

Rational Integration Tester



Reference Guide for SAP

Version 8.0.1



Note

Before using this information and the product it supports, read the information in “Notices” on page 28.

This edition applies to version 8.0.1 of Rational Integration Tester and to all subsequent releases and modifications until otherwise indicated in new editions.

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About this Publication

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This guide describes how to configure and run IBM® Rational® Integration Tester with the SAP plugin, which provides support for synchronization with and testing of the Business Objects within a SAP system by means of BAPIs (Business Application Programming Interface), as well as RFCs and IDocs.

Intended Audience

This document 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. Readers should also be familiar with the SAP system and the Business Objects with which they plan to synchronize.

Scope

This document is concerned only with IBM Rational Integration Tester, its configuration, and its use with SAP technologies. For more information about SAP, BAPIs, RFCs, or IDocs, please refer to the relevant SAP documentation.

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/

Requirements

Contents

**SAP Systems and Product
Libraries**

**SAP Application Server
Requirements**

This chapter describes software and system requirements for using the SAP plugin for Rational Integration Tester.

1.1 SAP Systems and Product Libraries

The following sections provide details about the versions of the various SAP systems that are supported in Rational Integration Tester, as well as the product libraries that are required to work with each one.

The following SAP systems are compatible with the Rational Integration Tester SAP plugin:

- SAP R/3 4.7
- SAP ECC 5.0
- SAP ECC 6.0

To connect to supported SAP systems, Library Manager must be configured with the required SAP libraries (found in `c:\Program Files\SAPJCo`, by default), as follows:

- The SAP JCo (Java Connector) v3.x libraries are required – `sapjco3.jar`.

NOTE: In addition to the JAR file, `sapjco3.dll` must be present within the system path (for example, `C:\WINDOWS\System32`).

- To enable the use of SAP IDocs within Rational Integration Tester, the SAP IDoc Connector 3.x is required – `sapidoc3.jar`.

NOTE: Default locations for the specified libraries can be modified using the Library Manager. For more information, refer to *IBM Rational Integration Tester Installation Guide*.

NOTE: The **internal version** of `sapjco3.jar` and `sapidoc3.jar` must be 7.11.x. To determine the internal version, extract the jar files and use a text editor to open `META-INF/MANIFEST.MF`. The internal version is recorded in a line similar to the following:
Specification-Version: 7.11.1

The SAP JCo and IDoc libraries can be downloaded from the SAP Service Marketplace at <http://service.sap.com/connectors>.

1.2 SAP Application Server Requirements

Before using Rational Integration Tester with your SAP system, you will need a SAP user ID and password that allows access to a dedicated SAP application server. You will need authorization from your SAP system administrator to execute Remote Function Calls and access tables in SAP, which is required to extract metadata from the Business Object Repository (BOR) to enable testing of BAPIs using Rational Integration Tester.

Specifically, ensure that the following Remote Function Calls can be executed successfully from transaction SE37 in your SAP GUI:
SWO_QUERY_API_OBJTYPES and SWO_QUERY_API_METHODS.

Your login parameters should specify the correct language. BAPIs specific to a particular language will not be retrieved if you login to SAP with a different language.

SAP Resources

Contents

**[Creating a Physical SAP
Application Server Resource](#)**

[Add a Logical SAP System](#)

This chapter provides an overview of how to create and configure SAP resources in Rational Integration Tester.

2.1 Creating a Physical SAP Application Server Resource

The SAP server is created when you create a physical SAP Application Server resource in Rational Integration Tester's Architecture School. In Architecture School, you can create a new SAP Application Server resource as follows:

1. Select the Physical View in Architecture School.
2. Right-click the Physical folder and select **New > SAP > SAP Application Server**, or select **SAP Application Server** from the **SAP** menu.



The physical SAP Application Server resource can be selected when adding an external SAP System (see [Add a Logical SAP System](#)).

2.1.1 Configuring the SAP Application Server

To configure a SAP Application Server, double-click a SAP Application Server resource in Architecture School's Physical View. If desired, enter a name for the server in the **Name** field (to help identify it when multiple servers are available).

Server settings are managed under the **Config** tab, and are broken into [Basic Settings](#) (**Settings** tab) and [Advanced Settings](#).

NOTE: You can test the connection parameters at any time by clicking the **Test Transport** button.

