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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.

This chapter includes:

- How This Guide is Organized on page 10
- Documentation Library on page 12
- Additional Online Resources on page 15

How This Guide is Organized

The HP Business Process Testing User 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, create flows, build and run business process tests, and report defects detected during the testing process.

This guide 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 and flows. 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 or flow is selected.

Chapter 8 Working with Flows

Describes how to create and develop flows, and how to use flows to build business process tests.

Chapter 9 Managing Business Process Tests

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

Chapter 10 Working with Parameters

Describes how to expand the flexibility and reusability of business components, flows, and business process tests by replacing fixed values with parameters.

Chapter 11 Defining Run Conditions

Describes how to add run conditions to your flows, enabling you to run business components selectively, depending on parameter values of previous business components in a flow.

Chapter 12 Running Business Process Tests and Flows

Describes how to run and debug components in manual and automated business process tests and in flows, 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 version 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 select **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 Guide explains how to use Quality Center to organize and execute all phases of the application life cycle management process. It describes how to specify releases, define requirements, plan tests, run tests, and track defects. (Available online and in PDF format.)

HP Quality Center Administrator 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 standalone application. (Available in PDF format.)

HP Quality Center Upgrade Preparation Guide explains how to detect and repair problems before beginning a project upgrade. (Available in PDF format.)

HP Quality Center Database Best Practices Guide provides best practices for deploying Quality Center on database servers. (Available in PDF format.)

Business Process Testing Guides

HP Business Process Testing User 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 Entity Dependencies API Reference provides an online reference for managing relations between Quality Center entities. The reference covers a subset of the Quality Center COM-based API and a subset of the data tables used when managing relations. You can use this reference to integrate testing tools with Quality Center. (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:

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

HP Software Support accesses the HP Software Support Web site. This site enables you to browse the Self-solve knowledge base. You can also post to and search user discussion forums, submit support requests, download patches and updated documentation, and more. Choose **Help > HP Software Support**. The URL for this Web site is www.hp.com/go/hpsupport.

Most of the support areas require that you register as an HP Passport user and sign in. Many also require a support contract.

To find more information about access levels, go to:
http://h20230.www2.hp.com/new_access_levels.jsp

To register for an HP Passport user ID, go to:
<http://h20229.www2.hp.com/passport-registration.html>

HP Software Web site accesses the HP Software Web site. This site provides you with the most up-to-date information on HP Software products. This includes new software releases, seminars and trade shows, customer support, and more. Choose **Help > HP Software Web site**. The URL for this Web site is www.hp.com/go/software.

Add-ins Page opens the HP Quality Center Add-ins Page, which offers integration and synchronization solutions with HP and third-party tools. For more information, refer to the *HP Quality Center Installation Guide*.

Welcome to This Guide

1

Introducing Business Process Testing

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

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

This chapter includes:

- About Business Process Testing on page 18
- Understanding the Business Process Testing Model on page 19
- Understanding Business Process Testing Integration with QuickTest Professional on page 31
- Understanding Business Process Testing Integration with WinRunner on page 37
- Working with Scripted Components on page 40

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.

Note: Some of the functionality described in this guide may not be supported in the Quality Center edition you are using. For more information, see the *HP Quality Center User Guide*.

Business Process Testing uses a new methodology for testing, and in conjunction with testing tools such as HP QuickTest Professional and HP 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 flows and business component units in multiple tests.
- ▶ Version control enables you to keep track of changes made to entities in your project, including business process tests, flows, and components.
- ▶ 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, flows, 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 and flows in 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 45.

Designing Business Components, Flows, and Business Process Tests

Business Process Testing provides an intuitive interface that enables Subject Matter Experts to create and implement an effective Business Process Testing structure, without using complex scripting or programming procedures.

The building blocks of Business Process Testing comprise Business Components, Flows, and Business Process Tests.

Business Components

A **Business Component** is a reusable unit that performs a specific task in a business process. You can use a component in multiple business process tests and flows. When you modify a component or its steps, all business process tests or flows containing that component reflect that modification.

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 and flows even before the application is ready for testing. For information, see Chapter 4, “Working with Business Components.”

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.

- ▶ 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. For information, see Chapter 5, “Designing Manual Component Steps.”
- ▶ After automated testing resources are ready, you can convert your manual components to automated components and begin implementing the automated steps for each component. For information, see Chapter 6, “Working with Automated Component Steps.”

Flows

A **Flow** is a type of test comprising a collection of business components in a fixed sequence that performs a specific task. You can use a flow in multiple business process tests. When you modify a flow or any of its components, all business process tests containing that flow reflect that modification.

You create flows in the Test Plan module by defining flow details, such as a description and comments. You can also assign attachments to the flow, and associate the flow with other Quality Center records, such as requirements and defects. In addition, you can create and configure manual and automatic business components and add them to the flow. For information, see Chapter 8, “Working with Flows.”

You can use **run conditions** to enhance the flexibility of a flow by enabling components to run selectively, based on earlier stages within the flow. For more information, see Chapter 11, “Defining Run Conditions.”

Business Process Tests

The **Business Components** module enables Subject Matter Experts to create and manage reusable business components that perform specific tasks in a business process. For information, see Chapter 3, “Getting Started with the Business Components Module.”

The **Test Plan** module enables Subject Matter Experts to build and configure business process tests and flows by combining business components into an effective testing structure representing the main tasks performed within a business process. For information, see Chapter 7, “Getting Started with Business Process Testing in the Test Plan Module.”

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

Parameterization

Quality Center enables you to expand the scope of business components (both manual and automated), flows, and business process tests by replacing fixed values with component, flow, and run-time **parameters**. This process greatly increases the power and flexibility of your component, flow, or test. For information on component and flow parameterization, see Chapter 10, “Working with Parameters.”

For an example of component parameterization, see the Parameterization Example, below.

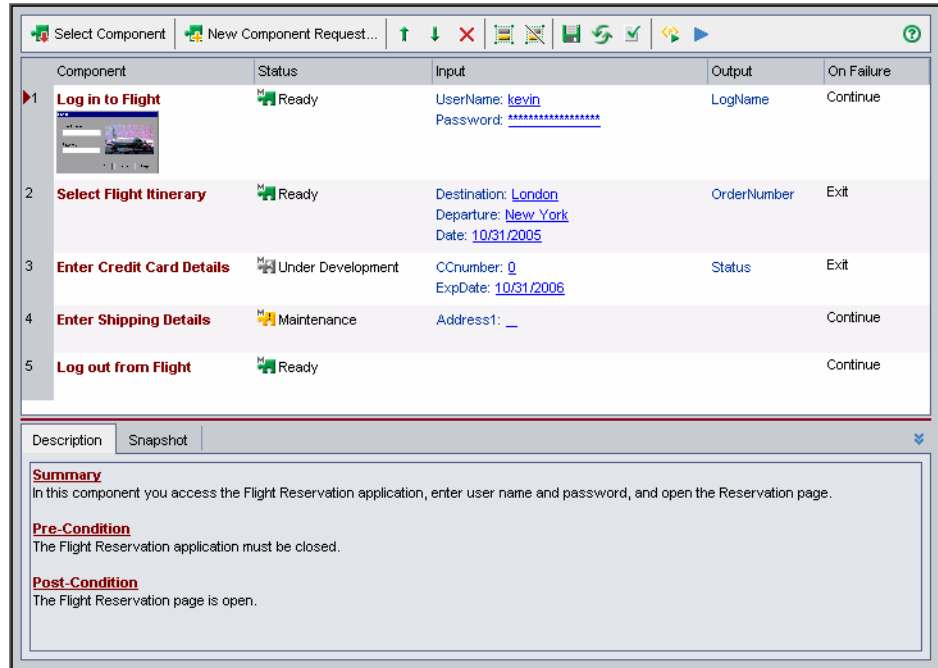
Parameterization Example

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 to the application, 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 and flows.

The login and logout components could be used in most other tests or flows on the same application. For example, you might be able to use the component for entering shipping details in other business process tests that check 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 or flow.

After you automate the components, you can check for problems arising from the combination and order of business components in a business process test or flow 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 is 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 flow, 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 test run. These results include the steps in each business component, the actual value of each component parameter, and the results of individual steps.

Understanding Version Control

Version control enables you to keep track of changes made to entities in your project, including business process tests, flows, and components.

For information on enabling version control for a project, see the *HP Quality Center Administrator Guide*.



In a version control enabled project, you can create and manage your business process tests, flows, and components while maintaining previous versions of these entities.

You check out an entity to make changes. When you check out an entity, Quality Center locks it, preventing other users from overwriting any changes you make. The checked out version of the entity is not visible to other users. Then you check in the entity to store the changes, and make the new version available to other users. You can view and compare previous versions of an entity, or restore a previous version.

When you create a new component, Quality Center automatically checks it out. When you create a new test or flow, you can choose whether to immediately check it out. A component version includes its properties (including user defined fields), text descriptions and comments, and screenshot. It does not include linked entities or the business process tests or flows that contain that component.

You can create and manage entities in a version control enabled project in both the tree and grid views.

Note: The option to check WinRunner components in and out of a version-controlled project in Quality Center is not available from the WinRunner menu. When working in a version-controlled project in Quality Center, WinRunner components can be checked in and checked out using Quality Center only (using the same process as with any other Quality Center entity). For more information on using the versioning functionality in Quality Center, see the *HP Quality Center User Guide*.

- ▶ In the Component Tree view, a component checked out by the current user is displayed with an open green lock icon . A component checked out by another user is displayed with a red lock icon , together with the name of the user. No lock icon indicates that the component is checked in.
- ▶ In the Component Grid view, you can include additional columns, such as **Version Number** and **Version Status**.

You work with version-controlled entities in Business Process Testing in the same way as you do with version-controlled entities in other Quality Center modules. For information on working with version control in Quality Center, see the *HP Quality Center User Guide*.

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 47, or see the *HP Quality Center Administrator 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 or flows, composed of a sequence of 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 or flows, resulting in easier and more cost-efficient maintenance, updating, and test management.

The Subject Matter Expert configures the values used for business process tests and flows, 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, see the *HP QuickTest Professional for Business Process Testing User Guide* or the *HP 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. You can use business components in multiple tests and flows. 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 sequence of business components or flows, designed to test a specific business process of an application.

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

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 or flow 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 or flow.

Flow. A reusable collection of business components in a fixed sequence that performs a specific task. You can use flows in multiple business process tests. Flows may require input values from an external source or from other components or flows, and they can return output values to other components or flows.

Flow input parameters. Variable values that enable you to define data used by a flow that is provided to the flow from an external source.

Flow output parameters. Values that enable you to define data that is retrieved and stored by a flow and can be used in subsequent components in a flow.

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, group of components, or flow, 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.

Run condition. A conditional statement you can insert into a flow to check the current value of a given parameter before running a component in a flow. The run condition determines whether to run the component, skip the component run, or skip and set the component status to fail.

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

Status (Business Process Test, or Flow). A status value that is automatically generated based on the status values of all the business components in the business process test or flow.

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, flows, and business process tests.

Understanding Business Process Testing Integration with QuickTest Professional

As already described, business process tests and flows 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.

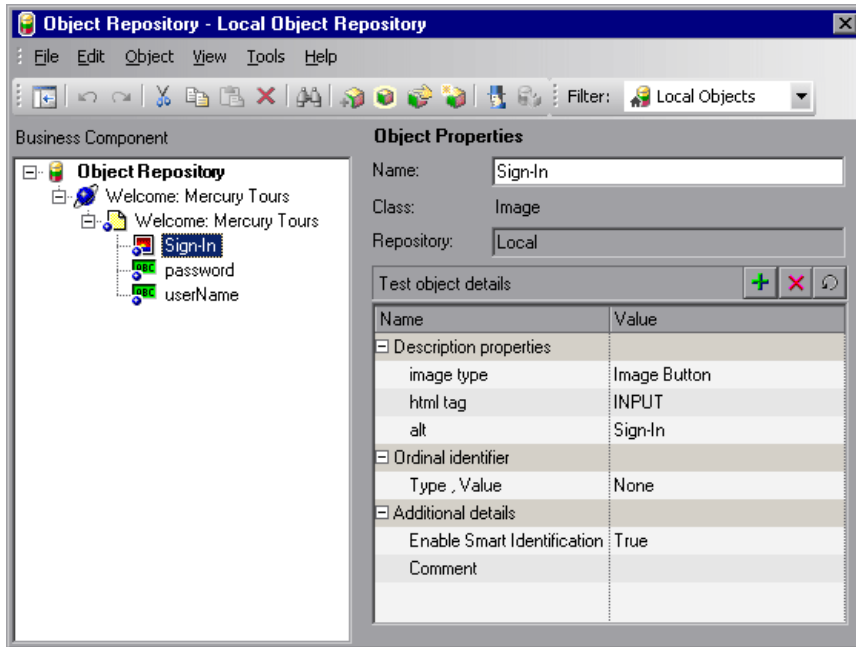
Integration between the two applications enables the Subject Matter Expert to implement the testing steps for the business components in a keyword view, and also enables the Automation Engineer to effectively maintain the set of objects in the object repository and the operations in the function libraries.

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 34)
- Function Libraries (see page 34)
- Associated Add-ins (see page 34)
- Applications List (see page 35)
- Recovery Scenarios (see page 35)

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, see the *HP QuickTest Professional for Business Process Testing User 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, flows, 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 SAP Solutions, Java, Oracle, Siebel, 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 make sure 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 171.

Applications List

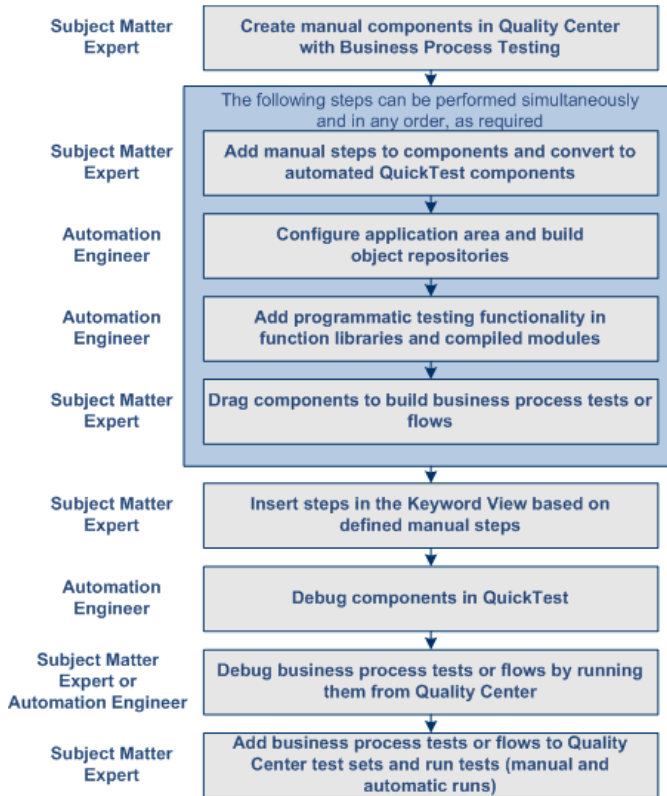
QuickTest runs components only on the set of Windows-based applications that are specified for the component. It can also run on applications in any other environment for which the appropriate QuickTest Add-in is loaded.

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.

Note: The option to check WinRunner components in and out of a version-controlled project in Quality Center is not available from the WinRunner menu. When working in a version-controlled project in Quality Center, WinRunner components can be checked in and checked out using Quality Center only (using the same process as with any other Quality Center entity). For more information on using the versioning functionality in Quality Center, see the *HP Quality Center User Guide*.

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.

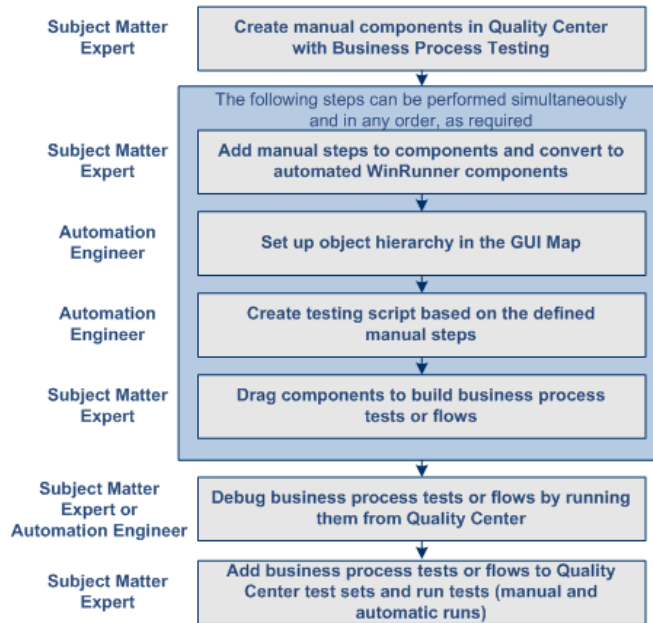
Note: Add-ins are not automatically associated with manual components in WinRunner. To associate one or more add-ins to a component, open the Add-ins tab from **File > Scripted Component Properties**, select the required add-in check box(es), and then save the component.

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. For more information on creating and editing scripted components in QuickTest, see the *HP QuickTest Professional for Business Process Testing User Guide*.

For information on creating and editing scripted components in WinRunner, see the *HP 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 and settings for Business Process Testing in the Quality Center application.

This chapter includes:

- Licensing Business Process Testing on page 42
- Requirements for Business Process Testing on page 43
- Upgrading from Previous Versions on page 44
- Connecting to Business Process Testing on page 45
- Installing the QuickTest Professional Add-in for Business Process Testing on page 45
- Customizing Business Process Testing on page 46
- Setting Permissions for Business Process Testing on page 47

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, see the *HP Quality Center Administrator 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 see the <i>HP Quality Center Administrator Guide</i> .
Work with manual components	Quality Center version 9.0 or later.
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 10.00 from a previous version, consider the following:

- ▶ To work with project entities from a previous version, you must upgrade them to the current version of Quality Center. Project entities include business process tests and components, as well as application areas, function libraries and shared object repositories created in QuickTest.
- ▶ To upgrade QuickTest-based Business Process Testing entities from Quality Center version 9.0 or 9.2, the Quality Center administrator must first upgrade the project and then upgrade the QuickTest Professional-based business process testing entities using the QuickTest Asset Upgrade Tool for Quality Center, which is provided with QuickTest Professional version 10.00.
- ▶ Projects from Quality Center 8.x, TestDirector 8.0, or TestDirector 7.6 must first be upgraded to Quality Center 9.0 or 9.2.
- ▶ For business process testing entities such as application areas, function libraries and shared object repositories that were created in QuickTest Professional 8.x, you must first upgrade the project to QuickTest Professional 9.x using the Business Component Upgrade Tool released with QuickTest Professional 9.x.
- ▶ The entity upgrade and conversion process is non-reversible. After you upgrade an entity, it cannot be opened in QuickTest Professional 9.5 or earlier, or in Quality Center 9.2 or earlier.

For more information about upgrading projects and entities, see the *HP Quality Center Administrator Guide*.

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 see the *HP Quality Center Administrator 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 see the *HP Quality Center Administrator 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 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.

Customizing Business Process Testing

You can customize your Business Process Testing project in Quality Center to suit your environment and unique testing requirements.

For more information, see:

- “Customizing Business Process Testing Entities” on page 46
- “Writing Workflow Scripts” on page 47

Customizing Business Process Testing Entities

Business Process Testing entities have system fields that contain information about components, such as name and status. You can modify the behavior of these fields by restricting users to selecting values only from associated lists, by making entry in certain fields mandatory, and by preserving a history of values entered in the fields.

You can also include data unique to your project by creating user-defined fields for components. User-defined fields added to business components are displayed in the Details tab of the component.

For more information on customizing projects in Quality Center, see the *HP Quality Center Administrator Guide*.

Writing Workflow Scripts

You can write workflow scripts to customize the actions that Business Process Testing users can perform, and the fields that are available to users in dialog boxes.

During a user session, as the user initiates various actions, Quality Center triggers event procedures. By adding VBScript code to the event procedures, you can write a workflow script that customizes the execution of the associated user actions. The code you add to the event procedures can access Quality Center objects.

The Script Editor (available in Quality Center from **Tools > Customize > Workflow > Script Editor**) lists the event procedures for each Quality Center module, and allows you to add your code to the appropriate procedure. For more information, see the *HP Quality Center Administrator Guide*.

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, see the *HP Quality Center Administrator Guide*.

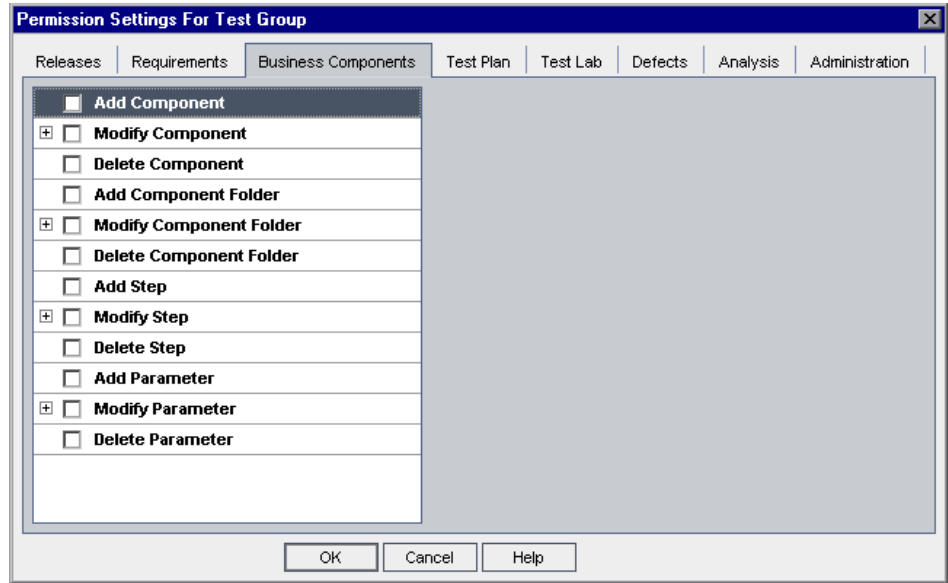
When setting user group permissions, consider the following:

- ▶ 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 flows, you must have the same permission settings as those for working with tests. For more information on configuring user group permission settings, see the *HP Quality Center Administrator Guide*.
- ▶ 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.
- ▶ When setting group permissions, you can limit the capabilities of modifying or deleting a field value, so that only the user who owns the record can change or delete the value. The default owner of the Quality Center Business Component object is defined in the **Created By** field.

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 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 50.

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.
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.

Task	Description
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.

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 includes:

- ▶ About Getting Started with the Business Components Module on page 54
- ▶ Introducing the Business Components Module Window on page 56
- ▶ Working with Component Tabs on page 67
- ▶ Understanding the Design Steps Tab on page 73
- ▶ Understanding the Automation Tab on page 81
- ▶ Understanding the Dependencies Tab on page 89
- ▶ Understanding the History Tab on page 93
- ▶ Sharing Entities in Libraries on page 96
- ▶ Using Baselines on page 97
- ▶ Introducing the Component Grid on page 98
- ▶ Business Components Module Shortcuts on page 106

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 and flows.

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 and flows 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 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 45.

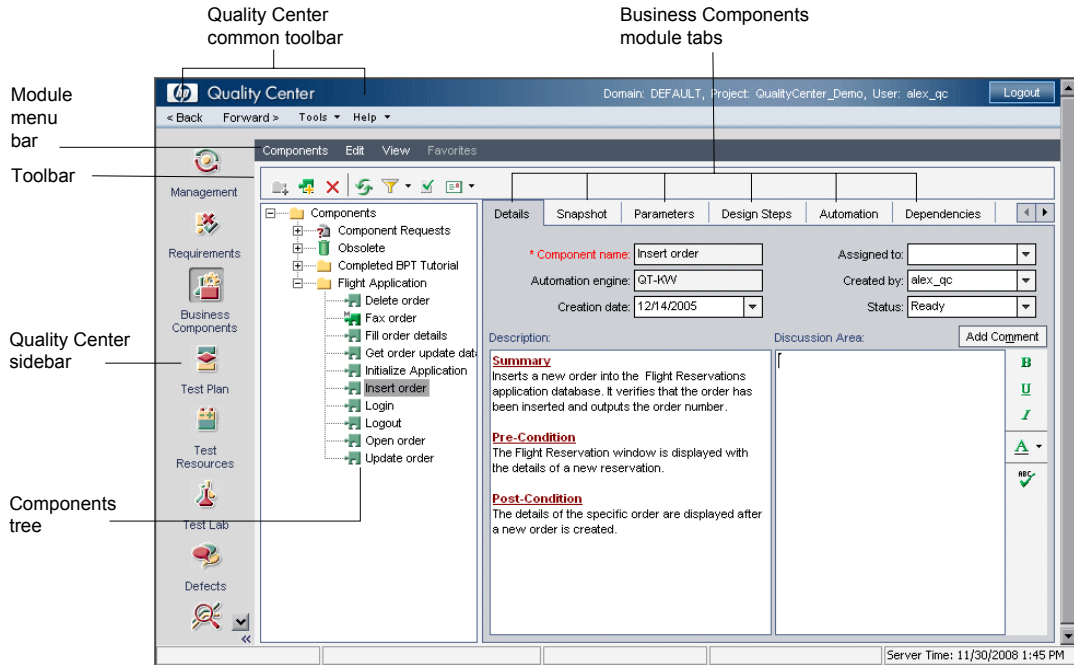
- 3 If the Component Grid view is displayed, choose **View > Component Tree**. For information on the component grid, see “Introducing the Component Grid” on page 98.
- 4 Expand a component folder in the component tree and select a business component. The Details tab of the component opens.

Tips:

- For information on how to expand folders in the component tree and view business components, see “Viewing and Modifying Business Components” on page 121.
 - You can switch between the Quality Center modules using CTRL+SHIFT+<number> shortcut keys. The number represents the sequential order in which the module is displayed in the module sidebar. For example, if Requirements is the first module, press CTRL+SHIFT+1. If Business Components is the second module, press CTRL+SHIFT+2.
 - You can view and work with all the business components in the current project simultaneously by switching from the Component Tree view to the Component Grid view. For more information, see “Introducing the Component Grid” on page 98.
-

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 57.
- ▶ **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 58.
- ▶ **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 60.

► **Business Components module tabs:**

- **Details tab.** Enables you to specify details and implementation requirements for the currently selected business component. For more information, see “Details Tab” on page 67.
- **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 69.
- **Parameters tab.** Enables you to define input and output component parameters and parameter values for the business component. This allows the component to receive data from an external source and to pass data to other components or flows. For more information, see “Parameters Tab” on page 70.
- **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 “Understanding the Design Steps Tab” on page 73.
- **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 “Understanding the Automation Tab” on page 81.
- **Dependencies tab.** Displays the dependency relationships between components, tests, flows, resources, and application areas. For more information, see “Understanding the Dependencies Tab” on page 89.
- **History tab.** Displays a log of changes made to the component. For more information, see “Understanding the History Tab” on page 93.

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, validate business components, and send e-mail.
- **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 view and the Component Grid view.
- ▶ **Versions.** In a version-controlled project, the Components menu bar also displays the Versions menu, which contains commands for checking in and checking out components. For information on working with version control in Quality Center, see the *HP Quality Center User Guide*.

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.** Adds a new folder to the component tree below the currently selected item.



- ▶ **New Component.** 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 111.



- ▶ **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 or flows 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 134.

Tip: Business components that are being used by one or more business process tests or flows can be easily recovered from the **Obsolete** folder if they were deleted accidentally. For more information, see “Restoring Obsolete Business Components” on page 137.



- ▶ **Refresh All.** Refreshes the data for the currently selected folder or business component.



- ▶ **Set Filter/Sort.** Enables you to easily locate required component tree items by setting filter or sort preferences. For more information on filtering and sorting tree items, see the *HP Quality Center User Guide*.



- ▶ **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 131.



- ▶ **Send E-Mail.** Enables you to send an e-mail about a component to another user. For more information, see “Mailing Components” on page 138.

In a version-controlled project, the Components toolbar displays the following additional buttons for checking in and checking out components.



- ▶ **Check Out.** Opens the Check Out dialog box, enabling you to check out the selected component.



- ▶ **Check In.** Opens the Check In dialog box, enabling you to check in the selected component.

For information on working with version control in Quality Center, see the *HP Quality Center User Guide*.

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 or flows.



- **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 62.

In a version-controlled project, a component checked out by the current user is displayed with an open green lock icon next to the component icon. A component checked out by another user is displayed with a red lock icon , together with the name of the user. For information on working with version control in Quality Center, see the *HP Quality Center User Guide*.

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 121.
- ▶ **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 121.
- ▶ **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 62.
- ▶ **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 121.
- ▶ **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 125.

In a version-controlled project, the **Versions** option in the right-click context menu includes **Undo Check Out**. This enables you to undo the checkout of a checked in entity and cancel your changes. For information on working with version control in Quality Center, see the *HP Quality Center User Guide*.






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 flow, or that it has errors that require attention before it can be successfully used in a test or flow. The more ready a component is to be included successfully in a business process test or flow, 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 or flows of which it is a part. In general, the component with the most severe status determines the status of the test or flow.

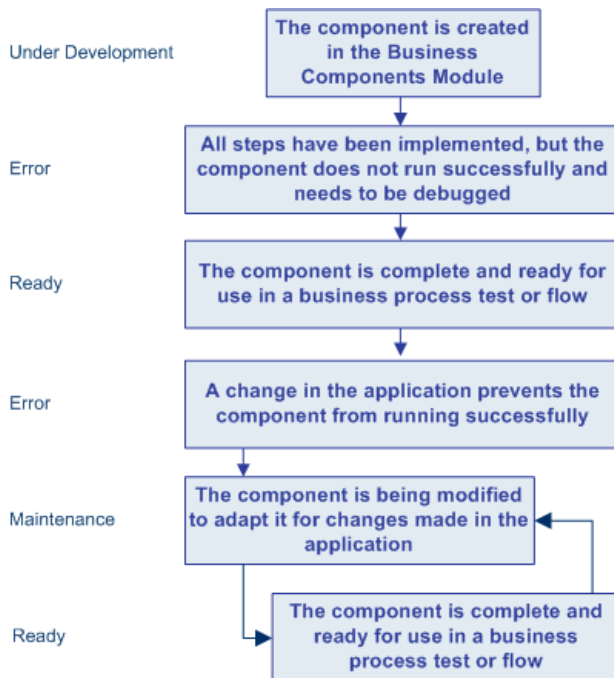
For example, a business component with an Error status causes any business process test or flow of which it is a part to have an Error status.

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 or flow contains a component with this status, the status of the entire business process test or flow is also Error .

- ▶ 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:



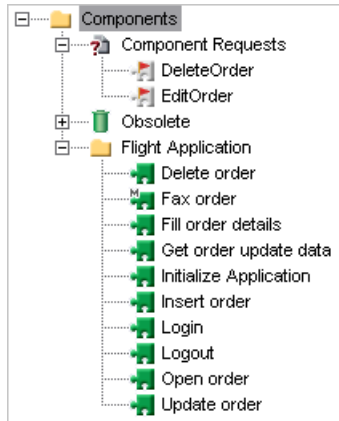
Business Component Tabs

Selecting a business component in the component tree displays several tabs, as described in “Working with Component Tabs” on page 67.

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 component 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 or flow.

You can select the Dependencies tab to view details of the business process tests or flows 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 or flow.

For more information on transferring component requests from the Component Requests folder to a component folder, see “Handling Component Requests” on page 141.

For more information on requesting business components for business process tests or flows, see “Requesting New Components for Business Process Tests or Flows” on page 261.

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, view changes, automate the component, and view the business process tests or flows 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

*** Component name:**

Automation engine:

Creation date:

Assigned to:

Created by:

Status:

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: Add Comment

Alex Smith <alex_qc>, 1/17/2006:
Use only in new business process tests

B

U

/

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 drop-down lists.

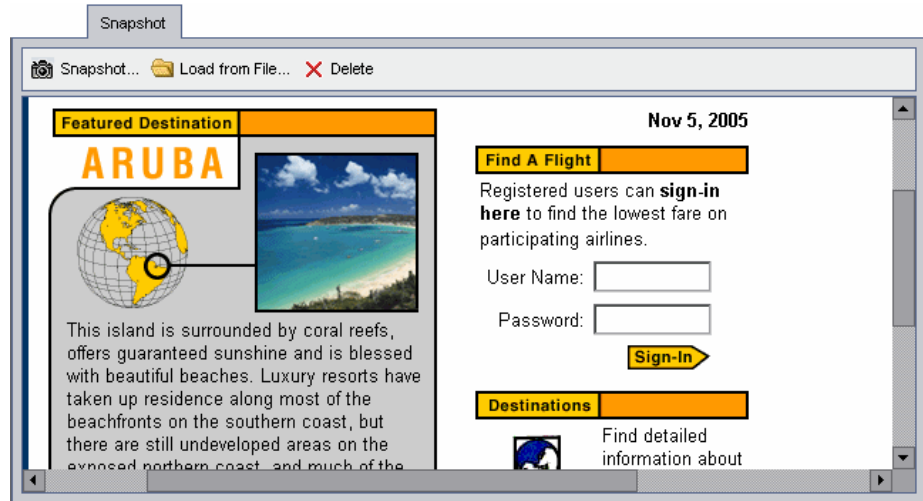
The Details tab can contain the following information:

- **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 62.
- **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 114.

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 118.
- ▶ **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 119.
- ▶ **Delete.** Deletes the currently attached snapshot.

For more information on the Snapshot tab, see “Attaching Images” on page 118.

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 or flows.

Input component parameters make business components more flexible and make it easier to reuse the same component in multiple business process tests and flows—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 or flow.

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 or flow.

Parameters

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 or flow.

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 or flow.

- **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 or flow.

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

- **New.** Enables you to create new component parameters.
- **Delete.** Enables you to delete existing component parameters.



- **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 10, “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 or flow 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 73.

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 81.

Dependencies Tab

The Dependencies tab displays the dependency relationships that exist between entities such as components, tests, flows, test resources, and application areas. The tab comprises the Resources, Used By Tests, and Application Area sub-tabs. For more information, see “Understanding the Dependencies Tab” on page 89.

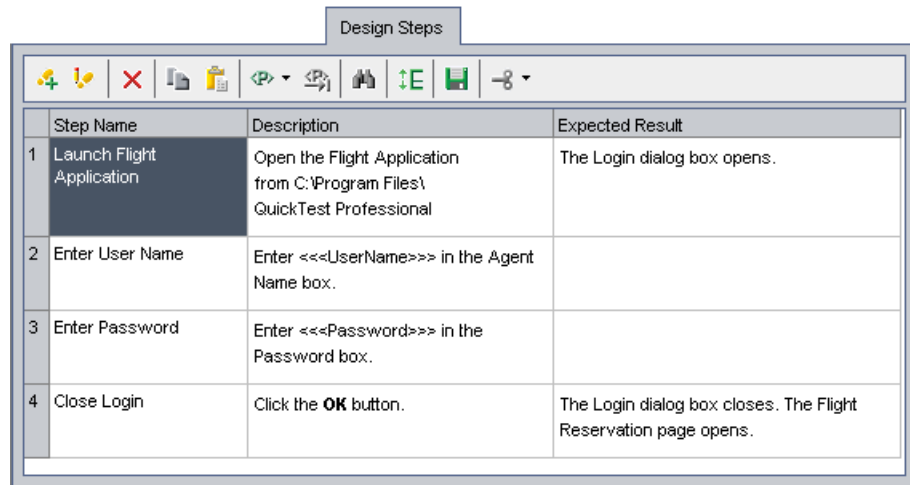
History Tab

The History tab displays changes made to specified fields in an entity. For each change, the tab displays the date and time of the change and the name of the user who made the change. For more information on the functionality provided by the History tab, see “Understanding the History Tab” on page 93.

