VERSION 8.2 SERVICE PACK 1

Open Test Architecture Guide

MERCURY™

Mercury Quality Center™

Open Test Architecture Guide

Version 8.2 Service Pack 1

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Mercury Quality Center Open Test Architecture Guide, Version 8.2 Service Pack 1

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Table of Contents

Welcome to Quality Center Open Test Architecture

Welcome to Mercury Quality Center (formerly TestDirector), Mercury Interactive's Web-based test management tool. Quality Center helps you organize and manage all phases of the application testing process, including specifying testing requirements, planning tests, executing tests, and tracking defects.

Using Quality Center Open Test Architecture, you can integrate your own requirement and configuration management tools, defect tracking tools, third-party and custom tools, and modelling applications. You can:

- execute tests in your testing application on multiple hosts across a network, and analyze the test results from within the Quality Center environment.
- use the Quality Center COM-based API to enable your application to create, retrieve, and update Quality Center project records from within your test application environment.

Note: New API examples are continuously being added to the Knowledge Base on the Mercury Interactive Customer Support Web site. To search the Mercury Quality Center Knowledge Base for new information, select **Using the Open Test Architecture - API** from the **Topic** list.

For information about getting started with the Quality Center API, and for details of the classes, methods, and properties exposed, refer to the *Quality Center Open Test Architecture API Reference*.

Using This Guide

The chapters in this guide are summarized below:

Chapter 1 Integrating Custom Testing Tools

Describes how the Quality Center API enables Quality Assurance testers to automate and extend the testing process by integrating custom or third-party testing tools with Quality Center.

Chapter 2 Implementing Testing Tool Integration

Describes how to create a custom test type. The custom test types you create with the Quality Center client can be accessed using the Quality Center user interface. You can use these test types the same way you use the built-in test types.

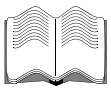
Chapter 3 Using the Quality Center API

Describes the API Architecture, including the relationships between the API component terminology and the Quality Center project terminology.

Chapter 4 Quality Center Projects Data Structure

Describes the project database, including the user tables and the security and system tables.

Mercury Quality Center Documentation Set



In addition to this guide, Quality Center comes with the following printed documentation:

Mercury Quality Center User's Guide explains how to use Quality Center to organize and execute all phases of the testing process. It describes how to define requirements, plan tests, run tests, and track defects.

Mercury Quality Center Administrator's Guide explains how to create and maintain projects using the Site Administrator, and how to customize projects using Project Customization.

Mercury Quality Center Installation Guide explains how to install Quality Center on a server machine in a cluster environment or as a stand-alone application.

Mercury Quality Center Tutorial is a self-paced guide teaching you how to use Quality Center to manage the software testing process.

Mercury Business Process Testing User's Guide explains how to use Business Process Testing to create business process tests.

Online Resources

Quality Center includes the following online resources:

Note: The **Help** button is located on the upper-right side of the Quality Center window.

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

What's New describes the newest features in the latest versions of Quality Center. Click the **Help** button and choose **What's New**.

Books Online displays the complete documentation set in PDF format. Online books can be read and printed using Adobe Reader which can be downloaded from the Adobe Web site *(*http://www.adobe.com*)*. Click the **Help** button and choose **Books Online**.

Mercury Quality Center Online Help provides immediate answers to questions that arise as you work with Quality Center. It describes menu commands and dialog boxes, and shows you how to perform Quality Center tasks. Click the **Help** button and choose **Online Help**.

Mercury Quality Center Open Test Architecture API Reference provides a complete online reference for the Quality Center COM-based API. You can use the Quality Center open test architecture to integrate your own configuration management, defect tracking, and home-grown testing tools with a Quality Center project. Click the **Help** button and choose **Books Online**. Under **Quality Center API**, select **Mercury Quality Center Open Test Architecture API Reference (Help file)**.

Mercury Quality Center Site Administrator Client API Reference provides a complete online reference for the Site Administrator Client COM-based API. You can use the Site Administrator Client API to enable your application to organize, manage, and maintain Quality Center users, projects, domains, connections, and site configuration parameters. Click the **Help** button and choose **Books Online**. Under **Quality Center API**, select **Mercury Quality Center Site Administrator API Reference (Help file)**.

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Mercury Interactive on the Web uses your default Web browser to open Mercury Interactive's home page. This site provides the most up-to-date information on Mercury Interactive and its products. This includes new software releases, seminars and trade shows, customer support, educational services, and more. The URL for this Web site is http://www.mercury.com. Alternatively, click the **Help** button and choose **Mercury Interactive on the Web**.

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To download updated documentation:

1. In the Customer Support Web site, click the **Documentation** link.
2. Under **Please Select Product**, select TestDirector for Quality Center. If TestDirector for Quality Center does not appear in the list, you must add it to your customer profile. Click **My Account** to update your profile.
3. Click **Retrieve**. The Documentation page opens and lists the documentation available for the current release and for previous releases. If a document was recently updated, **Updated** appears next to the document name.
4. Click a document link to download the documentation.

Typographical Conventions

This book uses the following typographical conventions:

1, 2, 3	Bold numbers indicate steps in a procedure.
➤	Bullets indicate options and features.
>	The greater than sign separates menu levels (for example, **File** > **Open**).
Stone Sans	The **Stone Sans** font indicates names of interface elements (for example, "Click the **Run** button.").
Bold	**Bold** text indicates function and object names.
Italics	*Italic* text indicates property and parameter names.
Arial	The Arial font is used for examples and statements that are to be typed in literally.
`Courier New`	The `Courier New` font is used for syntax examples in the object reference.
`Courier New`	The *`Courier New italic`* font is used for comments within examples.

1

Integrating Custom Testing Tools

You can integrate your custom and third-party testing tools with Quality Center to create tests using these tools. You can then use Quality Center to configure the testing tools you are using, view test scripts created, execute the tests across multiple remote hosts, and view test results.

This chapter describes the architecture that enables Quality Center to integrate with custom and third-party testing tools. For information on implementing this integration, see Chapter 2, "Implementing Testing Tool Integration".

This chapter describes:

- The Quality Center Open Test Architecture
- The Test Types Mechanism

About Integrating Custom Testing Tools

Quality Center enables you to integrate your custom and third-party testing tools so that you can continue to develop and use your current testing solution.

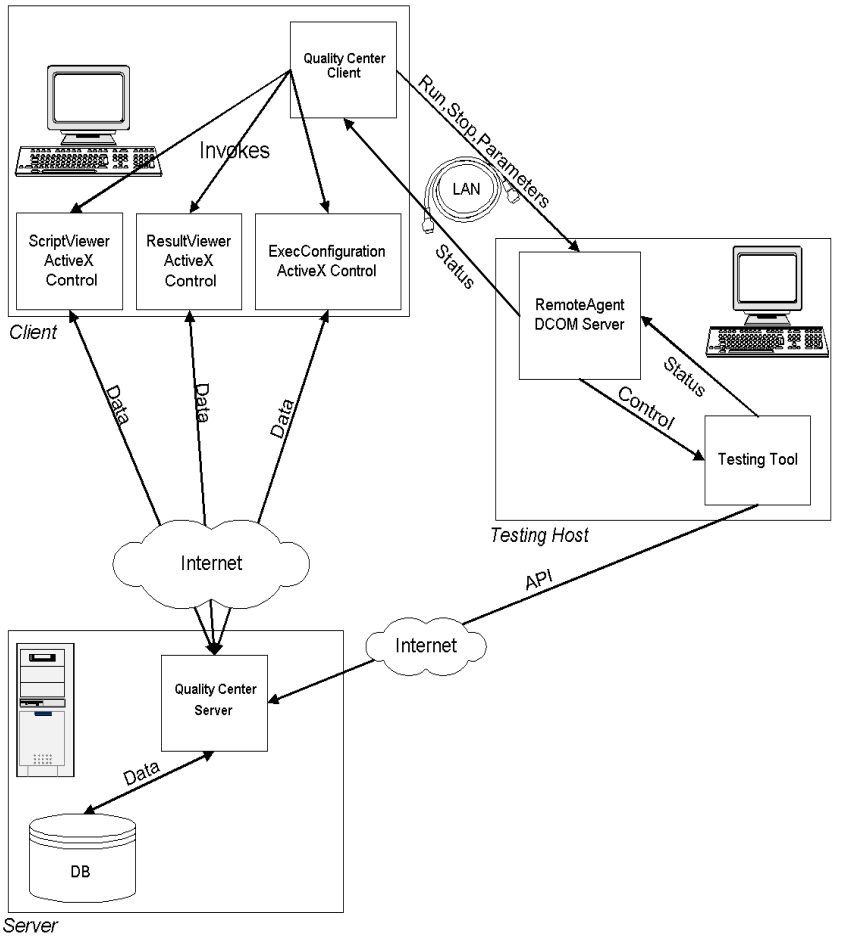
After you define your testing requirements and creating a test plan tree in Quality Center, you can create tests with Quality Center or other testing tools integrated with Quality Center. Once you have created tests, you define test sets in the Test Lab module. A test set is a group of tests designed to meet a specific testing goal. For example, to verify that the application being tested is functional and stable, you could create a sanity test set that checks the application's basic features. You can then create other test sets to test the advanced features.

Additionally, you define the conditions that cause each test in the test set to be run. These can be a date and time (time condition), or a condition based on the result of another test (run condition). A typical run condition configures a test to run after another test in the test set has run and passed. By using this condition for all the tests in a test set, the tester can create a batch test in which the tests run in sequence until one of the tests fails, at which point the sequence is terminated.

After you design your tests and test sets, you can use Quality Center to execute tests created with third-party testing tools on multiple hosts across a network. After test execution is complete, you can use Quality Center reports and graphs to analyze test results. You can use customized controls to view the test script and results in a format compatible with the testing tool you are using. You can also add defects discovered during test execution to the Quality Center defect database, and track these defects until they are repaired. For a complete discussion of the Quality Center features and user interface, refer to the *Mercury Quality Center User's Guide*.

The Quality Center Open Test Architecture

The following diagram illustrates the Quality Center open test architecture.



The Quality Center physical environment consists of three types of entities:

- The Quality Center server
- The Quality Center client
- The testing application host

Note that two, or even all, of these entities can reside on one machine.

The server hosts the server modules and the Quality Center database. (The physical location of the database may vary, but it is included on the server for simplicity.)

The testing tool host executes the testing application and a remote agent module, that enables the client modules on the client machine to control the testing application and obtain the testing status. The testing application then uses the Quality Center API (Application Program Interface) to update the Quality Center server database with information regarding the test being run and the results. The Quality Center API is COM (Component Object Model)-based, and can be implemented directly through the testing application as an extension to the remote agent module, or through any other custom component.

The client hosts optional controls that enable the client user to view and set the testing application properties in its own custom format. The client machine and the server can be located anywhere on the Internet.

The Quality Center client uses custom controls to access testing details—such as the test script and test parameters—from the Quality Center server. The custom controls are needed to view the testing details in the custom format used by the specific testing application. These components are optional and are downloaded to the client from the server through the mechanism described in “Registering Custom Test Types with Quality Center” on page 43.

Quality Center uses the testing host remote agent to communicate with testing tools. By using Microsoft's DCOM (Distributed Component Object Model) protocol, the remote agent is accessible directly over a network, enabling the testing tool to receive commands from the Quality Center client. For your testing application to receive commands from Quality Center, you must install a remote agent on each host you use for running tests. Note that the Quality Center client and testing host machines must be on the same LAN (Local Area Network).

When the Quality Center client requests to run a test, it first checks with the appropriate remote agent module that the testing application is ready. The client then sets the test parameters for the requested test through the remote agent and commands the agent to run the test. Once the test is run, the client can query the remote agent for the execution progress and results (for example, success or failure). The testing application can then communicate with the Quality Center server through the Quality Center API interfaces to update the server's database with the test details and results.

The ability to run a test through the client on a remote testing host (running a custom or third-party testing application) and obtain the test's results from the server enables you to use the custom or third-party testing tool as you would use integrated testing applications.

The TestType Mechanism

Interfacing your testing tool with Quality Center requires the Quality Center client to be aware of your custom or third-party testing tool. This is achieved through the TestType mechanism. The two major components of this mechanism are detailed below:

- The test_type.ini File
- The TestType Class

The following diagram illustrates the TestType access mechanism.

The test_type.ini File

The **test_type.ini** file on the client is downloaded from the archive file **qcbin.war**, found on the application server machine in the Quality Center virtual directory under **Quality Center\application**. The file contains a list of all the testing tools currently supported by the Quality Center server, with their associated TestType COM (Component Object Model) class ID. For more information on the TestType class, see "TestType COM Class" on page 12.

When you open the test_type.ini file, you can see the following:

```
[WR-AUTOMATED]
CLSID={E1ED35C0-8482-11D2-9399-0080C837F11F}
[VAPI-TEST]
CLSID={6D3B8D58-B5F5-11D2-9399-0080C837F11F}
[LR-SCENARIO]
CLSID={7B1A7474-AFAD-11D2-9399-0080C837F11F}
[DB-TEST]
CLSID={04D794C0-B9FC-11D2-9399-0080C837F11F}
[MANUAL]
CLSID={11A7DB23-A1A7-11D3-9CA4-0080C837F11F}
.....
```

The file lists the supported testing applications such as WinRunner (WR-AUTOMATED), followed by their TestType class IDs (CLSID).

For the Quality Center client to support your custom or third-party testing application (through the modules mentioned in "The Quality Center Open Test Architecture" on page 3), you must add an entry to this file specifying your test type name, followed by its TestType class ID.

The test_type.ini file is discussed in greater detail in "Registering Custom Test Types with Quality Center" on page 43.

The TestType Class

If you know the class ID of the TestType class associated with your custom or third-party testing tool, you can access this class through COM. The TestType class contains general testing tool properties—such as the testing tool's name and icon—as well as the class IDs for the testing tool's remote agent and custom controls. These class IDs enable Quality Center to access the remote agent modules of the testing tools, and to use the appropriate custom controls to view the tests' properties.

For more information on the TestType class, see "TestType COM Class" on page 12

2

Implementing Testing Tool Integration

To integrate custom and third-party testing tools with Quality Center, create a DCOM server and test type add-in for each testing tool, and register the add-in with Quality Center. The DCOM server enables Quality Center to interface with the testing tool on a remote testing host. The test type add-in consists of one or several OCX files that contain information enabling Quality Center to interface with the third-party testing tool information in the Quality Center database.

This chapter describes:

- Creating Custom Test Types
- TestType COM Class
- RemoteAgent DCOM Server
- ScriptViewer ActiveX Control
- ResultViewer ActiveX Control
- ExecConfiguration ActiveX Control
- Registering Custom Test Types with Quality Center

About Implementing Testing Tool Integration

For Quality Center to run tests and display test scripts and execution results created with a custom testing tool, Quality Center must use a remote agent and test type for the tool. The remote agent is a DCOM server residing on the remote testing host, interfacing with the testing tool. A test type is one or more COM components residing on the client, containing information that tells Quality Center how to interface with the data of the selected testing tool. A testing tool can support more than one test type.

You register the test type with Quality Center by specifying the class ID of the test type class in the Quality Center ini file. For more information, see "Registering Custom Test Types with Quality Center" on page 43. This identifies the main COM class of the test type. Quality Center creates an object of this class and uses its methods to interface with the testing tool through the remote agent and the custom ActiveX controls (DLL and OCX files).

