

HP Business Process Testing

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Table of Contents

Welcome to This Guide	9
How This Guide is Organized.....	9
Documentation Library	11
Additional Online Resources.....	13
Typographical Conventions.....	15
Chapter 1: Introducing Business Process Testing.....	17
About Business Process Testing	18
Understanding the Business Process Testing Model.....	19
Understanding Business Process Testing Integration with QuickTest Professional	28
Understanding Business Process Testing Integration with WinRunner	34
Working with Scripted Components	36
Chapter 2: Setting Up Business Process Testing	37
Licensing Business Process Testing	38
Requirements for Business Process Testing.....	38
Upgrading from Previous Versions	39
Connecting to Business Process Testing	40
Installing the QuickTest Professional Add-in for Business Process Testing	40
Chapter 3: Getting Started with the Business Components Module	43
About Getting Started with the Business Components Module.....	44
Introducing the Business Components Module Window	46
Working with Component Tabs	55
Understanding the Design Steps Tab	61
Understanding the Automation Tab.....	68
Introducing the Component Grid	75

Chapter 4: Working with Business Components	83
About Working with Business Components.....	84
Creating a Component Tree.....	85
Defining Business Components.....	87
Viewing and Modifying Business Components.....	95
Handling Component Requests.....	109
Setting Permissions for Business Process Testing.....	112
Generating Project Documents.....	115
Chapter 5: Designing Manual Component Steps	119
About Designing Manual Component Steps.....	119
Designing Manual Steps.....	120
Working with Parameters in Manual Steps.....	127
Chapter 6: Working with Automated Component Steps	133
About Working with Automated Component Steps.....	134
Automating Components.....	135
Working with Keyword-Driven Automated Steps.....	137
Understanding Application Areas.....	142
Creating Steps in the Keyword View.....	146
Working with Parameters in the Keyword View.....	158
Entering Comments in the Keyword View.....	165
Modifying Component Steps in the Keyword View.....	167
Using Keyboard Commands in the Keyword View.....	169
Viewing Scripted Components.....	170
Chapter 7: Getting Started with Business Process Testing in the Test Plan Module	171
About Getting Started with Business Process Testing in the Test Plan Module.....	172
Introducing the Test Plan Module Window.....	174
Test Plan Module Tabs.....	178
Chapter 8: Managing Business Process Tests	189
About Managing Business Process Tests.....	190
Creating Business Process Tests.....	191
Building Business Process Tests.....	193
Working with Component Groups.....	201
Requesting New Components for Business Process Tests.....	211
Working with Business Process Tests.....	219
Generating Documents for Business Process Tests.....	226

Chapter 9: Working with Parameters	227
About Working with Parameters.....	228
Understanding Component Input Parameters and Run-Time Parameters.....	235
Defining Component Parameters	236
Configuring Component Input Parameter Values and Iterations.....	241
Importing and Saving Component Parameter Values	254
Working with Run-Time Parameters.....	260
Chapter 10: Running Business Process Tests	271
About Running Business Process Tests.....	271
Running a Business Process Test Manually	273
Understanding the Manual Runner Window	281
Understanding the Manual Runner Dialog Box	285
Debugging Tests in the Test Plan Module.....	293
Running Automated Business Process Tests.....	299
Viewing Run Results of Business Process Tests	302
Index.....	309

Table of Contents

Welcome to This Guide

Welcome to HP Business Process Testing. Business Process Testing with HP Quality Center enables non-technical Subject Matter Experts to build and work with business components in a script-free environment and to create application-quality business process tests.

How This Guide is Organized

The HP Business Process Testing User's Guide describes how to use Business Process Testing to create business process tests. It provides step-by-step instructions to help you create and debug business components, build and run business process tests, and report defects detected during the testing process.

It contains the following chapters:

Chapter 1 **Introducing Business Process Testing**

Provides an introduction to the Business Process Testing model and its integration with HP QuickTest Professional and HP WinRunner Testing.

Chapter 2 **Setting Up Business Process Testing**

Describes the licensing, system requirements, and compatibility requirements of Business Process Testing, and describes the installation procedure for the QuickTest Professional Add-in for Business Process Testing.

Chapter 3 Getting Started with the Business Components Module

Provides an overview of the Business Components module in Quality Center, and describes the component tree and component grid views. The chapter also describes the key elements in the module interface, including the various formats of the tabs when working with manual components, keyword view components, and scripted components.

Chapter 4 Working with Business Components

Describes how to create, define, and modify the business components that are incorporated into business process tests. The chapter also describes how to request new components, enter manual steps in a requested component, and generate project documents that include component information.

Chapter 5 Designing Manual Component Steps

Describes how to create business component content in the form of manual steps and expected results, and how to create and insert parameters into the steps directly from the Design Steps tab.

Chapter 6 Working with Automated Component Steps

Describes how to work with automated component steps, how to convert manual components to keyword-driven components or WinRunner components, and how to add or modify component content in the form of keyword-driven steps, operations, parameters, and comments. The chapter also describes viewing scripted components that are created in QuickTest Professional or WinRunner.

Chapter 7 Getting Started with Business Process Testing in the Test Plan Module

Provides an overview of the Test Plan module in Quality Center and describes the unique elements in the module interface when a business process test is selected.

Chapter 8 Managing Business Process Tests

Describes how to create and manage business process tests in the Test Plan module of Quality Center.

Chapter 9 Working with Parameters

Describes how to expand the scope of business components or business process tests by replacing fixed values with parameters.

Chapter 10 Running Business Process Tests

Describes how to run and debug components in manual and automated business process tests, and to view the results.

Documentation Library

The Documentation Library is an online help system that describes how to use Quality Center. You can access the Documentation Library in the following ways:

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

Documentation Library Guides

The Documentation Library 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>).

Getting Started explains how to use the Documentation Library and how it is organized. (Available online.)

What's New? describes the newest features in the latest versions of Quality Center. (Available online and in PDF format.)

You can also access **What's New?** from the Quality Center **Help** menu. In addition, you can choose **Help > Product Feature Movies** to view short movies that demonstrate the main product features.

Readme provides last-minute news and information about Quality Center.

Quality Center Guides:

HP Quality Center User's Guide explains how to use Quality Center to organize and execute all phases of the testing process. It describes how to define requirements, plan tests, run tests, and track defects. (Available online and in PDF format.)

HP Quality Center Administrator's Guide explains how to create and maintain projects using Site Administration, and how to customize projects using Project Customization. (Available online and in PDF format.)

HP Quality Center Tutorial is a self-paced guide teaching you how to use Quality Center to manage the software testing process. (Available in PDF format.)

HP Quality Center Installation Guide explains how to install Quality Center on a server machine in a cluster environment or as a stand-alone application. (Available in PDF format.)

Business Process Testing Guides:

HP Business Process Testing User's Guide explains how to use Business Process Testing to create business process tests. (Available online and in PDF format.)

HP Business Process Testing Tutorial provides a self-paced guide that teaches you the basics of Business Process Testing in the Quality Center application. (Available in PDF format.)

API References:

HP Quality Center Database Reference provides a complete online reference for the project database tables and fields. (Available online.)

HP Quality Center Open Test Architecture API Reference provides a complete online reference for the Quality Center COM-based API. You can use the Quality Center open test architecture to integrate your own configuration management, defect tracking, and home-grown testing tools with a Quality Center project. (Available online.)

HP Quality Center 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 Quality Center users, projects, domains, connections, and site configuration parameters. (Available online.)

HP Quality Center Custom Test Type Guide provides a complete online guide for creating your own testing tool and integrating it into the Quality Center environment. (Available online.)

Additional Online Resources

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

Knowledge Base uses your default Web browser to open the Mercury Customer Support Web Site directly to the Knowledge Base landing page.

Customer Support Web Site uses your default Web browser to open the Mercury Customer Support Web site. This site enables you to browse the Mercury Support Knowledge Base and add your own articles. You can also post to and search user discussion forums, submit support requests, download patches and updated documentation, and more. The URL for this Web site is <http://support.mercury.com>.

HP Software Web site uses your default Web browser to access 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. The URL for this Web site is <http://www.hp.com/managementsoftware>.

Add-ins Page opens the HP Quality Center Add-ins Page, which offers integrations with HP testing tools, as well as third-party, synchronization, and version control tools. For more information, refer to the *HP Quality Center Installation Guide*.

Typographical Conventions

This guide uses the following typographical conventions:

UI Elements and Function Names	This style indicates the names of interface elements on which you perform actions, file names or paths, and other items that require emphasis. For example, “Click the Save button.” It also indicates method or function names. For example, “The wait_window statement has the following parameters:”
<i>Arguments</i>	This style indicates method, property, or function arguments and book titles. For example, “Refer to the <i>HP User’s Guide</i> .”
<Replace Value>	Angle brackets enclose a part of a file path or URL address that should be replaced with an actual value. For example, <MyProduct installation folder>\bin.
Example	This style is used for examples and text that is to be typed literally. For example, “Type Hello in the edit box.”
CTRL+C	This style indicates keyboard keys. For example, “Press ENTER.”
[]	Square brackets enclose optional arguments.
{ }	Curly brackets indicate that one of the enclosed values must be assigned to the current argument.
...	In a line of syntax, an ellipsis indicates that more items of the same format may be included. In a programming example, an ellipsis is used to indicate lines of a program that were intentionally omitted.
	A vertical bar indicates that one of the options separated by the bar should be selected.

Welcome to Business Process Testing

1

Introducing Business Process Testing

Business Process Testing enables Subject Matter Experts to create business process tests using reusable business components.

This chapter introduces Business Process Testing in the Quality Center application.

This chapter describes:	On page:
About Business Process Testing	18
Understanding the Business Process Testing Model	19
Understanding Business Process Testing Integration with QuickTest Professional	28
Understanding Business Process Testing Integration with WinRunner	34
Working with Scripted Components	36

About Business Process Testing

Many applications are mission critical for modern corporations. Effective functional testing is essential to assess the quality of your applications and ensure that they are stable and free from damaging and costly defects.

Business Process Testing enables Subject Matter Experts to design quality assurance tests for an application early in the development cycle and in a script-free environment.

Business Process Testing uses a new methodology for testing, and in conjunction with testing tools such as QuickTest Professional and WinRunner, provides numerous benefits in an improved automated testing environment.

Benefits Of Business Process Testing

Business Process Testing and its integration with various testing tools provides numerous benefits in efficiency and cost reduction, including the following:

- ▶ Business process tests can be created in a script-free environment by Subject Matter Experts who best understand the business processes that need to be tested, without the need for a programming background.
- ▶ Business Process Testing enables structured testing of an application by combining test automation and automatically generated, easy-to-understand, plain-language test documentation.
- ▶ Business Process Testing is not dependent on the completion of detailed testing scripts. Applications can be tested manually before automated tests are ready. Business process tests can therefore be created and implemented more quickly than other automated tests, enabling potential performance issues to be detected earlier in the development process, and before downtime can occur.

- ▶ Business process test creation is further accelerated by the ability to use modular, reusable business component units in multiple business process tests.
- ▶ Ongoing test maintenance time and costs are reduced, while increasing staff efficiency.
- ▶ Quality assurance experts can take advantage of the sophisticated automated testing capabilities in QuickTest and WinRunner to prepare object hierarchies and application-specific functions that can be packaged as building blocks for use in business process tests by Subject Matter Experts. Subject Matter Experts can work efficiently with quality assurance experts to test the functionality of applications.
- ▶ Documents containing information about the tests and components in a project can be easily generated.

Understanding the Business Process Testing Model

Business Process Testing is based on the creation and implementation of business components in business process tests using Quality Center's Business Components module and Test Plan module.

Note: The Business Components module is available only if your Quality Center license includes Business Process Testing. For more information, see "Connecting to Business Process Testing" on page 40.

Getting Started

The Business Components and Test Plan modules provide an intuitive interface that enables Subject Matter Experts to create and implement business components and business process tests without using complex scripting or programming procedures.

The Business Components module enables Subject Matter Experts to create and manage reusable business components that perform specific tasks in a business process, and which are then combined into business process tests.

The Test Plan module enables Subject Matter Experts to build and configure business process tests by combining business components into an effective testing structure.

Note: After a business process test is complete, you can work with the test in the Requirements, Test Lab, and Defects modules, just like any other test type.

Designing Business Components and Business Process Tests

Business components are reusable units that perform a specific task, and are the building blocks from which an effective Business Process Testing structure can be produced.

Business components are themselves comprised of several application steps. In a Web application for example, a login component's first step could be to open the application. Its second step could be to enter a user name. Its third step could be to enter a password, and its last step could be to click the **Submit** button on the Web page. The business component could also be enhanced with other logic to test important details of the login task.

You create business components in the Business Components module by defining the shell of the components, for example, their name, description, status, and implementation requirements. You can use these components to build business process tests even before the application is ready for testing.

You incorporate the components into business process tests in the Test Plan module by dragging and dropping them into a serial flow representing the main tasks performed within a particular business process.

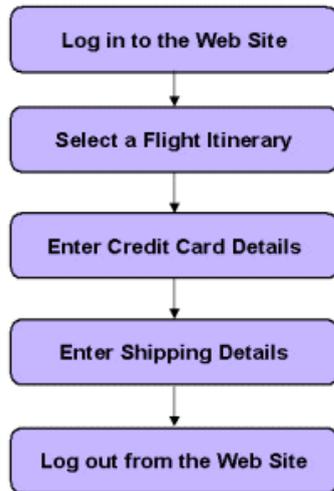
Before automated testing resources are available, you can add manual steps in the Design Steps tab of each component and you can run these steps using the Manual Runner.

After automated testing resources are ready, you can convert your manual components to automated components and begin implementing the automated steps for each component.

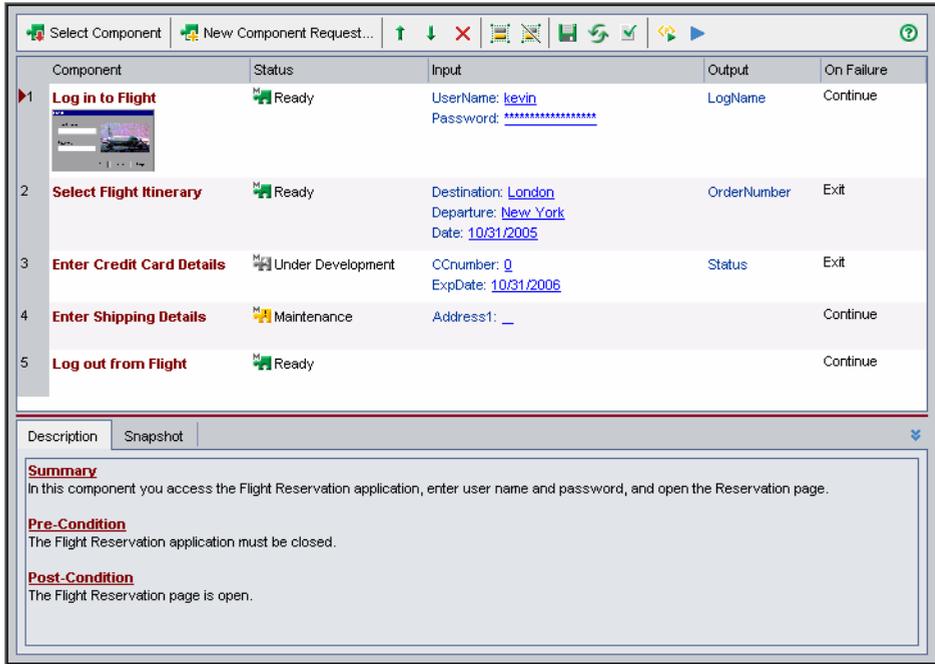
Quality Center enables you to expand the scope of business components (both manual and automated) and business process tests by replacing fixed values with component and run-time parameters. This process, called **parameterization**, greatly increases the power and flexibility of your component or test.

For example, if you wanted to create a business process test that tests the business process of booking a flight from an online reservation application, you might structure it from business components that: Log in, select an itinerary, enter credit card details, enter shipping details, and log out.

If you were planning such a test without Business Process Testing, you might use the following diagram as part of your master test plan document:



Using Business Process Testing, you could directly create a business process test containing business components, as shown below:



The steps in each of these business components can be set up to receive specific elements of data from the test that runs them (for example, the login name and password, the number of passengers, and credit card details).

This means that the same business process test can be used to answer many testing needs, for example:

- ▶ testing the flight booking process for users with different login permissions, such as new users, VIP customers, and so on.
- ▶ testing the flight booking process for one itinerary, or for several itineraries.
- ▶ testing the flight booking process for one passenger, or for several passengers.

Additionally, due to the modular structure of these business components and the ability to control components with external data, you can use the same components in other business process tests.

For example, the login and logout components could be used in most other tests on the same application. You might also be able to use the component for entering shipping details in other business process tests that check, for example, the business process of ordering online merchandise from the application, or in a test for subscribing to a frequent flyer program.

Running Business Process Tests and Viewing Results

Before automated parts of the test are ready, you can perform a manual run of the business process test.

After you automate the components, you can check for problems arising from the combination and order of business components in a business process test by running the test in debug mode from the Test Plan module. Both QuickTest and WinRunner automated components can be used in the same business process test. The appropriate application will be launched to run the components.

You can also check for syntax or logic errors in specific business components by running them individually in QuickTest or WinRunner.

Then, when you are ready to run a complete business process test, or to run it as part of a larger test set, you run it from the Test Lab module.

From the Test Lab module, you can view the results of the business process test run. These results include the steps in each business component, the actual value of each component parameter, and the results of individual steps.

Identifying Roles

The Business Process Testing model is role-based, allowing non-technical Subject Matter Experts to work on tests with Automation Engineers, both together and in parallel. Two basic user roles are identified in the Business Process Testing model and referred to in this guide:

- ▶ Subject Matter Expert
- ▶ Automation Engineer

However, these roles are flexible and depend on the abilities and time resources of the personnel using Business Process Testing. There are no product-specific rules or limitations controlling which roles must be defined in a particular organization, or which types of users can do which Business Process Testing tasks (provided that the users have the correct permissions). For example, in some organizations, the tasks of the Subject Matter Expert may be performed by multiple personnel.

Note: To control access to various modules and tasks, Quality Center enables you to configure access permissions for users. For more information, see “Setting Permissions for Business Process Testing” on page 112, or refer to the *HP Quality Center Administrator’s Guide*.

Subject Matter Expert

The Subject Matter Expert has specific knowledge of the application logic, a high-level understanding of the entire system, and a detailed understanding of the individual elements and tasks that are fundamental to the application being tested. This enables the Subject Matter Expert to determine the operating scenarios or business processes that must be tested and identify the key business activities that are common to multiple business processes.

Using the Business Components module, the Subject Matter Expert creates business components that describe the specific tasks that can be performed in the application, and the condition or state of the application before and after those tasks. The Subject Matter Expert then defines the individual steps for each business component comprising the business process in the form of manual, or non-automated steps.

These manual steps can later be automated by defining them as keyword-driven or WinRunner components and implementing the automated steps.

Using the Test Plan module, the Subject Matter Expert combines the business components into business process tests, composed of a serial flow of the components.

For example, most applications require users to log in before they can access any of the application functionality. The Subject Matter Expert could create one business component that represents this login procedure. This component procedure can be used in many business process tests, resulting in easier and more cost-efficient maintenance, updating, and test management.

The Subject Matter Expert configures the values used for business process tests, runs them in test sets, and reviews the results. The Subject Matter Expert is also responsible for maintaining the testing steps for each of the individual business components.

Automation Engineer

The Automation Engineer is an expert in QuickTest Professional or WinRunner automated testing.

The Automation Engineer prepares the resources and automated functions required for testing the features associated with each specific component.

For example, the Automation Engineer populates the shared object repository with objects that represent the different objects in the application being tested. The Subject Matter Expert then uses these objects to create steps in keyword-driven business components.

Automation Engineers can also create, debug, and modify business components in QuickTest or WinRunner if required. For more information, refer to the *QuickTest Professional for Business Process Testing User's Guide* or the *WinRunner User's Guide*.

Introducing Business Process Testing Terminology

The following terminology, specific to Business Process Testing, is used in this guide:

Application Area. Application areas contain all of the settings and resources required to create the content of keyword-driven business components for a particular application or part of an application. These include representations of the objects from your application contained in the shared object repository, and user-defined operations, contained in function libraries.

Automation Engineer. An expert in an automated testing product, such as QuickTest Professional or WinRunner.

Business Component (or Component). An easily-maintained, reusable unit comprising one or more steps that perform a specific task. A business component can be defined as a manual or automated component. Business components may require input values from an external source or from other components, and they can return output values to other components.

Business Process Test. A scenario comprising a serial flow of business components, designed to test a specific business process of an application.

Business Process Test Run-Time Parameters. Variable values that a business process test can receive and then pass to business components for use as input component values.

Business Process Test Status. A status value that is automatically generated based on the status values of all the business components in a business process test.

Component Input Parameters. Variable values that a business component can receive and use as the values for specific, parameterized steps in the component.

Component Output Parameters. Values that a business component can return. These values can be viewed in the business process test results and can also be used as input for a component that is used later in the test.

Component Request. A request for the creation of a new business component, when no existing component answers the needs of a business process test.

Component Status. A status value that indicates whether a business component is fully implemented, debugged, and ready to be run in a business process test. The component with the most severe status in a test determines the status of the entire test. The status can be modified by the Subject Matter Expert in Quality Center and the Automation Engineer in QuickTest or WinRunner.

Implementation requirements. Details and information, written by the Subject Matter Expert that creates a business component, describing a general overview of the business component's purpose or goals, and the condition of the application before and after a component is run (the pre-conditions and post-conditions).

Iterations. The number of times that an individual business component, or group of components, runs within a single test run, or the number of times that an entire business process test runs within a test set.

Pre-Condition and Post-Condition. The state of the application before the first step in a business component, and the state of the application after the last step in a business component. For example, the pre-condition for a component may state that all applications should be closed, or a specific application should be open to a specific screen or with a specific dialog box displayed. A post-condition may state that an application should be open to a particular screen, or be closed.

If you want the business component to allow iterations, the post-conditions should specify that the application's end state must match its state at the beginning of the component. The pre-conditions and post-conditions provide a guide when implementing the steps for the business component.

Roles. The various types of users who are involved in Business Process Testing.

Steps. Individual operations in a component. These can be manual steps or detailed automated testing steps and are designed and implemented in a business component to test the workings of a specific task in an application.

Subject Matter Expert. The subject matter expert who uses Quality Center to create business components and business process tests.

Understanding Business Process Testing Integration with QuickTest Professional

As already described, business process tests are composed of business components. The information in the component's outer layer or shell, for example, the component's description, status, and implementation requirements, together with the steps that make up the component, are defined by the Subject Matter Expert in Quality Center.

When QuickTest is connected to a Quality Center project with Business Process Testing, the Automation Engineer can define objects in the object repository and save them in Quality Center. The objects are then available for insertion into component steps by the Subject Matter Expert in Quality Center. In addition, all business component information is visible in QuickTest.

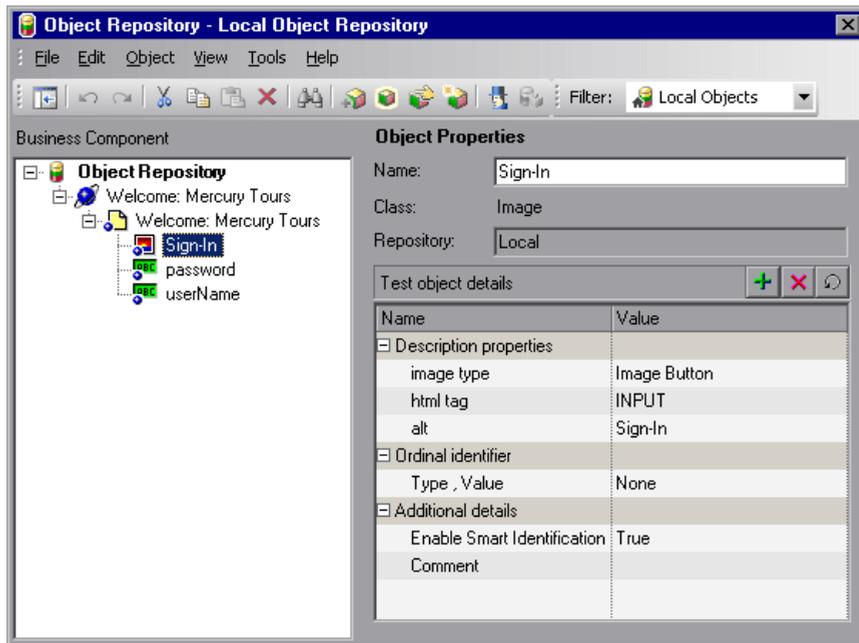
Integration between the two applications enables the Subject Matter Expert to implement the testing steps for the business components in a keyword view, and also enables the Automation Engineer to effectively maintain the set of objects in the object repository and the operations in the function libraries.

QuickTest offers two types of automated components; keyword-driven components and scripted components. The automated steps of keyword-driven components can be created and edited by the Subject Matter Expert in Quality Center. Scripted component steps can be created and maintained only in QuickTest.

Each testing step is made up of an item (an object in the application or an operation), and an operation. The available items and operations are defined by the Automation Engineer.

The Automation Engineer compiles an object repository containing objects that represent all the objects in the application or application segment that you need to test.

For example, the objects in a login window may be captured in the object repository in QuickTest as follows:



The Automation Engineer encapsulates all the activities and steps that require programming into a set of function libraries. These function libraries define the operations (or keywords) that your test needs to perform. With keyword-driven components, the Subject Matter Expert can use these operations to create the component steps in the Business Components module in Quality Center.

The object repository location and associated function libraries for each part of the application being tested are specified by the Automation Engineer in an **application area**. The application area contains all of the settings, configurations, and resources required to create the content of its associated keyword-driven business components. These include representations of the objects from your application, contained in the shared object repository, and user-defined operations, contained in function libraries.

All application area settings are automatically inherited by the business components that are based on that application area. Each application area is intended for use with a different part of the application being tested. Each business component is based on a specific application area. Application areas include the resources and settings described in Business Component Resources and Settings, below.

Business Component Resources and Settings

Using QuickTest Professional, the Automation Engineer defines an important set of resources and settings that comprise the application area or otherwise affect the business component. These include:

- Object Repositories (see page 31)
- Function Libraries (see page 31)
- Associated Add-ins (see page 31)
- Applications List (see page 32)
- Recovery Scenarios (see page 32)

The resources and settings in the application area apply to all components that are associated with it. The Automation Engineer can create multiple application areas for different purposes. Each QuickTest business component must be associated with an application area. You cannot delete an application area that is associated with a business component.

This section contains only a brief description of these resources and settings. For more information on QuickTest resources and settings and the application area, refer to the *QuickTest Professional for Business Process Testing User's Guide*.

Object Repositories

The object repository stores all the information about the test objects that are used in each business component. After you associate a shared object repository with an application area, it can be accessed by any component that is associated with that application area.

By using the same shared object repository file for multiple components, the same objects can be used in multiple components and business process tests in Quality Center, and object changes in the application can be updated in one central location.

Function Libraries

Function libraries contain VBScript functions, subroutines, and so on, that can be used as operations in a business component.

Associated Add-ins

The specified set of QuickTest Professional Add-ins that is associated with the business component determines the types of objects that QuickTest recognizes and that can be tested using that business component. Each add-in is associated with a development environment. For example, QuickTest includes built-in add-ins for testing in Web, ActiveX, and Visual Basic environments. Additional QuickTest Professional Add-ins are available for testing environments such as Java, Oracle, Siebel, SAP Solutions, terminal emulators, and more.

When you convert manual components to automated components, the add-ins associated with the first keyword-driven or scripted component in a business process test (inherited from the application area used by the component) are automatically loaded in QuickTest Professional when Quality Center runs the test. Add-ins associated with other components in the business process test are not loaded.

Note: Quality Center assumes that the add-ins associated with the first component in a business process test are required for all the components in the same test. Therefore, it is important to ensure that all required QuickTest Add-ins are associated with the first business component in the test. If they are not, you should ask the Automation Engineer to add them to the application area used by the first component in the test. Then update your copy of the application area. For more information on updating the application area, see “Understanding Application Areas” on page 142.

Applications List

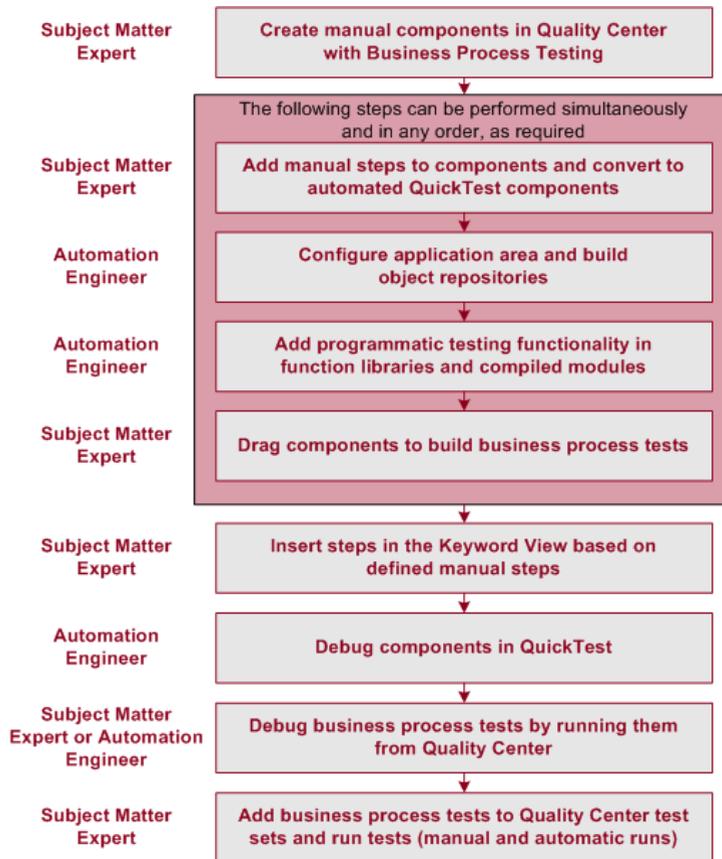
QuickTest runs components only on the set of Windows-based applications that are specified for the component. It can also run on applications in any other environment for which the appropriate QuickTest Add-in is loaded.

Recovery Scenarios

Recovery scenarios are activated during the running of a business component if an unexpected event occurs, such as an application crash, and the run is suspended. Recovery scenarios define the operations necessary to recover from the event and continue the run.

Business Process Testing Workflow Using QuickTest Professional

The following is an example of a common Business Process Testing workflow using QuickTest. The actual workflow in an organization may differ for different projects, or at different stages of the product development life cycle.



Understanding Business Process Testing Integration with WinRunner

When WinRunner is connected to a Quality Center project with Business Process Testing, you can create scripted components in WinRunner and save them in the component tree in the Business Components module. You can also save existing WinRunner tests as scripted components.

Integration between the two applications enables the Subject Matter Expert to convert manual components to WinRunner automated components and to include scripted components in business process tests. However, scripted components cannot be edited in Quality Center. You can open WinRunner directly from the Business Components module to view or edit the scripted component.

Associated Add-ins

The specified set of WinRunner Add-ins that is associated with the business component determines the types of objects that WinRunner recognizes and that can be tested using that business component. Each add-in is associated with a development environment. For example, WinRunner includes built-in add-ins for testing in Web, ActiveX, PowerBuilder, and Visual Basic environments.

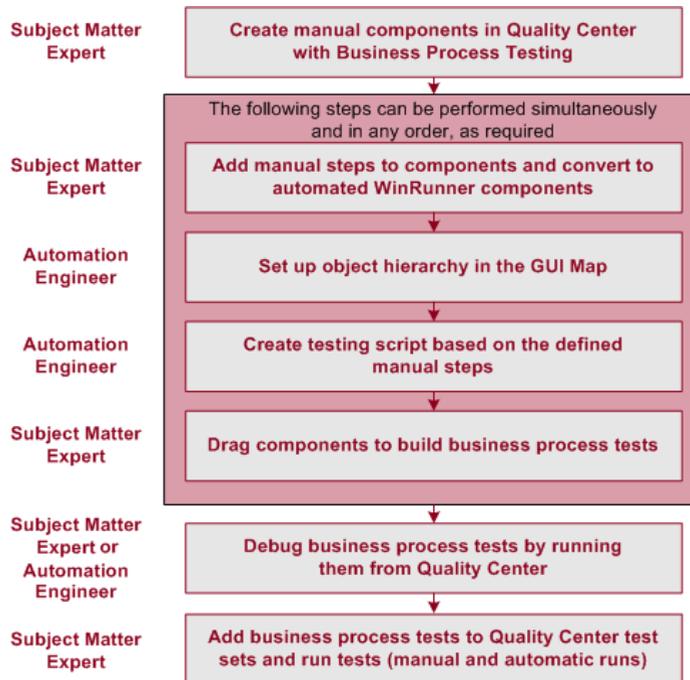
Note: Add-ins are not automatically associated with manual components in WinRunner. To associate one or more add-ins to a component, open the Add-ins tab from **File > Scripted Component Properties**, select the required add-in check box(es), and then save the component.

When you convert manual components to automated components, the add-ins associated with the first WinRunner component in a business process test are automatically loaded in WinRunner when Quality Center runs the test. Add-ins associated with other WinRunner components in the business process test are not loaded.

Note: Quality Center assumes that the add-ins associated with the first WinRunner component in a business process test are required for all the WinRunner components in the same test. Therefore, it is important to ensure that all required add-ins are associated with the first business component in the test.

Business Process Testing Workflow Using WinRunner

The following is an example of a common Business Process Testing workflow using WinRunner. The actual workflow in an organization may differ for different projects, or at different stages of the product development life cycle.



Working with Scripted Components

Keyword-driven business components and scripted components are both part of Business Process Testing. Both types of components are maintainable, reusable modules that perform a specific task when testing your application.

Scripted component steps can contain programming logic and can be edited only in the applications in which they were created, such as QuickTest and WinRunner. They cannot be modified by the Subject Matter Expert in Quality Center, but you can include these scripted components in any business process tests.

In the Automation tab, you can launch the component in the testing tool in which it was automated.

You create scripted components in QuickTest by converting existing QuickTest actions to components or by selecting to create scripted components from the QuickTest menu.

For more information on creating and editing scripted components in QuickTest, refer to the *QuickTest Professional for Business Process Testing User's Guide*.

For information on creating and editing scripted components in WinRunner, refer to the *WinRunner User's Guide* for version 8.2 or later.

Note: Most of the information, examples, and images in this guide focus specifically on working with keyword-driven business components. However, much of the information also applies to scripted components.

2

Setting Up Business Process Testing

This chapter describes the licensing, installation requirements, and setup procedures for Business Process Testing in the Quality Center application.

This chapter describes:	On page:
Licensing Business Process Testing	38
Requirements for Business Process Testing	38
Upgrading from Previous Versions	39
Connecting to Business Process Testing	40
Installing the QuickTest Professional Add-in for Business Process Testing	40

Licensing Business Process Testing

Business Process Testing is fully integrated with Quality Center. It is enabled only if your Quality Center server is licensed for Business Process Testing.

Licensing Business Process Testing for the Quality Center server enables you to access the Business Components module and provides the ability to edit business process tests in the Test Plan module.

Each user with the proper permissions who logs into a Quality Center server with Business Process Testing licenses uses up both a Business Process Testing license and a Quality Center license.

Note: You can run test sets containing business process tests in the Test Lab module and you can also edit automated components in QuickTest Professional and WinRunner, even if no Business Process Testing license is available in Quality Center.

For more information on licensing, refer to the *HP Quality Center Administrator's Guide*.

Requirements for Business Process Testing

The Business Process Testing solution requires the following:

To...	Requirements
Access the Business Components module	Customized Module Access to Business Process Testing must be provided by your Quality Center Project Administrator using Project Customization. For more information, contact your Quality Center Project Administrator or refer to the <i>HP Quality Center Administrator's Guide</i> .
Work with manual components	Quality Center version 9.0 or later.

To...	Requirements
Create and/or modify keyword-driven components and their steps	The QuickTest Professional Add-in for Business Process Testing Add-in, installed on the client computer.
Debug or run automated keyword-driven business components, or view test results	Quality Center version 9.0 or later. QuickTest Professional version 9.0 or later.
Debug or run WinRunner automated components	WinRunner version 8.2 or later. WinRunner 8.2 Patch for BPT with QC 9.0.

The minimum system requirements to run Business Process Testing are the same as for Quality Center, as described in the *HP Quality Center Installation Guide*.

Upgrading from Previous Versions

If you are upgrading to Quality Center 9.0 or later from a previous version, consider the following:

- Business components and application areas created in a previous version are not automatically updated. Business process tests can still be run, but the components and application areas are read-only.

To update and edit components and application areas to the version 9.0 or later format, you must open and save them in QuickTest Professional 9.0 or later. This operation cannot be reversed.

- Associated application areas are not copied when you copy a component created in an older version of Quality Center to a version 9.0 or later project. In these cases, you must copy the application area and all of its associated resources manually. Otherwise you will be unable to open the component for editing in QuickTest, and business process tests containing these components will fail.

Connecting to Business Process Testing



You work with Business Process Testing by clicking the **Business Components** module button in the sidebar of Quality Center. If the **Business Components** module button is not displayed in the sidebar, one of the following may be the cause:

- ▶ You are connected to a Quality Center server without Business Process Testing. Disconnect from your current Quality Center server and reconnect to a server with Business Process Testing.
- ▶ No Business Process Testing licenses are currently available on the Quality Center server. Contact your Quality Center Site Administrator or refer to the *HP Quality Center Administrator's Guide*.
- ▶ You belong to a Quality Center user group that does not have access to the Business Components module. Contact your Quality Center Project Administrator or refer to the *HP Quality Center Administrator's Guide*.

Installing the QuickTest Professional Add-in for Business Process Testing

The QuickTest Professional Add-in for Business Process Testing enables you to work with keyword-driven automated components in the Business Components module of Quality Center and provides the interface between Quality Center and QuickTest.

The QuickTest Professional Add-in for Business Process Testing is installed from the Quality Center Add-ins page.

Note: The QuickTest Professional Add-in for Business Process Testing can also be installed from the QuickTest Professional CD-ROM. However, to ensure that you are installing the latest version of the add-in, it is recommended to install it from the Quality Center Add-ins page.

To install the QuickTest Professional Add-in for Business Process Testing:

- 1** Open the Quality Center Login window, as described in the *HP Quality Center User's Guide*.
- 2** Click the **Add-ins Page** link. The **Add-ins** page opens.
- 3** Click the **More HP Quality Center Add-ins** link. The **More HP Quality Center Add-ins** page opens.
- 4** Click the **QuickTest Professional for Business Process Testing Add-in** link. The **QuickTest Professional for Business Process Testing Add-in** page opens.
- 5** Click the **Download Add-in** link to download the add-in.
- 6** Follow the instructions on your screen to install the add-in.

3

Getting Started with the Business Components Module

The Business Components module enables Subject Matter Experts with a high-level knowledge of their application to create and manage business components in Quality Center. These components provide the basis for Business Process Testing.

This chapter introduces the Business Components module. Chapter 4, “Working with Business Components” describes how to work with the features and other options available in the Business Components module.

This chapter describes:	On page:
About Getting Started with the Business Components Module	44
Introducing the Business Components Module Window	46
Working with Component Tabs	55
Understanding the Design Steps Tab	61
Understanding the Automation Tab	68
Introducing the Component Grid	75

About Getting Started with the Business Components Module

You create and manage business components in Quality Center's Business Components module. Components perform specific tasks in a business process, and are used as the building blocks of business process tests.

The Business Components module enables you to define the business component's shell, which comprises an overview of the information that is required at the test-creation level. You can also define manual steps for the component, and then choose whether to convert it to an automated QuickTest keyword-driven component, QuickTest scripted component, or WinRunner component. For keyword-driven components, you can begin implementing the automated steps in the keyword view. Components can be created and used to build business process tests even if the implementation of the application has not yet begun.

You access the Business Components module by clicking the **Business Components** module button in the Quality Center sidebar.

To access a business component in the Business Components module:

- 1 Log in to your Quality Center project as described in the *HP Quality Center User's Guide*. The Quality Center window opens.

Note: After login, Quality Center displays the module in which you last worked.



- 2 Click the **Business Components** module button in the sidebar. The Business Components module opens.

Note: If the **Business Components** module button is not displayed in the sidebar, see "Connecting to Business Process Testing" on page 40.

- 3 If the Component Grid is displayed, choose **View > Component Tree**. For information on the Component Grid, see “Introducing the Component Grid” on page 75.
- 4 Expand a component folder in the component tree and select a business component. The Details tab of the component opens.

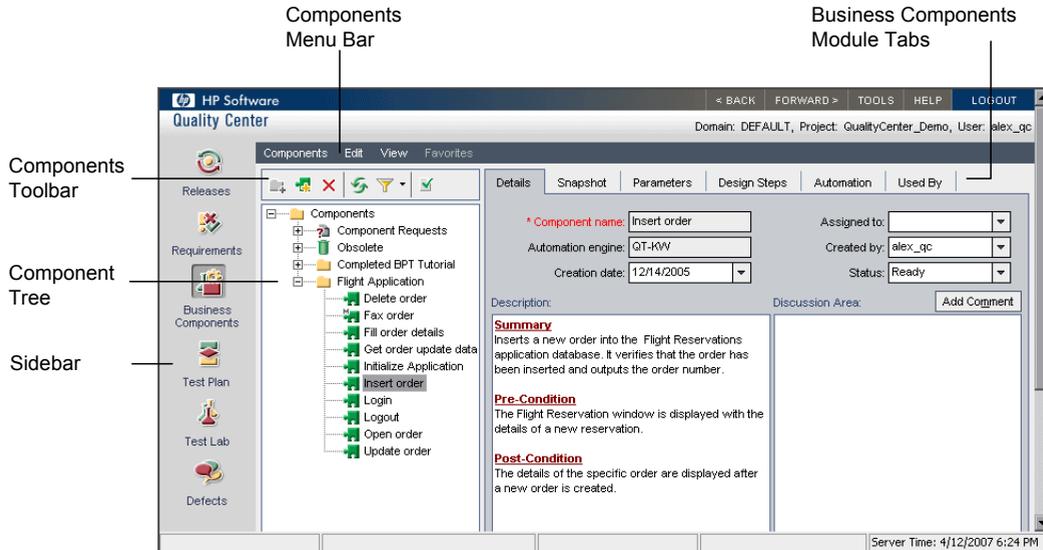
Tips:

For information on how to expand folders in the component tree and view business components, see “Viewing and Modifying Business Components” on page 95.

You can view and work with all the business components in the current project simultaneously by switching from the component tree to the component grid. For more information, see “Introducing the Component Grid” on page 75.

Introducing the Business Components Module Window

The Business Components module window is shown below, displaying the Details tab for the component selected in the component tree.



When a business component is selected in the component tree, the Business Components module contains the following key elements:

- ▶ **Components menu bar.** Contains menus with Business Components module commands. For more information, see “Components Menu Bar” on page 47.
- ▶ **Components toolbar.** Contains buttons for frequently-used commands in the Business Components module. These commands enable you to create and delete folders and business components, refresh data in the tree, filter and sort the components displayed in the tree, and validate components. For more information, see “Components Toolbar” on page 48.
- ▶ **Component tree.** Enables you to construct and organize the hierarchy of your business component folders and individual business components. For more information, see “Component Tree” on page 49.

- ▶ **Details tab.** Enables you to specify details and implementation requirements for the currently selected business component. For more information, see “Details Tab” on page 55.
- ▶ **Snapshot tab.** Enables you to capture a snapshot image from the application and attach it to the currently selected business component. For more information, see “Snapshot Tab” on page 57.
- ▶ **Parameters tab.** Enables you to define input and output component parameter values for the business component. This allows the component to receive data from an external source and to pass data to other components in the business process test flow. For more information, see “Parameters Tab” on page 58.
- ▶ **Design Steps tab.** Enables you to create or view the manual steps of your business component, and to automate it if required. For more information, see “Design Steps Tab” on page 59.
- ▶ **Automation tab.** Displays or provides access to automated components. For keyword-driven components, enables you to create and modify the steps of your automated business component in a keyword-driven, table format, and provides a plain-language textual description of each step of the implemented component. For more information, see “Automation Tab” on page 60.
- ▶ **Used By tab.** Provides details of the business process tests that include the currently selected business component. The tab also includes a link to the relevant business process test in the Test Plan module. For more information, see “Used By Tab” on page 60.

Components Menu Bar

The Components menu bar in the component tree view contains the following menus:

- ▶ **Components.** Contains commands that enable you to create business components and folders, and validate business components.
- ▶ **Edit.** Contains commands that enable you to work with and delete business components and folders.

- **View.** Contains commands that enable you to expand and collapse folders, work with filters, and toggle between the component tree and component grid.

Tip: You can access many of the menu and toolbar commands by right-clicking in panes or on items in the component tree to access context menus.

Components Toolbar

The Components toolbar above the component tree contains the following buttons:



New Folder. (CTRL+ALT+N) Adds a new folder to the component tree below the currently selected item.



New Component. (CTRL+N) Adds a new business component to the component folder below the currently selected item.

For more information on adding new folders and business components to the component tree, see “Creating a Component Tree” on page 85.



Delete. (DELETE) Removes the currently selected folder or business component from the component tree. The contents of a removed folder are also removed.

Any removed component that is used by one or more business process tests is moved to the **Obsolete** folder in the tree. Unused components are permanently deleted. For more information on working with the **Obsolete** folder, see “Removing Business Components” on page 106.

Tip: Business components that are being used by one or more business process tests can be easily recovered from the **Obsolete** folder if they were deleted accidentally. For more information, see “Restoring Obsolete Business Components” on page 109.



Refresh All. (F5) Refreshes the data for the currently selected folder or business component.



Set Filter/Sort. (Keyboard shortcut to refresh the filter: CTRL+F5) Enables you to easily locate required component tree items by setting filter or sort preferences. For more information on filtering and sorting tree items, refer to the *HP Quality Center User's Guide*.



Validate Component. (F8) Checks the selected business component for any configuration errors and displays the results. For more information on validating components, see “Validating Business Components” on page 103.

Component Tree

Business components created in the Business Components module and in automated testing tools such as QuickTest or WinRunner are displayed graphically in a hierarchical tree. Component requests initiated in the Test Plan module are also displayed in the tree. You can organize components into folders, and filter and sort the components according to your requirements.

Business components and folders are identified by specific icons in the component tree.



➤ **Folder.** Folders organize business components in the tree into logical groups.



➤ **Component Requests Folder.** The Component Requests folder contains requests that can be used to create business components.



➤ **Obsolete Folder.** The Obsolete folder contains deleted business components and component requests that are being used by one or more business process tests.



➤ **Business Component.** Business components are testing units that perform specific tasks in a business process.

Manual business components are indicated by an **M** symbol on the component icon, for example, .

For more information on the component icons used in the component tree, see “Business Component Statuses” on page 50.

Component Tree Context Menu

The right-click context menu in the component tree includes many of the commands from the menu bar menus and toolbar, as well as the following commands, which provide additional functionality:

- ▶ **Expand All** and **Collapse**. You can expand any of the folders in the component tree to display all its subfolders and business components, or collapse folders to display only the highest levels in the hierarchy. For information on how to expand and collapse folders, see “Viewing and Modifying Business Components” on page 95.
- ▶ **Rename**. You can rename folders and business components in the component tree if required. For information on how to rename folders and business components, see “Viewing and Modifying Business Components” on page 95.
- ▶ **Change Status**. You can change the status of a component without switching to the Details tab. For information on business component statuses, see “Business Component Statuses” on page 50.
- ▶ **Cut** and **Paste**. You can manage folders and business components in the component tree by using these functions. For information on how to cut and paste folders and business components, see “Viewing and Modifying Business Components” on page 95.
- ▶ **Copy**. You can copy folders and business components in the component tree if required. For information on how to copy folders and business components, see “Copying Folders and Business Components” on page 99.

Business Component Statuses

The color of the business component icons in the component tree and the symbols shown in the icons vary according to the status of the component. For example, you can use the status to indicate that a business component is ready to be run in a business process test, or that it has errors that require attention before it can be successfully used in a test. The more ready a component is to be included successfully in a business process test, the less severe is its status.

Knowing the status of a business component is important because it affects the status of any business process tests of which it is a part. In general, the component with the most severe status determines the status of the test.

For example, a business component with an Error status causes any business process test of which it is a part to have an Error status.