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 could perform manually (as opposed to automated steps created in a testing tool).

You can include a manual component in a business process test or flow 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 a keyword-driven 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 or flow 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.** 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 78.
- 
 ▶ **Edit step.** (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 78.
- 
 ▶ **Delete selected steps.** (or press DELETE) Deletes the currently selected step.
- 
 ▶ **Copy steps.** Copies the selected component step to the clipboard. Use this button in conjunction with the **Paste steps** button.
- 
 ▶ **Paste steps.** Pastes the copied component step to a new location.
- 
 ▶ **Create/Select Parameter.** Includes the following options:
 - ▶ **Select Parameter.** 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 157.
 - ▶ **Create Parameter.** 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 155.
- 
 ▶ **Complete Parameter Name.** 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.** 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 77.



- ▶ **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.** 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 178.



- ▶ **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 163.

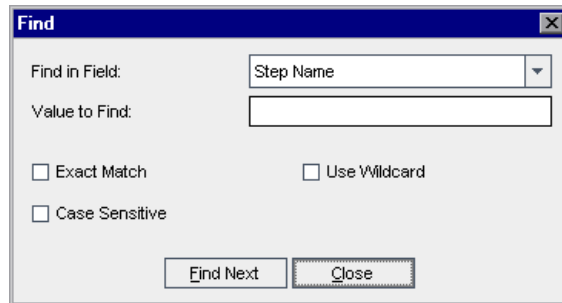
Using Keyboard Commands in the Design Steps Tab

If you prefer to use your keyboard, you can use the following keyboard commands to navigate within the Design Steps tab:

- ▶ ALT+N. Creates a new step
- ▶ ALT+E. Edits a step
- ▶ CTRL+P. Opens the Select Parameter dialog box
- ▶ CTRL+C. Copies the selected component step to the clipboard. Use this button in conjunction with Paste steps
- ▶ CTRL+V. Pastes the copied component step to a new location
- ▶ CTRL+R. Opens the Create Parameter dialog box
- ▶ CTRL+K. Completes the parameter name, based on the first character or characters of the parameter name that you have entered
- ▶ CTRL+S. Saves the steps that you have created or modified
- ▶ CTRL+F. Opens the Find dialog box

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 distinguish between uppercase and lowercase characters, select the **Case Sensitive** check box.
- 4 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.

Exporting Data to a File

You can export the information in the Design Steps tab to several formats, including text file, Microsoft Word document, Microsoft Excel spreadsheet, or HTML document.

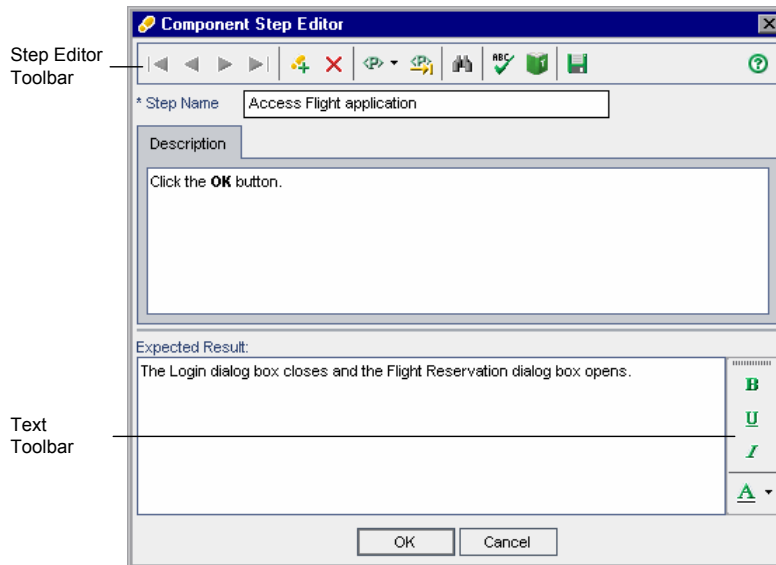
To export data to a file:

- 1 Right-click in the Design Steps tab and choose **Export To**. Then choose the format you require. The Export Grid Data dialog box opens.
- 2 In the **Save in** box, choose a location for the file.
- 3 In the **File name** box, enter a name for the file.
- 4 In the **Save as type** box, select a file type.
- 5 Click **Save**.

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 148.

The Component Step Editor toolbar contains the following buttons:



➤ **First Step.** Jumps to the first manual step in the component.



➤ **Previous Step.** Jumps to the previous manual step.



➤ **Next Step.** Jumps to the next manual step.



➤ **Last Step.** Jumps to the last manual step in the component.



➤ **New Step.** Enables you to add a new manual step to the component after the current step. For more information, see “Designing Manual Steps” on page 148.



➤ **Delete Step.** Deletes the currently open step.



➤ **Create/Select Parameter.** Includes the following options:

➤ **Select Parameter.** 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 157.

➤ **Create Parameter.** 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 155.



- **Complete Parameter Name.** 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.** 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.** Checks the spelling of the selected word or all the words in the step.



- **Thesaurus.** 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.** 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 178.



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

Using Keyboard Commands in the Component Step Editor

If you prefer to use your keyboard, you can use the following keyboard commands to navigate within the Component Step Editor:

- CTRL+F. Opens the Replace dialog box
- F7. Performs a spell check
- ALT+HOME. Jumps to the first manual step in the component
- ALT+LEFT. Jumps to the previous manual step
- ALT+RIGHT. Jumps to the next manual step
- ALT+END. Jumps to the last manual step in the component
- ALT+N. Enables you to add a new manual step to the component after the current step

- CTRL+DELETE. Deletes the currently open step
- CTRL+P. Opens the Select Parameter dialog box
- CTRL+R. Opens the Create Parameter dialog box
- CTRL+K. Completes the parameter name, based on the first character or characters of the parameter name that you have entered
- CTRL+F. Opens the Replace dialog box
- CTRL+ALT+T. Opens the Thesaurus dialog box
- CTRL+S. Saves the component steps that you have created or modified

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 82
- “Working with Columns in the Automation Tab” on page 84
- “Working with the Automation Tab - Scripted Components” on page 87

Keyboard shortcuts within the Automation tab are described in “Using Keyboard Commands in the Automation Tab” on page 88.

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.

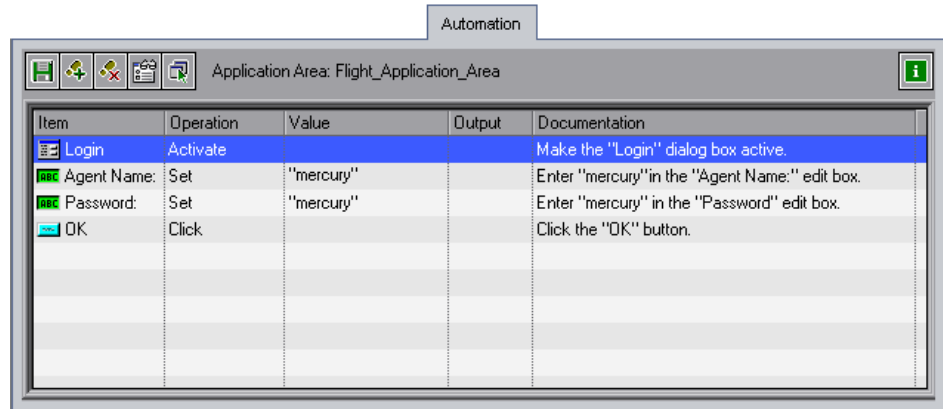
Each step or comment in the component is created as a row in the table. Columns separate the steps into individual parts, which you can modify if required. Each step of a keyword-driven component is automatically documented as you complete it, providing a plain-language textual description of the component. 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 for an application area named 'Flight_Application_Area'. It displays a table with four columns: Item, Operation, Value, Output, and Documentation. The table contains four rows of manual steps that have been converted into 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 178.



- ▶ **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 175.



- ▶ **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 173, or “Changing the Application Area” on page 174.



- ▶ **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 167.



- ▶ **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.** Deletes the selected row and stores it on the Clipboard.
- ▶ **Copy.** Copies the selected row to the Clipboard.
- ▶ **Paste.** 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 167.

Note: To view content in the Automation tab, the QuickTest Professional Add-in for Business Process Testing must be installed. For more information, see “Installing the QuickTest Professional Add-in for Business Process Testing” on page 45.

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 178.

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 195.

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 183.

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 188.
- **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 or flow. For more information, see Chapter 10, “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 as an input parameter in other business components or flows.

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 185.

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 and flows.

For more information on creating and editing scripted components in QuickTest, see the *HP QuickTest Professional for Business Process Testing User Guide*.

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

Using Keyboard Commands in the Automation Tab

If you prefer to use your keyboard, you can use the following keyboard commands to navigate within the Automation tab:

- ▶ CTRL+X. Deletes the selected row and stores it on the Clipboard (from Automation tab)
- ▶ CTRL+C. Copies the selected row to the Clipboard (from Automation tab)
- ▶ CTRL+V. Pastes a cut or copied row below the selected row in the tab (from Automation tab)

Understanding the Dependencies Tab

The Dependencies tab displays the dependency relationships that exist between entities such as components, tests, flows, test resources, and application areas. When analyzing the impact of a change proposed in a specific entity, the dependency links indicate the other entities that the change might affect. For example, when deleting a component that is being used by another test or flow.




For more information on entity dependencies, see the *HP Quality Center User Guide*.

To display the Dependencies tab, select a component in the component tree and click the **Dependencies** tab. The Dependencies tab comprises the Resources Tab, the Used By Tests Tab, and the Application Area Tab.

Resources Tab

The Resources tab displays the application area that is used by the component in the Using grid, and entities that can potentially use the component in the Used By grid.

In the Resources tab, you can:

-  ➤ Click the **Show/Hide** arrow to display or hide the Used By or Using grids.
-  ➤ Click the **Refresh** button to refresh the grids.
-  ➤ Select an entity in the grids and click the **Go To** button to view additional details on an entity. Clicking a resource opens the Test Resources module and displays the resource in the tree.

The Used By grid contains the following columns. (This grid does not normally contain any information.)

Column	Description
Owner ID	A unique numeric ID for the related entity. The ID is assigned automatically by Quality Center.
Owner Type	The type of the related entity using the selected component.
Owner Name	The name of the related entity using the selected component.
Owner Description	The description of the related entity using the selected component.

The Using grid contains the following columns:

Column	Description
Related ID	A unique numeric ID for the related application area. The ID is assigned automatically by Quality Center.
Related Type	Although the related entity is an application area, this column displays Component .
Related Name	The name of the application area that the selected component uses. Note: Quality Center treats application areas different from other entities. Clicking the application area link has no effect.
Related Description	The description of the application area.

Used By Tests Tab




The Used By Tests tab provides details of the business process tests and flows that include the currently selected business component. You can click the test or flow name to jump directly to the test or flow in the Test Plan module.

Application Area Tab

The Application Area tab displays the name of the application area used by the component, as well as Used By and Using grids, which display the entities that use the application area, and the resources that the application area uses.

Note: If the component is not a QuickTest Automated or QuickTest Scripted component, it will not have an application area associated with it.

In the Application Area tab, you can:

-  ➤ Click the **Show/Hide** arrow to display or hide the Used By or Using grids.
-  ➤ Click the **Refresh** button to refresh the grids.
-  ➤ Select an entity in the grids and click the **Go To** button to view additional details on an entity. You can view additional details for the following:
 - **Resources.** Goes to the Test Resources module and displays the resource in the tree.
 - **Components.** Goes to the Business Components module and displays the component in the tree.

The Used By grid contains the following columns:

Column	Description
Owner ID	A unique numeric ID for each component using the application area. The ID is assigned automatically by Quality Center.
Owner Type	Component.
Owner Name	The name of the component using the application area. You can click the name to jump to the component in the Business Components module.
Owner Description	The description of the component using the application area, as specified in the Details tab (in this pane).

The Using grid contains the following columns:

Column	Description
Related ID	A unique numeric ID for each related entity, such as function library or shared object repository, that the application area uses. The ID is assigned automatically by Quality Center.
Related Type	Resource.
Related Name	The name of the related entity that the application area uses, such as a function library, shared object repository, or recovery scenario. You can click the name to jump to the resource in the Test Resources module.
Related Description	The description of the related entity that the application area uses.

Understanding the History Tab

The History tab comprises two sub tabs; the Audit Log Tab, and the Baselines Tab.

The History tab is available from both the Component Tree view and the Component Grid view.

Note: The baselines tab is named the **Versions and Baselines** tab in a version-controlled project. For information on working with version control in Quality Center, see the *HP Quality Center User Guide*.

Audit Log Tab

In the Audit Log tab, you can view a list of the changes made to the various fields of a component. For each change, the tab displays the date and time of the change, the name of the user who made the change, and the old and new value of the field.

You can expand each change, or all the changes to view a list of the fields that were modified, or specify which changes are displayed in the tab.

The following list describes the Business Process Testing entities and fields for components that can be viewed in the Audit Log tab. By default, all items in the list except for component Status are disabled, and if required for viewing must be enabled by the project administrator in Project Customization. The change histories of fields that are not on the list are not available for viewing.

For more information on enabling history options for a field, see the *HP Quality Center Administrator Guide*.

Component Entities

Field name	Description
Assigned to	The user to whom the component implementation is assigned.
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, or SERVICE-TEST-AUTOMATED for a Service Test component. MANUAL is displayed for a manual component.
Comments	The comments entered in the Discussion Area of the Details tab.
Component name	The component name.
Deleted on	The date and time that an obsolete component was deleted.
Description	The description of the component entered in the Details tab.
Has Picture	Indicates (by displaying Y or N) whether a snapshot is attached to the component.
Last Detected Change	The date and time that the record was last changed.
Last Update	The date and time that the record was last updated.
Original Location	The folder in the Components tree in which the business component was located when it was deleted.
Status	The status of the business component. Component statuses are described in “Business Component Statuses” on page 62.

To view the history of changes made to a component:

- 1 Select a component in the component tree or component grid and click the **History** tab. Then click the **Audit Log** sub tab.

The history of changes made to the component is displayed in a table.

Field Name	Old Value	New Value
Change #2 : Date: 11/10/2008 12:22:35 PM Changer: admin		
Status	Under Development	Maintenance
Change #1 : Date: 11/6/2008 11:45:16 AM Changer: admin		
Status	Under Development	Under Development

- 2 Expand a change to view a list of fields modified during the change. For each field, the table displays the old value and the new value. To expand all changes, click the **Expand All** button.
- 3 You can specify which changes are displayed in the table. In the **Field** list, select a field name to view changes made to that field only. Select **<All>** to view changes made to all fields.

Baselines Tab

In the Baselines tab, you can view the version history for a selected entity, including all previous versions, the name of the user who created each version, and the date each version was created. Baselines enable you to share entities with other Quality Center users in other Quality Center projects.

In a version-controlled project, this tab is named the Versions and Baselines tab, in which you can also view the baseline in which a version is stored.

For more information on working with baselines, see “Using Baselines” on page 97, and the *HP Quality Center User Guide*.

Sharing Entities in Libraries

You can share and reuse the component, test, and flow entities in your project, together with their resources, by using the Libraries tab in the Management module in Quality Center. A library represents a set of entities in a project and the relationships between them.

You can import a library from the same project, or from a different project. Importing a library from another project enables you to reuse an existing set of entities instead of having to recreate them. When you import a library, the library is added to your libraries tree and the library's selected entities, such as flows and components, are copied to the corresponding modules in your project. If the library includes associated entities, this relationship is also copied.

Note: Components in the **Obsolete** and **Component Requests** folders are not included in the library import process.

When changes are made to entities in a library, you can synchronize libraries to update the entities in an associated library. You can also create a baseline, which provides a record of the library at a specific point in time.

For more information on sharing entities in libraries, see the *HP Quality Center User Guide*.

Using Baselines

After you create a library, you can create a baseline, which provides a record of the library at a specific point in time. Baselines enable you to keep track of changes made to your project over time.

You can compare libraries and baselines at all stages of the application development life cycle. For example, you can compare baselines at different stages of development to assess the impact of changes made to requirements in your project. You can then update tests accordingly. You also can compare an imported library with the source library from which it was imported. This enables you to review changes and make decisions about updates to your project.

For more information on working with baselines, see the *HP Quality Center User Guide*.

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 Component Grid interface. At the top is the Grid Menu Bar with 'Components', 'Edit', 'View', and 'Favorites'. Below it is the Grid Toolbar with icons for refresh, filter, save, and print, and a 'Favorite: <None>' dropdown. The Grid Filter Box shows a filter 'Linked flow test ID[= *]' and sorting 'Creation date[Desc]'. The Component List is a table with columns: Component name, Status, Assigned to, Created by, and Creation date. The Description Tab is active, showing a 'Summary' and 'Pre-Condition' section.

Component name	Status	Assigned to	Created by	Creation date
C2	Ready		alex_qc	7/28/2008
Comp1	Ready		alex_qc	7/27/2008
login	Under Development		alex_qc	3/2/2007
Create Order	Under Development		alex_qc	3/2/2007
Delete Order	Under Development		alex_qc	3/2/2007
Logout	Under Development		alex_qc	3/2/2007

Description Tab

Summary
Access the Mercury Flight Reservations application, enter name and password, and open the Flight Reservation dialog box.

Pre-Condition
The Flight Reservations application must be closed.

Post-Condition
The Flight Reservation dialog box is displayed.

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.

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 101.
- ▶ **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 101.
- ▶ **Grid columns.** Contain the same component information as the corresponding item in the component Details tab. In a version-controlled project, the Component Grid view can contain additional columns, such as **Version Status**, which indicates if the component is checked in or checked out. For more information, see “Working with Component Grid Columns” on page 104.

- ▶ **Grid filter boxes.** Display the filter that is currently applied to each column. For more information on filtering data, see the *HP Quality Center User 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 114.
- ▶ **History tab.** Displays the changes made to a component. For each change, the tab displays the date and time of the change and the name of the user who made the change. For more information, see “Understanding the History Tab” on page 93.
- ▶ **Dependencies tab.** Displays the dependency relationships that exist between entities such as components, tests, test resources, and application areas. It comprises the Resources, Used By Tests, and Application Area sub-tabs. For more information, see “Understanding the Dependencies Tab” on page 89.

Note: If the Description, History, and Dependencies tabs are not visible in the Component Grid view, click the **Show** button  at the bottom-right of the Business Components module window. Click the **Hide** button  to 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, rename or delete business components.
- **View.** Contains commands that enable you to work with filters and toggle between the Component Tree view and the Component Grid view. For more information on filtering data, see the *HP Quality Center User Guide*.
- **Favorites.** Contains commands that enable you to work with favorite views. For more information, see the *HP Quality Center User 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.** Deletes the selected business component from the Quality Center project.



- **Refresh.** 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 123. For more information on filtering and sorting data in a grid, see the *HP Quality Center User 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 view, see “Working with Component Grid Columns” on page 104. For more information on arranging columns in a grid, see the *HP Quality Center User 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 131.



- ▶ **Send E-Mail.** Enables you to send an email about a component to another user. For more information, see “Mailing Components” on page 138.

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

In a version-controlled project, the Component Grid toolbar displays the following additional buttons for checking in and checking out components.



- ▶ **Check Out.** Opens the Check Out dialog box, enabling you to check out the selected component.



- ▶ **Check In.** Opens the Check In dialog box, enabling you to check in the selected component.

For information on working with version control in Quality Center, see the *HP Quality Center User 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 126.

- ▶ **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, see the *HP Quality Center User 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.** 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. If you have applied filters to the grid, the search is restricted to the currently displayed components.
 - ▶ **Find Next.** 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, see the *HP Quality Center User 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 65.
- ▶ **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, see the *HP Quality Center User Guide*.

Available columns in the Component grid include:

Column	Description
Component Folder	The folder in which the component is located.
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 62.

Column	Description
Assigned To	The Subject Matter Expert to whom the business component implementation is assigned.
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.)

When your project is version-controlled, the following additional fields are available:

Column	Description
Version Number	The version number.
Version Status	The status of the version (Checked Out or Checked In).
Checked Out By	The name of the user who checked out the component.
Version Check Out Date and Version Check Out Time	The date and time the version was checked out.

For information on working with version control in Quality Center, see the *HP Quality Center User Guide*.

Business Components Module Shortcuts

You can perform the following commands in the Business Components module by pressing the corresponding shortcut keys:

Shortcut Key	Function
CTRL+N	Creates a new component.
CTRL+ALT+N	Creates a new components folder.
F8	Validates the selected component by checking for any configuration errors, and displays the results.
CTRL+DEL	Deletes the selected business component from the project.
CTRL+ALT+N	Adds a new folder to the component tree below the currently selected item.
CTRL+N	Adds a new business component to the component folder below the currently selected item.
F5	In the component tree, refreshes the data for the currently selected folder or business component.
F5	In the component grid, refreshes the grid so that it displays the most up-to-date business component information.
CTRL+F5	Refreshes all the folders and components in the component tree.
CTRL+F	Opens the Find dialog box (from the component grid). Ctrl+L finds the next occurrence of the last string you searched for.

For more information about working with keyboard shortcuts in Business Process Testing views and dialog boxes, see:

- “Using Keyboard Commands in the Design Steps Tab” on page 76
- “Using Keyboard Commands in the Component Step Editor” on page 80
- “Using Keyboard Commands in the Automation Tab” on page 88
- “Using Keyboard Commands in the Keyword View” on page 199
- “Using Keyboard Commands in the Snapshot Dialog Box” on page 118
- “Using Keyboard Commands in the Group Iterations Dialog Box” on page 256
- “Using Keyboard Commands in the Parameters Tab” on page 296
- “Using Keyboard Commands in the Component Iterations Dialog Box” on page 318
- “Using Keyboard Commands in the Test Iterations or Flow Iterations Dialog Box” on page 341

4

Working with Business Components

You create business components and define their details in the Business Components module. You can then combine these components into business process tests and flows 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 includes:

- ▶ About Working with Business Components on page 110
- ▶ Creating a Component Tree on page 111
- ▶ Defining Business Components on page 113
- ▶ Viewing and Modifying Business Components on page 121
- ▶ Mailing Components on page 138
- ▶ Handling Component Requests on page 141
- ▶ Generating Project Documents on page 144

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 dependent 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 47, or see the *HP Quality Center Administrator 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 and flows in the Test Plan module tabs.

Components created by converting manual tests, or by using other testing tools such as QuickTest Professional and WinRunner, are also stored in the component tree and can be included in business process tests and flows.

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 or flows.

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, see the *HP QuickTest Professional for Business Process Testing User Guide*. For more information on the Scripted Component Properties dialog box, see the *HP 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.

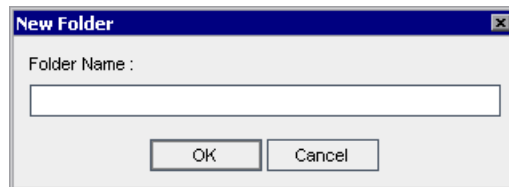
At the top level of the component tree is the **Components** root folder, which contains the **Component Requests** folder, the **Obsolete** folder and the business components folders. The **Component Requests** folder contains requests for new components. The **Obsolete** folder contains any components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

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

In a version-controlled project, the new components you create are automatically checked out.

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 54.
- 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 must not contain two consecutive semicolons (;) or include any of the following characters: \ * ^

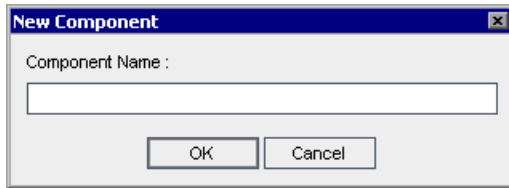
The new folder is displayed under the folder you selected in step 2.

- ▶ 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 exceed 255 characters, contain two consecutive semicolons (;), or include any of the following characters: ! % * { } \ | ' : " / < > ?
Spaces at the beginning or end of business component names are ignored.

- 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 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 or Automation tabs, and view test and flow information in the Dependencies 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 114.
- **Snapshot tab.** Enables you to capture an image that helps to describe the business component. For more information, see “Attaching Images” on page 118.
- **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 120.
- **Design Steps tab.** Enables you to create and view the manual steps of your component. For more information, see “Designing Manual Steps” on page 148.
- **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.”

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.

The screenshot shows a 'Details' tab for a component. The form is organized into several sections:

- Component Information:**
 - * Component name:** Insert order
 - Automation engine:** QT-KW
 - Creation date:** 11/24/2005
 - Assigned to:** (dropdown menu)
 - Created by:** alex_qc
 - Status:** 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:**
 - Add Comment** button
 - Alex Smith <alex_qc>, 1/17/2006:** Use only in new business process tests
 - Rich text editor with formatting options: **B** (Bold), U (Underline), *I* (Italic), and A (Text color).

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, see the *HP Quality Center User 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.

Business component statuses and their corresponding icons are described in “Business Component Statuses” on page 62.

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.

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 221.

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 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 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 or flows 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 “Components and Flows Pane” on page 219.

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 or flow in the Test Script tab of the Test Plan module by clicking the relevant thumbnail image. Viewing the sequence of these images can help you to better understand the business process test or flow.

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 118.
- ▶ Loading a saved image is described in “Loading an Image” on page 119.

Using Keyboard Commands in the Snapshot Dialog Box

If you prefer to use your keyboard, you can use the following keyboard commands to navigate within the Snapshot dialog box:

- ▶ ALT+S. Takes a snapshot of an image
- ▶ ALT+L. Loads an image from a file

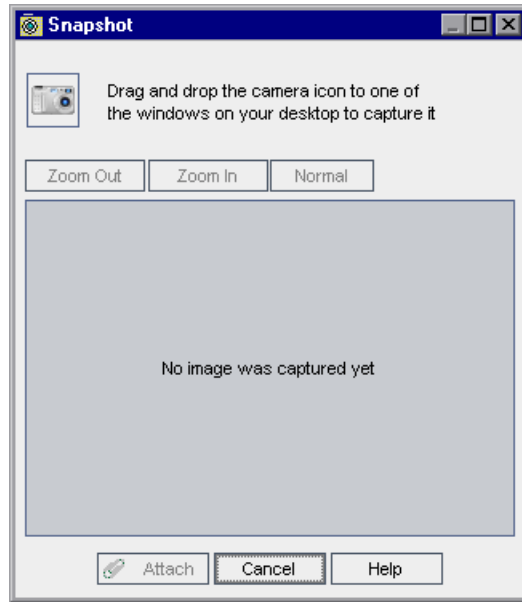
Attaching an Image to a Business Component


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 213.

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 and flows. 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 or flow in the test.

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 10, “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 or flows 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. If your project contains many entities, expanding all folders might take some time.
- 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 113.



- 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 to open the Filter dialog box. Any currently applied filters or sort orders are displayed under the component tree toolbar.

When defining a filter, you can also include a **cross filter**, which is available in the **Cross filter** section of the Filter Condition tab. This is an advanced, second filter on fields in the Business Components module. For example, you can define the cross filter for components that have the status of **Ready**. This ensures that only components that have this status are displayed in the component tree.

For more information on filtering and sorting a tree, and on using a cross filter, see the *HP Quality Center User 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 113.
 - ▶ 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 grid, or using a cross filter, see the *HP Quality Center User Guide*.

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

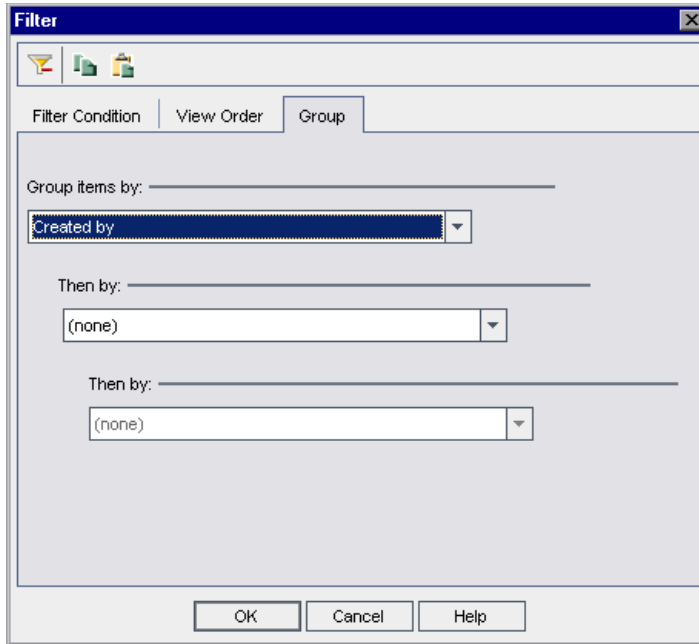
Sorting the Component Grid by Group

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. You can also sort according to **Version Status** and the name of the user that checked out the component.

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_gc**.

Component Name	Status	Assigned To	Created By	Creation Date	Description	Script Type
[-] Status : Error (3 records)						
[-] Created By : alex_gc (3 records)						
[+] Fax order	Error		alex_gc	12/13/2005	Summary Faxes an existing order	MANUAL
[+] Logout	Error	admin	alex_gc	12/13/2005	Summary Closes the Flight Reser	QT-KW
[+] Open order	Error		alex_gc	12/13/2005	Summary Uses information about	QT-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. You can also share all the components in a project across multiple projects.

For more information, see:

- ▶ “Considerations When Copying Components or Folders to Other Projects” on page 126
- ▶ “Copying Components or Component Folders in the Current Project” on page 128
- ▶ “Copying Components or Component Folders between Projects” on page 129
- ▶ “Sharing Components and Component Resources” on page 131

Considerations When Copying Components or Folders to Other Projects

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

- ▶ Both servers must be running the same version of Quality Center.
- ▶ The source and target projects must be opened in separate browsers.
- ▶ In a version-controlled project, you can copy and paste any checked in entity, as well as any entity that is checked out by another user - the copied entity will contain the last checked-in data. However, you cannot copy and paste an entity that is currently checked out by you. You must first check in the entity and all its checked-out dependencies before copying and pasting it.

For example, consider a business process test containing a flow, which in turn contains a business component and a scripted component. Before copying and pasting the test, you need to check in the components in the Business Components module, the resources associated with those components in the Test Resources module, and the flow in the Test Plan module.

- ▶ Before you copy components that were created in a previous version of Quality Center, you must upgrade them to the current version. For more information, see “Upgrading from Previous Versions” on page 44, and the *HP Quality Center Administrator Guide*.

Copying Business Components

- ▶ If the component path in the target project already exists, and a business component in a test or flow 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 or flows 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.

- ▶ 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.

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.

Application Areas

- ▶ 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.

Important: If an application area with the same name already exists in the target location, the application area is not copied, and the new component is linked to the existing application area. You must check to ensure that the application area in the new location has the correct settings and resource files for the component you are copying.

Copying Components or Component Folders in the Current Project

You can copy components or component folders within the same project. For more information, see “Considerations When Copying Components or Folders to Other Projects” on page 126

To copy an existing folder or business component:

- 1** Select the component or component folder that you want to copy in the component tree or component grid. To copy more than one component in the component grid, use the CTRL key.
- 2** Right-click and choose **Copy**. Alternatively, Select **Edit > 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 113.

Copying Components or Component Folders between Projects

You can copy components or component folders from one project to another. For more information, see “Considerations When Copying Components or Folders to Other Projects” on page 126.

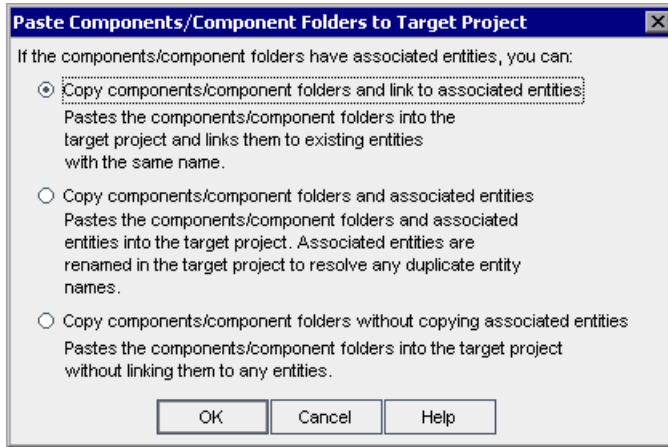
If the components or component folders have related entities, you can instruct Quality Center to copy them using one of the following methods:

- Copy components or component folders and their related entities to the target project. Entities in the target project with duplicate names are renamed.
- Copy components or component folders to the target project and associate them to existing entities with the same name.
- Copy components or component folders to the target project without copying related entities. The associations to the entities are removed.

To copy a component or component folder between projects:

- 1** If copying to another project or server, open the source and target projects in separate browsers.
- 2** Select the component or component folder that you want to copy in the component tree or component grid. To copy more than component or component folder, use the CTRL key.
- 3** Right-click and choose **Copy**. Alternatively, select **Edit > Copy**.
- 4** Open another instance of Quality Center and log into the project to which you want to paste the components.
- 5** Select the folder to which you want to copy the components or component folders.

- 6 Right-click and choose **Paste**. Alternatively, select **Edit > Paste**. The Paste Components/Component Folders to Target Project dialog box opens.



- 7 Select one of the following options:

- ▶ **Copy components/component folders and link to associated entities.** Quality Center copies the components or component folders and pastes them into the target project. The copied components or component folders are linked to related entities with the same name and path. If an entity does not exist in the target project, Quality Center copies it to the target project and links it to the component.
- ▶ **Copy components/component folders and associated entities.** Quality Center copies the components or component folders along with the related entities and pastes them into the target project. If a related entity already exists in the target project, the copied entity is renamed to resolve the duplicate name.
- ▶ **Copy components/component folders without copying associated entities.** Quality Center copies the components/component folders without copying related entities, and pastes them into the target project. The copied items are not associated with any entities.

- 8 Click **OK**.

Sharing Components and Component Resources

You can also share all the components in a project across multiple projects. Quality Center enables you to create baseline libraries of components, tests, and other entities, together with their resources. These entities can then be reused in other projects. For more information, see “Sharing Entities in Libraries” on page 96, and the *HP Quality Center User Guide*.

Validating Business Components

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

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



Note: You can also check business process tests or flows for configuration errors. Clicking the **Validate Test** button in the Test Script tab of a business process test or flow in the Test Plan module checks the test or flow and all its instances within all test sets. For more information, see “Validating Business Process Tests and Flows” on page 270.

The validation process for business components and business process tests or flows 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 or flows using the currently selected component.

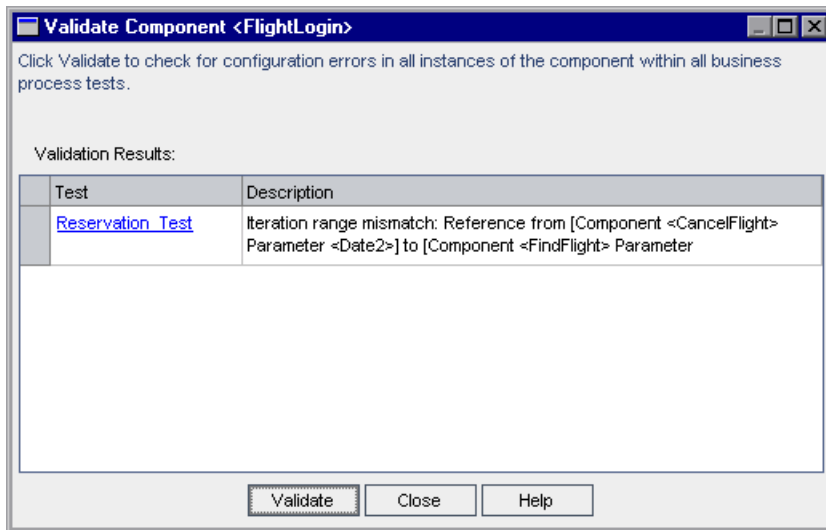
To validate a business component:

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 flows 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 or flow 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 10, “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 or flow are permanently deleted. Components that are being used by one or more business process tests or flows 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 136.



