HP QuickTest Professional .NET Add-in Extensibility

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Developer's Guide

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This manual's title page contains the following identifying information:

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

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Table of Contents

Welcome to This Guide

Welcome to QuickTest Professional .NET Add-in Extensibility.

QuickTest Professional .NET Add-in Extensibility is an SDK (Software Development Kit) package that enables you to support testing applications using third-party and custom .NET controls that are not supported out-of-the-box by the QuickTest Professional .NET Add-in.

This chapter includes:

How This Guide Is Organized

This guide explains how to set up and use QuickTest Professional .NET Add-in Extensibility to extend QuickTest support for third-party and custom .NET controls.

This guide assumes you are familiar with QuickTest functionality and should be used together with the *QuickTest Professional .NET Add-in Extensibility API Reference* provided in online Help format with the SDK installation (**Start** > **Programs** > **QuickTest Professional** > **Extensibility** > **Documentation** > **.NET Add-in Extensibility Help**). These documents should also be used in conjunction with the *HP QuickTest Professional User's Guide*, the .NET section of the *HP QuickTest Professional Add-ins Guide*, and the *HP QuickTest Professional Object Model Reference*. These guides can be accessed online by choosing Help > QuickTest Professional Help from the QuickTest main window.

This guide contains:

Chapter 1 **Introducing QuickTest Professional .NET Add-in Extensibility**

Explains the concepts of extending support to custom .NET controls.

Chapter 2 **Installing the QuickTest Professional .NET Add-in Extensibility SDK**

Explains how to install the QuickTest .NET Add-in Extensibility SDK and what the SDK contains.

Chapter 3 **Using a .NET DLL to Extend Support for a Custom Control**

Explains how to extend support for a custom control using a .NET DLL.

Chapter 4 **Using an XML File to Extend Support for a Custom Control**

Explains how to extend support for a custom control using an XML file.

Chapter 5 **Using Test Object Configuration Files**

Explains how to use test object configuration files to enable additional functionality for custom methods and properties.

Chapter 6 Configuring QuickTest to Use the Custom Server

Explains how to configure QuickTest to use the Custom Server and describes the configuration file format.

Chapter 7 Tutorial - Step-by-Step Basic Example

Provides instructions and leads you step-by-step through the process of creating custom support for a control.

Chapter 8 Tutorial - Advanced Example

Provides instructions for creating custom support for a control that requires more complex support implementation.

Note: The information, examples, and screen captures in this guide focus specifically on working with QuickTest tests. However, much of the information applies equally to components.

Business components and scripted components are part of HP Business Process Testing, which utilizes a keyword-driven methodology for testing applications. For more information, see the *HP QuickTest Professional User's Guide* and the *HP QuickTest Professional for Business Process Testing User's Guide*.

Who Should Read This Guide

This guide is intended for programmers, QA engineers, systems analysts, system designers, and technical managers who want to extend QuickTest support for .NET custom controls.

To use this guide, you should be familiar with:

- Major QuickTest features and functionality
- QuickTest Professional Object Model
- QuickTest Professional .NET Add-in
- .NET Programming in C# or Visual Basic
- XML (basic knowledge)

QuickTest Professional Online Documentation

QuickTest Professional includes the following online documentation:

Readme provides the latest news and information about QuickTest. Choose **Start** > **Programs** > **QuickTest Professional** > **Readme**.

QuickTest Professional Installation Guide explains how to install and set up QuickTest. Choose **Help** > **Printer-Friendly Documentation** > **HP QuickTest Professional Installation Guide**.

QuickTest Professional Tutorial teaches you basic QuickTest skills and shows you how to design tests for your applications. Choose **Help** > **HP QuickTest Professional Tutorial**.

Product Feature Movies provide an overview and step-by-step instructions describing how to use selected QuickTest features. Choose **Help** > **Product Feature Movies**.

Printer-Friendly Documentation displays the complete documentation set in Adobe portable document format (PDF). Online books can be viewed and printed using Adobe Reader, which can be downloaded from the Adobe Web site (http://www.adobe.com). Choose **Help** > **Printer-Friendly Documentation**.

QuickTest Professional Help includes:

- **What's New in QuickTest Professional** describes the newest features, enhancements, and supported environments in the latest version of QuickTest.
- **QuickTest User's Guide** describes how to use QuickTest to test your application.
- **QuickTest for Business Process Testing User's Guide** provides step-by-step instructions for using QuickTest to create and manage assets for use with Business Process Testing.
- **QuickTest Professional Add-ins Guide** describes how to work with supported environments using QuickTest add-ins, and provides environment-specific information for each add-in.
- **QuickTest Object Model Reference** describes QuickTest test objects, lists the methods and properties associated with each object, and provides syntax information and examples for each method and property.
- **QuickTest Advanced References** contains documentation for the following QuickTest COM and XML references:
  - **QuickTest Automation** provides syntax, descriptive information, and examples for the automation objects, methods, and properties. It also contains a detailed overview to help you get started writing QuickTest automation scripts. The automation object model assists you in automating test management, by providing objects, methods and properties that enable you to control virtually every QuickTest feature and capability.
  - **QuickTest Test Results Schema** documents the test results XML schema, which provides the information you need to customize your test results.
  - **QuickTest Test Object Schema** documents the test object XML schema schema, which provides the information you need to extend test object support in different environments.
  - **QuickTest Object Repository Schema** documents the object repository XML schema, which provides the information you need to edit an object repository file that was exported to XML.

  - **QuickTest Object Repository Automation** documents the Object Repository automation object model, which provides the information you need to manipulate QuickTest object repositories and their contents from outside of QuickTest.

- **VBScript Reference** contains Microsoft VBScript documentation, including VBScript, Script Runtime, and Windows Script Host.

To access the QuickTest Professional Help, choose **Help** > **QuickTest Professional Help**. You can also access the QuickTest Professional Help by clicking in selected QuickTest windows and dialog boxes and pressing F1. Additionally, you can view a description, syntax, and examples for a QuickTest test object, method, or property by placing the cursor on it and pressing F1.

Additional Online Resources

Mercury Tours sample Web site is the basis for many examples in this guide. The URL for this Web site is newtours.demoaut.com.

Knowledge Base opens directly to the Knowledge Base landing page on the Mercury Customer Support Web site. Choose **Help** > **Knowledge Base**. The URL for this Web site is support.mercury.com/cgi-bin/portal/CSO/kbBrowse.jsp.

Customer Support Web site accesses the HP Software Support Web site. This site enables you to browse the Support Knowledge Base and add your own articles. You can also post to and search user discussion forums, submit support requests, download patches and updated documentation, and more. Choose **Help** > **Customer Support Web site**. The URL for this Web site is www.hp.com/go/hpsoftwaresupport.

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

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

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

Send Feedback enables you to send online feedback about **QuickTest Professional** to the product team. Choose **Help** > **Send Feedback**.

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.

Typographical Conventions

This guide uses the following typographical conventions:

UI Elements and **Function Names**

This style indicates the names of interface elements on which you perform actions, file names or paths, and other items that require emphasis. For example, “Click the **Save** button.” It also indicates method or function names. For example, "The **wait_window** statement has the following parameters:"

Arguments

This style indicates method, property, or function arguments and book titles. For example, “Refer to the *HP User’s Guide*.”

<**Replace Value**>

Angle brackets enclose a part of a file path or URL address that should be replaced with an actual value. For example, <**MyProduct installation folder**>**\bin**.

Example

This style is used for examples and text that is to be typed literally. For example, “Type Hello in the edit box.”

CTRL+C

This style indicates keyboard keys. For example, “Press ENTER.”

[ ]

Square brackets enclose optional arguments.

{ }

Curly brackets indicate that one of the enclosed values must be assigned to the current argument.

...

In a line of syntax, an ellipsis indicates that more items of the same format may be included. In a programming example, an ellipsis is used to indicate lines of a program that were intentionally omitted.

|

A vertical bar indicates that one of the options separated by the bar should be selected.

1

Introducing QuickTest Professional .NET Add-in Extensibility

QuickTest Professional .NET Add-in Extensibility enables you to provide high-level support for third-party and custom .NET controls that are not supported out-of-the-box by the QuickTest Professional .NET Add-in.

It is possible to record tests on .NET controls that are not supported out-of-the-box by the QuickTest Professional .NET Add-in without using the Extensibility module. However, the recorded steps will reflect the low-level activities passed as Windows messages. By supporting a .NET control with the Extensibility module, this default low-level support is extended so that tests are meaningful, understandable, and easy to modify.

This chapter includes:

Understanding .NET Add-in Extensibility

QuickTest Professional .NET Add-in Extensibility enables you to support third-party and custom .NET controls by extending QuickTest test objects with methods representing the meaningful behaviors of those .NET controls.

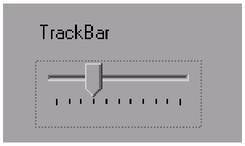
The QuickTest Professional .NET Add-in, without the Extensibility module, supports many .NET controls out-of-the-box. The .NET Add-in provides test objects that supply methods representing these controls' meaningful behaviors.

The Extensibility module enables you to implement this level of support for additional .NET controls. Using the Extensibility module, you extend the .NET Add-in interfaces by overriding existing methods and defining new ones, creating a Custom Server. When the custom control is mapped to an existing QuickTest test object, you have the full functionality of a QuickTest test object, including visibility in IntelliSense and meaningful steps in the test.

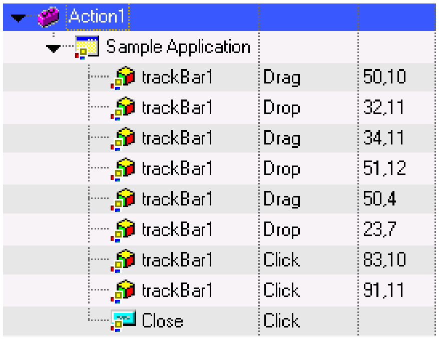
Understanding the Concept of Meaningful Behaviors

A control's meaningful behavior is the behavior that you want to test. For example, when you click on a button in a radio button group in your application, you are interested in the value of the selection, not in the **Click** event and the coordinates of the click. The meaningful behavior of the radio button group is the change in the selection.

If you record a test on a custom control without extending support for the control, you record the low-level behaviors of the control. For example, the TrackBar control in the sample .NET application shown below is a control that does not have a corresponding QuickTest test object.



If you record on the TrackBar without implementing support for the control, the Keyword View looks like this:



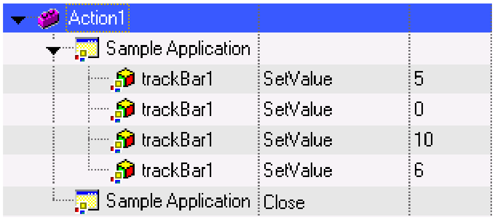
Action1		
Sample Application		
trackBar1	Drag	50,10
trackBar1	Drop	32,11
trackBar1	Drag	34,11
trackBar1	Drop	51,12
trackBar1	Drag	50,4
trackBar1	Drop	23,7
trackBar1	Click	83,10
trackBar1	Click	91,11
Close	Click	

In the Expert View, the recorded test looks like this:

```
SwfWindow("Sample Application").SwfObject("trackBar1").Drag 50,10
SwfWindow("Sample Application").SwfObject("trackBar1").Drop 32,11
SwfWindow("Sample Application").SwfObject("trackBar1").Drag 34,11
SwfWindow("Sample Application").SwfObject("trackBar1").Drop 51,12
SwfWindow("Sample Application").SwfObject("trackBar1").Drag 50,4
SwfWindow("Sample Application").SwfObject("trackBar1").Drop 23,7
SwfWindow("Sample Application").SwfObject("trackBar1").Click 83,10
SwfWindow("Sample Application").SwfObject("trackBar1").Click 91,11
SwfWindow("Sample Application").SwfButton("Close").Click
```

Note that the **Drag**, **Drop**, and **Click** methods—the low-level actions of the TrackBar control—are recorded at specific coordinates in the control display. These steps are difficult to understand and modify.

If you use .NET Add-in Extensibility to support the TrackBar control, the result is more meaningful. Below is the Keyword View of a test recorded on the TrackBar with a Custom Server:



Action1		
Sample Application		
trackBar1	SetValue	5
trackBar1	SetValue	0
trackBar1	SetValue	10
trackBar1	SetValue	6
Sample Application	Close	

In the Expert View, the recorded test looks like this:

```
SwfWindow("Sample Application").SwfObject("trackBar1").SetValue 5
SwfWindow("Sample Application").SwfObject("trackBar1").SetValue 0
SwfWindow("Sample Application").SwfObject("trackBar1").SetValue 10
SwfWindow("Sample Application").SwfObject("trackBar1").SetValue 6
SwfWindow("Sample Application").Close
```

QuickTest is now recording a **SetValue** operation reflecting the new slider position, instead of the low-level **Drag**, **Drop**, and **Click** operations recorded without the customized test object. You can understand and modify this test more easily.

Using the .NET Windows Forms Spy

The .NET Windows Forms Spy enables you to view details about selected .NET Windows Forms controls and their run-time properties. You can use the .NET Windows Forms Spy to help you develop extensibility for .NET Windows Forms controls.

You can use the .NET Windows Forms Spy when planning .NET Add-in extensibility implementation to create support for custom .NET Windows Forms controls. The .NET Windows Forms Spy assists you in examining .NET Windows Forms controls within your application. It also enables you to see which events cause your application to change (to facilitate record and run extensibility implementation) and how the changes manifest themselves in the control's state.

