezvous Points**

- **Viewing Rendezvous Information**

About Using Rendezvous Points

During a scenario run you can instruct multiple Vusers to perform tasks simultaneously by using rendezvous points. A rendezvous point creates intense user load on the server and enables Astra LoadTest to measure server performance under load.

Suppose you want to measure how a bank server performs when ten Vusers simultaneously withdraw cash from ten different automatic teller machines (ATMs). In order to emulate the required user load on the server, you instruct all the Vusers to withdraw cash at exactly the same time.

You ensure that multiple Vusers act simultaneously by creating a *rendezvous point*. When a Vuser arrives at a rendezvous point, it is held there by the Controller. The Controller releases the Vusers from the rendezvous either when the required number of Vusers arrive, or when a specified amount of time has passed. For details on the release criteria, see **Setting the Rendezvous Behavior** on page 88.

You define rendezvous points in the Vuser script. For information about inserting rendezvous points into Vuser scripts, refer to the *Virtual User Recorder* guide.

Using the Controller, you can influence the level of server load by selecting:

- which of the rendezvous points will be active during the scenario
- how many Vusers will take part in each rendezvous

For example, to test an online bank you could create a scenario that contains two rendezvous points. The first rendezvous ensures that one thousand Vusers simultaneously deposit cash. The second rendezvous ensures that another thousand Vusers simultaneously withdraw cash. If you want to measure how the server performs when only five hundred Vusers deposit cash, you can deactivate (disable) the "withdraw" rendezvous, and instruct only five hundred Vusers to participate in the "deposit" rendezvous.

The following procedure outlines how to control load peaks on the server:

1 Create the Vuser scripts, inserting the necessary rendezvous points.

2 Create a scenario.

When you add a Vuser group to a scenario, Astra LoadTest scans the group's associated script for the names of the rendezvous points and adds them to the list in the Rendezvous window (**Scenario > Rendezvous**). If you create another Vuser group that runs the same script, the Controller adds the new Vusers to the rendezvous and updates the list.

3 Set the level of emulated user load.

You determine the exact level of load by selecting the rendezvous points that will take part in the scenario, and how many Vusers will participate in each rendezvous.

4 Set the attributes for the rendezvous (optional).

For each rendezvous you can set the *timeout* and *policy attributes*. For more information, see **Setting the Rendezvous Behavior** on page 88.

5 Run the scenario.

Setting the Rendezvous Attributes

You can set the following rendezvous attributes from the Rendezvous Information dialog box (**Scenario > Rendezvous**):

● Timeout

● Rendezvous Policy

● Enabling and Disabling Rendezvous

● Enabling and Disabling Vusers

In addition, the dialog box displays general information about the rendezvous point: which script is associated with the rendezvous and release history.

For information on manipulating the Vusers during scenario execution using the Release command, see Chapter 11, **Running a Scenario**.

Setting the Rendezvous Behavior

Setting the rendezvous behavior determines how the Vusers handle a rendezvous point. You set the following behavior attributes for each rendezvous:

timeout   how long the Controller waits before releasing Vusers from a rendezvous.

policy   sets how many Vusers will be released from a rendezvous at a time.

Setting the Timeout Behavior Attribute

The *timeout* determines the maximum time (in seconds) that Astra LoadTest waits for each Vuser to arrive at a rendezvous. After each Vuser arrives at the rendezvous, Astra LoadTest waits up to *timeout* seconds for the next Vuser to arrive. If the next Vuser does not arrive within the *timeout* period, then the Controller releases all the Vusers from the Rendezvous. Each time a new Vuser arrives, the *timer is reset to zero*. The default *timeout* is thirty seconds. You set a *timeout* for each rendezvous point.

To set a timeout:

1 Choose **Scenario** > **Rendezvous**. The Rendezvous Information dialog box opens.

2 Select the rendezvous for which you want to set a timeout from the Rendezvous list .

3 In the **Behavior** section, locate the **Timeout** box. Enter a timeout value—the default is 30 seconds.

4 Click **OK** to close the dialog box and set the timeout for the rendezvous.

Setting the Release Policy Attribute

The policy attribute determines how the Controller releases Vusers from the rendezvous. For each rendezvous you can set the following policies:

All Arrived   Instructs the Controller to release the Vusers from the rendezvous only when all the Vusers included in the rendezvous arrive. All the Vusers are released simultaneously. The default policy is *All Arrived*.

Quota   Sets the number of Vusers that must arrive at a rendezvous point before the Controller releases the Vusers. For instance, suppose that you are testing a scenario of fifty Vusers and that you want a particular operation to be executed simultaneously by ten Vusers. You can designate the entire scenario as participants in the rendezvous and set a quota of ten Vusers. Every time ten Vusers arrive at the rendezvous, they are released.

To set the policy attribute:

1 Choose **Scenario** > **Rendezvous**. The Rendezvous Information dialog box opens.

2 Click a rendezvous in the Rendezvous list.

3 In the **Behavior** section, locate the **Policy** box.

4 To set the policy to All Arrived, select **All Arrived** from the list. The new policy appears in the Policy field.

5 To set the policy to Quota, select **Quota** from the list. The Rendezvous - Quota dialog box opens.
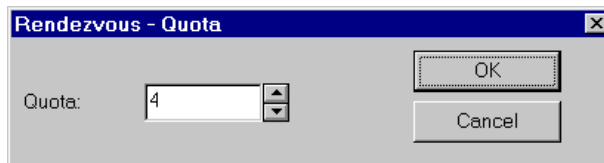
Enter the number of Vusers in the **Quota** box.

6 Click **OK** to close the dialog box. The new policy appears in the Policy field.

Disabling and Enabling Rendezvous Points

You can temporarily disable a rendezvous and exclude it from the scenario. By disabling and enabling a rendezvous, you influence the level of server load.

You use the Disable and Enable buttons in the Rendezvous Information dialog box, to change the status of a rendezvous.

Find

Find Again

Top of Chapter

Back

To disable a rendezvous:

1 Choose **Scenario** > **Rendezvous**. The Rendezvous Information dialog box opens.

2 Select the rendezvous you want to disable.

3 Click the **Disable** button. The button changes to **Enable** and the rendezvous becomes disabled.

To enable a rendezvous:

1 Choose **Scenario** > **Rendezvous**. The Rendezvous Information dialog box opens.

2 Select the disabled rendezvous that you want to enable.

3 Click the **Enable** button. The button changes to **Disable** and the rendezvous becomes enabled.

Disabling and Enabling Vusers at Rendezvous Points

In addition to disabling a rendezvous point for all Vusers in a scenario, Astra LoadTest lets you disable it for specific Vusers. By disabling Vusers at a rendezvous, you temporarily exclude them from participating in the rendezvous. Enabling disabled Vusers returns them to the rendezvous. You use the Disable and Enable commands to specify which Vusers will take part in a rendezvous.

To disable a Vuser in a rendezvous:

1 Choose **Scenario** > **Rendezvous**. The Rendezvous Information dialog box opens.

Find

Find Again

Top of Chapter

Back

2 Select the rendezvous for which you want to disable Vusers from the Rendezvous list .

3 In the section **Enable/Disable Vusers**, select the Vuser(s) you want to exclude from the rendezvous. Select multiple Vusers using the CTRL key.

4 Click **Disable** (the button directly below the Vuser list). The disabled Vusers change from black to gray and will not take part in the rendezvous.

5 To enable a Vuser, select it and click **Enable**.

Viewing Rendezvous Information

During and after a scenario, you can view the rendezvous status in the Rendezvous Information dialog box. The following information is provided:

Time: The time the rendezvous was released.

Reason: The reason the rendezvous released the Vusers. The possible values are *Timeout* or *Arrived*.

Arrived: The number of Vusers that arrived at the rendezvous point, out of the total number of Vusers assigned to the rendezvous.

To view rendezvous information:

1 Choose **Scenario** > **Rendezvous**. The Rendezvous Information dialog box opens.

2 Select the rendezvous whose information you want to view. The rendezvous status is displayed in the **Status Information** section.

You can configure how hosts and Vusers behave when you run a scenario so that the scenario accurately emulates your working environment.

This chapter describes:

Find

Top of Chapter

Back

About Configuring a Scenario

Before you run a scenario, you can configure both the host and Vuser behaviors for the scenario. Although the default settings correspond to most environments, Astra LoadTest allows you to modify the settings in order to customize the scenario behavior. The settings apply to all future scenario runs and generally only need to be set once.

The settings described in this chapter apply to all the hosts in a scenario. To change the settings for individual host machines, refer to Chapter 5, **Creating a Scenario**. If the global scenario settings differ from those of an individual host, the host settings override them.

The settings discussed in this chapter are unrelated to the Vuser Runtime settings. These settings, which apply to individual Vusers or scripts, contain information about logging, think time, and the number of iterations. For information on setting the Run-Time settings, see the *Virtual User Recorder* guide.

For information on setting the options for online monitors, see Chapter 13, **Online Monitoring**.

The Astra LoadTest Expert mode allows you to configure additional settings for the Astra LoadTest agent and other Astra LoadTest components. For more information, see Appendix B, **Working in Expert Mode**.

Saving Messages to the Output Files

By default, Astra LoadTest generates an output file, *output.log*, and stores it in the script directory. This file contains error, warning and notification messages issued by the Controller during scenario execution. Using the Options dialog box, you can select the type of messages to save to the output file. In addition, you can disable the logging entirely.

You can specify the number of messages that will appear in the output window. If the number of messages exceeds the limit, they are deleted. A deletion quota value specifies the number of messages that may be deleted from the output. The deletion quota overrides the limit number. For example, assume that you limit the number of messages to 500 and set the deletion quota to 50. If there are 600 messages, 550 will appear in the output.

To configure the output file:

1 Choose **Tools** > **Options**. The Options dialog box opens. Click the **Output** tab.
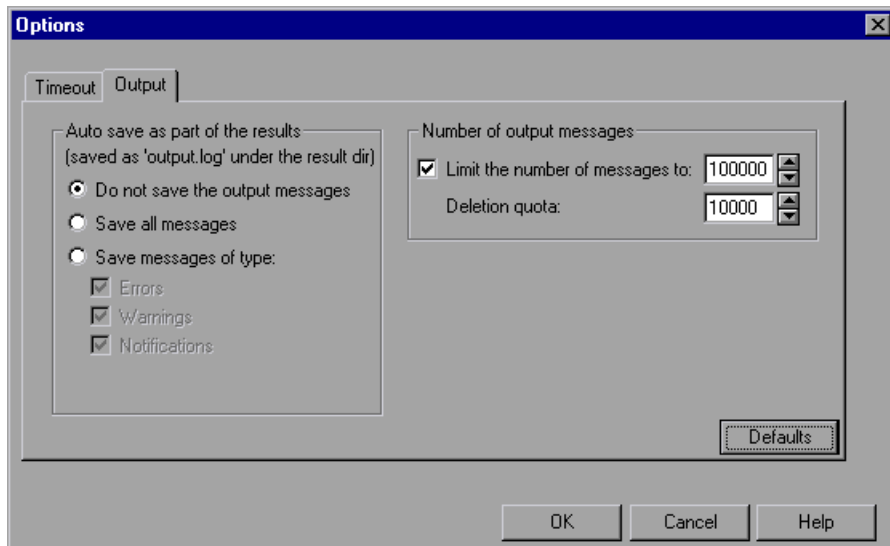
2 Select **Do not save the output messages** to disable writing to the *output.log* file.

3 Select **Save all messages** to instruct Astra LoadTest to save message of all types to the log file.

4 Select **Save messages of type** to exclude a specific message type. Then select the message type(s) to include in the log file.

5 To limit the number of output messages, select **Limit the number of messages to** and specify a value.

6 To set a deletion quota, specify a value in the **Deletion quota** box.

Setting Timeout Intervals

Astra LoadTest enables you to set the timeout interval for commands, pinging of hosts, and Vuser elapsed time.

The command timeouts are the maximum time limits for various Astra LoadTest commands. When a command is issued by the Controller, you set a maximum time for the host or Vuser to execute the command. If it does not complete the command within the timeout interval, the Controller issues an error message.

The command timeouts relate to hosts and Vusers. The host commands for which you can specify a timeout interval are Connect, Disconnect, and Heartbeat. The Vuser commands for which you can specify a timeout interval are Init, Run, Pause, and Abort.

For example, the default **Init** timeout is 180 seconds. If you select a Vuser and click the **Initialize** button, Astra LoadTest checks whether the Vuser reaches the Ready state within180 seconds; if it does not, the Controller issues a message indicating that the Init command timed out.

In the Vuser view, the Elapsed column (the last column) indicates the amount of time that elapsed from the beginning of the scenario. You can specify the frequency in which Astra LoadTest updates this value. The default is 4 seconds.

During scenario execution, Astra LoadTest periodically pings all of the hosts participating in the scenario to ensure that a connection still exists. You can set the ping frequency. The default is 30 seconds.

Note: Astra LoadTest's calculations consider the number of active Vusers and their influence on the timeout values. For example, 1000 Vusers trying to initialize will take much longer than 10 Vusers. Astra LoadTest adds an internal value, based on the number of active Vusers, to the specified timeout value.

To set timeout intervals:

1 Choose **Tools** > **Options**. The Options dialog box opens. Click the **Timeout** tab.

Find

Find Again

Top of Chapter

Back
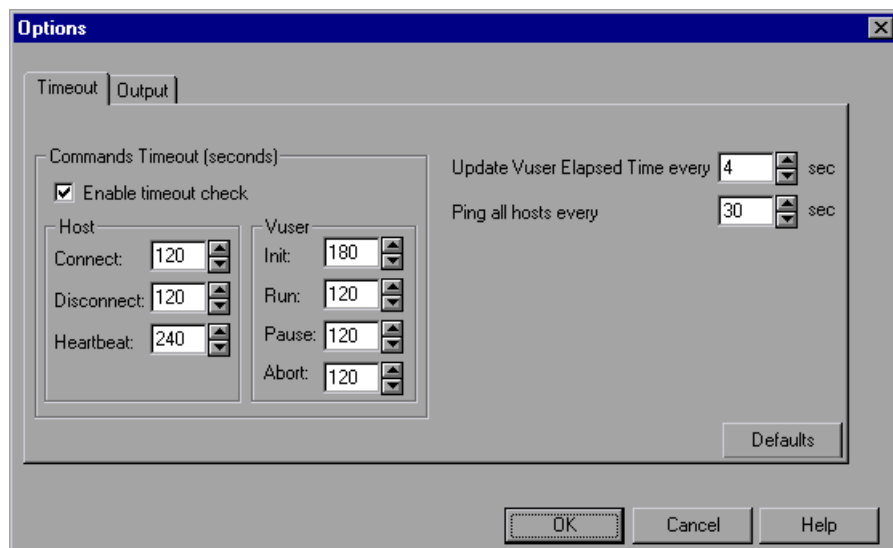
2 Clear the **Enable timeout checks** check box to disable the timeout test. Astra LoadTest waits an unlimited time for the Initialize, Run, Pause, and Stop commands to be executed.

3 To specify a command timeout interval, select the **Enable timeout checks** check box and specify the appropriate timeouts.

4 Specify the frequency at which Astra LoadTest updates the Elapsed time, in the **Update Vuser Elapsed Time every** box.

5 Enter the frequency at which Astra LoadTest pings the various host machines participating in the scenario in the **Ping all hosts every** box.

The Astra LoadTest Expert mode allows you to configure additional timeout-related settings. For more information, see Appendix B, **Working in Expert Mode**.

After you create a scenario, you can set the start and duration time of the scenario or of the Vuser groups within the scenario. In addition, you can gradually run the Vusers within a scenario or within a Vuser group.

This chapter describes:

- **Opening the Schedule Builder**
- **Scheduling a Scenario**
- **Scheduling Vuser Groups**

About Scenario Scheduling

An important factor in the creation of a scenario, is developing a test that accurately portrays user behavior—the types of actions and the timing of those actions. The actions are represented by Vuser scripts. You set the timing aspect of the scenario using the Astra LoadTest Schedule Builder.

You can instruct Astra LoadTest to begin executing a scenario or Vuser group with a delay. You specify the number of minutes to wait from the time a **Run** command is issued, until the scenario or Vuser group begins.

You can limit the time duration of a scenario or Vuser group. You specify the number of minutes a scenario or Vuser group should be in the Running state. When the scenario or group reaches its time limitation, it finishes.

You can stipulate how many Vusers Astra LoadTest runs within a certain time frame during a scenario or Vuser group. You specify whether Astra LoadTest should run all Vusers simultaneously, or run only a certain number of Vusers within a specified amount of time.

Find

Find Again

Top of Chapter

Back

Opening the Schedule Builder

You use the Schedule Builder to schedule both a scenario and an individual Vuser group. You can either create a New Schedule with new properties, or change the properties for one of the two existing schedules: **Slow Ramp Up** and **Ramp Up** (the default schedule).

To open the Schedule Builder:

1 Select Scenario > Schedule Builder or click the **Schedule Builder** button. Alternatively, you can choose **Slow Ramp Up**, **Ramp Up**, or **New Schedule** from the Schedule selector on the toolbar.

If you select **New Schedule**, the New Schedule dialog box opens.
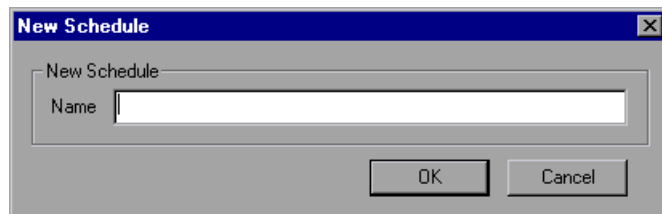
In the **Name** text box, type the name of the New Schedule and click **OK**. The Schedule Builder dialog box opens.
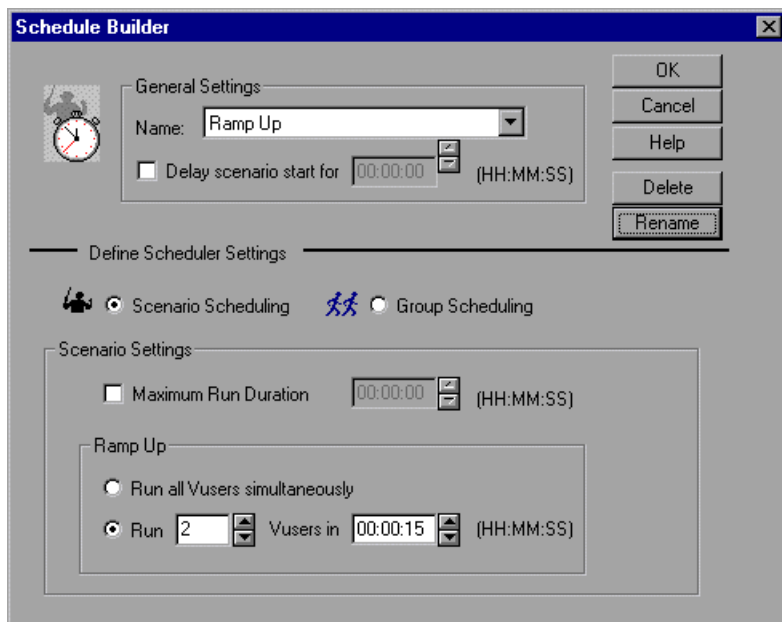
2 In the **General Settings** box, select the schedule name.

To rename a schedule, click **Rename**. Enter the new name you want to use in the dialog box that opens. To delete a schedule, click **Delete**.

3 To delay the start of the scenario, check **Delay scenario start for** and select the amount of time you want to delay the start of your scenario.

Scheduling a Scenario

Using the Schedule Builder, you can control the execution of your scenario by:

- Limiting the scenario duration
- Gradually running Vusers within a scenario

   To set the scheduling options for a scenario:

1 Select the **Scenario Scheduling** option.

```
┌─ Define Scheduler Settings ──────────────────────────┐
│                                                        │
│  👤 ⦿ Scenario Scheduling    🏃 ○ Group Scheduling    │
│  ┌─ Scenario Settings ──────────────────────────────┐ │
│  │  ☐ Maximum Run Duration  [00:00:00] ⬍ (HH:MM:SS) │ │
│  │  ┌─ Ramp Up ────────────────────────────────────┐ │ │
│  │  │  ○ Run all Vusers simultaneously             │ │ │
│  │  │  ⦿ Run [2] ⬍ Vusers in [00:00:15] ⬍ (HH:MM:SS)│ │ │
│  │  └──────────────────────────────────────────────┘ │ │
│  └──────────────────────────────────────────────────┘ │
└────────────────────────────────────────────────────────┘
```

2 In the **Scenario Settings** box, select **Maximum Duration** and specify the maximum amount of time you want to allot to the scenario.