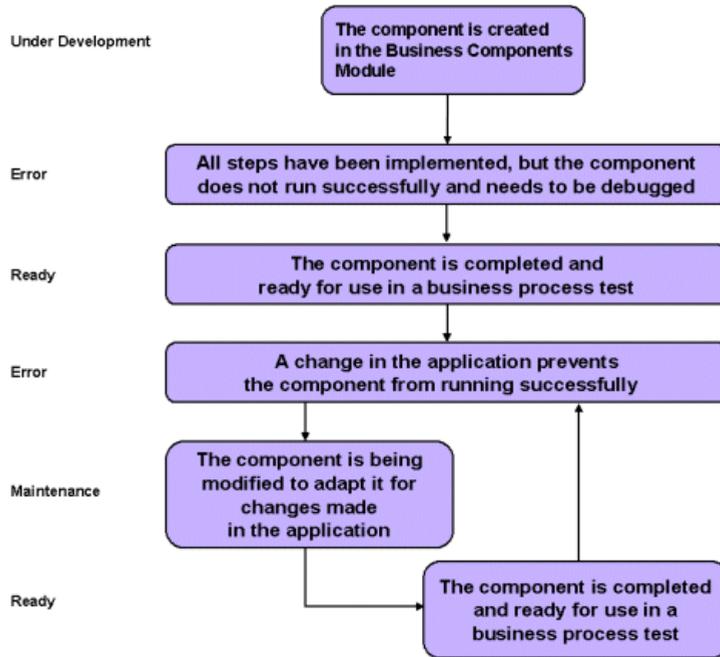
Business component statuses and their corresponding icons are described in the following table, listed in order of their level of severity, from the least severe status to the most severe status:

Status	Icon	Color	Description
Ready		Green	The business component is fully implemented and ready to be run. It answers the requirements specified for it and has been tested according to the criteria defined for your specific system.
Maintenance		Yellow	The business component was previously implemented and is now being modified to adapt it for changes that have been made in the application.
Not Implemented		Gray	A business component request has been initiated in the Test Plan module. The component request status changes from Not Implemented to Under Development when you move the request from the Component Requests folder in the component tree in the Business Components module.
Under Development		Gray	The business component is currently under development. This status is initially assigned to: <ul style="list-style-type: none"> ▶ New components created in the Business Components module. ▶ Component requests dragged or moved out of the Component Requests folder into a component folder in the component tree.
Error		Red	The business component contains errors that need to be fixed, for example, due to a change in the application. When a business process test contains a component with this status, the status of the entire business process test is also Error .

Chapter 3 • Getting Started with the Business Components Module

The above icons represent components that have been automated using a testing tool such as QuickTest or WinRunner. A manual component is indicated by an **M** symbol on the appropriate icon. For example, a component with a Maintenance status that has not been automated would be indicated by .

The status of a business component shown in the component tree could change several times during its life-cycle, as illustrated in the example below:



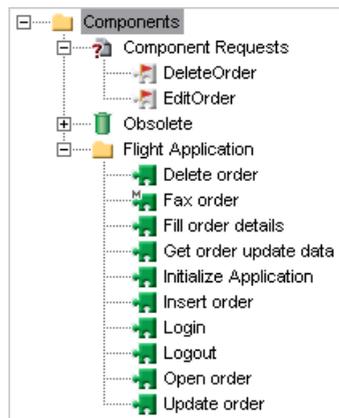
Business Component Tabs

Selecting a business component in the component tree displays several tabs, as described in “Working with Component Tabs” on page 55.

Note: Selecting a folder in the component tree displays a **Description** area that enables you to enter a textual description of the folder contents.

Component Requests

Component Requests are located in the Component Requests folder in the components tree of the Business Components module.



Component requests are initiated in the Test Plan module and are an indication that an additional business component is necessary for the business process test flow.

You can select the Used By tab to view details of the business process test or tests that are already using the requested business component.

To change component requests to official business components of the project, you can drag them from the Component Requests folder and drop them in the appropriate folder in the component tree, or cut and paste them into a component folder.

You can right-click a component request and then select to delete it. You can also choose **Validate Component** from the menu to check whether the component request contains any configuration errors that could halt the successful running of a test.

For more information on transferring component requests from the Component Requests folder to a component folder, see “Handling Component Requests” on page 109.

For more information on requesting business components for business process tests, see “Requesting New Components for Business Process Tests” on page 211.

Working with Component Tabs

The tabs in the Business Components module enable you to provide a complete overview of the component's content. You can detail its input and output parameters, design component steps, automate the component, and view the business process test or tests for which it is used. You can also provide a snapshot associated with the component.

Details Tab

The Details tab enables you to define component attributes, a general description of the business component, and detailed implementation requirements. It also enables you to communicate with the Automation Engineer and other component users and developers.

Details	Snapshot	Parameters	Design Steps	Automation	Used By
* Component name: <input type="text" value="Insert order"/>		Automation engine: <input type="text" value="QT-KW"/>		Assigned to: <input type="text" value=""/>	
Creation date: <input type="text" value="11/24/2005"/>				Created by: <input type="text" value="alex_gc"/>	
				Status: <input type="text" value="Ready"/>	
Description: Summary Inserts a new order into the Flight Reservations application database. It verifies that the order has been inserted and outputs the order number. Pre-Condition The Flight Reservation window is displayed with the details of a new reservation. Post-Condition The details of the specific order are displayed after a new order is created.			Discussion Area: Alex Smith <alex_gc>, 1/17/2006: Use only in new business process tests Add Comment B U I A		

You can change the business component's status and other details displayed in this tab according to your requirements by choosing alternative selections from the dropdown lists.

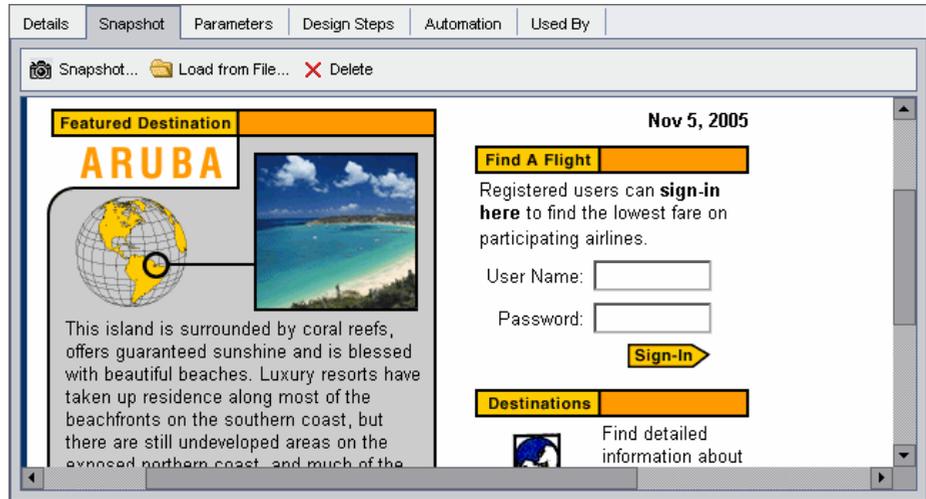
The following information can be provided in the Details tab:

- **Component Name.** The name of the selected component.
- **Assigned To.** The user to whom the business component implementation is assigned.
- **Automation engine.** How the component was converted to an automated component; QT-KW for a QuickTest keyword-driven component, QT-SCRIPTED for a QuickTest scripted component, WR-AUTOMATED for a WinRunner component, and SERVICE-TEST-AUTOMATED for a Service Test component. MANUAL is displayed for a component that has not been automated.
- **Created By.** The user that created the business component. This data is automatically entered by Quality Center, and cannot be modified.
- **Creation Date.** The date that the business component was created.
- **Status.** The status of the business component. For information on business component statuses, see “Business Component Statuses” on page 50.
- **Deleted on** (For components contained in the **Obsolete** folder only). The date that the business component was deleted. This data is automatically entered by Quality Center.
- **Original Location** (For components contained in the **Obsolete** folder only). The folder in which the business component was located when it was deleted. This data is automatically entered by Quality Center.
- **Description.** The **Description** area enables you to provide an overall textual summary of the business component’s purpose or contents, plus the intended pre-condition and post-condition of the application at the start and end of the component run.
- **Discussion Area.** The **Discussion Area** enables you to communicate with the Automation Engineer and other component users or developers by adding remarks, such as requests to the Automation Engineer for new operations or the need to update a step in the component.

For more information on the Details tab for a business component, see “Providing Component Details and Implementation Requirements” on page 88.

Snapshot Tab

The Snapshot tab enables you to attach an image associated with the business component.



The Snapshot tab toolbar contains the following buttons:

Snapshot. Opens the Snapshot dialog box. For information on how to use the Snapshot dialog box, see “Attaching an Image to a Business Component” on page 92.

Load from File. Enables you to load a previously saved **.png** or **.bmp** file containing the snapshot. For information on how to load snapshot files, see “Loading an Image” on page 93.

Delete. Deletes the currently attached snapshot.

For more information on the Snapshot tab, see “Attaching Images” on page 92.

Parameters Tab

The Parameters tab enables you to define component parameters that allow a business component to receive data from an external source and/or return data for use in other components.

Input component parameters make business components more flexible and make it easier to reuse the same component in multiple business process test scenarios—by supplying different input values, you can change how the component performs according to those values. Input component parameters also enable you to transfer multiple data values to the component in order to run the same component multiple times (iterations) in a business process test.

Output component parameters allow data values retrieved from a component step in one component to be passed to a subsequent component in the business process test flow.

Details	Snapshot	Parameters	Design Steps	Automation	Used By
Input					
New Delete ↑ ↓					
Parameter Name	Value Type	Default Value	Description		
AgentName	String		Login user names. Can be any 4 or more characters		
Password	Password		Your application password		
Output					
New Delete ↑ ↓					
Parameter Name	Value Type	Description			
Date	Date	The access date			
ID	Number	The itinerary number			

The Parameters tab contains the following panes:

- **Input.** Enables you to define component parameter names, value types, default values, and descriptions of the input data that the business component can receive from a business process test.

The value type, such as string, number, or date, defines the type of input value expected from the external source.

The default value, which must correspond to the value type, is used when the business component runs, if no other value is supplied by the business process test.

- **Output.** Enables you to define component parameter names, types, and descriptions of the output data that the business component can return to a business process test.

The Input and Output panes in the Parameters tab each contain the following buttons:

New Parameter. Enables you to create new component parameters. (Keyboard shortcuts: For new Input parameters, ALT+N, for new Output parameters, ALT+W.)

Delete Parameter. Enables you to delete existing component parameters. (Keyboard shortcuts: For Input parameters, ALT+D, for Output parameters, ALT+L.)



Move Parameter Up/Move Parameter Down. Enables you to move the selected parameter up or down in the list.

For more information on the Parameters tab, see Chapter 9, “Working with Parameters.”

Design Steps Tab

The Design Steps tab provides an editable table in which you can create manual steps for your component. You can describe each step to be performed, create and insert parameters where required, and describe the expected result of the step.

You can include this manual component in a business process test and then manually run the steps you created. Alternatively, you can choose to convert a manual component to an automated keyword-driven or a scripted component for a specific testing tool such as QuickTest or WinRunner.

For more information on the functionality provided by the Design Steps tab, see “Understanding the Design Steps Tab” on page 61.

Automation Tab

The Automation tab enables you to add and modify the steps of a business component in a keyword-driven, table format. The appearance and functionality of the Automation tab depends on the development and use of the component selected in the component tree.

For more information on the functionality provided by the Automation tab, see “Understanding the Automation Tab” on page 68.

Used By Tab

The Used By tab provides details of, and links to, the business process tests that include the currently selected business component.

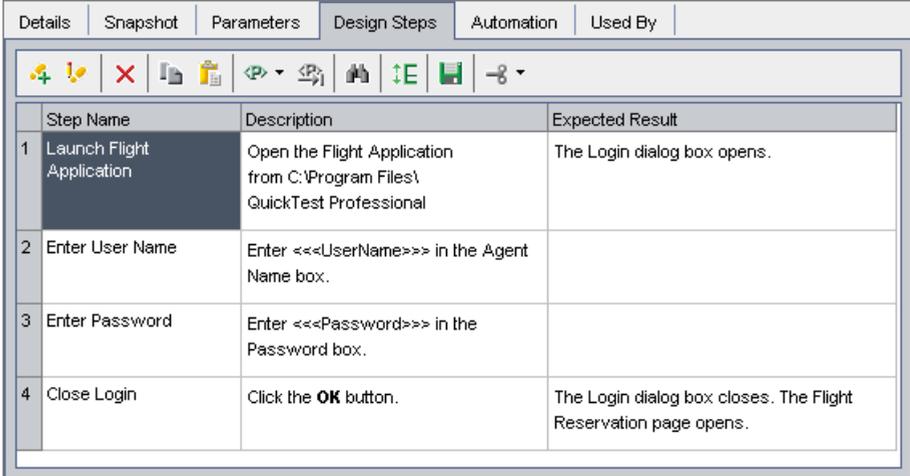
Details	Snapshot	Parameters	Design Steps	Automation	Used By	
Test Name	Status	Designer	Creation Date	Subject Path		
BPT1	Maintenance	krichter	9/29/2005	Subject\Doc		
BPT2	Ready	admin	11/2/2005	Subject\Doc		

You can click a link in the **Test Name** column to jump directly to the relevant business process test in the Test Plan module.

Understanding the Design Steps Tab

When the Design Steps tab for a new component is first opened in the Business Components module, an editable table is displayed in which you can add manual steps to the component. The new component is called a **manual** component, because it describes the steps that a tester should perform manually (as opposed to automated steps created in a testing tool).

You can include a manual component in a business process test and run its steps manually if required. Alternatively, you can convert a manual component to an automated component and then add automated steps that can be run by a specific testing tool such as QuickTest or WinRunner.



Step Name	Description	Expected Result
1 Launch Flight Application	Open the Flight Application from C:\Program Files\QuickTest Professional	The Login dialog box opens.
2 Enter User Name	Enter <<<UserName>>> in the Agent Name box.	
3 Enter Password	Enter <<<Password>>> in the Password box.	
4 Close Login	Click the OK button.	The Login dialog box closes. The Flight Reservation page opens.

When an automated keyword-driven component is created in QuickTest, the Design Steps tab provides a view of the component's manual steps in read-only format. You can use these steps to run the component manually.

When an automated scripted component is created in QuickTest or WinRunner, the Design Steps tab provides an editable view of the component's manual steps. You can use and modify these steps to run the component manually.

Although the manual steps are read-only in the Design Steps tab after the component is automated in QuickTest, the content of the manual steps can be updated to match the steps in the automated test by adding special operations to the automated test. The content of manual steps is not updated when scripted components are modified in QuickTest or WinRunner.

The Design Steps tab also displays the steps of an automated component that was created in QuickTest and saved to the current project.

Working with Rows in the Design Steps Tab

You create each step in the business component as a row in the Design Steps tab.

A step is an operation to be performed on an application. For each step, you describe the procedure to be performed, and define a successful result. When a business process test runs in Quality Center, the steps defined in the associated business components are performed.

Working with Columns in the Design Steps Tab

The rows in the Design Steps tab are divided into the following columns:

- Step Name Column
- Description Column
- Expected Result Column

Step Name Column

The **Step Name** column displays an incrementing number for each step that you create, for example, Step 1, Step 2, and so on. You can change this default to a more descriptive name if required.

Description Column

In the **Description** column, you describe the step procedure to be performed on the application.

Expected Result Column

In the **Expected Result** column, you describe the expected result of performing the procedure described in the Description column.

Working with the Design Steps Tab Toolbar

The Design Steps tab toolbar for a manual component contains the following toolbar buttons:



Add New Step. (ALT+N) Opens the Component Step Editor, enabling you to add a step below the currently selected step. For more information, see “Understanding the Component Step Editor” on page 66.



Edit step. (ALT+E, or double-click a step) Opens the Component Step Editor, enabling you to edit the selected manual step. For more information, see “Understanding the Component Step Editor” on page 66.



Delete selected steps. (DELETE) Deletes the currently selected step.



Copy steps. (CTRL+C) Copies the selected component step to the clipboard. Use this button in conjunction with the **Paste steps** button.



Paste steps. (CTRL+V) Pastes the copied component step to a new location.



Create/Select Parameter. Includes the following options:

- ▶ **Select Parameter.** (CTRL+P) Opens the Select Parameter dialog box, enabling you to integrate existing parameters into a component step or expected result. This command is enabled only when your focus is in the Description or Expected Result cells. For more information, see “Working with the Select Parameters Dialog Box” on page 129.
- ▶ **Create Parameter.** (CTRL+R) Opens the Create Parameter dialog box, enabling you to create a new parameter. For more information, see “Working with the Create Parameter Dialog Box” on page 127.



Complete Parameter Name. (CTRL+K) Automatically inserts an existing parameter into a component step description or expected result, based on the first character or characters of the parameter name that you have entered. The parameter is entered in the correct format, for example, <<<parameter_name>>>. This command is enabled only when your focus is in the Description or Expected Result cells.



Find Text. (Ctrl+F) Opens the Find dialog box, enabling you to search in the tab for steps that contain a specified text value. Select the column in which you want to search, and enter the value you want to find. For more information, see “Working with the Find Dialog Box” on page 64.

The Find dialog box also provides **Exact Match**, **Case Sensitive**, and **Use Wildcard** search features.



Adjust row heights. Enables you to change the row height of the step so that all the text in the step is visible.



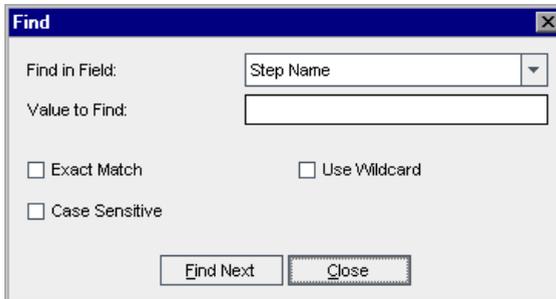
Save steps. (CTRL+S) Saves the component steps that you have created or modified. New or changed steps are not saved until either you click this button or you leave the Design Steps tab. For more information, see “Saving Component Steps” on page 149.



Automate component. Enables you to convert the manual component to an automated QuickTest keyword-driven business component, a QuickTest scripted component, or a WinRunner component. For information on how to automate components, see “Automating Components” on page 135.

Working with the Find Dialog Box

You can search for values in the Design Steps tab using the Find dialog box.



To find a value:

- 1 In the **Find in Field** box, select the column in which you want to search for a specific value. Select **Any Field** to search in all the columns.
- 2 In the **Value to Find** box, enter the value to find.

- 3 To search for an exact value, select the **Exact Match** check box.
- 4 To distinguish between uppercase and lowercase characters, select the **Case Sensitive** check box.
- 5 To include wildcards in your search, select the **Use Wildcard** check box.
- 6 Click the **Find Next** button. Quality Center attempts to locate any steps with the specified value. If the search is successful, the step is highlighted. If the search is unsuccessful, an information box opens.

Working with the Design Steps Tab Context Menu

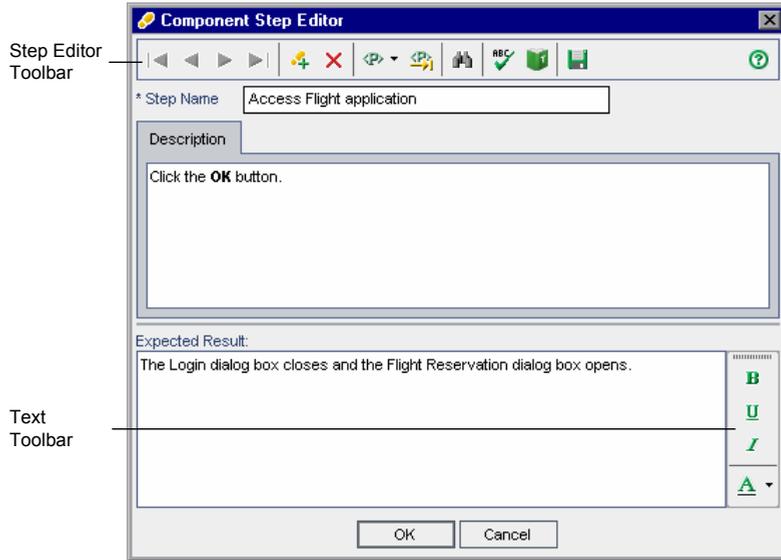
You can right-click in the Design Steps tab of a manual component to display a context menu that includes the options from the toolbar. The following command in the context menu also provides additional functionality:

Export To. Enables you to export the information in the tab to several formats, including text file, Microsoft Word document, Microsoft Excel spreadsheet, or HTML document. For more information on exporting data, refer to the *HP Quality Center User's Guide*.

Understanding the Component Step Editor



The Component Step Editor enables you to add manual steps to your component or edit a selected step. You open the editor from the Design Steps tab by clicking the **Add New Step** or **Edit Step** button in the toolbar or by double-clicking an existing step.



Note: The Component Step Editor provides a comprehensive selection of text editing and formatting commands to assist you in entering textual step information. Right-click in the **Description** or **Expected Result** column to access the commands from the context menu. By default, the **Text** toolbar is hidden. Choose **Toolbar Visible** from the context menu to display (or hide) commonly used commands in the **Text** toolbar.

For information on working with the Component Step Editor, see “Designing Manual Steps” on page 120.

The toolbar in the Component Step Editor contains the following buttons:



First Step. (ALT+HOME) Jumps to the first manual step in the component.



Previous Step. (ALT+LEFT) Jumps to the previous manual step.



Next Step. (ALT+RIGHT) Jumps to the next manual step.



Last Step. (ALT+END) Jumps to the last manual step in the component.



New Step. (ALT+N) Enables you to add a new manual step to the component after the current step. For more information, see “Designing Manual Steps” on page 120.



Delete Step. (CTRL+DELETE) Deletes the currently open step.



Create/Select Parameter. Includes the following options:

- ▶ **Select Parameter.** (CTRL+P) Opens the Select Parameter dialog box, enabling you to integrate parameters into a component step or expected result. This command is enabled only when your focus is in the Description or Expected Result cells. For more information, see “Working with the Select Parameters Dialog Box” on page 129.
- ▶ **Create Parameter.** (CTRL+R) Opens the Create Parameter dialog box, enabling you to create a new parameter. For more information, see “Working with the Create Parameter Dialog Box” on page 127.



Complete Parameter Name. (CTRL+K) Automatically inserts an existing parameter into a component step description or expected result, based on the first character or characters of the parameter name that you have entered. The parameter is entered in the correct format, for example, <<<parameter name>>>. This command is enabled only when your focus is in the Description or Expected Result areas.



Find/Replace text. (CTRL+F) Opens the Replace dialog box, enabling you to search for and replace data in the tab. Enter the value you want to find and, if relevant, the value with which to replace it. The Replace dialog box also provides **Match whole word only** and **Match case** features.



Spell Checking. (F7) Checks the spelling of the selected word or all the words in the step.



Thesaurus. (CTRL+ALT+T) Opens the Thesaurus dialog box, and displays a synonym, antonym, or related word for the selected word. You can replace the selected word or look up new words.



Save Steps. (CTRL+S) Saves the component steps that you have created or modified. New or changed steps are not saved until either you click this button or you click **OK** in the Component Step Editor. For more information, see “Saving Component Steps” on page 149.



Help. (F1) Opens the Online Help for the Component Step Editor.

Understanding the Automation Tab

The content of the Automation tab depends whether the component is automated, and if so, the type of automated component. If the component is not automated, a message is displayed in the tab. You must convert the component to an automated component before using this tab.

The keyword view format of the Automation tab is displayed when:

- ▶ A business component is automated as a QuickTest keyword-driven component.
- ▶ A keyword-driven business component is created in QuickTest.

For other component types, such as WinRunner or QuickTest scripted components, the Automation tab does not display the steps but provides a **Launch** button. You can then launch the applicable testing tool and edit the component directly in the tool.

This section describes the different formats of the Automation tab for automated components, as follows:

- ▶ “Working with the Automation Tab - Keyword View” on page 69
- ▶ “Working with Columns in the Automation Tab” on page 71
- ▶ “Working with the Automation Tab - Scripted Components” on page 74

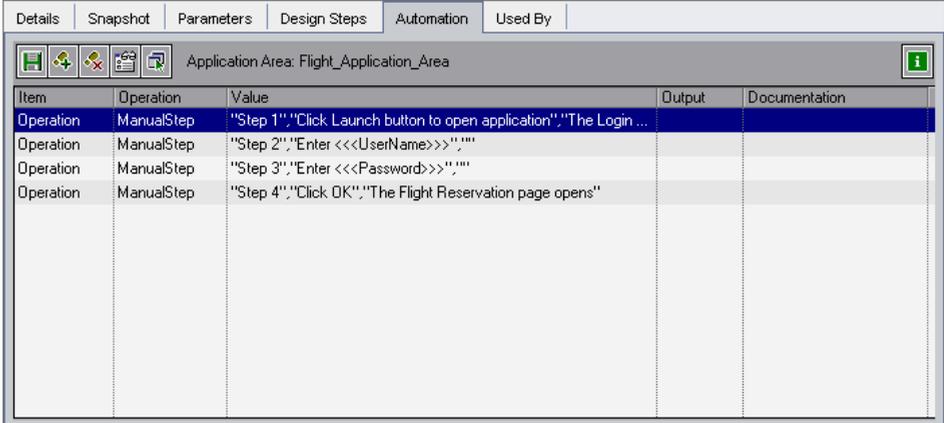
For more information on the Automation tab, see Chapter 6, “Working with Automated Component Steps.”

Working with the Automation Tab - Keyword View

The Keyword View format of the Automation tab is displayed when a component is created in Quality Center and then automated as a QuickTest keyword-driven component, or is created as a business component in QuickTest. The Automation tab of a keyword-driven business component enables you to create new steps and modify the existing steps of your business component in a keyword-driven, table format. You can provide additional information in the form of comments.

Each step or comment in the component is created as a row in the table. Columns separate the steps into individual parts, which you can modify if required. Each step of a keyword-driven component is automatically documented as you complete it, providing a plain-language textual description of the component. This information makes it easy to review the operations of an implemented (or under development) component.

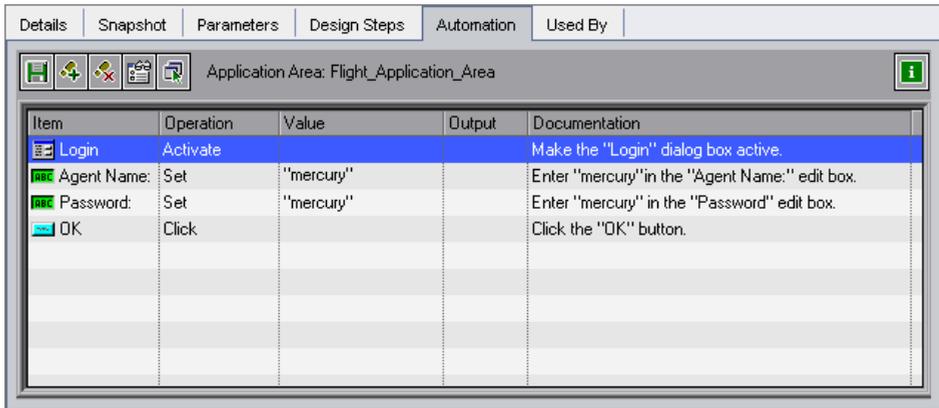
The steps of the following component were created in Quality Center. The component was then automated as a QuickTest keyword-driven component. You can see the automatic conversion of the manual steps that were created in the Design Steps tab before the component was automated:



The screenshot shows the 'Automation' tab of a component in Quality Center. The application area is 'Flight_Application_Area'. The table below displays the manual steps that were converted into a keyword-driven format.

Item	Operation	Value	Output	Documentation
Operation	ManualStep	"Step 1","Click Launch button to open application","The Login ..."		
Operation	ManualStep	"Step 2","Enter <<UserName>>",""		
Operation	ManualStep	"Step 3","Enter <<Password>>",""		
Operation	ManualStep	"Step 4","Click OK","The Flight Reservation page opens"		

The following component was created as a business component in QuickTest Professional. It already contains automated steps.



Automation Tab Toolbar

The Automation tab toolbar for keyword-driven business components contains the following toolbar buttons:



Save. Saves the business component steps and comments. Steps and comments you create or modify are not saved until either you click this button or you leave the Automation tab. For more information, see “Saving Component Steps” on page 149.



Add Step. Enables you to add a step or comment below the currently selected step. For more information, see “Creating Steps in the Keyword View” on page 146.



Delete Step. Deletes the currently selected step or comment.



Select Application Area. Enables you to select an application area on which to base your business component, or select a different application area. For more information, see “Choosing the Application Area” on page 144, or “Changing the Application Area” on page 145.



View Options. Opens the Keyword View Options dialog box, enabling you to specify which columns to display in the Automation tab and the order in which they are displayed. For more information, see “Setting Keyword View Options” on page 138.



Information. Displays the QuickTest Professional Add-in for Quality Center version installed on your Quality Center client.

Automation Tab Context Menu

You can right-click a selected row in the keyword view Automation tab to display a context menu that includes some of the options from the toolbar, as well as the following commands, which provide additional functionality:

- **Insert Operation.** Enables you to insert an operation row below the selected row.
- **Insert Comment.** Enables you to insert a comment row below the selected row.
- **Cut.** (CTRL+X) Deletes the selected row and stores it on the Clipboard.
- **Copy.** (CTRL+C) Copies the selected row to the Clipboard.
- **Paste.** (CTRL+V) Pastes a cut or copied row below the selected row in the tab.

Working with Columns in the Automation Tab

You can select which columns to display in the Automation tab, and their order in the tab, according to your requirements. If you do not see one or more of the required columns in the tab, you can use the Keyword View Options dialog box to display them.

You can also display the **Documentation** column only, for example, if you want to use the steps as instructions for manual testing. For more information, see “Setting Keyword View Options” on page 138.

The Automation tab in the keyword view format can contain the following columns:

- ▶ Item Column
- ▶ Operation Column
- ▶ Value Column
- ▶ Output Column
- ▶ Documentation Column

Item Column

The **Item** column displays the objects in your application on which you perform operations. These objects are defined in the object repository that was prepared for you by the Automation Engineer and associated with the application area on which your business component is based.

You choose the item from an icon-based list, which displays the item and all sibling objects of the previous step, as well as any child objects for the previous step.

For example, if the previous step specifies the **Login Window** object, then the **User name** and **Password** objects might be displayed for the next step.

This column can also display the **Operation** item, which enables you to choose from operations defined in the function libraries associated with your component's application area. For example, operations that open an application at the start of a business component or check the value of a specific property.

For more information on selecting objects and operations, see "Selecting an Item for a Step" on page 149.

If you want to add a comment to your business component, you can choose **Comment** from the list. Comments are displayed in a free-text cell that extends the entire width of the row.

For more information on adding comments, see "Entering Comments in the Keyword View" on page 165.

Operation Column

The **Operation** column displays the operation to be performed on the item selected in the business component step. This column provides a list of all available operations that can be performed on the object selected in the **Item** column, for example, **Click** or **Select**.

The available operations change dynamically according to the item selected in the **Item** column. By default, the most commonly used operation for the object is displayed.

For more information on selecting operations, see “Selecting an Operation for a Step” on page 154.

Value Column

The **Value** column displays the values for the selected operation. The **Value** cell is partitioned according to the number of values that must or can be supplied for the selected operation.

The value can be a fixed value (a constant), a **local** parameter, or a **component** parameter.

Local parameter. A local parameter is specific to the business component. Its value is defined within the component and can be accessed by that component only. It is intended for use in a single step or between component steps, for example, as an output parameter for one step and an input parameter for a later step. For more information, see “Working with Parameters in the Keyword View” on page 158.

Component parameter. A component parameter is assigned a value from an external source, such as the business process test designer, test runner, or from a retrieved value of another component. For more information, see Chapter 9, “Working with Parameters.”

Output Column

The **Output** column displays the parameter in which output values for the step are stored. You can use the value stored in an output parameter later in the business component or in other business components as an input parameter.

Similar to the **Value** column, you can use two types of parameters when specifying an output parameter—a local parameter or a component parameter.

For more information on defining the output type and settings for output values, see “Defining Output Values for Steps” on page 156.

Documentation Column

The **Documentation** column displays read-only auto-documentation of what the step does, in a plain-language textual description.

You can copy the contents of the Documentation column to the clipboard. Right-click the column header row and choose **Copy Documentation to Clipboard** from the displayed menu. Right-click at the location you want to paste the text and choose **Paste**.

Working with the Automation Tab - Scripted Components

Complex functionality, such as loops or conditional statements, is added to a keyword-driven component using operations from a function library that was created for your needs by the Automation Engineer. Scripted components can contain this type of programming functionality directly inside the steps. They can be created in Quality Center, QuickTest Professional, or WinRunner.

However, the individual steps in the scripted component are not shown in the Automation tab, and they can be edited only in QuickTest or WinRunner as appropriate. You can click the **Launch** button in the Automation tab to open the applicable testing tool and edit the component.

You can include combinations of scripted, manual, and keyword-driven component types in business process tests.

For more information on creating and editing scripted components in QuickTest, refer to the *QuickTest Professional for Business Process Testing User's Guide*.

For more information on creating and editing scripted components in WinRunner, refer to the *WinRunner User's Guide* for version 8.2 or later.

Introducing the Component Grid

The component grid displays data for all the business components in the current Quality Center project in a single view. This enables advanced search and filtering capabilities. Each row in the grid displays a business component, and each column in the grid displays information about that component.

To view the component grid, choose **View > Component Grid**.

The screenshot shows the 'Components' window with a menu bar (Components, Edit, View, Favorites), a toolbar with icons for delete, refresh, filter, and save, and a 'Favorite: <None>' dropdown. The main area is a table with columns: Component name, Status, Assigned to, Created by, Creation date, and Automation engine. Below the table is a 'Description' tab showing details for the 'Delete order' component.

Component name	Status	Assigned to	Created by	Creation date	Automation engine
Delete order	Ready		alex_qc	12/14/2005	QT-KW
Fax order	Ready		alex_qc	12/14/2005	MANUAL
Fill order details	Ready		alex_qc	12/14/2005	QT-KW
Get order update	Ready		alex_qc	12/14/2005	QT-KW
Initialize Applicati	Ready		alex_qc	12/14/2005	QT-KW
Insert order	Ready		alex_qc	12/14/2005	QT-KW
Login	Ready		alex_qc	12/14/2005	QT-KW
Logout	Maintenance		alex_qc	12/14/2005	QT-KW
Open order	Ready		alex_qc	12/14/2005	QT-KW
Update order	Maintenance		alex_qc	12/14/2005	QT-KW

Description Tab:

Summary
Deletes an existing order from the Flight Reservations application database. If the delete operation fails, the business component fails.

Pre-Condition
The Flight Reservation window is open, displaying the details of the order to be deleted.

Post-Condition
The details of the specified order are deleted.

In the component grid, you can arrange columns, filter and sort business components and their properties according to your needs, find and replace data, and save the component information displayed in the grid in various formats.

You can modify information for a single component or for multiple components simultaneously. For example, you can select specific data cells and select different properties for the components from the dropdown lists.

Tip: You can select more than one business component in the grid using standard Windows selection techniques (using the CTRL or SHIFT keys). Click to the left of the component row to ensure that the entire row is selected (the row is highlighted), before pressing the required keys.

From this view, you can also copy one or more components and paste them elsewhere in the current project or in another project on the same server, or you can delete several components at once.



Note: Obsolete business components cannot be copied or modified and are identified in the grid by an Obsolete icon to the left of the **Component Name** column.

The component grid contains the following key elements:

- ▶ **Grid menu bar.** Contains menus with grid commands. For more information, see “Working with the Component Grid Menu Bar” on page 77.
- ▶ **Grid toolbar.** Contains buttons for commands that are commonly used when working with business components and for modifying the component grid. For more information, see “Working with the Component Grid Toolbar” on page 78.
- ▶ **Grid columns.** Contain the same component information as the corresponding item in the component Details tab. For more information, see “Working with Component Grid Columns” on page 80.
- ▶ **Grid filter boxes.** Display the filter that is currently applied to each column. For more information on filtering data, refer to the *HP Quality Center User’s Guide*.

- **Description tab.** Displays and enables you to edit the details and implementation requirements for the business component. For more information, see “Providing Component Details and Implementation Requirements” on page 88.
- **Used By tab.** Displays details of the business process tests that include the currently selected business component. The tab also includes a link to the relevant business process test in the Test Plan module. For more information, see “Used By Tab” on page 60.

Note: If the Description and Used By tabs are not visible in the Component Grid, click the **Show** button  at the bottom-right of the Business Components module window. Click the **Hide** button  to hide the tabs. You can also double-click to the right of the tab names to show or hide the tabs.

Working with the Component Grid Menu Bar

The Component Grid menu bar in the grid view contains the following menus:

- **Edit.** Contains commands that enable you to work with, find, and delete business components.
- **View.** Contains commands that enable you to work with filters and toggle between the component tree and component grid. For more information on filtering data, refer to the *HP Quality Center User's Guide*.
- **Favorites.** Contains commands that enable you to work with favorite views. For more information, refer to the *HP Quality Center User's Guide*.

Tip: You can also access many of the menu and toolbar commands by right-clicking in panes or on items in the component tree to access context menus.

Working with the Component Grid Toolbar

The component grid toolbar has the following buttons:



Delete Selected Components. (CTRL+DEL) Deletes the selected business component from the Quality Center project.



Refresh. (F5) Refreshes the grid so that it displays the most up-to-date business component information based on the filters and sort order you have selected.



Set Filter/Sort. Enables you to locate required components in the grid by setting filter or sort preferences using the Filter dialog box. Any currently applied filters or sort orders are displayed under the component grid toolbar. For information on sorting data in the component grid by group, see “Sorting the Component Grid by Group” on page 97. For more information on filtering and sorting data in a grid, refer to the *HP Quality Center User’s Guide*.



Select Columns. Opens the Select Columns dialog box, enabling you to specify which columns to display in the grid and their order. You can also set the number of columns that remain stationary when you scroll horizontally.

For information on the columns available in the Component Grid, see “Working with Component Grid Columns” on page 80. For more information on arranging columns in a grid, refer to the *HP Quality Center User’s Guide*.



Go to Component in Component Tree. Closes the component grid and highlights the selected business component in the component tree.



Validate Component. Checks the selected business component for any configuration errors and displays the results. For more information on validating components, see “Validating Business Components” on page 103.

Favorite. Enables you to select a favorite view. Use the **Favorites** menu to add or organize your favorite views. For more information, refer to the *HP Quality Center User’s Guide*.

Working with the Component Grid Context Menu

The right-click context menu in the component grid includes many of the functions in the toolbar, as well as the following commands, which provide additional functionality and information about the business component:

Copy. Copies the selected business component to the clipboard. Use this button in conjunction with the **Paste** option.

Paste. Pastes the copied business component. You can also switch to the component tree (by choosing **View > Component Tree**) and paste the copied component to a new location in the component tree.

For more information on copying business components, see “Copying Business Components” on page 100.

- ▶ **Grid Filters.** Toggles to display or hide the grid filter boxes at the top of the data columns. If the filter box is empty, no filter is currently applied to the column. Type directly into the box, or click the box to display the browse button, which opens the Select Filter Condition dialog box. For more information on filtering data in a grid, refer to the *HP Quality Center User's Guide*.
- ▶ **Select All.** Selects all the business components in the grid. This enables you to perform operations such as Copy or Delete on all the existing components simultaneously.
- ▶ **Find.** Includes the following options:
 - ▶ **Find.** (CTRL+F) Opens the Find dialog box, enabling you to search for a business component in the grid. Select the field in which you want to search, and enter the value you want to find. The Find dialog box also provides **Exact Match**, **Case Sensitive**, and **Use Wildcard** search features. If you have applied filters to the grid, the search is restricted to the currently displayed components.
 - ▶ **Find Next.** (CTRL+L) Finds the next occurrence of the last string you searched for.
 - ▶ **Replace.** Opens the Find/Replace dialog box, enabling you to search for and replace a specific field value in the grid.

For more information on Find and Replace functionality, refer to the *HP Quality Center User's Guide*.

- ▶ **Properties.** Displays and enables you to edit the information in the Snapshot tab, the Parameters tab, and the Design Steps tab for the selected business component. For more information on the functionality of these tabs, see “Business Component Tabs” on page 53.
- ▶ **Export.** Enables you to export the grid data of the selected component or components, or of all the components, as a text file.

Working with Component Grid Columns



The component grid columns correspond to the information provided in the component’s Details tab. You can select which columns to display in the component grid, and their order, by clicking **Select Columns** in the toolbar or context menu. You can also set the number of columns that remain stationary when you scroll horizontally.

For more information on selecting and arranging columns in a grid, refer to the *HP Quality Center User’s Guide*.

You can view the following columns in the Component grid:

Column	Description
Component Name	The name of the business component.
Creation Date	The date on which the business component was created.
Created By	The user name of the person who created the business component.
Description	The implementation requirements for the business component, as entered in the Details tab.
Comments	The comments entered in the Discussion Area of the Details tab for the Automation Engineer, component users, or developers.
Status	The status of the business component. Component statuses are described in “Business Component Statuses” on page 50.
Assigned To	The Subject Matter Expert to whom the business component implementation is assigned.

Column	Description
Automation Engine	The automation engine used to automate the component; QT-KW for a QuickTest keyword-driven component, QT-SCRIPTED for a QuickTest scripted component, WR-AUTOMATED for a WinRunner component, and SERVICE-TEST-AUTOMATED for a Service Test component. MANUAL is displayed for a manual component.
Has Picture	Indicates whether an image is attached to the component. (Y or N)
Deleted on	The date on which the business component was deleted, if applicable. (For components contained in the Obsolete folder only.)
Original Location	The folder in which the business component was located when it was deleted, if applicable. (For components contained in the Obsolete folder only.)

4

Working with Business Components

Business components are created and defined in the Business Components module. These components can be combined into business process tests in the Test Plan module, as described in Chapter 7, “Getting Started with Business Process Testing in the Test Plan Module.”

This chapter describes the basic management operations required to create and define business components.

This chapter describes:	On page:
About Working with Business Components	84
Creating a Component Tree	85
Defining Business Components	87
Viewing and Modifying Business Components	95
Handling Component Requests	109
Setting Permissions for Business Process Testing	112
Generating Project Documents	115

Note: To control access to various modules and tasks, Quality Center enables you to configure access permissions for users. The procedures described in this chapter are dependant on the user or user group to which the user belongs having the proper permissions. For more information, see “Setting Permissions for Business Process Testing” on page 112, or refer to the *HP Quality Center Administrator’s Guide*.

About Working with Business Components

You create business components in the Business Components module by defining the details of the component's shell, such as the component's description, status, implementation requirements, and so on, and storing the components in the component tree. You can then incorporate the components into business process tests in the Test Plan module tabs.

Components created in other testing tools such as QuickTest Professional and WinRunner are also stored in the component tree and can be included in business process tests.

Business component definitions include a description of the component's purpose, the conditions of the application being tested before and after the component steps are performed, and the actual steps that comprise the component. You can define the steps in the business component as manual steps, or you can automate them using QuickTest or WinRunner.

You can define input component parameters that are required by the business component and output component parameter values returned to other components.

Several of the component shell settings that you define in the Business Components module, for example, the snapshot and the component parameters, can be viewed and modified in the Business Component Settings dialog box in QuickTest, and in the Scripted Component Properties dialog box in WinRunner.

Note: For more information on the Business Component Settings dialog box, refer to the *QuickTest Professional for Business Process Testing User's Guide*. For more information on the Scripted Component Properties dialog box, refer to the *WinRunner User's Guide*.

After the business component has been defined, the Subject Matter Expert and the Automation Engineer can work independently of each other, in parallel or sequentially, depending on the status of the application being tested.

Creating a Component Tree

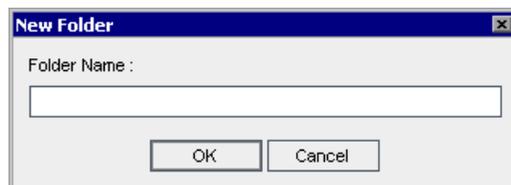
The component tree displays business components in a graphical hierarchy. Icons identify the status of the component and whether it is an automated or manual component. This enables you to easily organize all the components in your project. You can group related components in folders and subfolders, and drag and drop folders or subfolders to other folders in the tree. You can filter the component tree to display only those components you want to view, and you can sort the tree according to your requirements.

At the top level of the component tree is the **Components** root folder, which contains the **Component Requests** folder, the **Obsolete** folder and the business components folders. The **Component Requests** folder contains requests for new components. The **Obsolete** folder contains any components that have been removed from the components folders but are still being used by one or more business process tests.

The **Components** folder, the **Component Requests** folder, and the **Obsolete** folder cannot be renamed or deleted.

To create a component folder in the component tree:

- 1 Access the Business Components module, as described in “About Getting Started with the Business Components Module” on page 44.
- 2 In the component tree, select the **Components** root folder, or another folder in the tree.
- 3  Click the **New Folder** button in the tree toolbar, or right-click and choose **New Folder**. The New Folder dialog box opens.



- 4 Enter a descriptive name in the **Folder Name** box and click **OK**.

Note: Component folder names cannot include any of the following characters:

\ ^ * ;

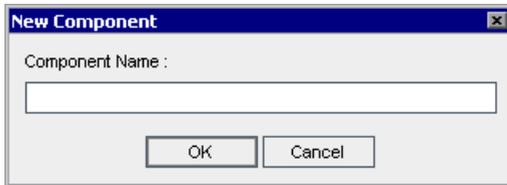
The new folder is displayed under the folder you selected in step 2.

- ▶ To create additional folders at the main level, select the **Components** root folder and repeat steps 3 and 4.
- ▶ To create a subfolder below an existing folder, select the existing folder and repeat steps 3 and 4.

To add a new business component to a folder:



- 1 Select the folder and click the **New Component** button in the tree toolbar, or right-click the folder and choose **New Component**. The New Component dialog box opens.



- 2 Enter a descriptive name in the **Component Name** box and click **OK**. The new business component is displayed under the folder in the component tree. Components in a folder are displayed in alphabetical order. New components are automatically assigned the status of **Under Development**.

Note: Business component names cannot begin or end with a space, exceed 255 characters, or include any of the following characters:

! % * { } \ | ' : " / < > ? ;

- 3 To add additional business components at this folder level, select the folder and repeat steps 1 and 2.

After you have created your business component, you define its shell and content, as described in “Defining Business Components”, below.

Defining Business Components

After you create a business component and select it in the component tree, the six component tabs are displayed. You define the shell of the component by entering the relevant details into the Details, Snapshot, and Parameters tabs, work with manual and automated component steps in the Design Steps and Automation tabs, and view test information in the Used By tab. More information on working with these tabs is provided as follows:

- ▶ **Details tab.** Enables you to provide or view the general details of the business component as well as a summarized description and implementation requirements. For more information, see “Providing Component Details and Implementation Requirements” on page 88.
- ▶ **Snapshot tab.** Enables you to capture an image that helps to describe the business component. For more information, see “Attaching Images” on page 92.
- ▶ **Parameters tab.** Enables you to define input and output component parameters for the component. For more information, see “Defining Input and Output Component Parameters for a Business Component” on page 94.
- ▶ **Design Steps tab.** Enables you to create and view the manual steps of your component. For more information, see “Designing Manual Steps” on page 120.
- ▶ **Automation tab.** Enables you to view and work with the automated steps of your component. For more information, see Chapter 6, “Working with Automated Component Steps.”
- ▶ **Used By tab.** Enables you to view details of the business process tests that include the currently selected business component. For more information, see “Used By Tab” on page 60.

Providing Component Details and Implementation Requirements

You provide or view the general details and attributes of the business component in the upper area of the Details tab. You can enter a summarized description and the implementation requirements of the component in the Description area. You can also enter additional comments in the Discussion Area.

The following details are entered automatically in the Details tab:

- **Component Name.** The name of the component in the component tree.
- **Created By.** The login name of the user who created the component.
- **Creation Date.** The date that the component was created in the component tree.
- **Automation Engine.** How the component was converted to an automated component; QT-KW for a QuickTest keyword-driven component, QT-SCRIPTED for a QuickTest scripted component, WR-AUTOMATED for a WinRunner component, and SERVICE-TEST-AUTOMATED for a Service Test component. MANUAL is displayed for a component that has not been automated.

An example of the Details tab for a component is shown below.

Details	Snapshot	Parameters	Design Steps	Automation	Used By
* Component name: <input type="text" value="Insert order"/>		Automation engine: <input type="text" value="QT-KW"/>		Assigned to: <input type="text" value=""/>	Created by: <input type="text" value="alex_qc"/>
Creation date: <input type="text" value="11/24/2005"/>				Status: <input type="text" value="Ready"/>	
Description:			Discussion Area:		<input type="button" value="Add Comment"/>
<p>Summary Inserts a new order into the Flight Reservations application database. It verifies that the order has been inserted and outputs the order number.</p> <p>Pre-Condition The Flight Reservation window is displayed with the details of a new reservation.</p> <p>Post-Condition The details of the specific order are displayed after a new order is created.</p>			<p>Alex Smith <alex_qc>, 1/17/2006: Use only in new business process tests</p>		<p>B</p> <p><u>U</u></p> <p><i>I</i></p> <p><u>A</u> ▾</p>

To specify general component details:

- 1 In the **Assigned To** box, enter or select the name of the Subject Matter Expert responsible for writing and maintaining the testing steps for this business component. You can click the arrow to search for a specific user in the user list or view users by user group. For more information on selecting a name from a user list, refer to the *HP Quality Center User's Guide*.
- 2 In the **Status** box, you can modify the status of the business component, if required. To do so, select a different status from the list. The icon in the component tree changes dynamically according to your selection.

Available options are:

- ▶ **Error.** The business component has errors that need to be fixed.
- ▶ **Maintenance.** The business component is currently being updated to match changes in the application.