You access the .NET Windows Forms Spy by choosing **Tools** > **.NET Windows Forms Spy** in the main QuickTest window.

Note: To spy on a .NET Windows Forms application, make sure that the application is running with Full Trust. If the application is not defined to run with Full Trust, you cannot spy on the .NET application's Windows Forms controls with the .NET Windows Forms Spy. For information on defining trust levels for .NET applications, refer to Microsoft documentation.

For more information on the .NET Windows Forms Spy, see the *HP QuickTest Professional Add-ins Guide*.

Understanding Coding Options: .NET DLL and XML

You can implement QuickTest custom support in the following ways:

- **.NET DLL.** Extends support for the control using a .NET Assembly.
- **XML.** Extends support for the control using an XML file.

Guidelines for Selecting a Coding Option

Most Custom Servers are implemented as a .NET DLL. This option is generally preferred because development is supported by all the services of the program development environment, such as syntax checking, debugging, and Microsoft IntelliSense. Furthermore, a Custom Server implemented as a .NET DLL can perform part of its **Test Record** functions in the **QuickTest** context and part in the **Application under test** context. For more information, see "Using a .NET DLL to Extend Support for a Custom Control" on page 29, and refer to the *QuickTest Professional .NET Add-in Extensibility API Reference* (available in the QuickTest Professional .NET Add-in Extensibility online Help).

For information on run-time contexts, see "Understanding Custom Server Run-Time Contexts" on page 20.

The XML implementation is most practical either with relatively simple, well documented controls, or with controls that map well to an existing object but for which you need to replace the **Test Record** implementation, or replace or add a small number of test object **Test Run** methods. It is also useful when a full programming environment is not available because it requires only a text editor.

However, when implementing a custom control with XML, you have none of the support provided by a program development environment. The XML implementation includes C# programming commands, and runs only in the **Application under test** context. For more information, see “Using an XML File to Extend Support for a Custom Control” on page 47.

For information on setting the coding option, see “Configuring QuickTest to Use the Custom Server” on page 61.

Understanding Custom Server Run-Time Contexts

Classes supplied by a Custom Server may be instantiated in the following software processes (run-time contexts):

- **Application under test**
- **QuickTest**

An object created in the **Application under test** context has direct access to the .NET control’s events, methods, and properties. However, it cannot listen to Windows messages.

An object created in the **QuickTest** context can listen to Windows messages. However, it does not have direct access to the .NET control’s events, methods, and properties.

If the Custom Server is implemented as a .NET DLL, an object created in the **QuickTest** context can create **Assistant objects** that run in the **Application under test** context.

Guidelines for Selecting the Custom Server Run-Time Context

The Custom Server may implement **Test Record**, **Test Run**, or both.

Test Record is the software module used in a session that records the actions performed on the application being tested and the application's resulting behaviors. The recording is then converted to a test. If you plan to create tests using keyword-driven testing, and not by recording steps on an application, you do not need to implement **Test Record.**

Test Run is the software module used to test if the application is performing as required (by running the test and tracking the results). **Test Run** is nearly always implemented in the **Application under test** context. Direct access to the control makes setting values and calling the control's methods straightforward. There is no need to listen to Windows messages during a **Test Run** session, so the **QuickTest** context is not required. However, if your application uses QuickTest services more than it uses services of the custom control, it may be more efficient to implement **Test Run** in the **QuickTest** context.

The programming for **Test Record** is generally simpler in the **Application under test** context. However, if it is essential to use Windows messages for recording, you must use the **QuickTest** context.

If the .NET DLL Custom Server must both listen to Windows messages and access control events and properties, use **Assistant classes**. The Custom Server running in the **QuickTest** context can listen to events in the **Application under test** context with **Assistant class** objects that run in the **Application under test** context. These objects also provide direct access to control properties.

For more information, see "Implementing Test Record for a Custom Control Using the .NET DLL" on page 36.

For more information on **Assistant classes**, see "Using a .NET DLL to Extend Support for a Custom Control" on page 29, and refer to the *QuickTest Professional .NET Add-in Extensibility API Reference*.

For more information on setting the context, see "Configuring QuickTest to Use the Custom Server" on page 61.

Understanding Test Object Mapping

All Custom Servers are mapped to a parent QuickTest test object. When the test object is applied to the custom control, the Custom Server extends the parent test object.

When you map your Custom Server to a functionally similar QuickTest test object, you do not need to override those Test Run methods of the parent object that apply without change to your custom object. For example, most controls contain a **Click** method. If the **Click** method of the parent object implements the **Click** method of the custom object adequately, you do not need to override the parent's method.

To cover the **Test Run** functionality of the custom object that does not exist in the parent, add new methods in your Custom Server. To cover functionality that has the same method name, but a different implementation, override the parent methods. The custom control support consists of the **Test Run** members of the parent object (or overrides of those members), and new members added by this Custom Server.

Note that mapping is sometimes sufficient without any programming. If the parent QuickTest test object adequately covers a control, it is sufficient to map the control to the QuickTest test object. If the QuickTest test object adequately covers **Test Record**, but you need to customize **Test Run**, do not implement **Test Record**. If you do implement **Test Record**, the implementation replaces that of the parent object. You must implement all required **Test Record** functionality.

If you do not specify a mapping, QuickTest maps the custom control to the default generic test object, **SwfObject**.

When you edit a step that references the custom control, Microsoft IntelliSense displays the properties and methods of the custom control in addition to those of the parent QuickTest test object. QuickTest uses test object configuration files to provide IntelliSense for custom methods and properties. For more information, see "Using Test Object Configuration Files" on page 53.

For more information on mapping, see "Configuring QuickTest to Use the Custom Server" on page 61.

2

Installing the QuickTest Professional .NET Add-in Extensibility SDK

This chapter describes the installation process for the QuickTest Professional .NET Add-in Extensibility SDK and the content of the SDK.

This chapter includes:

About Installing the QuickTest Professional .NET Add-in Extensibility SDK

The QuickTest Professional .NET Add-in Extensibility SDK installation provides the following:

- A Custom Server C# Project Template for Microsoft Visual Studio .NET or Microsoft Visual Studio 2005.
- A Custom Server Visual Basic Project Template for Microsoft Visual Studio .NET or Microsoft Visual Studio 2005.

  Each Custom Server template provides a framework of blank code, some sample code, and the QuickTest project references required to build a Custom Server.
- The wizard that runs when the Custom Server template is selected to create a new project.

  The wizard simplifies setting up a Microsoft Visual Studio .NET or Microsoft Visual Studio 2005 project to create a Custom Server .NET DLL using the .NET Add-in Extensibility module. For more information, see "Using a .NET DLL to Extend Support for a Custom Control" on page 29.
- The online .NET Add-in Extensibility Help, which includes the following:
  - A Developer's Guide
  - An API Reference
  - A Toolkit Configuration Schema Help
  - The QuickTest Test Object Schema Help
- A printer-friendly (PDF) version of the Developer's Guide

After you install the .NET Add-in Extensibility SDK, you can access the .NET Add-in Extensibility documentation from **Start** > **Programs** > **QuickTest Professional** > **Extensibility** > **Documentation**.

Before You Install

Before you install the QuickTest Professional .NET Add-in Extensibility SDK, review the requirements listed below.

- You must have access to the QuickTest Professional installation DVD.
- Microsoft Visual Studio .NET or Microsoft Visual Studio .NET 2005 must be installed on your computer.

Installing the QuickTest Professional .NET Add-in Extensibility SDK

Use the QuickTest Professional Setup program to install the QuickTest Professional .NET Add-in Extensibility SDK on your computer.

To install the QuickTest Professional .NET Add-in Extensibility SDK:

1. Close all instances of Microsoft Visual Studio.
2. Insert the QuickTest Professional DVD into the CD-ROM/DVD drive. The QuickTest Professional Setup window opens. (If the window does not open, browse to the DVD and double-click **setup.exe** from the root folder.)
3. Click **Add-in Extensibility SDKs**. The Add-in Extensibility SDKs screen opens.
4. Click **QuickTest Professional .NET Add-in Extensibility SDK Setup**. The QuickTest Professional .NET Add-in Extensibility SDK Setup wizard opens.

Note: If the wizard screen that enables you to select whether to repair or remove the SDK installation opens, the QuickTest Professional .NET Add-in Extensibility SDK is already installed on your computer. Before you can install a new version, you must first uninstall the existing one, as described in "Uninstalling the QuickTest Professional .NET Add-in Extensibility SDK" on page 28.

5. Follow the instructions in the wizard to complete the installation.

6 In the final screen of the setup wizard, if you select the **Show Readme** check box, the QuickTest Professional .NET Add-in Extensibility Readme file opens after you click **Close**. The Readme file contains the latest technical and troubleshooting information. To open the Readme file at another time, select **Start** > **Programs** > **QuickTest Professional** > **Extensibility** > **Documentation** > **.NET Add-in Extensibility Readme**.

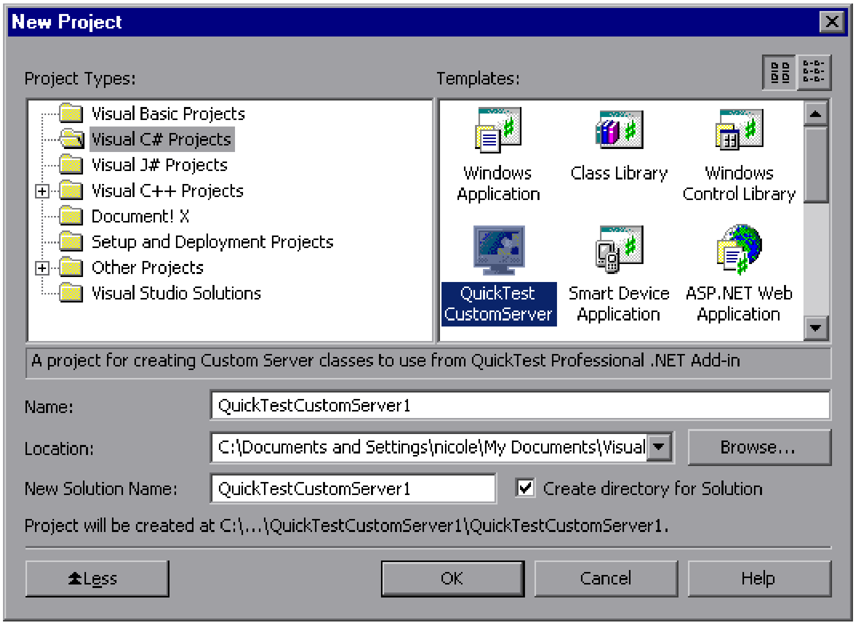
To confirm that the installation was successful:

1 Open Microsoft Visual Studio .NET or Microsoft Visual Studio 2005.

2 Choose **File** > **New** > **Project** to open the New Project dialog box.

3 Select **Visual C# Projects** in the **Project Types** list.

4 Confirm that the **QuickTest CustomServer** template icon is displayed in the **Templates** pane.



A project for creating Custom Server classes to use from QuickTest Professional .NET Add-in

Name: QuickTestCustomServer1

Location: C:\Documents and Settings\nicole\My Documents\Visual

New Solution Name: QuickTestCustomServer1

☑ Create directory for Solution

Project will be created at C:\...\QuickTestCustomServer1\QuickTestCustomServer1.

Note: The above dialog box is from Microsoft Visual Studio .NET. The dialog box in Microsoft Visual Studio 2005 differs slightly in appearance.

5. Select **Visual Basic Projects** in the **Project Types** list.
6. Confirm that the **QuickTest CustomServer** template icon is displayed in the **Templates** pane.

Repairing the QuickTest Professional .NET Add-in Extensibility SDK Installation

Your QuickTest Professional DVD enables you to repair an existing QuickTest Professional .NET Add-in SDK installation by replacing any missing or damaged files from your previous installation.

Note: To use the QuickTest Professional DVD to repair an installation, you must use the same DVD that you used for the original installation.

To repair the QuickTest Professional .NET Add-in Extensibility SDK installation:

1. Insert the QuickTest Professional DVD into the CD-ROM/DVD drive. The QuickTest Professional Setup window opens. (If the window does not open, browse to the DVD and double-click **setup.exe** from the root folder.)
2. Click **Add-in Extensibility SDKs**. The Add-in Extensibility SDKs screen opens.
3. Click **QuickTest Professional .NET Add-in Extensibility SDK Setup**. The .NET Add-in Extensibility SDK Setup wizard opens, enabling you to select whether to repair or remove the SDK installation.
4. Select **Repair** and click **Finish**. The Setup program replaces the QuickTest Professional .NET Add-in Extensibility SDK files and opens the Installation Complete screen.
5. In the Installation Complete screen, click **Close** to exit the Setup wizard.

Uninstalling the QuickTest Professional .NET Add-in Extensibility SDK

You can uninstall the QuickTest Professional .NET Add-in SDK by using **Add/Remove Programs** as you would for other installed programs. Alternatively, you can use the setup program on the QuickTest Professional DVD.

Note:

- You must use the same DVD that you used for the original installation.
- You must be logged on with Administrator privileges to uninstall the QuickTest .NET Add-in Extensibility SDK.