   3 In the **Ramp Up** box:

● Select **Run all Vusers simultaneously** if you want to run all the Vusers at once.

● To gradually run the Vusers, select the number of Vusers you want to run and the time span within which you want to run them.

   4 Click **OK** to save your settings.

Scheduling Vuser Groups

After you create a Vuser group, you can schedule the group's script execution by setting:

● the amount of time after the start of the scenario that the group must wait before it starts running

● the number of Vusers that will run within a specified period of time

● the amount of time the group will run

To schedule a Vuser Group:

1 Select the **Group Scheduling** option.
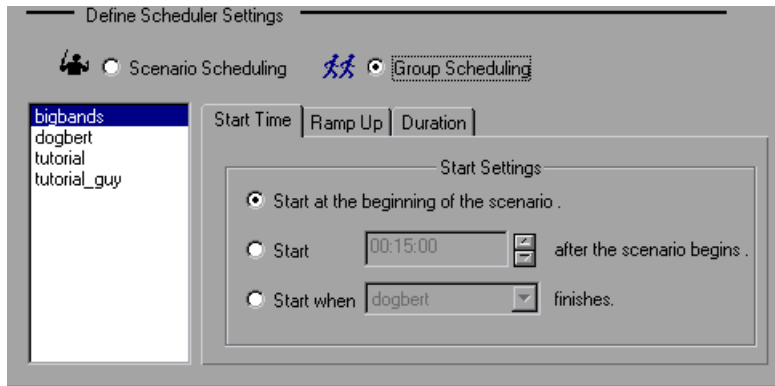
2 Select a group from the box on the left.

3 To set the start time for the group, click the **Start Time** tab. Choose one of the following three options:

● Start the group at the beginning of the scenario.

● Specify the amount of time that you want to elapse before the group begins running.

● Specify that you want to begin the group after another group finishes running.

4 To set the ramp up for the group, click the **Ramp Up** tab.

Choose one of the following options:

● Load all of the Vusers simultaneously.

● Specify the number of Vusers you want to load within a certain period of time.

5 To set the duration of the group, click the **Duration** tab.
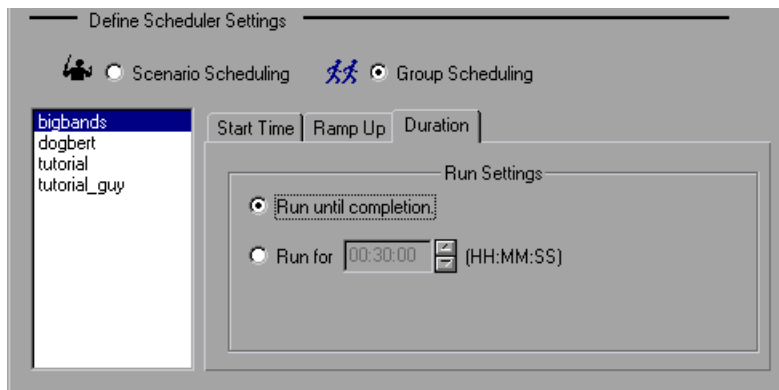
Choose one of the following options:

• Run until completion.

Note: Specify the amount of time for which you want to run the group. The duration setting overrides the Vuser iteration settings. This means that if the duration is set to five minutes (the default setting), the Vusers will continue to run as many iterations as required in five minutes, even if the run-time settings specify only one iteration.

---

6 Click **OK** to close the Schedule Builder and save your settings.

Before you run a scenario, you specify a location for the scenario results and other runtime related settings.

This chapter describes:

- **Specifying a Results Location**
- **Results Directory File Structure**
- **Collating Results**
- **Limiting Access to a Host Machine**
- **Setting Scenario Summary Information**

Find

Find Again

Top of Chapter

Back

About Preparing to Run a Scenario

Before you run a scenario, you need to specify the location of the results (mandatory), assign a name to the results, schedule the scenario, and provide scenario summary information. In addition, you can specify the applications to invoke at the start of a scenario.

Although most of the pre-scenario settings are optional, by using them you can enhance the testing process. These values are scenario specific—you can set different values for each Astra LoadTest scenario.

For information on one-time configuration settings such as timeout, output, and quotas, see Chapter 7, **Configuring a Scenario**.

Find

Find Again

Top of Chapter

Back

Specifying a Results Location

When you run a scenario, by default the runtime files are stored locally on each host. After the scenario, the results are collated together and processed on the Controller machine.

You can also use Mercury Interactive's test management program, TestDirector, to store results to a project. For information on connecting to a TestDirector database, see Chapter 10, **Managing Scenarios Using TestDirector**.

Astra LoadTest allows you to give descriptive names to each result set. This is especially useful for cross results analysis, which lets you compare the results of multiple scenario runs. Astra LoadTest superimposes the results of several scenario runs in a single graph. The descriptive graph names enable you to distinguish between the results of the multiple runs.

Find

Find Again

Top of Chapter

Back

In the example below, the results of two scenario runs are superimposed. The result sets are *res12,* and *res15*.
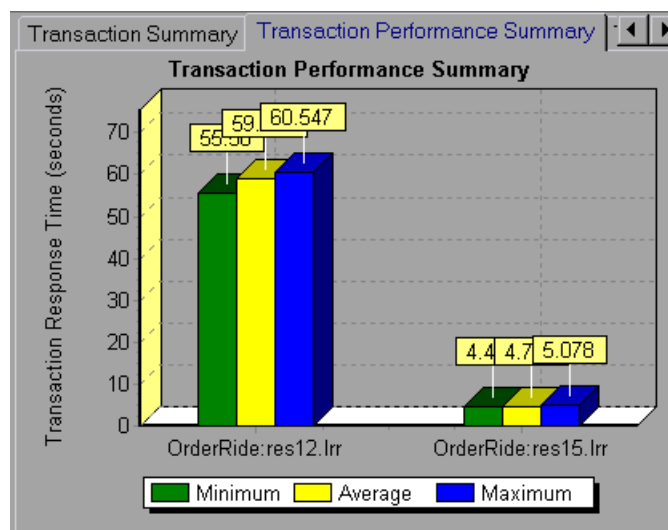
For more details on cross-scenario graphs, see the *Astra LoadTest Analysis User's Guide*.

To specify where results are stored(not in TestDirector):

1 Choose **Results** > **Results Settings**. The Set Results Directory dialog box opens.

Set Results Directory

Results name: `res_b`

Directory: `R:\LR_TESTS`   Browse...

Results path: `R:\LR_TESTS\res_b`

☐ Automatically create a results directory for each scenario execution

☐ Automatically overwrite existing results directory without prompting for confirmation

[OK]   [Cancel]   [Help]

(Navigation icons: Find, Find Again, arrows, Top of Chapter, Back)
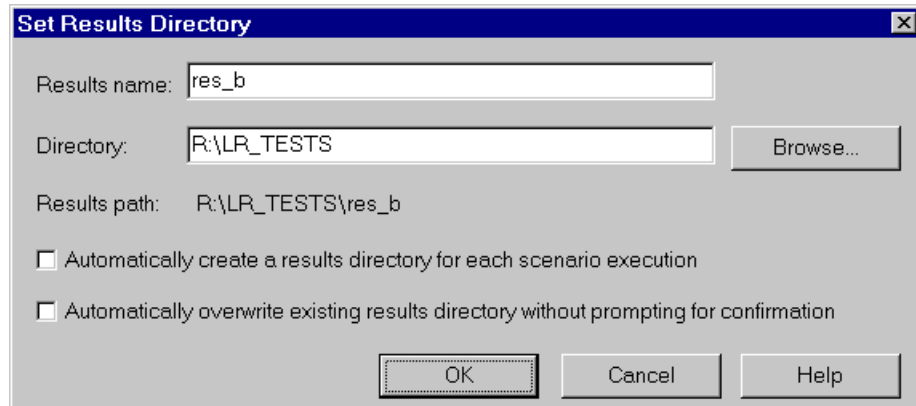
2 In the **Results Name** box, enter a name for the results. Avoid using the same name with different paths, since the names will appear identical on the graphs.

3 In the **Directory** box, type the full path of the results directory. If you are using the default file storage setting (local machine), specify a directory in which to store all of the collated results after the scenario run. If you specified a shared network drive as the file storage method, specify the directory to which Vuser groups should write during scenario execution.

Using the results name from step 2, the Controller creates a subdirectory within the results directory. All results are saved within this subdirectory.
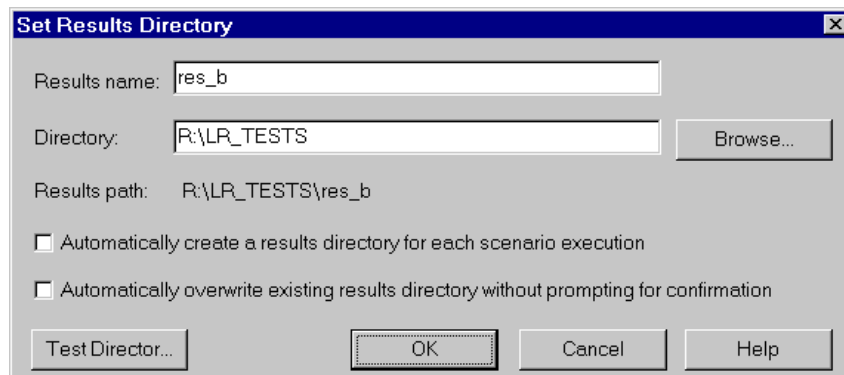
4 Select the appropriate check box for subsequent executions: **Automatically create a results directory for each scenario execution** or **Automatically overwrite existing results directory without prompting for confirmation**.

5 Click **OK** to save the results directory setting.

To specify where results are stored (using TestDirector):

1 Choose **Tools** > **TestDirector Connection** to open a connection to a TestDirector server and database.

2 Open a scenario from the database (**File** > **Open**), or save the current scenario to the TestDirector database (**File** > **Save As**).
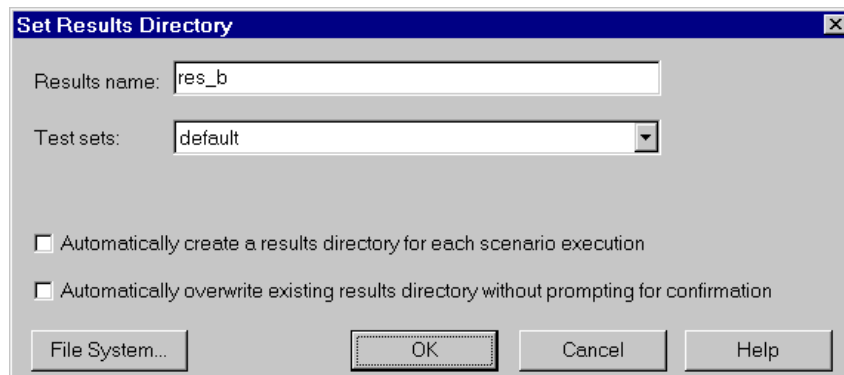
3 Choose **Results** > **Results Settings**. The Set Results Directory dialog box opens.

Set Results Directory

Results name: res_b

Directory: R:\LR_TESTS   Browse...

Results path: R:\LR_TESTS\res_b

☐ Automatically create a results directory for each scenario execution

☐ Automatically overwrite existing results directory without prompting for confirmation

Test Director...   OK   Cancel   Help

4 Click **TestDirector**. The **Directory** box changes to **Test sets**.

Set Results Directory

Results name: res_b

Test sets: default

☐ Automatically create a results directory for each scenario execution

☐ Automatically overwrite existing results directory without prompting for confirmation

File System...   OK   Cancel   Help

5 In the **Results Name** box, enter a name for the results. Avoid using the same name with different paths, since the names will appear identical on the graphs.

6 Select an existing test set from the **Test Sets** list, or specify a new one.

7 Select the appropriate check box for subsequent executions: **Automatically create a results directory for each scenario execution** or **Automatically overwrite existing results directory without prompting for confirmation**.

8 Click **OK** to save the results settings.

Results Directory File Structure

When you set the results directory, you also specify a results name. Astra LoadTest creates a subdirectory using the results name, and places all of the data it gathers in that directory. Every set of results contains general information about the scenario in a result file (.*lrr*) and an event (.*eve*) file.

During scenario execution, Astra LoadTest also gathers data from each Vuser and stores it in an event file _t_rep.eve and an output file *output.txt.* Astra LoadTest creates a directory for each group in the scenario and a subdirectory for each Vuser. A typical result directory has the following structure:

Results directory
Results name
Event file
Definition file
Result file
Output logfile
Data directory
Group directory

Vuser directories

Vuser files
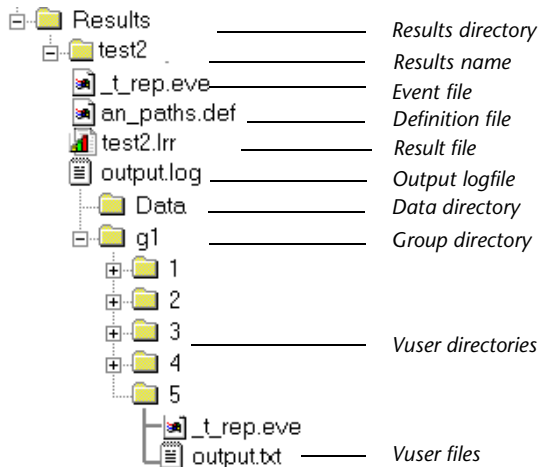
- *t_rep.eve* in the main result directory contains Vuser and rendezvous information.

- **.def* are definition files for graphs that describe the online and other custom monitors.

- *results_name.lrr* is the Astra LoadTest Analysis document file.

- *output.log* contains output information about the scenario generated during test execution.

- The *Data* directory contains the database created by the Analysis (from the results files).

- *g1* is a group directory. A separate directory exists for each Vuser group that runs in the scenario. Each group directory consists of Vusers subdirectories.

- *t_rep.eve* in each Vuser directory contains transaction information.

- *output.txt* in each Vuser directory contains output information generated during replay.

  When you generate analysis graphs and reports, the Astra LoadTest Analysis engine copies all of the scenario result files (*.eve* and *.lrr*) to a database. Once the database is created (and stored in the *Data* directory), the analysis works directly with the database and does not use the result files.

  For information on Astra LoadTest Analysis, see the *Astra LoadTest Analysis User's Guide*.

Collating Results

When you run a scenario, by default all Vuser information is stored locally on each host. After scenario execution, the results are automatically *collated* or consolidated—results from all of the hosts are transferred to the results directory. You set the location of the results directory as described in **Specifying a Results Location** on page 115.

To disable automatic collation, choose **Results** > **Auto Collate Results** to clear the check mark adjacent to the option. To manually collate results, choose **Results > Collate Results**. If your results have not been collated, then Astra LoadTest will automatically collate the results before generating the analysis data.

Limiting Access to a Host Machine

You can limit access to a host by creating a list of authorized machines in the host's Remote Command Launcher (shortcut menu). Only machines which appear on the list are authorized to launch applications on the host.

To limit access to a host machine:

1 Make sure that the Remote Command Launcher, *rmcdl.exe*, is active on the host machine.

2 Select **Edit Permissions** from the Remote Command Launcher's shortcut menu.

The host list opens in Notepad.

3 Create or update the list of machines which are authorized to access this host. Place each machine name on a separate line.

4 Close the Notepad file.

5 To save the permissions list, select **Update Permissions** from the Remote Command Launcher's shortcut menu.

Setting Scenario Summary Information

The Controller allows you to provide a detailed description of the scenario. In addition, you can specify the author's name and a subject title for the scenario. Whenever you open this scenario, the summary information is available to you.

To set the scenario summary information:

1 Choose **Scenario** > **Summary Information**. The Summary Information box opens.

Summary Information	⊠
Scenario path: E:\Program Files\Mercury Interactive\LoadRunner\vusers\tutorial\lesson8.lrs	
Author:	john
Subject:	Flight Reservation
Description:	
This scenario creates 14 flight reservations ranging from 1 to 10 seats. The script, reserve, is executed 10 times with 200 Vusers.	
	OK Cancel

2 In the **Author** box, enter the name of the author.

3 In the **Subject** box, enter a subject name or short title for the scenario.

4 In the **Description** box, enter a detailed description about the scenario.

5 Click **OK** to close the dialog box.

Astra LoadTest integration with TestDirector lets you manage Astra LoadTest scenarios using TestDirector. TestDirector helps you organize and manage all scripts, scenarios, and results using a repository.

This chapter describes:

- **Opening a Connection to a TestDirector Project**

- **Opening a Scenario Using TestDirector**

- **Saving Scenarios to the TestDirector Project**

- **Saving Results to the TestDirector Project**

- **Adding Vuser Scripts with TestDirector**

- **Managing Your Scenario in TestDirector**

For detailed information on using TestDirector to manage your scenarios, refer to the *TestDirector User's Guide.*

About Managing Scripts Using TestDirector

Astra LoadTest works together with TestDirector, Mercury Interactive's test management tool. TestDirector provides an efficient method for storing and retrieving scenarios and collecting results. You store scenarios and results in a TestDirector repository and organize them into unique groups.

The Controller's **Tools** menu contains two menu items related to TestDirector. The first item, *TestDirector Connection* changes the test repository from the standard file system to the TestDirector database. The second item, *TestDirector,* invokes TestDirector. To save scenario results to a TestDirector repository, it is sufficient to open the TestDirector connection. However, if you want to include details about the scenario, open TestDirector and enter the appropriate details from the program's UI.

The following sections describe how to use the TestDirector repository to:

- open scenarios
- save scenarios
- save results
- open scripts

Opening a Connection to a TestDirector Project

Before you can work with a TestDirector project, you must open a connection to the server hosting the project.

To open a connection to a TestDirector project:

1 Choose **Tools** > **TestDirector Connection** (*not* TestDirector) from the Controller.

2 In the **Server** box, type the name of the TestDirector server and click **Connect**. A message appears indicating that Astra LoadTest is connecting to the server.

3 In the **Project Connection** box, select one of the available projects.

4 Provide the user login and password.

5 Select the **Reconnect on Startup** check box to automatically open the connection to the TestDirector server and project when you start Astra LoadTest.

6 If you select **Reconnect on Startup**, you can save the specified password to automate the login process. Select the **Save Password for Reconnection on Startup** check box.

7 Click **Connect**. A message appears indicating that Astra LoadTest is connecting to the project.

8 Click **Close** to close the Connection to TestDirector dialog box.

Opening a Scenario Using TestDirector

You can open a scenario through the standard file system or the TestDirector repository. Before opening a scenario through TestDirector, make sure you have opened a connection to the project.

To open a scenario from the TestDirector repository:

1 Choose **File** > **Open** or click the **File Open** button. The Open Scenario from TestDirector Project dialog box opens.
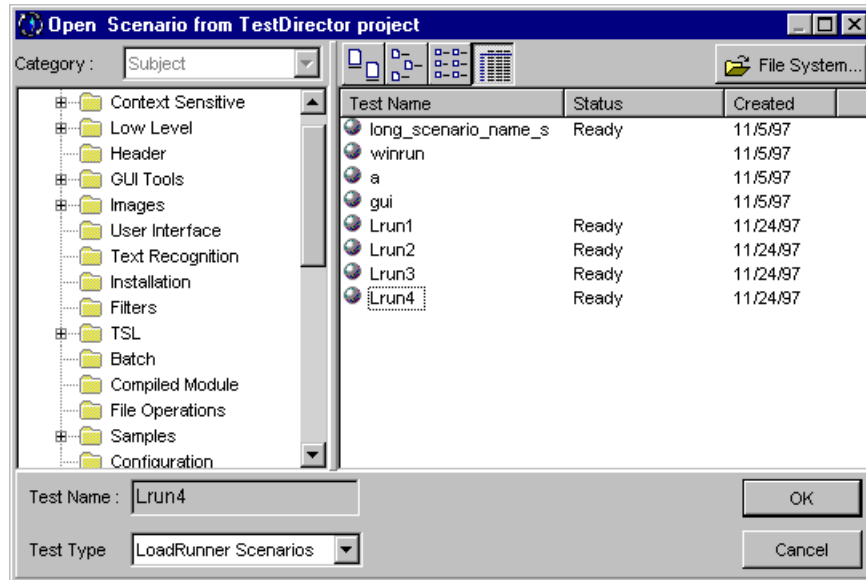
2 Select an Astra LoadTest scenario from the project.

3 Click **OK**. Astra LoadTest loads the scenario. The name of the scenario appears in the Controller's banner. The Design tab shows the scripts, the hosts, and the Vusers and Vuser groups in the scenario.

