## **HP ALM Performance Center**

Software Version: 11.52

User and Administrator Guide

Document Release Date: May 2013

Software Release Date: May 2013



## **Legal Notices**

## Warranty

The only warranties for HP products and services are set forth in the express warranty statements accompanying such products and services. Nothing herein should be construed as constituting an additional warranty. HP shall not be liable for technical or editorial errors or omissions contained herein.

The information contained herein is subject to change without notice.

### **Restricted Rights Legend**

Confidential computer software. Valid license from HP required for possession, use or copying. Consistent with FAR 12.211 and 12.212, Commercial Computer Software, Computer Software Documentation, and Technical Data for Commercial Items are licensed to the U.S. Government under vendor's standard commercial license.

## **Copyright Notice**

© Copyright 2002 - 2013 Hewlett-Packard Development Company, L.P.

### **Trademark Notices**

Adobe® is a trademark of Adobe Systems Incorporated.

Intel® is a trademark of Intel Corporation in the U.S. and other countries.

Java is a registered trademark of Oracle and/or its affiliates.

Microsoft® and Windows® are U.S. registered trademarks of Microsoft Corporation.

Oracle® is a registered trademark of Oracle and/or its affiliates.

UNIX® is a registered trademark of The Open Group.

## **Documentation Updates**

The title page of this document contains the following identifying information:

- Software Version number, which indicates the software version.
- Document Release Date, which changes each time the document is updated.
- Software Release Date, which indicates the release date of this version of the software.

To check for recent updates or to verify that you are using the most recent edition of a document, go to:

#### http://h20230.www2.hp.com/selfsolve/manuals

This site requires that you register for an HP Passport and sign in. To register for an HP Passport ID, go to:

http://h20229.www2.hp.com/passport-registration.html

Or click the New users - please register link on the HP Passport login page.

You will also receive updated or new editions if you subscribe to the appropriate product support service. Contact your HP sales representative for details.

## **Support**

Visit the HP Software Support Online web site at:

#### http://www.hp.com/go/hpsoftwaresupport

This web site provides contact information and details about the products, services, and support that HP Software offers.

HP Software online support provides customer self-solve capabilities. It provides a fast and efficient way to access interactive technical support tools needed to manage your business. As a valued support customer, you can benefit by using the support web site to:

- · Search for knowledge documents of interest
- Submit and track support cases and enhancement requests
- Download software patches
- · Manage support contracts
- Look up HP support contacts
- · Review information about available services
- Enter into discussions with other software customers
- · Research and register for software training

Most of the support areas require that you register as an HP Passport user and sign in. Many also require a support contract. To register for an HP Passport ID, go to:

http://h20229.www2.hp.com/passport-registration.html

To find more information about access levels, go to:

http://h20230.www2.hp.com/new\_access\_levels.jsp

## **Contents**

User and Administrator Guide	1
Contents	5
Welcome to This Guide	16
How This Guide is Organized	16
ALM Help	17
ALM Help Guides	17
Topic Types	20
Additional Online Resources	21
ALM Extension Guides	22
Part 1: Performance Testing Basics	23
Chapter 1: HP ALM Performance Center Introduction	25
HP ALM Performance Center Overview	26
How to Conduct a Performance Test	27
Part 2: Performance Testing Assets	29
Chapter 2: Testing Assets - Introduction	31
How to Manage Testing Assets	32
Chapter 3: VuGen Script Management	33
Vuser Scripts	34
Mapping VuGen Parameters to AUT Parameters	34
How to Upload VuGen Scripts	34
VuGen Script Management User Interface	35
Upload VuGen Scripts Dialog Box	36
Troubleshooting and Limitations	37
Chapter 4: Topologies	39
Topologies Overview	40
How to Design Topologies	40
How to Design Topologies - Use-Case Scenario	43

Topologies User Interface	46
Topologies Module	47
Topologies Module Fields	48
New Topology Dialog Box	49
Topology Details Dialog Box	50
Topology Designer Window	52
Performance Test Designer > Topology Tab	54
Chapter 5: Monitor Profiles	57
Monitor Profiles Overview	58
How to Create and Configure Monitor Profiles	58
Monitor Profiles User Interface	59
Monitors Configuration Page	60
Add New Monitors Page	61
Edit Monitors Dialog Box	62
Edit SNMP Monitors Dialog Box	64
Edit SiteScope Monitors Dialog Box	64
Edit Network Delay Time Monitors Dialog Box	65
Performance Test Designer > Monitors Tab	67
Part 3: Performance Test Design	69
Chapter 6: Performance Test Design - Introduction	71
Performance Test Design Overview	72
Performance Test Design Best Practices	72
How to Design a Performance Test	72
Performance Test Design User Interface	75
Test Design / Summary Tab	76
Performance Test Designer Window	78
Test Validation Results Dialog Box	81
Chapter 7: Defining Performance Test Workloads	83
Performance Test Workload Overview	84
Rendezvous Points	84
How to Define a Performance Test Workload	85
How to Distribute Vusers Among Vuser Groups	88

Defir	ning Performance Test Workloads User Interface	90
F	Performance Test Designer > Workload Tab	90
V	Vorkload Types Dialog Box	97
S	Select Controller Dialog Box	98
F	Rendezvous Dialog Box	100
Т	est Options Dialog Box	102
Chapter	8: Integrating Virtualized Services	105
Integ	grating Virtualized Services Overview	106
S	Service Virtualization Monitoring	108
S	Service Virtualization Locking	108
How	to Add Virtualized Services to Performance Tests	109
Integ	grating Virtualized Services User Interface	110
C	Configure Services Virtualization Dialog Box	110
Α	odd Project Dialog Box	114
С	Pelete Project Dialog Box	115
С	Deployment Check Results Dialog Box	116
C	Configure Virtualization Servers Dialog Box	117
Chapter	9: Load Generator Distribution	119
Load	Generator Distribution Overview	120
How	to Distribute Load Generators Among Vuser Groups	121
Load	Generators User Interface	123
Α	Assign Load Generators to Multiple Groups Dialog Box	123
S	Select Load Generators Dialog Box	127
Α	outomatch Load Generators Properties Dialog Box	130
Chapter	10: Scheduling Performance Tests	133
Sche	eduling Performance Tests Overview	134
S	Scheduling By Test	134
S	Scheduling By Vuser Group	135
How	to Define a Schedule for the Performance Test	136
How	to Add Actions to a Test Schedule	138
How	to Edit Scheduler Actions	139
Sche	eduling Performance Tests User Interface	140

Global Scheduler Pane	140
Scheduler Actions	143
Chapter 11: Service Level Agreements	147
Service Level Agreements Overview	148
Tracking Period	149
How to Define Service Level Agreements	149
How to Define Service Level Agreements - Use-Case Scenario	150
Service Level Agreement User Interface	153
Service Level Agreement Pane	153
Service Level Agreement Wizard	155
Measurement Page	156
Transactions Page	157
Load Criteria Page	158
Thresholds Page	159
Summary Page	161
Tracking Period Dialog Box	162
Chapter 12: Enabling and Configuring ERP/CRM and J2EE/.NET Diagnostics	165
How to Enable and Configure ERP/CRM Diagnostics	166
How to Enable and Configure J2EE/.NET Diagnostics	167
How to View Diagnostics Results	167
Diagnostics User Interface	168
Performance Test Designer > Diagnostics Tab	168
J2EE/.NET Configuration Dialog Box	170
Oracle 11i Configuration Dialog Box	172
Oracle 11i Server Configuration Dialog Box	173
SAP Configuration Dialog Box	173
Siebel Configuration Dialog Box	175
Siebel DB Configuration Dialog Box	176
Siebel DB Server Configuration Dialog Box	176
Siebel Server Configuration Dialog Box	177
Chapter 13: Configuring Terminal Sessions	179
Terminal Sessions Overview	180

How to Create a Terminal Session	180
How to Connect to a Terminal Session	182
How to Configure a Terminal Session over a Firewall	184
Terminal Sessions User Interface	184
Terminal Services Dialog Box	185
Performance Center Agent Runtime Settings Dialog Box	186
Troubleshooting and Limitations	186
Chapter 14: Multiple IP Addresses	187
Multiple IP Addresses Overview	188
How to Enable IP Spoofing in ALM	188
How to Configure Multiple IP Addresses on Linux	190
IP Wizard	190
Part 4: Performance Testing Execution	193
Chapter 15: Performance Test Execution Introduction	195
Running Performance Tests Overview	196
How to Manage a Performance Test Run	197
How to Manage Vusers During a Test Run	199
How to Manage Virtualized Services During a Test Run	200
How to Manage Monitoring and Load Generator Information During a Test Run	201
Performance Test Execution User Interface	202
Results/Last Run Results Tab	202
Initializing Run Page	205
Performance Test Run Page	207
Run Performance Test Dialog Box	217
Timeslot Duration Dialog Box	219
Stop Run Dialog Box	220
Output Details Dialog Box	221
Edit Scheduler Dialog Box	223
Monitor Profile Content Dialog Box	224
Load Generators Dialog Box	225
Add Load Generators Dialog Box	227
Monitor Over Firewall Dialog Box	228

Vusers Dialog Box	229
Run Vusers Dialog Box	230
Add Group Dialog Box	232
View Script Dialog Box	234
SLA Report	235
Calculate Service Level Agreement Dialog Box	236
Chapter 16: Network Virtualization	239
Network Virtualization Overview	240
How to Integrate Network Virtualization into a Performance Test	243
Network Virtualization Graphs	245
Average Latency Graph	245
Packet Loss Graph	246
Average Bandwidth Utilization Graph	247
Average Throughput Graph	247
Total Throughput Graph	248
Network Virtualization User Interface	249
Network Virtualization Settings Dialog Box	250
Import Virtual Locations Dialog Box	252
Limitations for Network Virtualization	253
Part 5: Online Monitoring	255
Chapter 17: Working with ALM Performance Center Online Monitors	257
Monitoring Process Overview	258
How to Set Up the Monitoring Environment – Workflow	258
Monitor Types	259
Chapter 18: Web Resource Monitors	261
Web Resource Monitoring Overview	262
HTTP Status Codes	265
Chapter 19: Run-Time and Transaction Monitoring	267
Run-Time Graph Overview	268
Transaction Monitor Graphs Overview	270
Chapter 20: System Resource Monitoring	271
System Resource Monitors Overview	272

	Windows Resource Monitoring	272
	UNIX Resource Monitoring	272
	SNMP Resource Monitoring	272
	SiteScope Resource Monitoring	272
	How to Set up the UNIX Monitoring Environment	273
	UNIX Resources Performance Counters	274
CI	napter 21: Network Delay Monitoring	277
	Network Monitoring Overview	278
	How to Set Up the Network Monitoring Environment	279
	How to Configure the UNIX Source Machine for Network Monitoring	280
	Network Delay Monitoring User Interface	. 282
	Network Delay Time Graph	282
	Troubleshooting and Limitations	282
CI	napter 22: Web Server Resource Monitoring	285
	Web Server Resource Monitoring Overview	286
	How to Change the Apache Default Server Properties	286
	Apache Performance Counters	286
	Microsoft IIS Performance Counters	287
CI	napter 23: Web Application Server Resource Monitoring	289
	Web Application Server Resource Monitoring Overview	290
	MS Active Server Pages Performance Counters	. 290
CI	napter 24: Database Resource Monitoring	291
	Database Resource Monitoring Overview	292
	How to Set Up the Oracle Monitoring Environment	292
	Oracle Performance Counters	294
	SQL Server Performance Counters	295
CI	napter 25: ERP/CRM Server Resource Monitoring	297
	ERP/CRM Server Resource Monitoring Overview	. 298
	How to Set Up the PeopleSoft (Tuxedo) Resource Monitor	298
	How to Set Up the SAPGUI Server Resource Monitor	299
	PeopleSoft (Tuxedo) Performance Counters	300
	SAPGIII Performance Counters	301

Chapter 26: Middleware Performance Monitoring	303
Middleware Performance Monitoring Overview	304
How to Set Up the Tuxedo Monitoring Environment	304
Tuxedo Performance Counters	305
Tuxedo tpinit.ini File	306
Chapter 27: Application Deployment Solution Monitoring	307
Application Deployment Solution Monitoring Overview	308
How to Set up the Citrix Monitoring Environment	308
Citrix MetaFrame Performance Counters	309
Part 6: Runtime Settings Configuration	315
Chapter 28: Script Runtime Settings	317
Script Runtime Settings Overview	318
General Runtime Settings Overview	318
Protocol-Specific Runtime Settings Overview	318
How to Configure Runtime Settings	318
Protocol Specific Runtime Settings Types	319
Runtime Settings User Interface	319
Edit Runtime Settings Dialog Box	320
Part 7: My Performance Center	355
Chapter 29: Personalizing Performance Center	357
My Performance Center Overview	358
How to Work with My Performance Center	358
My Performance Center User Interface	359
My Performance Center Window	359
My Performance Center Views	361
My Notifications	363
Chapter 30: Trending	365
Trend Reports Overview	366
Trend by Quality Attributes Template - Trended Measurements	369
Measurement Acronyms	370
Trend Reports User Interface	372
Performance Trending Page	372

Create New Trend Report Page	374
<report name=""> Trend Report</report>	375
Trend Overview Tab	376
Trend View Tabs	378
Trend Views	379
Export Trend Report Page	384
Select Columns Dialog Box	385
Select Test Runs to Trend Report Dialog Box	388
Threshold Settings Dialog Box	390
Custom Measurement Mapping Dialog Box	391
Add Trend Views to Tab Dialog Box	393
Measurements Configuration Dialog Box	394
Chapter 31: Performance Application Lifecycle (PAL)	397
PAL Overview	398
How to Work with PAL	400
PAL User Interface	401
PAL Flow Pane	403
Manage Production Data Sets Pane	404
Manage PAL Applications Dialog Box	405
Upload Production Data Set Dialog Box	407
PAL Reports Pane	408
Create New Performance Application Lifecycle Report Dialog Box	409
Performance Test Set Pane	411
Run <entity> Dialog Box</entity>	413
Create New Performance Test Dialog Box	417
Test Runs Pane	418
Export PAL Data Dialog Box	420
<report name=""> PAL Report</report>	421
Export Report to PDF Dialog Box	423
Data Sources Tab	424
PAL Report View Tabs	426
PAL Report Views	427

Add Views To Tab Dialog Box	429
Select Measurements Dialog Box	431
Add Data Dialog Box	432
Select Columns Dialog Box	434
Threshold Settings Dialog Box	435
Monitors Mapping Dialog Box	437
Transactions Mapping and Grouping Dialog Box	439
Set Scaling Factors Dialog Box	442
Set Global Transactions Filter Dialog Box	443
Part 8: Performance Center Administration	445
Chapter 32: Performance Center Administration - Introduction	447
Performance Center Administration Overview	448
How to Work with Performance Center Administration	448
Chapter 33: Initial Performance Center Configuration	451
Initial Performance Center Configuration Overview	452
How to Initially Configure Performance Center	452
Chapter 34: Performance Center System Administration	455
ALM Performance Center Communication Security	456
Performance Center System User	456
Remote Performance Center Server and Host Administration	456
How to Update the Communication Security Passphrase	457
How to Change the System User	458
How to Configure the System User Manually	460
Required Policies for the Performance Center System User	463
System Identity Utility Window	464
Chapter 35: Secure Host Communication	469
Secure Host Communication Overview	470
Host Security Configuration	471
Remote Security Configuration	471
Host Security Best Practices	472
How to Configure Security Settings Locally on Hosts	473
How to Update Host Security Settings Remotely	474

Secure Host Communication User Interface	475
Host Security Manager Window	476
Host Security Setup Dialog Box	478
Update Security Key Dialog Box	479
Update Security Mode Dialog Box	480
Troubleshooting and Limitations	480
Chapter 36: ALM Performance Center Permissions	483
Performance Center Permissions Overview	484
Performance Center Permission Levels	484

### **Welcome to This Guide**

ALM Performance Center is HP's Web-enabled global performance testing tool, which is specially designed to simplify the testing process and increase test efficiency for multiple concurrent performance tests across multiple geographic locations.

This guide describes how to use ALM Performance Center. It provides descriptive and conceptual information, step-by-step guidance to help you work with the application, and explanations of reference-oriented material.

## **How This Guide is Organized**

The HP ALM Performance Center Guide contains the following parts:

Part	Description
"Performance Testing Basics" on page 23	Provides an overview of HP ALM Performance Center and performance testing methodology.
	Relevant task: "How to Conduct a Performance Test" on page 27
"Performance Testing Assets" on page 29	Describes how to define project settings and performance testing assets.
	Relevant task: "How to Manage Testing Assets" on page 32
"Performance Test Design" on	Describes how to design a performance test.
page 69	Relevant task: "How to Design a Performance Test" on page 72
"Performance Testing	Describes how to run a performance test.
Execution" on page 193	Relevant task: "How to Manage a Performance Test Run" on page 197
"Online Monitoring" on page 255	Describes how to set monitors for monitoring performance test runs.
	Relevant task: "How to Set Up the Monitoring Environment – Workflow" on page 258
"Runtime Settings Configuration" on page 315	Describes how to configure runtime settings in your Vuser scripts.
	Relevant task: "How to Configure Runtime Settings" on page 318

Part	Description	
"My Performance Center" on page 355	Describes how to create a personalized view of performance testing features.	
	Relevant task: "How to Work with My Performance Center" on page 358	
"Performance Center Administration" on page 445	Describes how to perform Performance Center administration.	
	Relevant task: " How to Work with Performance Center Administration" on page 448	

## **ALM Help**

The ALM Help is an online help system that describes how to use ALM. You can access the ALM Help in the following ways:

- Click **Documentation Library** in the ALM Help menu to open the ALM Help home page. The home page provides quick links to the main help topics.
- Click **Help on this page** in the Help menu to open the ALM Help to the topic that describes the current page.

## **ALM Help Guides**

The ALM Help consists of the following guides and references, available online, in PDF format, or both. PDFs can be read and printed using Adobe Reader, which can be downloaded from the Adobe Web site (http://www.adobe.com).

Reference	Description	
Using the ALM Help	Explains how to use the Help and how it is organized.	
What's New?	Describes the newest features in the latest version of ALM.	
Movies	Short movies that demonstrate the main product features.	
	To access, select <b>Help &gt; Movies</b> .	
Readme	Provides last-minute news and information about ALM.	

HP Application Lifecycle Management (ALM) Guides	Description
HP ALM User Guide	Explains how to use ALM to organize and execute all phases of the application lifecycle management process. It describes how to specify releases, define requirements, plan tests, run tests, and track defects.

HP Application Lifecycle Management (ALM) Guides	Description
HP ALM Administrator Guide	Explains how to create and maintain projects using Site Administration, and how to customize projects using Project Customization.
HP ALM Lab Management Guide	Explains how to use Lab Management to manage lab resources used for functional and performance testing on remote hosts.
HP ALM Lab Management Troubleshooting Guide	Provides information for troubleshooting problems while working with HP ALM Lab Management.
HP ALM Tutorial	A self-paced guide teaching you how to use ALM to manage the application lifecycle management process.
HP ALM Installation and Upgrade Guide	Describes the installation and configuration processes for setting up ALM Server, and the project upgrade process.
HP ALM Business Views Microsoft Excel Add-in User Guide	Explains how to install and use the Business Views Microsoft Excel Add-in to create and configure business view Excel reports.
Business Process Testing User Guide	Explains how to use Business Process Testing to create business process tests.

HP ALM Performance Center Guides	Description
HP ALM Performance Center Quick Start	A self-paced guide giving the Performance Center user a high level overview of creating and running performance tests.
HP ALM Performance Center Guide	Explains to the Performance Center user how to create, schedule, run, and monitor performance tests. Explains to the Performance Center administrator how to configure and manage Performance Center projects.
HP ALM Performance Center Installation Guide	Describes the installation processes for setting up Performance Center Servers, Performance Center Hosts and other Performance Center components.

HP ALM Performance Center Guides	Description
HP ALM Performance Center Troubleshooting Guide	Provides information for troubleshooting problems while working with HP ALM Performance Center.

HP ALM Best Practices Guides	Description
HP ALM Agile Testing Best Practices Guide	Provides best practices for implementing agile testing principles.
HP ALM Business Process Models Best Practices Guide	Provides best practices for working with the Business Models module.
HP ALM Database Best Practices Guide	Provides best practices for deploying ALM on database servers.
HP ALM Entities Sharing Best Practices Guide	Provides best practices for sharing entities.
HP ALM Project Planning and Tracking Best Practices Guide	Provides best practices for managing and tracking releases.
HP ALM Project Topology Best Practices Guide	Provides best practices for structuring projects.
HP ALM Upgrade Best Practices Guide	Provides methodologies for preparing and planning your ALM upgrade.
HP ALM Versioning and Baselining Best Practices Guide	Provides best practices for implementing version control and for creating baselines.
HP ALM Workflow Best Practices Guide	Provides best practices for implementing workflows.

HP ALM Performance Center Best Practices Guides	Description
HP Performance Centers of Excellence Best Practices	Provides best practices for successfully building and operating Performance Centers of Excellence.
HP Performance Monitoring Best Practices	Provides best practices for monitoring the performance of applications under test.

HP ALM API References	Description
HP ALM Project Database Reference	Provides a complete online reference for the project database tables and fields.
HP ALM Open Test Architecture API Reference	Provides a complete online reference for the ALM COM-based API. You can use the ALM open test architecture to integrate your own configuration management, defect tracking, and home-grown testing tools with an ALM project.
HP ALM Site Administration API Reference	Provides a complete online reference for the Site Administration COM-based API. You can use the Site Administration API to enable your application to organize, manage, and maintain ALM users, projects, domains, connections, and site configuration parameters.
HP ALM REST API Reference (Technology Preview)	Provides an online reference for the ALM REST-based API. You can use the REST API to access and work with ALM data.
HP ALM COM Custom Test Type Developer Guide	Provides a complete online guide for creating your own testing tool and integrating it into the ALM environment using native COM development tools.
HP ALM .NET Custom Test Type Developer Guide	Provides a complete online guide for creating your own testing tool and integrating it into the ALM environment using a combination of DCOM and .NET classes.

## **Topic Types**

The content in the above mentioned ALM guides is organized by topics. Three main topic types are in use: **Concepts**, **Tasks**, and **Reference**.

Topic Type	Description	Usage
Concepts	Background, descriptive, or conceptual information.	Learn general information about what a feature does.

Topic Type	Description	Usage
Tasks	Instructional Tasks. Step-by-step guidance to help you work with the application and accomplish your goals.	Learn about the overall workflow of a task.
	Task steps can be with or without numbering:	Follow the steps listed in a numbered task to complete a task.
	Numbered steps. Tasks that are performed by following each step in consecutive order.	Perform independent operations by completing steps in a non-numbered
	Non-numbered steps. A list of self- contained operations that you can perform in any order.	task.
	Use-case Scenario Tasks. Examples of how to perform a task for a specific situation.	Learn how a task could be performed in a realistic scenario.
Reference	General Reference. Detailed lists and explanations of reference-oriented material.	Look up a specific piece of reference information relevant to a particular context.
	User Interface Reference. Specialized reference topics that describe a particular user interface in detail. Selecting Help on this page from the Help menu in the product generally opens the user interface topics.	Look up specific information about what to enter or how to use one or more specific user interface elements, such as a window, dialog box, or wizard.
Troubleshooting and Limitations	Troubleshooting and Limitations. Specialized reference topics that describe commonly encountered problems and their solutions, and list limitations of a feature or product area.	Increase your awareness of important issues before working with a feature, or if you encounter usability problems in the software.

## **Additional Online Resources**

The following additional online resources are available from the Help menu:

Resource	Description
Troubleshooting & Knowledge Base	Opens the Troubleshooting page on the HP Software Support Web site where you can search the Self-solve knowledge base. Choose <b>Help &gt; Troubleshooting &amp; Knowledge Base</b> . The URL for this Web site is http://h20230.www2.hp.com/troubleshooting.jsp.

Resource	Description
HP Software Support	Opens the HP Software Support Web site. This site enables you to browse the Self-solve knowledge base. You can also post to and search user discussion forums, submit support requests, download patches and updated documentation, and more. Choose Help > HP Software Support. The URL for this Web site is www.hp.com/go/hpsoftwaresupport.  • Most of the support areas require that you register as an HP Passport user and sign in. Many also require a support contract.  • To find more information about access levels, go to: http://h20230.www2.hp.com/new_access_levels.jsp  • To register for an HP Passport user ID, go to: http://h20229.www2.hp.com/passport-registration.html
HP Software Web site	Opens the HP Software Web site. This site provides you with the most up- to-date information on HP Software products. This includes new software releases, seminars and trade shows, customer support, and more. Choose <b>Help &gt; HP Software Web site</b> . The URL for this Web site is www.hp.com/go/software.
Add-ins	Opens the Add-ins page, which offers integration and synchronization solutions with HP and third-party tools.
Tools	Opens the ALM Performance Center Tools add-ins page, which offers integration and synchronization solutions with HP and third-party tools that are installed with ALM on the ALM Server.

### **ALM Extension Guides**

Extensions provide added functionality to HP ALM. If you have a license for an ALM extension, you can utilize the added functionality by enabling the extension on a per project basis. For more details on enabling extensions, refer to the *HP Application Lifecycle Management Administrator Guide*.

To view the list of extensions available with ALM 11.52, or to download documentation for ALM extensions, visit the HP ALM Add-ins page, available from the HP Application Lifecycle Management Add-ins page (**Help > Add-ins**).

## **Part 1: Performance Testing Basics**

### **User and Administrator Guide**

Part 1: Performance Testing Basics

# **Chapter 1: HP ALM Performance Center Introduction**

Thic	chanter	includes:
11115	Chablei	includes.

HP ALM Performance Center Overview	26
How to Conduct a Performance Test	27

### **HP ALM Performance Center Overview**

HP ALM Performance Center is a global cross-enterprise performance testing tool which enables you to manage multiple, concurrent performance testing projects across different geographic locations without any need to travel between the locations. Performance Center administers all your internal performance testing needs. With Performance Center, you manage all aspects of large-scale performance testing projects, including resource allocation and scheduling, from a centralized location accessible through the Web. Performance Center helps streamline the testing process, reduce resource costs, and increase operating efficiency.

Performance Center generates load on your Web server or application using HP's virtual user (Vuser) technology. Each Vuser follows a series of steps (for example, hyperlink steps, submit form steps, and so on) that you define in a Vuser script. You design Vuser scripts to emulate typical user activity in your application.

Vusers run on dedicated host machines. Each host machine runs many Vusers. When run concurrently, the Vusers create the same load as tens of thousands of individual human users. While Vusers run, Performance Center collects server response time data.

Performance Center analysis tools, which you access both during and after the performance test, provide you with a clear and concise picture of your application's performance under load.

Performance Center helps you pinpoint performance bottlenecks. It also allows you to determine the number of users your system can scale up to (this number is the "breaking point" after which your application's performance starts to degrade). This information gives clues as to what can be done to increase your application's load capacity.

In addition, the information provided by Performance Center helps you analyze how the load on your system affects the service level agreements (SLAs) or other performance thresholds that are important to your business.

Performance Center has the following system advantages:

- Performance Center's step-by-step process helps guide you through the performance testing procedure.
- Performance Center enables remote testing by anybody, from anywhere, at any time, eliminating the need to travel.
- Performance Center enables multiple concurrent tests, replacing serial testing with parallel testing.
- Performance Center enables remote management from anywhere through a Web server.
- Performance Center is a complete system for managing performance tests, scripts, and resources. Furthermore, Performance Center centralizes the testing environment, with no duplication of testing labs, keeping costs down and minimizing time.
- Performance Center enables you to take advantage of the power of the Web for supporting services such as remote consulting, online support, and so on.

For details on how to conduct a performance test, see "How to Conduct a Performance Test" on next page.

### **How to Conduct a Performance Test**

This task describes how to conduct a performance test on your application.

**Note:** To view a movie that demonstrates how to conduct a performance test, select **Help > Movies** in the ALM main window.

To learn more about performance testing, see "HP ALM Performance Center Overview " on previous page.

This task includes the following steps:

- "Create and add test assets" below
- "Reserve a timeslot for performance testing" below
- "Design a performance test" below
- "Run, monitor, and view results of the performance test" below
- 1. Create and add test assets

For details, see "How to Manage Testing Assets" on page 32.

2. Reserve a timeslot for performance testing

For details, refer to the HP Application Lifecycle Management User Guide.

3. Design a performance test

For details, see "How to Design a Performance Test" on page 72.

4. Run, monitor, and view results of the performance test

For details, see "How to Manage a Performance Test Run" on page 197.

## **Part 2: Performance Testing Assets**

## **Chapter 2: Testing Assets - Introduction**

This chapter includes:	
How to Manage Testing Assets	32

### **How to Manage Testing Assets**

The following steps describe how to configure project settings and add testing assets.

**Note:** This task is part of a higher-level task. For details, see "How to Conduct a Performance Test" on page 27.

This task includes the following steps:

- "Configure project settings" below
- "Create projects that contain virtualized services optional" below
- "Upload VuGen scripts" below
- "Design topologies of your applications under test" below
- "Create monitor profiles to monitor your tests" below

### Configure project settings

You can configure the monitors, runtime settings, timeout, general, and debug information options for all your Performance Center projects. For details, refer to the *HP ALM Lab Management Guide*.

### Create projects that contain virtualized services - optional

You can create projects that contain virtualized services and integrate these services into your VuGen scripts. For details, see the *HP Service Virtualization User Guide*.

#### Upload VuGen scripts

After you create Vuser scripts using HP Virtual User Generator, you must upload them to ALM. For details, see "How to Upload VuGen Scripts" on page 34.

#### Design topologies of your applications under test

You can design topologies of your applications under test using the Topologies feature. For details, see "How to Design Topologies" on page 40.

#### Create monitor profiles to monitor your tests

To monitor server resources, you must configure the monitor settings for a test. These monitor settings can then be saved as monitor profiles that can be used by any performance test in your project. For details on creating monitor profiles, see "How to Create and Configure Monitor Profiles" on page 58.

## **Chapter 3: VuGen Script Management**

### This chapter includes:

Vuser Scripts	34
Mapping VuGen Parameters to AUT Parameters	.34
How to Upload VuGen Scripts	34
VuGen Script Management User Interface	. 35
Troubleshooting and Limitations	.37

### **Vuser Scripts**

When you run a performance test, virtual users (Vusers) access your application concurrently in order to put load on your server. The actual steps that the Vusers perform when accessing your application are represented in a Vuser script. Each Vuser performs the actions recorded in one Vuser script.

You design Vuser scripts to emulate typical end-user activities on your application. For example, if you are testing performance on a Web site, the Vuser script emulates a real user accessing URLs, clicking links, submitting forms, and so on. When you create a performance test, you distribute your Vuser scripts among your Vusers.

For example, in the case of testing a Web site, you can specify that a portion of the Vusers run a Vuser script that emulates real users accessing your home page, a portion run a script that performs a search query, and a portion emulate the completion of an order form.

You obtain Vuser scripts by recording them using HP's Virtual User Generator (VuGen) and uploading them to ALM.

In addition to testing Web sites, Performance Center can be used to test performance of non-Web environments. For example, you can test WAP, Real, or Oracle NCA applications. For details of supported protocols, see the *HP Virtual User Generator User Guide*.

For details on how to upload VuGen scripts to ALM, see "How to Upload VuGen Scripts" below.

### Mapping VuGen Parameters to AUT Parameters

When setting VuGen parameters in a Vuser script, you can define AUT environment parameters. AUT Environments allows users to make test execution more dynamic by parameterizing the environment data used for testing. Instead of defining and running several different scripts that use the same logic but need different AUT environment parameters, you can simply provide a specific AUT environment configuration that ALM inserts into your script at run-time. ALM will then use the parameter values you defined in the AUT environment configuration when deploying the environment and executing the test.

For more details on working with AUT environments, refer to the *HP Application Lifecycle Management User Guide*.

### **How to Upload VuGen Scripts**

This task describes how to upload VuGen scripts to ALM.

**Note:** This task is part of a higher-level task. For details, see "How to Manage Testing Assets" on page 32.

This task includes the following steps:

- "Prerequisites" on next page
- "Upload the VuGen scripts to ALM" on next page

### Prerequisites

Create scripts in VuGen. For details, see the HP Virtual User Generator User Guide.

#### Note: Service Virtualization:

- If your test requires the service to be running while you record your business process, open HP Service Virtualization simultaneously and deploy the virtualized service. Record the script as usual.
- Pointing calls to virtual services in the application under test covers two major scenarios:
  - Application components that use the service are embedded in the code or in a configuration file. In this case, update the code in the application under test or update the configuration file to point to the new URL.

#### Examples:

A .NET Desktop application uses a web service, and the url is set using a constant: stringURL = http://hp.com

A service or back end component uses the web service and the URL is configured in the app.config file.

• The service is consumed by accessing UDDI or some other registry component (Systinet) and the URL is retrieved at run-time. In this case, update the end point URL in UDDI/Systinet.

### Upload the VuGen scripts to ALM

You can upload scripts in one of the following ways:

- Upload scripts from the Test Plan module.
- Save the VuGen scripts locally. The scripts must be saved in ZIP format and must include all the files in the test scripts folder.
- On the Test Plan module toolbar, click the Upload VuGen Scripts button.



Select a destination folder, scripts to upload, and upload options.

For user interface details, see "Upload VuGen Scripts Dialog Box" on next page.

Upload the scripts from VuGen to ALM.

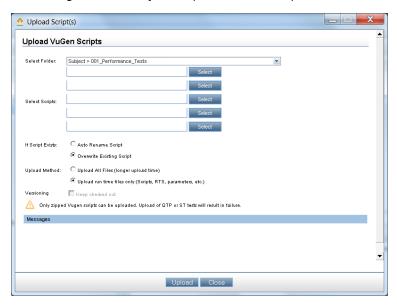
For details about uploading VuGen scripts from VuGen to ALM, see the section about saving VuGen scripts to ALM in the HP Virtual User Generator User Guide.

### **VuGen Script Management User Interface**

This section includes:

### **Upload VuGen Scripts Dialog Box**

This dialog box enables you to upload VuGen scripts to ALM.



To access	On the ALM sidebar, under <b>Testing</b> , select <b>Test Plan</b> .
	On the Test Plan module toolbar, click the <b>Upload VuGen Scripts</b> button.
Important information	The Upload VuGen Scripts dialog box is intended for uploading VuGen scripts only. The VuGen scripts must be saved locally, must be in ZIP format, and must include all the files in the test scripts folder.
	You cannot upload QuickTest (UFT GUI Tests) or Service Test tests using the Upload VuGen Scripts dialog box. To upload QuickTest (UFT GUI Tests) or Service Test tests, see the relevant product's User Guide.
Relevant tasks	"How to Upload VuGen Scripts" on page 34
See also	"Vuser Scripts" on page 34

User interface elements are described below:

UI Elements	Description
Upload	Uploads the selected VuGen Scripts to the specified destination folder.
Select Folder	The destination folder for the uploaded scripts.
	<b>Note:</b> The folder name must not contain a forward slash (/). For more details, see "Troubleshooting and Limitations" on next page.

UI Elements	Description
Select	Enables you to select up to five scripts.
Scripts	<b>Note:</b> The scripts must be saved locally, must be in ZIP format, and must include all the files in the test scripts folder.
If Script	Action to take if the script already exists in the destination folder.
Exists	Auto Rename Script. Automatically gives the script a different name.
	Overwrite Existing Script. Overwrites the existing script.
Upload	The method to use for uploading the script:
Method	Upload All Files. Uploads all the files contained in the .zip file. With this option the upload takes a long time.
	Upload runtime files only. Only the runtime files—that is the scripts, runtime settings, parameters, and so on—are uploaded.
Versioning >	For version enabled projects, keeps the uploaded scripts checked out.
Keep checked out	<b>Version Control:</b> When you upload a script, it is available only for your own use until you check it in. After you check the script in, other users can access the script as well.
Messages	Enables you to enter messages and comments about the script upload.

### **Troubleshooting and Limitations**

This section describes troubleshooting and limitations for uploading VuGen scripts.

• If the name of the folder to which you are uploading VuGen scripts contains a forward slash (/) you cannot upload the scripts using the Upload VuGen Scripts dialog box. Either rename the folder so that it does not contain a forward slash (/) or upload the scripts from VuGen.

# **Chapter 4: Topologies**

#### This chapter includes:

Topologies Overview	40
How to Design Topologies	40
How to Design Topologies - Use-Case Scenario	. 43
Topologies User Interface	46

### **Topologies Overview**

ALM Performance Center can articulate the topology of your application under test (AUT) and use it as an interface for defining performance monitors by integrating with HP SiteScope.

Using topologies, you can:

- Manage an inventory of application under test (AUT) hosts which are grouped into AUT host pools, similar to Performance Center hosts and host pools
- Visually understand the tested environment
- Configure monitors using best practice monitor templates
- Pinpoint runtime performance issues by highlighting a topology node's status based on the SiteScope monitor thresholds

The SiteScope user interface hosted in ALM Performance Center enables leveraging SiteScope functionality in a use-case oriented approach, without requiring additional monitor configuration on the ALM Performance Center side.

During runtime, the AUT schema with comprehensive SiteScope monitor data is displayed in different monitor graphs in the ALM Performance Center run screen and measurement names can be identified and filtered.

For details on designing topologies, see "How to Design Topologies" below.

### **How to Design Topologies**

This section describes how to design a topology that graphically displays the logical components that make up your application under test (AUT) and the relationships between the components. This provides a useful method for managing your inventory of AUT hosts and enables topology-oriented monitoring and analysis.

#### Note:

- This task is part of a higher-level task. For details, see "How to Manage Testing Assets" on page 32.
- Ensure that SiteScope is installed and configured to integrate with ALM Performance Center. For details, see the section about installing SiteScope in the *HP ALM Performance Center Installation Guide*.
- After you have designed a topology you can select it for a performance test when you design the test.
- **Product Feature Movie.** To view a movie that demonstrates how to design topologies, select **Help > Movies** in the ALM main window.

**Tip:** For a use-case scenario related to this task, see "How to Design Topologies - Use-Case Scenario" on page 43.

To learn more about topologies, see "Topologies Overview" above.

This task includes the following steps:

- "Create an empty topology" below
- "Design the topology" below
- "Add the AUT hosts" below
- "Configure the component properties" on next page
- "Configure monitors on the components" on next page
- "Results" on next page

#### 1. Create an empty topology

- a. On the ALM sidebar, under **Performance Center**, select **Topologies**.
- b. To create a topology folder, click the **New Folder** button, and enter the folder name.
- c. Click the **New Topology** button and enter the topology details. To add SiteScope monitors to the topology, specify the SiteScope server details.

For details about the topology fields, see "Topologies Module Fields" on page 48.

#### 2. Design the topology

**Note:** The Topology Designer window opens automatically when you create a new topology. If the Topology Designer window did not open, right-click the topology and select **Design Topology**.

In the Topology Designer window:

- a. From the palette on the left, select relevant nodes representing the components in your AUT and drag them onto the Topology canvas.
- b. To connect two components, click one component (ensure that it is not selected) and drag the cursor to the other component.

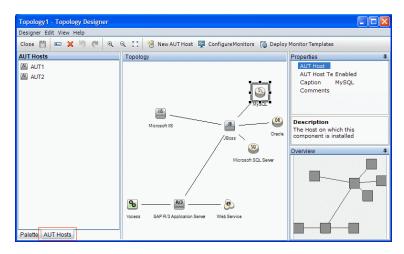
#### 3. Add the AUT hosts

Define the machines that host the relevant components of the AUT.

On the Topology Designer toolbar, click **New AUT Host** to define the machines hosting your AUT.

**Tip:** If you have an Excel file listing your AUT hosts, you can import the list of AUT hosts into ALM. For details, refer to the *HP ALM Lab Management Guide*.

You can view the list of AUT hosts in the AUT Hosts tab on the left.



#### 4. Configure the component properties

Select a component and, in the **Properties** pane in the top right corner of the Topology Designer, enter the relevant properties for that component. For successful integration with SiteScope, ensure that you select the relevant AUT host, and that all of the relevant properties are accurate.

**Tip:** When you click a property, a description is displayed in the lower area of the Properties pane.

Repeat this procedure for each of the relevant components.

#### 5. Configure monitors on the components

You can configure groups of monitors for the components on AUT hosts. Ensure that the AUT host details are accurate for each relevant component.

- To deploy relevant system-defined monitors on specific components on your canvas, select the components, right-click the selection, and select **Deploy Monitor Templates**. Monitor groups are created in SiteScope for each selected component, and each group is automatically configured with relevant system-defined monitors.
- To configure monitors for a component manually in SiteScope, right-click the component and select **Configure Monitors**. For more details about configuring monitors in SiteScope, see the *HP SiteScope User Guide*.

**Note:** The AUT host defined in a component's properties is passed to SiteScope as a remote host and is inserted as the default monitored server for all monitors created for this component.

#### 6. Results

After you save the topology, you can select the designed topology for your performance test. For details, see "Performance Test Designer > Topology Tab" on page 54.

During a test run, you can view the SiteScope monitor activity on the relevant components in your AUT. For details, see "Performance Test Run Page" on page 207.

### How to Design Topologies - Use-Case Scenario

This use-case scenario describes how to design a topology that graphically displays the logical components that make up your application under test (AUT) and the relationships between the components.

**Note:** For a task related to this use-case scenario, see "How to Design Topologies" on page 40.

This scenario includes the following steps:

- "Background" below
- "Create the topology and design the outline" below
- "Add the AUT hosts" on page 45
- "Define the component properties" on page 45
- "Deploy the monitor templates" on page 46
- "Results" on page 46

#### 1. Background

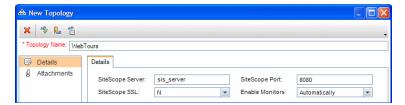
John is a performance engineer working with HP Web Tours. He would like to design a performance test for the application.

As a first step, he would like to model the application in ALM Performance Center so that he can keep track of the topology of his application under test. Using this model, he can benefit from the monitoring and online view features that the topology feature offers.

#### 2. Create the topology and design the outline

a. On the ALM sidebar, under Performance Center, John selects Topologies to open the

Topology module, and clicks the **New Topology** button to create a new topology. He calls the topology **WebTours**, and enters the details of the SiteScope server with which the application will interact for monitoring purposes.



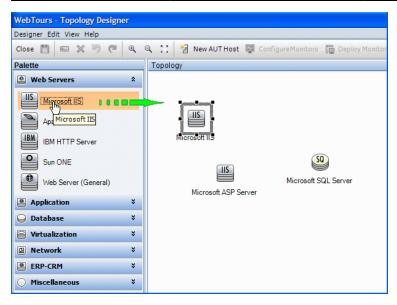
When John clicks **OK**, the Topology Designer window opens, displaying the Topology canvas which, at this stage, is empty.

b. John's Web Tours application comprises the following components: A Web server, an application server, and a database server. The user accesses the application through a client workstation.

In the Topology Designer window, from the palette in the left, John drags the nodes representing these components onto the Topology canvas, and changes their captions to names that are relevant to the components they represent.

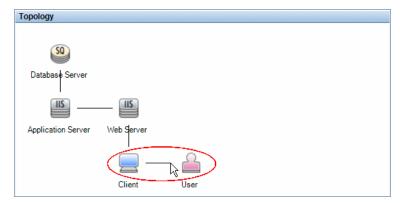
John drags the following nodes:

Palette Category	Component	New Caption
Web Servers	Microsoft IIS	Web Server
Application	Microsoft ASP Server	Application Server
Database	Microsoft SQL Server	Database Server
Miscellaneous	Workstation	Client
Miscellaneous	User	User



c. John connects the application server to the Web server by clicking the application server (ensuring that it is not selected) and dragging the cursor over to the Web server.

Similarly, he connects the application server to the database server, the client workstation to the Web server, and the user to the client.



#### 3. Add the AUT hosts

The AUT hosts are the physical machines that host the relevant components of the application under test.

On the Topology Designer toolbar, John clicks **New AUT Host**, and enters the name and details of the machine that hosts the database server:



John then adds the AUT host that hosts both the application and Web servers.

#### Tip:

- Alternatively, if John had an Excel file listing the AUT hosts in his system, he could have imported the list of AUT hosts to ALM. For details, refer to the HP ALM Lab Management Guide.
- John can view the list of AUT hosts in the AUT Hosts tab by clicking AUT Hosts at the bottom of the Palette tab.

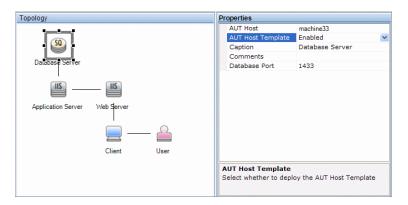
#### 4. Define the component properties

For successful integration with SiteScope, John needs to ensure that the properties for each component are defined correctly.

John selects each component and, in the **Properties** pane in the top right corner of the Topology Designer window, he provides the relevant properties. The properties differ from one type of component to another.

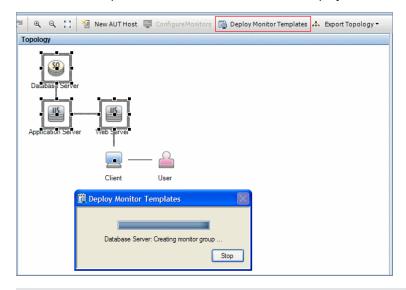
**Tip:** A description for each property is displayed in the lower area of the Properties pane, and helps John to understand what information to provide for each property.

For example, for the database server, John selects **machine33** from the **AUT Host** drop-down list, and accepts the default values for all of the other properties. Then he provides the relevant details for the application and Web servers.



#### 5. Deploy the monitor templates

John selects the three servers and clicks **Deploy Monitor Templates**. ALM creates a monitor group in SiteScope for each of the selected components, and deploys the relevant system-defined monitor templates for each component. Because the AUT Host Templates property is enabled, the templates for the actual AUT host are deployed as well.



**Tip:** If John wants to view or modify these monitors, he can do so by clicking **Configure Monitors** on the toolbar, which opens HP SiteScope and displays the monitor trees that were created for each component.

#### 6. Results

John saves the topology and closes the Topology Designer window. He selects this topology when designing the performance test for the Web Tours application. When he runs the test, he can view the SiteScope monitor activity on the relevant components in the application in the Performance Test Run page.

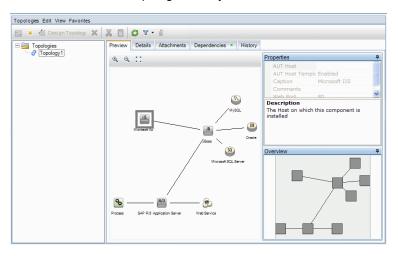
### **Topologies User Interface**

This section includes:

Topologies Module Fields	48
New Topology Dialog Box	. 49
Topology Details Dialog Box	50
Topology Designer Window	52
Performance Test Designer > Topology Tab	54

### **Topologies Module**

This module lists the topologies that you have defined.



To access	On the ALM sidebar, under <b>Performance Center</b> , select <b>Topologies</b> .
Important information	After you have designed a topology for your performance test, you must associate it with your test. For details about associating a topology with a test, see "Performance Test Designer > Topology Tab" on page 54.
Relevant tasks	"How to Design Topologies" on page 40
See also	"Topologies Overview" on page 40

User interface elements are described below (unlabeled elements are shown in angle brackets):

UI Elements	Description
<b>*</b>	New Topology Folder. Enables you to create a topology folder.
*	New Topology. Enables you to create a new topology.
🖄 Design Topology	Opens the Topology Designer window, enabling you to design topologies. For details, see "Topology Designer Window" on page 52.

UI Elements	Description
×	<b>Delete.</b> Enables you to delete the selected topologies.
2 1	Cut/Paste. Enables you to cut and paste the selected topology from one topology folder to another.
<b>②</b>	<b>Refresh All.</b> Refreshes the page so that it displays the most up-to-date information.
7-	<b>Set Filter/Sort.</b> Enables you to filter and sort the topologies. Any currently applied filters or sorting orders are displayed below the toolbar. For more details, see the <i>HP Application Lifecycle Management User Guide</i> .
U	<b>Attachments.</b> Enables you to add attachments that provide additional information about the topology. For more details, see the <i>HP Application Lifecycle Management User Guide</i> .
<topologies tree=""></topologies>	Located on the left side of the window, organizes and displays your topologies hierarchically.
Preview tab	Displays a preview of the topology selected in the Topology tree.
	Properties pane. Displays general details about a node selected in the topology on the left. If an AUT host is configured on the node, the host's details are displayed as well.
	Overview pane. Displays a full overview of the topology structure.
Details tab	Displays the details of the selected topology. For details, see "Topology Details Dialog Box" on page 50.
Attachments tab	Lists attachments that provide additional information about the currently selected topology. For details, see the HP Application Lifecycle Management User Guide.
Dependencies tab	Displays dependency relationships that exist between entities. For more information, see the <i>HP Application Lifecycle Management User Guide</i> .
History tab	Lists changes made to the selected topology. For more details, see the HP Application Lifecycle Management User Guide.

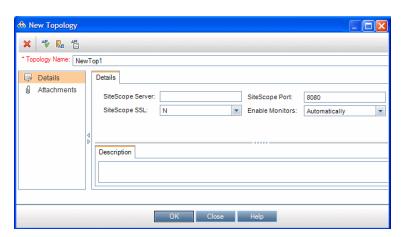
### **Topologies Module Fields**

This section describes the Topologies module fields:

Field (A-Z)	Description
Created by	The user who created the topology.

Field (A-Z)	Description
Creation Date	The date and time the topology was created.
Enable Monitors	Always enables SiteScope monitors, or enables them automatically during monitor configuration and performance test runs.
Modified	The date and time the topology was last modified.
Modified by	The user who last modified the topology.
SiteScope Port	The port defined for SiteScope during installation of SiteScope.  Default value:  Non-SSL: 8080 SSL: 8443  For details, see the section about installing SiteScope for Performance Center in the HP ALM Performance Center Installation Guide.
SiteScope Server	The name of the SiteScope server.
SiteScope SSL	Indicates whether or not SiteScope uses SSL.
Topology Name	A name for the topology.

### **New Topology Dialog Box**



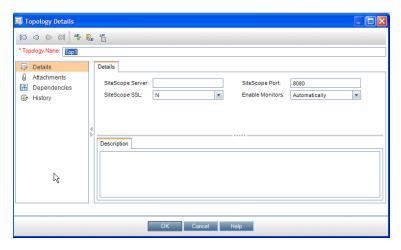
To access	On the ALM sidebar, under <b>Performance Center</b> , select <b>Topologies</b> . Click the	
	New Topology button.	

Relevant tasks	"How to Design Topologies" on page 40
See also	"Topologies Overview" on page 40

UI Elements	Description
×	Clear All Fields. Clears the data.
₽₽	Spell Check. Checks the spelling for the selected word or text box.
<b>₽</b> B	<b>Thesaurus.</b> Displays a synonym, antonym, or related word for the selected word.
AR:	Spelling Options. Enables you to configure how to check the spelling.
Topology Name	The name of the topology.
Details	Enables you to enter the details of the selected topology. Required fields are marked with an asterisk (*) and are displayed in red.
	For details, see "Topologies Module Fields" on page 48.
Attachments	Lists attachments that provide additional information about the currently selected topology. For details, see <i>HP Application Lifecycle Management User Guide</i> .

### **Topology Details Dialog Box**

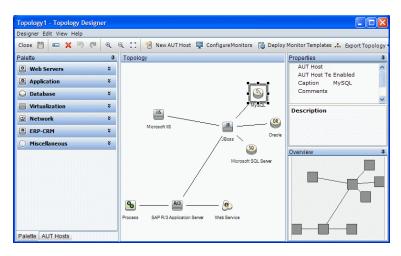
This dialog box enables you to view topology details.



To access	On the ALM sidebar, under <b>Performance Center</b> , select <b>Topologies</b> .
	Select a topology in the Topology tree, and click the <b>Attachments</b> button. Then click <b>Details</b> .
Relevant tasks	"How to Design Topologies" on page 40
See also	"Topologies Overview" on page 40

UI Elements	Description
B000	<b>First/Previous/Next/Last Entity.</b> Enables you to browse through the list of topologies.
AB	Spell Check. Checks the spelling for the selected word or text box.
Re	<b>Thesaurus.</b> Displays a synonym, antonym, or related word for the selected word.
AR:	Spelling Options. Enables you to configure how to check the spelling.
Topology Name	The name of the topology.
Details	Displays the details of the selected topology. For more details, see "Topologies Module Fields" on page 48.
Attachments	Lists attachments that provide additional information about the currently selected topology. For details, see the <i>HP Application Lifecycle Management User Guide</i> .
Dependencies	Displays dependency relationships that exist between entities. For more information, see the <i>HP Application Lifecycle Management User Guide</i> .
History	Lists changes made to the selected topology. For more details, see the HP Application Lifecycle Management User Guide.

### **Topology Designer Window**

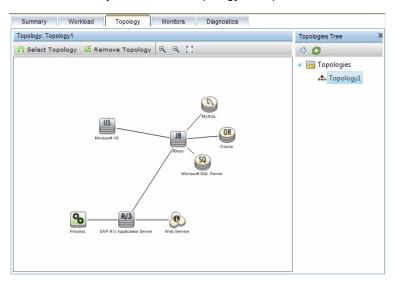


To access	On the ALM sidebar, under <b>Performance Center</b> , select <b>Topologies</b> . In the tree, select a topology, and click Design Topology.
Important information	After you have designed a topology for your performance test, you must select it for your test. For more details, see "Performance Test Designer > Topology Tab" on page 54.
Relevant tasks	"How to Design Topologies" on page 40
See also	"Topologies Overview" on page 40

UI Elements	Description
Close	Enables you to close the Topology Designer window.
Save & Close	Enables you to save the topology and close the Topology Designer.
	Save Topology. Enables you to save your topology.
R	Rename. Enables you to rename the node selected on the canvas.
×	<b>Delete.</b> Enables you to delete the nodes selected on the canvas.
9 (	Undo/Redo. Enables you to undo or redo the previous action.

UI Elements	Description
(Q)	Zoom into the canvas/Zoom out of the canvas. Enables you to zoom in and out of the canvas.
6, 2, c, a,	<b>Fit to screen.</b> Enables you to fit the whole topology design to the current screen size.
New AUT Host	Opens the New AUT Host dialog box, enabling you to add a new AUT host. For details, refer to the HP ALM Lab Management Guide.
	<b>Tip:</b> If you have a list of AUT hosts set up in an Excel file, you can import this list instead of adding the hosts one by one. For details, refer to the <i>HP ALM Lab Management Guide</i> .
Configure Monitors	Opens the Configure Monitors dialog box, enabling you to manually configure SiteScope monitors on the selected node. For details about creating SiteScope monitors, see the <i>HP SiteScope User Guide</i> .
	Note: When configuring monitors for these components in SiteScope, the value for Monitor Run Settings > Frequency should be changed to a more suitable value, such as 5 - 15 seconds.
Deploy Monitor Templates	Opens the Deploy Monitor Templates dialog box, enabling you to configure SiteScope monitors on the selected node automatically by deploying a template monitor set.
♠ Export Topology ▼	Enables you to export the whole area of the topology, or only the visible region of the topology to an image file.
Palette tab	Enables you to select components to add to the canvas.
	The palette includes various types of server categories, as well as a Miscellaneous category. This category includes nodes that are not necessarily AUT-specific but that complete the topology design, such as a user or a client workstation.
AUT Hosts tab	Displays all AUT hosts defined in the projects AUT host pool.
Topology canvas	Provides a canvas where you can lay out the topology by dragging components/server nodes and linking them to each other.
Properties pane	Enables you to define properties for the node selected on the canvas.
	The lower section of the Properties pane displays a description of the selected property.
Overview pane	Displays an overview of the topology's structure.

This tab enables you to select a topology for a performance test.



To access	On the ALM sidebar, under <b>Testing</b> , select <b>Test Plan</b> .
	Right-click a performance test in the test plan tree and select <b>Edit Test</b> .
	3. In the Performance Test Designer window, click the <b>Topology</b> tab.
Important information	You design topologies in the Topologies module. After you have designed topologies, you can select one of them for a performance test.
Relevant	"How to Design a Performance Test" on page 72
tasks	"How to Design Topologies" on page 40
See also	"Topologies Overview" on page 40

UI Elements	Description
Select Topology	Opens the Topologies tree in the right pane, enabling you to select a topology for the test.
Remove Topology	Enables you to remove the selected topology.
<b>Q</b>	Zoom in. Enables you to zoom into the displayed topology.
Q	Zoom out. Enables you to zoom out of the displayed topology.
54	<b>Fit to panel.</b> Enables you to fit the topology to the size of the Topology pane.

UI Elements	Description
Topologies tree	Opens when you click <b>Select Topology</b> , enabling you to select a topology for the test.
	Expand the Topologies tree, select a topology, and click to the Topology pane on the left.
	To refresh the tree, click .
Topology pane	Displays the selected topology.

## **Chapter 5: Monitor Profiles**

#### This chapter includes:

Monitor Profiles Overview	.58
How to Create and Configure Monitor Profiles	. 58
Monitor Profiles User Interface	. 59

#### **Monitor Profiles Overview**

You monitor performance test execution using the Performance Center online monitors. To monitor server resources, you must configure the monitor settings for a performance test. You select the type of monitors to run, the servers whose resources you want to monitor, and add the measurements to monitor for each server. These monitor settings can then be saved as a monitor profile that can be used by any performance test in your project.

For details about creating monitor profiles, see "How to Create and Configure Monitor Profiles" below.

### **How to Create and Configure Monitor Profiles**

This task describes how to create and configure a monitor profile.

**Note:** This task is part of a higher-level task. For details, see "How to Manage Testing Assets" on page 32.

To learn more about monitor profiles, see "Monitor Profiles Overview" above.

This task includes the following steps:

- "Prerequisites" below
- "Create the monitor profile test resource type" on next page
- "Add monitors to the monitor profile" on next page

#### 1. Prerequisites

To use the following monitors, you must first install or configure monitoring components on the server machine. For task details about configuring the monitoring components, see the specific monitoring sections listed below.

- Citrix. For task details, see " How to Set up the Citrix Monitoring Environment" on page 308.
- **J2EE & .NET.** For task details, see "How to Enable and Configure J2EE/.NET Diagnostics" on page 167.
- Network Delay. For task details, see "How to Set Up the Network Monitoring Environment" on page 279.
- **Oracle.** For task details, see "How to Set Up the Oracle Monitoring Environment" on page 292.
- **PeopleSoft (Tuxedo).** For task details, see "How to Set Up the PeopleSoft (Tuxedo) Resource Monitor" on page 298.
- **SAPGUI.** For task details, see "How to Set Up the SAPGUI Server Resource Monitor" on page 299.
- Tuxedo. For task details, see "How to Set Up the Tuxedo Monitoring Environment" on page

304.

■ UNIX. For task details, see "How to Set up the UNIX Monitoring Environment" on page 273.

#### 2. Create the monitor profile test resource type

You create test resources from the Test Resources module. For task details, see the *HP Application Lifecycle Management User Guide*.

#### Add monitors to the monitor profile

- a. In the Test Resources module, select a monitor profile, select the Monitors
   Configuration tab, and then click the Add Monitor button page that opens, select the monitor that you want to run.
- b. In the Edit Monitor page, enter the required information and select the counters that you want to monitor. The Edit Monitor page varies depending on which monitor type you select:
  - For user interface details for Windows Resources, UNIX, Apache, MS IIS, MS ASP, Citrix, SQL, Oracle, TUXEDO, PeopleSoft (Tuxedo), or SAPGUI monitors, see "Edit Monitors Dialog Box" on page 62.
  - For SNMP monitor user interface details, see "Edit SNMP Monitors Dialog Box" on page 64.
  - For SiteScope monitor user interface details, see "Edit SiteScope Monitors Dialog Box" on page 64.
  - For Network Delay Time monitor user interface details, see "Edit Network Delay Time Monitors Dialog Box" on page 65.

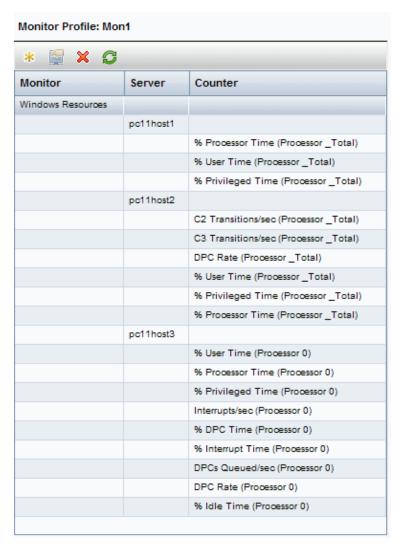
### **Monitor Profiles User Interface**

#### This section includes:

Monitors Configuration Page	.60
Add New Monitors Page	61
Edit Monitors Dialog Box	62
Edit SNMP Monitors Dialog Box	64
Edit SiteScope Monitors Dialog Box	64
Edit Network Delay Time Monitors Dialog Box	.65
Performance Test Designer > Monitors Tab	.67

### **Monitors Configuration Page**

This page enables you to add and edit monitors that are part of a monitor profile.



To access	<ul> <li>Use one of the following:</li> <li>In the Test Resources module, select a monitor profile in the test resource tree and click the Monitors Configuration tab.</li> <li>In the Performance Test Designer, click the Monitors tab, and then click View Selected.</li> </ul>
Relevant tasks	<ul><li> "How to Create and Configure Monitor Profiles" on page 58.</li><li> "How to Manage a Performance Test Run" on page 197.</li></ul>

UI Elements	Description
*	<b>Add Monitor.</b> Opens the Add New Monitor page, enabling you to select which monitors to run in the monitor profile.
	Edit Monitor. Enables you to edit the selected monitor.
×	Delete Selected Item. Deletes the selected item from the monitor profile.
S	Refresh Monitor List. Refreshes the monitors list.
Counters	The counters that are being monitored.
Monitor	The name of the monitor.
Server	The server whose resources are being monitored.

### **Add New Monitors Page**

This page enables you to select the monitor type to add to a monitor profile.

То	Use one of the following:
access	<ul> <li>In the Test Resources module, select a monitor profile in the test resource tree and click the Monitors Configuration tab. Then click the Add Monitor button</li> <li>.</li> </ul>
	• In the Run-Time Monitors dialog box, click the <b>Add Monitor</b> button . For more information, see "Monitor Profile Content Dialog Box" on page 224.
Relevant tasks	"How to Create and Configure Monitor Profiles" on page 58
	"How to Manage a Performance Test Run" on page 197

UI Elements	Description
Windows     Resources	Enables you to select the specific counters for this monitor type. For more information, see "Edit Monitors Dialog Box" below.
Unix     Resources	
Apache	
MS IIS	
MS ASP	
Citrix     Server	
SQL     Server	
• Oracle	
• TUXEDO	
PeopleSoft (Tuxedo)	
• SAPGUI	
SNMP	Opens the Edit Monitors Page, which enables you to select the specific counters that you want to monitor for this monitor type. For more information, see "Edit SNMP Monitors Dialog Box" on page 64.
SiteScope	Opens the Edit Monitors Page, which enables you to select the specific counters that you want to monitor for this monitor type. For more information, see "Edit SiteScope Monitors Dialog Box" on page 64.
Network Delay Time	Opens the Edit Monitors Page, which enables you to select the specific counters that you want to monitor for this monitor type. For more information, see "Edit Network Delay Time Monitors Dialog Box" on page 65.

### **Edit Monitors Dialog Box**

This dialog box enables you to define the server whose resources you want to monitor, and to select the counters to monitor.

To access	In the Test Resources module, select a monitor profile in the test resource tree
	and click the <b>Monitors Configuration</b> tab. Click the <b>Add Monitor</b> button, and then select one of: Windows Resources, UNIX Resources, Apache, MS IIS, MS ASP, Citrix, SQL, Oracle, Tuxedo, PeopleSoft, SAPGUI.

Important information	This dialog box contains information relevant for the following monitor types: Windows Resources, UNIX Resources, Apache, MS IIS, MS Active Server Pages, Citrix, SQL, Oracle, TUXEDO, PeopleSoft (Tuxedo), SAPGUI
Relevant tasks	"How to Create and Configure Monitor Profiles" on page 58

UI Elements	Description
Get Counters	Click to display a list of available counters.
Available Counters	A list of available counters for the selected monitor.
Client	The PeopleSoft (Tuxedo)/SAPGUI client.
	Available for: PeopleSoft, TUXEDO, SAPGUI
Password	The monitored server's password, if relevant.
Port	The port number of the Apache server.
	<b>Note:</b> To monitor an Apache server through a firewall, use the Web server port (by default, port 80).
	Available for: Apache
SAP Server	The SAP Server.
	Available for: SAPGUI
Selected Counters	A list of selected counters for the monitor.
Server	The name or IP address of the server whose resources you want to monitor.
URL (Apache only)	The Server statistics information URL. To verify the statistics information URL, try to view it through the browser using the following format: http:// <server_name address="" ip="">:<port_number>/server-status?auto For example: http://stimpy:80/server-status?auto.</port_number></server_name>
	Format: Enter the server statistics information URL, without the server name.
	Default value:/server-status?auto
	<b>Note:</b> The default port number and URL can vary from one server to another. Consult your Web server administrator.
	Available for: Apache
User Name	The monitored server's user name, if relevant.

### **Edit SNMP Monitors Dialog Box**

This dialog box enables you to define the SNMP server whose resources you want to monitor, and to select the counters to monitor.

To access	In the Test Resources module, select a monitor profile in the test resource tree and click the <b>Monitors Configuration</b> tab. Click the <b>Add Monitor</b> button, and then select <b>SNMP</b> .
Relevant tasks	"How to Create and Configure Monitor Profiles" on page 58

User interface elements are described below (unlabeled elements are shown in angle brackets):

UI Elements	Description
Get Counters	Click to display a list of available counters.
<pre><choose area="" counters=""></choose></pre>	Displays a list of available counters. <b>Default:</b> Displays all nodes of the SNMP objects in a tree-level hierarchy.
Concatenate SNMP Levels	For SNMP object nodes with ten or more levels, select to display the sub-levels as a single string, separated by periods (.).
Server	Enter the name or IP address of the server to monitor.
	<b>Note:</b> Performance Center connects to default SNMP port 161. To use a different port number, specify the machine name in the following format:
	<pre><server name="">:<port number=""></port></server></pre>

### **Edit SiteScope Monitors Dialog Box**

This dialog box enables you to define the SiteScope server whose resources you want to monitor, and to select the counters to monitor.

To access	In the Test Resources module, select a monitor profile in the test resource tree and click the <b>Monitors Configuration</b> tab. Click the <b>Add Monitor</b> button, and then select <b>SiteScope</b> .
Relevant tasks	"How to Create and Configure Monitor Profiles" on page 58

UI Elements	Description
Get Counters	Click to display a list of available counters.
Password	When <b>Use Account</b> is selected, enter the relevant password.
Port	The SiteScope port.
	Default: 8888
Server	The SiteScope server name.
Use Account	Select when SiteScope is working in secure mode, which requires authentication. Enter the SiteScope account name, user name and password in the corresponding fields.
Use HTTPS	Specify if you are using a secure HTTP connection.
User Name	When <b>Use Account</b> is selected, enter the relevant user name.

### **Edit Network Delay Time Monitors Dialog Box**

This dialog box enables you to define the Network Delay Time server whose resources you want to monitor, and to select the counters to monitor.

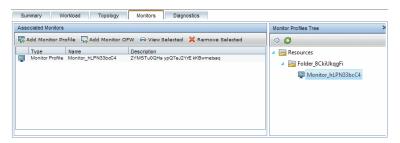
To access	In the Test Resources module, select a monitor profile in the test resource tree and click the <b>Monitors Configuration</b> tab. Click the <b>Add Monitor</b> * button, then select <b>Network Delay Time</b> .
Relevant tasks	"How to Create and Configure Monitor Profiles" on page 58

UI Elements	Description
Use Defaults	Uses the default values.
Destination Machine	The name of the machine at the final destination of the path you want to monitor.
	<b>Note:</b> If the destination machine is <b>localhost</b> , type the local machine's name and not <b>localhost</b> .
Monitor Frequency	Send next packet X milliseconds after receipt of previous packet. Select the number of milliseconds the monitor should wait between receiving a packet and sending out the next packet. If you have a long, steady load test, you can increase the interval by several seconds.
	Default: 3000 milliseconds

UI Elements	Description
Monitor Settings	Send Request Using X protocol. Select the relevant protocol. It is recommended that you keep the default protocol. In Windows, the default is TCP, and in UNIX, the default is UDP.
	Send request to port X. Enter the port number being used by the network path.
	Enable display of network nodes by DNS names. Select to view the DNS name of each node along the network path, in addition to its IP address. Note that selecting this option decreases the speed of the Network monitor.
Monitoring Packet Retries	Wait Xseconds for packet to return before retrying. Select the maximum number of seconds that the monitor should wait for a packet to return before it retries to send the packet.
	<b>Default:</b> 3 seconds. If your network is very large and loaded (an internet connection with a low capacity), increase the value by several seconds. If you have a small network (such as a LAN), decrease the value.
	Number of retries. Select the number of times the Network monitor should try resending a packet to a node if the packet is not initially returned.
	Default: 0
Platform	The platform on which the machine runs.
Source Machine	The name of the source machine from which you want the network path monitoring to begin.
	<b>Note:</b> To run the Network Delay Monitor when there are firewalls between the Performance Center Host machine and the source machine, type the server name or IP address of the source machine according to the format:
	<mi listener="" machine="">:<source key="" local="" machine=""/></mi>
	Where source machine local key is the unique key that you chose when configuring the Performance Center agent on the source machine.
	<b>Example</b> 12.12.12.3:vds
	For more information about working with firewalls in Performance Center, see the section about firewalls in the HP ALM Performance Center Installation Guide.

### **Performance Test Designer > Monitors Tab**

This tab enables you to select monitor profiles and monitor-over-firewall agents to use in your performance test.



To access	1. On the ALM sidebar, under <b>Testing</b> , select <b>Test Plan</b> .
	Right-click a performance test in the test plan tree and select <b>Edit Test</b> .
	3. In the Performance Test Designer window, click the <b>Monitors</b> tab.
Important information	You must have monitor profiles defined before you can select them for the test.
Relevant tasks	"How to Design a Performance Test" on page 72
	"How to Create and Configure Monitor Profiles" on page 58
See also	"Monitor Profiles Overview" on page 58

UI Elements	Description
Add Monitor Profile	Opens the Monitor Profiles tree in the right pane, enabling you to select a monitor profile for the test.
Add Monitor OFW	Opens the Monitors Over Firewall tree in the right pane, enabling you to select a monitor-over-firewall agent for the test.
ବୈ View Selected	Opens a window that displays all of the measurements of the selected monitor profile.
X Remove Selected	Removes the selected monitor profile or monitor-over-firewall agent from the test.
Associated Monitors grid	Displays the monitors and monitor-over-firewall agents selected for the test.

UI Elements	Description
Monitor Profile Tree / Monitor Over Firewall Tree	Enables you to select a monitor profile or monitor-over-firewall agent for the test.  Expand the Resources tree, select a monitor profile or monitor-over-firewall agent, and click to move it to the Associated Monitors grid on the left.

# **Part 3: Performance Test Design**

# **Chapter 6: Performance Test Design - Introduction**

Performance Test Design Overview	. 72
How to Design a Performance Test	.72
Performance Test Design User Interface	.75

### **Performance Test Design Overview**

When you design a performance test you create the test, define a workload for the test and, if desired, associate a topology and monitor profiles which provide a diagram of the application under test.

You can also enable a diagnostics module to collect diagnostics data during the test run.

**Service Virtualization:** Your test can run simulated, virtualized services instead of actual services, for example, if the actual services involve additional costs or if the services are inaccessible at the time you run the performance test.