To uninstall the QuickTest Professional .NET Add-in Extensibility SDK:

1. Insert the QuickTest Professional DVD into the CD-ROM/DVD drive. The QuickTest Professional Setup window opens. (If the window does not open, browse to the DVD and double-click **setup.exe** from the root folder.)

2. Click **Add-in Extensibility SDKs**. The Add-in Extensibility SDKs screen opens.

3. Click **QuickTest Professional .NET Add-in Extensibility SDK Setup**. The .NET Add-in Extensibility SDK Setup wizard opens, enabling you to select whether to repair or remove the SDK.

4. Select **Remove** and click **Finish**. The Setup program removes the QuickTest Professional .NET Add-in Extensibility SDK and opens the Installation Complete screen.

5. In the Installation Complete screen, click **Close** to exit the Setup wizard.

3

Using a .NET DLL to Extend Support for a Custom Control

You can support a .NET control by creating a Custom Server implemented as a .NET DLL.

To create a .NET DLL Custom Server you need to know how to program a .NET Assembly. The illustrations and instructions in this chapter assume that you are using Microsoft Visual Studio .NET as your development environment and that the Custom Server Project Templates are installed. For more information, see "Installing the QuickTest Professional .NET Add-in Extensibility SDK" on page 23.

This chapter includes:

About Using a .NET DLL to Extend Support for a Custom Control

You can create a Custom Server to implement high level support for a custom .NET control. The Custom Server is a .NET DLL class library that implements interfaces for **Test Record** and/or **Test Run**, and general utilities. For more information, see “Implementing Test Record for a Custom Control Using the .NET DLL” on page 36, “Implementing Test Run for a Custom Control Using the .NET DLL” on page 41, and “API Overview” on page 44.

After creating the Custom Server, configure QuickTest to use it. For more information, see “Configuring QuickTest to Use the Custom Server” on page 61.

Note:

- QuickTest loads the Custom Server when you open a test. Therefore, if you implement your Custom Server as a .NET DLL, any changes you make to the DLL after the Custom Server is loaded take effect only the next time you open a test.
- Applications running under .NET Framework version 1.1 cannot use DLLs that were created using Visual Studio 2005. Therefore you cannot use a Custom Server that you implemented as a .NET DLL using Visual Studio 2005 when you run the application you are testing under .NET Framework version 1.1.

Creating a Custom Server

To create a Custom Server, set up a .NET project in Microsoft Visual Studio .NET, code the support for QuickTest **Test Record** and/or **Test Run**, and edit the configuration file so that QuickTest loads the Custom Server.

Setting up the .NET Project

Set up a .NET project in Microsoft Visual Studio .NET using the Custom Server C# Project Template or the Custom Server Visual Basic Project Template.

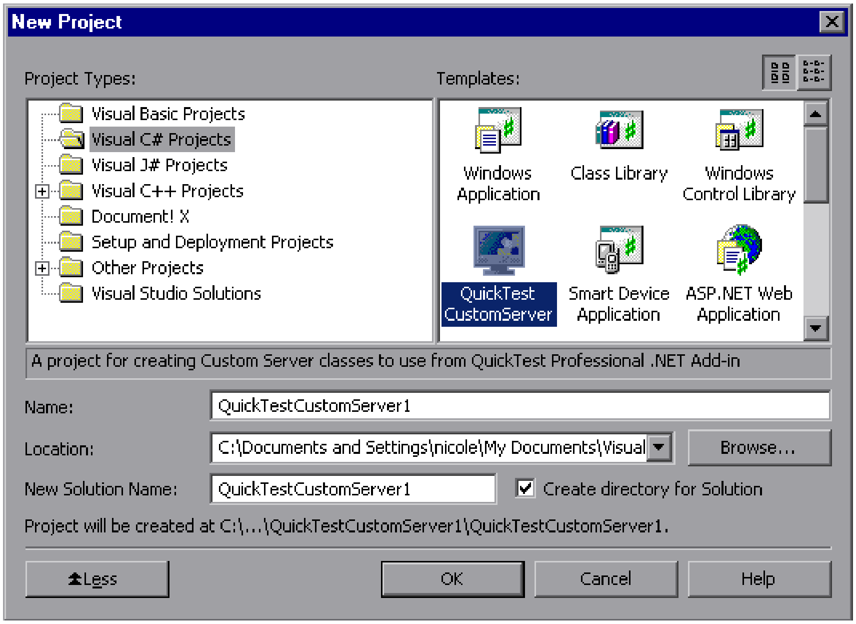
When you set up the .NET project, the template does the following:

- Creates an XML file with definitions of the Custom Server that you can copy into the QuickTest configuration file.
- Creates the project files necessary for the build of the .DLL file.
- Sets up a C# or Visual Basic file (depending which template you selected) with commented code that contains the definitions of methods that you can override when you implement **Test Record** or **Test Run**.
- Provides sample code that demonstrates some **Test Record** and **Test Run** implementation techniques.

To setup a new .NET project:

1. Start Microsoft Visual Studio .NET.
2. Choose **File** > **New** > **Project** to open the New Project dialog box, or press CTRL + SHIFT + N. The New Project dialog box opens.

3 Select **Visual C# Projects** or **Visual Basic Projects** in the **Project Types** list.



A project for creating Custom Server classes to use from QuickTest Professional .NET Add-in

Name: QuickTestCustomServer1

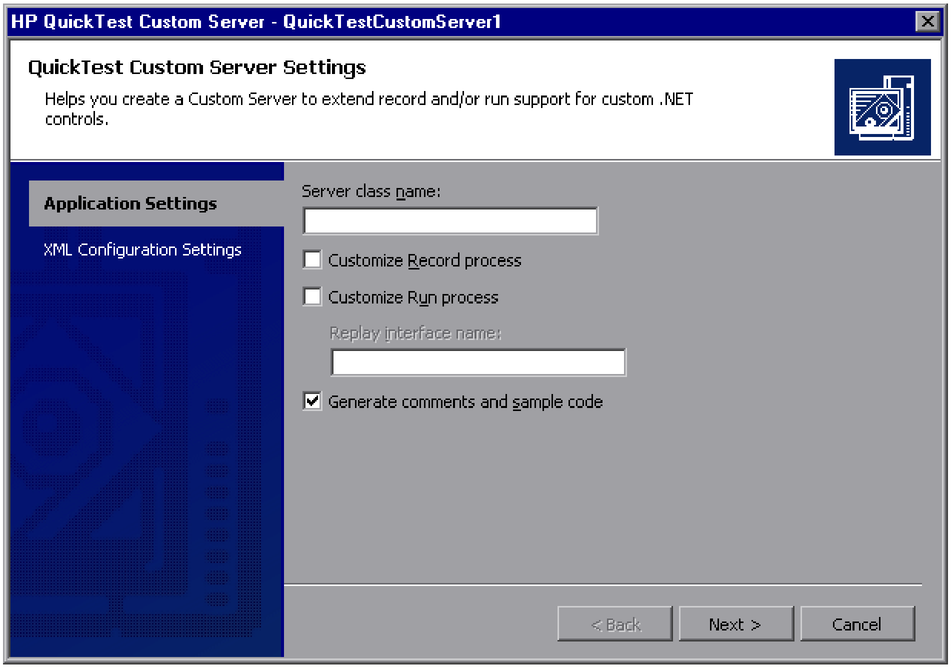
Location: C:\Documents and Settings\nicole\My Documents\Visual

New Solution Name: QuickTestCustomServer1

☑ Create directory for Solution

Project will be created at C:\...\QuickTestCustomServer1\QuickTestCustomServer1.

4 Select the **QuickTest CustomServer** template in the Templates pane. Enter the name of your new project and the location in which you want to save the project. Click **OK**. The QuickTest Custom Server Settings wizard opens.



HP QuickTest Custom Server - QuickTestCustomServer1

QuickTest Custom Server Settings

Helps you create a Custom Server to extend record and/or run support for custom .NET controls.

Server class name:

□ Customize Record process

□ Customize Run process

Replay interface name:

☑ Generate comments and sample code

5 Make your selections in the Application Settings page of the wizard.

- In the **Server class name** box, provide a descriptive name for your custom server class.
- Select the **Customize Record process** check box if you intend to implement the **Test Record** process in QuickTest.

  If you select the **Customize Record process** check box, the wizard creates a framework of code for the implementation of recording steps.

  Do not select this check box if you are going to create the test manually in QuickTest, or if you are going to use the **Test Record** functions of the parent test object to which this control will be mapped. Note that if you implement **Test Record**, the implementation replaces that of the parent object. You must implement all required **Test Record** functionality.

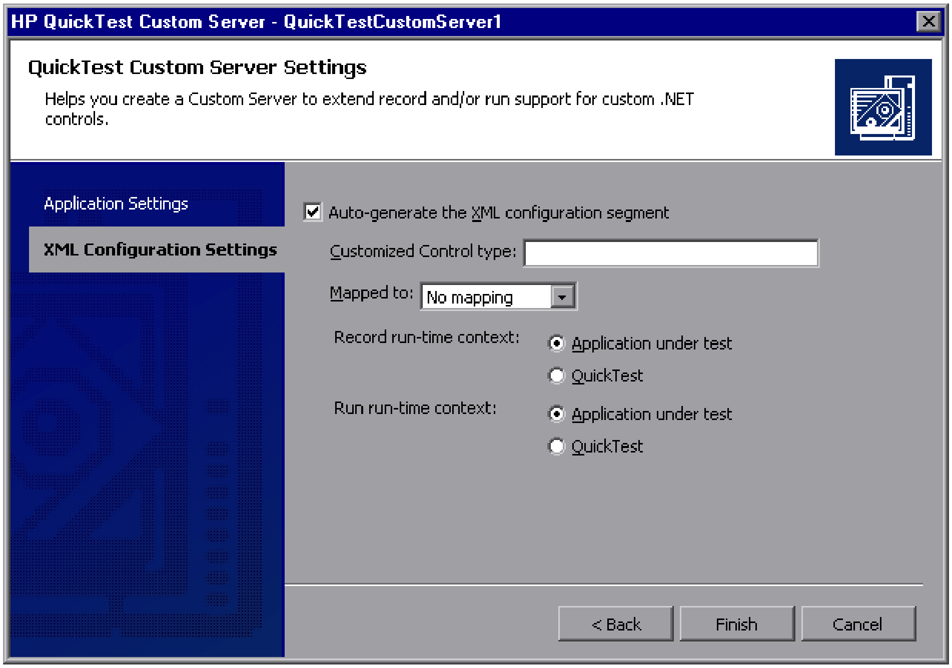
- Select the **Customize Run process** check box if you intend to implement the **Test Run** functions for the custom control. Enter a name for the replay interface you will create in the **Replay interface name** box.

  If you select the **Customize Run process** check box, the wizard creates a framework of code to implement **Test Run** support.

  Select the **Customize Run process** check box if you are going to override any of the existing test object's methods, or extend the test object with new methods.

- Select the **Generate comments and sample code** check box if you want the wizard to add comments and samples in the code that it generates.

6 Click **Next**. The XML Configuration Settings page of the wizard opens.



HP QuickTest Custom Server - QuickTestCustomServer1

QuickTest Custom Server Settings

Helps you create a Custom Server to extend record and/or run support for custom .NET controls.

☑ Auto-generate the XML configuration segment

Customized Control type:

Mapped to: No mapping

Record run-time context: ● Application under test ○ QuickTest

Run run-time context: ● Application under test ○ QuickTest

7 Make your selections in the XML Configuration Settings page of the wizard.

- Select the **Auto-generate the XML configuration segment** check box to instruct the wizard to create the **Configuration.xml** file, containing an XML segment with the configuration information for QuickTest.
- In the **Customized Control type** box, enter the full type name of the control for which you are creating the Custom Server, including all wrapping namespaces, for example, `System.Windows.Forms.CustomCheckBox`.
- In the **Mapped to** box, select the test object to which you want to map the Custom Server. If you select **No mapping**, the Custom Server is automatically mapped to the **SwfObject** test object.

  For more information, see "Understanding Test Object Mapping" on page 22.
- Select the run-time context for **Test Record** and/or **Test Run**: **Application under test** or **QuickTest**.

  For more information, see "Understanding Custom Server Run-Time Contexts" on page 20.

8 Click **Finish**. The wizard closes and the new project opens, ready for coding.

When you click **Finish** in the wizard, a **Configuration.xml** file is created and added to the project. When you are ready to use the Custom Server, update and modify the configuration information as required and transfer it to the QuickTest configuration file as described in "Using the XML Configuration Segment" on page 36.

Using the XML Configuration Segment

The XML configuration segment created by the wizard is used when the Custom Server is ready for deployment. Before using it, add the information that was not available when you created the project.

To use the XML configuration segment when configuring QuickTest:

1. Edit the **Configuration.xml** file in the project to ensure that the information is correct. Set the **DllName** element value to the location in which you will install the Custom Server. If **Test Record** and/or **Test Run** are to be loaded in different run-time contexts, edit the **Context** value accordingly.
2. Copy the entire <**Control**>**...**</**Control**> node. Do not include the enclosing <**Controls**> tags.
3. Open the QuickTest Professional .NET Add-in configuration file, <**QuickTest Professional**>**\dat\SwfConfig.xml**. Paste the **Control** node from **Configuration.xml** at the end of the file, before the closing </**Controls**> tag.
4. Save the file. If QuickTest was open, you must close and reopen it for the **SwfConfig.xml** changes to take effect.

