

Rational Integration Tester



Integration Guide for IBM Rational Quality Manager

Version 8.0.0

Note

Before using this information and the product it supports, read the information in “Notices” on page 21.

This edition applies to version 8.0.0 of Rational Integration Tester and to all subsequent releases and modifications until otherwise indicated in new editions.

© **Copyright IBM Corporation 2001, 2012.**

US Government Users Restricted Rights – Use, duplication or disclosure restricted by GSA ADP Schedule Contract with IBM Corp.

Contents

About this Publication	iv
Intended Audience	v
Scope	v
Typographical Conventions	v
Contacting IBM Support	v
Installation	1
Overview	2
Integration Steps	3
Updating the IBM Rational Quality Manager Plugin	10
Executing Rational Integration Tester Resources	11
Overview	12
Exporting Resources from Rational Integration Tester	13
Executing Tests and Suites in IBM Rational Quality Manager	15
Glossary	20
Notices	21
Trademarks and service marks	24

About this Publication

Contents

Intended Audience

Scope

Typographical Conventions

Contacting IBM Support

This document provides details about how to configure and utilize the IBM® Rational® Integration Tester integration with IBM Rational Quality Manager.

Intended Audience

This document is intended to be read by those with a fair understanding and exposure to the concepts involved in both testing and development and in enterprise integration.

Scope

This document covers the integration of IBM Rational Integration Tester with IBM Rational Quality Manager, and it is assumed that you are already familiar with the concepts and use of both tools.

Users of this document are assumed to have some experience using Rational Integration Tester and some of its core functions such as Tagging, Data Validation, creating reports, and running tests. Please refer to *IBM Rational Integration Tester Getting Started Guide* and *IBM Rational Integration Tester Reference Guide* for more information.

Typographical Conventions

The following typographical conventions are observed throughout this document:

Type	Usage
Constant width	Program output, listings of code examples, file names, commands, options, configuration file parameters, and literal programming elements in running text.
<i>Italic</i>	Document title names in statements that refer you to other documents. Also used to highlight concepts when first introduced.
Bold	Menu items in graphical user interface windows (such as Microsoft Windows-based or UNIX X Window applications) from which you select options or execute macros and functions. Submenus and options of a menu item are indicated with a “greater than” sign, such as Menu > Submenu or Menu > Option .

Contacting IBM Support

To contact IBM Support, see: www.ibm.com/contact/us/en/

Installation

Contents

Overview

Integration Steps

Updating the IBM Rational Quality Manager Plugin

This chapter describes the steps required to enable the integration of Rational Integration Tester and IBM Rational Quality Manager.

1.1 Overview

The integration of Rational Integration Tester with IBM Rational Quality Manager enables the execution of Rational Integration Tester tests and suites in IBM Rational Quality Manager's centralized test management environment.

To export Rational Integration Tester resources to IBM Rational Quality Manager, a plugin (provided with Rational Integration Tester) is deployed into an existing IBM Rational Quality Manager server. To execute Rational Integration Tester resources in IBM Rational Quality Manager, the Rational Integration Tester Agent is configured as an IBM Rational Quality Manager adapter that can execute the resources remotely.

The Rational Integration Tester-IBM Rational Quality Manager integration is supported by Rational Integration Tester 5.2.11 and later. The integration has been tested with IBM Rational Quality Manager version 3.

1.2 Integration Steps

To enable the integration of Rational Integration Tester and IBM Rational Quality Manager, a local update site is provided in a .zip archive with the Rational Integration Tester installation. The site is extracted on the Rational Integration Tester machine and IBM Rational Quality Manager is configured to use the site. Additionally, the Rational Integration Tester Agent is configured with the details of the IBM Rational Quality Manager installation, enabling the remote execution of Rational Integration Tester test resources from IBM Rational Quality Manager.

The details of each part of the integration can be found in the following sections:

- [Configure the Local Update Site](#)
- [Configure the Rational Integration Tester Agent](#)

1.2.1 Configure the Local Update Site

Creating a local update site on the IBM Rational Quality Manager server provides the files required by the server to enable the export of Rational Integration Tester tests into IBM Rational Quality Manager. Follow the steps below to create the update site and configure IBM Rational Quality Manager to use it.

1. Locate the RQM directory in the root of your Rational Integration Tester installation (C:\Program Files\IBM\RationalIntegrationTester, by default).

Inside the RQM directory is `rqm.zip`, the compressed local update site.

2. Extract the contents of the .zip file into a new or empty directory on the IBM Rational Quality Manager server (for example, C:\users\jsmith\rqm).

NOTE: The update site should not be created within the Rational Quality Manager install directory.

Within the extracted directory you will find a `features` directory, a `plugins` directory, `com.ghc.ghTester.rqm-profile.ini`, and `site.xml`.