For example, when Quality Center runs a WinRunner test, the WinRunner test type notifies Quality Center of the WinRunner remote agent's class ID.

Quality Center supports two kinds of test types:

- **Pre-defined test types**: These are the default test types included with Quality Center. These enable you to execute various Mercury testing tools, such as running WinRunner automated tests on remote hosts, viewing test scripts, and displaying test results.
- **Custom add-in test types**: You create this kind of test type to run tests that were created with other testing tools on remote hosts, and view test scripts and results. A custom test type must contain one or more of the components described in "Creating Custom Test Types" on page 11.

Creating Custom Test Types

Custom test types enable you to execute tests that were created with your own testing tools on remote hosts, and view test scripts and results. Each custom test type may include the following components:

TestType COM Class	Contains the test type general properties. This component is mandatory.
Remote Agent DCOM Server	Runs tests locally and remotely.
ScriptViewer ActiveX Control	Shows the test script. This component is optional.
ResultViewer ActiveX Control	Shows the test results. This component is optional.
ExecConfiguration ActiveX Control	Configures the testing tool. This component is optional.

To use a custom test type, Quality Center creates an object of the TestType COM class, and uses its methods to obtain the user interface properties of the test type, to create the test script template, and to obtain the class ID of the ScriptViewer, ResultViewer, ExecConfiguration ActiveX controls, and RemoteAgent DCOM server.

Note: The type library required for creating the test type is downloaded and registered automatically when you log on to Quality Center from the workstation.

TestType COM Class

The **TestType** object provides the interface between the testing tool and Quality Center. The *Init* method of the **TestType** object gets an *IDispatch* reference to a **TDConnection** object, used to access the Quality Center database. For more information about the **TDConnection** object, see *Quality Center Open Test Architecture API Reference*.

The following are the properties and methods that must be implemented by the **TestType** object.

TestType Properties

Simple Data Type Properties

Property Name	R/W	Type	Description
CanCreateScriptTemplate	R	Long	Indicates whether the test type supports creating script templates. Returns 0 if the test cannot be created; 1 if the test can be created; 2 if the test supports creating script templates.
ExecConfigCLSID	R	String	The class ID of the ExecConfiguration class associated with this test type, in the following format: {XXXXXXXX-XXXX-XXXX-XXXX-XXXXXXXXXXXX}, where X is a hexadecimal character. If ExecConfiguration is not supported, this property returns an empty string.
LastErrorMessage	R	String	The most recent error message.
RemoteAgentCLSID	R	String	The class ID of the RemoteAgent class associated with this test type, in the following format: {XXXXXXXX-XXXX-XXXX-XXXX-XXXXXXXXXXXX}, where X is a hexadecimal character. If RemoteAgent is not supported, this property returns an empty string.

Property Name	R/W	Type	Description
ResultViewerCLSID	R	String	The class ID of the ResultViewer class associated with this test type, in the following format: {XXXXXXXX-XXXX-XXXX-XXXX-XXXXXXXXXXXX}, where X is a hexadecimal character. If ResultViewer is not supported, this property returns an empty string.
ScriptViewerCLSID	R	String	The class ID of the ScriptViewer class associated with this test type, in the following format: {XXXXXXXX-XXXX-XXXX-XXXX-XXXXXXXXXXXX}, where X is a hexadecimal character. If ScriptViewer is not supported, this property returns an empty string.
TestingToolName	R	String	The name of the testing tool.

TestType Methods

Init Method

Initializes the **TestType** object.

Syntax

```
HRESULT Init( VARIANT TDConnection )
```

Parameters

Parameter Name	Description	Default
TDConnection	Required. A variant containing the *IDispatch* reference to the **TDConnection** object. For a description of the **TDConnection** object, see the **TDConnection** object description in *Quality Center Open Test Architecture API Reference*.	None

CreateScriptTemplate Method

Creates a script template for the specified test. The test type creates a script on the local client machine, and uploads it to the server side test repository.

Syntax

```
HRESULT CreateScriptTemplate( long TestKey, BSTR LocalPath,
                              long Value )
```

Parameters

Parameter Name	Description	Default
TestKey	Required. The key of the test for which the template is created.	None
LocalPath	Input - the path on the local host in which the client wishes to place the script (the path does not have to exist). Output - one of the following two options: • If the script is created and loaded correctly by the TestType object, and the database has been updated, the return value is an empty string. • If the upload and database update is performed by Quality Center rather than by the TestType object, the return value is the path in which the script was created and from which it is downloaded (it does not have to be the same path as the input).	None
Value	Returns TRUE (1) if the call is successful, FALSE (0) otherwise.	None

Returns

In Visual Basic, *Value* is the return value, and is not passed as an argument. In C++, *Value* is passed as an argument, and the HRESULT is returned.

TestType Example

The following example is of the main TestType class. The example is developed step by step with the other remote execution component examples, so that executing all the steps included in this section results in a (simple) working remote test execution mechanism. The example uses Microsoft Visual Basic 6.0.

Using Microsoft Visual Basic, create a new ActiveX Exe project. Declare the following class members in the code window (global declaration area):

```
Public RemoteAgentCLSID As String         ' Run Remote Agent Class ID
Public ScriptViewerCLSID As String        ' ActiveX script viewer Class ID
Public TestingToolName As String          ' Remote Agent name
Public ExecConfigCLSID As String          ' Configuration Class ID
Public CanCreateScriptTemplate As Long  ' Flag
Public LastErrorMessage As String         ' Most common error message
Public ResultViewerCLSID As String        ' ActiveX result viewer Class ID
```

These members represent the main TestType object properties. Add the following sub-routine to the code:

```
Private Sub Class_Initialize()
‘This sub-routine is run when the TestType is loaded.
‘Note that at this time, none of the optional controls is
‘  supported, as their class ID strings are empty.
‘Also note that the remote agent class ID is empty,
‘  as no such agent yet exists.
‘This example does not support script templates,
‘  and has only one error type.

    ExecConfigCLSID = ""        ' No configuration utility provided
    RemoteAgentCLSID = "[Class ID for the Run Remote Agent]"
    ScriptViewerCLSID = "[Class ID for ActiveX script viewer]"
    TestingToolName = "Script"
    CanCreateScriptTemplate = 1    ' create new test feature turned on
    LastErrorMessage = ""         ' Testing issues
    ResultViewerCLSID = ""       ' No result viewer ActiveX provided
```

```
    LoadPicture ""
End Sub

Public Sub Init(mytd As Variant)
    ‘ You may need a TDConnection to use OTA functions in your application.
    ‘ If you do, add a project reference to the OTA:
    ‘ In Projects > References, check the "OTA COM 8.0 Type Library."
    ‘ and declare a module-level variable: Private td As TDConnection
    Set td = mytd      'Get the td object to be used if needed
End Sub

Public Function CreateScriptTemplate(TestKey As Long, _
        ByRef LocalPath As String) As Long

    ‘ Create a batch file to emulate a test script for
    ‘ this example

    Dim myf As String

    LocalPath = "c:\temp"
    myf = "C:\temp\batch.bat"
    Open myf For Output As #1
    Print #1, "ping localhost" & vbCrLf & "pause" 'create script template
    Close #1
    CreateScriptTemplate = 1
End Function

Public Function GetBitmap(Status As Long) As Long
     GetBitmap = 0 'no bitmap
  End Function
```

In the class properties window, change the Instancing property to 6 - GlobalMultiUse.

Choose **Project** > **Properties**. Click the **General** tab. Change the project's name to MyTestType. Select **Unattended Execution** and **Upgrade ActiveX Controls**. In the same tab, in the **Threading Model** section, select the **Thread Per Object** option. Save the project as MyTestType.

Choose **File** > **Make MyTestType.exe** to compile the class and register it.

Note that this example is also incorporated in the other examples in this chapter.

RemoteAgent DCOM Server

Quality Center communicates with other testing tools via a remote agent. The remote agent resides on the host machine with the testing tool, and uses a DCOM protocol to communicate over the network with the host machine on which Quality Center resides.

For the remote agent to communicate with Quality Center, the agent must implement the *IDispatch* interface or dual interfaces, as well as the following methods.

is_host_ready Method

Before test execution, the Quality Center client uses this method to ask the remote agent to ensure that the designated testing host is available and ready to run the test.

Syntax

```
HRESULT is_host_ready( BSTR descr )
```

Parameters

Parameter Name	Description	Default
descr	Required. A string for the description of the reason the host is not ready.	None

Return Value

Returns S_OK if the testing tool and host are ready to run tests, and S_FALSE otherwise.

set_value Method

Before the testing tool can run a test, it must receive information from Quality Center, including the name of the test, the database to which the test belongs, and other test-related information. This information enables the testing tool to retrieve data from the Quality Center database, run tests, and return the test results to Quality Center.

This method accepts two parameters: the parameter name to be set and its designated value.

Syntax

```
HRESULT set_value (BSTR prm_name, BSTR prm_value)
```

Parameters

Parameter Name	Description	Default
prm_name	Required. The name of the parameter to be set. Case insensitive. This method supports the parameter names described in the table below.	None
prm_value	Required. The value to be set. Case insensitive.	None

Supported Parameter Names

Parameter Name	Description
database_name	The name of the active Quality Center database.
domain_name	The name of the Quality Center domain in which test and result information is stored.
host_name	The name of the host on which the remote agent test type is run.
password	The user's password.
plann_status	The planning mode status of the test.
project_name	The name of the Quality Center project in which test and result information is stored.

responsible	The name of the user responsible for the project.
runner_result_dir	The name of the test run results directory.
scheduler_version	The software version number of the scheduler.
subject	The subject folder to which the test belongs in the test plan tree.
sys_computer_name	The name of the PC on which the Quality Center client is running.
sys_user_name	The login user name for the user logged in on the Quality Center client PC.
TDAPI_host_name	The name of the host on which the Quality Center server is running.
test_id	The ID of the test to be run.
test_name	The name of the test to be run.
test_path	The full path of the test to be run.
test_set	A string of form: {test_set: "<test set path in the test tree>" testcycle_id: "148~1"}
test_set_id	The ID of the test set to which the test belongs.
test_set_user1...99	The value of a user field in the Test in the Test Set table.
test_type	The custom test type.
test_user1...99	The value of a user field in the Tests table. *test_instance*The ID of the test instance inside a test set.
testcycle_id	The ID of the test.
tester_name	The name of the tester assigned to run the test.
tstest_name	The name of the test to be run with a "[1]" instance prefix.

user_name	The name of the user running the test.

Return Value

Returns S_OK if the call succeeds, and S_FALSE otherwise.

run Method

The **run** method instructs the testing tool to load and run the test. This function also launches the testing tool if it is not already running.

Syntax

```
HRESULT run()
```

Return Value

Returns S_OK if the call succeeds, and S_FALSE otherwise.

tdstop Method

The **tdstop** method instructs the testing tool to terminate the test that is currently running.

Syntax

```
HRESULT tdstop()
```

Return Value

Returns S_OK if the call succeeds, and S_FALSE otherwise.

get_status Method

During test execution, Quality Center checks the status of the testing tool and displays this information. This enables the tester to monitor the test's progress at each stage of the run.

This function returns the current status of the testing tool.

Syntax

```
HRESULT get_status (BSTR descr, BSTR status)
```

Parameters

Parameter Name	Description	Default
descr	Required. Returns a verbal description of the testing tool's current status.	None
status	Returns one of the following values as a generic description of the current testing tool status.	None

Supported Status Values

Return Value	Message
BUSY	The testing tool is currently running another test.
END_OF_TEST	The testing tool has reached the end of the current test.
FAILED	The testing tool has failed.
INIT	The testing tool is in its initialization stage.
LOGICAL_RUNNING	The testing tool is running the test.
PAUSED	The testing tool has paused execution of the current test.
READY	The testing tool is ready to run the test.
STOPPED	The testing tool has stopped execution of the current test.
TEST_PASSED	The test has been successfully completed.
TEST_FAILED	The test failed.
RETRY	You cannot execute the test on the current host. Try to execute the test on another host from the attached host group.

Return Value

Returns S_OK if the testing tool and host are ready to run tests, and S_FALSE otherwise.

RemoteAgent Example

The following is an example of the remote agent class that runs the test.

Using Microsoft Visual Basic, create a new ActiveX EXE project. In **Projects > References**, check the "OTA COM 8.0 Type Library."

Declare the following class members in the code window (global declaration area):

```
'These variables are required by the interface:
Private Status As String                ‘ The current testing status
Private Descr As String                 ‘ The current testing description
Private ServerName As String            ‘ The server URL
Private ProjectName As String           ‘ The current project’s name
Private DomainName As String            ‘ The Quality Center domain name
Private UserName As String              ‘ The current user name
Private SysUserName As String           ‘ The workstation system user
Private Password As String              ‘ The current user’s password
Private TestPath As String              ‘ The current test’s path
Private TestName As String              ‘ The current test’s name
Private TestSet As String               ‘ The current test set’s name
Private TestID As Integer               ‘ The current test’s ID
Private TestInst As Long                ‘ The test instance
Private TestIDInst As String            ‘ The test instance descriptor
Private S_OK As Long                    ‘ Return value if the run is OK
Private S_FALSE As Long                 ‘ Return value if the run failed
Private END_OF_TEST As Long             ‘ Return value for end of test

'These variables are not required by the interface.
'They are for a log file for your custom messages
'Use requires a project reference to
'Microsoft Scripting Runtime
Private LogFile As Scripting.TextStream
Private oSFile As Scripting.File
Private oFileSys As Scripting.FileSystemObject
```

Add the class initialization sub-routine:

```
Private Sub Class_Initialize()
```

```
' Initialization method of some class members.
   S_OK = 0
   S_FALSE = 1
   END_OF_TEST = 4


   On Error GoTo initerr

   Set oFileSys = _
      CreateObject("Scripting.FileSystemObject")
   Set LogFile = _
      oFileSys.OpenTextFile _
         ("D:\Temp\MyOTARunAgent.log", ForAppending)
   LogFile.WriteLine "Initialize " & CStr(Now)
initerr:
End Sub
```