   For more information, see “Configuring QuickTest to Use the Custom Server” on page 61.

Implementing Test Record for a Custom Control Using the .NET DLL

Recording a test on a control means listening to the activity of that control, translating that activity into test object method calls, and writing the method calls to the test. Listening to the activities on the control is done by listening to control events, hooking Windows messages, or both.

Note: If you plan to create tests using keyword-driven testing, and not by recording steps on an application, you do not need to implement **Test Record.**

To implement **Test Record**, implement the methods in the IRecord interface created by the wizard. Add all the functionality required by your application. Your **Test Record** implementation does not inherit from the parent test object to which the custom control is mapped. It replaces the parent object's **Test Record** implementation entirely. Therefore, if you need any of the parent object's functionality, code it explicitly.

Before reading this section, make sure you are familiar with "Understanding Custom Server Run-Time Contexts" on page 20.

For more information about the interfaces, classes, enumerations, and methods in this section, refer to the *QuickTest Professional .NET Add-in Extensibility API Reference* (available in the QuickTest Professional .NET Add-in Extensibility online Help).

This section describes:

- ➤ Implementing the IRecord Interface
- ➤ Writing Test Object Methods to the Test

Implementing the IRecord Interface

To implement the IRecord interface, override the call-back methods described in this section and add the details of your implementation in your event handlers or message handler. The examples provided in this guide are written in C#.

Callback Method InitEventListener

CustomServerBase.InitEventListener is called by QuickTest when your Custom Server is loaded. Add your event and message handlers using this method.

1 Implement handlers for the control's events.

A typical handler captures the event and writes a method to the test. This is an example of a simple event handler:

```
public void OnMouseDown(object sender, MouseEventArgs e)
{
    // Get the event.
    if(e.Button != System.Windows.Forms.MouseButtons.Left)
    return;
    /*
    For more complex events, here you would get any
    other information you need from the control.
    */
    // Write the test object method to the test
    RecordFunction("MouseDown",
    RecordingMode.RECORD_SEND_LINE,
    e.X,e.Y);
}
```

For more information, see "Writing Test Object Methods to the Test" on page 41.

2 Add your event handlers in InitEventListener:

```
public override void InitEventListener()
{
    .....
    // Adding OnMouseDown handler.
    Delegate  e = new MouseEventHandler(this.OnMouseDown);
    AddHandler("MouseDown", e);
    .....
}
```

Note that if **Test Record** will run in the **Application under test** context, you can use the syntax:

```
SourceControl.MouseDown += e;
```

If you use this syntax, you must release the handler in ReleaseEventListener.

3 Add a remote event listener.

If your Custom Server will run in the **QuickTest** context, use a remote event listener to handle events. Implement a remote listener of type EventListenerBase that handles the events, and add a call to AddRemoteEventListener in method InitEventListener.

```
public class EventsListenerAssist : EventsListenerBase
{
    // class implementation.
}
public override void InitEventListener()
{
    ...
    AddRemoteEventListener(typeof(EventsListenerAssist));
    ...
}
```

When you implement a remote event listener, you must override EventListenerBase.InitEventListener and EventListenerBase.ReleaseEventListener in addition to overriding these call-back functions in CustomServerBase. The use of these EventListenerBase call-backs is the same as for the CustomServerBase call-backs. For details, refer to the EventsListenerBase class in the *QuickTest Professional .NET Add-in Extensibility API Reference*.

Note that when you handle events from the **QuickTest** context, the event arguments must be serialized. For details, refer to CustomServerBase.AddHandler(*String, Delegate, Type*) and the IEventArgsHelper interface in the *QuickTest Professional .NET Add-in Extensibility API Reference*.

To avoid the complications of remote event listeners, run your event handlers in the **Application under test** context, as described above.

Callback Method OnMessage

OnMessage is called on any window message hooked by QuickTest. If **Test Record** will run in the **QuickTest** context and message handling is required, implement the message handling in this method.

If **Test Record** will run in the **Application under test** context, do not override this function.

For details, refer to CustomServerBase.OnMessage in the *QuickTest Professional .NET Add-in Extensibility API Reference*.

Callback Method GetWndMessageFilter

If **Test Record** will run in the **QuickTest** context and listen to windows messages, override this method to inform QuickTest whether the Custom Server will handle only messages intended for the specific custom object window, or whether it will handle messages from child windows, as well.

For details, refer to IRecord.GetWndMessageFilter in the *QuickTest Professional .NET Add-in Extensibility API Reference*.

Callback Method ReleaseEventListener

QuickTest calls this method at the end of the recording session. In ReleaseEventListener, unsubscribe from all the events to which the Custom Server was listening. For example, if you subscribe to **OnClick** in InitEventListener with this syntax,

```
SourceControl.Click += new EventHandler(this.OnClick);
```

you must release it:

```
public override void ReleaseEventListener()
{
    ....
    SourceControl.Click -= new EventHandler(this.OnClick);
    ....
}
```

However, if you subscribe to the event with the AddHandler method, QuickTest unsubscribes automatically.

Writing Test Object Methods to the Test

When information about activities of the control is received, whether in the form of events, Windows messages, or a combination of both, this information must be processed as appropriate for the application and a step must be written as a test object method call.

To write a test step, use the RecordFunction method of the CustomServerBase class or the EventsListenerBase, as appropriate.

Sometimes, it is impossible to know how an activity should be processed until the next activity occurs. Therefore, there is a mechanism for storing a step and deciding in the subsequent call to **RecordFunction** whether to write it to the test. For details, refer to RecordingMode Enumeration in the *QuickTest Professional .NET Add-in Extensibility API Reference*.

To determine the parameter values for the test object method call, it may be necessary to retrieve information from the control that is not available in the event arguments or Windows message. If the Custom Server **Test Record** object is running in the **Application under test** context, use the **SourceControl property** of the CustomServerBase class to obtain direct access to the public members of the control. If the control is not thread-safe, use the **ControlGetProperty** method to retrieve control state information.

Implementing Test Run for a Custom Control Using the .NET DLL

Defining test object methods for **Test Run** means specifying the actions to perform when the method is encountered in a step. Typically, the implementation of a test object method performs several of the following actions:

- Sets the values of attributes of the control object
- Calls a method of the control object
- Makes mouse and keyboard simulation calls
- Reports a step outcome to QuickTest

- Reports an error to QuickTest
- Makes calls to another library (to show a message box, write custom log, and so forth)

The custom control is mapped to a parent QuickTest test object. If there is no explicit mapping, it is mapped to **SwfObject**. The test object type that supports the custom control is the new type that consists of the members of the parent object (or overrides of those members), and new members added by this Custom Server.

Define custom **Test Run** methods if you are overriding existing methods of the parent test object, or if you are extending the parent test object by adding new methods.

Ensure that all test object methods recorded are implemented in **Test Run**, either by the parent test object, or by this Custom Server.

To define custom **Test Run** methods, define an interface and instruct QuickTest identify it as the **Test Run** interface by applying the ReplayInterface attribute to it. Only one replay interface can be implemented in a Custom Server. If your interface defines methods with the same names as existing methods of the parent object, the interface methods override the test object implementation. Any method name that is different from parent object's method name is added as a new method.

Start a test object method implementation with a call to PrepareForReplay, specify the activities to perform, and end with a call to ReplayReportStep and/or ReplayThrowError.

For more information, refer to the *QuickTest Professional .NET Add-in Extensibility API Reference* (available in the QuickTest Professional .NET Add-in Extensibility online Help).

Running Code under Application Under Test from the QuickTest Context

When the Custom Server is running in the **QuickTest** context, there is no direct access to the control, which is in a different run-time process. To access the control directly, run part of the code in the **Application under test** context.

To launch code from the **QuickTest** context that will run under the **Application under test** context, implement an assistant class that inherits from CustomAssistantBase. To create an instance of an assistant class, call CreateRemoteObject. Before using the object, attach it to the control with SetTargetControl.

After SetTargetControl is called, you can call methods of the assistant in one of the following ways:

If the method can run in any thread of the **Application under test** process, read and set control values and call control methods with the simple **obj.Member** syntax:

```
int i = oMyAssistant.Add(1,2);
```

If the method must run in the control’s thread, use the InvokeAssistant method:

```
int i = (int)InvokeAssistant(oMyAssistant, "Add", 1, 2);
```

Tip: You can use the EventListenerBase, which is an assistant class that supports listening to control events.

API Overview

This section provides a quick reference of the most commonly used API calls.

For more information, refer to the *QuickTest Professional .NET Add-in Extensibility API Reference* (available in the QuickTest Professional .NET Add-in Extensibility online Help).

Test Record Methods

AddHandler	Adds an event handler as the first handler of the event.
RecordFunction	Records a step in the test.

Test Record Callback Methods

GetWndMessageFilter	Called by QuickTest to set the Windows message filter.
InitEventListener	Called by QuickTest to load event handlers and start listening for events.
OnMessage	Called when QuickTest hooks the window message.
ReleaseEventListener	Stops listening for events.

Test Run Methods

DragAndDrop, KeyDown, KeyUp, MouseClick, MouseDblClick, MouseDown, MouseMove, MouseUp, PressKey, PressNKeys, SendKeys, SendString	Mouse and keyboard simulation methods.
PrepareForReplay	Prepares the control for an action run.
ReplayReportStep	Writes an event to the test report.
ReplayThrowError	Generates an error message and changes the reported step status.
ShowError	Displays the .NET warning icon.
TestObjectInvokeMethod	Invokes one of the methods exposed by the test object's IDispatch interface.

Cross-Process Methods

AddRemoteEventListener	Creates an **EventListener** instance in the **Application under test** process.
CreateRemoteObject	Creates an instance of an **Assistant** object in the **Application under test** process.
GetEventArgs (IEventArgs)	Retrieves and deserializes the **EventArgs** object.
Init (IEventArgsHelper)	Initializes the **EventArguments** helper class with an **EventArgs** object.
InvokeAssistant	Invokes a method of a **CustomAssistantBase** class in the control's thread.
InvokeCustomServer	Invokes the Custom Server’s methods running in the **QuickTest** process from the **Application under test** process.
SetTargetControl	Attaches to the source control object by the control's window handle.

General Methods

ControlGetProperty	Retrieves a property of a control that is not thread-safe.
ControlInvokeMethod	Invokes a method of a control that is not thread-safe.
ControlSetProperty	Sets a property of a control that is not thread-safe.
GetSettingsValue	Gets a parameter value from the settings of this control in the configuration file.
GetSettingsXML	Returns the settings of this control as entered in the configuration file.

4

Using an XML File to Extend Support for a Custom Control

You can extend support for a customized .NET control using an XML file. This enables you to extend support without a program development environment.

This chapter includes:

About Using an XML File to Extend Support for a Custom Control

You can implement custom control support without programming a .NET DLL by entering the appropriate **Test Record** and **Test Run** instructions in a Control Definition XML file. You can instruct QuickTest Professional to load the instructions by pointing to this control definition file in the QuickTest configuration file, **SwfConfig.xml**.

When using this technique, you do not have the support of the .NET development environment—the object browser and the debugger. However, by enabling the implementation of custom control support without the .NET development environment, this technique enables relatively rapid implementation, even in the field.

This feature is most practical either with relatively simple, well documented controls, or with controls that map well to an existing object but for which you need to replace the **Test Record** definitions, or replace or add a small number of test object **Test Run** methods.

Understanding the Control Definition XML File

The Control Definition XML file specifies the control events to be captured during recording and to be used to generate steps to be written to the test. These steps are calls to methods of the custom control's test object. The file also specifies the operations QuickTest performs for each method during **Test Run**. You do not always need to enter both a **Record** and a **Run** element.

If the custom object is mapped to a parent test object that implements either all the required **Test Record** methods or all the required **Test Run** methods, you do not need to create the section of the definition file that defines that element.

If you create a **Record** element, the definitions replace the **Test Record** implementation of the parent object entirely. If you create a **Run** element, it inherits the **Test Run** implementation of the parent object and extends it. For more information on test object mapping options, see "Understanding Test Object Mapping" on page 22.

The structure of the Control Definition XML file is:

```
<?xml version="1.0" encoding="UTF-8" ?>
<Customization>
    <Record>
        <Events>
            <!-- There are 1 to n Event elements -->
            <Event name="controlEventName" enabled="true|false">
                <RecordedCommand name="theCommandName">
                    <!-- There are 0 to n Parameter elements -->
                    <Parameter> param</Parameter>
                </RecordedCommand>
            </Event>
        </Events>
    </Record>
    <Replay>
        <Methods>
            <!-- There are 1 to n Method elements -->
            <Method name="theCommandName">
                <Parameters>
                    <!-- There are 0 to n Parameter elements -->
                    <Parameter type="theDataType" name="param 1
                        name"></Parameter>
                </Parameters>
                <MethodBody>theCommand</MethodBody>
            </Method>
        </Methods>
    </Replay>
</Customization>
```

Control Definition File Elements

- **Customization.** The root element.
- **Record.** Information on the conversion of events to test steps.
- **Events.** Collection of Event elements.
- **Event.** Contains the information needed to convert a specific event to a step in a test. It contains the following attributes:
  - **name.** The name of the control event.
  - **enabled.** Indicates whether recording is active for this event. Can be true or false.
- **RecordedCommand.** Defines the step to be written when the event described in the parent **Event** element is received. Has the following attribute:
  - **name.** The test object method name to write to the test.
- **Parameter.** Each **Parameter** element defines a parameter to be written to the test after the **name** of the **RecordedCommand**. The parameters are written to the test in the order in which they are defined in the Control Definition XML file.