3. Open `com.ghc.ghTester.rqm-profile.ini` in a text editor and modify the `url` path to reflect the extracted directory (for example, `url=file:///C:/users/jsmith/rqm`).
4. Save and close the file when finished.
5. Copy `com.ghc.ghTester.rqm-profile.ini` to the IBM Rational Quality Manager install location on the IBM Rational Quality Manager server (for example, C:\IBM\RQM3\server\conf\jazz\provision_profiles).

-
6. Start or restart the IBM Rational Quality Manager server.

1.2.2 Configure an IBM Rational Quality Manager Integration in Rational Integration Tester

One or more IBM Rational Quality Manager servers can be configured in Rational Integration Tester. Once configured, a server can be selected as the target when exporting tests or tests suites from the Test Factory. Follow the steps below to configure an IBM Rational Quality Manager server in Rational Integration Tester.

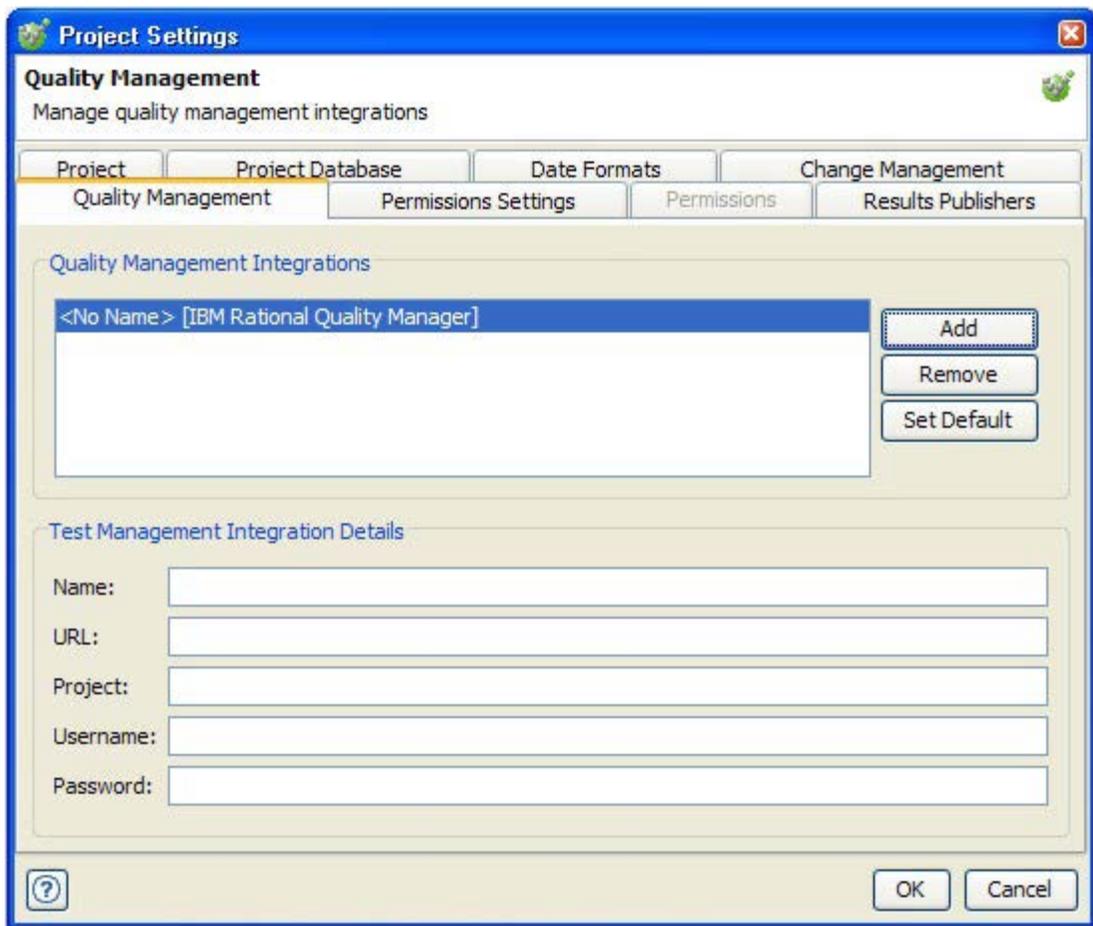
1. If not already running, launch Rational Integration Tester and select a new or existing project.

2. Select **Project Settings** from the **Project** menu.

The **Project Settings** dialog is displayed.

3. Select the **Quality Management** tab.
4. In the **Quality Management Integrations** pane, click **Add**.
5. In the **Select Provider** dialog, click **IBM Rational Quality Manager**.

A new IBM Rational Quality Manager configuration is created.