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 or flows.

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 or flows are transferred to the **Obsolete** folder.



Note: Business process tests or flows 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 or flow.

Before you choose to remove a business component, you can check whether any business process tests or flows are using that component by selecting it in the tree and clicking the **Dependencies** 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 does not work.

- 2 Click **OK**. The folder or business component is removed. Components that are currently being used by a business process test or flow 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 or flow, 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 137. 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 or flow.

Tip: You can simultaneously delete from the **Obsolete** folder all the business components that are no longer being used by any business process test or flow. 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			
* Component name:	Insert order	Assigned to:	
Automation engine:	QT-KVV	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.

Mailing Components

You can send an e-mail about a component to another user. This enables you to inform other personnel about new and existing components, including component design steps, history, and snapshot.

Quality Center includes a **Go To** link in the e-mail, which enables the recipient to go directly to the component in the Business Components module.

Note: By default, Quality Center sends e-mail in HTML format. To send e-mail as plain text, edit the **MAIL_FORMAT** parameter in the **Site Configuration** tab in Site Administration. For more information, see the *HP Quality Center Administrator's Guide*.

To mail a component:



- 1 In the component tree, select a component and click the **Send E-mail** button. Alternatively, click the **Send E-mail** arrow and select **Send E-Mail to Designer** if you want to send the e-mail to the user who created the component.

The Send E-mail dialog box opens.

 Snapshot History'. A large empty text area is labeled 'Additional comments:'. At the bottom are four buttons: 'Send', 'Custom...', 'Cancel', and 'Help'."/>

Send E-mail

ABC ✓ [Envelope] [Document]

To: []

CC: []

Subject: DEFAULT.naama_09_11_ver - Component #17 - CreateOrder

Item:

17 - CreateOrder

Include: Snapshot History

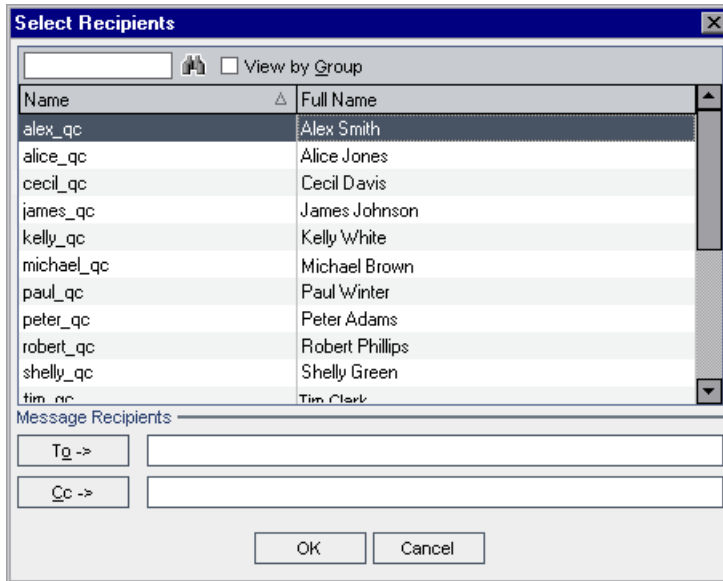
Additional comments:

[]

Send Custom... Cancel Help

- 2 Type a valid e-mail address or user name. If you selected **Send E-Mail to Designer** in the previous step, the address of the user who created the component appears in the To box. Alternatively, click the **To** button or **CC** button to select users.

The Select Recipients dialog box opens.



You can sort the users list, search for users, group users by user groups, and select users from the list or from a group tree. For more information, see the section on selecting users in the *HP Quality Center User Guide*.

Select the users or user groups to which you want to send the e-mail, and click **OK**.

- 3 If required, you can add additional descriptive information to the e-mail in the **Subject** box. By default, the domain, project, component ID, and component name are displayed in the Subject box.
- 4 Select whether you want to include a **Snapshot** and/or the **History** of the component. **Snapshot** refers to any snapshot in the Snapshot tab.
- 5 In the **Additional comments** box, add any comments you have.
- 6 You can check your wording in the e-mail:



- Click the **Check Spelling** button to check the spelling for the selected word or text box. If there are no errors, a confirmation message opens. If errors are found, the Spelling dialog box opens and displays the word that is misspelled together with replacement suggestions.



- Click the **Spelling Options** button to open the Spelling Options dialog box, enabling you to configure the way Quality Center checks spelling.



- Click the **Thesaurus** button to open the Thesaurus dialog box and display a synonym, antonym, or related word for the selected word. You can replace the selected word or look up new words.

7 Click **Custom** to customize the e-mail. In the Select Fields dialog box, you can specify fields to include in the e-mail.

8 Click **Send** to send the e-mail.

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 or flow. 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 or flows 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 or Flows” on page 261.

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 113.

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 or flow are permanently deleted.
- Component requests that are being used by one or more business process tests or flows are automatically transferred to the **Obsolete** folder in the component tree.


Note: Business process tests or flows 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 or flows are using that component request by selecting it in the Component Requests folder and clicking the **Dependencies** 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 or flow.

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 or flows are transferred to the **Obsolete** folder. Component requests that are not currently being used by any business process test or flow 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 **Dependencies** tab to check that the request is not currently being used by any business process test or flow.
-  **2** Select the component 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.

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, see the *HP Quality Center User 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.

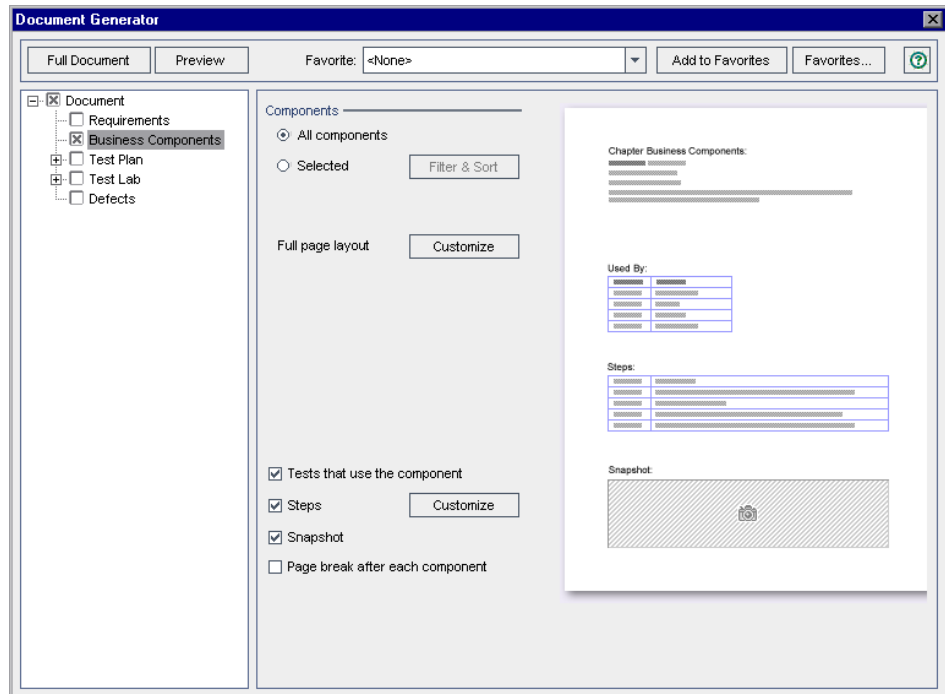
Used By. Details of the business process tests or flows that include the business component, including status, creation details, path, and links to the relevant business process tests or flows in the Test Plan module.

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-left 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, see the *HP Quality Center User Guide*.

- 5 Next to **Full page layout**, click the **Customize** button to choose the information that you want to 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 or flows 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 you want to 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, see the *HP Quality Center User 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 flows and follow the steps to manually test your application.

This chapter includes:

- ▶ About Designing Manual Component Steps on page 147
- ▶ Designing Manual Steps on page 148
- ▶ Working with Parameters in Manual Steps on page 155

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 or flow. You can also provide additional information in the form of expected results and comments.

You can expand the scope of your tests, flows, 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 component 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.

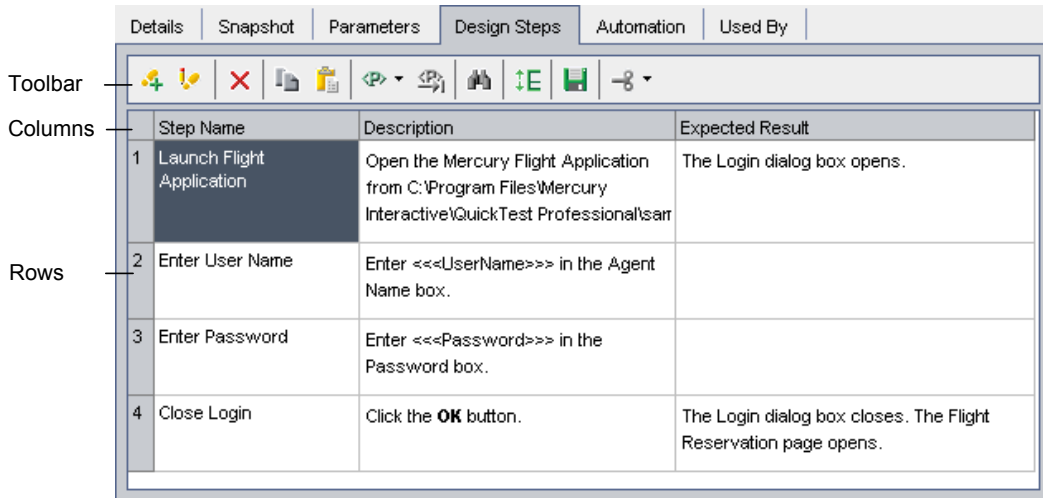
This means that you can update automated components in either Quality Center or a testing tool and still continue to run them manually using the Manual Runner when needed.

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

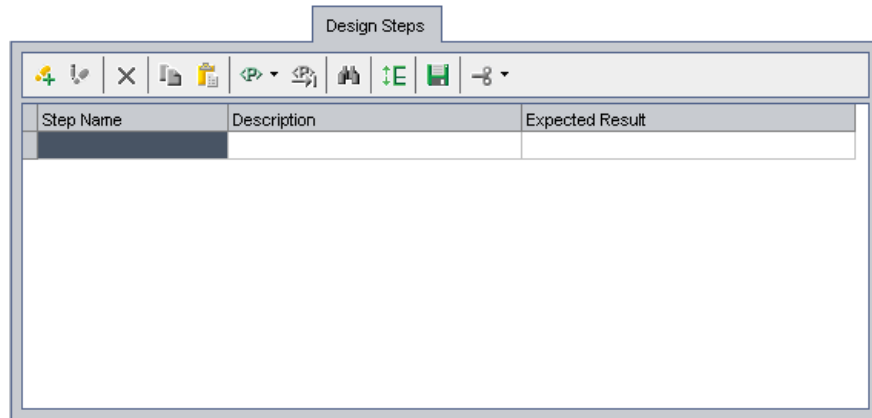
You can use the Component Step Editor to create, modify, copy, and delete manual component steps.

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.

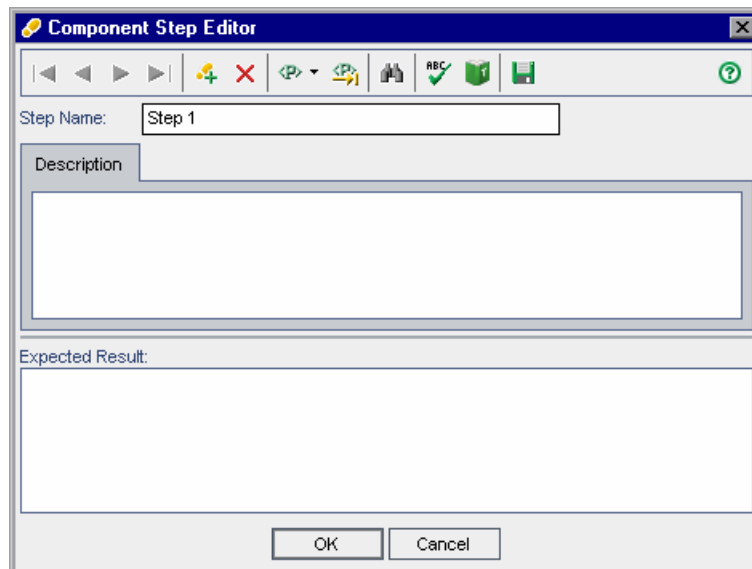
Tip: Manual components in the component tree are indicated by an **M** symbol on the component icon, for example, .

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 opens 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 157.
- ▶ 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 155.

Note: For more information on parameters, see Chapter 10, “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 to 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

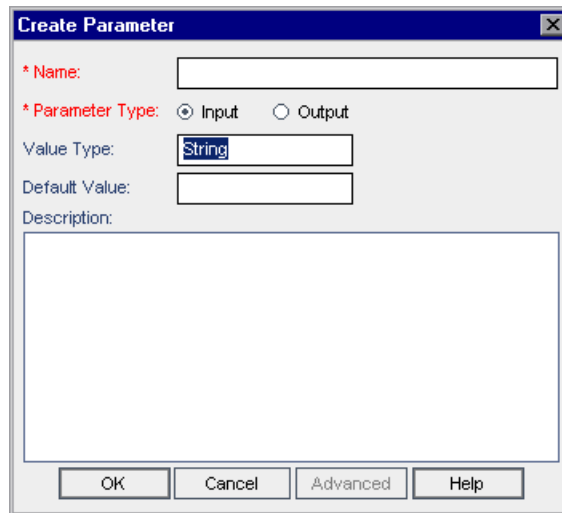
You can define input parameters that pass values into your business component, and output parameters that pass values from your component to later components in the business process test or flow, or from one step to another step later in the same business component. You can then use these parameters 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 and flow parameters, see Chapter 10, “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". It has a standard Windows-style title bar with a close button (X). The dialog contains the following fields and controls:

- * Name:** A text input field.
- * Parameter Type:** Two radio buttons, "Input" (which is selected) and "Output".
- Value Type:** A dropdown menu currently displaying "String".
- Default Value:** A text input field.
- Description:** A large, empty text area for providing details about the parameter.

At the bottom of the dialog, there are four buttons: "OK", "Cancel", "Advanced", and "Help".

The Select Parameter dialog box is shown here after clicking the Advanced button. The 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
- **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 or flow.
- **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>>>.

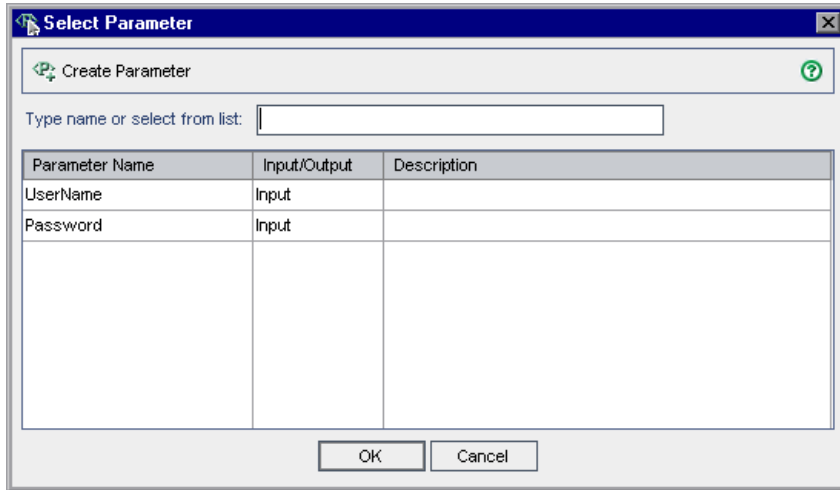
When you run your component manually, the inserted parameter is replaced with the value of that parameter. For example, if mercury was defined as the value for the user_name parameter, then when you run the manual test, the step “Enter <<<user_name>>> in the Agent Name box” would be displayed as “Enter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

Note: For more information on working in the Design Steps tab, see “Designing Manual Steps” on page 148.

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 155.

- 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.

Note: 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 includes:

- About Working with Automated Component Steps on page 162
- Automating Components on page 163
- Working with Keyword-Driven Automated Steps on page 166
- Understanding Application Areas on page 171
- Creating Steps in the Keyword View on page 175
- Working with Parameters in the Keyword View on page 188
- Entering Comments in the Keyword View on page 195
- Modifying Component Steps in the Keyword View on page 197
- Using Keyboard Commands in the Keyword View on page 199
- Viewing Scripted Components on page 200

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 are 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, see the *HP QuickTest Professional for Business Process Testing User 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, flows, and business components by using variable input and output parameter values in your business process test or flow. 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.

Note: The **BPT Resources** folder, which contains the business component resources in the project, is created automatically in the Test Resources module when you create a QuickTest automated component for the first time (or when QuickTest connects to Quality Center for the first time).

For more information, see “BPT Resources Folder” on page 165.

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 or Flow Manually” on page 360.


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.

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.

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 166.
 - 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 200.

- ▶ 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 200.
- ▶ 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, see the *HP Service Test User’s Guide*.

BPT Resources Folder

The **BPT Resources** folder is created automatically in the Test Resources module 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 a Quality Center project for the first time).

For business process tests or flows to perform properly, this folder and its subfolders should not be renamed or deleted.

Note: In previous versions of Quality Center, the BPT Resources folder was created in the Test Plan module. When upgrading to Quality Center version 10.00, a BPT Resources folder that already exists in the Test Plan module is moved to the Test Resources module by the QuickTest Asset Upgrade Tool for Quality Center.

The BPT Resources 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.

The Libraries folder contains the default function library containing operations that can be used when creating business component steps. The Automation Engineer can store additional function 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.
- **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, the Recovery Scenarios folder contains the **DefaultWeb.qrs** file, which is a recovery scenario file that can be used in the Web environment.

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 167.

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.

Item	Operation	Value	Output	Documentation
Login	Activate			Make the "Login" dialog box active.
Agent Name:	Set	"mercury"		Enter "mercury" in the "Agent Name:" edit box.
Password:	Set	"mercury"		Enter "mercury" in the "Password" edit box.
OK	Click			Click the "OK" button.

Setting Keyword View Options

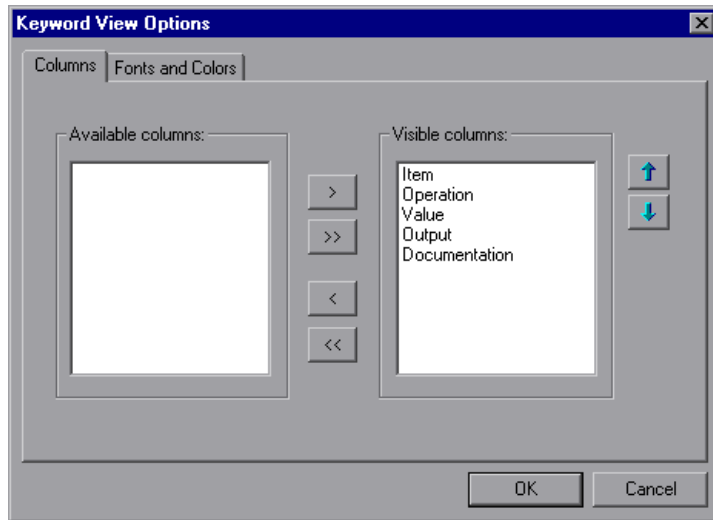
You can select which columns to display in the Automation tab, specify their order, and set the number of columns that remain stationary when you scroll horizontally. You can also set the font and color of many elements in the Automation tab.

For more information on the available columns, see “Working with Columns in the Automation Tab” on page 84.

To select columns to display or hide in the Keyword View Options dialog box:



- 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.



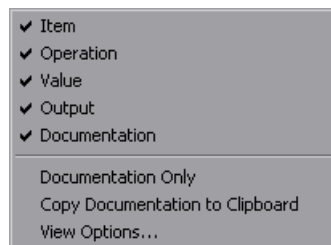
- 3** In the **Visible columns** box, set the order in which columns appear in the Automation tab by selecting one or more columns and then using the Up and Down arrow buttons.

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 using the context menu:

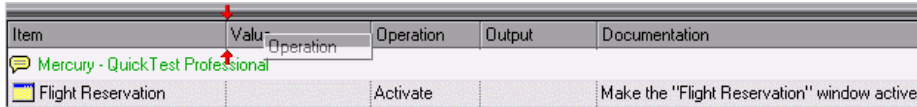
- ▶ Display a hidden column by right-clicking the column header row and then selecting the required column name from the displayed menu.
- ▶ Hide a displayed column by right-clicking the column header row and then selecting the column name from the displayed menu.



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 in the Automation tab:

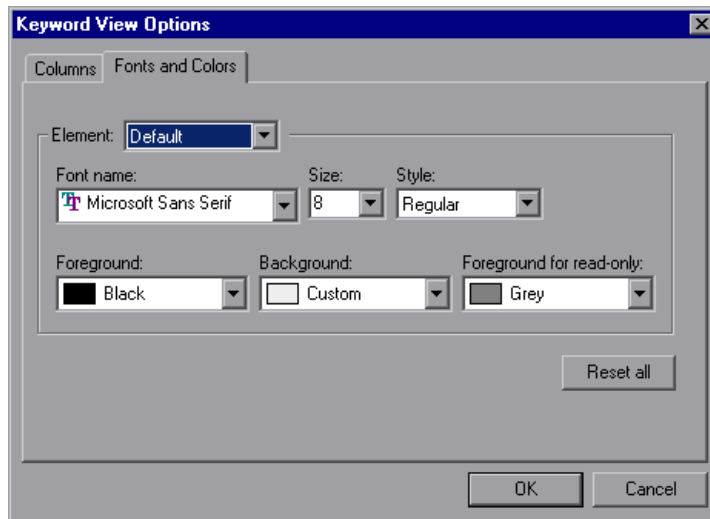
Drag a column header and drop it at a new location. Red arrows are displayed when the column header is dragged to an available location.



To set font and color options for the Automation tab:



- 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 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 173
- ▶ “Changing the Application Area” on page 174

For more information on working with application areas in QuickTest, see the *HP QuickTest Professional for Business Process Testing User 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:

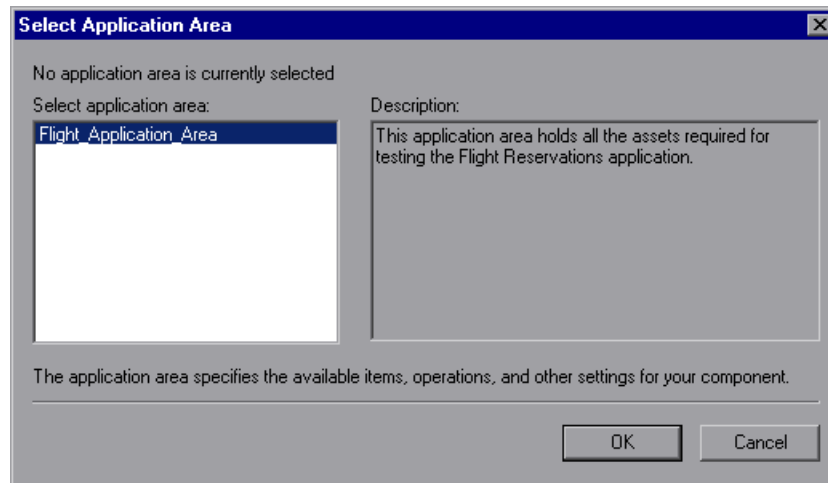
“To create steps, you must first select an application area by clicking the Select Application Area button.”

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

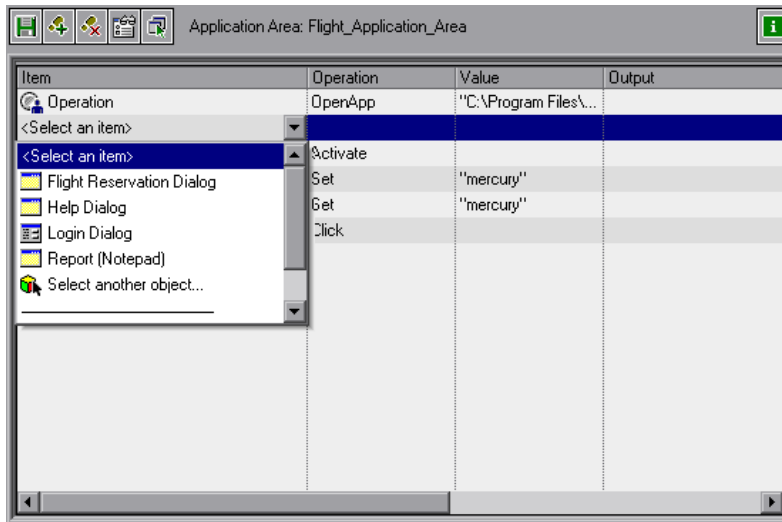
Creating a New Step

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 178.

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 195.

- ▶ **Operation.** The operation to be performed on the item. For more information, see “Selecting an Operation for a Step” on page 183.
- ▶ **Value** (if relevant). The argument values for the selected operation. For more information, see “Defining Values for Operations” on page 184.
- ▶ **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 185.

- 3 Save the steps as described in “Saving Component Steps” on page 178.

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 or Flow Manually” on page 361.

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 183.

This section describes:

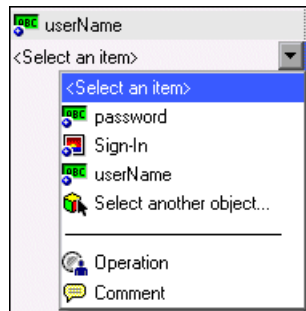
- ▶ “Selecting an Object from the Item List” on page 179
- ▶ “Selecting an Object from the Shared Object Repository” on page 180
- ▶ “Selecting an Operation Item from the Item List” on page 182

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 195.


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 183.

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.

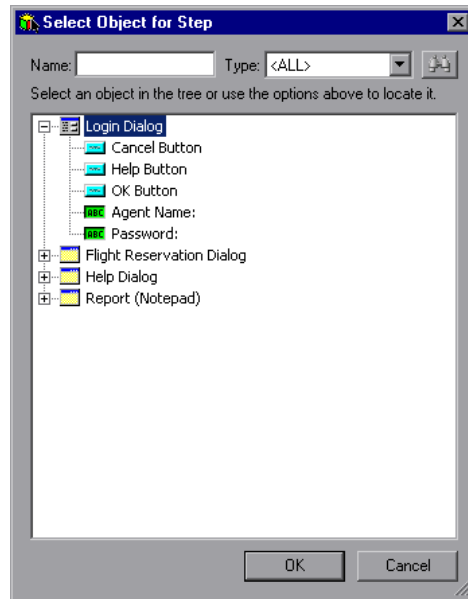
For more information on the shared object repository, see the *HP QuickTest Professional for Business Process Testing User Guide*.

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 183.

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, see the *HP QuickTest Professional for Business Process Testing User 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, see the *HP QuickTest Professional for Business Process Testing User 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

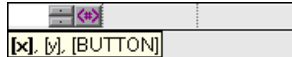
The **Value** cell lists the values for the operation arguments. An operation **argument** provides the specific information that an operation uses to accomplish a specific purpose. For example, the argument of an edit box Set operation indicates the specific value to enter in the edit box. The argument 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 does not restore the quotes, and the value is 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 188.

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.

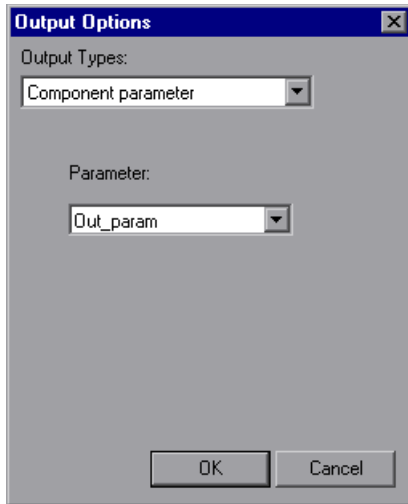
You can modify the output parameter, as required. If you select a local parameter, you can modify its name and description directly in the Output Options dialog box. If you select a component parameter, its name and description are read-only. You can modify the parameter details in the Parameters tab of the Business Components module. For more information on local and component parameters, see “Working with Parameters in the Keyword View” on page 188.

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 187.

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 193.

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 or flow to a later one during a 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 10, “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.

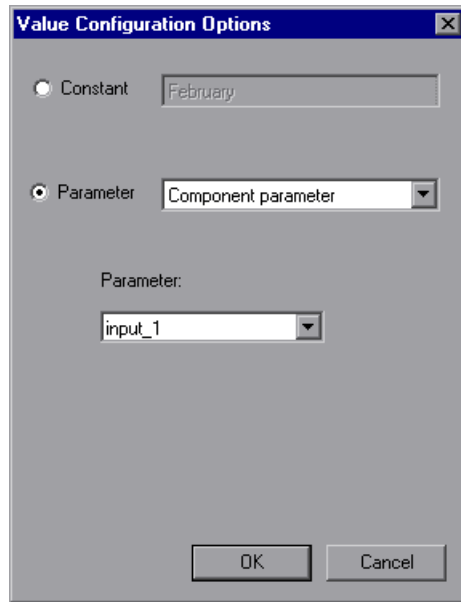
Parameterizing Input Values

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:



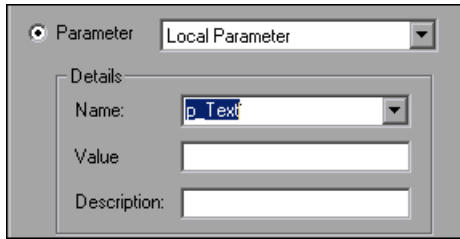
- 1 In the **Value** cell, click the **Configure the value** button or press CTRL+F11. The Value Configuration Options dialog box opens.



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

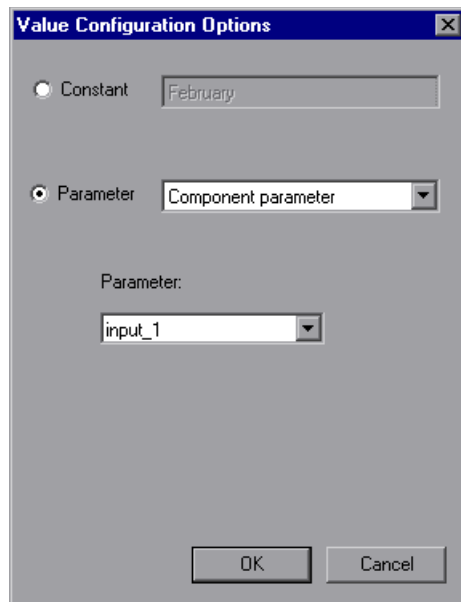
- ▶ **Description.** Enter a brief description for the parameter.
- 4** Click **OK**. The local parameter is displayed in the **Value** cell of your step. When the business component runs, it uses the value specified in the parameter for the step.

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 10, “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.
-

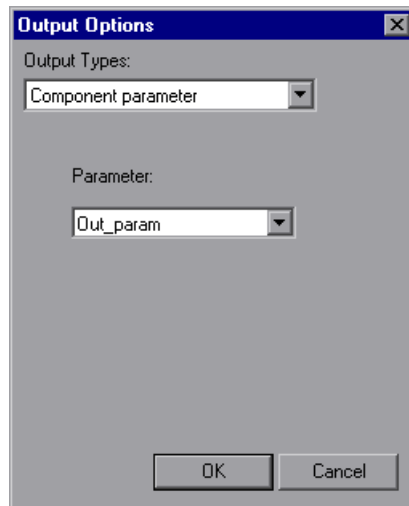
Parameterizing Output Values

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 or flow in the test.

To parameterize an output value using a local parameter:

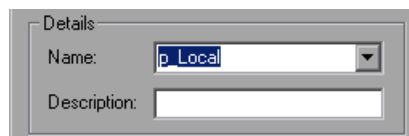


- 1 In the **Output** cell, click the **Specify parameter for output** button or press CTRL+F11. The Output Options dialog box opens.




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.



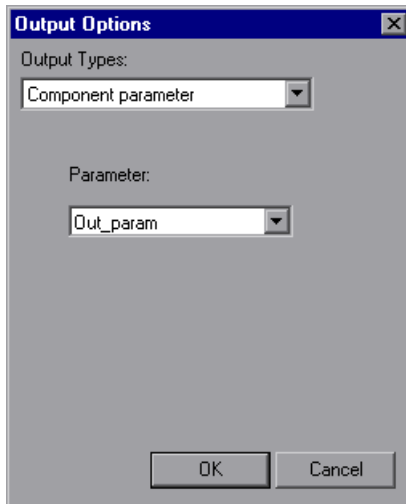
- 3 Specify the property details for the local parameter:
 - ▶ **Name.** Enter a meaningful name for a new parameter or choose an existing parameter name from the list.
 - ▶ **Description.** Enter a brief description for the parameter.
- 4 Click **OK**. The local parameter is displayed in the **Output** 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 10, “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 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 does 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 and flows 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 and flows. Chapter 9, “Managing Business Process Tests” describes how to work with the features and other options available in the Test Plan module.

This chapter includes:

- ▶ About Getting Started with Business Process Testing in the Test Plan Module on page 202
- ▶ Introducing the Test Plan Module Window on page 204
- ▶ Test Plan Module Tabs on page 208

About Getting Started with Business Process Testing in the Test Plan Module

You create and manage business process tests and flows in the Test Plan module. Business process tests are testing scenarios comprised of business components and flows. Flows are a type of test that comprise a sequence of business components.

For information on creating components in the Business Components module, see Chapter 4, “Working with Business Components.” For information on creating flows in the Test Plan module, see Chapter 8, “Working with Flows.”

Business process tests and flows 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 flows, manual tests, manual or automated business process tests, and automated tests using other products, such as HP WinRunner and HP 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, see the *HP Quality Center User 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 or a flow in the Test Plan module:

- 1 Log in to your Quality Center project as described in the *HP Quality Center User 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.

Tip: You can switch between the Quality Center modules using CTRL+SHIFT+<number> shortcut keys. The number represents the sequential order in which the module is displayed in the module sidebar. For example, if Requirements is the first module, press CTRL+SHIFT+1. If Business Components is the second module, press CTRL+SHIFT+2.

If the Test Plan module opens to the **Test Grid**, choose **View > Test Plan Tree** to work with business process tests or flows as described in this chapter.