This sub-routine initializes the return value variables. Add the following RemoteAgent interface methods:

```
Public Function is_host_ready(Descr As String) As Long
' Quality Center calls this method to check if the
' host is ready
' In this example, is_host_ready always reports that
' the host is ready, and changes the description to
' "Ready"

    Descr = "Ready"
    is_host_ready = S_OK
End Function


Public Function set_value(ByVal name As String, _
    ByVal Value As String) As Long
' Quality Center will use this method to set the
    'variables declared.
    Select Case name
    Case "TDAPI_host_name"
        ServerName = Value
    Case "project_name"
        ProjectName = Value
```

```
    Case "domain_name"
        DomainName = Value
    Case "user_name"
        UserName = Value
    Case "sys_user_name"
        SysUserName = Value
    Case "password"
        Password = Value
    Case "test_name"
        TestName = Value
    Case "test_path"
        TestPath = Value
    Case "test_set_id"
        TestSet = Value
    Case "test_set"
        TestIDInst = Value
    Case "test_id"
        TestID = Val(Value)
    End Select

    set_value = S_OK


    On Error Resume Next
        LogFile.WriteLine "set_value: " _
            & " name = " & name & ", value = " & Value
End Function

Public Function get_status(StatusDescription As String, _
      CurrentStatus As String) As Long
' Quality Center calls this method to check the
' status and description of the run.

    StatusDescription = Descr
    CurrentStatus = Status
    get_status = S_OK

End Function

Public Function run() As Long
' Quality Center calls this method to run the test
```

```
' and update the test status and description.
' In this example, batch.bat is downloaded
' and run.

    On Error GoTo runErr

    LogFile.WriteBankLines 3
    LogFile.WriteLine "Start run " & CStr(Now)

    Dim td As New TDAPIOLELib.TDConnection
    Dim tsfact As TestSetFactory
    Dim ts As TestSet
    Dim tstfact As TSTestFactory
    Dim tst As TSTest
    Dim rfact As RunFactory
    Dim theRun As TDAPIOLELib.run

    'These variables are needed to get
    ' batch.bat for this example:
    Dim tfact As TDAPIOLELib.TestFactory
    Dim theTest As TDAPIOLELib.Test
    Dim LocalScriptPath As String
    Dim ExtStorage As TDAPIOLELib.ExtendedStorage

'Connect to the project
    td.InitConnectionEx ServerName
    td.ConnectProjectEx DomainName, ProjectName, UserName, Password

'Get a local copy of batch.bat
    'Get the test

    Set tfact = td.TestFactory
    Set theTest = tfact.Item(TestID)
    LogFile.WriteLine "The test name = " & theTest.name

    ' Get the file
    Set ExtStorage = theTest.ExtendedStorage
```

```
    LocalScriptPath = ExtStorage.Load("-r batch.bat", True)

    ' Add the file name to the path returned from Load
    ' so it directly refers to the file.
    LocalScriptPath = LocalScriptPath & "\batch.bat"
    LogFile.WriteLine "LocalScriptPath = " & LocalScriptPath


' Update the status variables for use in get_status
    Status = "RUNNING"
    Descr = "Running..."


' Run the application and update the status
    Dim rc
    rc = Shell(LocalScriptPath)
    Status = "END_OF_TEST"
    Descr = "Completed"


' Record the run in the project
    Set tsfact = td.TestSetFactory
    Set ts = tsfact(TestSet)
    Set tstfact = ts.TSTestFactory


    Dim ttt As String

    'Get the TSTest id:
    '   TestID & "~" & the instance of this test
    '   in this test set. For example, "84~2"
    'TestIDInst is the test set, for example:
    ' {
    '   test_set: "Root\\Sample Tests\\My Sample Tests",
    '   testcycle_id: "84~1"
    ' }
    ttt = Mid(TestIDInst, _
                InStr(1, TestIDInst, "testcycle_id: ") + 15)
    'Get the instance number
    ttt = Mid(ttt, InStr(1, ttt, "~") + 1)
    TestInst = Val(Mid(ttt, 1, InStr(1, ttt, """")))
```

```
    'Get the TSTest object using the TestID and Instance
    Set tst = tstfact(TestID & "~" & TestInst)
    'Get the run factory for the TSTest
    Set rfact = tst.RunFactory


    'Set the run data
    Dim data(0 To 1)
    'Test run name (ID)
    data(0) = "New Run 7"
    'User who ran the test (from set_value)
    data(1) = UserName

    ' Create the new Run
    Set theRun = rfact.AddItem(data)
    ' Mark the run Passed
    theRun.Status = "Passed"
    theRun.Post

run = S_OK

Exit Function

runErr:
Dim msg$
    On Error Resume Next
    msg = "Error in run: " & Err.Description
    LogFile.WriteLine msg
    On Error GoTo runErr
    Resume Next
End Function

‘Close the log file at the end.
Private Sub Class_Terminate()
   LogFile.Close
End Sub
```

In the class properties window, change the **Instancing** property to 6 - GlobalMultiUse.

Choose **Project** > **Properties** and click the **General** tab. Change the project's name to MyRunAgent. Select **Unattended Execution** and **Upgrade ActiveX Controls**. In the same tab, in the **Threading Model** section, select the **Thread Per Object** option.

Click the **Component** tab and select **Remote Server Files**.

Save the project as MyRunAgent.

Choose **File** > **Make MyRunAgent.exe** to compile the class and register it.

The remote agent is now ready to run. For information on registering and running the remote agent with Quality Center, see "Registering Custom Test Types Example" on page 46.

ScriptViewer ActiveX Control

Each custom test type can include a ScriptViewer ActiveX control, enabling you to view the stored scripts in the test repository. This control can be activated within an ActiveX hosting frame. The ScriptViewer control must implement the following methods.

ScriptViewer Properties

Simple Data Type Properties

Property Name	R/W	Type	Description
ScriptReadOnly	R/W	Boolean	Set by Quality Center to indicate that the script should not be alter. For example, it may be locked by a version control system.

TestType Methods

Init Method

Initializes the **ScriptViewer** object.

Syntax

```
HRESULT Init( VARIANT TDConnection )
```

Parameters

Parameter Name	Description	Default
TDConnection	Required. A variant containing the *IDispatch* reference to the **TDConnection** object. For a description of the **TDConnection** object, see the **TDConnection** object description in *Quality Center Open Test Architecture API Reference*.	None

ShowTest Method

Displays the specified test script in the Script Viewer control.

Syntax

```
HRESULT ShowTest( long TestKey )
```

Parameters

Parameter Name	Description	Default
TestKey	Required. The requested test's ID.	None

SaveScript Method

Saves the test script to the Quality Center project.

Syntax

```
HRESULT SaveScript( Variant Flags )
```

Parameters

Parameter Name	Description	Default
Flags	Required. Always pass zero (0).	None

ScriptViewer Example

The following is an example of the script viewer control that allows you to view the test.

Using Microsoft Visual Basic, create a new "ActiveX Control" project. Choose **Project** > **References**, and select the **OTA COM 8.0 Type Library** reference. For this example, you must also select a reference to the **Microsoft Scripting Runtime**, though you may not need it for your production code.

Add a text box to the user control. The script contents are displayed inside the box. Add a Command button named cmdSave. The button is used to save changes to the script.

Declare the following class members in the code window (global declaration area):

```
'A ScriptReadOnly Boolean variable is required
'by the interface
Public ScriptReadOnly As Boolean

'These variables you can name as you like
Private td As New TDAPIOLELib.TDConnection
Private tfact As TDAPIOLELib.TestFactory
Private theTest As TDAPIOLELib.Test
Private LocalScriptPath As String
Private ExtStorage As TDAPIOLELib.ExtendedStorage

'Use of these variable requires project reference to
'Microsoft Scripting Runtime
Dim ScriptFile As Scripting.TextStream
Dim oSFile As Scripting.File
Dim oFileSys As Scripting.FileSystemObject
```

Add the interface methods: Init, SaveScript, and ShowTest.

The **Init** method sets the **td** object to the **ITDConnection** object passed by the Quality Center client, and clears the list box.

```
Public Sub Init(mytd As Variant)
    ' Initialization method, Quality Center will call this
    ' method and pass an TDConnection class object.

     Set td = mytd

End Sub
```

The **ShowTest** method gets the path for the specified test using its key, reads the script file (Batch.bat) from this location, and displays it in the text box.

```
Public Sub ShowTest(TestKey As Long)
    ' ShowTest(TestKey As Long) is required by the interface
    ' Quality Center will call the ShowTest method and pass
    ' the TestKey.


    Dim mydata As String

    On Error GoTo ShowTestErr


    'Get the test
    Set tfact = td.TestFactory
    Set theTest = tfact.Item(TestKey)


    'Get a local copy of the script
    'In this example, the script is "batch.bat"
    Set ExtStorage = theTest.ExtendedStorage
    LocalScriptPath = ExtStorage.Load("-r batch.bat", True)


    'Add the file name to the path returned from Load
    'so it directly refers to the file.
    LocalScriptPath = LocalScriptPath & "\batch.bat"
```

```
'Open the script
Set oFileSys = _
    CreateObject("Scripting.FileSystemObject")
Set ScriptFile = _
    oFileSys.OpenTextFile(LocalScriptPath, _
        ForReading, False)


'Get the contents of the file into a string variable
If Not ScriptFile.AtEndOfStream Then _
    mydata = ScriptFile.ReadLine
Do While ScriptFile.AtEndOfStream <> True
     'List1.AddItem ScriptFile.ReadLine
     mydata = mydata & vbCrLf & ScriptFile.ReadLine
Loop
ScriptFile.Close


' Load the text box with the script text,
' Note that the text box must have the Multi-line
' attribute enabled
Text1.Text = mydata
'This is the initial state, so:
Text1.DataChanged = False


' Enable or disable the text box and save button,
' and make the file R/O or R/W depending
' on the lock status.
Set oSFile = oFileSys.GetFile(LocalScriptPath)
If ScriptReadOnly Then
    oSFile.Attributes = 1 'ReadOnly
    MsgBox "File locked by version control system " _
        & "or by Quality Center." _
        & vbCrLf & "Changes made to file " _
        & "will not be saved"
    Text1.Enabled = False
    cmdSave.Visible = False
Else
    oSFile.Attributes = 0
    Text1.Enabled = True
```

```
        cmdSave.Visible = True
    End If

Exit Sub
ShowTestErr:
    On Error Resume Next
    Dim msg$
    msg = " on " & theTest.Name
    msg = "ShowTest error" & msg & vbCrLf
    msg = msg & Err.Description
    MsgBox msg
End Sub
```

The **SaveScript** method uploads changes to the script to the Quality Center project.

```
Sub SaveScript(Optional Flags As Variant = 0)
    'SaveScript(Flags) is required by the interface.
    'Quality Center may call this method directly.


     Dim FileArchive As Integer


    'If the file was never downloaded for editing, exit
    If Len(LocalScriptPath) = 0 Then Exit Sub


    'If the file is locked (probably by a
    ' configuration manager), exit
    If ScriptReadOnly Then Exit Sub


    ' If the file hasn't changed, exit
    Set oSFile = oFileSys.GetFile(LocalScriptPath)
    FileArchive = oSFile.Attributes And Archive
    'File not changed
    If FileArchive <> Archive Then Exit Sub


    ' Ensure that there's an ExtendedStorage object
```

```
    If (ExtStorage Is Nothing) Then _
        Set ExtStorage = theTest.ExtendedStorage


    'Save the file to the Quality Center Project
    ExtStorage.Save "-r batch.bat", True


End Sub
```

For this example, the Save button click event writes the contents of the text box to the local file.

```
Private Sub cmdSave_Click()
' The cmdSave button ("Save") on the dialog box

    ' If the user didn't make any changes, exit
    If Not Text1.DataChanged Then Exit Sub

    'Delete the existing file
    oFileSys.DeleteFile LocalScriptPath, True

    'Create a new one and write the contents of the
    ' text box to the file
    Set ScriptFile = _
        oFileSys.CreateTextFile(LocalScriptPath, True)
    ScriptFile.Write Text1.Text
    ScriptFile.Close

    ' Set the no-change status for the text box.
    Text1.DataChanged = False

    ' Save the script to the Quality Center project
    SaveScript 0
End Sub
```

For this example, you can set ScriptReadOnly in your code to exercise the different options. In production code, Quality Center will set this value.

```
Private Sub UserControl1_Initialize()
    ScriptReadOnly = False
End Sub
```

Choose **Project** > **Properties**. Click the **General** tab, and rename the project MyScriptViewer. Save the project under this name.

Choose **File** > **Make MyScriptViewer.ocx** to compile the ActiveX control class and register it with Windows.

To see the ScriptViewer control at work, you need to register it with Quality Center. For more information, see "Registering Custom Test Types Example" on page 46.

ResultViewer ActiveX Control

A test type can include a ResultViewer ActiveX control. This control is created within an ActiveX hosting frame. The ResultViewer control must implement the following methods.

Init Method

Initializes the **ResultViewer** object.

Syntax

```
HRESULT Init( VARIANT TDConnection )
```

Parameters

Parameter Name	Description	Default
TDConnection	Required. A variant containing the *IDispatch* reference to the **TDConnection** object. For a description of the **TDConnection** object, see the **TDConnection** object description in *Quality Center Open Test Architecture API Reference*.	None

ShowResultEx Method

This method displays the result of the specified test instance in a test set in the Result Viewer. This method is an extension to the ShowResult method (see below), and supports multiple instances of a test in a test set.

Syntax

```
HRESULT ShowResultEx( VARIANT TestSetKey,
                      VARIANT TSTestKey,
                      VARIANT ResultKey )
```

Parameters

Parameter Name	Description	Default
TestSetKey	Required. The test set's key.	None
TSTestKey	Required. The test's key in the test set.	None
ResultKey	Required. The specific run result key.	None

ShowResult Method

This is an outdated method that is only supported for backward compatibility. The method displays the result of the specified test in the Result Viewer. This method's calling format does not support multiple instances of a specific test in one test set.

Syntax

```
HRESULT ShowResult( long TestKey,
                    long TestSetKey,
                    long ResultKey )
```

Parameters

Parameter Name	Description	Default
TestKey	Required. The test's key.	None
TestSetKey	Required. The test set's key.	None
ResultKey	Required. The test run's result key.	None

ExecConfiguration ActiveX Control

A test type can include an ExecConfiguration ActiveX Control. This control is used to configure tests and testing tools in the Quality Center execution mode. The control returns configuration strings (in the testing tool's internal format) to the Quality Center client call, which saves them in the database. Test configuration information is saved per test in a test set. Test type configuration is saved per project.

When Quality Center activates an ExecConfiguration ActiveX Control, it sets the *TestConfiguration* and *TestTypeConfiguration* properties, then calls the *ShowExecConfiguration* method in the ExecConfiguration ActiveX Control. When the session ends, Quality Center gets the *TestConfiguration* and *TestTypeConfiguration* properties and saves them in the Quality Center database. When Quality Center executes a test, it uses the **set_value** function to send the configuration strings to the appropriate remote agent. For a description of the **set_value** function, see "set_value Method" on page 20.

The ExecConfiguration ActiveX Control is created within an ActiveX hosting frame. The ExecConfiguration control must implement the following properties and methods.

ExecConfiguration ActiveX Control Properties

Simple Data Type Properties:

Property Name	R/W	Type	Description
TestConfiguration	R/W	String	Returns or sets the configuration strings for the test specified by the ShowExecConfiguration or ShowExecConfigurationEx methods.
TestTypeConfiguration	R/W	String	Returns or sets the general test type configuration string.

ExecConfiguration ActiveX Control Methods

Init Method

Initializes the **ExecConfiguration** object.

Syntax

```
HRESULT Init( VARIANT TDConnection )
```

Parameters

Parameter Name	Description	Default
TDConnection	Required. A variant containing the *IDispatch* reference to the **TDConnection** object. For a description of the **TDConnection** object, see the **TDConnection** object description in *Quality Center Open Test Architecture API Reference*.	None

ShowExecConfigurationEX Method

This method displays the configuration of the specified test in the specified test set. The method is an extension to the ExecConfiguration method (see below), and supports multiple instances of a test in a test set.