-
6. Configure the details of the new integration using the available fields in the **Test Management Integration Details** pane, as follows:

Field	Description
Name	A user-defined name describing the integration – available integrations will be listed by name when exporting tests and test suites.
URL	The base URL of the IBM Rational Quality Manager server (for example, https://server.domain.com:9443/jazz).
Project	Enter the exact name of an existing project on the IBM Rational Quality Manager server. When exporting tests and test suites, this is the IBM Rational Quality Manager project where they will be created.
Username	Enter the user ID of an IBM Rational Quality Manager user who has sufficient privileges in the named project to create tests and test scripts.
Password	Enter the password for the user ID entered in Username .

7. When the IBM Rational Quality Manager server details are correct, click **OK** to save the changes and close the **Project Settings** dialog.

1.2.3 Configure the Rational Integration Tester Agent

The Rational Integration Tester Agent can be configured as an IBM Rational Quality Manager Adapter to enable remote test execution. To do this, the Agent must be provided with the IBM Rational Quality Manager server configuration information, similar to the details provided in Rational Integration Tester.

The configuration can be modified in `Agent.conf`, found in the `config` directory of the Rational Integration Tester installation (`C:\Program Files\IBM\RationalIntegrationTester\config`, by default). The configuration file is an xml file containing an empty or default configuration that can be changed to match the Rational Integration Tester and IBM Rational Quality Manager installation environment.

NOTE: By default, the IBM Rational Quality Manager Adapter functionality is disabled and must be configured before it can be used.

The IBM Rational Quality Manager Adapter configuration is contained within the `<rqm>` element in the configuration file. The `<rqm>` element has an additional attribute of `enabled`, which can be set to “true” or “false” to enable or disable the Adapter functionality without having to change any other part of the configuration.

The default Adapter configuration is shown below:

```
<rqm enabled="false">
  <username value="" />
  <password value="" />
  <url value="https://localhost:9443/jazz" />
  <rqmproject value="" />
  <ghtprojectbaselocation value="" />
  <runtests value=".RunTests.exe" />
  <rqmAdapterId value="MyFixedGHTesterId" />
</rqm>
```

NOTE: To use an encrypted password in the `Agent.conf` file, you can apply the desired password to your database connection (in **Project Settings**). After applying the change, the encrypted password can be found in the **password** attribute of the database **connectionParams** element of the Rational Integration Tester project file (that is, `*.ghp`). Open the project file in a text editor, copy the entire value (including `#com.ghc.1!` but excluding the quotes), and paste it into the **value** attribute of the **password** element in `Agent.conf`. When finished, be sure to change the database connection password back to its original value.

Once the agent configuration file has been modified and saved (see the next page for details), run the agent to connect it to IBM Rational Quality Manager as an Adapter.

The required configuration values should be modified as follows:

Parameter	Description
username	The ID of an IBM Rational Quality Manager user to be used by the agent/adapter when connecting. This user ID will require a Connector Client Access License, assigned within IBM Rational Quality Manager, to allow access.
password	The password for the user ID entered in Username .
url	The base URL of the IBM Rational Quality Manager server (for example, <code>https://server.domain.com:9443/jazz</code>).
rqmProject	The IBM Rational Quality Manager project to which the configured agent should connect.
ghtProjectBaseLocation	The base location of your Rational Integration Tester projects (that is, the directory that contains the Rational Integration Tester projects that will be used for running tests). For example, <code>C:\RationalIntegrationTesterProjects</code> .
runTests	The full path or relative location of the Rational Integration Tester RunTests executable (for example, <code>.\RunTests.exe</code> or <code>C:\Program Files\IBM\RationalIntegrationTester\RunTests.exe</code>).
rqmAdapterId	A unique identified for the current instance of the agent/adapter. Each running instance must supply a unique identifier.

In addition to the required configuration parameters (shown above), the following optional parameters can be specified:

Parameter	Description	Default Value (if not supplied)
rqmPollInterval	The polling interval in seconds. This is the wait interval between queries of the IBM Rational Quality Manager server.	5
rqmAdapterName	The name used when registering with the IBM Rational Quality Manager server.	Rational Integration Tester
rqmAdapterDescription	The description used when registering with the IBM Rational Quality Manager server.	Rational Integration Tester Adapter

All parameters take the form `<parameter value=" ">`, where the configuration value is specified in quotation marks and `parameter` is the configuration parameter being specified (for example, `<user name value="ghuser" />`).

1.3 Updating the IBM Rational Quality Manager Plugin

If a new Rational Integration Tester plugin for IBM Rational Quality Manager is provided, the local update site needs to be replaced and the server needs to be configured to reload its contents.

Follow the steps below to backup and replace the update site that was configured previously:

1. Configure the server to reset the cache the next time it starts by submitting the **requestReset** command from your browser:

```
https://<Server URL>:<Port Number>/jazz/  
admin?internal#action=com.ibm.team.repository.admin.serverReset
```

NOTE: You must be logged in as a user with JazzAdmins permissions.