- ▶ **Ready.** The business component is fully implemented and ready to be run.
- ▶ **Under Development.** The business component is currently being developed. This status is assigned automatically when the component is created.

The status can also be modified by the Automation Engineer in the Business Component Settings dialog box in QuickTest, or in the Scripted Component Properties dialog box in WinRunner.

For more information on component statuses, see “Business Component Statuses” on page 50.

To specify implementation requirements:

In the **Description** area, enter a description of the business component’s purpose or contents, and the implementation requirements of the component, such as the pre-conditions and post-conditions of the application before and after running the component.

For keyword-driven and WinRunner components, you can also use this area to specify additional functionality that needs to be provided by the Automation Engineer in the form of new, registered operations.

Note: The Description area provides a comprehensive selection of text editing and formatting commands to assist you in entering the component description. Right-click in the **Description** area to access the commands from the context menu. Choose **Toolbar Visible** from the context menu to display (or hide) commonly used commands in the toolbar.

The information that you enter in the Business Components module **Description** area can be viewed in the Business Component Settings dialog box in QuickTest and in the Scripted Component Properties dialog box in WinRunner.

The information can also be viewed in the Component Details pane of the Test Script tab in the Test Plan module, as described in “Component Details Pane” on page 185.

By default, the Description area provides a basic template of section headings, which can be modified if required.

The default section headings are:

- **Summary.** Enter an overall textual description of the business component's purpose or contents.
- **Pre-Condition.** Describe the point in the flow of the application at which the current business component starts. This generally includes information on which applications should be open or closed, whether the component should launch an application, and/or the state of the application prior to the first step in the component.
- **Post-Condition.** Describe the point in the flow of the application at which the current business component ends. This generally includes information on whether the component steps should close any applications and/or information on the state of the application after the last step in the component. For example, if you want the component to allow iterations, the post-conditions should specify that the application's end state should match its state at the beginning of the component.

To add comments to the Discussion Area:

The **Discussion Area** in the Details tab provides a communication channel between different users of the component.

Enter any additional information or remarks that you want to communicate to the Automation Engineer or other users, such as requests for new operations, future changes planned for the component, or alternative tests in which the component can be used.

You can click the **Add Comment** button to automatically insert your user name and the current server date into the **Discussion Area** as an introduction to your comments.

The Automation Engineer, other component users, or developers can then view the information that you enter. These users may also provide feedback or instructions for you in this area. For more information, see "Component Tree Pane" on page 183.

Note: The Discussion Area provides a comprehensive selection of text editing and formatting commands to assist you in entering your comments. Right-click in the **Discussion Area** to access the commands from the context menu. Choose **Toolbar Visible** from the context menu to display (or hide) commonly used commands in the toolbar.

Attaching Images

A snapshot of a specific part of the application provides a visual cue of the contents or purpose of the business component. You can view the image for each component in a business process test in the Test Script tab of the Test Plan module by clicking the relevant thumbnail image. This can help you to understand the flow of the business process test by viewing the serial flow of these images.

You can capture and attach an image associated with the business component using the Snapshot dialog box, or you can load a previously saved **.png** or **.bmp** image from your local drive.

- ▶ Attaching an image is described in “Attaching an Image to a Business Component” on page 92.
- ▶ Loading a saved image is described in “Loading an Image” on page 93.

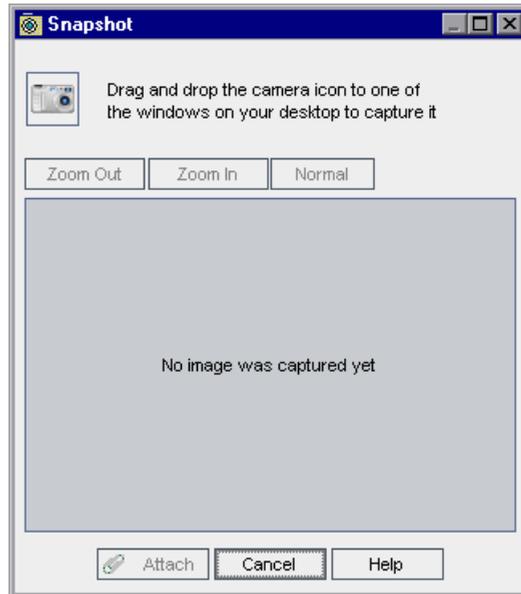
Attaching an Image to a Business Component

You capture and attach an image associated with a business component in the Snapshot tab.

To attach an image to a business component:

- 1** Select the relevant business component in the Test Plan tree and click the **Snapshot** tab.
- 2** Click the **Snapshot** button in the toolbar.

The Snapshot dialog box opens.



- 3 Display the object you want to capture on your desktop. The Snapshot dialog box remains in view.
- 4  Drag and drop the camera icon from the Snapshot dialog box onto the object you want to use for your snapshot image. The image is captured and displayed in the Snapshot dialog box.
- 5 Click the **Attach** button. The image is saved and displayed in the Snapshot tab of the component.

Loading an Image

You can load an image for your component from a local drive.

To load an image for a business component:

- 1 Select the relevant business component in the Test Plan tree and click the **Snapshot** tab.
- 2 Click the **Load from File** button in the toolbar. The Select Snapshot dialog box opens.

- 3 Browse to the location of the snapshot you want to attach and click **Open**.

Note: The image that you attach or load in the Business Components module Snapshot tab can be viewed in the Test Script tab of the Test Plan module, as described in “Test Script Tab” on page 180.

The image can also be viewed or replaced in the Business Component Settings dialog box in QuickTest or in the Scripted Component Properties dialog box in WinRunner.

Defining Input and Output Component Parameters for a Business Component

In the Parameters tab, you can define the input component parameters that the business component can receive and the output component parameters that the component can pass to other components. Input component parameters enable components to use data provided by an external source. Output values enable data from one component to be passed as an input value to a subsequent component in the business process test flow.

Component parameter names, value types, descriptions, and default values in the case of input component parameters, are initially defined in the Business Components module. Actual values for input component parameters are assigned in the Test Plan module and run-time component parameter values are assigned in the Test Lab module.

For more information on working with business component parameters, see Chapter 9, “Working with Parameters.”

Viewing and Modifying Business Components

You can view and modify business components, and component folders, in the component tree or in the component grid. You can also validate components that are included in business process tests to locate any configuration errors.

Note: Component folders are used in the component tree hierarchy, and are not shown in the component grid. References to component folders in these sections are therefore relevant only in the component tree view.

Viewing and Modifying Business Components in the Component Tree

When the Business Components module is first accessed, the component tree displays only the highest level folder or business component in the hierarchy.

- ▶ To expand a folder in the tree, click the expand symbol  to the left of the folder name, or double-click the folder. You can also select the folder, and then right-click and select **Expand All**, or press the asterisk key (*) on the keyboard number pad.
- ▶ To collapse a folder in the tree, click the collapse symbol  to the left of the folder name, or double-click the folder. You can also select the folder, and then right-click and select **Collapse**, or press the minus key (-) on the keyboard number pad.
- ▶ To rename a folder or business component, select the folder or component in the tree and click it, or press F2. Alternatively, right-click it and choose **Rename**. Then edit the item name and press ENTER.

- To move a folder or business component in the tree:
 - Drag and drop the folder or component to the required position in the tree.
 - Or
 - Right-click the folder or component, and choose **Cut**. Then right-click the required folder in which to paste the folder or component and choose **Paste**.
- To modify a component, select it in the tree and then edit the data in the displayed tabs. For more information, see “Defining Business Components” on page 87.



- To refresh a folder or business component in the tree, select the folder or component and click the **Refresh All** button in the toolbar. To refresh all the folders and components in the tree, select the **Components** root folder and click the **Refresh All** button in the toolbar. Alternatively, you can press F5 on the keyboard to refresh the selected folder or component, or CTRL+F5 to refresh all the folders and components in the tree.



- To filter or sort the business components in the tree, click the **Set Filter/Sort** button in the toolbar. Any currently applied filters or sort orders are displayed under the component tree toolbar. For more information on filtering and sorting a tree, refer to the *HP Quality Center User's Guide*.

Viewing and Modifying Business Components in the Component Grid

When the Business Components module is first accessed, components are displayed in the component tree view. To view the component grid, choose **View > Component Grid**.

- ▶ To rename a business component, select the component cell in the **Component Name** column. Then edit the item name and click another cell.
- ▶ To modify other data for a component:
 - ▶ Double-click anywhere in the component row. The Component dialog box opens. Modify the component in the Snapshot, Parameters, or Design Steps tabs. For more information, see “Defining Business Components” on page 87.
 - ▶ Select the relevant cell in the component grid. You can then enter data directly in the cell, or click the arrow button and enter the appropriate data in the box that opens, or choose it from the displayed list or calendar.



- ▶ To filter or sort the business components, click the **Set Filter/Sort** button in the toolbar. You can view any currently applied filters in the filter boxes below the component grid toolbar. If the filter boxes are not displayed, choose **Grid Filters** from the right-click menu.

For more information on filtering and sorting a tree, refer to the *HP Quality Center User's Guide*.

You can also access specific data that you want to view by sorting the components in the component grid into groups.

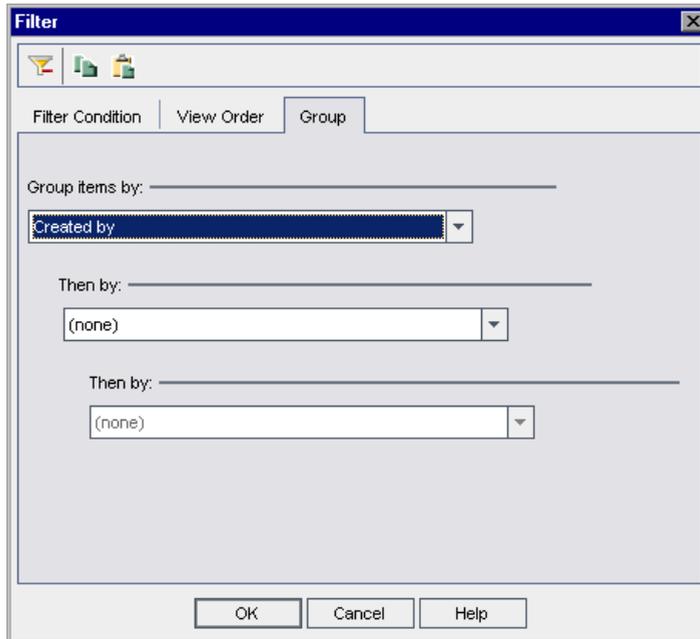
Sorting the Component Grid by Group

You can sort the components in the component grid into groups according to the values that are displayed in the **Assigned to**, **Automation engine**, **Created by**, and **Status** columns. For example, you could sort by the **Created by**, **Status**, and **Assigned to** values to group and display components that you have created, have the status of Ready, and that are assigned to a specific Automation Engineer.

To sort the component grid by group:



- 1 In the component grid, click the **Set Filter/Sort** button in the toolbar. The Filter dialog box opens.
- 2 Click the **Group** tab.



- 3 Select a value from the first sort list.
- 4 If required, select values from the second and third sort lists. Selecting values in this step sorts the data into subgroups.
- 5 Click **OK**. The component grid displays all the components according to your sort specifications.

The example below displays the three components in a project that have status **Error** and were created by the user with the user name **alex_qc**.

Component Name	Status	Assigned To	Created By	Creation Date	Description	Script Type
[-] Status : Error (3 records)						
[-] Created By : alex_qc (3 records)						
[-] Fax order	Error		alex_qc	12/13/2005	Summary Faxes an existing order	MANUAL
[-] Logout	Error	admin	alex_qc	12/13/2005	Summary Closes the Flight Reser	QT-KW
[-] Open order	Error		alex_qc	12/13/2005	Summary Uses information about	GT-KW
[-] Status : Maintenance (6 records)						
[-] Status : Not Implemented (3 records)						
[-] Status : Ready (15 records)						
[-] Status : Under Development (20 records)						

- To expand a group or subgroup, click the expand symbol  to the left of the name, or double-click the row. You can also select the group and press the asterisk key (*) on the keyboard number pad to expand the group and all its subgroups.
- To collapse a group or subgroup, click the collapse symbol  to the left of the name, or double-click the row. You can also select the group and press the minus key (-) on the keyboard number pad to collapse the group and all its subgroups.

Copying Folders and Business Components

You can copy an existing business component or folder and paste it to another location in the component tree or component grid, or to another project or server.

Note: To copy a business component or a folder containing business components to another server, both servers must be running the same version of Quality Center.

Copying Business Components

You can copy a business component to another project on the same server or another server. When you copy a business component, its associated application area is also automatically copied, unless an application area with the same name already exists in the location in which you are copying the component. In this case, it is recommended that you check to ensure that the application area in the new location has the correct settings and resource files for the component you are copying.

Note: Associated application areas are not copied when you copy a component created in an older version of Quality Center to a version 9.0 or later project. In these cases, you must copy the application area and all of its associated resources manually. Otherwise you will be unable to open the component for editing in QuickTest, and business process tests containing these components will fail. For more information on copying application areas, contact the Automation Engineer or Customer Support.

Although the application area, which contains configuration settings and references to associated resources, is copied to another project or server, the actual resource files (shared object repository, function libraries, and recovery scenarios) are not automatically copied. To view the objects in the keyword view (for keyword-driven components), or to run a business process test that contains the component, you must manually copy the BPT Resources folder to the target project in the Test Plan module, using the same relative path and folder names as in the original project.

When copying a business component to another project or server, consider the following:

- ▶ The source and target projects must be opened in separate browsers.
- ▶ If the component path in the target project already exists, and a business component in the copied test matches the name and signature of an existing component (meaning the number of parameters, parameter types, and so on), the existing component is linked to the business process tests that include it, and the original component is not copied.
- ▶ If the signatures do not match, the component is copied and a suffix, for example `_Copy_1`, is automatically added to the component name to create a unique name.
- ▶ For components created in QuickTest Professional 8.2.1, the application area will not be copied if the component had not been opened in QuickTest.

Copying Folders

If a copied folder has the same name as a folder that already exists in the target folder, a duplicate name warning message is displayed. Click **OK**. The folder is copied to the new position in the component tree, and a suffix, for example `_Copy_1`, is automatically added to the folder name.

Components within folders that are copied in the component tree are also copied. All considerations for copying individual components to other projects or servers, as described above, also apply to all components copied when you copy a folder. You can then use the settings and steps of the copied components as the basis for new components.

Note: When you copy and paste a component in the component grid, the component is copied to the same folder in the component tree as the original component. When you paste a component in the component grid of another project, the same folder structure is created, if it does not already exist.

To copy an existing folder or business component:

- 1** If copying to another project or server, open the source and target projects in separate browsers.
- 2** Right-click the folder or business component that you want to copy in the component tree or component grid, and choose **Copy**.
- 3** If you are working in the component tree, right-click the folder in which you want to paste the new folder or business component, and choose **Paste**. The folder or component is copied to the new position in the component tree.

If you are working in the component grid, right-click anywhere in the grid and choose **Paste**. The component is copied to the component grid. The position of a new component pasted to the grid is determined by the currently defined sort order.

- 4** If you want to change the name of the copied folder or business component, right-click the folder or component in the tree, choose **Rename** from the context menu and then enter a new name.
- 5** If required, select the copied business component in the tree, or double-click the component in the grid, and modify the settings in the tabs as described in “Defining Business Components” on page 87.

Validating Business Components

You can validate components that are included in business process tests to locate any configuration errors that could halt the successful running of the tests.

Validating a business component in the Business Components module checks all instances and iterations of the component that are contained in business process tests.



Note: You can also check business process tests for configuration errors. Clicking the **Validate Test** button in the Test Script tab of a business process test in the Test Plan module checks the test and all the test instances within all test sets. For more information, see “Validating Business Process Tests” on page 222.

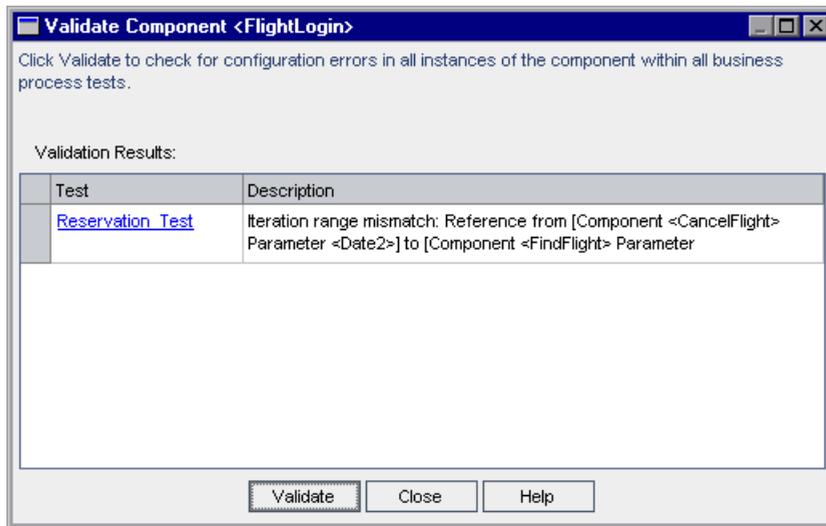
The validation process for business components and business process tests reports the following:

- ▶ **Value type mismatch errors.** Resulting from mismatched input and output component parameter types. For example, an output component parameter defined as a string and the corresponding input component parameter in a subsequent component defined as a number.
- ▶ **Empty parameter value errors.** Resulting from date or number type input component parameters that do not have specified values. For example, an input component parameter without a specific date value.
- ▶ **Iteration range mismatch errors.** Resulting from a difference in the number of iterations in components. For example, where iterations 1 through 4 are selected to run in a component that receives input from a previous component that is iterated only three times.
- ▶ **Not in use warning.** Where there are no business process tests using the currently selected component.

To validate a business component:

- 1 Select the business component in the component tree or component grid.
- 2  Click the **Validate Component** button in the toolbar, or right-click and choose **Validate Component**.

Quality Center validates all instances of the component in all business process tests and reports the results in the Validate Component dialog box, as shown in the example below.



- 3 If a validation error is reported, click the link in the **Test** column to jump directly to the Test Script tab of the relevant business process test in the Test Plan module.

The Validate Component dialog box remains in view, enabling you to fix the displayed errors.

In the Test Script tab, errors are indicated in red text in the **Status** column of the component. In addition, the icon in the **Status** column changes to a yellow icon, as shown in the **FindFlight** component below.

	Component	Status	Input	Output	On Failure
1	Log in	 Ready	2 Component iterations UserName	Name OP2	Continue
2	FindFlight	 Ready Iterations error	Input1: [Log in] OP2 Input2: __		Continue

Note: In the case of a value type mismatch, the error is indicated in the component containing the input component parameter. In the case of an iteration range mismatch, the error is indicated in the later of the components.

- 4 Open the Component Iterations dialog box of the component causing the error, and modify the component parameters as required. For more information on working with business component parameters, see Chapter 9, “Working with Parameters.”
- 5 When you have completed your corrections, click the **Validate** button in the Validate Component dialog box to repeat the validation test. If the error has been resolved, a message is displayed indicating that the validation was successfully completed.
- 6 Click **Close** to close the Validate Component dialog box.

Removing Business Components

You can delete a folder or remove a business component that is not required.

Business components that are not being used by any business process test are permanently deleted. Components that are being used by one or more business process tests are automatically transferred to the **Obsolete** folder. Obsolete business components cannot be copied or modified. For more information on the **Obsolete** folder, see “Understanding the Obsolete Folder” on page 108.



The deletion date and original location of a removed business component in the **Obsolete** folder are shown in the component’s Details tab. Obsolete components are identified in the component grid by an Obsolete icon to the left of the **Component Name** column.

In addition, the component status is shown as Obsolete  in the Test Script tab in the Test Plan module, to indicate that the component should not be used in business process tests.

If you delete a component folder in the component tree, its subfolders and all the business components in the folders are removed. Components contained in the folders that are being used by one or more business process tests are transferred to the **Obsolete** folder.



Note: Business process tests containing one or more obsolete components are assigned the status of **Outdated**, indicating that a more up-to-date component may be required in the test.

Before you choose to remove a business component, you can check whether any business process tests are using that component by selecting it in the tree and clicking the **Used By** tab.

To remove a folder or business component:

- 1 Select the folder or business component in the component tree or component grid and click the **Delete** button in the toolbar, or right-click the folder or component and choose **Delete**. A warning message is displayed.
-

Tip: In the component grid, you can select and then delete more than one business component simultaneously using standard Windows selection techniques (using the CTRL or SHIFT keys). Click to the left of the component row to ensure that the entire row is selected (the row is highlighted), before pressing the required keys. Otherwise, the selection operation will not work.

- 2 Click **OK**. The folder or business component is removed. Components that are currently being used by a business process test are transferred to the **Obsolete** folder.
-



Tip: To view a removed business component in the **Obsolete** folder in the component tree, you must first refresh the folder. Select the **Obsolete** folder and click the **Refresh All** button in the tree toolbar.

Understanding the Obsolete Folder

When you delete business components that are currently being used by one or more business process tests, they are automatically transferred to the **Obsolete** folder.

Business components in the **Obsolete** folder are read-only and cannot be modified, but they can be restored to their original location using the **Restore** option, as described in “Restoring Obsolete Business Components” on page 109. They can also be transferred to any position in the component tree by dragging them from the **Obsolete** folder to the required position.

Note: Business components whose original location folders have been deleted, and component requests that were not previously located in the component tree, can be transferred from the **Obsolete** folder to the component tree using the drag and drop method only.

You can delete business components from the **Obsolete** folder if they are no longer being used by any business process test.

Tip: You can simultaneously delete from the **Obsolete** folder all the business components that are no longer being used by any business process test. Right-click the **Obsolete** folder and choose **Clean unused components**.

Restoring Obsolete Business Components

Business components in the Obsolete folder can be restored to their original position in the component tree, if the folder still exists in the tree.

You can view the folder in which the business component was located when it was last deleted in the **Original Location** box in the component Details tab. The date that the component was deleted is also displayed in the tab.

Details	Snapshot	Parameters	Design Steps	Automation	Used By
* Component name:	Insert order			Assigned to:	
Automation engine:	QT-KW			Created by:	alex_gc
Creation date:	11/24/2005			Deleted on:	1/17/2006
Original Location:	Components\Flight Application			Status:	Ready

To restore a business component, right-click the component in the **Obsolete** folder, and choose **Restore**. The component is restored to its original location in the component tree.

Note: You can also select the component in the **Obsolete** folder and drag it to the appropriate folder in the component tree. This method must be used for business components whose original location folders have been deleted in the component tree.

Handling Component Requests

It is possible that none of the existing business components in the component tree meets the needs of a business process test. If a necessary component has not been defined, a request for a new component can be created and submitted directly from the Test Plan module. This feature is especially useful when the roles of creating components in the Business Components module and building business process tests in the Test Plan module are performed by different personnel.

For more information on creating a component request in the Test Plan module, see “Requesting New Components for Business Process Tests” on page 211.

After a component request has been submitted from the Test Plan module, it is automatically displayed in the Component Requests folder in the component tree of the Business Components module. Component requests cannot be copied or modified in the Component Requests folder.

You can then add the requested business component to a component folder in the component tree, and edit its properties if required. You can also delete the request if an existing component already answers the same needs as the request, or you otherwise determine that the requested component is unnecessary.

Adding Component Requests to the Component Tree

If no existing business component answers the needs defined in the component request, you can drag and drop the request into the appropriate position in the component tree. You can then define the component in the Details, Snapshot, and Parameters tabs, and create component steps in the Design Steps tab, as described in “Defining Business Components” on page 87.

To add a component request to the component tree:



- 1** Click the **Refresh All** button above the component tree to ensure that the most recent component requests are displayed in the tree.
- 2** Select the required component request and drag it to the appropriate folder in the component tree.

The request is displayed in the new position in the tree and its component tabs are displayed. The status of the request changes from **Not Implemented** to **Under Development**.

- 3** To rename the request, select it in the tree and then click it. Alternatively, right-click the request and choose **Rename**. Edit the request name and press ENTER.

Deleting Component Requests

If a requested business component is not required, you can remove the request from the Component Requests folder.

- ▶ Component requests that are not being used by a business process test are permanently deleted.
- ▶ Component requests that are being used by one or more business process tests are automatically transferred to the **Obsolete** folder in the component tree.

Note: Business process tests containing one or more obsolete component requests are assigned the status of **Outdated**.

Before you choose to remove a component request, you can check whether any business process tests are using that component request by selecting it in the Component Requests folder and clicking the **Used By** tab.

Component requests in the **Obsolete** folder are read-only and cannot be modified, but they can be transferred to any position in the component tree by dragging them from the **Obsolete** folder to the required position.

You can delete component requests from the **Obsolete** folder only if they are no longer being used by any business process test.

To delete a component request from the Component Requests folder:

- ✘ **1** Select the component request in the Component Requests folder and click the **Delete** button in the toolbar. A warning message is displayed.
- 2** Click **OK**. The request is removed from the folder. Component requests that are currently being used by one or more business process tests are transferred to the **Obsolete** folder. Component requests that are not currently being used by any business process test are permanently deleted from the project.

To permanently delete a component request:

- 1 Select the component request in the Component Requests folder and click the **Used By** tab to check that the request is not currently being used by any business process test.
-  2 Select the request in the **Obsolete** folder and click the **Delete** button in the component tree toolbar, or right-click the request and choose **Delete**. A warning message is displayed.
- 3 Click **OK**. The component request is permanently deleted from the project.

Setting Permissions for Business Process Testing

Quality Center enables the Project Administrator to control access to a project by defining which users can log in to the project and by specifying the types of tasks each user may perform.

Each project user is assigned to one or more user groups. Each group has a set of permissions that provides access to certain Quality Center modules and tasks, for example, modifying components in the Business Components module. These settings are defined in Quality Center Project Customization.

Setting user group permissions for the Business Components module is described in this section. For more information on managing users, user groups, and permissions in projects in general, refer to the *HP Quality Center Administrator's Guide*.

When setting user group permissions, consider the following:

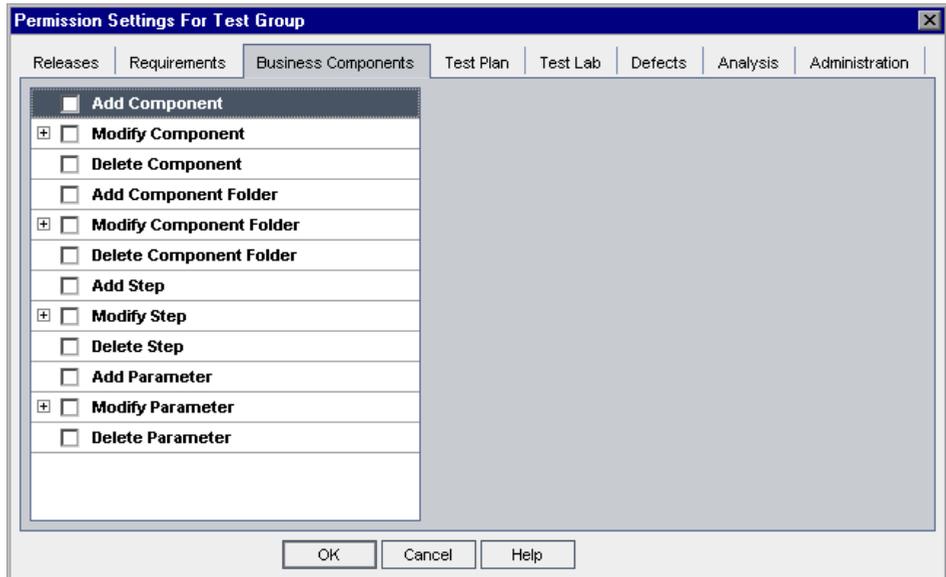
- ▶ To work with component steps, you must have the appropriate Add Step, Modify Step, or Delete Step permissions set. You do not need Modify Component permission to work with component steps. The Modify Component permission enables you to work with component properties (the fields in the component Details tab).
- ▶ To work with parameters in Quality Center or in a testing tool, you must have all the parameter task permissions set in Quality Center.

- To work with application areas in QuickTest, you must have Add Step, Modify Step, Delete Step, and Modify Component permissions in Quality Center. If you do not have permission for all four of these tasks, the application area opens in read-only format.

To set user group permissions:

- 1** In Quality Center, select **Tools > Customize**. The Project Customization window opens.
- 2** Click the **Set Up Groups** link and access the applicable Permission Settings dialog box, as described in the *HP Quality Center Administrator's Guide*.
- 3** Click the **Business Components** tab.

The tab displays the tasks available in the Business Components module.



- 4 Select the tasks that the selected user group can use. For more information on the available tasks, see “Business Component Tasks” on page 114.

When you select a task with a sublevel, a list of associated fields is displayed below the task. All the associated fields are automatically selected. Select or clear the check boxes as required.

When you select a task that can be modified by the owner of the item only, an additional check box option is displayed on the right of the tab. Select this check box as required.

- 5 After you have defined permissions for the selected user group, click **OK** to close the Permission Settings dialog box.
- 6 Click **Apply** to save your changes, or click **Exit** to save your changes and close the Set Up Groups dialog box.

Business Component Tasks

The Business Components tab displays the tasks available to user groups in the module:

Task	Description
Add Component	Add components to the component tree.
Modify Component	Modify component properties. This task enables you to specify the properties (fields) that the selected user group can modify. To ensure that only the owner of the component can modify component properties, select the Can be modified by owner only check box.
Delete Component	Delete components from the component tree. To ensure that only the owner of the component can delete it, select the Can be deleted by owner only check box.
Add Component Folder	Add folders to the component tree.
Modify Component Folder	Modify folder properties in the component tree. This task enables you to specify the properties (fields) that the selected user group can modify.

Task	Description
Delete Component Folder	Delete folders from the component tree. To ensure that only the owner of the folder can delete it, select the Can be deleted by owner only check box.
Add Step	Add steps to the component.
Modify Step	Modify steps in the component. This task enables you to specify the fields that the selected user group can modify.
Delete Step	Delete steps in the component. To ensure that only the owner of the step can delete it, select the Can be deleted by owner only check box.
Add Parameter	Add parameters to the component.
Modify Parameter	Modify parameters in the component. This task enables you to specify the fields that the selected user group can modify.
Delete Parameter	Delete parameters in the component. To ensure that only the owner of the parameter can delete it, select the Can be deleted by owner only check box.

Generating Project Documents

The Quality Center Document Generator enables you to create a Microsoft Word document that includes information about the project's business components.

Note: This section describes how to include information about the project's business components in a document using the Quality Center Document Generator. For detailed information on how to generate project documents, refer to the *HP Quality Center User's Guide*.

Business component documentation can include the following details for each component in the project:

Description. A descriptive summary of each component, including its pre-conditions and post conditions, and its status.

Details. The component's details, including its creation details, status, and whether iterations are allowed.

Snapshot. The snapshot attached to the selected component.

Parameters. Input and output parameter names, descriptions, types, and default values (for input component parameters).

Steps. The steps of the business component.

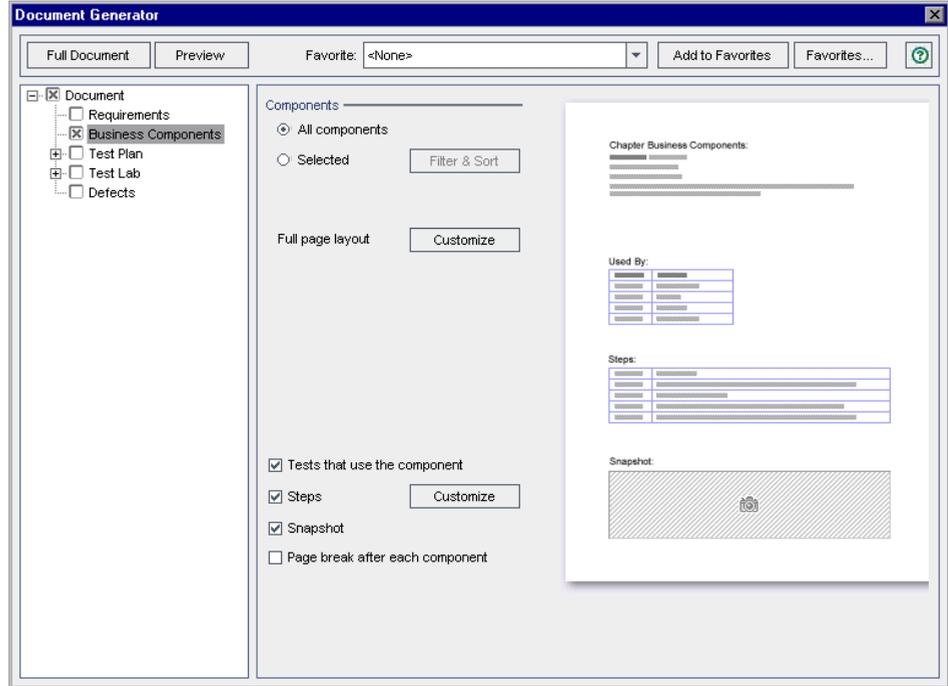
Used By. Details of the business process test or tests that include the business component, including status, creation details, path, and link to the relevant business process test in the Test Plan module.

You use the Components page of the Document Generator to specify the business component information that should appear in the Component section of the project document.

To specify business component data in a generated document:

- 1** Click the **Tools** button on the upper-right side of the Quality Center window. Choose **Document Generator**. The Document Generator opens, displaying a tree comprising check boxes and links.
- 2** Select the **Business Components** check box to add a components section to the document.
- 3** Click the **Business Components** link in the Document Generator tree.

The Components page opens.



- 4 Under **Components**, select one of the following options:
 - **All components.** Includes all the components in the project.
 - **Selected.** Includes only selected components. Click the **Filter & Sort** button to specify the criteria for selecting components. For more information on using the Filter dialog box, refer to the *HP Quality Center User's Guide*.
- 5 Next to **Full page layout**, click the **Customize** button to choose the information that will appear in the document, such as the component status, description, and whether iterations of the component are allowed.
- 6 To include a list of business process tests that use the component, select **Tests that use the component**.
- 7 To include all the steps of the selected components, select **Steps**.

- 8** Next to **Steps**, click the **Customize** button to configure the tabular layout and the step information that will appear in the document, such as the step name, description, and expected result.
- 9** To include any snapshots that are attached to the components, select **Snapshot**.
- 10** To insert a page break after the component section of the project document, select **Page break after each component**.
- 11** Click **Full Document** at the top left of the Components page to continue the document generation and saving procedure. For more information, refer to the *HP Quality Center User's Guide*.

Tip: You can also generate a preview project document to see how the document will look, without all the detail included. To generate a preview document, click the **Preview** button. Quality Center opens Microsoft Word and displays the preview project document.

5

Designing Manual Component Steps

You use the Design Steps tab in the Business Components module to create or modify manual business component content in the form of steps and expected results. You can combine your manual components into business process tests and follow the steps to manually test your application.

This chapter describes:	On page:
About Designing Manual Component Steps	119
Designing Manual Steps	120
Working with Parameters in Manual Steps	127

About Designing Manual Component Steps

The Design Steps tab provides a tabular format in which you can create and modify manual steps in your business components. These steps represent operations that should be manually performed on your application when you run the component in a business process test. You can also provide additional information in the form of expected results and comments.

You can expand the scope of your tests and business components by using variable input and output parameter values in your manual steps. Using variable values in your components can affect test results. When you run your component manually, the parameter is replaced with an assigned value.

Quality Center enables you to create parameters directly from the Design Steps tab and insert them into your test steps.

When you finish designing your manual steps, you can manually perform the steps on the application and compare the expected results to the actual results.

Note: If required, you can use your manual steps as guidelines for creating automated steps at a later time, using an applicable testing tool. You can use your manual steps even before the application is ready to be tested automatically, or before automated tests are complete. For more information, see Chapter 6, “Working with Automated Component Steps.”

Designing Manual Steps

In the Design Steps tab for manual components, you create each step in the component using the Component Step Editor. Each step comprises a step name, a textual description of the procedure to be performed on the application, and the expected result (if any), of performing that step.

You can insert input and output parameters into your steps if required. When you enter parameters, you enclose the parameter names between three sets of <<< >>> brackets. (Parameters that you insert into your steps using the Select Parameter feature are automatically displayed between <<< >>> brackets.)

The steps enable you to run tests containing components manually using the Test Lab module. You can check the actual results in the application against the expected results, and then indicate whether the individual steps of the components passed or failed.

Note: Quality Center recognizes the text between <<< >>> brackets as parameter names, and displays the parameters, or their defined values, for your use when you manually run the component. Therefore it is recommended that you avoid using < or > symbols in parameter names or text in your steps.

You can later convert your manual component to an automated component, if you choose to do so. After you automate a component, you can still view its steps in the Design Steps tab, and you can still run the tests containing this component, manually.

- ▶ If you convert to a scripted component, your manual steps remain editable in the Design Steps tab.
- ▶ If you convert to a keyword-driven component, the Design Steps tab is displayed in read-only format, but you can edit the content of your original manual steps from the keyword view in the Automation tab. Additionally, the documented descriptions of your automated steps are displayed in the Design Steps tab, so you can use these descriptions to run your component manually.

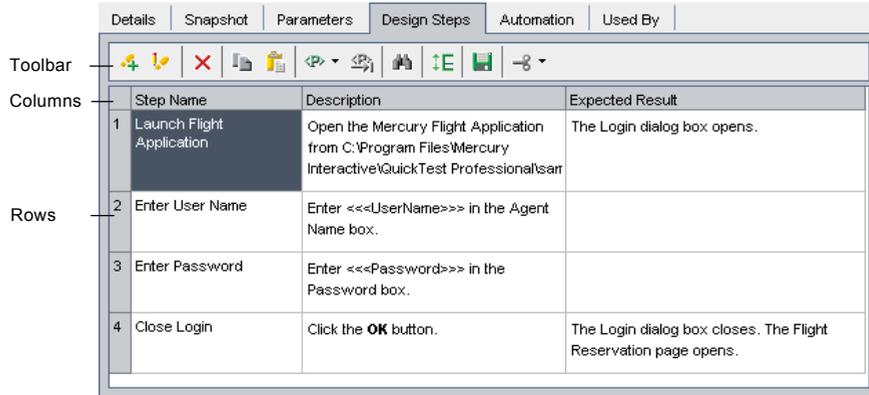
This means that you can update automated components in either Quality Center or a testing tool and still continue to run them manually using the Manual Runner when needed.

For more information on working with automated steps, see Chapter 6, “Working with Automated Component Steps.”

Each manual component step you create comprises a row in the Design Steps tab. For example, you could create the manual component shown below. Its rows contain the steps that are performed to log into the Mercury Flight Reservations sample application:

- ▶ Access the application and open the Login page.
- ▶ Enter the value of the parameter <<<UserName>>> in the **Agent Name** edit box.
- ▶ Enter the value of the parameter <<<Password>>> in the **Password** edit box.
- ▶ Click the **OK** button and open the Flight Reservation page.

The Design Steps tab for the component is displayed as follows.



Designing Manual Steps in the Component Step Editor

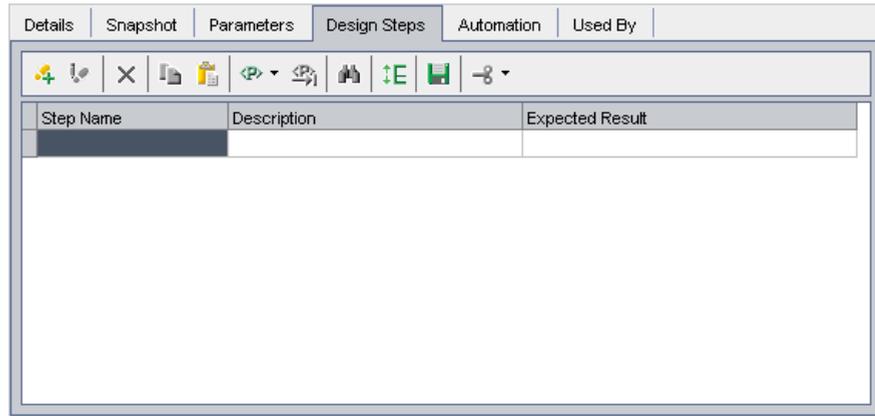
You can use the Component Step Editor to create, modify, copy, and delete manual component steps.

To design manual component steps:

- 1 After you have created and defined a new business component, as described in Chapter 4, “Working with Business Components,” select it in the component tree and click the **Design Steps** tab.

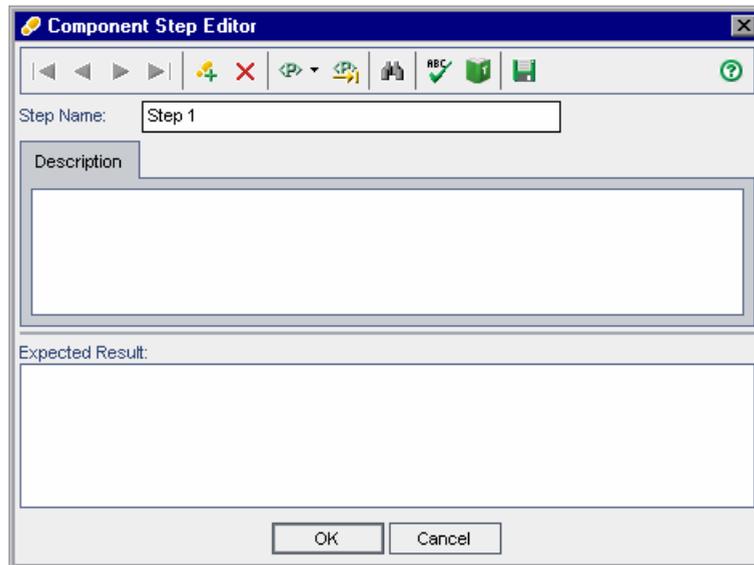
Tip: Manual components in the component tree are indicated by an **M** symbol on the component icon, for example, .

The Design Steps tab for a manual component opens.



2 In the Design Steps tab toolbar, click the **Add New Step** button.

The Component Step Editor opens.



3 In the **Step Name** box, enter a descriptive name for the step.

4 In the **Description** tab, enter a full description of how to perform the first manual step.

- 5 In the **Expected Result** box, enter the expected application response to performing the step.
- 6 If you want to include parameters in the descriptions or expected results of your manual step, enter the parameter name at the appropriate point in the text, enclosed in three sets of <<<>>> brackets. The parameter name is automatically validated when you move to another step.

Note: If you apply any text formatting to the parameter name, you must apply the same formatting to the <<<>>> brackets. If you do not, a validation error message will open when you close the step.



Alternatively, click the **Create/Select Parameter** button at the point in the text where you need to enter a parameter.

- ▶ Choose **Select Parameter** to choose an existing parameter from a list. For more information on inserting parameters in the Design Steps tab, see “Working with the Select Parameters Dialog Box” on page 129.
- ▶ Choose **Create Parameter** to create a new parameter for your component. For more information on creating parameters directly from the Design Steps tab, see “Working with the Create Parameter Dialog Box” on page 127.

Note: For more information on parameters, see Chapter 9, “Working with Parameters.”



- 7 In the Component Step Editor toolbar, click the **New Step** button. The next step of the component opens in the Component Step Editor.
- 8 Repeat steps 3 through 7 until all the required steps in the component and their expected results are described.



- 9 In the Component Step Editor toolbar, you can click the **Save Steps** button while you work to ensure you do not lose any data.

- 10 Click **OK** in the Component Step Editor. The manual steps are displayed in the Design Steps tab.



- 11 In the Design Steps tab toolbar, click the **Save steps** button.

Modifying Manual Steps

In a manual component, you can modify any manual step in the Component Step Editor or directly in the Design Steps tab.

To modify a manual component step in the Component Step Editor:

- 1 In the Design Steps tab, select the step that you want to edit.
- 2 Click the **Edit Step** button in the toolbar. The Component Step Editor opens.
- 3 Edit the step name, description, or the expected result.
- 4 Click **OK**. The modified step is displayed in the Design Steps tab.



- 5 In the Design Steps tab toolbar, click the **Save steps** button.



To modify a manual component step in the Design Steps tab:

- 1 Select a cell in any of the columns in the Design Steps tab.
- 2 Click the cell again to modify the step directly in the tab.

You can press CTRL+Z to undo your most recent change, or press ESC to undo all the changes you made.

- 3 When you have finished modifying the component, click the **Save steps** button in the toolbar.



Copying Manual Steps

When working in the Design Steps tab, you can use the standard editing **Copy** and **Paste** commands in the context-sensitive menu to make it easier to create and modify your steps.

To copy a manual component step:

- 1 In the Design Steps tab, right-click the step and select **Copy**.
- 2 Right-click another step and select **Paste**. The step is positioned below the selected step.
- 3 In the Design Steps tab toolbar, click the **Save steps** button.



Tip: You can also press CTRL+C and CTRL+V to copy and paste your selection.

Deleting Manual Steps

You can delete manual steps if required.

To delete manual component steps:

- 1 In the Design Steps tab, select one or more steps that you want to delete.
- 2 Click the **Delete Step** button in the toolbar. A warning message is displayed.
- 3 Click **Yes** to delete the selected items.
- 4 In the Design Steps tab toolbar, click the **Save steps** button.



Working with Parameters in Manual Steps

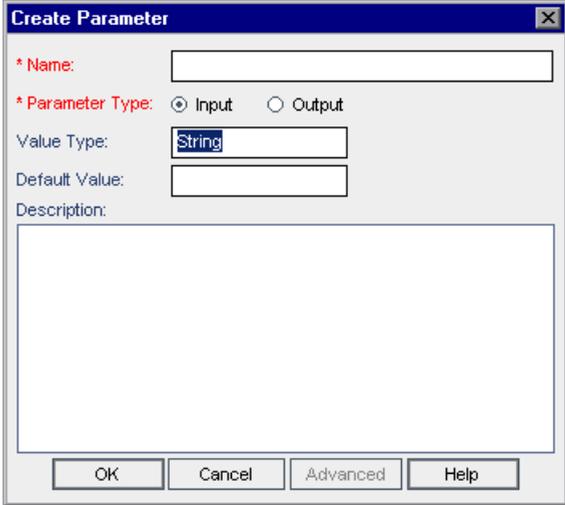
You can define input parameters that pass values into your business component, and output parameters that pass values from your component to later components in the business process test, or from one step to another step later in the same business component. You can then use these parameters to parameterize input and output values in steps.

Generally, you define component parameters in the Parameters tab of the Business Components module. You can also create parameters, and insert them into your component steps, directly from the Design Steps tab.

This section describes how to configure parameters and parameterize input and output values from the Design Steps tab. For more information on component parameters, and how to define them in the Parameters tab, see Chapter 9, “Working with Parameters.”

Working with the Create Parameter Dialog Box

In addition to creating parameters in the Parameters tab, you can create parameters for your component by accessing the Create Parameter dialog box directly from the Design Steps tab, the Component Step Editor, or the Select Parameter dialog box.



The screenshot shows a dialog box titled "Create Parameter" with a close button (X) in the top right corner. The dialog contains the following fields and controls:

- * Name:** A text input field.
- * Parameter Type:** Two radio buttons: "Input" (selected) and "Output".
- Value Type:** A text input field containing the word "String".
- Default Value:** A text input field.
- Description:** A large text area for entering a description.
- Buttons:** Four buttons at the bottom: "OK", "Cancel", "Advanced", and "Help".

The Create Parameter dialog box enables you to enter or select the following details for a new parameter:

- ▶ **Name.** A descriptive name for the parameter.

Note: Component parameter names must begin with a letter, include only English characters, and cannot include spaces or any of the following characters:

! @ # \$ % ^ & * () + = \ { } | ; ' : " , . / < > ? ~ ` [] - ~

- ▶ **Parameter Type.** Indicates whether the parameter is an input or output parameter.

You can click the **Advanced** button to define the following additional properties:

- ▶ **Value Type.** The appropriate value type of the parameter.

The following value types are available in the list:

- ▶ **String.** One or more characters
- ▶ **Boolean.** A True or False value
- ▶ **Date.** A date (in the date format of the local computer)
- ▶ **Number.** Any digit
- ▶ **Password.** An encoded string

For input component parameters, a default value is automatically entered in the **Default Value** box, based on the value type you select.

- ▶ **Default Value.** An input parameter default value must correspond to the value type, and is used when the business component runs if no other value is supplied by the business process test. The Default Value box is available only when you select **Input** as the parameter type.
- ▶ **Description.** A description of the component parameter's purpose, or other descriptive text.

Working with the Select Parameters Dialog Box

You can use the Select Parameter dialog box to insert parameters into new or existing manual steps in the Description or Expected Result columns of the Design Steps tab.

The parameters that you insert are enclosed in three sets of triangle brackets, for example, <<<user_name>>>.