4 To select a scenario file from the standard file system, click the **File System** button in the upper right corner of the dialog box. The Open dialog box opens.
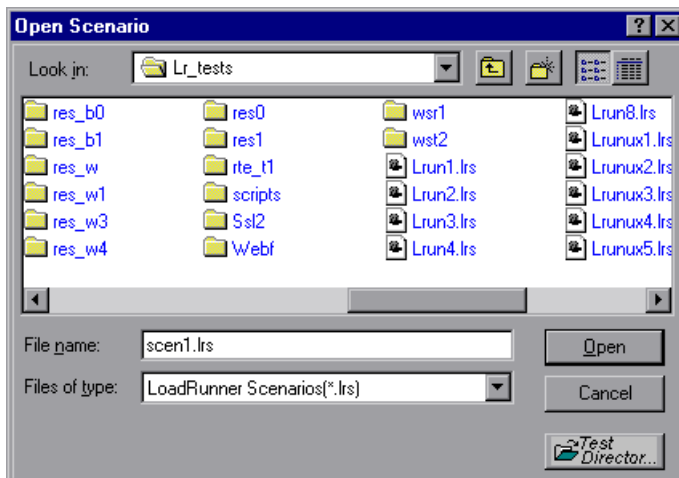
5 To return to the Open from TestDirector Project dialog box, click the **TestDirector** button in the bottom right of the dialog box.

Saving Scenarios to the TestDirector Project

You can save a new scenario, or one that previously existed as a local file, into the TestDirector project.

To save a scenario to the TestDirector project:

1 Connect to the TestDirector server (see **Opening a Connection to a TestDirector Project** on page 128.)

2 Choose **File** > **Save As**. The Save in TestDirector Project dialog box opens.
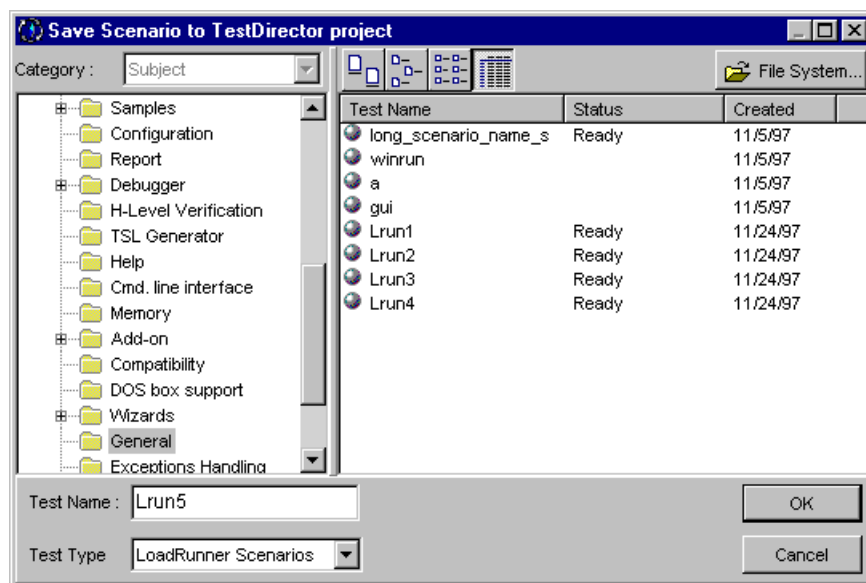
   3 Type a scenario name, select a folder and click **OK**.

   4 To save the scenario to disk, click **File System** and save the file as you would on a standard file system.

Saving Results to the TestDirector Project

Before you run a scenario, you set the results location. If you have a connection open to the TestDirector project, results are saved to the default test set. You can also save the results to a new or existing test set, or to disk using the standard file system.

To specify a results location:

1 Choose **Results** > **Results Setting**. The Set Results Directory dialog box opens.

Set Results Directory	
Results name:	res_b
Directory:	R:\LR_TESTS
Results path:	R:\LR_TESTS\res_b

☐ Automatically create a results directory for each scenario execution

☐ Automatically overwrite existing results directory without prompting for confirmation

OK   Cancel   Help
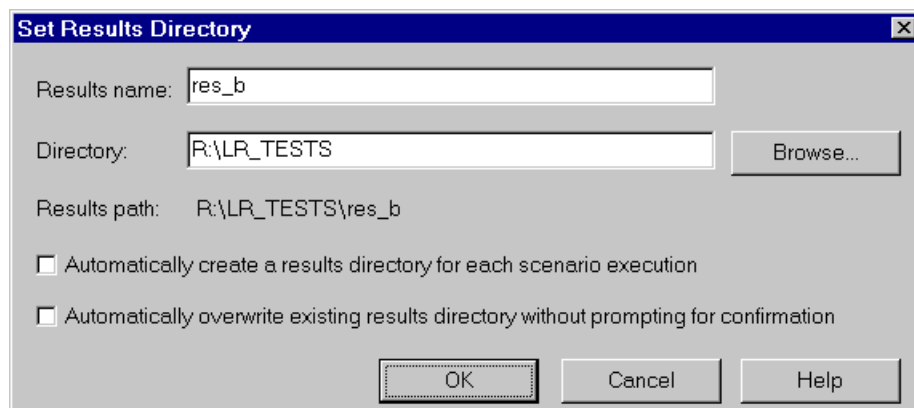
If you have a connection to TestDirector, a TestDirector button also appears.

2 Type a name for the results in the **Results name** box.

3 Specify a directory for the results, or click **TestDirector** to save the results in a TestDirector repository.

4 For a TestDirector project, specify the name of a test set.

5 Click **OK** to close the dialog box.

Adding Vuser Scripts with TestDirector

You can add scripts from the TestDirector project to the Controller's script list.

To add a script to the script list:

1 Connect to the TestDirector server (see **Opening a Connection to a TestDirector Project** on page 128.)

2 In the Scenario Groups window, double-click within the **Script** column. The Group Information dialog box opens. Click the **Change Script** button. The Add Scripts dialog box opens.
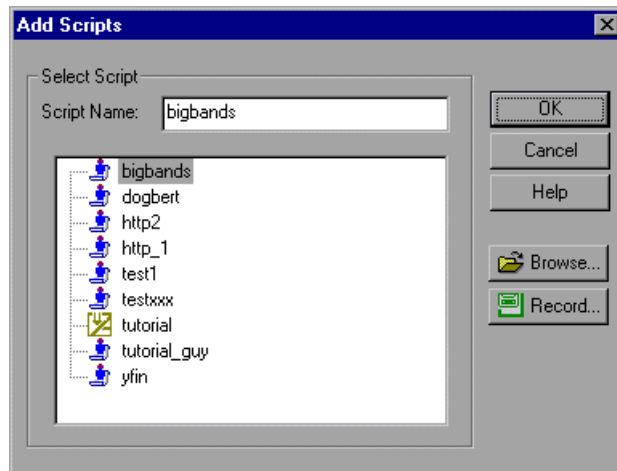
3 Click the **Browse** button to the right of the Path box. The Open dialog box opens.

4 Locate the script in the TestDirector repository and click **OK**. The full path and name of the script appear in the Path box. TestDirector scripts are preceded by a "[TD]".

5 Click **OK** to close the Add Scripts dialog box. The script appears in the Script column in the Scenario Groups window.

Managing Your Scenario in TestDirector

You can further utilize TestDirector to manage scenario and test information. After you save a scenario to the TestDirector project, you can enter details about the scenario and the structure of the test.

To enter scenario details:

1 Choose **Tools** > **TestDirector** or click the **TestDirector** button to start TestDirector.

2 Open the database where the results are stored and select a scenario.

3 Enter information about the test level, version, owner, and designer.
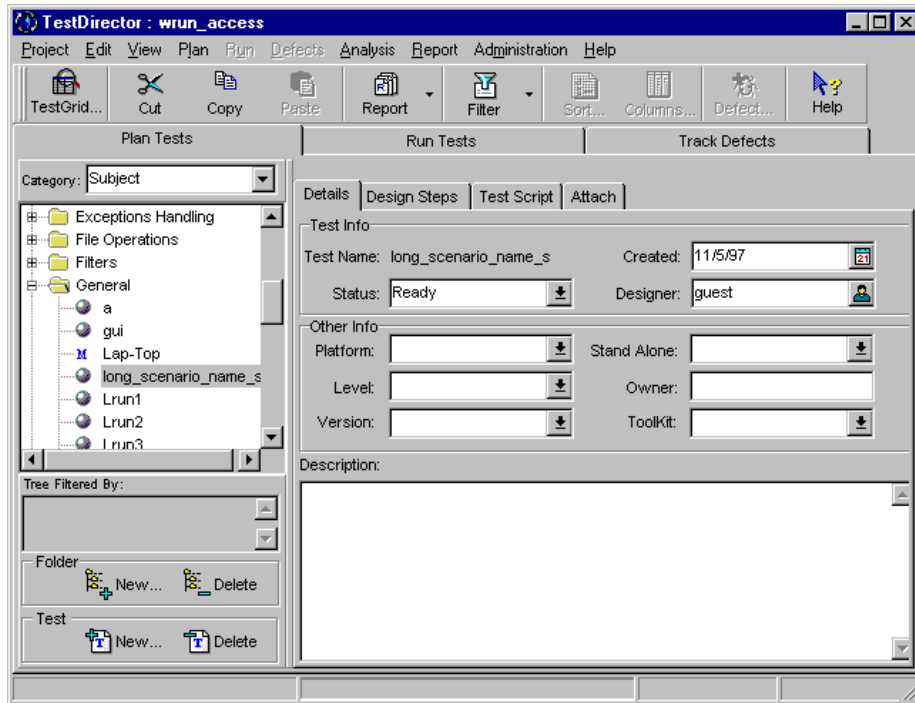
TestDirector also enables you to manage the user access to a test's project. By creating a list of authorized users and assigning each user a password and user type, you control the kinds of additions and modifications each user makes to the project. The user type determines the privileges that the user has within TestDirector.

For more information on using TestDirector to manage your scenarios, refer to the *TestDirector User's Guide.*

Executing a Scenario

When you run a scenario, Astra LoadTest generates load on the Web system you are testing, and measures the system's performance.

This chapter describes:

- **Running an Entire Scenario**
- **Controlling Vuser Groups**
- **Controlling Individual Vusers**
- **Manually Releasing Vusers from a Rendezvous**

About Running a Scenario

When you run a scenario, the Vuser groups are assigned to their hosts and execute their Vuser scripts. During scenario execution, Astra LoadTest:

- records the durations of the transactions you defined in the Vuser scripts
- performs the rendezvous included in the Vuser scripts
- collects error and notification messages generated by the Vusers

You can run an entire scenario unattended, or you can interactively select the Vuser groups and Vusers that you want to run. When the scenario starts running, the Controller first checks the scenario configuration information. Next, it invokes the applications that you selected to run with the scenario. Then, it distributes each Vuser script to its designated host. When the Vuser groups are ready, they start executing their scripts. While the scenario runs, you can stop both Vuser groups and individual Vusers.

Note: When a test runs in the Virtual User Recorder, the full browser is used. This differs from a test run in the Controller, where only the browser basics are used. There may be occasions when a test passes its run in the Virtual User Recorder , but fails when it is run in the Controller. Before running a scenario in the Controller with multiple Vusers, run a single Vuser to ensure the test is bug free.

Find

Find Again

Top of Chapter

← Back

The scenario ends when all the Vusers have completed their scripts, when the duration runs out, or when you terminate it.

The following procedure outlines how to run a scenario:

1 Open an existing scenario or create a new one.

2 Configure and schedule the scenario.

3 Set the results directory.

4 Run and monitor the scenario.

While the scenario runs, you can stop both Vuser groups and individual Vusers; monitor each Vuser in the scenario; and view error and notification messages generated by the Vusers.

Running an Entire Scenario

You can run all the Vusers and Vuser groups in a scenario, or you can select the specific Vuser groups and Vusers that you want to run. Note that when you run an entire scenario, Astra LoadTest does not begin running Vusers until all of them have reached the *Ready* state. However, if you run individual groups or Vusers, Astra LoadTest runs the Vusers as soon as they reach the *Ready* state.

The following section describes how to run an entire scenario. **Controlling Vuser Groups** on page 145 and **Controlling Individual Vusers** on page 148, describe how to manipulate Vuser groups and individual Vusers.

Find

Find Again

Top of Chapter

Back

To run an entire scenario:

1 Open an existing scenario or create a new one. Click the **Run** tab. The Scenario Groups window appears in the top left-hand corner of the screen.

▶ Run...   **2** Choose **Scenario** > **Start**, or click the **Run** button. The Controller starts initializing the Vusers and distributing them to their designated hosts—where they begin to execute their Vuser scripts.

If you have not specified a results directory for the scenario, the Set Results Directory dialog box opens.

During scenario execution you can manipulate individual Vusers and Vuser groups. This is described in **Controlling Vuser Groups** on page 145 and **Controlling Individual Vusers** on page 148.
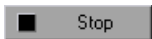
■ Stop   **3** Choose **Scenario** > **Stop**, or click the **Stop** button to terminate the scenario.

🔄   **4** Choose **Scenario** > **Reset**, or click the **Reset** button to reset all Vusers to their pre-scenario, DOWN status.

Controlling Vuser Groups

You can run an entire scenario as described above, or you can manipulate individual Vuser groups in the scenario. This section describes how to initialize, run, and stop Vuser groups.

Initializing Vuser Groups

Initializing a Vuser group distributes the Vusers in the group to their designated hosts so that they are ready to execute their script. By initializing all of the Vusers in a group before running them, you can ensure that they all begin executing the scenario at the same time.

To initialize a Vuser group:

1 Select the Vuser group or groups that you want to initialize.

2 Right-click the Vuser group or groups you want to initialize and select **Initialize Group/s**. The Vuser group's status changes from DOWN to PENDING to INITIALIZING to READY. If a Vuser group fails to initialize, the Vuser group status changes to ERROR.

Running Vuser Groups

Running a Vuser group tells the Vuser group to execute its script.

To run a Vuser group:

1 Select the Vuser group or groups that you want to run.

2 Select **Run Group/s** from the right-click menu. The Vuser groups execute their scripts. If you run a Vuser group in the DOWN or ERROR state, Astra LoadTest initializes and then runs the Vuser group.

Stopping Vuser Groups

Stopping a Vuser group stops script execution. If you stop a Vuser group, the group still appears in the Vuser group list.

To stop a Vuser group:

1 Select the Vuser group or groups that you want to stop.

2 Select **Stop** from the right-click menu. The Vuser groups stop executing their scripts.

Resetting Vuser Groups

Resetting causes all of the Vuser groups to revert to their pre-scenario, DOWN status.

To reset the Vuser groups:

1 Choose **Scenario** > **Reset**, or click the **Reset** button. The Vuser groups revert to their pre-scenario, DOWN status.

Controlling Individual Vusers

You can also manipulate individual Vusers within the Vuser groups you have defined. This section describes how to initialize, run, and stop individual Vusers.

To control an individual Vuser:

1 In the Scenario Groups window, select a group and click the **Vusers** button. The Vusers dialog box opens, with a list of the **ID**, **Status**, **Script**, **Host**, and **Elapsed** time (since the beginning of the scenario) for each of the Vusers in the group.

You can control an individual Vuser using the following utilities:

● Select a Vuser and click **Run** to run it.

● Select a Vuser and click **Stop** to stop it from running.

● Select a Vuser and click **Reset** to revert its status to DOWN.

● To initialize a Vuser, right-click it and select **Initialize**.

● To filter the Vusers listed, right-click in one of the columns and select **Filter Vusers**. Select the way in which you want to filter the Vusers.

● To sort the Vusers listed, right-click in one of the columns and select **Sort Vusers**. Select the way in which you want to sort the Vusers.

● To view a Vuser executing its assigned script, select the Vuser and click the **Show** button. A browser opens, allowing you to see the Vuser executing the script.

To close the browser, click the **Hide** button.

● To view the Vuser script log, click the **Vuser log** button. A script log, such as the following, appears.

Find

Find Again

Top of Chapter
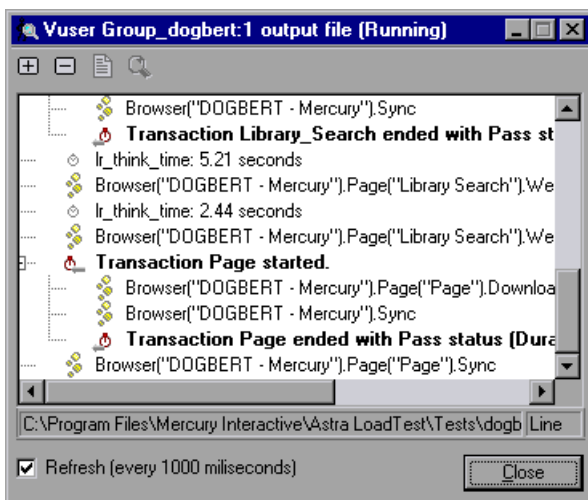
Back

To close the Vuser script log, click the **Close Vuser log** button.

2 Click **Close** to close the Vusers dialog box.

Manually Releasing Vusers from a Rendezvous

While you run a scenario, you can manually release Vusers from a rendezvous before the Controller releases them.

To manually release Vusers from a rendezvous:

 1 Choose **Scenario > Rendezvous**. The Rendezvous Information dialog box opens.

 2 Select a rendezvous from the Rendezvous list.

 3 Click **Release**. The Vusers in the rendezvous are released.

During scenario execution, you can view the actions that are performed by Vusers.

This chapter describes:

Find

Find Again

Top of Chapter

Back

About Viewing Vusers During Execution

Astra LoadTest lets you view Vuser activity during a scenario:

- On the Controller host machines, you can view the Output window, monitor Vuser performance online, and check the status of Vusers executing the scenario.

- On remote machines, you can view the Agent summary with information about the active Vusers.

Monitoring Vuser Status

During scenario execution, you can use the Scenario Groups window in the Run view to monitor the actions of all the Vusers and Vuser groups in the scenario.

The Status field of each Vuser group displays the current state of each Vuser in the group. The following table describes the possible Vuser states during a scenario.

Status	Description
DOWN	The Vuser is down.
PENDING	The Vuser is ready to be initialized and is waiting for an available host, or is transferring files to the host. The Vuser will run when the conditions set in its scheduling attributes are met.
INITIALIZING	The Vuser is being initialized on the remote machine.
READY	The Vuser already performed the init section of the script and is ready to run.
RUNNING	The Vuser is running. The Vuser script is being executed on a host.
RENDEZVOUS	The Vuser has arrived at the rendezvous and is waiting to be released by Astra LoadTest.
DONE.PASSED	The Vuser has finished running. The script passed.

Status	Description
DONE.FAILED	The Vuser has finished running. The script failed.
ERROR	A problem occurred with the Vuser. Check the Status field on the Vuser dialog box or the output window for a complete explanation of the error.
EXITING	The Vuser has finished running or has been stopped, and is now exiting.
STOPPED	The Vuser stopped when the Stop command was invoked.

You can also view a synopsis of the running scenario in the box at the top right-hand corner of the Run view.

Scenario Status	Down
Running Vusers	**0**
Passed Transactions	**0**
Failed Transactions	**0**
Hits/Seconds	**0.0**
Errors	**4**

Status Summary	Description
SCENARIO STATUS	indicates whether the scenario is ACTIVE or DOWN
RUNNING VUSERS	indicates how many Vusers are being executed on a host machine
PASSED TRANSACTIONS	indicates how many transactions have been executed successfully
FAILED TRANSACTIONS	indicates how many transactions have been executed unsuccessfully
HITS/SECOND	indicates how many hits there have been to the Web site being tested per second that each Vuser has been running
ERRORS	indicates how many problems have occurred with the Vusers

To view details of the transactions and errors:

1 Click the **Show Snapshot** button. The Transactions dialog box opens.

Transactions				
Name	TPS	Passed	Failed	
DOGBERT_-_Mercury	0.1	10	0	
Mercury_Interactive	0.1	10	0	
Mercury_Interactive_2	0.1	10	0	

Close   Help

The **Name** column lists the individual transactions in a script. For each transaction, the Transactions dialog box lists information concerning the number of **Transactions Per Second (TPS)**, the number of transactions **Passed**, and the number of transactions **Failed**.

2 Click the **Exclamation Point** button. The Output window opens.

Output(3)					⊠
🕵 🖫 👆 Errors	▼				
Time	Type	Host	Vuser	Message - Errors	▲
17:02:22	Error	Controller	test2:2	test2:2 failed to load An error occurred in the Multi-Threaded driver	
17:02:22	Error	Controller	test2:10	test2:10 failed to load An error occurred in the Multi-Threaded driver	
					▼

The **Vusers** column lists the Vusers that did not execute properly. The Output window also lists the time at which the errors occurred, the host machine on which the errors took place, and the reason for each error. For more information on the Output window, see see **Viewing the Output Window,** on page 158.