2. On the page that is displayed, click the **Request Server Reset** button.

A message should be displayed indicating that the server has been flagged to reset and reload the configured update site when it is restarted.

3. Stop the IBM Rational Quality Manager Jazz server.
4. Make a backup of the update site location that was created during the installation steps.
5. Extract the new update site to replace the contents of the existing site.
6. Start the IBM Rational Quality Manager server.

Executing Rational Integration Tester Resources

Contents

Overview

Exporting Resources from Rational Integration Tester

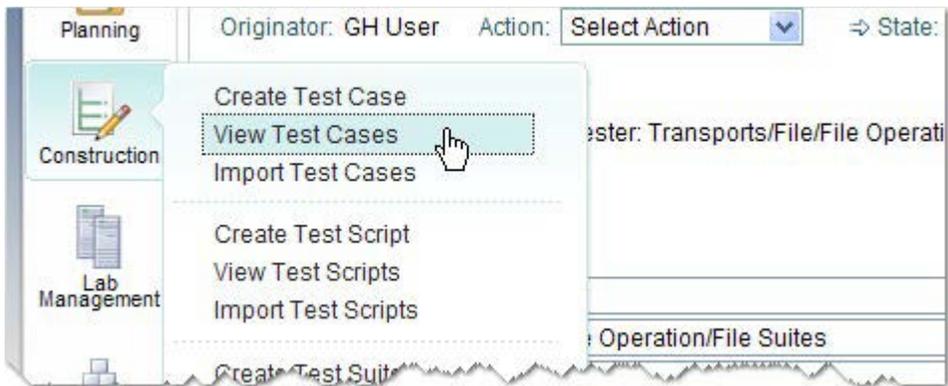
Executing Tests and Suites in IBM Rational Quality Manager

This chapter describes how to export Rational Integration Tester tests and test suites to IBM Rational Quality Manager, and how to execute those resources remotely using the Rational Integration Tester Agent/IBM Rational Quality Manager Adapter.

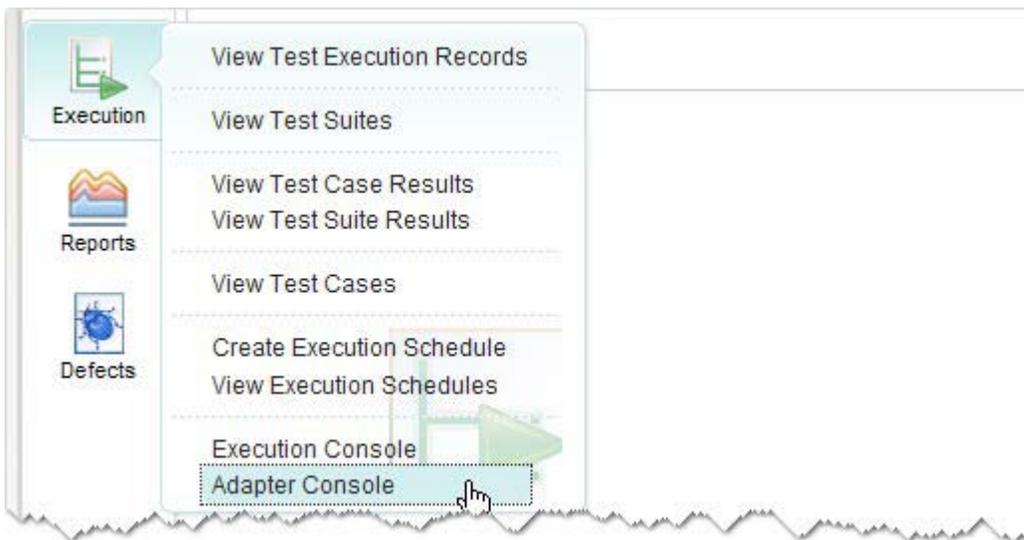
2.1 Overview

Once the Rational Integration Tester-IBM Rational Quality Manager integration is complete (see [Installation](#)), users can export tests and test suites from Rational Integration Tester into IBM Rational Quality Manager. Exported tests and test suites are created as test cases and test scripts in IBM Rational Quality Manager.

Rational Integration Tester resources can be viewed in the **Construction** module of the IBM Rational Quality Manager console, as Test Cases and Test Scripts.