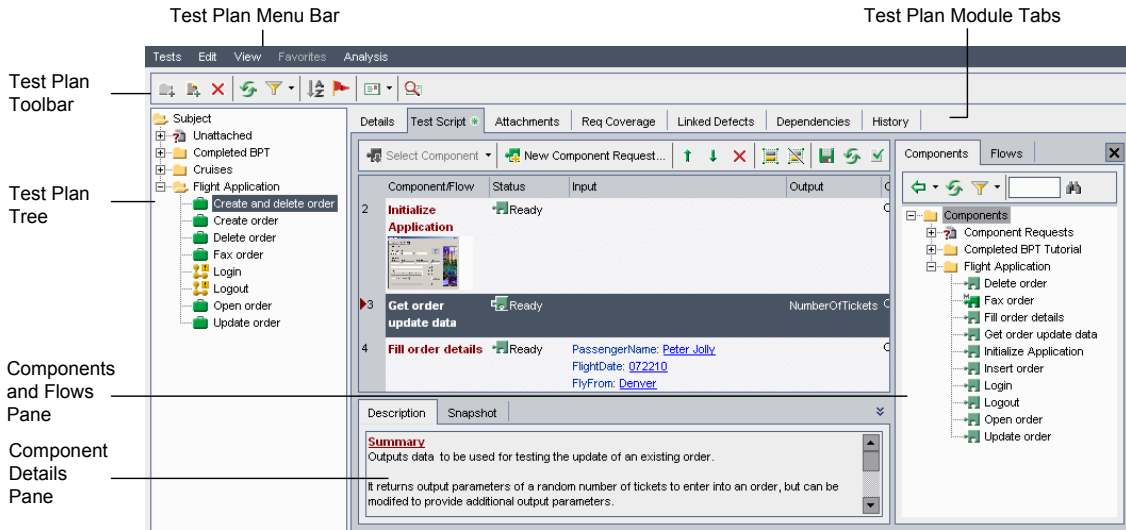


- 3 Select a business process test or a flow in the Test Plan tree. The Test Plan tabs are displayed.

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 or flow is selected in the Test Plan tree, the Test Plan module interface contains the following key elements:

- ▶ “Test Plan Menu Bar” on page 205
- ▶ “Test Plan Toolbar” on page 205
- ▶ “Test Plan Tree” on page 206
- ▶ “Test Plan Module Tabs” on page 208

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 and flows, changing the displayed view, and generating reports.

For more information on the Test Plan menu bar, see the *HP Quality Center User 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 commands that are commonly used when creating and modifying the Test Plan tree, such as creating or deleting business process tests and flows, refreshing the data, and filtering the tree. For more information on these commands, see the *HP Quality Center User Guide*.

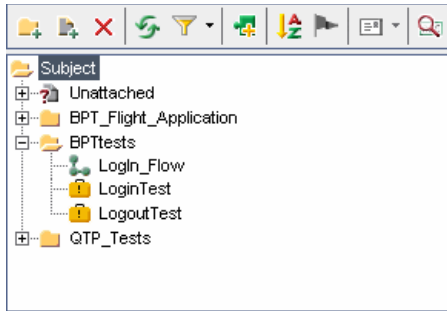
When working with Business Process Testing, the Test Plan toolbar also contains the following button:



Convert to Component. Opens the Select Destination Folder dialog box, which enables you to convert existing manual tests to manual components. For more information, see “Converting Manual Tests to Components” on page 277.

Test Plan Tree

The Test Plan tree is a graphical representation of your test plan, displaying subject folders, business process tests, and flows 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 and the test folders.






The **Unattached** folder contains tests whose folders have been removed from the tree and which have not been assigned to any other folder.

The **Subject** folder and **Unattached** folder cannot be renamed or deleted. 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.

Note: The **BPT Resources** folder, which contains the business component resources in the project, is created automatically in the Test Resources module when you create a QuickTest automated component for the first time (or when QuickTest connects to Quality Center for the first time). In previous versions of Quality Center, the BPT Resources folder was created in the Test Plan module. For business process tests or flows to perform properly, this folder and its subfolders should not be renamed or deleted.

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, see the *HP Quality Center User Guide*.

Notes:

- ▶ The status of business process tests and flows in the Test Plan tree are indicated by their icon colors. For more information, see “Understanding Business Process Test and Flow Statuses” on page 211.
- ▶ Tests and flows in the Test Plan tree to which an alert has been sent are indicated by a red exclamation mark  to the left of the test or flow name. Clicking the red exclamation mark opens the alert.
- ▶ In a version-controlled project, tests and flows checked out by the current user are displayed with an open green lock icon . Tests and flows checked out by another user are displayed with a red lock icon , together with the name of the user. No lock icon indicates that the test or flow is checked in.

After you have built the basic structure of your plan in the Test Plan tree, you can create business process tests and flows and assign them to the appropriate subjects in the tree. You build the content of a business process test by dragging business components and flows from the component tree and dropping them in the test. You build the content of a flow by dragging business components from the component tree and dropping them in the test. flow. For more information, see Chapter 8, “Working with Flows,” and Chapter 9, “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 10, “Working with Parameters.”

Test Plan Module Tabs

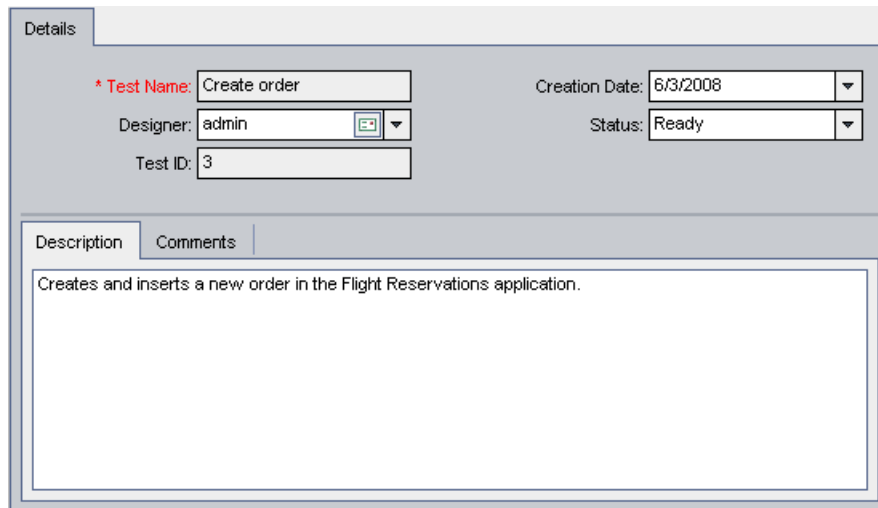
Selecting a business process test or flow in the Test Plan tree displays tabs that provide a complete overview of the business process test or flow, and its status.

The tabs are described in this section. For general information on the Test Plan module, see “Introducing the Test Plan Module Window” on page 204.

- “Details Tab” on page 208
- “Test Script Tab” on page 213
- “Attachments Tab” on page 222
- “Req Coverage Tab” on page 222
- “Linked Defects Tab” on page 223
- “Dependencies Tab” on page 223
- “History Tab” on page 223

Details Tab

The Details tab provides a general description of the business process test or flow.



Details

* Test Name: Creation Date: ▼

Designer: ▼ Status: ▼

Test ID:

Description Comments

Creates and inserts a new order in the Flight Reservations application.

The following information is displayed in the Details tab:

Field/Tab	Description
Test Name	The current name of the business process test or flow. This field is read-only in the Details tab, but you can rename a business process or flow in the Test Plan Tree. Select the name in the tree, and then click it again to activate the name label for editing. Alternatively, right-click it in the tree and choose Rename . Then edit the name and press ENTER.
Creation Date	The date on which the business process test or flow was created.
Designer	The user responsible for designing the business process test or flow. By default, the user who created the test or flow 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 or flow to the specified designer.
Status	<p>The status of the business process test or flow. This box is read-only because the status of the test or flow is determined by the status of its business components. The component with the most severe status determines the test or flow status.</p> <p>For more information on component statuses, see “Component Tree” on page 60. For more information on test or flow statuses, see “Understanding Business Process Test and Flow Statuses” on page 211.</p>
Test ID	A unique numeric ID automatically assigned by Quality Center to the business process test or flow. This field is read-only.

Field/Tab	Description
Description tab	A free text edit area enabling you to enter an overall textual summary of the business process test or flow's purpose, or any other relevant text.
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 flow, or alternative tests or flows 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.

In a version-controlled project, the current version number is also displayed in the top part of the tab.

Note: The Details tab provides a comprehensive selection of text editing and formatting tools to assist you in entering text in the Description or Comments tabs. Right-click in the Description or Comments tabs 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 and Flow Statuses

Business process test and flow statuses are identified in the Test Plan module tree by specific icons, and in the **Status** box in the test or flow's Details tab. The icons are colored and the symbols shown in the icons vary according to the status of the business process test or flow. For example, a green **Ready** icon indicates that all the business components in the test or flow 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 or flow is set to **Design** when the test or flow is created, and changes to **Maintenance** when it has been modified. The status is subsequently determined by the business component in the test or flow 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 or flow status would change to **Outdated**, because an Obsolete component is more severe than the **Error** status.

Business process test and flow 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 or flow have Ready status, indicating that they are fully implemented and ready to be run.
Maintenance	 	Yellow	The business process test or flow has been modified since it was created, or one or more business components included in the test or flow are being modified or are not yet complete, and have Under Development or Maintenance status (and no components in the test or flow have a more severe status). The Under Development component status is initially assigned to: <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.
Error	 	Red	One or more business components included in the business process test or flow 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 or flow 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.

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 or flow is created. These fields are displayed in the Details tab.

For more information on user defined fields, see the *HP Quality Center Administrator Guide*.

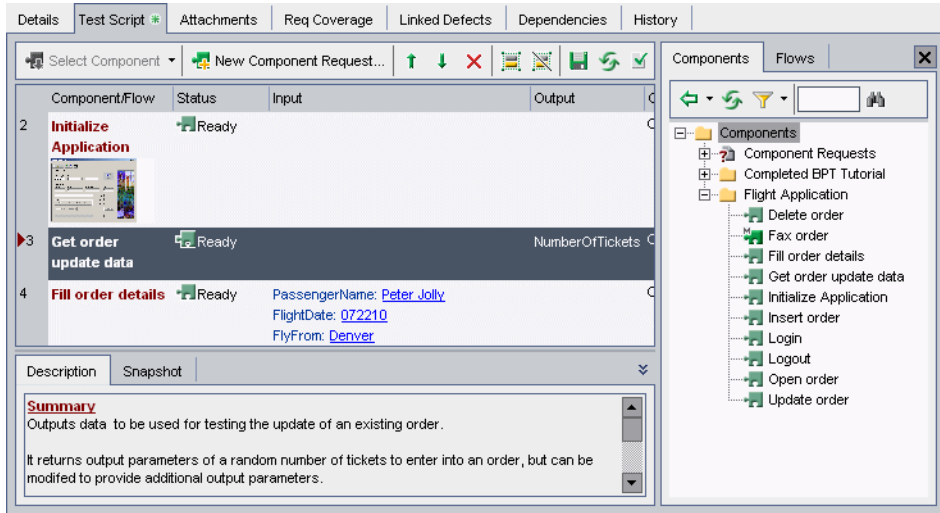
Test Script Tab


The Test Script tab enables you to build the structure of the business process test or flow.

You use this tab to:

- Add business components (created in the Business Components module or in a testing tool such as QuickTest Professional or WinRunner) to a business process test or flow.
- Group components in a business process test or flow.
- Add flows to a business process test.
- Configure values for input, output, and run-time component parameters.
- Define flow parameters and their default values.
- Define failure conditions.
- Add run conditions to the flow.
- Create iterations of components and flows.
- Validate tests and flows.
- Run tests or flows in Debug mode.

- Generate requests for additional business components that you require for your test or flow creation needs.




An icon  next to the Test Script tab name indicates that the selected business process test contains one or more business components or flows, or the selected flow contains one or more business components.

In addition to the standard functionality available for business process tests, the Test Script tab includes additional functionality when working with flows. For more information on using this tab when working with flows, see “Understanding the Test Script Tab for Flows” on page 230.

The Test Script tab comprises the Test Pane, the Components and Flows Pane, and the Component Details Pane.

Test Pane

For each business component in the business process test or flow, the Test 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 pane toolbar contains the following toolbar buttons:

- ▶ **Select Component.** Opens the Components tab on the right side of the Test pane. The tab displays a tree of 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 using these components, see “Building Business Process Tests” on page 241.

When you select a business process test in the Test Plan tree, clicking the down arrow on the right side of the **Select Component** button provides the following additional option:

- ▶ **Select Flow.** Opens the Flows tab on the right side of the Test pane. The tab displays the flows defined for the project. For more information on building a business process test using these flows, see “Adding Flows to Business Process Tests” on page 234.
- ▶ **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 or Flows” on page 261.



- ▶ **Move Component Up/Move Component Down.** Enables you to change the testing order in the business process test or flow by moving a selected component or flow up or down in the order. If you select a group border, you can move the border to include or exclude an adjacent business component or flow.



- ▶ **Remove Selected Components from Test.** Removes the selected business component from the business process test or flow. The component is still available for future use, if required, from the component tree pane.



- ▶ **Group Components/Flows.** Creates a new group that includes the selected business components and flows. For more information, see “Working with Component Groups” on page 251.



- ▶ **Ungroup Components/Flows.** Removes the selected group, or the grouping in which the selected business component or flow 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 or flow. The test itself is not updated.



- ▶ **Validate Test.** Checks the business process test or flow and all the test instances within the test set for configuration errors. For more information, see “Validating Business Process Tests and Flows” on page 270.



- ▶ **Run-Time Parameters.** Enables you to view or edit run-time component parameters. For more information, see Chapter 10, “Working with Parameters.”



- ▶ **Run or Debug Test.** Enables you to run and debug a business process test or flow. For more information, see “Debugging Tests in the Test Plan Module” on page 380.

When you select a flow in the Test Plan tree, the Test Script tab includes the following toolbar buttons:



- ▶ **Flow Input Parameters.** Enables you to define default values for your flow input parameters. For more information, see “Defining Default Flow Input Parameter Values” on page 312.



- ▶ **Flow Output Parameters.** Enables you to define flow output parameters. For more information, see “Working with Flow Output Parameters” on page 290.



- ▶ **Add Run Condition.** Enables you to add run conditions to your flow. For more information, see “Adding Run Conditions” on page 351.



- ▶ **Remove Run Condition.** Enables you to remove an existing run condition from your flow. For more information, see “Removing Run Conditions” on page 355.

Test Pane Context Menu

The right-click context menu in the Test pane includes many of the above options, as well as the following commands, which provide additional functionality and information about the business process test or flow:

- ▶ **Edit Component** or **Edit Flow**. Jumps to the selected component or flow, so that you can view or modify its details. If you select a component request, opens the component request tab so that you can edit the request.
- ▶ **Iterations**. Opens the Iterations dialog box for the selected business component or flow.
- ▶ **Output Parameters**. Opens the Output Parameters dialog box for the selected business component or flow.
- ▶ **Component Grouping**. Opens a submenu with the following options:
 - ▶ **Group Components/Flows**. Creates a new group that includes the selected business components and flows.
 - ▶ **Ungroup Components/Flows**. Removes the selected group, or the grouping in which the selected business components and flows are members.
 - ▶ **Move Group Up** (CTRL+U). Moves the selected group up in the test or flow.
 - ▶ **Move Group Down** (CTRL+D). Moves the selected group down in the test or flow.

For more information, see “Working with Component Groups” on page 251.

- ▶ **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.
- ▶ **Parameter Display**. For a business process test with flows, enables you to display parameters in different groupings. For more information, see “Setting Your Display Preference for Flow Parameters Within a Business Process Test” on page 234.

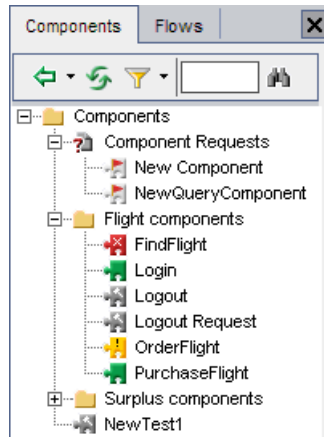
- **Display All Parameters.** By default, a maximum of three input or output component parameters for each business component or flow is displayed in the pane. More than three defined component parameters is indicated by an ellipsis (...) in the **Input** or **Output** columns. You can choose **Display All Parameters** to expand the space allocated to each business component or flow in the Test pane and ensure that all component parameters are visible. Choose **Display All Parameters** again to return to the default.

Components and Flows Pane

The Components and Flows pane can be optionally displayed on the right side of the Test Script tab. The pane comprises two tabs, the Components tab and the Flows tab, that display the hierarchical structure of all business components and flows in the project. The **Component Requests** branch in the Components tab shows any additional components that may have been requested from the Test Plan module.

If the Components and Flows pane is not visible, click the **Select Component** button in the Test Script tab toolbar.

An example of the Components and Flows pane is shown below:



In the Components tab, you can 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.



You use the Components and Flows pane to build a business process test by dragging and dropping one or more business components, flows, or component requests from the relevant tabs into the Test pane (or by clicking the **Add to Test** button in the tab toolbar).

The Components tab and the Flows tab each contain the following toolbar buttons:



- ▶ **Add Component to Test / Add to Test.** Adds the selected business component or flow after the component or flow selected in the Test Script pane (or at the end of the test if no component or flow is selected). You can also click the down arrow and choose whether to open the Promote Parameters dialog box.



- ▶ **Refresh Selected.** Updates the data in the Components tab or Flows tab.



- ▶ **Set Filter/Sort.** Enables you to filter and sort the business components or flows in the tree. For more information on filtering and sorting a tree, see the *HP Quality Center User Guide*.



- ▶ **Close.** Closes the Components and Flows pane.

Component Details Pane

The Component Details pane can be optionally displayed at the bottom of the Test Script tab. This pane contains the Description and Snapshot tabs.



If the Component Details pane is not visible at the bottom of the Test Script tab, click the **Show/Hide** button at the bottom-right of the Test Script tab. Click the button again to hide the pane.




- ▶ 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 114.
- ▶ 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 118.

For more information on the Test Script tab for Business Process Testing, see “Building the Test Structure” on page 242. For more information on other test types, see the *HP Quality Center User Guide*.

Attachments Tab

The Attachments tab enables you to associate an attachment with a business process test or flow. 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.

An icon  next to the Attachments tab name indicates that the selected test or flow has one or more 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 and flows has the same functionality as the Attachments tab for other test types. For more information on adding attachments, see the *HP Quality Center User Guide*.

Req Coverage Tab

The Req 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.

An icon  next to the Req Coverage tab name indicates that the selected test includes requirements coverage.

The Req Coverage tab for business process tests has the same functionality as the Req Coverage tab for other test types. For more information on linking requirements to a test, see the *HP Quality Center User Guide*.

Linked Defects Tab

The Linked Defects tab enables you to add and link defects to your business process tests.

An icon  next to the Linked Defects tab name indicates that the selected test has one or more 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, see the *HP Quality Center User Guide*.

Dependencies Tab

The Dependencies tab displays the dependency relationships that exist between entities such as test resources and tests. When analyzing the impact of a change proposed in a specific entity, the dependency links indicate the other entities that the change might affect. For example, when deleting or copying an entity that is being used by another entity.

The tab contains the Used By and Using grids. The **Used By** grid displays entities that depend on a selected entity. The **Using** grid displays the entities that a selected entity depends on.

The Dependencies tab in the Test Plan module provides the same functionality for tests and flows as the Dependencies tab does for components in the Business Components module. For more information, see “Understanding the Dependencies Tab” on page 89.

History Tab

The History tab in the Test Plan module comprises two sub-tabs; the Baselines tab and the Audit Log tab.

- ▶ The Baselines tab displays the version history of the item selected in the Test Plan tree. For information on working with version control in Quality Center, see the *HP Quality Center User Guide*.

- ▶ The Audit Log tab displays changes made to specified fields in a test or flow. For each change, the tab displays the date and time of the change and the name of the user who made the change. You can expand a change to view a list of fields modified during the change. For each field, the tab displays the old value and the new value.

The Audit Log tab in the Test Plan module provides the same functionality for tests and flows as the History tab does for components in the Business Components module. For more information, see “Understanding the History Tab” on page 93.

8

Working with Flows

This chapter describes how to create, build, and manage flows in the Test Plan module of Quality Center, and how to add flows to business process tests.

This chapter includes:

- About Working With Flows on page 226
- Creating Flows on page 228
- Developing Flows on page 229
- Understanding the Test Script Tab for Flows on page 230
- Building a Flow Structure on page 231
- Managing Flows on page 233

About Working With Flows

A flow is a collection of business components in a fixed sequence that can be used as a unit in multiple business process tests. This provides you with a building block you can use in multiple tests, but that has a single point of maintenance. When you modify a flow or any of its components, all business process tests containing that flow reflect that modification.

For an example of how flows can be used in more than one business process test, see “Flow Example” on page 227.

You work with flows in the Test Plan module. After you create a flow, you develop it by providing flow details, adding components, adding attachments, and creating associations between the flow and other Quality Center records, such as requirements and defects. These associations provide real-time visibility into modifications for interrelated, application-quality elements.

Notes:

- ▶ Much of the functionality available in Quality Center when working with flows is the same as the functionality when working with business process tests. For more information, see Chapter 9, “Managing Business Process Tests.”
 - ▶ The permission settings for a user group for working with flows are the same as those for the user group for working with tests. For more information on configuring user group permission settings, see the *HP Quality Center Administrator Guide*.
-

Flow Example

Suppose you are testing an application for a production and supply company. The company supplies goods it produces, as well as supplying goods through third-party order processing.

In third-party order processing, the company transfers the sales order to an external vendor. This vendor delivers the goods directly to the customer and invoices the branch company. The customer receives an invoice from the branch company's sales office.

To reflect these options, your application has two separate business processes, one for the **Generating Orders** business process, and one for **Third-party Order** processing. Both business processes begin with the **Create Sales Order** transaction. The **Create Sales Order** transaction contains all the steps necessary to begin sales processing.

The **Generating Orders** business process continues on to delivery and billing of the order, as well as producing a variety of other documents and reports. The **Third-party Order** business process continues on to creating a purchase order, posting a goods receipt, posting an invoice receipt, and invoicing the sales order.

To test these business processes, you would create a flow called **Create Sales Order**. This flow would contain the components that perform the operations necessary to complete the **Create Sales Order** transaction.

You would create one business process test for the **Generating Orders** business process and one for the **Third-party Order** business process. The **Create Sales Order** flow could be used in these two tests since both tests represent business processes that contain the same transaction.

If, at any time in the future, the **Create Sales Order** transaction changes in your application, you would update the **Create Sales Order** flow. Both your business process tests would reflect the changes in your application.

Creating Flows

You create flows within the Test Plan Tree in the Test Plan module. For information on working in the Test Plan module, see “About Getting Started with Business Process Testing in the Test Plan Module” on page 202.

To create a flow:

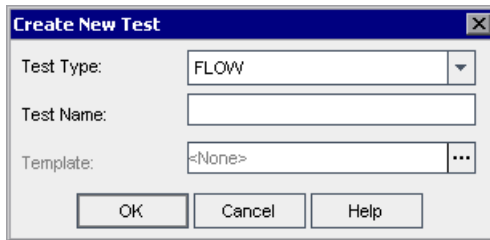


1 If the Test Plan module is not open, click the **Test Plan** button on the sidebar. The Test Plan module opens.

2 If the Test Plan Tree is not displayed, choose **View > Test Plan Tree**.



3 Select the folder in the Test Plan Tree in which you want to create the flow and click the **New Test** button. The Create New Test dialog box opens.



4 In the **Test Type** box, select **FLOW**.

In a version-controlled project, you can choose whether to check the flow out immediately, and if so, you can add a comment to the check out.

5 In the **Test Name** box, type a name for the flow.

6 Click **OK**. The flow is added to the selected folder in the Test Plan Tree.

Developing Flows

After you create a flow, you can use the following tabs to plan and design the flow:

- ▶ **Details tab.** Enables you to view and modify flow details. For more information, see “Details Tab” on page 208.
- ▶ **Test Script tab.** Enables you to build the structure of the flow by selecting one or more business components and adding them to the flow. For more information, see “Understanding the Test Script Tab for Flows” on page 230.
- ▶ **Attachments tab.** Enables you to associate the flow with a file, a URL, a screenshot, system information, or the contents of the clipboard. For more information on working with attachments, see the *HP Quality Center User Guide*.
- ▶ **Req Coverage tab.** Enables you to associate the flow with requirements. You create requirements coverage for a flow in the same way as you would for a test. For more information, see the *HP Quality Center User Guide*.
- ▶ **Linked Defects tab.** Enables you to link the flow with existing defects, or to create a new defect and link it to the flow. For more information on defect linkage, see the *HP Quality Center User Guide*.
- ▶ **Dependencies tab.** Enables you to view the dependency relationships that exist between entities such as components, tests, flows, test resources, and application areas. For more information on entity dependencies, see the *HP Quality Center User Guide*.
- ▶ **History tab.** Enables you to view changes made to the item selected in the Test Plan tree, as well as its version history. For more information, see “History Tab” on page 223.

Understanding the Test Script Tab for Flows

Most of the functionality available in the Test Script tab for flows is the same as that available for business process tests. For more information on this functionality, see “Test Script Tab” on page 213.

When working with flows, the Test Script tab enables you to build the structure of a flow by adding one or more business components to the flow.

You can also use the tab to:

- ▶ Define flow parameters and their default values.
- ▶ Display parameters for flows in business process tests in different groupings. For more information, see “Setting Your Display Preference for Flow Parameters Within a Business Process Test” on page 234.
- ▶ Add run conditions to the flow.
- ▶ Validate the flow.
- ▶ Run the flow in Debug mode.

In addition to the standard functionality available for business process tests, the Test Script tab for flows includes the following toolbar buttons:



- ▶ **Flow Input Parameters.** Enables you to define default values for your flow input parameters. For more information, see “Defining Default Flow Input Parameter Values” on page 312.



- ▶ **Flow Output Parameters.** Enables you to define flow output parameters. For more information, see “Working with Flow Output Parameters” on page 290.



- ▶ **Add Run Condition.** Enables you to add run conditions to your flow. For more information, see “Adding Run Conditions” on page 351.



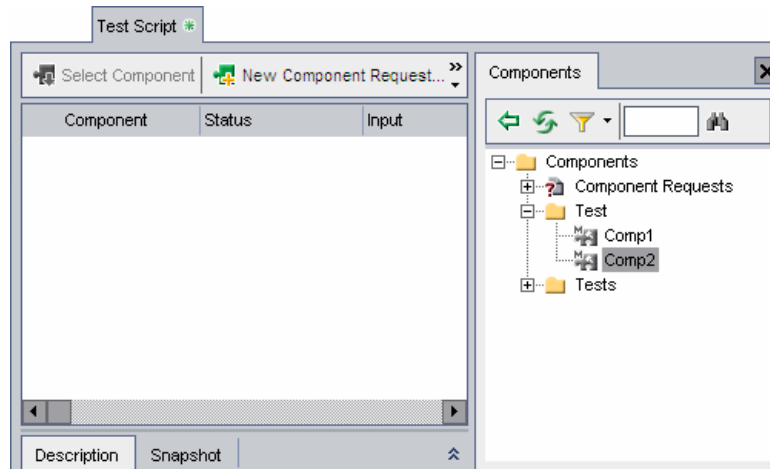
- ▶ **Remove Run Condition.** Enables you to remove an existing run condition from your flow. For more information, see “Removing Run Conditions” on page 355.

Building a Flow Structure

A flow consists of a sequence of one or more business components. You build the structure of a flow by selecting the business components from the Component Tree and adding them to the flow.

To build a flow:

- 1** In the Test Plan Tree, select the flow to which you want to add components and click the **Test Script** tab. The Test Script tab displays the components currently in the flow.
- 2** Click the **Select Component** button. The Component Tree opens in the right pane.



- 3** In the Component Tree, expand the folder containing the business component that you want to add to the flow.

Tips:



- ▶ You can search for a component by entering the name of the component (or part of the name) in the search box located in the Components tab toolbar, and clicking the **Find** button.
 - ▶ In addition to adding existing components to your flow from the Component Tree, you can add component requests. A component request acts as a signal to add a new business component to the Business Components module. You add component requests to a flow as you would for a business process test. For more information on component requests, see “Handling Component Requests” on page 141.
-



- 4** In the Component Tree, drag the component into the Test Script pane. Alternatively, select the component that you want to add to the flow and click the **Add Component to Test** button. You can also click the down arrow and choose whether to open the Promote Parameters dialog box.

If the selected component or flow has parameters, the Promote Parameters dialog box opens. This dialog box enables you to choose whether to promote component or flow parameters to the next level.

- 5** In the Promote Parameters dialog box, select the parameters you want to promote. For more information, see “Understanding the Promote Parameters Dialog Box” on page 246.
- 6** To add additional components to the flow, repeat steps 3 and 4 for each additional component.



- 7** Use the **Move Component Up** and **Move Component Down** buttons to arrange the components in the flow in the correct order. Alternatively, click the gray sidebar to the left of a component to highlight the component row and drag the component to the correct position.
- 8** You can add flow parameters and run conditions to increase the flexibility of your flow. For information on flow parameters, see Chapter 10, “Working with Parameters.” For information on run conditions, see Chapter 11, “Defining Run Conditions.”

Managing Flows

You can use flows in business process tests. A business process test can comprise only business components, only flows, or a combination of business components and flows. For more information, see “Adding Flows to Business Process Tests” on page 234.

You can also cut, copy, paste, rename, delete, and validate flows. You perform these actions for flows in the same way as you would for business process tests.

Note: In a version-controlled project, you can copy and paste any checked in flow, as well as any flow that is checked out by another user - the copied flow will contain the last checked-in data. However, you cannot copy and paste a flow that is currently checked out by you. You must check-in the flow before copying and pasting it.

You can send e-mail about a flow to another user. This enables you to inform other personnel about the status of new and existing flows, and the components they contain.

For more information on performing these actions, see Chapter 9, “Managing Business Process Tests.”

Adding Flows to Business Process Tests

You add flows to business process tests in the same way as you add components. For more information on adding flows and business components to business process tests, see “Building Business Process Tests” on page 241.

After you add flows to a test, you can manage the flows and define flow iterations in the same way as you would for business components within a test. For more information on managing business components in a business process test and defining iterations, see Chapter 9, “Managing Business Process Tests.”

You can also display parameters for the flows in a business process test in different groupings. For more information, see “Setting Your Display Preference for Flow Parameters Within a Business Process Test” on page 234.

Setting Your Display Preference for Flow Parameters Within a Business Process Test

When the Test pane of the Test Script tab displays a business process test with flows, it displays the parameters for the flows. You can display these parameters in different groupings.

When displaying flow parameters in different groupings, consider the following:

- ▶ Parameter Display options are available only when working in flows contained in business process tests.
- ▶ When you select a **Parameter Display** option, the selection applies to all the flows you view in this project.
- ▶ When viewing a business process test in the Test pane of the Test Script tab, only those parameters that were promoted to flow parameters are displayed.
- ▶ The default setting is **Group by Iteration**.

To set your display preference for flow parameters in the Test Script tab:

Right-click a flow in the Test pane, select **Parameter Display** and select one of the following options:

Display Option	Effect
Group by Component	Displays the parameters grouped according to the components from which they were promoted. Within the component, parameters are displayed according to the order in which they were created.
Group by Iteration	Displays the parameters grouped according to the components from which they were promoted, and within each component according to the iterations in which they appear.
No Grouping	Displays all the parameters according to the order in which they were created.

9

Managing Business Process Tests

This chapter describes how to create and manage business process tests in the Test Plan module of Quality Center. The Test Plan module also enables you to convert existing manual tests to manual components.

This chapter includes:

- ▶ About Managing Business Process Tests on page 238
- ▶ Creating Business Process Tests on page 239
- ▶ Building Business Process Tests on page 241
- ▶ Understanding the Promote Parameters Dialog Box on page 246
- ▶ Working with Component Groups on page 251
- ▶ Requesting New Components for Business Process Tests or Flows on page 261
- ▶ Working with Business Process Tests on page 267
- ▶ Mailing Business Process Tests or Flows on page 274
- ▶ Converting Manual Tests to Components on page 277
- ▶ Generating Documents for Business Process Tests and Flows on page 283

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 using a sequence of business components and flows 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 parameters allow business components and flows to pass variable values between the components and flows in a business process test. These values can affect the results of the test. You can configure input and output values for individual components and flows in the test, and the number of iterations for each component, in the Test Plan module.

You can also define global input parameters, called **run-time parameters**, in a business process test or flow. Run-time iterations, at the test or flow level, enable you to iterate the entire business process test or flow using different values for component parameters that affect the entire run.

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.

Note: Much of the functionality available in Quality Center when working with tests is also available when working with flows. For more information about flows, see Chapter 8, “Working with Flows.”

Creating Business Process Tests

You create business process tests by providing the overall details of the test and building a sequence of business components and flows. Business components can be created in the Business Components module or a testing tool such as QuickTest Professional. You can also attach appropriate files and link the test to project requirements.

In a version-controlled project, you can choose whether to check the business process test out immediately, and if so, you can add a comment to the check out.

To create a business process test:

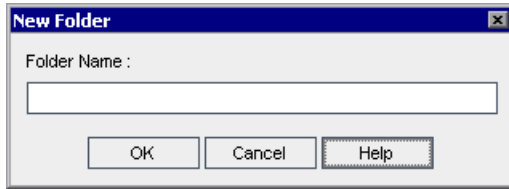
- 1 Access the Test Plan module, as described in “About Getting Started with Business Process Testing in the Test Plan Module” on page 202.

Note: Each business process test must be created in a folder or subfolder in the Test Plan tree. Steps 2 to 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**.

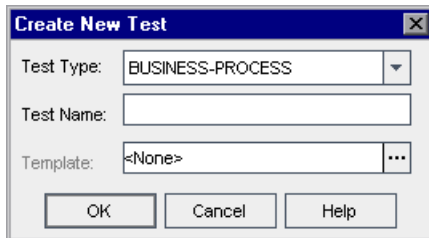
Note: The names of business process test folders must not contain two consecutive semicolons (;;) or include any of the following characters:
\\ * ^

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**.



In a version-controlled project, you can choose whether to check the business process test out immediately, and if so, you can add a comment to the check out.

- 7** In the **Test Name** box, enter a descriptive name for the business process test.

Note: Business process test names must not contain two consecutive semicolons (;;) or 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 “Details Tab” on page 208.
- **Test Script tab.** Enables you to build the structure of the business process test by adding business components and flows. For more information, see “Building the Test Structure” on page 242.
- **Attachments tab.** Enables you to associate any file with a business process test as an attachment. For more information, see the *HP Quality Center User Guide*.
- **Req Coverage tab.** Enables you to link predefined testing requirements to your business process tests. For more information, see the *HP Quality Center User Guide*.
- **Linked Defects tab.** Enables you to link defects to your business process tests. For more information, see the *HP Quality Center User Guide*.

- ▶ **Dependencies tab.** Displays a list of entities that are linked to the currently selected business component. The Dependencies tab for a test or flow in Test Plan has the same features and functionality as the Dependencies tab for a component in the Business Components module. For more information, see “Dependencies Tab” on page 72.
- ▶ **History tab.** Displays a log of changes made to an entity. The History tab for a test or flow in Test Plan has the same features and functionality as the History tab for a component in the Business Components module. For more information, see “History Tab” on page 72.

Building the Test Structure

In the Test Script tab, you build the structure of the business process test by selecting one or more previously created flows or 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.

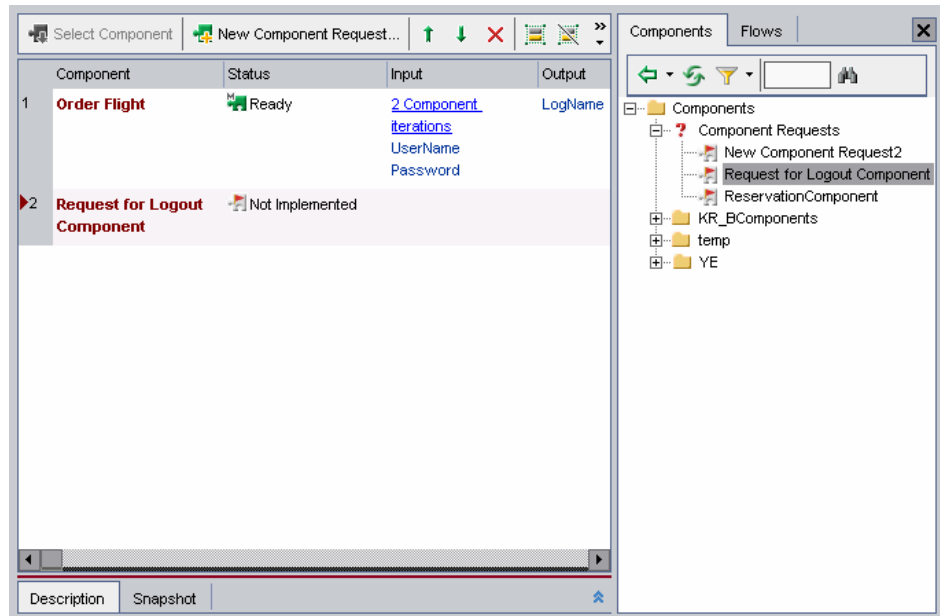
Tip: Flows can also be added directly to test sets in the Test Lab module.