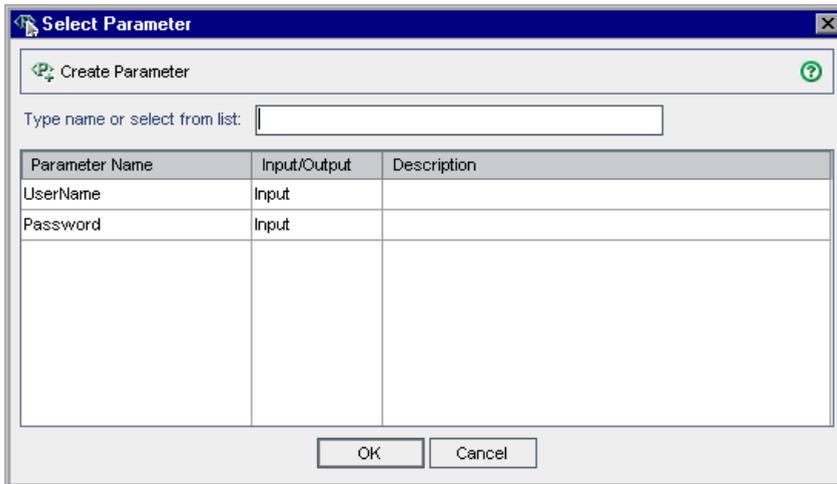
When you run your component manually, the inserted parameter is replaced with the value of that parameter. For example, if mercury was defined as the value for the user_name parameter, then when you run the manual test, the step “Enter <<<user_name>>> in the Agent Name box” would be displayed as “Enter mercury in the Agent Name box”.

Note: For more information on working in the Design Steps tab, see “Designing Manual Steps” on page 120.

To insert parameters into manual steps:

- 1** In the Design Steps tab, click **Add New Step** or **Edit Step** to open the Component Step Editor dialog box.
- 2** Enter the appropriate text for your step in the **Description** area or **Expected Result** area.
-  **3** At the point in the text where you need to enter a parameter, click the **Create/Select Parameter** button in the toolbar and choose **Select Parameter**.

The Select Parameter dialog box opens. The dialog box contains a list of all the existing input and output parameters in the component.



Note: You can search for the parameter you require by entering the name (or the first characters of the name) in the search box.

If the required parameter is not in the list, you can create it by clicking the **Create Parameter** button in the toolbar. For more information, see “Working with the Create Parameter Dialog Box” on page 127.

- 4 Select the required parameter in the list and click **OK**. The parameter is inserted into the text in the Component Step Editor, enclosed in <<< >>> brackets.
- 5 Click **OK** in the Component Step Editor dialog box. The step is inserted in the Design Steps tab.

Notes: You can also add a parameter to an existing step directly in the Design Steps tab.



Enter the appropriate text for your step in the **Description** column or **Expected Result** column. At the point in the text where you need to enter the name of the parameter, click the **Create/Select Parameter** button in the Design Steps tab toolbar and choose **Select Parameter**. Select the required parameter in the **Select Parameter** dialog box, and click **OK**.

Or,



If you know the exact name of the parameter, enter the first characters of the parameter name into your text in the **Description** or **Expected Result** column and press CTRL+K (or click the **Complete Parameter Name** button). The full name of the parameter is completed automatically and enclosed in <<<>>> brackets.

6

Working with Automated Component Steps

You create automated components by converting manual components to automated components. You use the Automation tab in the Business Components module to add or modify business component content in the form of automated steps, operations, and comments.

This chapter describes:	On page:
About Working with Automated Component Steps	134
Automating Components	135
Working with Keyword-Driven Automated Steps	137
Understanding Application Areas	142
Creating Steps in the Keyword View	146
Working with Parameters in the Keyword View	158
Entering Comments in the Keyword View	165
Modifying Component Steps in the Keyword View	167
Using Keyboard Commands in the Keyword View	169
Viewing Scripted Components	170

About Working with Automated Component Steps

The Automation tab provides a graphical format in which to create and modify automated keyword-driven business component steps. These steps represent the operations that will be performed automatically on your application when you run the component using a testing tool.

Notes:

The Automation tab for keyword-driven steps provides similar functionality to the Business Component Keyword View in QuickTest. For a full description of the functionality provided in QuickTest, refer to the *QuickTest Professional for Business Process Testing User's Guide*.

When working with QuickTest scripted components or WinRunner components, the component steps can be viewed or modified only within the relevant testing tool. You can open the tool from the Automation tab.

You can provide additional information in the form of free-text comments. You can mix and match entries in a component by including standard steps, operations, and comments, thereby ensuring that every aspect of the application to be tested is covered, even before the application is ready to be tested.

You can also expand the scope of your tests and business components by using variable input and output parameter values in your business process test. Using variable values in your components can affect test results.

Note: You can create manual components in the Design Steps tab. If required, you can automate the manual components using the applicable testing tool and then use the existing manual steps as guidelines to create automated steps. For more information on manual components and steps, see Chapter 5, “Designing Manual Component Steps.”

Automating Components

When your application is ready to be tested, and all of the required automation resources have been prepared, you can create the automated keyword-driven business component steps required to test your application. You can automate any previously-created manual component steps using the applicable testing tool, and use the manual step operations as guidelines for your automated steps.

The conversion process from manual to automated components is irreversible. However, you can still use the steps in the Design Steps tab to run the component manually, as described in “Running a Business Process Test Manually” on page 273.

For keyword-driven components, you can update the contents of the manual steps in the Design Steps tab only by modifying the automated component in the Automation tab. For scripted components, you can update the steps directly in the Design Steps tab.

To automate manual components:

- 1 Select the manual component in the component tree and click the **Design Steps** tab.

Tip: Manual components in the component tree are indicated by an **M** symbol on the component icon, for example, .



- 2 In the toolbar, click the **Automate component** button. The available automated component types are displayed in a list.

Note: An item in the automated component list is displayed only if the appropriate testing tool add-in is installed.

- 3 Select the applicable component type from the list to automate your manual component. The format of the Automation tab changes to one of the following views, according to your selection.
 - ▶ Selecting **QuickTest Keyword-Driven** converts the component to an automated QuickTest business component. The Automation tab displays the existing manual component steps as **Manual Step** operations in a keyword view format. For more information, see “Working with Keyword-Driven Automated Steps” on page 137.
 - ▶ Selecting **WinRunner** converts the component to an automated WinRunner component. The Automation tab provides a **Launch** button that enables you to view or edit the steps in WinRunner. For more information, see “Viewing Scripted Components” on page 170.
 - ▶ Selecting **QuickTest Scripted** converts the component to an automated QuickTest scripted component. The Automation tab provides a **Launch** button that enables you to view or edit the steps in QuickTest. For more information, see “Viewing Scripted Components” on page 170.
 - ▶ Selecting **Service Test** converts the component to an automated Service Test component. The Automation tab provides a **Launch** button that enables you to view or edit the steps in HP Service Test. For more information, refer to the *HP Service Test User's Guide*.

The content of the Design Steps tab can only be modified for **QuickTest Keyword-Driven** components by editing the automated component in the Automation tab or in QuickTest.

QuickTest Scripted and **WinRunner** components can be modified in the Design Steps tab. However, changes in the Design Steps tab are not reflected in the respective testing tool. Similarly, changes in the testing tool are not reflected in the Design Steps tab.

Working with Keyword-Driven Automated Steps

You create each item in the business component, comprising a step or a comment, as a row in the keyword view format of the Automation tab. A step is an operation to be performed in a business component. After you create a step, you specify its contents. For example, you can choose the object on which the step is performed, specify the operation to be performed in the step, and specify any relevant input or output parameters. When a business process test runs in Quality Center, the steps defined in the associated business components are performed automatically on the application being tested.

Columns in the tab divide the items into individual cells. You can choose which columns to display, and you can modify the contents of the cells, if required. Steps are automatically documented in the **Documentation** column of the Automation tab, providing a plain-language textual description of what the step does in the component.

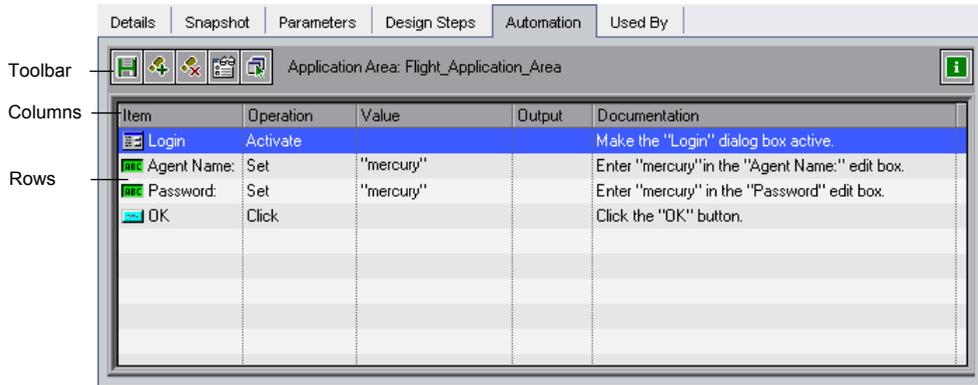
Note: For information on selecting which columns to display in the Automation tab, see “Setting Keyword View Options” on page 138.

Creating business component steps in the Automation tab requires little or no programming or scripting knowledge. The programming required to perform each step of the component is done behind-the-scenes in Business Process Testing.

Each component step you create comprises a row in the Automation tab. For example, the Automation tab could contain rows that show the steps that are performed on the Mercury Flight Reservations sample application. For example:

- The Login dialog box is opened.
- **mercury** is entered in the **Agent Name** edit box.
- **mercury** is entered in the **Password** edit box.
- The **OK** button is clicked.

The **Documentation** column automatically translates each of the steps into understandable sentences.



Setting Keyword View Options

You can select which columns to display in the Automation tab, specify their order, and set the number of columns that remain stationary when you scroll horizontally.

For more information on the available columns, see “Working with Columns in the Automation Tab” on page 71.

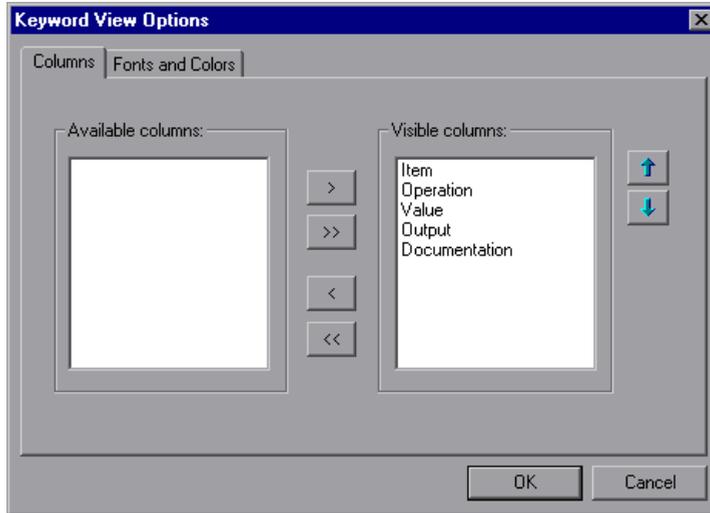
You can also set the font and color of many elements in the Automation tab.

This section describes how to set all of the Automation tab display options:

- ▶ Choosing columns to display or hide
- ▶ Displaying or hiding specific columns
- ▶ Rearranging the position of an individual column
- ▶ Setting text font and color options

To select columns:

- 1 In the Automation tab, click the **View Options** button in the toolbar. The Keyword View Options dialog box opens.



In the Columns tab, the **Available columns** box lists columns not currently displayed in the Automation tab. The **Visible columns** box lists columns currently displayed in the Automation tab.

- 2 Double-click column names, or select column names and click the arrow buttons (> and <), to move them between the **Available columns** and **Visible columns** boxes.

Tip: Click the double arrow buttons (>> and <<) to move all the column names from one list to the other. Select multiple column names (using the SHIFT and/or CTRL keys on your keyboard) and click the arrow buttons (> and <) to move only the selected column names from one list to the other.



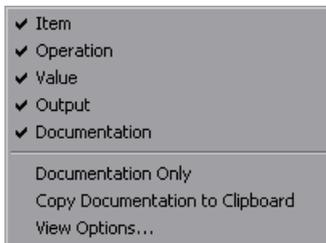
- 3 In the **Visible columns** box, set the order in which columns appear in the Automation tab by selecting one or more columns and then using the Up and Down arrow buttons.

Note: The order of the columns in the Automation tab does not affect the order in which the cells need to be completed for each step. For example, if you choose to display the **Operation** column to the left of the **Item** column, you select the item first, and the **Operation** column list is then refreshed to match the selection you made in the **Item** column.

- 4 Click **OK** to close the dialog box and apply the new column display.

To display or hide specific columns:

- ▶ Display a hidden column by right-clicking the column header row and then selecting the required column name from the displayed menu.
- ▶ Hide a displayed column by right-clicking the column header row and then selecting the column name from the displayed menu.



Tip: You may want to display only the **Documentation** column, for example, if you want to use the steps as instructions for manual testing. You can do this by selecting **Documentation Only**. The **Documentation** column and any comments defined in the business component are displayed.

To rearrange columns:

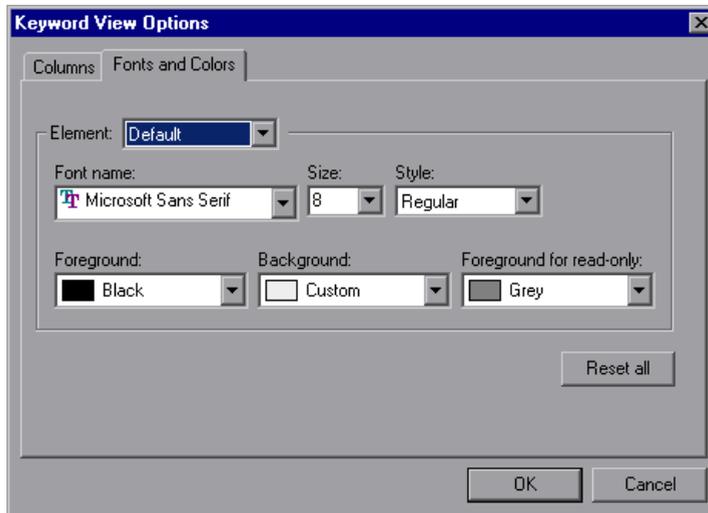
Drag a column header and drop it at a new location. Red arrows are displayed when the column header is dragged to an available location.



Item	Value	Operation	Operation	Output	Documentation
Mercury - QuickTest Professional					
Flight Reservation		Activate			Make the "Flight Reservation" window active.

To set font and color options:

- 1 In the Automation tab, click the **View Options** button in the toolbar. The Keyword View Options dialog box opens. Click the **Fonts and Colors** tab.



- 2 Set the display options according to your preferences.
 - **Element.** Select the rows for which your font and color selections apply;
 - **Default.** Applies your selections to all rows.
 - **Selected Rows.** Applies your selection of text and background color to the currently selected row only.
 - **Alternate Rows.** Applies your selection of a background color to alternate rows.
 - **Comment.** Applies your selections to comment rows.

- **Font name.** Select the font in which the text displays.
- **Size.** Select the font size in which the text displays.
- **Style.** Select the font style; **Regular**, **Bold**, **Italic**, or **Underline**.
- **Foreground.** Select the color in which the text displays.
- **Background.** Select the background color of the rows.
- **Foreground for read-only.** Select the color in which read-only text displays.

Tip: Click **Reset all** to change all your selections back to the default.

- 3 Click **OK** to save your settings.

Understanding Application Areas

The Automation Engineer creates the application area in QuickTest Professional. It contains all of the settings and resources required to create the content of keyword-driven business components for a particular application or part of an application. These include representations of the objects from your application, contained in the shared object repository, and user-defined operations, contained in function libraries. All application area settings are automatically inherited by the business components that are based on that application area.

Depending on your specific requirements, the Automation Engineer may have created multiple application areas, each representing a different area or aspect in your application. It is important that you select the correct application area on which to base your business component. Each application area should have a detailed description to help you to make the correct choice.

When you create a business component and choose an associated application area, the settings and resources that are defined in the current application area are embedded in the component. Therefore, any changes that are made to the application area in QuickTest Professional at a later time are applied directly to the component.

Note: The shared object repository, function libraries and scenario files that comprise an application area are links to the actual repository and files stored in Quality Center. Changes to the stored repository and files affect all the components that reference them, and it is not necessary to update the application area for such changes.

A keyword-driven component must be associated with an application area in order to create steps for it, but you can also change the application area that is associated with a specific business component when required.

Working with application areas is described in the following sections:

- “Choosing the Application Area” on page 144
- “Changing the Application Area” on page 145

For more information on working with application areas in QuickTest, refer to the *QuickTest Professional for Business Process Testing User's Guide*.

Choosing the Application Area

The first stage in adding content to a business component is to choose the associated application area.

A business component that does not have an associated application area displays the following message at the top of the Automation tab:

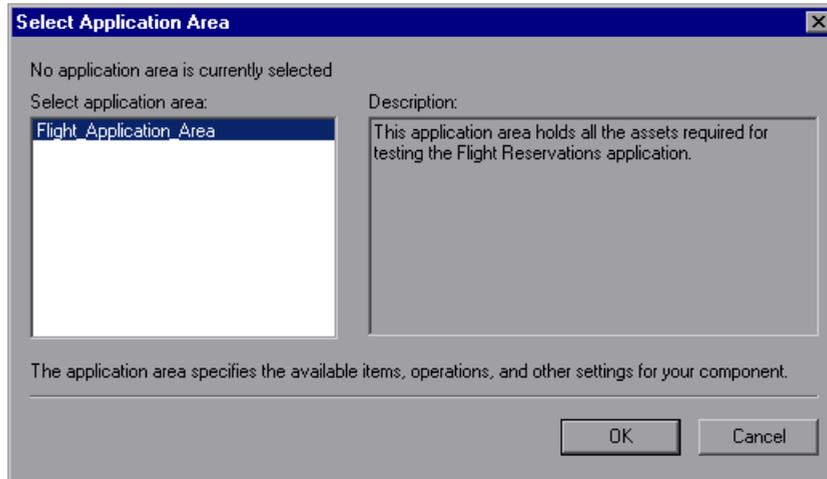
To create steps, you must first select an application area by clicking the Select Application Area button.

Note: You can start to create an automated business component before its application area has been created by the Automation Engineer, by adding comments describing the steps you need to create when the application area is available. However, if the application area has not yet been created, you cannot add keyword-driven steps to your component.

To choose the application area:



- 1 In the Automation tab, click the **Select Application Area** button in the toolbar. The Select Application Area dialog box opens.



- 2 Select the required application area.

- 3 Click **OK** to associate the business component with the selected application area.

All of the application objects in the associated object repository, and any operations defined in associated function libraries, are now available for you to choose when creating your component steps in the Automation tab.

Changing the Application Area

Quality Center enables you to change the application area on which your business component is based, if required.

Note: Changing an application area may affect the business component and prevent it from running correctly. For example, if a component step uses an object that is not contained in the object repository of the new application area, the step will fail.

To change the application area:



- 1 In the Automation tab, click the **Select Application Area** button in the toolbar. The Select Application Area dialog box opens.

The currently selected application area is displayed at the top of the dialog box.

- 2 Select a different application area.
- 3 Click **OK** to base the component on the currently selected application area.

All of the application objects in the new application area, and any user-defined operations, are now available for you to choose when creating your component steps in the Automation tab.

Creating Steps in the Keyword View

You create the sequential steps that comprise your automated business component content by selecting specific objects from the object repository (created in QuickTest Professional by the Automation Engineer). You then select the operation to be performed on each object, and define any required values.

It is important to note that when the business component runs, the context of each step in the component must be set by an earlier step or steps. This means that for an operation on an object to be performed successfully, the object must be currently displayed.

For example, consider a business component that opens an existing order in a flights reservation application. Before the **Customer Name** check box can be clicked in a component step, the following steps must first be performed:

- The application must be opened
and
- The Open Order dialog box must be opened

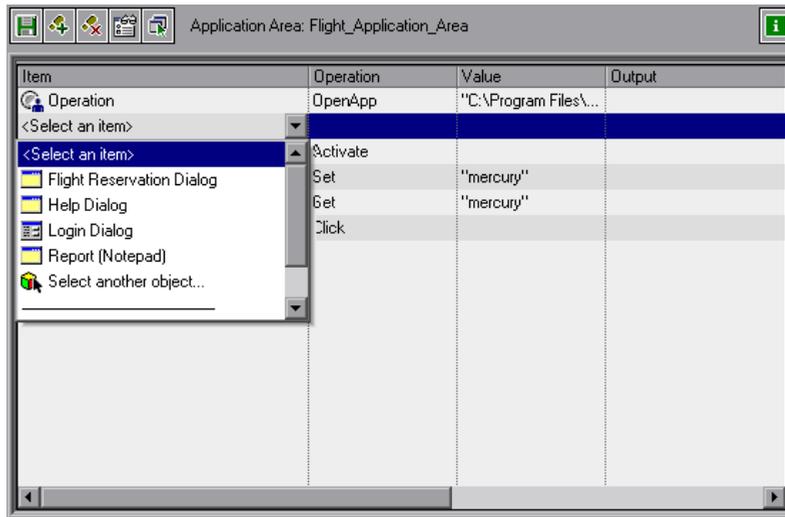
Creating a New Step

After you have selected an associated application area for your component, you can create new automated steps in the Automation tab.

To create a new step in a business component:



- 1 In the Automation tab, select the row after which you want to add the new step and click the **Add Step** button in the toolbar, or right-click and choose **Insert New Step**. The **Select an Item** list opens.



Tip: If no steps are currently defined for your business component, you can click in any of the columns to display the **Select an Item** list and add a new step. If you want to add a step at the end of your component, you can click in any of the columns below the existing steps to add a new step.

You can also press F8 or INSERT on your keyboard to open the **Select an item** menu and add a new step.

- 2 Define the step by clicking in the cell for the part of the step you want to add content, as described below. Each cell in the step row represents a different part of the step.

For each step, you can define the following:

- ▶ **Item.** Either an object on which you perform a step, or a user-defined function (**Operation**). You must select an option from the **Item** column before you can add additional content to a step. For more information, see “Selecting an Item for a Step” on page 149.

Alternatively, you can choose to add a **Comment**, which enables you to add a manual step or other free text information between steps. For more information, see “Entering Comments in the Keyword View” on page 165.

- ▶ **Operation.** The operation to be performed on the item. For more information, see “Selecting an Operation for a Step” on page 154.
- ▶ **Value** (if relevant). The argument values for the selected operation. For more information, see “Defining Values for Operations” on page 154.
- ▶ **Output** (if relevant). The parameter in which output values for the step are stored. For more information, see “Defining Output Values for Steps” on page 156.

- 3 Save the steps as described in “Saving Component Steps” on page 149.

Note: The **Documentation** cell is read-only. This cell displays an explanation of what the step does in a plain-language textual description, for example, Click the “Sign-in” image, or Select “San Francisco” in the “toPort” list. The documentation sentence is displayed only after you have entered the item, operation, and any required values for the selected operation.

The information in Documentation cells is also displayed in the Description column of the Design Steps tab. You can use these Documentation descriptions to run your automated components manually. For more information, see “Running a Test Manually” on page 274.

Saving Component Steps

You must save your component steps and any other changes that you make in the Automation tab. Since changes you make in the Automation tab are not saved automatically, it is recommended that you save them periodically.

To save component steps:



Click the **Save** button in the Automation tab toolbar.

Or

Select another tab in the component, another location in the component tree, or another module.

Tip: You can also export your component steps to a text file, Excel sheet, Word document or HTML document. Right-click in the **Design Steps** tab, choose **Export To** and select the appropriate format from the list.

Selecting an Item for a Step

An item can be an object in the shared object repository, a comment, or it can indicate a function from a function library. (The **Operation** item is available only if functions were added by the Automation Engineer to a function library that is associated with the application area on which your business component is based.)

After you select an item, you specify an operation for it. For more information, see “Selecting an Operation for a Step” on page 154.

This section describes:

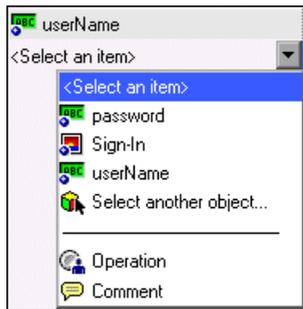
- ▶ “Selecting an Object from the Item List” on page 150
- ▶ “Selecting an Object from the Shared Object Repository” on page 151
- ▶ “Selecting an Operation Item from the Item List” on page 153

In addition to selecting an item or operation in the **Item** cell, you can also select to include a **Comment**. You use the **Comment** option to add notes about your component or to provide information about adjacent steps. For more information on comments, see “Entering Comments in the Keyword View” on page 165.

Selecting an Object from the Item List

The objects available in the **Select an Item** list are the sibling and child objects of the previous step’s object. These objects, for example, the Login dialog box, or User Name text box, are contained in the shared object repository that is associated with the application area on which your business component is based.

If you want to select an item other than a sibling or child object of the previous step’s object, you can choose the **Select another object** item. The example below shows the objects available for the step following a **userName** edit box object.



Notes:

If no application area is associated with the component, and/or no objects are available, only the **Operation** and **Comment** items are included in the **Select an Item** list. Some operation functions, such as **OpenApp**, are available without an associated application area.

If an object included in a step is later removed from the shared object repository by the Automation Engineer, the component run will fail. Objects that are missing from the shared object repository are indicated in the Automation tab by the  icon.

To select an object from the displayed Item list:

- 1** In the Automation tab, click in the **Item** cell, then click the arrow button to display the **Select an Item** list. If you have just created a new step, the list opens automatically as soon as you create the new step.
- 2** In the **Select an Item** list, select the object on which you want to perform the step. The item you select is displayed in the **Item** cell.

You now need to specify an operation for the step. For more information, see “Selecting an Operation for a Step” on page 154.

Selecting an Object from the Shared Object Repository

The shared object repository includes all of the objects that were defined for the application area on which your business component is based by the Automation Engineer in QuickTest Professional. If the object for which you want to add a step is not displayed in the item list, you can select any object from the object repository using the Select Object for Step dialog box.

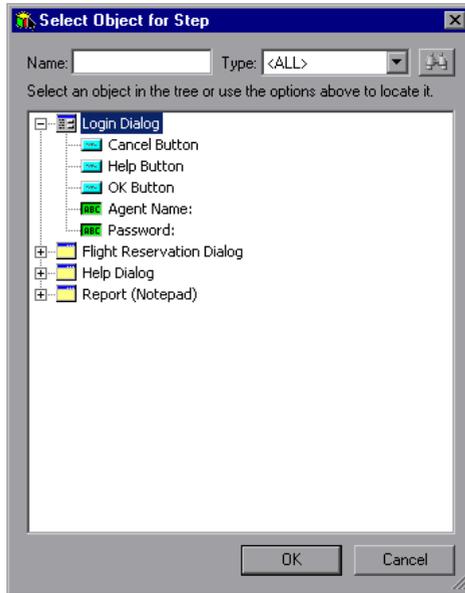
For more information on the shared object repository, refer to the *QuickTest Professional for Business Process Testing User's Guide*.

To select an object from the shared object repository:

- 1** Click in the **Item** cell, then click the arrow button to display the **Select an Item** list. If you have just created a new step, the list opens automatically as soon as you create the new step.

2 In the **Select an Item** list, choose **Select another object**.

The Select Object for Step dialog box opens.



Tip: You can search for the object you require by entering the object name (or the beginning letters of the name) in the **Name** box and clicking the **Find Next** button. You can also limit the number of objects displayed in the list by selecting the type of object you require from the **Type** list, for example, Check Box, or Button.

3 Select an object from the shared object repository tree and click **OK**. The selected object is displayed in the **Item** cell and is also added to the **Select an Item** list.

You now need to specify an operation for the step. For more information, see “Selecting an Operation for a Step” on page 154.

Selecting an Operation Item from the Item List

Operations, or **keywords**, are customized functions that may group together multiple steps, as well as programming logic that can perform a specific task in your application. For example, you can use an operation to open an application at the start of a business component, or check the value of a specific property of an object in your application.

Business Process Testing provides a set of basic keywords for you to use. The Automation Engineer can add to or enhance the keywords in QuickTest Professional. These keywords are derived from built-in methods and properties, as well as user-defined functions associated with the application area. The Automation Engineer manages the keywords and selects which of them should be available in the Item list when creating automated components.

Note: If an operation included in a step is later removed from the application area by the Automation Engineer, the component run will fail. Operations that are missing from the application area are indicated in the Automation tab by the  icon.

For more information on managing keywords, refer to the *QuickTest Professional for Business Process Testing User's Guide*.

To select an Operation item:

- 1 Click in the **Item** cell and then click the arrow button to display the **Select an Item** list. If you have just entered a new step, the list opens automatically as soon as you create the new step.
- 2 In the **Select an Item** list, choose **Operation**. The **Operation** item is displayed in the **Item** cell.

You now need to specify an operation for the step. For more information, see “Selecting an Operation for a Step”, below.

Selecting an Operation for a Step

In the **Operation** cell, you specify the operation to be performed on the item selected in the **Item** column. The available operations vary according to the item selected. The default operation (most commonly-used operation) for the item is automatically displayed in the **Operation** column.

If you select an application object in the **Select an Item** list, the **Operation** list for that object includes built-in operations and any operations that were created by the QuickTest Automation Engineer for that specific object type in the application area's function libraries. For example, if you selected a button object, the list contains the most commonly used methods available for the button object, such as **Click**.

If you select **Operation** in the **Item** column, the list contains the operations defined in the function library or libraries associated with the component's application area. For information on function libraries, refer to the *QuickTest Professional for Business Process Testing User's Guide*.

To select an operation for a step:

In the Automation tab, click in the **Operation** cell, then click the arrow button and select the operation to be performed on the item. The operation can be either a built-in operation or an operation from a function library, depending on the item you selected.

Tip: When you position the cursor over an operation in the list, a tooltip describes the operation.

Defining Values for Operations

The **Value** cell lists the values for the operation arguments. An operation **argument** provides the specific information that an operation uses to accomplish a specific purpose. For example, the argument of an edit box Set operation indicates the specific value to enter in the edit box. The argument numbers for a Click operation can optionally indicate the specific coordinates of the click. A particular operation may have required arguments, optional arguments, or no arguments at all.

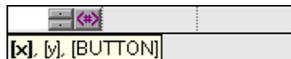
The **Value** cell is partitioned according to the number of possible arguments of the selected operation. Each partition contains different options, depending on the type of argument that can be entered in the partition, as follows:

Argument Partition	Argument Type	Instructions
	String	Enables you to enter any alphanumeric string enclosed by quotes. If you do not enter the quotes, Business Process Testing adds them automatically. If you modify a cell that contains a string enclosed by quotes by removing the quotes, Business Process Testing will not restore the quotes, and the value will be treated as a variable name.
	Integer	Enables you to enter any number, or use the up and down arrows to select a number.
	Boolean	Enables you to select a True or False value from the list.
	Predefined constant	Enables you to select a value from the list.

To define or modify a value:



Click in each partition of the **Value** cell and enter the argument values for the selected operation, or click the parameterization button to parameterize the value. When you click in the **Value** cell, a tooltip displays information for each argument. In the tooltip, the argument for the partition that is currently highlighted is displayed in bold, and any optional arguments are enclosed in square brackets.



You can parameterize the value for an argument using a local or component parameter. For more information, see “Working with Parameters in the Keyword View” on page 158.

Defining Output Values for Steps

For component steps that return an output value, you define the settings in the **Output** cell. This determines where the output value is stored and how it is used during the component run session. When the output value step is reached, each value set for output is retrieved and stored in the specified location for use later in the run session.

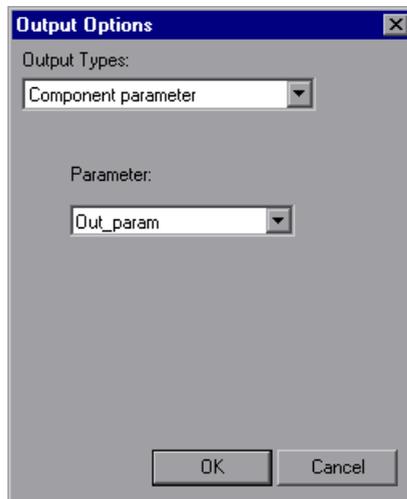
You can modify the output parameter, as required. If you select a local parameter, you can modify its name and description directly in the Output Options dialog box. If you select a component parameter, its name and description are read-only. You can modify the parameter details in the Parameters tab of the Business Components module. For more information on local and component parameters, see “Working with Parameters in the Keyword View” on page 158.

If, after you specify an output value, you choose not to save the output value, you can cancel it. For more information, see “Canceling Output for a Parameter” on page 157.

To configure output for a parameter:



- 1 Click in the **Output** cell of a component step that returns an output value. Click the **Specify parameter for output** button or press CTRL+F11. The Output Options dialog box opens.



Note: The default output type is **Component parameter** if at least one output parameter is defined in the business component Parameter tab. If you select **Local parameter**, the dialog box changes to the Output Options dialog box for a local parameter.

2 In the **Output Types** box, select either **Component parameter** or **Local parameter**.

- ▶ If you select **Component parameter**, the **Parameter** box displays the available component parameters. The information displayed is read-only.
- ▶ If you select **Local parameter**, the dialog box changes to the Output Options dialog box for a local parameter. The **Details** area displays the name and description of the available local parameters. You can select a local parameter and specify the details for it, or create a new local parameter if needed.

For more information, see “Parameterizing Output Values” on page 163.

Tip: If you click in the **Output** cell after you specify an output parameter for an item, the  icon is displayed in the cell for a local parameter, and the  icon is displayed in the cell for a component parameter.

Canceling Output for a Parameter

If you do not want to store the output value for a business component step, you can cancel it.

To cancel output for a parameter:



Click in the **Output** cell. Then click the **Cancel** button or press DELETE on the keyboard to cancel output for the parameter.

Working with Parameters in the Keyword View

You can define input parameters that pass values into your business component, and output parameters that pass values from your component to external sources or from one step to another step. You can also define local parameters for use within the component only. You can then use these parameters to parameterize input and output values in steps.

You can define two types of parameters—**local parameters** and **component parameters**.

Local parameter. A local parameter is defined for a specific business component. It is not accessible by other business components. You define local parameters in the Automation tab using the Value Configuration Options dialog box for input parameters and the Output Options dialog box for output parameters. You cannot delete local parameters, but you can cancel their input or output.

Component parameter. A component parameter whose value is set can be returned to or retrieved from a location outside the component. The values of these parameters can be passed from one component in a business process test to a later one during a business process test run. You define component parameters in the Parameters tab of the Business Components module.

This section describes how to configure local parameters and parameterize input and output values using local and component parameters. For more information on parameters, see Chapter 9, “Working with Parameters.”

After you define a parameter you can use it to parameterize a value. You can also change the parameterized value back to a constant value by entering it directly in the **Value** cell.

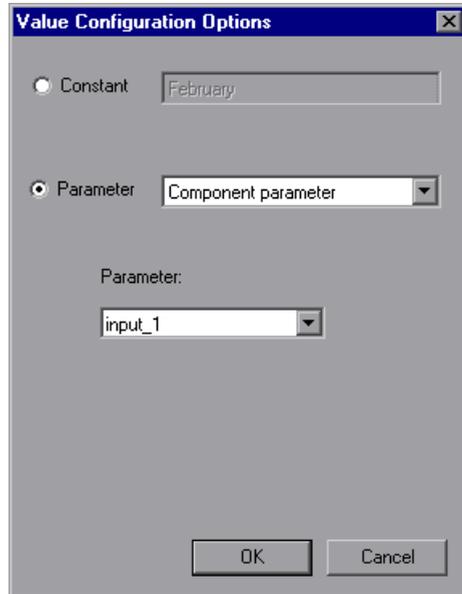
Parameterizing Input Values

In the **Value** cell, you can parameterize input values for a step using local or component parameters.

To parameterize an input value using a local parameter:



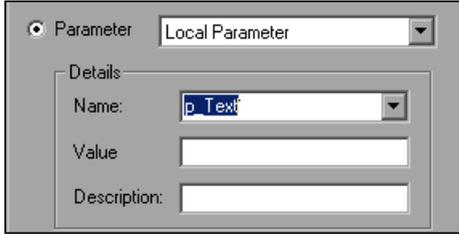
- 1 In the **Value** cell, click the **Configure the value** button or press CTRL+F11. The Value Configuration Options dialog box opens.



If at least one input component parameter is defined in the component, the default input type is **Component parameter**.

- 2 Select the **Parameter** radio button and then select **Local Parameter** from the list.

The details for the local parameter type are displayed.



3 Specify the property details for the local parameter:

- ▶ **Name.** Enter a meaningful name for a new parameter or choose an existing parameter name from the list.
- ▶ **Value.** Enter an input value for the parameter. If you do not specify a value, Quality Center assigns a default value, as follows:

Value Type	QuickTest Default Value
String	Empty string
Boolean	True
Date	The current date
Number	0
Password	Empty string

- ▶ **Description.** Enter a brief description for the parameter.
- 4** Click **OK**. The local parameter is displayed in the **Value** cell of your step. When the business component runs, it uses the value specified in the parameter for the step.

Tips:

You can cancel the parameterization of a value by selecting the **Constant** radio button in the Value Configuration Options dialog box and entering a constant value.

If you click a partition in the **Value** cell of a step after you define a local parameter for it, the  icon is displayed in that partition of the cell.

To parameterize an input value using a component parameter:

- 1 In the **Value** cell, click the **Configure the value** button or press CTRL+F11. The Value Configuration Options dialog box opens.



If at least one input component parameter is defined in the business component, the default input type is **Component parameter** and the default input name is the first input parameter from the Parameters tab of the Business Components module.

Note: If no component parameter is defined, you must define one before you can use it to parameterize an input value. For more information, see Chapter 9, “Working with Parameters.”

- 2** Select the **Parameter** radio button and then select **Component Parameter** from the list. Click the list arrow to view the available component parameters and their descriptions. Select the component parameter you want to use for the parameterized value.
- 3** Click **OK**. The component parameter is displayed in the **Value** cell of your step. When the business component runs, it uses the value specified in the parameter for the step.

Tips:

You can cancel the parameterization of a value by selecting the **Constant** radio button in the Value Configuration Options dialog box and entering a constant value.

If you click a partition of the **Value** cell after you define a component parameter for it, the  icon is displayed in that partition of the cell.

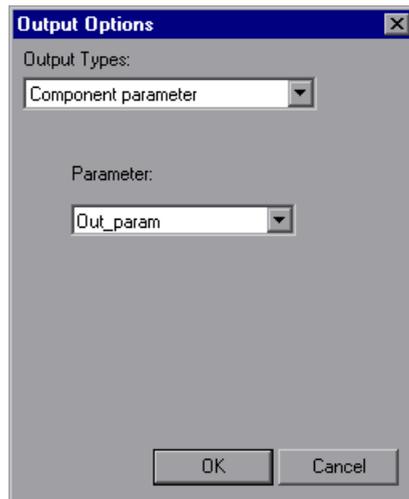
Parameterizing Output Values

You can parameterize output values for a step using local or component parameters in the **Output** cell of a step. You can then use the output parameter value as an input value in a later step in the component, or in a later component in the business process test.

To parameterize an output value using a local parameter:



- 1 In the **Output** cell, click the **Specify parameter for output** button or press CTRL+F11. The Output Options dialog box opens.



If at least one output component parameter is defined in the business component, the default output type is **Component parameter** and the default output name is the first output parameter from the Parameters tab of the Business Components module.

- 2 In the **Output Types** box, select **Local parameter**. The details for the local parameter type are displayed.



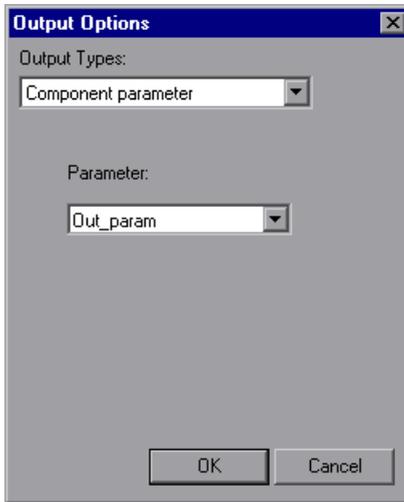
- 3 Specify the property details for the local parameter:
 - ▶ **Name.** Enter a meaningful name for a new parameter or choose an existing parameter name from the list.
 - ▶ **Description.** Enter a brief description for the parameter.
- 4 Click **OK**. The local parameter is displayed in the **Output** cell of your step. When the business component runs, it outputs the value to the output parameter specified for the step.

Tip: If you click the **Output** cell after you define a local parameter for it, the  icon is displayed in that partition of the cell.

To parameterize an output value using a component parameter:



- 1 In the **Output** cell, click the **Specify parameter for output** button or press CTRL+F11. The Output Options dialog box opens.



If at least one output component parameter is defined in the business component, the default output type is **Component parameter** and the default output name is the first output parameter from the Parameters tab of the Business Components module.

Note: If no component parameter is defined, you must define one before you can use it to parameterize an output value. For more information, see Chapter 9, “Working with Parameters.”

- 2** In the **Parameter** box, click the list arrow to view the available component parameters and their descriptions. The details for the component parameter are displayed in read-only format. Select the component parameter you want to use to store the output value.
- 3** Click **OK**. The component parameter is displayed in the **Output** cell of your step. When the business component runs, it outputs the value to the output parameter specified for the step.

Tip: If you click a partition of the **Output** cell after you define a component parameter for it, the  icon is displayed in that partition of the cell.

Entering Comments in the Keyword View

A comment is a free text entry that you can enter on a new line below the currently selected step in a business component. Comments span an entire row in the Automation tab.

The  icon indicates a comment in the Automation tab. You can use comments for several purposes. For example, you may want to use comments to plan steps to be included in a business component before your application is ready to be tested.

Then, when the application is ready, you can use your plan (comments) to verify that every item that needs to be tested is included in the component steps.

You may want to add comments to a business component to improve readability and make it easier to update. For example, you may want to add a comment before each section of a component to specify what that section includes.

After you add a comment, it is always visible in your component, as long as one or more columns are displayed. In addition, as you scroll from side to side across the tab, the comment can always be seen. Comments are not processed when business components run.

Note: After you insert a comment, you cannot change it to a step.

To add a comment to your business component:

- 1 Select a row after which you want to add a comment, click in the **Item** cell and choose **Comment** from the list, or right-click on a component step and select **Insert Comment**.



Note: You can also click the **Add Step** button in the toolbar and choose **Comment** from the list.

A comment row is added below the selected step.

- 2 Enter text in the comment row.

To modify an existing comment:

Double-click the comment. The text box becomes a free-text field. Alternatively, you can click the  icon, which acts as a toggle, making the comment either editable or read-only.

To delete a comment:

Select the comment and click the **Delete Step** button in the toolbar, press the DELETE key on your keyboard, or right-click and choose **Cut** or **Delete** from the context-sensitive menu. The comment is permanently removed from the business component.

Modifying Component Steps in the Keyword View

You can modify any part of a step in the Automation tab. For example, you can change the object on which the step is performed or change the operation to be performed in the step.

Note: Business components that are currently open in another session of Quality Center or in QuickTest or WinRunner are locked and open in read-only mode.

When working in the Automation tab, you can use the standard editing commands (**Cut**, **Copy**, **Paste** and **Delete**) in the context-sensitive menu to make it easier to modify your steps, operations, or comments. You can also drag and drop these items to move them to a different location within a business component.

Moving a Component Step

You can move a step (or other item) to a different location within a business component.

To move a step in the component:

- ▶ In the **Item** column, drag the step up or down and drop it at the required location. The step is positioned below the item over which it is dropped.
- ▶ Right-click the step and select **Cut** to cut it to the Clipboard. Right-click an item and then select **Paste** to paste the step from the Clipboard. The step is positioned below the selected item. You can also use CTRL+X to cut the step and CTRL+V to paste the step.
- ▶ To duplicate a step, right-click it and select **Copy**. Then right-click an item and select **Paste**. The step is positioned below the selected item. You can also use CTRL+C and CTRL+V to copy and paste the step.

Deleting a Component Step

You can delete a business component step (or other item), if required. Before you delete a step, make sure that removing it will not prevent the component from running correctly.

Note: You cannot delete a step if one of its cells is in edit mode.

To delete a step in the Automation tab:

- 1 Select the step that you want to delete.
- 2  Click the **Delete Step** button in the toolbar, press the DELETE key on the keyboard, or right-click and select **Cut** or **Delete**. A warning message is displayed.

Note: A warning message is not displayed when a comment is deleted.

- 3 Click **Yes** to delete the selected item.

Using Keyboard Commands in the Keyword View

If you prefer to use your keyboard, you can use the following keyboard commands to navigate within the Automation tab:

- ▶ You can change the item that is selected by using the up and down arrow keys.
- ▶ You can press F8 or INSERT on your keyboard to open the **Select an item** menu and add a new step below the selected step.
- ▶ You can use the TAB key to move the focus to the right within a single row. In the last cell in the row, the TAB key moves the focus back to the first cell in the same row.
- ▶ You can use the left and right arrow keys to move the focus one cell to the left or right, with the following exceptions:
 - ▶ In the last cell in a row, the right arrow key moves the focus to the first cell in the next row.
 - ▶ In the first cell in a row, the left arrow key moves the focus to the last cell in the row above (if any).
- ▶ When a **Value** cell is selected, press CTRL+F11 to open the Value Configuration Options dialog box.
- ▶ When a row is selected (not a specific cell), you can type a letter to jump to the next row that starts with that letter.
- ▶ When the **Select an item** menu is open, you can type a letter or sequence of letters to move to an object that starts with the typed letter or letters. The typed sequence is highlighted white.

Viewing Scripted Components

The automated steps of scripted components can be edited only in the applications in which the components were automated. They cannot be modified by the Subject Matter Expert in Quality Center.

You can click the **Launch** button in the Automation tab to open the applicable testing tool and edit the scripted component.

Note: The manual steps of a scripted component that was created in Quality Center can be modified in the Design Steps tab and used in manual tests if required.

When you convert a manual component to a scripted component in QuickTest (using the **Automate component** button in the Design Steps tab), your manual steps are converted to `ManualStep` operations in the script in QuickTest. The step name, description, and expected results are displayed in the QuickTest Keyword and Expert views.

When you convert a manual component to a WinRunner scripted component (using the **Automate component** button in the Design Steps tab), your manual step descriptions are displayed as comments in the script in WinRunner.

Note: If you are planning to convert a manual component to a WinRunner component, ensure that no individual manual step exceeds 500 characters.

7

Getting Started with Business Process Testing in the Test Plan Module

You use the Test Plan module to build and configure business process tests by combining business components into an effective testing structure.

This chapter introduces the elements of the Test Plan module that are available for business process tests. Chapter 8, “Managing Business Process Tests” describes how to work with the features and other options available in the Test Plan module.

This chapter describes:	On page:
About Getting Started with Business Process Testing in the Test Plan Module	172
Introducing the Test Plan Module Window	174
Test Plan Module Tabs	178

About Getting Started with Business Process Testing in the Test Plan Module

You create and manage business process tests in the Test Plan module. Business process tests are testing scenarios comprised of a serial flow of the business components created in the Business Components module, as described in Chapter 4, “Working with Business Components.”

Business process tests are used to challenge the application logic by testing the processes on which the whole application is based.

Note: The Test Plan module can be used to design manual tests, manual or automated business process tests, and automated tests using other products, such as WinRunner and QuickTest Professional. The information and procedures described in this chapter are relevant only to Business Process Testing, and are viewed using the Test Plan Tree view of the Test Plan module.

All the standard functionality in the Test Plan module applies to Business Process Testing as well. For more information on using the Test Plan module, refer to the *HP Quality Center User's Guide*.

You access the Test Plan module by clicking the **Test Plan** module button in the Quality Center sidebar.

To access a business process test in the Test Plan module:

- 1 Log in to your Quality Center project as described in the *HP Quality Center User's Guide*. The Quality Center window opens.

Note: After login, Quality Center displays the module in which you last worked.



- 2 Click the **Test Plan** module button in the sidebar. The Test Plan module opens.

If the Test Plan module opens to the **Test Grid**, choose **View > Test Plan Tree** to work with business process tests as described in this chapter.

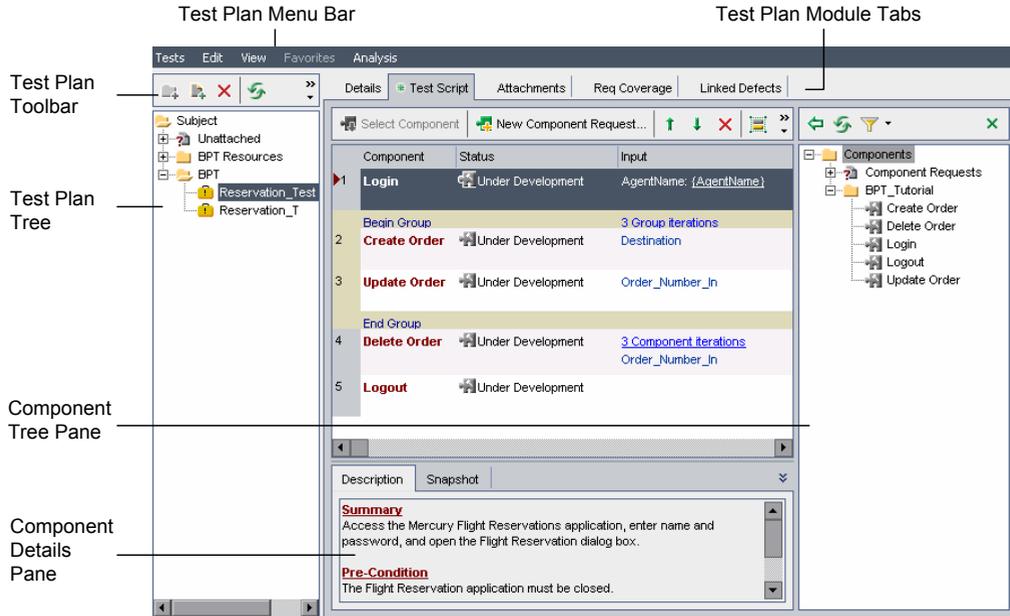


- 3 Select a business process test in the Test Plan tree. The Test Plan tabs are displayed.