### **Performance Test Design Best Practices**

Before you start with designing a performance test, it is recommended to:

- Create scripts for your test in the relevant application (VuGen scripts, QuickTest tests, Service Test tests), and upload them to ALM. For details, see the relevant User Guide.
- Design topologies of your application under test. For details, see "Topologies" on page 39.
- Configure the monitor machines or monitor-over-firewall agents that you want to use to monitor
  the test run, and define monitor profiles for these monitors. For details, see "Monitor Profiles" on
  page 57.
- To enable diagnostic modules to collect diagnostics data from the test run, you must set up the
  relevant diagnostics components (server/mediators). For details, refer to the HP ALM Lab
  Management Guide.
- To use simulated services during your test run instead of loading actual services, create your virtualized services in HP Service Virtualization Designer. For details on creating projects that contain virtualized services, see the HP Service Virtualization User Guide.

### **How to Design a Performance Test**

This task describes how to design a performance test.

**Note:** This task is part of a higher-level task. For details, see "How to Conduct a Performance Test" on page 27.

To learn more about performance test design, see "Performance Test Design Overview" above.

This task includes the following steps:

- "Prerequisites" on next page
- "Create a new performance test" on next page
- "Design a workload for the test" on page 74
- "Integrate virtualized services Optional" on page 74

- "Select a topology for the test Optional" on next page
- "Select monitor profiles to monitor the test Optional" on next page
- "Enable and configure diagnostics Optional" on page 75
- "Define service level agreements for the test Optional" on page 75
- "Results" on page 75

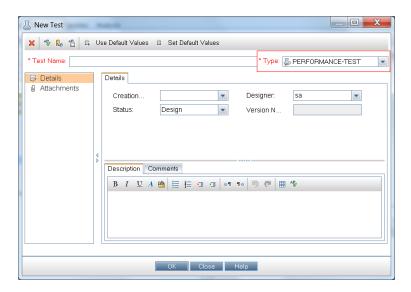
#### 1. Prerequisites

- Make sure the relevant scripts/tests have been uploaded/saved to ALM. You can use VuGen scripts for performance testing, as well as QuickTest (UFT GUI Tests) and Service Test tests.
- VuGen scripts: For details on uploading VuGen scripts, see "Upload VuGen Scripts Dialog Box" on page 36.
- QuickTest tests: For details on saving QuickTest tests (UFT GUI Tests) to ALM, see the HP Unified Functional Testing User Guide.
- Service Test tests: For details on saving Service Test tests (API Tests) to ALM, see the HP Service Test User Guide or the information about API testing in the HP Unified Functional Testing User Guide.
- Under Lab Resources, select Testing Hosts and make sure that there is at least one Controller, one load generator, and one data processor in your project's host pool. If not, contact your administrator to add them.
- For optional pre-design best practices, see "Performance Test Design Best Practices" on previous page.

#### 2. Create a new performance test

- a. On the ALM sidebar, under **Testing**, select **Test Plan**.
- b. Select View > Test Plan Tree.
- c. Select the **Subject** root folder, click **New Folder** , and rename the folder that is added to the tree.
- d. In the tree, right-click the new folder, and select **New Test**.
- e. Fill in the fields in the New Test dialog box. For details, see the *HP Application Lifecycle Management User Guide*.

In particular, in the **Type** box, select **PERFORMANCE-TEST**.



#### 3. Design a workload for the test

Designing a workload involves creating Vuser groups, distributing Vusers among the Vuser groups, assigning hosts to the Vuser groups, and defining a run schedule for the test. For task details, see "How to Define a Performance Test Workload" on page 85.

#### 4. Integrate virtualized services - Optional

Configure and integrate virtualized services into the performance test. For task details, see "How to Add Virtualized Services to Performance Tests" on page 109.

You can start adding projects that contain virtualization services to your performance test from the Performance Test Designer at any point in the design process, but we recommend adding projects after you have added relevant scripts to the test.

#### 5. Select a topology for the test - Optional

**Note:** Before you can select a topology for a test, you must design the topology. To design topologies, see "How to Design Topologies" on page 40.

In the Performance Center Designer's **Topology** tab, click **Select Topology** and select a topology for the test. For user interface details, see "Performance Test Designer > Topology Tab" on page 54.

#### 6. Select monitor profiles to monitor the test - Optional

**Note:** Before you can select monitors for a test, you must configure monitor machines and create monitor profiles. For details, see "How to Create and Configure Monitor Profiles" on page 58.

Similarly, you must define monitor-over-firewall agents in the system before you can select them to monitor a test.

In the Performance Center Designer's **Monitors** tab, click **Add Monitor Profile** or **Add Monitor OFW**. The respective tree opens on the right. Select a monitor, and drag and drop it into the left pane.

For user interface details, see "Performance Test Designer > Monitors Tab" on page 67.

#### 7. Enable and configure diagnostics - Optional

Enable and configure diagnostic modules to collect diagnostics data from the test run.

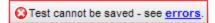
- For ERP/CRM diagnostics, see "How to Enable and Configure ERP/CRM Diagnostics" on page 166.
- For J2EE/.NET diagnostics, see "How to Enable and Configure J2EE/.NET Diagnostics" on page 167.

#### 8. Define service level agreements for the test - Optional

Define service level agreements to measure performance metrics against performance goals. For details, see "How to Define Service Level Agreements" on page 149.

#### 9. Results

When you save the test, it goes through a validation process. The test is valid only if it contains no errors. The result of the validation is stated at the bottom of the Test Designer window.



Click the link to open the Test Validation Results dialog box and view the details of the validation results. For user interface details, see "Test Validation Results Dialog Box" on page 81.

**Note:** If you make changes to the test, and the test is linked to a timeslot, the timeslot is updated with these changes automatically.

# **Performance Test Design User Interface**

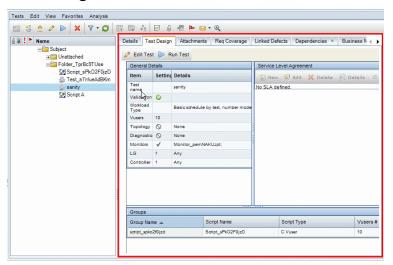
This section includes:

Test Design / Summary Tab	.76
Performance Test Designer Window	78
Test Validation Results Dialog Box	. 81

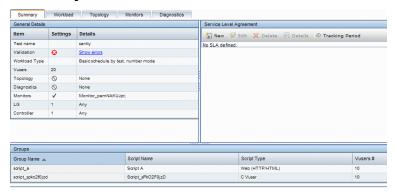
# **Test Design / Summary Tab**

The Test Design / Summary tabs display a detailed summary of a selected performance test.

#### **Test Design Tab**



#### **Summary Tab**



To access	Test Design tab:	
	1. On the ALM sidebar, under <b>Testing</b> , select <b>Test Plan</b> .	
	<ol><li>Select a performance test in the test plan tree and click the <b>Test Design</b> tab.</li></ol>	
	Summary tab:	
	1. On the ALM sidebar, under <b>Testing</b> , select <b>Test Plan</b> .	
	2. Right-click a performance test in the test plan tree and select <b>Edit Test</b> .	
	3. In the Performance Test Designer window, click the <b>Summary</b> tab.	
See also	"Performance Test Designer Window" on page 78	
	HP Application Lifecycle Management User Guide.	

User interface elements are described below:

UI Elements	Description
Edit Test	Opens the Performance Test Designer window where you design performance tests. For details, see "Performance Test Designer Window" on next page.
	Available in: Test Design tab only
Run Test	Enables you to run the test from the test planning area.
	Available in: Test Design tab only

#### **General Details Pane**

This pane displays general summary information about the test.

User interface elements are described below (unlabeled elements are shown in angle brackets):

UI Elements	Description	
<settings column="" icons=""></settings>	Indicates that there is an error in the test design.	
	Indicates that the test is valid and can run.	
	Indicates whether:	
	<ul> <li>A topology is selected for the test</li> </ul>	
	<ul> <li>Monitors are selected for the test</li> </ul>	
	<ul> <li>Diagnostics are enabled for the test</li> </ul>	
	<ul> <li>IP Spoofing is enabled for the test</li> </ul>	
Test name	The name of the test.	
Validation	Indicates whether the test is valid.	
	If the test is not valid or there are notifications about the test, the <b>Details</b> column displays a link to the Test Validation Results dialog box which lists errors and messages related to the test. For details, see "Test Validation Results Dialog Box" on page 81.	
Workload Type	The workload type selected for the test.	
Vusers	The number of Vusers defined in the test.	
Topology	Indicates whether a topology is associated with the test, and if so, displays the relevant details.	
Diagnostics	Indicates whether diagnostics are enabled for the test, and if so, displays the relevant details.	
Monitors	Indicates whether monitor profiles are defined for the test, and if so, displays the relevant details.	

UI Elements	Description
IP Spoofer	Indicates whether IP spoofing is enabled for the test. For details, see "Test Options Dialog Box" on page 102.
Services Virtualization	Indicates whether service virtualization is on or off.
Controller/C+LG/LG	Displays the number of hosts selected for the test, and their properties.

#### **Service Level Agreement Pane**

This pane displays service level agreements (SLAs) that are defined for the test.

Important information	You create, modify, and delete SLAs in the Summary tab.
	In the Test Design tab you can only view a list of defined SLAs.
Relevant tasks	"How to Define Service Level Agreements" on page 149
See also	"Service Level Agreements Overview" on page 148

For user interface details, see "Service Level Agreement Pane" on page 153.

#### **Groups Pane**

This pane displays details about the Vuser groups defined in the test.

User interface elements are described below:

UI Elements	Description
Group Name	The name of the Vuser group.
Script Name	The name of the Vuser script associated with the Vuser group.
Script Type	The Vuser script type.
Vusers #/%	The number/percentage of Vusers distributed to the Vuser group.

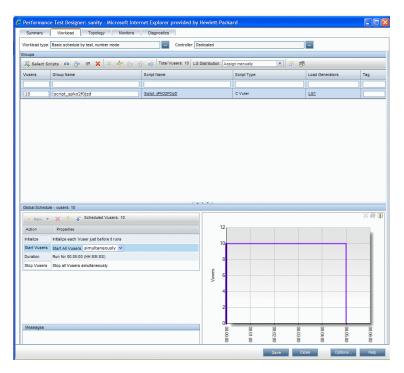
# **Performance Test Designer Window**

This window enables you to define a performance test. Defining a performance test includes selecting scripts for the test, scheduling how many Vusers to run in each script and for how long to run them, choosing topologies and monitor profiles for the test, and enabling collection of diagnostics data for the test run.

**Version Control:** If your project is version-enabled:

- To edit a test, you must check it out.
- When you check out a test, only you can edit the test.

• If the test is checked out by another user, you cannot check the test out as well. You can view the last checked in version in read-only mode.



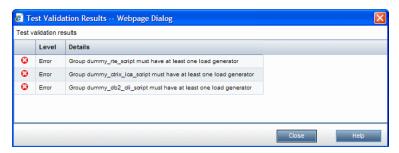
To access	On the ALM sidebar, under <b>Testing</b> , select <b>Test Plan</b> .
	2. Right-click a performance test in the test plan tree and select <b>Edit Test</b> .
Important information	In order to continue working in ALM, you must close the Performance Test Designer window. Make sure to save changes you have made to the test before closing this window.
Relevant tasks	"How to Design a Performance Test" on page 72
See also	<ul> <li>"Enabling and Configuring ERP/CRM and J2EE/.NET Diagnostics " on page 165</li> </ul>
	"Monitor Profiles" on page 57
	"Topologies" on page 39
	For version control enabled projects, see the HP Application Lifecycle     Management User Guide.

User interface elements are described below (unlabeled elements are shown in angle brackets):

UI Elements	Description
Check in	Enables you to check in saved changes to a performance test to create a new, updated version available to other users.
	Note: Available for version control enabled projects only.
Check Out	Enables you to check out a performance test so that you can make changes to it.
	Note: Available for version control enabled projects only.
Undo Check Out	After checking out a test, this button enables you to undo the checkout and cancel your changes.
	Note: Available for version control enabled projects only.
Options	Opens the Test Options dialog box, enabling you to set general Scheduler and testing options. For details, see "Test Options Dialog Box" on page 102.
Summary tab	Displays a summary of the test. For details, see "Test Design / Summary Tab" on page 76.
Workload tab	Enables you to design a workload for the test. For details, see "Performance Test Designer > Workload Tab" on page 90.
Topology tab	Enables you to associate a topology with the test. For details, see "Performance Test Designer > Topology Tab" on page 54.
Monitors tab	Enables you to select monitors to monitor the test. For details, see "Performance Test Designer > Monitors Tab" on page 67.
Diagnostics tab	Enables you to select a diagnostics module to collect diagnostics data from the test. For details, see "Performance Test Designer > Diagnostics Tab" on page 168.
<validation message=""></validation>	When you save the test, this message displays the test validation result. If there are errors or messages, a link to the test validation results is displayed.
	For details, see "Test Validation Results Dialog Box" on next page.

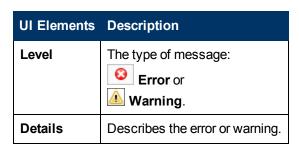
# **Test Validation Results Dialog Box**

This dialog box displays the validation results of your performance test.



# To access 1. On the ALM sidebar, under **Testing**, select **Test Plan**. 2. Right-click a performance test in the test plan tree and select **Edit Test**. 3. Use one of the following: Click the validation link at the bottom of the Performance Test Designer • In the **Summary** tab, click the Validation link. Note: The validation link appears only if the test is invalid or there are messages about the test. If the test is valid and there are no messages, no validation link is displayed. **Important** A performance test that is not valid cannot run. information Relevant "How to Design a Performance Test" on page 72 tasks See also "Test Design / Summary Tab" on page 76

User interface elements are described below:



# **Chapter 7: Defining Performance Test Workloads**

#### This chapter includes:

Performance Test Workload Overview	84
How to Define a Performance Test Workload	.85
How to Distribute Vusers Among Vuser Groups	. 88
Defining Performance Test Workloads User Interface	90

#### **Performance Test Workload Overview**

When you create a performance test you need to define a workload for the test. Defining a workload involves selecting a type of workload for the test, creating Vuser groups that emulate groups of users running on the application, and configuring how they should behave during the test.

# Select workload type Create Vuser groups Distribute load generators among Vuser groups Define test schedule Configure optional workload settings

You select a workload depending on the type of schedule and schedule run mode you want to use to run your test, and depending on how you want to distribute the Vusers among the Vuser groups in your test.

For details on defining a workload for your performance test, see "How to Define a Performance Test Workload" on next page.

This section also includes "Rendezvous Points" below.

#### **Rendezvous Points**

During a test run, you can instruct multiple Vusers to perform tasks simultaneously by using rendezvous points. A rendezvous point creates intense user load on the server, enabling you to measure server performance under load.

Suppose you want to measure the performance of an application when 10 Vusers perform a given task simultaneously. To make sure that multiple Vusers act simultaneously, you create a **rendezvous point** in the Vuser script. When Vusers arrive at a rendezvous point, they are held there by the Controller. The Controller releases the Vusers from the rendezvous either when the required number of Vusers arrives, or when a specified amount of time has passed.

For example, to test an online bank, you could create a test 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. To measure how the server performs when only 500 Vusers deposit cash, you can set the release policy so that the Vusers are released when 500 Vusers arrive at the rendezvous.

You can configure rendezvous policies when defining the test workload. For task details, see "How to Define a Performance Test Workload" on next page.

You can manually release Vusers waiting at a rendezvous point during a run. For task details, see "How to Manage a Performance Test Run" on page 197.

### How to Define a Performance Test Workload

This task describes how to define a performance test workload.

**Note:** This task is part of a higher-level task. For details, see "How to Design a Performance Test" on page 72.

To learn more about performance testing, see "Performance Test Workload Overview" on previous page.

This task includes the following steps:

- "Prerequisite" below
- "Select a workload" below
- "Select a Controller" below
- "Create Vuser groups and distribute Vusers to the groups" on next page
- "Distribute load generators among the Vuser groups" on next page
- "Define a schedule for the performance test" on next page
- · "Configure test settings Optional" on next page
- "Define topology, monitoring, and diagnostics options" on page 87

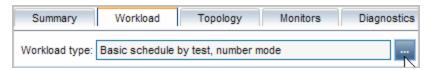
#### 1. Prerequisite

Create a performance test. For details, see "How to Design a Performance Test" on page 72.

#### 2. Select a workload

In the Test Plan tree, right-click the test and select **Edit Test**. The test opens in the Performance Test Designer window.

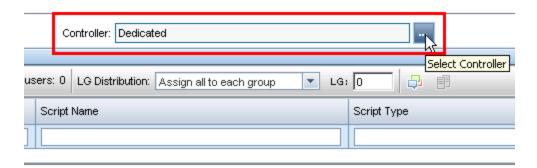
Click the **Select Workload Type** button adjacent to the **Workload type** box, and select a type of workload for the test. The type of workload you choose determines the type of schedule by which the test will run, and how the Vusers will be distributed at runtime.



For user interface details about the Workload Types dialog box, see "Workload Types Dialog Box" on page 97.

#### 3. Select a Controller

Click the **Select Controller** button adjacent to the **Controller** box, and select a host to act as the Controller for the test.



For user interface details about the Select Controller dialog box, see "Select Controller Dialog Box" on page 98.

#### 4. Create Vuser groups and distribute Vusers to the groups

a. In the Groups pane, select scripts from the Scripts Tree pane on the right to run in the test.
 If the Scripts Tree pane is not open, click the Select Scripts button.

**Tip:** You can select complete folders of scripts, or select multiple scripts while holding down the CTRL key on your keyboard.

- b. (Optional) For each selected script, a Vuser group is created in the Groups grid and is given, by default, the same name as the selected script. You can change the group name if desired.
- c. Distribute Vusers among the Vuser groups according to the Vuser distribution method you selected in the workload type. For details, see "How to Distribute Vusers Among Vuser Groups" on page 88.

#### 5. Distribute load generators among the Vuser groups

Select a method by which to distribute the load generators among the Vuser groups, and specify which load generators to distribute to which groups.

For details, see "How to Distribute Load Generators Among Vuser Groups" on page 121.

#### 6. Define a schedule for the performance test

Schedule how the Vuser groups are to run in the test. For details, see "How to Define a Schedule for the Performance Test" on page 136.

#### 7. Configure test settings - Optional

You can configure the following optional settings for your test:

Optional Test Setting	Description
Command line arguments	Sending command line arguments enables you to configure test settings without the need to manually define them in the UI.
	In the Groups pane, click the <b>Edit Command Line</b> button. For details, see <b>Edit Command Line</b> in the "Performance Test Designer > Workload Tab" on page 90.
Rendezvous Points	When you add Vuser groups to the test, their associated scripts are scanned for rendezvous points.
	To view and manage the rendezvous points, click the View Rendezvous
	button. For user interface details, see "Rendezvous Dialog Box" on page 100.
Runtime Settings Configuration	You can configure the runtime settings of uploaded Vuser scripts. Runtime settings are applied to Vusers when the script runs.
	To open the Runtime Settings dialog box, in the Groups pane toolbar, click
	the <b>Edit Runtime Settings</b> button. For user interface details, see "Edit Runtime Settings Dialog Box" on page 320.
Runtime Settings	You can copy runtime settings from one script in the test to other scripts of the same script type. In the Groups pane toolbar, click the <b>Duplicate</b>
Duplication	Runtime Settings button.
	For details, see <b>Duplicate Runtime Settings</b> in the "Performance Test Designer > Workload Tab" on page 90.
Network Virtualization	Network Virtualization enables you to emulate probable network effects over your network, thereby creating a more realistic performance test.
	To open the Network Virtualization Settings dialog box, in the Groups pane
	toolbar, click the <b>Edit Newtwork Virtualization Settings</b> button. For user interface details, see "Network Virtualization Settings Dialog Box" on page 250.
Terminal Services	When using manual load generator distribution, you can open terminal services sessions on the load generators, enabling you to run multiple GUI Vusers simultaneously on the same application. For details, see "Terminal Services Dialog Box" on page 185.

## 8. Define topology, monitoring, and diagnostics options

For task details, see "How to Design a Performance Test" on page 72.

# **How to Distribute Vusers Among Vuser Groups**

This task describes how to distribute Vusers in a performance test among the Vuser groups. You distribute Vusers according to the Vuser distribution method you selected for the workload.

You can distribute the Vusers by number, by percentage (manually), or by percentage using the relative distribution method.

#### Note:

- In workloads with group schedules, you can distribute Vusers by number only.
- This task is part of a higher-level task. For details, see "How to Define a Performance Test Workload" on page 85.

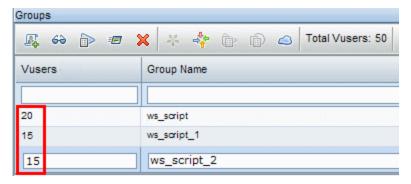
This task describes how to:

- "Distribute Vusers by number" below
- "Distribute Vusers by percentage" on next page
- "Distribute Vusers by percentage using relative distribution" on page 90

#### Distribute Vusers by number

**Note:** This procedure assumes that you selected **By number** when you selected the workload for the test. For user interface details, see "Workload Types Dialog Box" on page 97.

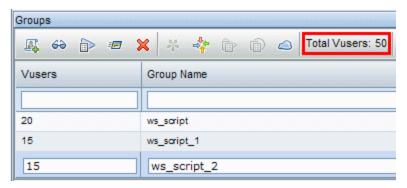
 Basic schedule: In the Performance Test Designer window, in the Groups grid, select a group, and in the Vusers column, enter the number of Vusers to allocate to that group.



 Real-world schedule: You define the number of Vusers when you define the test schedule. For details, see "How to Define a Schedule for the Performance Test" on page 136.

For both run modes, the total number of the Vusers assigned to all the Vuser Groups is displayed

in the Groups pane toolbar.

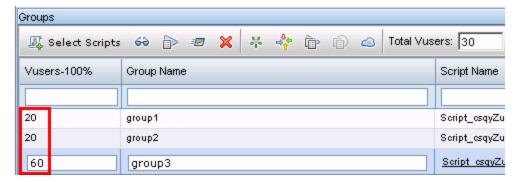


#### Distribute Vusers by percentage

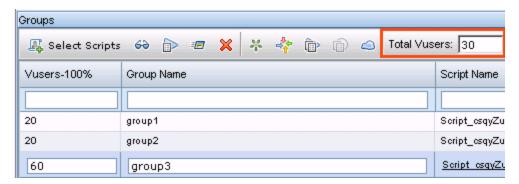
**Note:** This procedure assumes that you selected **By percentage** when you selected the workload for the test. For user interface details, see "Workload Types Dialog Box" on page 97.

1. In the Performance Test Designer window, in the Groups grid, in the **Vusers-100**% column for each group, enter the percentage of the total number of Vusers to allocate to the group.

**Note:** The total of all the groups' percentages must be exactly 100% for the test to be valid.



- 2. Allocate a total number of Vusers to run in the test:
  - Basic mode: In the Groups pane, enter the number of Vusers in the Total Vusers box.



■ **Real-world mode:** You define the number of Vusers when you define the test schedule. For details, see "How to Define a Schedule for the Performance Test" on page 136.

#### Distribute Vusers by percentage using relative distribution

In the Performance Test Designer window, in the Groups grid, click the **Relative Distribution** button to define a ratio by which to distribute the Vusers from each group. For user interface details, see **Relative Distribution** in the "Performance Test Designer > Workload Tab" below.

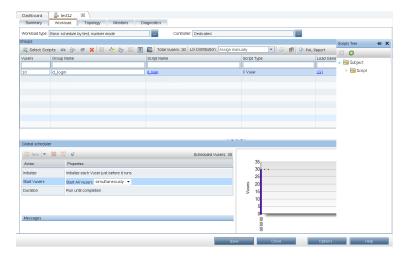
# **Defining Performance Test Workloads User Interface**

This section includes:

Performance Test Designer > Workload Tab	90
Workload Types Dialog Box	97
Select Controller Dialog Box	98
Rendezvous Dialog Box	100
Test Options Dialog Box	102

# **Performance Test Designer > Workload Tab**

This tab enables you to define a workload for the test. You select a Controller for the test, scripts to run in the test, and load generators on which to run the Vusers. You also define a run schedule for the test.



To access	On the ALM sidebar, under <b>Testing</b> , select <b>Test Plan</b> .
	Right-click a performance test in the test plan tree and select <b>Edit Test</b> .
	In the Performance Test Designer window, click the <b>Workload</b> tab.
Relevant tasks	"How to Define a Performance Test Workload" on page 85
See also	See "Groups Pane" below for details about:
	View Script dialog box
	Edit Command dialog box
	Relative Distribution dialog box
	Duplicate Runtime Settings dialog box
	Duplicate Scheduler Settings dialog box

#### **Workload Tab Common Area**

User interface elements are described below:

UI Elements	Description
Workload Type	Displays the workload type for the test. Click to open the Workload Types dialog box and select a type of workload for the test.
	For details, see "Workload Types Dialog Box" on page 97.
Controller	Displays the Controller selected for the test. Click to open the Select Controller dialog box and select a Controller for the test.
	For details, see "Select Controller Dialog Box" on page 98.

#### **Groups Pane**

User interface elements are described below (unlabeled elements are shown in angle brackets):

UI Elements	Description
Select Scripts	Select Scripts. Opens the Scripts Tree pane, enabling you to select scripts to run in your test. For details, see "Scripts Tree pane" on page 96.

UI Elements	Description
69	<b>View Script.</b> Opens the script selected in the Groups grid in a read-only window.
	Versioning:
	As long as a script is checked in, the same version is displayed for all users.
	If you have checked out the script, the script displayed is your own private copy of the script. If you make changes to the script, other users will not be able to see your changes until you check the script back in. Similarly, if other users check in changes to this script, you will not be able to see them as long as you have the script checked out.
	If another user checks out the script, you will still see the latest checked- in version.
	<b>Edit Runtime Settings.</b> Opens the Runtime Settings dialog box for the selected script, enabling you to configure its runtime settings.
	To use the default settings, click <b>Use Defaults</b> . Vuser scripts have individual runtime setting defaults for VuGen and the Controller, to support the debugging environment of VuGen and the performance testing environment of the Controller.
	For more information, see "Runtime Settings Configuration" on page 315.
	<b>Edit Command Line</b> . Opens the Command Line dialog box, enabling you to pass arguments to instruct the Controller how to behave. By passing arguments in the command line, you configure test settings without the need to manually define them in the user interface.
	Command line. Type the name and value of the parameter you want to send using the format, <parameter_name> <value>.</value></parameter_name>
	<b>Note:</b> For information about the command line parsing functions, or for details about including arguments on a command line, see the <i>HP LoadRunner Online Function Reference</i> , provided with HP Virtual User Generator.
	<command line="" options=""/> . Select whether to:
	<ul> <li>Apply the command line to the current script only</li> </ul>
	<ul> <li>Apply the command line to all the scripts in the test</li> </ul>
	<ul> <li>Add the command line to all the scripts in the test</li> </ul>
	Note: You cannot pass arguments to Service Test tests.

UI Elements	Description
×	Delete Group. Deletes the selected Vuser group.
that or give	<b>Relative Distribution.</b> Opens the Relative Distribution dialog box, enabling you to provide a ratio by which ALM calculates the percentage of Vusers to distribute to each Vuser group.
	Ratio. The part of total number of Vusers to distribute to the corresponding Vuser group.
	Group Name. The name of the Vuser group.
	Example:
	To distribute 200 Vusers among the groups at a ratio of 1:1:3, type 1 for <b>group1</b> , 1 for <b>group2</b> , and 3 for <b>group3</b> .
	20% of the Vusers are assigned to group1, 20% to group2, and 60% to group3. That is, 40 Vusers are assigned to group1, 40 Vusers to group2, and 120 Vusers to group3.
	Ratio Group Name
	1 group1
	1 group2
	3 group3
	Note: Enabled in percentage mode only.
	View Rendezvous. Opens the Rendezvous dialog box, enabling you to enable or disable rendezvous points, and set policies for how to treat Vusers when they arrive at a rendezvous point. For details, see "Rendezvous Dialog Box" on page 100.
	<b>Duplicate Runtime Settings.</b> Opens the Duplicate Runtime Settings dialog box, enabling you to select a source script, and copy its runtime settings to one or more scripts of the same type.
	<b>Note:</b> The source and destination scripts must be of the same script type.

UI Elements	Description
	<b>Duplicate Scheduler Settings.</b> Opens the Duplicate Scheduler Settings dialog box, enabling you to select a source Vuser group, and copy its schedule settings to one or more Vuser group in the test.
	For details, see the instructions on how to copy group schedules in "How to Define a Schedule for the Performance Test" on page 136
	Available for: Schedules by group only.
	Edit Newtwork Virtualization Settings. Opens the Newtwork Virtualization Settings dialog box, enabling you to emulate probable Newtwork Virtualization effects over your network, thereby creating a more realistic performance test.
	For details, see "Network Virtualization Settings Dialog Box" on page 250.
ល	Configure Services Virtualization. Opens the Configure Service Virtualization dialog box, enabling you to integrate virtualized services into your performance test. For user interface details, see "Configure Services Virtualization Dialog Box" on page 110.
	For details on creating projects that contain virtualized services, see the <i>HP</i> Service Virtualization User Guide.
	For task details on using virtualized services in performance tests, see "How to Add Virtualized Services to Performance Tests" on page 109.
Total Vusers	Displays the total number of Vusers distributed to all of the Vuser groups participating in the test. For details, see "How to Distribute Vusers Among Vuser Groups" on page 88.
LG Distribution	Enables you to select a method for assigning load generators to the Vuser groups in the test.
	Assign all to each group. All of the automatch load generators are distributed to all of the participating Vuser groups.
	Assign manually. Load generators are distributed manually.
	For details, see "Load Generator Distribution Overview" on page 120.
LG	Displays the number of automatch load generators selected for the test.
	Note: Available only if Assign all to each group is selected in the LG Distribution box.
<b>-</b>	Automatch Load Generator Properties. Opens the Automatch Load Generator Properties dialog box, enabling you to specify properties for automatch load generators. For details, see "Automatch Load Generators Properties Dialog Box" on page 130.

UI Elements	Description
	Assign Load Generators to Multiple Groups. Opens the Assign Load Generators to Multiple Groups dialog box, enabling you to assign one or more load generators—automatch or specific—to multiple Vuser groups at once. You can also use this dialog box to remove one or more load generators from multiple Vuser groups at once. For details, see "Assign Load Generators to Multiple Groups Dialog Box" on page 123.  Available for: The Assign manually load generator distribution method.
	See "LG Distribution" on previous page.
PAL Report	Opens the Select PAL Report dialog box, enabling you to select a PAL production report. For more details on PAL reports, see "PAL Reports Pane" on page 408.
<grid filters=""></grid>	Located under each column name. Displays the filter that is currently applied to a column. If the filter box is empty, no filter is currently applied to the column.
	Type directly into the box and press ENTER to apply the filter.
Groups grid	Displays the Vuser groups participating in the test.
	Vusers. (By Number mode) The number of Vusers distributed to the Vuser group.
	Default: 10 Vusers
	Group Name. The name of the Vuser group.
	Script Name. The name of the Vuser script associated with the Vuser group. When the group is selected, the script name turns into a link. To select a different script, click the script name and select a script.
	Load Generators. The load generators assigned to the Vuser group.
	Script Type. The Vuser script type.
	Tag. A tag for the Vuser group. Tagging enables categorization and easy identification of Vuser groups.
	<ul> <li>Examples:</li> <li>If you have finished configuring runtime and Scheduler settings for the group, you could tag the group Done. For a group that is not yet done, you could tag TODO.</li> <li>Groups running against the Defects or Requirements modules, could be tagged DEF or REQ.</li> </ul>

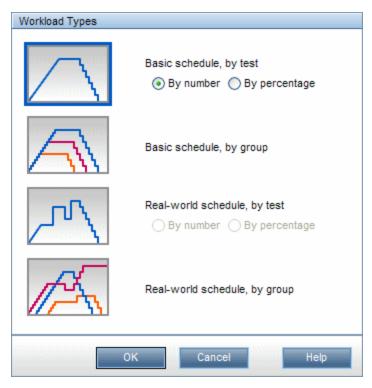
UI Elements	Description
Scripts Tree pane	Opens on the right when you click the <b>Select Scripts</b> button. Lists all the VuGen scripts, UFT GUI tests, and UFT API tests that have been uploaded to the project.
	<b>Note:</b> HP Unified Functional Testing (UFT) comprises the product formerly known as HP QuickTest Professional and the product known as HP Service Test.
	<ul> <li>Functionality provided by QuickTest is now known as GUI testing in UFT.</li> </ul>
	<ul> <li>Functionality provided by Service Test is also known as API testing in UFT.</li> </ul>
	Drag and drop one or more scripts from the tree into the Groups pane or select the scripts and click .
	<b>Tip:</b> You can select whole folders of scripts, or select multiple scripts while holding down the CTRL key on your keyboard.
	After selecting a script, the Scripts Tree pane closes by default.
	To keep the Scripts Tree open, click the <b>Dock</b> button.
	To enable the Scripts Tree to close automatically, click the <b>Undock</b> button.

#### **Global Scheduler Pane**

The Global Scheduler pane enables you to define a run schedule for your test. For details, see "Global Scheduler Pane" on page 140.

# **Workload Types Dialog Box**

This dialog box enables you to select a type of workload for the performance test. The type of workload you choose determines the type of schedule by which the test will run, and how the Vusers will be distributed at runtime.



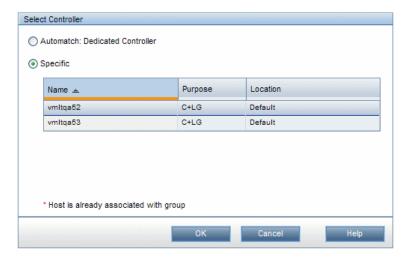
To access	1. On the ALM sidebar, under <b>Testing</b> , select <b>Test Plan</b> .
	Right-click a performance test in the test plan tree and select <b>Edit Test</b> .
	In the Performance Test Designer window, click the <b>Workload</b> tab.
	4. Next to the Workload type box, click Select Workload Type
Important information	If you change the workload, Scheduler settings are lost.
Relevant tasks	"How to Define a Performance Test Workload" on page 85
See also	"Performance Test Workload Overview" on page 84
	"Scheduling Performance Tests Overview" on page 134

User interface elements are described below:

# **UI Elements** Description Basic schedule, by test. Select this workload type to configure all the Vuser groups to run together on the same test schedule, in the basic run mode. Vusers can be distributed: • By number. The Vusers are distributed by number. • By percentage. The Vusers are distributed by percentage. Basic schedule by group. Select this workload type to configure each Vuser group to run on its own test schedule, in the basic run mode. In group schedules, Vusers are always distributed by number. Real-world schedule, by test. Select this workload type to configure all the Vuser groups to run together on the same test schedule, in the real-world run mode. Vusers can be distributed: • By number. The Vusers are distributed by number. • By percentage. The Vusers are distributed by percentage. **Real-world schedule**, **by group**. Select this workload type to configure each Vuser group to run on its own test schedule, in the real-world run mode. In group schedules, Vusers are always distributed by number.

# **Select Controller Dialog Box**

This dialog box enables you to select a Controller for the performance test.



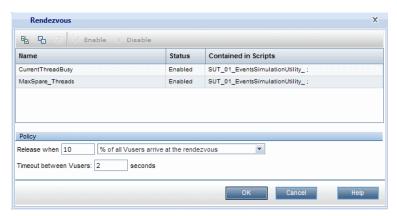
To access	On the ALM sidebar, under <b>Testing</b> , select <b>Test Plan</b> .
	Right-click a performance test in the test plan tree and select <b>Edit Test</b> .
	In the Performance Test Designer window, click the <b>Workload</b> tab.
	4. Next to the <b>Controller</b> box, click
Important information	You select only one Controller for a performance test.
	Due to possible heavy load on the Controller and load generator hosts during a performance test, if you select a C+LG host for Controller functionality, it is best practice not to assign it as a load generator as well.
Relevant tasks	"How to Define a Performance Test Workload" on page 85
See also	"Performance Test Workload Overview" on page 84

User interface elements are described below:

UI Elements	Description
Automatch: Dedicated Controller	At runtime, an available Controller host in the project's host pool is allocated for the test run, and is dedicated for Controller functionality. Because it is a dedicated Controller, it cannot be allocated as a load generator as well.  For details about host allocation, see the HP Application Lifecycle Management
	User Guide.
Specific	Select this option if you want a specific Controller host. The grid lists the specific Controller hosts available in the project's host pool.
	<b>Note:</b> If a host is marked with a red asterisk (*), it is already assigned to a Vuser group as a load generator. Due to possible heavy load on the Controller and load generator hosts during a performance test, if a host is assigned to a Vuser group, it is best practice not to select it as a Controller as well.

# **Rendezvous Dialog Box**

This dialog box enables you to enable/disable rendezvous points defined in the Vuser scripts and to set rendezvous policies that determine how the Controller handles Vusers at a rendezvous point.



To access	<ul> <li>During the test design phase: In the Workload tab, click View</li> <li>Rendezvous</li> <li>During the test run: On the Performance Test Run page, click Rendezvous</li> </ul>
Important information	Rendezvous points are inserted in the Vuser script when creating the script in VuGen. For information, see the <i>HP Virtual User Generator User Guide</i> .  Rendezvous points cause multiple Vusers to perform tasks at exactly the same time, thereby creating intense user load on the server. Enabling rendezvous points enables you to check your system's response under specific load.  For each rendezvous point, you can set <b>Policy</b> attributes. During the test run, you can manipulate the Vuser behavior at the rendezvous points.
Relevant tasks	<ul> <li>"How to Define a Performance Test Workload" on page 85.</li> <li>"How to Manage a Performance Test Run" on page 197</li> </ul>
See also	"Rendezvous Points" on page 84

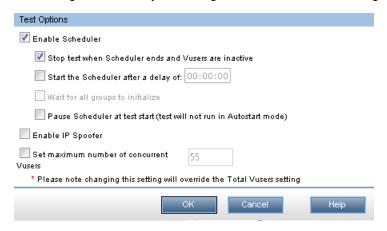
User interface elements are described below (unlabeled elements are shown in angle brackets):

UI Elements	Description	
<b>E</b>	Select all. Selects all the rendezvous points in the grid.	
8	Select none. Clears all the selected rendezvous points in the grid.	

UI Elements	Description	
윦	Switch between selected/non selected. Inverts the current selection of rendezvous points.	
	That is, the non-selected rendezvous points are selected, and the selected rendezvous points are cleared.	
<b>✓</b> Enable	Enables/Disables the selected rendezvous point. Enabling or disabling a rendezvous point influences the level of server load.	
X <u>Disable</u>		
Release	Releases the Vusers at the selected rendezvous points.	
	Available from: Performance Test Run page only	
<rendezvous< th=""><th>Displays the details about the rendezvous points in the scripts:</th></rendezvous<>	Displays the details about the rendezvous points in the scripts:	
grid>	Name. The name of the rendezvous point as given in the VuGen script.	
	Status. The status of the rendezvous point: Enabled or Disabled.	
	Contained in Scripts. The names of the scripts in which the rendezvous point was defined.	
	You select a rendezvous point by clicking it.	
Policy	Enables you to determine how the Controller handles Vusers at a rendezvous point. You set the following policy attributes for each rendezvous:	
	Release when. Sets how many Vusers are released from a rendezvous point at a time.	
	X% of all Vusers arrive at the rendezvous. Releases the Vusers only when the specified percentage of all Vusers have arrived at the rendezvous point.	
	<b>Note:</b> This option interferes with the scheduling of the test. If you select this option, your test will not run as scheduled.	
	X% of all running Vusers arrive at the rendezvous. Releases the Vusers only when the specified percentage of all Vusers running in the test have arrived at the rendezvous point.	
	<ul> <li>X Vusers arrive at the rendezvous. Releases the Vusers only when the specified number of Vusers have arrived at the rendezvous point.</li> </ul>	
	Timeout between Vusers. The timeout value (in seconds). After each Vuser arrives at the rendezvous point, the Controller waits up to the maximum timeout period specified for the next Vuser to arrive. If the next Vuser does not arrive within the timeout period, the Controller releases all the waiting Vusers from the rendezvous. Each time a new Vuser arrives, the timer is reset to zero. You set a timeout for each rendezvous point.	

# **Test Options Dialog Box**

This dialog box enables you to set general Scheduler and testing options.



To access	1. On the ALM sidebar, under <b>Testing</b> , select <b>Test Plan</b> .	
	Right-click a performance test in the test plan tree and select <b>Edit Test</b> .	
	3. In the Performance Test Designer window, click the <b>Workload</b> tab.	
	In the lower-right area of the Performance Test Designer window, click Options	
Important information	This is accessible only when the Workload tab is displayed.	
Relevant tasks	"How to Define a Schedule for the Performance Test" on page 136	
	"How to Enable IP Spoofing in ALM" on page 188	
See also	"Performance Test Workload Overview" on page 84	

User interface elements are described below:

UI Elements	Description	
Enable Scheduler	Enables the Scheduler so that you can run the test according to a user-defined schedule. To define a schedule, this option must be selected.	
	Stop test when Scheduler ends and Vusers are inactive. Automatically stops the test when the test schedule has stopped and all the Vusers are in any of the following inactive states: Down, Pass, Fail, Error, or Stop.	
	Start the Scheduler after a delay of HH:MM:SS. Enables you to specify when, after the Run Test command has been issued, the Scheduler should start running the schedule. If this option is not selected, the schedule starts to run as soon as the test starts running.	
	Wait for all groups to initialize. Instructs the Scheduler to wait until all the Vusers in all the Vuser groups have finished initializing before starting to run any of the groups.	
	<b>Note:</b> If you select this option, if any of the Vuser groups' Initialize action is <b>Initialize each Vuser just before it runs</b> , the Scheduler automatically changes this setting to <b>Initialize all Vusers simultaneously</b> .	
	Pause Scheduler at test start. Pauses the Scheduler at the start of a test run, enabling you make changes to the test design just before the test is about to run. You can then restart the Scheduler manually.	
Enable IP Spoofer	After you define multiple IP addresses, and before you run the test, select this option to enable IP spoofing.	
	Note: You must enable IP spoofing before running a test.	
	For details about multiple IP addressing, see "Multiple IP Addresses" on page 187.	
Set maximum number of concurrent Vusers	The maximum number of concurrent Vusers allowed for this test.	

# **Chapter 8: Integrating Virtualized Services**

#### This chapter includes:

Integrating Virtualized Services Overview	106
How to Add Virtualized Services to Performance Tests	109
Integrating Virtualized Services User Interface	110

# **Integrating Virtualized Services Overview**

As part of your performance test, you may want to test applications that depend on other services which are a part of your business scenario. Instead of loading actual services, you can use simulated services in your test run. The virtualized services are a simulation of actual services.

To facilitate performance testing business processes that contain services that are not available, Performance Center integrates with HP Service Virtualization.

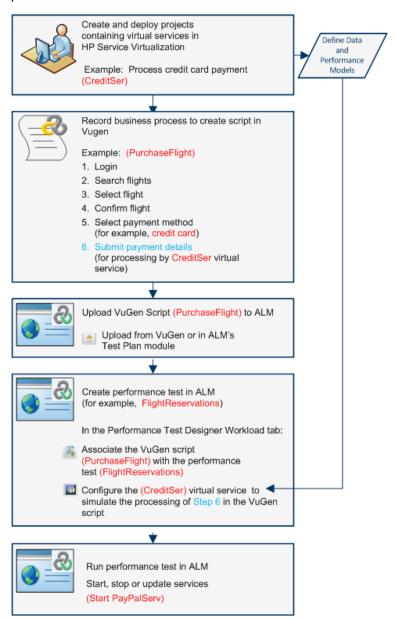
Using simulated services in your test is helpful if using actual services involves an additional cost or requires the service of an application that is under development or inaccessible at the time when you run your performance test.

#### Example

Your business process might include a service that is in development or incurs a cost, such as processing a credit card through a third-party vendor. By using a virtual service, you can replace actual services with simulated services that mirror both the data model and the performance model.

For details on creating projects that contain virtualized services, see the *HP Service Virtualization User Guide*.

The workflow below explains how HP Service Virtualization integrates with Performance Center processes:



For task details, see "How to Add Virtualized Services to Performance Tests" on page 109.

#### This section includes:

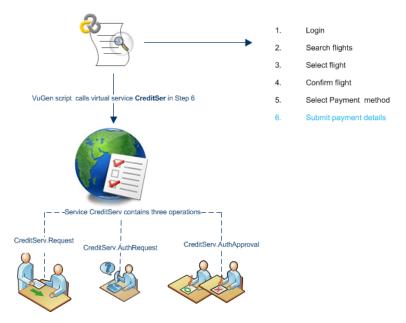
- "Service Virtualization Monitoring" on next page
- "Service Virtualization Locking" on next page

# **Service Virtualization Monitoring**

The HP Service Virtualization monitors enable you to analyze the status and performance of the simulated services during the performance test run. For example, you may integrate a payment process service containing the following operations into your script:

Туре	Example Name	Example Description
Service	CreditServ	Process online credit card payments
Operation	CreditServ.PurchaseRequest	Cardholder requests product/service
Operation	CreditServ.AuthorizationRequest	Merchant request authorization for payment
Operation	CreditServ.AuthorizationApproval	Credit card company authorizes or denies payment

The online monitors measure the overall behavior of the service and each operation. The flowchart illustrates using a service and operations for credit card payment.



In addition to the Run-Time monitor graphs available in Performance Center, the following graph(s) are useful for working with and analyzing service virtualization integration.

You can view the following Run-Time monitor graphs during a test run:

- "Operations Graph" on page 269
- "Services Graph" on page 269

## **Service Virtualization Locking**

When your performance test contains virtualized services, those services are automatically locked and cannot be used by other users while the test is running. Virtualized services may be locked by

you or other users for editing, simulation, deployment.

- If your test includes a service that has been locked by another user, start run will fail and an error message will appear in the ALM Test Runs module's event log for the specific run.
- If your test is running and you update the test to include a service that has been locked by another user, the test will continuing running, however an error message will appear in the Online Screen's Messages tab as an error. There will also be an error notification in the Summary.

## **How to Add Virtualized Services to Performance Tests**

The task describes how to configure virtual services to run when designing a performance test.

This task includes the following steps:

- "Prerequisites " below
- "Configure service virtualization" below
- "Add projects and services" below
- "Select the services to simulate" below
- "Check service deployment" on next page
- "Enter credentials for monitoring the SV server" on next page

### 1. Prerequisites

- Create your virtualized services in HP Service Virtualization Designer. For details on creating projects that contain virtualized services, see the HP Service Virtualization User Guide.
- In VuGen, create or record a script. Upload the script either from VuGen or from within ALM. For details on uploading VuGen scripts to ALM, see "How to Upload VuGen Scripts" on page 34.

#### 2. Configure service virtualization

In the Performance Test Designer Workload tab toolbar, click the **Virtual Service Settings** button . The Services Virtualization dialog box opens.

This dialog box enables you to add projects, remove projects, and check the deployment of services. For user interface details, see "Configure Services Virtualization Dialog Box" on next page.

#### 3. Add projects and services

To add projects and their corresponding services, click **Add Project** and search and select for the relevant project containing the simulated services you want to run with your performance test. For user interface details, see "Add Project Dialog Box" on page 114.

#### 4. Select the services to simulate

Check the **Simulate** checkbox of each virtualized service you want to run, and provide the relevant data model, performance model, and server URL information.

**Tip:** To divert requests for the virtualized services to the actual services, put the virtualized services in Standby mode:

- To put a single virtualized service in Standby mode, set both data and performance models for that service to **None.**
- To put multiple virtualized services in Standby mode, check the Simulate checkbox of each service and select the Update all checked services to standby mode checkbox.

### 5. Check service deployment

Click the **Deploy Check** button to determine if the services are deployed correctly on the SV server specified in the URL. The Deployment Check Results dialog box is displayed. For user interface details, see "Deployment Check Results Dialog Box" on page 116.

- indicates that the service is deployed on the specified server.
- indicates that the service is not deployed on the specified server.

**Note:** The virtualized service must be deployed on the simulation server to be able to configure the service and run it as part of your performance test in Performance Center.

### 6. Enter credentials for monitoring the SV server

Enter the credentials for monitoring the SV server in the Configure Virtualization Servers dialog box. For user interface details, see "Configure Virtualization Servers Dialog Box" on page 117.

### **Integrating Virtualized Services User Interface**

#### This section includes:

Configure Services Virtualization Dialog Box	110
Add Project Dialog Box	114
Delete Project Dialog Box	115
Deployment Check Results Dialog Box	116
Configure Virtualization Servers Dialog Box	117

### **Configure Services Virtualization Dialog Box**

This dialog box provides integration with HP Service Virtualization designer. This integration allows you to test services with virtualized services instead of real-time services.



To access	In the Performance Test Designer's Workload tab toolbar, click the <b>Configure</b>	
	Services Virtualzation button .	
Important information	If you make changes to the services virtualization configuration during run time, both the original and modified configurations are saved in the <b>wlrun.log</b> file on the Load Testing Server (LTS) machine.	
	<b>For developers:</b> Pointing calls to virtual services in the application under test cover two major scenarios:	
	<ol> <li>Application components that use the service are embedded in the code or in a configuration file. In this case, you will need to update the code in the application under test or update the configuration file to point to the new URL.</li> </ol>	
	Examples	
	.NET Desktop application uses a web service, and the url is set using a constant: stringURL = http://hp.com	
	Service or back end component uses the web service and the URL is configured in the app.config file.	
	<ol> <li>Service is consumed by accessing UDDI or some other registry component (Systinet) and the URL is retrieved at run-time. In this case, you will need to update the end point URL in UDDI/Systinet.</li> </ol>	
Relevant tasks	"How to Add Virtualized Services to Performance Tests" on page 109	

User interface elements are described below (unlabeled elements are shown in angle brackets):

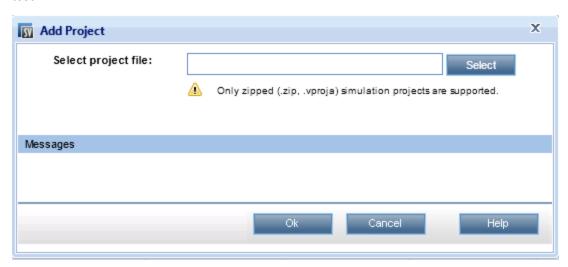
UI Element	Description
Update all checked services to StandBy mode.	Ignores calls to selected virtual services and runs the real-time services instead.  Ignore data and performance model settings.

Add Project	Opens the Add Project dialog box, allowing you to specify or browse for a HP Service Virtualization project. Project files have a .zip or .vproj extension. For user interface details, see "Add Project Dialog Box" on page 114.
Delete Project	Removes the selected project(s) and their services from the list. The Delete Project dialog box is displayed. For user interface details, see "Delete Project Dialog Box" on page 115.
	<b>Note:</b> Performance tests that are currently running the virtualized services in the deleted project keep running the virtualized services; Deleting the project unlocks the corresponding services so others can edit them.
Deploy Check	Checks if the virtual service was deployed (started) on the virtualization server specified in <b>Server URL</b> . For user interface details, see "Deployment Check Results Dialog Box" on page 116.
Configure Servers	Opens the Configure Virtualization Servers dialog box, which enables you to configure SV server credentials used for monitoring the SV servers and virtual services deployed on them. Credentials include server login and password. For user interface details, see "Configure Virtualization Servers Dialog Box" on page 117.

_	
<virtualized< th=""><th>A list of the virtualized services showing the following information:</th></virtualized<>	A list of the virtualized services showing the following information:
services>	Simulate. When checked, includes the virtual service when executing the performance test.
	Project Name. The name of the HP Service Virtualization project containing the virtual service.
	Service Name. The name of the virtual service to use during performance test execution.
	Data Model. The data model to associate with the virtual service.
	Performance Model. The performance model to associate with the virtual service.
	<ul> <li>Server URL. The address of the SV server on which the selected service is deployed.</li> </ul>
	Formats:  http: <server>:6080/management - for standalone SV servers  http:<server>:7080/management - for embedded SV servers (available only if the SV Designer is open)</server></server>
	<ul> <li>Deployed. An indicator showing the deployment status:</li> <li>Successfully deployed.</li> <li>The service is not deployed on the specified emulation server.</li> </ul>
Last Deployment Check	Data on which the last deployment check occurred.
More details	Opens the Deployment Check Results dialog box. For user interface details, see "Deployment Check Results Dialog Box" on page 116.

### **Add Project Dialog Box**

This dialog box enables you to add projects that contain virtualized services to your performance test.

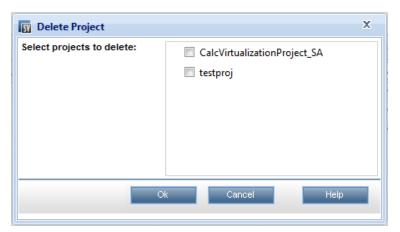


To access	In the Services Virtualization dialog box, click <b>Add Project</b> .	
Relevant tasks	"How to Add Virtualized Services to Performance Tests" on page 109	
See also	"Integrating Virtualized Services Overview" on page 106	
	"Configure Services Virtualization Dialog Box" on page 110	

UI Element	Description
Select Project File Name of the project file. Project files have a .zip or a .vproj extension	
Select	Enables you to browse for, and select, a project.
Messages	Displays messages about the project file, such as error messages.

### **Delete Project Dialog Box**

This dialog box enables you to delete projects and their virtualized services from the configuration of a performance test.



To access	In the Services Virtualization dialog box, click <b>Delete Project</b> .
Important information	During design, deleting a project has no impact on performance tests and virtualized services currently running. It only removes the projects and virtualized services from the configuration for future runs.
	At run time, deleting a project with a virtualized service removes the service from emulation and unlocks the service.
Relevant tasks	"How to Add Virtualized Services to Performance Tests" on page 109
See also	"Integrating Virtualized Services Overview" on page 106
	"Configure Services Virtualization Dialog Box" on page 110

UI Element	Description
Select projects to delete	Select the checkbox next to each project you want to delete.

### **Deployment Check Results Dialog Box**

This dialog box enables you to check if the projects and their virtualized services are deployed on the server at the specified URL address.



To access	In the Services Virtualization dialog box, click <b>More details</b> .
Important information	In general, the deployment check checks the following:
	A service with the same ID exists on the specified server.
	The performance and data models on the specified server match.
Relevant tasks	"How to Add Virtualized Services to Performance Tests" on page 109
See also	"Integrating Virtualized Services Overview" on page 106
	"Configure Services Virtualization Dialog Box" on page 110

UI Element	Description
Deployed	Indicates whether the virtualization service is deployed correctly on the specified server.
	Status is unknown. Click <b>Deploy Check</b> to check the status.
	Successfully deployed.
	The service is not deployed on the specified emulation server.
Project Name	Displays the name of the project containing the virtualization service.

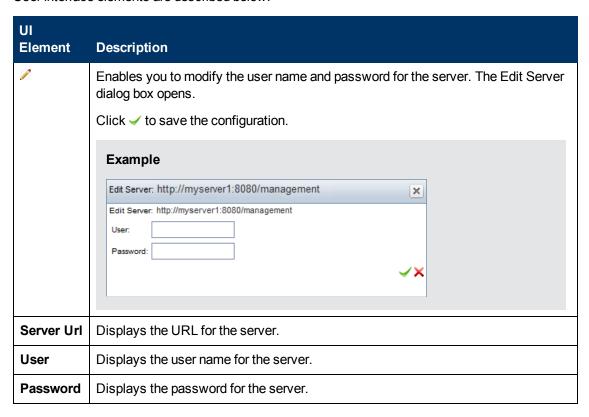
Service name	Displays the name of the virtualization service.
Check details	Displays the results of the check.

### **Configure Virtualization Servers Dialog Box**

This dialog box enables you to configure login information for the SV server.



To access	In the Services Virtualization dialog box, click the <b>Configure Servers</b> button .	
Important information	This dialog box only lists the servers that are defined in the Configuration Services Virtualization dialog box's <b>Server URL</b> column.	
Relevant tasks	"How to Add Virtualized Services to Performance Tests" on page 109	
See also	"Integrating Virtualized Services Overview" on page 106	
	"Configure Services Virtualization Dialog Box" on page 110	



### **Chapter 9: Load Generator Distribution**

### This chapter includes:

Load Generator Distribution Overview	.120
How to Distribute Load Generators Among Vuser Groups	121
Load Generators User Interface	123

### **Load Generator Distribution Overview**

Load generators are Performance Center hosts on which Vusers run during a test run.

This section includes:

- "Load Generator Types" below
- "Load Generator Distribution Methods" below
- "Load Generator Attribute Customization" below

### **Load Generator Types**

There are two types of load generators:

- Specific load generator. An actual load generator. For example, machine host1, located in London.
- Automatch load generator. A load generator placeholder, for example LG1. When you assign
  an automatch load generator to a Vuser group, you are not assigning a specific load generator to
  the group, but rather a placeholder for a load generator with specific properties. At runtime,
  specific load generators in the project's host pool that have the same properties as the
  automatch load generators, are allocated in place of the automatch load generators.

#### **Load Generator Distribution Methods**

When you design a performance test, you specify how to distribute load generators among the Vuser groups participating in the test. You can automatically assign all load generators to each Vuser group, or you can manually select which load generators to assign to which group.

Use the following methods to distribute load generators:

- Automatic load generator distribution. When you select the automatic load generator
  distribution method, during the test design phase all of the automatch load generators in the
  test are distributed to all of the participating Vuser groups.
  - At runtime, specific load generators in the project's host pool that have the same properties as the automatch load generators, are allocated in place of the automatch load generators.
- Manual Load Generator Distribution. Using the manual distribution method, you can assign specific load generators to Vuser groups.

If you are not particular about which load generators should be used for the test, you can assign automatch load generators to the groups. At the initialization stage of the test run, the automatch load generators are automatically replaced with specific load generators from the project's host pool that match the automatch load generators' properties.

**Tip:** Manual distribution enables you to distribute your load generators among Vuser groups, without overloading any one load generator.

#### **Load Generator Attribute Customization**

You can customize load generator attributes. For details about how to customize host attributes,

see the HP Application Lifecycle Management Administrator Guide.

When customizing load generator attributes, consider the following:

- Create attributes that represent properties about your hosts that will help tell one host apart from another host when using them for performance testing.
- Because you can select multiple attributes for your host, you can define an unlimited number of host attributes. They do not need to be related.
- Host attributes can refer to anything. For example, **Host Memory High**, **Spanish environment**, **Very slow machine**.

# How to Distribute Load Generators Among Vuser Groups

This task describes how to distribute load generators automatically and manually among Vuser groups participating in the performance test.

**Note:** This task is part of a higher-level task. For details, see "How to Define a Performance Test Workload" on page 85.

To learn more about load generator distribution, see "Load Generator Distribution Overview" on previous page.

This task includes the following steps:

- "Prerequisites" below
- "Select a load generator distribution method" below
- "Specify the load generators to use in the test" on next page
- "Select properties for the automatch load generators optional" on next page

#### 1. Prerequisites

Add Vuser groups to participate in the test. For details, see "How to Define a Performance Test Workload" on page 85 on "How to Define a Performance Test Workload" on page 85.

### 2. Select a load generator distribution method

On the Groups pane toolbar, in the **LG Distribution** box, select one of the following options:

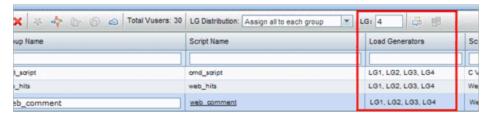
- Assign all to each group. Assigns all the load generators automatically to each Vuser group.
- Assign manually. Enables you to assign load generators manually to the Vuser groups.



### 3. Specify the load generators to use in the test

If you selected Assign all to each group above, the LG box is displayed to the right of the LG Distribution box.

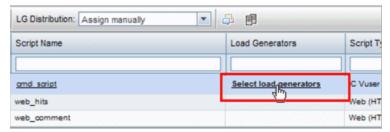
Type the number of load generators to use in the test and press ENTER. The automatch load generators are distributed to each of the Vuser groups and are displayed in the **Load Generators** column.



If you selected Assign manually above:

on next page.

- To select the same load generators for multiple groups at once, click the Assign Load
   Generators to Multiple Groups button. In the dialog box that opens, select automatch and/or specific load generators to multiple groups
   Similarly, you can remove load generators that have been assigned to the groups.
   For user interface details, see "Assign Load Generators to Multiple Groups Dialog Box"
- To select load generators for a specific group only, you can use the link that appears in the **Load Generators** column of a selected group. Click the link and select automatch and/or specific load generators to assign to the group.



For user interface details, see "Select Load Generators Dialog Box " on page 127.

### 4. Select properties for the automatch load generators - optional

You can select properties for the automatch load generators that are assigned to Vuser groups in your test. Properties include a location and other attributes. At runtime, each automatch load generator is matched up with an available specific load generator (in the project's host pool) with the same properties.

To select properties for automatch load generators, click the **Configure Automatch Load Generator Properties** button, select one or more automatch load generators, and enter a location and/or attributes.

For user interface details, see "Automatch Load Generators Properties Dialog Box" on page 130.

**Note:** If no properties are specified, the automatch load generator is matched up with any load generator in the project's host pool.

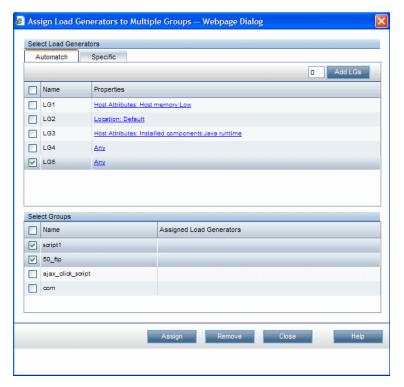
### **Load Generators User Interface**

This section includes:

Assign Load Generators to Multiple Groups Dialog Box	123
Select Load Generators Dialog Box	127
Automatch Load Generators Properties Dialog Box	. 130

### **Assign Load Generators to Multiple Groups Dialog Box**

This dialog box enables you to assign one or more load generators—automatch or specific—to multiple Vuser groups at once. You can also use this dialog box to remove one or more load generators from multiple Vuser groups at once.



To access	On the ALM sidebar, under <b>Testing</b> , select <b>Test Plan</b> .
	Right-click a performance test in the test plan tree and select <b>Edit Test</b> .
	In the Performance Test Designer window, click the <b>Workload</b> tab.
	4. From the <b>LG Distribution</b> drop-down list, select <b>Assign manually</b> .
	5. Click Assign Load Generators to Multiple Groups
Important information	This dialog box is available only when using the <b>manual</b> load generator distribution method.
Relevant tasks	"How to Define a Performance Test Workload" on page 85
	"How to Distribute Load Generators Among Vuser Groups" on page 121

User interface elements are described below (unlabeled elements are shown in angle brackets):

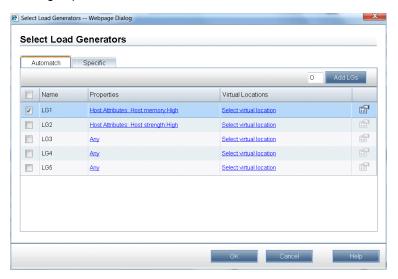
UI Elements	Description
O Add LGs	Enables you to add more automatch load generators for the test. Enter the number of load generators in the adjacent box and click <b>Add LGs</b> .
Assign	Assigns the selected load generators to the selected Vuser groups.
Remove	Removes the selected load generators from the selected Vuser groups.

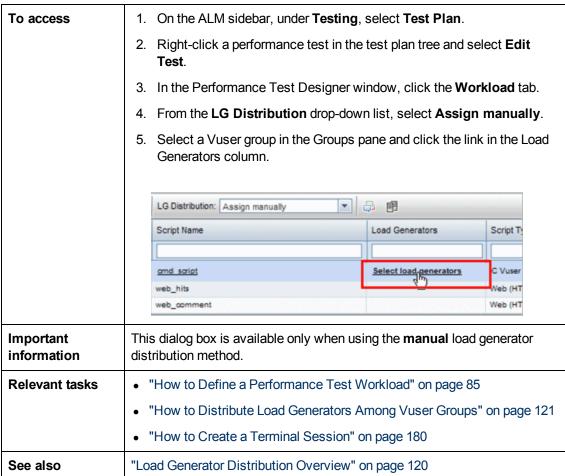
UI Elements	Description
Automatch tab	Enables you to select automatch load generators to assign to Vuser groups in the test, or to remove assigned automatch load generators from the Vuser groups.
	Name. The name of the automatch load generator. By default, these are named LG1, LG2, and so on.
	Properties. The properties by which the automatch load generator is matched up with a specific load generator in the project's host pool at runtime.
	<b>Any</b> is displayed by default. This means that the automatch load generator can be matched up with any load generator in the project's host pool at runtime.
	To specify properties for an automatch load generator, click the corresponding link in this column to open the Automatch Load Generator Properties dialog box. For details, see "Automatch Load Generators Properties Dialog Box" on page 130.
	<b>Tip:</b> To select all the load generators in the list, select the check box in the check box column heading.

UI Elements	Description
Specific tab	Enables you to select load generators from the project's host pool to assign to the Vuser groups in the test, or to remove them from the Vuser groups.
	Name. The name of the load generator.
	State. The state of the load generator: Operational; Non-operational; Unavailable
	Note: Assigned load generators must be operational during runtime.
	Location. The location of the load generator.
	Purpose. The purpose of the load generator. Controller, Load Generator, Data Processor, or a combination of these.
	<ul> <li>Only the hosts in the pool with at least a Load Generator purpose are displayed.</li> </ul>
	<ul> <li>QuickTest tests (UFT GUI Tests) cannot run on a load generator that has been selected as the Controller of the performance test.</li> </ul>
	If a load generator is marked with an asterisk (*), this indicates that the load generator host has been selected as the Controller. It is recommended not to use a Controller host as a load generator as well.
	<b>Tip:</b> To select all the load generators in the list, select the check box in the check box column heading.
<select load<br="">Generators</select>	Enables you to select load generators to assign to the Vuser groups in the test, or to remove them from the Vuser groups.
pane>	Click the <b>Automatch</b> tab to select automatch load generators.
	Click the <b>Specific</b> tab to select specific load generators.
Select Groups pane	Enables you to select the Vuser groups to which the selected load generators are to be assigned, or from which they are to be removed.
	Name. The name of the Vuser group.
	Assigned Load Generators. The load generators currently assigned to the Vuser group.
	<b>Tip:</b> To select all the Vuser groups, select the check box in the check box column heading.

### **Select Load Generators Dialog Box**

This dialog box enables you to assign one or more load generators—automatch or specific—to a Vuser group.



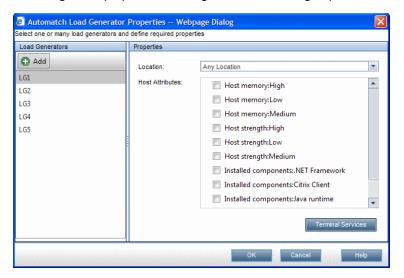


UI Elements	Description
0 Add LGs	Enables you to add more automatch load generators for the test. Enter the number of load generators in the adjacent box and click <b>Add LGs</b> .
	Available from: Automatch tab only
	<b>Terminal Services.</b> Enables you to configure terminal services sessions on the selected load generator. For details, see "Configuring Terminal Sessions" on page 179
	Available: For load generators
Automatch tab	Enables you to select automatch load generators to assign to the selected Vuser group.
	Name. The name of the automatch load generator. By default, these are named LG1, LG2, and so on.
	Properties. The properties by which the automatch load generator is matched up with a specific load generator at runtime.
	Any is displayed by default. This means that the automatch load generator can be matched up with any load generator at runtime. To specify properties for a particular automatch load generator, click the corresponding Any link in the Properties column to open the Automatch Load Generator Properties dialog box. For details, see "Automatch Load Generators Properties Dialog Box" on page 130.
	Virtual Locations. The name of the virtual location. Click the Select virtual location link to open the Select Virtual Location dialog box.
	<b>Tip:</b> To select all the load generators in the list, select the check box in the check box column heading.

UI Elements	Description
Specific tab	Enables you to assign load generators from the project's host pool to the selected Vuser group.
	Name. The name of the load generator.
	State. The state of the load generator: Operational, Non-operational, Unavailable.
	Note: Assigned load generators must be operational during runtime.
	Location. The location of the load generator.
	Virtual Locations. The name of the virtual location. Click the Select virtual location link to open the Select Virtual Location dialog box.
	Purpose. The purpose of the load generator, that is, Controller, Load Generator, Data Processor, or a combination of these.
	<ul> <li>Only the hosts in the pool with at least a Load Generator purpose are displayed.</li> </ul>
	<ul> <li>You can run QuickTest tests (UFT GUI Tests) only on load generators that are not also assigned as the Controller for the performance test.</li> </ul>
	If a load generator is marked with an asterisk (*), this indicates that the load generator host has been selected as the Controller. It is recommended not to use a Controller host as a load generator as well.
	<b>Tip:</b> To select all the load generators in the list, select the check box in the check box column heading.

### **Automatch Load Generators Properties Dialog Box**

This dialog box enables you to define properties for an automatch load generator. Properties include a location, and other host attributes. At runtime, a specific load generator in the project's host pool matching these properties is assigned to the Vuser group.



To access	On the ALM sidebar, under <b>Testing</b> , select <b>Test Plan</b> .
	Right-click a performance test in the test plan tree and select <b>Edit Test</b> .
	3. In the Performance Test Designer window, click the <b>Workload</b> tab.
	4. On the Groups pane tool bar, click <b>Configure Automatch Load Generators</b>
	Properties .
Relevant	"How to Distribute Load Generators Among Vuser Groups" on page 121
tasks	"How to Create a Terminal Session" on page 180

UI Elements	Description
⊕ Add	Enables you to add more automatch load generators for the test. Click this button, enter a number of automatch load generators to add, and click <b>Add</b> .
	<b>Available:</b> When the <b>Assign Manually</b> load generator distribution method is selected.
Terminal Services	Enables you to configure terminal services sessions on the selected load generator. For details, see "Configuring Terminal Sessions" on page 179.
	<b>Available:</b> When the <b>Assign Manually</b> load generator distribution method is selected.

UI Elements	Description
Load Generators pane	Lists the available automatch load generators.
Properties pane	<ul> <li>Enables you to define properties for the automatch load generators selected in the Load Generators list.</li> <li>Location. Select a load generator location.</li> <li>Host Attributes. Select attributes for the load generator.</li> <li>Tip: The list of attributes can be customized. For details, see "Load Generator Distribution Overview" on page 120.</li> </ul>
	Example:  You want a Vuser group to use a load generator that is located in London and has medium strength and memory. Under Location, select London, and in the Host Attributes list, select Host memory: Medium and Host strength: Medium. At runtime, the system tries to assign a specific load generator with these properties to the Vuser group.

# User and Administrator Guide Chapter 9: Load Generator Distribution

### **Chapter 10: Scheduling Performance Tests**

### This chapter includes:

Scheduling Performance Tests Overview	.134
How to Define a Schedule for the Performance Test	136
How to Add Actions to a Test Schedule	.138
How to Edit Scheduler Actions	.139
Scheduling Performance Tests User Interface	140

### **Scheduling Performance Tests Overview**

You use the Scheduler to create a schedule that distributes load in a performance test in a controlled manner.

Using the Scheduler, you can:

- Set the time at which the test should begin running, and specify how long the Scheduler should wait after the Run Test command is issued, and before running Vusers.
- Stipulate:
  - How to initialize the Vusers in the test
  - How many Vusers to start/stop within a given time period
  - How often to start running the Vusers—simultaneously or gradually

For details, see "Scheduler Actions" on page 143.

- Limit the run duration of the Vusers or Vuser groups within the test by specifying the amount of time the Vusers or Vuser groups should be in the running state.
- Set a test to run according to the runtime settings defined for the enabled Vuser groups, or set the Vuser groups to run over and over again until the schedule settings instruct them to stop running.

To define a performance test schedule, see "How to Define a Schedule for the Performance Test" on page 136.

This section also includes:

- "Types of Test Schedules" below
- "Schedule Run Modes" on next page

### Types of Test Schedules

When you design a performance test, you can define a schedule according to which the participating Vuser groups should run in the test.