For more information, see:

- ▶ Adding Components and Flows 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 251.

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 and Flows to a Business Process Test

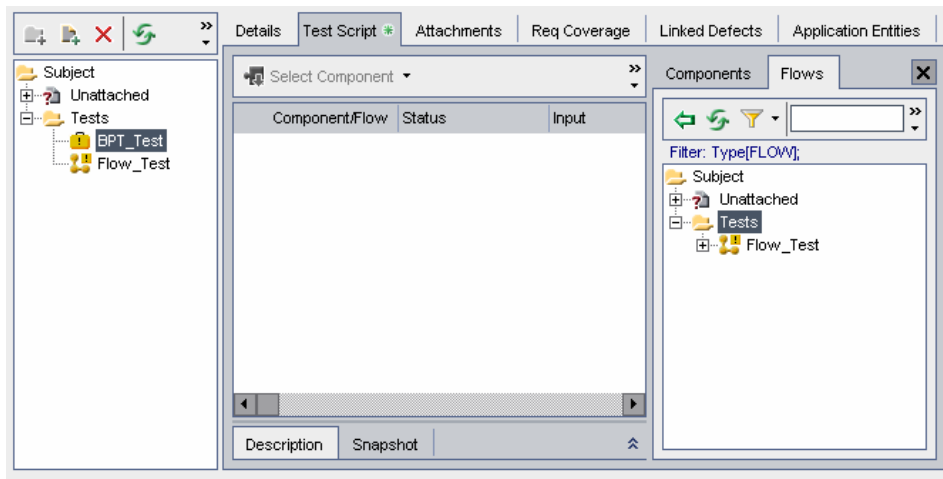
The first step in building a business process test is to select the business components and flows that you want to include in the test.

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 in the same way as a regular component. For more information, see “Requesting New Components for Business Process Tests or Flows” on page 261.

To select business components and flows:

- 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 Components and Flows pane is displayed on the right. If it is not displayed, click the **Select Component** button in the Test pane toolbar, or click the **Select Component** down arrow and select **Select Flow**.

The Components and Flows pane comprises a Components tab, filtered to show available components in the component tree, and a Flows tab, filtered to show available flows in the Test Plan tree.



- 3 In the relevant tab, expand the folder that contains the business component or flow required for the business process test.

Tips:

- ▶ 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.



- ▶ You can search for a component or flow by entering its name (or part of the name) in the search box located in the tab toolbar, and clicking the **Find** button.
- ▶ 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.

-
- 4** Drag the required business component or flow from the relevant tree and drop it in the Test pane of the Test Script tab. To add the required component or flow to the Test pane, you can also:

- ▶ double-click the component or the flow.



- ▶ select the component in the component tree and click the **Add Component to Test** button in the toolbar.



- ▶ select the flow in the Flows tree and click the **Add to Test** button in the toolbar.

- ▶ You can also click the down arrow on the right side of the **Add Component to Test / Add to Test** button in the toolbar. Then choose **Add to test. Open the Promote Parameters dialog box.**

If the selected component or flow has parameters, the Promote Parameters dialog box opens. This dialog box enables you to choose whether to promote component or flow parameters to the next level. If the selected component does not have parameters, or the component parameters in the selected flow were not promoted to the flow level, proceed to step 6.

- 5 In the Promote Parameters dialog box, select the parameters you want to promote. For more information, see “Understanding the Promote Parameters Dialog Box” on page 246.



- 6 If required, you can select business components and flows 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.

Understanding the Promote Parameters Dialog Box

Using the Promote Parameters dialog box, you can promote component parameters to the flow or test level at the same time as you add a component to a flow or test. Similarly, flow parameters can be promoted to the test level at the same time as you add a flow to a test. For more information, see “The Promote Parameters Dialog Box” on page 247.

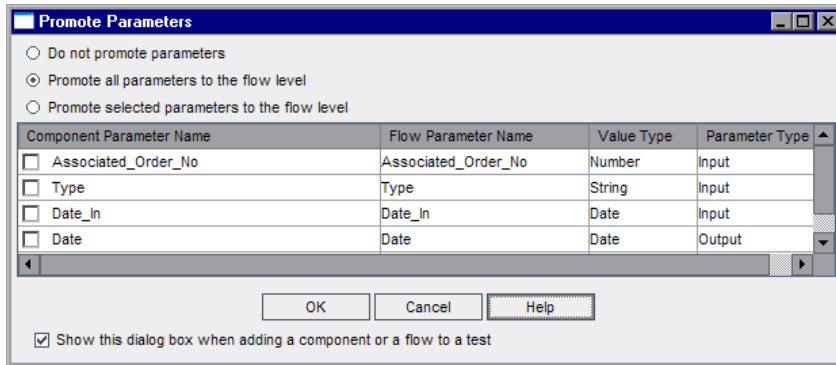
For information on promoting parameters to the flow or test level at a later time, see Chapter 10, “Working with Parameters.”

The Promote Parameters Dialog Box

Description	<p>Enables you to promote:</p> <ul style="list-style-type: none"> ➤ Component parameters to the flow or test level. ➤ Flow parameters to the test level.
How to Access	<p>In the Test Plan module, display the Components and Flows pane to the right of the Test Script tab by clicking the Select Component button. Then, for a component or flow containing parameters, you can do one of the following:</p> <ul style="list-style-type: none"> ➤ Drag the component or flow from the Components tab or the Flows tab and drop it in the Test pane. ➤ Select the component in the Components tab and click the Add Component to Test button in the toolbar. ➤ Select the flow in the Flows tab, and click the Add to Test button in the toolbar. ➤ Double-click the component or flow. <p>Note: You can choose not to display the Promote Parameters dialog box the next time you add a component or flow, by selecting the check box at the bottom of the dialog box. If you previously chose not to show the Promote Parameters dialog box again, select the component or flow in the Components tab or the Flows tab, and click the down arrow on the right side of the Add Component to Test / Add to Test button in the toolbar. Then choose Add to test / flow and display promote parameter options.</p>

<p>Important Information</p>	<ul style="list-style-type: none"> ▶ The content and text of the Promote Parameters dialog box depends on whether you are adding components to a flow or test, or flows to a test. ▶ The option you select, to promote some parameters, all the parameters, or no parameters, becomes the default option when the dialog box is opened again. If you choose not to show the Promote Parameters dialog box again, the option you select becomes the default behavior the next time you add a component or flow to the Test pane. ▶ Clicking Cancel or pressing the ESC key closes the dialog box but still adds the component or flow, without promoting any parameters.
<p>Learn More</p>	<p>Conceptual overview: “About Working with Parameters” on page 286</p> <p>Primary task: Selecting the business components and flows that you want to include in the test. See “To select business components and flows:” on page 244.</p>

Below is an image of the Promote Parameters dialog box:



Notes:

- The content and wording of the Promote Parameters dialog box depends on whether you are adding a business component to a flow or test, or a flow to a test.
- The Parameter Type column is shown only when adding a business component to a flow.

Promote Parameters Dialog Box Options

Option	Description
Do not promote parameters	No parameters are promoted when you add the component to a test or flow, or the flow to a test. The check boxes for the parameters are disabled.
Promote all parameters to the test/flow level	Promotes all parameters when you add the component to a test or flow, or the flow to a test. The check boxes for the parameters are disabled.
Promote selected parameters to the test/flow level	Enables the check boxes for available parameters. The parameters you select are promoted when you add the component to a test or flow, or the flow to a test.
Component Parameter Name column	Displays the parameters of the component or flow.
Test/Flow Parameter Name column	Displays the names assigned to the promoted parameters.
Value Type column	Displays the type of parameter value, String , Number , Date , Boolean , or Password .
Parameter Type column	Displays the type of parameter, Input or Output . Note: This column is shown only when adding a component to a flow.

Option	Description
Show this dialog when adding a component or a flow to a test	<p>Enables you to choose not to display the Promote Parameters dialog box when you add a component to a test or flow, or a flow to a test.</p> <p>The option you select, to promote some parameters, all the parameters, or no parameters, becomes the default behavior when adding a component to a test or flow, or a flow to a test.</p> <p>Note: This check box is checked and disabled when you choose to promote selected parameters.</p>
Cancel	<p>Closes the dialog box but still adds the component or flow, without promoting any parameters.</p>

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 component input parameter values (entered for the test, entered by the tester during runtime, 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 120.

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 10, “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 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

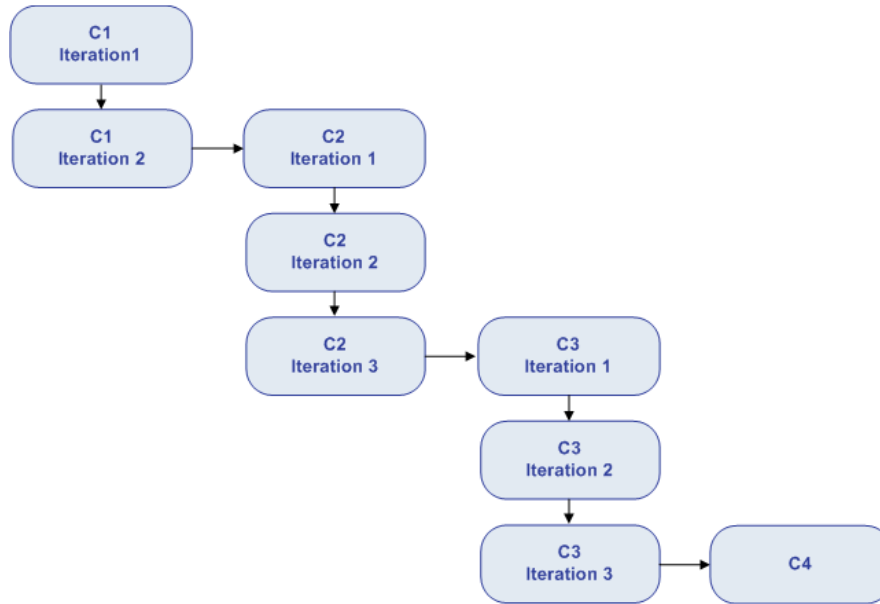
It may be logical in certain business process tests or flows to iterate several business components together as a group.

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.

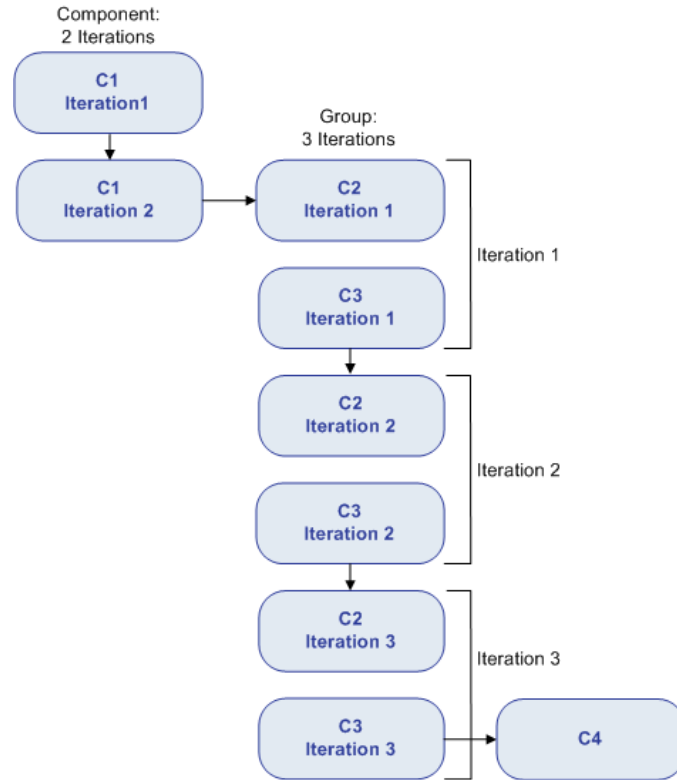
This is illustrated as follows:



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 followed by
- C4.

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
1	Ready	3 Component iterations (Selected for running 1 - 2) UserName Password	LogName	Exit
Begin Group		3 Group iterations (Selected for running 2 - 3)		
2	Ready	UserName Password	LogName	Continue
3	Maintenance	CCNumber ExpDate	Status	Continue
4	Maintenance	Address1		Continue
End Group				
5	Ready			Continue

Number of Group Iterations and Range

- 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 pane, select two or more contiguous components. The selected business components are highlighted.

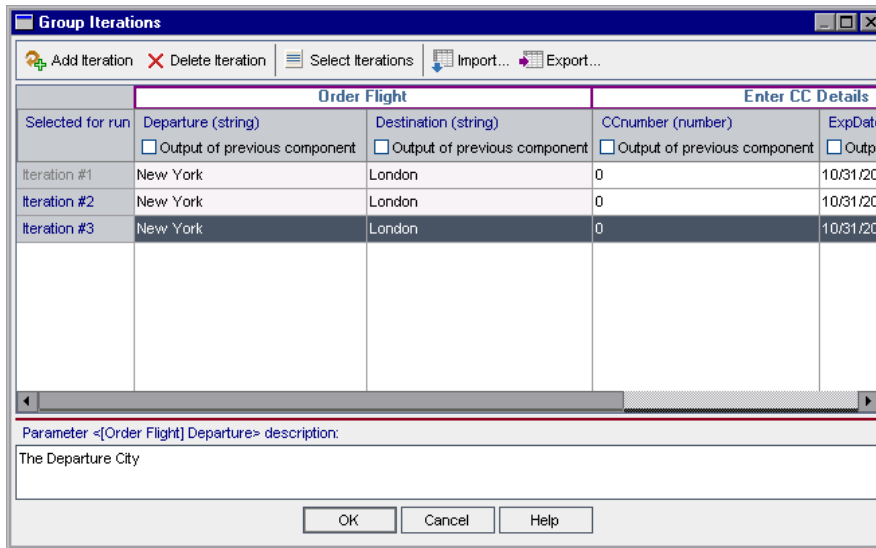
Note: You can select contiguous components in the tab using the SHIFT key. Click to the left of the component row to ensure that the entire row is selected (the row will then be highlighted). Press the SHIFT key and click the last contiguous component to be included in the group.

- 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.

- 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.

- 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, change the order of groups in a business process test or flow, and change 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 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.
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.

To...	Perform the following:
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 “Working with Iterations” on page 298.
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 Iteration Range for a Component” on page 313.

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 or Flows

If, while creating a business process test or flow 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.

You can view component requests generated in the Test Plan module in the Component Tree pane on the right of the Test Script tab, and in the Component Requests folder of the component tree in the Business Components module.

After confirming that a requested component and its parameters are necessary for business process testing, you can drag the component request from the Component Requests folder 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 141.

This feature is especially useful when the roles of creating components in the Business Components module and building business process tests or flows in the Test Plan module are performed by different personnel.

Creating a Component Request

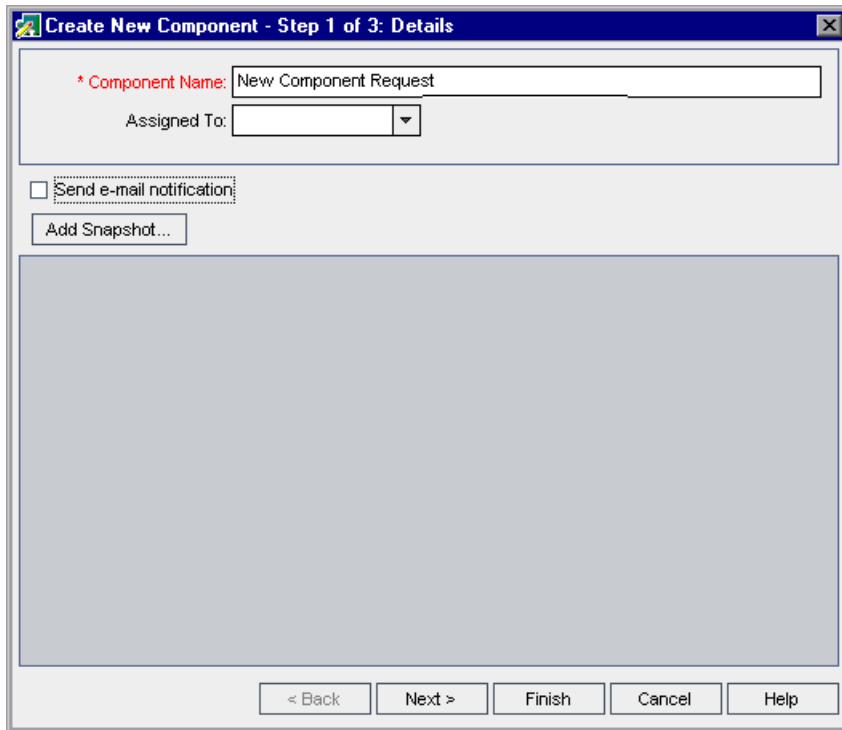
If a necessary business component has not been defined in the Business Components module, you can create and submit a component request from the Test Plan module.

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 or flow 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.



- 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 118.

- 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

B

U

I

A

Input: New Delete | ↑ ↓

Parameter Name	Value Type	Default Value	Description

Output: New Delete | ↑ ↓

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.

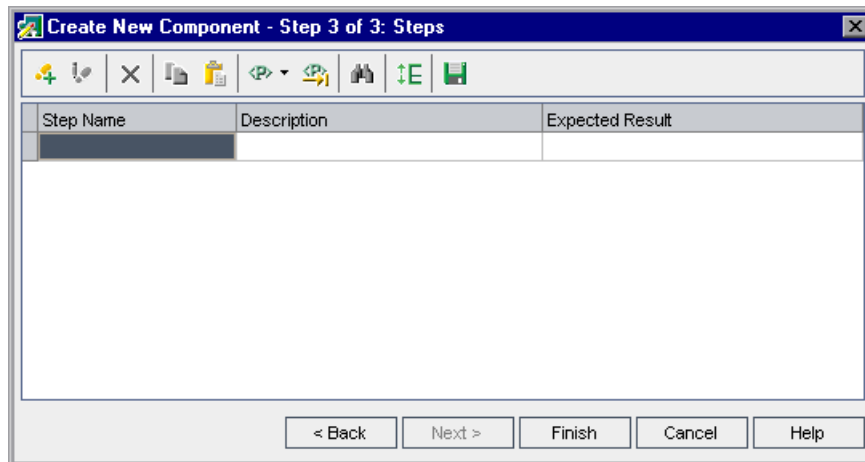
Note: The component request wizard provides a comprehensive selection of text editing and formatting tools to assist you in entering the component description. Right-click in the **Description** area to access the commands from the context menu. Choose **Toolbar Visible** from the context menu to display (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 10, “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 148.
- 13** Click **Finish**. The new component request is displayed in the Test Script tab for the selected business process test or flow, and in the Component Tree pane under the Component Requests folder.



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.

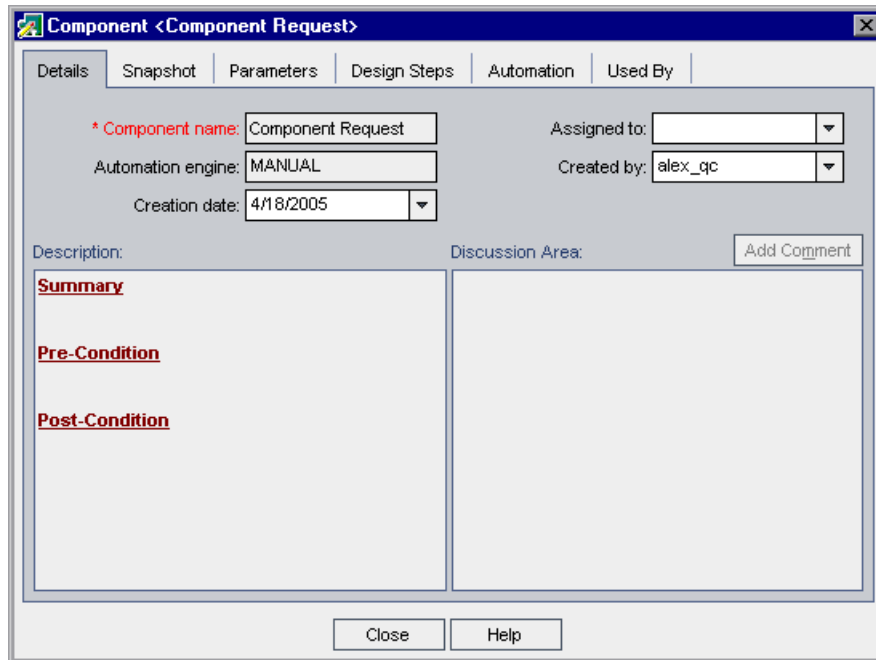
For more information, see “Handling Component Requests” on page 141.

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 pane of the Test Script tab, and choose **Edit Component**. The Component dialog box opens.



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 142.

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 267
- “Copying Business Process Tests” on page 269
- “Validating Business Process Tests and Flows” on page 270
- “Deleting Business Process Tests” on page 272

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 241.
- ▶ To move a folder or business process test in the tree, do one of the following:
 - ▶ Drag and drop the folder or test to the required position in the tree.
 - ▶ 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, see the *HP Quality Center User 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 126.

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 business process test settings, see “Test Plan Module Tabs” on page 208.

Validating Business Process Tests and Flows

You can check your business process tests and flows to locate any component configuration errors that could halt the successful running of the test or flow.

Validating a business process test or flow in the Test Plan module checks all instances of the test or flow 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 or flows. For more information, including the error types that are reported by the component and test or flow validation processes, see “Validating Business Components” on page 131.

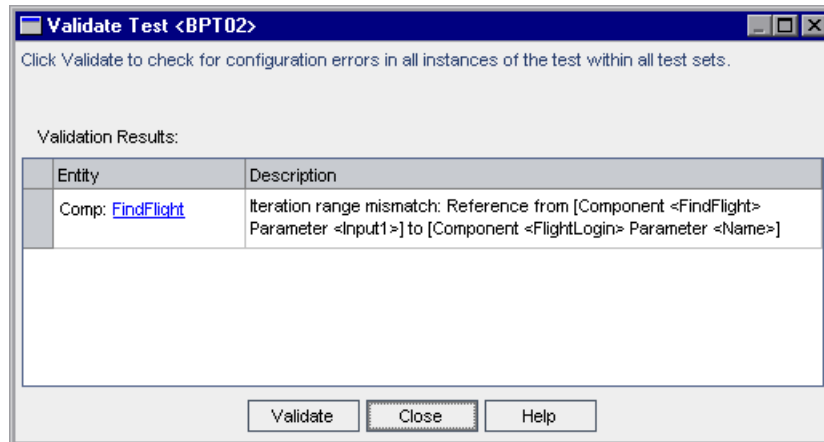
To validate a business process test or flow:

- 1 Select the business process test or flow 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 or flow 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. 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 10, “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 flow, or a test folder, from the Test Plan tree.

- ▶ If you delete a business process test or flow, Quality Center permanently deletes the test or flow from the project. The test or flow 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 or flows in the folder to the **Unattached** folder in the tree.

Note: It is highly recommended that you do not run a business process test or flow from the **Unattached** folder. Move the test or flow to a valid folder in the Test Plan tree before running it.

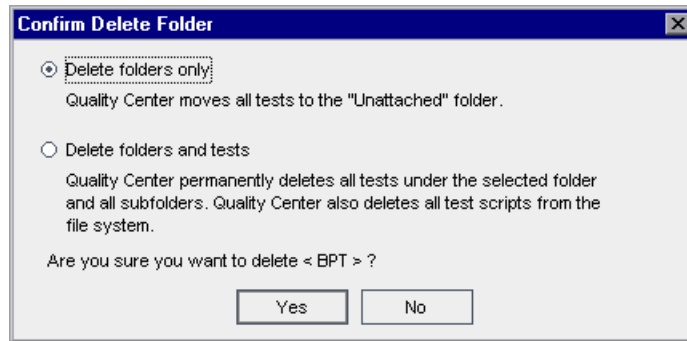
To delete a business process test or flow:



- 1 Select the business process test or flow 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 or flow 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 or flows in the folder to the **Unattached** folder.
 - ▶ **Delete folders and tests** to permanently delete all the tests, flows, and subfolders in the folder.
- 3 Click **Yes**. The folder or the folders, and the tests or flows, are deleted according to your selection.

Mailing Business Process Tests or Flows

You can send an e-mail about one or more business process tests or flows to another user. This enables you to inform other personnel about new or existing business process tests or flows, including their history, their attachments, and the design steps of each of their components. For example, the e-mail of a business process test could include a flow, the components that flow contains and their design steps, followed by a component and its design steps.

Quality Center includes a **Go To** link in the e-mail, which enables the recipient to go directly to the test or flow in the Test Plan module.

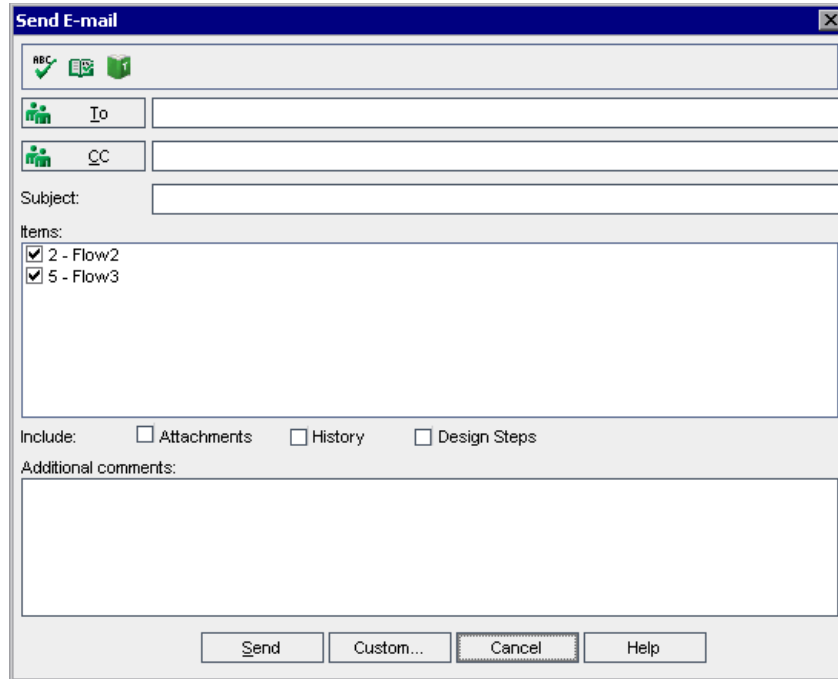
Note: By default, Quality Center sends e-mail in HTML format. To send e-mail as plain text, edit the **MAIL_FORMAT** parameter in the **Site Configuration** tab in Site Administration. For more information, see the *HP Quality Center Administrator's Guide*.

To mail a business process test or flow:



- 1 In the Test Plan Tree, select one or more business process tests or flows and click the **Send by E-mail** button. Alternatively, click the **Send by E-mail** arrow and select **Send E-Mail to Designer** if you want to send the e-mail to the user who created the tests or flows.

The Send E-mail dialog box opens.



Send E-mail

ABC ✓ [document icon] [document icon]

To [input field]

CC [input field]

Subject: [input field]

Items:

- 2 - Flow2
- 5 - Flow3

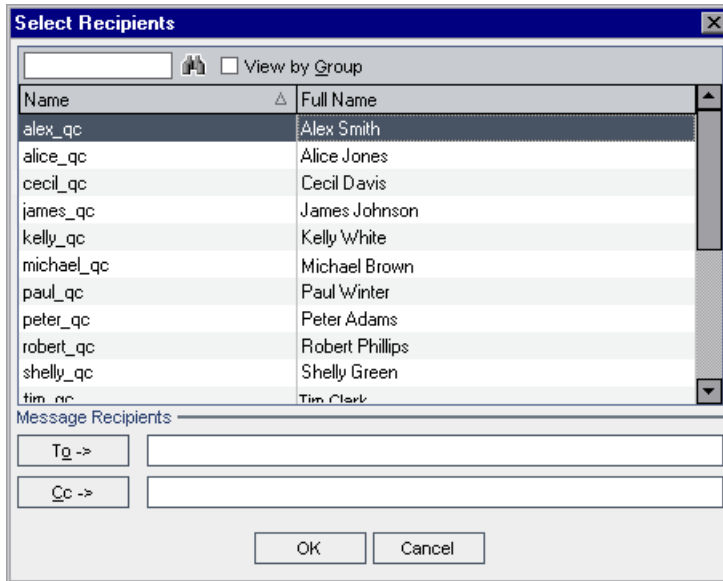
Include: Attachments History Design Steps

Additional comments: [text area]

Send Custom... Cancel Help

- 2 Type a valid e-mail address or user name. If you selected **Send E-Mail to Designer** in the previous step, the address of the user who created the component appears in the **To** box. Alternatively, click the **To** button or **CC** button to select users.

The Select Recipients dialog box opens.



You can sort the users list, search for users, group users by user groups, and select users from the list or from a group tree. For more information, see the section on selecting users in the *HP Quality Center User Guide*.

Select the users or user groups to which you want to send the e-mail, and click **OK**.

- 3** If required, you can add additional descriptive information to the e-mail in the **Subject** box. By default, if you select only one test or flow, the domain, project, test or flow ID, and name are displayed in the Subject box.
- 4** In the **Items** area, you can clear the check boxes of any items you do not want to include in the e-mail.
- 5** Select whether you want to include the **Attachments**, **History** and **Design Steps** of the tests or flows.
- 6** In the **Additional comments** box, add any comments you have.

7 You can check your wording in the e-mail:



➤ Click the **Check Spelling** button to check the spelling for the selected word or text box. If there are no errors, a confirmation message opens. If errors are found, the Spelling dialog box opens and displays the word that is misspelled together with replacement suggestions.



➤ Click the **Spelling Options** button to open the Spelling Options dialog box, enabling you to configure the way Quality Center checks spelling.



➤ Click the **Thesaurus** button to open the Thesaurus dialog box and display a synonym, antonym, or related word for the selected word. You can replace the selected word or look up new words.

8 Click **Custom** to customize the e-mail. In the Select Fields dialog box, you can specify additional fields to include in the e-mail.

9 Click **Send** to send the e-mail.

Converting Manual Tests to Components

In the Test Plan module, you can convert existing manual tests to manual components using the Select Destination Folder dialog box.



To access the Select Destination Folder dialog box, select one or more manual tests or a test folder in the Test Plan tree, and click the **Convert to Component** button. You can also right-click one or more manual tests or a test folder in the Test Plan tree, and select **Convert to Component**. The **Convert to Component** button is also available from the grid view.

The new components are created in a folder that you specify or create in the component tree in the Business Components module.

You can also recursively convert all the tests in a folder and all its subfolders simultaneously. In this case, the components are created in the same folder structure in the Business Components module as the original tests in the Test Plan module. If no manual tests exist in the selected source folder, an empty folder structure is created in the specified destination folder.

For more information, see:

- “The Select Destination Folder Dialog Box” on page 279
- “Considerations When Converting Manual Tests to Components” on page 282

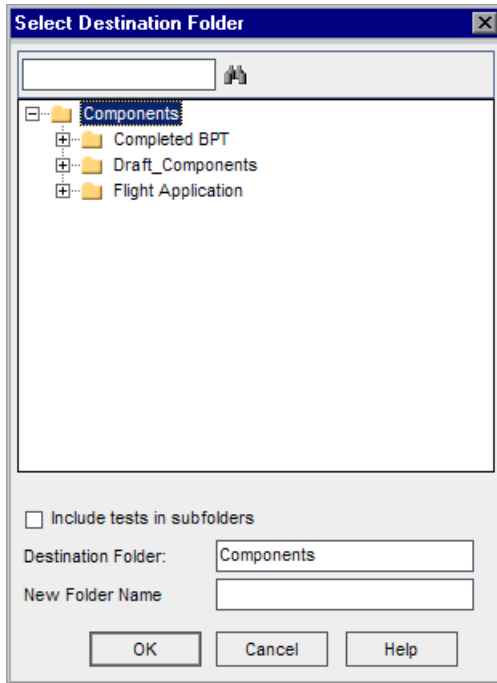
In the Business Components module, the Details tab of the converted component includes the following elements:

- **Component name.** The name you enter in the **New Component Name** box in the Destination Folder dialog box. (The default is the name of the test.) If a component with the same name already exists in the destination folder, a suffix, for example `_Copy_1`, is automatically added to the name to create a unique name within the folder.
- **Assigned to.** Remains empty.
- **Automation engine.** Displayed as **MANUAL**.
- **Created by.** The user who converted the test.
- **Creation date.** The date the test was converted.
- **Status.** Displayed as **Under Development**.
- **Description.** Copied from the Description tab of the test. The name of the source test and the test ID are also displayed.
- **Discussion Area.** Copied from the Comments tab of the test.

The Select Destination Folder Dialog Box

Description	Displays the component tree from the Business Components module, and enables you to select a destination folder for your converted components in the tree. The folder you select is automatically entered in the Destination Folder box.
How to Access	<p>In the Test Plan tree, do one of the following:</p> <ul style="list-style-type: none"> ▶ select one or more manual tests, or a test folder, and click the Convert to Component button. ▶ right-click one or more manual tests, or a test folder, and select Convert to Component. ▶ select one or more manual tests, or a test folder, and select the Tests > Convert to Component menu command.
Important Information	<ul style="list-style-type: none"> ▶ Only manual tests in the selected folders are converted. ▶ The options available in the Select Destination Folder dialog box depend on whether you select a single test, multiple tests, or a folder in the Test Plan Tree. For more information, see “Select Destination Folder Dialog Box Options” on page 281.
Learn More	<p>Conceptual overview: “Converting Manual Tests to Components” on page 277.</p> <p>Additional related topics:</p> <ul style="list-style-type: none"> ▶ “Select Destination Folder Dialog Box Options” on page 281. ▶ “Considerations When Converting Manual Tests to Components” on page 282.


Below is an image of the Select Destination Folder dialog box:



The example shown above opens when a folder is selected in the Test Plan tree.

- When a single test is selected:
 - The **New Folder Name** box is displayed as **New Component Name**.
 - The **Include tests in subfolders** check box is not displayed
- When more than one test is selected, only the **Destination Folder** box is displayed.

Select Destination Folder Dialog Box Options

Option	Description
 Find button	Enables you to search for a folder in the component tree. Full or partial folder names can be entered.
Include tests in subfolders (displayed when a test folder is selected in the Test Plan Tree)	Enables you to recursively convert all the tests in the selected folder and all of its subfolders simultaneously. If the number of tests is large, this action may take some time.
Destination Folder (displayed when a test folder or more than one test is selected in the Test Plan Tree)	Displays the destination folder you selected for your converted components in the component tree. This box is read-only. Note: When more than one test is selected, component names are copied from the test names.
New Folder Name (displayed when a test folder is selected in the Test Plan Tree)	Enables you to create a new folder for your converted components below the selected Destination Folder in the component tree.
New Component Name (displayed when a single test is selected in the Test Plan Tree)	Enables you to enter a new name for a converted component. The default is the name of the test. This field is mandatory. Note: If a component with the same name already exists in the destination folder, a suffix is automatically added to the name to create a unique name within the folder (for example <code>_Copy_1</code>).