Note: The data in the tabs is read-only if no Business Process Testing license is available. In addition, business process tests that are currently open in another session of Quality Center are locked and can be opened only in read-only mode.

Introducing the Test Plan Module Window

The Test Plan module window is shown below, with the Test Script tab selected.



When a business process test is selected in the Test Plan tree, the Test Plan module interface contains the following key elements:

- “Test Plan Menu Bar” on page 175
- “Test Plan Toolbar” on page 175
- “Test Plan Tree” on page 176
- “Test Plan Module Tabs” on page 178

Test Plan Menu Bar

The Test Plan menu bar contains the **Tests**, **Edit**, **View** and **Analysis** menus, from which you can perform Test Plan module commands, such as those for creating and modifying tests, including business process tests, changing the displayed view, and generating reports.

For more information on the Test Plan menu bar, refer to the *HP Quality Center User's Guide*.

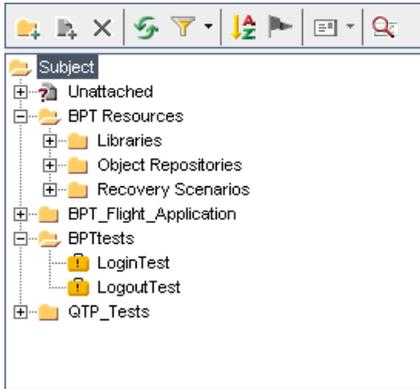
Tip: You can also access many of the menu and toolbar commands by right-clicking in panes or on items in the Test Plan tree to access context menus.

Test Plan Toolbar

The Test Plan toolbar contains buttons for the commands that are commonly used when creating and modifying the Test Plan tree, such as creating or deleting business process tests, refreshing the data, and filtering the tree. For more information on these commands, refer to the *HP Quality Center User's Guide*.

Test Plan Tree

The Test Plan tree is a graphical representation of your test plan, displaying subject folders and business process tests according to the hierarchical relationship of their functions within the business process.



The top level in the Test Plan tree is the **Subject** root folder, which contains the **Unattached** folder, the **BPT Resources** folder, and the test folders. The **Subject** folder and **Unattached** folder cannot be renamed or deleted.

The **BPT Resources** folder contains the business component resources in the project, and it is recommended that you do not delete or rename this folder. You can click the **Set Filter/Sort** or **Sort Folders** buttons in the toolbar to sort the other folders in the tree according to your requirements.

- **Unattached** folder. Contains tests whose folders have been removed from the tree and which have not been assigned to any other folder.
- **BPT Resources** folder. Created automatically by the QuickTest Professional Add-in for Business Process Testing when you create a QuickTest automated component for the first time (or when QuickTest connects to Quality Center for the first time).

This folder contains all the QuickTest resources available for business components in the project, and includes the following subfolders:

- **Libraries**. Contains all the function libraries available for business components in the QuickTest project. Function libraries provide customized operations for business components.

This folder contains the default function library containing operations that can be used when creating business component steps. The Automation Engineer can store additional libraries in this folder.

- ▶ **Object Repositories.** Contains all the shared object repository files available for business components in the QuickTest project. Object repository files define the test objects that can be used in the steps of a business component. This folder contains the **Default.tsr** file, which is the default repository.
- ▶ **Recovery Scenarios.** Contains all the recovery scenario files available for business components in the QuickTest project. Recovery scenarios define special operations to recover from errors and unexpected events during the component run. By default, this folder contains the **DefaultWeb.qrs** file, which is a recovery scenario file that can be used in the Web environment.

You can view the contents of the subfolders of the BPT Resources folder by selecting the folder in the tree and clicking its Attachments tab.

After you have built the basic structure of your plan in the Test Plan tree, you can create business process tests and assign them to the appropriate subjects in the tree. You build the content of a business process test by dragging one or more business components from the component tree and dropping them in the test. For more information, see Chapter 8, “Managing Business Process Tests.”

You then configure the test run details such as input and output component parameter values and iteration preferences. For more information, see Chapter 9, “Working with Parameters.”

Note: Selecting a subject folder in the Test Plan tree displays Description, Attachments, and Live Analysis tabs that enable you to provide a descriptive overview of the folder’s contents, attach appropriate files, URLs or other information, and create a graphical representation of data related to test plans and test sets. For more information on these tabs, refer to the *HP Quality Center User’s Guide*.

Test Plan Module Tabs

Selecting a business process test in the Test Plan tree displays tabs that provide a complete overview of the business process test and its status.

The tabs are described in this section. For general information on the Test Plan module, see “Introducing the Test Plan Module Window” on page 174.

- ▶ “Details Tab” on page 178
- ▶ “Test Script Tab” on page 180
- ▶ “Attachments Tab” on page 186
- ▶ “Reqs Coverage Tab” on page 186
- ▶ “Linked Defects Tab” on page 187

Details Tab

The Details tab for a business process test provides a general description of the test.

The screenshot shows the 'Details' tab selected in a window with other tabs: 'Test Script #', 'Attachments', 'Req Coverage', and 'Linked Defects'. The 'Details' tab contains the following fields:

- Test ID: 1
- Status: Ready
- Creation Date: 3/11/2007
- * Test Name: Create order
- Designer: alex_qc

Below these fields are two sub-tabs: 'Description' and 'Comments'. The 'Description' sub-tab is active and contains the text: "Creates and inserts a new order in the Flight Reservations application."

The following information is displayed in the Details tab:

- ▶ **Test ID.** The unique ID number for the test automatically assigned by Quality Center.

- ▶ **Test Name.** The current name of the business process test. You can edit the name in the Test Plan tree.
- ▶ **Status.** The status of the business process test. This box is read-only because the status of the test is determined by the status of its business components. The test component with the most severe status determines the business process test status. For more information on business process test statuses, see “Understanding Business Process Test Statuses” on page 195.
-  ▶ **Designer.** The user responsible for designing the business process test. By default, the user who created the test is displayed in this box. You can select another user from the list, if required. Clicking the e-mail button enables you to send an e-mail message about the test to the specified designer.
- ▶ **Creation Date.** The date that the business process test was created.
- ▶ **Description tab.** A free text edit area enabling you to enter an overall textual summary of the business process test’s purpose.
- ▶ **Comments tab.** A free text edit area enabling you to enter any additional information or remarks that you want to communicate to other users, such as future changes planned for the test, or alternative tests in which the components can be used. You can click the **Add Comment** button in the tab to automatically insert your user name and the current server date into the area as an introduction to your comments.

User Defined Fields

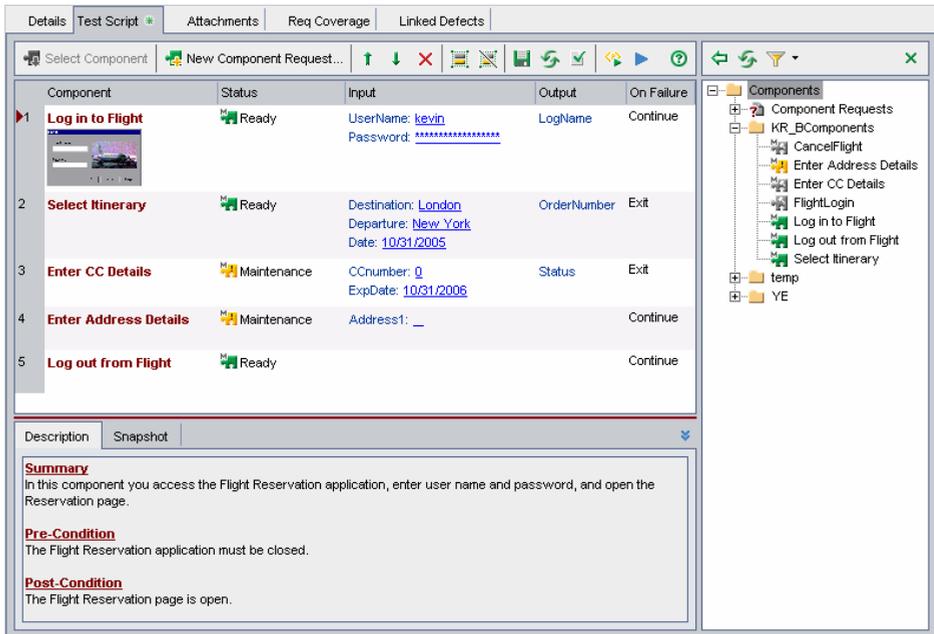
If relevant test fields were defined in the Project Customization window in Quality Center, the Required Test Fields dialog box opens when a new test is created. These fields are displayed in the Details tab.

For more information on user defined fields, refer to the *HP Quality Center Administrator’s Guide*.

For more information on the Details tab for a business process test, see “Providing Test Details” on page 194.

Test Script Tab

The Test Script tab enables you to build the structure of the business process test by adding one or more business components, created in the Business Components module or in a testing tool such as QuickTest Professional or WinRunner. You can also use this tab to configure values for input, output, and run-time component parameters, validate tests, run the test in debug mode, and generate requests for additional business components that you require for your test creation needs.



The tab includes an icon  next to the tab name if the selected business process test contains one or more business components.

The Test Script tab comprises the Test Flow Pane, the Component Tree Pane, and the Component Details Pane.

Test Flow Pane

For each business component in the business process test, the Test Flow pane displays the name, status, input and output component parameters, and whether the test will continue if the component fails during the test run.

Component	Status	Input	Output	On Failure
1 Log in to Flight 	Ready	UserName: kevin Password: *****	LogName	Continue
2 Select Itinerary	Ready	Destination: London Departure: New York Date: 10/31/2005	OrderNumber	Exit
3 Enter CC Details	Maintenance	CCnumber: 0 ExpDate: 10/31/2006	Status	Exit
4 Enter Address Details	Maintenance	Address1: _		Continue
5 Log out from Flight	Ready			Continue

The Test Flow pane toolbar contains the following toolbar buttons:

- ▶ **Select Component.** Opens the component tree pane on the right side of the tab, comprising the business components defined for the project. This is the same tree as is shown on the left side of the Business Components module. For more information on building a business process test from these components, see “Building Business Process Tests” on page 193.
- ▶ **New Component Request.** Enables you to request a new business component. For more information on generating a request for a new component, see “Requesting New Components for Business Process Tests” on page 211.
- ▶ **Move Component Up/Move Component Down.** Enables you to change the testing order in the business process test by moving a selected component up or down in the test. If you select a group border, you can move the border to include or exclude an adjacent business component.





- ▶ **Remove Selected Components from Test.** Removes the selected business component from the business process test. The component is still available for future use, if required, from the component tree pane.



- ▶ **Group Components.** Creates a new group that includes the selected business components. For more information, see “Working with Component Groups” on page 201.



- ▶ **Ungroup Components.** Removes the selected group, or the grouping in which the selected business component (or components) is a member.



- ▶ **Save.** Saves the business process test. The business process test is also saved automatically when another tab is opened, another location is selected in the Test Plan tree, or another module is opened.



- ▶ **Refresh.** Updates the data, such as the component parameter data and snapshot, for each business component in the business process test. The test itself is not updated.



- ▶ **Validate Test.** Checks the business process test and all the test instances within the test set for configuration errors. For more information, see “Validating Business Process Tests” on page 222.



- ▶ **Run-Time Parameters.** Enables you to view or edit run-time component parameters for the selected business component. For more information, see Chapter 9, “Working with Parameters.”



- ▶ **Run or Debug Test.** Enables you to run and debug an automated business process test. For more information, see “Debugging Tests in the Test Plan Module” on page 293.

Test Flow Pane Context Menu

The right-click context menu in the Test Flow pane includes many of the above options, as well as the following commands, which provide additional functionality and information about the business process test:

- ▶ **Edit Component.** If you select a business component, jumps to the selected component in the Business Components module, so that you can view or modify its details. If you select a component request, opens the component request tabs, so that you can edit the request.
- ▶ **Iterations.** Opens the Component Iterations dialog box for the selected business component.

- ▶ **Output Parameters.** Opens the Output Parameters dialog box for the selected business component.
- ▶ **Grouping.** Opens a submenu with the following options:
 - ▶ **Group Components.** Creates a new group that includes the selected business components.
 - ▶ **Ungroup Components.** Removes the selected group, or the grouping in which the selected business component (or components) is a member.
 - ▶ **Move Group Up (CTRL+U).** Moves the selected group up in the test.
 - ▶ **Move Group Down (CTRL+D).** Moves the selected group down in the test.

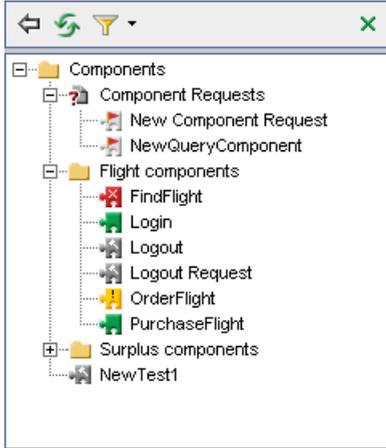
For more information, see “Working with Component Groups” on page 201.

- ▶ **Hide Snapshots.** Toggles to display or hide the thumbnail snapshot images (if any) attached to the business components in the pane. Click the thumbnail to view the image at normal size.
- ▶ **Display All Parameters.** By default, a maximum of three input or output component parameters for each business component is displayed in the pane. More than three defined component parameters is indicated by an ellipsis (...) in the **Input** or **Output** columns. You can choose **Display All Parameters** to expand the space allocated to each business component in the test flow pane and ensure that all component parameters are visible. Choose **Display All Parameters** again to return to the default.

Component Tree Pane

The Component Tree pane can be optionally displayed on the right side of the Test Script tab. The tree displays the hierarchical structure of all business components in the project. The **Component Requests** branch in the tree shows any additional components that may have been requested from the Test Plan module.

An example of the Component Tree pane is shown below:



Right-click any of the business components in the tree and select **Properties** to open the Component dialog box. This dialog box comprises several tabs that provide a read-only view of the settings defined in the Business Components module. In the Details tab, you can see any additional comments that were provided by the Subject Matter Expert.

For more information on the tabs and settings shown in this view, see “Defining Business Components” on page 87.



You use the Component Tree pane to build a business process test by dragging and dropping one or more business components or component requests from the tree into the Test Flow pane (or by clicking the **Add Component to Test** button in the Component Tree pane toolbar).

If the Component Tree pane is not visible, click the **Select Component** button in the Test Script tab toolbar.

The Component Tree pane contains the following toolbar buttons:



- **Add Component to Test.** Adds the selected business component after the component selected in the business process test in the Test Script pane (or at the end of the test if no component is selected).



- **Refresh Selected.** Updates the data in the Component Tree pane.



- **Set Filter/Sort.** Enables you to filter and sort the business components in the tree. For more information on filtering and sorting a tree, refer to the *HP Quality Center User's Guide*.



- **Close.** Closes the Component Tree pane.

Component Details Pane

The Component Details pane contains the Description and Snapshot tabs and can be optionally displayed at the bottom of the Test Script tab.



The **Description** tab displays the defined description of the business component in read-only format.

For more information on editing or entering implementation requirements for a business component, see “Providing Component Details and Implementation Requirements” on page 88.

The **Snapshot** tab displays the full-sized image of the snapshot attached to the business component. For more information on adding a component snapshot image, see “Attaching Images” on page 92.



If the Component Details pane is not visible, click the **Show/Hide** button at the bottom-right of the Test Script tab. Click the button again to hide the pane.

For more information on the Test Script tab for Business Process Testing, see “Building the Test Structure” on page 197.

For more information on other test types, refer to the *HP Quality Center User's Guide*.

Attachments Tab

The Attachments tab enables you to associate an attachment with a business process test. An attachment can be a file, URL, snapshot, or system information, and is identified by its name, associated application icon, size, and latest modification date and time. The tab also contains a **Description** area that enables you to enter a description of the selected attachment.

The Attachments tab includes an icon  next to the tab name if the selected test has any attachments.

You can select an attachment to view its description in the Description area, or double-click an attachment to launch it in the appropriate application.

The Attachments tab for business process tests has the same functionality as the Attachments tab for other test types. For more information on adding attachments, refer to the *HP Quality Center User's Guide*.

Reqs Coverage Tab

The Reqs Coverage tab enables you to define requirements coverage by linking your business process tests to requirements. Requirements specify the testing objectives in Quality Center by describing what must be tested in the application to assess its operation or usability. Testing requirements are created in the Requirements module of Quality Center.

The tab provides a list of all the testing requirements defined in the Requirements module, and enables you to map the specific requirements that are covered by the currently selected business process test to that test. This enables you to methodically build your business process tests according to preplanned requirements, and also to review the extent to which your tests cover these testing requirements.

The tab includes an icon  next to the tab name if the selected test includes requirements coverage.

The Reqs Coverage tab for business process tests has the same functionality as the Reqs Coverage tab for other test types. For more information on linking requirements to a test, refer to the *HP Quality Center User's Guide*.

Linked Defects Tab

The Linked Defects tab enables you to add and link defects to your business process tests.

The Linked Defects tab includes an icon  next to the tab name if the selected test has any defects.

The Linked Defects tab for business process tests has the same functionality as the Linked Defects tab for other test types. For more information on linking defects to a test, refer to the *HP Quality Center User's Guide*.

8

Managing Business Process Tests

This chapter describes how to create and manage business process tests in Quality Center.

This chapter describes:	On page:
About Managing Business Process Tests	190
Creating Business Process Tests	191
Building Business Process Tests	193
Working with Component Groups	201
Requesting New Components for Business Process Tests	211
Working with Business Process Tests	219
Generating Documents for Business Process Tests	226

About Managing Business Process Tests

You create and manage business process tests in the Test Plan module of Quality Center.

You define the details and description of the test, and then build up the test structure into a serial flow of business components in a specific business process. You can also define whether a business process test run continues or ends if a specific component in the test fails.

Input and output component parameters allow business components to use variable values that affect the test results and pass values between components in the business process test. In the Test Plan module, you configure input and output values for individual components in the test, and the number of iterations for each component.

You can attach appropriate files, snapshots, and URLs to provide additional information about the business process test, and link the test to preplanned project requirements.

If a business component that is necessary for a business process test has not yet been defined in the Business Components module, you can create a component request. You can use the requested component in the test you are building, and it also acts as a signal to add a new business component to the project.

Quality Center enables you to generate a document about your project and business process test, which includes detailed information about the project's requirements, planning, test list, test set folders, and defect tracking data.

Creating Business Process Tests

You create business process tests by providing the overall details of the test and building a serial flow of business components. You can also attach appropriate files and link the test to project requirements.

To create a business process test:

- 1 Access the Test Plan module, as described in “About Getting Started with Business Process Testing in the Test Plan Module” on page 172.

Note: Each business process test must be created in a folder or subfolder in the Test Plan tree. Steps 2 through 4 below describe the creation of a folder to contain the test. If you do not need to create a new folder, select the existing folder in which you want to store the business process test and proceed to step 5.

- 2 Select the **Subject** root folder, or another folder or subfolder in the Test Plan tree in which you want to create a new folder.



- 3 Click the **New Folder** button in the toolbar above the tree, or right-click a folder and choose **New Folder**. The New Folder dialog box opens.



- 4 In the **Folder Name** box, enter a descriptive name for the folder and click **OK**.

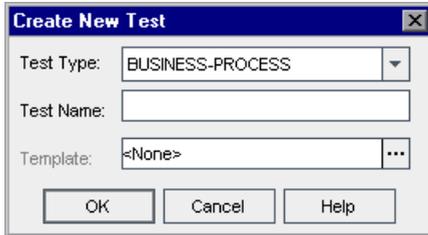
Note: The names of business process test folders cannot include any of the following characters:

\ ^ * ;

The new folder is displayed as a subfolder of the selected folder in the tree.



- 5 Select the folder in which you want to create the business process test and click the **New Test** button in the toolbar above the Test Plan tree, or right-click the folder and choose **New Test**. The Create New Test dialog box opens.
- 6 From the **Test Type** list, select **BUSINESS-PROCESS**.



- 7 In the **Test Name** box, enter a descriptive name for the business process test.

Note: Business process test names cannot include any of the following characters:

\ / : " ' ? ' < > | * % ;

- 8 Click **OK**. The new business process test is added to the selected folder in the Test Plan tree.

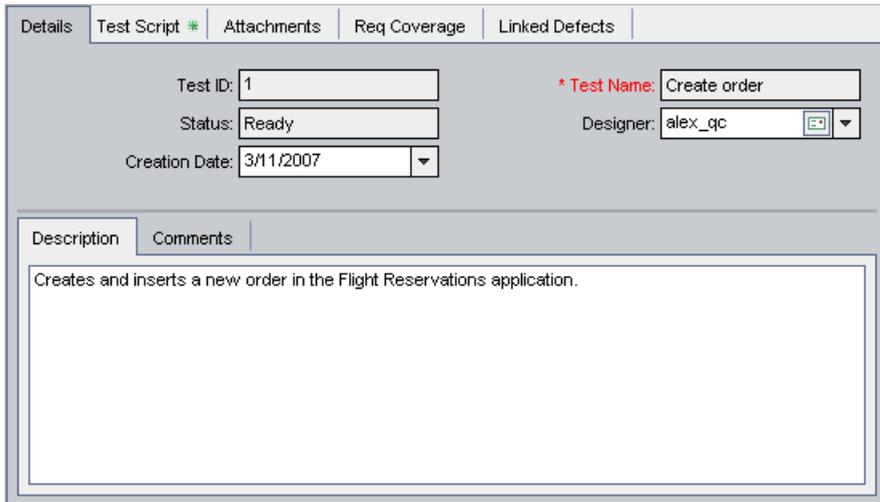
Building Business Process Tests

After you create a business process test and select it in the Test Plan tree, you can use the following tabs to plan and design the test.

- ▶ **Details tab.** Enables you to enter details and a description of the currently selected business process test. For more information, see “Providing Test Details” on page 194.
- ▶ **Test Script tab.** Enables you to build the structure of the business process test by adding one or more business components created in the Business Components module or other testing tool. For more information, see “Building the Test Structure” on page 197.
- ▶ **Attachments tab.** Enables you to associate any file with a business process test as an attachment. For more information, refer to the *HP Quality Center User's Guide*.
- ▶ **Reqs Coverage tab.** Enables you to link predefined testing requirements to your business process tests. For more information, refer to the *HP Quality Center User's Guide*.
- ▶ **Linked Defects tab.** Enables you to link defects to your business process tests. For more information, refer to the *HP Quality Center User's Guide*.

Providing Test Details

In the Details tab, you provide general information about the business process test.



The screenshot shows a software interface with a 'Details' tab selected. The interface contains several input fields and a description area:

- Test ID:** 1
- Status:** Ready
- Creation Date:** 3/11/2007
- * Test Name:** Create order
- Designer:** alex_gc
- Description:** Creates and inserts a new order in the Flight Reservations application.

Notes:

The **Test Name** box displays the current name of the business process test. You can edit the name in the Test Plan tree by selecting it in the tree, and then clicking it again to activate the test name label for editing. Alternatively, right-click it in the tree and choose **Rename**. Then edit the item name and press ENTER.

The status in the **Status** box is read-only because the status of a business process test is determined by the status of its business components. For more information on test statuses, see “Understanding Business Process Test Statuses” on page 195. For more information on component statuses, see “Component Tree” on page 49.

To provide general test details:

- 1** From the **Designer** list, select the Subject Matter Expert responsible for designing the business process test. By default, the user who created the test is displayed in the **Designer** box.
- 2** In the **Description** area, enter a description of the business process test's purpose or any other relevant text.

Note: The Details tab provides a comprehensive selection of text editing and formatting tools to assist you in entering the business process test description. Right-click in the **Description** area to access the formatting commands from the context menu. Choose **Toolbar Visible** from the context menu to display (or hide) commonly used commands in the toolbar.

Understanding Business Process Test Statuses

Business process tests and their statuses are identified in the Test Plan module tree by specific icons, and in the **Status** box in the test's Details tab. The icons are colored and the symbols shown in the icons vary according to the status of the business process test. For example, a green **Ready** icon indicates that all the business components in the test are ready to be run, and a red **Error** icon indicates that at least one component has one or more errors that require attention.

The status of a business process test is set to **Design** when the test is created, and changes to **Maintenance** when it has been modified. The status is subsequently determined by the business component in the test with the most severe status. For example, suppose you have a business process test that contains:

- 2 **Ready** components
- 1 **Maintenance** component
- 1 **Under Development** component
- 1 **Error** component
- 1 **Under Development** (requested) component

In this example, the test status is **Error**, because **Error** is the most severe status of a business component in the test.

If one of the business components was deleted and moved to the **Obsolete** folder in the component tree, then the test status would change to **Outdated**, because an Obsolete component is more severe than the **Error** status.

Business process test statuses and their corresponding icons are described in the following table, from the least severe status to the most severe status:

Status	Icon	Color	Description
Ready		Green	All the business components included in the business process test have Ready status, indicating that they are fully implemented and ready to be run.
Maintenance		Yellow	<p>The business process test has been modified since it was created, or one or more business components included in the test are being modified or are not yet complete, and have Under Development or Maintenance status (and no components in the test have a more severe status).</p> <p>The Under Development component status is initially assigned to:</p> <ul style="list-style-type: none"> ▶ New components created in the Business Components module. ▶ Component requests dragged into a component folder in the component tree.

Status	Icon	Color	Description
Error		Red	One or more business components included in the business process test have Error status, indicating that they have errors that will or may cause a test run to fail.
Outdated		Gray	One or more business components included in the business process test are Obsolete , indicating that they are outdated and are included in the Obsolete folder in the component tree in the Business Components module.

Note: Tests created in other testing tools can also be included in the Test Plan module tree, and are identified by other icons.

Building the Test Structure

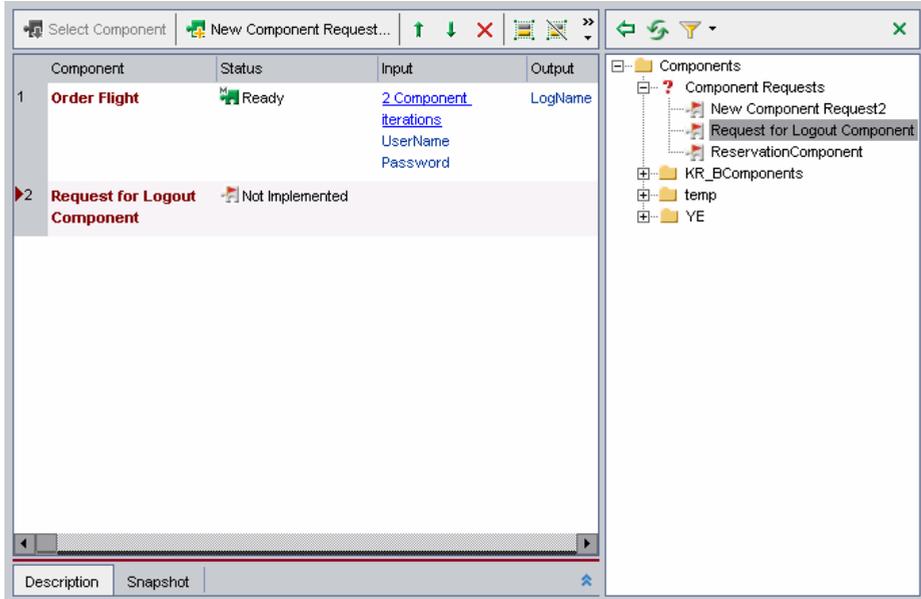
In the Test Script tab, you build the structure and flow of the business process test by selecting one or more previously created business components (or component requests) and adding them to the test, configuring their parameter settings, and defining what the test does if a component fails.

For more information, see:

- Adding Components to a Business Process Test
- Configuring Component Input Parameter Settings
- Defining Failure Conditions

You can also group business components so that they can be iterated together. For more information, see “Working with Component Groups” on page 201.

In the following example, the **OrderFlight** component has been added to the business process test as the first component. The **Request for Logout Component** has also been added to the test.



Adding Components to a Business Process Test

The first step in building a business process test is to select the business components that you want to include in the test.

Note: If you require a component in your business process test that does not yet exist, you can create a new component request and include it in your test. For more information, see “Requesting New Components for Business Process Tests” on page 211.

To select business components:

- 1** Select the relevant business process test in the Test Plan tree. The test tabs are displayed.
- 2** Click the **Test Script** tab and ensure that the Component Tree pane is displayed. If it is not displayed, click the **Select Component** button in the Test Flow pane toolbar.
- 3** In the Component Tree pane, expand the folder that contains the business component or component request required for the business process test.

Tip: To expand a folder in the component tree, click the expand symbol to the left of the folder name, or double-click the folder. You can also select the folder, and then right-click and select **Expand All**, or press the asterisk key (*) on the keyboard number pad.



- 4** Drag the required business component or component request from the Component Tree pane and drop it in the Test Flow pane. You can also select the component in the Component Tree pane and click the **Add Component to Test** button in the toolbar, or double-click the component.

Tip: You can right-click a business component in the Component Tree pane and then choose **Properties** from the context menu to view the component's description, component parameters, and other details.

- 5** Repeat steps 3 and 4 to add additional business components to the business process test.



- 6** If required, you can select business components in the Test Script pane and use the arrows in the toolbar, or use the **Move Component Up** and **Move Component Down** options in the right-click context menu to arrange them into a logical testing sequence.

Configuring Component Input Parameter Settings

If one or more business components in the business process test have input component parameters defined, then you can configure the settings that determine how the component should run in the test. For example, a business component can be configured to use various input component parameter values (entered for the test, entered by the tester during run time, or returned by a previously run component), or run a different number of iterations.

Component parameter names, descriptions, and value types, and default values are initially defined in the Business Components module. For more information, see Chapter 4, “Working with Business Components.”

Input and output values for individual business components, and the number of iterations for each component, are configured in the Test Plan module. For more information, see “Defining Input and Output Component Parameters for a Business Component” on page 94.

Run-time component parameter values, and the number of test iterations, are defined in the Test Lab module. For more information on component parameter and iteration settings, see Chapter 9, “Working with Parameters.”

Defining Failure Conditions

You can define whether a business process test run continues or ends if a specific business component in the test fails.

To define the failure condition for a component:

- 1 In the Test Flow pane of the Test Script tab, click in the **On Failure** column for the business component. A down arrow is displayed.

Component	Status	Input	Output	On Failure
1 Order Flight	Ready	2 Component iterations UserName Password	LogName	Continue
2 Request for Logout Component	Not Implemented			Continue
3 Log out from Flight	Ready			Continue

- 2 Click the down arrow and select one of the following from the list:
 - **Exit.** The business process test run will end if the selected business component fails.
 - **Continue.** The business process test will run the next business component if the selected component fails. By default, this failure condition is defined for each component when it is added to a test.

Working with Component Groups

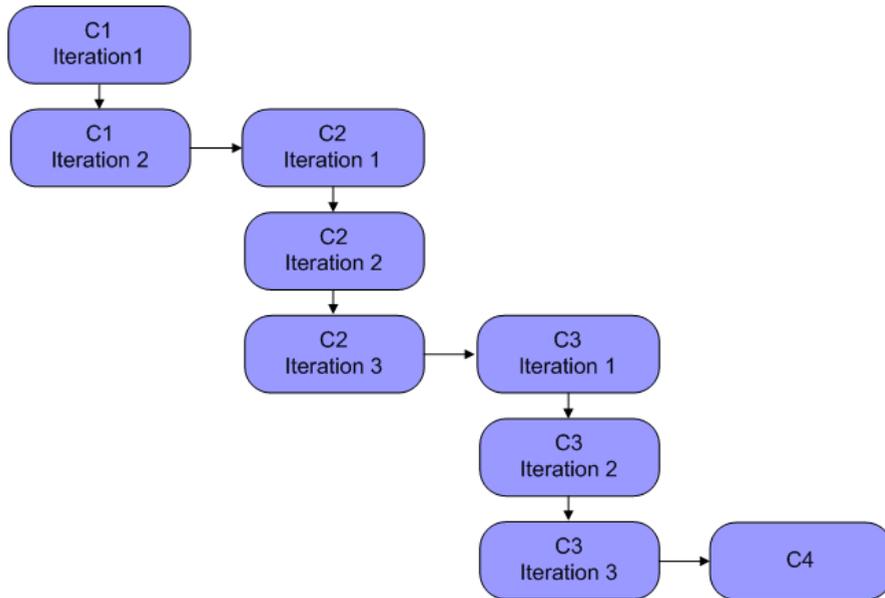
It may be logical in certain business process tests to iterate several business components together as a group.

For example, consider a business process test that contains four business components; C1, C2, C3, and C4. The test requires that the components be iterated as follows:

- Component C1 - Two iterations
- Component C2 - Three iterations
- Component C3 - Three iterations
- Component C4 - One iteration

Without grouping, the business process test would run each business component in sequence, C1 and its iterations, then C2 and its iterations, then C3 and its iterations, and then C4.

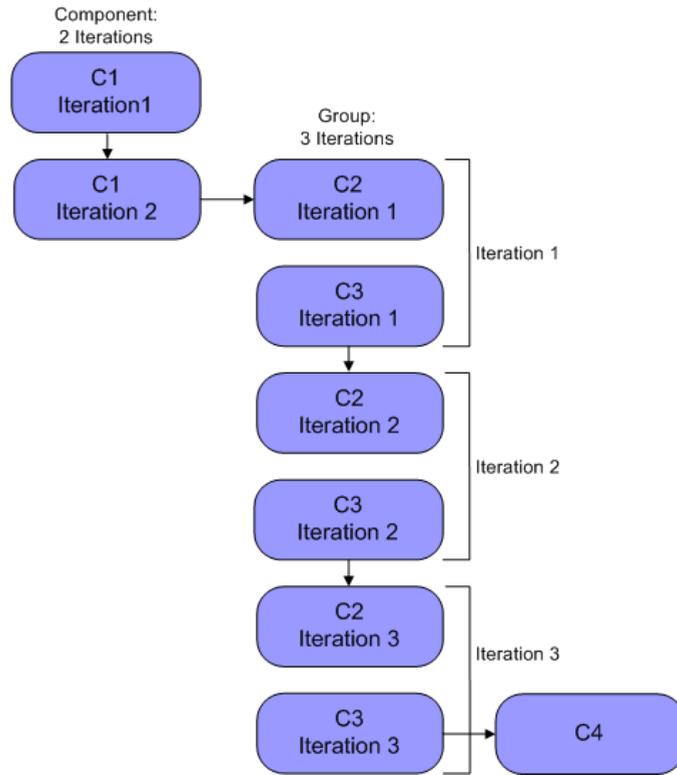
This is illustrated as follows:



Instead of running all the iterations of component C2 followed by all the iterations of component C3, you could group these two components together, enabling the business process test to run:

- ▶ the first iteration of C1, then the second iteration of C1, followed by
- ▶ the first iteration of C2, then the first iteration of C3, followed by
- ▶ the second iteration of C2, then the second iteration of C3, followed by
- ▶ the third iteration of C2, and then the third iteration of C3.

This is illustrated as follows:



Component groups in the Test Script tab are identified by a brown border surrounding the member components. The text **Begin Group** and **End Group** in the border indicate the start and end of the group.

In addition, the number of iterations and the iteration range are displayed in the **Begin Group** border, as shown in the example below.

	Component	Status	Input	Output	On Failure	
Number of Group Iterations and Range	1	Log in to Flight	Ready	3 Component iterations (Selected for running 1 - 2) UserName Password	LogName	Exit
	Begin Group		3 Group iterations (Selected for running 2 - 3)			
	2	Order Flight	Ready	UserName Password	LogName	Continue
	3	Enter CC Details	Maintenance	CCnumber ExpDate	Status	Continue
	4	Enter Address Details	Maintenance	Address1		Continue
	End Group					
5	Log out from Flight	Ready			Continue	

- The number of iterations indicates the total number of value sets defined for the group.
- The iteration range indicates the subset of iterations currently set for use when the test runs.

Creating Component Groups

You create groups of business components in the Test Script tab of the Test Plan module. You can combine any number of components in the business process test into a group, providing they comply with the following requirements:

- A component can belong to one group only.
- Components must be contiguous to be included in the same group.
- All components in the group must have the same number of iterations and the same iteration range, for example, they are set to run iterations 2 to 3.
- For iterations of a component group to be successful, the state of the application at the end of the last component in the group must match the state of the application before the first component in the group.

To create a component group:

- 1 Select the business process test in which you want to create one or more component groups and click the **Test Script** tab.
- 2 In the Test Flow pane, select two or more contiguous components. The selected business components are highlighted.

Note: You can select contiguous components in the tab using the SHIFT key. Click to the left of the component row to ensure that the entire row is selected (the row will then be highlighted). Press the SHIFT key and click the last contiguous component to be included in the group.

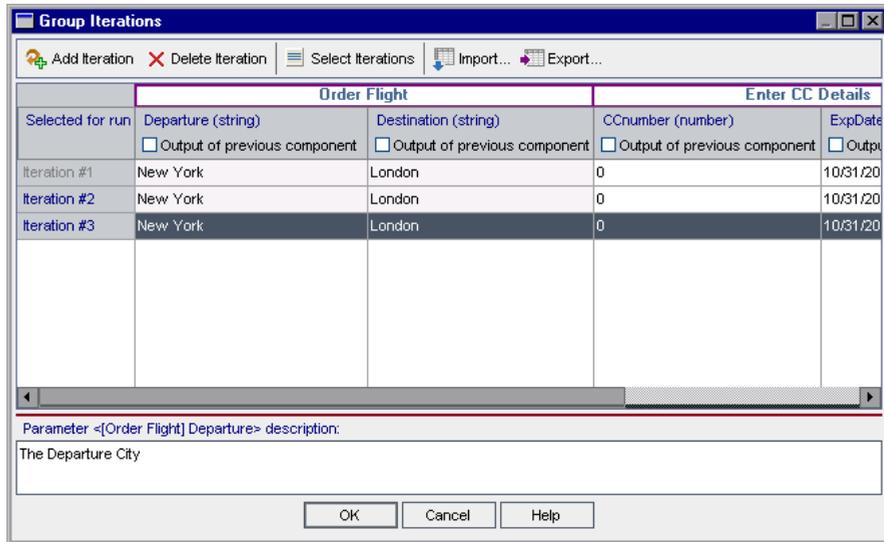
- 3 Right-click, and choose **Grouping > Group Components**. The group is created as indicated by the border around the components.

Component	Status	Input	Output	On Failure
1 Log in to Flight	Ready	3 Component iterations (Selected for running 1 - 2) UserName Password	LogName	Exit
Begin Group		3 Group iterations (Selected for running 2 - 3)		
2 Order Flight	Ready	UserName Password	LogName	Continue
3 Enter CC Details	Maintenance	CCnumber ExpDate	Status	Continue
4 Enter Address Details	Maintenance	Address1		Continue
End Group				
5 Log out from Flight	Ready			Continue

All business components to be included in the group must have the same number of iterations and the same iteration range, or a warning message will be displayed.

Note: The **Add Iteration**, **Delete Iteration** and **Select Iterations** buttons in the Component Iteration dialog box are disabled for a component in a group. These are common functions for all group members and can be accessed by clicking the link in the group border to open the Group Iterations dialog box. All other functions in the Component Iteration dialog box remain enabled.

- 4 Click the iterations link in the **Begin Group** border to view the iterations for each of the member components in the Group Iterations dialog box.



Using Keyboard Commands in the Group Iterations Dialog Box

If you prefer to use your keyboard, you can use the following keyboard commands to navigate within the Group Iterations dialog box:

- Press F2 to enter Edit mode.
- Use the up and down arrow keys to move the focus one iteration up or down.
- You can press TAB to move the focus one cell to the right, or to the first cell in the next row.
- Use the left and right arrow keys to move the focus one cell to the left or right, with the following exceptions:
 - In the last cell in a row, the right arrow key moves the focus to the first cell in the next row.
 - In the first cell in a row, the left arrow key moves the focus to the last cell in the row above (if any).
 - When a cell is in edit mode, the left and right arrow keys move within the edited cell.
- When a cell containing a list is selected, you can press ALT+DOWN arrow to open the list for that cell.
- You can select the last row and press ALT+A to add another group iteration row.

Modifying a Component Group

You can add and remove business components from component groups as required, and change the order of groups in a business process test and the order of components inside a group. In addition, you can add or delete iterations for all components in the group, and select a partial iteration range for all components in the group.

If a group or a group component is selected in the Test Flow pane, the **Grouping** submenu in the right-click context menu includes **Move Group Up** (CTRL+U) and **Move Group Down** (CTRL+D) options.

Note: Moving a component group or a component within a group could cause a parameter reference conflict, for example, where a group is moved to a position preceding the component providing an input component parameter for that group.

If the resulting warning message is ignored, the conflicting link to the source parameter is deleted. This will cause the iteration to fail, and the link must be reinstated if necessary in the Group Iterations dialog box.

To modify a component group:

The following table describes the procedures you can perform when working with groups:

To...	Perform the following:
Add a business component to a group:	Drag the component from the Component Tree pane to the relevant position within the group.
	Select a component in the group or the Begin Group border. Double-click the required component in the Component Tree pane.
	Select the component. Drag the selection marker up or down into the group, and drop it at the required location.
Move a business component into an adjacent group:	Select the component, and choose Move Component Up or Move Component Down in the context menu to include the component.
	Select the Begin Group or End Group border. Drag the selection marker up or down to include the component.
	Select the Begin Group or End Group border, and click Move Up or Move Down in the toolbar or context menu to include the component.

To...	Perform the following:
Remove a business component from a group:	Select the component. Drag the selection marker up or down out of the group, and drop it at the required location.
	Select the Begin Group or End Group border. Drag the selection marker down or up to exclude the component.
	Select the Begin Group or End Group border, and click Move Down or Move Up in the toolbar or context menu to exclude the component.
	Select the Begin Group or End Group border, and press CTRL+U or CTRL+D to exclude the component.
Move a group up or down in the test:	Select any component in the group, or the Begin Group or End Group border, right-click, and then choose Grouping > Move Group Up or Grouping > Move Group Down .
	Select any component in the group, or the Begin Group or End Group border, and press CTRL+U to move the group up or CTRL+D to move the group down.
Add group iterations:	Click the iterations link in the Begin Group border to open the Group Iterations dialog box. Click the Add Iteration button in the toolbar to add a new iteration for all the components in the group. Adding and configuring group iterations is similar to adding and configuring component iterations, as described in “Running Multiple Component Iterations” on page 242.
Delete group iterations:	Click the iterations link in the Begin Group border to open the Group Iterations dialog box. Select one or more iteration rows and click the Delete Iteration button in the toolbar.
Select a partial iteration range:	Click the iterations link in the Begin Group border to open the Group Iterations dialog box. Click the Select Iterations button in the toolbar. Selecting a partial iteration range for the components in a group is similar to selecting a partial iteration range for a single component, as described in “Selecting a Partial Component Iteration Range” on page 248.

Removing a Component Group

Components can be ungrouped if required.

The following table describes several procedures you can perform to ungroup components:

To...	Perform the following:
Remove a component grouping:	Right-click any business component in the group, and choose Grouping > Ungroup Components .
	Right-click the Begin Group or End Group border, and choose Grouping > Ungroup Components .
	Select the Begin Group border. Drag the selection marker to the End Group border. Alternatively, select the End Group border, and drag the selection marker to the Begin Group border.
Completely remove a component group:	Select all the business components in the group and click the Remove Selected Components from Test button in the toolbar.

Requesting New Components for Business Process Tests

If, while creating a business process test in the Test Plan module, you realize that a necessary business component has not been defined, you can create and submit a component request. The component request is a signal to add the new component to the project.

Component requests generated in the Test Plan module are automatically displayed in the component tree in the Test Plan module, and in the Component Requests folder of the component tree in the Business Components module.

Note: Only components in the component tree can be viewed from other testing tools, such as QuickTest and WinRunner.

After confirming that a requested component and its parameters are necessary for business process testing, you can add the component request to the appropriate folder in the component tree in the Business Components module. Alternatively, you can also delete the request if an existing component already answers the same needs as the request, or you otherwise determine that the requested component is unnecessary.

For more information on adding component requests to the component tree, see “Handling Component Requests” on page 109.

This feature is especially useful when the roles of creating components in the Business Components module and building business process tests in the Test Plan module are performed by different personnel.

Working with the New Component Request Wizard

Quality Center provides a three-step wizard in the Test Plan module that enables you to easily create a request for a new business component.

Step 1 of the New Component Request Wizard

You can enter the details and a relevant snapshot for the component request in Step 1 of the New Component Request wizard. Step 1 contains the following items:

Item	Description
Name box	The name of the requested business component. The name that you enter should be sufficiently descriptive to identify the request in the Business Components module.
Assigned to box	The Subject Matter Expert to whom you assign the request.
Send e-mail notification check box	This check box is enabled if the component request is assigned in the Assigned to box. Selecting the check box automatically sends an e-mail notification of the new request to the specified person.
Add Snapshot button	Clicking this button opens the Snapshot dialog box that enables you to attach an image associated with the component request. For more information on adding a snapshot, see “Attaching Images” on page 92.

Step 2 of the New Component Request Wizard

You enter the description of the required business component, as well as the input and output component parameters you want the requested component to receive and return, in Step 2 of the wizard.

Step 2 of the New Component Request wizard contains the following items:

Item	Description
Description area	By default, the Description area displays a basic template that includes several section headings. These headings, which can be changed if required, provide an outline that enables you to describe the requested business component's purpose or contents, and the pre-conditions and post-conditions of the application. For more information, see "Providing Component Details and Implementation Requirements" on page 88.
Input and Output panes	These panes enable you to define the input and output component parameters you want the requested business component to receive and return. For more information on defining parameters, see "Defining Component Parameters" on page 236.

Step 3 of the New Component Request Wizard

You can enter the details of the steps that should be included in the component.

Step 3 of the New Component Request wizard contains the following item:

Item	Description
Steps area	This area provides the same functionality as the Design Steps tab for a manual component, and enables you to describe the steps that should be included in the requested component. For more information, see "Designing Manual Steps" on page 120.

Creating a Component Request

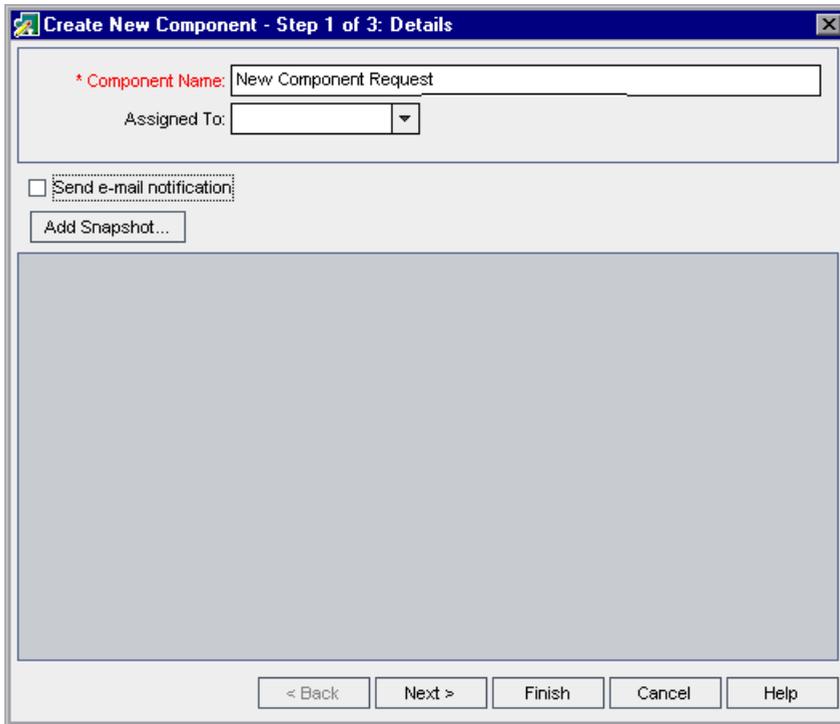
If a necessary business component has not been defined in the Business Components module, you can create and submit a component request from the Test Plan module.

To create a component request:



- 1 Click the **Test Plan** module button in the Quality Center sidebar to open the Test Plan module.
- 2 In the Test Plan tree, select the business process test for which you want to create a component request and click the **Test Script** tab.
- 3 Click the **New Component Request** button in the Test Script tab toolbar.

The first step of the new component request wizard opens.



Create New Component - Step 1 of 3: Details

* Component Name:

Assigned To:

Send e-mail notification

- 4 In the **Name** box, enter a unique name for the request.