You can schedule all the groups to run together on one schedule, or you can define a separate schedule for each Vuser group.

### **Scheduling By Test**

When you schedule **by test**, all the Vuser groups participate in the test run simultaneously. That is, the schedule is applied to all the Vuser groups concurrently, and each action is applied proportionally to all the Vusers groups.

For example, take a test that includes three participating Vuser groups as follows:

Group Name	Number of Vusers
Group1	10
Group2	20
Group3	30
Total	60

When scheduling by test, if the scheduler instructs 30 Vusers to start running when it starts the test run, a proportional number of Vusers starts running from each group as follows:

Group Name	Number of Vusers
Group1	5
Group2	10
Group3	15
Total	30

**Note:** The same principle applies when the test is in percentage mode.

### Scheduling By Vuser Group

Note: For tests in Vuser group (number) mode only.

When you schedule **by Vuser group**, each Vuser group participating in the test runs on its own separate schedule. That is, for each Vuser group, you can specify when to start running the Vuser group, how many Vusers in the group to start and stop running within specified time intervals, and how long the group should continue running.

Group schedules can run separately, or all at the same time.

#### Schedule Run Modes

You can schedule a test to run according to the run-time settings defined for the Vuser groups, or you can let the groups run over and over again until the test schedule instructs them to stop running.

You can schedule a test to run in one of the following run modes:

- Real-world run mode. The test runs according to a user-defined group of actions that simulate
  a real-world schedule of events. Vuser groups run according to the iterations defined in their runtime settings, but you can define how many Vusers to run at a time, how long Vusers should
  continue to run, and how many Vusers to stop running at a time.
- Basic run mode. All enabled Vuser groups run together on one schedule, each according to its

own run-time settings. You can schedule how many Vusers to start running at a time, and how long they should run before stopping.

The following table illustrates how the given schedule types run in real-world versus basic run mode:

Schedule by	Run Mode - Real World	Run Mode - Basic
Test	All participating Vuser groups run together on one schedule. The test runs according to a user-defined group of actions that emulates a true-to-life schedule of events. You can schedule Vusers to start and stop running numerous times during the test, and specify how long to keep them in their running or stopped state.	All participating Vuser groups run together on one schedule, each according to its own run-time settings. You schedule when to start running all the Vusers, specify how long they should run, and then specify how to stop running all the Vusers.
Group (Not applicable when the test is in Percentage mode)	Each participating Vuser group runs according to its own defined schedule that emulates a true-to-life schedule of events for that Vuser group. You can schedule Vusers in the groups to start and stop running numerous times during the test, and specify how long to keep them in their running or stopped state.	Each participating Vuser group runs according to its own schedule, each according to its own run-time settings. For each Vuser group, you schedule when to start running the Vuser group, how to start running all the Vusers in the group, specify how long the Vusers should run, and then specify how to stop running all the Vusers in the group.

# **How to Define a Schedule for the Performance Test**

This task describes how to define a schedule for a performance test.

**Note:** This task is part of a higher-level task. For details, see "How to Define a Performance Test Workload" on page 85.

This task includes the following steps:

- "Prerequisites" below
- "Define a set of scheduler actions" on next page
- "Group schedules only: Copy a Vuser group's scheduler settings to other groups optional" on next page
- "Schedule a start time for the test optional" on page 138

### 1. Prerequisites

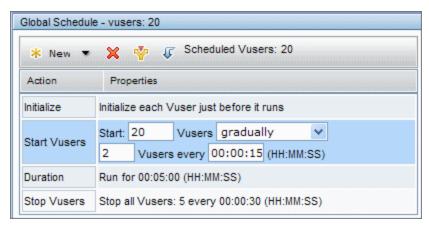
■ In the Performance Test Designer (**Test Plan >** Right-click a test in the tree and select **Edit Test > Workload** tab), make sure the test contains scripts.



■ The Scheduler must be enabled. Click the **Options** button located at the bottom of the Workload tab. In the Test Options dialog box, ensure that **Enable Scheduler** is selected. For user interface details, see "Test Options Dialog Box" on page 102.

#### 2. Define a set of scheduler actions

The Actions grid displays the default scheduler actions that correspond to the workload type selected in the **Workload type** box.



In real-world schedules, you can add more scheduler actions, and edit or delete existing actions.

In basic schedules, you can edit the existing scheduler actions.

- For details about the scheduler actions, see "Scheduler Actions" on page 143.
- For details about how to add actions (real-world schedules only), see "How to Add Actions to a Test Schedule" on next page.
- For details about how to edit actions, see "How to Edit Scheduler Actions" on page 139.

### Group schedules only: Copy a Vuser group's scheduler settings to other groups - optional

When scheduling **by Vuser group**, you can copy a Vuser group's scheduler settings to other Vuser groups.

#### Note:

- Scheduler settings copied include the scheduler run mode (basic or real-world) and the set of defined scheduler actions.
- This option is disabled for global schedules.

- a. On the Groups grid toolbar, click the **Duplicate Scheduler Settings** button.
- b. Select the source group whose settings you want to copy, and select one or more target groups.
- c. Click **Apply**. The source group's scheduler settings are copied to the target groups.
- 4. Schedule a start time for the test optional

Click the **Options** button located at the bottom of the Workload tab. Select **Start the Scheduler after a Delay of**, and enter the amount of time after which to start running the test.

### How to Add Actions to a Test Schedule

This task describes how to add actions to a real-world test schedule.

Note: You can add actions to a real-world schedule only.

This task includes the following steps:

- "How to Add Actions to a Test Schedule" above
- "How to Add Actions to a Test Schedule" above

### Add an action to the schedule from the Actions grid

Note: A new action is always added after the action selected in the Actions grid.

1. In the Actions grid, select an action after which to insert the new action, and click the **New scheduler action** button's down arrow.



2. Select the type of action to add.

**Note:** You can add a **Start Vusers**, **Stop Vusers**, or **Duration** action. For details about each type of action, see "Scheduler Actions" on page 143.

- 3. In the **Properties** column, specify the action's properties.
  - If you are adding a Start Vusers or Stop Vusers action, enter the number of Vusers to start/stop running, and select how to start/stop running the Vusers: simultaneously or gradually.

If you selected gradually, enter the number of Vusers to start/stop at a time, and a time interval.

If you are adding a Duration action, select how long to run the action.

Click Apply change to save the action settings.

4. When you have finished adding actions to the schedule, click Save at the bottom of the Workload tab.

Note: If you navigate away from the Performance Test Designer window without clicking Save, changes applied to the schedule are not saved.

### Add an action by splitting one action into two actions

You can add Start Vusers, Duration, and Stop Vusers actions from the Actions grid or from the graph by splitting an action into two halves of the original action.

#### To split an action in two:

1. Select the action in the grid, or the line in the graph that represents the action that you want to

**Tip:** Selecting the action in the Actions grid highlights the corresponding line in the graph.

2. Click the **Split selected action** button 2. The selected action/line splits in two. In the Actions grid, the original action splits into two equivalent actions, each representing half of the original action.

#### Example

- Splitting a Duration action of 5 minutes results in two Duration actions of 2.5 minutes
- Splitting a Start Vusers action that starts 20 Vusers results in two Start Vusers actions, each starting 10 Vusers.
- 3. (Optional) Edit each of the actions. For details, see "How to Edit Scheduler Actions" below.

### **How to Edit Scheduler Actions**

This task describes how to edit scheduler actions. You can edit all types of actions. For details about each action type, see "Scheduler Actions" on page 143.

#### To edit a scheduler action:

- 1. In the Actions grid, select the action that you want to edit. The Properties column becomes editable.
- 2. Modify the action settings and click **Apply change**

3. When you have finished editing the actions, click Save.

**Note:** If you navigate away from the Performance Test Designer window without clicking **Save**, changes applied to the schedule are not saved.

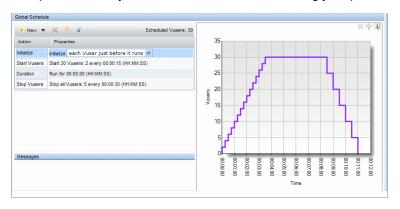
### **Scheduling Performance Tests User Interface**

This section includes:

Global Scheduler Pane	140
Scheduler Actions	143

### **Global Scheduler Pane**

This pane enables you to define a schedule for running your performance test.



To access	On the ALM sidebar, under <b>Testing</b> , select <b>Test Plan</b> .
	Right-click a performance test in the test plan tree and select <b>Edit Test</b> .
	3. In the Performance Test Designer window, click the <b>Workload</b> tab.
Important information	If scripts in your test contain rendezvous points, the test will not run as scheduled because the rendezvous points interfere with the schedule. For details, see "Rendezvous Points" on page 84.
Relevant tasks	"How to Define a Schedule for the Performance Test" on page 136
See also	"Scheduling Performance Tests Overview" on page 134
	"Scheduler Actions" on page 143

User interface elements are described below (unlabeled elements are shown in angle brackets):

UI Elements	Description
* New	<b>New scheduler action.</b> Enables you to add an action to the test schedule. The new action is added <b>after</b> the action selected in the grid.
	You can add Start Vuser, Duration, and Stop Vuser actions only. For details, see "Scheduler Actions" on page 143.
	Available from: Real-world schedule only
×	Delete selected action. Deletes the selected action.
*	<b>Split selected action</b> . Splits the selected action into two identical halves of the original action.
F	<b>Apply change.</b> Enables you to apply modifications made to the actions in the schedule graph.
<b>X</b>	Hide/Show Legend. Hides/Shows the graph legend.
*	<b>Note for group schedules only:</b> When the legend is showing, the group selected in the grid's title bar is read-only in the legend.
	To view/hide one or more of the other Vuser groups, select/clear the check boxes next to the Vuser groups respectively.
	Legend — X  Vuser Group  ✓ — script1  ✓ — script_7üilgmwßyp  ✓ — 50_ftp  ✓ — lol  ✓ — script3

UI Elements	Description	
Scheduled Vusers	Displays a total of the Vusers scheduled to run in the test.	
0.000.0	<ul> <li>When the test is in number mode and you are defining a basic schedule, the number of scheduled Vusers is updated when you modify the number of Vusers in the Vuser groups. You can change the number of Vusers in a selected group:</li> </ul>	
	<ul> <li>In the Groups grid: Select the group and change the number of Vusers</li> <li>In the Actions grid: Select the group in the Action grid's title bar and change the number of Vusers in the Start Vusers action.</li> </ul>	
	Group scheduler for: rendevouz_kalimanjaro ▼	
	* New ▼ 💢 🐺 Scheduled Vusers: 2	
	Action Properties	
	Start Group Start immediately after the test begins	
	<ul> <li>In real-world schedules, the total number of Vusers is the sum of all the Vusers defined in the Start Vusers actions.</li> </ul>	
<actions grid=""></actions>	Lists the scheduled actions. Initially the grid displays default actions that correspond to the schedule type you selected for your workload. For details, see "Workload Types Dialog Box" on page 97.	
	For all schedules, some of the actions can be modified.	
	In real-world schedules, you can also add and delete actions, enabling you to simulate a more true-to-life schedule by which to run your test.	
<schedule< th=""><th>Provides a graphical representation of the actions listed in the Actions grid.</th></schedule<>	Provides a graphical representation of the actions listed in the Actions grid.	
graph>	In real-world schedules, you can add new actions from the graph by splitting an action into two identical halves.	
<title bar&gt;</title 	Displays the type of schedule and the number of scheduled Vusers, depending in the type of workload is selected for the test:	
	Global Schedule. Displayed when the schedule is a schedule by test.	
	Group Schedule for <group>. Displayed for group schedules. Displays the name of the group whose schedule is displayed in the actions grid.</group>	
Messages	Displays alert messages.	

### **Scheduler Actions**

A performance test schedule contains a sequence of actions that instruct the test when to start running a Vuser group, how to initialize Vusers, when to start and stop running Vusers, and how long to run an action.

The following sections describe the available scheduler actions.

- "Start Group" below
- "Initialize" on next page
- "Start Vusers" on next page
- "Duration" on page 145
- "Stop Vusers" on page 146

### **Start Group**

The Start Group action defines when to start running a Vuser group. By default, the **Start Group** action appears as the first action in the Actions grid when you select a workload of type: **by group**.

Options	Description
Start immediately	The Scheduler starts running the selected Vuser group as soon as the test starts running.
	Resulting action: Start immediately after the test begins.
Start with delay	After the test starts running, the Scheduler waits the specified time (in hours, minutes, and seconds) before it starts running the selected Vuser group.
	Resulting action: Start (HH:MM:SS) after the test begins.
Start when group	The Scheduler starts running the selected Vuser group immediately after the Vuser group specified in this option has finished running.
	Resulting action: Start when group <group name=""> finishes.</group>

#### Note:

- The **Start Group** action is available for group schedules only.
- The **Start Group** action is always followed by the **Initialize** action.
- The **Start Group** action cannot be deleted.

#### Initialize

The **Initialize** action instructs the Scheduler to prepare the Vusers so that they are in the **Ready** state and can run. By default, the **Initialize** action appears in the Actions grid for all types of schedules.

Options	Description
Initialize all Vusers simultaneously	The Scheduler initializes all the Vusers in the test or selected Vuser group together, and waits the specified amount of time before running them.
	Resulting action: Initialize all Vusers simultaneously Wait for <00:00:00> (HH:MM:SS) after initialization
Initialize gradually	The Scheduler initializes the specified number of Vusers gradually, according to the specified time interval (in hours, minutes, and seconds), and waits the specified amount of time before running them.
	Resulting action: Initialize <x> Vusers every (HH:MM:SS) Wait for (HH:MM:SS) after initialization.</x>
Initialize each Vuser just before it runs	The Scheduler initializes each Vuser in the test or selected Vuser group just before it starts running.
	Resulting action: Initialize each Vuser just before it runs.
	Note: This option is not available for Group schedules when Wait for all groups to initialize is selected. See "Wait for all groups to initialize" on "Test Options Dialog Box" on page 102.

Note: The Initialize action cannot be deleted.

### **Start Vusers**

The Start Vusers action instructs the Scheduler to start running the Vusers.

Options	Description
Start All Vusers: Simultaneously	The Scheduler runs all the Vusers in the test simultaneously.
Start X Vusers: gradually Y Vusers: every <hh:mm:ss> (HH:MM:SS)</hh:mm:ss>	The Scheduler runs the specified number of Vusers (X) gradually. That is, the Scheduler runs Y Vusers, and waits the specified time (in hours, minutes, and seconds) before running another Y Vusers.  Resulting action: Start X Vusers: Y Vusers every <hh:mm:ss> (HH:MM:SS)</hh:mm:ss>

### Note:

- The Scheduler starts running Vusers only when they have reached the **Ready** state.
- In a basic schedule, the Scheduler always runs all the Vusers, whether simultaneously or gradually. In a real-world schedule, you can select how many Vusers to start running at a time.
- While a test is running, you can add Vuser groups/scripts to the test and enable them.
   When starting the Vusers gradually, if you add a Vuser group after all the Vusers in the test have started running, the new group will start running immediately.

### Duration

The Duration action instructs the Scheduler to continue running the test in the current state, for the specified amount of time.

Options	Description
Run until	The test runs until all the Vusers have finished running.
complete	Resulting action: Run until completion
Run for	The test runs in its current state for the specified amount of time (in days, hours, minutes, and seconds) before continuing with the next action.
	Default: 5 minutes
	Maximum definable duration period: 99.23:59:59 dd.HH:MM:SS.
	Resulting action: Run for <dd.hh:mm:ss> (dd.HH:MM:SS)</dd.hh:mm:ss>
Run	The test runs indefinitely.
indefinitely	Resulting action: Run indefinitely
	Available for: Basic schedule only

### Note:

- In a real-world schedule, if a Duration action is not followed by another action, the test continues to run indefinitely.
- In a real-world schedule, to avoid unexpected behavior during the test run, add a Duration action between consecutive Start Vusers and Stop Vusers actions.
- In a basic schedule, a **Run for** Duration action is always followed by a Stop Vuser action.

### **Stop Vusers**

The Stop Vusers action instructs the Scheduler to stop the running Vusers.

Options	Description
Stop All Vusers: Simultaneously	The Scheduler stops all the running Vusers at once.
Stop All/X Vuser: gradually	The Scheduler stops the specified number of Vusers (AII or X) gradually. That is, the Scheduler stops Y Vusers, and waits the specified time (in hours, minutes, and seconds) before stopping another Y Vusers.  Resulting action: Stop <x> Vuser: <y> Vusers every <hh:mm:ss> (HH:MM:SS)</hh:mm:ss></y></x>

### Note:

- A basic schedule that has a **Run for** Duration action, is always followed by a Stop Vuser action that stops all the Vusers, simultaneously or gradually.
- In a real-world schedule, to avoid unexpected behavior during the test run, add a Duration action between consecutive Start Vusers and Stop Vusers actions.
- In a real-world schedule, if no action is specified after a **Run for** Duration action, the Vusers continue to run indefinitely—that is, the schedule continues to run indefinitely.
- When scheduling by group, if Group A is scheduled to run indefinitely, and Group B is scheduled to run after Group A, then Group A must be stopped manually before Group B can start running.

# **Chapter 11: Service Level Agreements**

### This chapter includes:

Service Level Agreements Overview	148
How to Define Service Level Agreements	149
How to Define Service Level Agreements - Use-Case Scenario	150
Service Level Agreement User Interface	153

# **Service Level Agreements Overview**

**Service level agreements (SLAs)** are specific goals that you define for your performance test. After a test run, HP LoadRunner Analysis compares these goals against performance related data that was gathered and stored during the course of the run, and determines whether the SLA passed or failed.

Depending on the measurements that you are evaluating for your goal, ALM determines the SLA status in one of the following ways:

SLA Type	Description
SLA status determined at time intervals over a timeline	Analysis displays SLA statuses at set time intervals over a timeline within the test run. At each time interval in the timeline—for example, every 10 seconds—Analysis checks to see if the measurement's performance deviated from the threshold defined in the SLA.
	Measurements that can be evaluated in this way:
	Average Transaction Response Time
	Errors per Second
SLA status	Analysis displays a single SLA status for the whole test run.
determined over the whole run	Measurements that can be evaluated in this way:
	Transaction Response Time - Percentile
	Total Hits per run
	Average Hits (hits/second) per run
	Total Throughput (bytes) per run
	Average Throughput (bytes/second) per run

### Note:

- You can define and edit SLAs in ALM or in HP LoadRunner Analysis.
- For details about viewing post-run SLA statuses in ALM Performance Center, see "SLA Report" on page 235.
- For details about viewing post-run SLA statuses in Analysis reports, see the *HP LoadRunner Analysis User Guide*.

## **Tracking Period**

When you define service level agreements (SLAs) for measurements that are evaluated over a timeline, Analysis determines SLA statuses at specified time intervals within that timeline. The frequency of the time intervals is called the **tracking period**.

An internally-calculated tracking period is defined by default. You can change this tracking period by defining a value which Analysis plugs into a built-in algorithm to calculate the tracking period. For details, see "Tracking Period Dialog Box" on page 162.

# **How to Define Service Level Agreements**

This task describes how to define service level agreements (SLAs).

You can define service level agreements (SLAs) which measure performance test goals over time intervals during a test run, or over a whole performance test run. To learn more, see "Service Level Agreements Overview" on previous page and the HP LoadRunner Analysis User Guide.

**Note:** This task is part of a higher-level task. For details, see "How to Design a Performance Test" on page 72.

**Tip:** For a use-case scenario related to this task, see "How to Define Service Level Agreements - Use-Case Scenario" on next page.

This task includes the following steps:

- "Prerequisites" below
- "Run through the SLA wizard" below
- "Define a tracking period optional" on next page
- · "Results" on next page

### Prerequisites

Create a performance test. For details, see "How to Design a Performance Test" on page 72.

**Note:** To define Average Transaction Response Time or Transaction Response Time Percentile SLAs, your performance test must include a script that contains at least one transaction.

### 2. Run through the SLA wizard

In the Performance Test Designer, click the **Summary** tab. In the **Service Level Agreement** pane, click **New** to open the Service Level Agreement wizard. For user interface details, see "Service Level Agreement Wizard" on page 155.

- a. Select a measurement for the SLA.
- b. If you are defining an SLA for Transaction Response Time (Average/ Percentile), select the transactions to include in your goal.
- c. (Optional) When evaluating SLA statuses over a timeline, select a load criterion to take into account and define appropriate load value ranges for the load criterion.
- d. Set thresholds for the measurements.
  - If the values of Transaction Response Time (Average/Percentile) or Errors per Second exceed the defined thresholds, Analysis will produce a Failed SLA status.
  - If the values of Total Hits, Average Hits per Second, Total Throughput, or Average Throughput are lower than the defined threshold, Analysis will produce a Failed SLA status.

### Define a tracking period - optional

For measurements whose SLA statuses are determined over time intervals, you need to define the frequency of the time intervals, known as the **tracking period**. For details, see "Tracking Period" on previous page.

For user interface details, see "Tracking Period Dialog Box" on page 162.

### 4. Results

During post test run analysis, HP LoadRunner Analysis compares the data collected from the test run against the settings defined in the SLAs, and determines SLA statuses which are included in the default Summary Report and the SLA Report.

For more information, see "Results/Last Run Results Tab" on page 202.

See also the HP LoadRunner Analysis User Guide.

# How to Define Service Level Agreements - Use-Case Scenario

This use-case scenario describes how to define a service level agreement (SLA) for Average Transaction Response Time.

**Note:** For a task related to this scenario, see "How to Define Service Level Agreements" on previous page.

This use-case scenario includes the following steps:

- "Background" on next page
- · "Start the SLA wizard" on next page
- "Select the measurement for the SLA" on next page
- "Select the transactions to evaluate in your goal" on next page
- "Select a load criterion and define appropriate ranges of load optional" on next page

- "Set thresholds" on next page
- "Define a tracking period optional" on next page
- "Results" on page 153

### 1. Background

The administrator of HP Web Tours would like to know when the average transaction response time for booking a flight and searching for a flight exceeds a certain value. Assume that your performance test includes a script that includes the following transactions: **book\_flight** and **search\_flight**.

### 2. Start the SLA wizard

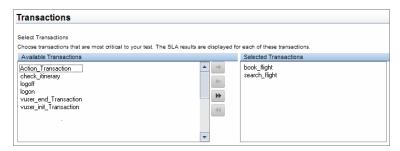
In the Service Level Agreement pane, click **New** to start the Service Level Agreement wizard. Click **Next**.

### Select the measurement for the SLA

On the Measurement page, select **Transaction Response Time**, and from the drop-down list, select **Average**.

### 4. Select the transactions to evaluate in your goal

On the Transactions page, select the transactions to be evaluated: **book\_flight** and **search\_flight**.



### 5. Select a load criterion and define appropriate ranges of load - optional

On the Load Criteria page, select the load criterion to take into account when evaluating the average transaction response time.

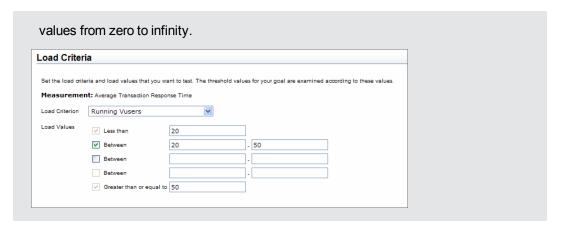
In this case, to see the effect that various quantities of Vusers running on the system has on the average transaction response time of each transaction, in the **Load Criterion** box, select **Running Vusers**.

Then set the value ranges for the running Vusers:

Consider less than 20 Vusers to be a light load, 20-50 Vusers an average load, and 50 Vusers or more a heavy load. Enter these values in the Load Values boxes.

### Note:

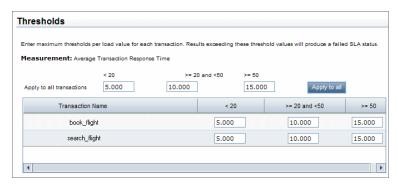
- You can set up to three in-between ranges.
- Valid load value ranges are consecutive—there are no gaps in the range—and span all



### 6. Set thresholds

On the Thresholds page, you define the acceptable average transaction response times for the transactions, taking into account the defined load criterion.

In this case, define the same threshold values for both transactions as follows: for a light load, a reasonable average response time can be up to 5 seconds, for an average load, up to 10 seconds, and for a heavy load, up to 15 seconds.



**Tip:** To define the same thresholds for all the transactions, enter the values in the **Apply to all transactions** boxes above the table, and click the **Apply to all** button.

### 7. Define a tracking period - optional

When SLA statuses for a measurement are determined at time intervals over a timeline, the frequency of the time intervals is determined by the **tracking period**.

This step is optional because an internally-calculated tracking period of at least 5 seconds is defined by default. You can change the tracking period in the Tracking Period dialog box:

- a. In the Service Level Agreement pane, click the **Tracking Period** button.
- b. Select Tracking period of at least X seconds, and select a tracking period. The time intervals are calculated by Analysis according to a built-in algorithm and as a function of the value you enter here.

### **Example:**

If you select a tracking period of 10, and the aggregation granularity for the performance test (defined in Analysis) is 6, then the tracking period is set to the nearest multiple of 6 that is greater than or equal to 10, that is, Tracking Period = 12.

For details, see "Tracking Period" on page 149.

For user interface details, see "Tracking Period Dialog Box" on page 162.

### 8. Results

When analyzing your test run, Analysis applies your SLA settings to the default Summary Report and the report is updated to include all the relevant SLA information.

For example, it displays the worst performing transactions in terms of defined SLAs, how specific transactions performed over set time intervals, and overall SLA statuses.

For more information, see the HP LoadRunner Analysis User Guide.

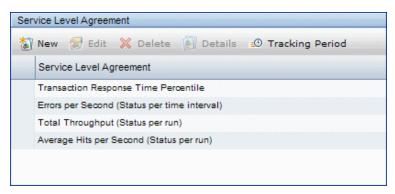
# Service Level Agreement User Interface

This section includes:

Service Level Agreement Pane	153
Service Level Agreement Wizard	155
Tracking Period Dialog Box	.162

## **Service Level Agreement Pane**

This pane lists all the service level agreements (SLAs) defined for the performance test.

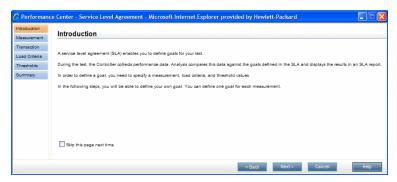


To access	On the ALM sidebar, under <b>Testing</b> , select <b>Test Plan</b> .
	Right-click a performance test in the test plan tree and select <b>Edit Test</b> .
	In the Performance Test Designer window, click the <b>Summary</b> tab.
Relevant Tasks	"How to Design a Performance Test" on page 72
	"How to Define Service Level Agreements" on page 149
See also	"Service Level Agreements Overview" on page 148

UI Elements	Description
New New	Starts the Service Level Agreement wizard where you can define new goals for the performance test.
Edit	Opens the Service Level Agreement wizard where you can modify the goals defined in the SLA.
X Delete	Deletes the selected SLA.
Details	Opens the SLA Details dialog box which displays a summary of the details of the selected SLA.
■ Tracking Period	Opens the Tracking Period dialog box where you can adjust the tracking period for measurements that are evaluated per time interval over a timeline.
	For conceptual information, see "Tracking Period" on page 149.
	For user interface details, see "Tracking Period Dialog Box" on page 162.
Service Level Agreement list	Lists the SLAs defined for the performance test.

# **Service Level Agreement Wizard**

This wizard enables you to define service level agreements (SLAs). SLAs enable you to define performance targets or goals for your performance test. During a test run, ALM measures performance and collects data. This data is compared against thresholds defined in the SLAs.



To access	To view a list of defined SLAs:
	<ol> <li>On the ALM sidebar, under <b>Testing</b>, select <b>Test Plan</b>, and select a test in the tree.</li> </ol>
	Click the <b>Test Design</b> tab. The Service Level Agreement pane lists the defined SLAs.
	To define SLAs:
	On the ALM sidebar, under <b>Testing</b> , select <b>Test Plan</b> , right-click a test in the tree, and select <b>Edit Test</b> .
	In the Performance Test Designer window, click the <b>Summary</b> tab.
	In the Service Level Agreement pane, click
Important information	You can define SLAs in the Performance Test Designer only.
Relevant tasks	"How to Define Service Level Agreements" on page 149
Wizard	This wizard contains:
тар	Introduction > "Measurement Page" on next page > "Transactions Page" on page 157 > "Load Criteria Page" on page 158 > "Thresholds Page " on page 159 > "Summary Page" on page 161
See also	"Service Level Agreements Overview" on page 148

UI Elements	Description
Skip this page next time	When this option is selected, the SLA wizard starts on the Measurements page. For details, see "Measurement Page" below.
	To view the Introduction page again, on the Measurement page click <b>Back</b> and clear the <b>Skip this page next time</b> option.

## **Measurement Page**

This wizard page enables you to select a measurement for the SLA. Some measurements are measured at time intervals over a timeline, and others are measured over the whole test run.

Important information	General information about this wizard is available here: "Service Level Agreement Wizard" on previous page.
Wizard map	The "Service Level Agreement Wizard" on previous page contains:  Introduction > "Measurement Page" above > "Transactions Page" on next page > "Load Criteria Page" on page 158 > "Thresholds Page" on page 159 > "Summary Page" on page 161
See also	"Service Level Agreements Overview" on page 148

UI Elements	Description
Transaction Response Time	Percentile. Measures the percentage of transactions whose transaction response time falls below a specific threshold. The SLA is measured over the whole run.
	Average. Measures whether the average transaction response time of the transactions over a specified time interval exceeds the defined threshold.
	<b>Note:</b> Transaction Response Time SLAs can be defined only when at least one of the scripts participating in the test includes a transaction.
Errors per Second	Measures whether the errors per second over a specified time interval exceed the defined threshold.
Total Hits	Measures whether the total number of hits over the whole test run reach the defined threshold.
Average Hits per Second	Measures whether the average hits per seconds over the whole test run reach the defined threshold.
Total Throughput	Measures whether the total throughput over the whole test run reaches the defined threshold.

UI Elements	Description
Average Throughput	Measures whether the average throughput over the whole test run reaches the defined threshold.

# **Transactions Page**

This wizard page enables you to include transactions critical to your test in the evaluation.

Important information	General information about this wizard is available here: "Service Level Agreement Wizard" on page 155.
	<ul> <li>The Transaction page is displayed only when at least one of the scripts participating in the test includes a transaction.</li> </ul>
Wizard map	The "Service Level Agreement Wizard" on page 155 contains:  Introduction > "Measurement Page" on previous page > "Transactions Page" above > "Load Criteria Page" on next page > "Thresholds Page" on page 159 > "Summary Page" on page 161
See also	"Service Level Agreements Overview" on page 148

UI Elements	Description
Available Transactions	Lists the transactions in the scripts participating in the test.  To move a script to the <b>Selected Transaction</b> list, double-click it.
	Note: You must select at least one transaction for evaluation.
Selected Transactions	Lists the transactions in the scripts that have been selected for the SLA.
	To remove a script from this list, double-click it.
	Note: At least one transaction must be listed.

# **Load Criteria Page**

This wizard page enables you to select a load criterion for your goal and define appropriate load value ranges. For example, you can define the SLA to show the behavior of errors per second when there are less than 5 running Vusers, when there are between 5 and 10 running Vusers, and when there are 10 or more running Vusers.

Important information	General information about this wizard is available here: "Service Level Agreement Wizard" on page 155.
	This page is available only when defining the Average Transaction     Response Time or Errors per Second SLAs.
	In the next wizard step (Thresholds page), you will set different thresholds for each of these load value ranges.
Wizard map	The "Service Level Agreement Wizard" on page 155 contains:  Introduction > "Measurement Page" on page 156 > "Transactions Page" on previous page > "Load Criteria Page" above > "Thresholds Page" on next page > "Summary Page" on page 161
See also	"Service Level Agreements Overview" on page 148

UI Elements	Description
Measurement	The measurement selected for the SLA.
Load	The load criterion to consider when evaluating the goal.
Criterion	None. Does not consider any load criterion.
	Running Vusers. Considers the impact of the running Vusers.
	Throughput. Considers the impact of throughput.
	Hits per Second. Considers the impact of the hits per second.
	For Average Transaction Response Time, you can also select:
	<ul> <li>Transactions per second. Considers the impact of the transactions per second.</li> </ul>
	Transactions per second (passed). Considers the impact of the transactions per second that passed the evaluation.

UI Elements	Description
Load Values	Values of load to consider when evaluating the goal.
	Value ranges must be consecutive, spanning all values from zero to infinity.
	Less than. The lower range is always from 0 up to, but not including, the value entered here.
	Example:
	If you enter 5, the lower range is between 0 and 5, but does not include 5.
	Between. The in-between ranges include the lower value of the range, but not the upper value.
	Example:
	If you enter 5 and 10, the range is from 5 and up to, but not including, 10.
	Note: You can set up to three in-between ranges.
	Greater than. The upper range is from the value entered here, and higher.
	Example:
	If you enter 10, the upper range is from 10 and up.

# **Thresholds Page**

This wizard page enables you to define thresholds for the selected measurement.

Important information	General information about this wizard is available here: "Service Level Agreement Wizard" on page 155.
Wizard map	The "Service Level Agreement Wizard" on page 155 contains:  Introduction > "Measurement Page" on page 156 > "Transactions Page" on page 157 > "Load Criteria Page" on previous page > "Thresholds Page" above > "Summary Page" on page 161
See also	"Service Level Agreements Overview" on page 148

User interface elements are described below (unlabeled elements are shown in angle brackets):

UI Elements	Description
Measurement	The measurement selected for the SLA.

UI Elements	Description
Percentile	Percentage of transactions to measure against the configured threshold.
	Available for the following measurement: Transaction Response Time Percentile
Apply to all transactions	Enables you to define a threshold or a set of thresholds for all of the listed transactions. Click Apply to all to apply the thresholds to all of the listed transactions simultaneously.
	<b>Note:</b> Threshold values for the transactions do not have to be the same. You can assign different values for each transaction.
	Available for the following measurement: Average Transaction Response Time
Provide a threshold value for all transactions	Enables you to define one threshold for all of the listed transactions.  Click Apply to all to apply the value to all of the listed transactions simultaneously.
	<b>Note:</b> The threshold values for the transactions do not have to be the same. You can assign different values for each transaction.
	Available for the following measurements: Transaction Response Time Percentile

UI Elements	Description
Threshold/ <threshold table=""></threshold>	The minimum/maximum threshold value for the selected measurement.
	<ul> <li>Transaction Response Time Percentile: If the resulting value over the whole run exceeds the defined threshold values, the SLA produces a Failed status.</li> </ul>
	<ul> <li>Average Transaction Response Time and Errors per Second:         If the resulting value over the specified time interval exceeds the threshold values, the SLA produces a Failed status for that time interval.     </li> </ul>
	Average/Total Throughput and Average Hits per Second/Total Hits: If the resulting value over the whole run is lower than the threshold value, the SLA produces a Failed status.
	Note:
	Transaction Response Time Percentile and Average     Transaction Response Time: When more than one     transaction is selected, all of the transactions are listed in a     table enabling you to define thresholds for each transaction     separately.
	Average Transaction Response Time and Errors per Second: When a load criterion is selected, the table displays the load value ranges, enabling you to define thresholds per range of load values. For details, see "Load Criteria Page" on page 158.

# **Summary Page**

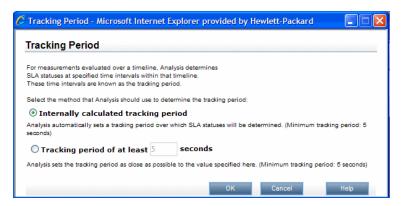
This wizard page displays a summary of the SLA you defined and enables you to define more SLAs.

Important information	General information about this wizard is available here: "Service Level Agreement Wizard" on page 155.
Wizard map	The "Service Level Agreement Wizard" on page 155 contains:  Introduction > "Measurement Page" on page 156 > "Transactions Page" on page 157 > "Load Criteria Page" on page 158 > "Thresholds Page" on page 159 > "Summary Page" above
See also	"Service Level Agreements Overview" on page 148

UI Elements	Description
Define another service level agreement	Enables you to define another SLA while still in the SLA wizard.  If this option is selected, clicking <b>Finish</b> takes you directly to the page where you can select a measurement for another SLA.

# **Tracking Period Dialog Box**

This dialog box enables you to set a tracking period for service level agreements.



To access	In the Performance Test Designer, click the <b>Summary</b> tab.
	2. In the Service Level Agreement pane, click the Tracking Period button.
Important information	For measurements evaluated over a timeline, Analysis determines SLA statuses at specified time intervals within that timeline. These time intervals are known as the tracking period.
Relevant tasks	"How to Define Service Level Agreements" on page 149
See also	"Service Level Agreements Overview" on page 148

UI Elements	Description
Internally calculated tracking period	Analysis automatically sets a tracking period over which SLA statuses are determined.  Minimum tracking period: 5 seconds

UI Elements	Description
Tracking period of at least <xx> seconds</xx>	Analysis sets the tracking period as close as possible to the value specified here.  Minimum tracking period: 5 seconds
	Example:  Assume that you select a tracking period of X=10, and assume that the aggregation granularity for the performance test is 6. The tracking period is set to the nearest multiple of 6 that is greater than or equal to 10. That is, Tracking Period = 12.
	For this option, Analysis uses the following formula:  Tracking Period = Max(5 seconds, m(Aggregation Granularity))  where m is a multiple of the performance test's aggregation granularity such that m(Aggregation Granularity) is greater than or equal to X.

# Chapter 12: Enabling and Configuring ERP/CRM and J2EE/.NET Diagnostics

### This chapter includes:

How to Enable and Configure ERP/CRM Diagnostics	166
How to Enable and Configure J2EE/.NET Diagnostics	167
How to View Diagnostics Results	167
Diagnostics User Interface	168

# How to Enable and Configure ERP/CRM Diagnostics

This task describes how to configure the ERP/CRM Diagnostics modules to communicate with the Mediator, and how to define the servers that you want to monitor in order to generate diagnostics data.

To learn more about ERP/CRM diagnostics, refer to the HP ALM Lab Management Guide.

**Note:** This task is part of a higher-level task. For details, see "How to Design a Performance Test" on page 72.

### 1. Prerequisites

- Make sure that the ERP/CRM Mediator is installed and configured. If this is not the case, consult the administrator for help.
- Make sure that the performance test is not already running.

### 2. Manually define transactions in the Vuser script

To ensure that valid diagnostics data are generated, manually define the transactions in the Vuser script rather than using automatic transactions. Make sure to disable the following options in the Run-Time Settings' **General > Miscellaneous** node: **Define each action as a transaction** and **Define each step as a transaction**.

### (Siebel/Siebel DB) Add think time after transactions

When preparing your script for collection of diagnostics data, we recommend that you add think time at the end of each transaction using the ratio of one second per hour of testing.

# 4. (Oracle 11i) Clear the server of users while the diagnostics module is running.

Make sure that no real or other virtual users are working on the Oracle server while the diagnostics module is running, as this may affect diagnostics results.

### 5. (Oracle 11i) Select the Oracle NCA application version

The Oracle 11i Diagnostics module supports Oracle NCA versions 11.5.0 and later. Enter the version of your Oracle application server in VuGen's run-time settings to enable the built-in trace mechanism.

**Note:** To check the version of your Oracle server, log on to the Oracle server and select **Help > About Oracle**. The version of your Oracle server is displayed in the Oracle Application field.

To enter your Oracle application version, open the script in VuGen and select **Vuser > Run- Time Settings**. In the **Oracle NCA: Client Emulation** node, select the version of Oracle NCA that you are using in the **Diagnostics > Application Version** field.

**Note:** If the Oracle 11i trace cannot be enabled using the built-in mechanism, you can enable it manually in the Vuser script using the **nca\_set\_custom\_dbtrace** and **nca\_set\_dbtrace\_file\_index** functions. This may occur if you are using a custom application that does not have a standard user interface.

### 6. Enable the diagnostics module

On the ALM sidebar, under **Testing**, select **Test Lab**. Then select the desired performance test, and select **Test Design > Edit Test > Diagnostics** tab where you enable and configure the relevant diagnostics module. For user interface details, see "Performance Test Designer > Diagnostics Tab" on next page.

# How to Enable and Configure J2EE/.NET Diagnostics

This step describes how to capture J2EE/.NET diagnostics metrics in a performance test, and how to select the probes that are included in the test.

To learn more about J2EE/.NET diagnostics, refer to the HP ALM Lab Management Guide.

**Note:** This task is part of a higher-level task. For details, see "How to Design a Performance Test" on page 72.

### **Enable J2EE/.NET diagnostics from the Diagnostics Tab**

Select the desired performance test, and then select **Test Design > Edit Test > Diagnostics** tab where you enable and configure J2EE/.NET Diagnostics. For user interface details, see "Performance Test Designer > Diagnostics Tab" on next page.

# **How to View Diagnostics Results**

You view results for ERP/CRM as well as J2EE/.NET diagnostics in HP LoadRunner Analysis.

### 1. Open Analysis

- a. Select Start > All Programs > HP Performance Center Host > Applications > Analysis.
- b. Open the desired results file from the following location:
  - <LTS installation>\orchidtmp\Results\<Domain Name+Project Name>\Run\_<Run
    number>\res<Run number>\lrr

### 2. View results in the Analysis diagnostics graphs

You can use the Analysis diagnostics graphs and reports to view the performance data and drill down to pinpoint problem areas in any layer of the application.

For information about specific diagnostics graphs, see the following sections in the *HP LoadRunner Analysis User Guide*:

- Siebel Diagnostics Graphs
- Siebel DB Diagnostics Graphs
- Oracle 11i Diagnostics Graphs
- SAP Diagnostics Graphs
- J2EE & .NET Diagnostics Graphs

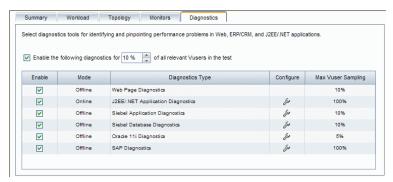
# **Diagnostics User Interface**

This section includes:

Performance Test Designer > Diagnostics Tab	168
J2EE/.NET Configuration Dialog Box	170
Oracle 11i Configuration Dialog Box	172
Oracle 11i Server Configuration Dialog Box	173
SAP Configuration Dialog Box	173
Siebel Configuration Dialog Box	175
Siebel DB Configuration Dialog Box	176
Siebel DB Server Configuration Dialog Box	176
Siebel Server Configuration Dialog Box	177

# **Performance Test Designer > Diagnostics Tab**

This tab enables you to enable and define the ERP/CRM and J2EE/.NET diagnostics modules for a performance test.



To access	On the ALM sidebar, under <b>Testing</b> , select <b>Test Plan</b> .
	2. Right-click a performance test in the test plan tree and select <b>Edit Test</b> .
	3. In the Performance Test Designer window, click the <b>Diagnostics</b> tab.
Important information	The contents of the tab are disabled while the performance test is running. You must enable and configure the diagnostics modules before running the test.
	The settings that you configure are per performance test. All scripts in the performance test run under the same diagnostics configuration.
Relevant	"How to Enable and Configure ERP/CRM Diagnostics" on page 166
tasks	"How to Enable and Configure J2EE/.NET Diagnostics" on page 167

UI Elements	Description
Configure	Click the 🌽 button to configure each diagnostics type.
	For user interface information for the specific diagnostic types, see:
	"J2EE/.NET Configuration Dialog Box " on next page
	"Oracle 11i Configuration Dialog Box" on page 172
	"SAP Configuration Dialog Box" on page 173
	"Siebel Configuration Dialog Box" on page 175
	"Siebel DB Configuration Dialog Box" on page 176

UI Elements	Description
Enable the following Diagnostics for X% of all relevant Vusers in the test	Specify the percentage of Vusers for which you want to collect diagnostics data. This value determines how many of the transactions on the application server are reported to the Controller. Reducing this percentage will reduce the overhead on the application server for Web Page, Oracle 11i, and J2EE & .NET Diagnostics.
	<b>Example:</b> If you enter a sampling value of 25% and run 12 Vusers in <b>group1</b> , 8 Vusers in <b>group2</b> , and 1 Vuser in <b>group3</b> , diagnostics data will be collected for 3 Vusers in <b>group1</b> , 2 Vusers in <b>group2</b> , and 1 Vuser in <b>group3</b> .
	<b>Note:</b> The minimum percentage of Vuser sampling allowed is 1%, or 1 Vuser per group, whichever is more.
	The maximum percentage allowed is the lowest of the <b>Max. Vuser Sampling</b> values of all the selected diagnostics types.
	<b>Example:</b> If you enable <b>Web Page</b> (max 10%), Oracle 11i (max 5%) and J2EE/.NET (max 100%) diagnostics, the percentage of Vuser participation for J2EE/.NET Diagnostics cannot exceed 5%.
Max Vuser Sampling	The maximum percentage of the amount of Vusers specified in the <b>Enable</b> the following Diagnostics for X% that can be collected.

# **J2EE/.NET Configuration Dialog Box**

This dialog box enables you to set up the J2EE/.NET diagnostics module.

To access	Select <b>Testing &gt; Test Plan</b> , then select the desired test.
	2. Select <b>Test Design &gt; Edit Test &gt; Diagnostics</b> tab.
	3. Select Enable the following diagnostics for X% of all relevant Vusers in the test.
	<ol> <li>Select Enable by J2EE/.NET Application Diagnostics, then click the Configure button .</li> </ol>
Important information	The dialog box is read only while the performance test is running.
Relevant tasks	"How to Enable and Configure J2EE/.NET Diagnostics" on page 167
See also	J2EE & .NET Diagnostics Graphs in the HP LoadRunner Analysis User Guide.

UI Elements	Description
Monitor server requests	Select to capture a percentage of server requests which occur outside the context of any Vuser transaction. For more information, see <i>HP ALM Lab Management Guide</i> .
	<ul> <li>Note:</li> <li>The server requests will be captured at the same percentage that was selected for the percentage of Vusers in the Diagnostics Distribution dialog box.</li> <li>Enabling this option imposes an additional overhead on the probe.</li> </ul>
Select Probes Table	Selects a probe for monitoring. At least one probe must be selected.
	Name. The name of the probe.
	Group. The probe group.
	Host Name. The host the probe is running on (or the application server on which the probe is installed).
	Status. The probe's status. Either Available or Not Available.
	<b>Note:</b> If you upgraded your Diagnostics installation, probes from existing performance tests may appear with a red status. Clear any probes that appear in red.
There is a firewall between the Mediator and the Controller.	Select if the Diagnostics server (or a Diagnostics server in Mediator mode in a distributed environment) is located behind a firewall.
Use the MI Listener for collating results.	<b>Note:</b> If there is a firewall between the Controller and the Diagnostics Server involved in a load test, you must configure the Controller and the Diagnostics Server to use the MI Listener to enable the transfer of the offline analysis file. For more information, refer to the <i>HP Diagnostics Installation and Configuration Guide</i> .
Troubleshoot diagnostics for J2EE/.NET connectivity	Click to open the HP Diagnostics System Health Monitor to enable you to investigate any connectivity issues between the Diagnostics components.

# **Oracle 11i Configuration Dialog Box**

This dialog box enables you to set up the Oracle 11i Diagnostics module to communicate with the Mediator.

To access	Select <b>Testing &gt; Test Plan</b> , then select the desired test.
	2. Select <b>Test Design &gt; Edit Test &gt; Diagnostics</b> tab.
	3. Select Enable the following diagnostics for X% of all relevant Vusers in the test.
	4. Select <b>Enable</b> by Oracle 11i Diagnostics, then click the Configure button 
Relevant tasks	"How to Enable and Configure ERP/CRM Diagnostics" on page 166
See also	"Oracle 11i Server Configuration Dialog Box" on next page
	Oracle 11i Diagnostics Graphs in the HP LoadRunner Analysis User Guide

UI Elements	Description
♣ Add Server	Opens the Oracle 11i Server Configuration dialog box where you can add Oracle 11i servers and enter server information. For more information, see "Oracle 11i Server Configuration Dialog Box" on next page.
Test Mediator	Tests the connections between the Oracle 11i Diagnostics module and the Mediator.
	Note: This does not check the connections to the Oracle servers.
🚼 Edit Server	Enables you to edit the server details.
Name	The name of the Mediator used to collect and process the Oracle 11i diagnostics data. Only one Mediator is supported for each diagnostics module.
Servers Table	Server. The name of the Oracle server.
	Platform. The platform of the Oracle server.
	Log Directory. The directory where the Oracle trace files (*.trc) are written.

# **Oracle 11i Server Configuration Dialog Box**

This dialog box enables you to add Oracle 11i servers and to add server information.

To access	In the Oracle 11i Configuration dialog box, click <b>Add Server</b> .
Relevant tasks	"How to Enable and Configure ERP/CRM Diagnostics" on page 166
See also	"Oracle 11i Configuration Dialog Box" on previous page

User interface elements are described below:

UI Elements	Description
Domain	The Oracle server domain.
Log Directory	A location where the Oracle application saves the trace files. The trace files can be saved in a shared directory on the Oracle server or in a separate folder.
Password/Passphrase	The user password or passphrase.
Platform	The Oracle server platform.
Private Key File	The name of the file where the Private Key is stored. This can be found on the Mediator. If you specify the file name only (without a path), the configuration automatically looks for the file in the Mediator's <mediator root="">\bin directory.</mediator>
Server	The name of the Oracle server.
Use Secure Shell	Select if you are working with a Secure Shell connection.
User Name	The user name of the server where trace files are stored.
	<b>Note:</b> For Windows platforms, the user should have administrator privileges.

# **SAP Configuration Dialog Box**

This dialog box enables you to add SAP servers and to add server information.

To access	1. Select <b>Testing &gt; Test Plan</b> , then select the desired test.
	2. Select <b>Test Design &gt; Edit Test &gt; Diagnostics</b> tab.
	3. Select Enable the following diagnostics for X% of all relevant Vusers in the test.
	4. Select <b>Enable</b> by SAP Diagnostics, then click the <b>Configure</b> button

Relevant tasks	"How to Enable and Configure ERP/CRM Diagnostics" on page 166
See also	SAP Diagnostics Graphs in the HP LoadRunner Analysis User Guide

UI Elements	Description
Validate	Validates the connection to the SAP server.
	When you click <b>Validate</b> , the Controller produces a report of all the servers that are available for diagnostics through the Server Host.
Client Number	The client number of the selected user.
Name	The name of the Mediator used to collect and process the SAP diagnostics data. Only one Mediator is supported for each diagnostics module.
	<b>Note:</b> If you are using a Mediator that is over a firewall, enter the local machine key of the Mediator instead of the Mediator machine name.
Server Host Name	The name of the SAP server.
System Router string	Optional. Enter the system router string of the SAP server.
System number	The system number of the SAP server.
User Name	The user's unique name for logging onto the SAP server.
User Password	The user's password for logging onto the SAP server.

# **Siebel Configuration Dialog Box**

This dialog box enables you to set up the Siebel Diagnostics module to communicate with the Mediator.

To access	Select <b>Testing &gt; Test Plan</b> , then select the desired test.
	2. Select <b>Test Design &gt; Edit Test &gt; Diagnostics</b> tab.
	3. Select Enable the following diagnostics for X% of all relevant Vusers in the test.
	<ol> <li>Select Enable by Siebel Application Diagnostics, then click the Configure button .</li> </ol>
Relevant tasks	"How to Enable and Configure ERP/CRM Diagnostics" on page 166
See also	"Siebel DB Server Configuration Dialog Box" on next page
	Siebel Diagnostics Graphs in the HP LoadRunner Analysis User Guide
	Siebel DB Diagnostics Graphs in the HP LoadRunner Analysis User Guide

UI Elements	Description
♣ Add Server	Opens the Siebel Server Configuration dialog box where you can add Siebel servers and enter server information. For more information, see "Siebel Server Configuration Dialog Box" on page 177.
Test Mediator	Tests the connections between the Siebel Diagnostics module and the Mediator.
	Note: This does not check the connections to the Siebel servers.
🚼 Edit Server	Enables you to edit the server details.
Name	The name of the Mediator used to collect and process the Siebel diagnostics data. Only one Mediator is supported for each diagnostics module.
Servers Table	Server Name. The name of the Siebel server.
	Platform. The platform of the Siebel server.
	Log Directory. The Siebel server directory where Siebel log files (*.SARM) are written.

# **Siebel DB Configuration Dialog Box**

This dialog box enables you to add Siebel DB servers and to add server information.

To access	Select <b>Testing &gt; Test Plan</b> , then select the desired test.
	2. Select <b>Test Design &gt; Edit Test &gt; Diagnostics</b> tab.
	3. Select Enable the following diagnostics for X% of all relevant Vusers in the test.
	<ol> <li>Select Enable by Siebel Database Diagnostics, then click the Configure button .</li> </ol>
Relevant tasks	"How to Enable and Configure ERP/CRM Diagnostics" on page 166
See also	"Siebel DB Server Configuration Dialog Box" below
	Siebel DB Diagnostics Graphs in the HP LoadRunner Analysis User Guide

User interface elements are described below:

UI Elements	Description
♣ Add Server	Opens the Siebel DB Server Configuration dialog box where you can add Siebel DB servers and enter server information. For more information, see "Siebel DB Server Configuration Dialog Box" below.
Test Mediator	Tests the connections between the Siebel DB Diagnostics module and the Mediator.
	Note: This does not check the connections to the Siebel servers.
🚼 Edit Server	Enables you to edit the server details.
Name	The name of the Mediator used to collect and process the Siebel diagnostics data. Only one Mediator is supported for each diagnostics module.
Servers Table	Server Name. The name of the Siebel server.
	Platform. The platform of the Siebel server.
	Log Directory. The Siebel server directory where Siebel log files (*.SARM) are written.

# **Siebel DB Server Configuration Dialog Box**

This dialog box enables you to add Siebel DB servers and add server information.

To access	In the Siebel DB Configuration dialog box, click <b>Add Server</b> .
-----------	--

Relevant tasks	"How to Enable and Configure ERP/CRM Diagnostics" on page 166
See also	"Siebel DB Configuration Dialog Box" on previous page

UI Elements (A-Z)	Description
Domain	The Siebel server domain.
Log Directory	A location where the Siebel application saves the trace files. The trace files can be saved in a shared directory on the Siebel server or in a separate folder.
Password/Passphrase	The user password or passphrase.
Platform	The Siebel server platform.
Private Key File	The name of the file where the Private Key is stored. This can be found on the Mediator. If you specify the file name only (without a path), the configuration automatically looks for the file in the Mediator's <mediator root="">\bin directory.</mediator>
Server Name	The name of the Siebel server.
Use Secure Shell	Select if you are working with a Secure Shell connection.
User Name	The user name of the server where trace files are stored.
	<b>Note:</b> For Windows platforms, the user should have administrator privileges.

# **Siebel Server Configuration Dialog Box**

This dialog box enables you to add Siebel servers and enter server information.

To access	In the Siebel Configuration dialog box, click <b>Add Server</b> .
Relevant tasks	"How to Enable and Configure ERP/CRM Diagnostics" on page 166
See also	"Siebel Configuration Dialog Box" on page 175

UI Elements	Description
Domain	The Siebel server domain.
Log Directory	A location where the Siebel application saves the trace files. The trace files can be saved in a shared directory on the Siebel server or in a separate folder.

UI Elements	Description
Password/Passphrase	The user password or passphrase.
Platform	The Siebel server platform.
Private Key File	The name of the file where the Private Key is stored. This can be found on the Mediator. If you specify the file name only (without a path), the configuration automatically looks for the file in the Mediator's <mediator root="">\bin directory.</mediator>
Server ID	The Siebel server ID.
Server Name	The name of the Siebel server.
Server Type	The Siebel server type.
Use Secure Shell	Select if you are working with a Secure Shell connection.
User Name	The user name of the server where trace files are stored.  Note: For Windows platforms, the user should have administrator privileges.

# **Chapter 13: Configuring Terminal Sessions**

### This section includes:

Terminal Sessions Overview	180
How to Create a Terminal Session	180
How to Connect to a Terminal Session	182
How to Configure a Terminal Session over a Firewall	184
Terminal Sessions User Interface	184
Troubleshooting and Limitations	186

### **Terminal Sessions Overview**

Using Performance Center's terminal sessions, you can run multiple load generators simultaneously in your performance test on a terminal server. Performance Center allows you to create a new terminal session, or connect to an existing session.

Using terminal sessions enables you to overcome the limitation of being able to run only a single GUI Vuser on a Windows-based load generator. GUI Vusers, which operate graphical user interface (GUI) applications, are defined in a GUI Vuser script. You create GUI Vuser scripts using HP's QuickTest Professional (HP Unified Functional Testing). By opening a terminal server session for each GUI Vuser, you can run multiple GUI Vusers on the same application.

You select the number of terminals to be used in your performance test (provided that you have sufficient terminal sessions running), and the maximum number of Vusers that can be run per terminal. The maximum number of Vusers depends on the Vuser type used in the script. For GUI Vusers, the maximum is one Vuser for each terminal session. Performance Center then evenly distributes the number of Vusers among the client sessions.

For details on how to create or connect to a terminal session, see "How to Create a Terminal Session" below.

### **How to Create a Terminal Session**

This task describes how to create a new terminal session.

To learn about terminal sessions, see "Terminal Sessions Overview" above.

#### Note:

- You can enable terminal sessions when configuring performance tests with manual load generator distribution only.
- The Terminal Services Manager does not support terminal sessions connected over a firewall. To configure terminal sessions over a firewall, see "How to Configure a Terminal Session over a Firewall" on page 184.

This task includes the following steps:

- "Prerequisites" on next page
- "Configure the Performance Center agent on the load generator machine" on next page
- "Check the Terminal Services logon settings" on next page
- "Windows 2003 operating systems: Ensure that each user is not restricted to one session" on next page
- "Add the load generator to the system" on page 182
- "Configure the terminal session" on page 182

#### 1. Prerequisites

■ Ensure that a load generator host is installed on the terminal server machine. For details, see the *HP Application Lifecycle Management Installation and Upgrade Guide*.

Note: You cannot use terminal sessions on Linux load generators.

 Ensure that the Remote Desktop Connection client software is installed on the Controller machine.

**Note:** For computers running Microsoft Windows XP or Windows Server 2003, the Terminal Services client program (Remote Desktop Connection) is already installed. Remote Desktop Connection can also be installed on other 32-bit Windows-based operating systems.

If you are running a terminal client session on a Windows Server 2003 or Windows XP SP2 machine, make sure that the Performance Center user has **Create Global Object** privileges. Add the Performance Center Administrators group (or whatever group the Performance Center user belongs to) to the **Create Global Object** privilege under **Local Security Policies\Local Policies\Users Rights Assignment** on the terminal server machine.

## 2. Configure the Performance Center agent on the load generator machine

- a. Select Start > All Programs > HP Performance Center Host > Advanced Settings > Performance Center Agent Configuration. The Agent Configuration dialog box opens.
- b. Select Enable Terminal Services and click OK.
- c. When prompted to restart the agent, click **OK**.

#### 3. Check the Terminal Services logon settings

Ensure that the correct terminal services settings are selected for the Remote Desktop Connection client.

#### To configure the correct Terminal Server logon settings:

- a. On the load generator machine, select Start > Programs > Administrative Tools >
   Terminal Services Configuration. The Terminal Services Configuration dialog box
   opens. Right-click RDP-TCP, and select Properties to open the RDP-TCP Properties
   dialog box.
- b. Click the **Logon Settings** tab.
- c. Make sure that **Use client-provided logon settings** is selected and that **Always prompt for password** is not selected.
- 4. Windows 2003 operating systems: Ensure that each user is not restricted to one session

For load generators running on Windows 2003 operating systems:

- a. Select **Start > Programs > Administrative Tools > Terminal Services Configuration.**The Terminal Services Configuration dialog opens.
- b. Select the Server Settings node from the left pane.
- c. In the right pane, ensure that the Restrict each user to one session attribute is No.

#### 5. Add the load generator to the system

Use the New Host dialog box to add the load generator the system. For user interface details, refer to the *HP ALM Lab Management Guide*.

#### 6. Configure the terminal session

You configure the terminal session from the Terminal Services dialog box. For user interface details, see "Terminal Services Dialog Box" on page 185.

## How to Connect to a Terminal Session

This task describes how to connect to an existing terminal session.

To learn about terminal sessions, see "Terminal Sessions Overview" on page 180.

#### Note:

- You can enable terminal sessions when configuring performance tests with manual load generator distribution only.
- The Terminal Services Manager does not support terminal sessions over a firewall. To configure terminal sessions over a firewall, see "How to Configure a Terminal Session over a Firewall" on page 184.

This task includes the following steps:

- "Prerequisites" below
- "Run the Performance Center agent as a process" on next page
- "Configure the Performance Center agent on the load generator" on next page
- "Add the load generator to the system" on next page
- "Launch a terminal session from the Controller" on next page
- "Configure the terminal session" on page 184

#### 1. Prerequisites

■ Ensure that a load generator host is installed on the terminal server machine. For details, see the *HP Application Lifecycle Management Installation and Upgrade Guide*.

**Note:** You cannot use terminal sessions on Linux load generators.

 Ensure that the Remote Desktop Connection client software is installed on the Controller machine. **Note:** For computers running Microsoft Windows XP or Windows Server 2003, the Terminal Services client program (Remote Desktop Connection) is already installed. Remote Desktop Connection can also be installed on other 32-bit Windows-based operating systems.

If you are running a terminal client session on a Windows Server 2003 or Windows XP SP2 machine, make sure that the Performance Center user has **Create Global Object** privileges. Add the Performance Center Administrators group (or group the Performance Center user belongs to) to the **Create Global Object** privilege under **Local Security Policies\Users Rights** on the terminal server machine.

#### 2. Run the Performance Center agent as a process

- a. On the load generator machine, run < Performance Center Host installation > \launch\_
  service \bin\Magentconfig.exe. The Agent Runtime Settings dialog box opens.
- b. Select Manual log in to this machine.

**Note:** You must run the Performance Center agent as a process for each terminal session that you are running.

#### 3. Configure the Performance Center agent on the load generator

- a. Select Start > All Programs > Performance Center Host > Advanced Settings >
   Performance Center Agent Configuration. The Agent Configuration dialog box opens.
- b. Select Enable Terminal Services and click OK.
- c. When prompted to restart the agent, click **OK**.

#### 4. Add the load generator to the system

Use the New Host dialog box to add the load generator to the system. For user interface details, refer to the *HP ALM Lab Management Guide*.

#### 5. Launch a terminal session from the Controller

**Note:** You must open a terminal session for each terminal that you want to run Vusers on during the performance test.

- a. Select Start > All Programs > Accessories > Communication > Remote Desktop
   Connection, or select Start > Run and run the mstsc command. The Remote Desktop
   Connection dialog box opens.
- b. Click **Options**.
- c. In the **General** tab, enter the name or IP address of a terminal server, or select a terminal server from the list of available servers.
- d. Enter you user name, password, and domain name (if required) for login onto the terminal server.
- e. Click **Connect** to open a Terminal Client window.

#### 6. Configure the terminal session

You configure the terminal session from the Terminal Services dialog box. For user interface details, see "Terminal Services Dialog Box" on next page.

# How to Configure a Terminal Session over a Firewall

This task describes how to configure a terminal session on a load generator that is located over a firewall.

- 1. Open the load generator machine console.
- 2. If the Performance Center Agent is not running as a process, run <load generator host installation>\launch\_service\bin\magentproc.exe.
- 3. Configure the Performance Center Agent on the console:
  - a. Select **Enable Firewall Agent**, click **Settings**. In the **Local Machine Key** field, enter a virtual load generator name, for example, machine ofw.
  - b. Select Enable Terminal Services, and click OK.
- 4. Create one or more terminal sessions on the load generator console machine.

Consider the following:

- For each terminal session, run the agent configuration as above. For each session, specify a different Local Machine Key name, for example, machine\_ofw\_1, machine \_ofw\_2, etc.
- If you stop the agent on a terminal session, you must reconfigure the settings for that particular session before restarting the agent.
- When selecting the load generator for the scenario in the Controller, select the local machine key for each individual virtual load generator used.

## **Terminal Sessions User Interface**

This section includes:

Terminal Services Dialog Box	185
Performance Center Agent Runtime Settings Dialog Box	186

## **Terminal Services Dialog Box**

This dialog box enables you to configure terminal sessions.



To access	Use one of the following:
	In the Select Load Generators dialog box, select a load generator and click
	the <b>Terminal Services</b> button . For more information, see "Select Load Generators Dialog Box " on page 127.
	In the Automatch Load Generators Properties dialog box, select a load generator then click <b>Terminal Services</b> . For more information, see "Automatch Load Generators Properties Dialog Box" on page 130.
	During Runtime, on the Performance Test Run page, click the <b>Load</b>
	Generators 🗐 button. Then click Terminal Sessions Settings.
Important information	During runtime, you can set or change terminal services settings only when the load generator is non-operational.
Relevant tasks	"How to Create a Terminal Session" on page 180

UI Elements	Description
Connect to existing Terminal Services session	Enables a connection to an existing terminal session.
Create new Terminal Services sessions	Enables the Controller to launch terminal sessions automatically using the Remote Desktop Connection.
Enable Terminal Services	Applies the settings to the load generator running on the terminal server.

UI Elements	Description
Maximum number of Vusers to run in a Terminal Service	Enter the maximum number of Vusers that you want to run in a terminal session.
	<b>Note:</b> The maximum number of Vusers depends on the Vuser type used in the script. For GUI Vusers, the maximum is one Vuser for each terminal session.
Number of Terminal Services to open on	Enter the number of terminals in your performance test.
Load Generator	<b>Note:</b> You must open a terminal session for each terminal on which you want to run Vusers during the performance test.

## **Performance Center Agent Runtime Settings Dialog Box**

This dialog box enables you to run the Performance Center Agent as a service, or as a process.

User interface elements are described below:

UI Elements (A-Z)	Description
Allow virtual users to run on this machine without user login	Select to run the Performance Center Agent as a service. You must enter your user credentials.
109	Note: This is the default selection.
Manual log in to this machine	Select to run the Performance Center Agent as a process. This enables you to run multiple GUI Vusers on the same load generator.

## **Troubleshooting and Limitations**

This section describes troubleshooting and limitations for configuring terminal sessions.

#### Host name is an IP address or domain name

You cannot set terminal services for a machine name that was added as an IP address or a domain name, when your environment is configured with a local user.

When your environment is configured with the default Performance Center system user (IUSR\_METRO), you cannot set terminal services for a machine name that was added as an IP address or a domain name (for example, 127.0.0.1, localhost.com).

**Workaround:** Delete the host from Lab Management (Hosts module), and add the host again using the host name only.

## **Chapter 14: Multiple IP Addresses**

#### This chapter includes:

Multiple IP Addresses Overview	. 188
How to Enable IP Spoofing in ALM	188
How to Configure Multiple IP Addresses on Linux	.190
IP Wizard	190

## **Multiple IP Addresses Overview**

Application servers and network devices use IP addresses to identify clients. The application server often caches information about clients coming from the same machine. Network routers try to cache source and destination information to optimize throughput. If many users have the same IP address, both the server and the routers try to optimize. Since Vusers on the same load generator have the same IP address, server and router optimizations do not reflect real-world situations.

The Multiple IP Addresses feature enables Vusers running on a single load generator to be identified by many IP addresses. The server and router recognize the Vusers as coming from different load generators and as a result, the testing environment is more realistic.

This feature can be implemented on Windows and Linux, and applies to the following protocols:

Client/Server	DNS, Windows Sockets
Custom	Javascript Vuser, VB Vuser, VB Script Vuser
E-business	FTP, Web (HTTP/HTML), Web Services
ERP/CRM	Oracle NCA, Oracle Web Applications 11i, PeopleSoft Enterprise, SAP-Web, Siebel-Web
Legacy	RTE
Mailing Services	Internet Messaging (IMAP), POP3, SMTP
Streaming Data	Real

## How to Enable IP Spoofing in ALM

The following steps describe how to add IP addresses to a load generator to enable IP Spoofing.

This task includes the following steps:

- "Create multiple IP addresses on the load generator." below
- "Update the server's routing table with the new addresses." on next page
- "Enable the Multiple IP Addresses feature from ALM" on next page
- 1. Create multiple IP addresses on the load generator.
  - Windows: Run the IP Wizard to create multiple IP addresses. For details on running the IP Wizard, see "IP Wizard" on page 190.

The new IP addresses are added to the load generator once and are used for all performance tests. After running the wizard, restart the load generator machine.

Linux: Manually configure the new IP addresses for Linux load generators. For details, see

"How to Configure Multiple IP Addresses on Linux" on next page.

#### 2. Update the server's routing table with the new addresses.

Once the client machine has new IP addresses, the server needs the addresses in its routing table, so that it can recognize the route back to the client. If the server and client share the same netmask, IP class, and network, the server's routing table does not require modification.

**Note:** If there is a router between the client and server machines, the server needs to recognize the path via the router. Make sure to add the following to the server routing table:

- A route from the Web server to the router,
- Routes from the router to all of the IP addresses on the load generator.

Update the Web server routing table as follows:

 Edit the batch file that appears in the IP Wizard Summary page. An example .bat file is shown below.

```
REM This is a bat file to add IP addresses to the routing table of a server

REM Replace [CLIENT_IP] with the IP of this machine that the server already recognizes

REM This script should be executed on the server machine

route ADD 192.168.1.50 MASK 255.255.255 [CLIENT_IP] METRIC 1 route ADD 192.168.1.51 MASK 255.255.255.255 [CLIENT_IP] METRIC 1 route ADD 192.168.1.52 MASK 255.255.255.255 [CLIENT_IP] METRIC 1 route ADD 192.168.1.53 MASK 255.255.255.255 [CLIENT_IP] METRIC 1 route ADD 192.168.1.54 MASK 255.255.255 [CLIENT_IP] METRIC 1
```

- b. For each occurrence of **[CLIENT\_IP]**, insert your IP address instead.
- c. Run the batch file on the server machine.

#### 3. Enable the Multiple IP Addresses feature from ALM

After you define multiple IP addresses, you set an option to tell the Controller to use this feature.

a. On the ALM sidebar, under **Testing**, select **Test Plan**. In the tree, right-click a performance test. Select **Edit Test**. In the Performance Test Designer window, click the Workload tab and click the **Options** button at the bottom of the window. Select **Enable IP Spoofer**.

**Note:** You must select this option before running a performance test.

 Specify how the Controller should allocate the IP addresses: per process or per thread. For details, see the Controller's general run option settings described in HP ALM Lab Management Guide.

## How to Configure Multiple IP Addresses on Linux

The following section describe how to manually configure multiple IP addresses on the Linux load generator.

- To define multiple IP addresses for a single Ethernet card, you need IP Aliasing compiled into the kernel. To do this, use the **ifconfig** command: /sbin/ifconfig eth0:0 x.x.x.x netmask 255.255.x.x up
- 2. Substitute the new IP address for x.x.x.x, and insert the correct information for subnet mask. Place this command in the **rc.local** file so that it executes upon boot.

## **IP Wizard**

This wizard enables you to create and save new IP addresses on Windows machines.

To access	Use one of the following:
	Start > Program Files > Performance Center Host > Tools > IP Wizard
	From the Performance Center Host's \bin directory, run ipwizard.exe.
Important	The IP wizard resides on each load generator.
information	The new addresses can be a range of addresses defined by the Internet Assignment Numbers Authority. They are for internal use only, and cannot connect to the Internet. This range of addresses is the default used by the IP Wizard.
	The IP Wizard only works on machines with a fixed IP, not on machines with a DHCP.
	Before any of the changes made can take effect, you must restart the machine after you run the wizard, and the Web server's routing table may need to be updated.
Relevant tasks	"How to Enable IP Spoofing in ALM" on page 188

#### IP Wizard Welcome - Step 1 of 3

UI Elements	Description
Create new settings	Enables you to define new IP settings on the load generator.
Load previous settings from file	Enables you to use an existing file with IP address settings.
Restore Original Settings	Restores original settings.