Considerations When Converting Manual Tests to Components

Parameters

- Test parameter names may contain special characters that are not permitted in a component parameter name. Such characters are replaced with an underscore (_) when the test is converted.
- If a parameter name does not start with an English letter, the letter **p** is added as a prefix to the name when the test is converted.
- The parameter value type is always set to **String** in the component parameter.
- The parameter default value is copied from the test parameter.
- The parameter description is copied from the test parameter.

Design Steps

In the Design Steps tab of the new component:

- Step names and expected results are copied from the design steps in the test.
- Parameter names may be changed during the conversion process - see “Parameters”, above. Parameter names in the step descriptions are changed accordingly.
- Certain test steps may call another test. If a design step is of type “call to”, it is copied as a regular step with the step name “**Call**”. The description is displayed as “**Call <linked test name>**”.

Other

Attachments, linked defects, and the test history are not copied over to the converted component.

Generating Documents for Business Process Tests and Flows

The Quality Center Document Generator enables you to generate Microsoft Word documents containing comprehensive data about a selected business process test, flow, 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, see the *HP Quality Center User Guide*.

Note: For more information on including component data in project documents, see “Generating Project Documents” on page 144.

10

Working with Parameters

You can affect the behavior and results of a business process test by using parameters to define the values that components and flows receive and return.

This chapter describes how to work with input and output parameter types in Quality Center at both the component and the flow level.

This chapter includes:

- ▶ About Working with Parameters on page 286
- ▶ Defining Component Parameters on page 291
- ▶ Configuring Input Parameter Values and Iterations on page 297
- ▶ Importing and Saving Parameter Values on page 319
- ▶ Working with Run-Time Parameters on page 332
- ▶ Understanding Date Parameters on page 342

About Working with Parameters

You can expand the scope of business process tests, flows, and components by defining the parameters that a component or flow can receive or return, and then replacing fixed values with these parameters. This process, known as **parameterization**, enables you to perform the same operations on the application you are testing with multiple sets of data. This greatly increases the power and flexibility of your tests, flows and components. For more information, see “Parameterization Example” on page 287.

Note: You can also define input and output parameters for a business component in QuickTest or WinRunner. For more information, see the *HP QuickTest Professional for Business Process Testing User Guide* or the *HP WinRunner User's Guide*.

There are two types of parameters: input parameters and output parameters. You can use parameters at both the component and the flow level, and at run-time.

- ▶ **Input parameters** enable you to define data used by a component or flow that is provided from an external source. Component input values and flow input values are described in “Understanding Input Parameters” on page 287.
- ▶ **Output parameters** enable you to define data that is retrieved and stored by a component or flow and can be used in subsequent components or flows. Component output values and flow output values are described in “Understanding Output Parameters” on page 290.

Parameterization Example

Suppose you create three flows corresponding to different stages in processing a customer order:

- **ReceiveOrder.** Receives a customer order and generates a unique order number when the customer authorizes the order.
- **SendOrder.** Sends the customer the goods the customer ordered.
- **BillOrder.** Sends the customer a bill for the goods.

In this example, you want to define a business process test to test the entire order processing workflow from receiving the order to billing it. You could therefore define an output parameter from the flow **ReceiveOrder** called **OrderNumber**, which stores the value of the order number generated when the order is placed. You could then use this value as an input parameter for subsequent components or flows in the business process test.

Understanding Input Parameters

When creating components, tests, and flows, you define how the values are supplied for input parameters.

An input parameter can receive:

- A predefined default value, if no other value is supplied by the test or flow.
- An output parameter value returned by a component or flow earlier in the test.
- An output parameter value from a component earlier in the same flow.
- A parameter value that is supplied at the test level, or when the flow runs in a business process test.

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 291.

If one or more business components in the business process test or flow have input parameters defined, you can configure the component to run a specified number of iterations during a single run, using different values for individual input parameters in the component. For example, using different departure locations for each flight itinerary in a test for an online flight booking application. For more information, see “Understanding Iterations” on page 288.

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 Input Parameter Values and Iterations” on page 297.

You can also define global input parameters, called **run-time parameters**, in a business process test or flow. 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 or flow runs. Each time that the test or flow runs, it sends different values to subsequent components or flows for each run-time parameter.

Run-time iterations, at the test or flow level, enable you to iterate the entire business process test or flow using different values for component parameters that affect the entire run. For example, using a specific exchange rate for monetary calculations. For more information, see “Working with Run-Time Parameters” on page 332.

Understanding Iterations

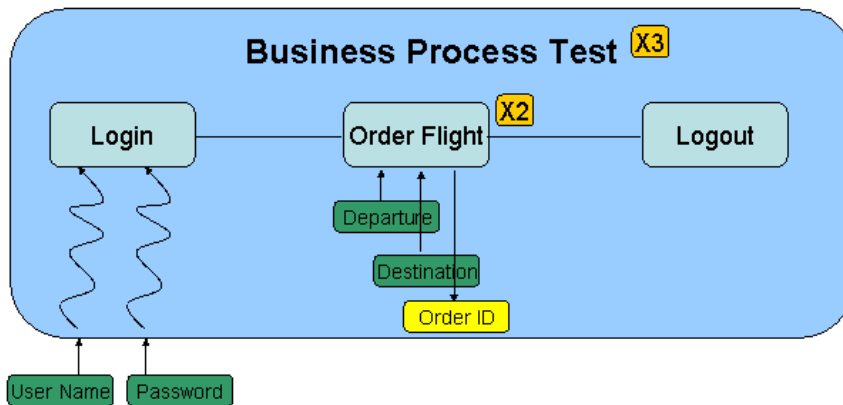
When you define input parameters, you can define the number of iterations that the component or flow runs. Defining iterations enables you to automatically run business components or flows multiple times, each time using different input parameter values.

When you run your business component or flow, one iteration is run for each value. For example, a test or flow with ten sets of run-time data will run ten times, and a component with six sets of component parameter values will run six times, before proceeding to the next component in the run.

- ▶ You define component parameters as run-time parameters in the Test Plan module, as described in “Creating Run-Time Parameters for Business Process Tests or Flows” on page 333.
- ▶ 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 337.

Iteration Example

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.

Working with Flow Input Parameters

A flow input parameter must be assigned as an input parameter of a component in the flow. By default, the value of the flow parameter is then used as the value for the component input parameter. For more information on component input parameters, see “Understanding Input Parameters” on page 287.

You can generate flow input parameters based on existing component input parameters, or manually define a new flow input parameter as the value for a component input parameter

You can define flow input parameters manually by specifying a new flow input parameter as the value for a component input parameter, or generate flow input parameters automatically, based on existing component input parameters.

Understanding Output Parameters

Output parameters allow data values retrieved from a component step or flow (the **source**) to be passed as input parameters to a subsequent component or flow (the **target**) in the test run.

You define component output parameter names, descriptions, and value types for the business component in the Business Components module, as described in “Defining Component Parameters” on page 291. You configure output values in the Test Plan module, as described in “Using Returned Output Parameter Values” on page 314.

Working with Flow Output Parameters

A flow output parameter must be promoted from an output parameter of a business component that is included in the flow.

When you create a flow output parameter from a specific component output parameter, it is automatically named to match the component and flow parameter naming convention. If required, you can change the flow output parameter name to suit your needs.

For information on creating, renaming, and removing flow output parameters, see “Understanding the Flow Output Parameters Dialog Box” on page 330.

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 155.

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 or flow.

You define value types as follows:

- ▶ **String.** One or more characters. When you enter a component parameter as a string, numbers are treated in the same way as 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** value 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 213.

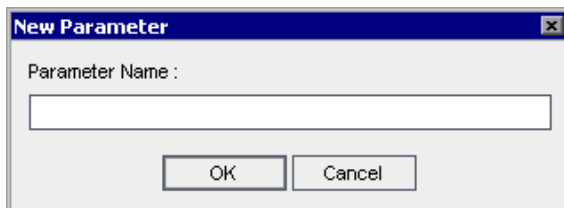
Notes for users of QuickTest or WinRunner:

- ▶ 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 dialog box titled "Parameters" with two sections: "Input" and "Output". Each section has a "New" button (with a plus icon) and a "Delete" button (with a minus icon), along with up and down arrow buttons for sorting. Below these buttons are tables for parameter lists.

Input Parameters Table:

Parameter Name	Value Type	Default Value	Description
Password	Password		

Output Parameters Table:

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 component input parameters, a default value is automatically entered in the **Default Value** column.

- 5 For component input 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.

Note: Do not begin and end a parameter value with curly brackets.

- **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 to 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:

- ▶ ALT+N. Creates a new input parameter.
- ▶ ALT+D. Deletes an input parameter.
- ▶ ALT+W. Creates a new output parameter.
- ▶ ALT+L. Deletes an output parameter.
- ▶ 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 Input Parameter Values and Iterations

You can configure the parameter values for a business component parameter or flow. The values you supply affect the way a component or a flow containing that component runs. You can also enter multiple values to instruct a business process test or flow to run a component multiple times within the test or flow, 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.

Working with 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 or flow can result in multiple parameter output values. In these cases, each iteration passes its value as input to the corresponding target component or flow.

The linking of one or more output parameters in a source component or flow to one or more input parameters of a target component or flow can occur successfully only where one of the following two conditions exist:

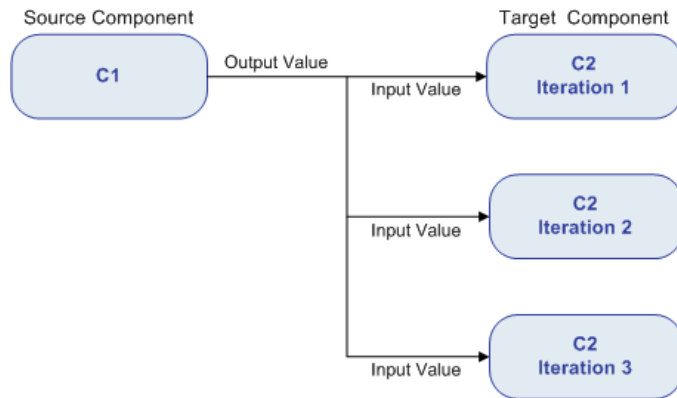
- ▶ **Condition 1.** The source component or flow has one iteration and the target component or flow has one or more iterations (a 1 to n relationship).
- ▶ **Condition 2.** The source component or flow and the target component or flow have the same number of iterations (an n to n relationship).

Notes:

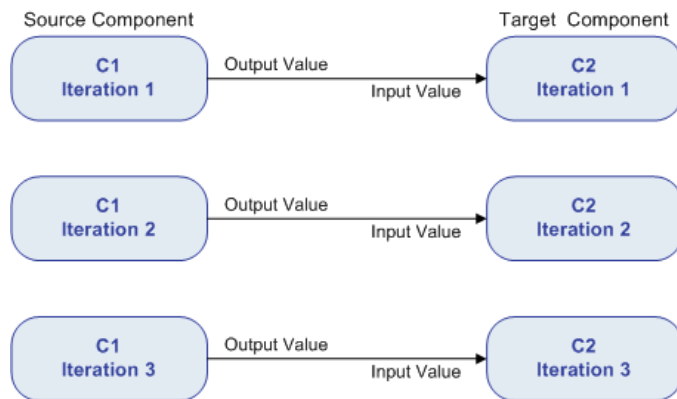
- ▶ When a source or target component is a member of a group, the number of iterations is that of the group.
 - ▶ Iterations of a source component in a business process test or flow can result in multiple parameter output values. In these cases, the value provided by each iteration run is passed as input to the corresponding iteration of the target component or flow.
-

Condition 1: Example

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: Example**

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.



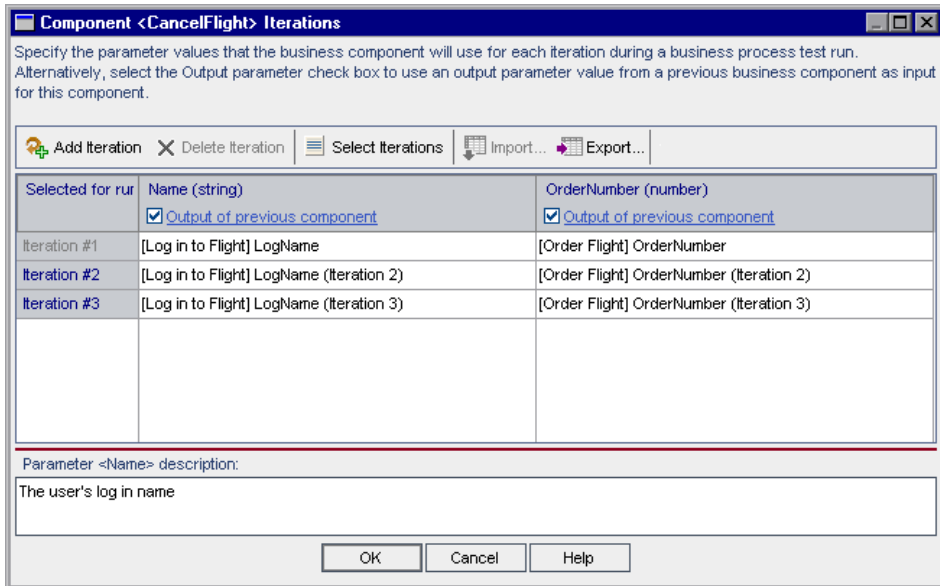
If the components are not represented by a 1 to n or n to n relationship, a warning message is displayed.

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 on partial iteration ranges, see “Selecting a Partial Iteration Range for a Component” on page 313.

To define component output parameters, you define the output data that a subsequent business component can use as input values in a business process test.

When a component input parameter is linked to a component output 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 component input parameter OrderNumber in CancelFlight, there is a corresponding iteration of component output parameter OrderNum from FindFlight.

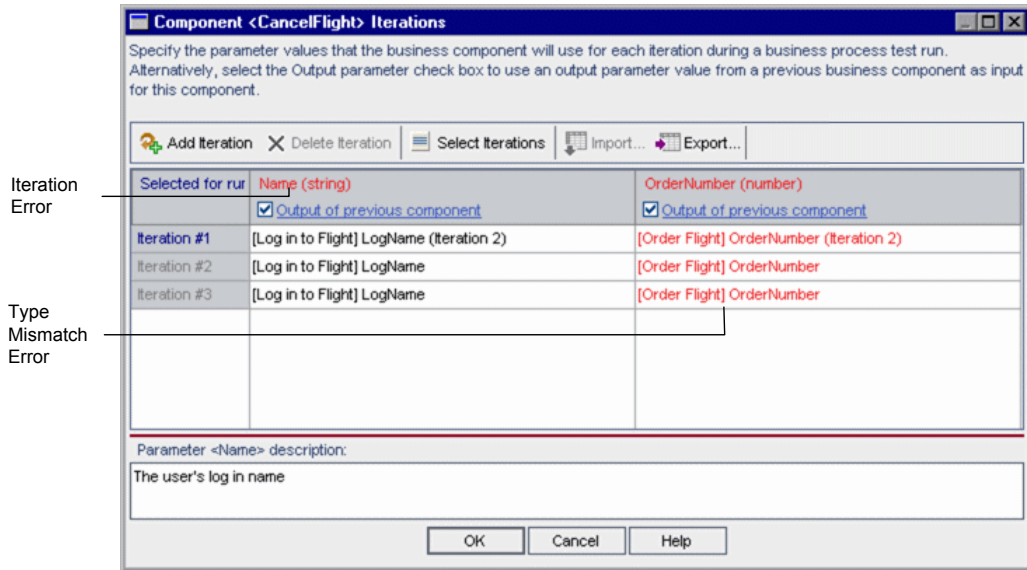
Conversely, the source component (Login) has a 1 to n (1 to 3) relationship with the target component (CancelFlight). Each iteration of component input parameter Name in the CancelFlight component uses the same component output parameter (LogName) from the Login component.

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 value 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 131, and “Validating Business Process Tests and Flows” on page 270.

Configuring Input Parameter Values

You use the Component Iterations dialog box to configure the parameter values that a component will use for each iteration in a business process test or flow.

You can define a new flow input parameter from the Component Iterations dialog box, by promoting an existing component input parameter to a flow input parameter. For more information, see “Defining Flow Input Parameters Manually” on page 310. You can also define default values for flow input parameters. For more information, see “Defining Default Flow Input Parameter Values” on page 312.


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.

To configure input parameter values:

- 1 In the Test Plan module, select the relevant business process test or flow in the Test Plan tree, and click the **Test Script** tab.

- In the Test 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 component input parameter values and choose **Iterations**.

Input Parameter Link

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 Component Iterations dialog box opens.

Component <Select Itinerary> Iterations

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
Parameter Value	London	New York	10/31/2005

Parameter <Departure> description:
The departure city

OK Cancel Help

Tip: Click a cell under a component input 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 component input 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 318.
-

- 5 Configure the value of each component input 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, see “Selecting a Date for a Component Input Parameter” on page 307.
 - ▶ For fixed string values, you can also enter XML code. For more information, see “Entering XML for a Component Input Parameter” on page 308.
 - ▶ To use a run-time value (a value supplied when the business process test runs), see “Creating Run-Time Parameters for Business Process Tests or Flows” on page 333.
 - ▶ To use a value returned from a previous business component in the business process test, see “Using Returned Output Parameter Values” on page 314.

For guidance about when to use component parameter values or run-time parameter values, see “Guidelines for Choosing Component or Flow Parameter Values and Run-Time Parameter Values” on page 342.

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 291.


- 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 Iteration Range for a Component” on page 313.
- 7 Click **OK** to close the Component Iterations dialog box.

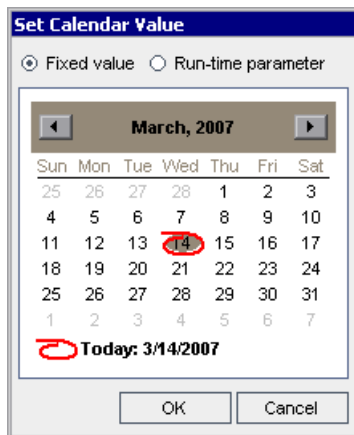
Selecting a Date for a Component Input Parameter

You can select a date value for a component input 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).

Business Process Testing also supports the use of dynamic date values for flow and run-time parameters. It is not supported at the component level. For more information, see “Understanding Date Parameters” on page 342.

To select a date value:

- 1 Open the Component Iterations dialog box as described in “Configuring Input Parameter Values and Iterations” on page 297.
- 2  Click the cell for the component input 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 or Flows” on page 333.
- 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 a Component Input Parameter

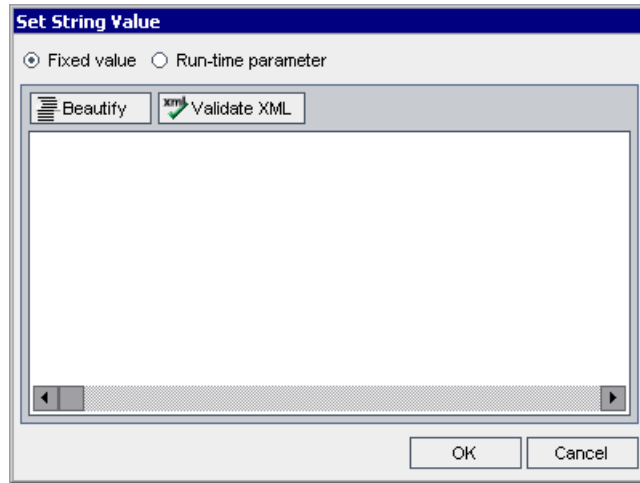
When using a component that invokes a service call, for example, a component that is automated using HP Service Test, the service call may require XML as input data. You can specify XML as multi-line string values in the Set String Value dialog box. You can also format the XML and check that the it conforms to XML coding standards.

To enter XML for a fixed value component input string parameter:

- 1 Open the Component Iterations dialog box as described in “Configuring Input Parameter Values and Iterations” on page 297.
- 2 Click the cell for the component input 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 or Flows” on page 333.

- 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.

Defining Flow Input Parameters Manually

You can manually define a new flow input parameter from the Component Iterations dialog box, by promoting an existing component input parameter to a flow input parameter.

Tip: You can also define flow input parameters from the Group Iterations dialog box. You define flow input parameters from the Group Iterations dialog box as you would from the Component Iterations dialog box. For more information, see “Working with Component Groups” on page 251.

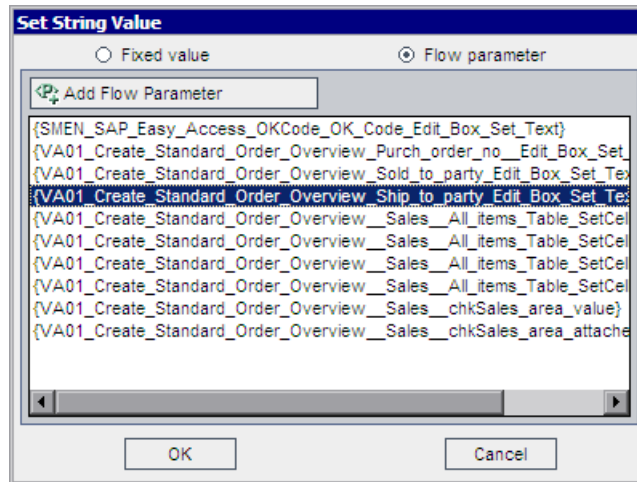
To configure flow input parameter values:

- 1 Open the Component Iterations dialog box, as described in steps 1 and 2 in the procedure “To configure input parameter values:” on page 303.
- 2 The process for creating a flow input parameter at this stage, depends on the value type of the parameter.

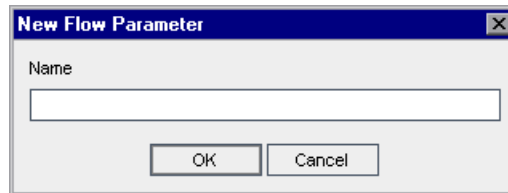
For **number**, **boolean**, or **password** value type parameters: Click the relevant cell, click the down arrow, and select <**New Flow Parameter**>. Type the name of the flow input parameter you want to create.

For **string** or **date** value type parameters: Click the relevant cell and click the browse button. The Set String Value or Set Calendar Value dialog box opens. For information on date parameters, see “Understanding Date Parameters” on page 342.

- 3 Select **Flow parameter**. A list of existing flow input parameters is displayed.



- 4 Click the **Add Flow Parameter** button. The New Flow Parameter dialog box opens.



- 5 In the **Name** box, type a name for the flow input parameter you want to create and click **OK**. The New Flow Parameter dialog box closes.
- 6 Click **OK**. If you are defining a string or date parameter, click **OK**. The Set String Value or Set Calendar Value dialog box closes.
- 7 Click **OK**. The Component Iterations dialog box closes.

Defining Default Flow Input Parameter Values

You can define default values for flow input parameters. When you run a test containing a flow, and no value is supplied to the flow input parameter from some other source, or when you run a flow directly from the Test Plan module, the default value is used.

To define a default flow input parameter value:

- 1 In the Test Plan Tree, select a flow that has at least one flow input parameter.
- 2 In the Test Script tab, click the **Flow Input Parameters** button. The Flow Input Parameters dialog box opens.



Parameter Name	Value	Value Type	Promoted From
Param_1	12/3/2008	Date	Create_Order

Description:

OK Cancel Help

- 3 Select the parameter for which you want to define a default value and click the **Value** column.
- 4 Type or select the default value you want to use for the parameter. This value must be consistent with the value type displayed in the **Value Type** column. You can enter a dynamic date value for date type parameters. For more information, see “Understanding Date Parameters” on page 342.
- 5 In the **Description** box, you can type a description of the parameter.
- 6 Click **OK**. The Flow Input Parameters dialog box closes.

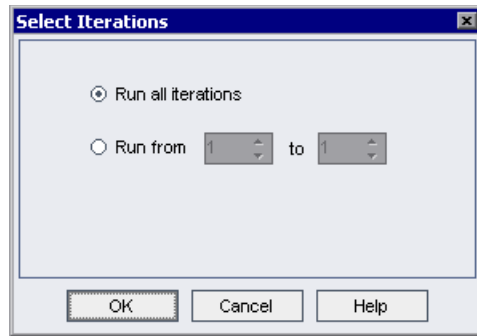
Selecting a Partial Iteration Range for a Component

You can specify a single component iteration or a partial range of iterations to run in a business process test or flow. 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 or flow.

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 component output parameters for any business component. For more information, see “Viewing Output Parameter Details for a Business Component or Flow” on page 317.

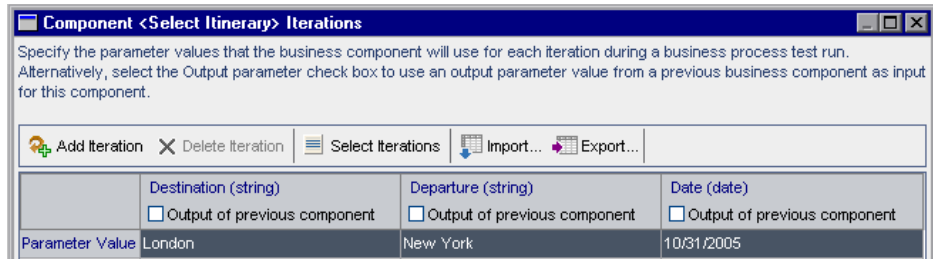
Note: When you choose to use the output of a previous component as the value for a component input parameter, the option applies to all component iterations for that input parameter.

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.

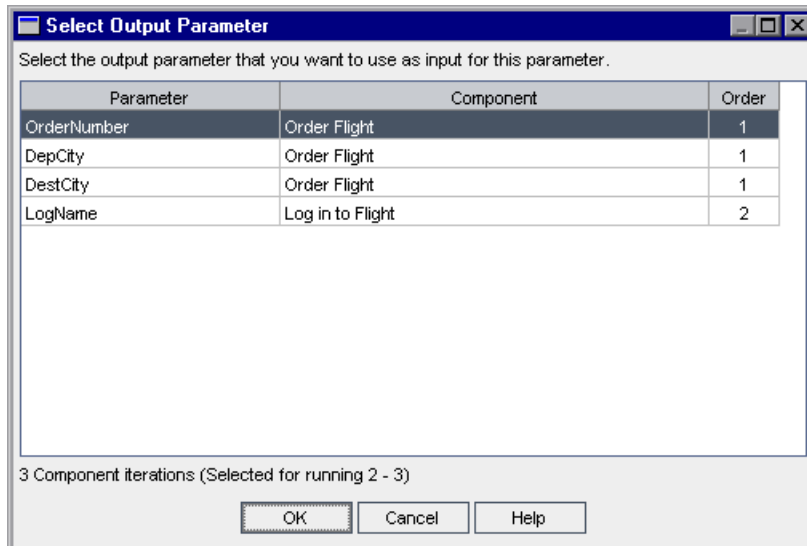
To use a component output parameter:

- 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 pane, right-click the business component for which you want to configure a component input 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 component output 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 component input 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.

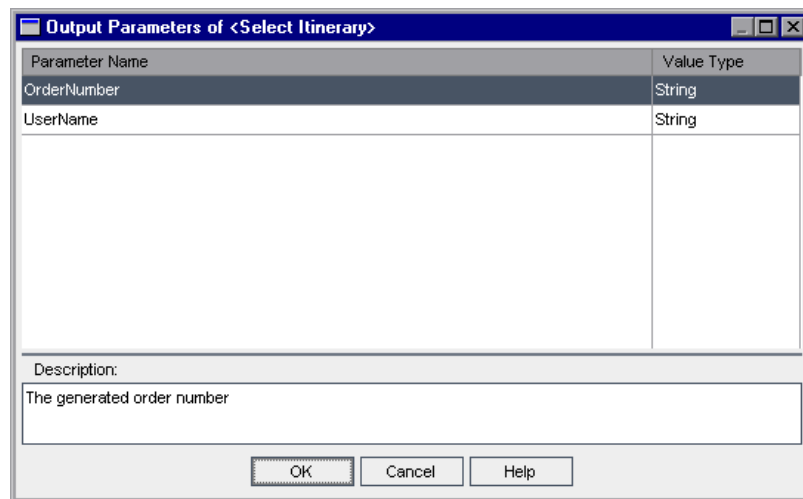
Viewing Output Parameter Details for a Business Component or Flow

You can view the output parameters that have been defined for a business component or flow from the Test Script tab in the Test Plan module.

Each defined output parameter for the business component or flow is displayed in the Output Parameters dialog box. The value type is also displayed.

To view output parameters for a business component or flow:

- 1 In the Test Plan module, select the relevant business process test or flow in the Test Plan tree, and click the **Test Script** tab.
- 2 In the Test pane, right-click the business component or flow for which you want to view output parameters, and choose **Output Parameters**. The Output Parameters dialog box for the component or flow opens.



Tip: Select an output 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 component output parameter details, see “Defining Input and Output Component Parameters for a Business Component” on page 120.

- 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 Parameter Values

The task of defining lists of component or flow parameter values for iterations can be facilitated by importing the values from an external file. You can also save a set of defined parameter values as a file, for example, to use with other business components or flows.

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 parameter values that are used in iterations of the business process test or flow.

You map the 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 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 parameters in a business process test or flow as a **.csv** file.

Tip: Enter a few rows in the Component Iterations or Flow 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 Parameter Values from a File

You can import parameter values for component or flow iterations from a `.csv` file. When you import a file, all the records in the file become iterations in the business process test or flow.

Note: The 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.

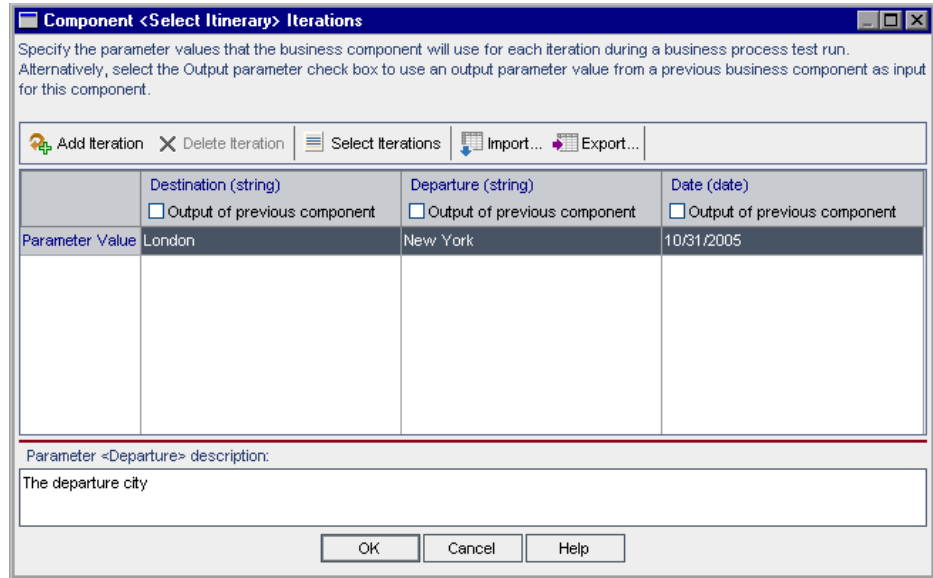
Before importing a `.csv` file, ensure that it is set up in the proper format, as described in “Importing and Saving Parameter Values” on page 319.

To import saved component or flow 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 or flow for which you want to import component parameter values, and choose **Iterations**.

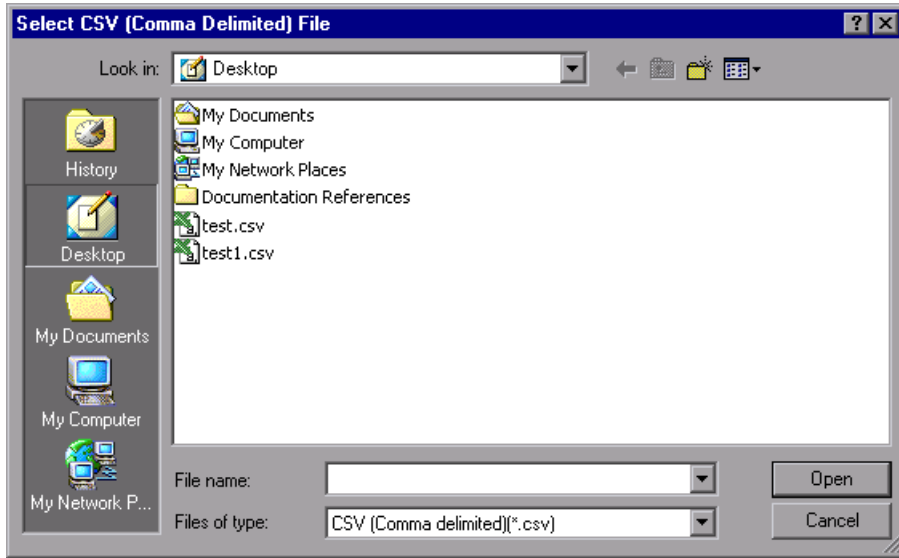
The Component Iterations, or Flow Iterations, dialog box opens.



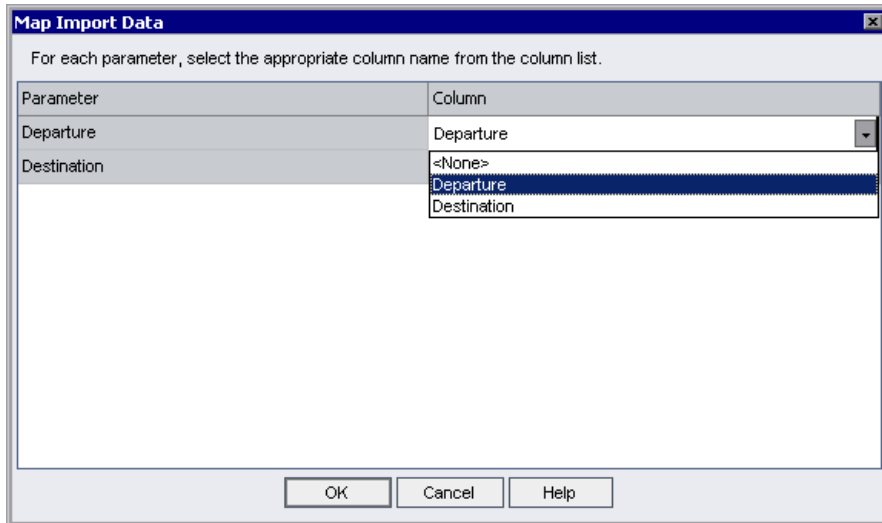
Note: The title and text instructions in the dialog box differ according to whether the dialog box is opened for a component or a flow.



- 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 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 or Flow Iterations dialog box.

Note: If the Component Iterations or Flow Iterations dialog box already has values defined for one or more iterations, these values are overwritten by the imported values. If the Component Iterations or Flow 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 or Flow Iterations dialog box.

Saving Parameter Values to a File

You can save parameter values that you have defined for a business component or flow to a **.csv** file.

You can then apply the same values to other component or flow iterations by importing the saved data. Saving 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 or flow.

For more information on importing parameters, see “Importing Parameter Values from a File” on page 320.

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 or flow 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 or flow, and click the **Test Script** tab.
- 3 In the Test pane, right-click the business component or flow for which you want to save the component parameter values, and choose **Iterations**.

The Component Iterations, or Flow Iterations, dialog box opens.

Component <Select Itinerary> Iterations

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

Note: The title and text instructions in the dialog box differs according to whether the dialog box is opened for a component or a flow.