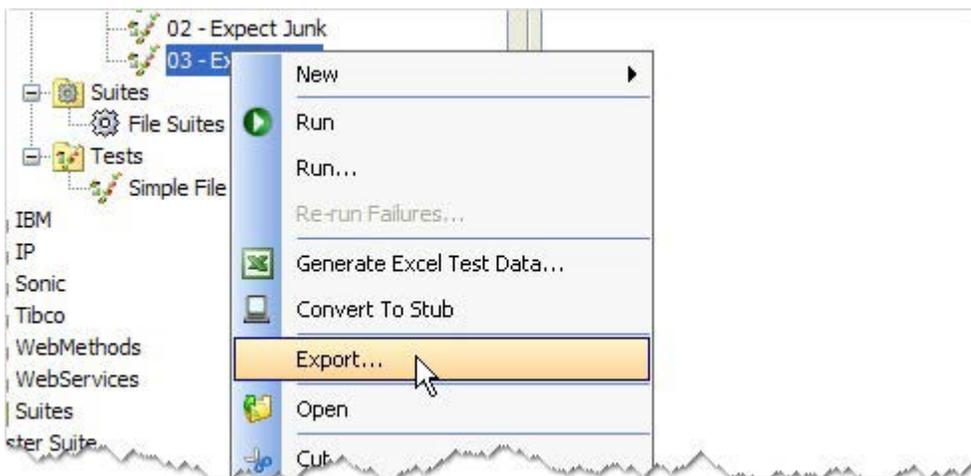
The Rational Integration Tester Agent, once running, can be seen as an IBM Rational Quality Manager Adapter by selecting Adapter Console from the Execution module.



2.2 Exporting Resources from Rational Integration Tester

This section describes how to export Rational Integration Tester tests and test suites into IBM Rational Quality Manager.

1. Launch Rational Integration Tester and open the project containing the tests or test suites you want to export.
2. Open the Test Factory perspective (**F10**).
3. Right-click on the desired test or test suite and select **Export** from the context menu.



The **Quality Management** dialog is displayed.



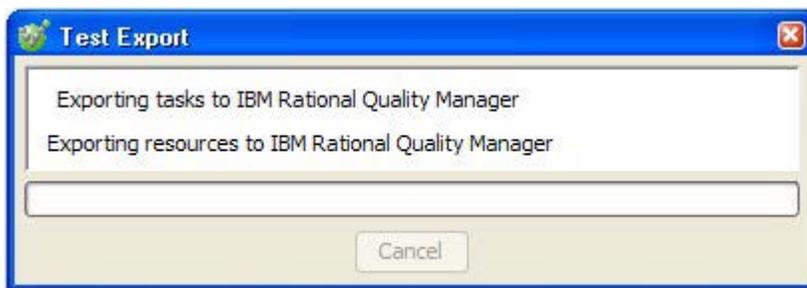
The default IBM Rational Quality Manager integration is selected under **Integration**.

4. If more than one integration are configured in Rational Integration Tester, select the desired integration from the **Integration** field.
5. To manage the integrations in the Rational Integration Tester **Project Settings** dialog, click **Manage** next to the field.
6. In the **Environments** pane, place a check mark next to the environments to use for the selected test or test suite. By default, the assets current environment is selected.
7. To manage environments in Rational Integration Tester, click **Manage** next to the pane.

NOTE: If you export multiple environments, Rational Integration Tester will create multiple test scripts (one per environment), but only one test case per test or test suite. The exported test case will contain all of the exported test scripts.

8. When the integration and environment options are correct, click **Export**.

The progress is displayed in the **Test Export** dialog.



9. Once finished, select **View Test Cases** or **View Test Scripts** from the **Construction** module in the IBM Rational Quality Manager console.
10. The exported tests or test suites should be displayed.

ID	Risk	Suspect	Name	State	Category	Function	Test Phase	Theme	Weight	Modified
4	OOOOO	◇	01 - Read empty expect e...		Unassi...	Unassi...	Unassi...	Unassi...	1	35 minute...
6	OOOOO	◇	02 - Expect Junk		Unassi...	Unassi...	Unassi...	Unassi...	1	3 minutes ...
7	OOOOO	◇	Databases Suite		Unassi...	Unassi...	Unassi...	Unassi...	1	2 minutes ...

2.3 Executing Tests and Suites in IBM Rational Quality Manager

This section describes how to execute Rational Integration Tester tests and test suites in IBM Rational Quality Manager.

- [Verify the Rational Integration Tester Agent](#)
- [Executing Test Cases in IBM Rational Quality Manager](#)

2.3.1 Verify the Rational Integration Tester Agent

Before you can execute Rational Integration Tester resources from IBM Rational Quality Manager, the Rational Integration Tester Agent must be configured, running (see [Configure the Rational Integration Tester Agent](#)) and available as an Adapter in IBM Rational Quality Manager.

To see available adapters, open the IBM Rational Quality Manager console and select **Adapter Console** from the **Execution** module. All registered adapters are listed.