## IP Wizard - Step 2 of 3 - Optional

User interface elements are described below (unlabeled elements are shown in angle brackets):

UI Elements	Description
<web address<="" server="" th=""><th>If you have more than one network card, enables you to choose the card to use for IP addresses.</th></web>	If you have more than one network card, enables you to choose the card to use for IP addresses.
box>	This step enables the IP Wizard to check the server's routing table to see if it requires updating after new IP addresses are added to the load generator.
	For details, see "How to Enable IP Spoofing in ALM" on page 188.

## IP Wizard - Step 3 of 3 - Optional

UI Elements	Description
	Opens the Add dialog box, enabling you to add a new IP address.
Add	Private Address Spaces. The class that represents the correct submask for the machine's IP addresses.
	From IP. Adds IP addresses starting with this number.
	Submask. IP addresses include two components, a netid and hostid. The submask determines where the netid portion of the address stops and where the hostid begins.
	Number to add. The number of IP addresses to add.
	Verify that new IP addresses are not already in use. Instructs the IP Wizard to check the new addresses. The IP Wizard adds only the addresses that are not already in use.
	Removes a selected IP Address.
Remove	
IP Address	The IP addresses on the load generator machine.
Subnet Mask	The submasks of the IP addresses on the load generator machine.
Number of IPs added	The number of IP addresses added to the load generator machine.

## **IP Wizard - Summary**

User interface elements are described below (unlabeled elements are shown in angle brackets):

UI Elements	Description
<summary area=""></summary>	Displays a summary of the operations performed by the IP Wizard.
	Take note of the location of the batch file (.bat). This is used to update the routing table if necessary. See "How to Enable IP Spoofing in ALM" on page 188.
Reboot now to update routing tables	If you updated the routing table, rebooting initializes the Windows device drivers with the new addresses.

## **Part 4: Performance Testing Execution**

#### **User and Administrator Guide**

Part 4: Performance Testing Execution

# **Chapter 15: Performance Test Execution Introduction**

#### This chapter includes:

Running Performance Tests Overview	196
How to Manage a Performance Test Run	197
How to Manage Vusers During a Test Run	199
How to Manage Virtualized Services During a Test Run	200
How to Manage Monitoring and Load Generator Information During a Test Run	201
Performance Test Execution User Interface	202

## **Running Performance Tests Overview**

After planning, designing and scheduling your performance test, you run it to create load on your application and to test its performance.

This section includes:

- "Performance Test Execution Flow" below
- "Monitoring Performance Test Execution" below
- "Analyzing Performance Test Results" below

#### **Performance Test Execution Flow**

The following table explains the various stages of the test run flow.

Run stage	Description
Start of run	At the start of the run, the Controller checks the test configuration information, invokes the applications that were selected to run with the test, and then distributes each Vuser script to its designated load generator. When the Vusers are ready, they start running their scripts.
During run	During the run, you can see a synopsis of the test and can also drill down to see which Vuser actions are causing the application problems.
	<b>Service Virtualization:</b> During the run, specified virtualized services run instead of the actual services. You can update services during the test run.
	The online graphs display performance data collected by the monitors. You use this information to isolate potential problem areas in your system.
End of run	The test run ends when all the Vusers have completed their scripts, when the duration runs out, or when you terminate it.

#### **Monitoring Performance Test Execution**

Online monitors enable you to monitor performance test execution. During a test run, you can view graphs that display information about the load that Vusers generate on your Web server and other applications. ALM Performance Center displays this data in real-time during test execution.

At the conclusion of the performance test, you can use HP LoadRunner Analysis to view a summary and graphs of the data collected from these monitors during the test run. For detailed information on the available graphs, see the HP LoadRunner Analysis User Guide.

For a list of supported monitor types, see "Monitor Types" on page 259.

#### Analyzing Performance Test Results

HP LoadRunner Analysis lets you analyze performance test data off-line, from any computer on which Analysis is installed. You use Analysis to generate various graph views, merge graphs, drill down within graphs, change zoom level and granularity, and so forth.

Analysis integrates with ALM Performance Center to let you analyze data collected during a performance test run. You can download raw results and sessions for analysis on a local machine. After analyzing the data, you can upload the analysis data (HTML and Rich reports) to Performance Center to share the results with other users.

For Analysis to access an ALM project, your version of Analysis must be properly configured, and be connected to ALM Performance Center.

For information about how to work with ALM Performance Center from within Analysis, see the *HP LoadRunner Analysis User Guide*.

For details about running performance tests, see "How to Manage a Performance Test Run" below.

## How to Manage a Performance Test Run

This task describes the workflow for running a performance test, and the available options for managing the test run.

#### Note:

- **Version Control:** If your project is version-enabled: If you have checked out your test or related scripts, the checked-out versions are used. If another user has checked out the test or scripts and you want to run the test or script, the last checked-in version is used.
- Product Feature Movie. To view a movie that demonstrates the performance testing lifecycle, select Help > Movies in the ALM main window.

To learn more about running performance tests, see "Running Performance Tests Overview" on previous page.

This task includes the following steps:

- "Prerequisite" below
- "Begin test execution" below
- "Manage Vusers during the test run Optional" on next page
- "Manage virtualized services during the test run Optional" on next page
- "Manage runtime monitors, monitor over firewall machines, and load generators during the test run " on next page
- "Manually stop the test run and collate run results Optional" on next page
- "View test results and manage result files" on next page
- "Analyze test run results" on page 199
- "View performance improvements and regressions" on page 199

#### 1. Prerequisite

Make sure that the performance test you want to run is valid. For more information, see "How to Design a Performance Test" on page 72.

#### 2. Begin test execution

- a. In the Test Lab module, create a test set that includes an instance of the performance test you want to run. For information on working with test sets, see the *HP Application Lifecycle Management User Guide*.
- b. In the Execution Grid tab, right-click the test you want to run, and select **Run Test**. The Run Performance Test dialog box opens, enabling you to select a timeslot for the test run. For user interface details, see "Run Performance Test Dialog Box" on page 217.
- c. Select an available timeslot and click **Run**. The Initializing Run page opens. The Initializing Run page displays the performance test initialization steps performed by ALM Performance Center, and the status for each step. If each step is completed successfully, the performance test starts running and the Performance Test Run page opens.
  - For Initializing Run page user interface details, see "Initializing Run Page" on page 205.
  - For Performance Test Run page user interface details, see "Performance Test Run Page" on page 207.

#### 3. Manage Vusers during the test run - Optional

You can override the defined schedules and manually control the behavior of Vusers during a performance test run.

For task details, see "How to Manage Vusers During a Test Run" on next page.

#### 4. Manage virtualized services during the test run - Optional

You can stop, start, update, and load virtualized services during your performance test run.

For task details, see "How to Manage Virtualized Services During a Test Run" on page 200.

## 5. Manage runtime monitors, monitor over firewall machines, and load generators during the test run

You can perform actions related to the status and management of runtime monitors, monitor over firewall machines, and load generators during a performance test run.

For task details, see "How to Manage Monitoring and Load Generator Information During a Test Run" on page 201.

#### 6. Manually stop the test run and collate run results - Optional

You can manually stop a test run, for example, if you want to delay data collection and analysis until a more convenient time.

- To stop the test run gradually. On the Performance Test Run page, click the Stop Run button . The Stop Run dialog box opens, which prompts you to select a post-run collation option. Select an option, then click Stop. All Vusers in the test move to the Gradual Exiting state. For user interface details, see "Stop Run Dialog Box" on page 220.

#### 7. View test results and manage result files

■ View test results. For task details, see the HP Application Lifecycle Management User

Guide.

 Managing test run result and session files. You view and manage result files generated by the test run in the Test Lab module's Results tab. For user interface details, see "Results/Last Run Results Tab" on page 202.

#### 8. Analyze test run results

You use HP LoadRunner Analysis to analyze test run data off-line, from any computer on which Analysis is installed. For information on how to access your ALM Project from Analysis, see the HP LoadRunner Analysis User Guide.

If there are SLAs defined for the performance test, you can calculate SLA results, and view these results in the Analysis Summary report and SLA report which can be accessed from the test run's Result tab. For details, see "Results/Last Run Results Tab" on page 202.

#### 9. View performance improvements and regressions

You can use the Trend Reports feature to view improvements or regressions in performance across several test runs. For more information, see "Trending" on page 365.

## How to Manage Vusers During a Test Run

The following steps describe runtime options for managing the behavior of Vusers during a performance test run.

**Note:** This task is part of a higher level task. For more information, see "How to Manage a Performance Test Run" on page 197.

This task includes the following steps:

- "View details of individual Vusers" below
- "Run Vusers" below
- "Add/Edit Vuser groups" on next page
- "View Vuser scripts" on next page
- "Manually release Vusers from a Rendezvous" on next page

#### View details of individual Vusers

You can view status details of individual Vusers, and run/stop a single Vuser currently in the **down/run** state, irrespective of its defined schedules.

On the Performance Test Run page, click the **Vusers Details** button . The Vusers dialog box opens, enabling you to run or stop individual Vusers. For user interface details, see "Vusers Dialog Box" on page 229.

#### Run Vusers

You can initialize, run, or stop any number of Vusers irrespective of their defined schedules. In addition, you can add new Vusers to the performance test.

On the Performance Test Run page, click the **Run Vusers** button . The Run Vusers dialog box opens, enabling you to run additional Vusers. For user interface details, see "Run Vusers Dialog Box" on page 230.

#### Add/Edit Vuser groups

You can add Vuser groups, or you can modify existing groups during the test run.

#### To open the Add/Edit Vuser Group dialog box:

- To add a group. On the Performance Test Run page, click the **Design Groups and**Scheduler button . Then select **Add Groups**. The Add/Edit Vuser Group dialog box opens, enabling you to add a Vuser group.
- **To edit a group.** On the Performance Test Run page, on the Groups pane, place the mouse cursor over the name of the group you want to edit. Click the down arrow that appears adjacent to the name, and select **Edit Group**. The Edit Group dialog box opens, enabling you to edit the group's details.

For user interface details, see "Add Group Dialog Box" on page 232.

#### View Vuser scripts

On the Performance Test Run page, on the Groups pane, place the mouse cursor over a group name. Click the down arrow that appears adjacent to the name, and select **View Script**. The View Script dialog box opens up, enabling you to view the code for each action in the script.

#### Manually release Vusers from a Rendezvous

You can manually release Vusers from a rendezvous before the Controller releases them.

On the Performance Test Run page, click the **View Rendezvous** button : The Rendezvous Policy dialog box opens. For user interface details, see "Rendezvous Dialog Box" on page 100.

# **How to Manage Virtualized Services During a Test Run**

The following steps describe runtime options for managing the behavior of virtualized services during a performance test run.

**Note:** This task is part of a higher level task. For more information, see "How to Manage a Performance Test Run" on page 197.

This task includes the following step(s):

"Manage virtualized services" below

#### Manage virtualized services

You can stop, start, update, and load virtualized services during your performance test run.

The following describes how to update services during your performance test run.

- 1. In the Performance Test Run Page's Summary, click in the toolbar to open the Service Simulation dialog box.
- 2. In the **Service Simulation** dialog box, click the **Simulate** checkbox of the service you want to stop, start, or update (for example, change its data model).
- 3. Click **Add Project** to load the additional project containing the virutalized services to run with your performance test.

Tip: You can also click Remove Project to remove the project.

# How to Manage Monitoring and Load Generator Information During a Test Run

The following steps describe runtime options for managing monitor profile, monitor-over-firewall, and load generator information during a performance test run.

**Note:** This task is part of a higher level task. For more information, see "How to Manage a Performance Test Run" on page 197.

This task includes the following steps:

- "Manage Runtime Monitors" below
- "Edit Monitor Over Firewall Information" below
- "Manage load generators" below

#### **Manage Runtime Monitors**

You can add, edit, or remove currently running monitors during a performance test run.

On the Performance Test Run page, click the **Monitors** button , and select **Run Time Monitors**. The Monitor Profile Content dialog box opens. For user interface details, see "Monitor Profile Content Dialog Box" on page 224.

#### **Edit Monitor Over Firewall Information**

You can change the status of a monitor over firewall machine during a performance test run.

On the Performance Test Run page, click the **Monitors** button , and select **Monitors Over Firewall**. The Monitors Over Firewall dialog box opens. For user interface details, see "Monitor Over Firewall Dialog Box" on page 228.

#### Manage load generators

You can perform the following actions with load generators during a performance test run: View status and machine utilization, connect and disconnect load generators, add load generators to the test, and configure terminal sessions.

On the Performance Test Run page, click the **Load Generators** button . The Load Generators dialog box opens. For user interface details, see "Load Generators Dialog Box" on page 225.

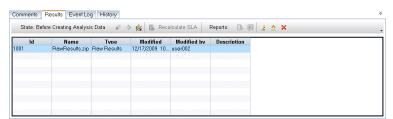
## **Performance Test Execution User Interface**

This section includes:

Results/Last Run Results Tab	202
Initializing Run Page	205
Performance Test Run Page	207
Run Performance Test Dialog Box	217
Timeslot Duration Dialog Box	219
Stop Run Dialog Box	220
Output Details Dialog Box	221
Edit Scheduler Dialog Box	223
Monitor Profile Content Dialog Box	224
Load Generators Dialog Box	225
Add Load Generators Dialog Box	227
Monitor Over Firewall Dialog Box	228
Vusers Dialog Box	229
Run Vusers Dialog Box	230
Add Group Dialog Box	232
View Script Dialog Box	234
SLA Report	235
Calculate Service Level Agreement Dialog Box	236

## Results/Last Run Results Tab

This tab enables you to manage results related actions for individual test runs.



To access	Results tab. On the ALM sidebar, under Testing, select Test Runs. The Results tab is available in the Information Panel in the Test Runs tab.
	• Last Run Results tab. On the ALM sidebar, under Testing, select Test Lab. In the left pane select a test set, then select the Execution Grid tab in the right pane. The Last Run Results tab is displayed in the area below.
Important information	Results tab. Displays information for the selected test run in the Test Instance Runs tab.
	Last Run Results tab. Displays information for the last test run of the selected test in the Execution Grid tab.
Relevant tasks	"How to Manage a Performance Test Run" on page 197

User interface elements are described below (unlabeled elements are shown in angle brackets):

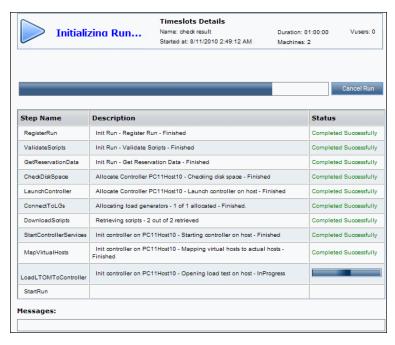
UI Elements	Description
<b>⇒</b>	Collate Results. Collates results of test runs that have not yet been collated.
	Note:
	<ul> <li>If a test is running on the Controller that will perform the collating, ALM Performance Center issues an alert. Click <b>OK</b> to proceed with collating the results, or <b>Cancel</b> to defer the action until later.</li> </ul>
	<ul> <li>Should the Collate Results process encounter an error, the Collate Errors dialog box appears, displaying details of the error. To analyze the partially collated results, select Analyze partially collated results. Note that analyzing partially collated results is an irreversible operation.</li> </ul>
8	<b>Recover Results.</b> Enables you to recover and collate the results of a failed test run.
	Note:
	Only enabled when the test run is in the <b>Failed</b> state.
	Enables you to collate results only up to the point where the test failed.
<u></u>	Analyze Results. Analyzes results for the selected test run. ALM Performance Center generates analysis data and deletes the temporary results from the load generators and the Controller.
	Note: Only enabled when the test run state is <b>Before Creating Analysis</b> Data.

UI Elements	Description	
	Recalculate SLA. Opens the Calculate SLA dialog box. For details, see "Calculate Service Level Agreement Dialog Box" on page 236.	
	<b>Note:</b> This feature is available only if SLAs were defined during the performance test design phase. For more information about SLAs, see "Service Level Agreements" on page 147.	
Lò .	Show HTML Report. Opens an HTML version of the Analysis Summary report, which analyzes the data collected during the performance test run. The report provides general information about the performance test, lists statistics about the test run, and provides links to graphs containing test run data.	
	For more details regarding the summary report, see the HP LoadRunner Analysis User Guide.	
	<b>SLA Report.</b> Opens the SLA Report for the selected test run. For details, see "SLA Report" on page 235.	
	<b>Note:</b> This feature is available only if SLAs were defined during the performance test design phase. Fore more information about SLAs, see "Service Level Agreements" on page 147.	
<b>业</b>	Download File. Enables you to download the selected file in the grid.	
<u>•</u>	Upload File. Enables you to upload a file to the Results tab.	
×	Delete File. Deletes the selected result file.	
	Stop Operation. Stops the current action.	
	Note: Appears to the right of the progress bar.	
<grid></grid>	Contains a table that displays all available result files. These results include the Analysis session files, raw results, a topology snapshot (if a topology is defined for the test), among others.	
<pre><pre><pre><pre>bar&gt;</pre></pre></pre></pre>	Displays the progress of the current action.	
Description	A description of the result file.	
ID	The result file ID.	
Modified	The date the result file was last modified.	
Modified by	The user who last modified the result file.	

UI Elements	Description
Name	The name of the result file.
State	Displays the current state of the selected test runs.
Туре	Results.zip. Contains the Analysis session files that are automatically generated by ALM Performance Center. The file can be deleted or replaced by uploading a different one.

## **Initializing Run Page**

The Initializing Run page displays the performance test initialization steps performed by ALM Performance Center and the status for each step.



To access	In the Run Performance Center dialog box, click <b>Run</b> . For details, see "Run Performance Test Dialog Box" on page 217.	
Relevant tasks	"How to Manage a Performance Test Run" on page 197	

UI Elements	Description
Description	A detailed description of the current status of the step.

UI Elements	Description	
Messages	Displays error messages generated when a step fails. These error messages can also be viewed from the Event Log. For details about the event log, refer to the HP ALM Lab Management Guide.	
Status	Displays whether the step passed or failed.	
Step Name	Displays the step name. For explanations about the action ALM Performance Center performs for each step, see Initialization Steps below.	
Timeslot Details	Displays details of the selected timeslot.	

## **Initialization Steps**

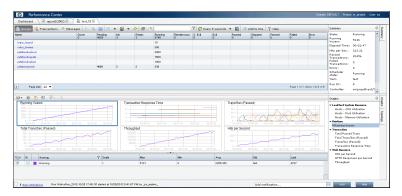
The Initialization steps are described below:

Step	Description
RegisterRun	ALM Performance Center initializes the run process.
ValidateScripts	ALM Performance Center checks that the selected scripts' Run Logic runtime settings are in sync with the scripts' state.
GetReservationData	ALM Performance Center checks the required resource information from the selected timeslot.
CheckDiskSpace	ALM Performance Center checks that there is enough disk space on the Controller.
LaunchController	ALM Performance Center initializes the Controller so that other testing entities, such as load generators and scripts can connect to it.
	If there is a problem launching the Controller, ALM Performance Center automatically attempts to find an alternative Controller. This attempt appears as an additional initialization step.
	If no alternative Controller is available, the step fails.
ConnectToLGs	ALM Performance Center checks that the required load generators are valid and connects them to the Controller. If this step fails, ALM Performance Center attempts to find alternative load generators automatically. If this step still fails, check the test definitions and select different load generators for the test.
DownloadScripts	ALM Performance Center downloads the required Vuser scripts.
StartControllerServices	ALM Performance Center initializes the Controller's configuration settings in preparation to run the performance test.
MapVirtualHosts	ALM Performance Center maps virtual hosts to actual hosts.

Step	Description
LoadLTOMToController	ALM Performance Center creates the performance test and adds the Vuser scripts to the Controller.
StartRun	ALM Performance Center starts the performance test run.

## **Performance Test Run Page**

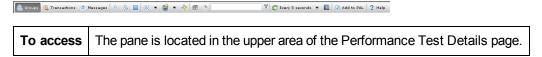
The Performance Test Run page displays a detailed overview of the running performance test, and enables you to perform all runtime test run actions.



To access	The Performance Test Run page opens as a tab in My Performance Center automatically when a performance test starts, or when you join a running test from My Performance Center.
Relevant tasks	"How to Manage a Performance Test Run" on page 197

#### **Performance Test Details Pane - Toolbar Buttons**

The Performance Test Details pane displays details on the running test.



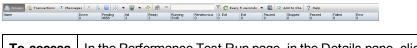
UI Elements	Description
& Groups	Displays the Performance Test Run page Details pane Groups view. For more information, see "Performance Test Details Pane - Groups View" on page 209
(L) Transactions	Displays the Performance Test Run page Details pane Transactions view. For more information, see "Performance Test Details Pane - Transactions View" on page 210.

UI Elements	Description
① Messages	Displays the Performance Test Run page Details pane Messages view. For more information, see "Performance Test Details Pane - Messages View" on page 211.
2	Vusers Details. Displays specific details for each Vuser in the performance test, and enables you to run or stop individual Vusers irrespective of their defined schedules. For user interface details, see "Vusers Dialog Box" on page 229.
26	Run Vusers. Enables you to run additional Vusers during the course of a performance test. That is, you can run Vusers that are not included in the test's original defined schedule. For user interface details, see "Run Vusers Dialog Box" on page 230.
	Stop Run/Stop Run Now. Enables you to stop a running performance test.
	Stop Run. Stops the test gradually by moving all running Vusers to the Gradual Exiting state. For user interface details, see "Stop Run Dialog Box" on page 220.
	Stop Run Now. Enabled only after you click the Stop Run button. Enables you to stop the Vusers immediately.
iāi	<b>Design Groups and Scheduler.</b> Click the arrow adjacent to the button for the following options:
	Add Group. Enables you to add a Vuser group to a running performance test, or to edit Vuser group settings during a test run. For user interface details, see "Add Group Dialog Box" on page 232.
	Edit Scheduler. Enables you to edit the scheduler during a test run. For user interface details, see "Edit Scheduler Dialog Box" on page 223.
	<b>Monitors.</b> Click the arrow adjacent to the button for the following options:
	Runtime Monitors. Displays a list of monitors which are currently running during a performance test, and enables you to add, edit, and remove monitors during the run. For user interface details, see "Monitor Profile Content Dialog Box" on page 224.
	Monitor Over Firewall Agent. Enables you to change the status of a monitor over firewall machine. For user interface details, see "Monitor Over Firewall Dialog Box" on page 228.

UI Elements	Description
<b>⇔</b> **	View Rendezvous. Enables you to enable/disable rendezvous points defined in the Vuser scripts and to set rendezvous policies that determine how the Controller handles Vusers at a rendezvous point. For user interface details, see "Rendezvous Dialog Box" on page 100.
	<b>Load Generators.</b> Enables you to manage the load generator in the performance test. For user interface details, see "Load Generators Dialog Box" on page 225.
	<b>Timeslot Duration.</b> Enables you to extend or shorten the duration of the performance test. For user interface details, see "Timeslot Duration Dialog Box" on page 219.
S	<b>Refresh.</b> Enables you to change the rate at which Performance Center refreshes the displayed graph data.
Y	Filter Items. Enables you to filter the information being displayed.
€ Every 5 seconds ▼	<b>Refresh Frequency.</b> Enables you set the refresh frequency of the page.
TSV .	Services Virtualization. Opens the Configure Services Virtualization Dialog Box. For user interface details, see see "Configure Services Virtualization Dialog Box" on page 110.
Add to PAL	Add to PAL. Opens the Select PAL Report dialog box, enabling you to add the test run data to a selected PAL report. The test run data is displayed in the Data Sources Tab. For more details, see "Data Sources Tab" on page 424.

## **Performance Test Details Pane - Groups View**

The Groups view of the Details pane displays the statuses of the Vusers in the performance test.



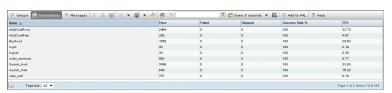
To access	In the Performance Test Run page, in the Details pane, click <b>Groups</b> .
	Note: Displayed by default.

UI Elements	Description
Down	The number of Vusers that are down.
Error	The number of Vusers for which a problem occurred.

UI Elements	Description
Exiting (displayed as Exit)	The number of Vusers that have finished running, or have been stopped, and are exiting now.
Failed	The number of Vusers that have finished running. The script failed.
Gradual Exiting (displayed as G. Exit)	The number of Vusers that are finishing their current iteration before exiting.
Init	The number of Vusers that are being initialized on the host machine.
Name	The Vuser group name.
Passed	The number of Vusers that have finished running. The script passed.
Paused	The number of Vusers that have been paused.
Pending	The number of Vusers that are ready to be initialized and are waiting for an available load generator, or are transferring files to the load generator. The Vusers run when the conditions set in their scheduling attributes are met.
Ready	The number of Vusers that have already performed the <b>init</b> section of the script and are ready to run.
Rendezvous (displayed as Rendez)	The number of Vusers that have arrived at the rendezvous and are waiting to be released.
Running	The number of Vusers that are running. The Vuser script is being executed on a host machine.
Stopped	The number of Vusers that have been stopped manually.

#### **Performance Test Details Pane - Transactions View**

The Transactions view of the Details pane displays how many transactions have been executed successfully or unsuccessfully.



To access In the Performance Test Run page, in the Details pane, click **Transactions**.

User interface elements are described below:

UI Elements	Description
Failed	The number of times the transaction failed.
Name	The transaction name.
Pass	The number of times the transaction passed.
Stopped	The number of times the transaction stopped.
Success Rate %	The transactions success rate percentage.
TPS	The number of times per second the transaction has run.

## **Performance Test Details Pane - Messages View**

The Messages view of the Details pane displays error, warning, debug, and output messages that are sent to the Controller by the Vusers and load generators during a test run.



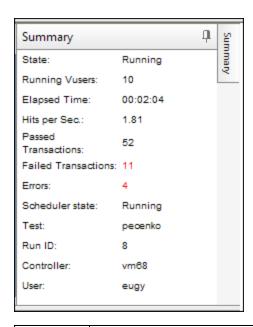
To access	In the Performance Test Run page, in the Details pane, click <b>Messages</b> .
Important information	To view details of specific messages, click the number for the message type to open the Output Details dialog box. For user interface details, see "Output Details Dialog Box" on page 221.

User interface elements are described below:

UI Elements	Description
Script Name	The name of the script that generated the message.
Total Debug	Sent only if the debugging feature is enabled in the Controller. To enable the feature, select <b>Tools &gt; Performance Center Controller Options &gt; Debug Information</b> .
Total Errors	The total number of error messages received. Error messages usually indicate that the script failed.
Total Messages	The total number of messages received.
Total Output	The total number of output messages received from the Vuser script.
Total Warnings	The total number of warning messages received. Warning messages indicate that the Vuser encountered a problem, but the test continued to run.

#### **Summary Pane**

The Summary pane displays a synopsis of the running performance test.



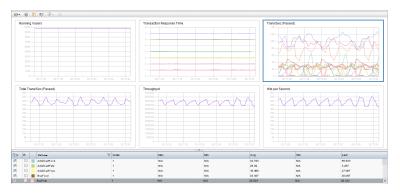
To access	Displayed in the upper left corner of the Performance Test Run page.
-----------	--

UI Elements	Description
Controller	The Controller being used in the test.
Elapsed Time	The amount of time since the test began running.
Errors	The number of Vuser errors that occurred during the test run.
Failed Transactions	The number of completed, unsuccessful transactions performed during the test run.
Hits per Sec	How many hits (HTTP requests) there have been to the Web server by Vusers during each second of the test run.
Passed Transactions	The number of completed, successful transactions performed during the test run.
Run ID	The run ID.
Running Vusers	The number of Vusers currently running in the test.
Scheduler State	The current state of the scheduler.
State	The current run state.
Test	The name of the test.
User	The name of the user who is running the test.

UI Elements	Description
Services Virtualization	Whether services virtualization is on or off.

### **Online Graphs Pane**

The online monitor graphs are used to display performance measurements for those resources being monitored in a performance test.



**To access** Displayed in the lower section of the Performance Test Run page.

User interface elements are described below (unlabeled elements are shown in angle brackets):

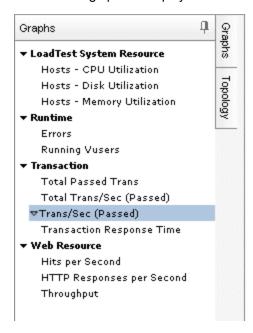
UI Elements	Description
200	# Graphs. Enables you to select the number of graphs being displayed.

## UI **Description Elements Graph Configuration.** Opens the Graph Configuration dialog box which enables you 11/2 to configure the graphs display. The following options are available: • **Granularity.** The interval of the test displayed in the graph. • **Time Display.** The time displayed on the x-axis. Relative to Load Test start. Displays the amount of time that has elapsed since the beginning of the test (in hours, minutes, and seconds). ■ Controller clock. Displays the time on the Controller clock. ■ None. No clock or time is displayed. • Scale. Select the desired scale: • Automatic. Each measurement in the graph is displayed in the scale that best suits it. • None. Each measurement's true values are displayed in the graph. • Line Style. Select the desired line style: • With markers. Lines in the graph are marked with dots. Without markers. Lines in the graph are smooth. • Apply to all visible graphs. Applies the changes to all displayed graphs. **Duplicate Graph.** Enables you to duplicate a graph. 6 A **Rename Graph.** Enables you to rename a graph. Diagnostics Transaction Breakdown. Opens HP Diagnostics, displaying the **(II)** Transactions view, which displays performance metrics and drilldown options for the relevant transaction. For more information about interpreting data in the Diagnostics Transactions view, see the section that describes the transaction views in the HP Diagnostics User Guide. Note: Only enabled if your system is configured to work with HP Diagnostics. • To ensure that you can view Diagnostics data during a performance test run, in the Java Settings' Java Control Panel, click the Network Settings button and select Direct Connection.

UI Elements	Description
<graph legend&gt;</graph 	Displays details about graph. The following information is displayed.
	V. Selects the measurement to be displayed on the graph.
	B. Displays the measurement in bold.
	<ul> <li><color>. Enables you to select in which color the measurement appears in the graph.</color></li> </ul>
	Name. The measurement name.
	Scale. The graph scale.
	Max. The measurement's maximum value.
	Min. The measurement's minimum value.
	Avg. The measurement's average value.
	Std. The measurement's standard deviation.
	Last. The measurement's last value.
Graphs	Displays a tree which lists all the configured online monitors graphs.

#### **Graph Selection Tab**

This tab displays a tree which lists all the configured online monitors graphs, and enables you to select which graphs to display in the Online Graphs pane.



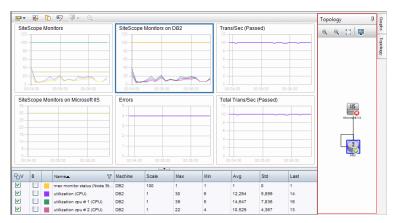
**To access** Click the **Graphs** tab, on the right of the Online Graphs pane.

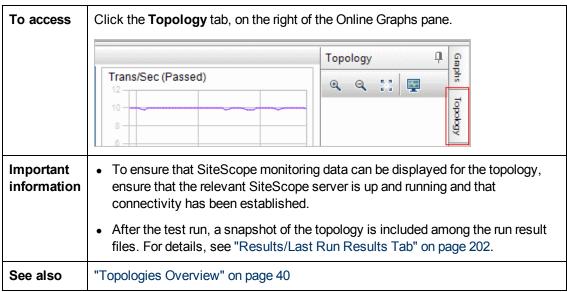
User interface elements are described below (unlabeled elements are shown in angle brackets):

UI Elements	Description
<online graphs="" tree=""></online>	Displays a list of the configured online monitors. Select a monitor to display its graph in the Online Graphs pane.

#### **Topology Tab**

This tab displays the topology selected for the performance test, enabling you to track the SiteScope monitor status on each component of your AUT.





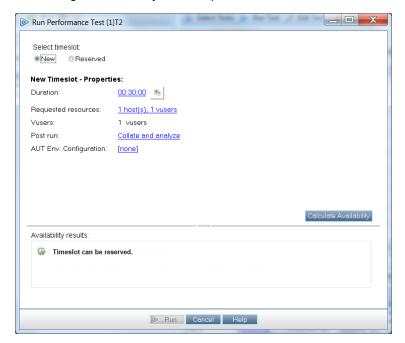
User interface elements are described below (unlabeled elements are shown in angle brackets):

UI Elements	Description
<b>Q Q</b>	Zoom in/out. Enables you to zoom in and out of the topology tab.

UI Elements	Description
6, 8,	Fit to screen. Enables you to fit the whole topology to the current screen size.
	<b>Edit monitor.</b> Opens HP SiteScope, enabling you to edit the monitors defined on the component selected in the Topology tab.
	<b>Note:</b> During a test run, you can only edit monitors that were defined on the components when designing the topology. You cannot add new monitors during the test run.
<topology< th=""><th>Displays the topology selected for the test.</th></topology<>	Displays the topology selected for the test.
display area>	If monitors are defined on a component in the topology, the following icons may appear:
	Indicates that all of the monitors on the component are working successfully.
	Indicates that there is an error with at least one of the monitors on the component.
	Indicates that at least one of the monitors on the component is not working or not receiving data.
	Indicates a warning on at least one of the monitors on the component.

# **Run Performance Test Dialog Box**

This dialog box enables you to run performance tests.



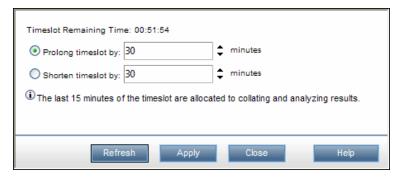
To access	To run a performance test, select a test set and click the <b>Execution Grid</b> tab. Select a test and click the <b>Run Test</b> button.
Relevant tasks	"How to Manage a Performance Test Run" on page 197

UI Element	Description
Select timeslot	Select New or Reserved.
	<b>New.</b> Allows you to create a new timeslot. If the current resources are insufficient for the selected test, you will be unable to reserve a timeslot to run the test.
	<b>Reserved.</b> Allows you to run a test in a reserved manual timeslot that has been assigned to your test or has not been assigned to any test. If there are no timeslots available, you will be unable to schedule your test.
<reserved< th=""><th>Displayed when you use a Reserved timeslot.</th></reserved<>	Displayed when you use a Reserved timeslot.
Timeslots Grid>	This grid includes the details of manual non-autostart timeslots which are currently reserved by you or another user, but are not yet assigned to another test.
	The Status field in the grid can have the following values:
	Recommended. This timeslot is recommended because it was originally created by you and it is linked to the selected test entity.
	OK. You can run your test in this timeslot.
	Update needed. This timeslot is available, but it does not have sufficient resources for your run. If you choose to run your test in that timeslot, PC automatically allocates the necessary resources.
	<b>Note:</b> Even if you reserved a timeslot in the Timeslots module, it may not appear in the grid. Some possible reasons include:
	The timeslot is not open yet.
	<ul> <li>The timeslot is running (it was configured to start automatically instead of manually).</li> </ul>
	<ul> <li>The timeslot does not have the required resources, and due to concurrent timeslots, it cannot be updated with more resources.</li> </ul>
	The timeslot was not configured with a duration long enough to run the selected test entity, and it cannot be prolonged.
	The timeslot was linked to another test by mistake.

UI Element	Description
Timeslot Properties	<b>Duration</b> . The amount of time, in hours and minutes, that you need the resources reserved.
	Requested Resources. The resources being requested for this test.
	Vusers. The number of Vusers being allocated.
	Post Run. The action to be taken when the test run is complete.     Do not collate results. Frees the machines immediately after the performance test ends. When the run has finished, the run results are left on the load generators. You can analyze the results at a later stage from the Results.
	Collate results. When the run has finished, the run results are collected from all the load generators. This is recommended because collation of results takes only a few minutes, and can prevent loss of or inaccessibility to results in case any of your load generators becomes unavailable.
	Collate and analyze results. When the run has finished, the run results are collected and analyzed. Data analysis requires some time, depending on the size of the results file. If there is no timeslot available to include the data analysis, select the Collate option instead, and run late Analysis when a data processor becomes available. You run late Analysis from the Results tab. For user interface details, see "Results/Last Run Results Tab" on page 202.
	<b>AUT Env. Configuration.</b> You can only use a deployed environment. For details, refer to the <i>HP Application Lifecycle Management User Guide</i> .
Calculate Availability	Calculate Availability. Calculates the availability of the resources required for running the test and checks whether a new timeslot can be created.
Availability results	Displays the results of the availability verification. If your timeslot cannot be reserved, the reason will be displayed.
Run	Uses the hosts reserved by the selected timeslot and runs the test.

## **Timeslot Duration Dialog Box**

This page enables you to extend or shorten the current timeslot.

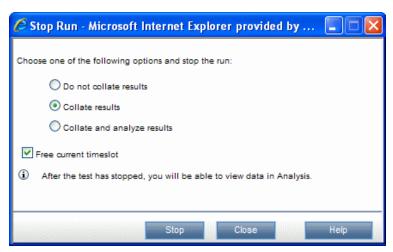


To access	During runtime, on the Performance Test Run page, click the <b>Timeslot Duration</b> button .
Relevant tasks	"How to Manage a Performance Test Run" on page 197

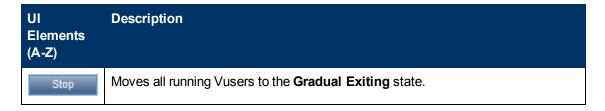
UI Elements	Description
Refresh	Refreshes the <b>Timeslot Remaining Time</b> information.
Prolong Timeslot by X minutes	Prolongs the timeslot duration by the selected number of minutes.
Shorten Timeslot by X minutes	Shortens the timeslot duration by the selected number of minutes.

## **Stop Run Dialog Box**

This page enables you to stop a running performance test and to select a post-run collation option.



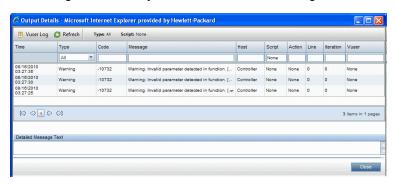
To access	During a test run, on the Performance Center Dashboard's Performance Test Run page, click the <b>Stop Run</b> button .
Relevant tasks	"How to Manage a Performance Test Run" on page 197



UI Elements (A-Z)	Description
Collate and analyze results	ALM Performance Center collates the run data from the load generators and generates analysis data. After data is collated, ALM Performance Center automatically deletes the temporary results from the load generators and controllers. You can display the results using analysis tools such as graphs and reports, or download the results for analysis on a local machine. This option takes the most time.
Collate results	ALM Performance Center collates the run data from the load generators. After data is collated, ALM Performance Center automatically deletes the temporary results from the load generators. You can download the raw results from the Results tab, or manually analyze results at a later point from the Results tab.  Note: This is the default setting.
Do not collate results	Frees the machines immediately after the test ends. You can collate and analyze results at a later point from the Results tab.
Free current timeslot	Frees the current timeslot once the test has stopped.

## **Output Details Dialog Box**

This dialog box enables you to view details of messages that are received during a test run.



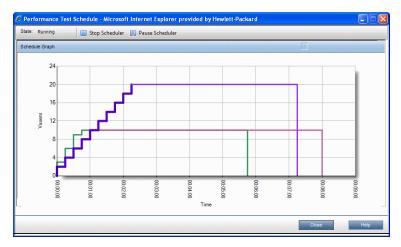
To access	On the Performance Test Run page, in the Details pane, click <b>Messages</b> . Then in the grid, click the number of messages for the message type whose details you want to view. For more details about the Messages view of the Details pane, see "Performance Test Run Page" on page 207.
Relevant tasks	"How to Manage a Performance Test Run" on page 197

UI Elements	Description
Vuser Log	Opens the Vuser activity log, which enables you to view a list of messages per individual Vuser. The log contains the following information:
	Activity log for Vuser. The selected Vuser whose ID is being displayed.
	Refresh. Enables you to refresh the log.
	Download log. Enables you to download the log.
	Log Message area. Displays a list of all messages received for the selected Vuser.
	Snapshot. Generates a snapshot (a graphical representation of the Web page) of the point in the test run where an error occurred. Before using this feature, you must install the Snapshot Viewer on your desktop, and enable the Show Snapshot on Error option in the script's runtime settings. For more information on the runtime settings, see "Script Runtime Settings" on page 317.
	<b>Refresh.</b> Enables you to refresh the dialog box information.
Action	The action in the script where the message was generated.
Code	The message code.
Host	The host that generated the message.
Iteration	The iteration during which the message was generated.
Line	The line in the script where the message was generated.
Message	The received message.
Script	The script that generated the message.
Time	The time the message was generated.

UI Elements	Description
Туре	The type of message. The possible message types are:
	Notify. Provides runtime information.
	Error. Usually indicates that the script failed.
	Warning. Indicates that the Vuser encountered a problem, but that the test continued to run.
	Debug. Sent only if the debugging feature is enabled in the Controller. To enable the feature, select Tools > Performance Center Controller Options > Debug Information.
Vuser	The Vuser which generated the message.

## **Edit Scheduler Dialog Box**

This dialog box enables you to edit scheduler settings during a performance test run.



To access	On the Performance Test Run page, click the <b>Design Groups and Scheduler</b> button . Then select <b>Edit Scheduler</b> .
Relevant tasks	"How to Manage a Performance Test Run" on page 197

User interface elements are described below (unlabeled elements are shown in angle brackets):

UI Elements	Description
Stop Scheduler	Stops the scheduler and enables it for editing.
Pause Scheduler	Pauses the scheduler.
Start Scheduler	Restarts the scheduler after editing.

UI Elements	Description
<edit scheduler="" section=""></edit>	Enables you to edit a defined schedule. For more information, see "Scheduler Actions" on page 143.
Global/Groups Schedule	Displays whether the current schedule has been defined <b>by test</b> or <b>by group</b> .
	Start Time. Enter a delay time for the scheduler to restart after editing.  To restart the scheduler immediately, leave this setting blank.
	Wait. (Groups schedule only) Select to initialize all Vuser groups together.
	Group. (Groups schedule only) Select individual groups to display and edit their schedules.
Schedule Graph	Provides a graphical representation of the defined schedule actions.
State	Displays the current scheduler status.

## **Monitor Profile Content Dialog Box**

This dialog box displays a list of monitors which are currently running during a performance test, and enables you to add, edit, and remove monitors during the run.

The monitors that are displayed are a combination of the monitors from all the monitor profiles that were associated to the test, as well as a set of 'host' monitors which are added automatically to every test for each host which is used in the test.

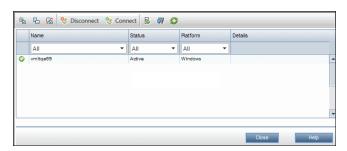


To access	On the Performance Test Run page, click the <b>Monitors</b> button , and select <b>Runtime Monitors</b> .
Important information	Monitors which are defined as part of a monitor profile but fail to run do not appear in the list of monitors.
	Default host monitors cannot be modified during runtime.
Relevant tasks	"How to Manage a Performance Test Run" on page 197

UI Elements	Description
*	<b>Add Monitor.</b> Click to add a monitor to the performance test. For more information about monitors, see "Add New Monitors Page" on page 61.
	<b>Edit Monitor.</b> Click to edit the selected monitor. The relevant monitor type page opens, enabling you to edit the monitor information.
×	Delete Selected Item. Deletes the selected monitor.
<b>©</b>	Refresh Monitors List. Refreshes the monitors list.
<b></b>	<b>Check Out.</b> Opens the Check Out dialog box, enabling you to check out selected entities. For details, see the <i>HP Application Lifecycle Management User Guide</i> .
	Available for: Version-control-enabled projects only
<b>4</b>	<b>Check In.</b> Opens the Check In dialog box, enabling you to check in selected entities. For details, see the <i>HP Application Lifecycle Management User Guide</i> .
	Available for: Version-control-enabled projects only
<b>P</b>	Undo Check Out. Cancels the check out of selected entities and discards changes.
	To undo checkouts for entities checked out by other users, you must have the appropriate user permissions. For more information, refer to the <i>HP Application Lifecycle Management Administrator Guide</i> .
	When you undo a checkout, any changes you made to non-versioned fields while the entity was checked out are not cancelled and the new values remain. For details, see the HP Application Lifecycle Management User Guide.
	Available for: Version-control-enabled projects only

## **Load Generators Dialog Box**

This dialog box enables you to view load generator status and machine utilization, connect and disconnect load generators, add load generators to the test, and to configure terminal sessions.

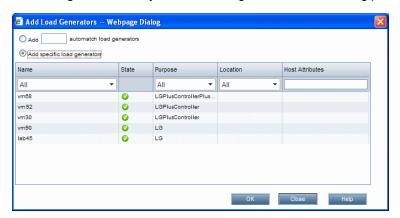


To access	On the Performance Test Run page, click the <b>Load Generators</b> button.
Relevant tasks	"How to Manage a Performance Test Run" on page 197

UI Elements	Description
<b>E</b>	Select All. Selects all displayed load generators.
8	Deselect All. Deselects all displayed load generators.
昆	<b>Invert Selection.</b> Inverts the current selection of load generators. That is, the non-selected load generators are selected, and the selected load generators are cleared.
<b>%</b>	Disconnect. Disconnects the selected load generator for the performance test.
<b>%</b>	Connects. Connects the selected load generator for the performance test.
	<b>Add Load Generators.</b> Opens the Add Load Generators dialog box, which enables you to add load generators to the test. For user interface details, see "Add Load Generators Dialog Box " on next page.
₽ P	<b>Terminal Session Settings.</b> Opens the Terminal Services dialog box, which enables you to configure terminal sessions for the load generator. For user interface details, see "Terminal Services Dialog Box" on page 185.
<b>S</b>	<b>Refresh.</b> Refreshes the information displayed in the Load Generators dialog box.
Name	The load generator name.
Details	Load generator details.
Platform	The platform on which the load generator is running.
Status	The current status of the load generator. The possible statuses are:
	Active. The load generator is connected.
	Busy. The load generator is running Vusers.
	Disconnecting. The load generator is disconnecting.
	Down. The load generator is not connected.
	Failed. A connection with the load generator could not be established.
	Ready. The load generator is connected.

## **Add Load Generators Dialog Box**

This dialog box enables you to add load generators to a running performance test.



To access	In the Load Generators dialog box, click the <b>Add Load Generators</b> button
Relevant tasks	"How to Manage a Performance Test Run" on page 197
See also	"Load Generator Distribution " on page 119

UI Elements	Description
Add X Automatch Load Generators	Enables you to add a specified number of automatch load generators.
Add Specific Load Generators	Enables you to add specific load generators. The load generator table lists the specific load generators which are available, displaying the following information for each load generator:
	Name. The load generator name.
	State. The current state of the load generator: Operational, Non-Operational, or Unavailable.
	Purpose. The purpose of the load generator, that is, Controller, Load Generator, Data Processor, or a combination of these.
	Location. The location of the load generator.
	Host Attributes. Select attributes for the load generator.

## **Monitor Over Firewall Dialog Box**

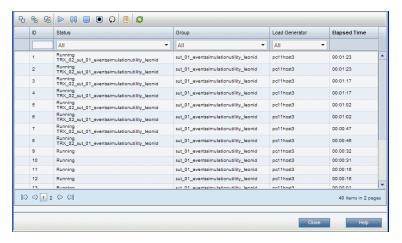
This dialog box enables you to change the status of a monitor over firewall machine during a test run.

To access	On the Performance Test Run page, click the <b>Monitors</b> button , and select <b>Monitor Over Firewall</b> .
Relevant tasks	"How to Manage a Performance Test Run" on page 197

UI Elements	Description
	Select All. Selects all displayed monitor over firewall machines.
<b>B</b>	Deselect All. Deselects all displayed monitor over firewall machines.
₽3	Invert Selection. Inverts the current selection of monitor over firewall machines.
	That is, the non-selected machines are selected, and the selected machines are cleared.
<b>%</b>	<b>Disconnect.</b> Disconnects the selected monitor over firewall machine for the performance test.
<b>%</b>	<b>Connect.</b> Connects the selected monitor over firewall machine for the performance test.
<b>©</b>	<b>Refresh.</b> Refreshes the information displayed in the monitor over firewall agent dialog box.

## **Vusers Dialog Box**

This dialog box displays specific details for each Vuser in the performance test, and enables you to run or stop individual Vusers irrespective of their defined schedules.



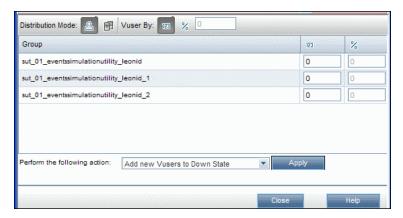
To access	During Runtime, on the Performance Center Dashboard's Performance Test Run page, click the <b>Vusers Details</b> button .
Relevant tasks	"How to Manage a Performance Test Run" on page 197

UI Elements	Description
	Select All. Selects all displayed Vusers.
8	Deselect All. Deselects all selected Vusers.
₽2	Invert Selection. Inverts the current selection of Vusers. That is, the non-selected Vusers are selected, and the selected Vusers are cleared.
	Run Selected Vusers. Runs the selected Vusers.
0,0	Pause Selected Vusers. Pauses the selected Vusers.
	Stop Selected Vusers Gradually. Stops the selected Vusers gradually. The Vusers complete the current iteration before stopping.
	Stop Selected Vusers Immediately. Stops the selected Vusers immediately.
Ω	Reset Selected Vusers. Resets the selected Vusers to the Down state.

UI Elements	Description
	<b>Show Selected Vusers Log.</b> Opens the Vuser Activity Log, which displays runtime information for the selected Vuser. The log displays the following information:
	Activity log for Vuser. The selected Vuser.
	Refresh. Refreshes the information displayed in the log.
	Download log. Enables you to download the log.
	Close. Closes the log.
	Log Message. Displays the logged Vuser messages.
	Show snapshot. Generates a snapshot of the point where an error occurred in a test run. Before using this feature, you must install the snapshot viewer on your desktop, and enable the Snapshot on Error option in the Runtime Settings for the Vuser script. For more information on configuring the runtime settings, see "Script Runtime Settings" on page 317.
<b>©</b>	Refresh. Refreshes the information displayed in the dialog box.
Elapsed Time	The amount of time the Vuser has been running.
Group	Filters displayed Vusers by Vuser group.
ID	The Vuser's ID.
Load Generator	Filters displayed Vusers by load generators.
Status	Filters displayed Vusers by their current status.

## **Run Vusers Dialog Box**

This dialog box enables you to initialize, run, or stop any number of Vusers irrespective of their defined schedules. In addition, you can add new Vusers to the performance test.



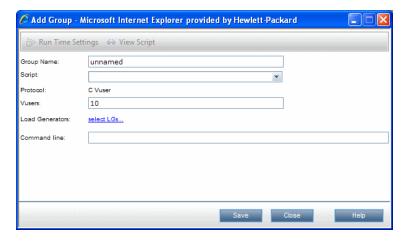
To access	On the Performance Test Run page, click the <b>Vuser Details</b> button 🕹 .
Relevant tasks	"How to Manage a Performance Test Run" on page 197

UI Elements	Description
Distribution Mode:	<b>by Vusers.</b> The Vusers being given an instruction are distributed according to Vuser groups.
Distribution Mode:	<b>by Load Generator.</b> The Vusers being given an instruction are distributed according to load generators.
Vuser By: 123	<b>by Number.</b> Enables you to give an instruction to a specific number of Vusers per Vuser group/load generator.
Vuser By: %	<b>by Percentage.</b> Enables you to give an instruction to a specific number of Vusers, which are then distributed among the Vuser groups/load generators according to a percentage which you define.
	Example: If you choose to run an additional 200 Vusers, among three Vuser groups, A, B, and C, and you define the percentage distribution as A = 75%, B = 20%, and C = 5%, then the Vusers would be distributed as follows:
	A. 150 Vusers
	B. 40 Vusers
	C. 10 Vusers
	<b>Note:</b> When selecting this method, you enter the number of Vusers to run in the box adjacent to the <b>by Percentage</b> button.
123	Enter the number of Vusers per Vuser group/load generator.
%	Enter the percentage distribution per Vuser group/load generator.
Apply	Performs the selected instruction.
Group	Lists the Vuser groups in the test.

UI Elements	Description
Perform the following Action	Give the desired instruction to the defined number of Vusers. The possible actions are:
	Add new Vusers to Down state. Add the desired number of Vusers to the Down state.
	Initialize Vusers from Down. Initializes the desired number of Vusers currently in the Down state.
	Run Vusers from Down. Runs the desired number of Vusers currently in the Down state.
	Run Vusers from Ready. Runs the desired number of Vusers currently in the Ready state.
	Stop Vusers. Moves the desired number of Vusers from the Run state to the Gradual Exiting state.
	Reset Vusers. Moves the desired number of Vusers from the Stopped state to the Down state.
	<b>Note:</b> You cannot perform an action on more Vusers than are currently in a particular state. For example, if you define <b>10</b> Vusers and select <b>Initialize Vusers from Down</b> , but there are only <b>five</b> Vusers in the Down state, <i>only</i> those five Vusers are initialized.

## **Add Group Dialog Box**

This dialog box enables you to add a Vuser group to a running performance test, or to edit Vuser group settings during a test run.

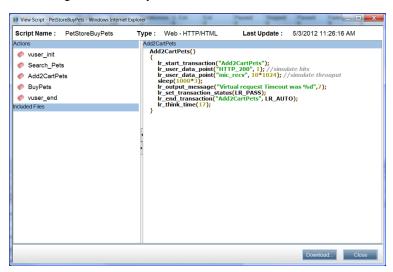


To access	<ul> <li>When adding a Vuser group. On Performance Test Run page, click the Design Groups and Scheduler button . Then select Add Groups.</li> <li>When editing a Vuser group. On the Performance Test Run page, on the Groups pane, place the mouse cursor over the name of the group you want to edit. Click the downward arrow that appears adjacent to the name, and select Edit Group.</li> </ul>
Important information	To edit a Vuser group, all Vusers must be in the <b>inactive</b> state.
Relevant tasks	"How to Manage a Performance Test Run" on page 197

UI Elements (A-Z)	Description
Run Time Settings	Enables you to view and change the runtime settings for the Vuser script.
60 View Script	Opens the script in VuGen.
Command Line	Type the name and value of the parameter you want to send using the format, <parameter_name> <value>.</value></parameter_name>
	For information about the command line parsing functions, or for details about including arguments on a command line, see the <i>HP LoadRunner Online Function Reference</i> , provided with HP Virtual User Generator.
Group Name	The name of the Vuser group.
Load Generators	The load generators on which the group is running.
Protocol	The Vuser script's protocol.
Script	The name of the Vuser script.
Vusers	The number of Vusers assigned to the group.

## **View Script Dialog Box**

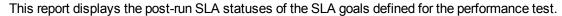
This dialog box enables you view the code for each action in a running Vuser script.

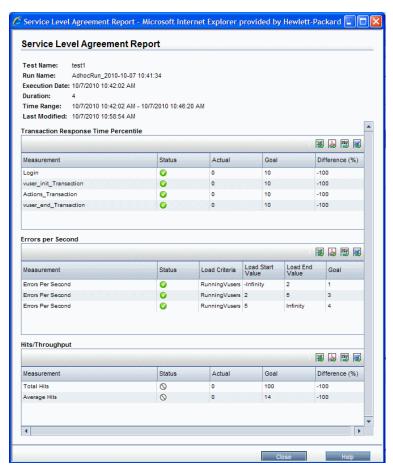


To access	On the Performance Test Run page, on the Groups pane, place the mouse cursor over the name of a group. Click the downward arrow that appears adjacent to the name, and select <b>View Script</b> .
Relevant tasks	"How to Manage a Performance Test Run" on page 197

UI Elements	Description
Download	Enables you to download the script.
Script Name	The script's name.
Туре	The script type.
Last Update	The last updated date and time.
Actions	Lists the actions included in the script. Click on an action to view its code in the right pane.
Included files	Displays files included in the script.

## **SLA Report**





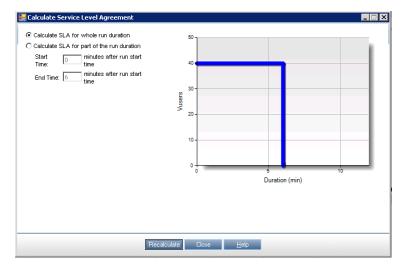
To access	<ul> <li>On the ALM sidebar, under Testing, select Test Lab. Select the Test Runs tab. Use one of the following:</li> <li>In the information panel, in the Results tab, click the SLA Report button.</li> <li>In the left pane select a test set. Select the Execution Grid tab in the right pane. In the area below, in the Last Run Results tab, click the SLA Report button.</li> </ul>
Important information	The SLA report is available only if SLAs were defined for the performance test.
Relevant tasks	"Running Performance Tests Overview" on page 196
See also	"Service Level Agreements Overview" on page 148

User interface elements are described below (unlabeled elements are shown in angle brackets):

UI Elements	Description
*	<b>Export to Excel.</b> Enables you to export the selected section of the SLA report to an Excel file.
<b>&amp;</b>	<b>Export to PDF.</b> Enables you to export the selected section of the SLA report to a .pdf file.
<u>(5)</u>	<b>Export to CSV.</b> Enables you to export the selected section of the SLA report to a .csv file.
<b>K</b>	<b>Export to Word.</b> Enables you to export the selected section of the SLA report to a Word file.
<test details="" run=""></test>	The details of the performance test run to which the SLA report data relates are displayed at the top of the report.
<sla grids=""></sla>	The results for each SLA are displayed in separate grids.
	<b>Tip:</b> Each set of results can be exported to Excel, Word, PDF, and CSV format.
<sla indicators="" status=""></sla>	Ondicates a failed SLA status.
	. Indicates a passed SLA status.
	. Indicates that there is no data about the SLA status.

## **Calculate Service Level Agreement Dialog Box**

This dialog box enables you to change the test time range included in the Service Level Agreement (SLA).



To access	On the ALM sidebar, under <b>Testing</b> , select <b>Test Lab</b> .      Select the <b>Test Runs</b> tab.
	<ol> <li>Select the Test Runs tab.</li> <li>In the information panel, in the Results tab, click the Recalculate SLA Report button.</li> </ol>
Important information	The Recalculate SLA button is available only if SLAs were defined for the performance test.
Relevant tasks	"Running Performance Tests Overview" on page 196
See also	"Service Level Agreements Overview" on page 148

UI Elements	Description
Recalculate	Recalculates the SLA according to the defined information.
Calculate SLA for whole run duration	Calculates the SLA over the whole test run.
Calculate SLA for part of run duration	Calculates the SLA over part of the test run. Enter the desired <b>Start Time</b> and <b>End Time</b> over which to calculate the SLA.

# **Chapter 16: Network Virtualization**

## This chapter includes:

Network Virtualization Overview	.240
How to Integrate Network Virtualization into a Performance Test	.243
Network Virtualization Graphs	245
Network Virtualization User Interface	249
Limitations for Network Virtualization	253

## **Network Virtualization Overview**

HP ALM Performance Center integrates with Shunra NV (Network Virtualization) to help you test point-to-point performance of network-deployed products under production conditions. By installing Shunra NV for HP Software, you can introduce highly probable network effects such as latency, packet loss, and link settings. As a result, your test scenario runs in an environment that more reliably and accurately represents the real-world conditions experienced by end users.

Shunra NV for HP Software includes a global library of network conditions from cities around the world. Because the network parameters are provided by Shunra NV, you do not need to manually enter this information.

The following table presents the most typical effects that you can configure:

Effect	Description
Latency	The time, in milliseconds, that it takes an IP packet to cross the network. This is usually affected by geographical distance, the available bandwidth, the network load on the route between the two ends, and whether this is a terrestrial link.
Packet Loss	The chance of losing IP packets while data travels through a network. Packets can get lost due to link faults or due to extreme network load.
Bandwidth	The capacity of your network to transfer data.

You can create more meaningful results by configuring several load generators or groups of Vusers with a unique set of network effects, and by giving each set a unique location path. For example, you could define a location from **New York** to **London** and another one from **Los Angeles** to **New York**.

After running a performance test, view the results in the Performance Test Run page or the LoadRunner Analysis. For details on the Performance Test Run page, see "Performance Test Run Page" on page 207. For details on viewing results in Analysis, see the *HP LoadRunner Analysis User Guide*.

For more information on Shunra NV for HP Software, see http://www.shunra.com/products/shunra-nv-hp-software.

For details on how to integrate Network Virtualization into your performance test, see "How to Integrate Network Virtualization into a Performance Test" on page 243.

This section also includes:

- "Defining Virtual Locations" below
- "Excluding Machines from Network Virtualization" on next page
- "Viewing Network Virtualization Graphs" on next page
- "Workflow for Working with Network Virtualization" on next page

### **Defining Virtual Locations**

From within Performance Center, Shunra NV enables you to define different network locations and

conditions for virtualizing in the test environment, so each end user geography and the unique conditions associated with each can be accurately represented. For example, you can define end point locations in **London** and **New York** and emulate the network path between those two cities. You add locations in the Network Virtualization Settings dialog box. You can define global virtualization settings or configure the settings for each of the locations separately. For details, see "Network Virtualization Settings Dialog Box" on page 250.

### **Excluding Machines from Network Virtualization**

In some situations, you may need to exclude certain machines from the network virtualization as they could inappropriately affect the emulation. When a machine is excluded from network virtualization, network traffic to that machine does not suffer any network effects and is not included in the network virtualization results.

The following machines are excluded by default:

- The Controller machine or the MI Listener and proxy server
- The Diagnostics Commander server
- The Performance Center server
- The SiteScope server (configured to monitor Performance Center servers and hosts)

In addition to the machines that are excluded by default, consider excluding the following machines:

- In a Multi-protocol performance test that includes a Web server and a database server, where
  information from the database server is not required as a part of the performance test, exclude
  the database server
- All deployment and software upgrade servers
- Where you run and store scripts on a shared network drive

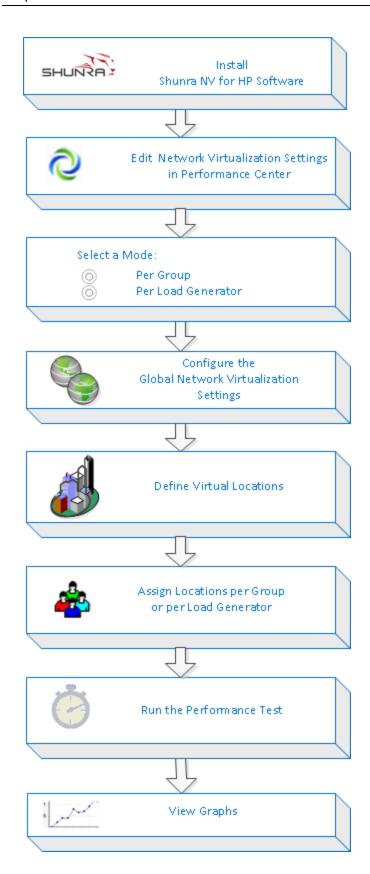
### **Viewing Network Virtualization Graphs**

Network Virtualization starts and stops automatically as you start and stop the performance test. Network Virtualization monitors are assigned automatically when the performance test run starts and metrics are automatically collected during the performance test run. You can view the network virtualization metrics during the performance test run in the Performance Test Run page. For details on the Performance Test Run page, see "Performance Test Run Page" on page 207.

You can also view the results in LoadRunner Analysis. For more details on viewing results in Analysis, see the *HP LoadRunner Analysis User Guide*.

### Workflow for Working with Network Virtualization

The following diagram shows the steps required for running a performance test with network virtualization.



# How to Integrate Network Virtualization into a Performance Test

This following describes how to integrate Network Virtualization into your performance test and how to view the metrics in Analysis.

To learn more about Network Virtualization, see "Network Virtualization Overview" on page 240.

### Prerequisites

- Make sure that you have Shunra NV for HP Software installed on the following machines:
  - the Performance Center server
  - the load generators
  - the Controller

For more information about Shunra NV for HP Software, see http://www.shunra.com/products/shunra-nv-hp-software.

 Make sure that you have a properly designed performance test. For more information, see "How to Define a Performance Test Workload" on page 85.

### 2. Open network virtualization

- a. Open Performance Test Designer window > Workload tab. In the Performance Test
  Designer window, click the Workload tab. For user interface details, see "Performance
  Test Designer > Workload Tab" on page 90.
- b. Open network virtualization. In the Workload tab, click the Edit Network

**Virtualization Settings** button . The Network Virtualization Settings dialog box opens. For user interface details, see "Network Virtualization Settings Dialog Box" on page 250.

### 3. Enable network virtualization and choose a virtualization method

- a. **Enable Network Virtualization.** In the Network Virtualization Settings dialog box, select **Enable Network Virtualization**.
- b. Select a method. Select Per Group or Per Load Generator.

Use the default **Per Group** to perform network virtualization per Vuser group. This option enables you to emulate multiple virtual locations on the same load generator. It makes it easier to switch between load generators used in your performance test.

Use **Per Load Generator** to perform network virtualization per load generator, where each machine can only emulate a single location.

### 4. Set the global network virtualization settings

- a. Click **Global Settings** to define the global options for all network virtualizations. This opens the interface to the Shunra NV software.
- b. Indicate if you want to allow packet capture and which recording method to use, **cyclic** or **non-cyclic**. It is recommended that you do not enable packet capture as this requires a

larger memory allocation and may affect performance.

c. In the **IP Filter** section, specify any machines that you may want to exclude from network virtualization for all locations. For details on which machines to exclude, see "Network Virtualization Overview" on page 240.

#### 5. Add virtual locations

a. In the **Add new virtual location** field, type a location name.

**Note:** For location names, only use English letters. You cannot use the following characters:  $\ \ ' : "?' <> |* \% ^, ! {}(); = #$ 

- b. Click Add. This opens the interface to the Shunra NV software.
- c. In the Shunra NV Virtualization tab, select a definition mode such as Import from library or Custom. If you select Import from library, Shunra NV automatically uses its built-in settings for the location you select. If you select Custom, you need to manually specify the network effects to apply to the location, such as latency, loss, and client bandwidth.

**Manage virtual locations.** In the Network Virtualization Virtual Locations pane, you can add, modify, duplicate, or delete a virtual location. You can also import locations from other tests.

- d. In the Shunra NV **Options** tab's **Bandwidth allocation** section, select **Share bandwidth between all users** unless you are testing mobile applications.
- e. In the **Options** tab's **IP Filter** box, specify any machines that you may want to exclude from network virtualization for this location. For details on which machines to exclude, see "Network Virtualization Overview" on page 240.
- f. Click **OK** to close the Shunra NV interface. The location is added to the Network Virtualization Settings dialog box. To enable the location, select the check box.
- g. Repeat the above steps for each location.

# 6. For network virtualization per Group - Define the settings for each group

- a. Select virtual location. In the Performance Test Designer window > Workload tab, under the Virtual Location column, click the Select virtual location link. The Virtual Location dialog box opens.
- b. Select a virtual location.

## 7. For network virtualization per Load Generator - Define the settings for each load generator

a. In the Performance Test Designer window > Workload tab, under the **Load Generator** column, click the **Select Load Generator** link.

**Note:** This link is available only when using the Assign Manually load generator distribution method. For details, see "Performance Test Designer > Workload Tab" on page 90.

The Select Load Generators dialog box opens. For user interface details, see "Select Load Generators Dialog Box " on page 127.

- b. **Assign one or more load generators.** Select the **Automatch** or **Specific** tab. Select one or more load generators.
- c. Select virtual location. Under the Virtual Locations column, click the Select Virtual Location link for each selected load generator. The Select Virtual Location dialog box opens. Select a virtual location.

### 8. Run the performance test

Run the test to check its performance. For more details on running a performance test, see "How to Manage a Performance Test Run" on page 197.

### 9. View the graphs

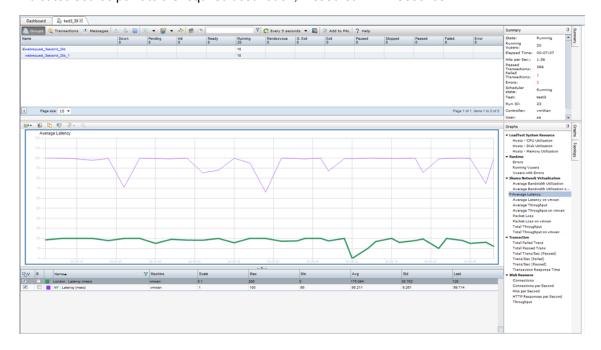
Network virtualization metrics are automatically collected during the performance test run. You can view all the network virtualization metrics in the Performance Test Run Page or the LoadRunner Analysis.

For more details on the Performance Test Run page, see "Performance Test Run Page" on page 207. For more details on viewing results in Analysis, see the *HP LoadRunner Analysis User Guide*.

## **Network Virtualization Graphs**

## **Average Latency Graph**

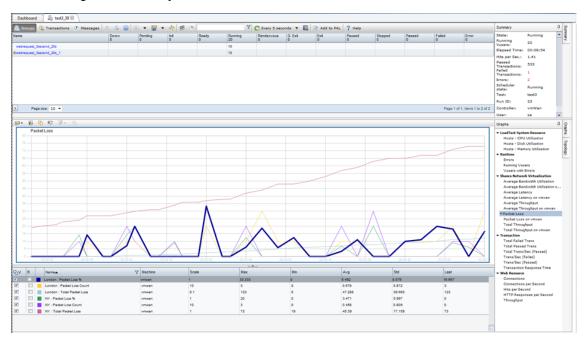
This graph shows the average recorded time required for a packet of data to travel from the indicated source point to the required destination, measured in milliseconds.



Purpose	Helps you evaluate the time required for a packet of data to travel over the network.
X-axis	Elapsed time since the start of the run.
Y-axis	The average latency—the time in milliseconds required for a packet of data to reach its destination.
See also	"Network Virtualization Overview" on page 240
	"Performance Test Run Page" on page 207

## **Packet Loss Graph**

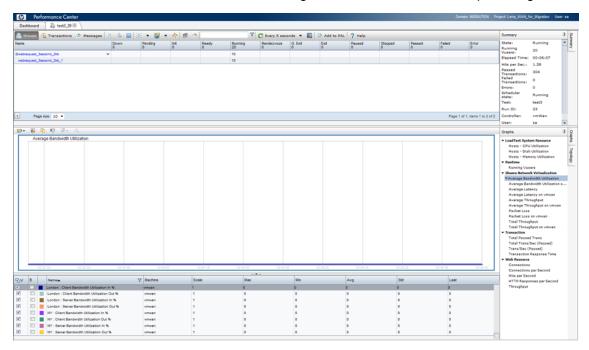
This graph shows packets lost during the last second of the test run. Packet loss occurs when data packets fail to reach their destination. It can result from gateway overload, signal degradation, channel congestion, or faulty hardware.



Purpose	Helps you understand how many data packets were lost over a specific time interval.	
X-axis	Elapsed time since the start of the run.	
Y-axis	Includes the following measurements:	
	The percentage of lost packets from all packets that were sent.	
	The number of data packets that were lost over 60 seconds.	
	The total number of packets that were lost.	
See also	"Network Virtualization Overview" on page 240	
	"Performance Test Run Page" on page 207	

## **Average Bandwidth Utilization Graph**

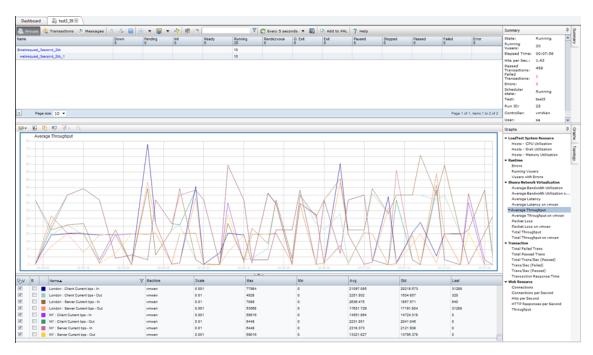
This graph shows the average bandwidth utilized by a virtual user or a virtualized location from the maximum available bandwidth allocated for it during the last second, measured in percentages.