Syntax

```
HRESULT ShowExecConfigurationEx(VARIANT TestSetKey,
                                VARIANT TSTestKey)
```

Parameters

Parameter Name	Description	Default
TestSetKey	Required. The test set's key.	None
TSTestKey	Required. The test's key in the test set.	None

ShowExecConfiguration Method

This is an outdated method that is supported for backward compatibility. The method displays the configuration of the specified test in the specified test set. This method's calling format does not support multiple instances of a specific test in one test set.

Syntax

```
HRESULT ShowExecConfiguration( long TestKey,
                               long TestSetKey )
```

Parameters

Parameter Name	Description	Default
TestKey	Required. The test's key.	None
TestSetKey	Required. The test set's key.	None

Registering Custom Test Types with Quality Center

To use a custom test type, you need to register it with Quality Center.

To register a custom test type with Quality Center:

1. Go to the **application** directory under the Quality Center virtual directory on the application server machine.
2. Create a temporary scratch directory. Copy qcbin.war to the scratch directory and extract the files.
3. Copy the test type files (the class and controls file you created) into the **Install** directory under your scratch directory. Change the files' extensions—for example, change *.exe to *.xxx, *.dll to *.lld, *.ocx to *.xco, and so forth.

4 Add a section to <**scratch**>**Install****test_type.ini** with the following format:

```
[TEST TYPE NAME]
CLSID={XXXXXXXX-XXXX-XXXX-XXXX-XXXXXXXXXXXX}
```

where [TEST TYPE NAME] is the name of the test type, and X is a hexadecimal character of the class ID for the TestType class.

For example:

```
[VAPI-TEST]
CLSID={6D3B8D58-B5F5-11D2-9399-0080C837F11F}
```

This file will be downloaded to each client machine, and enables Quality Center to recognize the test type and its controls. Note that on existing clients, you must delete **test_type.ini** from the client so that the client downloads the revised version of this file. In the Common Data section of the file **setup_a_80mp.ini**, note the default client root directory for the file download. It is in the Destination item line, and is generally:

```
Destination=%CommonDir%\Mercury Interactive\TD2000_80
```

which evaluates to C:\Program Files\Common\Mercury Interactive\TD2000_80

5 Add a section to <**scratch**>**setup_a_80mp.ini** with the following format for each of the files to be downloaded to client machines (that is, the files you added to the Install directory, excluding the test_type.ini file):

```
[file_name]
URLName=<URLName>
Shortname=<shortname>
Description=<description>
Register=<register>
ProgID=<progID>
Version=<version>
Checksize=<checksize>
```

The required parameters within the setup ini file are described below:

Parameter	Description
URLName	Required. The location of the source file to be downloaded. Must start with %URL% and continue with the relative location under the main IIS virtual directory. For example: URLName=%URL%\Install\MyFile.xco
shortname	The options are: • The file name - the file is downloaded to the default destination directory. • The file name with the full path - the file is downloaded to the specified directory. • The file name with a partial path - the file is downloaded to the specified subdirectory of the default directory. Note that the file name extension here must be the runtime extension. For example: MyFile.ocx
description	Optional. A free text description that is displayed during file download. For example: Description=My Test Type Manager
register	Optional. Relevant only for COM/DCOM servers (EXE,OCX,DLL). There are two possible values: “Y” - register COM/DCOM server after download. “N” - do not register COM/DCOM server after download. For example: Register=Y If you omit this item, the default value “N” is used.
progID	Optional. Relevant only for COM/DCOM servers (EXE,OCX,DLL). The prog ID (the default string at the registry) for the COM/DCOM server. For example: ProgID=TestType.Class1

Parameter	Description
version	Optional. Relevant only for files that have compiled version information. If there is a COM server on the client machine with the same prog ID and the same version, the file is not downloaded. For example: Version=1.48.9.2089
checksize	Optional. Relevant only if the ProgID and Version items are omitted. The file size in bytes. If there is a file with the same name and size in the destination directory, the file is not downloaded. For example: CheckSize=4589

These parameters control the download of the control files to the client machine. This is done for every custom control file needed for this test type.

Registering Custom Test Types Example

This example demonstrates how to register and use the custom controls and remote agent described in the previous examples in this chapter.

Registering Class IDs Inside MyTestType

The MyTestType example (see "TestType Example" on page 17) does not provide information about the class ID or the necessary remote agent ID. Once you have registered both the MyRunAgent and MyScriptViewer examples, revisit the MyTestType project and fix this problem.

First, you must get the registered class CLSIDs. From the **Start** menu, choose **Run**, and run **Regedit**. In the Registry Editor, choose **Edit** > **Find**, and search for MyScriptViewer. You find the class under the HKEY_CLASSES_ROOT\CLSID\{XXXXXXXX-XXXX…} key, with the default string: MyScriptViewer.UserControl". The class ID string is the {XXXXXXXX-XXXX…} part (with hexadecimal numbers instead of the Xs). It is the folder name in the left pane near the open folder icon.

Copy the class ID string into a text file for later use. Look at the Version sub-key and copy the version.

Repeat this procedure for MyRunAgent and MyTestType.

Next, open the MyTestType project with Visual Basic. Go to the **Class_Initialize** sub-routine, and type the MyScriptViewer and MyRunAgent class ID strings from above at the appropriate assignments of RemoteAgentCLSID and ScriptViewerCLSID variables.

Copy the Class ID string for MyScriptViewer to the "MyTestType" project, setting the variable "ScriptViewerCLSID". Replace "[Class ID for ActiveX script viewer]" with the class ID from the registry. For example:

```
ScriptViewerCLSID = "{CEC307CF-09A8-4E9B-B2D0-E4BBFAD1D93C}"
```

Copy the Class ID string for MyRunAgent to the "MyTestType" project, setting the variable "RemoteAgentCLSID". Replace "[Class ID for the Run Remote Agent]" with the class ID from the registry. For example:

```
RemoteAgentCLSID = "{19260D4B-EC7D-4868-9DCD-8B7FC64A370A}"
```

Do not use the ID strings from this example. Use the strings you copied from the registry on your development machine.

Recompile the MyTestType project by choosing **File** > **Make MyTestType.exe** from the menu bar. Save the project.

Note the new version number for MyTestType in the registry. Enter it in the text file where you are keeping the IDs and versions for later use.

Opening the war archive on the server

Go to the **application** directory under the Quality Center virtual directory on the server machine.

Create a temporary scratch directory in another location. Copy <QC Dir>\application\qcbin.war to the scratch directory and extract the files. This example assumes you created and extracted to D:\qctemp.

Registering MyTestType with test_type.ini

Edit **test_types.ini** file in the **D:\qctemp\Install** directory, and add the following lines:

```
[My-TEST]
CLSID={XXXXXXXX-XXXX-XXXX-XXXX-XXXXXXXXXXXX}
```

where you replace the {XXX.....} part with the class ID string you found for MyTestType using **Regedit**. Save the file.

This file is downloaded to every registered client connecting to the server. You must delete this file from existing clients, so that it can be reloaded to these clients in its revised form.

Downloading the Files to the Client

Copy the three example files (**MyTestType.exe**, **MyRunAgent.exe** and **MyscriptViewer.ocx**) to the **D:\qctemp\Install** directory. Change their file extensions to `.xxx` for the EXE files and `.xco` for the OCX file.

Open the **D:\qctemp\setup_a_80mp.ini** file. Note that this is a list of files to be downloaded to the client (including the test_type.ini file), numbered [File_1], [File_2], and so forth. Make a new section for each of the three files.

In this example, the last number before adding this example was 12. On your site the numbering may be different. Start with the next number after the highest file, [File_<current_max + 1>]. For “Version”, use the version numbers you saved above, when you recorded the class IDs from the registry on your development machine.

```
[File_13]
Register=Y
URLName=%URL%/Install/MyScriptViewer.xco
ShortName=MyScriptViewer.ocx
Description=My Script Viewer
ProgID=MyScriptViewer.UserControl1
Version=[the version is a sub key in the registry from within the class id]
```

```
[File_14]
Register=Y
URLName=%URL%/Install/MyTestType.xxx
ShortName=MyTestType.exe
Description=DOS Batch Test Type
ProgID=MyTestType.Class1
Version=[the version is a sub key in the registry from within the class id]

[File_15]
Register=Y
URLName=%URL%/Install/MyRunAgent.xxx
ShortName=MyRunAgent.exe
Description=My Remote Run agent
ProgID=MyRunagent.Class1
Version=[the version is a sub key in the registry from within the class id]
```

Save the file.

Recreating the war archive on the server

Update the D:\qctemp\qcbin.war file, so that it contains the three program files and the updated versions of the two ini files. Make a back-up copy of **<QC Dir>\application\qcbin.war**, then copy the updated archive, **D:\qctemp\qcbin.war**, into the application directory, overwriting the existing file.

Copy the **<QC Dir>\application\qcbin.war** archive to **<QC Dir>\jboss\server\default\deploy\20qcbin.war**, overwriting the existing 20qcbin.war. Note that the file is copied with a new name, 20qcbin.war.

Testing With MyTestType

The example custom test type is now ready for use.

Note: It is not recommended to use the station on which the custom test was compiled to run the client with the custom tests. If it is necessary to do so, delete all mentions of MyScriptViewer, MyTestType, and MyRunAgent from the system registry before running the client on the machine.

On the client machine, log off Quality Center. Delete the file **test_type.ini** from the client download directory, typically **C:\Program Files\Common Files\Mercury Interactive\TD2000_80**.

In this example, the batch file is created on the client before being transferred to the server. Ensure that the directory used by "CreateScriptTemplate" exists. In the sample above, the directory is C:\temp.

Open a browser and enter the URL, http://<server:port>/qcbin. Click the **Mercury Quality Center** link. You should see progress bars for each file you added to setup_a_80mp.ini.

Click the **Customize** button on the login page (in the upper left corner), and log in as the administrator. Click the **Customize Project Entities** link to open the Customize Project Entities dialog box. In the **Project Entities** list, expand the **Test** entity, expand the **System Fields** folder under it, and select **Type**. Click the **Goto List** button to open the Customize Project Lists dialog box. Click the **New Item** button, and type the name My-TEST to add it to the list of test types. Close the Project Lists dialog box, and click **OK** to close the Customize Project Entities dialog box. Log out of the Project Customization window. The My-TEST type is added to the test type options.

Log in to the Quality Center client. In the **Test Plan** module in the test plan tree, create a test of type My-TEST. Note that the icon to the left of the test name, in the test grid, indicating the test type, is a question mark (the default). Log out of the Quality Center client for the change to take effect.

Log in to the Quality Center client. In the **Test Plan** module in the test plan tree, select the test you added. Click the **Test Script** tab to display the test's text inside the MyScriptViewer control you created earlier.

In the **Test Lab** module, select and add your test. Run the test. A minimized console window opens, the script commands are run, and the status field of the test is updated to Completed. Press Enter from the console window to close it.

3

Using the Quality Center API

The Quality Center application program interface (API) enables you to extend Quality Center functionality to your testing and reporting applications. Your applications can communicate with any Quality Center project and create, retrieve, and update project contents.

For details of the classes, methods, and properties exposed in the API, see the *Quality Center Open Test Architecture API Reference*.

This chapter describes:

- Integrating Your Applications with Quality Center
- Accessing Quality Center API Functions
- Downloading the OTAClient80.dll
- How the OTAClient80.dll Communicates with Quality Center
- Quality Center API Terminology

About the Quality Center API

Quality Center is a complete test management framework. At the center of this framework are projects that you create to store all the test requirements, test planning, test execution, and defect tracking information associated with each testing process. You access projects by using the Quality Center Login window, or by using external applications. These can include your configuration management, defect tracking, and custom testing tools.

You integrate external applications with Quality Center by using the Quality Center API. The Quality Center API objects expose COM–based interfaces that let you communicate directly with the Quality Center server to perform a variety of testing tasks. The Quality Center user interface uses this same API for all of its operations, such as connecting to a project, importing information from external applications to a project, and exporting information from a project to an external application.

The following chapters explain how to integrate external applications so that they can access and process information contained in projects.

Integrating Your Applications with Quality Center

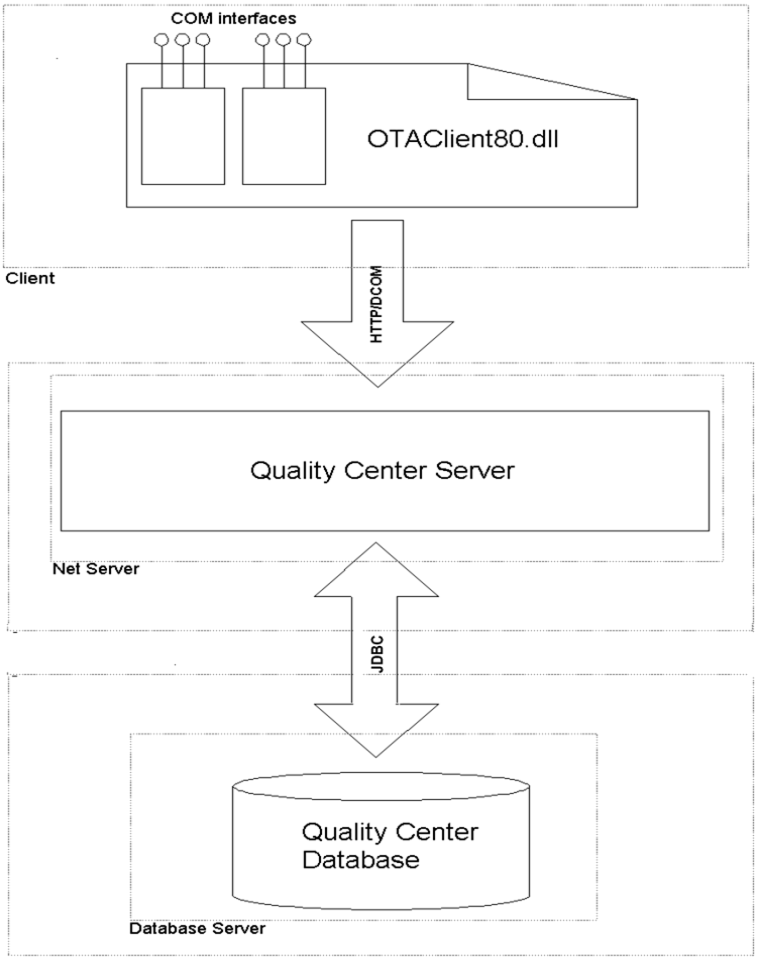
Integrating Quality Center with other testing applications lets you extend Quality Center functionality to your execution, reporting, and productivity (word processing, spreadsheet, and presentation) applications.

For example, during the running tests stage you could use the Quality Center API to locate and retrieve tests created with third-party testing tools from the Quality Center test repository. The Quality Center API also lets you store all the data generated by the testing tool during each test run in the project.

After the running tests stage is complete, you can analyze this data with Quality Center reports and graphs, or export the results to an external application, such as a spreadsheet, to perform a detailed analysis. You can also use the Quality Center API to report any defects detected during a test to the project's defect database automatically, and view this information in an external application.

Accessing Quality Center API Functions

You integrate external applications with Quality Center projects via COM objects. The definition of each object, including its properties, methods, and parameters, is packaged in the OTA (open test architecture) Client dynamic link library (OTAClient80.dll). After your application has performed an object function call, it is sent to the Quality Center server for processing. Note that you must download and register the OTAClient80.dll on each workstation that will communicate with the Quality Center server.