The screenshot shows the 'Adapter Console' interface. At the top, there are tabs for 'Dashboards' and 'Adapter Console'. Below the tabs, the title 'Adapter Console' is displayed with a help icon. A 'Group by' dropdown menu is set to 'Ungrouped'. To the right, there is a search box labeled 'Type Filter Text'. Below this, there is a 'Show All' dropdown and 'Items per page' settings. A table lists the adapters. The table has columns for ID, Machine Name, Adapter type, Status, Health, Host Name, IP, and Polling Interval. The table contains one row with ID 1, Machine Name 'jdgebickilap', Adapter type 'GH Tester', Status 'Unavailable', Health 'Unhealthy' (indicated by a red square), Host Name 'jdgebickilap', IP '192.168.0.34', and Polling Interval '5 sec'. Navigation links for 'Previous' and 'Next' are visible at the bottom of the table.

ID	Machine Name	Adapter type	Status	Health	Host Name	IP	Polling Interval
1	jdgebickilap	GH Tester	Unavailable	Unhealthy	jdgebickilap	192.168.0.34	5 sec

If the Rational Integration Tester Agent is not listed, then it has not been successfully registered with the server. In this case, ensure that `Agent.conf` has been modified properly and then launch the Agent to register it (see [Configure the Rational Integration Tester Agent](#)).

If the Agent is listed but unavailable, then it has been successfully registered but is probably not running. In this case, launch the agent, wait for it to connect to IBM Rational Quality Manager, then refresh the list of available adapters.

Once the Agent is listed as “Available” in the Adapter Console, you are ready to run Rational Integration Tester resources from IBM Rational Quality Manager.

The screenshot shows the 'Adapter Console' interface. At the top, there are tabs for 'Dashboards' and 'Adapter Console'. Below the tabs, the title 'Adapter Console' is displayed with a help icon. A 'Group by' dropdown menu is set to 'Ungrouped'. To the right, there is a search box labeled 'Type Filter Text'. Below this, there are navigation controls: 'Show All' (dropdown), 'Items per page', and 'Previous | 1 - 1 of 1 | Next'. A table with the following columns is shown: ID, Machine Name, Adapter type, Status, Health, Host Name, IP, and Polling Interval. The table contains one row with the following data: ID: 1, Machine Name: jdgebickilap, Adapter type: GH Tester, Status: Available, Health: (green dot), Host Name: jdgebickilap, IP: 192.168.0.34, Polling Interval: 5 sec. At the bottom, there are more navigation controls: 'Previous | 1 - 1 of 1 | Next'.

ID	Machine Name	Adapter type	Status	Health	Host Name	IP	Polling Interval
1	jdgebickilap	GH Tester	Available	●	jdgebickilap	192.168.0.34	5 sec

2.3.2 Executing Test Cases in IBM Rational Quality Manager

Once you have exported at least one test or test suite into IBM Rational Quality Manager and the Rational Integration Tester Adapter is available, you can execute Rational Integration Tester resources remotely. Rational Integration Tester tests and test suites are created in IBM Rational Quality Manager as Test Cases and Test Scripts. Please refer to your IBM Rational Quality Manager documentation for more information about Test Cases and Test Scripts.

Test Cases in IBM Rational Quality Manager can be executed in many ways (for example, direct or fast path execution, as part of a test suite, and so on). This section illustrates the fast path execution method. Please refer to your IBM Rational Quality Manager documentation for more information about other ways to utilize the test resources exported from Rational Integration Tester.

Follow the steps below to execute Rational Integration Tester resources (that is, IBM Rational Quality Manager Test Cases) using the fast path method:

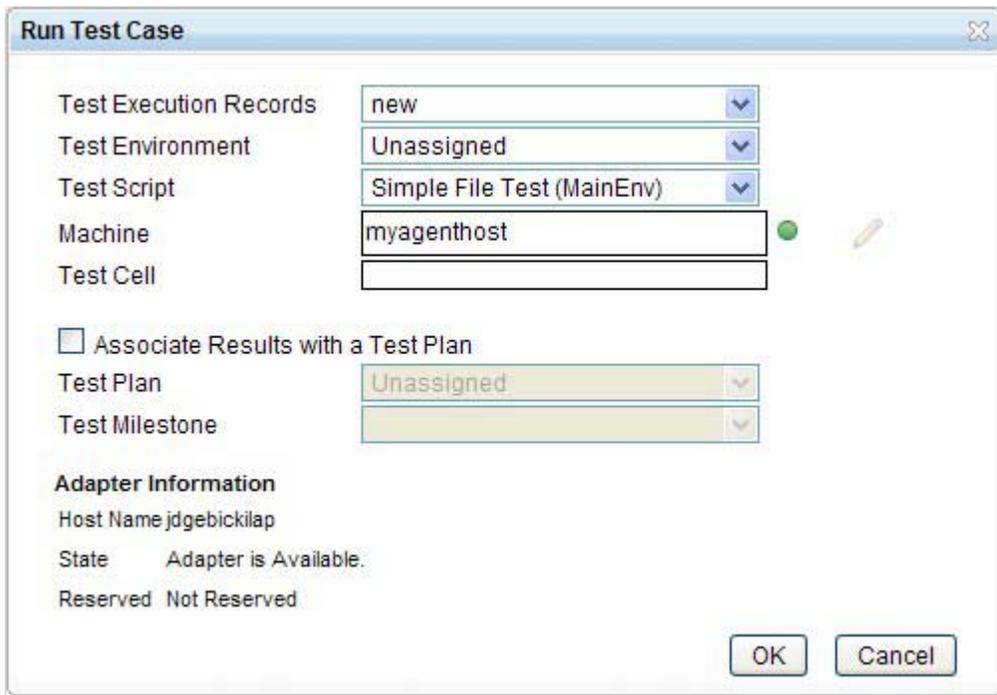
1. Export a test or test suite from Rational Integration Tester into IBM Rational Quality Manager (see [Exporting Resources from Rational Integration Tester](#)).
2. Ensure that the Rational Integration Tester agent is running and available as an Adapter in IBM Rational Quality Manager (see [Verify the Rational Integration Tester Agent](#)).
3. In the IBM Rational Quality Manager console, select **View Test Cases** from the **Construction** module.