The Status Bar

At the bottom of the Run view is a Status Bar, where the status of the scenario—ACTIVE or DOWN—is displayed. To view the Status Bar, select **View > Status Bar**.

Viewing the Output Window

While the scenario runs, the Vusers and hosts send error, notification, and warning messages to the Controller. You can view these messages in the Output window. Astra LoadTest clears the messages in this window at the start of each scenario execution.

Time	Type	Host	Vuser	Message - All Messages
17:02:22	Error	Controller	test2:2	test2:2 failed to load An error occurred
17:02:22	Error	Controller	test2:10	test2:10 failed to load An error occurred
17:02:29	Notify	localhost	None	Agent: Bridge is terminating all script test2 Vusers

Output(3) All Messages
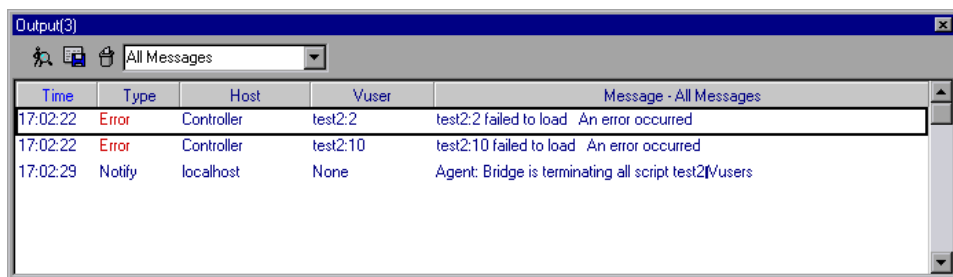
Find

Find Again

Top of Chapter

Back

The Output window provides the following scenario information:

Column	Description
TIME	the time each message arrived
TYPE	the type of message sent: Error, Notify, Warning
HOST	the Vuser's host
VUSER	the ID of the Vuser that sent the message
MESSAGE - ALL MESSAGES	the text of the message

Note: You can limit the number of messages in the output window, and set a deletion quota for the number of messages that will be overwritten. For more information, see Appendix B, **Working in Expert Mode**.

You can view and manipulate the messages using the following utilities:

- To show (or hide) the Output window choose **View** > **Output**.

- To sort output messages, click the appropriate column header, or right-click within the Output window and select **Sort Messages**. Choose the method by which you want to sort the messages.

- To filter output messages to display only certain message types, choose the type of message you want to view in the selector, or right-click within the Output window and select **Filter Messages**. Choose the way in which you want to filter the messages.

- To view all of a message's details, right-click the message and select **Details**.

- To save messages, right-click within the Output window and select **Export To File**, or click the **Export to File** button.

- To clear scenario execution messages, right-click within the Output window and select **Remove All**, or click the **Remove All** button.

- To view more details about a Vuser who sent a message, right-click a message and select **Vuser Details**.

● To view the complete Vuser log, right-click a message and select **Show Vuser Log**, or click the **Show Vuser Log** button. This log contains runtime information about the Vuser and is refreshed every 1000 milliseconds. To disable the refreshing of this log, clear the **Refresh** check box.
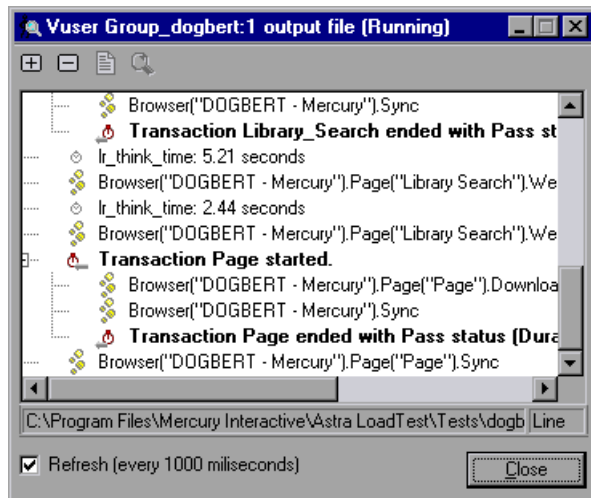
● To view a snapshot of the Web page where an error occurred, highlight the error in the Vuser Log and click the Show Snapshot button.

Viewing the Agent Summary

When you run a scenario, the machine running the Vusers invokes an agent that controls the Vuser execution on that host. During scenario execution, the agent displays a summary of the Ready, Running, and Paused Vusers.

The Agent window comes forward at the start of the scenario, You can minimize and restore it at any time.

```
LoadRunner Agent  (serving delta)            _ □ ×
File  About

   Active Vusers:

   Ready     0

   Running   0

   Paused    0

```
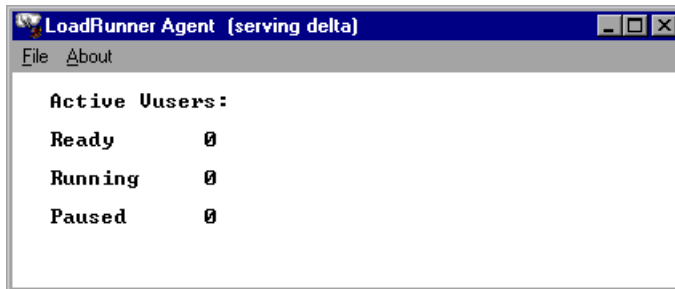
Find

Find Again

Top of Chapter

⇐ Back

Monitoring a Scenario

You can monitor scenario execution using the Astra LoadTest online Vuser status, transaction, server resource, Web server resource, and Web application server resource monitors.

The specific monitors are discussed in the next few chapters. This chapter describes the online monitor user interface:

- **Starting the Monitors**
- **Configuring Online Monitors**
- **Configuring Online Graphs**
- **Understanding Online Monitor Graphs**
- **Configuring Online Measurements**
- **Exporting Online Monitor Graphs**
- **Viewing Data Offline**

Find

Find Again

Top of Chapter

Back

About Online Monitoring

Astra LoadTest provides the following online monitors:

- Server Resources

- Vuser Status

- Transaction

- Web Server Resources

- Web Application Server Resources

The *Server Resource* monitor gauges the system resources used during a scenario. It is capable of measuring NT and SNMP resources gathered by custom monitors. To activate the Server Resource monitor, you must set the monitor options before you run your scenario. For information on setting these options, see Chapter 15, **Resource Monitoring**.

The *Vuser Status* monitor displays the current states of the Vusers participating in the scenario. (READY, RUNNING, etc.)

The *Transaction* monitor displays the transaction rate and response time during scenario execution. For more information, see Chapter 14, **Runtime and Transaction Online Monitors**.

The *Web Server Resource* monitor measures statistics at the Web server(s) during scenario runs. It provides information about the number of Web connections and throughput volume during the scenario, as well as Apache, Microsoft IIS, and Netscape servers. To activate the Web Server Resource monitor, you must set up a list of resources to monitor before you run your scenario. For more information, see Chapter 16, **Web Performance Monitors**.

The *Web Application Server Resource* monitor measures statistics at the Web Application Server(s) during the scenario. To activate the Web Application Server Resource monitor, you must set up a list of resources to monitor before you run your scenario. For more information, see Chapter 16, **Web Performance Monitors**.

An additional monitor, the *Network Delay* monitor, displays information about the network delays on your system. You can view a summary of the results at the conclusion of the scenario. For more information see Chapter 17, **Network Monitoring**.

All of the monitors allow you to view a summary of the collected data at the conclusion of the scenario. Using Astra LoadTest Analysis, you can generate a graph for any of the monitors. For more information, see the *Astra LoadTest Analysis User's Guide*.

Starting the Monitors

You use the online monitors to monitor Vuser status, transactions, server resources, Web server resources, and Web application server resources while running a scenario.

To start the online monitors:

1 Start the scenario. Select the Vusers you want to run and choose **Scenario > Start.**

Find

Find Again

Top of Chapter

⇐ Back

2 Click the **Run** tab. The default graphs are displayed below the Scenario Groups window.

Find

Find Again

Top of Chapter

Back
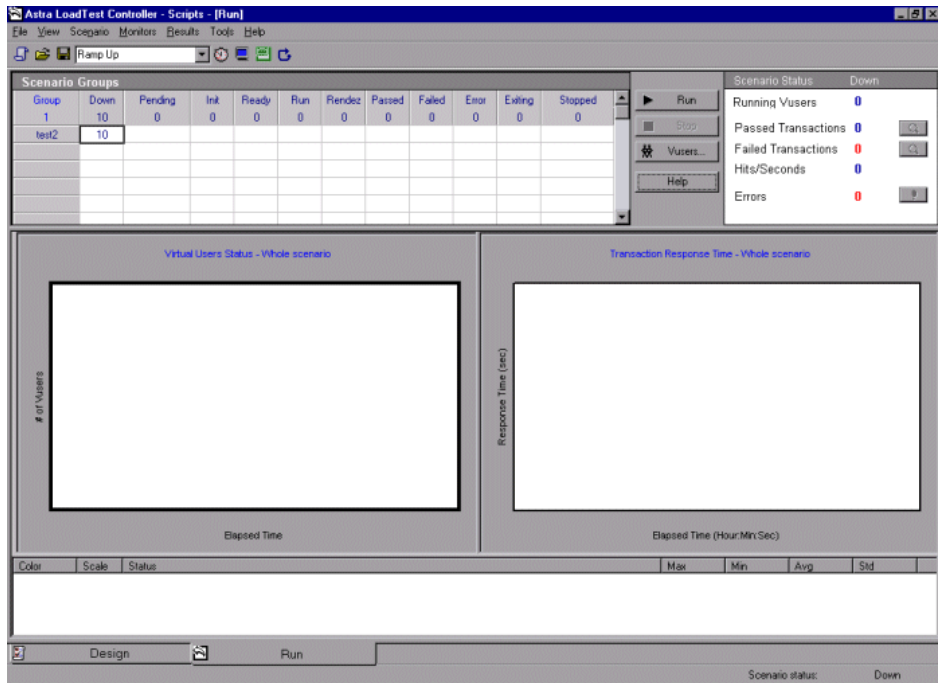
3 Double-click a graph to maximize it. Repeat the operation to restore the tiled view.

4 Select **View > Show Available Graphs** to display the graph tree view. Click the "+" in the left pane to expand the graph tree.

5 Select a graph from the tree and drag it into the right pane. You can also drag graphs between panes.

Note: The Transaction Monitor graphs will not contain any data unless transactions are being executed. In addition, the Server Resource Monitor and Web Application Server Monitor graphs will not contain any data unless you set up a list of resources to monitor before running your scenario. To set up a list of resources to monitor, see Chapter 15, **Resource Monitoring** and Chapter 16, **Web Performance Monitors**.

A Find

Find Again

Top of Chapter

Back

Configuring Online Monitors

Astra LoadTest lets you configure the settings for your online monitors. You can set graph measurements and properties.

Graph properties: refresh rate and graph time for the x-axis. For more information, see **Viewing Data Offline** on page 185.

Measurement settings: line color, scale of the y-axis, and whether to show or hide the line. For more information, see **Configuring Online Measurements** on page 177.

When you save a scenario, the online monitor configuration settings are saved as well.

Configuring Online Graphs

You can customize your graph in the following areas:

- refresh rate

- x-axis style

- graph time

Note that these settings can be set globally—to apply to all graphs, or per graph.

Refresh Rate

The refresh rate is the interval in which the graph is refreshed with new data. By default, the graph is refreshed every second. If you increase the refresh rate, the data is refreshed less frequently.

X-axis Style

You can specify how the graph displays the x-axis time: *Don't show*, *Clock time*, or *Relative to Scenario Start*. The **Don't Show** setting instructs Astra LoadTest not to display a name for the x-axis. The **Clock Time** setting displays the absolute

Find

Find Again

Top of Chapter

Back

time, based on the system clock. The **Relative to Scenario Start** displays the time relative to the beginning of the scenario. In the following example the graph is shown with the *Don't show*, and *Clock time* options:
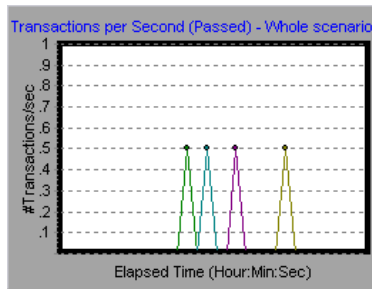
Don't Show
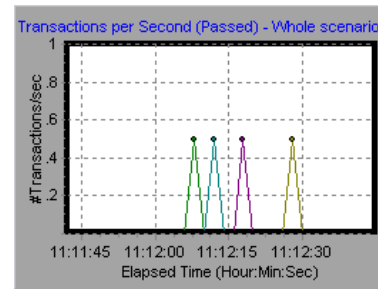
Clock time

Graph Time

The Graph Time settings indicate the scale for a graph's x-axis when it is time-based. A graph can show 60 or 3600 seconds of activity. To see the graph in greater detail, decrease the graph time. To view the performance over a longer period of time, increase the graph time. The available graph times are: *Whole scenario*, *60*, *180*, *600*, and *3600* seconds.

To configure graph times:

1 Select the online graph you want to configure (in either the right or left pane) and choose **Monitors > Online Graphs > Configure**. Alternatively, right-click a graph and select **Configure**. The Graph Configuration dialog box opens.

Graph Configuration	⊠
Refresh rate (sec) :	1
Time:	Relative to Scenario Start
Graph Time (sec) :	60
⦿ Apply to selected graph	
○ Apply to all graphs	
OK	Cancel	Help
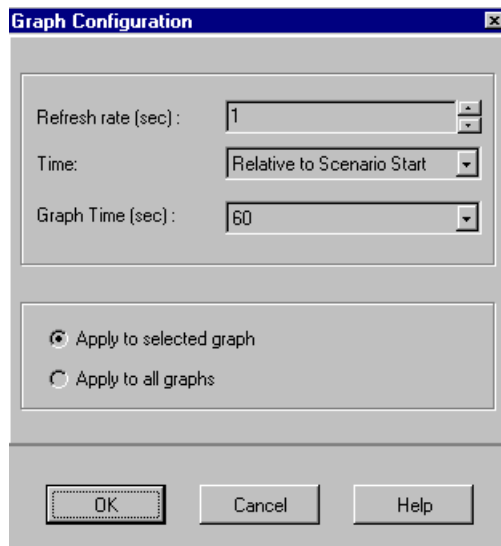
2 To apply the dialog box settings to all graphs, select **Apply to all graphs**.

3 Enter the desired refresh rate—the time in seconds between two sequential samples—in the **Refresh Rate** box.

4 Select a style for the x-axis from the **Time** box.

5 Select a value from the **Graph Time** box. The graph time is the time in seconds displayed by the x-axis.

6 Click **OK**.

Find

Find Again

Top of Chapter

Back

Understanding Online Monitor Graphs

Online monitor graphs display information about the measurements listed below the graph. Each value is represented by a colored line. A legend beneath the graph indicates the color and measurement.
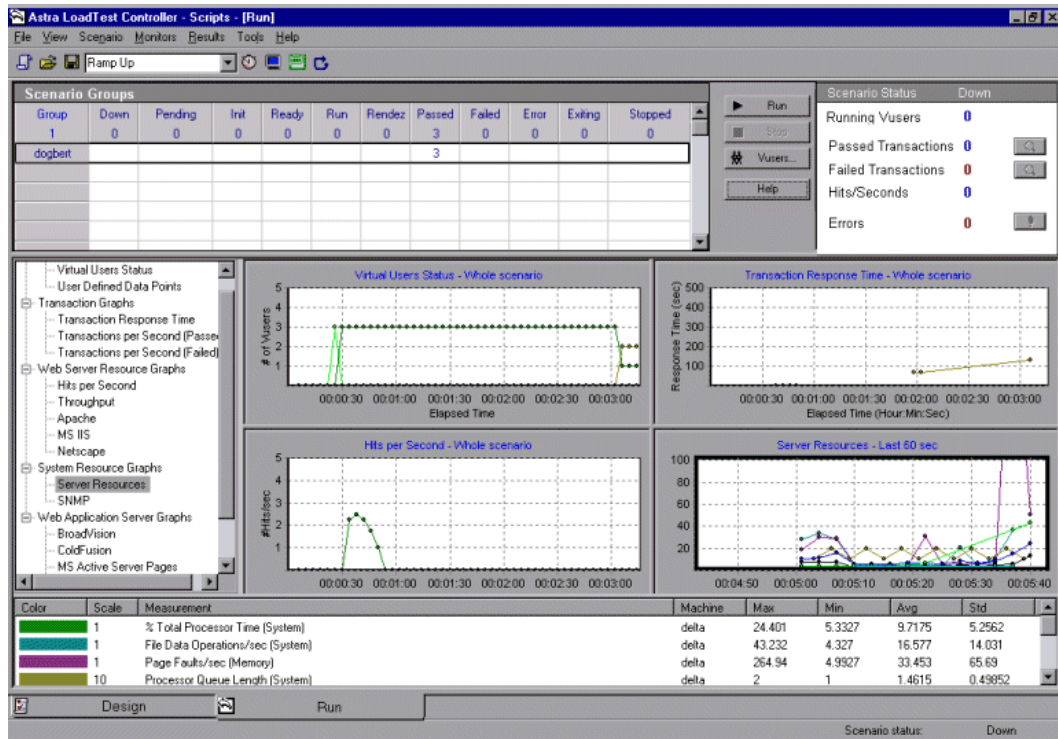
By default, the online monitor displays each measurement—whether Status, Transaction, Web Resource, or Server Resource—in a scenario in the legend below the graphs. The legend displays the measurements for the selected graph.

To get additional information about a measurement, right-click the measurement and choose **Description**.

To focus on a particular line, you can:

Highlight a measurement: To highlight a specific measurement, select it in the legend. The corresponding line in the graph is displayed in blue.

Hide a measurement: To hide a measurement, right-click the measurement and choose **Hide**.

To show a hidden measurement, right-click the measurement and choose **Show**.

Pause the monitor: To pause the monitoring of a specific graph during scenario execution, select the graph and choose **Monitors > Online Graph > Freeze** or right-click the graph and select **Freeze**. To resume, repeat one of the above actions. When you resume, the graph displays the data for the paused period.

Configuring Online Measurements

You can configure the following online measurement settings:

- line color

- scale

- show/hide

Changing Line Colors

Astra LoadTest assigns a unique color to each measurement. You can modify the color using the configuration interface.

Setting the Scale of the Measurement

You can modify the scale of a measurement—the relationship between the *y-axis* and the graph's actual value. For example, a scale set at 1 indicates that the measurement's value is the value of the y-axis. If you choose a scale of 10, you must divide the y-axis value by 10 to obtain the true value of the measurement.

In the following example, the same graph is displayed with a scale of 1 and 10.
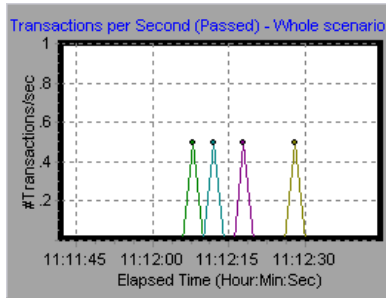
scale = 1
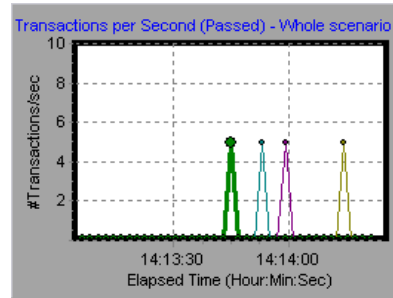
scale = 10

The actual graph values range from 0-1, as shown in the left graph. You can view the information more accurately using a larger scale for the display, as shown in the right graph. However, to obtain the actual values, you need to divide the displayed value by the scale. In the example above, the highest value shown in the graph is 5. Since the scale is 10, the actual value is 0.5.

The legend below the graph indicates the scale factor.

Color	Scale	Transaction	Max	Min	Avg	Std
	10	DOGBERT_-_Mercury	0.5	0	0.013158	0.080...
	10	Mercury_Interactive	0.5	0	0.013158	0.080...
	10	Mercury_Interactive_2	0.5	0	0.013158	0.080...
	10	Mercury_Interactive_3	0.5	0	0.045455	0.14374

scale factor

By default, Astra LoadTest uses the *autoscale* option, which automatically scales the measurements by calculating the best ratio for displaying the graph.

Showing and Hiding Transactions

By default, the Transaction Monitor displays a line for each item in the transaction list. You can hide the line for any of the monitored transactions in order to focus on a specific measurement.