Downloading the OTAClient80.dll

The OTAClient80.dll is automatically downloaded to your workstation the first time you run Quality Center. Note that the OTAClient80.dll is not backward compatible with previous versions. An Open Test Architecture application must reference the OTAClient80.dll (also called the OTA COM 8.0 Type Library).

To download the OTAClient80.dll the first time you run Quality Center:

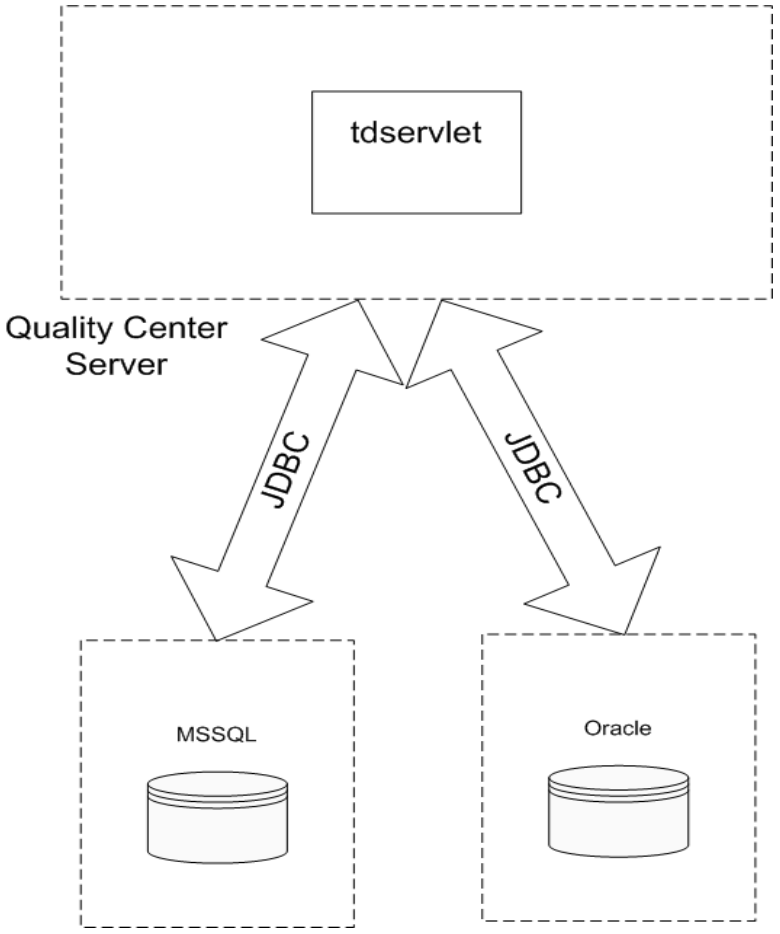
1. Open your Web browser and type the URL given to you by your system administrator.
2. Click the Quality Center link. The OTAClient 80.dll is automatically downloaded to the following folder:

   <*NT installation drive letter*>\Program Files\Common Files\Mercury Interactive\TD2000_80

How the OTAClient80.dll Communicates with Quality Center

The OTAClient80.dll communicates with the Quality Center server either through Internet/intranet (HTTP) or through LAN (Microsoft's DCOM). This enables your applications to receive information from, and send information to, your Quality Center projects.

Since Quality Center is a three-tier application, its server handles the communications between all applications that need to access the database, thus eliminating the need to install database clients on all the PCs that must access the database.


tdservlet
Quality Center Server
JDBC
JDBC
MSSQL
Oracle

Quality Center API Terminology

Some of the terms used in the Quality Center project and the API differ from the terms used in the current Quality Center user interface.

Quality Center Project	Quality Center API
Defect	Bug
Attachment (cross reference)	Cros_ref
Test set	Cycle
Project	Database
Design steps	Dessteps
Test steps	Steps
Test Execution	Test Cycle

4

Quality Center Projects Data Structure

To fully utilize the Quality Center API to integrate external applications with Quality Center, you must understand the database design of the Quality Center project. The following sections explain the tables and fields that comprise the Quality Center project.

This chapter describes:

- Quality Center Projects
- Table Relationships
- Data Tables
- System Tables and Security Tables

Note: You should modify the database using only the Quality Center API. Do not modify it directly.

Quality Center Projects

This chapter describes the tables that comprise a Quality Center project and how these tables relate to one another. You can view each table and the fields it contains using the Site Administrator. For more information about viewing project tables using the Site Administrator, refer to the *Mercury Quality Center Administrator's Guide*.

Each Quality Center project contains three types of tables: data tables, system tables, and security tables.

Data tables contain data entered by the users of the project at all stages of the testing process. For example, there are data tables that contain tests (Test table), test execution data (Run table), and defect information (Bug table). The Quality Center API interacts mainly with these tables, to which most of this chapter refers.

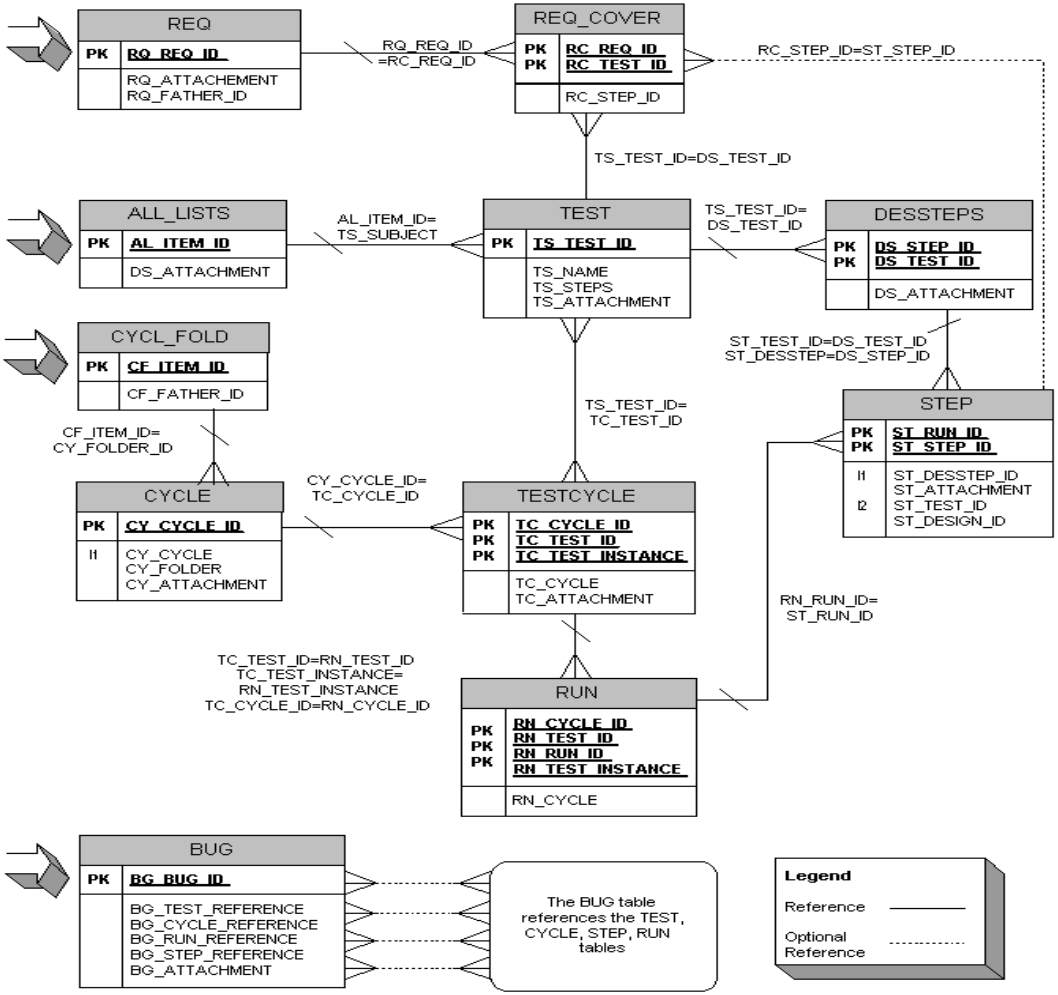
System tables contain information used internally by Quality Center. For example, there are system tables that contain information about fields in the project (System_Field table), the conditions under which defect reports are mailed to users (Mailcond table), and the host servers to which Quality Center is connected (Hosts table).

Security tables contain information used for generating, assigning, and controlling permissions within the project. For example, there are tables that control the actions that a user can perform (Actions table), the tables that a user can access and modify (Tables table), and the fields that the user can modify within the table (System_field table).

Table Relationships

The following diagram shows the relationship between the main data tables in a project, displaying their relevant fields. For clarity, the diagram is organized according to the Quality Center client entities.

Note: This is a partial description of the database and the relationships within it.


REQ
PK RQ_REQ_ID
RQ_ATTACHEMENT
RQ_FATHER_ID
RQ_REQ_ID =RC_REQ_ID
REQ_COVER
PK RC_REQ_ID
PK RC_TEST_ID
RC_STEP_ID
RC_STEP_ID=ST_STEP_ID
TS_TEST_ID=DS_TEST_ID
ALL_LISTS
PK AL_ITEM_ID
DS_ATTACHMENT
AL_ITEM_ID= TS_SUBJECT
TEST
PK TS_TEST_ID
TS_NAME
TS_STEPS
TS_ATTACHMENT
TS_TEST_ID= DS_TEST_ID
DESSTEPS
PK DS_STEP_ID
PK DS_TEST_ID
DS_ATTACHMENT
CYCL_FOLD
PK CF_ITEM_ID
CF_FATHER_ID
ST_TEST_ID=DS_TEST_ID
ST_DESSTEP=DS_STEP_ID
STEP
PK ST_RUN_ID
PK ST_STEP_ID
I1 ST_DESSTEP_ID
ST_ATTACHMENT
I2 ST_TEST_ID
ST_DESIGN_ID
TS_TEST_ID= TC_TEST_ID
CF_ITEM_ID= CY_FOLDER_ID
CYCLE
PK CY_CYCLE_ID
I1 CY_CYCLE
CY_FOLDER
CY_ATTACHMENT
CY_CYCLE_ID= TC_CYCLE_ID
TESTCYCLE
PK TC_CYCLE_ID
PK TC_TEST_ID
PK TC_TEST_INSTANCE
TC_CYCLE
TC_ATTACHMENT
RN_RUN_ID= ST_RUN_ID
TC_TEST_ID=RN_TEST_ID
TC_TEST_INSTANCE=
RN_TEST_INSTANCE
TC_CYCLE_ID=RN_CYCLE_ID
RUN
PK RN_CYCLE_ID
PK RN_TEST_ID
PK RN_RUN_ID
PK RN_TEST_INSTANCE
RN_CYCLE
BUG
PK BG_BUG_ID
BG_TEST_REFERENCE
BG_CYCLE_REFERENCE
BG_RUN_REFERENCE
BG_STEP_REFERENCE
BG_ATTACHMENT
The BUG table references the TEST, CYCLE, STEP, RUN tables
Legend
Reference
Optional Reference

Data Tables

Data tables contain data entered by project users at all stages of the testing process. For example, the Test table lists each test and its name, ID, and type. Users can access this information through the main Quality Center window or through external applications that interface with the project, such as WinRunner. Quality Center projects include the following data tables:

Table	Related Entity	Description
Req	**Requirements**	Contains information about testing requirements.
Req_Cover	**Requirements**	Matches testing requirements to the tests and steps that cover them.
Test	**Tests**	Contains a list of all tests in Quality Center.
Dessteps	**Design Steps**	Contains information about design steps that are part of a planned test.
Cycle	**Test Sets**	Contains a list of all test sets in Quality Center.
Testcycl	**Test Sets**	Matches tests to test sets. Enables multiple instances of a single planned test within one test set.
Run	**Test Execution**	Contains information about test executions.
Step	**Test Step Execution**	Contains information about test step executions within a test execution.
Bug	**Defects**	Contains information about all the defects recorded in the project.
Bug_Tokens	**Defects**	Matches defect records to tokens used to search for similar defects.
Tokens	**Defects**	Contains tokens used to enable automated searching for similar defects.
Cros_Ref	**Attachments**	Files and URLs attached to any project entity.

Table	Related Entity	Description
History	**History**	Contains record change information for the project entities.
All_Lists	**Test Plan Tree**	Contains the test plan tree with which the tests are associated. Also has a different role as a system table.
Step_Params	**Test Parameters**	Contains manual tests run parameters and their optional values.
Alerts	**Traceability**	Contains automatic generated alerts for data objects and user-defined follow-ups for data objects.
Cycl_Fold	**Test Lab Folders**	Contains the test lab tree with which the test sets are associated.
Rules	**Customization/ Traceability**	Contains traceability identification rules which activate/deactivate rules and enable e-mail notifications.

You can customize a Quality Center project by adding user-defined fields. If you are using Oracle or Microsoft SQL Server databases, you can add up to 99 user-defined fields and 3 memo fields to each Quality Center entity.

Note: The maximum field size is 255 characters for Oracle or SQL Server databases.

The Req Table - Requirements

The Req table contains information about testing requirements. A project can have various requirements for which testing must be performed. Tests that cover elements of the requirement are assigned to the requirement in the Req_Cover table. For example, initialization can be a requirement, and all tests that involve initialization can be assigned to this requirement. Note that a test can be assigned to more than one requirement. The table contains the following fields:

Field	Description
RQ_REQ_ID	The unique ID of the requirement.
RQ_FATHER_ID	The ID of the requirement for which the listed requirement is a sub-requirement.
RQ_ORDER_ID	The order in which the requirement appears among other requirements at the same level of the requirements hierarchy.
RQ_ISTEMPLATE	Indicates whether or not the requirement is a requirement template. Testers can design requirement templates as the basis for multiple requirements with common features.
RQ_REQ_COMMENT	Comments about the requirement.
RQ_REQ_REVIEWED	Indicates whether or not the User responsible for the project has reviewed the requirement.
RQ_REQ_PATH	The requirement path in the requirements hierarchy.
RQ_REQ_STATUS	The aggregated status of previous runs of tests in the requirement coverage. Indicates whether a test that covers the requirement fails. Possible values of this field: No Run, Failed, Passed, Not Completed, N/A. Additional user-defined values may be added to this field by the user.
RQ_REQ_PRIORITY	The requirement priority level. Possible values: 1-Low, 2-Medium, 3-High, 4-Very High, 5-Urgent.
RQ_REQ_TYPE	The requirement type (that is, system or functional).

Field	Description
RQ_REQ_PRODUCT	The product for which the requirement is designed.
RQ_REQ_NAME	The name assigned to the requirement by the tester that designed the requirement.
RQ_REQ_AUTHOR	The user that designed the requirement.
RQ_REQ_VER_STAMP	The revision number of this requirement. Increases each time a change is made.
RQ_ATTACHMENT	Indicates whether the requirement has any attachments. The value of this field can be either Y or N.
RQ_REQ_DATE	The date the requirement was added to the project.
RQ_REQ_TIME	The time the requirement was added to the project.
RQ_NO_OF_SONS	The number of requirements that have this requirement as a father requirement (have their **RQ_FATHER_ID** field set to this requirement's ID).
RQ_IS_FOLDER	Indicates if this requirement has folder-like behavior. Contains either Y or N.
RQ_VTS	The version time stamp. Indicates the time this record was last changed. The time stamp is according to the database server.
RQ_USER_01...102	You can add user-defined fields to customize the table (see page 63 for the maximum allowable number). You can also add up to 3 memo fields.
RQ_TASK_STATUS	For future use.