Purpose	Helps you evaluate the bandwidth used over your network.	
X-axis	Elapsed time since the start of the run.	
Y-axis	The percentage of bandwidth utilization.	
See also	"Network Virtualization Overview" on page 240	
	"Performance Test Run Page" on page 207	

## **Average Throughput Graph**

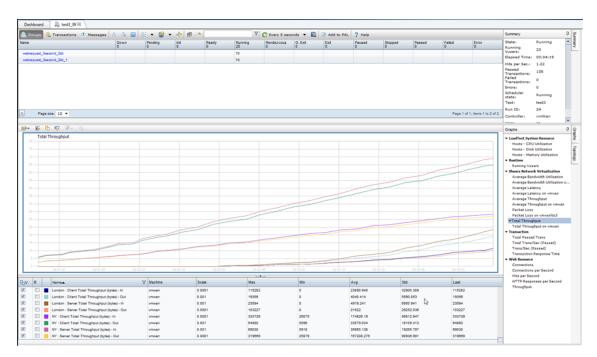
This graph shows the average data traffic passing to or from the virtualized location, measured in kilobytes per second (kbps).



Purpose	Helps you evaluate the amount of load Vusers generate, in terms of server and client throughput. The graph shows metrics for input and output traffic for both the server and client machines. Use the legend below the graph to determine the line color for each metric.	
X-axis	Elapsed time since the start of the run.	
Y-axis	The rate of data passing to and from the virtual location, in kbps for the following metrics per group or load generator:	
	Input to the client machine	
	Output from the client machine	
	Input to the server machine	
	Output from the server machine	
See	"Total Throughput Graph" below	
also	"Network Virtualization Overview" on page 240	
	"Performance Test Run Page" on page 207	

# **Total Throughput Graph**

Displays the total data traffic passing to or from the virtualized location, measured in kilobytes.



Purpose	Helps you evaluate the total amount of load that Vusers generate while running a scenario with network virtualization.	
	The graph shows metrics for input and output traffic for both the server and client machines. The legend below the graph indicates the line color for each of these metrics.	
X-axis	Elapsed time since the start of the run.	
Y-axis	Throughput of the server, in kilobytes per second (Kbps).	
See also	<ul> <li>"Average Throughput Graph" on page 247</li> <li>"Network Virtualization Overview" on page 240</li> <li>"Performance Test Run Page" on page 207</li> </ul>	

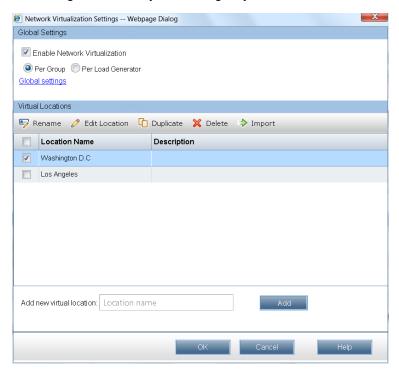
## **Network Virtualization User Interface**

This section includes:

Network Virtualization Settings Dialog Box	
Import Virtual Locations Dialog Box	252

## **Network Virtualization Settings Dialog Box**

This dialog box enables you to configure your network virtualization settings.

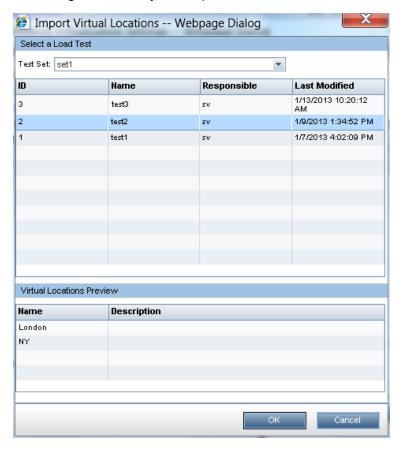


To access	In the <b>Testing &gt; Test Plan</b> module, select a test, then click the <b>Test Design</b> tab.
	2. Click the <b>Edit Test</b> button.
	In the Workload tab, click the Edit Network Virtualization Settings     button.
Important information	To access this dialog box, you must have the Shunra NV for HP Software installed on your machine.
Relevant tasks	"How to Integrate Network Virtualization into a Performance Test" on page 243

UI Elements	Description
Enable Network	Enables Network Virtualization per one of the following:
Virtualization	Per Group. Assigns network virtualization locations per Vuser group. (Default)
	Per Load Generator. Assigns network virtualization locations per load generator. Each machine can only emulate a single location.
Global Settings	Opens the Shunra NV interface for defining the global setting for the virtualization. For more details on global settings, see "How to Integrate Network Virtualization into a Performance Test" on page 243.
Rename	Enables you to modify the virtual location name and description.
Ø Edit Location	Opens the Shunra NV interface for editing the location. For details, see the relevant third party software documentation.
Duplicate	Duplicates the virtual location.
× Delete	Deletes the selected virtual location from the Virtual Locations list and any associated groups or load generators.
> Import	Opens the Import Virtual Locations dialog box enabling you to import virtual locations from another test. For details, see "Import Virtual Locations Dialog Box" on next page.
Location Name	Indicates the virtual location name.
Description	The description of the virtual location.
Add new virtual location	Enables you to add a new virtual location. Type the location name and click <b>Add</b> . Opens the Shunra NV interface for setting the virtualization properties and location options. For more details on adding virtual locations, see "How to Integrate Network Virtualization into a Performance Test" on page 243.

## **Import Virtual Locations Dialog Box**

This dialog box enables you to import virtual locations from another test.



To access	In the <b>Testing &gt; Test Plan</b> module, select a test, then click the <b>Test</b> Design tab.	
	2. Click the <b>Edit Test</b> button.	
	3. In the Workload tab, click the Edit Network Virtualization Settings button.  4. Olick the Instruct button.	
	4. Click the <b>Import</b> button.	
Important information	To access this dialog box, you must have the Shunra NV for HP Software installed on your machine.	
Relevant tasks	"How to Integrate Network Virtualization into a Performance Test" on page 243	

User interface elements are described below:

UI Elements	Description
Test Set	A list of available test sets from which to select tests with virtual locations.
ID	The ID number of the test.
Name	The name of the test.
Responsible	The user responsible for the test.
Last Modified	The date on which the test was last modified.
Virtual Locations Preview pane	Displays the location names included in a selected test.

#### **Limitations for Network Virtualization**

- Network virtualization integration does not comply with accepted Internationalization (I18N) conventions.
- The network virtualization software may consume large amounts of memory, since the
  technology delays traffic and captures traffic for later analysis. To verify that the load generator
  machine has sufficient memory, compare the load generator memory consumption with and
  without the virtualization.
- Network virtualization software integration is not supported for the Linux platform.
- You cannot run a scenario on the same load generator from two different Controller machines if they both have network virtualization enabled.

#### **Part 5: Online Monitoring**

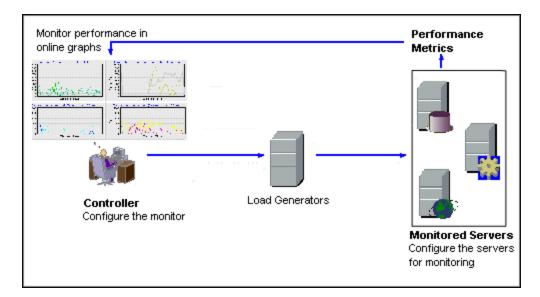
# **Chapter 17: Working with ALM Performance Center Online Monitors**

#### This chapter includes:

Monitoring Process Overview	258
How to Set Up the Monitoring Environment – Workflow	258
Monitor Types	259

#### **Monitoring Process Overview**

Before monitoring a performance test, you need to set up and configure the ALM Performance Center monitoring components. Each monitor has different configuration requirements that are explained in the specific monitoring chapters. The following diagram illustrates the ALM Performance Center monitoring process.



Before monitoring a server, perform the following steps:

- Configure the monitoring environment on the server machine (if necessary).
- Configure the monitor on the Controller machine.

For details, see "How to Set Up the Monitoring Environment – Workflow" below.

### How to Set Up the Monitoring Environment – Workflow

This task describes how to set up the ALM Performance Center online monitoring environment. You specify the machines and measurements that the Controller will monitor during performance test execution in the ALM Test Resources module. During performance test execution, the collected measurement data appears in the online graphs.

#### Configure the monitoring environment on the server machine

To use the following monitors, you must first install or configure monitoring components on the server machine. For details about configuring the monitoring components, see the specific monitoring sections.

" How to Set up the Citrix Monitoring "How to Set Up the PeopleSoft (Tuxedo) Environment" on page 308 Resource Monitor" on page 298 "How to Enable and Configure ■ "How to Set Up the SAPGUI Server J2EE/.NET Diagnostics" on page 167 Resource Monitor" on page 299 "How to Set Up the Network Monitoring "How to Set Up the Tuxedo Monitoring Environment" on page 279 Environment" on page 304 "How to Set Up the Oracle Monitoring "How to Set up the UNIX Monitoring Environment" on page 292 Environment" on page 273

#### 2. Configure the monitors on the Controller

To obtain performance data for a monitor, you need to configure the monitor (from the Controller), and indicate which statistics and measurements you want to monitor.

- For information about selecting the servers to monitor and selecting the measurements to monitor, see "How to Create and Configure Monitor Profiles" on page 58.
- For details about each monitor's default measurements, refer to the relevant reference section for the monitor.

#### **Monitor Types**

All of the monitors allow you to view a summary of the collected data at the conclusion of the performance test. Using LoadRunner Analysis, you can generate a graph for any of the monitors. For more information, see the *HP LoadRunner Analysis User Guide*.

The online monitors are divided into the following categories:

Monitor Type	Description
Web Resource Monitors	Provide information about the number of Web connections, throughput volume, HTTP responses, server retries, and downloaded pages at the Web servers during performance test run. For more information, see "Web Resource Monitors" on page 261.
Run-Time and Transaction Monitors	Display the transaction rate and response times, and the number and status of Vusers participating in the performance test, as well as the number and types of errors that the Vusers generate. For more information, see "Run-Time and Transaction Monitoring" on page 267.
System Resource Monitors	Measure the Windows, UNIX, Server, SNMP, and SiteScope resources used during a performance test run. For more information, see "System Resource Monitoring" on page 271.
Network Delay Monitors	Displays information about the network delays on your system. For more information, see "Network Delay Monitoring" on page 277.

Monitor Type	Description
Web Server Resource Monitors	Measure statistics related to the Microsoft IIS and Apache Web servers during the performance test run. For more information, see "Web Server Resource Monitoring" on page 285.
Web Application Server Resource Monitors	Measure statistics related to the Microsoft ASP application servers during the performance test run. For more information, see "Web Application Server Resource Monitoring" on page 289.
Database Server Resource Monitors	Measure statistics related to the SQL server, and Oracle databases during the performance test run. For more information, see "Database Resource Monitoring" on page 291.
ERP/CRM Server Resource Monitors	Measure statistics related to the SAPGUI and PeopleSoft (Tuxedo) servers during the performance test run. For more information, see "ERP/CRM Server Resource Monitoring" on page 297.
J2EE & .NET Diagnostics Monitors	Provide information to trace, time, and troubleshoot individual transactions through J2EE Web, application, and database servers. For more information, see the <i>HP Diagnostics User Guide</i> .
Application Deployment Solutions Monitors	Measures statistics related to the Citrix MetaFrame XP server during a performance run. For more information, see "Application Deployment Solution Monitoring" on page 307.
Middleware Performance Monitors	Measures statistics related to the Tuxedo server during a performance test run. For more information, see "Middleware Performance Monitoring" on page 303.

#### **Chapter 18: Web Resource Monitors**

#### This chapter includes:

Web Resource Monitoring Overview	
HTTP Status Codes	

#### **Web Resource Monitoring Overview**

The Web Resource monitor enables you to analyze the following resources on the Web server during a performance test run: throughput, HTTP requests, downloaded pages, server retries, TCP/IP connections, and SSL connections.

You can view the following resource monitor graphs during a test run:

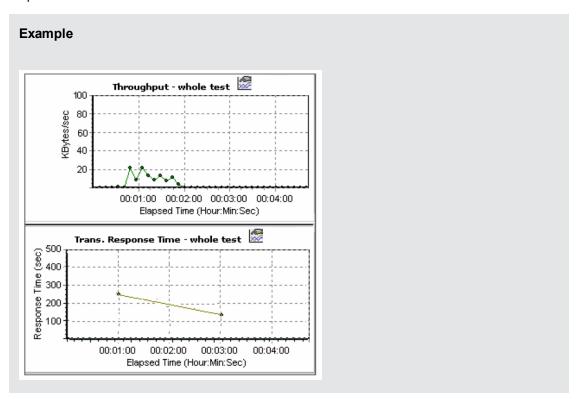
#### Hits per Second Graph

The **Hits Per Second** graph shows the number of hits (HTTP requests) to the Web server (y-axis) as a function of the elapsed time in the performance test (x-axis). This graph can display the whole step, 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.

#### Throughput Graph

The **Throughput** graph shows the amount of throughput (y-axis) on the Web server during each second of the test run (x-axis). Throughput is measured in bytes 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 decreases, the transaction response time also decreases. The peak throughput occurred at approximately 1 minute into the step. The highest response time also occurred at this time.



#### **HTTP Responses per Second Graph**

The **HTTP Responses per Second** graph shows the number of HTTP status codes (y-axis)—which indicate the status of HTTP requests, for example, "the request was successful" or "the page was not found"—returned from the Web server during each second of the performance test run (x-axis).

The HTTP responses are grouped by status code. You can also group the results shown in this graph by script (using the "Group By" function) to locate scripts which generated error codes.

For a list of status codes and their explanations, see "HTTP Status Codes" on page 265.

#### Pages Downloaded per Second Graph

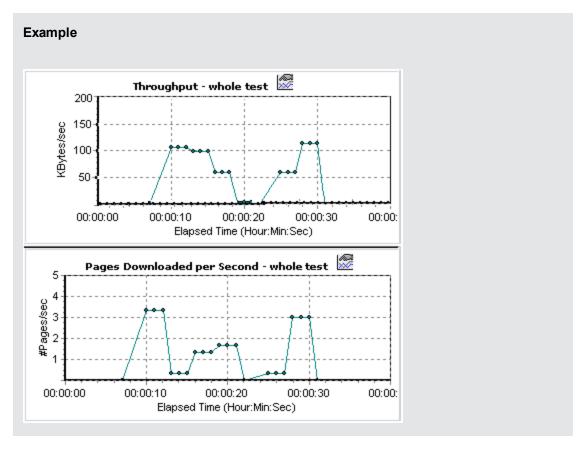
The **Pages Downloaded per Second** graph shows the number of Web pages (y-axis) downloaded from the server during each second of the test run (x-axis). This graph helps you evaluate the amount of load Vusers generate, in terms of the number of pages downloaded.

**Note:** To view the Pages Downloaded per Second graph, you must select **Pages per second** (**HTML Mode only**) from the script's Run-time settings Preferences tab before running your performance test.

Like throughput, downloaded pages per second is a representation of the amount of data that the Vusers received from the server at any given second.

- The Throughput graph takes into account each resource and its size (for example, the size of each .gif file, the size of each Web page).
- The Pages Downloaded per Second graph takes into account simply the number of pages.

In the following example, the Throughput graph is compared with the Pages Downloaded per Second graph. It is apparent from the graph that throughput is not proportional to the number of pages downloaded per second. For example, between 15 and 16 seconds into the performance test, the throughput decreased while the number of pages downloaded per second increased.



#### Retries per Second Graph

The **Retries Per Second** graph shows the number of attempted Web server connections (y-axis) as a function of the elapsed time in the performance test (x-axis).

A server connection is retried when:

- The initial connection was unauthorized
- Proxy authentication is required
- The initial connection was closed by the server
- The initial connection to the server could not be made
- The server was initially unable to resolve the load generator's IP address

#### **Connections Graph**

The **Connections** graph shows the number of open TCP/IP connections (y-axis) at each point in time of the performance test (x-axis). One HTML page may cause the browser to open several connections, when links on the page go to different Web addresses. Two connections are opened for each Web server.

This graph is useful in indicating when additional connections are needed. For example, if the number of connections reaches a plateau, and the transaction response time increases sharply, adding connections would probably cause a dramatic improvement in performance (reduction in the transaction response time).

#### **Connections per Second Graph**

The **Connections Per Second** graph shows the number of new TCP/IP connections (y-axis) opened and the number of connections that are shut down each second of the performance test (x-axis).

This number should be a small fraction of the number of hits per second, because new TCP/IP connections are very expensive in terms of server, router and network resource consumption. Ideally, many HTTP requests should use the same connection, instead of opening a new connection for each request.

#### SSLs per Second Graph

The SSLs per Second graph shows the number of new and reused SSL connections (y-axis) opened in each second of the performance test (x-axis). An SSL connection is opened by the browser after a TCP/IP connection has been opened to a secure server.

Because creating a new SSL connection entails heavy resource consumption, you should try to open as few new SSL connections as possible; once you have established an SSL connection, you should reuse it. There should be no more than one new SSL connection per Vuser.

If you set your run-time settings to simulate a new Vuser at each iteration (using the run-time settings **Browser Emulation** node), you should have no more than one new SSL connection per Vuser per iteration. Ideally, you should have very few new TCP/IP and SSL connections each second.

#### **HTTP Status Codes**

The following table displays a list of HTTP status codes. These codes appear in the "Web Resource Monitoring Overview" on page 262

Code	Description	Code	Description
200	ОК	405	Method Not Allowed
201	Created	406	Not Acceptable
202	Accepted	407	Proxy Authentication Required
203	Non-Authoritative Information	408	Request Timeout
204	No Content	409	Conflict
205	Reset Content	410	Gone
206	Partial Content	411	Length Required
300	Multiple Choices	412	Precondition Failed
301	Moved Permanently	413	Request Entity Too Large
302	Found	414	Request - URI Too Large
303	See Other	415	Unsupported Media Type

Code	Description	Code	Description
304	Not Modified	416	Requested range not satisfiable
305	Use Proxy	417	Expectation Failed
307	Temporary Redirect	500	Internal Server Error
400	Bad Request	501	Not Implemented
401	Unauthorized	502	Bad Gateway
402	Payment Required	503	Service Unavailable
403	Forbidden	504	Gateway Timeout
404	Not Found	505	HTTP Version not supported

For more information on the above status codes and their descriptions, see http://www.w3.org/Protocols/rfc2616/rfc2616-sec10.html#sec10.

# **Chapter 19: Run-Time and Transaction Monitoring**

TING CHAPTEL HICHAGE	This	chapter	includes:
----------------------	------	---------	-----------

Run-Time Graph Overview	268
Transaction Monitor Graphs Overview	270

#### **Run-Time Graph Overview**

The **Run-Time** monitor provides information about the status of the Vusers participating in the performance test, as well as the number and types of errors that the Vusers generate. In addition, the Run-Time monitor provides the User-Defined Data Points graph, which displays the real time values for user-defined points in a Vuser script.

The Run-Time monitor is enabled by default—it automatically begins monitoring Vusers at the start of a performance test.

You can view the following Run-Time monitor graphs during a test run:

#### **Running Vusers Graph**

The monitor's **Running Vusers** graph provides information about the status of the Vusers running in the current performance test on all load generator machines. The graph shows the number of running Vusers, while the information in the legend indicates the number of Vusers in each state.

The Name 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 load generators.
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.

#### **User-Defined Data Points Graph**

The **User-Defined Data Points** graph displays the real-time values of user-defined data points. You define a data point in your Vuser script by inserting an **Ir\_user\_data\_point** function at the appropriate place (**user\_data\_point** for GUI Vusers and **Ir.user\_data\_point** for Java Vusers).

For Vuser protocols that support the graphical script representations such as Web and Oracle NCA, you insert a data point as a user-defined step. Data point information is gathered each time the script executes the function or step.

By default, ALM Performance Center displays all of the data points in a single graph. The legend provides information about each data point. If desired, you can hide specific data points using the legend below the graphs.

You can also view data points offline, after the completion of the performance test. For more information, see the *HP LoadRunner Analysis User Guide*.

#### **Error Statistics Graph**

The monitor's **Error Statistics** graph provides details about the number of errors that accrue during each second of the test run. The errors are grouped by error source—for example, the location in the script or the load generator name.

#### **Operations Graph**

The Operations graph shows virtual service operations performance counters on all the SV servers that are used in the scenario. It only shows services that are used in the scenario.



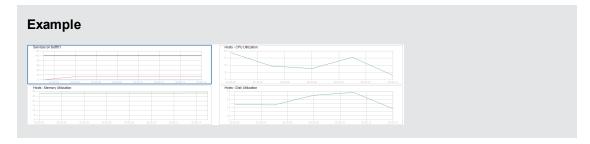
The **Operations on <server>** graph shows the measurement (y-axis) as a function of the elapsed time in the performance test (x-axis).

Measurement	Description
Average Response Time	Average response time of virtual service in milliseconds.
Hit Rate	The number of requests per second of the virtual service operation.
Throughput	Data sent and received by virtual service operation measured in megabytes.

#### Services Graph

The Services monitor displays information about the virtual services used during a test run.

The **Services on <server>** graph shows the measurement (y-axis) as a function of the elapsed time in the performance test (x-axis).



Measurement	Description
Average Response Time	Average Response Time on virtual service in milliseconds.
Data Simulation Accuracy	Accuracy of Data Model emulation on virtual service displayed as a percentage. Accuracy is compared to the recorded behavior on the corresponding actual service, if available.
Hit Rate	The number of requests per second of the virtual service.
Performance Simulation Accuracy	Accuracy of performance model emulation on virtual service displayed as a percentage. Accuracy is compared to the recorded behavior on the corresponding actual service, if available.
Throughput	Data sent and received on virtual service measured in megabytes per second.

#### **Vusers with Errors Graph**

The **Vusers with Errors** graph provides details about the number of Vusers that generate errors during test execution. The errors are grouped by error source.

#### Transaction Monitor Graphs Overview

The Transaction monitor displays the transaction rate and response time during a test run. The Transaction monitor is enabled by default—it automatically begins monitoring Vuser transactions at the start of a test run. To conserve resources, you can disable the Transaction monitor from the Controller.

You can view the following Transaction monitor graphs during a test run:

- The **Transaction Response Time** graph shows the average response time of transactions in seconds (y-axis) as a function of the elapsed time in the performance test (x-axis).
- The **Transactions per Second (Passed)** graph shows the number of successful transactions performed per second (y-axis) as a function of the elapsed time in the performance test (x-axis).
- The **Transactions per Second (Failed, Stopped)** graph shows the number of failed and stopped transactions per second (y-axis) as a function of the elapsed time in the performance test (x-axis).
- The **Total Transactions per Second (Passed)** graph shows the total number of completed, successful transactions per second (y-axis) as a function of the elapsed time in the performance test (x-axis).

#### Note:

- If there are no transactions defined in your Vuser script or if no transactions are being executed, no data will be displayed in the online monitor graphs.
- To generate Web Page diagnostics for each transaction, configure the Diagnostics options from the Controller.

#### **Chapter 20: System Resource Monitoring**

#### This chapter includes:

System Resource Monitors Overview	272
Windows Resource Monitoring	272
UNIX Resource Monitoring	272
SNMP Resource Monitoring	272
SiteScope Resource Monitoring	272
How to Set up the UNIX Monitoring Environment	273
LINIX Resources Performance Counters	274

#### **System Resource Monitors Overview**

You use ALM Performance Center's System Resource monitors to monitor a machine's system resource usage during a performance test run and isolate server performance bottlenecks.

A primary factor in a transaction's response time is its system resource usage. Using the ALM Performance Center resource monitors, you can monitor the Windows, UNIX, SiteScope, and SNMP server on a machine during a test run, and determine why a bottleneck occurred on a particular machine.

The resource monitors are automatically enabled when you execute a test run. However, you must specify the machine you want to monitor and which resources to monitor for each machine. You can also add or remove machines and resources during the test run.

#### **Windows Resource Monitoring**

The Windows Resources monitor shows the Windows resources measured during the test run. Windows measurements correspond to the built-in counters available from the Windows Performance Monitor.

If you want to monitor a remote Windows server that does not use Windows domain security, you must authenticate the Controller on the remote Windows server. To authenticate the Controller, create an account, or change the password of the account used to log on to the Controller so that it matches the password and user name used to log on to the remote monitored Windows machine. When the remote Windows machine requests another machine's resources, it sends the logged-in user name and password of the machine requesting the resources.

#### **UNIX Resource Monitoring**

The UNIX Resources monitor shows the UNIX resources measured during the test run. This graph helps you determine the impact of Vuser load on the various system resources.

The UNIX kernel statistics measurements include those available by the **rstatd** daemon. For a description of the measurements, see "UNIX Resources Performance Counters" on page 274.

**Note:** You must configure an **rstatd** daemon on all UNIX machines being monitored. For information see "How to Set up the UNIX Monitoring Environment" on next page.

#### **SNMP Resource Monitoring**

The SNMP Resource monitor shows statistics for a Windows or UNIX machine using the Simple Network Management Protocol (SNMP). The SNMP Resources monitor is available for monitoring any machine that runs an SNMP agent, using the Simple Network Management Protocol (SNMP).

#### SiteScope Resource Monitoring

The SiteScope Resources monitor graph shows the SiteScope resources measured during the test run. The SiteScope monitor can measure server, network, and processor performance counters.

For detailed information on the performance counters that SiteScope can monitor, refer to the relevant SiteScope documentation.

Before setting up the SiteScope monitor, ensure that SiteScope has been installed on a server. You can install SiteScope on the same machine as the Controller, or on a dedicated server. If SiteScope is installed on a machine other than the Controller, verify that the SiteScope machine is accessible from the Controller machine.

#### How to Set up the UNIX Monitoring Environment

This task describes how to configure the UNIX environment before setting up the UNIX monitor.

This task includes the following steps:

- "Verify whether the rstatd daemon is already configured" below
- "Configure the rstatd daemon" below
- "Configure the monitor for a UNIX machine over a firewall (optional)" below
- "Configure the monitor measurements on the Controller" on next page

#### Verify whether the rstatd daemon is already configured

The rstatd daemon might already be configured, because when a machine receives an rstatd request, the inetd on that machine automatically activates the rstatd.

■ The **rup** command reports various machine statistics, including rstatd configuration. Run the following command on the UNIX machine to view the machine statistics:

```
>rup host
```

You can also use Ir\_host\_monitor and see if it returns any relevant statistics.

If the command returns meaningful statistics, the retatd daemon is already configured and activated. If not, or if you receive an error message, the retatd daemon is not configured.

#### 2. Configure the rstatd daemon

If the rstatd daemon is not yet configured, follow these steps to configure it:

- a. On the UNIX machine, run the command: su root
- b. Go to **/etc/inetd.conf** and look for the rstatd row (it begins with the word rstatd). If it is commented out (with a #), remove the comment directive, and save the file.
- c. From the command line, run:

```
kill -1 inet pid
```

where <code>inet\_pid</code> is the pid of the inetd process. This instructs the inetd to rescan the <code>/etc/inetd.conf</code> file and register all daemons which are uncommented, including the rstatd daemon.

d. Run **rup** again.

If the command still does not indicate that the rstatd daemon is configured, contact your system administrator.

3. Configure the monitor for a UNIX machine over a firewall (optional)

To monitor a UNIX machine over a firewall, you must run a UNIX utility called rpcinfo and identify the rstatd's port number.

Run **rpcinfo** -p <hostname>. You will receive a list of all RPC servers registered in the host's portmapper, along with the port number. This list will not change until retatd is stopped and rerun.

Some firewalls allow you to open an RPC program number instead of a port. In such cases, open program 100001. If are prompted to include a version number, specify versions 3 and 4.

#### 4. Configure the monitor measurements on the Controller

For task details, see "How to Create and Configure Monitor Profiles" on page 58.

For a description of the available UNIX monitor measurements, see "UNIX Resources Performance Counters" below.

#### **UNIX Resources Performance Counters**

The following default measurements are available for the UNIX machine:

Measurement	Description
Average load	Average number of processes simultaneously in Ready state during the last minute.
Collision rate	Collisions per second detected on the Ethernet.
Context switches rate	Number of switches between processes or threads, per second.
CPU utilization	Percent of time that the CPU is utilized.
Disk rate	Rate of disk transfers.
Incoming packets error rate	Errors per second while receiving Ethernet packets.
Incoming packets rate	Incoming Ethernet packets per second.
Interrupt rate	Number of device interrupts per second.
Outgoing packets errors rate	Errors per second while sending Ethernet packets.
Outgoing packets rate	Outgoing Ethernet packets per second.
Page-in rate	Number of pages read to physical memory, per second.
Page-out rate	Number of pages written to pagefile(s) and removed from physical memory, per second.
Paging rate	Number of pages read to physical memory or written to pagefile(s), per second.
Swap-in rate	Number of processes being swapped in.

#### Chapter 20: System Resource Monitoring

Measurement	Description
Swap-out rate	Number of processes being swapped out.
System mode CPU utilization	Percent of time that the CPU is utilized in system mode.
User mode CPU utilization	Percent of time CPU is utilized in user mode.

#### **Chapter 21: Network Delay Monitoring**

#### This chapter includes:

Network Monitoring Overview	278
How to Set Up the Network Monitoring Environment	279
How to Configure the UNIX Source Machine for Network Monitoring	280
Network Delay Monitoring User Interface	282
Troubleshooting and Limitations	282

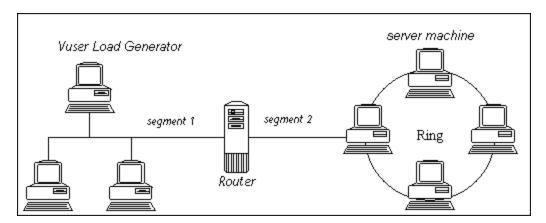
#### **Network Monitoring Overview**

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

You use Network monitoring to determine whether your network is causing a delay in the performance test. You can also determine the problematic network segment.

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

The following diagram shows a typical network. To go from the server machine to the Vuser machine, data must travel over several segments.



The Network Delay Time monitor shows the delays for the complete path between the source and destination machines (for example the database server and Vuser host). The graph maps the delay as a function of the elapsed performance test time. Each defined path is represented by a separate line with a different color in the graph.

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

**Note:** The delays from the source machine to each of the nodes are measured concurrently, yet independently. It is therefore possible that the delay from the source machine to one of the nodes could be greater than the delay for the complete path between the source and destination machines.

- For information about how to set up the network monitoring environment, see "How to Set Up the Network Monitoring Environment" on next page.
- For information about how to configure the UNIX source machine for network monitoring, see "How to Configure the UNIX Source Machine for Network Monitoring" on page 280.

#### How to Set Up the Network Monitoring Environment

This task describes how to prepare your environment for network monitoring.

To lean more about network monitoring, see "Network Monitoring Overview" on previous page.

This task includes the following steps:

- "Prerequisites" below
- "Configure the UNIX source machine optional" below
- "Configure the firewall between the source and destination machines Optional" below
- "Configure the Network monitor on the Controller" on next page

#### 1. Prerequisites

To enable network monitoring, you must install the Performance Center agent on the source machine. You do not have to install the Performance Center agent on the destination machine.

To run the Network monitor, you must have administrator privileges on the Windows source machine (unless you are using the ICMP protocol).

#### 2. Configure the UNIX source machine - optional

You can run the Network monitor on UNIX source machines, using UDP or ICMP. Before running the Network monitor from a UNIX source machine, configure the source machine. For task details, see "How to Configure the UNIX Source Machine for Network Monitoring" on next page.

#### Configure the firewall between the source and destination machines Optional

If you are monitoring a network in which there are firewalls between the source and the destination machines, you must configure the firewalls to allow the network data packets to reach their destinations.

- If you are using the TCP protocol, the firewall that protects the destination machine should not block outgoing ICMP\_TIMEEXCEEDED packets (packets that are sent outside the firewall from the machine). In addition, the firewall protecting the source machine should allow ICMP\_TIMEEXCEEDED packets to enter, as well as TCP packets to exit.
- If you are using the ICMP protocol, the destination machine's firewall should not block incoming ICMP\_ECHO\_REQUEST packets, or outgoing ICMP\_ECHO\_REPLY and ICMP\_ECHO\_TIMEEXCEEDED packets. In addition, the firewall protecting the source machine should allow ICMP\_ECHO\_REPLY and ICMP\_ECHO\_TIMEEXCEEDED packets to enter, and ICMP\_ECHO\_REQUEST packets to exit.
- If you are using the UDP protocol, ensure that the UDP protocol can access the destination machine from the source machine. The destination machine's firewall should not block outgoing ICMP\_DEST\_UNREACHABLE and ICMP\_ECHO\_TIMEEXCEEDED packets. In addition, the firewall protecting the source machine should allow ICMP\_DEST\_UNREACHABLE and ICMP\_ECHO\_TIMEEXCEEDED packets to enter.

**Note:** To run the Network Delay monitor when there are firewalls between the Controller and the source machine, you must configure the Performance Center agent, MI Listener, and Network Delay monitor for monitoring over a firewall.

#### 4. Configure the Network monitor on the Controller

For task details, see "How to Create and Configure Monitor Profiles" on page 58.

#### How to Configure the UNIX Source Machine for Network Monitoring

This task describes how to configure a UNIX source machine before running the network monitor.

To lean more about network monitoring, see "Network Monitoring Overview" on page 278.

This task includes the following steps:

- "Assign permissions where Performance Center is installed locally" below
- "Assign permissions where Performance Center is installed on the network" below
- "Connect to the Unix Source Machine Through RSH" on next page
- "Connect to the Unix Source Machine Through the Agent" on next page

#### 1. Assign permissions where Performance Center is installed locally

Follow these steps to assign root permissions to the **merc\_webtrace** process:

- a. Log in to the source machine as root.
- b. Type: cd <performance center\_installation>/bin to change to the bin directory.
- Type: chown root merc\_webtrace to make the root user the owner of the merc\_webtrace file.
- d. Type: **chmod +s merc\_webtrace** to add the s-bit to the file permissions.
- e. To verify, type Is -I merc\_webtrace. The permissions should look like this: -rwsrwsr-x.

#### 2. Assign permissions where Performance Center is installed on the network

In a Performance Center network installation, the **merc\_webtrace** process is on the network, not on the source machine disk. The following procedure copies the **merc\_webtrace** file to the local disk, configures **mdrv.dat** to recognize the process, and assigns root permissions to **merc\_webtrace**:

a. Copy merc\_webtrace from <performance center\_installation>/bin to anywhere on the local disk of the source machine. For example, to copy the file to the /local/<performance center> directory, type: cp /net/tools/performance center\_ installation/bin/merc\_webtrace /local/<performance center>

Note: All of the source machines that use the same network installation must copy

merc\_webtrace to the identical directory path on their local disk (for example, /local/<performance center>), since all of them use the same mdrv.dat.

b. Add the following line to the <performance center\_installation>/dat/mdrv.dat file, in the [monitors server] section:

```
ExtCmdLine=-merc webtrace path /local/xxx
```

- c. Log in to the source machine as root.
- d. Type: cd performance center installation/bin to change to the bin directory.
- e. Type: chown root merc\_webtrace to make the root user the owner of the merc\_ webtrace file.
- f. Type: chmod +s merc webtrace to add the s-bit to the file permissions.
- g. To verify, type ls -l merc\_webtrace. The permissions should look like: -rwsrwsr-x.

#### 3. Connect to the Unix Source Machine Through RSH

Follow these instructions if the Controller is connected to the source machine through RSH (default connection mode). In this case you do not need to activate the agent daemon.

Before running the Network monitor the first time, you enter an encrypted user name and password in the Network monitor configuration file.

- a. On the Performance Center host machine, type cd <Performance Center installation>/bin to change the bin directory.
- b. Run CryptonApp.exe.
- c. In the **Password** box, type your RSH user name and password, separated by a vertical bar symbol. For example, myname | mypw.
- d. Click **Generate**. An encoded string is displayed in the Encoded string field.
- e. Click **Copy** to copy the encoded string to the clipboard.
- f. Add the following line to the <performance center\_installation>/dat/monitors/ndm.cfg file, in the [hosts] section:

```
Host = <encrypted string copied from clipboard>
```

g. Close and open the current performance test. ALM Performance Center will read the updated configuration file and recognize the source machine for monitoring.

#### 4. Connect to the Unix Source Machine Through the Agent

Follow these instructions for activating agent daemon on the source machine if the Controller is not connected to the source machine through RSH.

- a. Type m\_daemon\_setup -install from the <performance center\_installation>/bin directory.
- b. Make sure that the agent daemon is running whenever you activate the Network monitor.
- c. To stop the Network Delay Monitor agent daemon, type m daemon setup -remove.

#### **Network Delay Monitoring User Interface**

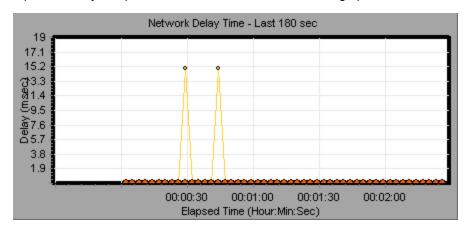
This section includes:

• "Network Delay Time Graph" below

#### **Network Delay Time Graph**

The Network Delay Time graph shows the delay for the complete path between the source and destination machines (y-axis) as a function of the elapsed performance test time (x-axis).

Each path defined in the Add Destination Machines for Network Delay Monitoring dialog box is represented by a separate line with a different color in the graph.



#### **Troubleshooting and Limitations**

This section describes troubleshooting for the Network Delay monitor.

If monitoring is unsuccessful and ALM Performance Center cannot locate the source or destination machines, make sure that the specified machines are available to your machine. Perform a "ping" operation. At the command line prompt, type <code>Ping server name</code>.

To check the entire network path, use the trace route utility to verify that the path is valid.

For Windows, type tracert <server name>.

For UNIX, type traceroute <server name>.

If the monitoring problem persists once you verify that the machines are accessible and that the network path is valid, perform the following procedures:

- If you receive results by running webtrace.exe, the problem is related to the Controller. Verify that the source machine is not a UNIX machine, and contact the Customer Support Web site with the following information:
  - the Controller log file, **drv\_log.txt**, located in the **temp** directory of the Controller machine.
  - the **traceroute\_server** log file, located on the source machine.
  - the debug information located in the TRS\_debug.txt and WT\_debug.txt files in the path directory. These files are generated by adding the following line to the [monitors\_server] section of the <performance center root folder>\dat\mdrv.dat file, and rerunning the Network monitor:

```
ExtCmdLine=-traceroute debug path
```

- 3. If you do not receive results by running **webtrace.exe**, the problem is related to the WebTrace technology, on which the Network Delay monitor is based. Perform the following procedures on the source machine:
  - Verify that the packet.sys file (the Webtrace driver) exists in the WINNT\system32\drivers
    directory.
  - Check whether a driver (such as "Cloud" or "Sniffer") is installed on top of the network card driver. If so, remove it and run WebTrace again.
  - Verify that there are administrator permissions on the machine.
  - Using ipconfig /all, check that only one IP address is assigned to the network card.
     WebTrace does not know how to handle multiple IP addresses assigned to the same card (IP spoofing).
  - Check the number of network cards installed. Run webtrace -devlist to receive a list of the available network cards.
  - If there is more than one card on the list, run webtrace -dev <dev\_name> <destination>, where <dev\_name> is one of the network card names shown in the list.
    If you discover that WebTrace is binding to the wrong card, you can use webtrace set\_device <dev\_name> to set a registry key that instructs WebTrace to use a specified card instead of the default one.
  - Verify that the network card is of the Ethernet type.
  - Contact the Customer Support Web site with the output of webtrace.exe -debug (for example, webtrace.exe -debug www.merc-int.com) and ipconfig /all on the machine.

# User and Administrator Guide Chapter 21: Network Delay Monitoring

#### **Chapter 22: Web Server Resource Monitoring**

#### This chapter includes:

Web Server Resource Monitoring Overview	286
How to Change the Apache Default Server Properties	286
Apache Performance Counters	286
Microsoft IIS Performance Counters	287

#### Web Server Resource Monitoring Overview

Web Server Resource monitors provide you with information about the resource usage of the Microsoft IIS and Apache Web servers during performance test execution. To obtain this data, you need to activate the online monitor for the server and specify which resources you want to measure before executing the test.

For information about how to configure the monitors on the Controller, see "How to Set Up the Monitoring Environment – Workflow" on page 258.

## How to Change the Apache Default Server Properties

This task describes how to modify the Apache default server properties that are defined in the monitor configuration file.

- Open the apache.cfg file in the <performance center server root folder>\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 monitor will poll the server for the statistics information. If this value is greater than 1000, ALM Performance Center will use it as its sampling rate. Otherwise, it will use the sampling rate defined in the Monitors tab of the Options dialog box.

3. Save and close the file.

#### **Apache Performance Counters**

The following table describes the measurements and server properties that can be monitored on the Apache Web server during the test run:

Measurement	Description
# Busy Servers	The number of servers in the Busy state.
# Idle Servers	The number of servers in the Idle state.
Apache CPU Usage	The percentage of time the CPU is utilized by the Apache server.
Hits/sec	The HTTP request rate.
KBytes Sent/sec The rate at which data bytes are sent from the Web server.	

#### **Microsoft IIS Performance Counters**

The following table describes the measurements and server properties that can be monitored on the Microsoft IIS Web server during the test run:

Object	Measurement	Description
Web Service	Bytes Sent/sec	The rate at which the data bytes are sent by the Web service.
Web Service	Bytes Received/sec	The rate at which the data bytes are received by the Web service.
Web Service	Get Requests/sec	The rate at which HTTP requests using the GET method are made. Get requests are generally used for basic file retrievals or image maps, though they can be used with forms.
Web Service	Post Requests/sec	The rate at which HTTP requests using the POST method are made. Post requests are generally used for forms or gateway requests.
Web Service	Maximum Connections	The maximum number of simultaneous connections established with the Web service.
Web Service	Current Connections	The current number of connections established with the Web service.
Web Service	Current NonAnonymous Users	The number of users that currently have a non-anonymous connection using the Web service.
Web Service	Not Found Errors/sec	The rate of errors due to requests that could not be satisfied by the server because the requested document could not be found. These are generally reported to the client as an HTTP 404 error code.
Process	Private Bytes	The current number of bytes that the process has allocated that cannot be shared with other processes.

# **User and Administrator Guide** Chapter 22: Web Server Resource Monitoring

# **Chapter 23: Web Application Server Resource Monitoring**

Web Application Server Resource Monitoring Overview	290
MS Active Server Pages Performance Counters	290

## Web Application Server Resource Monitoring Overview

You use ALM Performance Center's Web Application Server Resource monitors to monitor Microsoft Active Server Pages servers during a test run and isolate application server performance bottlenecks.

The Microsoft Active Server Pages (ASP) monitor displays statistics about the resource usage on the ASP server during the test run.

## **MS Active Server Pages Performance Counters**

The following table describes the default counters that can be monitored:

Measurement	Description
Errors per Second	The number of errors per second.
Requests Wait Time	The number of milliseconds the most recent request was waiting in the queue.
Requests Executing	The number of requests currently executing.
Requests Queued	The number of requests waiting in the queue for service.
Requests Rejected	The total number of requests not executed because there were insufficient resources to process them.
Requests Not Found	The number of requests for files that were not found.
Requests/sec	The number of requests executed per second.
Memory Allocated	The total amount of memory, in bytes, currently allocated by Active Server Pages.
Errors During Script Run-Time	The number of failed requests due to run-time errors.
Sessions Current	The current number of sessions being serviced.
Transactions/sec	The number of transactions started per second.

## **Chapter 24: Database Resource Monitoring**

## This chapter includes:

Database Resource Monitoring Overview	292
How to Set Up the Oracle Monitoring Environment	292
Oracle Performance Counters	294
SQL Server Performance Counters	295

## **Database Resource Monitoring Overview**

ALM Performance Center's Database Server Resource monitors measure database resource usage statistics for Oracle, or SQL Servers during a performance test run. You use these monitors to isolate database server performance bottlenecks.

The Oracle monitor displays information from Oracle V\$ tables: Session statistics, V\$SESSTAT, system statistics, V\$SYSSTAT, and other table counters defined by the user in the custom query.

Before defining the monitoring measurements for the Oracle monitors in the Controller, you must set up the monitoring environment on the database server.

For details about the Oracle monitor configuration, see "How to Set Up the Oracle Monitoring Environment" below.

## How to Set Up the Oracle Monitoring Environment

This task describes how to set up the monitor environment before monitoring an Oracle database server.

**Note:** If a problem occurs in setting up the Oracle environment, check the Oracle server to view the error messages.

This task includes the following steps:

- "Prerequisites" below
- "Configure the Oracle client/server connection" on next page
- "Connect to the monitored server machine and verify the connection" on next page
- "Modify the monitoring sample rate (optional)" on page 294
- "Configure the Oracle monitor on the Controller" on page 294

#### 1. Prerequisites

- Ensure that the Oracle client libraries are installed on the Controller machine.
- Verify that %OracleHome%\bin is included in the path environment variable. If it is not, add
  it.
- Ensure that the registries are updated for the version of Oracle that you are using and that they have the following key: HKEY\_LOCAL\_MACHINE\SOFTWARE\ORACLE
- Ensure that the Performance Center Server is installed in a directory whose path does not include any of the following characters: ():;\*\/"~&?{}\$%|<>+=^[].
- Verify that the Oracle server you want to monitor is up and running. Note that it is possible to monitor several Oracle database servers concurrently.

Note: Only the 32-bit Oracle client should be installed on the Controller machine running

the Oracle monitor. If you have a 16-bit and a 32-bit Oracle client installation on the Controller machine, the 16-bit installation should be uninstalled.

#### 2. Configure the Oracle client/server connection

Set the connection parameters so the Oracle client (Controller machine) can communicate with the Oracle server(s) you plan to monitor.

On the Controller machine, set the following configuration parameters either by editing the **tnsnames.ora** file in a text editor, or using the Oracle service configuration tool.

#### **Example:**

#### Start > Programs > Oracle for Windows NT > Oracle Net8 Easy Config

- A new service name (TNS name) for the Oracle instance
- TCP protocol
- The host name (name of monitored server machine)
- The port number (usually 1521)
- The database SID (the default SID is ORCL)

Example:

```
TOPAZ.MERCURY.COM =

(DESCRIPTION =

(ADDRESS_LIST =

(ADDRESS = (PROTOCOL = TCP)(HOST = night)(PORT = 1521))

)

(CONNECT_DATA =

(SID = ORCL)

)
```

#### 3. Connect to the monitored server machine and verify the connection

- a. Obtain a username and password for the service from your database administrator, and ensure that the Controller has database administrator privileges for the Oracle V\$ tables (V\$SESSTAT, V\$SYSSTAT, V\$STATNAME, V\$INSTANCE, V\$SESSION).
- b. Verify connection with the Oracle server by performing **tns ping** from the Controller machine.

**Note:** There may be a problem connecting if the Oracle server is behind a DMZ/firewall that limits its communication to application servers accessing it.

c. Run SQL\*Plus from the Controller and attempt to log in to the Oracle server(s) with the

desired username/password/server combination.

d. Type **SELECT** \* **FROM V\$SYSSTAT** to verify that you can view the V\$SYSSTAT table on the Oracle server. Use similar queries to verify that you can view the V\$SESSTAT, V\$SESSION, V\$INSTANCE, V\$STATNAME, and V\$PROCESS tables on the server.

#### 4. Modify the monitoring sample rate (optional)

To change the length of each monitoring sample (in seconds), edit the **dat\monitors\vmon.cfg** file in the Performance Center root folder. The default rate is 10 seconds.

The minimum sampling rate for the Oracle Monitor is 10 seconds. If you set the sampling rate at less than 10 seconds, the Oracle Monitor will continue to monitor at 10 second intervals.

#### 5. Configure the Oracle monitor on the Controller

For task details, see "How to Create and Configure Monitor Profiles" on page 58.

## **Oracle Performance Counters**

The following measurements are most commonly used when monitoring the Oracle server (from the V\$SYSSTAT table):

Measurement	Description
CPU used by this session	The amount of CPU time (in 10s of milliseconds) used by a session between the time a user call started and ended. Some user calls can be completed within 10 milliseconds and, as a result, the start and end-user call time can be the same. In this case, 0 milliseconds are added to the statistic. A similar problem can exist in the operating system reporting, especially on systems that suffer from many context switches.
Bytes received via SQL*Net from client	The total number of bytes received from the client over Net8.
Logons current	The total number of current logons.
Opens of replaced files	The total number of files that needed to be reopened because they were no longer in the process file cache.
User calls	Oracle allocates resources (Call State Objects) to keep track of relevant user call data structures every time you log in, parse, or execute. When determining activity, the ratio of user calls to RPI calls gives you an indication of how much internal work is generated as a result of the type of requests the user is sending to Oracle.

Measurement	Description
SQL*Net roundtrips to/from client	The total number of Net8 messages sent to, and received from, the client.
Bytes sent via SQL*Net to client	The total number of bytes sent to the client from the foreground processes.
Opened cursors current	The total number of current open cursors.
DB block changes	Closely related to consistent changes, this statistic counts the total number of changes that were made to all blocks in the SGA that were part of an update or delete operation. These are changes that generate redo log entries and hence will cause permanent changes to the database if the transaction is committed. This statistic is a rough indication of total database work and indicates (possibly on a per-transaction level) the rate at which buffers are being dirtied.
Total file opens	The total number of file opens being performed by the instance. Each process needs a number of files (control file, log file, database file) to work against the database.

## **SQL Server Performance Counters**

The following table describes the default counters that can be monitored on version 6.5 of the SQL Server:

Measurement	Description
% Total Processor Time	The average percentage of time that all the processors on the system are busy executing non-idle threads. On a multi-processor system, if all processors are always busy, this is 100%, if all processors are 50% busy this is 50% and if 1/4 of the processors are 100% busy this is 25%. It can be viewed as the fraction of the time spent doing useful work. Each processor is assigned an Idle thread in the Idle process which consumes those unproductive processor cycles not used by any other threads.
% Processor Time	The percentage of time that the processor is executing a non-idle thread. This counter was designed as a primary indicator of processor activity. It is calculated by measuring the time that the processor spends executing the thread of the idle process in each sample interval, and subtracting that value from 100%. (Each processor has an idle thread which consumes cycles when no other threads are ready to run). It can be viewed as the percentage of the sample interval spent doing useful work. This counter displays the average percentage of busy time observed during the sample interval. It is calculated by monitoring the time the service was inactive, and then subtracting that value from 100%.

Measurement	Description
Cache Hit Ratio	The percentage of time that a requested data page was found in the data cache (instead of being read from disk).
I/O - Batch Writes/sec	The number of 2K pages written to disk per second, using Batch I/O. The checkpoint thread is the primary user of Batch I/O.
I/O - Lazy Writes/sec	The number of 2K pages flushed to disk per second by the Lazy Writer.
I/O - Outstanding Reads	The number of physical reads pending.
I/O - Outstanding Writes	The number of physical writes pending.
I/O - Page Reads/sec	The number of physical page reads per second.
I/O - Transactions/sec	The number of Transact-SQL command batches executed per second.
User Connections	The number of open user connections.

# **Chapter 25: ERP/CRM Server Resource Monitoring**

## This chapter includes:

ERP/CRM Server Resource Monitoring Overview	.298
How to Set Up the PeopleSoft (Tuxedo) Resource Monitor	.298
How to Set Up the SAPGUI Server Resource Monitor	.299
PeopleSoft (Tuxedo) Performance Counters	.300
SAPGUI Performance Counters	301

## **ERP/CRM Server Resource Monitoring Overview**

You use ALM Performance Center's ERP/CRM server resource monitors to monitor ERP/CRM servers during a performance test run and isolate server performance bottlenecks.

- The PeopleSoft (Tuxedo) monitor displays statistics about the resource usage of a PeopleSoft (Tuxedo) server during the test run.
- The SAPGUI monitor displays statistics about the resource usage of a SAP R/3 system during the test run. You can use the SAPGUI monitor to view:
- The number of configured instances for each SAP system
- Data for all application instances (not just the one you logged on to)
- Transactions used and the users that call them
- Number of users working on the different instances
- Performance history for recent periods of all instances
- Response time distribution
- Resource consumption for any application server
- Application server workload for the current day or for a recent period

## How to Set Up the PeopleSoft (Tuxedo) Resource Monitor

This task describes the working order for setting up the monitoring environment. If Tuxedo 7.1 or later is installed, you can monitor more than one PeopleSoft (Tuxedo) application server at a time. If Tuxedo 6.5 or earlier is installed, you can monitor only one PeopleSoft (Tuxedo) application server at a time.

This task includes the following steps:

- "Prerequisites" below
- "Define the environment variables on the Controller machine" on next page
- "Check the Workstation Listener (WSL) Process" on next page
- "Configure the PeopleSoft (Tuxedo) monitor on the Controller" on next page

#### 1. Prerequisites

Ensure that a Tuxedo workstation client (not a native client), version 6.3 or later, is installed on the Controller machine.

Use a Tuxedo 6.x client if a Tuxedo 6.x server is used, and Tuxedo 7.1 or later client if a Tuxedo 7.1 or later server is used.

If you use a Tuxedo 6.5 or earlier server, you can still use a Tuxedo 7.1 or later client in order to monitor it, provided that you set the **WSINTOPPRE71** environment variable to **yes**.

**Note:** A Tuxedo workstation client communicates with the application server over the network, and is not required to run the Tuxedo application server on the same machine. A native client can only communicate with the Tuxedo application server if it is part of the relevant Tuxedo domain.

#### 2. Define the environment variables on the Controller machine

- a. Set the TUXDIR variable to the Tuxedo installation directory (for example, V:\environ\32\Tuxedo 8.0).
- b. Add the Tuxedo **bin** directory to the **PATH** variable.

#### Check the Workstation Listener (WSL) Process

Ensure that the workstation listener (WSL) process is running. This enables the application server to accept requests from workstation clients.

The address and port number used to connect to the application server must match those dedicated to the WSL process.

**Note:** For information on configuring the WSL, refer to the BEA Tuxedo Web site.

#### 4. Configure the PeopleSoft (Tuxedo) monitor on the Controller

For task details, see "How to Create and Configure Monitor Profiles" on page 58.

## How to Set Up the SAPGUI Server Resource Monitor

This task describes the working order for setting up the monitoring environment.

**Note:** The SAPGUI monitor supports SAP server versions 3.1 to 4.6, regardless of the SAP R/3 server's operating system and the platform on which it is installed.

This task includes the following steps:

- "Prerequisites" below
- "Enable the last minute load from the client" on next page
- "Configure the SAPGUI Server Resource monitor on the Controller" on next page

#### 1. Prerequisites

**Note:** Once the SAPGUI monitor is activated on the Controller machine, you cannot record a SAPGUI protocol script on that machine.

- Install the SAPGUI for Windows 6.20 client on the Controller machine.
- Install the latest patch for the SAPGUI for Windows 6.20 client. The lowest supported level is patch 36. (SAPGUI patches can be downloaded from https://websmp104.sap-

ag.de/patches. You will need a valid Service Marketplace username and password to access this site.)

#### 2. Enable the last minute load from the client

From the SAPGUI client application, click **F6** to determine whether you can access the st03 transaction and query for **last minute load** information.

If this functionality is not already enabled, enable it from the SAP R/3 client on the Controller machine, using the username and password defined in the Controller.

Configure the SAPGUI Server Resource monitor on the Controller
For task details, see "How to Create and Configure Monitor Profiles" on page 58.

## **PeopleSoft (Tuxedo) Performance Counters**

The following table describes the default counters that can be measured. It is recommended to pay particular attention to the following measurements: % Busy Clients, Active Clients, Busy Clients, Idle Clients, and all the queue counters for the APPQ/PSAPPSRV queue.

Monitor	Measurements
Machine	% Busy Clients - The percent of active clients currently logged in to the Tuxedo application server that are waiting for a response from the application server.
	Active Clients - The total number of active clients currently logged in to the Tuxedo application server.
	<b>Busy Clients</b> - The total number of active clients currently logged in to the Tuxedo application server that are waiting for a response from the application server.
	<b>Current Accessers</b> - The number of clients and servers currently accessing the application either directly on this machine or through a workstation handler on this machine.
	<b>Current Transactions</b> - The number of in use transaction table entries on this machine.
	Idle Clients - The total number of active clients currently logged in to the Tuxedo application server that are not waiting for a response from the application server.
	Workload Completed/second - The total workload on all the servers for the machine that was completed, per unit time.
	Workload Initiated/second - The total workload on all the servers for the machine that was initiated, per unit time.
Queue	% Busy Servers - The percent of active servers currently handling Tuxedo requests.
	Active Servers - The total number of active servers either handling or waiting to handle Tuxedo requests.

Monitor	Measurements
	<b>Busy Servers</b> - The total number of active servers currently busy handling Tuxedo requests.
	Idle Servers - The total number of active servers currently waiting to handle Tuxedo requests.
	<b>Number Queued</b> - The total number of messages which have been placed on the queue.
Server	Requests/second - The number of server requests handled per second.
	Workload/second - The workload is a weighted measure of the server requests. Some requests could have a different weight than others. By default, the workload is always 50 times the number of requests.
Workstation Handler (WSH)	<b>Bytes Received/sec</b> - The total number of bytes received by the workstation handler, per second.
	Bytes Sent/sec - The total number of bytes sent back to the clients by the workstation handler, per second.
	<b>Messages Received/sec</b> - The number of messages received by the workstation handler, per second.
	<b>Messages Sent/sec</b> - The number of messages sent back to the clients by the workstation handler, per second.
	<b>Number of Queue Blocks/sec</b> - The number of times the queue for the workstation handler blocked, per second. This gives an idea of how often the workstation handler was overloaded.

## **SAPGUI Performance Counters**

The following table lists the most commonly monitored counters:

Measurement	Description
Average CPU time	The average CPU time used in the work process.
Average response time	The average response time, measured from the time a dialog sends a request to the dispatcher work process, through the processing of the dialog, until the dialog is completed and the data is passed to the presentation layer. The response time between the SAPGUI and the dispatcher is not included in this value.

Measurement	Description
Average wait time	The average amount of time that an unprocessed dialog step waits in the dispatcher queue for a free work process. Under normal conditions, the dispatcher work process should pass a dialog step to the application process immediately after receiving the request from the dialog step. Under these conditions, the average wait time would be a few milliseconds. A heavy load on the application server or on the entire system causes queues at the dispatcher queue.
Average load time	The time needed to load and generate objects, such as ABAP source code and screen information, from the database.
Database calls	The number of parsed requests sent to the database.
Database requests	The number of logical ABAP requests for data in the database. These requests are passed through the R/3 database interface and parsed into individual database calls. The proportion of database calls to database requests is important. If access to information in a table is buffered in the SAP buffers, database calls to the database server are not required. Therefore, the ratio of calls/requests gives an overall indication of the efficiency of table buffering. A good ratio would be 1:10.
Roll ins	The number of rolled-in user contexts.
Roll outs	The number of rolled-out user contexts.
Roll in time	The processing time for roll ins.
Roll out time	The processing time for roll outs.
Roll wait time	The queue time in the roll area. When synchronous RFCs are called, the work process executes a roll out and may have to wait for the end of the RFC in the roll area, even if the dialog step is not yet completed. In the roll area, RFC server programs can also wait for other RFCs sent to them.
Average time per logical DB call	The average response time for all commands sent to the database system (in milliseconds). The time depends on the CPU capacity of the database server, the network, the buffering, and on the input/output capabilities of the database server. Access times for buffered tables are many magnitudes faster and are not considered in the measurement.

# **Chapter 26: Middleware Performance Monitoring**

## This chapter includes:

Middleware Performance Monitoring Overview	304
How to Set Up the Tuxedo Monitoring Environment	304
Tuxedo Performance Counters	305
Tuxedo tpinit.ini File	306

## Middleware Performance Monitoring Overview

A primary factor in a transaction's response time is the Middleware performance usage. ALM Performance Center's Middleware Performance monitors provide you with information about the Middleware performance usage of the Tuxedo server during performance test execution. To obtain performance data, you need to activate the online monitor for the server and specify which resources you want to measure before executing the performance test.

The Tuxedo monitor allows you to measure and view your Tuxedo server performance. It provides information about the host machine, workstation handler, and queue in a Tuxedo system. To run the Tuxedo monitor, you must install the Tuxedo client libraries on the machine you want to monitor.

## How to Set Up the Tuxedo Monitoring Environment

This task describes the working order for setting up the monitoring environment.

**Note:** If Tuxedo 7.1 or higher is installed on the Controller machine, more than one Tuxedo application server can be monitored at a time. However, if Tuxedo 6.5 or below is installed on the Controller machine, only one Tuxedo application server can be monitored at a time.

#### 1. Prerequisites

Ensure that a Tuxedo workstation client (not a native client) is installed on the Controller machine. Use a Tuxedo 6.x client if a Tuxedo 6.x server is used, and Tuxedo 7.1 or above client if a Tuxedo 7.1 or above server is used.

If you use a Tuxedo 6.5 or earlier server, you can still use a Tuxedo 7.1 or later client to monitor it, provided that you set the WSINTOPPRE71 environment variable to "yes".

**Note:** A Tuxedo workstation client communicates with the application server over the network, and is not required to run the Tuxedo application server on the same machine. A native client can only communicate with the Tuxedo application server if it is part of the relevant Tuxedo domain.

#### 2. Define the Tuxedo Environment Variables

Define the Tuxedo environment variables on the Controller machine—set the TUXDIR variable to the Tuxedo installation directory (for example, V:\environ\32\Tuxedo8.0), and add the Tuxedo bin directory to the PATH variable.

#### 3. Check the Workstation Listener (WSL) Process

Ensure that the workstation listener (WSL) process is running. This enables the application server to accept requests from workstation clients.

The address and port number used to connect to the application server must match those dedicated to the WSL process.

Note: For information on configuring the WSL, refer to the BEA Tuxedo Web site.

### 4. Configure the Tuxedo monitor on the Controller

For task details, see "How to Create and Configure Monitor Profiles" on page 58.

## **Tuxedo Performance Counters**

The following table lists the available Tuxedo monitor measurements. It is recommended to pay particular attention to the following measurements: % Busy Clients, Active Clients, Busy Clients, Idle Clients, and all the queue counters for relevant queues.

Monitor	Measurements
Machine	% Busy Clients - The percent of active clients currently logged in to the Tuxedo application server that are waiting for a response from the application server.
Machine	Active Clients - The total number of active clients currently logged in to the Tuxedo application server.
Machine	<b>Busy Clients</b> - The total number of active clients currently logged in to the Tuxedo application server that are waiting for a response from the application server.
Machine	<b>Current Accessers</b> - The number of clients and servers currently accessing the application either directly on this machine or through a workstation handler on this machine.
Machine	<b>Current Transactions</b> - The number of in-use transaction table entries on this machine.
Machine	Idle Clients - The total number of active clients currently logged in to the Tuxedo application server that are not waiting for a response from the application server.
Machine	Workload Completed/second - The total workload on all the servers for the machine that was completed, per unit time.
Machine	Workload Initiated/second - The total workload on all the servers for the machine that was initiated, per unit time.
Queue	<b>% Busy Servers</b> - The percent of active servers currently handling Tuxedo requests.
Queue	Active Servers - The total number of active servers either handling or waiting to handle Tuxedo requests.
Queue	<b>Busy Servers</b> - The total number of active servers currently busy handling Tuxedo requests.
Queue	Idle Servers - The total number of active servers currently waiting to handle Tuxedo requests.

Monitor	Measurements
Queue	<b>Number Queued</b> - The total number of messages which have been placed on the queue.
Server	Requests/second - The number of server requests handled per second
Server	Workload/second - Workload is a weighted measure of the server requests.  Some requests could have a different weight than others. By default, the workload is always 50 times the number of requests.
Workstation Handler (WSH)	<b>Bytes Received/sec</b> - The total number of bytes received by the workstation handler, per second.
Workstation Handler (WSH)	Bytes Sent/sec - The total number of bytes sent back to the clients by the workstation handler, per second.
Workstation Handler (WSH)	<b>Messages Received/sec</b> - The number of messages received by the workstation handler, per second.
Workstation Handler (WSH)	Messages Sent/sec - The number of messages sent back to the clients by the workstation handler, per second.
Workstation Handler (WSH)	Number of Queue Blocks/sec - The number of times the queue for the workstation handler blocked, per second. This gives an idea of how often the workstation handler was overloaded.

## Tuxedo tpinit.ini File

The **tpinit.ini** file is saved in the recorded script's directory. It contains information for connecting the Tuxedo monitor to the server. The client logon information is located in the Logon section of the **tpinit.ini** file.

In the following example of a **tpinit.ini** file, the Tuxedo monitor was configured for a server named psft1 using port 7000, and a client named bankapp. The logon user name was PS and the password was PS.

[Logon]
LogonServername=//psft1:7000
LogonUsrName=PS
LogonCltName=bankapp
LogonGrpName=
LogonPasswd=PS
LogonData=

# **Chapter 27: Application Deployment Solution Monitoring**

## This chapter includes:

Application Deployment Solution Monitoring Overview	. 308
How to Set up the Citrix Monitoring Environment	.308
Citrix MetaFrame Performance Counters	309

# **Application Deployment Solution Monitoring Overview**

Using ALM Performance Center's Application Deployment Solution monitor, you can isolate server performance bottlenecks by monitoring the Citrix server during a performance test run.

ALM Performance Center's Citrix monitor provides you with information about the application deployment usage of the Citrix server during performance test execution. The Citrix monitor allows you to monitor the server performance statistics from Citrix servers. You can monitor multiple parameters (counters) with a single monitor instance. This allows you to watch server loading for performance, availability, and capacity planning.

To obtain performance data, you need to activate the online monitor for the server and specify which resources you want to measure before executing the performance test.

For information about how to set up the Citrix monitoring environment, see " How to Set up the Citrix Monitoring Environment" below.

## How to Set up the Citrix Monitoring Environment

This task describes the working order for setting up the monitoring environment.

To learn more about application deployment solution monitoring, see "Application Deployment Solution Monitoring Overview" above.

#### Prerequisites

- Make sure that Citrix Server has been installed and is running.
- If Citrix Server machine is running Windows 2000, make sure that the server machine is also running the Remote Registry service.
- Measurements that monitor instances are valid for the currently running Citrix session only.
   If you run this test again, you will need to reconfigure the measurements that are instance-oriented.

To monitor the different instances, ensure that the server login and logout procedures are recorded in the **Vuser\_init** and **Vuser\_end** sections respectively, and not in the Action section of the script. For more information, see the *HP Virtual User Generator User Guide*.

#### 2. Map the Network Drive

From the Controller machine, map a network drive to the Citrix server machine. This ensures that the required authentication is provided to the Controller to access the resource counters.

#### 3. Launch PerfMon

Launch PerfMon from the Controller machine to enable the counters on the Citrix server. This allows you to monitor the same counters for the ICA Session object on the Citrix monitor.

#### 4. Open the Connection with the Citrix Server

You can configure the Citrix monitor to view ICA Session object counters only if at least one

session is being run on the Citrix server. If no "real" user has opened a connection with the Citrix server, you need to first initialize or run a Citrix Vuser against the server, and only then configure the Citrix Monitor and add the ICA Session counters. If you configure the Citrix monitor without first initializing or running a Citrix Vuser (or connecting to the Citrix server as a "real" user), you will not be able to view the ICA Session object.

#### 5. Configure the Citrix Monitor on the Controller

For task details, see "How to Create and Configure Monitor Profiles" on page 58.

## **Citrix MetaFrame Performance Counters**

The following sections describe some of the counters that can be measured.

- "Non-Virtual Counters" below
- "Virtual Channel Counters" on page 311

#### **Non-Virtual Counters**

The following table describes non-virtual counters:

Measurement	Description
% Disk Time	The percentage of elapsed time that the selected disk drive services read or write requests.
% Processor Time	The percentage of time that the processor executes a non-Idle thread. This counter is a primary indicator of processor activity. It is calculated by measuring the time that the processor spends executing the thread of the Idle process in each sample interval, and subtracting that value from 100%. (Each processor has an Idle thread which consumes cycles when no other threads are ready to run.) It can be viewed as the percentage of the sample interval spent doing useful work. This counter displays the average percentage of busy time observed during the sample interval. It is calculated by monitoring the time the service was inactive, and then subtracting that value from 100%.
File data Operations/sec	The rate that the computer issues Read and Write operations to file system devices. This does not include File Control Operations.
Interrupts/sec	The average number of hardware interrupts the processor receives and services per second. It does not include DPCs, which are counted separately. This value is an indirect indicator of the activity of devices that generate interrupts, such as the system clock, the mouse, disk drivers, data communication lines, network interface cards and other peripheral devices. These devices normally interrupt the processor when they have completed a task or require attention. Normal thread execution is suspended during interrupts. Most system clocks interrupt the processor every 10 milliseconds, creating a background of interrupt activity. This counter displays the difference between the values observed in the last two samples, divided by the duration of the sample interval.

Measurement	Description
Output Session Line Speed	This value represents the line speed from server to client for a session in bps.
Input Session Line Speed	This value represents the line speed from client to server for a session in bps.
Page Faults/sec	A count of the Page Faults in the processor. A page fault occurs when a process refers to a virtual memory page that is not in its Working Set in main memory. A Page Fault will not cause the page to be fetched from disk if that page is on the standby list, and hence already in main memory, or if it is in use by another process with whom the page is shared.
Pages/sec	The number of pages read from the disk or written to the disk to resolve memory references to pages that were not in memory at the time of the reference. This is the sum of Pages Input/sec and Pages Output/sec. This counter includes paging traffic on behalf of the system Cache to access file data for applications. This value also includes the pages to/from non-cached mapped memory files. This is the primary counter to observe if you are concerned about excessive memory pressure (that is, thrashing), and the excessive paging that may result.
Pool Nonpaged Bytes	The number of bytes in the Nonpaged Pool, a system memory area where space is acquired by operating system components as they accomplish their appointed tasks. Nonpaged Pool pages cannot be paged out to the paging file, but instead remain in main memory as long as they are allocated.
Private Bytes	The current number of bytes this process has allocated that cannot be shared with other processes.
Processor Queue Length	The instantaneous length of the processor queue in units of threads. This counter is always 0 unless you are also monitoring a thread counter. All processors use a single queue in which threads wait for processor cycles. This length does not include the threads that are currently executing. A sustained processor queue length greater than two generally indicates processor congestion. This is an instantaneous count, not an average over the time interval.
Threads	The number of threads in the computer at the time of data collection. Notice that this is an instantaneous count, not an average over the time interval. A thread is the basic executable entity that can execute instructions in a processor.
Latency – Session Average	This value represents the average client latency over the life of a session.
Latency – Last Recorded	This value represents the last recorded latency measurement for this session.

Measurement	Description
Latency – Session Deviation	This value represents the difference between the minimum and maximum measured values for a session.
Input Session Bandwidth	This value represents the bandwidth from client to server traffic for a session in bps.
Input Session Compression	This value represents the compression ratio for client to server traffic for a session.
Output Session Bandwidth	This value represents the bandwidth from server to client traffic for a session in bps.
Output Session Compression	This value represents the compression ratio for server to client traffic for a session.
Output Session Linespeed	This value represents the line speed from server to client for a session in bps.

### **Virtual Channel Counters**

The following table describes virtual channel counters:

Measurement	Description
Input Audio Bandwidth	This value represents the bandwidth from client to server traffic on the audio mapping channel. This is measured in bps.
Input Clipboard Bandwidth	This value represents the bandwidth from client to server traffic on the clipboard mapping channel. This is measured in bps.
Input COM1 Bandwidth	This value represents the bandwidth from client to server traffic on the COM1 channel. This is measured in bps.
Input COM2 Bandwidth	This value represents the bandwidth from client to server traffic on the COM2 channel. This is measured in bps.
Input COM Bandwidth	This value represents the bandwidth from client to server traffic on the COM channel. This is measured in bps.
Input Control Channel Bandwidth	This value represents the bandwidth from client to server traffic on the ICA control channel. This is measured in bps.
Input Drive Bandwidth	This value represents the bandwidth from client to server traffic on the client drive mapping channel. This is measured in bps.