2.1.2 Basic Settings

The basic SAP Application Server settings are configured under the **Settings** tab. The available configuration options are described in the following table:

Host	The host name or IP address of the SAP Application Server.
System Number	The system number for the application server (for example, 00).
User/Password	The user name and password of the SAP client account to use for connecting to the server.
Client Number	The number assigned to the SAP client to which this user belongs (for example, 190).


2.1.3 Advanced Settings

The advanced SAP Application Server settings are configured under the **Advanced** tab. The available configuration options are described in the following table:

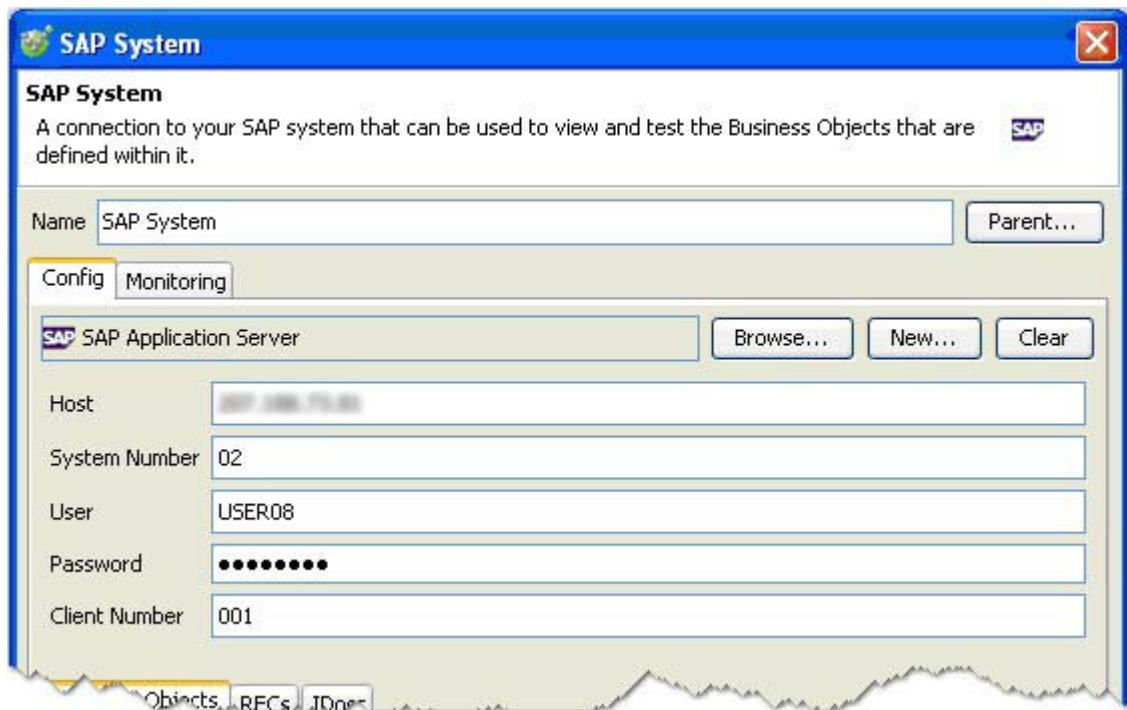
Language	Specifies the language that will be used to connect to the server, which may influence the list of available BAPIs that are retrieved when refreshing the Business Objects from the BOR.
Server Program ID	The ID of the desired RFC server program, registered with the SAP gateway, that is listening for incoming RFC call requests.
Server Gateway Host	The host name of the SAP application server gateway.
Server Gateway Service	The service name of the SAP gateway.
Unicode	Enable this option if you are connecting to a unicode SAP system (that is, the server has been set up using the jco.server.unicode=1 property).
Metadata Connection ID	The SAP system user id to use for metadata connections.
IDoc Monitor Function	<p>The qualified name of the IDoc Monitor function.</p> <p>If you want to record or watch-subscribe to IDocs, you will need to install Advanced Business Application Programming (ABAP). Installation instructions are available in <i><Rational Installation Directory>\tools\SAP</i>.</p>

2.2 Add a Logical SAP System

Follow the steps below to add an external SAP System to your project.