4 Click the **Export** button. The Save CSV (Comma Delimited) File dialog box opens.

5 Enter a descriptive name in the **File Name** box and click **Save**. The component or flow 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 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 parameter during a single iteration of the business process test or flow.

- 6 Click **OK** to close the Component Iterations or Flow Iterations dialog box.

Generating Flow Input Parameters for Existing Components

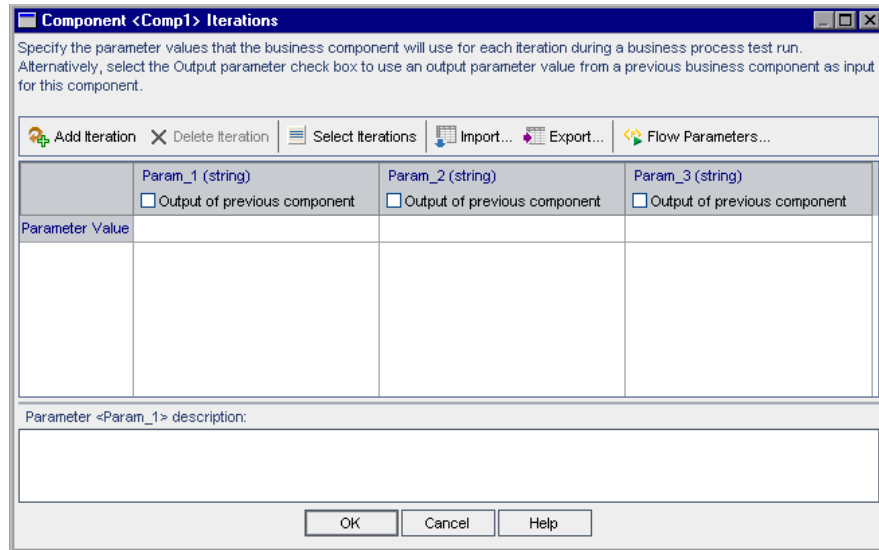
You can generate flow input parameters based on existing input parameters for a component within the flow. When the component runs, these component input parameters take the values assigned to the corresponding flow input parameters.

There are several criteria you can define when generating flow input parameters. For example, you can:

- Specify whether to use the same or unique flow parameters for each iteration.
- Configure the naming convention for your flow parameters.
- Generate flow parameters for all component parameters.
- Specify the cells in the Component Iterations or Group Iterations dialog box for which you want to generate flow parameters.

To generate flow input parameters:

- 1 In the Test Plan Tree, select the flow for which you want to generate flow input parameters. Click the **Test Script** tab.
- 2 In the Test Script tab, right-click the component whose component input parameters you want to use as a basis for generating flow input parameters and select **Iterations**, or click the parameter name. The Component Iterations dialog box opens.



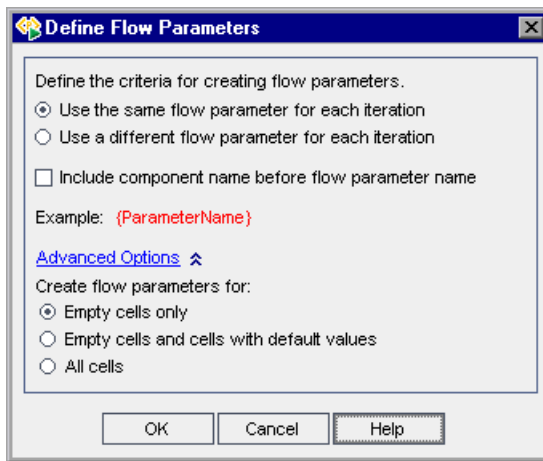
Most of the functionality available in the Component Iterations dialog box for flows is the same as that available for regular components. For more information on this functionality, see “Working with Iterations” on page 298.

Tip: You can also generate flow input parameters automatically from the Group Iterations dialog box, based on input parameters for components within component groups. You generate flow input parameters from the Group Iterations dialog box as you would from the Component Iterations dialog box. For more information, see “Working with Component Groups” on page 251.

- 3 Click the **Flow Parameters** button. The Define Flow Parameters dialog box opens. Define the criteria for creating and naming flow parameters. For more information, see “Understanding the Define Flow Parameters Dialog Box” on page 328.
- 4 Click **OK**. The Define Flow Parameters dialog box closes and flow input parameters are generated for the flow, based on the criteria you selected.

Understanding the Define Flow Parameters Dialog Box

The Define Flow Parameters dialog box defines the way generated flow parameters are created and named.



The Define Flow Input Parameters dialog box contains the following options:

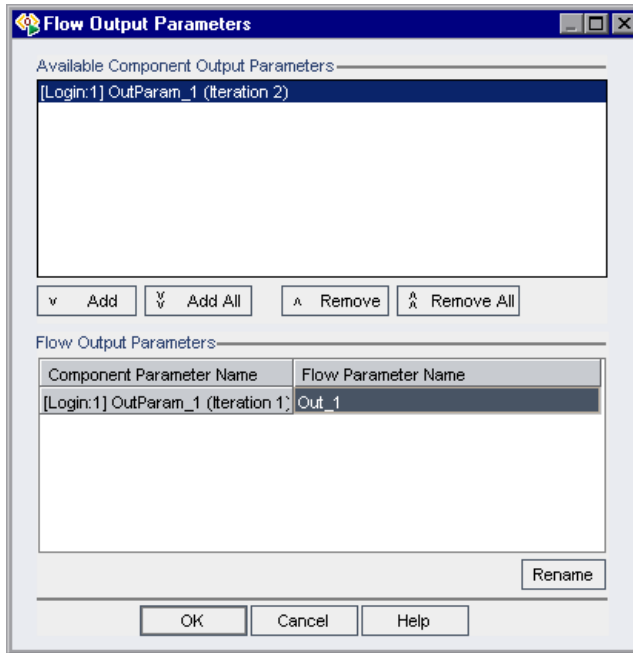
Option	Description
Define the criteria for creating flow parameters	<ul style="list-style-type: none"> ➤ Use the same flow parameter for each iteration. Clears the flow parameter values between iterations so that the same parameter names are used for every iteration, but the values are not passed from one iteration to the next. ➤ Use a different flow parameter for each iteration. Automatically creates a new flow parameter for each iteration. The parameter values are saved with each iteration run.
Include component name before flow parameter name	Adds the component name as a prefix preceding the generated flow parameter name.
Example	Provides an example of the flow parameter name based on the selected criteria.

The **Advanced Options** link expands the dialog box to display the following options:

Option	Cells for which flow parameters are generated
Create flow parameters for	<p>Empty cells only. Creates flow parameters only for cells that do not contain any value (default).</p> <p>Empty cells and cells with default values. Creates flow parameters for all cells that either do not contain a value or contain the default value defined in the component parameter.</p> <p>All cells. Creates flow parameters for all cells in the Component Iterations or Group Iterations dialog box.</p>

Understanding the Flow Output Parameters Dialog Box

The Flow Output Parameters dialog box controls the creation, naming, and removal of flow output parameters.



The Flow Output Parameters dialog box contains the following sections:

Section	Description
Available Component Output Parameters	Displays the output parameters of the components in the flow that are not already promoted to flow output parameters. The components are listed using the following naming convention: [<ComponentName>:<ComponentIndex>] <ParameterName> or [<ComponentName>:<ComponentIndex>] <ParameterName> (Iteration <IterationNumber>)
Flow Output Parameters	Displays the output parameters of components in the flow that are already promoted to flow output parameters.

To define a flow output parameter:

In the **Available Component Output Parameters** list, select the component output parameter that you want to promote to a flow output parameter and click the **Add** button. You can click the **Add All** button to promote all component output parameters in the flow to flow output parameters.

To rename a flow output parameter:

Select the parameter in the **Flow Output Parameters** list, and click the **Rename** button or double-click the **Flow Parameter Name** cell. Type the new name and press ENTER. Renaming a flow output parameter does not rename the corresponding component output parameter.

Consider the following when renaming a flow output parameter:

- The parameter name must be unique within the flow.
- The parameter name must begin with a letter. If the first character of the component name is not a letter, the prefix **comp_** is added.

- ▶ The parameter name must not contain non-English characters nor any of the following characters: ! @ # \$ % ^ & * () + = \ { } | ; ' : " , . / < > ? ~ ` [] - Any invalid character is automatically replaced by an underscore (_).
- ▶ You can resize or maximize the Flow Output Parameters dialog box to display the entire parameter name.

To remove a defined flow output parameter:

In the **Flow Output Parameters** list, select the flow output parameter and click the **Remove** button. You can click the **Remove All** button to remove all defined flow parameters.

Working with Run-Time Parameters

Before running a business process test or flow, you can define run-time parameter values and test or flow iterations in the Test Lab module. These run-time parameter values are then used as the input values for any business components or flows that reference them in the run.

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, see the *HP Quality Center User Guide*.

Creating Run-Time Parameters for Business Process Tests or Flows

You can create run-time parameters for a business process test or flow by specifying a run-time parameter name as the value for the parameter. When you create a new run-time parameter, it automatically uses the value type of the parameter for which it is created.

After you create a run-time parameter, you can select it for any other parameter of the same value type in any business component or flow in the business process test.

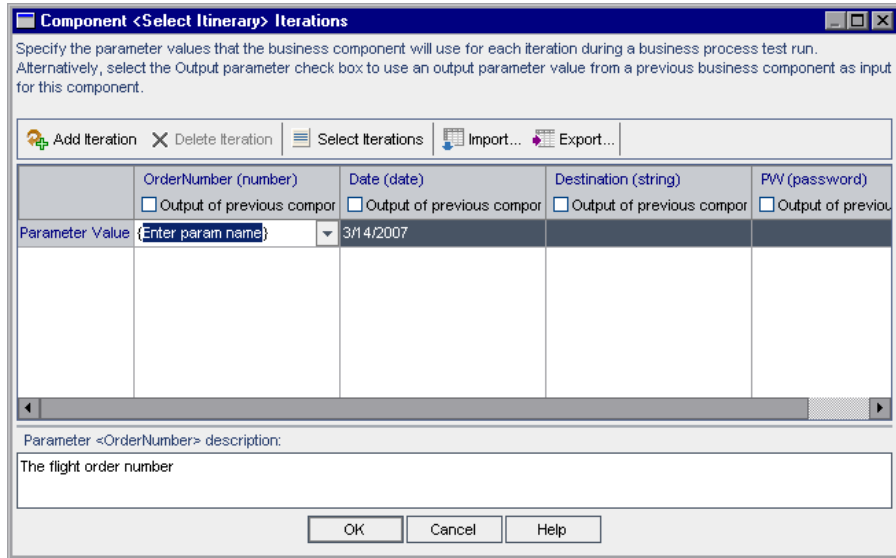
To create a run-time parameter:



- 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 or flow, and click the **Test Script** tab.
- 3** In the Test pane, right-click the business component or flow for which you want to create a run-time parameter, and choose **Iterations**.
- 4** The Component Iterations, or Flow Iterations, dialog box opens.
- 5** Click the relevant Parameter Value cell.
 - For string or date value type parameters, skip to step 7.



- For number, boolean, or password value 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.



Note: The title and text instructions in the dialog box differs according to whether the dialog box is opened for a component or a flow.

- 6 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 parameter as a run-time parameter and not as a fixed value.

Skip to step 8.



- 7 For string or date value 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.

- 8 Repeat steps 5 or 7 for any other parameters or iteration rows for which you want to use run-time parameter values.
- 9 Click **OK** to close the Component Iterations or Flow 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 component and flow input parameter values to be used as default values for test runs.

The dialog box displays each run-time parameter that is defined for any of the business components and flows in the business process test.

- The **Parameter Name** column displays the names of the parameters.
- The **Value** column enables you to enter the run-time parameter value to use as the default value for each run-time parameter.
- The **Value Type** column displays the value type defined for each business component, for example, **String** or **Number**. 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 291.
- The **Promoted From** column displays the component or flow from which the run-time parameter was promoted.
- The **Description** area enables you to enter text that can guide the person running the test or flow 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 relevant business process test or flow, and click the **Test Script** tab.



- 3 In the Test pane toolbar, click the **Run-Time Parameters** button. The Run-Time Parameters dialog box opens.

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	Promoted From
DestinationCity		String	C2
DepartureCity		String	C2

Description:
The destination city

OK Cancel Help

- 4 In the **Value** column, enter the run-time parameter value to use as the default value 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 or flow within a test set, you can specify the values for any run-time parameters defined for the test or flow. 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 335.

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 or flow for which you want to configure the run-time parameter.



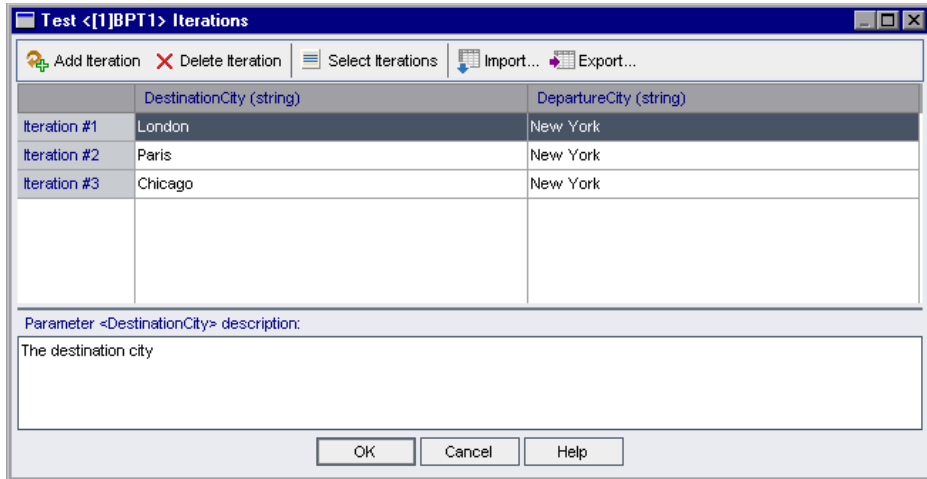
The tests and flows in the test set are listed in the Execution Grid tab. Business process tests and flows are identified in the grid in the **Plan: Type** column and by the icons in the **Plan: Test Name** column.

Note: The specific icon displayed in the Execution Grid tab depends on the current status of the test or flow. For more information, see “Understanding Business Process Test and Flow Statuses” on page 211.

- 3 In the Execution Grid tab, right-click the business process test or flow for which you want to configure run-time parameter values, and choose **Iterations**. Alternatively, click the link in the **Iterations** column of the tab.

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, see the *HP Quality Center User Guide*.

The Test Iterations dialog box opens.



- 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 or flow. The value that is entered in a cell must correspond to the value type defined for the parameter. The value type is displayed in parentheses in the column header for each parameter.

Tip: Select a cell in a 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 335.

- 5 If you want to run more than one iteration of the test or flow, click the **Add Iteration** button in the toolbar. An additional iteration row is added to the dialog box. The previous run-time parameter value row is automatically duplicated.

- 6 Modify the run-time parameter value for the test or flow iteration.

Tips:

- ▶ You can drag and drop iterations in the list to change the order in which they are used in the test or flow.
 - ▶ 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 to 6 to add additional test or flow iterations.
- 8 If you want the 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 iterations to run, see “Selecting a Partial Iteration Range for a Test or Flow” on page 339.

- 9 Click **OK** to save the run-time parameters values and close the Test Iterations dialog box.

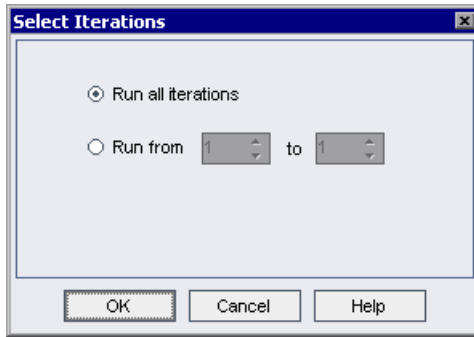
Selecting a Partial Iteration Range for a Test or Flow

You can specify a single iteration or a partial range of iterations to run for a business process test or flow. This enables you to run and check one or more specific iterations without having to run all the defined iterations for the test or flow. In addition, you could use the same business process test or flow definition for different scenarios. Different combinations of iterations can be run for different test runs.

You define the iterations to run in the Select Iterations dialog box.

To select an iteration range for a test or flow:

- 1 In the Test Iterations or Flow 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 or flow.

Tip: To run one specific iteration only, enter or choose 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 in the Test Iterations or Flow Iterations dialog box. When the business process test or flow runs, only the defined iteration range is included.

Note: The selected range of iterations is displayed in the top left cell of the Test Iterations or Flow 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 or Flow Iterations Dialog Box

If you prefer to use your keyboard, you can use the following keyboard commands to navigate within the Test Iterations or Flow 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 iteration row.

Guidelines for Choosing Component or Flow Parameter Values and Run-Time Parameter Values

For each of the parameters defined in the components and flows 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 flow), 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 test that affects how the business components and flows that use the run-time parameters are run.

To make this decision, consider the following:

Component or Flow Input Parameters...	Run-Time Parameters...
<ul style="list-style-type: none"> ➤ Allow multiple iterations of a business component or flow. ➤ Enable the Subject Matter Expert to control the values used. 	<ul style="list-style-type: none"> ➤ Allow multiple iterations of an entire business process test or flow, with different values in each iteration. ➤ Enable the person running the business process test to determine the values of the component and flow parameters at runtime. ➤ Use the same value for a particular purpose in all business components and flows that reference the same run-time parameter.

Understanding Date Parameters

A date parameter can be defined as a static value from a calendar, or a dynamic value. A dynamic date value consists of a date string, which represents a time relative to the current date. The date string can be customized by the addition or subtraction of a time period.

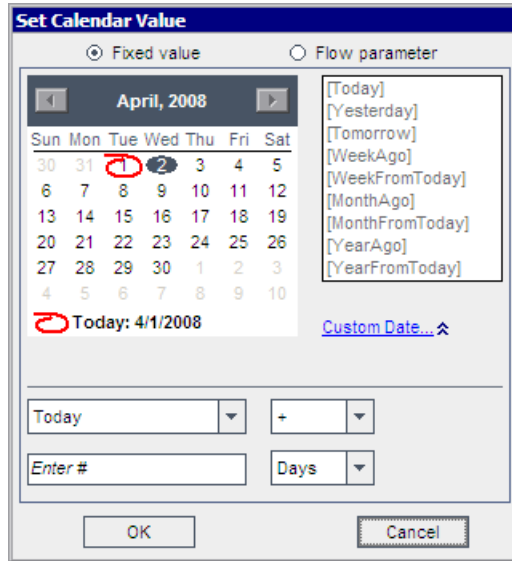
This section includes “The Set Calendar Value Dialog Box” on page 343.

The Set Calendar Value Dialog Box

Description	Enables you to enter a static or dynamic date value for a date parameter or to create a flow or run-time parameter as the value for a date parameter.
How to Access	<p>Click the cell containing the date parameter in one of the following dialog boxes, and then click the button on the right side of the cell:</p> <ul style="list-style-type: none"> ➤ Component Iterations dialog box ➤ Flow Iterations dialog box ➤ Flow Input Parameters dialog box ➤ Test Iterations dialog box
Important Information	<p>The Set Calendar Value dialog box can be used to assign a fixed value to the parameter or to create a flow or run-time parameter, by selecting one of the radio buttons on the top of the dialog box. The structure of the dialog box changes depending on which radio button is selected. Additionally, the radio buttons may not be available, depending on the location from which you opened the dialog box. For more information, see “The Set Calendar Value Dialog Box (Set Value Variation)” on page 344, and “The Set Calendar Value Dialog Box (Promote Parameter Variation)” on page 348.</p>
Learn More	<p>Conceptual overview: “Understanding Date Parameters” on page 342.</p> <p>Primary tasks:</p> <ul style="list-style-type: none"> ➤ “Defining Flow Input Parameters Manually” on page 310. ➤ “Defining Default Flow Input Parameter Values” on page 312.

The Set Calendar Value Dialog Box (Set Value Variation)

The image below displays the dialog box as it appears when setting the value for the parameter, with the **Custom Date** area expanded. To expand or collapse the **Custom Date** area, click the **Custom Date** link.



The radio button options and button labels shown above may be different or not available, depending on the location from which you opened the dialog box.

Set Calendar Value Dialog Box Options (Set Value Variation)

The options below are relevant when the top of the dialog box does not contain radio buttons or when the **Fixed value** radio button is selected.

Option	Description
calendar area	Enables you to select a static date in the calendar. Click the right or left arrow to scroll through the calendar. Click a date to select it.
date string area	Enables you to provide a time relative to the current date (such as Today or WeekAgo) as the fixed value for the parameter.
Custom Date area (to expand or collapse, click Custom Date)	<p>Enables you to provide a customized date string as the fixed value for the parameter.</p> <ol style="list-style-type: none"> 1 Select a date string from the drop-down list. 2 Select + or - from the drop-down list. 3 Enter the number in the edit box by which you want to adjust the date string. 4 Select a time period from the drop-down list that you want to use to customize the date string. <p>For example, to specify a date 10 days before the current date, the custom date should be: WeekAgo-3 days</p>

You can also set the value for a dynamic date parameter directly in the relevant Parameter or Iterations dialog box. Dynamic date parameters must be enclosed by square brackets. You can provide a date string as the dynamic date value of the date parameter, or you can customize the date string.

The following are the valid date strings you can enter manually for a date value parameter:

[Today], [Yesterday], [Tomorrow], [WeekAgo], [WeekFromToday], [MonthAgo], [MonthFromToday], [YearAgo], [YearFromToday].

The following values can be entered manually to customize a date string by adding or subtracting a time period to or from it:

Value	Represents	Usage
Day/Days/D	Time period in days	[Tomorrow + 1 day], [Today + 3 days], [Yesterday - 5 d]
Week/Weeks/W	Time period in weeks	[Tomorrow - 1 week], [Today + 2 weeks], [MonthFromToday + 3 w]
Month/Months/M	Time period in months	[YearAgo - 1 month], [YearFromToday + 5 months], [Today + 3 m]
Year/Years/Y	Time period in years	[Today - 1 year], [Tomorrow + 2 years], [WeekFromToday + 2 y]

Considerations for Working with Dynamic Date Values

- Date strings are not case-sensitive. For example, both **[WeekAgo]** and **[Weekago]** are valid values.
- Time periods used to modify date strings are not case-sensitive. For example, both **[YearFromToday + 5 Months]** and **[YearFromToday + 5 months]** are valid.
- Spaces are not required in dynamic date values. For example, both **[MonthFromToday + 3 w]** and **[MonthFromToday+3w]** are valid.

- The following maximum values apply to the time periods used to modify date strings:

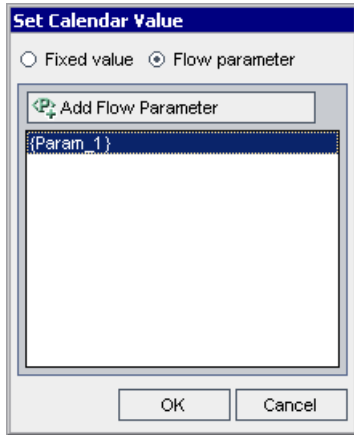
Time Period	Maximum Value
Years	5000
Months	60,000
Weeks	240,000
Days	1,680,000

For example, **[today + 5000 years]** is valid. **[today + 5001 years]** is not valid.

- When you run a test or flow, either automatically or manually, the dynamic dates are converted to the actual dates they represent.
- When a test or flow run ends, the run-time parameters displayed in **Last Run Result** show the actual date used in the run and not the dynamic date value.
- You can create a run condition on a date parameter that is defined as a dynamic date. The run condition must be defined as a static date (for example 12/10/2009), which will be compared to the actual date used in the run.
- Dynamic date values use the date as it is set on the server machine and not the client machine.

The Set Calendar Value Dialog Box (Promote Parameter Variation)

The image below displays the dialog box as it appears when promoting the parameter to a higher level.



The button options shown above may be different depending on the location from which you opened the dialog box.

Set Calendar Value Dialog Box Options (Promote Parameter Variation)

Option	Description
Add Parameter button	Enables you to create a new parameter in order to promote the definition of the date parameter value to the next level. <ol style="list-style-type: none"> 1 Click the button. The New Parameter dialog box opens. 2 Enter a name for the new parameter and click OK.
existing parameters area	Displays a list of all existing date parameters.

11

Defining Run Conditions

This chapter describes how to define and work with run conditions for your flows.

This chapter includes:

- ▶ About Defining Run Conditions on page 349
- ▶ Adding Run Conditions on page 351
- ▶ Managing Run Conditions on page 355
- ▶ Running Tests with Run Conditions on page 356

About Defining Run Conditions

You can use run conditions to insert condition statements into your flows. A **run condition** checks the current value of a given parameter before running a component in a flow. Based on the parameter value and the run condition definition, it then determines whether to run the component, skip to the next component, or end the component run and set the component status to fail.

When you run business process tests containing flows with run conditions, the test run results display the results of run conditions in the test, and lists the components that did not run because a run condition was not met.

Guidelines for Working with Run Conditions

- You can define only one run condition per business component.
- To set run conditions for a component, the component must contain at least one flow parameter, input parameter, or output parameter.
- In some cases, it may be preferable to define different flows, rather than using a large number of run conditions within a particular flow.
- If you set run conditions, and later add or remove a component or change the component order within a flow, the parameters may no longer be relevant and the run condition may not work. For example, if Component B uses an output parameter value from Component A, and you change the order of the components so that Component B precedes Component A, then Component B cannot receive the output parameter value from Component A and the run fails.

Run Condition Example

Suppose you create a test called **Standard Sales Order**, which contains all the transactions necessary to complete the **Standard Sales Order** business process. The first transaction in this business process is **Create Standard Order**. The **Create Standard Order** transaction contains all the steps necessary to begin sales processing.

You would create a flow called **Create Standard Order**. This flow would contain the collection of components that perform the operations necessary to complete the **Create Standard Order** transaction.

In the **Create Standard Order** transaction, depending on the material being ordered, some screens may or may not open.

For example, suppose when ordering item number 10, with material number **p-101**, the **Standard Order: Availability Control** screen is displayed. When ordering item number 10 with material number **p-103**, this extra screen is not displayed.

You can include the **Create Standard Order** flow in your **Standard Sales Order** test and test when either material number **p-101** or **p-103** is entered.

In the component that enters the material number, you promote the parameter containing the item number and the material number, to a run-time parameter. When running the test you can then assign that parameter a value of either **p-101** or **p-103**.

You then create a run-condition for the **Standard Order: Availability Control** component. The run-condition checks the status of the parameter. If the value in the material number cell of the table parameter is **p-101**, the flow runs the component for the **Standard Order: Availability Control** screen. Otherwise, it skips to the next component and continues.

Adding Run Conditions

When you add a run condition to a flow, the condition is displayed in the **Run Condition** column of the Test pane in the Test Script tab. For some additional considerations when working with run conditions, see “Guidelines for Working with Run Conditions” on page 350.

To add a run condition:

- 1 In the Test Script tab for a flow, do one of the following:



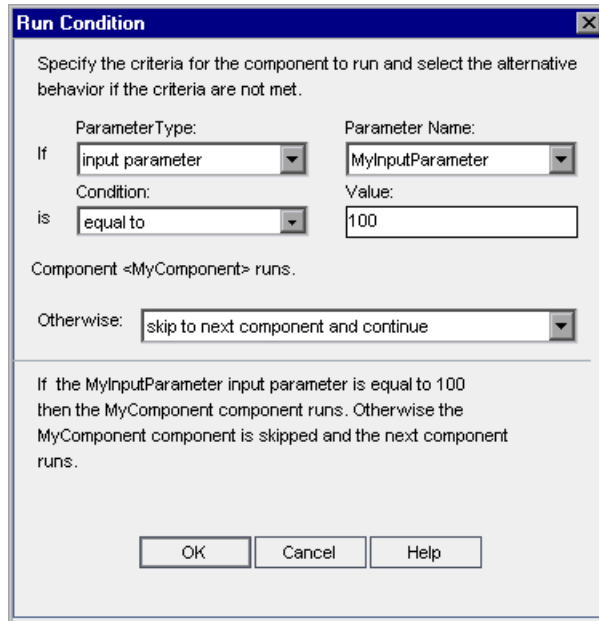
- Select the component for which you want to add the run condition and click the **Add Run Condition** button.
- Right-click the component for which you want to add the run condition and select **Run condition**.

The Run Condition dialog box opens.

- 2 Specify the criteria for the component to run. For more information, see “Understanding the Run Conditions Dialog Box” on page 352.
- 3 Click **OK**. The Run Condition dialog box closes and the run condition is added to the flow.

Understanding the Run Conditions Dialog Box

The Run Conditions dialog box defines the criteria that need to be met for the component to run.



The Run Conditions dialog box contains the following sections:

Section	Description
Parameter Type	<p>A drop-down list of parameter types. The following types are available:</p> <ul style="list-style-type: none"> ▶ Input Parameter. Available only if one or more input parameters are defined for this component. ▶ Output Parameter. Available only if one or more output parameters are defined for one or more of the previous components in the flow. ▶ Flow Parameter. Available only if one or more flow input parameters are defined. For more information on flow input parameters, see “Working with Flow Input Parameters” on page 290.
Parameter Name	A drop-down list of available parameter names.
Condition	<p>A drop-down list of conditions that need to be met for the component to run. The following conditions are available:</p> <ul style="list-style-type: none"> ▶ Equal to ▶ Not equal to ▶ Less than (not available for table parameters) ▶ Less than or equal to (not available for table parameters) ▶ Greater than (not available for table parameters) ▶ Greater than or equal to (not available for table parameters)
Value	An edit box in which you enter the valid value for the condition.

Section	Description
Otherwise	<p>Specifies what to do if the condition is not met. The following options are available:</p> <ul style="list-style-type: none"> ▶ Skip to next component and continue. If the condition is not met, the component for which the run condition is set does not run, and the test run continues with the next component in the flow. ▶ End component run and fail. If the condition is not met, the component for which the run condition is set does not run, but instead sets the status of the component run as Failed. The flow either continues to the next component or ends, depending on the failure condition set for the component. For more information on defining failure conditions for components, see “Defining Failure Conditions” on page 251.
description area	A text description of the run condition criteria you have defined for the component.

Prior to a component run, the condition and value are checked. If the condition and value are met, the component run continues. If the condition and value are not met, then the component does not run, and the run session proceeds according to your selection in the **Otherwise** box.

Tip: Your selection in the **Otherwise** box applies only if the run condition is not met. To specify whether to continue or end the entire run if a component run fails, set the failure condition for the component. You do this in the Test Script tab of the Test Plan module. For more information, see “Defining Failure Conditions” on page 251.

Managing Run Conditions

After you create a run condition, you can modify its settings. You can also remove a run condition from a flow.

Modifying Run Conditions

This section describes how to modify run conditions.


To modify a run condition:

- 1** In the Test Script tab for a flow, right-click the component and select **Run Condition**. The Run Condition dialog box opens.
- 2** In the Run Condition dialog box, modify the criteria and alternative behavior as needed. For more information on the available options, see “Understanding the Run Conditions Dialog Box” on page 352.
- 3** Click **OK**. The run condition is modified.

Removing Run Conditions

This section describes how to remove run conditions.

To remove a run condition:

- 1** In the Test pane of the Test Script tab, do one of the following:
 -  ► Select the component and click the **Remove Run Condition** button.
 - Right-click the component and select **Remove run condition**.
- 2** Click **Yes** in the confirmation box. The run condition is removed from the flow.

Running Tests with Run Conditions

You run a business process test containing flows with run conditions as you would a regular business process test. For more information on running business process tests, see Chapter 12, “Running Business Process Tests and Flows.”

As with regular business process tests, you can view test results in the Last Run Result pane in the Test Lab module.

- ▶ If you select **Skip to next component and continue** for a run condition, and the run condition you specify is not met, the test results list the run status for the component with the run condition as **Ignored**. The component is not displayed in the run results.
- ▶ If you select **End component run and fail** for a run condition, and the run condition you specify is not met, the test results list the run status for the component with the run condition as **Failed**.

If a run condition is not met, the test results also provide details about the condition that was not met to help you understand why the component run failed or did not run.

12

Running Business Process Tests and Flows

This chapter describes how to run business process tests and flows in Quality Center and how to view the results.

This chapter includes:

- ▶ About Running Business Process Tests and Flows on page 357
- ▶ Running a Business Process Test or Flow Manually on page 360
- ▶ Understanding the Manual Runner Window on page 368
- ▶ Understanding the Manual Runner Dialog Box on page 371
- ▶ Debugging Tests in the Test Plan Module on page 380
- ▶ Running Automated Business Process Tests or Flows on page 386
- ▶ Viewing Run Results of Business Process Tests or Flows on page 389

About Running Business Process Tests and Flows

Business process tests and flows can contain manual and automated components. You run business process tests and flows, and view run results in the Test Plan module and Test Lab module of Quality Center.

When working with tests that contain one or more manual components, use the Manual Runner. For information on the Manual Runner, see “Running a Business Process Test or Flow Manually” on page 360.

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 enables you to check, for example, whether the component and flow 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 380.

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 results are provided for debugging purposes only and are not stored in Quality Center.

After a test has been debugged and is ready to test new builds of an application, you use the Test Lab module. 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 or Flows” on page 386.

Both QuickTest and WinRunner automated components can be used in the same test. When you run the test, QuickTest Professional or WinRunner opens each component in the test. For more information, see “Working with Other Testing Products” on page 359.

Note: If required, you can continue using the Manual Runner to run your test manually even after the test has been automated.

When a 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 test.

Working with Other Testing Products

Before you run an automated 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** node, and ensure that **Allow other HP products to run tests and components** is selected in the Run pane.

To run a QuickTest component from Quality Center, you must have the necessary Quality Center permissions. For more information, see “Setting Permissions for Business Process Testing” on page 47, or see the *HP Quality Center Administrator Guide*.

Note: When you run a QuickTest business process test from Quality Center, the test run may be influenced by QuickTest Remote Agent settings on the QuickTest computer. For more information on the QuickTest Remote Agent, see the *HP QuickTest Professional User 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 HP products to run tests remotely** is selected.

Running a Business Process Test or Flow Manually

If you are working with one or more manual components in your business process test or flow, you can use the Manual Runner in the Test Lab module to run the test or flow manually. A manual 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 or flows is described in the following sections:

- ▶ Understanding Manual Runs
- ▶ Running a Test or Flow Manually
- ▶ Understanding Run Statuses

The Manual Runner for business process tests and flows is somewhat different from the Manual Runner used for Quality Center manual tests. For information on running Quality Center manual tests, see the *HP Quality Center User Guide*.

Understanding Manual Runs

Quality Center enables you to run both manual and automated tests and flows 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.

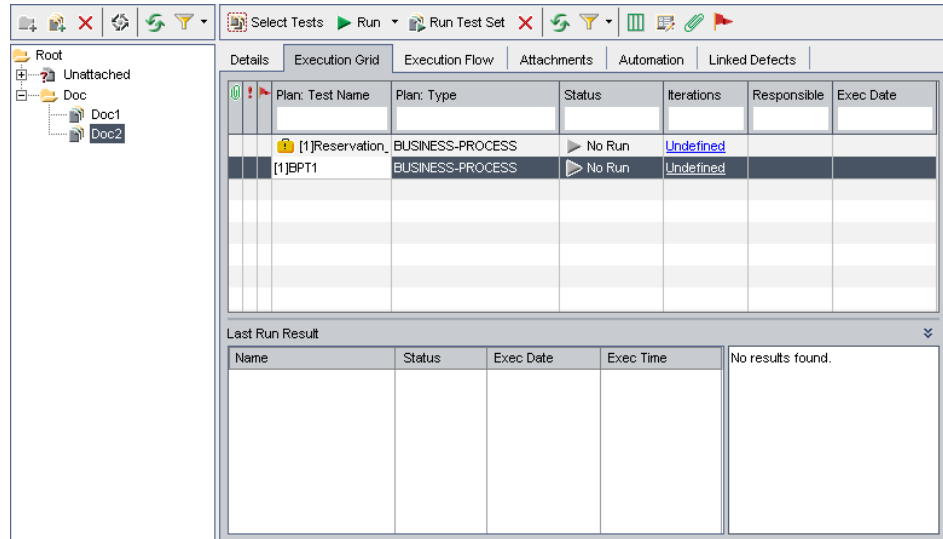
Note: Component steps created in versions prior to Quality Center 9.0 are not displayed in the Manual Runner.