Measurement	Description
Input Font Data Bandwidth	This value represents the bandwidth from client to server traffic on the local text echo font and keyboard layout channel. This is measured in bps.
Input Licensing Bandwidth	This value represents the bandwidth from server to client traffic on the licensing channel. This is measured in bps.
Input LPT1 Bandwidth	This value represents the bandwidth from client to server traffic on the LPT1 channel. This is measured in bps.
Input LPT2 Bandwidth	This value represents the bandwidth from client to server traffic on the LPT2 channel. This is measured in bps.
Input Management Bandwidth	This value represents the bandwidth from client to server traffic on the client management channel. This is measured in bps.
Input PN Bandwidth	This value represents the bandwidth from client to server traffic on the Program Neighborhood channel. This is measured in bps.
Input Printer Bandwidth	This value represents the bandwidth from client to server traffic on the printer spooler channel. This is measured in bps.
Input Seamless Bandwidth	This value represents the bandwidth from client to server traffic on the Seamless channel. This is measured in bps.
Input Text Echo Bandwidth	This value represents the bandwidth from client to server traffic on the local text echo data channel. This is measured in bps.
Input Thinwire Bandwidth	This value represents the bandwidth from client to server traffic on the Thinwire (graphics) channel. This is measured in bps.
Input VideoFrame Bandwidth	This value represents the bandwidth from client to server traffic on the VideoFrame channel. This is measured in bps.
Output Audio Bandwidth	This value represents the bandwidth from server to client traffic on the audio mapping channel. This is measured in bps.
Output Clipboard Bandwidth	This value represents the bandwidth from server to client traffic on the clipboard mapping channel. This is measured in bps.
Output COM1 Bandwidth	This value represents the bandwidth from server to client traffic on the COM1 channel. This is measured in bps.
Output COM2 Bandwidth	This value represents the bandwidth from server to client traffic on the COM2 channel. This is measured in bps.
Output COM Bandwidth	This value represents the bandwidth from server to client traffic on the COM channel. This is measured in bps.

Measurement	Description
Output Control Channel Bandwidth	This value represents the bandwidth from server to client traffic on the ICA control channel. This is measured in bps.
Output Drive Bandwidth	This value represents the bandwidth from server to client traffic on the client drive channel. This is measured in bps.
Output Font Data Bandwidth	This value represents the bandwidth from server to client traffic on the local text echo font and keyboard layout channel. This is measured in bps.
Output Licensing Bandwidth	This value represents the bandwidth from server to client traffic on the licensing channel. This is measured in bps.
Output LPT1 Bandwidth	This value represents the bandwidth from server to client traffic on the LPT1 channel. This is measured in bps.
Output LPT2 Bandwidth	This value represents the bandwidth from server to client traffic on the LPT2 channel. This is measured in bps.
Output Management Bandwidth	This value represents the bandwidth from server to client traffic on the client management channel. This is measured in bps.
Output PN Bandwidth	This value represents the bandwidth from server to client traffic on the Program Neighborhood channel. This is measured in bps.
Output Printer Bandwidth	This value represents the bandwidth from server to client traffic on the printer spooler channel. This is measured in bps.
Output Seamless Bandwidth	This value represents the bandwidth from server to client traffic on the Seamless channel. This is measured in bps.
Output Text Echo Bandwidth	This value represents the bandwidth from server to client traffic on the local text echo data channel. This is measured in bps.
Output Thinwire Bandwidth	This value represents the bandwidth from server to client traffic on the Thinwire (graphics) channel. This is measured in bps.
Output VideoFrame Bandwidth	This value represents the bandwidth from server to client traffic on the VideoFrame channel. This is measured in bps.

er 27: Application Deployment \$		

## **Part 6: Runtime Settings Configuration**

## User and Administrator Guide

Part 6: Runtime Settings Configuration

## **Chapter 28: Script Runtime Settings**

### This chapter includes:

Script Runtime Settings Overview	318
General Runtime Settings Overview	
Protocol-Specific Runtime Settings Overview	318
How to Configure Runtime Settings	318
Protocol Specific Runtime Settings Types	319
Runtime Settings User Interface	319

## **Script Runtime Settings Overview**

Before you run a performance test, you can configure the behavior of the Vuser scripts in the test using runtime settings. You can configure general settings and protocol-specific settings.

This section also includes:

- "General Runtime Settings Overview" below
- "Protocol-Specific Runtime Settings Overview" below

## **General Runtime Settings Overview**

After you record a Vuser script, you can configure its runtime settings. The runtime settings define the way the script runs, such as delay between actions, the number of times to repeat an action, and the level of logging.

Configuring runtime settings allows you to emulate different kinds of user activity. For example, you can emulate a user who responds immediately to the server, or a user who stops and thinks before each response. You can also configure the runtime settings to specify how many times the Vuser should repeat a set of actions. The General runtime settings described in this chapter apply to all types of Vuser scripts.

For task details, see "How to Configure Runtime Settings" below.

## **Protocol-Specific Runtime Settings Overview**

Before replaying a Vuser script, you can configure its runtime settings. The runtime settings define the way the script runs, using settings that are specific for your particular environment.

Since runtime settings are protocol-specific, you will notice that not all runtime settings are available.

For task details, see "How to Configure Runtime Settings" below.

## **How to Configure Runtime Settings**

This task describes how to open and configure runtime settings to define the way a script runs.

To learn more about runtime settings, see "Script Runtime Settings Overview" above

#### To configure the runtime settings in a Vuser script:

- 1. On the ALM sidebar, under **Testing**, select **Test Plan**.
- 2. Right-click a performance test in the test plan tree and select **Edit Test**.
- 3. In the Workload tab, select a Vuser group and click **Edit Runtime Settings** . The Edit Runtime Settings dialog box opens.

4. Select the runtime settings type to edit and define the required information. For user interface details, see "Edit Runtime Settings Dialog Box" on next page.

For a list of runtime settings types that relate to specific protocols, see "Protocol Specific Runtime Settings Types" below.

5. Click **OK** to save the settings and close the dialog box.

## **Protocol Specific Runtime Settings Types**

The following list shows the protocol-specific runtime settings.

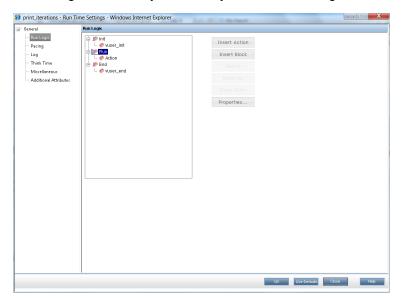
Protocol(s)/Category	Runtime Setting
Web Services / JMS	Advanced
Internet Protocols / Browser	Browser Emulation
Java / Java Environment Settings	Classpath Options
Oracle NCA / Oracle NCA	Client Emulation
Citrix ICA / Citrix	Configuration
Internet Protocols / Internet Protocol	Download Filter
WAP, MMS / WAP	Gateway
SAPGUI / SAPGUI	SAPGUI
Java / Java Environment Settings	Java VM
Microsoft .NET / .NET	.NET Environment
Internet Protocols / Internet Protocol	Preferences
Internet Protocols / Internet Protocol	Proxy
WAP, MMS / WAP	Radius
Terminal Emulation / RTE	RTE
MMS (Multimedia Messaging Service)	Server and Protocol
Internet Protocols, NCA / Network	Speed Simulation
Citrix ICA / Citrix	Timing

## **Runtime Settings User Interface**

This section includes:

## **Edit Runtime Settings Dialog Box**

This dialog box enables you to modify the runtime settings of the test scripts.



To access	<ol> <li>On the ALM sidebar, under Testing, select Test Plan.</li> <li>Right-click a performance test in the test plan tree and select Edit Test.</li> <li>In the Workload tab, select a Vuser group and click Edit Runtime Settings</li> </ol>
Important information	If you do not edit the runtime settings, the script runs using the default runtime settings, or the last saved runtime settings if the script was recorded in VuGen.
Relevant tasks	"How to Configure Runtime Settings" on page 318
See also	" Script Runtime Settings Overview" on page 318
	HP Virtual User Generator User Guide

## **Run Logic Settings**

The Run Logic settings enable you to organize the Vuser script actions and their sequence.

User interface elements are described below:

UI Elements	Description
Run Logic	Displays the Vuser scipt. Every Vuser script contains three sections:  Init, Run, and End. You can instruct a Vuser to repeat the Run section a specific number of times when you run the script. Each repetition is known as an iteration.
	The <b>Init</b> and <b>End</b> sections of a Vuser script are not repeated when you run multiple iterations.
	Within the <b>Run</b> section, you can organize your steps into separate actions. You do this when creating the script.
	You can organize the actions and their sequence. You can also organize blocks that perform one or more actions.
Insert Action	Inserts an action to a selected section.
Insert Block	Inserts a block to a selected section.
Delete	Deletes a selected action or block.
Move Up	Moves up a selected action or block.
Move Down	Moves down a selected action or block.
Properties	Defines the run logic and the iteration for a selected section or block.

## **Pacing Settings**

The Pacing runtime settings let you control the number of iterations and the time between them.

User interface elements are described below:

UI Elements	Description
Iteration Count	Specifies the number of times to repeat the script's <b>Run</b> section.
As soon as the previous iteration ends	The new iteration begins as soon as possible after the previous iteration ends.

UI Elements	Description
After the previous iteration ends with a fixed delay of	Starts each new iteration at a fixed delay after the end of the previous iteration.
After the previous iteration ends with a random delay of	Starts each new iteration at a random delay from the end of the previous iteration. You specify a range for the delay.  When you run the script, the Execution Log shows the actual time the Vuser waited between the end of one iteration and the start of the next one.
At fixed or random intervals, every [to] seconds	You specify the time between iterations—either a fixed number of seconds or a range of seconds from the beginning of the previous iteration. For example, you can specify to begin a new iteration every 30 seconds, or at a random rate ranging from 30 to 45 seconds from the beginning of the previous iteration. Each scheduled iterations begins only when the previous iteration is complete.  When you run the script, the Execution Log shows the time the Vuser waited between the end of one iteration and the start of the next one.  The Execution Log also indicates if the delay could not be achieved, for example where it took the iteration eight seconds and the delay was seven seconds.

## **Log Settings**

During execution, Vusers log information about themselves and their communication with the server. The log information is useful for debugging purposes.

The Log runtime settings let you disable logging or determine how much information is logged to the output—a **Standard** or **Extended** log.

User interface elements are described below:

UI Elements	Description
Disable logging	Disabling the log is useful when working with many Vusers. If you have tens or hundreds of Vusers logging their runtime information to disk, the system may work slower than normal. During development, enable logging so that you will have information about the replay. You should only disable logging after verifying that the script is functional.
	If you disable logging, it only affects automatic logging. Messages sent manually using message functions such as <b>Ir_output_message</b> , are still issued.

UI Elements	Description
Standard log	Creates a standard log of functions and messages sent during script execution to use for debugging. Disable this option for large performance testing scenarios or profiles.
	If the logging level is set to <b>Standard</b> , the logging mode is automatically set to <b>JIT logging</b> when adding it to the Controller host. If, however, the logging mode was disabled or set to <b>Extended</b> , then running it from a Controller host will not affect its logging settings.
Extended log	Creates an extended log, including warnings and other messages. Disable this option for large performance tests.
	You can specify which additional information to add to the extended log using the Extended log options:
	<ul> <li>Parameter substitution. Logs all parameters assigned to the script with their values.</li> </ul>
	Data returned by server. Logs all data returned by the server.
	Advanced trace. Logs all of the functions and messages sent by the Vuser during the session. This option is useful when you debug a Vuser script.
Log Options	The Log runtime settings let you indicate when to send log messages to the log:  Send messages only when an error occurs or Always send messages. During development, you can always send messages. Once you verify that your script is functional, you can enable logging for errors only.
	If you choose to send messages only when errors occur, also known as JIT, (Just in Time) messaging, you can set an advanced option, indicating the size of the log cache.
	The <b>Advanced</b> options for the Log runtime settings let you indicate the size of the log cache. The log cache stores raw data about the test execution, to make it available should an error occur. When the contents of the cache exceed the specified size, it deletes the oldest items. The default size is 1KB.
	When an error occurs (either an internal error or a programmed error using Ir_error_message), VuGen places the contents of the cache into the log file and Execution Log tab. This allows you to see the events that led up to the error.
	The actual file size will be greater than the cache size. For example, if your cache size is 1KB, the log file size may be 50 KB. This is normal and only reflects the overhead required for formatting the raw data into readable text.

## **Think Time Settings**

Vuser **think time** emulates the time that a real user waits between actions. For example, when a user receives data from a server, they may wait several seconds to review the data before responding. Vuser scripts use **Ir\_think\_time** functions to emulate the think time delays.

#### **Example**

The following recorded function indicates that the user waited eight seconds before performing the next action:

```
lr_think_time(8);
```

By default, when you run a Vuser script, the Vuser uses the think time values that were recorded into the script during the recording session. VuGen allows you to use the recorded think time, ignore it, limit it, or use a value related to the recorded time.

User interface elements are described below:

UI Elements	Description
Ignore think time	Replays the script ignoring all <b>Ir_think_time</b> functions.
Replay the think time as recorded	Uses the value recorded. This is the argument that appears in the Ir_think_time function. For example, <code>lr_think_time</code> (10) waits 10 seconds.
Modify replay think time - Multiply recorded value by	Uses a multiple of the recorded think time. This can increase or decrease the think time applied during playback. For example, if a think time of four seconds was recorded, you can instruct your Vuser to multiply that value by two, for a total of eight seconds. To reduce the think time to two seconds, multiply the recorded time by 0.5.
Use random percentage of the recorded think time	Uses a random percentage of the recorded think time. You set a range for the think time value by specifying a range for the think time. For example, if the think time argument is 4, and you specify a minimum of 50% and a maximum of 150%, the lowest think time can be two (50%) and the highest value six (150%)
Limit think time to	Limits the think time's maximum value. You can use this option in conjunction with the other options.

# **Miscellaneous Settings**

UI Elements	Description
Error Handling	Contains the following options:
	Continue on Error. Instructs Vusers to continue script execution when an error occurs. This option is turned off by default, indicating that the Vuser will exit if an error occurs.
	Fail open transactions on Ir_error_message. Marks all transactions in which an Ir_error_message function was issued, as Failed. The Ir_error_message function is issued through a programmed If statement, when a certain condition is met.
	Generate Snapshot on Error. Generates a snapshot when an error occurs. You can see the snapshot by viewing the Vuser Log and double-clicking the line at which the error occurred.
	Note: It is not recommended to enable both the Continue on Error and Generate Snapshot on Error options in a performance test environment. This configuration may adversely affect the Vusers' performance.
Multithreading	Vusers support multithread environments. The primary advantage of a multithread environment is the ability to run more Vusers per load generator. Only threadsafe protocols should be run as threads.
	The following multithreading options are available:
	Run Vuser as a process. Disables multithreading and runs each Vuser as a separate process.
	<b>Note:</b> The Controller host uses a driver program (such as <b>mdrv.exe</b> or <b>r3vuser.exe</b> ) to run your Vusers. If you run each Vuser as a process, then the same driver program is launched (and loaded) into the memory again and again for every instance of the Vuser. Loading the same driver program into memory uses up large amounts of RAM (random access memory) and other system resources. This limits the numbers of Vusers that can be run on any load generator.
	Run Vuser as a thread. Enables multithreading.
	<b>Note:</b> The following protocols are not threadsafe: Sybase-Ctlib, Sybase-Dblib, Informix, Tuxedo, and PeopleSoft-Tuxedo.

UI Elements	Description
Automatic Transactions	Instructs the Controller host to handle every step or action in a Vuser script as a transaction. The Controller assigns the step or action name as the name of the transaction.
	The following options are available:
	Define each action as a transaction. Disables automatic transactions per action.
	Define each step as a transaction. Enables automatic transactions per step.
	<b>Note:</b> If you disable automatic transactions, you can still insert transactions manually during and after recording.

#### **Additional Attributes**

You can use the additional attributes node to provide additional arguments to a Vuser script. The Additional Attributes settings apply to all types of Vuser scripts.

You specify command line arguments that you can retrieve at a later point during the test run using the **Ir\_get\_attrib\_string**. Using this node you can pass external parameters to prepared scripts.

User interface elements are described below (unlabeled elements are shown in angle brackets):

UI Elements	Description
	Add new attribute. Adds a new attribute.
+ Add	
	Edit attribute. Modifies the selected attribute.
Æ Edit	
	<b>Delete attribute.</b> Deletes the selected attribute.
m Delete	
<additional attributes="" grid=""></additional>	A list of the additional attributes and their values.
Description	A description of the selected additional attribute.

#### **Advanced Settings**

To use JMS as a transport for Web Service calls, there are several resources that need to be allocated and configured. Those resources include the JVM, JNDI initialization parameters, JMS resources, and timeout values.

ALM Performance Center lets you configure some of those resources through the runtime settings. You can set options in the area of VM (Virtual Machine), the JMS connections, and message timeouts.

UI Elements	Description
Use external VM	Enables you to select a VM (Virtual Machine) other than the standard one. If you disable this option, Vusers use the JVM provided with Performance Center.
JVM Home	The location of the external JVM. This should point to the JDK home directory, defined by JDK_HOME. Performance Center supports JDK 1.4 and above.
Classpath	The vendor implementation of JMS classes together with any other required supporting classes, as determined by the JMS implementation vendor.
Additional VM Parameters	Extra parameters to send to the JVM such as Xbootclasspath, and any parameters specified by the JVM documentation.
JNDI initial context factory	The fully qualified class name of the factory class that will create an initial context. Select a context factory from the list or provide your own.
JNDI provider	The URL string of the service provider.  Examples:  Weblogic - t3://myserver:myport  Websphere - iiop://myserver:myport
JMS connection factory	The JNDI name of the JMS connection factory. You can only specify one connection factory per script.
JMS security principal	Identity of the principal (for example the user) for the authentication scheme.
JMS security credentials	The principal's credentials for the authentication scheme.
Number of JMS connections per process	The number of JMS connections per <b>mdrv</b> process or Vuser. All Vusers sharing a connection receive the same messages. <b>Default:</b> 1 <b>Maximum:</b> 50 Vusers.
	<b>Note:</b> The less connections per process, the better the performance.

UI Elements	Description
Receive	The timeout for received messages.
message timeout	The following options are available:
options	Indefinite wait. Wait as long as required for the message before continuing.
	No wait. Do not wait for the Receive message, and return control to the script immediately. If there was no message in the queue, the operation fails.
	Specify the timeout in seconds. Manually specify a timeout value for the message. If the timeout expired and no message arrived, the operation fails.
	User defined timeout. Specify the amount of seconds to wait for the message before timing out. The default is five seconds.
	Default: No Wait
Automatically generate selector	Generates a selector for the response message with the correlation ID of the request ( <b>No</b> by default). Each JMS message sent to the server has a specific ID. Enable this option if you want Performance Center to automatically create a selector that includes the message ID.

#### **Preferences Settings**

You use the **Internet Protocol Preferences** runtime settings to control the Vusers in the following areas:

- Image and Text Checks
- Generating Web Performance Graphs
- Advanced Web Runtime Options
- Additional Options for Internet Preferences

UI Elements	Description
Checks	The <b>Enable image and text checks</b> option allows the Vuser to perform verification checks during replay by executing the verification functions: <b>web_find</b> or <b>web_image_check</b> . This option only applies to test steps that were recorded in HTML-based mode. Vusers running with verification checks enabled, require additional memory.

UI Elements	Description
Generate Web performance graphs	Collects data to create several Web Performance graphs: <b>Hits per Second and HTTP codes</b> , <b>Pages per Second</b> , and <b>Response Bytes per Second</b> . You view the graphs during test execution using the online monitors and after test execution using HP Analysis. You view the Component Breakdown graph after test execution using the Analysis. Select the types of graph data for the Vuser to collect.
	<b>Note:</b> If you do not use the Web Performance graphs, disable all graphs to conserve memory.
Advanced	WinInet replay instead of Sockets (Windows only). Instructs Vusers to use the WinInet replay engine instead of the standard Sockets replay. There are two HTTP replay engines: Sockets-based (default) or WinInet based. The WinInet is the engine used by Internet Explorer and it supports all of the features incorporated into the IE browser. The limitations of the WinInet replay engine are that it is not scalable, nor does it support UNIX. In addition, when working with threads, the WinInet engine does not accurately emulate the modem speed and number of connections.
	The proprietary sockets-based replay is a lighter engine that is scalable for performance testing. It is also accurate when working with threads. The limitation of the sockets-based engine is that it does not support SOCKS proxy. If you are recording in that type of environment, use the WinInet replay engine.
	File and line in automatic transaction names. Creates unique transaction names for automatic transactions by adding file name and line number to the transaction name (enabled by default).
	<b>Note:</b> This option places additional information in the log file, and therefore requires more memory.
	Non-critical resource errors as warnings. This option returns a warning status for a function which failed on an item that is not critical for performance testing, such as an image or Java applet that failed to download. This option is enabled by default. If you want a certain warning to be considered an error and fail your test, you can disable this option. You can set a content-type to be critical by adding it to the list of Non-Resources. For more information, see the HP Virtual User Generator User Guide.
	Save snapshot resources locally. Saves the snapshot resources to files on the local machine. This feature lets the runtime viewer create snapshots more accurately and display them quicker.

UI Elements	Description
Set Advanced Options	Enables you to set advanced options in the following areas: DNS caching, HTTP version, Keep-Alive HTTP connections, Accept server-side compression, Accept-Language headers, HTTP-request connect timeout, HTTP-request receive timeout, Network buffer size, and Step download timeout.  For more information, see the relevant "Advanced Options for Internet Preferences - HTTP" below.

Advanced Options for Internet Preferences - HTTP

UI Elements	Description
HTTP version	Specifies which version HTTP to use: version 1.0 or 1.1. This information is included in the HTTP request header whenever a Vuser sends a request to a Web server.
Keep-Alive HTTP connections	Keep-alive is a term used for an HTTP extension that allows persistent or continuous connections. These long-lived HTTP sessions allow multiple requests to be sent over the same TCP connection. This improves the performance of the Web server and clients.
	The keep-alive option works only with Web servers that support keep-alive connections. This setting specifies that all Vusers that run the Vuser script have keep-alive HTTP connections enabled.  Default: Enabled
Accept- Language request header	Provides a comma-separated list of accepted languages. For example, <b>en-us</b> , <b>fr</b> , and so on.

UI Elements	Description
HTTP errors as warnings	Issues a warning instead of an error upon failing to download resources due to an HTTP error.
	HTTP-request connect timeout (seconds). The time, in seconds, that a Vuser will wait for the connection of a specific HTTP request within a step before aborting. Timeouts provide an opportunity for the server to stabilize and respond to the user.
	<b>Note:</b> This timeout also applies to the time the Vuser will wait for a WAP connection, initiated by the <b>wap_connect</b> function.
	HTTP-request receive timeout (seconds). The time, in seconds, that a     Vuser will wait to receive the response of a specific HTTP request within a     step before aborting. Timeouts provide an opportunity for the server to     stabilize and respond to the user.
	Default: 120 seconds
	HTTP Keep-Alive timeout. Enter the number of seconds to keep idle connections open.
Request Zlib Headers	Sends request data to the server with the <b>zlib</b> compression library headers. By default, requests sent to the server include the <b>zlib</b> headers. This option lets you emulate non-browser applications that do not include <b>zlib</b> headers in their requests. To exclude these headers, set this option to <b>No</b> .
	Default: Yes
Accept Server-Side Compression	Indicate to the server that the replay can accept compressed data. The available options are: <b>None</b> (no compression), <b>gzip</b> (accept gzip compression), <b>gzip</b> , <b>deflate</b> (accept gzip or deflate compression), and <b>deflate</b> (accept deflate compression).
	<b>Note:</b> By accepting compressed data, you may significantly increase the CPU consumption. The default is to accept <b>gzip</b> , <b>deflate</b> compression.

Advanced Options for Internet Preferences - General

UI Elements	Description
DNS caching	Instructs the Vuser to save a host's IP address to a cache after resolving its value from the Domain Name Server. This saves time in subsequent calls to the same server. In situations where the IP address changes, as with certain load balancing techniques, be sure to disable this option to prevent Vusers from using the value in the cache (enabled by default).

UI Elements	Description
Convert from/to UTF-8	Converts received HTML pages and submitted data from and to UTF-8. You enable UTF-8 support in the recording options. For more information, see the HP Virtual User Generator User Guide.
	Default: No
Step timeout caused by resources is a	Issues a warning instead of an error when a timeout occurs due to a resource that did not load within the timeout interval. For non-resources, Performance Center issues an error.
warning	Default: Disabled
Parse HTML Content-Type	When expecting HTML, parse the response only when it is the specified content-type: HTML, text\html, TEXT any text, or ANY, any content-type.
	Note: text/xml is not parsed as HTML. The default is TEXT.
	The timeout settings are primarily for advanced users who have determined that acceptable timeout values should be different for their environment. The default settings should be sufficient in most cases. If the server does not respond in a reasonable amount of time, check for other connection-related issues, rather than setting a very long timeout which could cause the scripts to wait unnecessarily.
Step download timeout (sec)	The time that the Vuser will wait before aborting a step in the script. This option can be used to emulate a user behavior of not waiting for more than x seconds for a page.
Network buffer size	Sets the maximum size of the buffer used to receive the HTTP response. If the size of the data is larger than the specified size, the server will send the data in chunks, increasing the overhead of the system. When running multiple Vusers from the Controller, every Vuser uses its own network buffer. This setting is primarily for advanced users who have determined that the network buffer size may affect their script's performance.
	Default: 12kB
	Maximum size: 0x7FFF FFFF
Print NTLM information	Prints information about the NTLM handshake to the standard log.
Print SSL information	Prints information about the SSL handshake to the standard log.

UI Elements	Description
Max number of error matches issued as ERRORS	Limits the number of error matches issued as ERRORS for content checks using a LB or RB (left boundary or right boundary). This applies to matches where a failure occurs when the string is found (Fail=Found). All subsequent matches are listed as informational messages.  Default: 10 matches.
Maximum number of META Refresh to the same page	The maximum number of times that a META refresh can be performed per page.  Default: 2
ContentCheck values in UTF-8	Store the values in the ContentCheck XML file in UTF-8.
Tree-View request body limit	Limits the number of request body bytes displayed in Tree-View, 0 for no limit.
IP Version	Specifies the IP version.
web_sync retry interval (millisec)	Specifies the number of milliseconds to wait between testing the condition that yields false and the next retry.
web_sync retry timeout (millisec)	Specifies the maximum number of milliseconds during which retries are allowed. If the computed timeout exceeds the step timeout (as determined by the 'Step download timeout' run-time setting, the latter is used.

Advanced Options for Internet Preferences - Authentication

UI Elements	Description
Fixed think time upon authentication retry (msec)	Automatically adds a think time to the Vuser script for emulating a user entering authentication information (username and password). This think time will be included in the transaction time.  Default: 0
Disable NTLM2 session security	Uses full NTLM 2 handshake security instead of the more basic NTLM 2 session security response.  Default: 0
Use Windows native NTLM implementation	Use the Microsoft Security API for NTLM authentication instead of the indigenous one.

UI Elements	Description
Override credentials in Windows native NTLM implementation	Overrides the credentials in the Windows native NTLM implementation.
Enable integrated Authentication	Enable Kerberos-based authentication. When the server proposes authentication schemes, use <b>Negotiate</b> in preference to other schemes. <b>Default:</b> 0
Induce heavy KDC load	Do not reuse credentials obtained in previous iterations. Enabling this setting will increase the load on the KDC (Key Distribution Center). To lower the load on the server, set this option to <b>Yes</b> in order to reuse the credentials obtained in previous iterations. This option is only relevant when Kerberos authentication is used.
	Default: No

Advanced Options for Internet Preferences - Log

User interface elements are described below:

UI Elements	Description
Print buffer line length	Line length for printing request/response header/body and/or JavaScript source, disabling wrapping.
Print buffer escape only binary zeros	Yes. Escape only binary zeros when printing request/response headers/body and/or JavaScript source.
	No. Escape any unprintable/control characters.

Advanced Options for Internet Preferences - Web (Click and Script) Specific

UI Elements	Description
Home Page URL	The URL of the home page that opens with your browser.
	Default: about:blank
DOM-based snapshots	Generates snapshots from the DOM instead of from the server responses.
	Default: Yes
Charset conversions by HTTP	Perform charset conversions by the `Content-Type:; charset=' HTTP response header. Overrides `Convert from /to UTF-8.'

UI Elements	Description
Reparse when META changes charset	Reparse HTML when a META tag changes the charset. Effective only when <b>Charset conversions by HTTP</b> is enabled. <b>Auto</b> means reparsing is enabled only if it used in the first iteration.
Fail on JavaScript error	Fails the Vuser when a JavaScript evaluation error occurs. ALM issues a warning message only after a JavaScript error, but continues to run the script.
	Default:No.
Initialize standard classes for each new window project	When enabled, the script—the src compiled script, will not be cached.
Ignore acted on element being disabled	Ignore the element acted on by a Vuser script function being disabled.
Optimize timers at end of step	When possible, executes a setTimeout/setInterval/ <meta refresh=""/> that expires at the end of the step before the expiration time.
	Default: Yes
Single setTimeout/setInterval threshold (seconds)	Specifies an upper timeout for the window.setTimeout and window.setInterval methods. If the delay exceeds this timeout, these methods will not invoke the functions that are passed to them. This emulates a user waiting a specified time before clicking on the next element.
	Default: 5 seconds
Accumulative setTimeout/setInterval threshold (seconds)	Specifies a timeout for the window.setTimeout and window.setInterval methods. If the delay exceeds this timeout, additional calls to window.setTimeout and window.setInterval will be ignored. The timeout is accumulative per step.
	Default: 30 seconds
Reestablish setInterval at end of step	<b>0</b> = No; <b>1</b> = Once; <b>2</b> = Yes.
Limit no-network timers at end of step	Limits the number of setTimeout/setInterval-specified script evaluations at the end of a step when no network requests are issued (zero for no limit). Applicable only when 'Optimize timers at end of step' is enabled.

UI Elements	Description
History support	Enables support for the window.history object for the test run. The options are <b>Enabled</b> , <b>Disabled</b> , and <b>Auto</b> . The Auto option instructs Vusers to support the window.history object only if it was used in the first iteration.
	Default: Auto
	Note: By disabling this option, you improve performance.
Maximum history size	The maximum number of steps to keep in the history list.
	Default: 100 steps
navigator.browserLanguage	The browser language set in the navigator DOM object's browserLanguage property.
	Default: The recorded value.
	Note: Scripts created with older recording engines, use enus by default.
navigator.systemLanguage	The system language set in the navigator DOM object's systemLanguage property.
	Default: The recorded value.
	Note: Scripts created with older recording engines, use enus by default.
navigator.userLanguage	The user language set in the navigator DOM object's userLanguage property.
	Default: The recorded value.
	Note: Scripts created with older recording engines, use enus by default.
screen.width	Sets the width property of the screen DOM object in pixels.
	Default: 1024
screen.height	Sets the height property of the screen DOM object in pixels.
	Default: 768
screen.availWidth	Sets the availWidth property of the screen DOM object in pixels.
	Default: 1024

UI Elements	Description
screen.availHeight	Sets the availHeight property of the screen DOM object in pixels.
	Default: 768
Default block size for DOM memory allocations	Sets the default block size for DOM memory allocations. If the value is too small, it may result in extra calls to malloc, slowing the execution times. Too large a block size may result in an unnecessarily big footprint.
	Default: 16384 bytes
Memory Manager for dynamically-created DOM	Yes. Use the Memory Manager for dynamically-created DOM objects.
objects	No. Does not use the Memory Manager, for example when multiple DOM objects are dynamically created in the same document as under SAP.
	Auto—Use the protocol recommended.
	Default: Yes for all protocols except for SAP
JavaScript Runtime memory size (KB)	Specifies the size of the JavaScript runtime memory in kilobytes.
	Default: 256 KB
JavaScript Stack memory size (KB)	Specifies the size of the JavaScript stack memory in kilobytes (default is 32 KB).
	Default: 32 KB

Advanced Options for Internet Preferences -Web JavaScript

User interface elements are described below:

UI Elements	Description
Enable running JavaScript code	Enables JavaScript code to run.
JavaScript Engine runtime size (KB)	Specifies the memory size to allocate for the JavaScript Engine runtime in Kilobytes. One runtime will be created for all Vuser in the process.
JavaScript Engine stack size per-thread	Specifies the memory size to allocate for each Vuser thread in the JavaScript Engine, in Kilobytes.

#### **Proxy Settings**

You use the **Proxy** runtime Settings to set the proxy-related settings. The following proxy options

are available in the runtime settings.

UI Elements	Description
No proxy (direct connection to the Internet)	All Vusers should use direct connections to the Internet. This means that the connection is made without using a proxy server.
Obtain the proxy settings from the default browser	All Vusers use the proxy settings of the default browser from the machine upon which they are running.
Use custom proxy	Use automatic configuration script. Enables you to specify a JavaScript file (usually with a .pac extension) containing proxy assignment information. This script tells the browser when to access a proxy server and when to connect directly to the site, depending on the URL. In addition, it can instruct the browser to use a specific proxy server for certain addresses and another server for other addresses.
	Specify either a web location beginning with http://. For example, http://hostname/proxy.pac.
	Use proxy server. Select to supply actual proxy server details.
	HTTP (Address of proxy to use). The HTTP proxy server's IP address or name.
	■ HTTP Port. The HTTP port.
	HTTPS (Address of proxy to use). The HTTPS proxy server's IP address or name.
	■ HTTPS Port. The HTTPS port.
	<ul> <li>Use same server for all protocols. Select to use same proxy server for all Internet protocols (HTTP, HTTPS) rather than specifying a specific server for secure sites.</li> </ul>
	<b>Note:</b> You can specify one proxy server for all HTTP sites, and another proxy server for all HTTPS (secure) sites.

UI Elements	Description
Exceptions	When specifying proxy server information, you can specify that all Vusers use a specified proxy server. In such a case, if there are any URLs that you want Vusers to access directly, that is, without using the proxy server, type the list of these URLs in the Exceptions box.
	Do not use proxy server for addresses beginning with. Type the addresses you want to exclude from the proxy server. Use semicolons to separate entries.
	Do not use proxy server for local (intranet) addresses. Select this check box to exclude local addresses, such as those from an Intranet, from the proxy server.
Authentication	When specifying proxy server information, if the proxy server requires authentication for each Vuser, use this dialog box to type the relevant password and user name.
	User Name. The user name for Vusers to access the proxy server.
	Password. The password required by Vusers to access the proxy server.

#### **Download Filter Settings**

The Download Filters runtime setting lets you specify the Web sites from which Vusers should download resources during replay. You can indicate either the sites to exclude or the sites to include. You control the allowed or disallowed sources, by specifying a URL, host name, or host suffix name.

UI Elements	Description
Include only addresses in list	Includes the addresses in the address list. The Vuser filters out resources from all Web sites except for those in the Include list.
Exclude addresses in list	Excludes the addresses in the address list. The Vuser downloads resources from all Web sites except for those specified in the list
+ Add	Add Address. Enables you to add an address to the address list.
/ Edit	Edit Address. Enables you to modify an address from the address list.
m Delete	Delete Address. Enables you to delete an address from the address list.
Туре	The address type: URL, Host, or Host Suffix

UI Elements	Description
Data	The address data.
	<b>Note:</b> Depending on the address type, be sure to enter the data as follows:
	URL. Enter a complete URL beginning with http:// or https://.
	Host. Enter the name of the host machine with its domain, such as www.hp.com.
	Host Suffix. The common suffix for several host names, such as hp.com. This is useful when you have several Web sites on a common domain.

# **Browser Emulation Settings**

You use the **Browser Emulation** settings to set the browser properties of your testing environment.

UI Elements	Description
User- Agent (browser to be emulated) - Customize your browser	By default, the user-agent emulates the Microsoft Internet Explorer 5.5 browser agent. You can, however, instruct the script to emulate a different browser, that is compatible with Internet Explorer 5.5. This setting creates a <b>User-Agent</b> header that identifies the type and version of the browser.

#### UI **Description Elements** Simulate Instructs the Vuser to simulate a browser with a cache. By default, cache browser simulation is enabled. When the cache is disabled, Vusers will ignore all caching cache functionality and download all of the resources for every request. Even if you disable the cache simulation, each resource is only downloaded once for each page, even if it appears multiple times. A resource can be an image, frame, or another type of script file. When running multiple Vusers, every Vuser uses its own cache and retrieves images from the cache. If you disable this option, all Vusers emulate a browser with no cache. You can also set the following browser cache options: • Cache URLs requiring content (HTML). Cache only the URLs that require the HTML content. The content may be necessary for parsing, verification, or correlation. When you select this option, HTML content is automatically cached. This option is enabled by default. **Tip:** To decrease the memory footprint of the Vusers, disable this option, unless it is an explicit requirement for your test. Specify URLs requiring content in addition to HTML pages. This setting lets you specify the URL content types other than HTML pages, that you want to store in the cache for verification purposes. For example, text/xml or image/gif. Separate multiple content types with a semicolon. • Check for newer versions of stored pages every visit to the page. This setting instructs the browser to check for later versions of the specified URL, than those stored in the cache. When you enable this option, the "If-modifiedsince" attribute is added to the HTTP header. This option brings up the most recent version of the page, but also generates more traffic during the scenario or session execution. By default, browsers do not check for newer resources, and therefore this option is disabled. Download Loads graphic images when accessing a Web page during replay. This includes non HTML both graphic images that were recorded with the page, and those which were not resources explicitly recorded along with the page. When real users access a Web page, they wait for the images to load. Therefore, enable this option if you are trying to test the entire system, including end-user time. To increase performance and not emulate real users, disable this option. Tip: Disable this option if you experience discrepancies in image checks, since some images vary each time you access a Web page (for example, advertiser banners).

UI Elements	Description
Simulate a new user on each iteration	Resets all HTTP contexts between iterations to their states at the end of the init section. This setting allows the Vuser to more accurately emulate a new user beginning a browsing session. It deletes all cookies, closes all TCP connections (including keep-alive), clears the emulated browser's cache, resets the HTML frame hierarchy (frame numbering will begin from 1) and clears the user-names and passwords. This option is disabled by default.  • Clear cache on each iteration. Clears the browser cache for each iteration in order to simulate a user visiting a Web page for the first time. Disable this option if you want Vusers to use the browser's cache, simulating a user who recently visited the page.

#### **Speed Simulation Settings**

The Speed Simulation settings let you emulate your network connection.

Using these settings, you select a bandwidth that best emulates the environment under test.

User interface elements are described below:

UI Elements	Description
Use maximum bandwidth	By default, bandwidth emulation is disabled and the Vusers run at the maximum bandwidth that is available over the network.
Use bandwidth	Indicate a specific bandwidth level for your Vuser to emulate. You can select a speed ranging from 14.4 to 512 Kbps, emulating analog modems, ISDN, or DSL.
Use custom bandwidth	Indicate a bandwidth limit for your Vuser to emulate. Specify the bandwidth in bits, where 1 Kilobit=1024 bits.

#### **Data Format Extension Configurations Settings**

The configurations settings let you convert specified data to more readable formats.

User interface elements are described below:

UI Elements	Description
Enable Data Format Extension	Enables Data Format Extensions during replay.

#### Classpath Settings

The Classpath settings let you specify the location of additional classes that were not included in the system's CLASSPATH environment variable. You may need these classes to run Java applications and insure proper replay.

User interface elements are described below:

UI Elements	Description
Classpath Entries	Enter the path of additional classes that were not included in the system's CLASSPATH environment variable.
	Separate multiple entries with a semicolon.

#### **Client Emulation Settings**

The Oracle NCA Client Emulation runtime settings let you specify the communication parameters for your NCA client. You should configure the settings to accurately emulate your Oracle NCA environment.

UI Elements	Description
Socket mode	The communication to and from the client is performed on a socket level—not on the higher HTTP level.
	Timeout (seconds): The time that an Oracle NCA Vuser waits for a response from the server. The default value of -1 disables the timeout and the client waits indefinitely.
Pragma mode	In Pragma mode, communication is carried out in the Oracle-defined Pragma mode. This communication level, above the HTTP and Servlet levels, is characterized by the periodic sending of messages. In this mode, the client recognizes that the server cannot respond with data immediately. The server sends messages at given intervals until it is able to send the requested data.
	Max Retries. Indicates the maximum number of IfError messages the client will accept from the server before issuing an error. IfError messages are the periodic messages the server sends to the client, indicating that it will respond with the data as soon as it is able.
	Retry Interval. Defines the interval between retries in the case of IfError messages.
	Include retry intervals in transaction. Includes the interval between retry time, as part of the transaction duration time.
Enable Heartbeat	You can enable or disable the heartbeat sent to the Oracle server. The heartbeat verifies that there is proper communication with the server. If you are experiencing a heavy load on the Oracle NCA server, disable the heartbeat. If you enable the heartbeat, you can set the frequency of how often heartbeat messages are sent to the server.
	In the Frequency box, you can define the frequency of the heartbeat signal. The default is 120 seconds.
	Default: Enabled

UI Elements	Description
Forms Version	You can specify the version of the Oracle Forms server detected during recording.
	Note: Modify this setting only if the server was upgraded since the recording.
Diagnostic	This section lets you provide information about diagnostic modules for the database layer of Oracle Applications.
	Application version. The version of Oracle Application. This option is relevant when using Oracle Application—not a custom Oracle NCA application. It is only required when using Oracle database breakdown.

#### **Citrix Configuration Settings**

The Citrix Configuration settings relate to the screen latency, data compression, disk cache, and queuing of mouse movements. These settings, which will influence the load on the server, should correspond to the properties of your Citrix client. To view the client properties, select the icon representing the ICA connection in the Citrix Program Neighborhood, and select **Properties** from the right-click menu. Select the **Default Options** tab.

UI Elements	Description
SpeedScreen Latency Reduction	The mechanism used to enhance user interaction when the network speed is slow. You can turn this mechanism <b>on</b> or <b>off</b> , depending on the network speed. The <b>auto</b> option turns it on or off based on the current network speed. If you do not know the network speed, set this option to <b>Use Server Default</b> to use the machine's default.
Use data compression	Instructs Vusers to compress the transferred data. To enable this option, select the check box to the left of the option; to disable it, clear the check box. You should enable data compression if you have a limited bandwidth (enabled by default).
Use disk cache for bitmaps	Instructs Vusers to use a local cache to store bitmaps and commonly-used graphical objects. To enable this option, select the check box to the left of the option; to disable it, clear the check box. You should enable this option if you have a limited bandwidth (disabled by default).
Queue mouse movements and keystrokes	Instructs Vusers to create a queue of mouse movements and keystrokes, and send them as packets to the server less frequently. This setting reduces network traffic with slow connections. Enabling this option makes the session less responsive to keyboard and mouse movements. To enable this option, select the check box to the left of the option; to disable it, clear the check box (disabled by default).

UI Elements	Description
Sound quality	Specifies the quality of the sound: <b>Use server default</b> , <b>Sound off</b> , <b>High sound quality</b> , <b>Medium sound quality</b> , or <b>Low sound quality</b> . If the client machine does not have a 16-bit Sound Blaster-compatible sound card, select <b>Sound Off</b> . With sound support enabled, you will be able to play sound files from published applications on your client machine.

#### **Gateway Settings**

You use the **Gateway** link to set the WAP Gateway settings.

UI Elements	Description
Connection Options	The connection options specify the method that the Vuser uses to connect to the WAP gateway.
	WAP Gateway. Runs the Vusers accessing a Web server via a WAP Gateway.
	HTTP Direct. Runs the Vusers in HTTP mode, accessing a Web server directly.
	If you select the HTTP Direct connection mode, the remaining WAP Gateway options are not applicable.
Gateway Settings	If the Vusers connect through a gateway, the IP, Port, and WAP Versions options specify the Gateway connection.
	IP. The IP address of the gateway.
	Port. The port of the gateway. When running your Vusers through a WAP gateway, the Vusers automatically use default port numbers, depending on the selected mode. However, you can customize the settings and specify a custom IP address and port for the gateway.
	WAP version. The WAP version, 1.x (WSP) or 2.0 (HTTP proxy). If you recorded in WAP 1.x (WSP), you can run the Vusers in either 1.x (WSP), or 2.0 (HTTP proxy) mode. If you recorded in WAP 2.0 (HTTP proxy), then you can only run the Vusers in the same mode.
	If you are running the script in WAP 1.x (WSP), you can specify several connection and advanced options.

UI Elements	Description
Gateway	The connection mode settings apply to WAP version 1.x (WSP) connections.
Connection Mode	Connection-oriented Mode. Sets the connection mode for the WSP session to Connection-Oriented.
	Connectionless Mode. Sets the connection mode for the WSP session to Connectionless.
	Enable security. Enables a secure connection to the WAP gateway.
Advanced Gateway Options	Open the <b>Advanced</b> option in the Gateway runtime settings to configure the WAP Capabilities and other advanced Gateway options. For details see "Advanced Gateway Options" below.

# **Advanced Gateway Options**

UI Elements	Description
Confirm Push support	In CO mode, if a push message is received, this option instructs the Vuser to confirm the receipt of the message (disabled by default). For more information, see the HP Virtual User Generator User Guide.
Push support	Enables push type messages across the gateway (disabled by default).
CAPSessionResume	Enables requests for session suspend or resume.
Acknowledge	Returns standard headers that provide information to the gateway.
headers	Server SDU buffer size. The largest transaction service data unit that may be sent to the server during the session.
	Default: 4000
	Client SDU buffer size. The largest transaction service data unit that may be sent to the client during the session.
	Default: 400
	MethodMOR. The number of outstanding methods that can occur simultaneously.
	PushMOR. The number of outstanding push transactions that can occur simultaneously.
	BearerType. The type of bearer used as the underlying transport.
	Retrieve messages. When a push messages is received, this option instructs the Vuser to retrieve the message data from the URL indicated in the push message.
	Default: Disabled

UI Elements	Description
SupportCookies	Provides support for saving and retrieving cookies.
	Default: Disabled
WTP Segmentation and Reassembly	Enables segmentation and reassembly (SAR) in WTP, Wireless Transport Protocol.
	Default: True
	WTP Retransmission Time. The time in seconds that the WTP layer waits before resending the PDU if it did not receive a response.
	Default: 5000
WTLS Abbreviated Handshake	Use an abbreviated handshake instead of a full one, when receiving a redirect message.
	Default: False
WTLS Deffie Hellman	Use the Deffie Hellman encryption scheme for WTLS (Wireless Transport Layer Security) instead of the default scheme, RSA.
	Default: False
	WTLS Deffie Hellman identifier. An identifier for the Deffie Hellman encryption scheme. This identifier is required for the abbreviated handshake with the Operwave gateway that uses the Deffie Hellman encryption scheme.
	Network MTU Size. The maximum size in bytes, of the network packet.
	Default: 4096

#### **SAPGUI Settings**

The SAPGUI runtime settings let you set the general settings for a SAPGUI Vuser script. Performance Center uses these settings when running the script.

UI Elements	Description
Send status bar text	Send the text from the status bar to the log file.
Send active window title	Send the active window title text to the log file.  The Performance runtime settings allow you to indicate whether or not to display the SAP client during replay.

UI Elements	Description
Show SAP Client during replay	Shows an animation of the actions in the SAP client during replay. The benefit of displaying the user interface (UI) is that you can see how the forms are filled out and closely follow the actions of the Vuser. This option, however, requires additional resources and may affect the performance of your performance test.
Take ActiveScreen snapshots during replay	Captures replay snapshots with the Control ID information for all active objects. ActiveScreen snapshots differ from regular ones, in that they allow you to see which objects were recognized by VuGen in the SAPGUI client. As you move your mouse across the snapshot, VuGen highlights the detected objects. You can then add new steps to the script directly from within the snapshot. It also allows you to add steps interactively from within the snapshot for a specific object. For more information, see the <i>HP Virtual User Generator User Guide</i> .
Advanced	Advanced options let you set a timeout for the <b>SAPfewgsvr.exe</b> process, save a snapshot on error, and configure Performance Center to use SAPlogon during replay.
	Each Vuser invokes a separate <b>SAPfewgsvr.exe</b> process during test execution. In some instances, the process stays active even after the replay session has ended. You can check the Windows Task Manager to see if the process is still active.
	The Advanced SAPGUI settings let you set a timeout for this application. When the timeout is reached, Performance Center closes any <b>SAPfewgsvr</b> processes not previously terminated.
	Replay using running SAPlogon application. Instructs the Vusers to use the SAPlogon application that is currently running for replay.
	Set SAPfewgsvr application timeout. Allows you to modify the SAPfewgsvr.exe process timeout.
	Timeout to SAPfewgsvr. The SAPfewgsvr.exe process timeout in seconds.
	Default: 300 seconds

# **Java Environment Settings**

For Java scripts, you provide information about the Java virtual machine settings in the Java VM section.

UI Elements	Description
Use internal logic to locate JDK	Search the PATH, registry, and Windows folder for the JDK to use during replay.
Use specified JDK	Use the specified JDK during replay.

UI Elements	Description
Using Xbootclasspath parameters	Replays the script with the Xbootclasspath /p option.
Load each Vuser using dedicated class loader	Load each Vuser using a dedicated class loader. This will allow you to use a unique namespace for each Vuser and manage their resources separately.

#### .NET Environment Settings

The .NET environment runtime settings let you specify information about the application, such as its base path and the location of its configuration file.

UI Elements	Description
AUT Application Base Path	The AUT (Application Under Test) base directory from which DLLs are loaded during replay. By default, during recording, all of the necessary DLLs are stored in the script's directory. Use this option to specify the location of any missing DLL files for the AUT. This is usually the installation path of the recorded application.
	<b>Note:</b> The AUT must be installed on the machine running the script. If you leave this box empty, the Vusers use the local script\bin directory as the application base directory during replay.
AUT Configuration File	The file name of the recorded application's configuration file. Performance Center copies the AUT configuration file to the script\bin directory and loads the locally saved file. To specify a different location, use a full path. If you only specify a file name, and the file is not in the script\bin folder, the Vusers load it from the App base directory.

UI Elements	Description
AppDomain Per Vuser.	Enables execution of each Vuser in a separate app domain (true by default). Running Vusers in separate app domains enables each Vuser to execute separately without sharing static variables and prevents locking between them.
	ADO.NET providers deploy a feature called <b>connection pooling</b> which can significantly influence performance test accuracy. Whenever only one app domain is used for all Vusers, connection pooling is turned on—.NET Framework keeps the database connections open and tries to reuse them when a new connection is requested. Since many Vusers are executed in the context of a single application domain, they may interfere with one another. Their behavior will not be linear and that may decrease their accuracy. The default setting, <b>true</b> , allocates a separate connection pool for each Vuser. This means that there is connection pooling in the scope of each Vuser, but the Vusers will not interfere with one another. This setting provides more accuracy, but lower scalability.
	If you disable this option, you need to manually disable connection pooling for the database. For more information, see the <i>HP Virtual User Generator User Guide</i> .
Support for previous .NET versions	Supports previous .NET versions.

#### **Shared DLLs Settings**

The Shared DLLs settings let you manage the shared DLLs.

User interface elements are described below:

UI Elements	Description
+ Add	Add new entry. Adds a new DLL entry.
<i>▶</i> Edit	Edit entry. Modifies the selected DLL entry.
m Delete	<b>Delete entry.</b> Deletes the selected DLL entry.

#### Radius Settings

RADIUS (Remote Authentication Dial-In User Service) is a client/server protocol and software that enables remote access servers to communicate with a central server to authenticate dial-in users. It also authorizes their access to the requested system or service.

RADIUS allows a company to maintain user profiles in a central database that all remote servers can share. It provides better security, allowing a company to set up a policy that can be applied at a

single administered network point. Using a central service enables you to track usage for billing and store network statistics.

RADIUS has two sub-protocols:

- Authentication. Authorizes and controls user access.
- Accounting. Tracks usage for billing and for keeping network statistics.

For Vusers, the RADIUS protocol is supported for WSP replay for both of the Radius sub-protocols—authentication and accounting. You supply the dial-in information in the Radius runtime settings:

User interface elements are described below:

UI Elements	Description
Network Type	The accounting network type: GPRS (General Packet Radio Service) or CSD (Circuit-Switched Data).
IP Address	The IP address of the Radius server.
Authentication port number	The authentication port of the Radius server.
Accounting port number	The accounting port of the Radius server.
Secret Key	The secret key of the Radius server.
Connection Timeout	The time in seconds to wait for the Radius server to respond.
(sec)	Default: 120 seconds.
Retransmission retries	The number of times to retry after a failed transmission.
	Default: 0
Store attributes returned by the server	Allow Vusers to save attributes returned by the server as parameters, which can be used at a later time.
to parameters	Default: False
Radius client IP	Radius packets source IP, usually used to differentiate between packets transmitted on different NIC cards on a single load generator machine.

#### **RTE Settings**

Terminal Emulator runtime settings allow you to configure your TE Vusers so that they accurately emulate real users performing remote terminal emulation. You can configure settings for the number of connection attempts, device names, typing delay, and X-System synchronization.

UI Elements	Description
Maximum number of connection attempts	The <b>TE_connect</b> function is generated when you record a connection to a host. When you replay an RTE script, the <b>TE_connect</b> function connects the terminal emulator to the specified host. If the first attempt to connect is not successful, the Vuser retries a number of times to connect successfully. Details of each connection are recorded in the report file <b>output.txt</b> .  Enter the maximum number of times that a Vuser will try to connect. <b>Default:</b> Vusers try to connect 5 times
Use original device name	In certain environments, each session (Vuser) requires a unique device name. The <b>TE_connect</b> function generates a unique 8-character device name for each Vuser, and connects using this name.
	Select this option to connect using the device name that is contained within the com_string parameter of the <b>TE_connect function</b> .
	The original device name setting only applies to IBM block-mode terminals.
	Default: Selected
Delay before	The delay setting determines how Vusers execute <b>TE_type</b> functions.
typing	First key (milliseconds). Specifies the amount of time that a Vuser waits before entering the first character in a string.
	Subsequent key (milliseconds). Specifies the amount of time that a Vuser waits between submitting successive characters.
	<b>Note:</b> If you type zero for both the first key and the subsequent key delays, the Vuser will send characters as a single string, with no delay between characters.
	You can use the <b>TE_typing_style</b> function to override the Delay settings for a portion of a Vuser script.

UI Elements	Description
X-System synchronization	RTE Vuser scripts use the <b>TE_wait_sync</b> function for synchronization. You can set a timeout value and a stable-time value that applies to all <b>TE_wait_sync</b> functions.
	Timeout (seconds). When you replay a TE_wait_sync function, if the system does not stabilize before the synchronization timeout expires, the TE_wait_sync function returns an error code.
	To set the synchronization timeout, type a value (in seconds).
	Default: 60 seconds
	Stable time (milliseconds). After a Vuser executes a TE_wait_sync function, the Vuser waits until the terminal is no longer in the X-SYSTEM mode. After the terminal returns from the X-SYSTEM mode, the Vuser still monitors the system for a short time. This makes sure that the terminal has become stable, that is, that the system has not returned to the X-SYSTEM mode. Only then does the TE_wait_sync function terminate.
	To set the time that a Vuser continues to monitor the system after the system has returned from the X-SYSTEM mode, type a value (in milliseconds).
	Default: 1000 milliseconds.

#### **Server and Protocol Settings**

The following section describes the runtime settings specific to MMS (Multimedia Messaging Service) Vusers. These runtime setting allow you to configure the Server and Protocol settings.

UI Elements	Description
MMSC URL	The URL of the MMSC (Multimedia Messaging Center) server.
MMS Version	The version of the MMS protocol used by the script.
Timeout (seconds)	The time that the server waits for incoming messages.  Default: 60 seconds.
SMSC IP	The IP address of the SMSC server used for sending MMS notifications over SMPP.
SMSC Port	The IP port of the SMSC server used for sending MMS notifications over SMPP.

UI Elements	Description
Automatic WAP Connections	Defines when to connect and disconnect from a WAP gateway. This setting is only relevant when a WAP gateway is used. The possible values are:
	Per Iteration. Connect at the beginning of each iteration and disconnect at the end of each iteration.
	Per Send or Receive. Connect and disconnect at the beginning and end of each message.
	None. Do not use automatic WAP connections.
	Default: Per Iteration
Default Sender address	The default address sent in the Sender header.
	<b>Default:</b> +999999

#### **Timing Settings**

The Citrix Timing runtime settings relate to the connect and waiting timeouts. These settings apply to the entire script. To set the waiting time for a specific section of the script, use the **Set Waiting Time** step in the Vuser script. The new waiting time applies from the point of insertion until the end of the script or the next **Set Waiting Time** step.

UI Elements	Description
Connect time	The time in seconds to wait idly at an established connection before exiting.
	Default: 180 seconds
Waiting time	The time in seconds to wait idly at a synchronization point before exiting.
	Default: 60 seconds.
Typing rate	The delay in milliseconds between keystrokes.

# Part 7: My Performance Center

# **Chapter 29: Personalizing Performance Center**

#### This chapter includes:

My Performance Center Overview	358
How to Work with My Performance Center	358
My Performance Center User Interface	359

# **My Performance Center Overview**

My Performance Center provides an interface specifically designed for facilitating execution of dayto-day performance testing activities. It allows you to create a personalized view of performance testing features. Using My Performance Center, you can edit tests and test assets, as well as run and track test runs.

For information about how to use My Performance Center, see "How to Work with My Performance Center" below

# **How to Work with My Performance Center**

This task describes the main performance testing actions that can be run from within My Performance Center.

To learn more about My Performance Center, see "My Performance Center Overview" above.

#### Join a running performance test

- 1. Select Perspectives > Performance Tests.
- 2. In the Test Runs view, identify the currently running test you want to join. Currently running tests display the **Running** state, and the run name appears as a link.

**Tip:** To view all currently running tests, add the Currently Running Tests view to a User Perspective.

 Click the run name to join the test. The Performance Test Run page opens, enabling you to view and manage the test. For user interface details, see "Performance Test Run Page" on page 207.

#### Run a performance test

- 1. Select Perspectives > Performance Tests.
- 2. In the Performance Test Set view, select an instance of the test you want to run, and click **Run Test**. The Run Performance Test dialog box opens, enabling you to select a timeslot for the test run. For user interface details, see "Run Performance Test Dialog Box" on page 217.
- 3. Select an available timeslot and click **Run**. The Initializing Run page opens. The Initializing Run page displays the performance test initialization steps performed by ALM Performance Center, and the status for each step. If each step is completed successfully, the performance test starts running and the Performance Test Run page opens. For user interface details, see "Initializing Run Page" on page 205.

#### View and download performance test results

- Select Perspectives > Performance Test.
- 2. In the Test Runs view, select the completed test run whose results you want to view. The results are displayed in the Test Run Results view.
- To download result files, click **Download**.

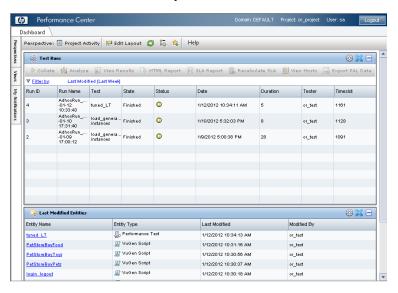
# **My Performance Center User Interface**

This section includes:

My Performance Center Window	. 359
My Performance Center Views	361
My Notifications	363

### **My Performance Center Window**

This section describes the My Performance Center window.



#### To access Use one of the following: • In your web browser, enter the ALM URL (http://<ALM Platform server name>[<:port number>]/gcbin). In the HP Application Lifecycle Management Options window, click **My Performance Center**. • In your web browser, enter the Performance Center Server URL (http://<server name>/loadtest). Log in to your domain and project with your ALM credentials. **Important** • If more than one Performance Center Server is installed in your system information together with a load balancer, you should access My Performance Center by entering the load balancer's URL. Alternatively, you can also enter the server's defined internal URL. You must have the relevant permissions in order to login to My Performance Center. For more information, see the HP Application Lifecycle Management Administrator Guide.

Relevant	"How to Work with My Performance Center" on page 358
tasks	

UI Elements	Description
🔝 Edit Layout	Edit Layout. Enables you to edit views.
S	Refresh. Refreshes the current display.
12	<b>Download Applications</b> . Opens the Download Applications window, enabling you to download standalone applications needed for working with ALM Performance Center.
<b>\$</b>	Add a Favorite. Opens the Add Favorite dialog box, enabling you to add a favorite view.
<b>@</b>	<b>Open Menu.</b> Opens a menu that contains the following options for managing the view:
	Select Columns. Enables you to select which columns to display in the view.
	Refresh this View. Refreshes the information displayed in the view.
	Remove this View. Removes the view.
80년 <b>21일</b> -	Show in Maximized/Minimized View. Maximizes or minimizes the view.
Perspectives -	Enables you to select a predefined groups of views. The group of views are:
System Perspectives	Project Activity. Displays views related to project activity.
Соросито	Performance Tests. Displays views related to managing performance tests.
	Test Resources. Displays views related to managing test resources.
	Trending. Enables you to view performance trending information. For user interface details, see "Performance Trending Page" on page 372.
	PAL. Enables you to view performance application lifecycle information.  For user interface details, see "PAL Flow Pane" on page 403.
	Lab Resources. Displays views relating to managing lab resources.
	Error Handling. Displays views related to managing test errors.
	Community. Provides views that enable easy access to Performance Center RSS feeds, links to relevant groups and forums, and the product's Web site.

UI Elements	Description
Perspectives - User Perspectives	Enables you create a personalized group of views to suit your specific testing needs.
Views	Contains a list of the available views. For information about the available views, see "My Performance Center Views" below.
My Notifications	Enables you to receive and send notifications to other users. For information about the available views, see "My Performance Center Views" below.

# **My Performance Center Views**

This section describes the views that are available in My Performance Center.

To access	In My Performance Center, select <b>Views.</b>
Important information	When a <b>System Perspective</b> is selected, the Views list is set to Read Only, and a check mark in the relevant check box identifies which views are included in the currently selected perspective.
	When creating a User Perspective, you use the check boxes to select which views to include in your perspective.

UI Elements (A - Z)	Description
AUT Hosts	Enables you to view and manage AUT hosts. For more information about AUT Hosts, refer to the <i>HP ALM Lab Management Guide</i> .
	Appears in System Perspective: Lab Resources
Currently Running Tasks	Enables you to keep track of currently running tasks in the system.
	Appears in System Perspective: Project Activity, Error Handling
Currently Running Tests	Enables you to keep track of currently running tests in the system.
Event Log	Displays a list of events generated for a specific test run selected in the Test Runs view. For more information about the Event Log, see "Initializing Run Page" on page 205.
	Appears in System Perspective: Error Handling
	System Perspective filter. Filter by date
	User Perspective filters. Filter by date, Filter by Related Test Runs

UI Elements (A - Z)	Description
Last	Enables you to keep track of changes to performance testing entities.
Modified Entities	Appears in System Perspective: Project Activity
Manage Production Data Sets	Enables you to import and monitor PAL data sets from the production system. For more information about PAL data sets, see "Manage Production Data Sets Pane" on page 404.
	Appears in System Perspectives: PAL
Monitor Profiles	Enables you to create and manage existing monitor profiles. For more information about monitor profiles, see "Monitor Profiles" on page 57.
	Appears in System Perspective: Test Resources
	System Perspective filter. Filter by date
	User Perspective filters. Filter by date, Filter by Related Test Set
PAL Reports	Enables you to manage PAL reports. It displays a list of available reports, and enables you to create new reports, and to delete or duplicate existing reports. For more information about PAL reports, see "PAL Reports Pane" on page 408.
	Appears in System Perspectives: PAL
Performance Center	Enables you to view and manage Performance Center hosts. For more information about hosts, see the HP ALM Lab Management Guide.
Hosts	Appears in System Perspectives: Lab Resources Error Handling
Performance Test Set	Enables you to view and edit selected test instances within test sets. You can create, edit, rename, and remove test instances. You can also run tests directly from this view. For more details about working with test sets, see <i>HP Application Lifecycle Management User Guide</i> .
	Appears in System Perspective: Performance Tests
Performance Trending	Enables you to create trend reports in order to identify performance improvements and regressions. For more information about trending, see "Trending" on page 365.
Test Run	Displays result information for a test run selected in the Test Runs view.
Results	For information on viewing test runs and test run results, see HP Application     Lifecycle Management User Guide.
	For information on managing test run results, see "Results/Last Run Results Tab" on page 202.
	Appears in System Perspective: Performance Tests
	System Perspective filter. Filter by date
	User Perspective filter. Filter by date

UI Elements (A - Z)	Description
Test Runs	Enables you to view and manage results for individual test runs.
	For more information on viewing test runs and test run results, see HP     Application Lifecycle Management User Guide.
	For information on managing test run results, see "Results/Last Run Results Tab" on page 202.
	Appears in System Perspectives: Project Activity, Performance Tests, Error Handling
	System Perspective filter. Filter by date
	User Perspective filters. Filter by date, Filter by Related Test Set
Timeslots	Enables you to view reserved timeslots for the project. For more information on timeslots, refer to the <i>HP Application Lifecycle Management User Guide</i> .
	Appears in System Perspectives: Project Activity, Performance tests, Lab Resources, Error Handling
	System Perspective filter. Filter by date
	User Perspective filter. Filter by date
Topologies	Displays details about topologies defined in the system. For more information on topologies, see "Topologies" on page 39.
	Appears in System Perspective: Test Resources
	System Perspective filter. Filter by date
	User Perspective filters. Filter by date, Filter by Related Test Set
Topology Preview	Displays a preview of the topology defined in a performance test selected in the Performance Test Sets view. For more information on topologies, see "Topologies" on page 39.
VuGen Scripts	Enables you to view and upload VuGen scripts to ALM. For more information on managing scripts, see "VuGen Script Management" on page 33.
	Appears in System Perspective: Test Resources
	System Perspective filter. Filter by date
	User Perspective filter. Filter by date, Filter by Related Test Set

# **My Notifications**

This pane enables you to communicate with other My Performance Center users.

To access	In My Performance Center, select <b>My Notifications.</b>
-----------	---

User interface elements are described below (unlabeled elements are shown in angle brackets):

UI Elements	Description
My Last Notifications	Enables you to view and send notifications.
Notifications Management	Contains a list of the available notifications.
<add notifications="" pane=""></add>	Enables you to send notifications. Located at the bottom of the My Performance window.

.

# **Chapter 30: Trending**

### This chapter includes:

Trend Reports Overview	.366
Trend by Quality Attributes Template - Trended Measurements	.369
Measurement Acronyms	.370
Trend Reports User Interface	372

# **Trend Reports Overview**

The ALM Performance Center trend reports allow you to compare performance test run data over time, thereby giving you better visibility and control of your application's performance.

By comparing the same measurement in more than one instance of a test run, you can identify whether its performance trend is improving or regressing.

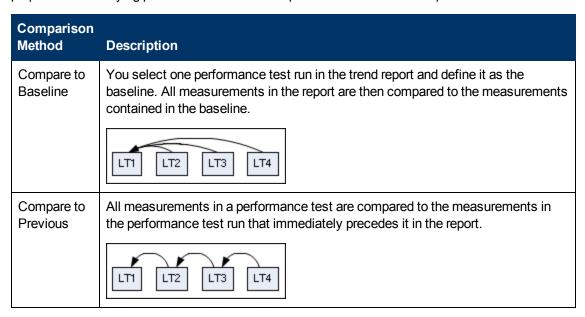
For example, if you were interested in the performance trend of the transaction response time measurement, the trend report clearly displays whether over several instances of a test run, this value has increased or decreased from one run to another - a performance regression or improvement respectively.

This section also includes:

- "Comparison Methods" below
- "Trend Thresholds" on next page
- "Custom Measurement Mapping" on page 368

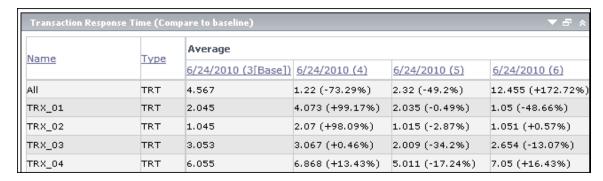
### **Comparison Methods**

There are two methods of comparing measurements contained in a performance test run for the purposes of identifying performance trends: Compare to Baseline and Compare to Previous.



It is important to understand the difference between the two comparison methods. The following example will illustrate how the same data can yield different results depending on the method you select.

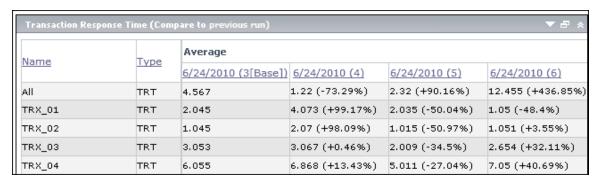
As shown in the image below, the average Transaction Response Time measurement is being trended from four performance test runs: **3**, **4**, **5**, and **6**.



Performance test run (PT) **3** has been defined as the baseline (as indicated by the word **Base** in parentheses). The average transaction response times contained in the other performance test runs are compared to PT **3** only.

In PT 3, the average transaction response time for TRX\_01 was 2.045. The average transaction response time for the same transaction in PT 5 was 2.035, which represents a slightly faster response time and therefore a slight improvement in the performance of this measurement. The percentage difference between the two figures is displayed in brackets, in this case -0.49%.

However, if the Compare to Previous comparison method was selected, then the average transaction response time in PT 5 would be compared not to PT 3, but rather to PT 4 (since 4 precedes it in the table). The value for PT 4 is 4.073 while for PT 5 it's 2.035, a percentage difference of -50.04%.



Using exactly the same data, the two comparison methods have yielded very different results. Only a slight improvement with the Compare to Baseline method (-0.49%), while a more significant improvement with the Compare to Previous method (-50.04%).

### **Trend Thresholds**

To identify significant improvements or regressions in performance, you can define unique thresholds to track differentials between measurements being compared. If a differential exceeds a defined threshold, that value appears in a predetermined color, identifying it as an improvement, minor regression, or major regression.

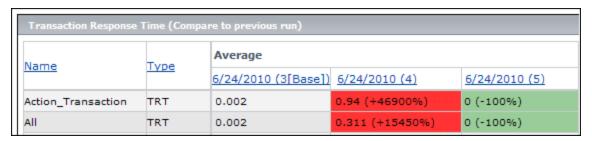
For example, if you define an improvement threshold for comparing transaction response times as 50%, then any transaction response time that is 50% lower than that of the baseline or previous run (depending on the comparison method) will appear in the color you defined for improvements.

In the example below, the following performance thresholds for the transaction response time (TRT) measurement have been defined:

- Improvement. At least 90% decrease
- Major Regression. At least 50% increase

These threshold definitions mean that any performance improvements or regressions which exceeds these percentages will be displayed in color, making them more identifiable.

In the following table, the Compare to Previous comparison method is used.



In the table above, we see that the value of the TRT measurement for the **Action\_Transaction** in performance test run **4** is **46900**% higher than in performance test run **3** - a performance regression which far exceeds the defined threshold for major regressions. Therefore, the value appears in red, the default color for major regressions.

The corresponding value for performance test run **5** represents a **100**% improvement on performance test run **4**. Since this percentage exceeds the defined threshold for improvements, the value appears in green, the default color for improvements.

### **Custom Measurement Mapping**

The Custom Measurement Mapping feature allows you to reconcile inconsistent transaction or monitor names between performance test runs, thereby allowing you to properly trend these measurements.

The following are two examples of when you would use the Custom Measurement Mapping feature:

### Inconsistent transaction name

You run a performance test that contains the transaction **BuyBook**. A while later you run the performance test again. However, in the time between the two performance test runs, the transaction name has been changed to **TRX\_01\_BuyBook**.

As a result of this inconsistent naming, you cannot obtain any trending information for this measurement, as Performance Center cannot recognize that the two transactions are actually the same, and compare them for trending purposes.

To overcome this problem, you map the two measurements (**BuyBook** and **TRX\_01\_BuyBook**) to a new third measurement which you create, for example **Buy\_Book\_mapped**. You add this new user-defined measurement to the trend report. Performance Center can then compare two instances of the **Buy\_Book\_mapped** transaction and give you meaningful trending information.