In the following example, a line is shown for each measurement.
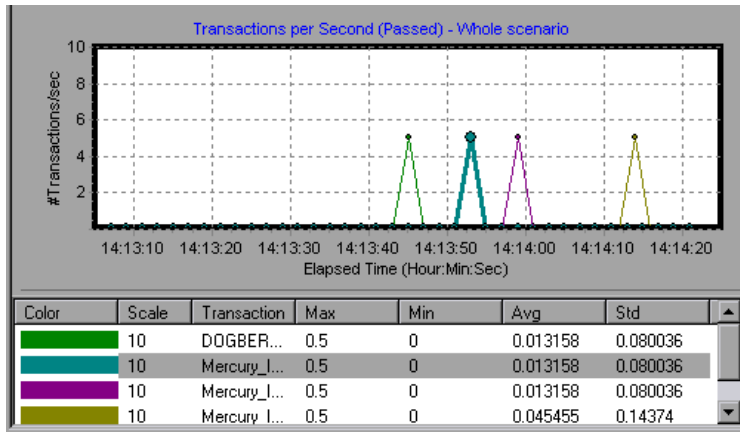
In this example, the second item in the legend is hidden.
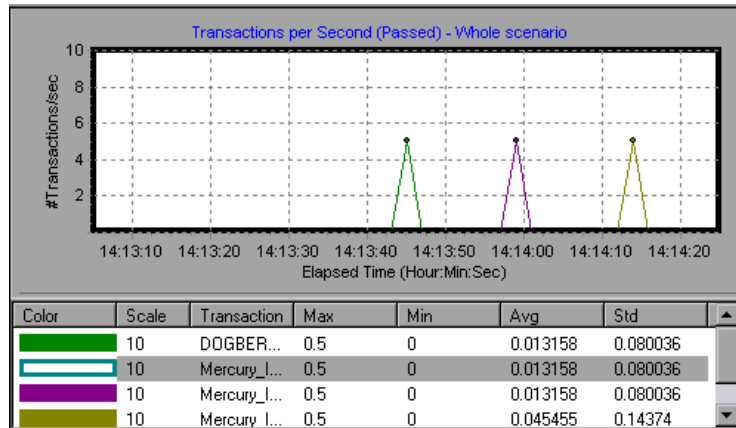
To configure a measurement:

1 In the legend below the graphs, select the measurement you want to configure. Right-click and choose **Configure**. The Measurement Configuration dialog box opens.

2 To change the color of the line, select a color from the **Color** list.

3 To change the scale, clear the **Autoscale** check box and select the desired ratio from the **Scale** list.

4 To hide a measurement, click **Hide**. To show a hidden resource click **Show**.

5 Note that you can also show and hide measurements without opening the Measurement Configuration dialog box by right-clicking a measurement in the legend and selecting **Show/Hide**.

6 Click **OK** to accept the settings and close the dialog box.

The specified changes are reflected in the graph and in the legend beneath the graph. The color is displayed in the first column of the legend. Hidden transactions are displayed as unfilled boxes. The scale is displayed in the legend's second column.

Color	Scale	Transaction	Max	Min	Avg	Std	
	10	DOGBER...	0.5	0	0.013158	0.080036	▲
	10	Mercury_I...	0.5	0	0.013158	0.080036	
	10	Mercury_I...	0.5	0	0.013158	0.080036	
	10	Mercury I...	0.5	0	0.045455	0.14374	▼

Exporting Online Monitor Graphs

Astra LoadTest allows you to export the online graph to HTML for viewing at a later stage. When you export to HTML, the legend is also displayed with the graph. You can export all graphs or only the selected one.

To export online graphs to HTML:

1 To export a specific graph, select the graph you want to export and choose **Monitors > Online Graphs > Export to HTML**. The Select Filename and Path dialog box opens.

2 To export all graphs in the Online Monitor view, choose **Monitors > Export Online Graphs to HTML.** The Select Filename and Path dialog box opens.

3 Specify a filename and path and click **Save**.

Viewing Data Offline

After monitoring resources during a scenario run, you can view a graph of the data that was gathered using the Astra LoadTest Analysis. When you run the Analysis utility, it processes the data and generates a graph for each measurement that was monitored.

To view a graph, choose **Graph > Add Graph** in the Analysis window. For more information about working with the Astra LoadTest Analysis at the conclusion of the scenario, see the *Astra LoadTest Analysis User's Guide*.

Monitoring a Scenario
Runtime and Transaction Online Monitors

While running a scenario, you can use Astra LoadTest's online monitors to view graphs of runtime status and transaction performance.

This chapter describes:

- **Runtime Graphs**
- **Transaction Monitor Graphs**
- **Adding Transactions to a Script**

About Online Graphs

Astra LoadTest's online monitor lets you view Vuser performance during scenario execution. You can view the current Vuser status, transaction rate and response time, server resource information, and Web server and Web application server statistical information. For information about monitoring server resources, see Chapter 15, **Resource Monitoring**. For information regarding Web server resource and Web application server resource monitoring, see Chapter 16, **Web Performance Monitors**.

The *Runtime* monitor provides information about the current state of the Vusers participating in a scenario.

The *Transaction* monitor displays the transaction rate and response time during scenario execution. For more information about transactions, see **Adding Transactions to a Script** on page 190.

Once the scenario finishes execution, you can use the Astra LoadTest Analysis to view summary graphs of all the data collected during execution. For more information, see the *Astra LoadTest Analysis User's Guide*.

Runtime Graphs

The monitor's *Runtime* graph provides information about the status of the Vusers running in the current scenario on all host machines. The graph shows the number of running Vusers, while the information in the legend indicates the number of Vusers in each state.

Color	Scale	Status	Max	Min	Avg	Std
	1	Ready	2	0	0.035714	0.26486
	1	Finished	0	0	0	0
	1	Error	0	0	0	0
	1	Running	2	0	1.3214	0.94693

The Status field of each Vuser displays the current status of the Vuser. The following table describes each Vuser status.

Status	Description
RUNNING	The total number of Vusers currently running on all hosts.
READY	The number of Vusers that completed the initialization section of the script and are ready to run.
FINISHED	The number of Vusers that have finished running. This includes both Vusers that passed and failed.
ERROR	The number of Vusers whose execution generated an error. Check the Status field in the Vuser view or the Output window for a complete explanation of the error.

Transaction Monitor Graphs

The *Transaction* monitor provides the following graphs:

● Transaction Response Time

● Transaction per Second (Passed)

● Transaction per Second (Failed)

The **Transaction Response time** graph shows the response time of transactions in seconds (y-axis) as a function of the elapsed time in the scenario (x-axis).

The **Transaction per Second (Passed)** graph shows the number of successful transactions performed per second (y-axis) as a function of the elapsed time in the scenario (x-axis).

The **Transaction per Second (Failed)** graph shows the number of failed transactions per second (y-axis) as a function of the elapsed time in the scenario (x-axis).

Adding Transactions to a Script

If there are no transactions defined in your Vuser script, no data will be displayed in the online graphs. To add transactions to an existing script, edit it using the Virtual User Recorder.

To add a transaction to a script:

1 Click the **Scripts** tab to view the script list.

2 Select the script you want to edit.

3 Choose **Script** > **Edit script** to open the script generation tool.

4 Insert Start and End Transaction functions or markers throughout your script.

For more information, see the appropriate user's guide as described in the *Welcome* chapter.

Find

Find Again

Top of Chapter

Back

You can monitor a machine's resource usage during a scenario run, using Astra LoadTest's Server Resource monitor. After the scenario run, you view the results in an offline graph.

This chapter describes:

- **Creating a Measurement List**

About Resource Monitoring

A primary factor in a transaction's response time is its resource usage. By monitoring resources during a scenario run, you can determine why a bottleneck occurred on a particular machine. The Astra LoadTest Resource monitor lets you keep track of resources used during a scenario. During test execution, Astra LoadTest displays a graph display of the resource usage in real-time.

You can monitor the NT or SNMP resources on a machine. The NT measurements correspond to the built-in counters available from the NT Performance Monitor.

The SNMP monitor is available for monitoring machines using the Simple Network Management Protocol (SNMP).

Find
Find Again
Top of Chapter
Back

You can also monitor Web server resources and Web application server resources. After you understand the basic procedure for creating a measurements list, see Chapter 16, **Web Performance Monitors** for additional details about monitoring Web resources.

A description of each measurement appears in the Resource Monitors Description box when you highlight the measurement.

For information on configuring monitor graphs, see Chapter 13, **Online Monitoring**.

Creating a Measurement List

The resource monitor is automatically enabled when you execute a scenario. However, you must specify the host you want to monitor and which resources to monitor for each host. You can also add or remove hosts and resources during the scenario run.

To set up a list of resources to monitor:

1 Select the graph whose resource list you want to create from the online monitor tree view.

2 Choose **Monitors** > **Add Online Measurement**. The Server Resource Monitoring dialog box opens.
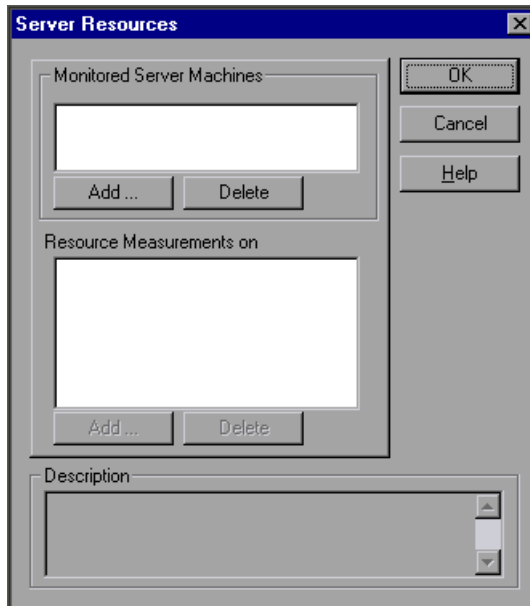
3 Click **Add...** in the **Monitored Server Machines** section to add the host you want to monitor. The Add Machine dialog box opens.
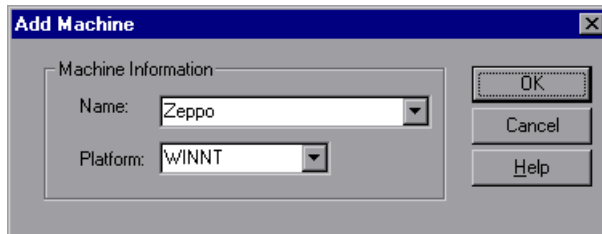
4 Type a machine name and select a platform. Click **OK** to accept the settings and close the dialog box.

5 To delete a machine from the list (entered for a prior scenario), select it and click **Delete**.

6 Click **Add** in the **Measurements** section to display a list of available resources that can be monitored. The appropriate dialog box opens (NT Resources, SNMP)

7 For NT resources, select an object, counter, and instance. You can select multiple counters using the **CTRL** key. The instance is relevant only if multiple instances of the highlighted counter are running. For a description of each counter, click **Explain>>** to expand the dialog box.
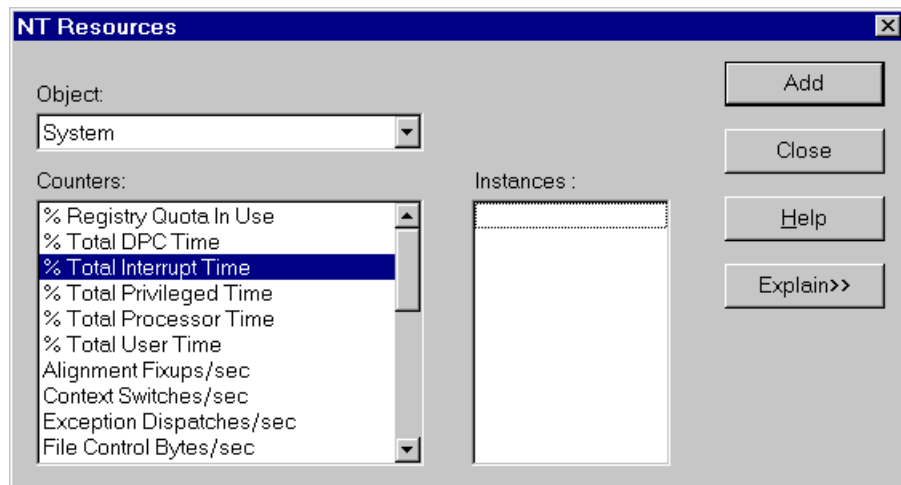
Click **Add** to place the selected counter on the resource list. Add all the desired resources to the list and then click **Close**.

8 To add SNMP resources to the monitor list, select an SNMP resource from the Object list. For a description of each resource, click **Explain>>** to expand the dialog box. Click **Add** to place the selected item on the resource list. Add all the desired items to the list and then click **Close**.

9 Repeat the above procedure for each machine you want to monitor.

10 Click **OK** to begin monitoring resources.

You can modify the list of resources that you want to monitor at any point during the scenario. Note that a scenario does not have to be active in order for you to monitor the resources on a remote machine.

The Web performance monitors aid in Web server and Web application server performance bottleneck isolation. The interface to Astra LoadTest's Web performance monitors is similar for the various monitor types.

This chapter describes:

- **Web Server Resource Monitors**
- **Activating the Monitors**
- **Configuring the Monitors**
- **WebSphere Monitor**

About Web Performance Monitors

There are two sets of monitors: Web server resource monitors and Web application server resource monitors.

Web Server Resource Monitors

Astra LoadTest supports the following Web server versions:

- Microsoft Information Internet Service (IIS) 4.0
- Netscape Enterprise Server 3.6
- Apache 1.3.9

Web Application Server Resource Monitors

Astra LoadTest supports the following Web application server versions:

- Microsoft Active Server Pages (ASP)
- BroadVision 4.1
- ColdFusion 4.5
- SilverStream 2.5
- WebLogic 5.0 (currently in beta)

Web Server Resource Monitors

The *Web Server Resource* monitor provides the following Web graphs:

- Hits Per Second
- Throughput
- Apache Server
- Microsoft IIS Server
- Netscape Server

The **Hits Per Second** graph shows the number of hits on the Web server (y-axis) as a function of the elapsed time in the scenario (x-axis). This graph can display the whole scenario, or the last 60, 180, 600, or 3600 seconds. You can compare this graph to the Transaction Response Time graph to see how the number of hits affects transaction performance.

The **Throughput** graph shows the amount of throughput on the Web server (y-axis) during each second of the scenario run (x-axis). Throughput is measured in kilobytes and represents the amount of data that the Vusers received from the server at any given second. You can compare this graph to the Transaction Response Time graph to see how the throughput affects transaction performance.

In the following example, the Transaction Response time graph is compared with the Throughput graph. It is apparent from the graph that as the throughput increases, the transaction response time also increases. The peak throughput occurred at approximately 1 minute into the scenario. The highest response time also occurred at this time.
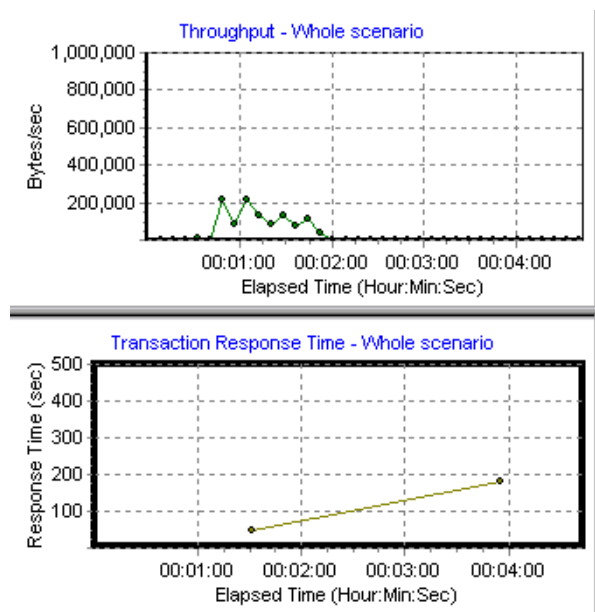
The **Apache Server Resource** monitor measures statistics at the Apache server during scenario execution. For more information about the Apache Server Resource monitor, see the following sections of this chapter.

The **Microsoft IIS Resource** monitor measures statistics at the Microsoft IIS server during scenario execution. For more information about the Microsoft IIS Resource monitor, see the following sections of this chapter.

The **Netscape Server Resource** monitor measures statistics at the Netscape server during scenario execution. For more information about the Netscape Server Resource monitor, see the following sections of this chapter.

Activating the Monitors

The Web performance monitors are not automatically activated when you begin running a scenario. In order to use these monitors, you must first activate them.

To activate the Web performance monitors from the Controller:

 1 Click the **Online Monitors** tab to open the Online Monitor view.

 2 Click on a Web server graph in the tree and drag it into the right pane.

 3 Right-click the graph and choose **Add**, or choose **Monitors > Add Online Measurement**.

The procedures for selecting monitor measurements and configuring the monitors vary according to server type. Refer to the next section, **Configuring the Monitors** for specific instructions.

Configuring the Monitors

Each of the sections below describes the configuration settings and limitations for a specific Web server monitor.

Apache Monitor

To monitor an Apache server you need to know the server statistics information URL. A simple way to verify the statistics information URL is to try to view it through the browser.

The URL should be in the following format:

http://<server_name/IP address>:port/server-status?auto

For example:

http://stimpy:80/server-status?auto

To activate the online Apache monitor from the Controller:

1 Right-click the graph and choose **Add**, or choose **Monitors > Add Online Measurement**.

2 Enter the server name or IP address.

3 In the Resource Measurements section, click **Add..** to select the measurements that you want to monitor.

The Apache dialog box displays the available measurements and server properties.
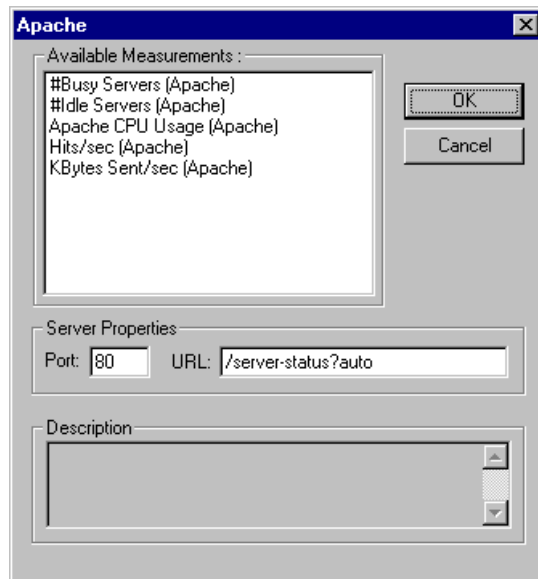
4 Highlight the required measurements.

5 In the **Server Properties** section, enter the Port number and URL (without the server name). The default URL is /server-status?auto.

6 Click **OK** to activate the monitor.

Note: The default port number and URL can vary from one server to another. Please consult your Web server administrator.

To change the default server properties:

1 Open the *Apache.cfg* file in the *<ALT installation dir>\dat\ monitors* directory.

2 Edit the following parameters after the Delimiter=: statement:

InfoURL   server statistics information URL

ServerPort   server port number

SamplingRate   rate (milliseconds) at which the Astra LoadTest monitor will poll the server for the statistics information. If this value is greater than 1000, Astra LoadTest will use it as its sampling rate. Otherwise, it will use the sampling rate defined in the Online Monitors UI.

Netscape Monitor

To monitor a Netscape server, you need to know the server statistics information URL. A simple way to verify the statistics information URL, is to try to view it through the browser.

The URL should be in the following format:

http://<srv_name/IP addr>:port/https-<srv_name/IP addr>/bin/sitemon?doit

for example:

http://lazarus:80/https-lazarus/bin/sitemon?doit

Note: In some server configurations, the URL must contain the server name and not the IP address.

Find

Find Again

Top of Chapter

Back

To activate the Netscape monitor from the Controller:

1 Right-click the graph and choose **Add**, or choose **Monitors > Add Online Measurement**.

2 Enter the server name or IP address.

3 In the **Resource Measurements** section, click **Add..** to select the measurements that you want to monitor.

The Netscape dialog box displays the available measurements and server properties:
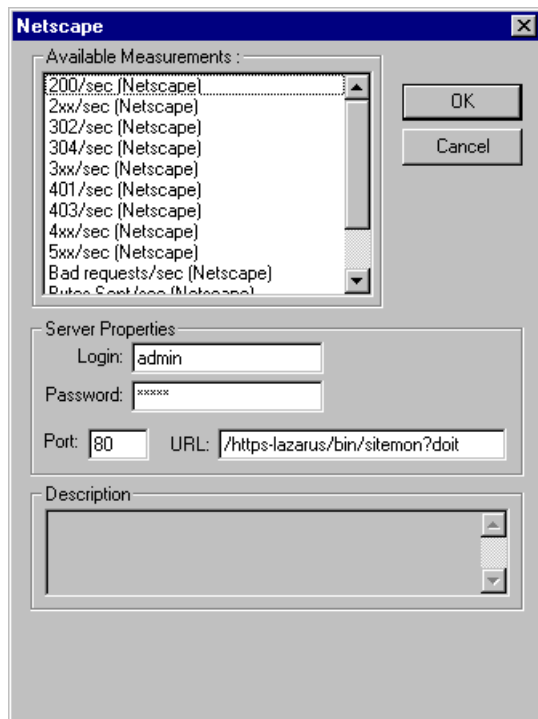
4 Highlight the required measurements.