The Req_Cover Table - Requirements Coverage

The Req_Cover table matches requirements to the tests—and, optionally, test steps—that cover them. For each requirement, the table lists each test and test step that covers the requirement. For a diagram of these relationships, see "Table Relationships" on page 60.

The Req_Cover table contains the following fields:

Field	Description
RC_REQ_ID	The requirement ID. This is a reference to the Req table's **RQ_REQ_ID** field.
RC_TEST_ID	The ID of a test that covers the requirement. This is a reference to the Test table's **TS_TEST_ID** field.
RC_STEP_ID	The ID of a test step that covers the requirement. This is a reference to the Step table's **ST_STEP_ID** field.
RC_ORDER_ID	The order in which this requirement coverage appears among other coverages of the requirement.

The Test Table - Tests

The Test table contains information on each test in the project, such as test ID, name, and type. When a new test is created, a new row is added to the Test table. The table contains the following fields:

Field	Description
TS_TEST_ID	The unique ID of the test.
TS_NAME	The name of the test assigned by the test developer.
TS_STEPS	The number of design steps in the test.
TS_PATH	The test directory path.
TS_SUBJECT	The ID of the subject folder in which the test resides.
TS_STATUS	The test's current status. Possible values: Ready, Design, Imported, Repair. Additional user-defined values may be added to this field by the user.

Field	Description
TS_RESPONSIBLE	The user responsible for implementing the test.
TS_CREATION_DATE	The date on which the test was created.
TS_DESCRIPTION	A description of the test.
TS_TYPE	The type of test. For a description of possible test types, see *The Quality Center Open Test Architecture API Reference*.
TS_TIMEOUT	Reserved.
TS_ATTACHMENT	Indicates whether the test has any attachments. The value of this field can be either Y or N.
TS_USER_01...102	You can add user-defined fields to customize the table (see page 63 for the maximum allowable number). You can also add up to 3 memo fields.
TS_USER_HR_01...06	Not in use.
TS_ESTIMATE_DEVTIME	The time estimated to develop the test.
TS_TEST_VER_STAMP	The revision number of this record. Increases each time a change is made.
TS_EXEC_STATUS	Indicates the execution status of the test. Possible values: Not Completed, No Run, Passed, N/A, Failed.
TS_TEMPLATE	Indicates that this test is a test template. The value of this field can be either Y or N.
TS_STEP_PARAM	Not in use.
TS_VTS	The version time stamp. Indicates the time this record was last changed. The time stamp is according to the database server.
TS_VC_CUR_VER	The last checked-in version of the test. Used by the Version Control engine.
TS_TASK_STATUS	For future use.

The Dessteps Table - Design Steps

The Dessteps table contains information about design steps. Design steps are detailed, step-by-step instructions on how to execute a test, including the actions to perform on the application, the required input, and the expected output. When a new design step is created, a new row is added to the table. You can add new steps during the test run process and decide whether or not to save them to the Dessteps table. The table contains the following fields:

Field	Description
DS_TEST_ID	The ID of the test to which the step belongs. This is defined in the Test table **TS_TEST_ID** field.
DS_STEP_ID	The ID of the step within the test.
DS_STEP_ORDER	The order in which the step appears within the test.
DS_STEP_NAME	The name assigned to the step by the test developer.
DS_DESCRIPTION	The design step description.
DS_EXPECTED	The expected result string.
DS_USER_01...102	You can add user-defined fields to customize the table (see page 63 for the maximum allowable number). You can also add up to 3 memo fields.
DS_ATTACHMENT	Indicates whether the design step has any attachments. The value of this field can be either Y or N.
DS_LINK_TEST	The ID of a test to be run when this design step is executed. If no ID is present, no test will be run.
DS_HAS_PARAMS	Indicates whether this design step has parameters associated with it. This field can be either Y or N.

The Cycle Table - Test Sets

The Cycle table contains information about all the test sets in the Quality Center project. A test set is a group of tests designed to meet a specific testing goal. When a new test set is created, a new row is added to the Cycle table. The table contains the following fields:

Field	Description
CY_CYCLE_ID	The ID of the test set.
CY_CYCLE	The test set name assigned by the creator of the test set.
CY_OPEN_DATE	The date the test set was opened.
CY_CLOSE_DATE	The date the test set was closed.
CY_STATUS	The current status of the test set. Possible values: Open, Closed.
CY_DESCRIPTION	The information contained in the Execution Flow tab.
CY_CYCLE_VER_STAMP	The revision number of this record. Increases each time a change is made.
CY_COMMENT	A description of the test set.
CY_ATTACHMENT	Indicates whether the test set has any attachments. The value of this field can be either Y or N.
CY_EXEC_EVENT_HANDLE	The actions to be executed in reaction to various execution events during the test set. This field is in a proprietary format.
CY_MAIL_SETTINGS	The mailing actions in reaction to various execution events during the test set. This field is in a proprietary format.
CY_USER_01...102	You can add user-defined fields to customize the table (see page 63 for the maximum allowable number). You can also add up to 3 memo fields.

Field	Description
CY_VTS	The version time stamp. Indicates the time this record was last changed. The time stamp is according to the database server.
CY_FOLDER_ID	The ID of the folder containing test sets.
CY_REQUEST_ID	Foreign key links to the req table.

The Testcycl Table - Tests in Test Sets

The Testcycl table contains information indicating which tests belong to which test sets. When a test is added to a test set, a new row is added to the table, indicating the Cycle_ID, Test_ID, and Test_Instance_ID. The table supports multiple instances of the same test in one test set through the TC_TEST_INSTANCE field. For a diagram of these relationships, see "Table Relationships" on page 60.

The Testcycl table contains the following fields:

Field	Description
TC_TEST_ID	The ID of the test. This is defined in the Test table **TS_TEST_ID** field.
TC_CYCLE_ID	The ID of the test set in which the test resides. This is defined in the Cycle table **CY_CYCLE_ID** field. Note that the same test set ID can appear in many tests.
TC_TEST_INSTANCE	The number for this test instance inside the cycle. This field enables several test instances with the same **TC_TEST_ID** to reside within the same test set.
TC_CYCLE	Not in use.
TC_TEST_ORDER	The order in which the test appears within the test set.
TC_STATUS	The status of the last run of the test. Possible values: Not Completed, No Run, Passed, N/A, Failed. Additional user-defined values may be added to this field by the User.

Field	Description
TC_TESTER_NAME	The user name of the person responsible for running the test.
TC_ACTUAL_TESTER	The name of the user that is actually executing the test.
TC_EXEC_DATE	The date on which the test was last executed.
TC_EXEC_TIME	The time at which the test was last executed.
TC_PLAN_ SCHEDULING_DATE	The date on which the tester plans to next run the test.
TC_PLAN_ SCHEDULING_TIME	The time at which the tester plans to next run the test.
TC_HOST_NAME	The name or IP address of the host server on which the test will be executed.
TC_EPARAMS	The testing tool configuration string, created by the testing tool itself.
TC_ATTACHMENT	Indicates whether the test instance has any attachments. The value of this field can be either Y or N.
TC_USER_01...102	You can add user-defined fields to customize the table (see page 63 for the maximum allowable number). You can also add up to 3 memo fields.
TC_TEST_VERSION	The current test version.
TC_TEST_CYCLE _VER_STAMP	The revision number of this record. Increases each time a change is made.
TC_EXEC_EVENT _HANDLE	The actions to be executed in reaction to various execution events during the test set run. This field is in proprietary format.
TC_VTS	The version time stamp. Indicates the time this record was last changed. The time stamp is according to the database server.
TC_TASK_STATUS	For future use.

The Run Table - Test Executions

The Run table contains information on test instance executions, such as the ID of the test run, the name of the test run, the test instance, and the time and date the run was performed.

When you run a test, a new row is created in the Run table and all test-specific design-steps are copied from the Dessteps table to the Steps table.

The Run table contains the following fields:

Field	Description
RN_CYCLE_ID	The ID of the test set in which the test being run resides. This is defined in the Cycle table **CY_CYCLE_ID** field. Note that the same test set index can appear in many test runs.
RN_TEST_ID	The ID of the test being run. This is defined in the Test table **TS_TEST_ID** field. Note that a test may have more than one run.
RN_RUN_ID	The ID of the test run.
RN_RUN_NAME	The name assigned to the test run by the tester.
RN_HOST	The name or IP address of the host server on which the test was executed.
RN_STATUS	The current status of the test run. Possible values: Not Completed, No Run, Passed, N/A, Failed. Additional user-defined values may be added to this field by the User.
RN_EXECUTION_DATE	The date on which the test run was performed.
RN_EXECUTION_TIME	The time at which the test run was performed.
RN_DURATION	The duration of the test run.
RN_TESTER_NAME	The user name of the person who last executed the test.
RN_PATH	The directory path of the test run.

Field	Description
RN_USER_01...102	You can add user-defined fields to customize the table (see page 63 for the maximum allowable number). You can also add up to 3 memo fields.
RN_TEST_VERSION	The version of the application being tested.
RN_ATTACHMENT	Indicates whether the run has any attachments. The value of this field can be either Y or N.
RN_RUN_VER_STAMP	The revision number of this record. Increases each time a change is made.
RN_VTS	The version time stamp. Indicates the time at which this record was last changed. The time stamp is according to the database server.
RN_CYCLE	For future use.
RN_TEST_INSTANCE	The number of the test instance being run. This is defined in the Testcycl table **TC_TEST_INSTANCE** field.
RN_OS_NAME	The name of the operating system on which the test run is running.
RN_OS_SP	The current service pack to which the operating system is updated.
RN_OS_BUILD	The current operating system build number.
RN_VC_LOKEDBY	The name of the User that locked the test. Used by the Version Control engine.
RN_VC_STATUS	The version control status of the test instance during execution. This field value can be one of the following: CHECKEDOUT, CHECKEDIN or GETTED.
RN_VC_VERSION	The test instance version during execution.
RN_DISK_STATUS	Not in use.
RN_MEM_STATUS	Not in use.

The Step Table - Test Steps

The Step table contains information on each test step performed during a test instance run. Test steps contain detailed, step-by-step instructions on how to execute a test. A step includes the actions to be performed on the application, required input, and actual output.

The Step table contains the following fields:

Field	Description
ST_RUN_ID	The ID of the test run to which the test belongs. This is defined in the Run table **RN_RUN_ID** field. Note that the same Run ID can appear in many steps.
ST_STEP_ID	The ID of the test step.
ST_STEP_NAME	The name of the test step.
ST_STATUS	The status of the test step. Possible status values: Not Completed, No Run, Passed, N/A, Failed. Additional user-defined values may be added to this field by the User.
ST_EXECUTION_DATE	The date on which the test step was executed.
ST_EXECUTION_TIME	The time at which the test step was executed.
ST_DESCRIPTION	A description of the test step.
ST_EXPECTED	The expected result of the test step.
ST_ACTUAL	The actual result of the test step.
ST_PATH	The directory path of the test script containing the test step.
ST_LINE_NO	The line number on which the step appears in the test script.
ST_USER_01...102	You can add user-defined fields to customize the table (see page 63 for the maximum allowable number). You can also add up to 3 memo fields.
ST_STEP_ORDER	The order in which the step appears within the test.
ST_DESSTEP_ID	Not in use. Use **ST_DESIGN_ID** instead.

Field	Description
ST_ATTACHMENT	Indicates whether the step has any attachments. The value of this field can be either Y or N.
ST_TEST_ID	The test ID to which this step belongs.
ST_DESIGN_ID	The ID of the design step on which the test step is based. This is defined in the Dessteps tables **DS_STEP_ID** field.

The Bug Table - Defects

The Bug table contains information about each of the defects recorded in the Quality Center project, including defect ID, current status, and the developer responsible for correcting the defect.

The Bug table contains the following fields:

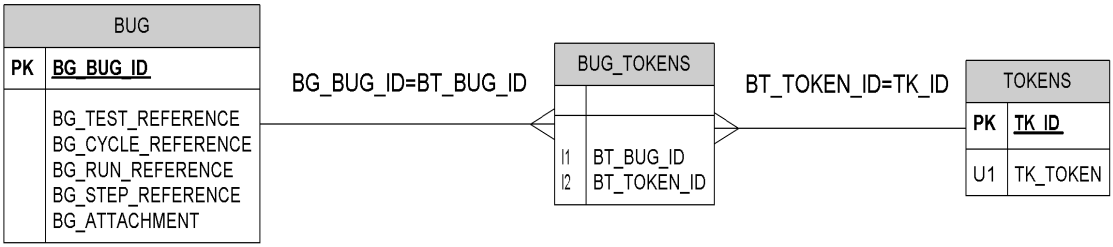
Field	Description
BG_BUG_ID	The ID of the defect record.
BG_CYCLE_ID	The index of the test set in which the defect was found. This is defined in the Cycle table **CY_CYCLE_ID** field.
BG_STATUS	The current status of the defect. The possible values of this field are: Open, Fixed, Closed, New, Rejected, Reopen. Additional user-defined values may be added to this field by the User.
BG_RESPONSIBLE	The name of the developer responsible for fixing the defect.
BG_PROJECT	The name of the project in which the defect was found.
BG_SUBJECT	The ID of the subject in the test plan tree to which the bug is related.
BG_SUMMARY	A summary of the defect.
BG_DESCRIPTION	A description of the defect.

Field	Description
BG_DEV_COMMENTS	Comments about the defect by the developer responsible for the defect.
BG_REPRODUCIBLE	Indicates whether the tester was able to reproduce the defect.
BG_SEVERITY	The severity level of the defect. Possible values: 1-Low, 2-Medium, 3-High, 4-Very High, 5-Urgent.
BG_PRIORITY	The priority level of the defect. Possible values: 1-Low, 2-Medium, 3-High, 4-Very High, 5-Urgent.
BG_DETECTED_BY	The name of the tester who found the defect.
BG_TEST_REFERENCE	The ID of the test in which the defect was found. This is defined in the Test table **TS_TEST_ID** field.
BG_CYCLE_REFERENCE	The name of the test set in which the defect was found. This is defined in the Cycle table **CY_CYCLE** field.
BG_RUN_REFERENCE	The index of the test run in which the defect was found. This is defined in the Run table **RN_RUN_ID** field.
BG_STEP_REFERENCE	The ID of the test run step in which the defect was found. This is defined in the Step table **ST_STEP_ID** field.
BG_DETECTION_DATE	The date the defect was found.
BG_DETECTION_VERSION	The version in which the defect was detected.
BG_PLANNED_CLOSING_VER	The version in which the developer estimates the defect will be closed.
BG_ESTIMATED_FIX_TIME	The number of days the developer estimates will be required to fix the defect.
BG_ACTUAL_FIX_TIME	The number of days taken to fix the defect.
BG_CLOSING_DATE	The date the defect record was closed.
BG_CLOSING_VERSION	The version in which the defect record was closed.