You can give the new transaction the same name as one of the current transactions. Additionally, you can configure the mapping so that all future instances of the transaction are automatically mapped to the new transaction name.

### Inconsistent monitor name

You want to compare your application's performance when it runs on different operating systems or when it runs on different Web/application servers.

You run the performance test once on a Windows platform, and then again on a UNIX platform. You then want to compare the CPU utilization between the two runs. However, each platform provides a different name for this measurement. For example, **% Processor Time (Processor\_Total)** in Windows, and **CPU Utilization** in UNIX.

Performance Center cannot successfully obtain trending information for this measurement because the measurement names may be different.

To overcome this problem, you map the two measurements (% Processor Time (Processor\_Total) and CPU Utilization) to a third measurement which you create, for example CPU\_mapped. You then add this new user-defined measurement to the trend report. Performance Center can then compare the two instances of the CPU\_mapped transaction and give you meaningful trending information.

You can give the new monitor the same name as one of the current monitors. Additionally, you can configure the mapping so that all future instances of the monitor are automatically mapped to the new monitor name.

# Trend by Quality Attributes Template - Trended Measurements

The following table shows which measurements are trended, and by which quality attribute the information is displayed when the Trend by Quality Attributes template is selected:

Quality Attribute	Trended Measurement
Performance	Transaction Response Time (compared to baseline). For more information on comparison methods, see "Trend Reports Overview" on page 366.
System Performance	CPU utilization  Disk utilization  Available memory
Availability	Transaction Summary (compared to baseline). For more information on comparison methods, see "Trend Reports Overview" on page 366.
Repeatability	Transaction Percentiles (compared to baseline). For more information on comparison methods, see "Trend Reports Overview" on page 366.
Stability	Error Statistics Transaction Failures

# **Measurement Acronyms**

The following table lists all the measurement acronyms that might be used in the trend report:

Data Type	Full Name	Initials
Vusers	Running Vusers	VU
Errors	Errors	ERR
Transactions	Transaction Response Time	TRT
	Transaction Per Second	TPS
	Transaction Summary	TRS
Web Resources	Hits per Second	WEB
	Throughput	
	Connections	
User Defined Data Points	User Defined Data Points	UDP
System Resources	Windows Resources	WIN
	UNIX Resources	UNX
	Server Resources	SRVR
	SNMP	SNMP
	SiteScope	SiS
Firewalls	CheckPoint Firewall 1	FW
Web Server Resources	Apache	APA
	MS IIS	IIS
	iPlanet	PLA

Data Type	Full Name	Initials
Web Application Server Resources	Ariba	ARI
	ATG Dynamo	ATG
	BroadVision	BDV
	ColdFusion	CFU
	MS ASP	ASP
	Oracle Application Server	OAS
	SilverStream	SST
	WebLogic	WL
	WebSphere	ws
Database Server Resources	DB2	DB2
	Oracle	ORA
	MS SQL	SQL
	Sybase	SYB
ERP/CRM Server Resources	SAP	SAP
	SAP Portal	SAPP
	SAP CCMS	CCMS
	SAP GUI	SAPU
	Siebel Web Server	SIEB
	Siebel Server Manager	SIEB
	PeopleSoft	PSFT
J2EE	Server Request	J2EE
.NET	Server Request	NET
Additional Components	COM+	СОМ
	.NET	NET
Application Deployment Solution	Citrix MetaFrame XP	CTRX
Middleware Performance	TUXEDO Resources	TUX
	IBM WebSphere MQ	MQ
Application Traffic Measurement	F5 BIG-IP	F5

# **Trend Reports User Interface**

This section includes:

Performance Trending Page	372
Create New Trend Report Page	374
<report name=""> Trend Report</report>	375
Trend Overview Tab	376
Trend View Tabs	378
Trend Views	379
Export Trend Report Page	384
Select Columns Dialog Box	385
Select Test Runs to Trend Report Dialog Box	388
Threshold Settings Dialog Box	390
Custom Measurement Mapping Dialog Box	391
Add Trend Views to Tab Dialog Box	393
Measurements Configuration Dialog Box	394

# **Performance Trending Page**

This page enables you to manage trend reports. It displays a list of available reports, and enables you to create new reports, and to delete or duplicate existing reports.



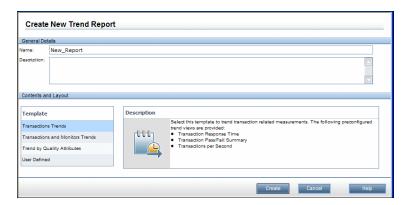
То	Use one of the following:
access	On the ALM sidebar, under <b>Testing</b> , select <b>Test Lab</b> . Select the <b>Test Runs</b> tab,
	and on the toolbar, click the <b>Performance Trending</b> button 🦥 .
	On the ALM sidebar, under Performance Center, select Performance Lifecycle. Click Open Trending Perspective in MyPC.
	In My Performance Center, select <b>Perspective &gt; Trending</b> . For more information, see "Personalizing Performance Center" on page 357.
Tip	On the ALM sidebar, under <b>Performance Center</b> , select <b>Performance Lifecycle</b> to view the five most recently created trending reports.
Relevant tasks	"How to Manage a Performance Test Run" on page 197

User interface elements are described below (unlabeled elements are shown in angle brackets):

UI Elements (A-Z)	Description
<my center="" common="" elements="" performance="" ui=""></my>	For My PC menus and buttons, see "My Performance Center Window" on page 359.
* New Trend Report	Opens the Trend Report creation page, which enables you to create trend reports.
Duplicate	Creates a duplicate of the selected report.
Rename	Enables you to edit the report name and description.
<trend information<="" report="" th=""><th>Displays details of the selected report.</th></trend>	Displays details of the selected report.
pane>	Note: If you have the required permissions, the Trend Report Name and Description fields are enabled for editing.
<performance table="" trending=""></performance>	Displays a list of all available trend reports.
Description	A description of the report.
Last Modified	The date on which the report was last modified.
Modified by	The user who last modified the report.
Responsible	The user who created the report
Report Name	The name of the report.
Runs	The number of trended runs contained in the report.

# **Create New Trend Report Page**

This page enables you to create trend reports.



To access	In My Performance Center, select     Perspectives > Trending.
	On the Performance Trending page, click <b>New Trend Report</b> .
Relevant tasks	"How to Manage a Performance Test Run" on page 197

### **General Details Pane**

User interface elements are described below:

UI Elements	Description
Name	The name of the report.
Description	A description of the report.

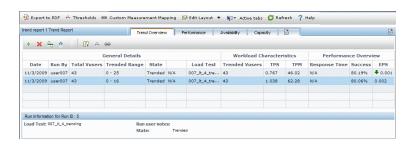
### **Contents and Layouts Pane**

UI Elements (A-Z)	Description
Description	A description of the selected template.
Transaction Trends template	Provides trend views that display trending information for the following measurements:  Transaction Response Time Transaction Pass/Fail Summary Transactions per Second

UI Elements (A-Z)	Description
Transactions and	Provides trend views that display trending information for the following measurements:
Monitors Trends	Transaction Response Time
template	Transaction Summary
	System Resources (specifically: CPU utilization, Disk utilization, and Available memory)
Trend by Quality Attributes template	Provides trend views that display trending information from the point of view of quality attributes. For a table which displays which measurements are trended and by which quality attribute, see "Trend by Quality Attributes Template - Trended Measurements" on page 369.
User Defined template	This template provides only the basic layout for the report with no further predefined tab or trend view configuration.

### <Report Name> Trend Report

This page enables you to manage the test runs that are included in the report, as well as to manage the trend views which display the trending information.



# To access

- 1. In My Performance Center, select **Perspectives > Trending**.
- 2. On the Performance Trending page, in the Trend Reports grid, click the name of the report to open. The report opens as an additional tab on the My Performance Center Dashboard.

User interface elements are described below (unlabeled elements are shown in angle brackets):

UI Elements	Description
Export to PDF	Opens the Export Trend Report page, which enables you to export the selected report to a .pdf file. For user interface details, see "Export Trend Report Page" on page 384.

UI Elements	Description
→ Thresholds	Opens the Threshold Settings dialog box, which enables you to define the thresholds to be used for identifying performance improvements and regressions. For user interface details, see "Threshold Settings Dialog Box" on page 390.
© Custom Measurement Mapping	Opens the Custom Measurement Mapping dialog box, which enables you to define and customize mapped measurements. For user interface details, see "Custom Measurement Mapping Dialog Box" on page 391.
₩ Edit Layout	Enables you to drag and drop trend views within a trend view tab.
Active tabs	Enables you to view tabs that are not currently displayed.
	<b>Note:</b> A maximum of five tabs can be displayed at one time.
C Refresh	Refreshes the information contained in the report.
<b></b>	Add a New Tab. Adds a new tab to the report.
<trend views=""></trend>	Trend views are display items that present trending information, and are contained within the <trend tabs="" view="">. For more information, see "Trend Views" on page 379.</trend>
<trend tabs="" view=""></trend>	The <trend tabs="" view=""> contain the trend views and are defined by the template on which the report is based. For more information, see "Trend View Tabs" on page 378.</trend>
Trend Overview tab	The Trend Overview tab displays the test runs trended in the report, and provides options for managing the test runs. For more information, see "Trend Overview Tab" below.

# **Trend Overview Tab**

The Trend Overview tab is used for managing the information contained in the trend report.

To access	The Trend Overview tab is displayed by default when you access a <report name=""> Trend Report.</report>
Important information	The Trend Overview tab is common to all trend reports, irrespective of which template is selected.
See also	" <report name=""> Trend Report " on previous page</report>

User interface elements are described below (unlabeled elements are shown in angle brackets):

UI Elements	Description
•	Add runs to trend report. Opens the Select Test Runs to Trend Report dialog box. For user interface details, see "Select Test Runs to Trend Report Dialog Box" on page 388.
×	Remove run from trend report. Remove test runs from the trend report.
<del></del>	<b>Set run as baseline.</b> Sets the selected test run as the baseline run for comparing test runs. For more information on comparison methods, see "Trend Reports Overview" on page 366.
	<b>Note:</b> The first run which is added to the report is automatically defined as the baseline.
<b>↑</b> ₩	<b>Move Run Up/Down.</b> Moves the selected test run up or down in the run order. Changing the position of the test run may have an effect on the comparison value when the Compare to previous method is selected. For more information on comparison methods, see "Trend Reports Overview" on page 366.
12° 32	<b>Republish this report item.</b> Enables you to republish run results to a Trend report.
	Customize Table Columns. Customizes which columns appear in the Trended Runs table. For user interface details, see "Select Columns Dialog Box" on page 385.
<trended runs="" table=""></trended>	Displays information for all trended test runs in the report. It is divided into three sections, <b>General Details</b> , <b>Workload Characteristics</b> , and <b>Performance Overview</b> .
General	Columns in this section display general information relating to the test run.
Details	For a list of the available fields under this section see <b>Customize Table Columns</b> above.
Performance Overview	Columns in this section contain information relating to the overall performance of your application.
	The purpose of this section is to provide you with basic overview trending information without having to open a trend view. The basic trend information is shown by upward or downward arrows that indicate performance improvements or regressions with regards the baseline only. For more information on comparison methods, see "Trend Reports Overview" on page 366.
	For a list of the available fields under this section see <b>Customize Table Columns</b> above.

UI Elements	Description
Run Information	Displays details for the selected test run. The following information is displayed:
pane	Performance Test Set. The test set from which the test was run.
	Test. The name of the test.
	Comments. Comments about the test run.
	Run Date. The date of the test run.
	State. The publish state of the run. Either Trended or Not Trended. If Not Trended, then the reason for this error appears in this field. A link appears to republish the run after you have fixed the error.
Workload Characteristics	Columns in this section are intended to display enough information in order for you to identify whether the test runs are similar enough in terms of workload, and therefore suitable for trending.
	The values displayed in this section are relevant only for the selected time range. Changing the selected time range will likely lead to different results. For more information on the Define Time Range filter, see "Select Test Runs to Trend Report Dialog Box" on page 388.
	For a list of the available fields under this section see <b>Customize Table Columns</b> above.

### **Trend View Tabs**

A report tab can contain any number of trend views. The tabs are defined by the template on which the report is based, and which sets the name of the tab and automatically includes trend views that are related to its name.

To access	In My Performance Center, select <b>Perspectives &gt; Trending</b> .
	<ol> <li>On the Performance Trending page, in the Trend Reports grid, click the name of the report to open. The report opens as an additional tab on the My Performance Center Dashboard. The trend view tabs are displayed by default.</li> </ol>
Important information	The trend view tabs which appear by default depend on which template the report is based on.
See also	" <report name=""> Trend Report " on page 375</report>

User interface elements are described below (unlabeled elements are shown in angle brackets):

UI Elements	Description
<tab management menu&gt;</tab 	Select a trend view tab and click the ♥ down arrow to open the tab management menu, which contains the following options (not available on the Trend Overview tab):
	Add View to Tab. Opens the Add Trend Views to Tab dialog box. For user interface details, see "Add Trend Views to Tab Dialog Box" on page 393.
	Edit Tab Title. Enables you to change the name of the tab.
	Move Tab Left. Moves the tab left in the tab order.
	Move Tab Right. Moves the tab right in the tab order.
	Delete This Tab. Deletes the tab and all of the trend views contained in it, from the report.
<trend view=""></trend>	A display item that presents trending information. For more information, see "Trend Views" below.

### **Trend Views**

A trend view is a display item that presents trending information for a particular performance metric, for example, transaction response time.

To access	In My Performance Center, select <b>Perspectives &gt; Trending</b> .		
	<ol><li>On the Performance Trending page, in the Trend Reports grid, click the name of the report to open. The report opens as an additional tab on the My Performance Center Dashboard. The trend view tabs are displayed by default.</li></ol>		
	Trend Views are contained within the trend view tabs. The trend view tabs are displayed by default.		
See also	" <report name=""> Trend Report " on page 375</report>		

### **Edit Trend View Menu**

This menu contains options that enable you to edit the trend view's display and comparison settings.

To access	On the trend view, click the <b>Open edit menu</b> button (Not available in the Trend Overview tab).
-----------	--

UI Elements	Description
3D Mode (stacked bar chart view only)	Enables you to view the chart in 3D.
Color Trends (table view only)	Activates the trend report's threshold settings. For more information about thresholds, see "Trend Reports Overview" on page 366.
Compare to baseline/previous (table view only)	Enables you to change the comparison method displayed in the trend view. For more information on comparison methods, see "Trend Reports Overview" on page 366.
Delete this Trend View	Deletes the trend view.
Do not show difference (table view only)	Enables you to hide value differentials between test runs. It is recommended to use this setting when exporting the report to a CSV format.
Edit Display Setting	Enables you to change the appearance of the trend view. The available settings are:
	Table view. This view is best suited for displaying comparisons between measurements. You can view threshold settings in this view only. For more information, see "Display Setting: Table" on next page.
	Line graph view. This view is best suited for displaying trending information graphically over a timeline. For more information, see "Display Setting: Line Graph" on next page.
	Stacked bar chart view. This view displays trending information graphically over a timeline. It is best suited for trending a small number of multiple measurements. For more information, see "Display Setting: Stacked" on page 382.
Edit Trend View Title	Enables you to edit the trend view title.
Export to CSV (table view only)	Enables you to export the report to a CSV format.
Select Measurements	Opens the Measurements Configuration dialog box, which enables you to add measurements to the trend view. For user interface details, see "Measurements Configuration Dialog Box" on page 394.
Show difference as value/percentage (table view only)	Enables you to define how to display value differentials between test runs in the trend view - as values or as percentages.

UI Elements	Description
Show Values (stacked bar chart view only)	Enables you to view the measurement values on the actual bar columns.

### **Display Setting: Table**

This section explains the Table trend view display setting.

To access	<ol> <li>On the trend view, click the Open edit menu button in the Trend Overview tab).</li> <li>Select Edit Display Setting.</li> <li>In the Edit Display Setting dialog box, select Table.</li> </ol>
Important information	You can view threshold settings in table view only.

User interface elements are described below (unlabeled elements are shown in angle brackets):

UI Elements	Description
<measurement name="" value=""></measurement>	The name of the measurement value being trended, for example, minimum, maximum, average, and so on.
<measurement value=""></measurement>	The actual value of the measurement being trended, and its comparison value, displayed per test run. For more information about comparison methods, see "Trend Reports Overview" on page 366.
Name	The name of the measurement being compared.
Туре	The type of measurement being compared.

### **Display Setting: Line Graph**

This section explains the Line Graph trend view display setting.

To access	<ol> <li>On the trend view, click the Open edit menu button (Not available in the Trend Overview tab).</li> <li>Select Edit Display Setting.</li> <li>In the Edit Display Setting dialog box, select Line.</li> </ol>
Important information	<ul> <li>When you hold the cursor over the line graph, a tooltip appears displaying the exact amount of units for that measurement, correct to the nearest test run on the timeline. In other words, if you hold the cursor near the left point of the line graph, you see the value of the first test run.</li> </ul>
	<ul> <li>When you click a section in the line graph/measurement in the legend, it becomes highlighted, as does the corresponding section in the legend/line graph.</li> </ul>

User interface elements are described below (unlabeled elements are shown in angle brackets):

UI Elements	Description
<graph slope&gt;</graph 	The upward or downward slope of the line represents an upward or downward change in the measurement's unit. For example, a higher transaction response time (which is a performance regression), or a higher transactions per second value (which is a performance improvement).
<x-axis></x-axis>	Lists the test runs according to their run date.
<y-axis></y-axis>	The relevant unit of measurement.
	<b>Example:</b> For the Transaction Response Time measurement, the y-axis values represent seconds, while for the transactions per second measurement, the values represent the number of transactions.
В	Displays the measurement in bold.
С	Displays the color of the measurement as it appears in the graph. Click the colored square in the column to select a different color for the measurement.
Function	Displays the value of the measurement being trended.
Name	The name of the measurement.
Scale	Indicates the scale of the measurement. When viewing information in the line graph view, you can adjust the scale of any measurement to make comparing measurements more meaningful.
	To change the scale of a measurement, click the value in the column and select the desired scale from the Set Scale box that opens. You can also apply the selected scale to all the measurements in the graph.
Туре	Contains an acronym that identifies the measurement type. For a full list of available acronyms, see "Measurement Acronyms" on page 370.
V	Determines whether the measurement is visible. All measurements are displayed by default. Clear the check box to hide a measurement.

### **Display Setting: Stacked**

This section explains the Stacked Bar Chart trend view display setting.

To access	On the trend view, click the <b>Open edit menu</b> button (Not available in the Trend Overview tab).
	2. Select Edit Display Setting.
	3. In the Edit Display Setting dialog box, select <b>Stacked</b> .

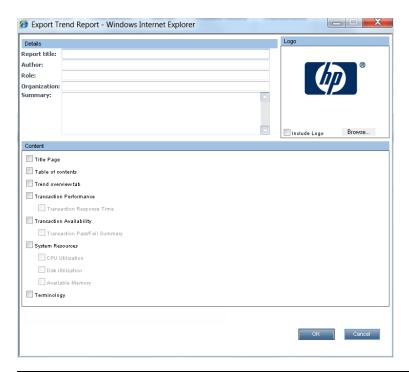
Important information	If different values are selected for the same measurement (for example,     Maximum and Average transaction response times), then the measurements     appear as stacked bars. That is, the values appear above each other for the bar     that represents the transaction response time measurement for a specific test     run.
	When you hold the cursor over a bar, a tooltip appears which displays the exact number of units for that measurement, correct for that test run.
	When you click a section in the bar chart/measurement in the legend, it becomes highlighted, as does the corresponding section in the legend/bar chart.

User interface elements are described below (unlabeled elements are shown in angle brackets):

UI Elements	Description
<bar height=""></bar>	The height of the bar represents the change in the measurement's unit. For example, a higher transaction response time, which represents a performance regression, or a higher transactions per second value, which represents a performance improvement.
<x-axis></x-axis>	Lists the test runs according to their run date.
<y-axis></y-axis>	The relevant unit of measurement.
	<b>Example:</b> For the Transaction Response Time measurement, the y-axis values represent seconds, while for the transactions per second measurement, the values represent the number of transactions.
С	Displays the color of the measurement as it appears in the graph. Click the colored square in the column to select a different color for the measurement.
Function	Displays the value of the measurement being trended.
Name	The name of the measurement.
Scale	Indicates the scale of the measurement. When viewing information in the line graph view, you can adjust the scale of any measurement to make comparing measurements more meaningful.
	To change the scale of a measurement, click the value in the column and select the desired scale from the Set Scale box that opens. You can also apply the selected scale to all the measurements in the graph.
Туре	Contains an acronym that identifies the measurement type. For a full list of available acronyms, see "Measurement Acronyms" on page 370.
V	Determines whether the measurement is visible. All measurements are displayed by default. Clear the check box to hide a measurement.

# **Export Trend Report Page**

This page enables you to export the selected trend report to a .pdf file.

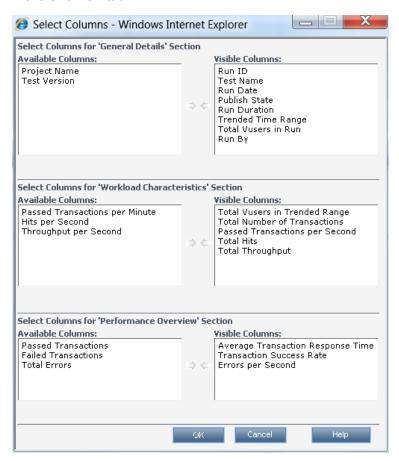


То	1. In My Performance Center, select <b>Perspectives &gt; Trending</b> .
access	<ol><li>On the Performance Trending page, in the Trend Reports grid, click the name of the report to open. The report opens as an additional tab on the My Performance Center Dashboard.</li></ol>
See also	" <report name=""> Trend Report " on page 375</report>

UI Elements	Description
Details area	Enables you to define report details, such as report title, author, and summary.
Logo area	Enables you to set the image that is placed on the cover page of the report and at the top of each page of the report. The HP logo is available by default.
Content area	Enables you to specify data to include in your report, such as a title page, table of contents, and trend views.

# **Select Columns Dialog Box**

This dialog box enables you to select columns to be displayed in the <report name> Trend Report's Trend Overview tab.



To access	On the <report name=""> Trend Report, select the <b>Trend Overview</b> tab, and click the <b>Customize table columns</b> button</report>
Important information	Due to space limitations, the names of the columns in the Trend Overview tab may differ from how they appear in this dialog box. In these cases, column names as they appear in the Trend Overview tab appear in parentheses.
See also	" <report name=""> Trend Report " on page 375</report>

Select Columns for 'General Details' Section

UI Elements (A-Z)	Description
Project Name (Project)	The name of the project in which the test was run.
Publish State (State)	Indicates whether the test run was successfully added to the report or not, either <b>trended</b> or <b>not trended</b> respectively. A test run that was not successfully added appears in red and a tooltip displays the reason.
	Note: Displayed by default.
Run By	The name of the user who ran the test.
	Note: Displayed by default.
Run Date (Date)	The date of the load test run.
(Date)	Note: Displayed by default.
Run Duration (Duration)	The duration of the test run, in minutes.
(	Note: Displayed by default.
Run ID	The run ID.
	Note: Displayed by default.
Test Name (Test)	The name of the test.
Test Version	The version of the test.
Total Vusers in Run (Total Vusers)	The number of Vusers in the test run, within the selected time range.
Trended Time Range (Trended Range)	The time range within the test run that is selected for trending.

Select Columns for 'Workload Characteristics' Section

User interface elements are described below:

UI Elements (A-Z)	Description
Hits per Second (HPS)	The average number of hits per second within the trended time range.
Passed Transactions per Minute (TPM)	The number of transactions that passed per minute of the test run within the selected time range.
	Note: Displayed by default.
Passed Transactions per Second (TPS)	The number of transactions that passed per second of the test run within the selected time range.
	Note: Displayed by default.
Total Hits (Hits)	The total number of hits per second within the trended time range.
Total Number of Transactions (Transactions)	The total number of transactions in the test run that passed, failed or stopped within the selected time range.
	Note: Displayed by default.
Total Throughput (Throughput)	The total throughput within the trended time range.
Total Vusers in Trended Range (Trended Vusers)	The maximum number of running Vusers within the trended time range.
	Note: Displayed by default.
Throughput per Second (Throughput per Sec.)	The amount of throughput per second within the selected time range.

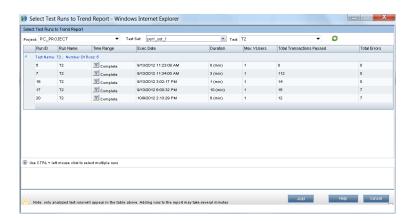
Select Columns for 'Performance Overview' Section

UI Elements (A-Z)	Description
Average Transaction Response Time (Response Time)	The weighted average transaction response time for all the transactions within the selected time range.
	Note: Displayed by default.

UI Elements (A-Z)	Description
Errors per Second (EPS)	The average amount of errors per second within the selected time range.
	Note: Displayed by default.
Failed Transactions (Failed)	The actual amount of transactions that failed within the selected time range.
Passed Transactions (Passed)	The actual amount of transactions that passed within the selected time range.
Total Errors (Errors)	The total number of errors within the selected time range.
Transaction Success Rate (Success)	The percentage of the total amount of transactions that passed within the selected time range.
	Note: Displayed by default.

# **Select Test Runs to Trend Report Dialog Box**

This dialog box enables you to add performance test runs to the report.



### To access

- 1. In My Performance Center, select **Perspectives > Trending**.
- On the Performance Trending page, in the Trend Reports grid, click the name of the report to open. The report opens as an additional tab on the My Performance Center Dashboard.
- 3. On the <report name> Trend Report, select the **Trend Overview** tab, and click the **Add runs to trend report** button .

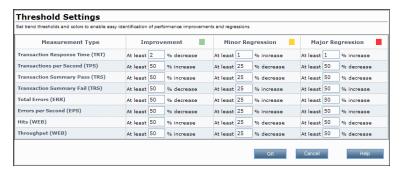
# In order to add performance test runs to the trend report, there must be a data processor present in your project pool. The process whereby ALM Performance Center extracts the performance test data from Analysis is very labor intensive on the data processor, and may take anywhere from several minutes to over an hour. It is recommended that you use a machine dedicated for this purpose. ALM Performance Center extracts the performance test data from Analysis using a granularity of 16 seconds. This value might be different from the defined granularity in Analysis, and may lead to slight variations when comparing values between Analysis and ALM Performance Center.

UI Elements	Description
Project	A list of available projects from which to select test instances to trend.
Test Set	A list of available test sets from which to select test instances to trend.
Test	The tests contained in the selected test set.
S	Refresh. Enables you to refresh the dialog box information
Load Data	Populates the test runs table with all analyzed instances of the selected test.
Run ID	The Run ID.
Run Name	The name of the test run.
Time Range	The duration of the test run that is selected for trending.
	<b>Example:</b> If a test run's overall duration is 30 minutes, and the time range is defined as <b>0-15min</b> , then only the first 15 minutes of the test run will be considered for trending.
	Default: The whole test run in selected.
Exec Date	The date and time of the test run.
Duration	The duration (in minutes) of the test run.
Max Vusers	The maximum number of running Vusers during the test run.
Total Transactions Passed	The total number of passed transactions during the test run.
Total Errors	The total number of errors during the test run.

UI Elements	Description
7	<b>Time Range filter.</b> Opens the Define Time Range dialog box, which enables you to change the defined time range within a test run for trending purposes.
	In the Define Time Range dialog box, select one of the following options:
	Trend Complete Run. Makes all data collected from the beginning to the end of the test run available for trending.
	Trend Part of Run. Makes only part of the test run available for trending. Select the desired part of the run to trend by entering the start and end times in the Start Time and End Time boxes.
Add	Adds the selected test runs to the trend report.

# **Threshold Settings Dialog Box**

This dialog box enables you to define which percentage differentials between measurement constitute significant improvements or regressions in performance.



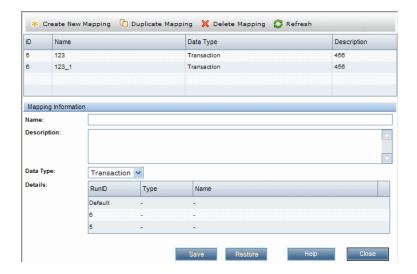
To access	In My Performance Center, select <b>Perspectives &gt; Trending</b> .
	<ol> <li>On the Performance Trending page, in the Trend Reports grid, click the name of the report to open. The report opens as an additional tab on the My Performance Center Dashboard.</li> </ol>
	3. On the <report name=""> Trend Report, click the <b>Set Thresholds</b> button  A Thresholds  .</report>
Important information	The threshold definition and color settings are applied on a global level and hold true across all trend views in the report.

User interface elements are described below:

UI Elements (A-Z)	Description
Improvement	Enter the percentage differential between instances of the measurement that will be considered an improvement in performance.
Major Regression	Enter the percentage differential between instances of the measurement that will be considered a major regression in performance.
Measurement Type	The type of measurement.
Minor Regression	Enter the percentage differential between instances of the measurement that will be considered a minor regression in performance.

# **Custom Measurement Mapping Dialog Box**

This dialog box enables you to map measurements with different names to a new single measurement which you create.



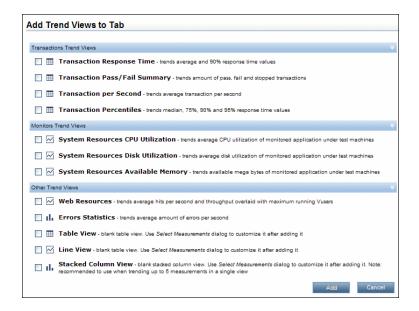
# To access

- 1. In My Performance Center, select **Perspectives > Trending**.
- 2. On the Performance Trending page, in the Trend Reports grid, click the name of the report to open. The report opens as an additional tab on the My Performance Center Dashboard.
- 3. On the <report name> Trend Report, click the **Custom Measurement Mapping** button .

UI Elements	Description
* Create New Mapping	Opens the Add New Mapping dialog box, enabling you to create a new mapped measurement.
	In the Add New Mapping dialog box, enter the following information:
	Name. The name of the new mapped measurement.
	Description. A description of the new mapped measurement.
	Data Type. Select the measurement type: Transaction, Monitor, or Other.
Duplicate Mapping	Creates a duplicate of the selected mapped measurement.
<b>⊘</b> Refresh	Refreshes the mapped measurements table.
Date Type	The mapped measurement's data type.
Description	A description of the mapped measurement.
Details	A table which lists all the test runs in the trend report. The runs appear in the same order as they appear in the Trend Overview tab.
	Click in the <b>Type</b> and <b>Name</b> fields to select which measurements to map to the mapped measurement.
	The following fields appear in the table:
	Run ID. The test run ID.
	Type. The measurement type.
	Name. The measurement name.
	<b>Note:</b> When you use the <b>Default</b> option, all future instances of the measurement are automatically mapped to the current settings.
ID	The mapped measurement's ID.
Name	The mapped measurement's name.

## **Add Trend Views to Tab Dialog Box**

This dialog box enables you to add trend views to a trend report.



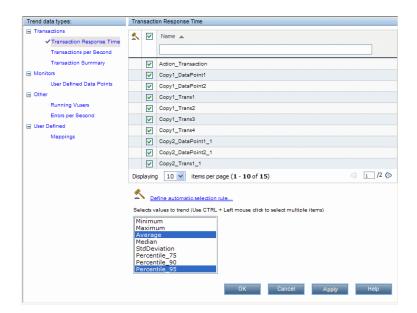
# To access

- 1. In My Performance Center, select **Perspectives > Trending**.
- On the Performance Trending page, in the Trend Reports grid, click the name of the report to open. The report opens as an additional tab on the My Performance Center Dashboard.
- 3. Select the desired trend view tab.
- 4. Click the down arrow next to the tab name to open the tab management menu and select Add View to Tab.

UI Elements	Description
Monitors Trend Views	Trend measurements related to monitors.
Other Trend Views	Trend measurements other than transactions and monitor measurements (Web Resources and Error Statistics). Included in this section are three basic non-configured trend views, each one based on one of the trend view display options. You can select one of these trend views and customize it as desired.
Transactions Trend Views	Trend measurements related to transactions.

# **Measurements Configuration Dialog Box**

Each trend view has a default set of measurements that it trends. This dialog box enables you to add additional measurements.



# To access

- 1. In My Performance Center, select **Perspectives > Trending**.
- On the Performance Trending page, in the Trend Reports grid, click the name of the report to open. The report opens as an additional tab on the My Performance Center Dashboard. The trend view tabs are displayed by default.

Trend Views are contained within the trend view tabs.

3. On a trend view, click the **Open edit menu** button (Not available in the Trend Overview tab), then select **Select Measurements**.

### Trend Data Types Pane

The Trend Data Types pane contains a list of the measurements that are available for trending. Only measurements that contain data appear.

UI Elements (A-Z)	Description
Monitors	All monitor related measurements that contain data.
Others	All non-transaction/monitor measurements.
Transactions	All transactions that contain data.

UI Elements (A-Z)	Description
User- Defined	This node appears only if you have mapped any measurements. For more information on mapped measurements, see "Trend Reports Overview" on page 366.

### **Measurement Selection Pane**

UI Elements (A-Z)	Description
*	<b>Rule.</b> This icon indicates that the measurement has already been selected using an automatic selection rule.
Define automatic selection rule	Opens the Automatic Selection Rule dialog box, which enables you use regular expressions to define a rule that automatically selects measurements to be included in the trend view. The automatic selection rule applies to measurements that are currently displayed in the trend report data, as well as any future measurements.
Name	The name of the available measurement.
Select values to trend	Displays the available values of the selected measurement which can be included in the trend view.

# **Chapter 31: Performance Application Lifecycle (PAL)**

## This chapter includes:

PAL Overview	398
How to Work with PAL	400
PAL User Interface	401

## **PAL Overview**

Performance Application Lifecycle (PAL) is a process which enables better communication between the development and operation teams around the testing and monitoring of applications.

PAL enables you to use user traffic and system monitoring data in production to design a load test that closely resembles production behavior. You can import production data from HP Business Service Management (BSM) and Webtrends Analytics.

Using the production system information, you can generate PAL reports to analyze and compare results between the production data and the load test data. Based on the results of these comparisons, load tests can be tuned to resemble production system activity.

PAL's importance stems from the basic need to correctly plan testing initiatives. Without a clear understanding of what users are doing in production, and how the production system behaves, it is very difficult to:

- focus testing on the most widely used business cases and scenarios
- test the system under appropriate loads
- define testing targets (for example, Service Level Agreements)

This section also includes:

- "PAL Flow" below
- "Comparison Methods" on next page
- "PAL Thresholds" on next page
- "Tuning Load Tests" on page 400

#### **PAL Flow**

The PAL flow includes the following main steps:



Step	Description
Import production data	Import data from the production systems. Performance Center supports data from HP Business Service Management (BSM) and Webtrends Analytics. Different production monitoring systems provide different data which may influence which information is available to the user.
Create PAL report using production data	Create a report based on the production data. The report displays information on the different activities that were observed in production. For example, measurements related to transactions, such as hits and response time.

Step	Description
Design and run load test	Use the production report to create a load test. The first load test design will probably exhibit very different behavior from production and is only a starting point for tuning. Execute the load test to gather traffic data and other information.
Add load test data to PAL report	Add load test data to the report and compare it to the production data. This comparison is the basis of the load test tuning process.
Tune load test	Update the load test to try bring the behavior and patterns of usage to resemble production as closely as possible. This is an iterative process in which the load test is updated, executed, and compared until it resembles the load in production.
Export data to production	Export various items that can help speed up the deployment of a new version to production. This information may include the scripts that can be used in Business Service Management (BSM) monitoring and the SiteScope templates that can be re-used in production. The information should be exported once the defined load test has been run on the final version of the application and the application has been certified for release.

## **Comparison Methods**

There are two methods of comparing measurements contained in a performance test run for the purposes of comparing testing environment data with real production environment data.

Comparison Method	Description	
Compare to Baseline	You select one performance test run in the PAL report and define it as the baseline. All measurements in the report are then compared to the measurements contained in the baseline.	
Compare to Previous	All measurements in a performance test are compared to the measurements in the performance test run that immediately precedes it in the report. Compare to previous depends on the order of the data sets in the report.	

#### **PAL Thresholds**

To identify significant differences in performance, you can define unique thresholds to track differentials between measurements being compared. If a differential exceeds a defined threshold, that value appears in a predetermined color, identifying it as a minor difference, or major difference.

## **Tuning Load Tests**

The first time you run your load test it will probably exhibit very different behavior than your production report. Remember that the output generated is only a starting point for tuning. Based on your PAL comparison reports, update the load test, run it again, and compare the updated load test to production. Continue this iterative process until the load test closely resembles production.

You can tune the test during runtime or after the run ends. When tuning during runtime, the framework enables you to continuously adjust the data to view your changes almost immediately.

## How to Work with PAL

This task describes how to work with PAL to create a testing environment similar to your real production environment.

This task includes the following steps:

## Open PAL

Use one of the following:

- On the ALM sidebar, under Performance Center, select Performance Lifecycle. Click
   Open PAL Perspective in MyPC.
- In My Performance Center, select Perspective > PAL. For more information, see "Personalizing Performance Center" on page 357.

## 2. Define a PAL application

- a. Click Manage PAL Applications. The Manage PAL Applications Dialog Box opens.
- Add an application. For user interface details, see "Manage PAL Applications Dialog Box" on page 405.

#### 3. Import production data

- a. In the PAL Flow pane, click **Import Production Data**. The PAL Data Sets Pane opens. For user interface details, see "Manage Production Data Sets Pane" on page 404.
- b. Select a data set folder and click **Upload**. The Upload Production Data Set Dialog Box opens.
- c. Upload the data for a specific application and for a selected time range from HP Business Service Management (BSM) or Webtrends Analytics. The data file is stored as a .zip file.
  - For user interface details, see "Upload Production Data Set Dialog Box" on page 407.

#### 4. Create production report

- a. In the PAL Flow pane, click **Create Production Report**. The PAL Reports Pane opens. For user interface details, see "PAL Reports Pane" on page 408.
- Select a report folder and click New PAL Report. The Create New Performance
   Application Lifecycle Report Dialog Box opens. For user interface details, see "Create New Performance Application Lifecycle Report Dialog Box" on page 409.
- c. In the Create New Performance Application Lifecycle Report Dialog Box, click **Create**. The report opens as an additional tab on the My Performance Center Dashboard. The report

- contains sub-tabs. The Data Sources sub-tab is displayed by default. For user interface details, see "<Report Name> PAL Report" on page 421.
- d. Define data sets and performance metrics to be used for the production report. For example, you can set threshold settings, custom measurement mappings, and scaling factors.

## 5. Design load test based on production report

- a. In the PAL Flow pane, click **Design and Run load test**. The Performance Test Set Pane opens. For user interface details, see "Performance Test Set Pane" on page 411.
- b. Click Create New Test to create a performance test. The Create New Performance Test dialog box opens. For user interface details, see "Create New Performance Test Dialog Box" on page 417.

#### 6. Run load test

In the Performance Test Set Pane, click **Run Test**. The Run dialog box opens. For user interface details, see "Run <Entity> Dialog Box" on page 413.

### 7. Add load test data to the report

- a. In the PAL Flow pane, click **Add load test data to report**. The PAL Reports Pane opens. For user interface details, see "PAL Reports Pane" on page 408.
- b. Select a report. In the Data Sources sub-tab, add load test data to the report. For user interface details, see "Data Sources Tab" on page 424.
- c. Click the report sub-tabs to view and compare production and load test behavior. For user interface details, see "PAL Report View Tabs" on page 426.

#### 8. Tune the load test

- a. Based on the comparison report, edit the load test and rerun the test. For user interface details, see "Performance Test Set Pane" on page 411
- b. View the updated report and compare the load test and production data. For user interface details, see "PAL Report View Tabs" on page 426.
- c. Continue tuning until the load test closely resembles production. You can tune the test during runtime or after the run ends.

### 9. Export the test run details

- a. In the PAL Flow pane, click **Export data to production**. The Test Run Pane opens. For user interface details, see "Test Runs Pane" on page 418.
- b. View the result information for the selected test run.
- c. To export test run data once the load test has run on the final version of the application, click Export PAL Data. For user interface details, see "Export PAL Data Dialog Box" on page 420.

## **PAL User Interface**

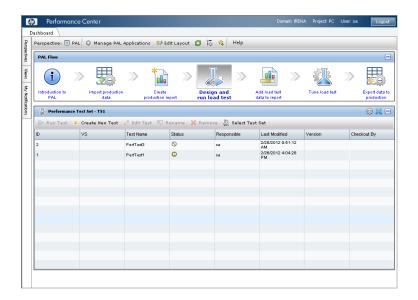
This section includes:

<sup>2</sup> AL I	-low Pane	 4	00	3

Manage Production Data Sets Pane	404
Manage PAL Applications Dialog Box	405
Upload Production Data Set Dialog Box	407
PAL Reports Pane	408
Create New Performance Application Lifecycle Report Dialog Box	409
Performance Test Set Pane	411
Run <entity> Dialog Box</entity>	413
Create New Performance Test Dialog Box	417
Test Runs Pane	418
Export PAL Data Dialog Box	420
<report name=""> PAL Report</report>	421
Export Report to PDF Dialog Box	423
Data Sources Tab	424
PAL Report View Tabs	426
PAL Report Views	427
Add Views To Tab Dialog Box	429
Select Measurements Dialog Box	431
Add Data Dialog Box	432
Select Columns Dialog Box	434
Threshold Settings Dialog Box	435
Monitors Mapping Dialog Box	437
Transactions Mapping and Grouping Dialog Box	439
Set Scaling Factors Dialog Box	442
Set Global Transactions Filter Dialog Box	443

## **PAL Flow Pane**

The PAL Flow pane enables you to navigate through the PAL phases.



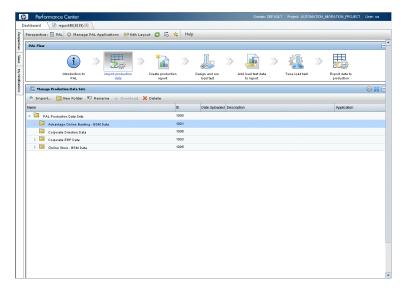
To access	Use one of the following:	
	On the ALM sidebar, under Performance Center, select Performance     Lifecycle. Click Open PAL Perspective in MyPC.	
	In My Performance Center, select <b>Perspectives</b> > <b>PAL</b> . The PAL Flow pane is located at the top of the page.	
Relevant tasks	"How to Work with PAL" on page 400	
See also	"PAL Overview" on page 398	

UI Elements	Description	
i	Introduction to PAL. Displays the PAL overview pane.	
20	Import production data. Opens the Manage Production Data Set pane. This pane enables you to import data from the production system. For user interface details, see "Manage Production Data Sets Pane" on next page.	

UI Elements	Description	
*	Create production report. Opens the PAL Reports pane. This pane enables you to manage PAL reports. It displays a list of available reports and enables you to create new reports. It also enables you to delete or duplicate existing reports. For user interface details, see "PAL Reports Pane" on page 408.	
	Design and run load test. Opens the Performance Test Set pane. This pane enables you to design and run load tests based on production reports. For user interface details, see "Performance Test Set Pane" on page 411.	
	Add load test data to report. Opens the PAL Reports pane. This pane enables you to manage PAL reports. It displays a list of available reports and enables you to create new reports. It also enables you to delete or duplicate existing reports. For user interface details, see "PAL Reports Pane" on page 408.	
	Tune load test. Opens the Performance Test Set pane. This pane enables you to design and run load tests based on production reports. You can tune the test during a test run or at the end of the run. For user interface details, see "Performance Test Set Pane" on page 411.	
	<b>Export data to production.</b> Opens the Performance Test Runs pane. This pane enables you to manage results related actions for test runs. For user interface details, see "Test Runs Pane" on page 418.	
	Minimizes the PAL Flow pane.	

# **Manage Production Data Sets Pane**

This pane enables you to import data from the production system.



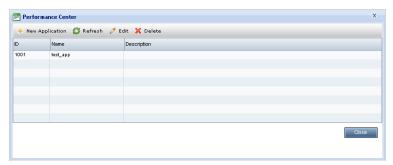
To access	<ol> <li>In My Performance Center, select Perspective &gt; PAL. For more information, see "Personalizing Performance Center" on page 357.</li> </ol>	
	2. In the PAL Flow pane, click <b>Import Production Data</b> .	
Relevant tasks	"How to Work with PAL" on page 400	
See also	"PAL Overview" on page 398	

User interface elements are described below (unlabeled elements are shown in angle brackets):

UI Elements	Description
<my center="" common="" elements="" performance="" ui=""></my>	For My PC menus and buttons, see "My Performance Center Window" on page 359.
↑ Import	Opens the Upload Production Data Set. For more details, see "Upload Production Data Set Dialog Box" on page 407.
New Folder	Enables you to add a data set folder.
Rename	Enables you edit the data set folder details.
₩ Download	Saves the data set locally in ZIP format.
<b>X</b> Delete	Enables you to delete the data set folder.
<pal reports="" table=""></pal>	Displays a list of all available PAL reports.
Name	The name of the data set.
ID	The ID number of the data set.
Date Uploaded	The date the data set was uploaded.
Description	A description of the data set.
Application	The application name.

# **Manage PAL Applications Dialog Box**

This dialog box enables you to associate PAL entities, such as data sets with a specific AUT

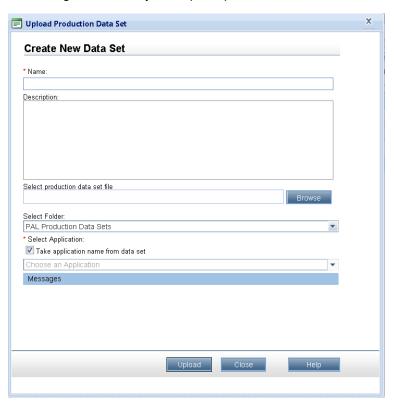


To access	<ol> <li>In My Performance Center, select Perspective &gt; PAL. For more information, see "Personalizing Performance Center" on page 357.</li> </ol>	
	2. Click Manage PAL Applications.	
Relevant tasks	"How to Work with PAL" on page 400	
See also	"PAL Overview" on page 398	

UI Elements	Description
* New Application	Defines a new application.
<b>⊘</b> Refresh	Refreshes the table.
Ø Edit	Edits a selected application.
× Delete	Deletes a selected application.
ID	The ID number of the application.
Name	The name of the application.
Description	A description of the application.

# **Upload Production Data Set Dialog Box**

This dialog box enables you to upload production data set files.



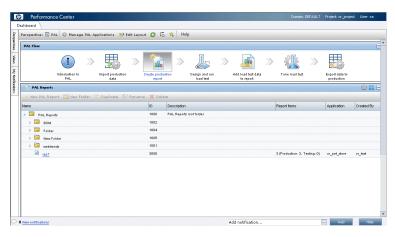
To access	<ol> <li>In My Performance Center, select Perspective &gt; PAL. For more information, see "Personalizing Performance Center" on page 357.</li> </ol>
	2. In the PAL Flow pane, click Import Production Data.
	3. In the PAL Data Sets pane, click <b>Import</b> .
Relevant tasks	"How to Work with PAL" on page 400
See also	"PAL Overview" on page 398

UI Elements	Description
Name	The name of the data set file.
Description	A description of the data set file.
Select production data set file	Click the <b>Select</b> button to select the data set file.
Select Folder	Indicates the folder for storing the data set file.

UI Elements	Description
Take application name from data set	Uses the application defined in the data set file.
Select Application	Indicates the application for use with the data set file.
Messages	Indicates the progress of the uploading process.
Upload	Uploads the data set file to the specified location.

## **PAL Reports Pane**

This pane enables you to manage PAL reports. It displays a list of available reports and enables you to create new reports. It also enables you to delete or duplicate existing reports.



To access	<ol> <li>In My Performance Center, select Perspective &gt; PAL. For more information, see "Personalizing Performance Center" on page 357.</li> </ol>
	<ol><li>In the PAL Flow pane, click Create Production Report or Add load test data to report.</li></ol>
Tip	On the ALM sidebar, under <b>Performance Center</b> , select <b>Performance Lifecycle</b> to view the five most recently created PAL reports.
Relevant tasks	"How to Work with PAL" on page 400
See also	"PAL Overview" on page 398

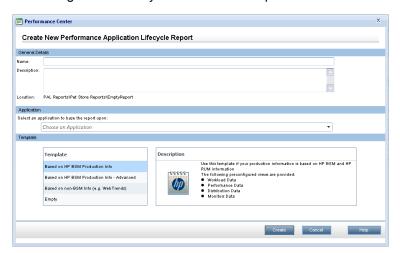
User interface elements are described below (unlabeled elements are shown in angle brackets):

UI Elements	Description
<my center="" common="" elements="" performance="" ui=""></my>	For My PC menus and buttons, see "My Performance Center Window" on page 359.

UI Elements	Description
* New PAL Report	Opens the Create New Performance Application Lifecycle Report, which enables you to create PAL reports. For more details, see "Create New Performance Application Lifecycle Report Dialog Box" below.
New Folder	Adds a PAL report folder.
Duplicate	Creates a duplicate of the selected report.
Rename	Renames the selected report or folder.
× Delete	Deletes the selected report or folder.
<pal reports="" table=""></pal>	Displays a list of all available reports. Click a report to view data. For more details, see " <report name=""> PAL Report" on page 421.</report>
Name	The name of the report.
ID	The ID number of the report.
Description	A description of the report.
Report Items	The report items in use.
Application	The name of the application in use.
Created By	The user who created the report.

# **Create New Performance Application Lifecycle Report Dialog Box**

This dialog box enables you to create PAL reports.



To access	On the PAL Reports page, click <b>New PAL Report</b> * New PAL Report .
Relevant tasks	"How to Manage a Performance Test Run" on page 197

## **General Details Area**

User interface elements are described below:

UI Elements	Description
Name	The name of the report.
Description	A description of the report.
Location	The location of the report.

## **Application Area**

User interface elements are described below:

UI Elements	Description
Select an application to base the report upon	List the available applications.

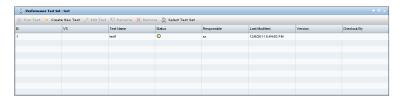
## **Template Area**

UI Elements	Description
Based on HP BSM Production Info	A report based on HP Business Service Management (BSM). This template displays the following preconfigured PAL report views:
	Workload Data
	Performance Data
	Distribution Data
	Monitors Data
Based on HP BSM Production Info - Advanced	A report based on HP Business Service Management (BSM). This template displays the following preconfigured PAL report views:
	Workload Data
	Performance Data
	Distribution Data
	Monitors Data
	Top 10 Hits, Top 10 Users and Workload Data
	Top 10 Response Time and Performance Data
	Top 10 Hits Percentage and Distribution Data

UI Elements	Description
Based on non-BSM info (e.g., WebTrends)	A report based on on WebTrends and other non-HP data sources.  This template displays the following preconfigured PAL report views:
	Workload Data
	Performance Data
	Distribution Data
Empty	Provides only the basic layout for the report without the preconfigured PAL report views.
Description	A description of the selected template.

# **Performance Test Set Pane**

This pane enables you to design and run load tests based on production reports.



To access	In My Performance Center, select <b>Perspective</b> > <b>PAL</b> . For more information, see "Personalizing Performance Center" on page 357.	
	2. In the PAL Flow pane, click <b>Design and run load test</b> or <b>Tune load test</b> .	
Relevant tasks	"How to Work with PAL" on page 400	
See also	"PAL Overview" on page 398	

User interface elements are described below (unlabeled elements are shown in angle brackets):

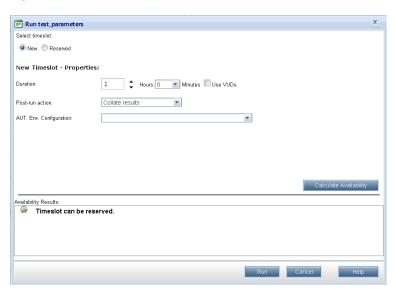
UI Elements	Description
<my performance<br="">Center common UI elements&gt;</my>	For My PC menus and buttons, see "My Performance Center Window" on page 359.
Run Test	Opens the Run dialog box, which enables you to run the performance test. For more details, see "Run <entity> Dialog Box" on page 413.</entity>
* Create New Test	Opens the Create New Performance Test dialog box, which enables you to define a performance test. For more details, see "Create New Performance Test Dialog Box" on page 417.

UI Elements	Description
Ø Edit Test	Opens the Performance Center Test Designer window, which enables you to define a performance test. Defining a performance test includes selecting scripts for the test, scheduling how many Vusers to run in each script and for how long, choosing topologies and monitor profiles for the test, and enabling collection of diagnostics data for the test run. For more details, see "Performance Test Designer Window" on page 78.
Rename	Enables you to rename the test.
<b>X</b> Remove	Enables you to remove the test.
Select Test Set	Opens the Select Test Set dialog box, which enables you to select a test set.
ID	The ID number of the test.
vs	The version status of the test.
Test Name	The name of the test.
Status	The run status of the test.
Responsible	The user responsible for the test.
Last Modified	The date on which the test was last modified.
Version	The version number of the test.
Checkout By	The user responsible for checking out the test.

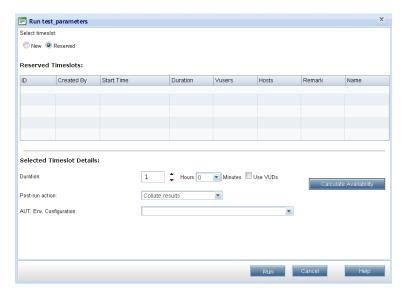
# **Run <Entity> Dialog Box**

This dialog box enables you to run a load test to get usage and monitoring data from the testing environment.

#### New



#### Reserved



# To access

## PAL:

- 1. In My Performance Center, select **Perspective > PAL**. For more information, see "Personalizing Performance Center" on page 357.
- 2. In the PAL Flow pane, click **Design and run load test** or **Tune load test**.
- 3. Click Run Test.

#### **Performance Test:**

- 1. In My Performance Center, select **Perspective > Performance Test**. For more information, see "Personalizing Performance Center" on page 357.
- 2. In the Performance Test view, click Run Test.

User interface elements are described below (unlabeled elements are shown in angle brackets):

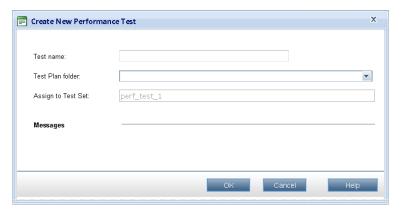
UI Elements	Description
Select timeslot	Select New or Reserved.
	<b>New.</b> Allows you to create a new timeslot. If the current resources are insufficient for the selected test, you will be unable to reserve a timeslot to run the test.
	Reserved. Allows you to run a test in a reserved manual timeslot that has been assigned to your test or has not been assigned to any test. If there are no timeslots available, you will be unable to schedule your test.

UI Elements	Description
New Timeslot - Properties / Selected Timeslot Details	Duration. The amount of time, in hours and minutes, that you need the resources reserved. This should be enough time to run the test and perform the post-run action that you select.
	Use VUDs. Requests VUDs Vusers for the test rather than regular Vusers. For details about VUDs, refer to the HP ALM Lab Management Guide.
	Post-run action. The action to be taken when the test run is complete.
	Do not collate results. Frees the machines immediately after the performance test ends. When the run has finished, the run results are left on the load generators. You can analyze the results at a later stage from the Results.
	Collate results. When the run has finished, the run results are collected from all the load generators. This is recommended because collation of results takes only a few minutes, and can prevent loss of or inaccessibility to results in case any of your load generators becomes unavailable.
	■ Collate and analyze results. When the run has finished, the run results are collected and analyzed. Data analysis requires some time, depending on the size of the results file. If there is no timeslot available to include the data analysis, select the Collate option instead, and run late Analysis when a data processor becomes available. You run late Analysis from the Results tab. For user interface details, see "Results/Last Run Results Tab" on page 202.
	AUT Env. Configuration. Select an AUT environment configuration to be used for the test. For details, refer to the HP Application Lifecycle Management User Guide.

UI Elements	Description
<reserved th="" timeslots<=""><th>Displayed when you use a Reserved timeslot.</th></reserved>	Displayed when you use a Reserved timeslot.
Grid>	ID. The ID of the run created in the context of the timeslot.
	Created By. The user who reserved the timeslot.
	Start Time. The date and time that the timeslot is due to start or started.
	Duration. The duration of the timeslot.
	Vusers. The number of Vusers reserved for the timeslot.
	Hosts. The number of hosts (including Controller) requested for the timeslot.
	<ul> <li>Remark. Indicates a timeslot remark. Includes the following values:</li> <li>New. Indicates a new timeslot that can be created especially for this run.</li> </ul>
	Recommended. Displayed when the test you are about to run is linked (without Autostart) to the timeslot. When the timeslot was reserved, all the resources needed for this test were reserved. It is therefore recommended to use this timeslot rather than creating a new one.
	Update Required. Indicates that the timeslot can offer some of the resources needed for the test but you need to update the timeslot to include all the other required resources too. The resource requiring the update is marked with an asterisk (*).
	Name. The name of the timeslot.
Calculate Availability	Calculates the availability of the resources required for running the test, and refreshes the list of available timeslots.
Availability Results	Displays the results of the availability verification. If your timeslot cannot be reserved, the reason will be displayed.
Run	Uses the hosts reserved by the selected timeslot and runs the test. The Performance Center Dashboard opens displaying the Performance Test Run page. For details, see "Performance Test Run Page" on page 207.

# **Create New Performance Test Dialog Box**

This dialog box enables you to create a performance test.

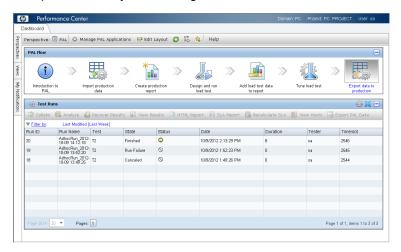


То	rformance Test:	
access	<ol> <li>In My Performance Center, select Perspective &gt; Performance Test. For more information, see "Personalizing Performance Center" on page 357.</li> </ol>	
	2. In the Performance Test view, click Create Test.	
	PAL:	
	In My Performance Center, select <b>Perspective &gt; PAL</b> . For more information, see "Personalizing Performance Center" on page 357.	
	2. In the PAL Flow pane, click <b>Design and run load test</b> or <b>Tune load test</b> .	
	3. Click Create Test.	
Relevant tasks	"How to Work with PAL" on page 400	
See also	"PAL Overview" on page 398	

UI Elements	Description
Test name	The name of the performance test.
Test Plan folder	The folder in the test plan tree in which the test resides.
Assign to Test Set	The test set in which the test resides.

## **Test Runs Pane**

This pane enables you to manage results related actions for test runs.



To access	<ol> <li>In My Performance Center, select Perspective &gt; PAL. For more information, see "Personalizing Performance Center" on page 357.</li> </ol>	
	2. In the PAL Flow pane, click <b>Export Data to Production</b> .	
Relevant tasks	"How to Work with PAL" on page 400	
See also	"PAL Overview" on page 398	

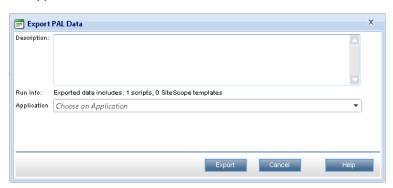
UI Elements	Description
⇒ Collate	Collate Runs. Collates results of test runs that have not yet been collated.
	<ul> <li>Note:</li> <li>If a test is running on the Controller that will perform the collating, ALM Performance Center issues an alert. Click OK to proceed with collating the results, or Cancel to defer the action until later.</li> <li>Should the Collate Results process encounter an error, the Collate Errors dialog box appears, displaying details of the error. To analyze the partially collated results, select Analyze partially collated results. Note that analyzing partially collated results is an irreversible operation.</li> </ul>

UI Elements	Description
Analyze	Analyze Run. Analyzes results for the selected test run. ALM Performance Center generates analysis data and deletes the temporary results from the load generators and the Controller.
	Note: Only enabled when the test run state is <b>Before Creating</b> Analysis Data.
Recover Results	Recover Results. Enables you to recover and collate the results of a failed test run.
	Note:
	Only enabled when the test run is in the failed state.
	<ul> <li>Enables you to collate results only up to the point where the test failed.</li> </ul>
View Results	View Results. Opens the Performance Center Dashboard and displays result information for the selected test run.
HTML Report	Show HTML Report. Opens an HTML version of the Analysis Summary report, which analyzes the data collected during the performance test run. The report provides general information about the performance test, lists statistics about the test run, and provides links to graphs containing test run data.
	For more details regarding the summary report, see the HP LoadRunner Analysis User Guide.
SLA Report	<b>SLA Report.</b> Opens the SLA Report for the selected test run. For details, see "SLA Report" on page 235.
	<b>Note:</b> This feature is available only if SLAs were defined during the performance test design phase. Fore more information about SLAs, see "Service Level Agreements" on page 147.
Recalculate SLA	Recalculate SLA. Opens the Calculate SLA dialog box. For details, see "Calculate Service Level Agreement Dialog Box" on page 236.
	<b>Note:</b> This feature is available only if SLAs were defined during the performance test design phase. For more information about SLAs, see "Service Level Agreements" on page 147.
View Hosts	View Hosts. Opens the Timeslot Hosts box, which displays the requested and actual hosts.
Export PAL Data	Export PAL Data. Opens the Export PAL Data dialog box.

UI Elements	Description
Run ID	The test run ID.
Run Name	The name of test run.
Test	The name of the test.
State	Displays the current state of the selected test runs.
Status	The run status of the test.
Date	The start date and time of the run.
Duration	The time, in minutes, that the test took to run.
Tester	The name of the user running the test.
Timeslot	The ID of the test run timeslot.

# **Export PAL Data Dialog Box**

This dialog box enables you to export test run data once the load test has run on the final version of the application.



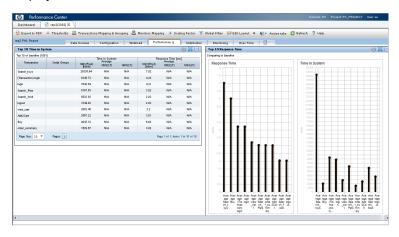
To access	<ol> <li>In My Performance Center, select Perspective &gt; PAL. For more information, see "Personalizing Performance Center" on page 357.</li> </ol>	
	2. In the PAL Flow pane, click <b>Export Data to Production</b> .	
	3. Click Export PAL Data.	
Relevant tasks	"How to Work with PAL" on page 400	
See also	"PAL Overview" on page 398	

UI Elements	Description	
Description	The description of the exported test run data.	

UI Elements	Description
Run Info	The list of exported information.
Application	Indicates the associated application.
Export	Saves the data set locally in ZIP format.

# <Report Name> PAL Report

This tab enables you to view and manage the PAL report. The PAL reports includes multiple tabs that allow you manage the data that is included in the report, as well as to manage the views which display the PAL information.



To access	In My Performance Center, select <b>Perspective &gt; PAL</b> . For more information, see "Personalizing Performance Center" on page 357.	
	<ol><li>In the PAL Flow pane, click Create Production Report or Add load test data to report.</li></ol>	
	3. In the PAL Reports pane, click a report.	
Important information	The PAL sub-tabs which appear by default depend on which template the report is based on. The Data Sources tab is common to all PAL reports irrespective of which template is selected.	
Relevant tasks	"How to Work with PAL" on page 400	
See also	"PAL Overview" on page 398	

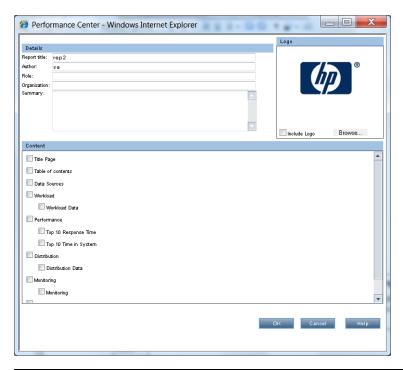
User interface elements are described below (unlabeled elements are shown in angle brackets):

UI Elements	Description
₹ Export to PDF	Opens the Export Report to PDF dialog box, which enables you to export the selected report to a .pdf file. For user interface details, see "Export Report to PDF Dialog Box" on next page.
A Thresholds	Opens the Threshold Settings dialog box, which enables you to define the thresholds to be used for identifying major and minor differences between production and testing data. For user interface details, see "Threshold Settings Dialog Box" on page 435.
Transactions Mapping & Grouping	Opens the Transactions Mapping and Grouping Dialog Box, which enables you to map and group similar transactions in your production data or in your load test results. For user interface details, see "Transactions Mapping and Grouping Dialog Box" on page 439.
Monitors Mapping	Opens the Monitors Mapping dialog box which enables you to map production and testing monitored hosts to monitor measurements, such as CPU, memory, and virtual memory used. For user interface details, see "Monitors Mapping Dialog Box" on page 437.
A Scaling Factor	Opens the Set Scaling Factors dialog box, which enables you to define the scaling factor. For user interface details, see "Set Scaling Factors Dialog Box" on page 442.
▼ Global Filter	Opens the Global Filter dialog box, which enables you to filter the transactions displayed in the PAL report views. For user interface details, see "Set Global Transactions Filter Dialog Box" on page 443.
₩ Edit Layout	Enables you to arrange views within a PAL view tab.
Active tabs	Enables you to view tabs that are not currently displayed.
C Refresh	Refreshes the information contained in the report.
Data Sources Tab	The Data Sources tab is used for managing the information contained in the PAL report. For more details, see "Data Sources Tab" on page 424.
<pal report="" tabs="" view=""></pal>	The PAL report view tabs contain the PAL report views and are defined by the template on which the report is based. For more details, see "PAL Report View Tabs" on page 426.

UI Elements	Description
<pal report="" views=""></pal>	PAL report views are display items that present PAL information, and are contained within the PAL report view tabs. For more information, see "PAL Report Views" on page 427.
<b>*</b>	Add a New Tab. Adds a new tab to the report.

# **Export Report to PDF Dialog Box**

This page enables you to export the selected PAL report to a .pdf file.



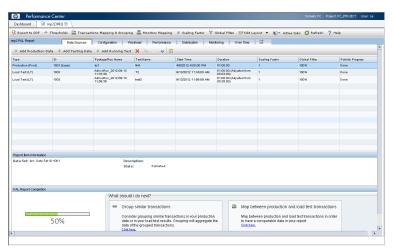
To access	In My Performance Center, select <b>Perspective</b> > <b>PAL</b> . For more information, see     "Personalizing Performance Center" on page 357.
	In the PAL Flow pane, click Create Production Report or Add load test data to report.
	3. In the PAL Reports pane, click a report.
	4. Click Export to PDF.
See also	" <report name=""> PAL Report" on page 421</report>

User interface elements are described below:

UI Elements	Description
Details area	Enables you to define report details, such as report title, author, and summary.
Logo area	Enables you to set the image that is placed on the cover page of the report and at the top of each page of the report. The HP logo is available by default.
Content area	Enables you to specify data to include in your report, such as a title page, table of contents, and report views.

## **Data Sources Tab**

The Data Sources tab is used for managing the information contained in the PAL report.



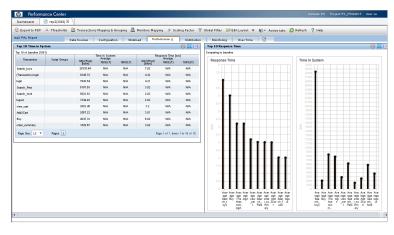
To access	In the PAL Flow pane, click Create Production Report or Add load test data to report.	
	In the PAL Reports pane, click a report. The Data Sources tab is displayed by default.	
Important information	The Data Sources tab is common to all PAL reports, irrespective of which template is selected.	
See also	" <report name=""> PAL Report" on page 421</report>	

UI Elements	Description
Add Production Data	Opens the Add Data dialog box and displays the Production tab. Select the production data to be used for comparison. For user interface details, see "Add Data Dialog Box" on page 432.
♣ Add Testing Data	Opens the Add Data dialog box and displays the Test Run Results tab. Select the testing data to be used for comparison. For user interface details, see "Add Data Dialog Box" on page 432.
♣ Add Running Test	Opens the Select Run Test dialog box and displays all the tests that are currently running. To tune a test during runtime, select a running test, select the refresh frequency rate from the <b>Refresh Time Intervals</b> drop-down list. Click <b>OK</b> . The test is added to the Data Sources tab.
	Note: A test added during runtime is displayed in blue in the Data Sources grid. After the test run ends, you can publish it by clicking Add Testing Data. The test will now be displayed in black.
×	Remove item from report. Removes production data sets or test runs from the PAL report.
<u>~</u>	Set run as baseline. Sets the selected item (production data set or test run) as the baseline run for the comparison.
	<b>Note:</b> The first item which is added to the report is automatically defined as the baseline.
↑↓	Move Up/Down. Moves the selected item up or down in the order. Changing the position of the report item may have an effect on the comparison value when the Compare to previous method is selected. For more information on comparison methods, see "PAL Overview" on page 398.

UI Elements	Description
	Customize Table Columns. Customizes which columns appear in the PAL Runs table. For user interface details, see "Select Columns Dialog Box" on page 434.
<data grid="" sources=""></data>	Displays information for all the items in the report. For a list of the available fields, see Customize Table Columns above.
Report Item Information	Includes a description and current state of the selected report item.
PAL Report Completion	Indicates the flow for completing the report.

# **PAL Report View Tabs**

A report tab can contain any number of views. The tabs are defined by the template on which the report is based. The tabs and views can be customized.



To access	In My Performance Center, select <b>Perspectives &gt; PAL</b> .	
	<ol><li>In the PAL Flow pane, click Create Production Report or Add load test data to report.</li></ol>	
	<ol> <li>In the PAL Reports pane, click a report. The report opens as an additional tab on the My Performance Center Dashboard. The PAL report view tabs are displayed.</li> </ol>	
Important information	The view tabs which appear by default depend on which template the report is based on.	
	For user interface details on the Data Sources tab, see "Data Sources Tab" on page 424.	

Relevant tasks	"How to Work with PAL" on page 400
See also	"PAL Overview" on page 398

User interface elements are described below (unlabeled elements are shown in angle brackets):

UI Elements	Description
*	Click the down arrow next to the tab name to open the tab management menu, which contains the following options:
	Add View to Tab. Opens the Add Views to Tab dialog box. For user interface details, see "Add Views To Tab Dialog Box" on page 429.
	Edit Tab Title. Enables you to change the name of the tab.
	Move Tab Left. Moves the tab left in the tab order.
	Move Tab Right. Moves the tab right in the tab order.
	Delete This Tab. Deletes the tab and all of the trend views contained in it, from the report.
	Note: This option is not available for all views.
<pal report view&gt;</pal 	A display item that presents PAL information within a PAL report view tab. For more information, see "PAL Report Views" below.

# **PAL Report Views**

A PAL report view is a display item that presents PAL information for a particular performance metric.

To access	<ol> <li>In My Performance Center, select Perspectives &gt; PAL.</li> <li>In the PAL Flow pane, click Create Production Report or Add load test data to report.</li> <li>In the PAL Reports pane, click a report. The report opens as an additional tab on the My Performance Center Dashboard. The PAL report view tabs are displayed. The PAL report views are contained within the tabs.</li> </ol>
Relevant tasks	"How to Work with PAL" on page 400
See also	"PAL Report View Tabs" on previous page

User interface elements are described below:

UI Elements	Description
<b>©</b>	<b>Edit PAL report view.</b> Contains options that enable you to edit the PAL report view's display and comparison settings.
정요 <b>교육</b>	Show in maximized view. Maximizes the PAL report view.
	Minimizes the view. Minimizes the PAL report view.