5 Fill in the **Server Properties**:

● Enter the user login name and password. The user must have administrator permissions on the server.

● Enter the port number and URL (without the server name). The default URL is /**https**-<**server**>/**bin/sitemon?doit**.

6 Click **OK** to activate the monitor.

Note: The default port number and URL can vary from one server to another. Please consult the Web server administrator. In some server configurations, the URL must contain the server name and not the IP address.

To change the default server properties:

1 Open the *netscape.cfg* file in the *<ALT installation dir>\dat\ monitors* directory.

2 Edit the following parameters in the [Netscape] section:

Counters	number of counters that the Astra LoadTest Netscape monitor will show you. This value should match the number of counters defined in the file.
InfoURL	server statistics information URL
ServerPort	server port number

ServerLogin	login name to the server
ServerPassword	login password for the login name
SamplingRate	rate (milliseconds) at which the Astra LoadTest monitor will poll the server for the statistics information. If this value is greater than 1000, Astra LoadTest will use it as its sampling rate. Otherwise, it will use the sampling rate defined in the Online Monitors UI.

SilverStream Monitor

To monitor a SilverStream server you need to know the server statistics information URL. A simple way to verify the statistics URL is to access it from a browser.

The URL should be in the following format:

http://<srv_name/IP addr>[:#port]/SilverStream/Statistics

for example:

http://199.203.78.57:80/SilverStream/Statistics

To activate the SilverStream monitor from the Controller:

1 Right-click the graph and choose **Add**, or choose **Monitors > Add Online Measurement**.

2 Enter the server name or IP address (platform is detected automatically).

3 In the **Resource Measurements** section, click **Add..** to select the measurements that you want to monitor.

The SilverStream dialog box displays the available measurements and server properties:
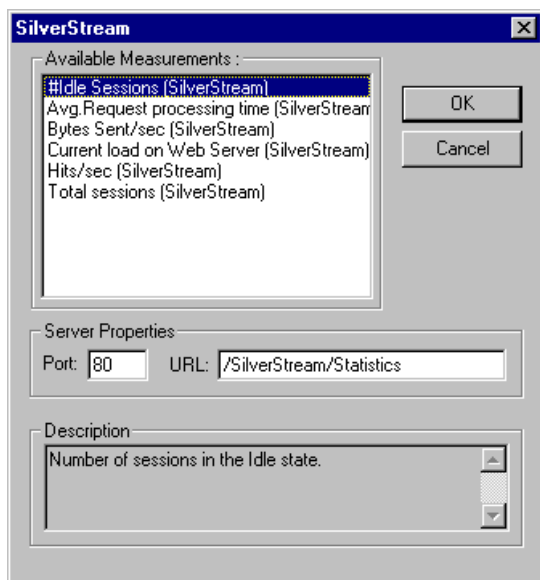
SilverStream

Available Measurements :

#Idle Sessions (SilverStream)
Avg.Request processing time (SilverStream)
Bytes Sent/sec (SilverStream)
Current load on Web Server (SilverStream)
Hits/sec (SilverStream)
Total sessions (SilverStream)

OK

Cancel

Server Properties
Port: 80   URL: /SilverStream/Statistics

Description
Number of sessions in the Idle state.

4 Highlight the required measurements.

5 In the **Server Properties** section, enter the port number and URL (without the server name). The default URL is /SilverStream/Statistics.

6 Click **OK** to activate the monitor.

Note: The default port number and URL can vary from one server to another. Please consult the Web server administrator.

To change the default server properties:

1 Open the *SilverStream.cfg* file in the *<ALT installation dir>\dat\ monitors* directory.

2 Edit the following parameters at the end of the file:

InfoURL   server statistics information URL.

ServerPort   server port number

SamplingRate   rate (milliseconds) at which the Astra LoadTest monitor will poll the server for the statistics information. If this value is greater than 1000, Astra LoadTest will use it as its sampling rate. Otherwise, it will use the sampling rate defined in the Online Monitors UI.

BroadVision Monitor

To monitor a BroadVision Server, you need to have JDK 1.2 or higher installed on the Controller machine.

You can install JDK 1.2 by following the download and installation instructions at the following website: http://java.sun.com/products/jdk/1.2/

Before activating the monitor, make sure that your Java environment is configured properly.

To configure your Java environment:

1 Open the Windows Registry.

2 The registry should contain the correct path to the Java executable (java.exe) under the JDK 1.2 installation directory. Verify the following registry key:

HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\App Paths\java.exe

3 The registry should contain the correct path to the Java runtime environment (JRE) under the JRE 1.2 installation directory. Verify the following registry key:

HKEY_LOCAL_MACHINE\SOFTWARE\JavaSoft\Java Runtime Environment\1.2\JavaHome

To activate the BroadVision online monitor from the Controller:

1 Right-click the graph and choose **Add**, or choose **Monitors > Add Online Measurement**.

2 Enter the server name or IP address with the port number according to the following format: server_name:port_number.

For example: dnsqa:1221. The platform is detected automatically.

Find

Find Again

Top of Chapter

Back

The BroadVision Monitor Configuration dialog box displays the available measurements:
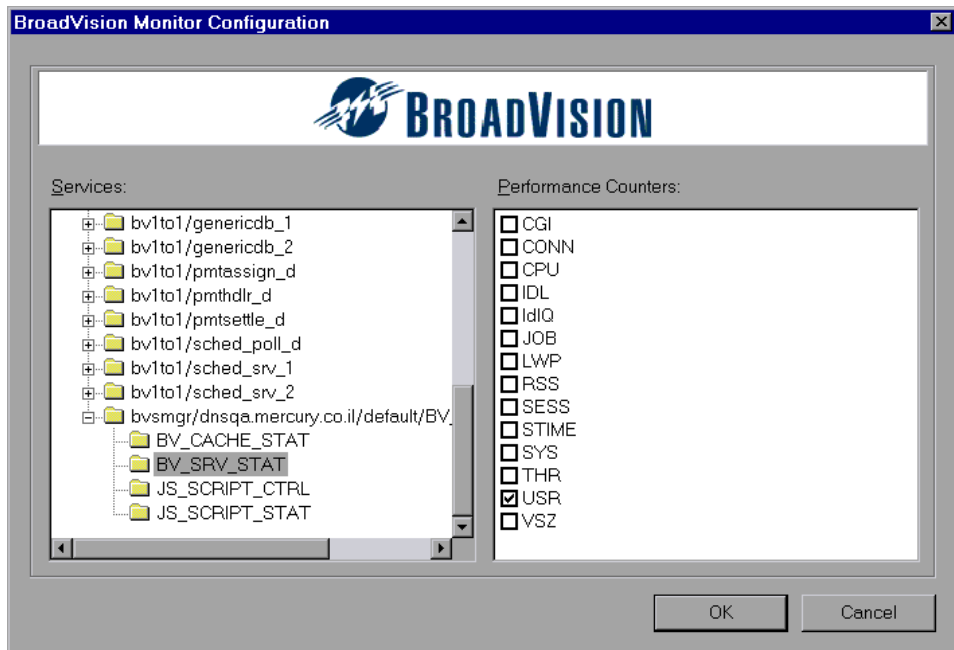
3 Check the required performance counters in the **BroadVision Monitor Configuration** window's right pane. Click **OK**.

ColdFusion Monitor

To monitor the ColdFusion application server, you need to know its IP address.

To activate the ColdFusion monitor from the Controller:

1 Right-click the graph and choose **Add**, or choose **Monitors > Add Online Measurement**.

2 Enter the server name or IP address (the platform is detected automatically).

The ColdFusion dialog box displays the default measurements to monitor:

ColdFusion

Monitored Server Machines

jecko

Add ...   Delete

Resource Measurements on :jecko

% Total Processor Time (System)
Avg Queue Time (msec) (ColdFusion Se
Avg Req Time (msec) (ColdFusion Serv
Bytes Out / Sec (ColdFusion Server cfs
Page Hits / Sec (ColdFusion Server cfs
Queued Requests (ColdFusion Server q
Running Requests (ColdFusion Server

Add ...   Delete

Resource Measurement Description

The number of web pages processed per second by the
ColdFusion Server.

OK   Cancel   Help

3 Highlight the required measurements.

4 Click **OK** to activate the monitor.

WebLogic Monitor

The WebLogic monitor uses SNMP to retrieve server statistics. To use this monitor, you must make sure that the WebLogic SNMP agent is installed and activated on the server.

To activate the WebLogic monitor from the Controller:

1 Right-click the graph and choose **Add**, or choose **Monitors > Add Online Measurement**.

2 Enter the server name or IP address (the platform is detected automatically).

3 In the **Resource Measurements** section, click **Add..** to select the measurements that you want to monitor.

4 The WebLogic Resources dialog box displays the available measurements:
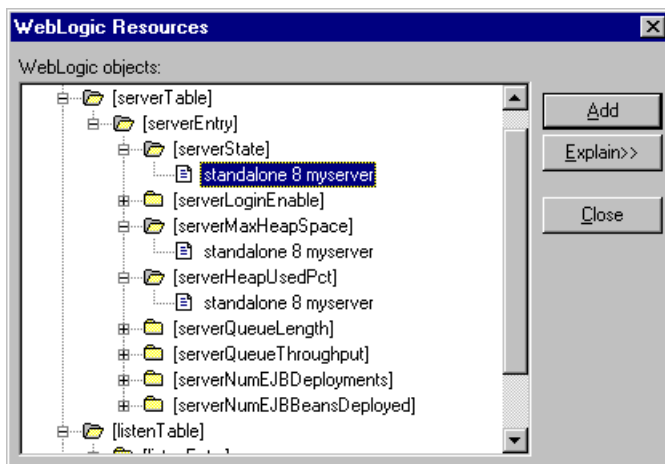
5 Browse the **WebLogic Object** tree.

6 Click **Add** to include more objects to be measured.

7 After selecting and adding the required objects, click **Close**.

WebSphere Monitor

To monitor the IBM WebSphere application server, you need to know its IP address.

To activate the WebSphere monitor from the Controller:

1 Right-click the graph and choose **Add**, or choose **Monitors > Add Online Measurement**.

2 Enter the server name or IP address (the platform is detected automatically).

3 In the **Resource Measurements** section, click **Add** to select the measurements that you want to monitor.

4 The WebSphere Monitor Configuration dialog box displays the available measurements:
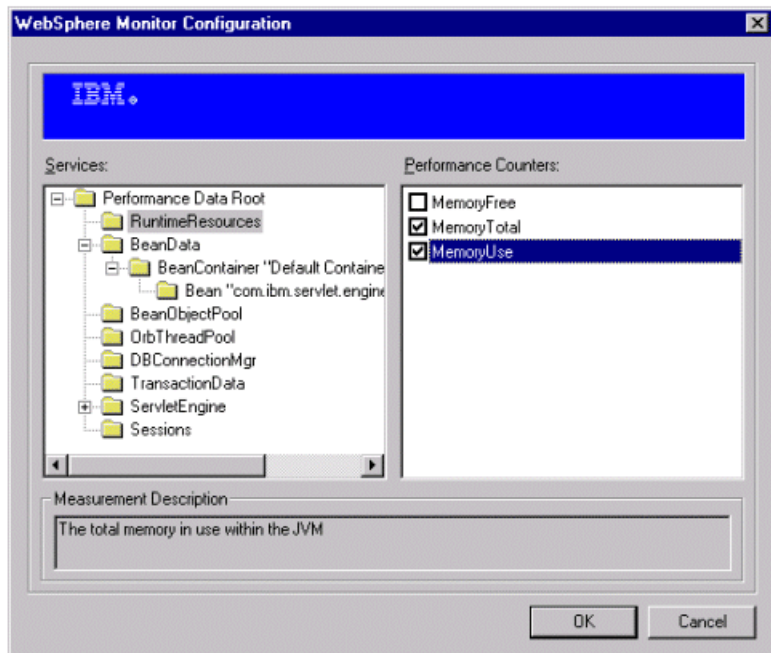
5 Browse the **WebSphere Services** tree.

6 Check the required performance counters in the **WebSphere Monitor Configuration** window's right pane. Click **OK**.

Troubleshooting the Monitors

Setting Permissions for NT Monitoring

When you monitor NT servers and the following types of Web servers: MS IIS, MS ASP and ColdFusion, the monitored machine requires permission settings for NT monitoring. You may receive a message about failure to connect to a machine. Use the following guidelines to make sure that you can access the monitored machine.

Cannot connect to an NT machine on a different NT-domain:

Ensure that you can log in to the other domain. The login name used for the Controller machine should also have an account on the monitored machine's domain.

Cannot monitor an NT machine on the same or different domain:

This means that the NT machine enables monitoring only for users with administrative permissions. To allow monitoring for non-admin users, you must give read permission to several files and registry entries (Microsoft tech-note number Q158438).

1 Using Explorer or File Manager, give the user at least read permission to %windir%\system32\PERFCxxx.DAT and %windir%\system32\PERFHxxx.DAT

where **xxx** is the basic language ID for the system (for example, 009 for English). These files may be missing or corrupted. If you suspect this, copy these files from the installation CD.

2 Open the registry editor by selecting **Run** from the Start Menu and typing **REGEDT32**. Select **Security > Permissions** from the Registry Editor menu.

3 Give the user read permission to HKEY_LOCAL_MACHINE\Software\Microsoft\Windows NT\CurrentVersion\Perflib

and all sub-keys of that key.

4 Give the user read permission to HKEY_LOCAL_MACHINE\System\CurrentControlSet\Control\SecurePi peServers\win reg

You can use Network monitoring to determine whether your network is causing a delay in the scenario. You can also determine the problematic network node.

This chapter describes:

- **Understanding Network Monitoring**
- **Setting the Network Monitor**
- **Configuring the Network Monitor**

About Network Monitoring

Network configuration is a primary factor in the performance of Web systems. A poorly designed network can slow activity to unacceptable levels.

In a true Web system, there are many network segments. A single network segment with poor performance can affect the entire system.

Network graphs let you locate the network related problem so that it can be fixed.

Understanding Network Monitoring

The following diagram shows a typical network. In order to go from the Web server machine to the Vuser machine, data must travel over several segments.
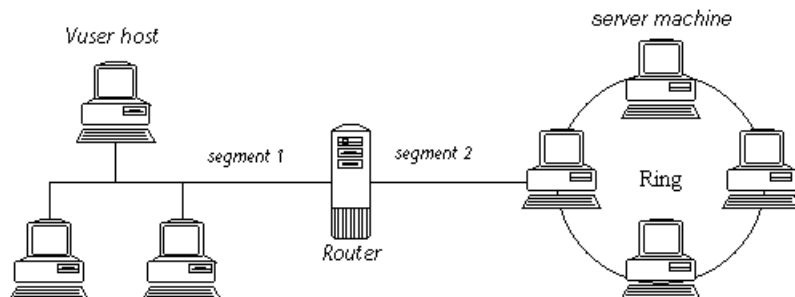
The Astra LoadTest Analysis provides several graphs that allow you to view the network performance during the scenario. After running your test, you open the Network graphs to determine which network segment caused the delay. Once you determine this, you can concentrate on improving the problematic segment. The available graphs are:

- **Network Monitor Graph** - to help you determine whether the network is the bottleneck

- **Network Monitor Segment Graph** - to help you locate the *bad* segment

- **Timeout Count Graph** - to help you see the number of timeouts that occurred during the scenario run.

For information on working with the Analysis to view the Network graphs, see the *Astra LoadTest Analysis User's Guide*.

Setting the Network Monitor

You set up the Network monitor from the Controller before you begin a scenario, and select the machines to monitor.

Note that the Network Monitor requires its own license. If the Network Delay option does not appear in the Monitor menu, you must enter a new license code to include it. You can enter a new license code from the Help > About menu. For information on upgrading a license, see the *Astra LoadTest Installation* guide.

To set up the Network Monitor:

 1 Choose **Monitors** > **Offline Monitors > Network Delay**. The Network Monitoring dialog box opens.

Find

Find Again

Top of Chapter

Back

2 Select the **Enable Network Delay Monitoring** check box.
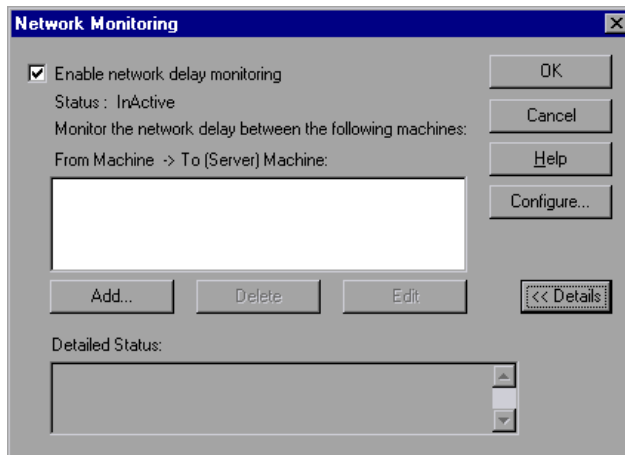
3 Click **Add**. The Network Path dialog box opens.
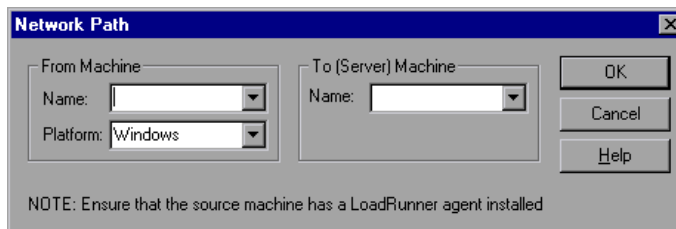
4 Enter the name of the remote machine running the Vusers and its platform. Make sure that the machine has a Astra LoadTest agent installed.

5 Enter the name of the server machine.

6 Click **OK**. The names of the remote and server machines are listed in the Network Monitoring dialog box.

7 Repeat steps 3-6 for each path you want to monitor.

8 To configure the monitor's settings, click **Configure** in the Network Monitoring dialog box. The Network Monitor Configuration dialog box opens.
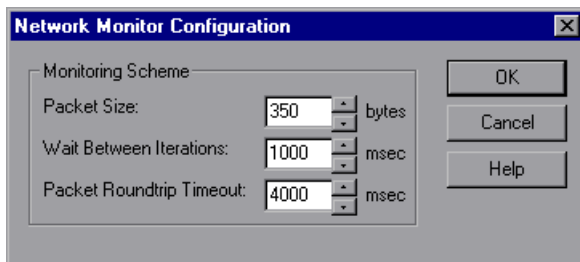
9 Modify the **Monitoring Scheme** and click **OK**. Note that these configuration settings apply to all network paths. For information about these settings, see **Setting the Network Monitor** on page 225.

10 Click **OK** to accept the settings and close the Network Monitoring dialog box.

11 Run the scenario, open the Analysis, and view the Network graphs.

Configuring the Network Monitor

To measure performance, the Network monitor sends packets of data across the network. When a packet returns, the monitor calculates the time it took for the packet to go to the requested node and return. This time is the delay which appears on the Network Delay graphs.

Before Astra LoadTest loads the network, it performs a calibration phase to determine the network delay at non-load condition. The monitor performs several iterations during which it sends packets across the network. It uses this information to map the segments between the source and target node.

You can configure the monitoring scheme variables to influence the network behavior from the Network Monitor Configuration dialog box. To open the dialog box, click **Configure** from the main Network Monitor dialog box.

Network Monitor Configuration		
Monitoring Scheme		
Packet Size:	350 bytes	OK
Wait Between Iterations:	1000 msec	Cancel
Packet Roundtrip Timeout:	4000 msec	Help
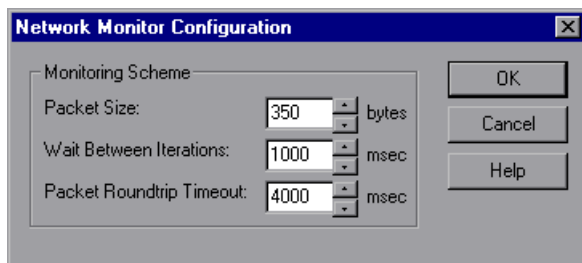
The **Monitoring Scheme** contains information about the packet sent across the network.