Field	Description
BG_TO_MAIL	Indicates whether a defect report should be mailed to users registered to receive such reports.
BG_ATTACHMENT	Indicates whether the defect record has any attachments. The value of this field can be either Y or N.
BG_USER_01...102	You can add user-defined fields to customize the table (see page 63 for the maximum allowable number). You can also add up to 3 memo fields.
BG_USER_HR_01...06	Not in use.
BG_BUG_VER_STAMP	A number indicating the revision number of this record. Increases each time a change is made.
BG_HAS_CHANGE	For backward compatibility.
BG_VTS	The version time stamp. Indicates the time this record was last changed. The time stamp is according to the database server.
BG_REQUEST_ID	Foreign key that links to the req table.

The Bug_Tokens Table - SImilar Defects

The Bug_Tokens table matches defects stored in the Bugs table with tokens stored in the Tokens table. This enables Quality Center to search for similar defects. The following diagram shows the relationship between the Bug_Tokens table and the two tables related to it.



The Bug_Tokens table contains the following fields:

Field	Description
BT_BUG_ID	The ID of the defect.
BT_TOKEN_ID	The ID of the token.

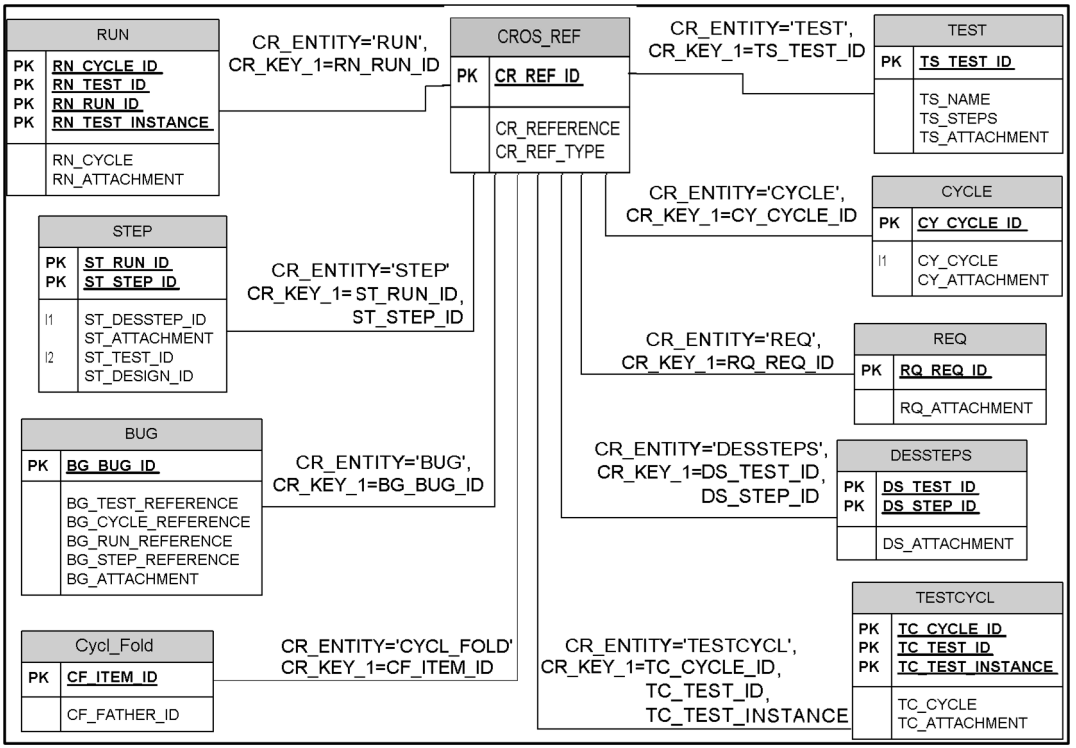
The Tokens Table - Tokens

The Tokens table contains tokens that enable automated searching for similar defects. The table contains the following fields:

Field	Description
TK_ID	The ID of the token.
TK_TOKEN	The name of the token.

The Cros_Ref Table - Attachments

The Cros_Ref table contains information about files and URLs attached to tests, test sets, and other project entities. The following diagram shows the relationship between the Cros_Ref table and other data tables. Note that this diagram excludes system tables.

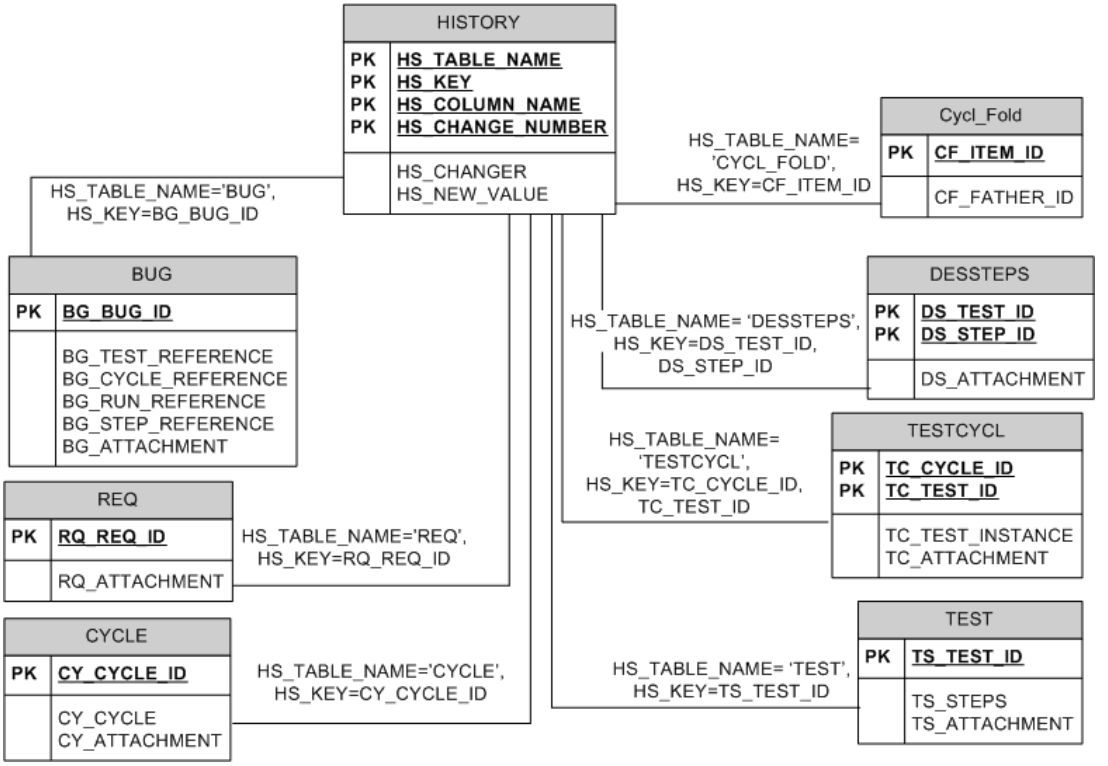


The Cros_Ref table contains the following fields:

Field	Description
CR_REF_ID	The ID of the attachment within the Cros_Ref table.
CR_REFERENCE	The full path of the attached file within the file system or a URL. If it is a relative path, Quality Center searches it relative to the project directory that is defined for the project using the Site Administrator.
CR_OLE_IND	Not in use.
CR_REF_TYPE	The type of attachment. An attachment can be kept as a URL, as a file in the attachment repository, or as a link to a file.
CR_DESCRIPTION	A description of the attachment.
CR_VC_CUR_VER	For future use.

The History Table - Entity Changes History

The History Table shows changes made to records in Quality Center tables. When data changes, the History table is automatically updated. The following diagram shows how the History table records history information from the project.



Note: Not all changes made to a project entity are logged in the History table. Only changes made to specific, pre-defined fields are logged.

The History table contains the following fields:

Field	Description
HS_TABLE_NAME	The name of the table for which the history record is logged.
HS_KEY	The string representation of the primary key of the record for which the history record is logged.
HS_COLUMN_NAME	The name of the field for which the history record is logged.
HS_CHANGE_DATE	The date on which the change being logged occurred.
HS_CHANGE_TIME	The time at which the change being logged occurred.
HS_CHANGER	The name of the user that made the change to the record.
HS_NEW_VALUE	The new value assigned to the field.

The All_Lists Table - Test Plan and List Values

The All_Lists table contains the test plan tree with the test TS_SUBJECT field, containing the AL_ITEM_ID of the node to which it belongs. It also functions as a system table, containing the list of all the values in all the drop down lists (combo boxes) displayed in the Quality Center grids. The table contains the following fields:

Field	Description
AL_ITEM_ID	The ID of the list item in the All_Lists table.
AL_FATHER_ID	The ID of the Parent folder of the item.
AL_DESCRIPTION	A description of the list item.
AL_NO_OF_SONS	The number of children of the item.
AL_SYSTEM	The type of list item. This can be one of the following: R - read-only but can add sub-folders. S - system field (Quality Center does not permit changes to this field). A - all actions are available. C - can change but not delete.
AL_ABSOLUTE_PATH	The list item path in the lists hierarchy.
AL_VIEW_ORDER	The order of the child item in the specified node.
AL_MEMO	A comment field.
AL_ATTACHMENT	Indicates whether the record has any attachments. The value of this field can be either Y or N.
AL_VTS	The version time stamp. Indicates the time this record was last changed. The time stamp is according to the database server.

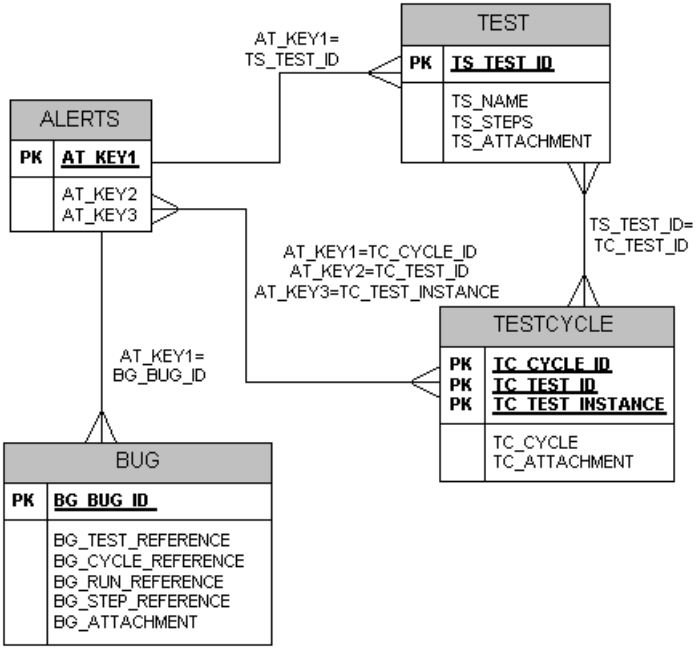
The Step_Params Table - Manual Test Parameters

The Step_param table contains parameters for executing manual tests. The parameters can be assigned values, so that a manual test run configuration is completely documented. Note that a parameter can be assigned a value at several levels (namely: test, run, test set, or design step), and the contents of some fields can vary accordingly. The table contains the following fields:

Field	Description
SP_ENTITY	The type of the entity for which the parameter was entered. This field can contain one of the following: TEST, RUN, TESTCYCL, DESSTEP.
SP_KEY	The string representation of the primary key of the entity for which the parameter was entered.
SP_PARAM_NAME	This field contains the actual parameter name.
SP_PARAM_VALUE	The value that should be assigned to this parameter.
SP_ORIGIN_TEST	The ID of the test that was executed by the run. For Run entities only.
SP_VALUE_FROM_ENTITY	Not in use.
SP_VALUE_FROM_KEY	Not in use.
SP_REF_COUNT	The number of steps in which this parameter is used. For Test entities only.
SP_ASSIGNED_BY	Not in use.
SP_ASSIGN_DATE	Not in use.
SP_ASSIGN_TIME	Not in use.

The Alerts Table

The Alerts table contains information for managing automatic traceability alerts and user-defined follow-ups. Alerts are automatically generated using the data in the Rules table, while follow-ups are user-defined reminders that are set by the user.



The Alerts table contains the following fields:

Field	Description
AT_ID	The unique ID of the alert or follow-up.
AT_USER	The owner of the alert or follow-up.
AT_ENTITY_TYPE	The entity the alert was created for. Possible values are Bug, Test, or TestCycl.
AT_KEY1	The record on which the alert is based. The information in this field is the first primary key of the table referenced by the alert: Bug table - BG_BUG_ID, Test table - TS_TEST_ID, Testcycl table - TC_CYCLE_ID
AT_KEY2	The field that contains the primary key data of the Testcycl table: TC_TEST_ID. If the Bug table or Test table is selected, than this field is not used and the value is -1.
AT_KEY3	The string representation of the next primary key of the Testcycl table: TC_TEST_INSTANCE. If the Bug table or Test Table is selected, than this field is not used and the value is -1.
AT_DESCRIPTION	A description of the alert.
AT_DATE	The date the alert was sent by the system or the follow-up was configured to be sent.
AT_SENT_BY_EMAIL	Indicates that the follow-up was sent via e-mail. The value of this field can be either Y or N.
AT_ALERT_TYPE	The type of alert created. Possible values are: 1 - Follow-up, 2 - Automatic.
AT_ALERT_STATUS	The status of the alert sent. Possible values are: 0 -Unread, 1 -Read.

The Cycl_Fold Table

The Cycl_Fold table contains information regarding the test set tree, including the parent folder of each test set, and related tests. The table contains the following fields:

Field	Description
CF_ITEM_ID	The unique ID of the folder.
CF_ITEM_NAME	The name of the folder.
CF_ITEM_PATH	The encrypted path of the folder.
CF_FATHER_ID	The ID of the parent folder of the particular test set.
CF_VIEW_ORDER	For future use.
CF_WORKFLOW	For future use.
CF_ATTACHMENT	Indicates if the folder has an attachment. The value of this field can be either Y or N.
CF_VER_STAMP	The revision number of this record. Increases each time a change is made.
CF_VTS	The version time stamp. Indicates the time this record was last changed. The time stamp is according to the database server.
CF_DESCRIPTION	A description of the folder.
CF_NO_OF_SONS	The number of children of the parent folder.

The Rules Table

The Rules table contains information used together with the information in the Alerts table to generate automatic alert messages. Quality Center allows the user to activate/deactivate a rule and be notified by e-mail. An alert is generated when an activated rule becomes true. The table contains the following fields:

Field	Description
RL_ID	The unique ID of the rule.
RL_CONDITION	For internal use.
RL_ACTION	For internal use.
RL_DESCRIPTION	A description of the rule.
RL_TO_MAIL	Indicates if the alert should be sent via e-mail. The value of this field can be either Y or N.
RL_IS_ACTIVE	Indicates if the rule is active. The value of this field can be either Y or N.
RL_IS_PREDEFINED	For future use.