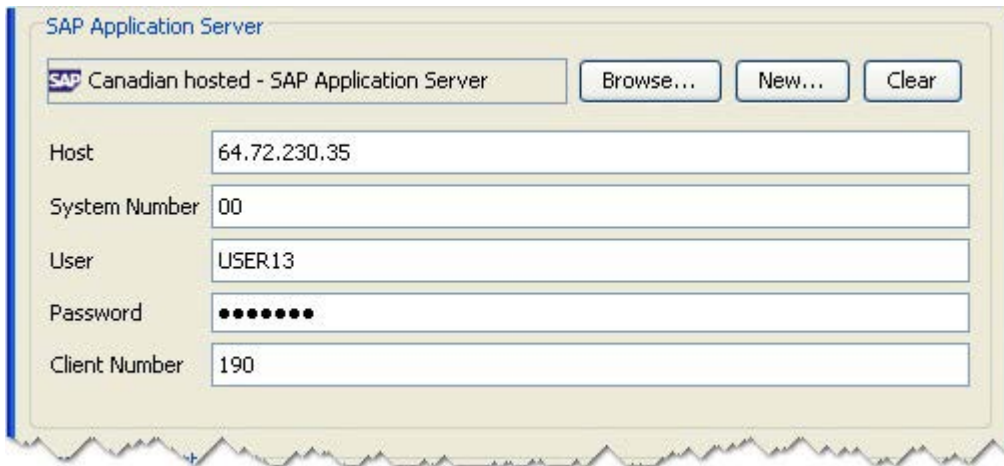
1. In the Logical or Synchronisation view, add a reference to the SAP System by clicking the **Add Item** button . Alternatively, you can select **SAP System** from the **SAP** menu or from the context menu.

The **Create a new External Resource** wizard is displayed.



2. Ensure that **SAP System** is selected in the **Type** field.
3. Click **Browse** to select an existing SAP Application Server from the project resource tree, or click **New** to create a new physical resource (see [Configuring the SAP Application Server](#)).

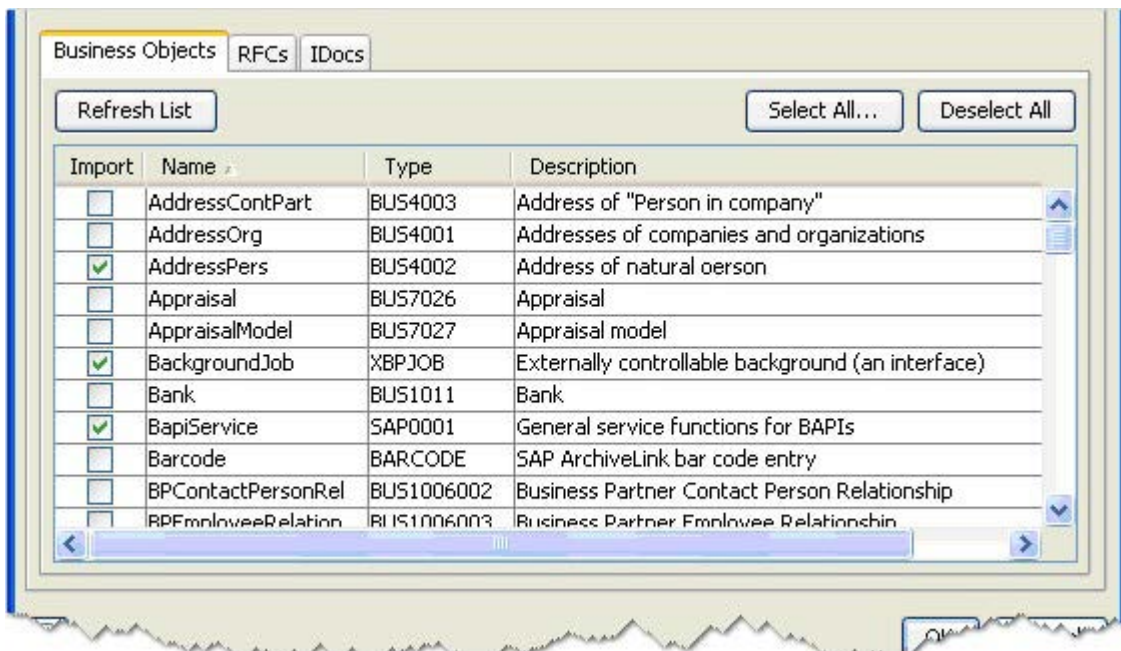
The connection details of the server (configured in the physical resource) are displayed.



The image shows a dialog box titled "SAP Application Server". It contains a text field with the label "SAP" and the text "Canadian hosted - SAP Application Server". To the right of this field are three buttons: "Browse...", "New...", and "Clear". Below this are five input fields: "Host" with the value "64.72.230.35", "System Number" with the value "00", "User" with the value "USER13", "Password" with a masked value of "*****", and "Client Number" with the value "190".