  A **Parameter** element may contain a single line of text content that will be evaluated and then written to the test. Alternatively, it may contain a short section of code to be run to produce the value to be written. In this case, the **lang** attribute must be specified, and the final value must be assigned to the return value variable, **Parameter**.

  You can use the following reserved words in a **Parameter** element:
  - **Sender.** The object that fired the event.
  - **EventArgs.** The object that represents **EventArgs** parameter of the Event Handler.
  - **Parameter.** The return value of the code.

  You can specify the following optional attribute in a **Parameter** element:
  - **lang.** If the element contains code, the **lang** attribute specifies the programming language. Currently, C# is supported.

- **Replay.** Information on the conversion of test object methods to the activities to be performed during the **Test Run** session.
- **Methods.** Collection of **Method** elements.
- **Method.** Defines a method added to the test object interface. It has the following attribute:
  - **name.** The test object method name.
- **Parameters.** Collection of **Parameter** elements.
- **Parameter.** Each **Parameter** element contains instructions for reading a command line parameter from the test. The order of **Parameter** elements must be the same as the order of the command line parameters in the script.

  These parameters are used in the **MethodBody** element to create the method call. Each parameter element has the following attributes:
  - **type.** The data type of the value as it will be used in the **MethodBody**.
  - **name.** The name by which to refer to the value in the **MethodBody.**
- **MethodBody.** A series of C# instructions to perform when the test object method is executed.

  The reserved word **RtObject** refers to the run-time object.

Example of a Control Definition XML File

The following example shows the handling of an object whose value changes at each **MouseUp** event. The value is in the **Value** property of the object. The **MouseUp** event handler has **Button, Clicks, Delta, X,** and **Y** event arguments.

The **Record** element describes the conversion of the **MouseUp** event to a **SetValue** command. The **Replay** mode defines the **SetValue** command as setting the value of the object to the recorded Value and displaying the position of the mouse pointer for debugging purposes.

```
<?xml version="1.0" encoding="UTF-8"?>
<Customization>
    <Record>
        <Events>
            <Event name="MouseUp" enabled="true">
                <RecordedCommand name="SetValue">
                    <Parameter>
                        Sender.Value
                    </Parameter>
                    <Parameter lang="C#">
                        String xy;
                        xy = EventArgs.X + ";" + EventArgs.Y;
                        Parameter = xy;
                    </Parameter>
                </RecordedCommand>
            </Event>
        </Events>
    </Record>
    <Replay>
        <Methods>
            <Method name="SetValue">
                <Parameters>
                    <Parameter type="int" name="Value"/>
                    <Parameter type="String" name="MousePosition"/>
                </Parameters>
                <MethodBody>
                    RtObject.Value = Value;
                    System.Windows.Forms.MessageBox.Show(MousePosition,
                        "Mouse Position at Record Time");
                </MethodBody>
            </Method>
        </Methods>
    </Replay>
</Customization>
```

5

Using Test Object Configuration Files

You can use test object configuration files to enable additional functionality for custom methods and properties.

This chapter includes:

About Using Test Object Configuration Files

Test object configuration files contain definitions of test object classes (for example, their identification properties, the test object methods they support, and so forth). You create a test object configuration file according to a specific XML schema, and then place the XML file in a specific location on the QuickTest computer.

You can choose to implement one or multiple test object configuration files (or none, if not needed). For example, you can define custom methods for one test object class in one test object configuration file, and custom methods for another test object class in a different test object configuration file. You can also choose to define a group of custom methods for a test object class in one test object configuration file, and another group of custom methods for the same test object class in a different test object configuration file.

Each time you open QuickTest, it reads all of the test object configuration files and merges the information for each test object class from the different files into a single test object class definition. For more information, see "Understanding How QuickTest Merges Configuration Files" on page 56.

Guidelines for Implementing Test Object Configuration Files

Implementation of a test object configuration file is optional. If you choose not to implement the test object configuration file, the test object methods and properties defined in the .NET Custom Server DLL or Control Definition XML files will work as expected, but some additional functionality will be missing. For example, custom methods will not be displayed in IntelliSense, and they will not have tooltips, custom icons, context-sensitive Help, or documentation in the Keyword View Documentation column.

By creating a test object configuration file, you can implement the additional functionality described above. When you add a custom method or property to the test object configuration file, the definition is added to the existing definition of this test object class, affecting all objects of this class.

For example, if you add an identification property, it appears in QuickTest in the list of properties for all objects of this class, but has no value unless it is implemented for the specific control. If you specify that the identification property should be available for use in checkpoints, and you create a checkpoint on this property in a test, the checkpoint will fail if the identification property does not exist in the relevant control.

If you add a test object method, it is displayed in IntelliSense list of test object methods in QuickTest, but if you use the test object method in a test, and it is not supported for the relevant control, a run-time error occurs. For this reason, you should only define custom methods and properties in the test object configuration file if you want them to be available for all test objects of the specified class. This is because after you implement the test object configuration file, custom methods and properties are automatically displayed in IntelliSense for all test objects of the relevant class, even if they are not supported or relevant for a specific test object. Test designers may use a custom method in a test step without realizing that it is not relevant for a specific test object, and then the test run will fail.

Tip: It is recommended that you add a unique prefix to all custom method and property names so that test designers can easily identify the custom methods and properties and use them in test steps only if they know that the custom method or property is supported for the specific test object.

You must also make sure that the information you define in the test object configuration file exactly matches the corresponding information defined in the .NET Custom Server DLL or Control Definition XML files. For example, the test object method names must be exactly the same in both locations. Otherwise, the methods will appear to be available (for example, in IntelliSense) but they will not work, and, if used, the run session will fail.

Note: When you modify a test object configuration file, the changes take effect only after you restart QuickTest.

Understanding How QuickTest Merges Configuration Files

Each time you open QuickTest, it reads all of the test object configuration files located in the <**QuickTest installation folder**>**\dat\Extensibility\**<**QuickTest add-in name**> folders. QuickTest then merges the information for each test object class from the different files into a single test object class definition, according to the priority of each test object configuration file.

You define the priority of each test object configuration file using the **Priority** attribute of the **TypeInformation** element.

Notes:

- If the priority of a test object configuration file is higher than the existing class definitions, it overrides any existing test object class definitions, including built-in QuickTest information. For this reason, be aware of any built-in functionality that will be overridden before you change the priority of a test object configuration file.
- QuickTest ignores the definitions in a test object configuration files in the following situations:
  a. The **Load** attribute of the **TypeInformation** element is set to false.
  b. The environment relevant to the test object configuration file is displayed in the Add-in Manager dialog box, and the QuickTest user selects not to load the environment.

When multiple test object class definitions exist, QuickTest must handle any conflicts that arise. The following sections describe the process QuickTest follows when **ClassInfo**, **ListOfValues**, and **Operation** elements are defined in multiple test object configuration files. All of the **IdentificationProperty** elements for a specific test object class must be defined in only one test object configuration file.

ClassInfo Elements

- If a **ClassInfo** element is defined in a test object configuration file with a priority higher than the existing definition, the information is appended to any existing definition. If a conflict arises between **ClassInfo** definitions in different files, the definition in the file with the higher priority overrides (replaces) the information in the file with the lower priority.
- If a **ClassInfo** element is defined in a test object configuration file with a priority that is equal to or lower than the existing definition, the differing information is appended to the existing definition. If a conflict arises between **ClassInfo** definitions in different files, the definition in the file with the lower priority is ignored.

ListOfValues Elements

- If a conflict arises between **ListOfValues** definitions in different files, the definition in the file with the higher priority overrides (replaces) the information in the file with the lower priority (the definitions are not merged).
- If a **ListOfValues** definition overrides an existing list, the new list is updated for all arguments of type **Enumeration** that are defined for operations of classes in the same test object configuration file.
- If a **ListOfValues** is defined in a configuration file with a lower priority than the existing definition, the lower priority definition is ignored.

Operation Elements

- **Operation** element definitions are either added, ignored, or overridden, depending on the priority of the test object configuration file.
- If an **Operation** element is defined in a test object configuration file with a priority higher than the existing definition, the operation is added to the existing definition for the class. If a conflict arises between **Operation** definitions in different files, the definition in the file with the higher priority overrides (replaces) the definition with the lower priority (the definitions are not merged).

For more information on the elements in a test object configuration file, see the *QuickTest Test Object Schema Help* (available with the .NET Add-in Extensibility SDK online Help).

Understanding the Test Object Configuration File

The test object configuration file contains information on test object classes, methods, and properties and enables additional functionality that cannot be implemented in the .NET Custom Server DLL or Control Definition XML files. The test object configuration file follows a defined XML schema and is used in conjunction with the .NET Custom Server DLL or Control Definition XML files.

A test object configuration file can include the following:

- The name of the test object class and its attributes
- The icon to use for the test object class in the Keyword View, Step Generator, Test Results, and object repository (Optional. If not defined, the default test object icon is used.)
- The methods for the test object class, including the following information for each method:
    - The arguments, including the argument type and direction
    - Whether the argument is mandatory, and, if not, its default value
    - The description (shown as a tooltip in the Keyword View, Expert View, and Step Generator)
    - The documentation string (shown in the Documentation column of the Keyword View and in the Step Generator)
    - The return value type
- The test object method that is selected by default in the Keyword View and Step Generator when a step is generated for a test object of this class
- The identification properties that are available for use in checkpoints
- The context-sensitive help topic to open when F1 is pressed on a selected object or method in the Keyword View and Expert View, or when the **Operation Help** button is clicked for a specific method in the Step Generator

The following example shows parts of the **SwfObject** test object class definition in a test object configuration file. The example shows that the **SwfObject** is extended by adding a **Set** method. The method has one argument (**Percent**, which defines the percentage to set in the control), and it also has a documentation string that appears in the Keyword View.

```
</TypeInformation>
...
    <ClassInfo Name="SwfObject"
    ...
        <TypeInfo>
            <Operation Name="Set" PropertyType="Method"
                ExposureLevel="CommonUsed">
                <Description>Set the percentage in the task bar</Description>
                <Documentation><![CDATA[Set the %l %t to <Percent> percent.]]>
                    </Documentation>
                <Argument Name="Percent" IsMandatory="true" Direction="In">
                    <Type VariantType="Integer"/>
                    <Description>The percentage to set in the task bar.
                        </Description>
                </Argument>
            </Operation>
        </TypeInfo>
    </ClassInfo>
</TypeInformation>
```

For information on the structure and syntax of the test object configuration file, refer to the *QuickTest Test Object Schema Help* (available in the QuickTest Professional .NET Add-in Extensibility online Help).

Deploying the Test Object Configuration File

After you create the test object configuration file, you must deploy it by placing it in the correct location, so that the test object definitions are available to QuickTest. Make sure that QuickTest is closed, and then place the test object configuration files in the <**QuickTest installation folder**>**dat****Extensibility****DotNet** folder. If the QuickTest Add-in for Quality Center is installed, you must also place the test object configuration files in the <**QuickTest Add-in for Quality Center installation folder**>**Dat****Extensibility****DotNet** folder.

Each time you open QuickTest, it reads all of the test object configuration files in this location and merges the information for each test object class from the different files into a single test object definition.

6

Configuring QuickTest to Use the Custom Server

The QuickTest System Windows Forms Configuration File provides QuickTest with all the information necessary to load your Custom Server with the required configuration.

This chapter includes:

About Configuring QuickTest to Use the Custom Server

To instruct QuickTest to load Custom Servers and to define the required configuration for QuickTest, enter the information in the QuickTest System Windows Forms Configuration File. The configuration file, **SwfConfig.xml**, is located in the **<QuickTest Professional installation path>\dat** folder.

Each control is configured in a **Control** node in the file.

Important: QuickTest loads the Custom Server when you open a test. Therefore, if you implement your Custom Server as a .NET DLL, any changes you make to the DLL after the Custom Server is loaded take effect only the next time you open a test.

Understanding the QuickTest System Windows Forms Configuration File

The structure of the **SwfConfig.xml** file is as follows:

```
<?xml version="1.0" encoding="UTF-8"?>
<Controls>
    <Control Type=" " MappedTo=”” >
        <CustomRecord>
            <Component>
                <Context> </Context>
                <DllName></DllName>
                <TypeName></TypeName>
            </Component>
        </CustomRecord>
        <CustomReplay>
            <Component>
                <Context></Context>
                <DllName></DllName>
                <TypeName></TypeName>
            </Component>
        </CustomReplay>
        <Settings>
            <Parameter Name=""> </Parameter>
        </Settings>
    </Control>
</Controls>
```

Configuration File Elements

- **?xml.** The XML declaration, version="1.0" encoding="UTF-8”?, is required.
- **Controls.** The root element.
- **Control.** The information required to support a custom control.

  Attributes:

  - **Type.** The custom control’s full type including wrapping namespaces, for example, System.Windows.Forms.CustomCheckBox.
  - **MappedTo.** Optional. A QuickTest test object class containing behaviors that are similar to those that your Custom Server will inherit, for example, **SwfCheckBox** or **SwfButton**.
- **Settings.** This element is generally a collection of **Parameter** elements. (For .NET DLL Custom Servers, the element is optional.)