System Tables and Security Tables

System tables contain information used internally by Quality Center. For example, the System_Field table contains information about project fields, the Mailcond table lists the conditions that govern whether defect reports are mailed to users, and the Groups table contains information defining user groups. Quality Center includes the following system tables:

Table	Related Subject	Description
System_Field	**Fields**	Contains information about all project fields, including access permissions.
Hosts	**Hosts**	Contains information about host testing servers.
Host_Group	**Hosts**	Contains information about host groups.
Host_In_Group	**Hosts**	Matches host servers to host groups.
Mailcond	**Mailing**	Contains information for determining when defect reports are mailed to users.
Sequences	**Sequences**	Used to generate unique ID numbers.
Groups	**User Groups**	Contains information about user groups.
Users	**Users**	Contains information about users.
Dataconst	**Project Constants**	Contains the project constant values.
Locks	**Fields Locks**	Handles the locking of project entities.
Change	**Change Integration**	Contains changes made to fix defects. For backward compatibility. This table does not exist in new projects created with Quality Center 8.2 or later.
Change_Entry	**Change Integration**	Contains change details by file. For backward compatibility. This table does not exist in new projects created with Quality Center 8.2 or later.

Table	Related Subject	Description
Change_Cover	**Change Integration**	Associates each change with the defect it fixed. For backward compatibility. This table does not exists in new projects created with Quality Center 8.2 or later.
Tran_Rules	**Transition Rules**	Contains information about the transition rules for the special fields of some entities.
Ver_Ctrl	**Version Control**	Version control locking management.
VC_xxx	**Version Control**	Shadow tables for version control. Represents as tables beginning with VC_.

Security tables contain information used for generating, assigning, and controlling access permission. For example, the Actions table defines the actions that users can perform, the Tables table defines the tables that users can access and modify, and the Transition Rules table defines the values that users can modify within tables. Quality Center includes the following security tables:

Table	Subject	Description
System_Field	**Fields**	Contains information about all project fields, including access permissions.
Actions	**Actions**	Lists all Quality Center actions and the types of access permissions associated with each action.
Tables	**Tables**	Lists Quality Center tables and the types of access permission associated with each table.
Modules	**Module Access Management**	Enables control over user group module access.

The System_Field Table - Fields Properties

The System_Field table contains information about all project fields, such as field type and user customization label. The table contains the following fields:

Field	Description
SF_TABLE_NAME	The name of the table in which the field resides.
SF_COLUMN_NAME	The name of the column in which the field resides.
SF_COLUMN_TYPE	The type of column in which the field resides.
SF_USER_LABEL	A user-defined label for the field.
SF_EDIT_STYLE	The field edit style.
SF_EDIT_MASK	The field edit mask.
SF_IS_SYSTEM	Indicates whether the field is a system field.
SF_IS_CANFILTER	Indicates whether the field is filter-enabled.
SF_IS_KEY	Indicates whether the field is a database key field.
SF_KEY_ORDER	The field database key order.
SF_IS_EDIT	Indicates whether the field is editable.
SF_IS_ACTIVE	Indicates whether the field is active.
SF_IS_HISTORY	Indicates whether the history is kept of changes to the field.
SF_IS_MAIL	Indicates whether users on the notification list are notified when the field is changed.
SF_IS_VERIFY	Indicates whether the field requires verification.
SF_ROOT_ID	The All_Lists table AL_FATHER_ID that identifies the list of all possible values for the field.
SF_IS_BY_CODE	Indicates whether the field saves the Tree Node ID, rather than the passed value.
SF_IS_REQUIRED	Indicates whether the field is required.

Field	Description
SF_GRANT_MODIFY	Grants permission for the users in a user group to modify the field. This is a 32-bit mask that indicates whether the modify action is granted to a specific group. If bit X in this mask is assigned the number 1, the modify action is granted to all users in group X.
SF_IS_TRANSITION_ LOGIC	Indicates whether transition logic exists for the field.
SF_USER_COLUMN_ TYPE	The field user column type.
SF_IS_KEEP_VALUE	Indicates whether the last value of the field is stored.
SF_IS_CUSTOMIZABLE	Indicates whether the field is shown in the customization user interface.
SF_CAN_CHANGE_ PERMISSIONS	Indicates whether the user can change the permission status of the field.
SF_OWNER_SENSIBLE	Indicates whether the field can be modified only by the owner of the entity.
SF_FIELD_SIZE	The field size.
SF_IS_VISIBLE_IN_NEW_ BUG	Reserved for future use.
SF_IS_VISIBLE_FOR_ GROUPS	Reserved for future use.
SF_IS_TO_SUM	Indicates whether there can be a summation of field contents for analysis. The value of this field can be either Y or N. Used for data fields only.
SF_IS_UNDER_VCS	Indicates whether this field is under version control. The value of this field can be either Y or N. Used for test fields only.

The Hosts Table - Testing Hosts

You can run automated tests on a local computer or on multiple remote hosts. A host is any computer connected to the network on which a testing tool has been installed. The Hosts table contains information on all hosts defined for the Quality Center project. The table contains the following fields:

Field	Description
HO_NAME	The name of the host.
HO_DESCRIPTION	A description of the host.
HO_REX_SERVER	The name of the remote server installed on the host.
HO_ATTACHMENT	Indicates whether this host has any attachment associated with it. The value of this field can be either Y or N.

The Host_Group Table - Host Grouping

The Host_Group table lists all the host groups in the project. The table contains the following fields:

Field	Description
GH_NAME	The name of the host group.
GH_ATTACHMENT	Indicates whether this host group has any attachment associated with it. The value of this field can be either Y or N.
GH_DESCRIPTION	The host group description.

The Host_In_Group Table - Host Grouping

The Host_In_Group table matches hosts to host groups. For each member in a group, it holds a record containing the group name and host name.

The Host_In_Group table contains the following fields:

Field	Description
HG_HOST	The name of the host.
HG_GROUP	The name of the host group.

The Mailcond Table - Mailing Management

The Mailcond table contains information that determines when various users receive defect reports. The table contains the following fields:

Field	Description
MC_USER	The name of the user for which the condition exists. This is defined in the user combo table **US_USERNAME** field.
MC_CONDITION	The condition under the user receives defect reports by mail.

The Sequence Table - Generating IDs

The Sequence table is used to generate unique ID numbers, based on the highest ID for each table. The Sequence table contains the following fields:

Field	Description
SQ_SEQ_NAME	The sequence name. In most cases, this is the name of a data table (such as BUG or TEST).
SQ_SEQ_VALUE	The last sequence value.

The Groups Table - User Groups

The Groups table contains information about all of the user groups in the project. A user group consists of users that share a common set of access privileges. The table contains the following fields:

Field	Description
GR_GROUP_ID	The ID of the group. The project administrator can create a maximum of 32 user groups and assign each of them an ID between 0 and 31.
GR_GROUP_NAME	The name of the user group assigned by the project administrator.
GR_IS_SYSTEM	Denotes if the field is one of five Quality Center default user groups. This field can be set to either Y or N.
GR_PREDEF_FILTER	Contains the pre-defined filter string for the group.

The Users Table - User Management

The Users table contains information about Quality Center users, such as user names and mailing addresses. Note that the table contains full details for only two generic users, Guest and Admin. For other generic users, only the US_USERNAME and US_GROUP fields are used.

The Users table contains the following fields:

Field	Description
US_USERNAME	The username assigned to the user by the project administrator.
US_MAIL_ADDRESS	The user's mailing address.
US_PASSWORD	The user's password.
US_GROUP	This is a 32-bit mask. Each digit in the mask represents membership in one of the user groups. One indicates that the user is a member of the corresponding user group. Zero indicates that the user is not a member of the user group. This allows the administrator to assign a user to a maximum of 31 user groups.

Field	Description
US_ADDRESS	The user's address.
US_PHONE	The user's telephone number.
US_FULL_NAME	The user's full name.

The Dataconst Table - Project Constants

The Dataconst table contains global values assigned to the project. The table contains the following fields:

Field	Description
DC_CONST_NAME	A string containing the constant name.
DC_VALUE	A string containing the constant value.

The global values set may be different from version to version and from installation to installation. Typical entries are:

Constant Name	Description
bug_file	Used by RDR.
checkouts_directory	The relative path of the version control checkout directory.
db_directory	The path of the project's related files. If *db_directory* is not empty, the value is used instead of the directory path defined for the project using the Site Administrator.
tests_directory	The relative path to test details and scripts.
unix_tests_directory	For future use.
VcsDb_directory	The relative path of the version control database.
version	The current Quality Center version number.

The Locks Table - Locking Entities

The Locks table handles locks on entities, preventing multiple users from modifying the same entity at the same time. The table contains the following fields:

Field	Description
LK_OBJECT_TYPE	The entity type for which the lock is set.
LK_OBJECT_KEY	The string representation of the key of the specific entity that is locked.
LK_USER	The user locking the entity.
LK_SESSION_ID	The session ID in which the lock was imposed.
LK_CLIENT_MUID	Not in use.
LK_CLIENT_MACHINE_NAME	The name of the client machine that locked the entity.
LK_SERVER_MUID	Not in use.
LK_SERVER_MACHINE_NAME	The name of the server machine on which the lock was set.
LK_SERVER_IP_ADDRESS	The IP address of the server machine on which the lock was set.
LK_LOCK_TIME	The time at which the lock was set.
LK_SESSION_LAST_TOUCH	For future use.

The Tran_Rules Table - Transition Rules

The Tran_Rules table defines the transition rules for tables in the project. These rules determine the possible value transitions that users in a user group can perform in a specific field in a specific table. For example, the project administrator can specify that a group can change the status of a defect from Fixed to Closed. The table contains the following fields:

Field	Description
TR_TABLE_NAME	The name of the table in which the field resides.
TR_FIELD_NAME	The name of the field for which the transition rule has been defined.
TR_GROUP_ID	The ID of the group to which the transition rule has been assigned. This is defined in the Group table **GR_GROUP_ID** field.
TR_RULES	The transition rule to be performed on the field.

The Ver_Ctrl Table - Version Control

The Ver_Ctrl table handles the version control locking information of the project. The table contains the following fields:

Field	Description
VC_OBJECT_KEY	The string representation of the primary key of the locked object.
VC_USER_NAME	The username of the user locking the object.
VC_STATUS	The locked object status. This field is a string containing either CHECKOUT or GET.
VC_DATE	The date the object was locked.
VC_TIME	The time the object was locked.
VC_VERSION	The locked object's version.
VC_COMMENTS	Comments regarding the locked object.
VC_OBJECT_TYPE	The entity type of the locked object.

Field	Description
VC_OBJECT_REFERENCE	The reference ID of the locked object. For a TEST this is the test ID.
VC_USER_1...102	You can add user-defined fields to customize the table (see page 63 for the maximum allowable number). You can also add up to 3 memo fields.

The VC_ prefix Tables - Shadow Version Control Tables

Tables with names that begin with VC_ are the same as tables containing the same name without the VC_ prefix, except that tables with the VC_ prefix are checkout tables. These tables are used when an entity is checked out, or when the user is working on a specific version. The VC_ tables have one additional field, *xxx*VC_USER_NAME, where *xxx* indicates the appropriate table prefix (for example, TS_VC_USER_NAME in the VC_TEST table). These fields contain the name of the user that locked the entity.

One additional field is added to the VC_Test table only: TS_TASK_STATUS. This field contains the status of the task during testing, and is currently configured for future use.

The Actions Table - Action Permissions

The Actions table contains information on different Quality Center actions a user can initiate in the project. The table contains the name of the action that can be performed and the user groups that are allowed to perform the action. The table contains the following fields:

Field	Description
AC_ACTION_NAME	The name of the action to be performed. The value for this field can be one of the following: ac_add_bug, ac_add_common_settings, ac_add_cover, ac_add_cycle, ac_add_cyclefolder, ac_add_cycle_to_cyclefolder, ac_add_desstep, ac_add_folder, ac_add_private_settings, ac_add_r&d_comments, ac_add_req ac_add_reqfolder, ac_add_test, ac_add_test_to_testcycl, ac_change_password, ac_clear_history, ac_configure_mail, ac_copy_cycle, ac_copy_folder, ac_copy_cyclefolder, ac_create_rbr_files, ac_create_views, ac_create_wr_script, ac_customize_fields, ac_delete_bug, ac_delete_common_settings, ac_delete_cover, ac_delete_cycle, ac_delete_cycle_from_cyclefolder, ac_delete_cyclefolder, ac_delete_desstep, ac_delete_folder, ac_delete_private_settings, ac_delete_req, ac_delete_run, ac_delete_test, ac_delete_test_from_testcycl, ac_import_bugs_from_file, ac_import_bugs_from_mail, ac_import_bugs_settings, ac_import_wr_tests, ac_modify_bug, ac_modify_common_settings, ac_modify_cycle, ac_modify_desstep, ac_modify_folder, ac_modify_hosts, ac_modify_private_settings, ac_modify_req, ac_modify_reqfolder, ac_modify_run, ac_modify_test, ac_modify_test_in_testcycl, ac_move_folder, ac_move_cyclefolder, ac_remove_reqfolder, ac_reset_cycle, ac_run_auto_test, ac_run_manual_test, ac_send_all_qualified, ac_test_exec_params, ac_users, ac_wr_settings.

Field	Description
AC_GRANT_MASK	The user groups that have permission to perform the action. This is a 32-bit mask that indicates whether permission to perform the action has been granted to a specific group. If bit X in this mask is set to 1, group X has permission to perform the action.
AC_OWNER_SENSIBLE	The action owner's sensibility mask.
AC_OWNERED_TABLE	The name of the table on which the action is performed.
AC_IS_COLUMNS_ MODIFY	Indicates whether the Columns dialog box can be opened or closed from this table. This field can be set to either Y or N.
AC_IS_SYSTEM_ INTERNAL	Indicates whether the action is an internal system action.

The Tables Table - Table Permissions

The Tables table contains the names of all the tables in the Quality Center project. It also contains information on the permissions associated with each table. The table contains the following fields:

Field	Description
TB_TABLE_NAME	The name of the table.
TB_GRANT_DELETE	Grants permission for the users in a user group to delete a record in the table. This is a 32-bit mask that indicates whether the action is granted to a specific group. If bit X in this mask is assigned the number 1, the delete action is granted to all Users in group X.
TB_GRANT_MODIFY	Grants permission for the users in a user group to modify a field in the table. This is a 32-bit mask that indicates whether the action is granted to a specific group. If bit X in this mask is assigned the number 1, the modify action is granted to all Users in group X.

Field	Description
TB_GRANT_ADD	Grants permission for the users in a user group to add a record to the table. This is a 32-bit mask that indicates whether the action is granted to a specific group. If bit X in this mask is assigned the number 1, the add action is granted to all Users in group X.
TB_OWNER_SENSIBLE_ DELETE	Specifies whether records in the table can only be deleted by their owners.
TB_OWNER_SENSIBLE_ MODIFY	Specifies whether records in the table can only be modified by their owners.
TB_OWNER_FIELD_NAME	The column in the table representing the owner of the record.

The Modules Table - Module License Restrictions

Due to licensing constraints, the use of several modules is restricted to a limited number of Users. The Modules table handles group module access so that the number of Users will not violate these restrictions. The table contains the following fields:

Field	Description
MD_ID	The module ID number.
MD_NAME	The module name.
MD_GUID	The module unique GUID.
MD_DESC	The module description.
MD_VISIBLE	A bit mask, indicating which groups can access this module.

Index

D

E

F

G

H

I

L

M

O

P

Q

R

S

T

U

V

W