- 5 From the **Assigned to** list, select the Subject Matter Expert to whom the request is assigned. The **Send e-mail notification** check box is enabled.
- 6 If required, select the **Send e-mail notification** check box to automatically send a notification of the new request to the person specified in the **Assigned to** box.
- 7 If required, you can click the **Add Snapshot** button to capture and attach an image associated with the component request. For more information on attaching an image, see “Attaching Images” on page 92.
- 8 If you do not want to define any additional properties for the component request at this time, proceed to step 13.

Or

Click **Next** if you want to add description details or define input or output component parameters for the component request.

The second step of the new component request wizard opens.

Create New Component - Step 2 of 3: Parameters

Description

Summary

Pre-Condition

Post-Condition

Input: ↑ ↓

Parameter Name	Value Type	Default Value	Description

Output: ↑ ↓

Parameter Name	Value Type	Description

< Back Next > Finish Cancel Help

- 9** In the **Description** area, enter a summary description of the requested business component, as follows:
- ▶ **Summary.** Enter an overall textual description of the business component’s purpose or contents.
 - ▶ **Pre-Condition.** Describe the state of the application at which the current business component should start.
 - ▶ **Post-Condition.** Describe the state of the application at which the current business component should end.

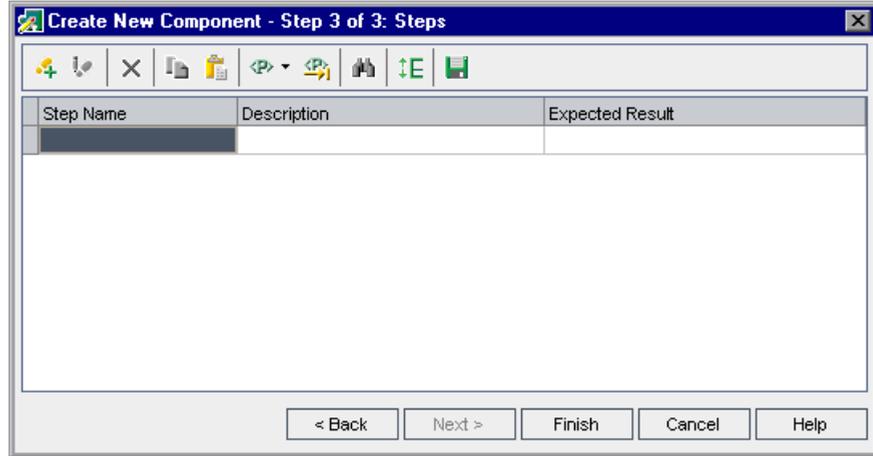
Note: The component request wizard provides a comprehensive selection of text editing and formatting tools to assist you in entering the component description. Right-click in the **Description** area to access the commands from the context menu. Choose **Toolbar Visible** from the context menu to display (or hide) commonly used commands in the toolbar.

- 10** In the Input and Output panes, define the input and output component parameters you want the requested business component to receive and return. For more information on defining input and output component parameters, see Chapter 9, “Working with Parameters.”
- 11** If you do not want to describe any steps for the component at this time, proceed to step 13.

Or

Click **Next** if you want to add a description of the steps in the required component.

The third step of the new component request wizard opens.



The third step of the wizard provides the same functionality as the Design Steps tab for a manual component.

- 12** Enter the steps that should comprise the component. For information on how to enter steps, see “Designing Manual Steps” on page 120.
- 13** Click **Finish**. The new component request is displayed in the Test Script tab for the selected business process test, and in the Component Tree pane under the Component Requests branch.



The new request is automatically assigned the status of **Not Implemented**.

Note: The component request status changes from **Not Implemented** to **Under Development** when you move the request from the Component Requests folder into a component folder in the Business Components module.

For more information, see “Handling Component Requests” on page 109.

Modifying a Component Request

You can edit the properties of a component request, provided the request is still listed in the Component Requests folder in the component tree.

To edit a component request:

- 1 Right-click the component request in the Test Flow pane of the Test Script tab, and choose **Edit Component**. The Component dialog box opens.

The screenshot shows a dialog box titled "Component <Component Request>". It has several tabs: "Details", "Snapshot", "Parameters", "Design Steps", "Automation", and "Used By". The "Details" tab is active. The form contains the following fields:

- * Component name: Component Request
- Automation engine: MANUAL
- Creation date: 4/18/2005
- Assigned to: (empty dropdown)
- Created by: alex_gc

Below the fields are two large text areas:

- Description:** Contains the text: Summary, Pre-Condition, and Post-Condition.
- Discussion Area:** Contains an "Add Comment" button.

At the bottom of the dialog box are "Close" and "Help" buttons.

Note: If the component request has been moved to a component folder from the Component Requests folder in the Business Components module, or it has been deleted, the **Edit Component** option is not available from the context menu. If the component request has been moved to the **Obsolete** folder, the properties in the Component dialog box are displayed in read-only format.

- 2 Edit the properties in the tabs, as required, and click **Close**.

Deleting a Component Request

You can delete a component request in the Business Components module only. For more information, see “Deleting Component Requests” on page 111.

Working with Business Process Tests

You can view and modify the business process tests in your project, copy and paste tests to other locations, or delete existing tests from your project. You can also check your business process tests for configuration errors.

Working with business process tests is described in the following sections:

- “Working with Business Process Tests in the Test Plan Tree” on page 219
- “Copying Business Process Tests” on page 221
- “Validating Business Process Tests” on page 222
- “Deleting Business Process Tests” on page 224

Working with Business Process Tests in the Test Plan Tree

You can work with the business process tests in the tree according to your testing needs.

To work with business process tests in the Test Plan tree:

When the Test Plan module is first accessed, the Test Plan tree displays only the highest level folders in the hierarchy.

- To expand a folder in the tree and view its contents, click the expand symbol  to the left of the folder name, or double-click the folder. You can also select the folder, and then right-click and select **Expand All**, or press the asterisk key (*) on the keyboard number pad.
- To collapse a folder in the tree, click the collapse symbol  to the left of the folder name, or double-click the folder. You can also select the folder, and then right-click and select **Collapse**, or press the minus key (-) on the keyboard number pad.

- ▶ To rename a folder or business process test, select the folder or test in the tree and click it. Alternatively, right-click it and choose **Rename**. Then edit the item name and press ENTER.
- ▶ To modify the details of a business process test, change attached files, or link the test to other project requirements, see “Building Business Process Tests” on page 193.
- ▶ To move a folder or business process test in the tree:
 - ▶ Drag and drop the folder or test to the required position in the tree.
 - Or
 - ▶ Right-click the folder or test, and choose **Cut**. Then right-click the required folder in which to paste the folder or test, and choose **Paste**.

Note: Business process tests can be moved or pasted only to a folder or subfolder below the **Subject** node in the Test Plan tree.



- ▶ To refresh a folder or business process test in the tree, select the folder or test and click the **Refresh All** button in the toolbar. To refresh all the folders and tests in the tree, select the **Subject** root folder and click the **Refresh All** button in the toolbar. Alternatively, you can press F5 on the keyboard to refresh the selected folder or test, or CTRL+F5 to refresh all the folders and tests in the tree.



- ▶ To filter or sort the business process tests in the tree, click the **Set Filter/Sort** button in the toolbar. Any currently applied filters or sort orders are displayed under the Test Plan tree toolbar. For more information on filtering and sorting a tree, refer to the *HP Quality Center User's Guide*.

Copying Business Process Tests

You can easily duplicate an existing business process test as the basis for a new test in the current project, or in another project, and then position the new test anywhere in the Test Plan tree of that project.

Note: You can copy a business process test to another project on the same server or on another server.

When you copy a business process test within the current project, existing business components in the test are linked to the copied test, and the original components are not copied.

When you copy a business process test to another project, the test and its related business components are copied in the same component tree structure as in the source project (including any components in the Obsolete folder).

When components are copied to another project or server as a result of copying a business process test, all considerations for copying components apply, as described in “Copying Business Components” on page 100.

To copy an existing business process test:

- 1** If copying to another project or server, open the source and target projects in separate browsers.
- 2** In the Test Plan tree, right-click the business process test that you want to copy and choose **Copy**.
- 3** Right-click the folder in which you want to paste the new business process test (in the current project or in another project on the same server) and choose **Paste**. The test is copied to the new position in the Test Plan tree.

Note: If a copied business process test has the same name as a test that already exists in the target folder, a duplicate name warning message is displayed. Click **OK**. The business process test is copied to the new position in the Test Plan tree and a suffix, for example `_Copy_1`, is automatically added to the test name to create a unique test name within the folder.

- 4** If you want to modify the business process test name, select the test in the tree and click again to activate the test label for editing. Alternatively, right-click the new test and choose **Rename**. Then enter a new name for the test.
- 5** If required, select the new business process test in the tree and modify the test settings in the tabs. For more information on modifying business process test settings, see “Working with Business Process Tests in the Test Plan Tree” on page 219.

Validating Business Process Tests

You can check your business process tests to locate any component configuration errors that could halt the successful running of the test.

Validating a business process test in the Test Plan module checks all instances of the test within all test sets.



Note: You can also check individual business components for configuration errors. Clicking the **Validate Component** button in the Business Components module checks all instances of the selected component in applicable business process tests. For more information, including the error types that are reported by the component and test validation processes, see “Validating Business Components” on page 103.

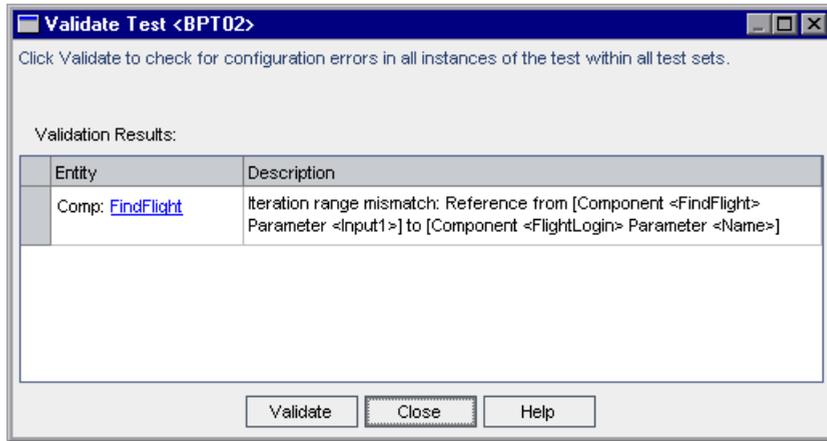
To validate a business process test:

- 1 Select the business process test in the Test Plan tree and click the **Test Script** tab.



- 2 Click the **Validate Test** button in the toolbar.

Business Process Testing validates all instances of the business process test and reports the results in the Validate Test dialog box, as shown in the example below.



- 3 If a validation error is reported, you can click the link in the **Entity** column to jump directly to the business component causing the error in the test. Errors are indicated in red text in the **Status** column of the component.

Note: In the case of a value type mismatch, the error is indicated in the component containing the input component parameter. In the case of an iteration range mismatch, the error is indicated in the second component.

Open the Component Iterations dialog box of the component that caused the error, and modify the component parameter or parameters as required. For more information on working with business component parameters, see Chapter 9, “Working with Parameters”.

- 4 The Validate Test dialog box remains in view, enabling you to fix the displayed error (or errors). When you are finished, click the **Validate** button in the Validate Test dialog box to repeat the validation check. If the error has been resolved, a message is displayed indicating that the validation was successfully completed.
- 5 Click **Close** to close the Validate Test dialog box.

Deleting Business Process Tests

You can delete a business process test or a test folder from the Test Plan tree.

- ▶ If you delete a business process test, Quality Center permanently deletes the test from the project. The test is removed from all test sets and the run history is erased.
- ▶ If you delete a test folder, then by default Quality Center moves all the tests in the folder to the **Unattached** folder in the tree.

Note: It is highly recommended that you do not run a business process test from the **Unattached** folder. Move the test to a valid folder in the Test Plan tree before running it.

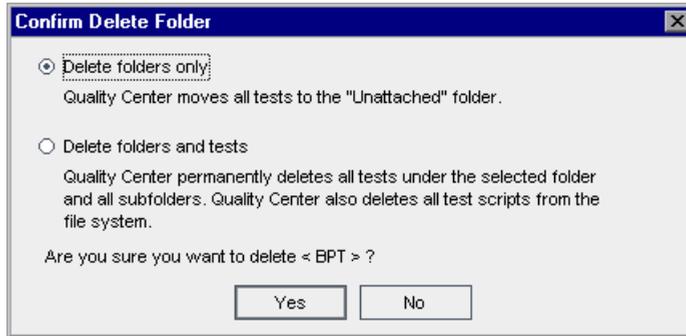
To delete a business process test:



- 1 Select the business process test in the Test Plan tree and click the **Delete** button in the tree toolbar, or right-click the test and choose **Delete**. A warning message is displayed.
- 2 Click **Yes**. The business process test is permanently deleted.

To delete a test folder:

- 1 Select the test folder in the Test Plan tree and click the **Delete** button in the tree toolbar, or right-click the folder and choose **Delete**. The Confirm Delete Folder dialog box opens.



- 2 Select:
 - ▶ **Delete folders only** to move all the tests in the folder to the **Unattached** folder.
 - ▶ **Delete folders and tests** to permanently delete all the tests and subfolders in the folder.
- 3 Click **Yes**. The folder or the folders and tests are deleted according to your selection.

Generating Documents for Business Process Tests

The Quality Center Document Generator enables you to generate Microsoft Word documents containing comprehensive data about a selected business process test or test set. These documents include detailed information about a project's requirements, planning, test list, test set folders, and defect tracking data.

For more information on generating documents for tests, refer to the *HP Quality Center User's Guide*.

Note: For more information on including component data in project documents, see “Generating Project Documents” on page 115.

9

Working with Parameters

You can expand the scope of business process tests and business components by defining the component parameters that a component can receive or return, and then replacing fixed values with these parameters. This process, known as **parameterization**, greatly increases the power and flexibility of your tests and components.

This chapter describes how to work with component parameters for business process tests in Quality Center.

This chapter describes:	On page:
About Working with Parameters	228
Understanding Component Input Parameters and Run-Time Parameters	235
Defining Component Parameters	236
Configuring Component Input Parameter Values and Iterations	241
Importing and Saving Component Parameter Values	254
Working with Run-Time Parameters	260

About Working with Parameters

A **component parameter** is an element within a business process test or business component that can be assigned various values. Input and output component parameters allow components to use variable values that affect the test results and pass values between components in the business process test.

You can control business components within a business process test by defining the input component parameters that components receive and the output component parameters that components return to subsequent components in the test flow.

Defining and Configuring Input Component Parameters

You define the name, description, value type, and default value of the input parameters that components can receive in the Business Components module, as described in “Defining Component Parameters” on page 236.

Note: You can also define input component parameters for a business component in QuickTest or WinRunner.

You configure input values for individual business components, and the number of iterations of each component, in the Test Plan module, as described in “Configuring Component Input Parameter Values and Iterations” on page 241. The input component parameters defined for a component are used to replace fixed values in specific steps of a component.

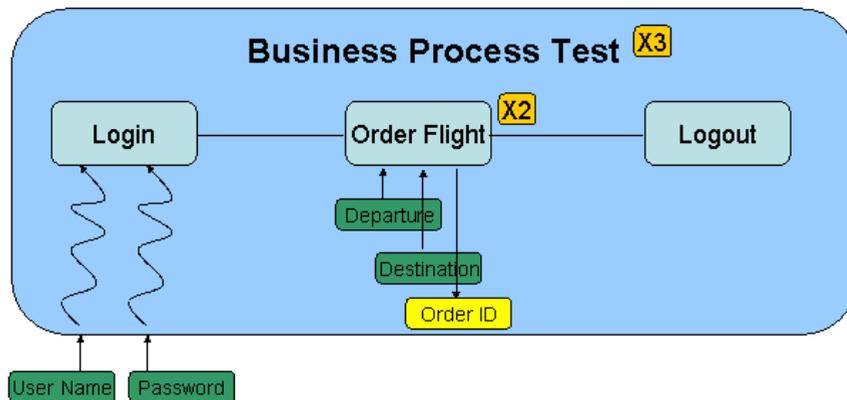
You can also define global input parameters, called **run-time parameters**, in a business process test. These parameters can apply to multiple business components. Their values are input into the test itself when the test runs.

When you define input parameters, you can define the number of iterations that the component runs. Defining iterations enables you to automatically run business components multiple times, each time using different input parameter values.

When you run your business component, one iteration is run for each value. For example, a business process test with ten sets of run-time data will run ten times, and a business component with six sets of component parameter values will run six times, before proceeding to the next component in the test.

- You define component parameters as run-time parameters in the Test Plan module, as described in “Creating Run-Time Parameters for Business Process Tests” on page 260.
- You configure input values for individual run-time parameters and the number of iterations of the business process test in the Test Lab module, as described in “Configuring Run-Time Parameter Values” on page 264.

Consider the following business process test for a flight reservation application comprising three business components, Login, Order Flight, and Logout:



- The entire business process test is iterated three times.
- Different values for the run-time parameters **User Name** and **Password** are used for each test iteration.
- Within each test iteration, the **Order Flight** component is iterated twice.
- Different values for the **Departure** and the **Destination** input parameters are used for each iteration of the **Order Flight** component.
- The **Order Flight** component provides an output value for the **Order ID** parameter for each iteration.

Defining Output Component Parameters

Output component parameters allow data values retrieved from a component step in one business component (the **source** component) to be passed as input parameters to a subsequent component (the **target** component) in the business process test flow.

The linking of one or more output component parameters in a source component to one or more input component parameters of a target component can occur successfully only where one of the following two conditions exist:

- ▶ **Condition 1.** The source component has one iteration and the target component has one or more iterations (a 1 to n relationship).
- ▶ **Condition 2.** The source component and the target component have the same number of iterations (an n to n relationship).

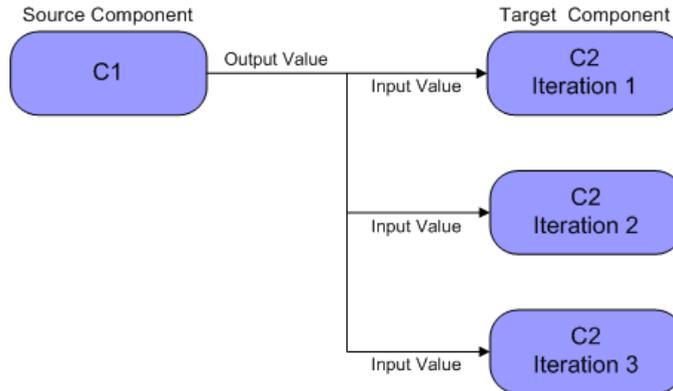
Notes:

When a source or target component is a member of a group, the number of iterations is that of the group.

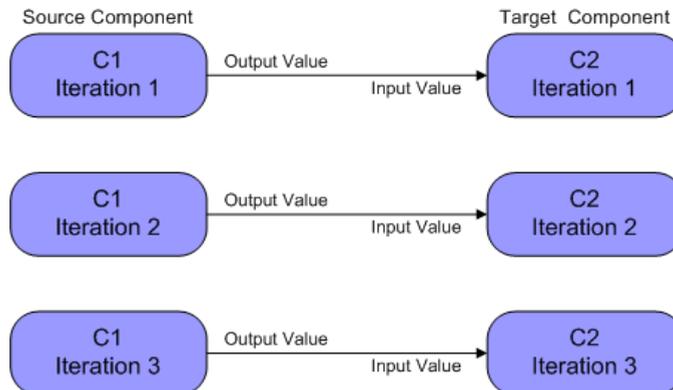
Iterations of a source component in a business process test can result in multiple parameter output values. In these cases, the value provided by each iteration run is passed as input to the corresponding iteration of the target component.

Condition 1

The source component has one iteration and the target component has one or more iterations. In this case, the same output value of the source component is used in each iteration of the target component.

**Condition 2**

The source component and the target component have the same number of iterations. In this case, the different output values of each of the source component's iterations are used in the respective iterations of the target component.



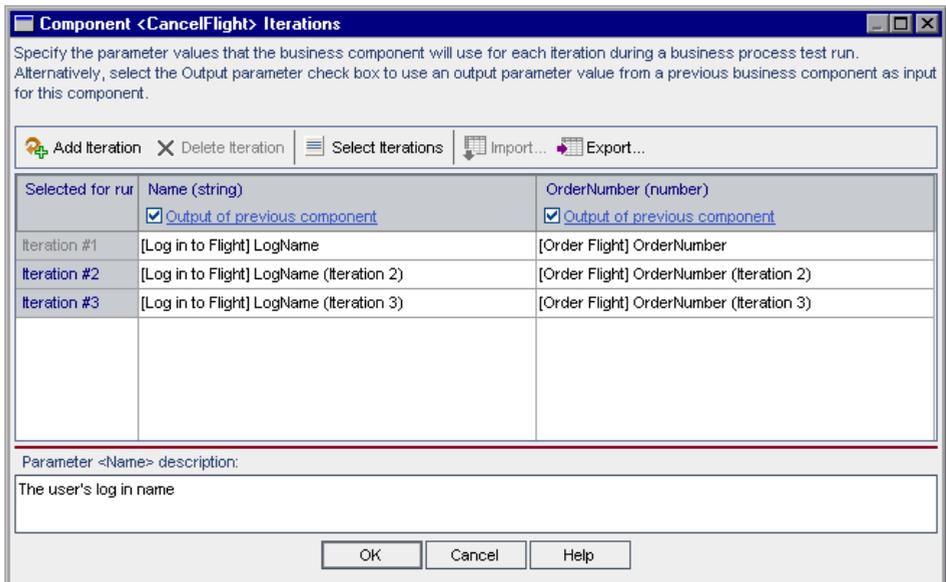
If the components are not represented by a 1 to n or n to n relationship, a warning message is displayed.

The number of iterations in the relationship between the components can be the number of actual iterations in each component or group, or the number of iterations selected in a partial range.

In Condition 2 above therefore, the three output iteration values of C1 could also have been used as input values in the three iteration runs of C2 (iterations 3, 4 and 5), if that range was selected in C2. For more information about partial iteration ranges, see “Selecting a Partial Component Iteration Range” on page 248.

To define output component parameters, you define the output data that a subsequent business component can use as input values in a business process test.

When an input component parameter is linked to an output component parameter, all the input parameter iterations are automatically filled in the Component Iterations dialog box, in read-only format, with the name of the component, the component parameter, and the relevant number of iterations, as shown below.



In the above example, the source component (FindFlight) has an n to n (3 to 3) relationship with the target component (CancelFlight). For each iteration of input component parameter OrderNumber in CancelFlight, there is a corresponding iteration of output component parameter OrderNum from FindFlight.

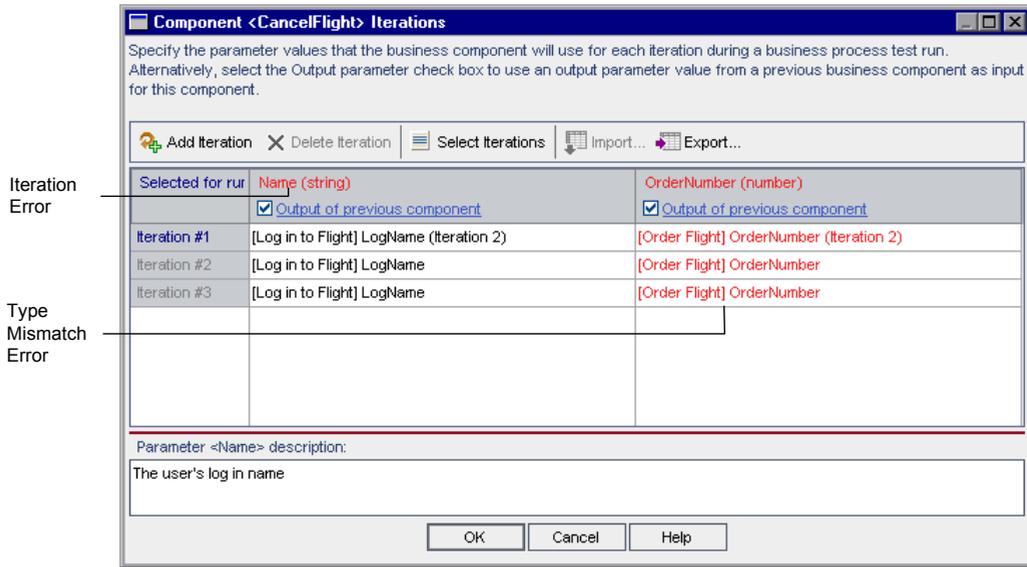
Conversely, the source component (Login) has a 1 to n (1 to 3) relationship with the target component (CancelFlight). Each iteration of input component parameter Name in the CancelFlight component uses the same output component parameter (LogName) from the Login component.

Note: Moving a business component or group can cause a parameter reference conflict, for example, where a target component is moved to a position preceding the source component.

If the resulting warning message is ignored, the conflicting link to the source parameter is deleted. This will cause the iteration to fail, and the link must be reinstated in the target Component Iterations dialog box if necessary.

In cases where there is an incompatible number of iterations between input and output component parameters, the parameter name in the column header is displayed in red text in the Component Iterations or Group Iterations dialog box.

Where there is a type mismatch between input and output component parameters, the relevant iterations in the grid are displayed in red text.



Note: Iteration errors will cause a business process test that contains the relevant components to fail. These errors are indicated in the Test Script tab in the Test Plan module, and reported when the component or test is validated. For more information, see “Validating Business Components” on page 103, and “Validating Business Process Tests” on page 222.

You define output component parameter names, descriptions, and value types for the business component in the Business Components module, as described in “Defining Component Parameters” on page 236. You configure output values in the Test Plan module, as described in “Using Returned Output Parameter Values” on page 249.

You can also define input and output component parameters for a business component in QuickTest or WinRunner. For more information, refer to the *QuickTest Professional for Business Process Testing User’s Guide* or the *WinRunner User’s Guide*.

Understanding Component Input Parameters and Run-Time Parameters

When creating business process tests, you define how the values are supplied for its component parameters. You can specify a fixed value, use a value returned by an output parameter of a previous business component in the business process test, or use a run-time parameter value that is supplied when the test runs in the Test Lab module.

If one or more business components in the business process test have input component parameters defined, you can configure the component to run a specified number of iterations during a single test run, each time using a different value for each component parameter.

Component level iterations enable you to iterate a specific business component in a business process test using different values for individual component parameters in the component. For example, using different departure locations for each flight itinerary in a test for an online flight booking application.

If you select to use a run-time parameter as the value for a component parameter value, then you can configure how many iterations the entire business process test runs. Each time that the test runs, it sends different values to the components for each run-time parameter.

Run-time iterations, at the test level, enable you to iterate the entire business process test using different values for component parameters that affect the entire flow of the test. For example, using a specific exchange rate for monetary calculations.

Defining Component Parameters

You define both input and output component parameters in the Business Components module Parameters tab.

Tip: You can also create parameters directly from the Design Steps tab, Component Step Editor or Select Parameter dialog box using the Create Parameter dialog box. For more information, see “Working with the Create Parameter Dialog Box” on page 127.

For each parameter, you must define a name and description, as well as the **value type**, which specifies the property of the input or output value returned to or from the component. In addition, for input parameters, you can define a **default value**. This value must correspond to the value type, and is used when the component runs if no other value is supplied by the business process test.

You define value types as follows:

- ▶ **String.** One or more characters. When you enter a component parameter as a string, numbers are treated like any other character. For example, “1” and “1.0” are treated as different strings.
- ▶ **Boolean.** A True or False value.
- ▶ **Date.** A date (in the date format of the local computer). Once entered, this date is a fixed value. It does not automatically update to the current date each day.
- ▶ **Number.** Any digit. When you use the **Number** type, component parameters with the same numeric value are treated as equal, for example, 1 and 1.0 are treated as the same value.
- ▶ **Password.** An encoded string. The characters you enter for a password are encrypted and displayed as asterisks.

You can insert these parameters into your steps in the Design Steps tab.

The component parameters that you define can be viewed and modified in the Test Script tab of the Test Plan module, as described in “Test Script Tab” on page 180.

Notes:

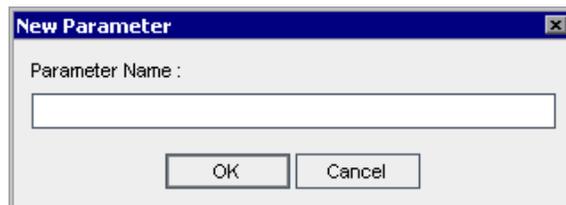
In QuickTest, parameters for keyword-driven components can be viewed and modified in the Business Component Settings dialog box. In addition, you can insert Data Table parameters and output values to business components, but you can store the values only in the first row of the Data Table. Component iterations are defined for the business process test in Quality Center and are not affected by the Data Table.

In WinRunner, parameters for WinRunner automated components can be viewed and modified in the Scripted Component Properties dialog box. If you enter and parameterize test data values in more than one row of the Data Table, then each component iteration run will perform the relevant data table loop according to the number of rows in the data table (in addition to component iterations according to the data set for the component parameters).

To define input and output component parameters in the Parameters tab:

- 1** In the Business Components module, select the relevant business component in the component tree, and click the **Parameters** tab.
- 2** In the Input pane or Output pane toolbar, click the **New** button.

The New Parameter dialog box opens:



- 3 Enter a descriptive name in the **Parameter Name** box and click **OK**.

Note: Component parameter names must begin with a letter and cannot include any of the following characters:

! @ # \$ % ^ & * () + = \ { } | ; ' : " , . / < > ? ~ ` [] -

A line for the new input or output component parameter is added in the relevant parameter list.

The screenshot shows a software interface with a 'Parameters' tab selected. The interface is divided into two sections: 'Input' and 'Output'. Each section has a toolbar with 'New' and 'Delete' icons and up/down arrows. Below each toolbar is a table with columns for 'Parameter Name', 'Value Type', 'Default Value', and 'Description'.

Parameter Name	Value Type	Default Value	Description
Password	Password		

Parameter Name	Value Type	Description

- 4 Select the **Value Type** cell for the component parameter and select the appropriate value type from the list. For input component parameters, a default value is automatically entered in the **Default Value** column.
- 5 For input component parameters, modify the default input value in the **Default Value** cell, if required. The default value must correspond to the value type entered in step 4.
- **String.** If **String** is selected as the value type, an empty string is entered in the **Default Value** column. You can click the cell and enter any string.
 - **Boolean.** If **Boolean** is selected as the value type, **True** is automatically entered in the **Default Value** column. You can click the cell and enter **False**, if required.

- ▶ **Date.** If **Date** is selected as the value type, the current date is automatically entered in the **Default Value** column. You can click the cell and select another date from the calendar, if required.
 - ▶ **Number.** If **Number** is selected as the value type, 0 is automatically entered in the **Default Value** column. You can click the cell and enter another valid number, if required.
 - ▶ **Password.** If **Password** is selected as the value type, an empty string is entered in the **Default Value** column. You can click the cell and enter any password string.
- 6** In the **Description** cell, enter a description of the component parameter's purpose, or other descriptive text. This will assist other users to understand how the parameter is used.
-

Tips:

Specific values or ranges of values that can be supplied for the component parameter, such as a range of dates, a range of numerical values, or a set of valid strings, should be included in this description when appropriate.

For long descriptions, click the down button in the cell and enter the description in the text box. Click **OK** or press CTRL+ENTER to save the description and close the box.

- 7** Repeat steps 2 through 6 to define additional input or output component parameters.
-

Tip: To change the order of the parameters in the Parameters tab, you can drag and drop the parameters in the list, or select a parameter and click the up or down arrows in the pane toolbar.

- 8** Exit from the component by selecting another business component in the component tree. Parameter data is saved when the business component is closed.

If the component had a **Ready** status before a component parameter was added, a popup dialog box enables you to choose whether to modify the component status to **Maintenance**.

Note: You can delete input and output component parameters by selecting the parameter in the Input or Output pane and clicking the **Delete** button in the relevant toolbar. A warning message is displayed.

If the component had a **Ready** status before a component parameter was deleted, a popup dialog box enables you to choose whether to modify the component status to **Maintenance**.

Deleting a component parameter may prevent a business process test that contains that component from running successfully. Therefore, a specific warning message is displayed if the parameter is contained in a component that is used by one or more business process tests.

Using Keyboard Commands in the Parameters Tab

If you prefer to use your keyboard, you can use the following keyboard commands to navigate within the Parameters tab:

- ▶ Press F2 to enter Edit mode.
- ▶ Use the up and down arrow keys to move the focus up or down.
- ▶ You can press TAB to move the focus one cell to the right, or to the first cell in the next row.
- ▶ Use the left and right arrow keys to move the focus one cell to the left or right, with the following exceptions:
 - ▶ In the last cell in a row, the right arrow key moves the focus to the first cell in the next row.
 - ▶ In the first cell in a row, the left arrow key moves the focus to the last cell in the row above (if any).
 - ▶ When a cell is in edit mode, for example, when modifying a name, value or description, the left and right arrow keys move within the edited cell.

- ▶ When a cell containing a list is selected:
 - ▶ You can press ALT+DOWN arrow to open the list for that cell, or to open the text box in the Description cell.
 - ▶ You can select an item in the list by using the up and down arrow keys to move to the item and then clicking ENTER. You can also move to the item by typing its first letter or letters.
- ▶ In the Description cell text box, you can press ALT+O to save and close the box, or press ALT+N to cancel your entry.

Configuring Component Input Parameter Values and Iterations

You can configure the values for a business component parameter. The values you supply affect the way a component runs. You can also enter multiple values to instruct the business process test to run a component multiple times within the test, and use a different value in each iteration.

For example, consider an online airline ticket booking application. As part of the flight booking process, you supply the departure and arrival locations and click the **Continue** button. The site returns the available flights for the requested itinerary.

You could conduct a business process test that logs into the Web site, books numerous itineraries comprising various departure and arrival locations, and logs out. This is a slow, laborious, and inefficient solution. Instead of creating a different business component for each itinerary, Business Process Testing enables you to use one component that searches for a ticket, and then use component parameters to run multiple iterations of the component, each time using different departure and arrival locations.

Running Multiple Component Iterations

In order for a business component to run iterations successfully, it is essential that the post-condition, meaning the state of the application after the last step in the component is run, matches the pre-condition, meaning the state of the application before the first step in the component is run.

Iterations of a component in a business process test can result in multiple parameter output values. In these cases, each iteration passes its value as input to the corresponding target component.

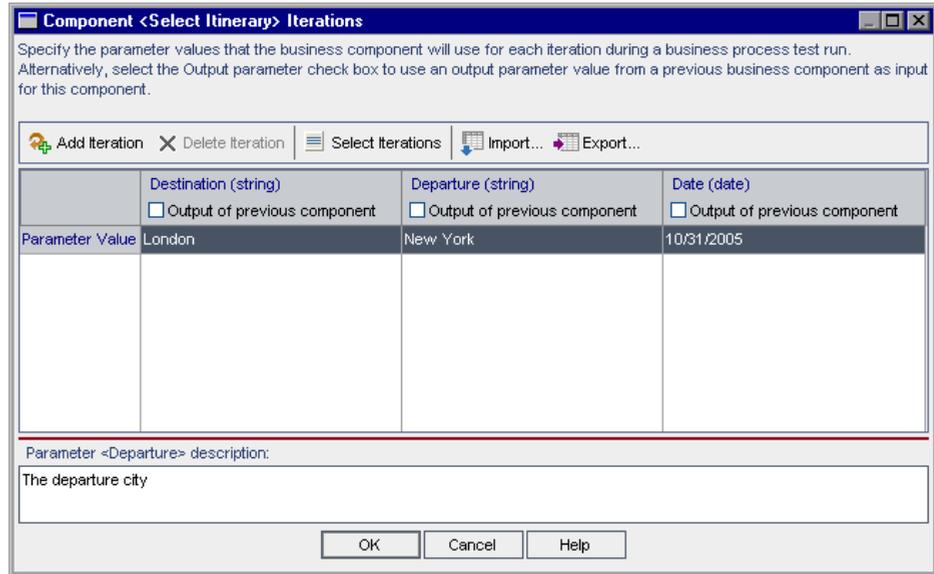
To configure input component parameter values:

- 1 In the Test Plan module, select the relevant business process test in the Test Plan tree, and click the **Test Script** tab.
- 2 In the Test Flow pane of the Test Script tab, click the input parameter link for the component in the **Input** column, or right-click the component for which you want to configure input component parameter values and choose **Iterations**.

Component	Status	Input	Output	On Failure
1 Log in to Flight 	Ready	UserName: kevin Password: *****	LogName	Continue
2 Select Itinerary	Ready	Destination: London Departure: New York Date: 10/31/2005	OrderNumber	Exit
3 Enter CC Details	Maintenance	CCNumber: 0 ExpDate: 10/31/2006	Status	Exit
4 Enter Address Details	Maintenance	Address1: _		Continue
5 Log out from Flight	Ready			Continue

Input Parameter Link

The Component Iterations dialog box opens.



Tip: Click a cell under an input component parameter or click the column header to view its description in the **Parameter description** area.

- 3 If you want the business component to run only once within the business process test, proceed to step 5.

If you want the business component to run more than one iteration, click the **Add Iteration** button. An additional iteration row is added to the Component Iterations dialog box. The input component parameter values in the previous row are automatically duplicated in the new row.

4 Repeat step 3 to add additional iterations for the component.

Tips:

You can drag and drop iterations in the list to change the order in which they are used in the business process test.

You can delete an iteration by selecting it and clicking the **Delete Iteration button** in the toolbar.

You can select more than one iteration in the list using standard Windows selection techniques (using the CTRL and SHIFT keys).

For a list of keyboard commands to navigate within the Component Iterations dialog box, see “Using Keyboard Commands in the Component Iterations Dialog Box” on page 253.

5 Configure the value of each input component parameter for each iteration.

- ▶ To use a fixed value, enter the value manually in the column cell, or keep the default value.
 - ▶ For fixed date values, you can select a date from a calendar. For more information on selecting a date value for an input component parameter, see “Selecting a Date for an Input Component Parameter” on page 245.
 - ▶ For fixed string values, you can also enter XML code. For more information on entering XML code for an input component parameter, see “Entering XML for an Input Component Parameter” on page 247.
- ▶ To use a run-time value (a value supplied when the business process test runs), see “Creating Run-Time Parameters for Business Process Tests” on page 260.
- ▶ To use a value returned from a previous business component in the business process test, see “Using Returned Output Parameter Values” on page 249.

For guidance about when to use component parameter values or run-time parameter values, see “Guidelines for Choosing Component Parameter Values and Run-Time Parameter Values” on page 269.

Note: The value type defined for each component parameter, for example, **String** or **Number**, is displayed in parentheses at the top of the relevant column. The value you configure for a parameter must match the value type of the parameter. For more information on specifying component value types, see “Defining Component Parameters” on page 236.

- 6** If you want the business component to run only one or a specific range of iterations, click the **Select Iterations** button and select the relevant iterations in the Select Iterations dialog box. For more information on specifying which component iterations to run, see “Selecting a Partial Component Iteration Range” on page 248.
- 7** Click **OK** to close the Component Iterations dialog box.

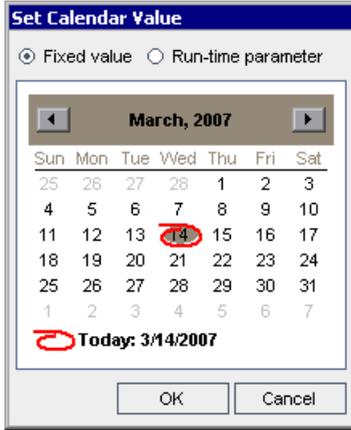
Selecting a Date for an Input Component Parameter

You can select a date value for an input component parameter in the Component Iterations dialog box. The date can be a fixed date from a calendar, or you can choose to use a run-time value for the date (a date supplied when the business process test runs).

To select a date value:

- 1** Open the Component Iterations dialog box as described in “Configuring Component Input Parameter Values and Iterations” on page 241.
-  **2** Click the cell for the input component parameter for which you want to select a date value. A browse button is displayed.

- 3 Click the browse button to open the Set Calendar Value dialog box.



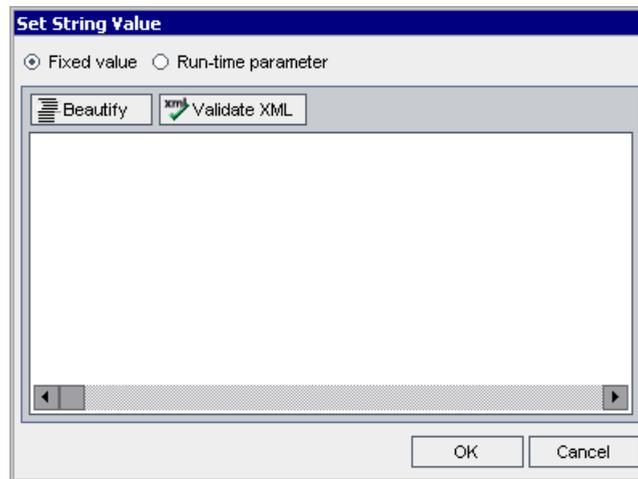
- 4 Select the date value you require.
 - ▶ To enter a fixed date, select **Fixed value** and then select a date in the calendar.
 - ▶ To enter a run-time parameter for the date, select **Run-time parameter**. A list of the available run-time date parameters is displayed. Select the required run-time date parameter from the list or create a new one by clicking the **Add Run-Time Parameter** button. For more information on run-time parameters, see “Creating Run-Time Parameters for Business Process Tests” on page 260.
- 5 Click **OK**. The component parameter is displayed in the input parameter cell in the Component Iterations dialog box.
- 6 Click **OK** to close the Component Iterations dialog box.

Entering XML for an Input Component Parameter

When using a component that invokes a service call, for example, a component that is automated using HP Service Test, the service call may require XML as input data. You can specify XML as multi-line string values in the Set String Value dialog box. You can also format the XML and check that it conforms to XML coding standards.

To enter XML for a fixed value input component string parameter:

- 1 Open the Component Iterations dialog box as described in “Configuring Component Input Parameter Values and Iterations” on page 241.
- 2 Click the cell for the input component string parameter for which you want to enter XML. A browse button is displayed.
- 3 Click the browse button to open the Set String Value dialog box.



- 4 Select **Fixed value** and enter the required XML code. If required, you can click the **Beautify** button to format the code so that it is more readable and conforms to XML coding standards. You can click the **Validate XML** button to check that the XML code does not contain any errors.

Note: You can also enter a run-time parameter from the Set String Value dialog box by selecting **Run-time parameter**. For more information on run-time parameters, see “Creating Run-Time Parameters for Business Process Tests” on page 260.

- 5 Click **OK**. The component parameter is displayed in the input parameter cell in the Component Iterations dialog box.
- 6 Click **OK** to close the Component Iterations dialog box.

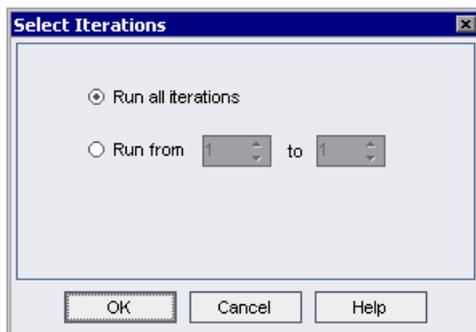
Selecting a Partial Component Iteration Range

You can specify a single component iteration or a partial range of iterations to run in a business process test. This enables you to run and check one or more specific iterations without having to run all the defined iterations for the business component.

You define which component iterations to run in the Select Iterations dialog box.

To select a component iteration range:

- 1 In the Component Iterations dialog box, click the **Select Iterations** button. The Select Iterations dialog box opens.



- 2 Select the second radio button. The **from** and **to** spin boxes are enabled.

- 3 Specify or select the start and end of the iteration range to run in the business process test.

Tip: To run one specific component iteration only, enter or select the same iteration number in both the **from** and **to** spin boxes.

- 4 Click **OK**. The iterations that are not selected for inclusion in the run are grayed. When the component runs, only the defined iterations run.

Note: The selected range of component iterations is displayed in the top left cell of the Component Iterations dialog box.

Using Returned Output Parameter Values

The Select Output Parameter dialog box lists output parameters with the appropriate value type from each business component in the business process test prior to the current component.

You can specify to use a value returned from an output parameter of a previous business component as an input parameter value for the current component in a business process test.

You can view the details of the output component parameters for any business component. For more information, see “Viewing Output Parameter Details for a Business Component” on page 252.

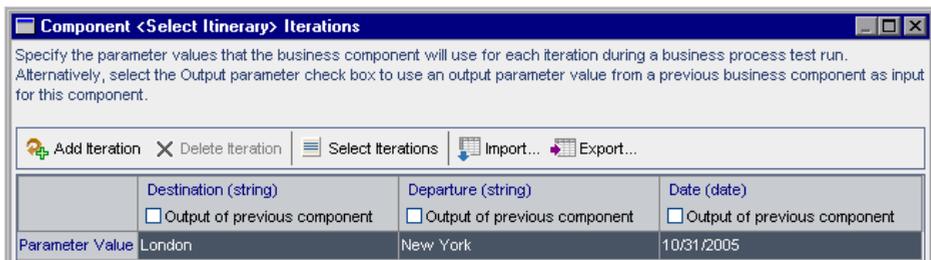
Note: When you choose to use the output of a previous component as the value for an input component parameter, the option applies to all component iterations for that input parameter.

When iterations of a source component in a business process test result in multiple parameter output values, the value that is provided by a given iteration run is passed as input to the corresponding iteration of the target component.

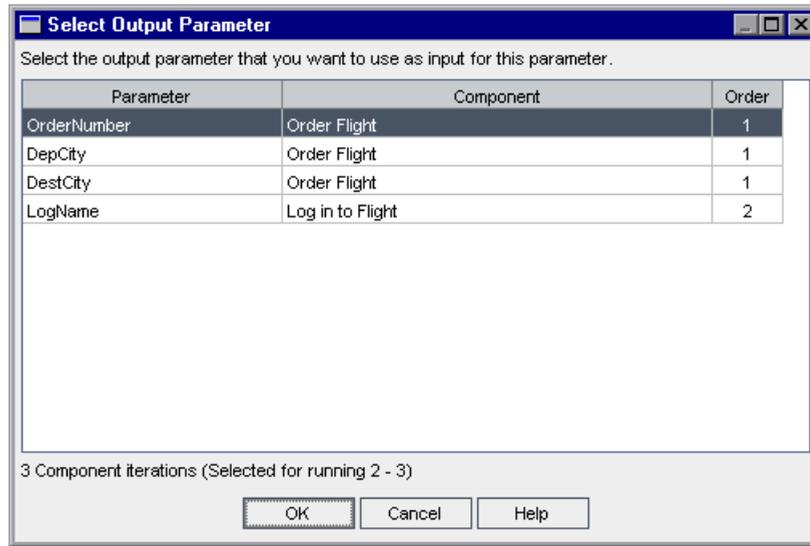
To use a component output parameter:

- 1** In the Test Plan module, select the relevant business process test in the Test Plan tree, and click the **Test Script** tab.
- 2** In the Test Flow pane, right-click the business component for which you want to configure an input component parameter value, and choose **Iterations**, or click the input parameter link for the component in the **Input** column.

The Component Iterations dialog box opens.



- 3 In the relevant parameter column, select the **Output of previous component** check box. The Select Output Parameter dialog box opens.



- 4 Select the output component parameter that you want to use as input for this parameter and click **OK**. Each iteration (row) of the component parameter in the Component Iterations dialog box is populated with the output parameter value from the corresponding iteration of the source component.

Note: Differences between the number of output and input component parameter iterations will result in an error, and an error message is displayed. If you choose to continue, the component parameter name in the Component Iterations dialog box is displayed in red text, indicating an iteration range mismatch.

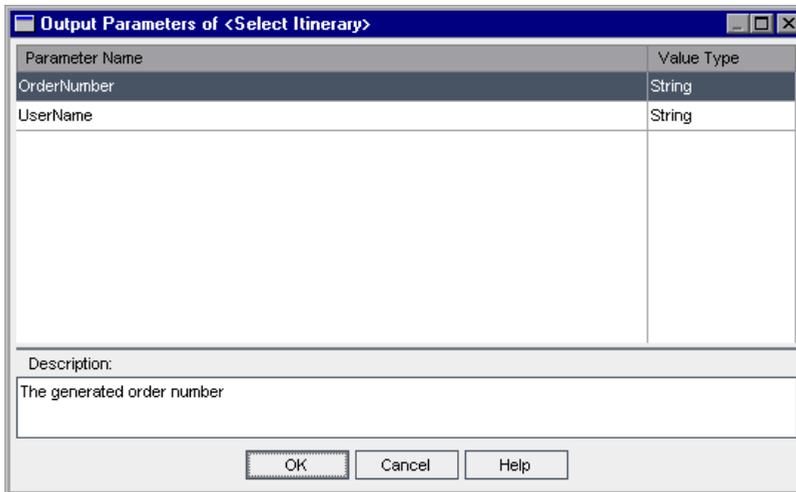
Viewing Output Parameter Details for a Business Component

You can view the output component parameters that have been defined for a business component from the Test Script tab in the Test Plan module.