All available IBM Rational Quality Manager test cases are displayed, including those exported from Rational Integration Tester.

ID	Risk	Suspect	Name	State	Category	Function	Test Phase	Theme	Weight	Modified
4	○○○○○	◇	01 - Read empty expect e...	Unassi...	Unassi...	Unassi...	Unassi...	Unassi...	1	Yesterday ...
6	○○○○○	◇	02 - Expect Junk	Unassi...	Unassi...	Unassi...	Unassi...	Unassi...	1	Yesterday ...
7	○○○○○	◇	Databases Suite	Unassi...	Unassi...	Unassi...	Unassi...	Unassi...	1	Yesterday ...
8	○○○○○	◇	Simple File Test	Unassi...	Unassi...	Unassi...	Unassi...	Unassi...	1	Yesterday ...

4. Select one of the Rational Integration Tester test cases by checking the box to the left of its entry in the list.
5. Click the **Run Test Case** icon  above the list of test cases.

The **Run Test Case** dialog is displayed.



6. If desired, modify the available execution and results options, then click **OK** to execute the test case.

NOTE: The **Test Script** option can be used to select which test script (that is, which environment) should be used when the test case is executed.

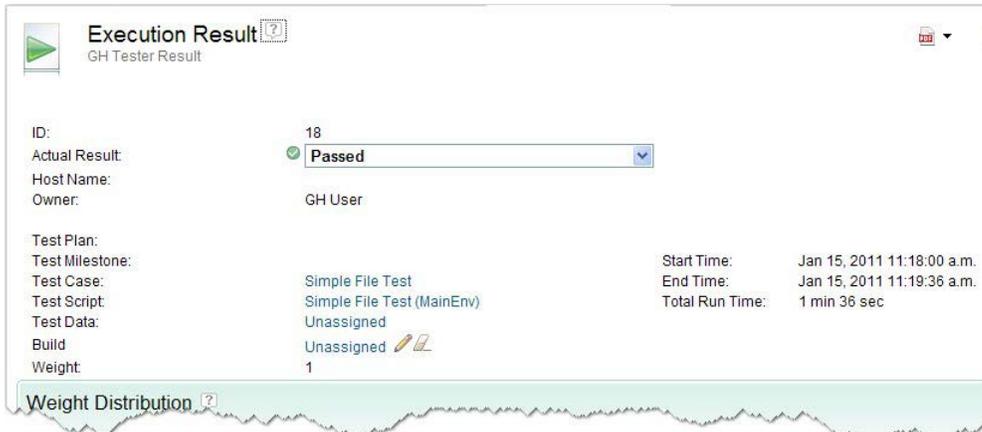
7. The test case will be executed in a new tab in the IBM Rational Quality Manager console, and the progress will be displayed in the console.

When the execution is finished, the status will be displayed in the console, and the “Execution completed” notification is displayed in the execution tab.



8. To view the detailed results of the execution, click **Close and show results**.

The results are opened in a new tab in the IBM Rational Quality Manager console, showing the detailed execution results (the same as for any IBM Rational Quality Manager test case).



In the **Result Details** section, a link to the Rational Integration Tester log for the executed resources is available.



9. Click the log file name to view it.

NOTE: Results for Rational Integration Tester resources executed by means of IBM Rational Quality Manager can be viewed in the Results Gallery.

Glossary

The following table below lists some of the key terms used in this document, and provides a description of each.