The **Packet Size** is the size in bytes for each packet of data sent across the network.

Wait Between Iterations indicates the time between two consecutive packets. The default value for "Wait Between Iterations" is 1000 milliseconds, or one second. If you have a long steady scenario, you can increase the interval by several seconds.

Packet Roundtrip Timeout is the total time allotted for the packet to return to the monitor. If a packet does not return within the timeout period, it is considered not to have returned. The timeout data appears in the Timeouts graph. The Packet Roundtrip Interval default value is 4 seconds. If your network is very large and loaded (an internet connection with a low capacity), you should increase the value by several seconds. If you have a small network (such as a LAN), you can decrease the value. To determine the appropriate value, check the packet response time on the path-delay graph and note the response time. If it is much lower than 4, lower the interval default. If it higher than 4, increase the default value.

The Controller waits until the calibration is finished before running Vusers. During calibration, the Controller displays a dialog box indicating the status of the Network monitor. To allow Vusers to run before the completion of the initial calibration, click **Don't Wait** in the dialog box.

Appendixes

Interpreting Astra LoadTest Graphs

Astra LoadTest online monitor and analysis graphs present important information about the performance of your scenario. This chapter describes some of the key graphs in greater depth and shows how they can be used to identify and pinpoint performance bottlenecks.

- **Online Monitoring Graphs**
- **Analysis Graphs**

Online Monitoring Graphs

Using the online monitor graphs, you can determine whether transactions transpire within an acceptable amount of time, whether your bandwidth is sufficient to keep download times to a minimum, and whether your hardware and operating system can handle peak load.

Question 1: Do all transactions in my scenario transpire within an acceptable amount of time? Which particular transactions take too long?

Answer: The **Transaction Response Time** graph shows the amount of time it takes for each transaction to be completed. Note that in the graph below, the transaction response time is quick, except for the login transaction. The initial login did not take much time, but subsequent logins were quite slow.

This indicates that the database is unable to process more than one login at a time, which may be due to inefficient database querying.

Color	Scale	Transaction	Max	Min	Avg	Std
	1	Mercury_Tours	9.944	1.332	4.2088	2.3487
	1	Welcome_to	1.713	0.49	0.9224	0.35404
	1	Find_Flights	3.114	0.331	1.6353	1.0861
	1	Search_Results	1.743	0.25	1.0477	0.51256
	1	Method_of_Payment	1.953	0.32	1.1756	0.50171
	1	Flight_Confirmation	2.253	0.231	1.1041	0.63992
	1	Mercury_Tours_2	2.013	0.32	0.77321	0.5076
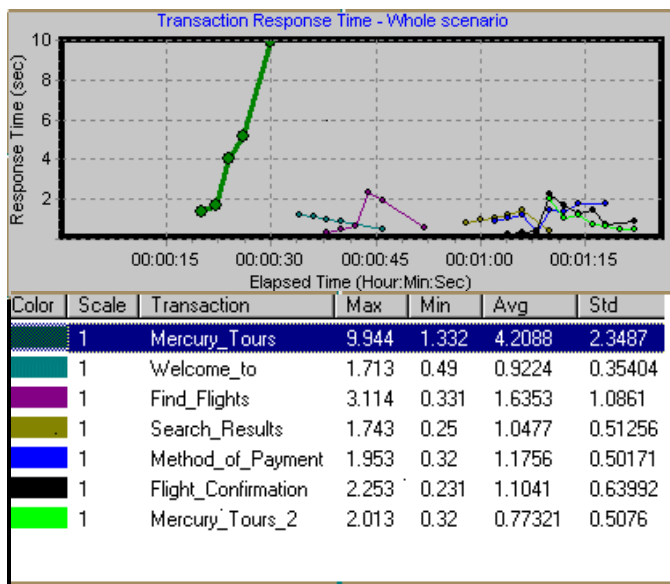
Question 2: Is bandwidth sufficient to keep download times to a minimum?

Answer: The **Throughput** graph shows the amount of throughput on the Web server during each second of the scenario run. Throughput represents the amount of data received from the server at any given second.
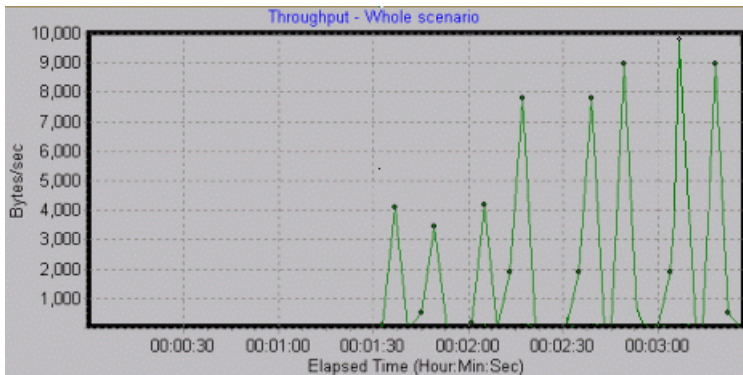
Note that in the graph above, the throughput scales upward as time progresses and the number of users increases. If the graph were to remain relatively flat as the number of users increased, it would be reasonable to conclude that the bandwidth is constraining the volume of data requested.

Question 3: Can the hardware and operating system handle peak load?

Answer: The **Server Resources** graph displays NT server resource usage in real-time. You use this graph to monitor the resources used during a scenario and locate a bottleneck on a particular machine.

Color	Scale	Measurement	Max	Min	Avg	Std
	1	% Total Processor Time (System)	45.003	26.164	35.835	5.4374
	1	File Data Operations/sec (System)	104.94	12.313	29.104	20.834
	1	Page Faults/sec (Memory)	74.61	9.3203	35.301	20.316
	1	Processor Queue Length (System)	8	3	4.7	1.2689
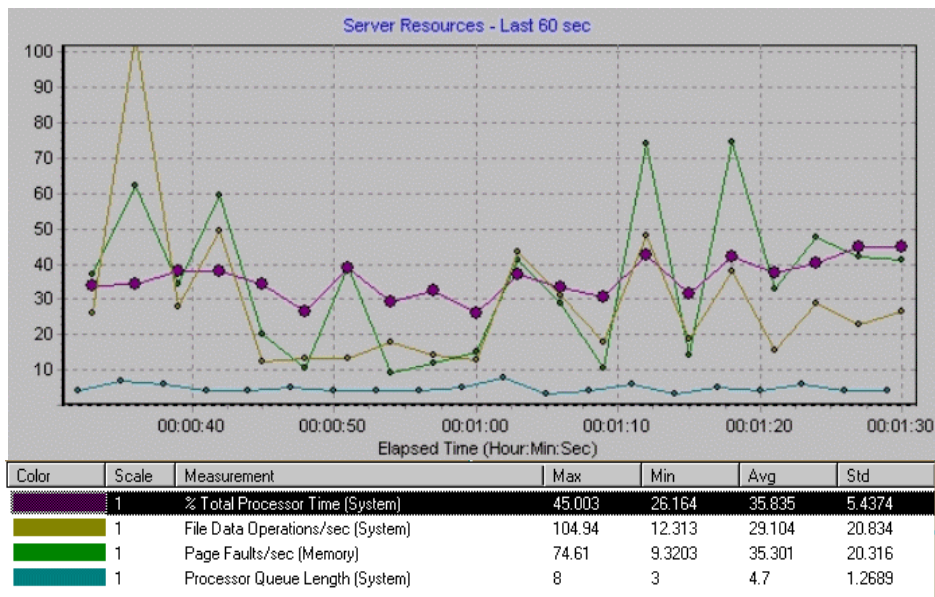
The **% Total Processor Time** in the above graph shows the amount of data processed by the server. **File Data Operations/sec** shows the rate at which the server is issuing Read and Write operations to file system devices. **Page Faults/sec** counts the number of page faults in the processor, representing virtual memory and caching algorithm opportunities.

It is commonly thought that newer and faster servers can resolve slow download times. However the above graph demonstrates that only a small amount of data is processed by the server. This indicates that there is adequate processor capacity, and more server hardware will not result in increased performance. There are cases, however, in which increased performance can be achieved by optimizing the data file system.

Analysis Graphs

Using the analysis graphs, you can determine the maximum number of concurrent users your application can handle.

Question 4: Will the application scale to handle 100 or 1000 concurrent users? What happens to the response time as the number of users increases?

Answer: The **Transaction Response Time - Under Load** graph demonstrates what happens to response time as the number of users increases. To view this graph, select **Graphs > Add Graphs > Transaction Response Time - Under Load**. The graph displays page download time relative to the number of active users.
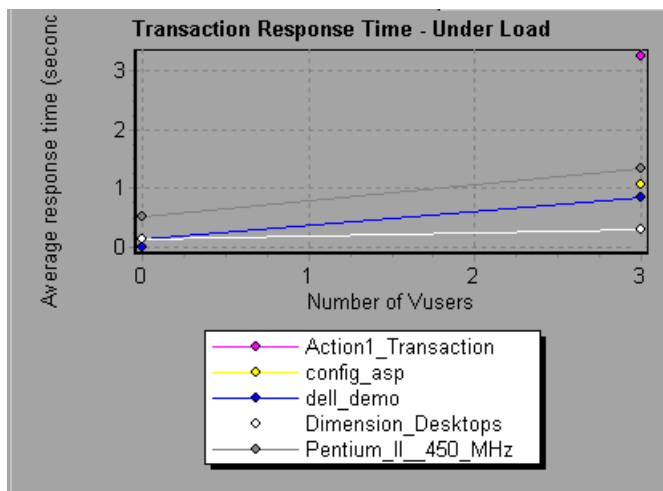
Find

Find Again

Top of Chapter

Back

The above graph shows that as the number of users increases, the response time of the application increases significantly. Thus, if you anticipate a lot of users for your application, you will need to ensure that response time remains acceptable under peak load.

Yet a quick response time is only meaningful if the returned information is correct. To verify that your application is working reliably under peak load, use the **Transaction Summary** graph, which summarizes the number of transactions in the scenario that failed, passed, aborted, and ended in error.
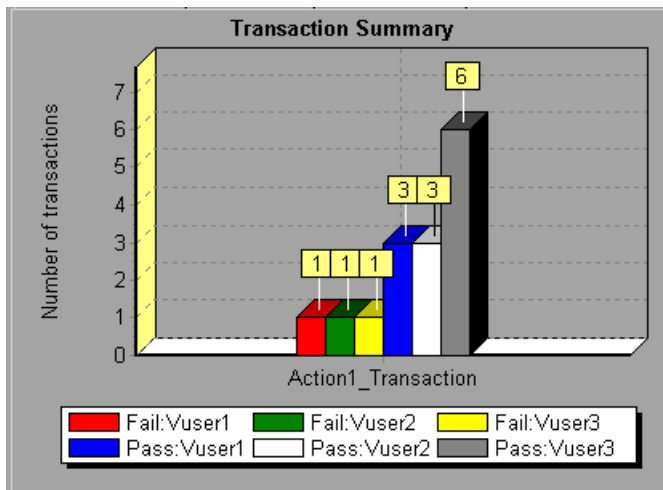
Working in Expert Mode

Advanced users can fine-tune the Astra LoadTest configuration settings while working in *Expert Mode*. In Expert mode, additional options are displayed in the Settings dialog box. This chapter describes the additional settings that are available in the Expert mode:

- **Entering Expert Mode**
- **Agent Settings**
- **General Settings**
- **Debug Information Settings**
- **Output Settings**
- **Timeout Settings**

Entering Expert Mode

The Astra LoadTest Controller Expert Mode is intended for support personnel to provide access to system information. When you work in the Expert Mode, the Controller dialog boxes contain additional options for fine tuning the Controller operation.

To activate the Expert Mode, choose **Tools** > **Expert Mode.** An active Expert Mode is indicated by a check mark.

To exit the Expert Mode, repeat the above process.

Agent Settings

The Agent settings allow you to customize the behavior of the agent on a remote host machine. Using the Settings dialog box, you set the online configuration and command line parameters for the agent.

The available configuration settings are:

Heartbeat rate: The time interval when all agents on remote hosts send messages to the Controller to indicate that the agent is still active. The default is every 30 seconds.

Heartbeat max miss: The maximum number of heartbeat misses that the Controller can tolerate before causing an agent to exit. Increase this number if the agents are exiting too soon after a heartbeat miss.

Debug level: The level of detail for the debug messages (from 0 - least detailed, to 15 - most detailed). The default is 0.

Rendz / Status grouping quota: The agent waits and collects Rendezvous and Status commands before releasing them. These settings specify how many Rendezvous or Status messages to gather before releasing the Vusers. The default is 100.

Timeout to Controller: The default timeout for the Controller when observing the agent. The Controller polls the agent at given intervals to determine whether it is still active. If it fails to respond within the specified timeout, the Controller issues a message that the agent is down. The default timeout is 120 seconds.

Max threads for driver: The maximum number of threads that can be executed for the current Vuser's driver.

Working Language: The agent's working language (English or Japanese).

The available command line settings are:

Keep agent connection log: This is the command line used by the Controller to bring up this host's agent. This appears only when the host is in the process of connecting or already connected. It is useful for determining why an agent failed to load. It saves the agent connection log in the directory specified in **Agent log dir**.

Debugger path: To launch a debugger with the agent, specify the debugger path. The agent appends this path to the *b-daemon.exe* command line.

To set the Agent settings:

1 Enter Expert Mode (see above).

2 Choose **Tools > Options**. The Options dialog box appears. Select the **Agent** tab.
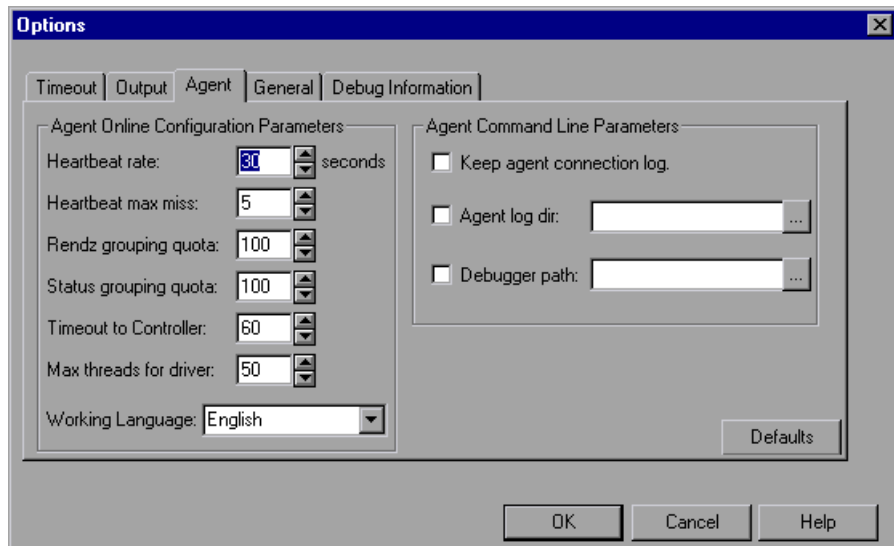
3 Set the desired parameters.

4 Click **OK** to accept the settings and close the dialog box.

General Settings

The General Expert Mode settings allow you to specify global settings for the host connection delay, data table storage and multiple IP address allocation.

Host connection delay: The delay, in seconds, that Astra LoadTest waits before connecting to a host.

Data tables global directory: This setting is only required for scripts created with earlier versions of Astra LoadTest. The network location for data tables used as a source for parameter values.

To set the General Expert Mode settings:

1 Choose **Tools** > **Options**. The Options dialog box appears. Select the **General** tab.
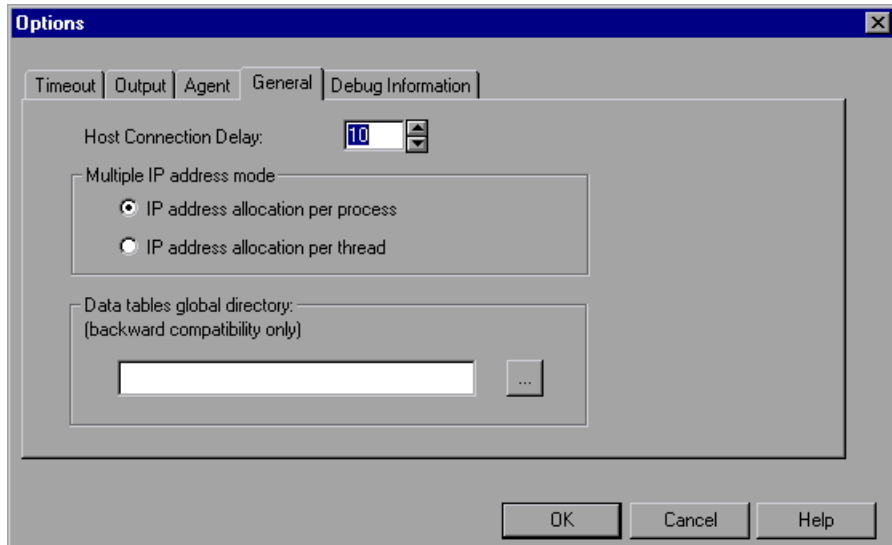
2 Enter the desired host connection delay in seconds.

3 Enter the global directory for data tables.

4 Click **OK** to accept the settings and close the dialog box.

Debug Information Settings

The Debug Information settings allow you to determine the extent of the trace to be performed during scenario execution. The debug information is written to the Output window.

The following trace flags are available: General, File Transfer, Incoming Communication, and Outgoing Communication. You only need to select the flags relating to your problem. For example, if you encounter specific problems with the transfer of files, select the File Transfer flag.

The agent creates some temporary files in the TMP or TEMP directory, which are normally deleted at the end of the scenario. The temporary files contain information such as the parameter file sent to the Vuser, the output compilation file and the configuration file. The files are saved in the TMP/lrr#/UsrTmp directory, where # indicates the session number. Using the Debug Expert mode settings you can instruct Astra LoadTest to keep those temporary files.

To set the Debug Information settings:

1 Choose **Tools** > **Options**. The Options dialog box appears. Select the **Debug Information** tab.
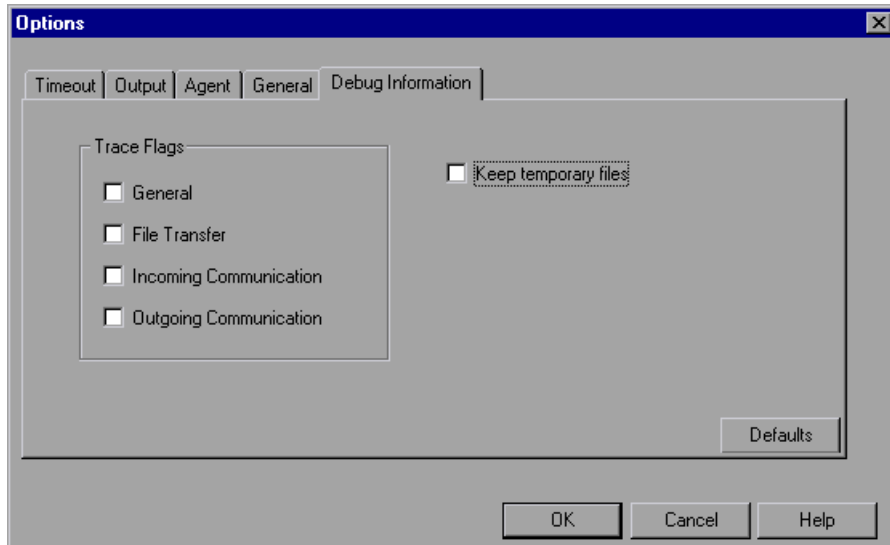
2 Select the check boxes for the desired trace flags.

3 To save the temporary runtime files, select the **Keep temporary files** check box.

4 Click **OK** to accept the settings and close the dialog box.

Output Settings

Basic Output settings are available when Expert mode is disabled. However, Expert mode provides additional settings for handling output messages:

Save Every *xxx* **messages:** Defines how often to auto-save the output message file. The default is every 100 messages.