  The first use is to pass information for the internal use of your Custom Server. This use is optional. You can use these parameters for any purpose appropriate to your application. You may also use a different structure—you are not bound to a collection of **Parameter** elements. However, if you use a different structure, you must parse it yourself in code, whereas the collection of **Parameter** elements has straightforward support in the API.

  The second use is required when extended control support is implemented with XML, and you must use the collection of **Parameter** elements. The full path and name of the XML file containing the implementation of the extended control support is passed in a **Parameter** element where the **Name** attribute is ConfigPath and the value of the element is the file path name.
- **Parameter.** A value to be passed to the Custom Server at run time.
  - **Name.** The name of the **Parameter**.
- **CustomRecord.** The information required for **Test Record**.
- **CustomReplay.** The information required for **Test Run**.

  The **CustomRecord** and **CustomReplay** nodes both contain a **Component** node. Not all **Component** sub-elements apply to both processes.
- **Component.** The Custom Server component data.

- **Context.** The Custom Server run-time context and the coding option.
  - **AUT.** The run-time context is the **Application under test** process. The support is implemented as a .NET DLL Custom Server.
  - **QTP.** The run-time context is the **QuickTest** process. The support is implemented as a .NET DLL Custom Server.
  - **AUT-XML.** The run-time context is the **Application under test** process. The support is implemented in an XML file.
- **DllName.** The filename of the DLL in which the user's class type is defined. Applies to the .NET DLL coding option only. You can use the full path and file name. Alternatively, if the Custom Server assembly is installed in the global assembly cache (GAC), pass the type name with the standard syntax, for example:

  ```
  myQTCustomServer
  ```

  or

  ```
  myQTCustomServer, Version=1.0.1234.0
  ```

  or

  ```
  myQTCustomServer, Version=1.0.1234.0, Culture="en-US",
  PublicKeyToken=b77a5c561934e089c
  ```

- **TypeName.** The name of the type created by the Custom Server, including wrapping namespaces. Applies to the .NET DLL coding option only.

Example of a Configuration XML File

Following is an example of a file that configures QuickTest to recognize two controls.

Support for the **CustomMyListView.CustListView** control is implemented in a .NET DLL Custom Server. **MyListView** is mapped to the SwfListView test object, and runs in the **Application under test** context. The Custom Server is not installed in the GAC.

Support for the **mySmileyControls.SmileyControl2** control is implemented in an XML file.

```
<?xml version="1.0" encoding="UTF-8"?>
<Controls>
    <Control
            Type="MyCompany.WinControls.MyListView “
            MappedTo="SwfListView" >
        <CustomRecord>
            <Component>
                <Context>AUT</Context>
                <DllName>C:\MyProducts\Bin\CustomMyList View.dll</DllName>
                <TypeName>CustomMyListView.CustListView</TypeName>
            </Component>
        </CustomRecord>
        <CustomReplay>
            <Component>
                <Context>AUT</Context>
                <DllName>C:\MyProducts\Bin\CustomMyList View.dll</DllName>
                <TypeName>CustomMyListView.CustListView</TypeName>
            </Component>
        </CustomReplay>
        <Settings>
            <Parameter Name="sample name">sample value</Parameter>
        </Settings>
    </Control>
```

```
        <Control Type="mySmileyControls.SmileyControl2">
            <Settings>
                <Parameter Name="ConfigPath">d:\Qtp\bin\ConfigSmiley.xml
                </Parameter>
            </Settings>
            <CustomRecord>
                <Component>
                    <Context>AUT-XML</Context>
                </Component>
            </CustomRecord>
            <CustomReplay>
                <Component>
                    <Context>AUT-XML</Context>
                </Component>
            </CustomReplay>
        </Control>
    </Controls>
```

7

Tutorial - Step-by-Step Basic Example

In this tutorial, you will learn how to build a Custom Server for a Microsoft TrackBar control that enables QuickTest Professional to record and run a **SetValue** operation on the control. You will implement the Custom Server in C#. A Custom Server can be similarly implemented in Visual Basic.

This tutorial refers to Visual Studio .NET. However, you can use also Visual Studio 2005 to build the Custom Server as described in this tutorial.

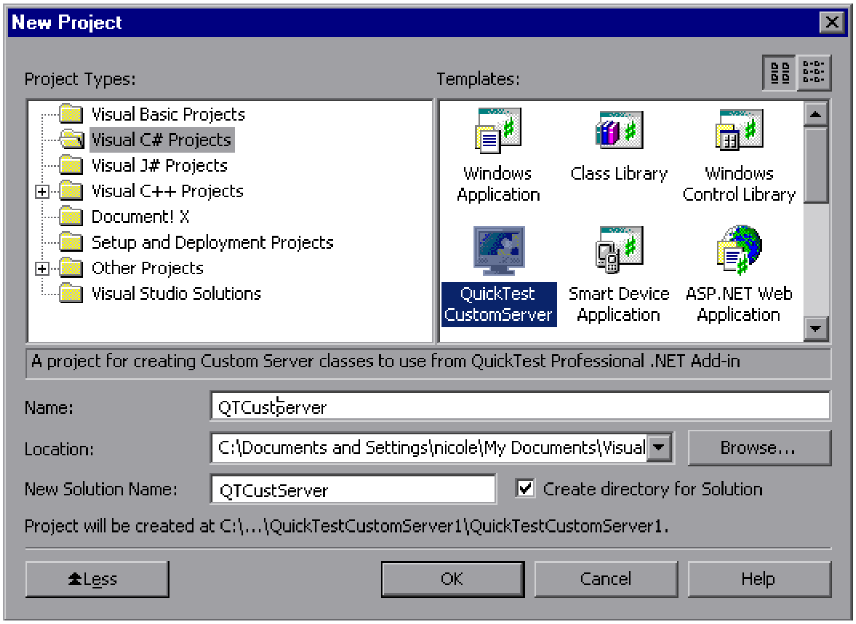
This chapter includes:

Creating a New Custom Server Project

The first step in creating support for the TrackBar control is to create a new Custom Server project.

To create a new Custom Server project:

1. Open Microsoft Visual Studio .NET.
2. Select **File** > **New** > **Project**. The New Project dialog box opens.



New Project

Project Types:

- Visual Basic Projects
- Visual C# Projects
- Visual J# Projects
- Visual C++ Projects
- Document! X
- Setup and Deployment Projects
- Other Projects
- Visual Studio Solutions

Templates:

- Windows Application
- Class Library
- Windows Control Library
- QuickTest CustomServer
- Smart Device Application
- ASP.NET Web Application

A project for creating Custom Server classes to use from QuickTest Professional .NET Add-in

Name: QTCustServer

Location: C:\Documents and Settings\nicole\My Documents\Visual

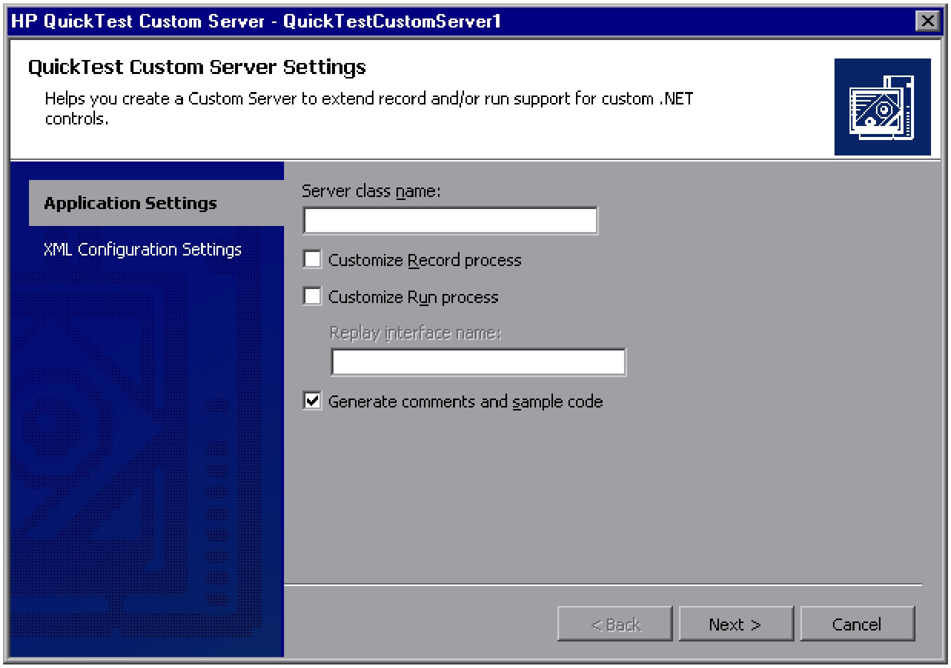
New Solution Name: QTCustServer

☑ Create directory for Solution

Project will be created at C:\...\QuickTestCustomServer1\QuickTestCustomServer1.

3. Specify the following settings:
   - ➤ Select **Visual C# Projects** in the **Project Types** pane.
   - ➤ Select **QuickTest CustomServer** in the **Templates** pane.
   - ➤ In the **Name** box, specify the project name QTCustServer.
   - ➤ In the **Location** box, specify the location in which to save your project.
   - ➤ Accept the rest of the default settings.

4 Click **OK**. The QuickTest Custom Server Settings wizard opens.



HP QuickTest Custom Server - QuickTestCustomServer1

QuickTest Custom Server Settings

Helps you create a Custom Server to extend record and/or run support for custom .NET controls.

Server class name:

□ Customize Record process

□ Customize Run process

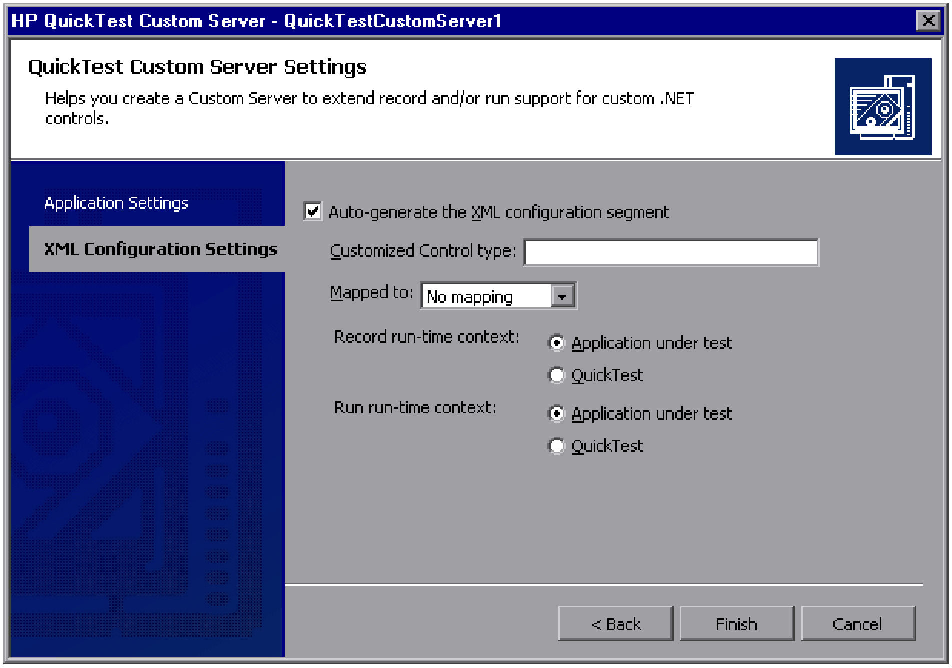
Replay interface name:

☑ Generate comments and sample code

5 In the Application Settings page, specify the following settings:

- In the **Server class name** box, enter TrackBarSrv.
- Select the **Customize Record process** check box.
- Select the **Customize Run process** check box.
- Accept the rest of the default settings.

6 Click **Next**. The XML Configuration Settings page opens.



HP QuickTest Custom Server - QuickTestCustomServer1

QuickTest Custom Server Settings

Helps you create a Custom Server to extend record and/or run support for custom .NET controls.

Application Settings

XML Configuration Settings

☑ Auto-generate the XML configuration segment

Customized Control type:

Mapped to: No mapping

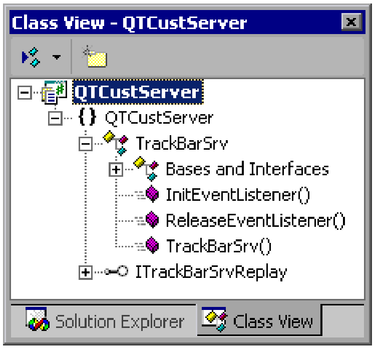
Record run-time context: ● Application under test ○ QuickTest

Run run-time context: ● Application under test ○ QuickTest

7 In the XML Configuration Settings page, specify the following settings:

- Make sure the **Auto-generate the XML configuration segment** check box is selected.
- In the **Customized Control type** box, enter System.Windows.Forms.TrackBar.
- Accept the rest of the default settings.

8 Click **Finish**. In the Class View window, you can see that the wizard created a **TrackBarSrv** class derived from the **CustomServerBase** class and **ITrackBarSrvReplay** interface.



Implementing Test Record Logic

You will now implement the logic that records a **SetValue(X)** command when a **ValueChanged** event occurs, using an event handler function.