Term	Description
Field	A bit of data constituent to a message. Most fields are scalar and therefore unitary, equivalent to data attributes. Vector fields are an aggregation of fields both scalar and vector, and are usually referred to as Messages (see also Message, below).
Message	A unit of information made up of a header consisting of meta-information and a body consisting of the message data.
Host	The computer on which a software process runs.
Publish-Subscribe	A messaging paradigm for efficient one-to-many communication in which one process (the publisher) sends information to zero or more other processes (subscribers).
Transport	Informally, the messaging software in use. For instance, TIBCO EMS, TIBCO ActiveEnterprise, IBM WebSphere® MQ (JMS).
Publishing	Making a message (data) available on a message channel.
Subscribing	Receiving a stream of messages (data) on a given message channel.
Server	A host computer on a network shared by more than one user.
Subject	A user-defined, meaningful name for identifying messages on transports. For example, the subject EQ.IBM might identify all pricing data about IBM stocks, while EQ.IBM.N might identify price data from the New York Stock Exchange only.

Notices

This information was developed for products and services offered in the U.S.A.

IBM may not offer the products, services, or features discussed in this document in other countries. Consult your local IBM representative for information on the products and services currently available in your area. Any reference to an IBM product, program, or service is not intended to state or imply that only that IBM product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any IBM intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any non-IBM product, program, or service.

IBM may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not grant you any license to these patents. You can send license inquiries, in writing, to:

IBM Director of Licensing
IBM Corporation
North Castle Drive
Armonk, NY 10504-1785
U.S.A.

For license inquiries regarding double-byte (DBCS) information, contact the IBM Intellectual Property Department in your country or send inquiries, in writing, to:

Intellectual Property Licensing
Legal and Intellectual Property Law
IBM Japan, Ltd.
1623-14, Shimotsuruma, Yamato-shi
Kanagawa 242-8502 Japan

The following paragraph does not apply to the United Kingdom or any other country where such provisions are inconsistent with local law:

INTERNATIONAL BUSINESS MACHINES CORPORATION PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT,

MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some states do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. IBM may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

IBM may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you.

Licensees of this program who wish to have information about it for the purpose of enabling: (i) the exchange of information between independently created programs and other programs (including this one) and (ii) the mutual use of the information which has been exchanged, should contact:

IBM United Kingdom Limited
Intellectual Property Law
Hursley Park
Winchester
SO21 2JN
Hampshire
United Kingdom

Such information may be available, subject to appropriate terms and conditions, including in some cases, payment of a fee.

The licensed program described in this document and all licensed material available for it are provided by IBM under terms of the IBM Customer Agreement, IBM International Program License Agreement or any equivalent agreement between us.

Any performance data contained herein was determined in a controlled environment. Therefore, the results obtained in other operating environments may vary significantly. Some measurements may have been made on development-level systems and there is no guarantee that these measurements will be the same on generally available systems. Furthermore, some measurements may have been estimated through extrapolation. Actual results may vary. Users of this document should verify the applicable data for their specific environment.

Information concerning non-IBM products was obtained from the suppliers of those products, their published announcements or other publicly available sources. IBM has not tested those products and cannot confirm the accuracy of performance, compatibility or any other claims related to non-IBM products. Questions on the

capabilities of non-IBM products should be addressed to the suppliers of those products.

All statements regarding IBM's future direction or intent are subject to change or withdrawal without notice, and represent goals and objectives only.

This information contains examples of data and reports used in daily business operations. To illustrate them as completely as possible, the examples include the names of individuals, companies, brands, and products. All of these names are fictitious and any similarity to the names and addresses used by an actual business enterprise is entirely coincidental.

COPYRIGHT LICENSE:

This information contains sample application programs in source language, which illustrate programming techniques on various operating platforms. You may copy, modify, and distribute these sample programs in any form without payment to IBM, for the purposes of developing, using, marketing or distributing application programs conforming to the application programming interface for the operating platform for which the sample programs are written. These examples have not been thoroughly tested under all conditions. IBM, therefore, cannot guarantee or imply reliability, serviceability, or function of these programs.

Each copy or any portion of these sample programs or any derivative work, must include a copyright notice as follows:

© (your company name) (year). Portions of this code are derived from IBM Corp. Sample Programs. © Copyright IBM Corporation 2001, 2012.

If you are viewing this information softcopy, the photographs and color illustrations may not appear.

Trademarks and service marks

IBM, the IBM logo, and ibm.com are trademarks or registered trademarks of International Business Machines Corp., registered in many jurisdictions worldwide. Other product and service names might be trademarks of IBM or other companies. A current list of IBM trademarks is available on the Web at “Copyright and trademark information” at www.ibm.com/legal/copytrade.shtml.

Microsoft and Windows are trademarks of Microsoft Corporation in the United States, other countries, or both.

UNIX is a registered trademark of The Open Group in the United States and other countries.

IBM[®]