Each defined output component parameter for the business component is displayed in the Output Parameters dialog box. The value type is also displayed.

To view output parameters for a business component:

- 1 In the Test Plan module, select the relevant business process test in the Test Plan tree, and click the **Test Script** tab.
- 2 In the Test Flow pane, right-click the business component for which you want to view output component parameters, and choose **Output Parameters**. The Output Parameters dialog box for the component opens.



Tip: Select an output component parameter to view its description in the Description area. Parameter descriptions are initially entered in the Business Components module, in QuickTest, or in WinRunner. For more information on defining output component parameter details, see “Defining Input and Output Component Parameters for a Business Component” on page 94.

- 3 Click **OK** to close the Output Parameters dialog box.

Using Keyboard Commands in the Component Iterations Dialog Box

If you prefer to use your keyboard, you can use the following keyboard commands to navigate within the Component Iterations dialog box:

- Press F2 to enter Edit mode.
- Use the up and down arrow keys to move the focus one iteration up or down.
- You can press TAB to move the focus one cell to the right, or to the first cell in the next row.
- Use the left and right arrow keys to move the focus one cell to the left or right, with the following exceptions:
 - In the last cell in a row, the right arrow key moves the focus to the first cell in the next row.
 - In the first cell in a row, the left arrow key moves the focus to the last cell in the row above (if any).
 - When a cell is in edit mode, the left and right arrow keys move within the edited cell.
- When a cell containing a list is selected, you can press ALT+DOWN arrow to open the list for that cell.
- You can select the last row and press ALT+A to add another component iteration row.

Importing and Saving Component Parameter Values

The task of defining lists of component parameter values for iterations can be facilitated by importing the values from an external file. You can also save a set of defined component parameter values as a file, for example, to use with other business components.

Component parameter values are imported and saved in **.csv** (comma separated value) files. This is a file format in which each line is a record, and each data value field in the record is separated by a comma.

The format of a typical **.csv** file is shown below:

```
Title      _____ Version 1.0
Column Headers ——— "Destination", "Departure", "Date"
              "London", "New York", "6/9/2004"
              "London", "Paris", "6/9/2004"
Parameter Values — "London", "Chicago", "6/9/2004"
```

- ▶ The first row is reserved as a title row. It can contain any text.
- ▶ The second row contains the column headers.
- ▶ The subsequent rows contain the component parameter values that are used in iterations of the business process test.

You map the component parameters in the Output Parameters dialog box to the column headers in the **.csv** file using the Map Import Data dialog box. The Map Import Data dialog box opens when you import component parameter values from a file.

You can create a **.csv** file manually in a text editor, save a spreadsheet file as a **.csv** file from a program such as Microsoft Excel, or save a set of already defined component parameters in a business process test as a **.csv** file.

Tip: Enter a few rows in the Component Iterations dialog box and use the **Export** option to create an initial **.csv** file in the proper format. Then edit and save the **.csv** file in a text editor or spreadsheet program to enter actual data.

Importing Component Parameter Values from a File

You can import parameter values for component iterations from a **.csv** file. When you import a file, all the records in the file become iterations in the business process test.

Note: The component parameter values that you import from a **.csv** file are the values that were defined when the file was last saved before the import. The values in the **.csv** file do not change dynamically according to value changes that may be implemented in Quality Center. Conversely, the parameter values in Quality Center do not change dynamically when you make changes to the **.csv** file.

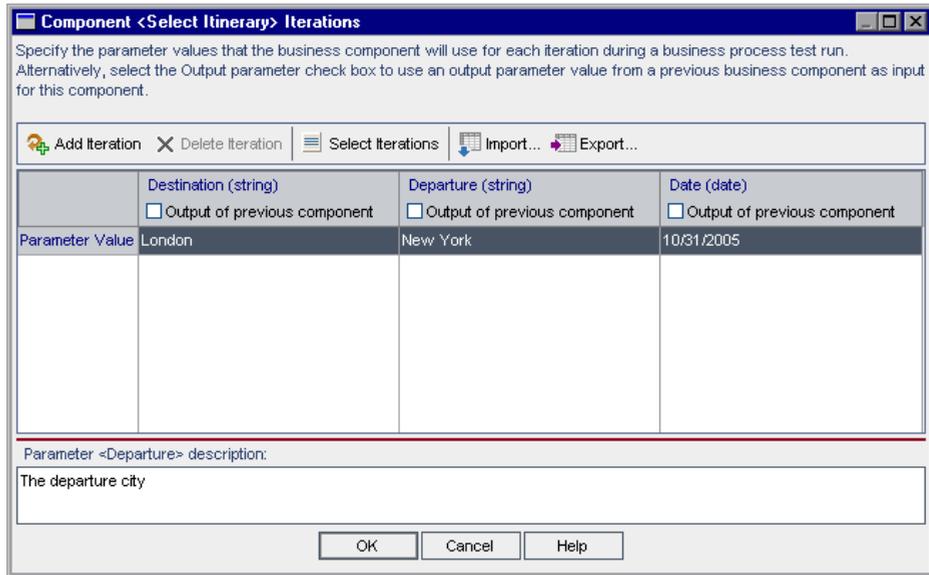
Before importing a **.csv** file, ensure that it is set up in the proper format, as described in “Importing and Saving Component Parameter Values” on page 254.

To import saved component parameter values:

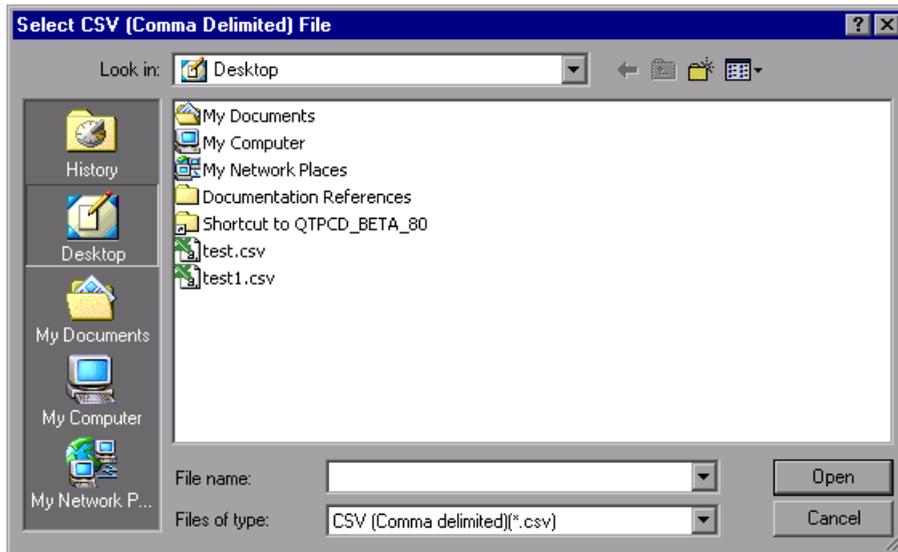


- 1** Click the **Test Plan** module button in the Quality Center sidebar to open the Test Plan module.
- 2** In the Test Plan tree, select the business process test that contains the relevant business component and click the **Test Script** tab.
- 3** In the Test Script pane, right-click the business component for which you want to import component parameter values, and choose **Iterations**.

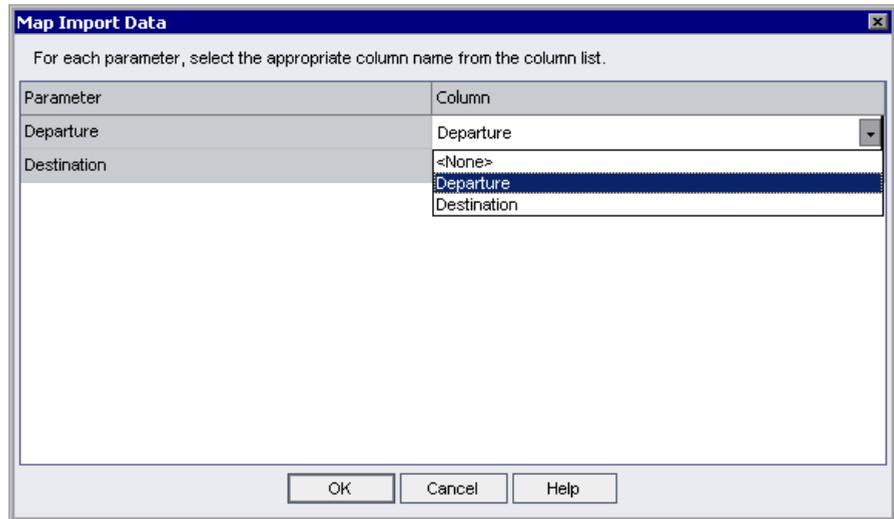
The Component Iterations dialog box opens.



- 4 Click the **Import** button. The Select CSV (Comma Delimited) File dialog box opens.



- 5 Specify or browse to the `.csv` file that contains the required data and click **Open**. The Map Import Data dialog box opens.



- 6 If you need to select or modify the mapped column header, click in the **Column** cell for the relevant component parameter. A down arrow is displayed.
- 7 Click the down arrow and select the column header from the list.
- 8 Repeat steps 6 and 7 for each mapping you need to set.
- 9 Click **OK**. A confirmation message is displayed.
- 10 Click **Yes**. The values from the `.csv` file are imported and displayed in the Component Iterations dialog box.

Note: If the Component Iterations dialog box already has values defined for one or more iterations, these values are overwritten by the imported values. If the Component Iterations dialog box has more iterations currently defined than the number of records in the imported file, the surplus iterations in the dialog box will be removed.

- 11 Click **OK** to close the Component Iterations dialog box.

Saving Component Parameter Values to a File

You can save the component parameter values that you have defined for the parameters of a business component to a **.csv** file.

You can then apply the same values to other component iterations by importing the saved data. Saving component parameters is also a useful way to create an initial **.csv** file that you can edit in a spreadsheet program, and then reimport to the component.

For more information on importing parameters, see “Importing Component Parameter Values from a File” on page 255.

Note: The values that you save to a **.csv** file are fixed, and do not change dynamically when you make changes to parameter values in Quality Center. Conversely, the parameter values in Quality Center do not change dynamically when you make changes to the **.csv** file. It is important therefore, to check the parameter values in Quality Center before saving them to a **.csv** file to ensure that they contain up-to-date values.

To save component parameter values:



- 1** Click the **Test Plan** module button in the Quality Center sidebar to open the Test Plan module.
- 2** In the Test Plan tree, select the business process test that contains the relevant business component, and click the **Test Script** tab.
- 3** In the Test Flow pane, right-click the business component for which you want to save the component parameter values, and choose **Iterations**.

The Component Iterations dialog box opens.

Specify the parameter values that the business component will use for each iteration during a business process test run. Alternatively, select the Output parameter check box to use an output parameter value from a previous business component as input for this component.

Add Iteration
 Delete Iteration
 Select Iterations
 Import...
 Export...

	Destination (string) <input type="checkbox"/> Output of previous component	Departure (string) <input type="checkbox"/> Output of previous component	Date (date) <input type="checkbox"/> Output of previous component
Iteration #1	London	New York	10/31/2005
Iteration #2	London	Paris	10/31/2005
Iteration #3	London	Chicago	10/31/2005

Parameter <Destination> description:
The destination city

OK Cancel Help



- Click the **Export** button. The Save CSV (Comma Delimited) File dialog box opens.
- Enter a descriptive name in the **File Name** box and click **Save**. The component parameter values are saved in a **.csv** file. The **.csv** file is saved in a comma delimited table format, as shown in the example below.

```
Version 1.0
"Destination", "Departure", "Date"
"London", "New York", "6/9/2004"
"London", "Paris", "6/9/2004"
"London", "Chicago", "6/9/2004"
```

Each column in the table represents the list of values for a single component parameter. The first row of the table is a title row. The second row contains the parameter names (column headers). Each subsequent row in a column represents a value for the displayed component parameter during a single iteration of the business process test.

- Click **OK** to close the Component Iterations dialog box.

Working with Run-Time Parameters

Before running a business process test, you can define run-time parameter values and test iterations in the Test Lab module. These run-time parameter values are then used as the values of input component parameters for any business components that reference them in the test.

You can also define run-time parameter values in the Test Plan module to act as default values, and for use with debug runs.

Note: The Test Lab module can be used for other tests, such as WinRunner and QuickTest tests. The information and procedures described in this chapter are relevant only to Business Process Testing, and are viewed using the Execution Grid tab of the Test Lab module.

The standard functionality in the Test Lab module applies to Business Process Testing as well.

For more information on using the Test Lab module and the Execution Grid tab, refer to the *HP Quality Center User's Guide*.

Creating Run-Time Parameters for Business Process Tests

You can create run-time parameters for a business process test by specifying a new run-time parameter name as the value for a component parameter. When you create a new run-time parameter, it automatically uses the value type of the component parameter for which it is created.

After you create a run-time parameter, you can select it for any other component parameter of the same value type in any business component in the business process test.

To create a run-time parameter:

- 1 Open the Component Iterations dialog box that contains the component parameters for which you want to use run-time parameter values. For information on how to open the Component Iterations dialog box, see “Configuring Component Input Parameter Values and Iterations” on page 241.

2 Click the relevant Parameter Value cell.

- ▶ For string or date type parameters, skip to step 3.
- ▶ For number, boolean, or password type parameters, click the down arrow in the Parameter Value cell and select **{New Run-Time Parameter}** from the list. **{Enter param name}** is displayed in the cell.

	OrderNumber (number)	Date (date)	Destination (string)	PWW (password)
	<input type="checkbox"/> Output of previous compor			
Parameter Value	{Enter param name}	3/14/2007		

Parameter <OrderNumber> description:
The flight order number

Overwrite the Enter param name text between the { } brackets with a descriptive name for the run-time parameter. Ensure that you do not delete the { } brackets, as they instruct Quality Center to treat the component parameter as a run-time parameter and not as a fixed value.

Skip to step 4.

- 3 For string or date type parameters, click the browse button in the relevant Parameter Value cell to display the Set String Value or Set Calendar Value dialog box.

Select **Run-time parameter**. A list of the available run-time parameters is displayed. Select the required run-time parameter from the list and click **OK**. If required, you can create a new run-time parameter by clicking the **Add Run-Time Parameter** button.

- 4 Repeat steps 2 or 3 for any other component parameters or iteration rows for which you want to use run-time parameter values.
- 5 Click **OK** to close the Component Iterations dialog box.

Working with the Run-Time Parameters Dialog Box

In the Run-Time Parameters dialog box in the Test Plan module, you can configure run-time input component parameter values to be used as default values for test runs and for use in debug test runs.

The dialog box displays each run-time parameter that is defined for any of the business components in the business process test.

The value type defined for each business component, for example, String or Number, is displayed in the **Value Type** column. The value you supply must match the value type for the component parameter. For more information on specifying component value types, see “Defining Component Parameters” on page 236.

You can also enter descriptions for run-time parameters in this dialog box that can guide the person running the business process test about the purpose of the run-time parameter and its possible values, if relevant.

To configure run-time parameter values in the Test Plan module:



- 1 Click the **Test Plan** module button in the Quality Center sidebar to open the Test Plan module.
- 2 In the Test Plan tree, select the business process test that contains the relevant business component, and click the **Test Script** tab.



- 3 In the Test Flow pane toolbar, click the **Run-Time Parameters** button. The Run-Time Parameters dialog box opens.

Run-Time Parameters

In the Value column for each run-time parameter, enter the default input value to be used in a test or debug run if no other value is supplied by the test. The value must correspond to the value type.

Parameter Name	Value	Value Type
DestinationCity		String
DepartureCity		String

Description:

The destination city

OK Cancel Help

- 4 In the **Value** column, enter the run-time parameter value to use as the default value and in the debug runs for each run-time parameter in the dialog box.
- 5 Enter a description of the run-time parameter in the **Description** area.

Tip: Valid values or ranges of valid values for a run-time parameter, such as a range of dates, a range of numerical values, or a set of valid strings, should be included in this description when appropriate.

- 6 Click **OK** to close the Run-Time Parameters dialog box.

Configuring Run-Time Parameter Values

Before running a business process test within a test set, you can specify the values for any run-time parameters defined for the test. If you do not specify values, and valid default values have not been specified in the Run-Time Parameters dialog box in the Test Plan module, the test run may fail.

For information on setting run-time default values, see “Working with the Run-Time Parameters Dialog Box” on page 262.

To configure run-time parameter values:



- 1 Click the **Test Lab** module button in the sidebar. By default, the Test Lab module opens with the Execution Grid tab displayed. Each line in the Execution Grid represents a separate test record in the test set tree.
- 2 In the test set tree, select the test set containing the business process test for which you want to configure the run-time parameter.



The tests in the test set are listed in the Execution Grid tab. Business process tests are identified in the grid in the **Plan: Type** column and by the business process test icon in the **Plan: Test Name** column.

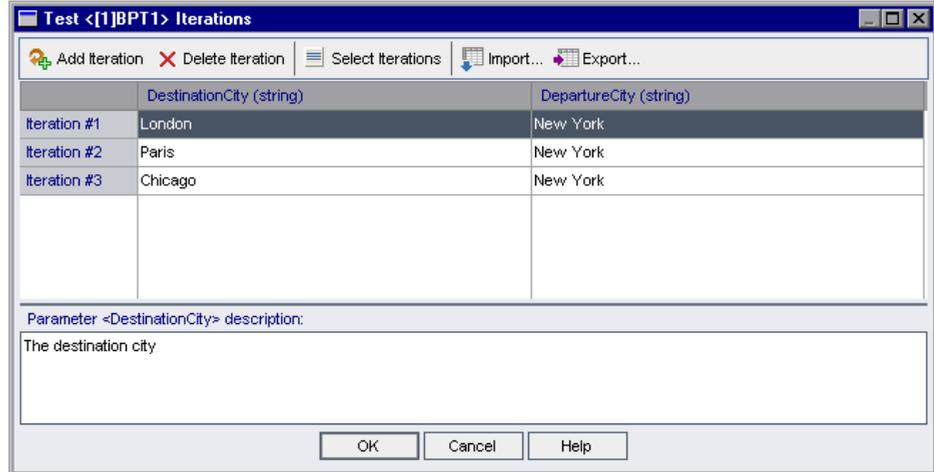
Note: The specific business process test icon displayed in the Execution Grid tab depends on the current status of the test. For more information, see “Understanding Business Process Test Statuses” on page 195.

- 3 In the Execution Grid tab, right-click the business process test for which you want to configure run-time parameter values, and choose **Iterations**.

Or

Click the link in the **Iterations** column of the tab.

The Test Iterations dialog box opens.



Note: By default, the **Iterations** column is not displayed in the Execution Grid tab. You must add it using the Select Columns dialog box, if required. For information on how to add or arrange columns in Quality Center, refer to the *HP Quality Center User's Guide*.

- 4 Select the value cell of the run-time parameter you want to configure, and enter the run-time parameter value to use in the business process test. The value that is entered in a cell must correspond to the value type defined for the component parameter. The value type is displayed in parentheses in the column header for each component parameter.

Tip: Select a cell in a component parameter column to view the parameter description in the **Parameter description** area. Run-time parameter descriptions are initially entered in the Run-Time Parameters dialog box in the Test Plan module. For more information, see “Working with the Run-Time Parameters Dialog Box” on page 262.

- 5 If you want to run more than one iteration of the test, click the **Add Iteration** button in the toolbar. An additional iteration row is added to the Test Iterations dialog box. The previous run-time parameter value row is automatically duplicated.
- 6 Modify the run-time parameter value for the test iteration.

Tips:

You can drag and drop iterations in the list to change the order in which they are used in the business process test.

You can delete an iteration by selecting it and clicking the **Delete Iteration** button in the toolbar.

You can select more than one iteration in the list using standard Windows selection techniques (using the CTRL and SHIFT keys).

- 7 Repeat steps 4 through 6 to add additional test iterations.
- 8 If you want the business process test to run only one iteration or a specific range of iterations, click the **Select Iterations** button and then select the relevant iterations in the Select Iterations dialog box.

For more information on specifying which test iterations to run, see “Selecting a Partial Test Iteration Range” on page 266.
- 9 Click **OK** to save the run-time parameters values and close the Test Iterations dialog box.

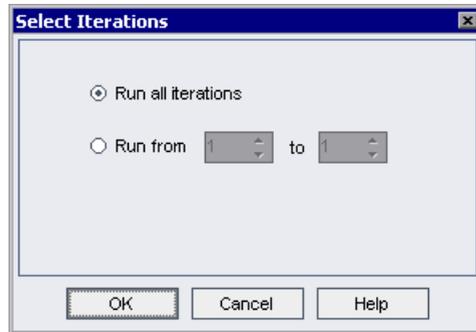
Selecting a Partial Test Iteration Range

You can specify a single iteration or a partial range of iterations to run for a business process test. This enables you to run and check one or more specific iterations without having to run all the defined iterations for the test. In addition, you could use the same business process test definition for different scenarios. Different combinations of iterations can be run for different test runs.

You define the test iterations to run in the Select Iterations dialog box.

To select a test iteration range:

- 1 In the Test Iterations dialog box, click the **Select Iterations** button. The Select Iterations dialog box opens.



- 2 Select the second radio button. The **from** and **to** spin boxes are enabled.
- 3 Specify or select the start and end of the iteration range to run in the business process test.

Tip: To run one specific test iteration only, enter or choose the iteration number in both the **from** and **to** spin boxes.

- 4 Click **OK**. The iterations that are not selected for inclusion in the run are grayed in the Test Iterations dialog box. When the business process test runs, only the defined iteration range is included.

Note: The selected range of test iterations is displayed in the top left cell of the Test Iterations dialog box, and the iterations that are not included in the range are grayed in the iteration list. The values of these iterations can still be modified or deleted if required.

Using Keyboard Commands in the Test Iterations Dialog Box

If you prefer to use your keyboard, you can use the following keyboard commands to navigate within the Test Iterations dialog box:

- Press F2 to enter Edit mode.
- Use the up and down arrow keys to move the focus one iteration up or down.
- You can press TAB to move the focus one cell to the right, or to the first cell in the next row.
- Use the left and right arrow keys to move the focus one cell to the left or right, with the following exceptions:
 - In the last cell in a row, the right arrow key moves the focus to the first cell in the next row.
 - In the first cell in a row, the left arrow key moves the focus to the last cell in the row above (if any).
 - When a cell is in edit mode, the left and right arrow keys move within the edited cell.
- You can select the last row and press ALT+A to add another test iteration row.

Guidelines for Choosing Component Parameter Values and Run-Time Parameter Values

For each of the component parameters defined in the components in your business process test, you need to decide whether the value is determined within the test (either as a fixed value or as a value returned by a previous component), or whether it is specified by the tester at the time of the test run. Run-time parameters enable you to input data into a business process test that affects how the business components that use the run-time parameters are run.

To make this decision, consider the following:

Component Input Parameters...	Run-Time Parameters...
Allow multiple iterations of a business component.	Allow multiple iterations of an entire business process test, with different values in each iteration of the test.
Enable the Subject Matter Expert to control the values used.	Enable the person running the business process test to determine the values of the component parameters at run time.
	Use the same value for a particular purpose in all business components that reference the same run-time parameter.

10

Running Business Process Tests

This chapter describes how to run business process tests in Quality Center and view the results.

This chapter describes:	On page:
About Running Business Process Tests	271
Running a Business Process Test Manually	273
Understanding the Manual Runner Window	281
Understanding the Manual Runner Dialog Box	285
Debugging Tests in the Test Plan Module	293
Running Automated Business Process Tests	299
Viewing Run Results of Business Process Tests	302

About Running Business Process Tests

Business process tests can contain both manual and automated components. You run business process tests and view run results in the Test Plan module and Test Lab module of Quality Center.

When working with business process tests that contain one or more manual components, use the Manual Runner. For information on the Manual Runner, see “Running a Business Process Test Manually” on page 273.

When working with automated tests, you can first check whether the individual automated business components run together successfully in the test by debugging it in the Test Plan module. Debugging the test enables you to check, for example, whether the component order in the test is logical, or that components start where previous components in the test end. For information, see “Debugging Tests in the Test Plan Module” on page 293.

When a debug run is complete, the Test Plan module displays a summarized report that shows which of the business components passed or failed the test. These test results are provided for debugging purposes only and are not stored in Quality Center.

Once a business process test has been debugged and is ready to test new builds of an application, you use the Test Lab module. Business process tests can be run individually, or they can be run as part of a test set containing multiple tests of all types. For more information, see “Running Automated Business Process Tests” on page 299.

Both QuickTest and WinRunner automated components can be used in the same business process test. When you run the business process test, QuickTest Professional or WinRunner opens each component in the test. For more information, see “Working with Other Testing Products” on page 273.

Note: If required, you can continue using the Manual Runner to run your business process test manually even after the test has been automated.

When a business process test run is complete, the Test Lab module displays a detailed report that shows the pass or fail results of checkpoints and other tested points in the business components included in the test.

In addition, you can view a comprehensive report that displays many details about each of the steps performed during the business process test.

Working with Other Testing Products

Before you run an automated business process test containing keyword-driven or WinRunner components on a host computer, you must ensure that the relevant testing tool on the host allows Quality Center to run tests.

QuickTest Professional

To enable Quality Center access to a specific QuickTest Professional client, open QuickTest on the host computer, choose **Tools > Options**, click the **Run** tab, and ensure that **Allow other Mercury products to run tests and components** is selected.

Note: To run a QuickTest test from Quality Center, you must have the necessary Quality Center permissions. For more information, see “Setting Permissions for Business Process Testing” on page 112, or refer to the *HP Quality Center Administrator's Guide*.

WinRunner

To enable Quality Center access to a specific WinRunner client, open WinRunner on the host computer, choose **Tools > General Options**, select **Run**, and ensure that **Allow other Mercury products to run tests remotely** is selected.

Running a Business Process Test Manually

If you are working with one or more manual components in your business process test, you can use the Manual Runner in the Test Lab module to run the test manually. A manual business process test run can include a combination of manual, keyword-driven, and WinRunner components.

You can also use the Manual Runner, for example, if you want to run an automated test manually, or when the automation of components has not yet been completed.

Working with the Manual Runner for business process tests is described in the following sections:

- ▶ Understanding Manual Runs
- ▶ Running a Test Manually
- ▶ Understanding Run Statuses

The Manual Runner for business process tests is somewhat different to the Manual Runner used for Quality Center manual tests. For information on running Quality Center manual tests, refer to the *HP Quality Center User's Guide*.

Understanding Manual Runs

Quality Center enables you to run both manual and automated business process tests manually, allowing you to follow the test steps and perform operations on the application you are testing. You use data from the Design Steps tab (manual steps from manual components, or step documentation from keyword-driven components).

Using the Manual Runner, you mark each step as passed or failed, depending on whether the actual application results match the expected results.

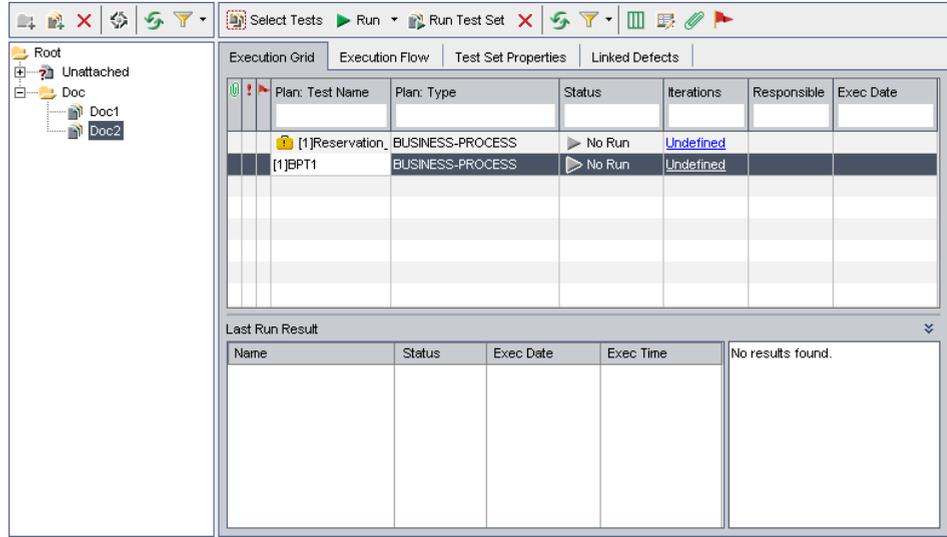
Note: Component steps created in versions prior to Quality Center 9.0 are not displayed in the Manual Runner.

Running a Test Manually

When you run a business process test manually, you follow the test steps and perform operations on the application you are testing. You can run a test as many times as you want and register the results. Test results are stored separately for each run.

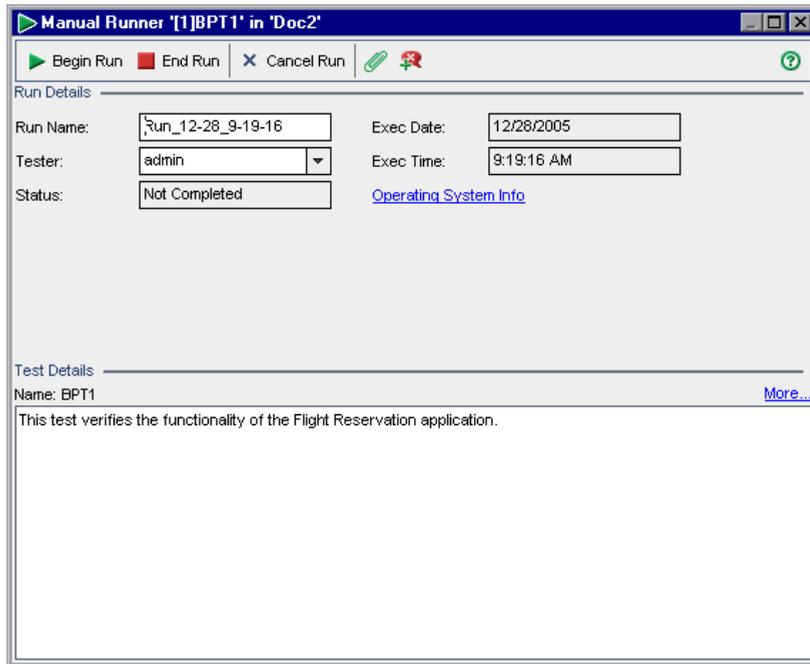
To run a business process test manually:

- 1 In the Test Lab module, select the relevant test set in the test set tree. The tests that comprise the test set are displayed in the Execution Grid tab.



- 2 If you want to iterate any test in the test set, select the test and right-click. Choose **Iterations** from the context menu. The Test Iterations dialog box opens. If you do not want to iterate any test in the test set, proceed to step 5.
- 3 In the Test Iterations dialog box, configure the number of iterations required for the selected test, and then define the run-time values for each parameter in each iteration. These run-time parameter values are automatically displayed for any components that reference them during the manual running of the business process test. For more information, see “Configuring Run-Time Parameter Values” on page 264.
- 4 Repeat steps 2 and 3 for each test in the test set that you want to iterate.

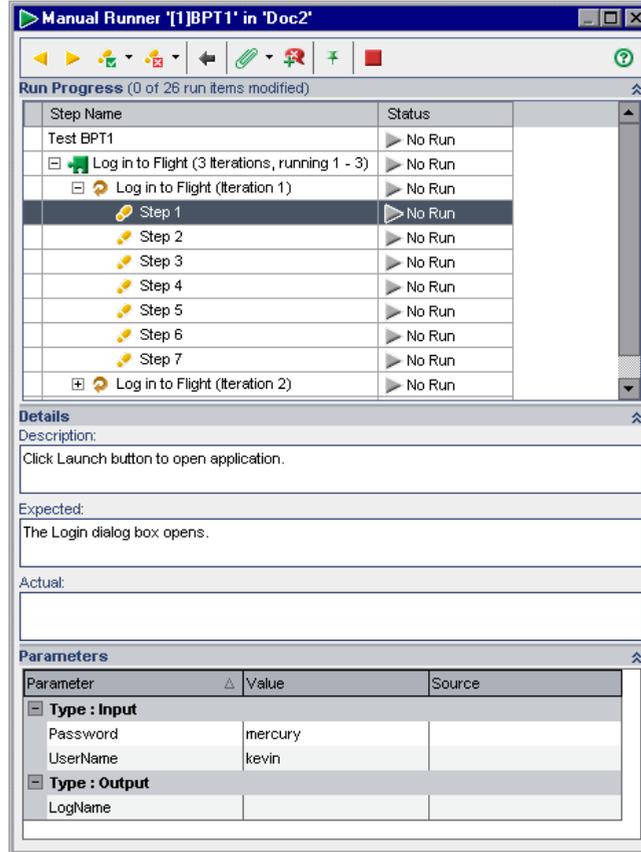
- 5 Click the arrow  next to the **Run** button in the Execution Grid tab toolbar and choose **Run Manually**. The Manual Runner window opens.



Note: For more information on this window, see “Understanding the Manual Runner Window” on page 281.

- 6 Click the **Begin Run** button to start the test run.

The Manual Runner dialog box opens.



Tip: You can keep the Manual Runner dialog box visible while you work with an application by clicking the **Keep on Top** button. Click the button again if you do not want to keep the Manual Runner dialog box visible while you work. For more information on this dialog box, see “Understanding the Manual Runner Dialog Box” on page 285.

- 7 If required, expand the first component in the test to view its steps. Select the first step in the component to see a detailed description of the step, its parameters and values, and its expected result. For more information, see “Understanding the Manual Runner Dialog Box” on page 285.
- 8 Open the application you are testing and perform the first step. If the selected step requires input parameters, use the values displayed in the **Value** cells under the **Type: Input** section in the Parameters pane. For more information, see “Working with the Parameters Pane” on page 288.
- 9 Indicate the result of the step:



- If the actual result is the same as the expected result when you perform the step, click the **Pass Selected** toolbar button, or select **Passed** from the list in the **Status** column. A green check mark is added to the step and the step status changes to **Passed**.

To pass the current test step and all its sub-steps at once, click the **Pass Selected** arrow  and choose **Pass (Including Sub-Steps)**.



- If the actual result is different to the expected result when you perform the step, type the actual result in the **Actual** box. Click the **Fail Selected** toolbar button, or select **Failed** from the list in the **Status** column. A red **X** is added to the step and the step status changes to **Failed**.

To fail the current test step and all its sub-steps at once, click the **Fail Selected** arrow  and choose **Fail (Including Sub-Steps)**. For example, if a dialog box does not open as expected during the test, you can perform none of the subsequent steps that are performed on that dialog box. In this case, select the specific component iteration node, click the **Fail Selected** arrow , and choose **Fail (Including Sub-Steps)**.

- If you are unable to complete the step, type the reason in the **Actual** box and select **Not Completed** from the list in the **Status** column.

Note: For a description of how test, component, and step statuses interact, see “Understanding Run Statuses” on page 280.

10 If the step description indicates that you must return a value to an output parameter, enter the resulting value in the **Value** cell of the parameter **Type: Output** list. This value may be used as the input value of one or more subsequent steps or components in the test, but you can possibly change the value during the component run.



11 If you detect an application flaw while running the test, click the **Add Defect** toolbar button. The Add Defect dialog box opens, enabling you to add the defect. Quality Center automatically creates an association between the test run and the new defect. For more information on adding defects, refer to the *HP Quality Center User's Guide*.



12 If you want to attach an image or other file with more information about what happened when you performed the step, click the **Attach to Step** toolbar button. The Attachments dialog box opens, enabling you to add attachments. An icon to the left of the step indicates an attachment. Click the toolbar button to view any attachments. To add attachments to the entire test run, click the **Attach to Step** arrow  and choose **Attach to Run**. For more information on adding attachments, refer to the *HP Quality Center User's Guide*.

13 Repeat steps 7 to 12 for each step in the component.



14 Click the **End Run** button when you complete the test run.

- 15** Open the **Last Run Result** pane at the bottom of the Execution Grid tab and review the results of your test. For more information, see “Viewing Business Process Test Results in the Test Lab Module” on page 303.

The screenshot displays the 'Execution Grid' and 'Last Run Result' panes. The Execution Grid shows a test plan named '[1]BPT1' with a 'Failed' status. The Last Run Result pane shows a detailed view of the test execution, including a table of steps and their statuses, and a description of the failure.

Name	Status	Exec Date	Exec Time
Test iteration 1	Failed	2/12/2006	3:25:14 PM
Log in to Flight (3 iterations, running 1 - 3)	Failed	2/12/2006	3:25:14 PM
Log in to Flight (iteration 1)	Failed	2/12/2006	3:25:14 PM
Step 1	Passed	2/12/2006	3:25:23 PM
Step 2	Passed	2/12/2006	3:25:19 PM
Step 3	Passed	2/12/2006	3:25:17 PM
Step 4	Failed	2/12/2006	3:25:14 PM
Step 5	No Run	2/12/2006	3:24:44 PM
Step 6	No Run	2/12/2006	3:24:44 PM
Step 7	No Run	2/12/2006	3:24:44 PM
Log in to Flight (iteration 2)	No Run	2/12/2006	3:24:44 PM
Log in to Flight (iteration 3)	No Run	2/12/2006	3:24:44 PM

Description:
Click **OK**.
Expected:
The Flight Reservation dialog box opens.
Actual:
The Flight Reservation dialog box did not open.

Understanding Run Statuses

In certain instances, the test, component, and step statuses in the **Status** column of the Manual Runner dialog box change automatically, according to the status of their respective parent and child nodes in the test hierarchy.

In general, if a test run item fails, all of that item’s parent items fail. Similarly, if all the items of a particular type pass, their immediate parent also passes.

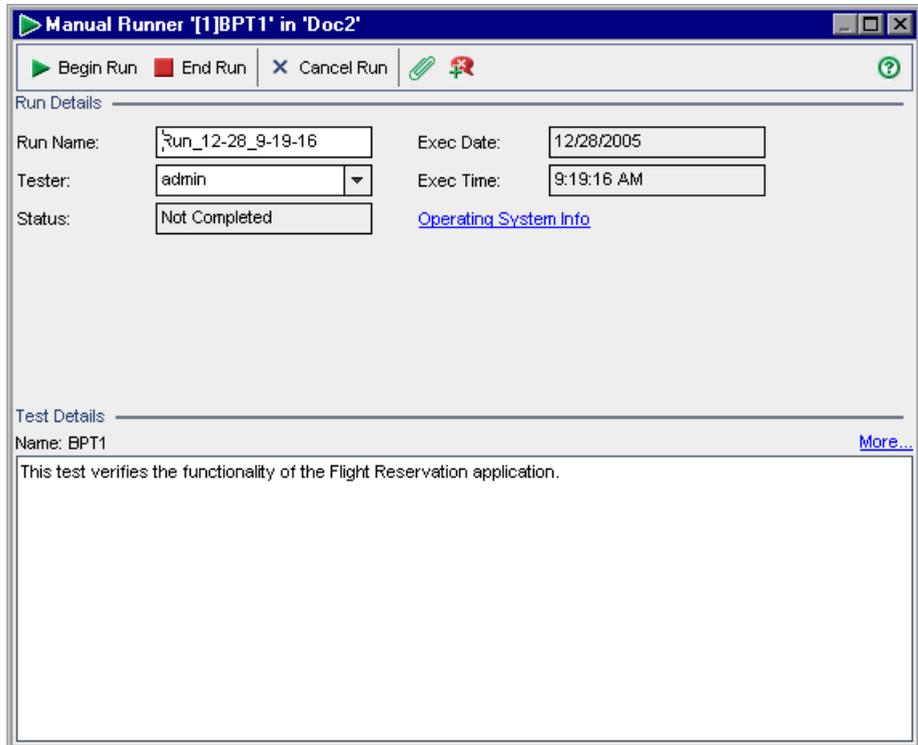
For example:

- ▶ If one or more steps receive a **Failed** or **Not Completed** status, all of its parent nodes (component iteration, component, and test) also receive a **Failed** or **Not Completed** status.
- ▶ If all the steps pass in a component iteration, then their immediate parent (the component iteration) receives a **Passed** status.

- ▶ If all the iterations for a component receive a **Passed** status, the component receives a **Passed** status.
- ▶ If all the components within a test receive a **Passed** status, the test receives a **Passed** status.

Understanding the Manual Runner Window

The Manual Runner window enables you to view and edit run and test details. It also lets you begin a new manual run, which opens the Manual Runner dialog box.



The name of the test you are running and the test set are shown in the title bar of the Manual Runner.

Toolbar

The Manual Runner window contains the following toolbar buttons:

Begin Run. Opens the Manual Runner dialog box.

End Run. (CTRL+Q) Ends the current test run.

Cancel Run. Cancels the current test run.



Attach to Run. Enables you to add attachments to the test run, such as a file, URL, snapshot of your application, an image from the Clipboard, or system information. For more information on how to add attachments, refer to the *HP Quality Center User's Guide*.



Add Defect. (CTRL+B) Enables you to add a defect in the Defects module regarding this test run. Quality Center automatically creates an association between the test run and the new defect. For more information on how to add defects, refer to the *HP Quality Center User's Guide*.



Help. (F1) Opens the Online Help for the Manual Runner window.

For more information, see:

- ▶ Working with the Run Details Pane
- ▶ Working with the Test Details Pane

Working with the Run Details Pane

The Run Details pane enables you to edit the following run information:

- ▶ **Run Name.** The name of the test run.
- ▶ **Tester.** The user name of the person who initiated the test run.

You can view the following run information:

- ▶ **Status.** The run status of the test, for example, Failed, or Not Complete.
- ▶ **Exec Date.** The date that the test run was initiated.
- ▶ **Exec Time.** The time that the test run was initiated.

You can also click the **Operating System Info** link in the Run Details pane to display or edit details about the operating system, operating system service pack and operating system build.



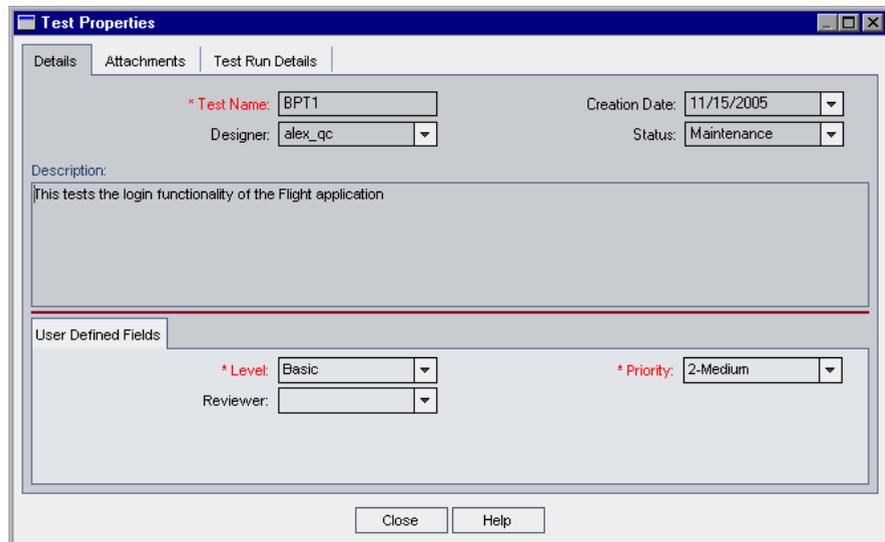
The image shows a dialog box titled "Operating System Information". It contains three input fields: "OS:" with the value "Windows 2000", "Service Pack:" with the value "Service Pack 4", and "Build:" with the value "Build 2195".

For more information on operating system information, refer to the *HP Quality Center User's Guide*.

Working with the Test Details Pane

The Test Details pane provides the description of the test defined in the Test Plan module.

You can click the **More** link in the Test Details pane to open the Test Properties dialog box and display test details and attachments.



The image shows a dialog box titled "Test Properties" with three tabs: "Details", "Attachments", and "Test Run Details". The "Details" tab is active. It contains the following fields:

- * Test Name: BPT1
- Designer: alex_qc
- Creation Date: 11/15/2005
- Status: Maintenance
- Description: This tests the login functionality of the Flight application
- User Defined Fields:
 - * Level: Basic
 - * Priority: 2-Medium
 - Reviewer: (empty)

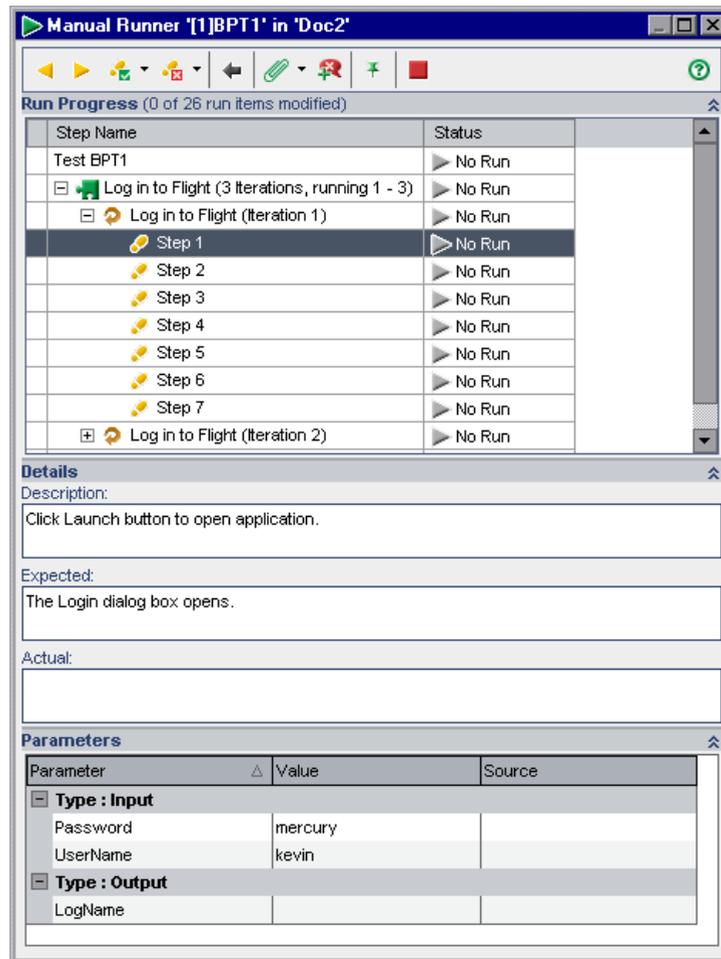
At the bottom of the dialog box are "Close" and "Help" buttons.

- ▶ The Details tab displays a description of the test. It contains the same information as the Details tab in the Test Plan module. For more information, see “Details Tab” on page 178.
- ▶ The Attachments tab displays the attachments that are added to the test. It contains the same information as the Attachments tab in the Test Plan module. For more information, refer to the *HP Quality Center User's Guide*.
- ▶ The Test Run Details tab displays details of the test. It contains the same information as the Details tab in the Test Set Properties dialog box in the Test Lab module. For more information, refer to the *HP Quality Center User's Guide*.

Understanding the Manual Runner Dialog Box

The Manual Runner dialog box enables you to manually progress through each step of your business process test and indicate a Pass, Fail, or Not Completed result for each step.

The Manual Runner dialog box displays a hierarchical tree of the business process test, and includes, where applicable, the run status, parameters, description, and expected result of each step.



The name of the test you are running and the test set are shown in the title bar of the Manual Runner dialog box.

The Run Progress, Details, and Parameters panes can be hidden or displayed. If a required pane is not visible in the Manual Runner dialog box, click the **Show** button  to the right of the pane name. Click the **Hide** button  to hide the pane if required.

Toolbar

The Manual Runner dialog box contains the following toolbar buttons:



Previous Step. (CTRL+UP) Jumps to the previous step.



Next Step. (CTRL+DOWN) Jumps to the next step.



Pass Selected. (CTRL+P) Enables you to indicate that the actual result of the selected step, (test, or component iteration) is the same as the expected result. A green check mark is added to the step and the step status changes to Passed. (To pass the current test step and all its sub-steps at once, click the **Pass Selected** arrow  and choose **Pass All**.)



Fail Selected. (CTRL+F) Enables you to indicate that the actual result of the selected step or steps is different than the expected result, and to enter the actual result in the **Actual** box. A red X is added to the step and the step status changes to Failed. (To fail the current test step and all its sub-steps at once, click the **Fail Selected** arrow  and choose **Fail All**.)



Return to previously clicked link. (ALT+LEFT) Enables you to jump back from a step containing a source output parameter to the step containing the related input parameter link you clicked previously.



Attach to Step. Enables you to add attachments to the step. To add attachments to the entire test run, click the arrow and choose **Attach to Run**. For more information on how to add attachments, refer to the *HP Quality Center User's Guide*.



Add Defect. (CTRL+B) Enables you to add a defect for the step in the Defects module. For more information on how to add defects, refer to the *HP Quality Center User's Guide*.



Keep On Top. (F12) Enables you to keep the Manual Runner dialog box visible while you work with the application you are testing.



End Run. (CTRL+Q) Ends the current run.



Help. (F1) Opens the Online Help for the Manual Runner dialog box.

For more information, see:

- ▶ Working with the Run Progress Pane
- ▶ Working with the Details Pane
- ▶ Working with the Parameters Pane
- ▶ Understanding the Run Progress Pane Hierarchy
- ▶ Understanding Run Statuses

Working with the Run Progress Pane

The Run Progress pane in the Manual Runner dialog box displays a hierarchical tree of each test iteration, business component, and component iteration contained in the business process test.