Find

Find Again

Top of Chapter

Back

To set the Output settings:

1 Choose **Tools** > **Options**. The Options dialog box appears. Select the **Output** tab.

Find

Find Again

Top of Chapter

Back
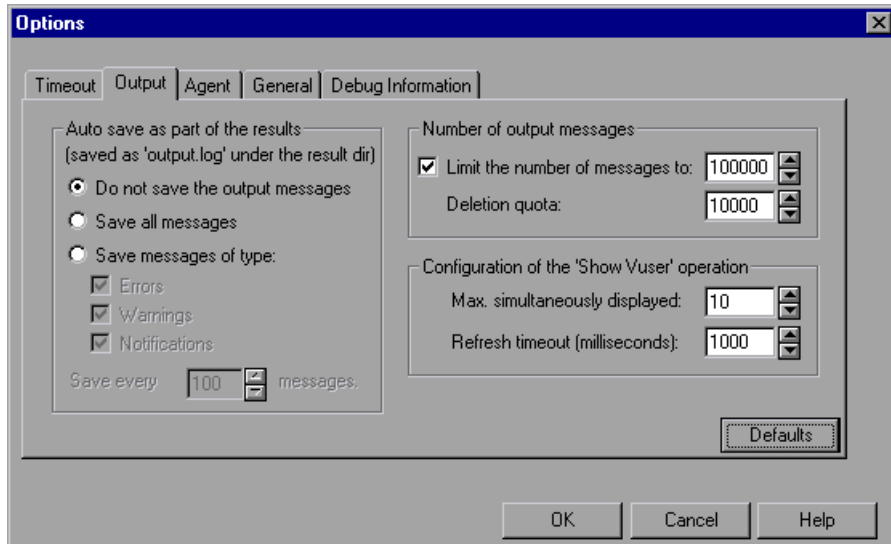
2 Enter the number of messages after which Astra LoadTest will perform an auto-save operation. To limit the number of messages in the output window, select the check box and enter the desired number of messages and deletion quota.

3 Click **OK** to accept the settings and close the dialog box.

Timeout Settings

Basic Timeout settings are available when Expert mode is disabled. However, Expert mode provides additional timeout settings:

Time to wait for grouping Vuser commands: You can tell Astra LoadTest to wait a specific time interval before issuing a group of commands. For example, wait 20 seconds before issuing a group of Pause commands. The commands which can be grouped are: Run, Pause, Abort, Rendezvous, Show and Hide. The default time is 0 seconds.

To set the Timeout settings:

1 Choose **Tools** > **Options**. The Options dialog box appears. Select the **Timeout** tab.
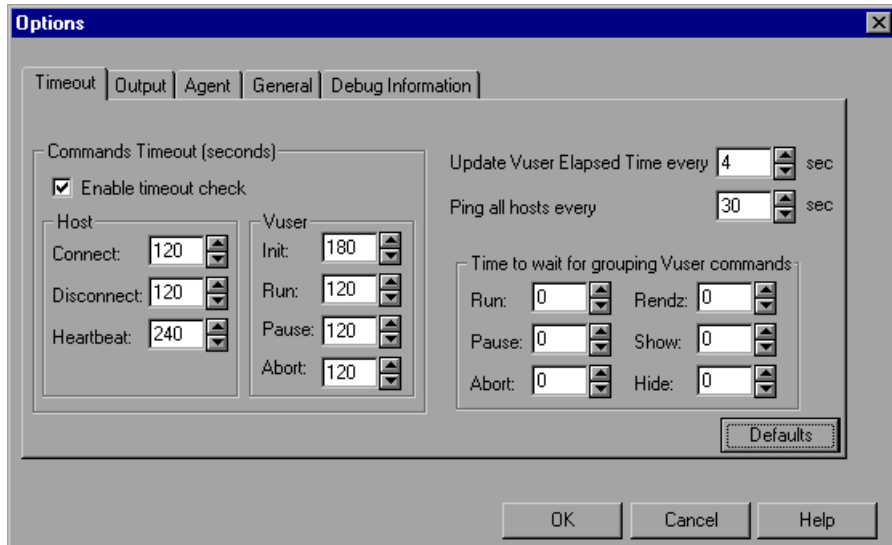
2 Enter the timeout for each of the Vuser commands: Run, Pause, Abort, Rendz, Show, and Hide.

Troubleshooting the Controller

Astra LoadTest enables you to test entire applications. If one of the components of the application is not configured properly, Astra LoadTest scenarios will not run.

This appendix discusses the most common Astra LoadTest problems:

- **Failure to Communicate with a Host**
- **Failure to Connect to the AUT Database**
- **Failure to Access Files**
- **Failed Vusers or Transactions**
- **Increasing the Number of Vusers on an NT Server**
- **Working with Firewall Limitations**

Find

Find Again

Top of Chapter

Back

About Troubleshooting

Astra LoadTest relies heavily upon communication between host machines on a network. If communication is not established properly, the Controller will be unable to send commands to remote hosts and the scenario will fail. By understanding the reason for the failure and determining when the failure occurred, you can solve most of the communication-related problems.

In order to ensure that the problem lies with your scenario and not your Vuser script, you should verify that your script runs properly on all remote hosts as a stand-alone:

- Test all types of Vuser scripts on Windows platforms by running them from the Virtual User Recorder, or by running a single user from the Controller.

Note: When a test runs in the Virtual User Recorder, the full browser is used. This differs from a test run in the Controller, where only the browser basics are used. There may be occasions when a test passes its run in the Virtual User Recorder , but fails when it is run in the Controller. Before running a scenario in the Controller with multiple Vusers, run a single Vuser to ensure the test is bug free.

For more information on running Vuser scripts in stand-alone mode, refer to the appropriate guide for creating Vuser scripts.

Astra LoadTest Communications

Most communication problems can be solved if you understand your Astra LoadTest configuration. This knowledge helps you to determine the source of the problem and perform the necessary actions to correct it.

The following diagram illustrates a sample network running Astra LoadTest. There are three servers: The Astra LoadTest Controller, the application or database server, and the file server which stores the scenario results (note that result files can also be saved on a non-dedicated server). There are five remote hosts, each one running multiple Vusers.

The arrows indicate the type of communication necessary between the elements of the network. The Vusers communicate with the Controller in both directions (send/receive), but with the file server in one direction (send). The Controller must have access to the file server. All Vusers participating in the scenario must be able to communicate with the application server in both directions (send/receive).

In order for a client host to connect to the server host, it must be able to resolve the server host name.

Controller

Result
File
Server

Database or
Application
Server

Remote Vuser Hosts
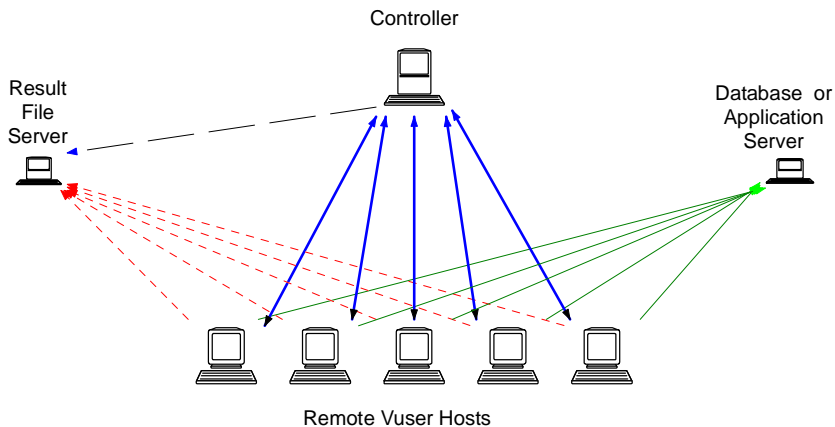
If any of the connections are broken, the scenario will fail.

Failure to Communicate with a Host

The most common communication error is the failure of the Controller host to connect with a remote host. Check the following items:

- TCP/IP setup
- TCP/IP connectivity
- Remote Command Launcher
- Host connections

Checking TCP/IP Setup

The first step in checking your configuration is to verify your machine's TCP/IP setup. Astra LoadTest includes a utility called Hostinfo (*hostinfo.exe*), located under Astra LoadTest's bin directory. This utility provides information about the current host—local name and local address. It also insures that TCP/IP is properly installed on the current machine.
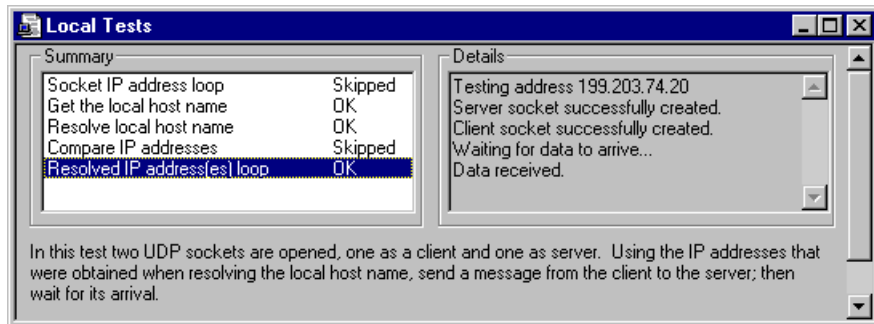
When you invoke Hostinfo, it automatically verifies the TCP stack by:

- retrieving and resolving the local host name
- retrieving and resolving the IP address

To resolve the IP address, Hostinfo tries to communicate using two UDP sockets on the same machine. It verifies that the IP address obtained while resolving the host name is the same as the actual IP address of this host.

To display the results of a test in the Details box, highlight the test name.

Note that the Edit menu in Hostinfo allows you to copy all host information to the clipboard for sending to support personnel.

Checking TCP/IP Connectivity

Make sure that TCP/IP connectivity is functional on the Controller and Vuser host machines. Use a ping utility or type PING *hostname* from the DOS command line to verify communication with a remote machine. Make sure that the remote host and Controller machines can ping each other by IP addresses and hostnames.

Remote Command Launcher

All remote hosts running on a Windows platform, use a Astra LoadTest Agent to accept commands from Astra LoadTest. The Agent is started through the Remote Command Launcher placed in you StartUp group during installation. An active Remote Command Launcher is indicated by an icon (on the task bar in Windows

95 and NT 4.0). If the Remote Command Launcher is not active, invoke it from the Astra LoadTest program group. If you upgraded from an earlier version of Astra LoadTest, check that all remote hosts have an updated version of the Remote Command Launcher.

Host Connections

To verify the host connectivity, connect to each one of the remote hosts from the Controller's Hosts dialog box. Select the host(s) and click the Connect button. The status changes to *Connecting*.

If the Connection fails, the status changes to *Fail* and details are written to the Details box. Double-click the details box for more information about a failure.

If a connection succeeds, the status changes to *Ready*, and the actual platform name appears in the Platform box, such as WIN95, WINNT, etc.

Name	Status	Details
doc9pc	✔ Ready	
goose	✔ Ready	
miro	✔ Ready	
rman	✘ Failed	Connection to host failed. Communication problem: RPC: F
oxygen	✘ Failed	Connection to host failed. Communication problem: RPC: F
jukebox	✘ Failed	Connection to host failed. Communication problem: RPC: F
hammer	✘ Failed	Connection to host failed. Communication problem: RPC: F
steel	⇄ Connecting	Connection started.

Failure to Connect to the AUT Database

If you are running a database application, you must ensure that all remote clients can connect with the database server. If network or configuration errors occur when the client accesses the server, you must correct them before running a scenario. To ensure that your client application can connect with the database server, perform the following tests.

- Ping
- SQL utilities

Ping: Ensure that the client can communicate with the database server using TCP/IP. Use a ping utility or type PING *hostname* from the DOS command line.

SQL Utilities: Use a simple utility such as ISQL or SQLPLUS to logon to the database server and perform several basic operations.

Failure to Access Files

An Astra LoadTest scenario will fail if the result path or Vuser script is inaccessible to one or more of the participating hosts. Check the following items:

- Vuser Script
- Result Path

Vuser Script: Make sure that the Vuser script is accessible to all hosts participating in the scenario through path translation and permissions. View or run the Vuser script as a stand-alone on each of the participating hosts.

Result Path: Make sure that the result path is accessible to all hosts participating in the scenario through path translation and permissions. Check the permissions of the result directory files and modify them if necessary.

Failed Vusers or Transactions

Astra LoadTest Vusers or transactions may fail for a variety of reasons relating to the network, database, or actual script. You can find information about scenario runs from the following sources:

- Run view

- Output window

- Output file

- Analysis reports and graphs

Run View

The Run view is part of the Astra LoadTest Controller. The Scenario Groups window in the top left-hand corner of the view indicates the status of the Vuser groups during and after the scenario run. During the scenario run, the column will show a PENDING, INITIALIZING, READY, RUNNING, or RENDEZVOUS status. You can also view the status of each individual Vuser in the Vusers dialog box. If a Vuser fails and does not complete the script execution, Astra LoadTest displays an error status. If a Vuser completes the script some of the transactions may have failed. Astra LoadTest indicates the transaction status of a completed script run using the DONE.FAILED or DONE.PASSED status.

For more information about the Vuser states, see Chapter 11, **Running a Scenario**.

ID	Status	Script	Host	Elapsed
1	Done. Passed 1 iteration(s) attempted: 1 suc	web	doc9pc	00:00:06
2*	Stopped	web	doc9pc	
3	Done. Passed 1 iteration(s) attempted: 1 suc	web	doc9pc	00:00:07
4*	Done. Failed 1 iteration(s) attempted: 0 succ	web	doc9pc	
5	Done. Passed 1 iteration(s) attempted: 1 suc	web	doc9pc	00:00:05
6	Done. Passed 1 iteration(s) attempted: 1 suc	web	doc9pc	00:00:09
7	Running	web	doc9pc	00:00:11
8	Done. Passed 1 iteration(s) attempted: 1 suc	web	doc9pc	00:00:07
9	Done. Passed 1 iteration(s) attempted: 1 suc	web	doc9pc	00:00:09

Find

Find Again
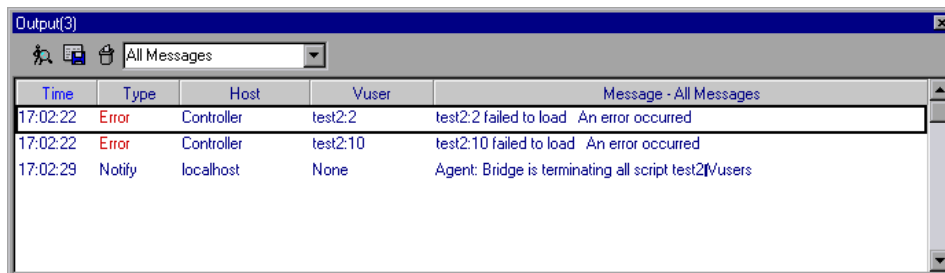
Top of Chapter

Back

Output Window

View the Output window from the Controller. The output window contains useful information for debugging a scenario. The output window lists three types of messages: error, warning, and notifications. An error message usually results in a failed script. A warning message indicates that the Vuser encountered a problem, but test execution continued. A notification provides useful information such as recorded think time values and other run-time information.

For more information about the Output window, see Chapter 12, **Viewing Vusers During Execution**.

Output File

You can view information about script execution in an output file located in the Vuser result directory. The output file, *output.txt*, contains:

- a list of the primary functions called during the scenario

- error messages from the database server

- transactions and rendezvous information

The extent of the information dumped to the output file, depends on the output file settings. In the Virtual User Recorder's runtime settings, you specify a Brief or Extended log. For the Extended log, you can specify a full trace, returned data, or current parameter value. An extended log is helpful for debugging a script, but if you are not debugging, Extended log is not recommended as it introduces extra overhead. For more information about configuring run-time settings, refer to the *Virtual User Recorder* guide.

Analysis Reports and Graphs

You can generate graphs and reports to view information about the scenario run. For example, the Scenario Summary report displays a table containing the scenario's run-time data and provides links to the following graphs: Running Vusers, Throughput (Web), Hits Per Second (Web), and Transaction Summary.

For more information on the available graphs and reports, see the *Astra LoadTest Analysis User's Guide*

Increasing the Number of Vusers on an NT Server

Under the normal settings of an NT server, you are limited to several hundred Vusers. This limitation is related to the operating system and not to the CPU or memory.

To work around the limitation of the NT operating system, modify the NT Kernel as follows:

1 Save a copy of the registry file in case you have trouble with these modifications.

2 Run Regedit.

3 Go to following key in KEY_LOCAL_MACHINE:

System\CurrentControlSet\Control\Session Manager\SubSystems

4 Select the Windows key. The default Windows key for NT 4.0 looks like this:

%SystemRoot%\system32\csrss.exe ObjectDirectory=\Windows
SharedSection=1024,3072
Windows=On SubSystemType=Windows ServerDll=basesrv,1
ServerDll=winsrv:UserServerDllInitialization,3
ServerDll=winsrv:ConServerDllInitialization,2
ProfileControl=Off MaxRequestThreads=16

The SharedSection=1024,3072 key has the format xxxx,yyyy where:

xxxx defines the maximum size of the system-wide heap (in kilobytes)

yyyy defines the size of the per desktop heap.

5 Increase the SharedSection parameter.

Change the yyyy settings from 3072 to 8192 (which is 8 MB).

This setup successfully allowed 1250 Oracle Vusers to run on an NT server using 2 Pentium PRO 200 MHz with 1 GB RAM.

Since each Vuser in this setup used approximately 2MB memory, other Vusers may require more memory.

We were able to load over 2500 Vusers when we ran the NT terminal server as the Operating System and changed the above registry setting.

The above registry changes enable us to run more threads allowing us to run more Vusers on the machine. This implies that we are not bound by the NT operating system, but only by hardware and internal scalability limitations.

Working with Firewall Limitations

Working with a Firewall means that you can prevent access to the outside world and from the outside world on specific port numbers.

For example, you can specify that there is no access to any port from the outside world, with the exception of the mail port (23) or you can specify that there is no outside connection to any ports except for the mail port and WEB port (80). The port settings are configured by the system administrator.

uses *rcmdl* for launching the Agents (via the PortMapper) on PC machines. When the Agent and the Controller are brought up, they look for a free port number from the range of free ports reserved for programs. If there is a firewall, then the Agent or the Controller may not find a free port.

Therefore, make sure that the following ports are open:

- The PortMapper port number (111) on the Vuser machines should be open to access from the outside.

- The User range on the Vuser and Controller machines should be open to access in both directions.

Note that Vusers usually need to access a server machine. A firewall in this case also poses a problem: the Vusers will not be able to run the client program at all.

Index

A

aborting Vusers, *See* stopping Vusers
Acrobat Reader **11**
agent
    defined **22**
    settings **241**–**242**
    summary window **162**
Analysis
    interpreting analysis graphs **237**
Analysis results **120**
application
    configuration **33**
    usage model **34**
Astra LoadTest Analysis **237**
Astra LoadTest implementation planning **39**
Astra LoadTest overview **16**–**23**
    emulating human users with Vusers **19**
    load testing **16**
    working with Astra LoadTest **23**
Astra LoadTest testing process
    see Testing process

B

Books Online **11**

C

collating scenario results **123**
command line options, Vuser script **79**
command line parameters, agent **241**
communication failure **256**
configuring a host **72**–**75**
configuring a script **76**–**82**
connecting to TestDirector server **128**
Context Sensitive Help **11**
Controller
    defined **20**
    invoking **49**
    managing scenario files **55**
    overview **51**
    quick tour **48**–**61**
    selecting LoadTest commands **54**
Controller window
    Design view **53**
    icon bar **54**
    menu bar **51**, **54**
    Output window **53**
    Run view **53**
    Scenario Groups window **53**
    status bar **51**
    title bar **51**
creating Vuser groups **66**–**71**

Find

Find Again

Top of Chapter

Back

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

Find

Find Again

Top of Chapter

Back

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

Find

Find Again

Top of Chapter

Back

A B C **D** E F **G** H I **J** K **L** M N O **P** Q **R** S **T** U **V** W X Y **Z**

Find

**Find
Again**

◀ ▶

回
**Top of
Chapter**

⬅ **Back**

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

Host Resolution Functions Copyright Agreement

Copyright (c) 1980, 1983, 1985, 1987, 1988, 1989, 1990, 1993

The Regents of the University of California. All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.

2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.

3. All advertising materials mentioning features or use of this software must display the following acknowledgement:

    This product includes software developed by the University of California, Berkeley and its contributors.

4. Neither the name of the University nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE REGENTS AND CONTRIBUTORS ''AS IS'' AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE REGENTS OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

Portions Copyright (c) 1993 by Digital Equipment Corporation.

Permission to use, copy, modify, and distribute this software for any purpose with or without fee is hereby granted, provided that the above copyright notice and this permission notice appear in all copies, and that the name of Digital Equipment Corporation not be used in advertising or publicity pertaining to distribution of the document or software without specific, written prior permission.

Astra® LoadTest Controller User's Guide, Version 4.5

If you have any comments or suggestions regarding this document, please send them via e-mail to documentation@mercury.co.il.

Find

Find Again

Back