Running a Test or Flow Manually


When you run a business process test or flow manually, you follow the test steps and perform operations on the application you are testing. You can run a test or flow as many times as you want and register the results. Results are stored separately for each run.

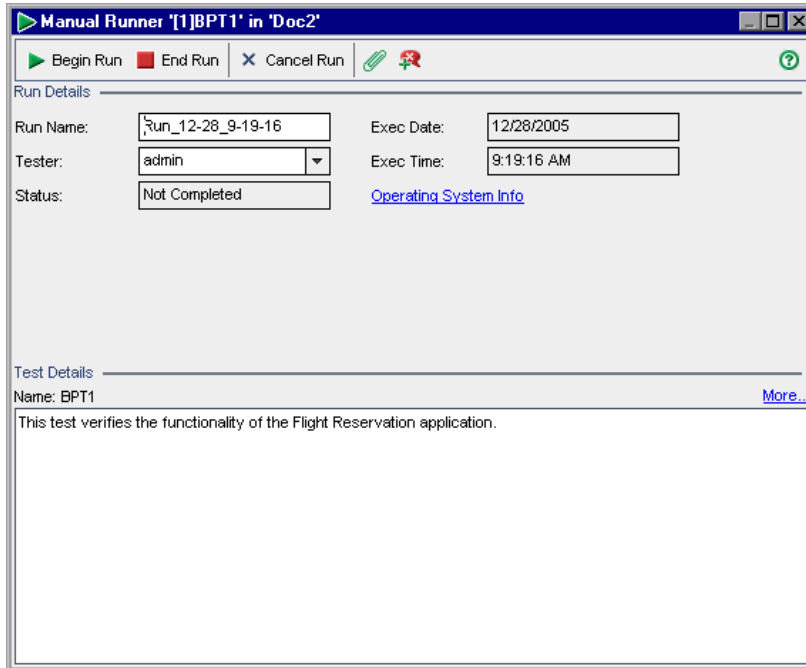
To run a business process test or flow manually:

- 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 test. For more information, see “Configuring Run-Time Parameter Values” on page 337.
- 4 Repeat steps 2 and 3 for each test in the test set that you want to iterate.

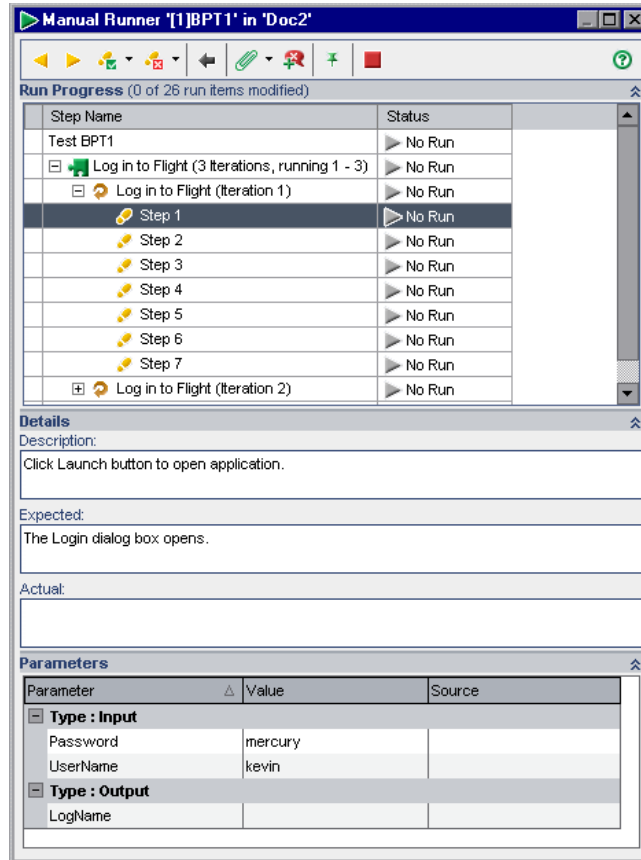
- 5 Click the arrow  next to the **Run** button in the Execution Grid tab toolbar and choose **Run Manually**. The Manual Runner window opens.



Note: For more information on this window, see “Understanding the Manual Runner Window” on page 368.

- 6 Click the **Begin Run** button to start the 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 371.

- 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 371.
- 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 375.
- 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 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 from 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 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 367.

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 run and the new defect. For more information on adding defects, see the *HP Quality Center User 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 run, click the **Attach to Step** arrow  and choose **Attach to Run**. For more information on adding attachments, see the *HP Quality Center User Guide*.

13 Repeat steps 7 to 12 for each step in the component.



14 Click the **End Run** button when you complete the 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 Test Results in the Test Lab Module” on page 390.

Plan: Test Name	Plan: Type	Status	Exec Date	Iterations
[1]Reservation_Test	BUSINESS-PROCESS	No Run		Undefined
[1]BPT1	BUSINESS-PROCESS	Failed	2/12/2006	3 Test iterations

Name	Status	Exec Date	Exec Time	Description:
Test Iteration 1	Failed	2/12/2006	3:25:14 PM	Click OK .
Log in to Flight (3 iterations, running 1 - 3)	Failed	2/12/2006	3:25:14 PM	Expected: The Flight Reservation dialog box opens.
Log in to Flight (iteration 1)	Failed	2/12/2006	3:25:14 PM	Actual: The Flight Reservation dialog box did not open.
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	

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.

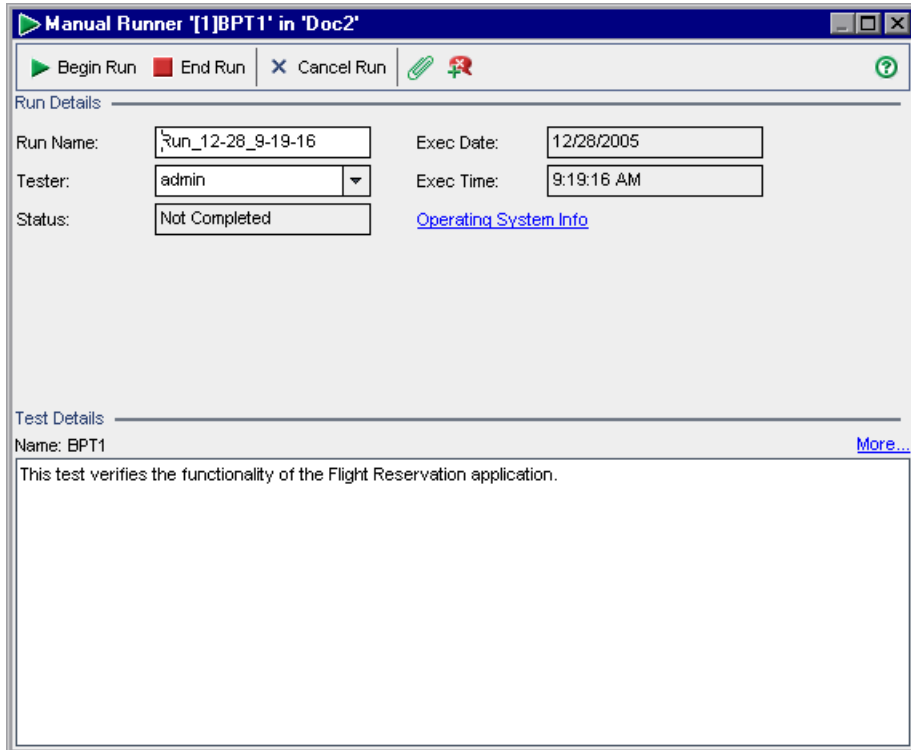
In general, if a run item fails, all of that item's parent items fail. Similarly, if all the items of a particular type pass, their immediate parent also passes.

For example:

- If one or more steps receive a **Failed** or **Not Completed** status, all of its parent nodes (component iteration, component, flow, 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. Ends the current run.

Cancel Run. Cancels the current 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, see the *HP Quality Center User Guide*.



Add Defect. (CTRL+B) Enables you to add a defect in the Defects module regarding this run. Quality Center automatically creates an association between the run and the new defect. For more information on how to add defects, see the *HP Quality Center User 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 run.
- **Tester.** The user name of the person who initiated the 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 run was initiated.
- **Exec Time.** The time that the 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.

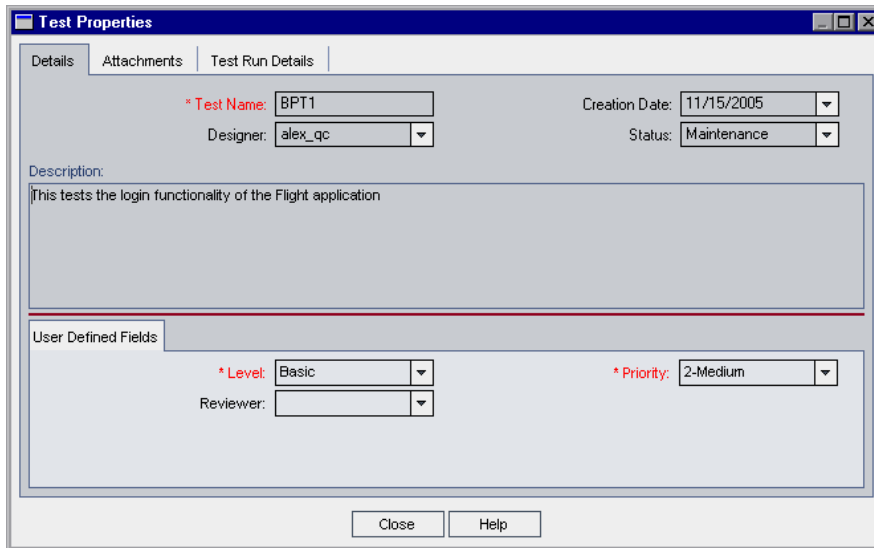
Operating System Information	
OS:	Windows 2000
Service Pack:	Service Pack 4
Build:	Build 2195

For more information on operating system information, see the *HP Quality Center User Guide*.

Working with the Test Details Pane

The Test Details pane provides the description of the test or flow 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 screenshot 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 section:
 - * Level: Basic
 - * Priority: 2-Medium
 - Reviewer: (empty)

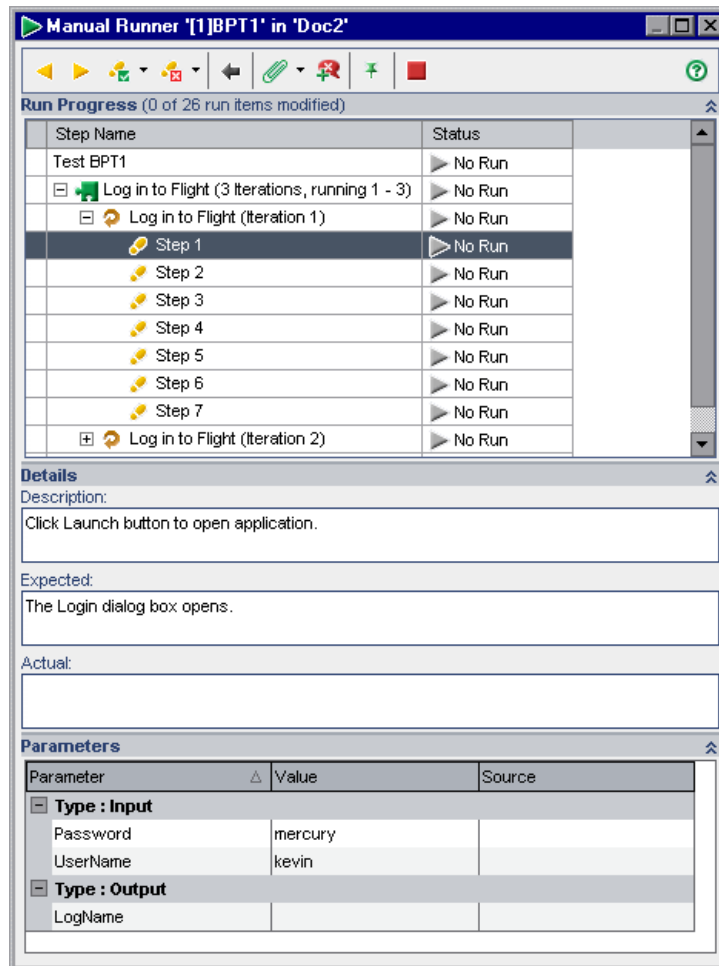
At the bottom of the dialog box are "Close" and "Help" buttons.

- ▶ 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 208.
- ▶ 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, see the *HP Quality Center User 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, see the *HP Quality Center User 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 or flow and indicate a **Pass**, **Fail**, or **Not Completed** result for each step.

The Manual Runner dialog box displays a hierarchical tree of the 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 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 from 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 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 to the step containing the input parameter link you clicked previously.



Attach to Step. Enables you to add attachments to the step. To add attachments to the entire run, click the arrow and choose **Attach to Run**. For more information on how to add attachments, see the *HP Quality Center User 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, see the *HP Quality Center User 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 or flow iteration, business component, and component iteration contained in the business process test or flow.

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 377.

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 367.

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 Details pane of the Manual Runner dialog box provides the textual description of the selected test, flow, 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 test or flow.

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 or flow 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 337.



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 291.

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 or 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 Component Parameters” on page 291.

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.

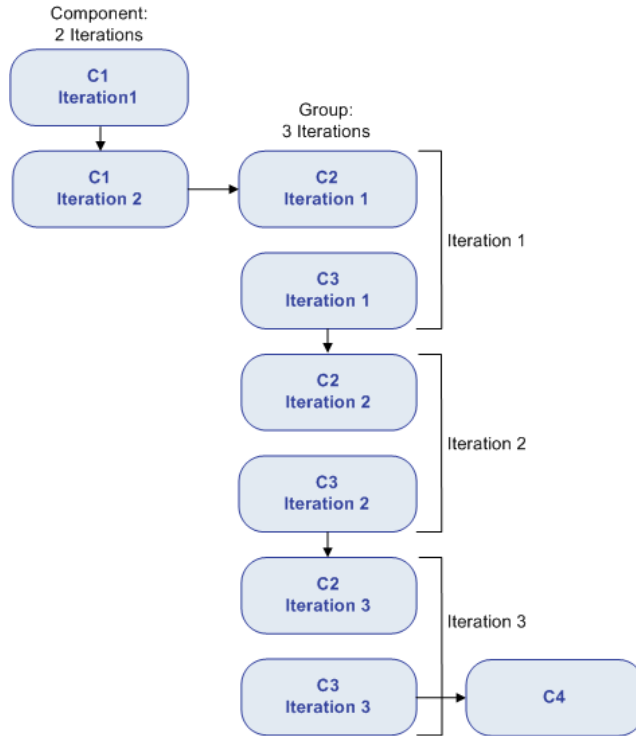
Understanding the Run Progress Pane Hierarchy

The Run Progress pane displays a tree hierarchy of all the components and steps in your business process test or flow 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:

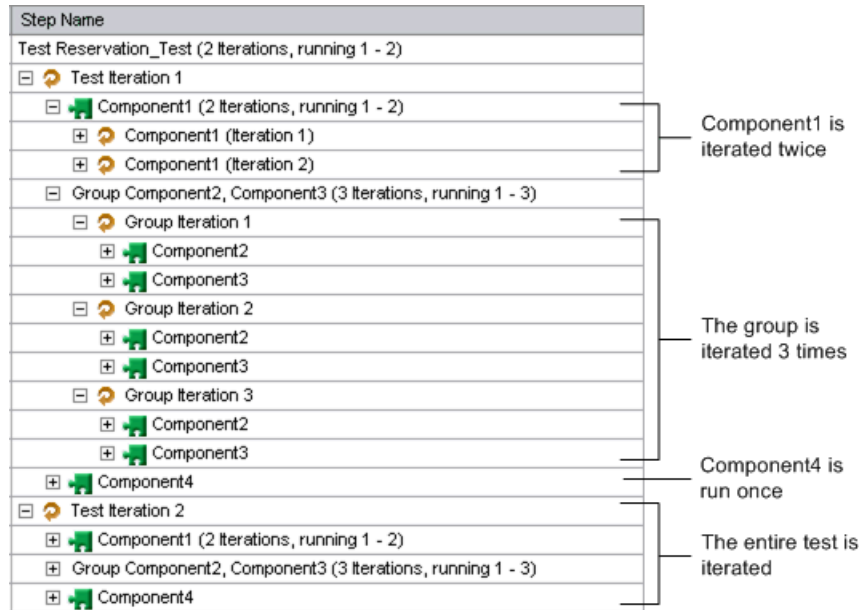
- the first iteration of C1, then the second iteration of C1, followed by
- the first iteration of the group comprising C2 and C3, followed by
- the second iteration of the group, followed by
- the third iteration of the group, followed by the component C4.

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 or flow 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, see the *HP QuickTest Professional for Business Process Testing User Guide*. For more information on running and debugging components in WinRunner, see the *HP WinRunner User's Guide*.

Debugging ensures that the 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.

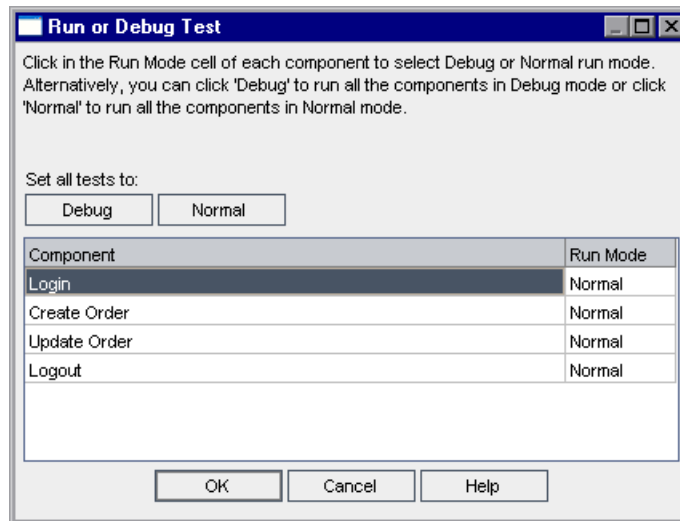
You use the Run or Debug Test dialog box to choose whether to run each of the business components in the test in **Debug** mode or in **Normal** mode.

- ▶ 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 or flow 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 or flow 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 or flow, 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 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 or Expert 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, see the *HP QuickTest Professional for Business Process Testing User Guide* or the *HP 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 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: Tests can contain both automated and manual components. Initiating a test to debug a manual component or test containing one or more manual components will display a warning message. To run tests that contain manual components, use the Manual Runner. For information on the Manual Runner, see “Running a Business Process Test or Flow Manually” on page 360.

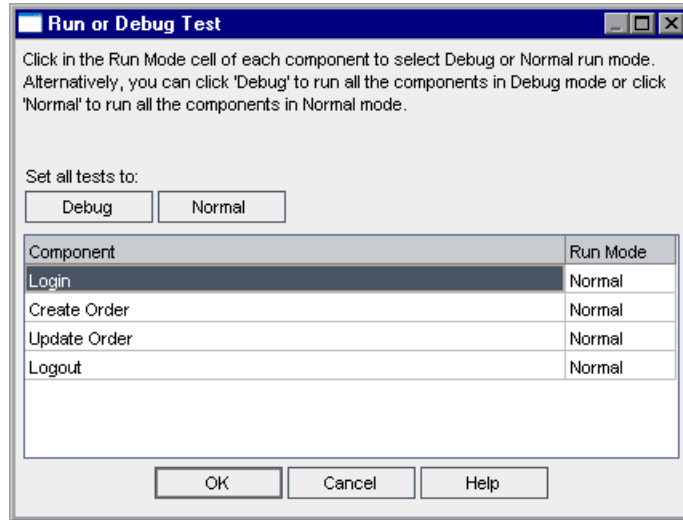
To run a test or flow using Debug mode:



- 1 Click the **Test Plan** module button in the sidebar to open the Test Plan module.
- 2 Select the relevant 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 10, “Working with Parameters.”
- 5 In the Test 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 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 test.

Note: You should close all browsers before running a 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 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.

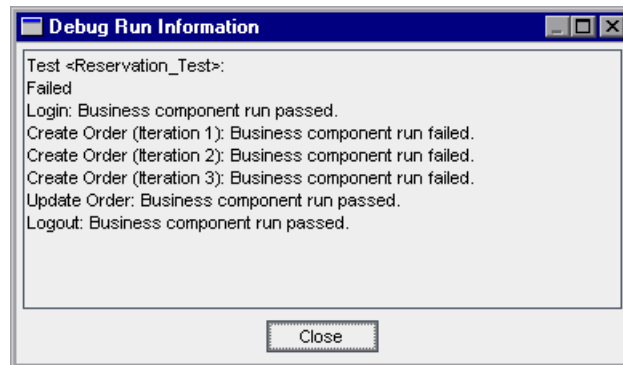
The same is true regarding the first WinRunner component that appears in a test, when Quality Center opens WinRunner and loads the add-ins associated with that component. Quality Center assumes that these are the required add-ins for all the WinRunner components in the test.

- In the Test Plan module, the status of the 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 run at any time.

- In QuickTest or WinRunner, the status of the 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, see the *HP QuickTest Professional for Business Process Testing User Guide* or the *HP WinRunner User's Guide*.
- 8** If you selected a business component to run in **Debug** mode, the 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, continue the run in QuickTest or WinRunner.

When one component finishes running, it closes and the next component in the 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 test and includes all relevant QuickTest or WinRunner messages.

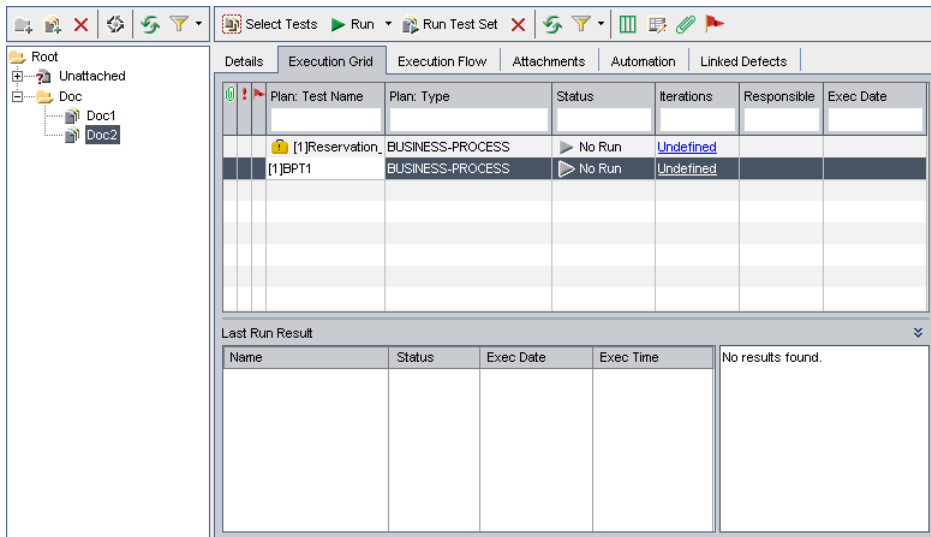
- 9** Click **Close** to complete the run.

Running Automated Business Process Tests or Flows


When a business process test or flow has been debugged and run-time parameters have been configured, you can run the test or flow, or a test set containing several tests and flows, from the Test Lab module.

To run a business process test or flow in the Test Lab module:

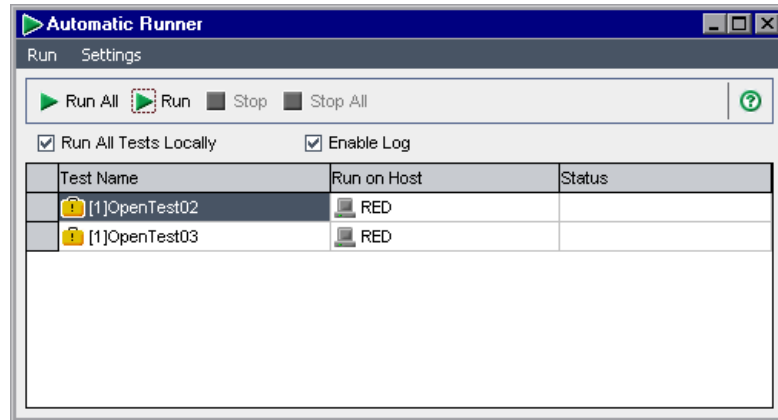
- 1 In the Test Lab module, select the relevant test set in the test set tree. The tests and flows in the test set are displayed in the Execution Grid tab.



- 2 Confirm that run-time parameter values have been configured for all tests you want to run. For more information, see “Working with the Run-Time Parameters Dialog Box” on page 335.
- 3 To run a specific test, or run all the tests in a test set, perform one of the following:
 - Select the specific test in the Execution Grid tab 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 or Flow Manually” on page 360.

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 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 10.00, or WinRunner version 9.0, installed on your computer.

For information on choosing a different host computer, see the *HP Quality Center User Guide*.

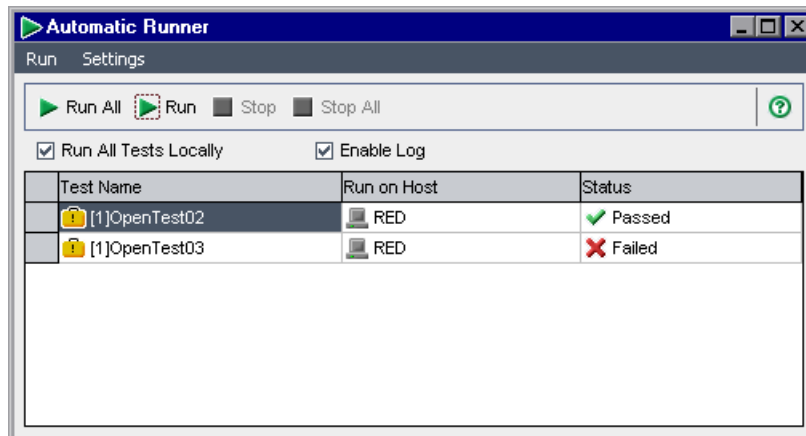
- 5 Select the **Enable Log** check box to enable QuickTest or WinRunner to record an execution log of the run. For more information on the execution log, see “Viewing the Execution Log” on page 393.
- 6 Select a test in the list and click the **Run** button to run the selected test.

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 Automatic Runner dialog box. You can click the **Stop** button in the toolbar to stop the run at any time. You can click the **Stop All** button in the toolbar to stop all the currently running tests.
- The status of the 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 393.

Viewing Run Results of Business Process Tests or Flows

After you run a business process test or flow 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 Test Results in the Test Lab Module” on page 390.
- 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 test run. For more information, see “Viewing Reports for Automated Business Process Tests” on page 391.
- For automated and manual tests, you can view an execution log of the 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 393.

Note: Results are stored in Quality Center only when the business component runs from the Test Lab module as part of a 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 Test Results in the Test Lab Module

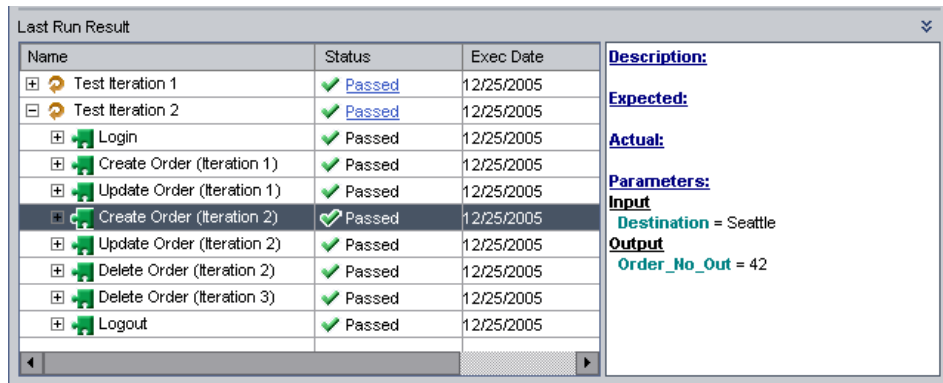
You can view the results of the latest automated or manual test run in the Test Lab module in the Last Run Result pane at the bottom of the Execution Grid.

The pane displays a hierarchical tree of each business component contained in the 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	Expected:
Test Iteration 2	Passed	12/25/2005	Actual:
Login	Passed	12/25/2005	Parameters:
Create Order (Iteration 1)	Passed	12/25/2005	Input
Update Order (Iteration 1)	Passed	12/25/2005	Destination = Seattle
Create Order (Iteration 2)	Passed	12/25/2005	Output
Update Order (Iteration 2)	Passed	12/25/2005	Order_No_Out = 42
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 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 test or the reason for a failed event.

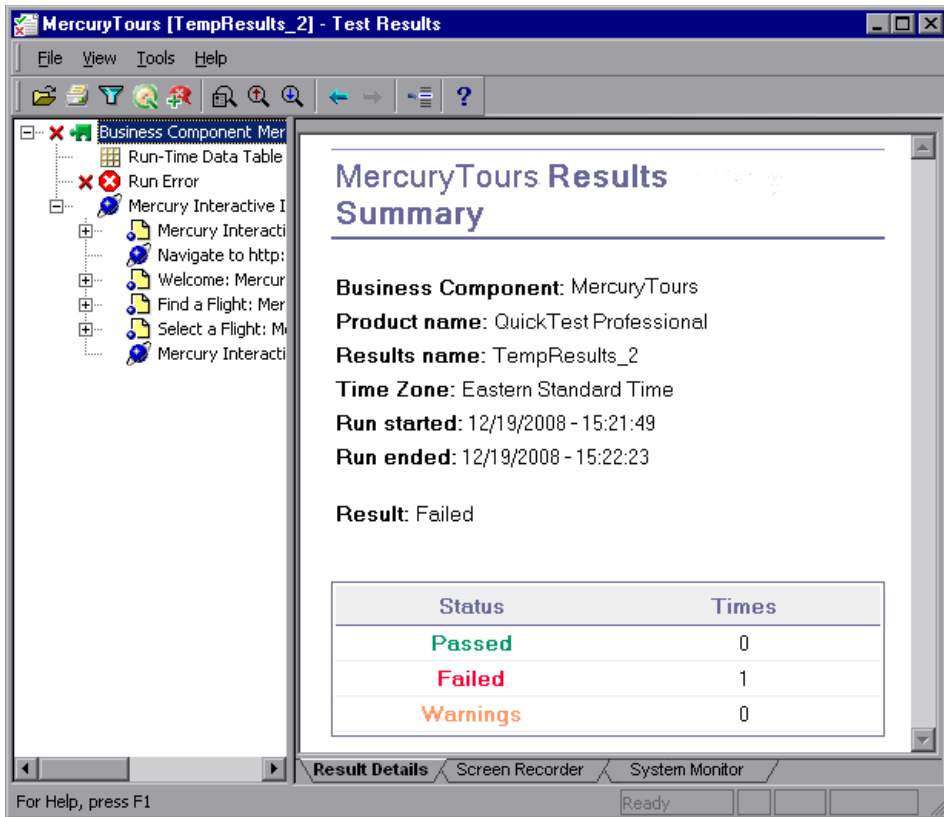
Viewing Reports for Automated Business Process Tests

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 Test Results in the Test Lab Module” on page 390.
- 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 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 tests in the Test Results window, see the *HP QuickTest Professional for Business Process Testing User Guide* or the *HP WinRunner User's Guide*.

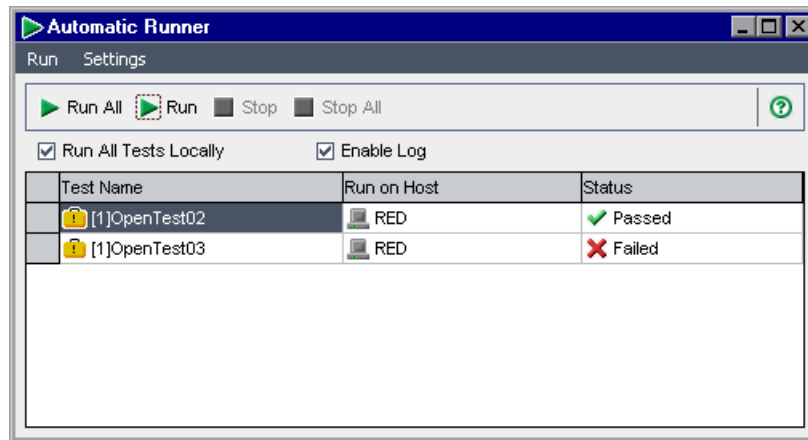
Viewing the Execution Log

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 Automatic Runner dialog box before the test or test set runs. For more information, see “Debugging Tests in the Test Plan Module” on page 380.

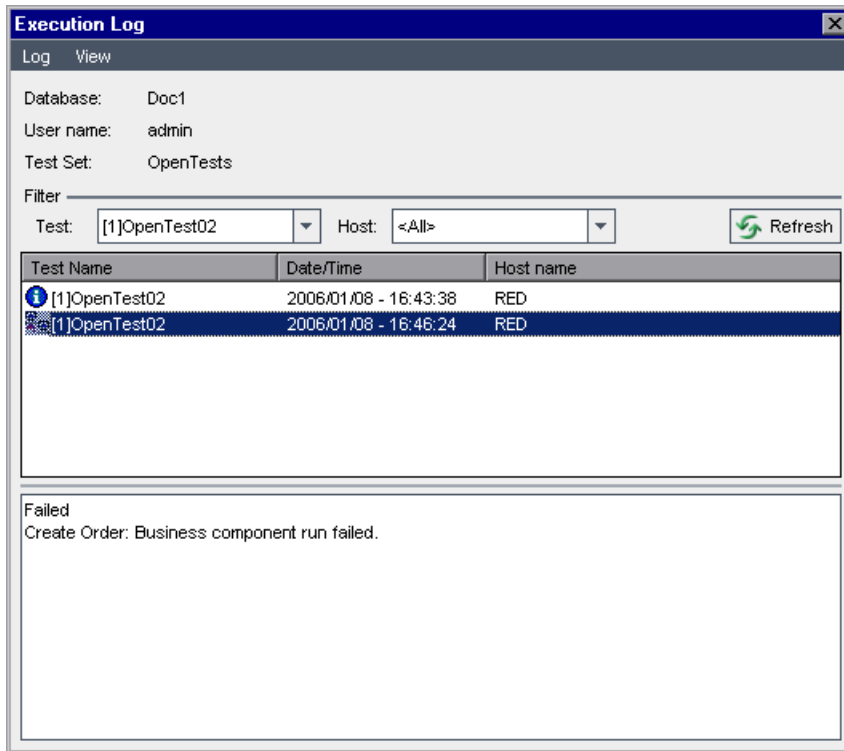
To view the Execution Log:

- 1 After the test or test set run is completed, the results of the run are shown in the **Status** column of the Automatic Runner dialog box.



- 2 Double-click a test name in the Automatic Runner dialog box, or select a test and 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.

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