To implement the Test Record logic:

1 Add a new method with the following signature to the **TrackBarSrv** class:

```
public void OnValueChanged(object sender, EventArgs e) { }
```

Note: You can add the new method manually or use the wizard that Visual Studio provides for adding methods and functions to a class.

2 Add the following implementation to the function you just added:

```
public void OnValueChanged(object sender, EventArgs e)
{
 System.Windows.Forms.TrackBar trackBar =
(System.Windows.Forms.TrackBar)sender;
 // get the new value
 int newValue = trackBar.Value;
 // Record SetValue command to the test
 RecordFunction("SetValue", RecordingMode.RECORD_SEND_LINE,
newValue);
}
```

3 Register the OnValueChanged event handler for the ValueChanged event, by adding the following code to the InitEventListener method:

```
public override void InitEventListener()
{
  Delegate e = new System.EventHandler(this.OnValueChanged);
  AddHandler("ValueChanged", e);
}
```

Implementing Test Run Logic

You will now implement a **SetValue** method for the test **Test Run**.

To implement the Test Run logic:

1 Add the following method definition to the **ITrackBarSrvReplay** interface:

```
[ReplayInterface]
public interface ITrackBarSrvReplay
{
   void SetValue(int newValue);
}
```

2 Add the following method implementation to the **TrackBarSrv** class:

```
public void SetValue(int newValue)
{
 System.Windows.Forms.TrackBar trackBar =
(System.Windows.Forms.TrackBar)SourceControl;
 trackBar.Value = newValue;
}
```

3 Build your project.

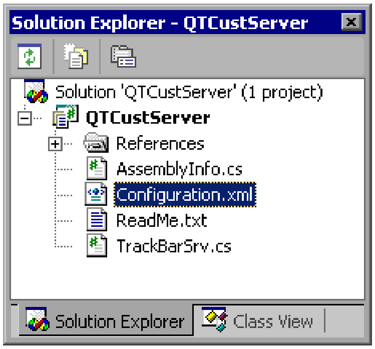
Note: You can see the full source code of the **TrackBarSrv** class in "Understanding the TrackBarSrv.cs File" on page 76.

Configuring QuickTest Professional

Now that you created the QuickTest Custom Server, you need to configure QuickTest Professional to use this Custom Server when recording and running tests on the TrackBar control.

To configure QuickTest Professional to use the Custom Server:

1 In the Solution Explorer window, click the **Configuration.XML** file.



The following content should be displayed:

```
<!-- Merge this XML content into file "<QuickTest Professional>\dat\
  SwfConfig.xml". -->
  <Control Type="System.Windows.Forms.TrackBar">
    <CustomRecord>
      <Component>
        <Context>AUT</Context>
        <DllName>D:\Projects\QTCustServer\Bin\QTCustServer.dll
          </DllName>
        <TypeName>QTCustServer.TrackBarSrv</TypeName>
      </Component>
    </CustomRecord>
    <CustomReplay>
      <Component>
        <Context>AUT</Context>
        <DllName>D:\Projects\QTCustServer\Bin\QTCustServer.dll
          </DllName>
        <TypeName>QTCustServer.TrackBarSrv</TypeName>
      </Component>
    </CustomReplay>
    <!--<Settings>
       <Parameter Name="sample name">sample value</Parameter>
    </Settings> -->
  </Control>
```

2 Select the <**Control**>...</**Control**> segment and select **Edit** > **Copy** from the menu.

3 Open the **SwfConfig.xml** file located in <**QuickTest Professional installation folder**>**dat**.

4 Paste the <**Control**>...</**Control**> segment you copied from **Configuration.xml** into **SwfConfig.xml**, under the <**Controls**> tag in **SwfConfig.xml**. After you paste the segment, the **SwfConfig.xml** file should look as follows:

```
<?xml version="1.0" encoding="UTF-8"?>
<Controls>
    <Control Type="System.Windows.Forms.TrackBar">
        <CustomRecord>
            <Component>
                <Context>AUT</Context>
                <DllName>D:\Projects\QTCustServer\Bin\QTCustServer.dll
                    </DllName>
                <TypeName>QTCustServer.TrackBarSrv</TypeName>
            </Component>
        </CustomRecord>
        <CustomReplay>
            <Component>
                <Context>AUT</Context>
                <DllName>D:\Projects\QTCustServer\Bin\QTCustServer.dll
                    </DllName>
                <TypeName>QTCustServer.TrackBarSrv</TypeName>
            </Component>
        </CustomReplay>
    </Control>
</Controls>
```

5 Make sure that the <**DllName**> elements contain the correct path to your Custom Server DLL.

6 Save the **SwfConfig.xml** file.

Testing the Custom Server

You can now verify that QuickTest records and runs tests as expected on the custom TrackBar control.

To test the Custom Server:

1. Open QuickTest Professional with the .NET Add-in loaded.
2. Start recording on a .NET application with a **System.Windows.Forms.TrackBar** control.
3. Click the **TrackBar** control. QuickTest should record commands such as:

   ```
   SwfWindow("Form1").SwfObject("trackBar1").SetValue 2
   ```
4. Run the test. The TrackBar control should receive the correct values.

Understanding the TrackBarSrv.cs File

Following is the full source code for the **TrackBarSrv** class.

```
using System;
using Mercury.QTP.CustomServer;

namespace QTCustServer
{
    [ReplayInterface]
    public interface ITrackBarSrvReplay
    {
        void SetValue(int newValue);
    }
    public class TrackBarSrv:
        CustomServerBase,
        ITrackBarSrvReplay
    {
        public TrackBarSrv()
        {
        }
```

```
        public override void InitEventListener()
        {
            Delegate  e = new System.EventHandler(this.OnValueChanged);
            AddHandler("ValueChanged", e);
        }

        public override void ReleaseEventListener()
        {
        }

        public void OnValueChanged(object sender, EventArgs e)
        {
            System.Windows.Forms.TrackBar trackBar =
                            (System.Windows.Forms.TrackBar)sender;
            int newValue = trackBar.Value;
            RecordFunction("SetValue",
                            RecordingMode.RECORD_SEND_LINE,
                            newValue);
        }

        public void SetValue(int newValue)
        {
            System.Windows.Forms.TrackBar trackBar =
                            (System.Windows.Forms.TrackBar)SourceControl;
            trackBar.Value = newValue;
        }
    }
}
```

8

Tutorial - Advanced Example

In this tutorial, you will learn how to build a Custom Server for controls that require more complex implementation solutions, so that QuickTest Professional can record and run operations on these controls. You will implement the Custom Server in C#. A Custom Server can be similarly implemented in Visual Basic.

The explanations in this chapter assume that you are familiar with .NET Extensibility concepts and already know how to implement a Custom Server.

This chapter includes:

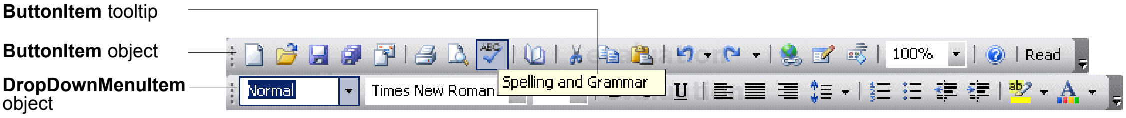
Toolbar Example

This example demonstrates how to implement .NET extensibility for the Divelements Limited **TD.Sandbar.Toolbar** control.

You can view the full source code of the final **ToolBarSrv.cs** class implementation in “Understanding the ToolBarSrv.cs File” on page 87.

Tip: You can download an evaluation copy of the **TD.Sandbar.Toolbar** control from: http://www.divil.co.uk/net/download.aspx?product=2&license=5.

The **Toolbar** control appears as follows:



The **Toolbar** control is comprised of a variety of objects, such as:

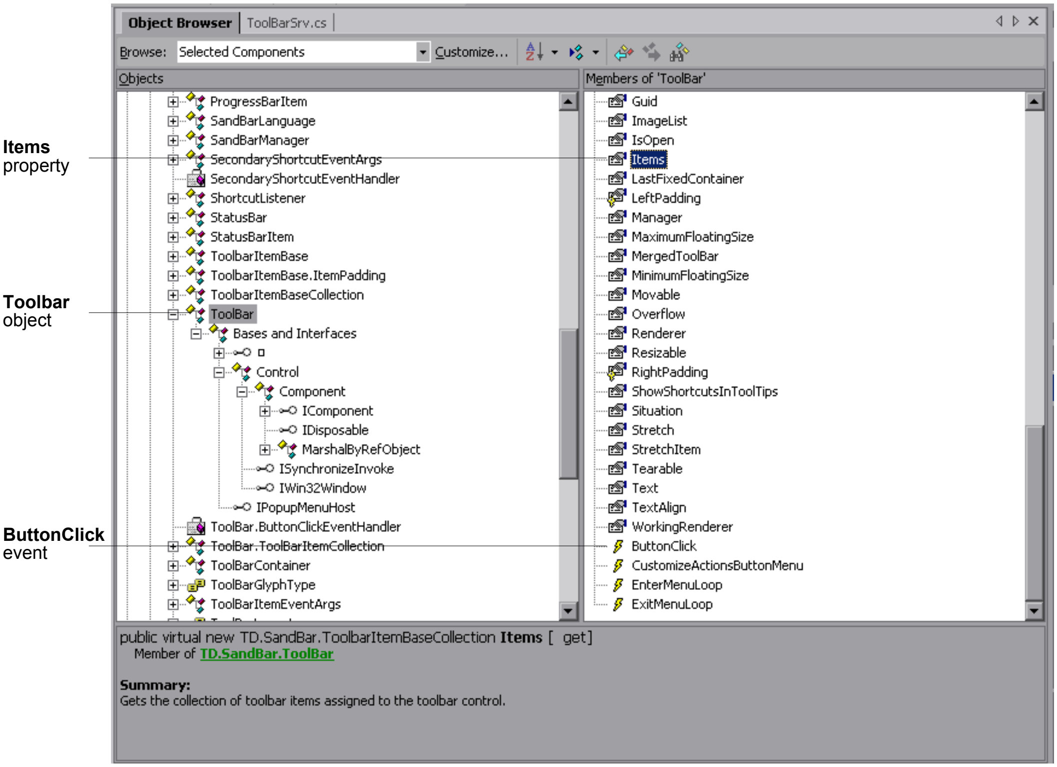
- **ButtonItem** objects, which represent buttons in the toolbar. **ButtonItem** objects contain images and no text. Each **ButtonItem** object has a unique tooltip.
- **DropDownMenuItem** objects, which represent drop-down menus in the toolbar.

Both the **ButtonItem** object and the **DropDownMenuItem** object are derived from the **ToolbarItemBase** object.

When you implement a Custom Server for a custom control, you want QuickTest to support recording and running the user's actions on the custom controls. When recording the test, your Custom Server listens to the control's events and handle the events to perform certain actions to add steps to the QuickTest test. When running the test, you simulate (replay) the same actions the user performed on that control.

For example, suppose you want to implement a user pressing a button on a custom toolbar. Before doing so, you must understand the toolbar control, its properties, and methods, and understand how you can use them to implement the Custom Server.

Following are some of the SandBar **ToolBar** object's properties and events (methods are not visible in this image):



Items property

Toolbar object

ButtonClick event

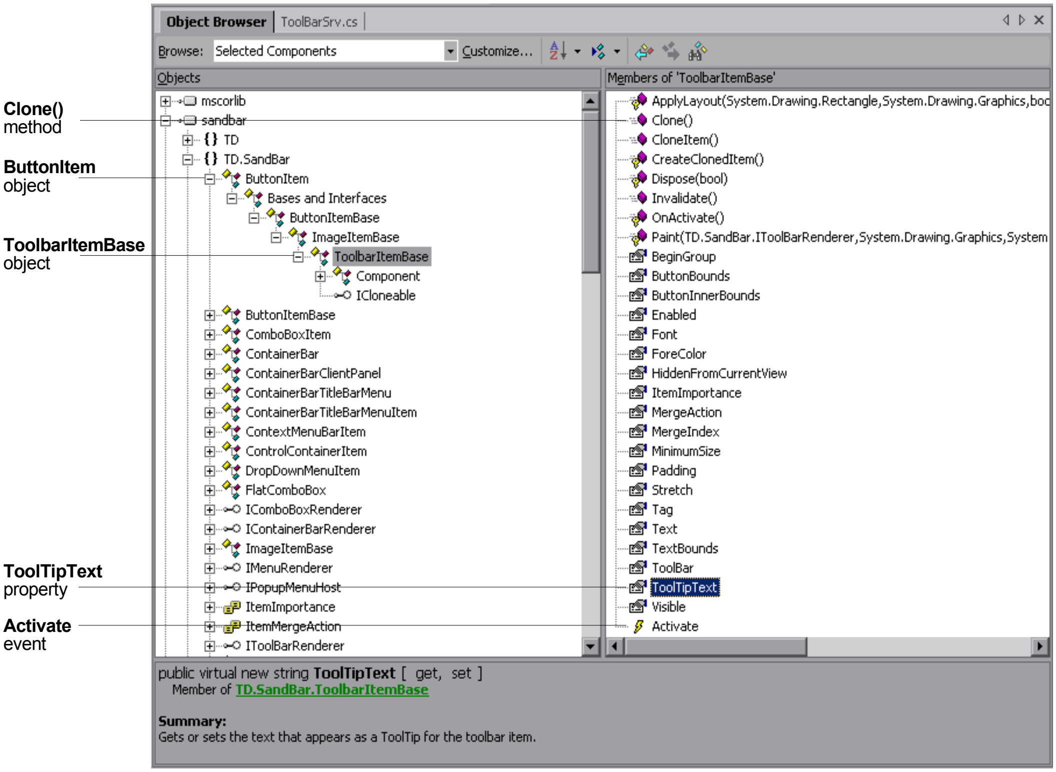
Browse: Selected Components

public virtual new TD.SandBar.ToolbarItemBaseCollection **Items** [get]
Member of TD.SandBar.ToolBar

Summary:
Gets the collection of toolbar items assigned to the toolbar control.