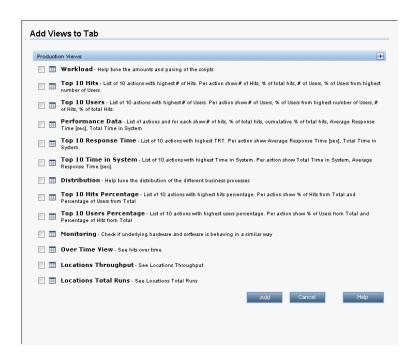
## **PAL Report View Menu**

Important	Some options are not available in all views.
-----------	--

UI Elements	Description
Select Measurements	Opens the Measurements Configuration dialog box, which enables you to add measurements to the view. For user interface details, see "Select Measurements Dialog Box" on page 431.
Edit Display Setting	Enables you to change the appearance of the view. The available settings are table view, line graph view, and stacked bar chart view.
Edit View Title	Enables you to edit the view title.
Compare to baseline/previous	Enables you to change the comparison method displayed in the view. For more information on comparison methods, see "Comparison Methods" on page 399.
Show difference as value/percentage	Enables you to define how to display value differences between items or data sets in the view - as values or as percentages.
Do not show difference	Enables you to hide value differences between items or data sets. It is recommended to use this setting when exporting the view to a CSV format.
Color View	Activates the PAL report's threshold settings.
Export to CSV	Enables you to export the view to a CSV format.
Delete this View	Deletes the view.

# **Add Views To Tab Dialog Box**

This dialog box enables you to add views to a PAL report view tab.



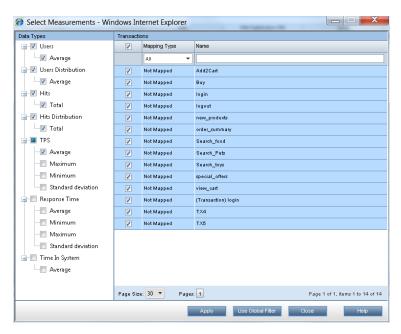
To access	<ol> <li>In My Performance Center, select Perspectives &gt; PAL.</li> </ol>
	In the PAL Flow pane, click Create Production Report or Add load test data to report.
	<ol> <li>In the PAL Reports pane, click a report. The report opens as an additional tab on the My Performance Center Dashboard. The PAL report view tabs are displayed.</li> </ol>
	<ol> <li>Click the</li></ol>
Important Information	Some views are not relevant for all report types.
See also	"PAL Report View Tabs" on page 426

UI Elements	Description
Workload	Displays data that will help you tune the amounts and pacing of the scripts.
Top 10 Hits	Lists the top ten actions with the highest number of hits.

UI Elements	Description
Top 10 Users	Lists the top ten actions with the highest number of users.
Performance Data	Shows the number of hits for each action, as well as response time, and total time in system.
Top 10 Response Time	Lists the top ten actions with the highest total response time in seconds.
Top 10 Time in System	Lists the top ten actions with the highest time in the system in seconds.
Distribution	Displays distributions of different business processes.
Top 10 Hits Percentage	Lists the top ten actions with highest number of hits by percentage.
Top 10 Users Percentage	List the top ten actions with highest number of users by percentage.
Monitoring	Displays monitoring data that helps compare the behavior of the underlying hardware and software in the production and testing systems.
Over Time View	Displays hits over time in the production system.
Locations Throughput	Displays location throughput.
Locations Total Runs	Displays total runs per location.
Add	Adds select views to a PAL report view tab.

# **Select Measurements Dialog Box**

Each PAL view has a default set of measurements that it uses. This dialog box enables you to customize the measurements displayed in a selected report view.



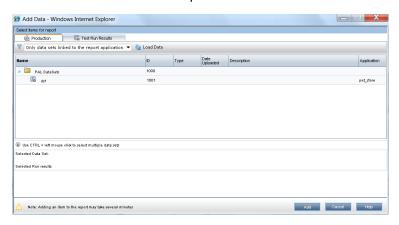
To access	In My Performance Center, select <b>Perspectives &gt; PAL</b> .
	<ol><li>In the PAL Flow pane, click Create Production Report or Add load test data to report.</li></ol>
	<ol> <li>In the PAL Reports pane, click a report. The report opens as an additional tab on the My Performance Center Dashboard. The PAL report view tabs are displayed. The PAL report views are contained within the tabs.</li> </ol>
	<ol> <li>On a PAL report view, select the menu button , then select Select Measurements.</li> </ol>
Important Information	The term transaction applies to any activity measured by testing and production systems. This includes VuGen script transactions, HP RUM transactions and actions, and URLs measured by other production systems.

UI Elements	Description
Data Types pane	Displays transactions with data. The transactions are enabled based on existing data.

UI Elements	Description
Transactions	This pane displays the following:
Pane	• <top box="" check="">. Selects/clears all transactions in the grid. To select/clear a specific transaction, select/clear the check box to the left of the transaction name.</top>
	Mapping Type. Indicates the mapping type: All, Mapped, Not Mapped.
	Name. Enables you to locate a specific transaction. Type the name and press Enter.
	Page Size. Sets the number of transactions displayed per page.
Apply	Applies the changes.
Use Global Fitter	Includes the transactions from the Set Global Transactions Filter dialog box. For more details, see "Set Global Transactions Filter Dialog Box" on page 443.

# **Add Data Dialog Box**

This dialog box enables you to add production data sets and performance test runs to the report. The added data is used for comparison and it is the basis for the load test tuning process.



# To access

- In the PAL Flow pane, click Create Production Report or Add load test data to report.
- 2. In the PAL Reports pane, click a report.
- 3. In the Data Sources tab, click Add Production Data or Add Testing Data.

UI Elements	Description
Production Tab	Enables you to select a production data set for the PAL report.

UI Elements	Description	
Test Run Results Tab  Enables you to select a test run for the PAL report.		
Add	Adds the selected production data set and test run results to the PAL report.	

## **Production Tab**

User interface elements are described below:

UI Elements	Description	
Y	Enables you to filter the data sets displayed in the production grid.	
	Select one of the following options:	
	Only data sets linked to the report application. Displays data sets associated with PAL application defined in the selected report.	
	All. Displays all data sets regardless of a selected PAL application.	
🚱 Load Data	Populates the production grid with data sets based on the matched filtering criterion.	
Name	The name of the data set.	
ID	The data set ID.	
Туре	The data set type.	
Date Uploaded	The date the data set was uploaded.	
Description	The description of the data set.	
Application	The application associated with the data set.	

## **Test Run Results Tab**

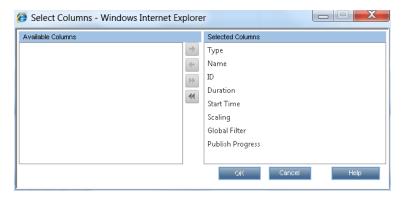
User interface elements are described below:

UI Elements	Description	
7	Enables you to filter the results displayed in the run results grid. Includes the following options: <b>Project</b> , <b>Test Set</b> , and <b>Test</b> .	
🙀 Load Data	Populates the run results grid with results based on the matched filtering criteria.	
ID	The Run ID.	
Run Name	The name of the test run.	

UI Elements	Description	
Time Range	The duration of the test run that is selected.	
	<b>Example:</b> If a test run's overall duration is 30 minutes, and the time range is defined as <b>0-15 min</b> , then only the first 15 minutes of the test run will be considered for trending.	
	Default: The whole test run in selected.	
Y	<b>Time Range filter.</b> Opens the Define Time Range dialog box, which enables you to change the defined time range within a test run for reporting purposes.	
	Select one of the following options:	
	Publish Complete Run. Makes all data collected from the beginning to the end of the test run available for the report.	
	Publish Part of Run. Makes only part of the test run available for the report.     Select the desired part of the run by entering the start and end times in the Start Time and End Time boxes.	
Exec Date	The date and time of the test run.	
Duration	The duration (in minutes) of the test run.	
Max Vusers	The maximum number of running Vusers during the test run.	
Total Transactions Passed	The total number of passed transactions during the test run.	
Total Errors	The total number of errors during the test run.	

## **Select Columns Dialog Box**

This dialog box enables you to select columns to be displayed in the <report name> PAL Report's Data Sources tab.



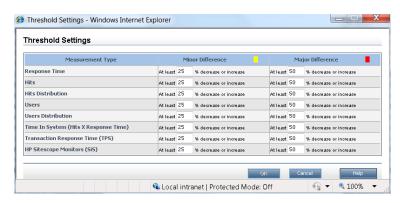
To access	On the <report name=""> PAL Report, select the <b>Data Sources</b> tab, and click the <b>Customize table columns</b> button .</report>
See also	" <report name=""> PAL Report" on page 421</report>

User interface elements are described below:

UI Elements	Description	
Duration	The duration of the test run, in minutes.	
Global Filter	The applied global filter.	
ID	The run ID.	
Name	The package or run name.	
Publish Progress	Indicates whether the report item was successfully added to the report.	
Test Name	The test name.	
Scaling	Indicated the scaling factor. For more details on setting the scaling factor, see "Set Scaling Factors Dialog Box" on page 442.	
Start Time	The date and time of the report item.	
Туре	Indicates the type of report item.	

## **Threshold Settings Dialog Box**

This dialog box enables you to define threshold values for the PAL measurement types.



To access	On the <report name=""> PAL Report, click the <b>Thresholds</b> button .</report>
	on the report harner 1712 Report, short the 1111 controlled battern

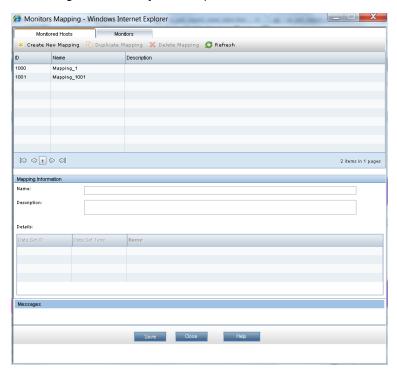
Important information	The term transaction applies to any activity measured by testing and production systems. This includes VuGen script transactions, HP RUM transactions and actions, and URLs measured by other production systems.
	The threshold definition and color settings are applied on a global level and hold true across all views in the report.

User interface elements are described below (unlabeled elements are shown in angle brackets):

UI Elements	Description	
Measurement Type	The type of measurement.	
Minor Difference	Enter a threshold value for indicating a minor difference between the production and test data.	
Major Difference	Enter a threshold value for indicating a major difference between the production and test data.	
<color settings=""></color>	Enables you to select in which color the measurement appears in the report. Click the colored square in the column to select a different color for the measurement.	
Response Time	Measures the average response time transactions take to complete (in seconds).	
Hits	Measures the total number of transaction hits over the entire test run.	
Hits Distribution	The percentage of transaction hits occurrence from the total amount of all transaction hits.	
Users	Counts the number of users that performed a specific transaction.	
Users Distribution	The percentage of transaction users from the total amount of users in all transactions.	
Time In System (Hits X Response time)	Total time a specific transaction was running in the system. Calculated by multiplying the average transaction response time by the number of hits.	
Transactions per Second (TPS)	The number of times a transaction was executed in a second. Calculated by dividing the number of hits by the duration of the data set.	
HP SiteScope Monitors (SiS)	The metrics monitored by HP SiteScope.	

## **Monitors Mapping Dialog Box**

This dialog box enables you to map monitored hosts and monitors.

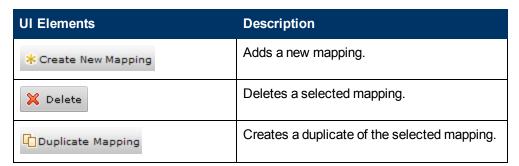


To access	On the <report name=""> PAL Report, click the <b>Monitors Mapping</b> button  Monitors Mapping .</report>
Relevant tasks	"How to Work with PAL" on page 400
See also	" <report name=""> PAL Report" on page 421 "PAL Overview" on page 398</report>

### **Monitored Hosts Tab**

Enables you to create mapping for the monitored hosts.

User interface elements are described below (unlabeled elements are shown in angle brackets):



UI Elements	Description
<b>⊘</b> Refresh	Refreshes the list of mappings.
<top grid=""></top>	Includes the following columns:
	<b>ID.</b> The mapping ID.
	Name. The mapping name.
	<b>Description.</b> A description of the mapping.
Mapping Information: Name	The mapping name.
Mapping Information: Description	A description of the mapping.
Mapping Information: Details	Lists details of a selected measurement.
	The following fields are displayed in the table:
	Data Set ID. The data set ID.
	Data Set Type. The measurement type.
	Name. The monitored host name.
Messages	Indicates the status of the mapping.

## **Monitors Tab**

Enables you to create mapping for monitor measurements.

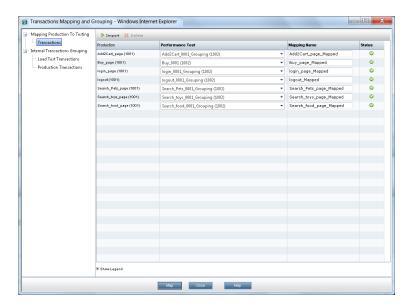
User interface elements are described below (unlabeled elements are shown in angle brackets):

UI Elements	Description
* Create New Mapping	Adds a new mapping.
× Delete	Deletes a selected mapping.
Duplicate Mapping	Creates a duplicate of the selected mapping.
C Refresh	Refreshes the list of mappings.
<top grid=""></top>	Includes the following columns:
	ID. The mapping ID.
	Name. The mapping name.
	<b>Description.</b> A description of the mapping.

UI Elements	Description
Mapping Information: Name	The mapping name.
Mapping Information: Description	A description of the mapping.
Mapping Information: Monitored	The host whose measurements are being monitored.
Hosts Mapping	Click in the field to select which monitored host to map to the mapped measurement.
Mapping Information: Details	Lists details of a selected measurement.
	The following fields are displayed in the table:
	Data Set ID. The data set ID.
	Data Set Type. The measurement type.
	Name. The monitor measurement name.
Messages	Indicates the status of the mapping.

## **Transactions Mapping and Grouping Dialog Box**

This dialog box enables you to map and group similar transactions in your production data or in your load test results. Grouping and mapping aggregates the data of the grouped transactions.



	ne> PAL Report, click the <b>Transactions Mapping &amp;</b>
Grouping button	Transactions Mapping & Grouping

Important Information	The term transaction applies to any activity measured by testing and production systems. This includes VuGen script transactions, HP RUM transactions and actions, and URLs measured by other production systems.
Relevant tasks	"How to Work with PAL" on page 400
See also	" <report name=""> PAL Report" on page 421</report>
	"PAL Overview" on page 398

## Mapping Production to Testing > Transactions Section

The pane enables you to map between production and load test transactions in order to have comparable data in your report. This is relevant in cases where transactions that measure the same business process have different names.

For example the transaction for measuring the search page is called Search in the VuGen script whereas the production system calls it Find. Mapping between the transactions makes them comparable.

User interface elements are described below:

UI Elements	Description
> Import	Enables you to import mappings from other reports.
× Delete	Enables you to delete a selected mapping.
Production	Lists the available production transactions.
Performance Test	Lists the available testing transactions or groups and enables you to map a testing transaction or a group to a production transaction.
Mapping Name	The mapping name of a production transaction. This is the transaction name that will be used in the reports.
Status	Indicates whether the production transaction is mapped or not.
Мар	Applies the mapping changes.

## Internal Transactions Grouping > Load Test or Production Transactions Section

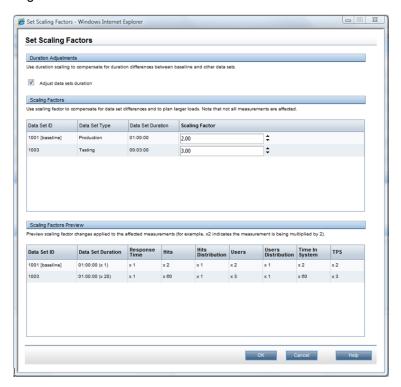
This pane enables you to group similar transactions in your production data or in your load test results. This is important when similar transactions are given different names. For example the Login transaction has a suffix added to denote the script it's in, so that several Login transactions are measured (for example. **login\_1**, **login\_2**, **login\_3**, etc.) although they all measure the same business process. Grouping will aggregate the data of the grouped transactions.

User interface elements are described below:

UI Elements	Description
* New	Clears details in the Group Details pane.
💢 Delete	Deletes a selected group name from the Grouping Name pane.
Grouping Name	Lists the available groups.  This icon indicates that the group is created using regular expressions. The group contains measurements that are currently displayed under  Available Measurements, as well as any future measurements.
Group's Name & Selected Measurements	Enter a group name. Use the arrows to move measurements between <b>Selected Measurements</b> and <b>Available Measurements</b> . To save the group, click the <b>Group</b> button.
Available Measurements	<ul> <li>Use the arrows to move measurements between Available Measurements and Selected Measurements.</li> <li>Filter . Enables you to locate a specific measurement, type the measurement name and click this button. The results are displayed below.</li> <li>Create group using this regular expression. Enables you use regular expressions to define a rule that automatically selects measurements to be included in a group. The automatic selection rule applies to measurements that are currently displayed under Available Measurements, as well as any future measurements.  To define a rule, type the regular expression and select the Create group using this regular expression check box. The applicable measurements are added under Selected Measurements.</li> </ul>
Group	Enables you to group the selected transaction measurements. The group name is added to the Grouping Name pane.

## **Set Scaling Factors Dialog Box**

This dialog box enables you to readjust data set durations and differences, to enable you to compensate for the dissimilarity between the data sets due to different durations or difference in system configuration (for example, number and power of servers). It also enables you to plan for larger loads.



То	On the <report name=""> PAL Report, click the Scaling Factor button</report>	
access	△ Scaling Factor	

## **Duration Adjustments Pane**

Affects the following measurement types: Hits and Time in System.

User interface elements are described below:

UI Elements	Description
Adjust data set duration	Adjusts duration differences of data sets to match the data set duration used for the baseline.

### **Scaling Factors Pane**

Affects the following measurement types: Hits, Users, Time in System, and transaction per second (TPS).

User interface elements are described below:

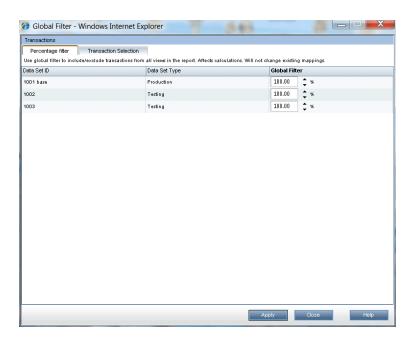
UI Elements	Description
Data Set ID	The data set ID.
Data Set Type	The data set type ( <b>Production</b> or <b>Testing</b> ).
Data Set Duration	The duration of the data set.
Scaling Factor	Indicates the scale of the measurement.  To change the scale of a measurement, click the upward/downward arrow to adjust to the desired scale.

### **Scaling Factors Preview Pane**

The pane previews the scaling factor changes set to the affected measurements. For example, x2 indicates the measurement is being multiplied by 2.

## **Set Global Transactions Filter Dialog Box**

This dialog box enables you to filter transactions from the PAL report views.



To access	On the <report name=""> PAL Report, click the Global Filter button</report>
	▼ Global Filter

Important Information	This filter does not affect mapped transactions.
Relevant tasks	"How to Work with PAL" on page 400

## Percentage Filter Tab

This tab enables you to set the filter percentage.

User interface elements are described below:

UI Elements	Description
Data Set ID	The data set ID.
Data Set Type	The data set type ( <b>Production</b> or <b>Testing</b> ).
Global	Indicates the filter percentage.
Filter	To change the percentage of a filter, click the upward/downward arrow to adjust to the desired value.

## **Transaction Selection Tab**

This tab enables you to select the transactions to be displayed in the report views.

User interface elements are described below:

UI Elements	Description
<top check box&gt;</top 	Selects/clears all transactions in the grid. To select/clear a specific transaction, select/clear the check box to the left of the transaction name.
Mapping Type	Indicates the mapping type: All, Mapped, Not Mapped.
Name	Enables you to locate a specific transaction. Type the name and press <b>Enter</b> .
Page Size	Sets the number of transactions displayed per page.

# Part 8: Performance Center Administration

# **User and Administrator Guide**Part 8: Performance Center Administration

# **Chapter 32: Performance Center Administration - Introduction**

Performance Center Administration Overview	
How to Work with Performance Center Administration	448

## **Performance Center Administration Overview**

Performance Center administration is performed in Lab Management. You must be a Lab Management administrator to perform these tasks.

Lab Management administrators are defined in the ALM Site Administration site. For details on how to create a Lab Management administrator user, see the *HP ALM Lab Management Guide*.

Performance Center administration responsibilities include managing lab resources, such as hosts and host pools, creating and maintaining testing assets, and other administration tasks.

For related task details, see " How to Work with Performance Center Administration" below.

## How to Work with Performance Center Administration

This section lists the tasks that a Lab Management administrator can perform. Some tasks are available only for projects with Performance Center licenses.

This task includes the following steps:

- "Prerequisites" below
- "Perform initial Performance Center configuration" below
- "Create Performance Center projects and define project settings" on next page
- "Manage and maintain Performance Center lab resources" on next page
- "View and manage performance test runs" on next page
- "View Performance Center usage reports" on next page
- "Upload application patches" on next page
- "Manage Performance Center Servers" on next page
- "Manage Performance Center and Performance Center host licenses" on next page
- "Manage Diagnostic Servers and Mediators" on next page
- "Maintain system health" on page 450
- "Change the Performance Center system user" on page 450
- "Update the Communication Security passphrase" on page 450
- "Update the secure host communication settings" on page 450
- "Configure general Performance Center settings" on page 450

#### **Prerequisites**

To perform any of these tasks, you must be a Lab Management administrator. For details on how to create a Lab Management administrator, see the *HP ALM Lab Management Guide*.

### Perform initial Performance Center configuration

Immediately after installing the Performance Center components, the relevant component's

configuration tool opens, prompting you for initial configuration settings. If this configuration was skipped, you must configure the settings manually before you can start working with Performance Center.

For details, see "How to Initially Configure Performance Center" on page 452.

## Create Performance Center projects and define project settings

You create projects in Site Administration, and define the limits and other settings for the project in Lab Management, in the Project Settings module. For details, see the *HP ALM Lab Management Guide*.

## Manage and maintain Performance Center lab resources

You manage hosts, host pools, host locations, and relevant MI Listeners from the Lab Resources modules. For details, see the *HP ALM Lab Management Guide*.

When you plan to perform maintenance tasks on the hosts—such as installing patches, rebooting hosts, and so on—it is recommended to reserve these hosts in timeslots. This way, you can be sure that they will be available for maintenance. For details, refer to the *HP Application Lifecycle Management User Guide*.

## View and manage performance test runs

The test runs from Performance Center can be viewed and managed in the Test Runs module. For details, see the *HP ALM Lab Management Guide*.

## View Performance Center usage reports

Performance Center usage reports provide you with an overall analysis of Performance Center site users, resource usage, concurrent resource usage vs. license limitations, timeslot usage, as well as resource usage by duration and runs. For details, see the *HP ALM Lab Management Guide*.

You can also export these reports to PDF and Excel format. For details, see the *HP ALM Lab Management Guide*.

## **Upload application patches**

Before you can install application patches on Performance Center Servers and hosts, you must upload the patches to the system. For details, see the *HP ALM Lab Management Guide*.

#### Manage Performance Center Servers

You manage Performance Center Servers in Lab Management from the PC Servers module. For details, see the *HP ALM Lab Management Guide*.

### Manage Performance Center and Performance Center host licenses

You manage the Performance Center license and Performance Center host license in Lab Management from the Licenses module. For details, see the *HP ALM Lab Management Guide*.

#### Manage Diagnostic Servers and Mediators

Integrating diagnostics modules with ALM enables monitoring and analysis of the performance of complex applications under test. For details on setting up the diagnostics modules, see the *HP ALM Lab Management Guide*.

## Maintain system health

You track and maintain the health of the system Lab Management from the System Health module. For details, see the *HP ALM Lab Management Guide*.

## Change the Performance Center system user

You use the System Identity Utility, installed on the Performance Center Server, to change the Performance Center system user on the Performance Center Server and hosts. For details, see "How to Change the System User" on page 458.

## **Update the Communication Security passphrase**

You use the System Identity Utility, installed on the Performance Center Server, to update the Communication Security passphrase on the Performance Center Server and hosts. For details, see "How to Update the Communication Security Passphrase" on page 457.

## Update the secure host communication settings

Initially, you define secure communication settings on each Performance Center host or standalone load generator using the Host Security Setup utility, installed locally on each host or load generator. For details, see "How to Configure Security Settings Locally on Hosts" on page 473.

To update these settings on all the hosts and load generators simultaneously, you can use the Host Security Manager, installed on the Performance Center Server. For details, see "How to Update Host Security Settings Remotely" on page 474.

## **Configure general Performance Center settings**

You manage general Performance Center settings in Lab Management. On the masthead, select **Tools > Performance Center General Settings**. For user interface details, see the *HP ALM Lab Management Guide*.

# **Chapter 33: Initial Performance Center Configuration**

nitial Performance Center Configuration Overview		
How to Initially Configure Performance Center	452	

## **Initial Performance Center Configuration Overview**

Immediately after installing the Performance Center Server and hosts, the relevant component's configuration tool opens, prompting you for initial configuration settings. If any parts of the configuration were skipped, you must configure the settings manually before you can start working with Performance Center.

You can perform the configuration by running the configuration tool on the relevant machine, or alternatively by defining the settings manually in Lab Management.

For details on running the relevant configuration tools, see the *HP ALM Performance Center Installation Guide*.

For details on configuring the initial settings in Lab Management, see "How to Initially Configure Performance Center" below.

## **How to Initially Configure Performance Center**

This task describes how to manually perform the initial configuration of the Performance Center Server and hosts in Lab Management.

This task includes the following steps:

- "Prerequisites" below
- · "Log into Lab Management" below
- "Add the Performance Center Server(s) to ALM" below
- "Add the Performance Center license and the host license" on next page
- "Add Performance Center hosts to the system" on next page

#### 1. Prerequisites

- The Performance Center Server and Performance Center hosts must be installed according to instructions provided in the *HP ALM Performance Center Installation Guide*.
- To perform any of these tasks, you must be a Lab Management administrator. For details on how to create a Lab Management administrator, refer to the HP ALM Lab Management Guide.

### 2. Log into Lab Management

a. Open your Web browser and type the ALM URL in the following format:

```
http://<ALM>[<:port number>]/qcbin
```

- b. In the HP Application Lifecycle Management window that opens, click Lab Management.
- c. Enter your Lab Management Administrator user name and password and click **Login**.

#### Add the Performance Center Server(s) to ALM

On the Lab Management sidebar, under **Servers**, select **PC Servers**, and add your Performance Center Server. For details on how to add a Performance Center Server, refer to

the HP ALM Lab Management Guide.

#### 4. Add the Performance Center license and the host license

On the Lab Management sidebar, under **Performance Center**, select **PC Licenses**.

Add the Performance Center license, and then the host license. For interface details, refer to the *HP ALM Lab Management Guide*.

## 5. Add Performance Center hosts to the system

On the Lab Management sidebar, under **Lab Resources**, select **Hosts**. For user interface details, refer to the *HP ALM Lab Management Guide*.

# **Chapter 34: Performance Center System Administration**

## This chapter includes:

ALM Performance Center Communication Security	
Performance Center System User	456
How to Update the Communication Security Passphrase	457
How to Change the System User	458
How to Configure the System User Manually	460
Required Policies for the Performance Center System User	463
System Identity Utility Window	464

## **ALM Performance Center Communication Security**

During installation of ALM and the Performance Center Server and hosts, a passphrase, known as the **Communication Security passphrase**, is defined. This passphrase enables secure communication between the Performance Center components and ALM. This passphrase must be identical on all of the components of the system.

The Communication Security passphrase can be updated from time to time. For information about updating the Communication Security passphrase, see "How to Update the Communication Security Passphrase" on next page.

## **Performance Center System User**

During installation of the Performance Center Server and hosts, a default Performance Center system user, **IUSR\_METRO** (default password **P3rfoRm@1nce**), is created in the Administrators user group of the server/host machines.

To prevent security breaches, you can replace Performance Center's default system user by creating a different local system user, or by using a domain user.

For stronger security, you can create a non-administrator Performance Center system user in a local group under the Users group. This system user has the permissions granted to any user in the Users group with extended rights to Web services and the HP file system and registry.

With these limited permissions, such a system user cannot perform all administrative system tasks. You need to specify a configuration user (a user with administrative privileges that is defined on the Performance Center Server and hosts) that Performance Center uses when administrative tasks are required on the system. After the tasks are complete, the system user reverts back to itself, with its limited Performance Center user permissions.

**Note:** The configuration user is saved in the database so that whenever an administrative-level system user is required to perform a task, the system automatically uses the configuration user, without asking for its credentials.

The Performance Center Server is installed with the System Identity Utility that enables you to manage the Performance Center system user on the Performance Center Server and hosts from one centralized location.

Using this utility, you can periodically update the Performance Center system user name and password. For more information, see "How to Change the System User" on page 458.

## Remote Performance Center Server and Host Administration

To perform administrative tasks on the Performance Center Server or hosts (such as adding, configuring, or resetting a Performance Center Server/host), Performance Center must use a user with administrative privileges. This must be the Performance Center system user with administrative privileges or, if the Performance Center system user is non-administrative, a configuration user.

When the Performance Center system user has administrative privileges and is defined on the remote machine, tasks are performed upon request. After validating the Performance Center system user or configuration user, Performance Center can perform required tasks.

## How to Update the Communication Security Passphrase

This task describes how to update the Communication Security passphrase on the ALM-Performance Center system components.

To learn more about ALM-Performance Center communication security, see "ALM Performance Center Communication Security" on previous page.

This task includes the following steps:

- "Update the Communication Security passphrase on ALM" below
- "Update the Communication Security passphrase on the Performance Center components" below

## 1. Update the Communication Security passphrase on ALM

- a. In Site Administration, update the COMMUNICATION\_SECURITY\_PASSPHRASE default parameter. For details, see the HP Application Lifecycle Management Administrator Guide.
- b. Restart the HP Application Lifecycle Management service on the ALM server.

## 2. Update the Communication Security passphrase on the Performance Center components

The System Identity Utility is installed on the Performance Center Server. You use this utility to update the Communication Security passphrase on the Performance Center Server and hosts from one centralized location.

a. From the Performance Center Server installation's bin directory, open the System Identity
 Utility (<Performance Center Server Installation
 directory>/bin/IdentityChangerUtil.exe).

**Note:** You can run this utility from any one of the Performance Center Servers in the system.

- b. Enter the ALM details to connect to ALM.
- The System Identity Utility opens. For user interface details, see "System Identity Utility Window" on page 464.

In the **Communication Security Passphrase** section, select **Change**, and enter the new Communication Security passphrase.

d. Click Apply.

## **How to Change the System User**

You use the System Identity Utility, installed on the Performance Center Server, to change the system user on the Performance Center Server and hosts.

When you change the system user, or a user's password, the System Identity Utility updates the Performance Center Server and hosts.

To learn more about the Performance Center system user, see "Performance Center System User" on page 456.

This task includes the following steps:

- "Prerequisites" below
- "Launch the System Identity Utility on the Performance Center Server" below
- "Change the details of the Performance Center user" below
- "Verify that the system user was changed on the Performance Center Server" on next page

## 1. Prerequisites

- When changing the system user, Performance Center must be down. That is, all users must be logged off the system and no tests may be running.
- When changing the user password:
  - Ensure that each host is listed in the Machines table under **one alias only**.
- In the case of a domain user, when the domain IT team notifies you that the password is to be changed, you need to temporarily change the Performance Center system user on the Performance Center Server and hosts to a different user. After the domain IT team has changed the password of the domain user and has notified you of this change, you need to change the Performance Center system user back to the domain user on the Performance Center Server and hosts.

### 2. Launch the System Identity Utility on the Performance Center Server

- a. In the Performance Center Server installation's bin directory, open the System Identity
   Utility (<Performance Center Server Installation
   directory>/bin/IdentityChangerUtil.exe).
- b. Enter the ALM details to connect to ALM.

The System Identity Utility opens. For user interface details, see "System Identity Utility Window" on page 464.

#### 3. Change the details of the Performance Center user

Enter the relevant details to update and click **Apply**. The utility updates the Performance Center Server and hosts, starting with the Performance Center Server.

In the lower part of the utility window, the **Machines** table displays the status of each machine during the configuration process.

If the utility is unable to change the user on the Performance Center Server, it stops the configuration, rolls back the change, and issues a message explaining why the change cannot be made. Correct the error and click **Apply** again.

When configuration completes successfully on the Performance Center Server, the utility proceeds with the configuration of the hosts. The utility attempts to configure all the hosts, even if the configuration on one or more hosts is unsuccessful. In this case, after the utility has attempted to configure all the hosts, correct the errors on the failed hosts, and click **Reconfigure**. The utility runs again on the whole system.

**Note:** If the configuration continues to fail, you can configure the Performance Center Server and hosts manually. However, all attempts should be made to correct errors that cause the configuration to fail. **Manual configuration should be left as a last resort.** For details on configuring the Performance Center Server and hosts manually, see "How to Configure the System User Manually" on next page.

## 4. Verify that the system user was changed on the Performance Center Server

- a. Open IIS Manager. Under Sites > Default Web Site, choose a virtual directory.
- Under Authentication select Anonymous Authentication. Verify that the anonymous
  user defined was changed for the following virtual directories: PCS, LoadTest and Files (a
  virtual directory in LoadTest).
- c. Check in the **PCQCWSAppPool** and **LoadTestAppPool** application pools that the identity is the Performance Center user.

## **How to Configure the System User Manually**

This task describes how to manually configure the Performance Center system user on the Performance Center Server and hosts.

#### Note:

- First try to configure the Performance Center user using the System Identity Utility (see "How to Change the System User" on page 458). **Use these manual instructions as a last resort only.**
- This section applies to an administrative or non-administrative Performance Center user on the Performance Center Server and hosts.
- Manual configuration of the Performance Center user on the Performance Center Server and hosts involves granting the required Performance Center policies, updating the Performance Center user, and, for a non-administrative Performance Center user, granting the required Performance Center permissions.
  - Follow all the procedures carefully, noting which procedures are relevant for the Performance Center Server and which for the hosts.

#### This task includes the following steps:

- "Define the Performance Center user as an Admin or Non-Admin user" below
- "Configure IIS settings (Performance Center Server only)" on next page
- "Configure the COM object identity" on next page
- "Reset services" on next page
- "Admin user only: Verify Performance Center user policies" on next page
- "Non-Admin user only: Configure Performance Center user policies and permissions" on page 462

### 1. Define the Performance Center user as an Admin or Non-Admin user

The Performance Center system user can have administrative or non-administrative permissions. You define what type of user it is by adding it to the relevant local user group on the Performance Center Server or host.

- a. Open the Computer Management (Control Panel > Administrative Tools > Computer Management).
- Add the user to the appropriate user group. In System Tools > Local Users and Groups > Users.
  - For administrative system users: Double-click the Performance Center user, and click the Member of tab. If Administrators is not listed, click Add, select Administrators. and click OK.
  - For non-administrative system users: Double-click the Performance Center user, and click the Member of tab. Change the Performance Center user to belong to the following groups:

- Users
- Distributed Com Users
- Performance Log Users

## 2. Configure IIS settings (Performance Center Server only)

- a. Open the IIS Manager on the Performance Center Server machine:
  - Windows 2003: Change the system user in the LoadTest and PCS virtual directories.
  - Windows 2008: For each of the LoadTest and PCS virtual directories, add the Performance Center system user and grant the user full control on the virtual directory.
- b. Change the **PCQCWSAppPool** and **LoadTestAppPool** application pool identity to the Performance Center system user.

## 3. Configure the COM object identity

For the Performance Center Server and hosts, change the identity of the COM objects to the Performance Center user.

For all the COM objects listed in the

<Performance Center component installation>\bin\MiDCOM.ini file, configure the identity to be the Performance Center user as follows:

- a. Run dcomcnfg.
- b. For each COM object, under **Properties > Identity**, select **This user** and enter the Performance Center user details.

#### 4. Reset services

For the Performance Center Server and hosts, reset the services as follows:

■ Performance Center Servers and hosts: Reset the RemoteManagement Agent service using the following commands:

```
%installation folder%\al_agent\bin\alagentservice.exe -remove
%installation folder%\al_agent\bin\alagentservice.exe -install
<username> <password>
```

where username and password are those of the Performance Center user.

- Performance Center hosts only:
  - Reset the Performance Center Agent service using the following commands:

```
%installation folder%\launch_service\bin\magentservice.exe -
remove
%installation folder%\launch_service\bin\magentservice.exe -
install <username> <password>
```

where username and password are those of the Performance Center user.

- Open the Services console, and restart the Performance Center Load Testing Service.
- 5. Admin user only: Verify Performance Center user policies

**Note:** This section is relevant when configuring an administrative Performance Center user only.

On the Performance Center Server and hosts, verify that the Performance Center user has the necessary policies. For details, see "Required Policies for the Performance Center System User" on next page.

If any of these policies is missing, grant the Performance Center user the missing policies.

## 6. Non-Admin user only: Configure Performance Center user policies and permissions

**Note:** This section is relevant when configuring a non-administrative Performance Center user only.

#### On the Performance Center Server and hosts:

- a. Grant the Performance Center user the required policies. For details, see "Required Policies for the Performance Center System User" on next page.
- b. Change registry permissions: Open the Registry Editor (**regedt32**) and give the Performance Center user full access to:

```
- HKEY_LOCAL_MACHINE\Software\Mercury Interactive- HKEY_CLASSES_ROOT\interface-
HKLM\SYSTEM\CurrentControlSet\Control\SecurePipeServers\winreg -
HKLM\SOFTWARE\Microsoft\Windows NT\CurrentVersion\Perflib -
HKLM\SOFTWARE\Microsoft\Windows NT\CurrentVersion\Winlogon
```

#### In addition, on hosts only:

- HKLM\SOFTWARE\Microsoft\Jet\4.0\Engines\Text (used by Analysis)
- HKEY CLASSES ROOT\CLSID\{67489277-9AB8-4AF6-91B4-94ED62303BE5}
- c. Add full control permissions to directories and files:
  - o In the File System folder grant the **Performance Center user** full control of:

```
- The Performance Center directory
(C:\Program Files\HP\Performance Center) and all sub-
directories- %CommonProgramFiles%- %windir%\TEMP- If the
systemroot is on an NTFS partition, grant at least Read access
to - %SystemRoot%\System32\Perfc009.dat -
%SystemRoot%\System32\Perfh009.dat
```

#### In addition, on hosts only:

```
- C:\Documents and Settings\Default User\Local Settings\Temp-
%windir%\wlrun7.ini- %windir%\wlrun5.ini-
%windir%\mercury.ini- %windir%\collate.txt-
%windir%\OnlineSet.ini
```

If a file does not exist, create it and give the user full access.

In the File System folder, after installing Web services, grant the IWAM\_Machine user
 Read permissions in the following directory:

```
windir%\TEMP
```

d. Add permissions to run .NET applications:

Add full control permissions for the Performance Center user to all folders needed to run .**NET** applications (Web services, and so on).

In a command line, go to %windir%\Microsoft.NET\Framework\v2.0.50727 and run

aspnet\_regiis.exe -ga <MachineName>\IUSR\_METRO

e. Change permissions of the Crypto key:

Open C:\Documents and Settings\AII Users\Application Data\Microsoft\Crypto\RSA\MachineKeys.

Right-click the f9416f003254e6f10da1f9bad8e4c383 file and select Properties.

In the **Security** tab, add the **Users Group** and grant it full control.

## Required Policies for the Performance Center System User

This section describes the policies required for the Performance Center system user.

Note: This section applies to:

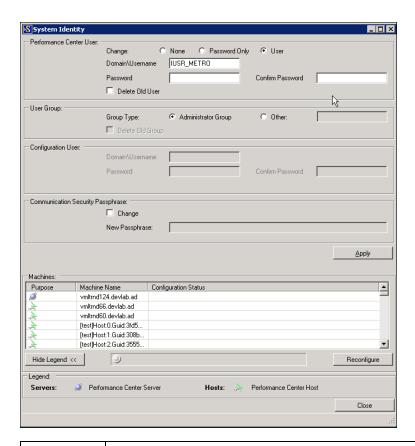
- An administrative or non-administrative Performance Center user
- All Performance Center servers and hosts

The Performance Center user must be granted all of the following policies:

Policy	Reason
Create global object	For Autolab running Vusers on the Controller.
Batch logon rights	The minimum policies required to run Web applications.
Service logon rights	The minimum policies required to run Web applications.
Access this computer from the network	The minimum policies required to run Web applications.
Log on locally	Required by infra services. For example, after reboot, the system logs in with the Performance Center system user.

## **System Identity Utility Window**

This utility enables you update the ALM-Performance Center Communication Security passphrase, as well as the Performance Center system user (by default, **IUSR\_METRO**) and/or password on the Performance Center Server and hosts from one centralized location.



To access	From the Performance Center Server installation's bin directory, open the System Identity Utility ( <performance center="" directory="" installation="" server="">/bin/IdentityChangerUtil.exe).</performance>
Important information	This utility does not apply changes to UNIX machines, Standalone Load Generators, or machines that are located over the firewall.
	When updating the Communication Security passphrase, it is essential that it is updated in ALM as well.
	When changing the system user, Performance Center must be down. That is, all users must be logged off the system and no tests may be running.
Relevant	"How to Change the System User" on page 458
tasks	"How to Update the Communication Security Passphrase" on page 457
See also	"Performance Center System User" on page 456
	"ALM Performance Center Communication Security" on page 456

User interface elements are described below:

UI Elements	Description
Apply	Applies the selected changes on the Performance Center Server and hosts, starting with the Performance Center Server.
Hide Legend << Show Legend >>	Hides/shows the legend.
Reconfigure	If, when applying a change, there are errors on any of the Performance Center hosts, troubleshoot the problematic host machines, then click <b>Reconfigure</b> . The utility runs again on the Performance Center Server and hosts.
Performance Center User	The Performance Center system user details.  • Change. Enables you to select which detail to change.
	<ul> <li>None. Do not change the user's name or password.</li> </ul>
	<ul> <li>Password Only. Enables you to change only the Performance Center system user's password.</li> <li>Note: When changing the password:         <ul> <li>Ensure that each host is listed in the Machines table under one alias only.</li> <li>In the case of a domain user, when the domain IT team notifies you that the password is to be changed, you need to temporarily change the Performance Center system user on the Performance Center Server and hosts to a different user. After the domain IT team has changed the password of the domain user and has notified you of this change, you need to change the Performance Center system user back to the domain user on the Performance Center Server and hosts.</li> </ul> </li> </ul>
	<ul> <li>User. Enables you to change the Performance Center system user name and password.</li> </ul>
	Domain\Username. The domain and user name of the Performance Center system user.
	Password/Confirm Password. The password of the Performance Center system user.
	Delete Old User. If you are changing the user, this option enables you to delete the previous user from the machine.
	Note: You cannot delete a domain user.

UI Elements	Description
User Group	The details of the user group to which the Performance Center system user belongs.
	Group type. The type of user group.
	<ul> <li>Administrator Group. Creates a user in the Administrators group with full administrator policies and permissions.</li> </ul>
	Other. Creates a local group under the Users group, granting policies and permissions as well as other Performance Center permissions.
Configuration User	If you are creating a non-administrative Performance Center system user, that is, if you selected <b>Other</b> under <b>User Group</b> , you need to configure a configuration user (a system user with administrative privileges) that the non-administrative Performance Center system user can impersonate when it needs to perform administrative tasks. For more details, refer to "Performance Center System User" on page 456.
	If you selected <b>Delete Old User</b> in the <b>Performance Center User</b> area, ensure that the configuration user you are configuring is not the same as the system user you are deleting. Alternatively, do not delete the old user.
	Domain\Username. The domain and user name of a system user that has administrator privileges on the Performance Center Server and hosts.
	Password/Confirm Password. The password of a system user that has administrator privileges on the Performance Center Server and hosts.
Communication Security	The Communication Security passphrase that enables the Performance Center Server and hosts to communicate securely with ALM.
Passphrase	Change. Enables you to change the passphrase.
	New passphrase. The new Communication Security passphrase.
	<b>Note:</b> This passphrase must be identical to the Communication Security passphrase defined in ALM. For details, refer to the "How to Update the Communication Security Passphrase" on page 457.

UI Elements	Description
Machines grid	Displays the configuration status on each of the Performance Center components.
	Configuration complete. The system user configuration was completed.
	Needs to be configured. The Performance Center server/host is pending configuration. Displayed only after the Performance Center Server configuration is complete.
	Configuring The Performance Center Server/host in being configured.
	Configuration failed. The Performance Center Server/host configuration failed. The utility displays the reason for failure together with this status.
	Note:
	<ul> <li>If the utility is unable to apply the change on the Performance Center Server, the utility stops the configuration, rolls back the change, and issues a message explaining why the change cannot be applied. Correct the error and click <b>Apply</b> again.</li> </ul>
	<ul> <li>When configuration completes successfully on the Performance Center Server, the utility proceeds with the configuration of the hosts. The utility attempts to configure all the hosts, even if the configuration on one or more hosts is unsuccessful. In this case, after the utility has attempted to configure all the hosts, correct the errors on the failed hosts, and click <b>Reconfigure</b>. The utility runs again on the whole system.</li> </ul>
	<ul> <li>When changing system user details, if the configuration continues to fail, you can perform the change on the Performance Center Server and hosts manually. However, this is not recommended—all attempts should be made to correct errors that cause the configuration to fail. Changing the system user manually should be left as a last resort. For details on changing the system user manually, see "How to Configure the System User Manually" on page 460.</li> </ul>

## **Chapter 35: Secure Host Communication**

## This chapter includes:

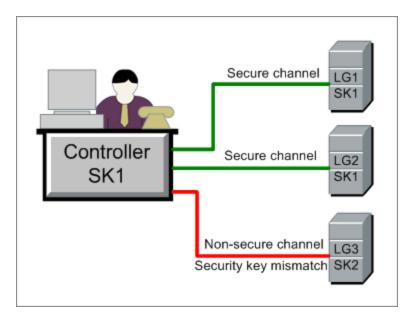
Secure Host Communication Overview	470
Host Security Configuration	471
Remote Security Configuration	471
Host Security Best Practices	472
How to Configure Security Settings Locally on Hosts	473
How to Update Host Security Settings Remotely	474
Secure Host Communication User Interface	475
Troubleshooting and Limitations	480

## **Secure Host Communication Overview**

The need to secure communication channels from hackers attacking the corporate networks is critical. Securing communication channels ensures confidentiality, integrity, and the user's authenticity within the scope of the load testing application.

Because load generators and Controllers serve so many projects, it is essential that the channels between Controllers and load generators remain opaque to all machines except for the Controllers and load generators participating in running performance tests or collating test data after a run.

Secure communication is established between the Controller and load generator hosts using a **security key**. Each host in the system must be set up with the identical security key. If security keys on the hosts do not match, secure communication cannot be established.



A host is in **secure mode** when it has a security key and security is enforced.

A host is in **non-secure mode**:

- if it has no security key
- if it has a security key but security is not enforced

When a host in secure mode tries to communicate with a host in non-secure mode, security is automatically enforced on the non-secure host—assuming their security keys match—allowing secure communication to be established.

#### Note:

 When you run a performance test, if secure communication cannot be established between a secure host (Controller or load generator) and another host participating in the test, the test cannot run.  By definition, non-secure hosts can communicate with each other and participate in test runs over non-secure channels.

This can be summarized in the following table:

	Both Hosts in Secure Mode	Security Mode on Hosts Differ	Both Hosts in Non- Secure Mode
Security keys match	Test runs over secure channel	Test runs over secure channel	Test runs over non- secure channel
Security keys do not match	Test does not run	Test does not run	Test runs over non- secure channel

## **Host Security Configuration**

When you install the hosts (Controllers and load generators), by default no security settings are defined on them, and communication channels between the hosts are not secure. To enforce secure communication between the hosts, you must configure security settings on each host machine immediately after installing the hosts.

When configuring these settings **for the first time**, to avoid configuration over non-secure channels, you must set the security on each host locally using the **Host Security Setup utility**. For details, see "How to Configure Security Settings Locally on Hosts" on page 473.

After initial security configuration, you can update security settings locally or simultaneously across all the Performance Center hosts from a remote location using the **HP Host Security Manager** utility. This utility is installed on the same Performance Center Server. For details, see "How to Update Host Security Settings Remotely" on page 474.

## **Remote Security Configuration**

You can align security settings across all the Performance Center hosts simultaneously from a remote location using the **HP Host Security Manager** utility.

The utility lists all the Performance Center hosts, as well as the MI Listeners required to connect to the hosts that are over a firewall, where applicable.

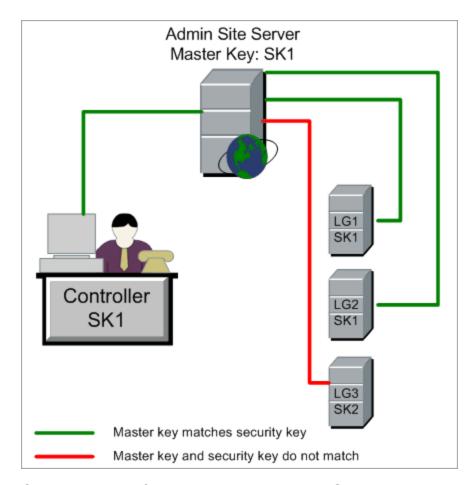
Using Host Security Manager, you can update the security key on all the hosts, or update the security mode on selected hosts. For details, see "How to Update Host Security Settings Remotely" on page 474.

## Master Security Key

To update security settings on the hosts, Host Security Manager uses a master key that matches the security keys on all the hosts. This enables secure communication between Host Security Manager and the hosts for the purpose of remotely updating the security settings.

If the master key and security key on a particular host do not match, Host Security Manager cannot update security settings on that host.

When you open Host Security Manager for the first time, you are prompted for a key. Host Security Manager stores this key as a master key for secure communication with the hosts. If you do not enter the key at this point, you are prompted for it again when you try to update the security settings.



## Considerations for Updating Linux Load Generators

- Linux load generators that use rsh (remote shell) to connect to the Controller host cannot be
  updated using Host Security Manager. To update security settings on such load generators, use
  the local Host Security Setup utility. See "How to Configure Security Settings Locally on Hosts"
  on next page.
- To update security settings on a Linux load generator using Host Security Manager, you must launch the load generator daemon for a user and manually grant write permissions to the user on <installation folder>/config.

## **Host Security Best Practices**

- To avoid sending security settings over a non-secure channel, perform initial configuration of the security settings on each host locally (see "How to Configure Security Settings Locally on Hosts" on next page).
- Security settings should be changed once a month.

- Security settings can be updated:
  - manually on each host
  - remotely on all hosts simultaneously using the Host Security Manager utility

If the host's settings fail when using the Host Security Manager utility, you must update the settings manually.

## How to Configure Security Settings Locally on Hosts

This task describes how to configure security settings locally on Controllers and load generators.

**Note:** This task is part of a higher-level task. For details, see " How to Work with Performance Center Administration" on page 448.

#### Windows Hosts

 On each host, launch the Host Security Setup utility (Start > All Programs > HP Performance Center Host > Tools > Host Security Setup).

For user interface details, see "Host Security Setup Dialog Box" on page 478.

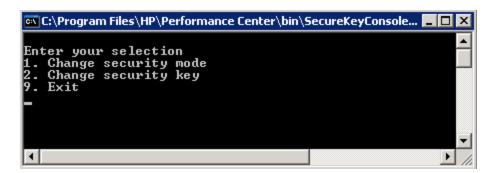
- 2. Select a security mode for the host.
- 3. If you selected to enforce secure communication, enter a security key (6 16 characters). Enter the key a second time for confirmation.

#### **Linux Hosts**

- 1. Log in as root user and change to tcsh.
- 2. Go to the /opt/HP/HP\_LoadGenerator directory and type:

```
>source ./env.csh
```

3. Run SecurityKeyConsole.exe, located in the <Installation\_folder>/bin/ directory.



- 4. In the Console window, enter an option as follows:
  - To change the security mode, enter 1.
  - To change the security key, enter 2.

- 5. If you are changing the security mode:
  - To turn the security on, enter 1.
  - To turn the security off, enter 0.
- 6. If you are changing the security key, enter the new key. A valid key is 6 16 characters long.

## **How to Update Host Security Settings Remotely**

This task describes how to use Host Security Manager to update security settings on the Performance Center hosts remotely, from the Performance Center Server.

**Note:** This task is part of a higher-level task. For details, see " How to Work with Performance Center Administration" on page 448.

This task includes the following steps:

- "Prerequisites" below
- "Register Performance Center hosts in Host Security Manager" below
- "Update the security settings" on next page
- · "Results" on next page

## 1. Prerequisites

- Each host must have a security key defined on it, and all of the hosts' security keys must be identical.
- Host Security Manager must have a master security key that is identical to the security key
  on all of the hosts. For details, see "Remote Security Configuration" on page 471.

#### 2. Register Performance Center hosts in Host Security Manager

For Host Security Manager to communicate with the Performance Center hosts, you must first register the hosts in Host Security Manager.

**Note:** Every time you use Host Security Manager to update security settings, make sure that the list of hosts in Host Security Manager is updated.

- a. Open Host Security Manager: On the Performance Center Server, select Start > All
   Programs > HP Performance Center Server > Tools > Host Security Manager. For
   user interface details, see" Host Security Manager Window" on page 476.
- b. Before opening, the tool prompts you for the ALM login credentials. Enter the credentials.
- c. In the Host Security Manager, click **Get Performance Center Hosts**. The list of hosts is updated as follows:
  - The hosts—and, where relevant, their associated MI Listeners—are imported from ALM into the utility.
  - If you are updating the list, hosts that are no longer in ALM are removed from the list.

## 3. Update the security settings

- a. Update the desired security setting:
  - Security key. Click Update Security Key, enter the new key, and enter it again for confirmation.
  - Security Mode. Select the hosts in the list that you want to update. To select multiple hosts, hold down the CTRL key on your keyboard while selecting the relevant hosts.
     Click Update Security Mode, and select a security mode.

#### b. Click Update.

Host Security Manager attempts to update the security setting on the hosts listed under **Update progress**. As it attempts to update each host, it displays the update status, **Updated** or **Failed**, before attempting to update the next host.

If a host is not updated successfully, check for possible reasons. You can stop the update process by clicking **Stop**.

If there is a mismatch between Host Security Manager's master security key and the host's security key, the Update Error dialog box opens, prompting you for an appropriate action:

- **Skip host.** Skip updating this host.
- **Establish a secure channel using this key.** Use a different security key to communicate securely with the host.
- Communicate over non-secure channel. Update the security setting over a non-secure channel. This action is not recommended, especially when updating the host security to secure mode. You should rather update the security setting locally on the host (see "How to Configure Security Settings Locally on Hosts" on page 473).

To apply the selected error-handling action to all similar mismatches, select **Use this** solution with all similar mismatches.

**Note:** The security key update also updates Host Security Manager's master security key. If the update fails on all of the hosts, Host Security Manager's master key is not updated.

#### 4. Results

If the update was successful, Host Security Manager displays the time and status of the security key/mode update for each host.

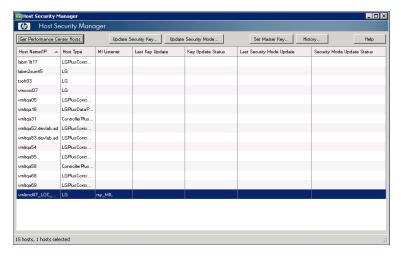
## **Secure Host Communication User Interface**

This section includes:

Host Security Manager Window	476
Host Security Setup Dialog Box	478
Update Security Key Dialog Box	479
Update Security Mode Dialog Box	480

## **Host Security Manager Window**

This window enables you to update security settings remotely on all of the hosts in the performance testing system.



To access	On the Performance Center host select Start > All Programs > HP Performance Center Server > Tools > Host Security Manager.
Important information	You must provide Host Security Manager with a master security key before you can update the security settings.
	Every time you use Host Security Manager to update security settings, click     Get Performance Center Hosts to make sure that the list of hosts is up to date.
Relevant tasks	"How to Update Host Security Settings Remotely" on page 474
See also	" Secure Host Communication Overview " on page 470

User interface elements are described below (unlabeled elements are shown in angle brackets):

UI Elements	Description
Get Performance Center Hosts	Imports all the hosts defined in ALM into Host Security Manager.
Update Security Key	Opens the Update Security Key dialog box, enabling you to update the security key on all the hosts. For details, see " Update Security Key Dialog Box" on page 479.
Update Security Mode	Opens the Update Security Mode dialog box, enabling you to update the security mode on selected hosts. For details, see "Update Security Mode Dialog Box" on page 480.

UI Elements	Description
Set Master Key	Opens the Set Master Key dialog box where you update Host Security Manager's master security key.
History	Opens the History dialog box, enabling you to view the history of updates made to the hosts. The information displayed includes the date of the update, the operation (key/mode update), and the update status (Passed/Failed).
<hosts table=""></hosts>	Displays the following information:
	Host Name/IP. The name or IP address of the host.
	Host Type. The type of host: Controller/Load Generator.
	MI Listener. When the host is over a firewall, the name of the MI Listener through which the host communicates with the other hosts.
	Last Key Update. The last time the security key was updated.
	Key Update Status. The status of the last security key update.
	Last Security Mode Update. The last time the security mode was updated.
	Security Mode Update Status. The status of the last security mode update.
	<b>Tip:</b> You can sort the details on this page in ascending or descending order by clicking the heading of the column by which you want to sort. Click the column heading again to reverse the sort order.

## **Host Security Setup Dialog Box**

This dialog box enables you to update a host's security settings manually.



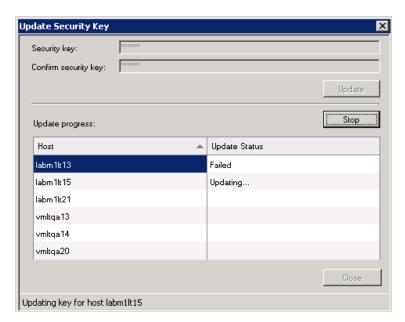
To access	On the host machine, select <b>Start &gt; All Programs &gt; Performance Center Host</b> > <b>Tools &gt; Host Security Setup</b>
Important information	When configuring security settings on hosts for the first time, to avoid configuration over non-secure channels, it is recommended to configure security settings on each host locally using the Host Security Setup utility.
	After initial security configuration, you can update security settings locally, or simultaneously across all the hosts in the system using the HP Host Security Manager utility installed on the Performance Center Server. For details, see "Remote Security Configuration" on page 471.
Relevant tasks	"How to Configure Security Settings Locally on Hosts" on page 473
See also	"Host Security Configuration " on page 471

User interface elements are described below (unlabeled elements are shown in angle brackets):

UI Elements	Description
Select a	Select one of the following security modes:
security mode	Allow non-secure communication. Allows the host to communicate with other machines over a non-secure channel. (Default)
	Enforce secure communication. Enforces the host to communicate with other machines over a secure channel. If you select this option, you must provide the key (6 - 16 characters long) matching the security key on the other hosts with which it needs to communicate.

## **Update Security Key Dialog Box**

This dialog box enables you to update the security key simultaneously on all the hosts.



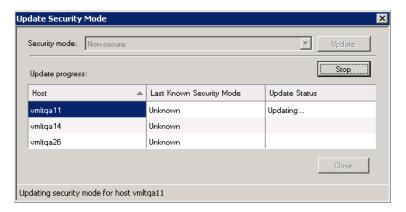
To access	In Host Security Manager, click <b>Update Security Key</b> .
Important information	When you update the security key, the Host Security Manager's master security key is also updated.
	If the update fails on all the hosts, the Host Security Manager's master key is not updated.
Relevant tasks	"How to Update Host Security Settings Remotely" on page 474

User interface elements are described below:

UI Elements	Description
Update	Updates the security key on all of the hosts.
Stop	Stops updating the hosts.
Security Key/Confirm Security Key	Enter the new security key to be updated on all the hosts, and a second time for confirmation.
	Note: The key must be 6 - 16 characters long.
Update progress	Displays the hosts and their status during and after the update.

## **Update Security Mode Dialog Box**

This dialog box enables you to update the security mode simultaneously on selected hosts.



To access	In Host Security Manager, click <b>Update Security Mode</b> .
Relevant tasks	"How to Update Host Security Settings Remotely" on page 474

User interface elements are described below:

UI Elements	Description
Update	Updates the security mode on the selected hosts.
Stop	Stops updating the hosts.
Security	Select a security mode:
mode	Non-secure. Allows non-secure communication.
	Secure. Enforces secure communication.
Update progress	Displays the hosts, their previous status (if known), and their status during and after the update.

## **Troubleshooting and Limitations**

This section describes troubleshooting and limitations for secure host communication.

#### **Cannot Run Test Over Secure Channels**

**Problem description:** When you try to run a test over secure channels, the test cannot initialize because it cannot connect to a Controller or load generator.

#### **Troubleshooting:**

Verify that the reason the test cannot run is because of a security key mismatch: try to run the same test with the same hosts from a local Controller.

If a Security Key Mismatch error is displayed in the error log, the keys do not match. Align the security keys on all the host machines.

#### Test Run Fails. Load Generator Status is Changed to Resource Failure

**Problem description:** When trying to run a test over secure channels, the test fails to run and the load generator status changes to **Resource Failure**.

**Troubleshooting:** To re-enable the load generators, manually reset the status on each affected load generator to **Operational**.

## When Opening Host Security Manager Get Unhandled Exception

**Problem description:** When you open Host Security Manager for the first time, a message displays the following exception: **Unhandled exception has occurred....** 

**Troubleshooting:** Click **Continue** to close the message window.

# **Chapter 36: ALM Performance Center Permissions**

Performance Center Permissions Overview	.484
Performance Center Permission Levels	.484

## **Performance Center Permissions Overview**

You can control user access to projects and modules by defining user groups that can enter them, and by determining the types of tasks each user group performs according to permission levels.

The following section provides details about permission levels that are specific to HP ALM Performance Center. For information about how to view and define these user groups and permissions, see the *HP Application Lifecycle Management Administrator Guide*.

For details about the specific ALM Performance Center permissions, see "Performance Center Permission Levels" below.

## **Performance Center Permission Levels**

The following permission levels are specific to HP ALM Performance Center:

This section includes:

- "Performance Center Administration Permission Levels" below
- "Lab Settings Permission Levels" on next page
- "Performance Center Lab Permission Levels" on page 486
- "Performance Center Test Lab Permission Levels" on page 488
- "Performance Center Test Plan Permission Levels" on page 489
- "Lab Resources Permission Levels" on page 490
- "Timeslots Permission Levels" on page 492

## **Performance Center Administration Permission Levels**

The following administrative tasks are specific to ALM Performance Center. For details about additional administrative tasks, see *HP Application Lifecycle Management Administrator Guide*.

Entity > Permission Level	Description
Performance Center > Download Standalone Applications	User group can download the standalone applications needed for working with ALM Performance Center.
Performance Center > Update General Settings	User group can update the Performance Center General Settings.
	Note: Lab Management only.
Performance Center > login to My Performance Center	User group can access My Performance Center.
	Note: ALM project only.

## **Lab Settings Permission Levels**

The Lab Settings tab displays the Lab Settings entities available in Lab Management and their corresponding permission levels. The entities are listed below in alphabetical order.

Entity > Permission Level	Description
Diagnostics Mediator > Create	User group can add ERP/CRM Diagnostics Mediators.
Diagnostics Mediator > Update	User group can update ERP/CRM Diagnostics Mediator information. This permission level enables you to specify the fields that the selected user group can modify.
Diagnostics Mediator > Delete	User group can delete ERP/CRM Diagnostics Mediators.
Diagnostics Mediator > Test Mediator	User group can test ERP/CRM Diagnostics Mediators.
Diagnostics Server > Create	User group can add HP Diagnostics Servers.
Diagnostics Server > Update	User group can update HP Diagnostics Server information. This permission level enables you to specify the fields that the selected user group can modify.
Diagnostics Server > Delete	User group can delete HP Diagnostics Servers.
Diagnostics Server > Test Server	User group can test HP Diagnostics Servers.
License > Manage Licenses	User group can manage Performance Center and host licenses.
Patch > Create	User group can upload Performance Center patches to ALM.
Patch > Update	User group can update Performance Center patch information. This permission level enables you to specify the fields that the selected user group can modify.
Patch > Delete	User group can delete Performance Center patches.
PC Server > Create	User group can add Performance Center Servers to ALM.
PC Server > Update	User group can update Performance Center Server information. This permission level enables you to specify the fields that the selected user group can modify.
PC Server > Delete	User group can delete Performance Center Servers from ALM.

Entity > Permission Level	Description
PC Server > Check Server	User group can perform checks on Performance Center Servers.
PC Server > Install Patch	User group can install patches on Performance Center servers.
PC Server > Reboot	User group can reboot Performance Center Servers.
PC Server > Reconfigure Server	User group can reconfigure Performance Center Servers.
PC Server > Set ALM Connection	User group can define ALM Connection information in the Performance Center Servers module.
Project Settings > Update	User group can update Performance Center project settings information. This permission level enables you to specify the fields that the selected user group can modify.
Project Settings > Manage Autostart Retries	User group can manage autostart retries information.
Project Settings > Manage Timeslot Alerts	User group can manage timeslot alert settings.
Project Settings > Manage Controller	User group can define global Controller options.
Options	Note: ALM project only.
Target IP > Create	User group can add target IP addresses.
Target IP > Update	User group can update target IP information. This permission level enables you to specify the fields that the selected user group can modify.
Target IP > Delete	User group can delete target IP addresses.

## **Performance Center Lab Permission Levels**

The Performance Center Lab tab displays permissions related to Performance Center lab resources, Application Under Test (AUT) resources, MI Listener, and test runs.

Entity > Permission Level	Description
AUT Host > Create	User group can add AUT hosts to ALM.

Entity > Permission Level	Description
AUT Host > Update	User group can update AUT host information. This permission level enables you to specify the fields that the selected user group can modify.
AUT Host > Delete	User group can delete AUT hosts.
AUT Host Pool > Create	User can add AUT host pools.  Note: Lab Management only.
AUT Host Pool > Update	User group can update AUT host pool information. This permission level enables you to specify the fields that the selected user group can modify.  Note: Lab Management only.
AUT Host Pool > Delete	User group can delete AUT Host Pools.  Note: Lab Management only.
AUT Host Pool > Manage AUT host-to- pool association	User group can add and remove AUT hosts to and from an AUT host pool.  Note: Lab Management only.
MI Listener > Create	User group can add MI Listeners to ALM.
	Note: Lab Management only.
MI Listener > Update	User group can update MI Listener information. This permission level enables you to specify the fields that the selected user group can modify.  Note: Lab Management only.
MI Listopor > Doloto	Liser group can delete MLL isteners from ALM
MI Listener > Delete	User group can delete MI Listeners from ALM.  Note: Lab Management only.

Entity > Permission Level	Description
Test Run > Delete	User group can delete test runs from the Test Runs module.
	Note: Lab Management only.
Test Run > Stop Run	User group can stop a test run.
	Note: Lab Management only.
Topology > Create	User group can design new topologies.
	Note: Lab Management only.
Topology > Update	User group can update topology information. This permission level enables you to specify the fields that the selected user group can modify.
	Note: ALM project only.
Topology > Delete	User group can delete topologies.
	Note: ALM project only.
Topology Folder > Create	User group can add topology folders.
o route	Note: ALM project only.
Topology Folder > Update	User group can update topology folder information. This permission level enables you to specify the fields that the selected user group can modify.
	Note: ALM project only.
Topology Folder >	User group can delete topology folders.
	Note: ALM project only.

## **Performance Center Test Lab Permission Levels**

The following permissions are specific to ALM Performance Center. For details about additional Test Lab permissions, see *HP Application Lifecycle Management Administrator Guide*.

**Note:** Available in the ALM project only.

Entity > Permission Level	Description
Result > Analyze	User group can analyze performance test results.
Result > Collate	User group can collate performance test results.
Result > Delete Files	User group delete performance test result files.
Result > Upload Files	User group can upload performance test result files.
Run > Stop Run	User group can stop a performance test run.
Run > Operations During Performance Run	User group can perform operations during a performance test run.
Run > Recalculate Performance SLA	User group can recalculate Service Level Agreements (SLAs).
Run > Start PC Run	User group can start performance tests.
Performance Application Lifecycle > Create Report	User group can create PAL reports.
Performance Application Lifecycle > Delete Data Set	User group can delete PAL data sets.
Performance Application Lifecycle > Delete Report	User group can delete PAL reports.
Performance Application Lifecycle > Update Report	User group can update PAL reports.
Performance Application Lifecycle > Upload Data Set	User group can upload PAL data sets.
Performance Trend Report > Create	User group can create trend reports.
Performance Trend Report > Delete	User group can delete trend reports.
Performance Trend Report > Update	User group can update trend reports.

## **Performance Center Test Plan Permission Levels**

The following permission is specific to ALM Performance Center. For details about more Test Plan permissions, see *HP Application Lifecycle Management Administrator Guide* 

**Note:** Available in the ALM project only.

Entity > Permission Level	Description
Test > Download VuGen Script	User group can download VuGen scripts.

## **Lab Resources Permission Levels**

The following permissions are specific to ALM Performance Center. For details about more Lab Resources permissions, see *HP Application Lifecycle Management Administrator Guide*.

**Note:** Available in the ALM project only.

Entity > Permission Level	Description
Host Location >	User group can add host locations.
Create	Note: Lab Management only.
Host Location > Update	User group can update host location information. This permission level enables you to specify the fields that the selected user group can modify.
	Note: Lab Management only.
Host Location >	User group can delete host locations.
Delete	Note: Lab Management only.
Host Pool > Create	User group can add Performance Center host pools to ALM.
	Note: Lab Management only.
Host Pool > Update	User group can update Performance Center host pool information. This permission level enables you to specify the fields that the selected user group can modify.
	Note: Lab Management only.
Host Pool > Delete	User group can delete Performance Center host pools from ALM.
	Note: Lab Management only.

Entity > Permission Level	Description
Host Pool > Manage host-to- pool association	User group can add and remove Performance Center hosts to and from a host pool.
poor association	Note: Lab Management only.
Testing Host > Create	User group can add Performance Center hosts.
	Note: Lab Management only.
Testing Host > Update	User group can update Performance Center host information. This permission level enables you to specify the fields that the selected user group can modify.
	Note: Lab Management only.
Testing Host > Delete	User group can delete Performance Center hosts.
	Note: Lab Management only.
Testing Host > Change Status	User group can change a Performance Center host's status.
Testing Host > Check Host	User group can perform checks on a Performance Center host.
Testing Host > Install Patch	User group can install patches on Performance Center hosts.
Testing Host > Kill Process	User group can kill processes on Performance Center hosts.
Testing Host > Manage DP Queue	User group can view pending data processing requests.
Testing Host > Reboot	User group can reboot Performance Center hosts.
Testing Host > Reconfigure Host	User group can reconfigure Performance Center hosts.

## **Timeslots Permission Levels**

This tab displays permissions related to timeslots.

Entity > Permission Level	Description
Timeslot > Create and Update	ALM project: User group can reserve and update performance testing timeslots.
	Lab Management: User group can reserve and update maintenance timeslots.
Timeslot > Delete	ALM project: User group can delete performance testing timeslots.
	Lab Management: User group can delete maintenance timeslots.
Timeslot > Abort and Free	ALM project: User group can abort active performance testing and data processing timeslots in his project, and free resources.
	Lab Management: User group can abort active maintenance timeslots, and free resources.
Timeslot > Manage Consume VUDs	User group can select to use VUDs Vusers for the timeslot.
	Note: ALM project only.
Timeslot (Project) > Abort and Free	User group can abort active performance testing and data processing timeslots, and free resources in any project from Lab Management.
	Note: Lab Management only.
Timeslot (Project) > Delete	User group can delete performance testing timeslots in any project from Lab Management.
	Note: Lab Management only.
Timeslot (Project) > Update	User group can update performance testing timeslots in any project from Lab Management.
	Note: Lab Management only.