Select a tree item to display its description, parameters and values, and expected result in the other panes. You can expand or collapse the nodes in the tree to display or hide the contents.

- ▶ To expand a test, group, component or iteration, click the expand symbol  to the left of the item name, press the plus key (+) on the keyboard number pad, or double-click the component.
- ▶ To collapse a test, group, component or iteration, click the collapse symbol  to the left of the item name, press the minus key (-) on the keyboard number pad, or double-click the component.

For more information on the tree hierarchy in the Run Progress pane, see “Understanding the Run Progress Pane Hierarchy” on page 290.

You can select the **Status** cell of each run item in the tree to modify its current status in the test, for example, **Passed** or **Not Completed**. For more information on statuses, see “Understanding Run Statuses” on page 280.

The number of run items modified during the current manual run, and the total number of run items in the test, is shown next to the Run Progress pane title.

Working with the Details Pane

The **Description** box in the Manual Runner Details pane provides the textual description of the selected test, component, or step. This is the text originally entered in the Business Components or Test Plan modules.

In the **Expected** box, you can view the expected result of running the selected component. This is the text originally entered in the Design Steps tab of the component in the Business Components module.

Input and output parameters within the text in the Description and Expected boxes are indicated by sets of brackets:

- ▶ **Input parameters.** Input parameters are enclosed in one set of brackets. If a value has been assigned to the parameter, the value is enclosed in the brackets, for example, <mercury>, for the AgentName parameter. If no value has been assigned to the parameter, an empty set of brackets is shown, for example, <>.
- ▶ **Output parameters.** Output parameter names are enclosed in three sets of brackets, for example, <<<Order_Number>>>.

In the **Actual** box you can enter the actual result of running the step during the business process test.

Working with the Parameters Pane

The Parameters pane in the Manual Runner dialog box displays the input parameter values for you to use when manually running the component selected in the run tree. The Parameters pane also enables you to enter values output by the application that you can use later in the test run.

Input Parameter Values

You can view the input parameter values defined for the component selected in the tree in the **Value** cells of the **Type: Input** section. These input parameter values are provided by:

- **Run-time parameters.** You can define run-time parameters for each component in each iteration using the Test Iterations dialog box before running the test. For more information, see “Configuring Run-Time Parameter Values” on page 264.



Run-time parameter names are shown as links in the **Source** cells in the **Type: Input** section. You can click the link to jump to the component or iteration that provides the run-time parameter value. You can click the **Return to previously clicked link** button to jump back to the step containing the link.

- **Output parameters.** You can enter a value provided by a step in the application you are testing in the **Value** cell of the parameter **Type: Output** list. You can then use this value as an input value in a subsequent step.

Input parameters derived from the output parameter of a previous step are shown as links in the **Source** cells in the **Type: Input** section.

The name of the link indicates the name of the source component and the name of the relevant output parameter, for example, [Component1] Order_Number.

To retrieve the output parameter value, you can click the link to jump to the step that provides the value.



You can click the **Return to previously clicked link** button to jump back to the step containing the link.

- **Default values.** Default values can be defined for input parameters in the component Parameters tab in the Business Components module. Default values are used if no other value is provided from a run-time parameter or output parameter during the test. For more information, see “Defining Component Parameters” on page 236.

Input parameter values that are defined as the default values in the Parameters tab of the component in the Business Components module do not have any associated link.

Output Parameter Values

Output parameters allow you to retrieve values from a step in one business component (the source component) and insert them as input parameters in a subsequent component (the target component) in the business process test flow.

Note: The output parameter must already have been created in the component Parameters tab in the Business Components module. In addition, the output parameter must have been linked to the input parameter in the Component Iterations dialog box. For more information, see “Defining Output Component Parameters” on page 230.

You enter the relevant value provided by the application you are testing in the **Value** cell of the parameter **Type: Output** list when you run the step. A link to the source component is displayed when the target component is run. You can click the link to retrieve the required value. This value may be used as the input value of one or more subsequent steps or components in the test.

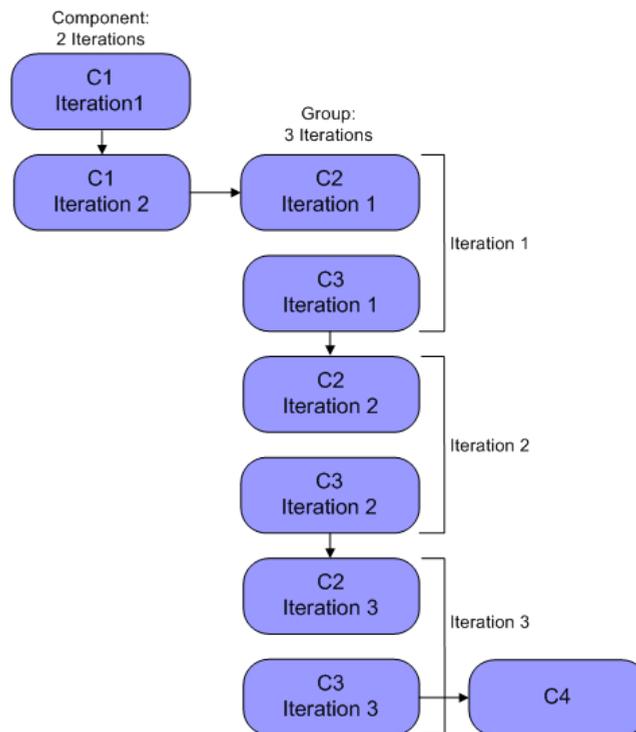
Understanding the Run Progress Pane Hierarchy

The Run Progress pane displays a tree hierarchy of all the components and steps in your business process test in the order that the steps should be performed on the application. Component groups, and iterations of groups and components, are also displayed in the tree in the defined order. This enables you to manually perform each of the individual component steps in the correct testing sequence.

For example, consider a business process test named `Reservation_Test`, that contains four business components; Component1 (C1), Component2 (C2), Component3 (C3), and Component4 (C4). The test requires that components C2 and C3 be grouped and that the components and group are then run and iterated as follows:

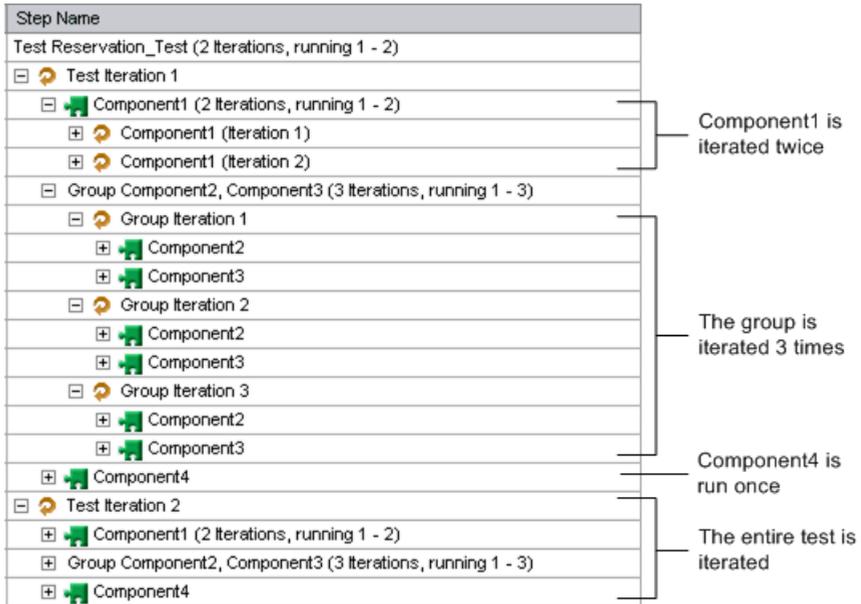
- the first iteration of C1, then the second iteration of C1, followed by
- the first iteration of the group comprising C2 and C3, followed by
- the second iteration of the group, followed by
- the third iteration of the group, followed by the component C4.

This is illustrated as follows:



In addition, the entire test is iterated twice.

The test is displayed in the Manual Runner as follows:



Note: For clarity, the components in the tree have not been expanded to display their individual steps.

Debugging Tests in the Test Plan Module

You can debug a business process test comprised of one or more automated business components by running the components in Debug mode in the Test Plan module. Debugging is usually performed after the Automation Engineer has ensured that the individual components can run successfully in QuickTest Professional or WinRunner, and all the components have a **Ready** status.

Tip: You can also access QuickTest or WinRunner to run and debug individual business components.

For more information on running and debugging components in QuickTest, refer to the *QuickTest Professional for Business Process Testing User's Guide*. For more information on running and debugging components in WinRunner, refer to the *WinRunner User's Guide*.

Debugging ensures that the business process test runs properly, and locates any possible errors that may have occurred during the building of the test. For example, you can check the logical order of business components in the test, the pre-conditions and post-conditions required by each component, and the suitability of component parameter values, especially where output values are used as input values in other components.

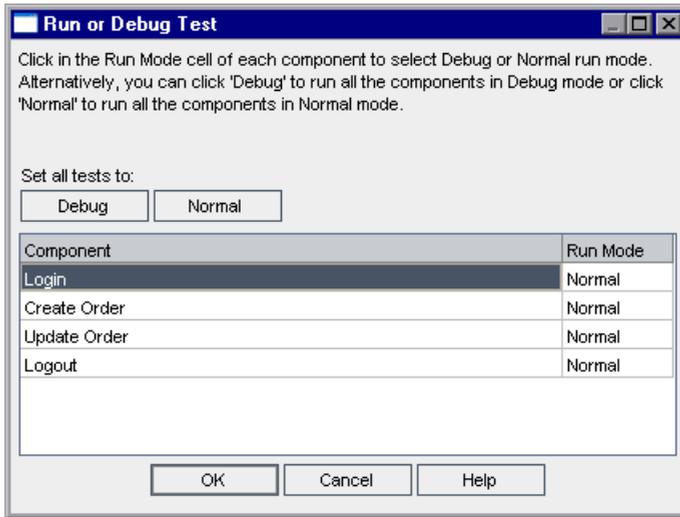
You use the Run or Debug Test dialog box to choose whether to run each of the business components in the test in **Debug** mode or in **Normal** mode.

- ▶ When you run an automated component in Debug mode, the component opens and immediately pauses, enabling you (or an Automation Engineer) to use the debug tools available in QuickTest or WinRunner to debug the component. When one component ends, the next one immediately opens.
- ▶ When you run in Normal mode, the testing tool runs all the steps in the component consecutively, and then opens the next component. You cannot access debug options while a component runs in Normal mode.

Note: When you run a business process test in debug mode in the Test Plan module, no results or other test data is saved to the Quality Center database.

Working with the Run or Debug Test Dialog Box

When you choose to run a business process test from the Test Plan module, the Run or Debug Test dialog box opens. The dialog box displays the business components that make up the selected business process test, and enables you to choose whether to run each component in the test in **Debug** mode or in **Normal** mode.



- ➤ **Debug** mode adds a breakpoint that causes the business process test to pause before running the first step in the specified business component. The position of the breakpoint in the test is indicated by a red spot in the left margin of the Keyword View in QuickTest or of the test window in WinRunner. This enables you to use all the debug options of QuickTest or WinRunner to check the performance of one or more specific steps in the component. You can then continue the run.

For more information on QuickTest or WinRunner debugging options, refer to the *QuickTest Professional for Business Process Testing User's Guide* or the *WinRunner User's Guide*.

- **Normal** mode runs the selected business component from start to finish without pausing.

Clicking the relevant cell in the **Run Mode** column enables you to select the required run mode from a list. You can also click the appropriate button to set all the components to **Debug** mode or to **Normal** mode simultaneously.

When you initiate a test to debug a business component or a complete business process test, Quality Center opens QuickTest or WinRunner directly from the Test Plan module. The requested test is then run on your local computer, and the results are exported back to Quality Center for your viewing.

Note: Business process tests can contain both automated and manual components. Initiating a test to debug a manual component or a business process test containing one or more manual components will display a warning message. To run business process tests that contain manual components, use the Manual Runner. For information on the Manual Runner, see “Running a Business Process Test Manually” on page 273.

To run a test using debug mode:



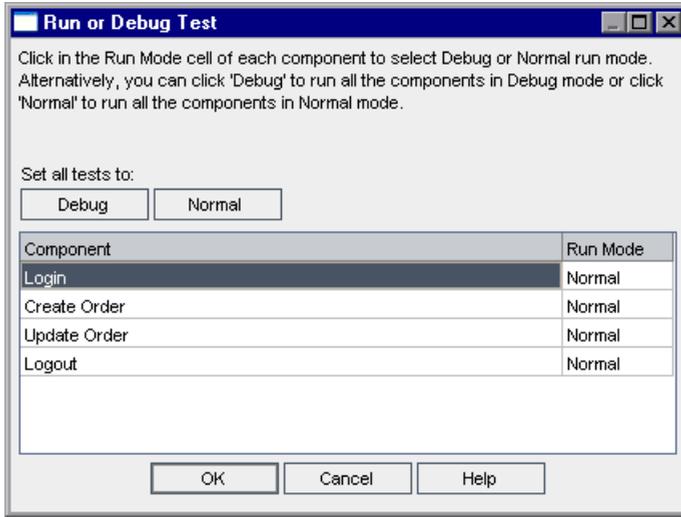
- 1** Click the **Test Plan** module button in the sidebar to open the Test Plan module.
- 2** Select the relevant business process test in the Test Plan tree, and click the **Test Script** tab.
- 3** Ensure that all the necessary applications for the test are set up to meet the pre-conditions required by the first business component. For example, close unnecessary instances of applications, or open the application at the required window.

- 4 Ensure that default values are set for the run-time parameters, as described in Chapter 9, “Working with Parameters.”



- 5 In the Test Flow pane of the Test Script tab, click the **Run or Debug Test** button in the toolbar.

The Run or Debug Test dialog box opens, which lists all the business components that make up the selected business process test.



- 6 For each component, click in the **Run Mode** column and select **Debug** or **Normal** from the list.

Tip: Click the **Debug** button to set all the components to run in Debug mode or click the **Normal** button to set all the components to run in Normal mode.

- 7 Click **OK** to close the Run or Debug Test dialog box. QuickTest or WinRunner opens on your computer and runs the first business component in the business process test.

Note: You should close all browsers before running a business process test on a Web browser. QuickTest or WinRunner must load the Web Add-in (or the WebTest Add-in for WinRunner) before a step in the test opens the browser.

If the business process test contains both QuickTest and WinRunner components, then the test should include both a QuickTest and a WinRunner component at the beginning of the test before the browser opens.

For example, you can add an empty WinRunner component (based on a template that loads the WebTest Add-in) with a comment stating that the component's purpose is just to load the add-in. You can then add a QuickTest component that loads the Web Add-in. The second component can contain steps that open a Web browser.

From your task bar, you can toggle between the Test Plan module, QuickTest or WinRunner, and the application you are testing.

- With the first keyword-driven or scripted component in the test, Quality Center opens QuickTest and loads the add-ins from the application area that is associated with that component. It assumes that these are the required add-ins for all the components in the test.

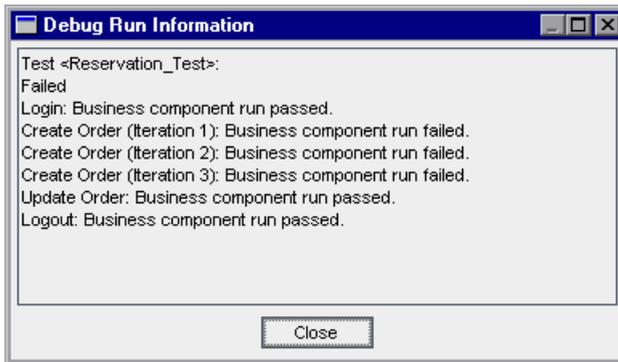
The same is true regarding the first WinRunner component that appears in a business process test, when Quality Center opens WinRunner and loads the add-ins associated with that component. Quality Center assumes that these are the required add-ins for all the WinRunner components in the test.

- In the Test Plan module, the status of the business process test and the name of the component currently being run are shown below the toolbar in the Test Script tab, for example, Running(OrderStart). You can click the **Stop Run** button to stop the test at any time.

- ▶ In QuickTest or WinRunner, the status of the business process test being run, for example **Running**, or **Ready**, is shown in the status bar at the bottom of the window.
 - ▶ In QuickTest or WinRunner, all the debugging functions from the **Debug** menu, for example, **Step Over** or **Step Into**, are enabled for use. For more information on applicable debug options, refer to the *QuickTest Professional for Business Process Testing User's Guide* or the *WinRunner User's Guide*.
- 8** If you selected a business component to run in **Debug** mode, the business process test pauses after opening the component in QuickTest or WinRunner. Use the QuickTest or WinRunner debug options to control the continuation of the run through the displayed component. When you are ready to proceed with the run of the test, continue the run in QuickTest or WinRunner.

When one component finishes running, it closes and the next component in the business process test opens in QuickTest or WinRunner.

When the debug run is complete, Quality Center imports the results from QuickTest and/or WinRunner and displays summary information in the Debug Run Information dialog box in the Test Plan module.



This report details the results of the debug run for each business component in the business process test and includes all relevant QuickTest or WinRunner messages.

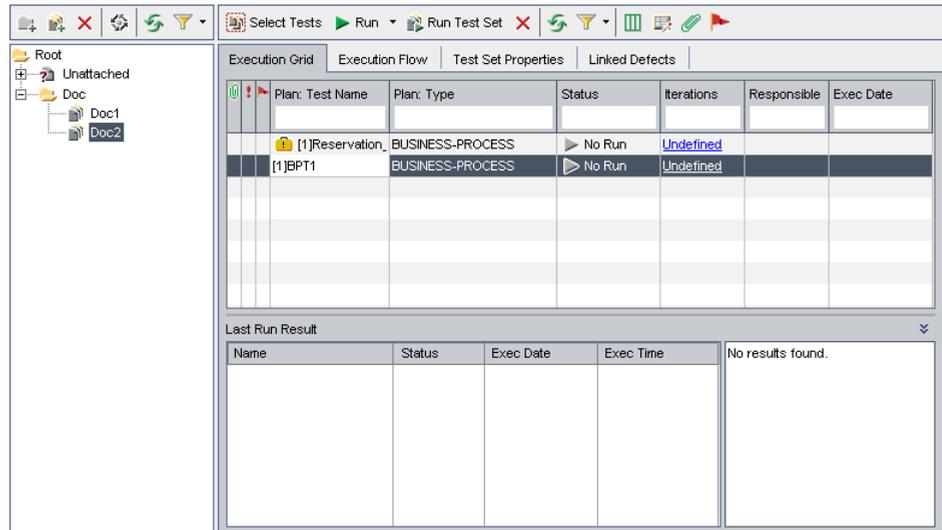
- 9** Click **Close** to complete the test run.

Running Automated Business Process Tests

When a business process test has been debugged and run-time parameters have been configured, you can run the test, or a test set containing several tests, from the Test Lab module.

To run a business process test in the Test Lab module:

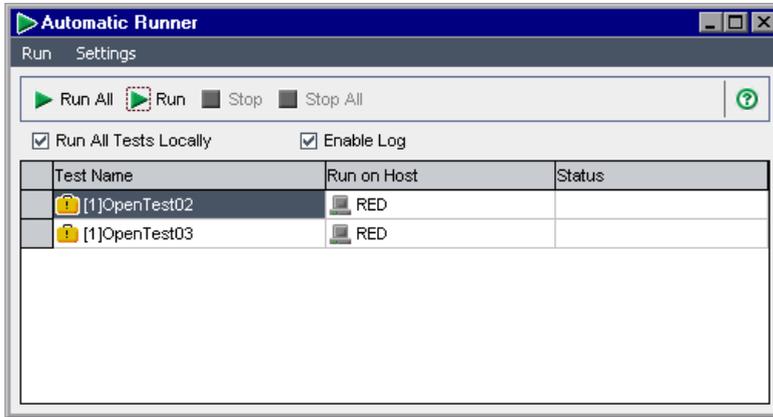
- 1 In the Test Lab module, select the relevant test set in the test set tree. The tests in the test set are displayed in the Execution Grid tab.



- 2 Confirm that run-time parameter values have been configured for all business process tests you want to run. For more information, see “Working with the Run-Time Parameters Dialog Box” on page 262.
- 3 To run a specific business process test, or run all the tests in a test set, perform one of the following:
 - Select the specific business process test in the Execution Grid and click the **Run** button in the tab toolbar.
 - Or
 - Click the **Run Test Set** button in the Execution Grid tab toolbar.

Note: Clicking the arrow  next to the **Run** button enables you to run a test manually. For more information, see “Running a Business Process Test Manually” on page 273.

The Automatic Runner dialog box opens.



The Automatic Runner dialog box lists the specific tests selected in the Execution Grid, or all the tests in the test set if you clicked the **Run Test Set** button.

- 4 Select the **Run All Tests Locally** check box if you want to run the selected business process test or test set using QuickTest or WinRunner on your local computer. If you want to run the test or test set on a host computer, select the cell in the **Run on Host** column, click, and select a host from the list.

Note: If you select **Run All Tests Locally**, you must have QuickTest Professional version 8.2 or later, or WinRunner version 8.2 or later, installed on your computer.

For information on choosing a different host computer, refer to the *HP Quality Center User's Guide*.

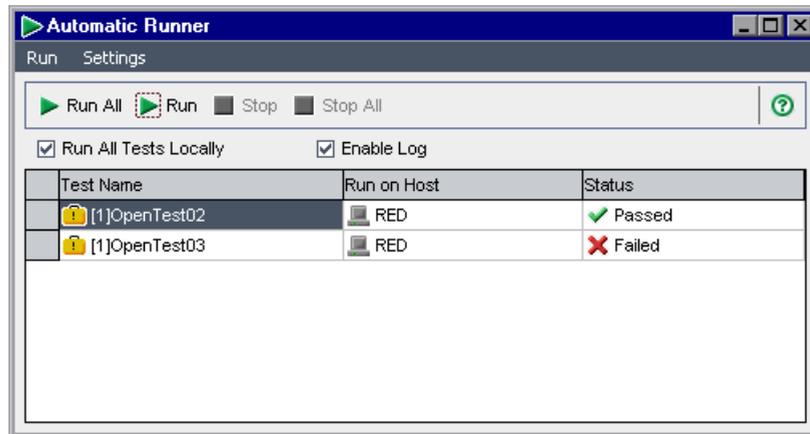
- 5 Select the **Enable Log** check box to enable QuickTest or WinRunner to record an execution log of the test run. For more information on the execution log, see “Viewing the Execution Log” on page 306.
- 6 Select a business process test in the list and click the **Run** button to run the selected test.

Or

Click the **Run All** button to run all the tests in the test set. The testing tool required for each component, QuickTest or WinRunner, opens and runs the applicable business components in the test or test set. From your task bar, you can toggle between the Test Lab module, QuickTest, or WinRunner, and the application you are testing.

- The status of the test run, for example, Connecting, or Running, is shown in the **Status** column of the Running Test Set dialog box. You can click the **Stop** button in the toolbar to stop the test at any time. You can click the **Stop All** button in the toolbar to stop all the currently running tests.
- The status of the test run is shown in the status bar at the bottom of the QuickTest or WinRunner window.

After the test or test set run ends, the overall result of the run is shown in the **Status** column of the Automatic Runner dialog box.



- 7 Close the Automatic Runner dialog box to return to the Test Lab window.

Tip: You can view an execution log of the test or test set run. For more information, see “Viewing the Execution Log” on page 306.

Viewing Run Results of Business Process Tests

After you run a business process test from the Test Lab module, you can view the results in various formats:

- ▶ For automated and manual tests, you can view the summarized results of the run in the Last Run Result pane. This pane lists each step of all the business components in the test, and, where applicable, the summarized results of main events reported by QuickTest or WinRunner. For more information, see “Viewing Business Process Test Results in the Test Lab Module” on page 303.
- ▶ For automated tests, you can view a complete QuickTest or WinRunner report. The hierarchical report contains details on all the steps for all the different iterations and business components within the automated business process test run. For more information, see “Viewing Reports for Automated Business Process Tests” on page 304.
- ▶ For automated and manual tests, you can view an execution log of the business process tests run. From this log you can view summarized or detailed results of any test or test set run. For more information, see “Viewing the Execution Log” on page 306.

Note: Results are stored in Quality Center only when the business component runs from the Test Lab module as part of a business process test. They are not stored in Quality Center when you run the test in debug mode from the Test Plan module, or when running components directly from QuickTest or WinRunner.

Viewing Business Process Test Results in the Test Lab Module

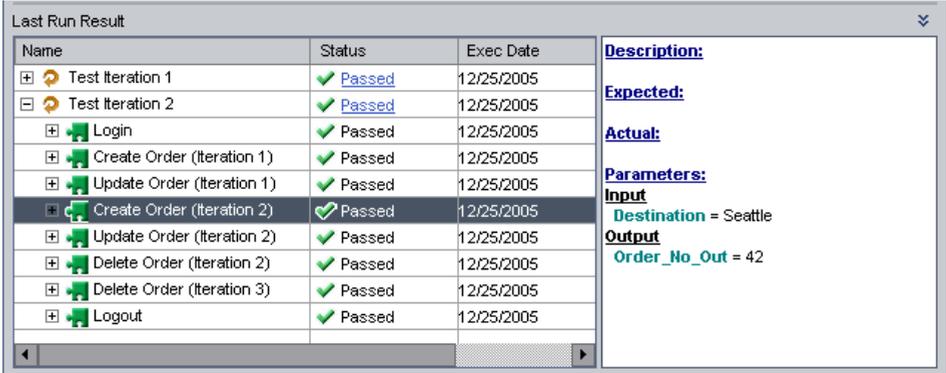
You can view the results of the latest automated or manual business process test run in the Test Lab module in the Last Run Result pane at the bottom of the Execution Grid.

The pane displays a hierarchical tree of each business component contained in the business process test, the test run date and time, and the overall result obtained when the component or step ran, such as **Passed**, or **Failed**. If one or more steps within a component receive a **Failed** result, the component itself displays a **Failed** status.

Note: The results of automated steps run in previous versions of Quality Center are not displayed in the Last Run Result pane.

To view the results of the last test run:

- 1 Ensure that the Last Run Result pane is displayed at the bottom of the Execution Grid tab.



Name	Status	Exec Date	Description:
Test Iteration 1	Passed	12/25/2005	<p>Expected:</p> <p>Actual:</p> <p>Parameters:</p> <p>Input Destination = Seattle</p> <p>Output Order_No_Out = 42</p>
Test Iteration 2	Passed	12/25/2005	
Login	Passed	12/25/2005	
Create Order (Iteration 1)	Passed	12/25/2005	
Update Order (Iteration 1)	Passed	12/25/2005	
Create Order (Iteration 2)	Passed	12/25/2005	
Update Order (Iteration 2)	Passed	12/25/2005	
Delete Order (Iteration 2)	Passed	12/25/2005	
Delete Order (Iteration 3)	Passed	12/25/2005	
Logout	Passed	12/25/2005	



If the Last Run Result pane is not visible, click the **Show** button at the bottom-right of the Execution Grid tab. After clicking this button, it changes to a **Hide** button that you can later use to hide the pane. You can also click the **Last Run Result** title to show or hide the pane.

When the Last Run Result pane is first accessed, the tree displays only the business components in the business process test.

- ▶ To expand a component to view the run result of iterations and steps in that component, click the expand symbol  to the left of the component name, press the plus key (+) on the keyboard number pad, or double-click the component.
 - ▶ To collapse a component, click the collapse symbol  to the left of the component name, press the minus key (-) on the keyboard number pad, or double-click the component.
- 2 Select steps in the pane to view a description of the events in the business process test or the reason for a failed event.

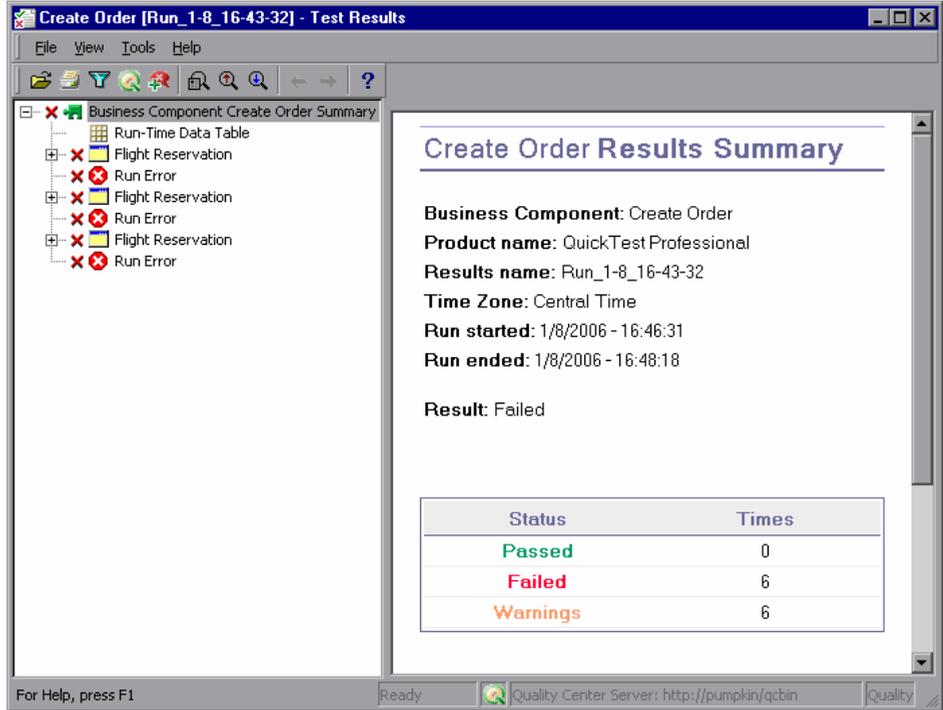
Viewing Reports for Automated Business Process Tests

If you have QuickTest Professional, WinRunner, or the QuickTest Professional Add-in for Quality Center installed on your computer, you can view a full report of an automated business process test run in the Test Lab module.

To view a report of an automated business process test:

- 1 After you run a business process test from the Test Lab module, open the **Last Run Result** pane at the bottom of the Execution Grid tab, as described in “Viewing Business Process Test Results in the Test Lab Module” on page 303.
- 2 Click the link to the report about each iteration in the **Status** column of the pane.

The Test Results window opens.



The Test Results window displays a graphical representation of the result of each step or event in the selected iteration of the business process test.

By selecting a node in the tree, you can view the details of how the step or node performed in the test.

For more information on viewing and analyzing the results of business process tests in the Test Results window, refer to the *QuickTest Professional for Business Process Testing User's Guide* or the *WinRunner User's Guide*.

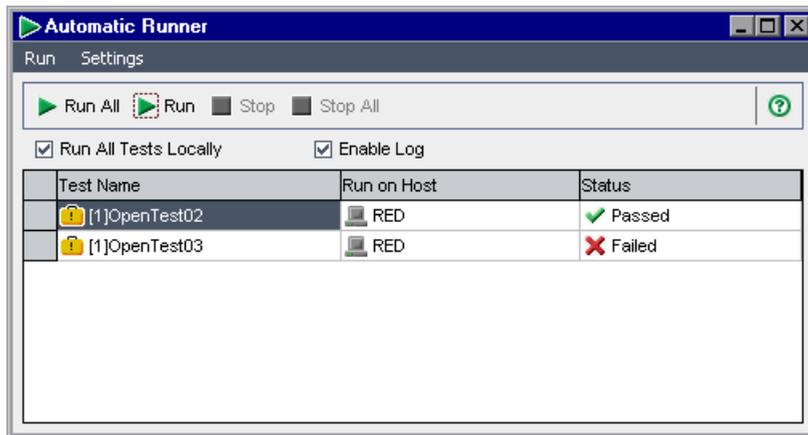
Viewing the Execution Log

The Execution Log provides a log of the automated test or tests run in a test set. The log includes the date and time that each test ran, the host on which it ran, and summary results of the selected test.

Note: The Execution Log is created only if the **Enable Log** check box is selected in the Running Test Set dialog box before the test or test set runs. For more information, see “Debugging Tests in the Test Plan Module” on page 293.

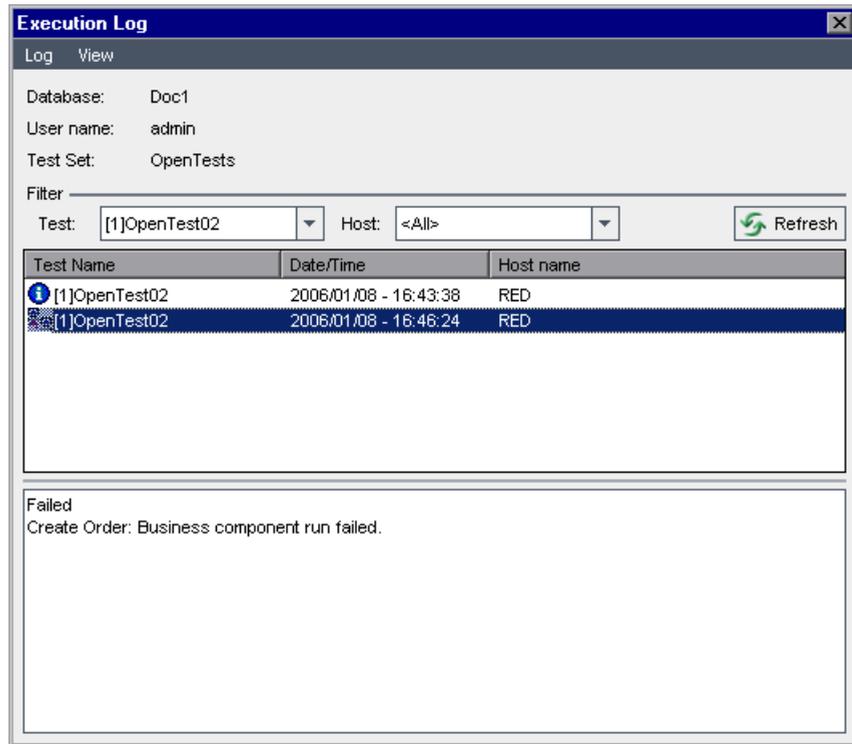
To view the Execution Log:

- 1 After the test or test set run is completed, the Automatic Runner dialog box opens in the Test Lab module.



- 2 Double-click in the Automatic Runner dialog box, or choose **View Execution Log** from the **Run** menu.

The Execution Log window opens and displays the results of the test or test set run.



- 3 If required, you can filter the list to display fewer entries by:
 - Selecting the specific test you want to view from the **Test** list, and clicking the **Refresh** button.
 - Selecting your local computer or the specific host on which the test was run from the **Host** list, and clicking the **Refresh** button.
- 4 In the list of test runs for the selected test set, select the test whose results you want to view. The results of the run are displayed in the box at the bottom of the log window.

Index

A

- accessing
 - Business Components module 44
 - Test Plan module 172
- Add Component task 114
- Add Defect button, manual test run 279, 286
- Add Folder task 114
- Add Iteration button
 - Component Iterations dialog box 243
 - Test Iterations dialog box 266
- Add Parameter task 115
- Add Snapshot button, New Component Request wizard 215
- Add Step button, keyword view 147
- Add Step task 115
- Add-in for Business Process Testing, installing 41
- adding components to tests 183, 199
- add-ins 31, 34
- Add-ins Page command 14
- Adobe Reader 11
- application areas
 - changing 145
 - choosing 144
 - overview 142
 - resources and settings for business components 30
- applications list 32
- Assigned To column, component grid 80
- Attach button, Snapshot dialog box 93
- Attachments tab, Test Plan module 186
- automated component steps, overview 134
- automating components 135
- automating manual steps 135
- Automation Engine column, component grid 81

- Automation Engineer 25
 - definition 26
- Automation tab 133
 - application areas 142
 - color options 141
 - columns 72
 - creating component steps 146
 - deleting component steps 168
 - entering comments 165
 - font options 141
 - keyword-driven components 68
 - modifying component steps 158
 - scripted components 74
 - selecting columns 139
 - using keyboard keys 169
 - working with parameters 158

B

- Begin Run button, manual test run 276
- Business Components module
 - accessing 44
 - menu bar 47
 - tabs 53
 - toolbar 48
 - window 44
 - window elements 46
- business process test reports, viewing from Test Lab 304
- business process test status, definition 26
- Business Process Testing
 - benefits 18
 - getting started in Test Plan 172
 - installing the QuickTest Add-in 40
 - integration with QuickTest 28
 - integration with WinRunner 34
 - licensing 38

Index

- model 19
- overview 18
- requirements 38
- roles 24
- setting up 37
- workflow using QuickTest 33
- workflow using WinRunner 35
- business process tests
 - copying 221
 - creating 191
 - debugging 293
 - definition 26
 - deleting 224
 - generating documents 226
 - managing 189
 - modifying 219
 - providing general details 195
 - running 271
 - running in debug mode 295
 - running manually 275
 - statuses 195
 - validating 222
 - viewing 219
 - viewing run results in Test Lab 302
- C**
- collapsing
 - business components in tests 304
 - component folders, component tree 95
 - test folders, Test Plan tree 219
- color options in Automation tab 141
- columns
 - Automation tab 72, 139
 - component grid 78
 - Design Steps tab 62
- comma separated value files, saving and importing parameter values 258
- comments
 - deleting in Automation tab 167
 - entering in Automation tab 165
 - entering in Discussion area 91
 - modifying in Automation tab 166
- Comments column, component grid 80
- Component Details pane, Test Plan module 185
- component folders, creating 85
- component grid 75
 - adding views to favorites 78
 - column definitions 80
 - copying components 79
 - deleting components 78
 - exporting component data 80
 - pasting components 79
 - refreshing filter/sort 78
 - selecting columns 78
 - sorting by group 98
 - validating components 78
 - viewing 97
- component groups 201
 - creating 204
 - modifying 207
 - removing 210
- component iterations 235
 - multiple 242
- Component Iterations dialog box 255
- component parameters
 - definition 73
 - parameterizing input values 161
 - parameterizing output values 164
- Component Requests 53
- component requests
 - adding 110
 - definition 27
 - deleting 111
 - handling 109
 - New Component Request wizard 214
- component status, definition 27
- Component Step Editor 66, 122
- component steps
 - automating 135
 - creating in Automation tab 146
 - definition 28
 - deleting from Automation tab 168
 - dragging and dropping 168
 - manual 119
 - modifying in Automation tab 167
 - moving 168
 - saving 149

- selecting an item 149
 - selecting an operation 154
 - selecting objects 150
 - component tree 49
 - adding new components 48
 - adding new folders 48
 - context menu 50
 - creating 85
 - deleting components and folders 48
 - expanding and collapsing 95
 - icons 49
 - refreshing components and folders 49
 - setting filter/sort 49, 78
 - validating components 49
 - viewing 95
 - Component Tree pane, Test Plan module 183
 - components
 - adding to business process tests 198
 - adding to folder 86
 - automating 135
 - configuring input parameter values 241
 - configuring iterations 241
 - configuring output parameter values 249
 - copying 99
 - creating folders 85
 - defining 87
 - defining parameters 236
 - definition 26
 - expanding and collapsing 304
 - grouping 204
 - implementation requirements 90
 - input parameters 269
 - obsolete 196
 - organizing in business process tests 199
 - post-conditions 27, 91
 - pre-conditions 27, 91
 - providing details 88
 - providing implementation requirements 88
 - removing 106
 - requests 211
 - restoring 109
 - scripted 36
 - specifying data in a generated document 116
 - specifying general details 89
 - statuses 50
 - used by a business process test 60
 - validating 103
 - viewing and modifying 95
 - working with 83
 - configuring
 - component input parameters 200
 - iterations 241
 - run-time iterations 235
 - context menu
 - Automation tab for keyword-driven components 71
 - component grid 79
 - component tree 50
 - Design Steps tab for manual component 65
 - copying
 - business components 102
 - business process tests 221
 - components in component grid 79
 - Create New Test dialog box 191
 - Create Parameter dialog box 127
 - Created By column, component grid 80
 - Creation Date column, component grid 80
 - .csv files
 - saving and importing 258
 - table columns 259
 - Customer Support Web Site command 13
 - cutting and pasting a test 220
 - cutting components or folders 95
- D**
- date values for input parameters 245
 - Debug mode 294
 - running business process tests in 293
 - Debug Run Information dialog box 298
 - debugging tests 293
 - defects, associating with manual run 279, 286

Index

defining

- components 87
- failure conditions 200
- input parameters 94, 236
- output parameters 94

Delete Component task 114

Delete Folder task 115

Delete Parameter task 115

Delete Selected Components button,
component grid 78

Delete Step button 167

Delete Step task 115

Deleted On column, component grid 81

deleting

- business component iterations 242
- business components 106
- business process tests 224
- comments in the Automation tab 167
- component requests 111
- component steps 168
- manual steps 126
- output values in the Automation tab 157

Description area, Details tab 90

Description column, component grid 80

Design Steps tab 119, 120

- columns 62
- manual components 61
- rows 62
- working with parameters 127

Details tab

- Business Components module 55, 88
- Test Plan module 178, 194

Discussion area

- adding comments 91
- Details tab 91

Document Generator 115

Documentation column, Automation tab 74

Documentation Library 11

documentation updates 14

documents, generating for business process
tests 226

E

End Run button, manual test run 279, 287

error status

- business components 51
- business process tests 196

Execution Grid tab 299

Execution Log 306

expanding

- business components 304
- component folders, component tree 95
- test folders, Test Plan tree 219

exporting component data, component grid 80

F

Fail All command 278, 286

Fail Selected button, manual test run 278, 286

failure conditions, defining 200

filtering

- component tree 95, 97
- Test Plan tree 220

Find Next command, component grid 79

Find/Replace command, component grid 79

finding components, component grid 79

font options in Automation tab 141

function libraries 31

G

generating documents 115

Getting Started 11

Go to Component in Component Tree
button, component grid 78

grid filters, component grid 79

grid view, components 75

grouping components 201

H

Has Picture column, component grid 81

Help on this page command 11

HP Software Web site command 13

I

- icons
 - component tree 49
 - Test Plan tree 196
- images, attaching to business components 92
- implementation requirements
 - definition 27
 - specifying 90
- importing parameter values from a file 254
- input components 241
- input parameters 94, 236, 269
 - configuring 242
 - date values 245
 - defining 58
 - definition 26
 - XML 247
- input values, parameterizing in the Automation tab 159
- installing the QuickTest Add-in Business Process Testing 40
- integration
 - Business Process Testing and QuickTest 28
 - Business Process Testing and WinRunner 34
- Item column, Automation tab 72
- Item list 150
 - keyword view 147
- items, selecting in Automation tab 149
- iterations
 - configuring values at run-time 235
 - configuring values for business component parameters 241
 - definition 27
 - selecting a component iteration range 248
 - selecting a test iteration range 267

K

- keyboard commands
 - Automation tab 169
 - Component Iterations dialog box 253
 - Group Iterations dialog box 207

- Parameters tab 240
- Test Iterations dialog box 268
- Keyword View dialog box 139
- keyword view options, setting 138
- keyword-driven components, Automation tab 68
- keyword-driven steps 137
- Knowledge Base command 13

L

- licensing Business Process Testing 38
- Linked Defects tab, Test Plan module 187
- loading an image, Snapshot tab 93
- local parameters
 - definition 73
 - parameterizing input values 159
 - parameterizing output values 163

M

- maintenance status
 - business components 51
 - business process tests 196
- managing business process tests 189
- manual components
 - Design Steps tab 61
 - designing 122
- manual run statuses 280
- Manual Runner dialog box 277
- Manual Runner window 276
- manual steps
 - automating 135
 - copying 126
 - deleting 126
 - designing 119, 122
 - modifying 125
 - modifying in the Component Step Editor 125
 - modifying in the Design Steps tab 125
- manual test runs 274
- menu bar
 - Business Components module 47
 - component grid 77
 - Test Plan module 175
- Modify Component task 114

Index

Modify Folder task 114
Modify Parameter task 115
Modify Step task 115

N

Name column, component grid 80
New Component button, component tree 48
New Component dialog box 86
new component requests 211
New Folder button, component tree 48
New Folder dialog box
 component tree 85
 Test Plan tree 191
New Parameter dialog box 237
Normal mode 295
 running business process tests in 293
not implemented status, business
 components 51

O

object repositories 31
 example 29
objects
 selecting from shared object
 repository 151
 selecting in Automation tab 150
Obsolete folder 106, 111
obsolete status, business components 196
Operation column, Automation tab 73
operations
 defining values 154
 selecting for a step 154
Original Location column, component grid
 81
outdated status, business process tests 196
Output column, Automation tab 73
Output Options dialog box 156, 163, 164
output parameters 94
 defining 59, 236
 definition 26
 using as input for other components
 249
 viewing details 252

output values
 defining in the Automation tab 156
 parameterizing in the Automation tab
 163

P

parameter values
 importing 255
 saving 258
parameterizing input values in the
 Automation tab 159
parameterizing output values in the
 Automation tab 163
parameters
 configuring 200
 configuring output 156
 creating in the Design Steps tab 127
 definition 228
 in the Automation tab 158
 in the Design Steps tab 127
 inserting into manual steps 129
 parameterizing input values 159, 161
 parameterizing output values 163,
 164
 run-time 260
 saving and importing values 254
 selecting in the Design Steps tab 129
 working with 227
Parameters tab, Business Components
 module 58, 94
partial iteration range, components 248
Pass All command 278, 286
Pass Selected button, manual test run 278,
 286
pasting components, component grid 79
Permission Settings dialog box 112
permissions
 changing 112
 setting for users 113
post-conditions, definition 27
pre-conditions, definition 27
Preview button, Document Generator 118
previous versions, upgrading 39

Q

- QuickTest Professional Add-in for Business Process Testing, installing 41
- QuickTest, integration with Business Process Testing 28

R

- Readme 12
- ready status
 - business components 51
 - business process tests 196
- recovery scenarios 32
- Refresh All button, component tree 49
- Refresh Filter/Sort button, component grid 78
- refreshing, component tree 95
- removing business components 106
- renaming
 - business components 95, 102
 - business components in component grid 97
 - business process tests 194, 220
 - component requests 110
- Reqs Coverage tab, Test Plan module 186
- requests for new business components 211
- requirements, Business Process Testing 38
- resources 31
- restoring obsolete business components 109
- results of test run, viewing 303
- roles
 - definition 28
 - in Business Process Testing 24
- Run Manually command, Execution Grid tab 276
- Run or Debug Test dialog box 294, 296
- Run Progress pane, understanding the hierarchy 290
- running business process tests
 - in Debug mode 293
 - in test sets 299
- Running Test Set dialog box 299, 300, 306
- running tests manually 274

- run-time parameters
 - creating for business process tests 260
 - definition 26
 - parameters and iterations 269
 - working with 260
- Run-Time Parameters dialog box 262

S

- Save button, Automation tab 149
- saving
 - component steps 149
 - parameter values 254
- scripted components 36, 170
 - Automation tab 74
- Select Application Area button 144
- Select Application Area dialog box 144, 145
- Select Columns button, component grid 78
- Select CSV File dialog box 255
- Select Iterations button, Component Iterations dialog box 245
- Select Object for Step dialog box 151
- Select Output Parameter dialog box 250
- Select Parameter dialog box 129
- selecting columns, Automation tab 139
- Set Filter/Sort button, component tree 49, 78
- shared object repository 31
 - selecting objects 151
- shortcut keys, in Automation tab 169
- Snapshot dialog box 92
- Snapshot tab
 - Business Components module 57, 92, 93
 - loading an image 93
- snapshots
 - creating for business components 92
 - creating for component requests 215
 - showing or hiding in the Test Plan module 183
- sorting components by group, component grid 97
- Status column, component grid 80
- statuses
 - business components 50
 - business process tests 195

Index

step arguments, defining values 154

steps. *See* component steps

Subject Matter Expert 18, 24
definition 28

support online 13

T

tabs

Business Components module 53

Test Plan module 178

tasks, changing permissions 112

terminology 26

Test Flow pane, Test Plan module 181

Test Iterations dialog box 264

Test Plan module

accessing 172

window 172

window elements 174

Test Plan tree, expanding and collapsing 219

Test Properties dialog box 283

Test Script tab, Test Plan module 180

test status, definition 26

toolbars

Automation tab for keyword-driven
components 70

Automation tab for scripted
components 74

Business Components module 48
component grid 78

Component Step Editor 67

Component Tree pane 185

Design Steps tab for manual
component 63

Test Flow pane 181

Test Plan module 175

Tools button 116

trees

Business Components module 49

Test Plan module 176

U

Unattached folder 176

under development status, business
components 51

updates, documentation 14

upgrading, from previous versions 39

Used By tab, Business Components module
60

users, setting permissions 113

V

Validate Component button

component grid 78

component tree 49

validating components 103

validating tests 222

Value cell 154

Value column, Automation tab 73

Value Configuration Options dialog box
159, 161

value types, parameters 238

values, defining in Automation tab 155

View Options button 139, 141

view options, setting 138

W

What's New command 11

WinRunner, integration with Business
Process Testing 34

workflow

using QuickTest 33

using WinRunner 35

X

XML values for input parameters 247