As you can see in the image above, the **ToolBar** object has a property called **Items** that retrieves the collection of **ToolbarItemBase** objects assigned to the **ToolBar** control. You can also see that the **ToolBar** control has an event called **ButtonClick**. Your Custom Server can listen to the **ButtonClick** event to know when a button in the toolbar is clicked. However, this event does not indicate which specific button in the toolbar is clicked.

Now expand the **ButtonItem** object and review its properties, methods, and events:



Clone() method

ButtonItem object

ToolbarItemBase object

ToolTipText property

Activate event

Browse: Selected Components

public virtual new string **ToolTipText** [get, set]
Member of TD.SandBar.ToolbarItemBase

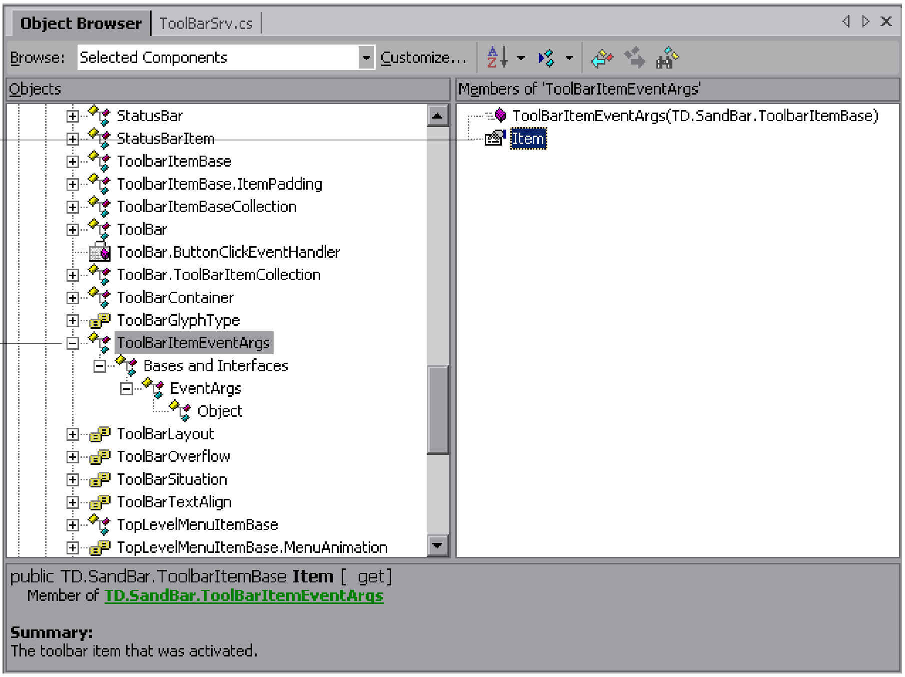
Summary:
Gets or sets the text that appears as a ToolTip for the toolbar item.

As shown in the image above, the **ButtonItem** object is derived from the **ToolbarItemBase** object. You can see that the **ToolbarItemBase** object contains a **ToolTipText** property, but does not contain a **Click** event or method.

When you look at the customized toolbar object, the following possible implementation issues arise:

Issue 1: When recording user actions, when you handle the **ButtonClick** event, how can you recognize which button in the toolbar was actually clicked?

Solution: All of the **ToolBar** object's events are **ToolBarItemEventArgs** events that are derived from the **EventArgs** object:



Item property

ToolBarItemEventArgs object

public TD.SandBar.ToolbarItemBase **Item** [get]
Member of TD.SandBar.ToolBarItemEventArgs

Summary:
The toolbar item that was activated.

The **Item** property indicates which toolbar item (button) raised the event. You can use that toolbar item's unique **ToolTipText** property to recognize which button was clicked and add that to the QuickTest test.

To do this, enter the following code in the **Record events handlers** section of the **ToolBarSrv.cs** file:

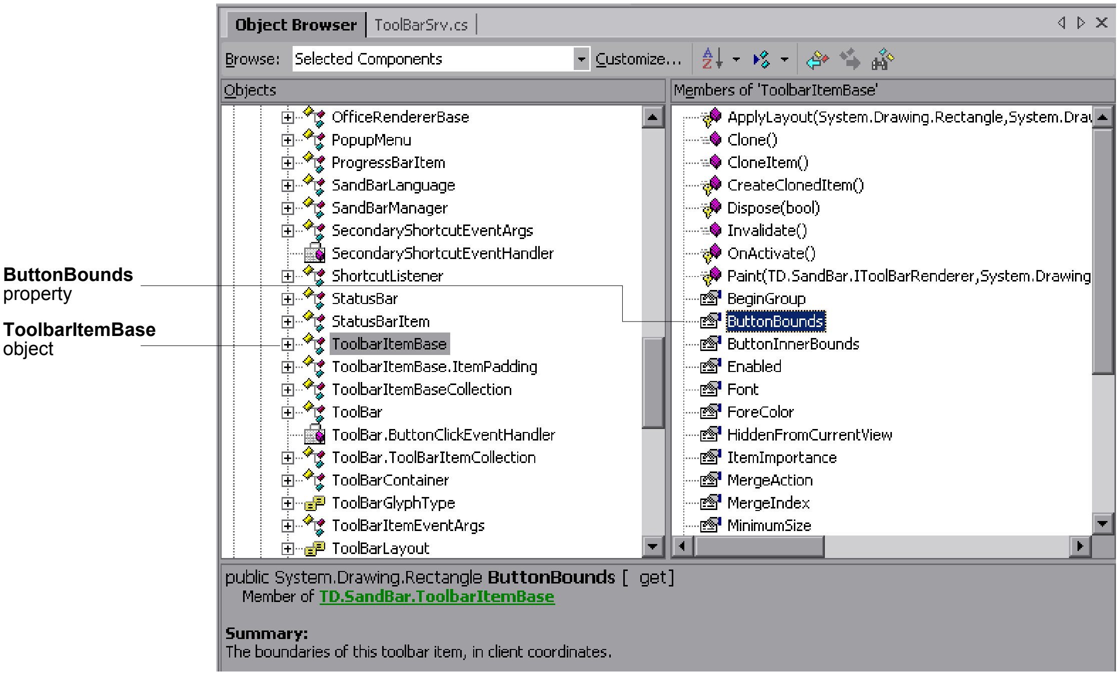
```
#region Record events handlers
private void oControl_ButtonClick(object sender,
TD.SandBar.ToolBarItemEventArgs e)
{
    TD.SandBar.ToolBar  oControl = (TD.SandBar.ToolBar)SourceControl;

    //Add a step in the test for the test object with the ClickButton method and the
        tooltip text as an argument
    base.RecordFunction("ClickButton",
        RecordingMode.RECORD_SEND_LINE, e.Item.ToolTipText);
}
#endregion
```

Now, each time you record a click on a button in the toolbar, a step is added to the test for the toolbar test object with the **ClickButton** method and the tooltip text of the button as its argument. For example:

```
SwfToolbar("MySandBar").ClickButton "Spelling and Grammar"
```

Issue 2: When running the test (replaying the user's actions), how do you perform a step that contains a **ClickButton** method, but the **ButtonItem** object does not contain a **Click** method or event, and you know only the **ButtonItem** object's tooltip text?

Solution: The **ToolbarItemBase** object has a property called **ButtonBounds**:



public System.Drawing.Rectangle **ButtonBounds** [get]
Member of TD.SandBar.ToolbarItemBase

Summary:
The boundaries of this toolbar item, in client coordinates.

ButtonBounds property

ToolbarItemBase object

You can loop through all of the **ToolbarItemBase** objects until you find a **ToolbarItemBase** objects that has the same tooltip text as the **ButtonItem** object, find that **ToolbarItemBase** object's rectangle boundaries, calculate the middle of its boundaries, and click that point.

To do this, enter the following code in the **Replay interface implementation** section of the **ToolBarSrv.cs** file:

```
#region Replay interface implementation
public void  ClickButton(string  text)
{
TD.SandBar.ToolBar  oControl = (TD.SandBar.ToolBar)SourceControl;

    //Find the correct item in the toolbar according to its tooltip text.
    for(int i=0; i<oControl.Items.Count; i++)
    {
        //Found the correct ButtonItem
        if(oControl.Items[i].ToolTipText == text)
        {
            //Retrieve the rectangle of the button's boundaries and locate its center
            System.Drawing.Rectangle oRect = oControl.Items[i].ButtonBounds;
            int x = oRect.X + oRect.Width/2;
            int y = oRect.Y + oRect.Height/2;

            //Click the middle of the button item
            base.MouseClick(x, y, MOUSE_BUTTON.LEFT_MOUSE_BUTTON);
            break;
        }
    }

    //Add the step to the report
    base.ReplayReportStep("ClickButton",
EventStatus.EVENTSTATUS_GENERAL, text);
}
#endregion
```

Understanding the ToolBarSrv.cs File

Following is the full source code for the **ToolBarSrv.cs** class, used to implement QuickTest record and run support for the **TD.Sandbar.Toolbar** control:

```
using System;
using Mercury.QTP.CustomServer;
//using TD.SandBar;

namespace ToolBar
{
    [ReplayInterface]
    public interface IToolBarSrvReplay
    {
        void  ClickButton(string  text);
    }
    /// <summary>
    /// Summary description for ToolBarSrv.
    /// </summary>
    public class ToolBarSrv:
        CustomServerBase,
        IToolBarSrvReplay
    {
        // You shouldn't call Base class methods/properties at the constructor
        // since its services are not initialized yet.
        public ToolBarSrv()
        {
            //
            // TODO: Add constructor logic here
            //
        }
        #region IRecord override Methods
        #region Wizard generated sample code (commented)
        /// <summary>
        /// To change Window messages filter, implement this method.
        /// The default implementation is to get only the control's
        /// Windows messages.
        /// </summary>
```

```
public override WND_MsgFilter GetWndMessageFilter()
{
    return(WND_MsgFilter.WND_MSGS);
}

/*
/// <summary>
/// To catch Windows messages, you should implement this method.
/// Note that this method is called only if the CustomServer is running
/// under QuickTest process.
/// </summary>
public override RecordStatus OnMessage(ref Message tMsg)
{
    // TODO:  Add OnMessage implementation.
    return RecordStatus.RECORD_HANDLED;
}
*/
#endregion

/// <summary>
/// If you are extending the Record process, you should add your event
/// handlers to listen to the control's events.
/// </summary>
public override void InitEventListener()
{
  TD.SandBar.ToolBar  oControl = (TD.SandBar.ToolBar)SourceControl;
  oControl.ButtonClick += new
  TD.SandBar.ToolBar.ButtonClickEventHandler(oControl_ButtonClick);
  //AddHandler("ButtonClick", new
  //TD.SandBar.ToolBar.ButtonClickEventHandler(oControl_ButtonClick));
}

/// <summary>
/// At the end of the Record process, this method is called by QuickTest to
/// release all the handlers the user added in the InitEventListener method.
/// Note that handlers added via QuickTest methods are released by
/// the QuickTest infrastructure.
/// </summary>
```

```
public override void ReleaseEventListener()
{
    TD.SandBar.ToolBar  oControl = (TD.SandBar.ToolBar)SourceControl;
    oControl.ButtonClick -= new
    TD.SandBar.ToolBar.ButtonClickEventHandler(oControl_ButtonClick);
}
#endregion

#region Record events handlers
private void oControl_ButtonClick(object sender,
                                        TD.SandBar.ToolBarItemEventArgs e)
{
    TD.SandBar.ToolBar  oControl = (TD.SandBar.ToolBar)SourceControl;
    // Add a step in the test for the test object with the ClickButton method
    // and the tooltip text as an argument
    base.RecordFunction("ClickButton",
            RecordingMode.RECORD_SEND_LINE, e.Item.ToolTipText);
}
#endregion
#region Replay interface implementation
public void  ClickButton(string text)
{
TD.SandBar.ToolBar  oControl = (TD.SandBar.ToolBar)SourceControl;
//Find the correct item in the toolbar according to its tooltip text.
for(int i=0; i<oControl.Items.Count; i++)
{
    //Found the correct ButtonItem
    if(oControl.Items[i].ToolTipText == text)
    {
    // Retrieve the rectangle of the button's boundaries and
    // locate its center
    System.Drawing.Rectangle oRect=oControl.Items[i].ButtonBounds;
    int x = oRect.X + oRect.Width/2;
    int y = oRect.Y + oRect.Height/2;
    //Click the middle of the button item
    base.MouseClick(x, y, MOUSE_BUTTON.LEFT_MOUSE_BUTTON);
    break;
    }
}
```

```
                //Add the step to the report
                base.ReplayReportStep("ClickButton",
                                                EventStatus.EVENTSTATUS_GENERAL, text);
                }
                #endregion
            }
        }
```

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