4. Click **Refresh List** under **Business Objects** to introspect the Business Object Repository on the SAP server to display a list of available objects.

NOTE: Only those Business Objects for which BAPIs have been configured will be displayed in the list.



The image shows a dialog box titled "Business Objects". It has three tabs: "Business Objects", "RFCs", and "IDocs". The "Business Objects" tab is selected. Inside the dialog, there is a "Refresh List" button and two buttons, "Select All..." and "Deselect All". Below these is a table with four columns: "Import", "Name", "Type", and "Description". The table contains the following data:

Import	Name	Type	Description
<input type="checkbox"/>	AddressContPart	BUS4003	Address of "Person in company"
<input type="checkbox"/>	AddressOrg	BUS4001	Addresses of companies and organizations
<input checked="" type="checkbox"/>	AddressPers	BUS4002	Address of natural person
<input type="checkbox"/>	Appraisal	BUS7026	Appraisal
<input type="checkbox"/>	AppraisalModel	BUS7027	Appraisal model
<input checked="" type="checkbox"/>	BackgroundJob	XBPJOB	Externally controllable background (an interface)
<input type="checkbox"/>	Bank	BUS1011	Bank
<input checked="" type="checkbox"/>	BapiService	SAP0001	General service functions for BAPIs
<input type="checkbox"/>	Barcode	BARCODE	SAP ArchiveLink bar code entry
<input type="checkbox"/>	BPContactPersonRel	BUS1006002	Business Partner Contact Person Relationship
<input type="checkbox"/>	RPFemployeeRelation	RIIS1006003	Business Partner Employee Relationship

5. Enable the **Import** option for each of the objects you want to import, and disable the option for those that should not be imported.

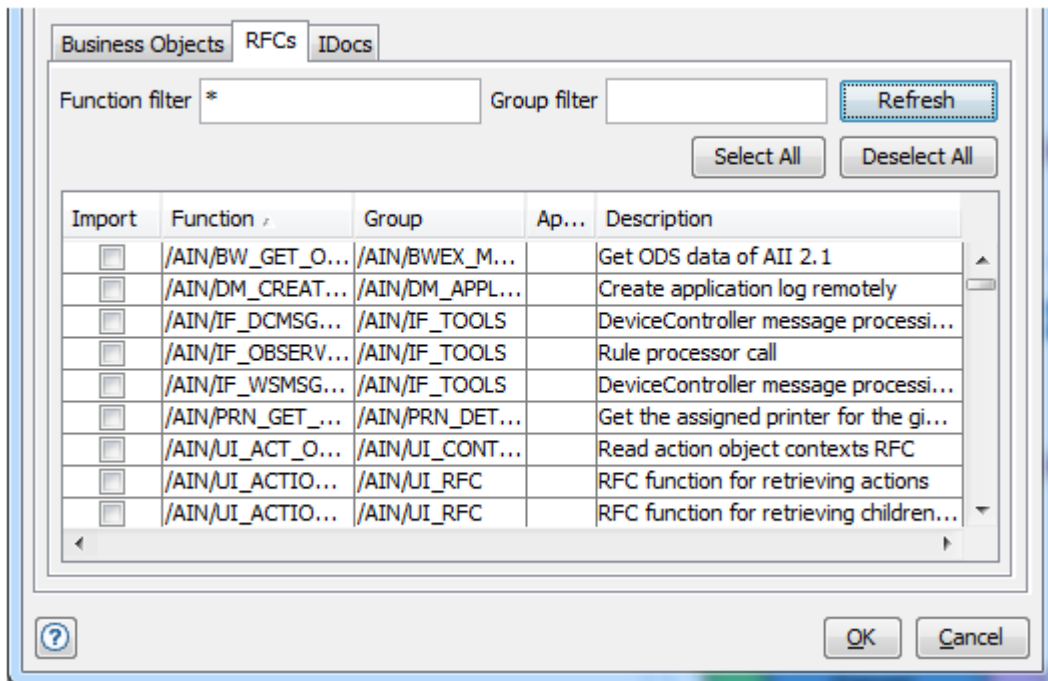
NOTE: To select or deselect all business objects quickly, click **Select All** or **Deselect All**, as desired.

NOTE: To find a specific Business Object quickly, you can click on any of the column headers to sort the data (in ascending or descending order) by that column.

6. On the **RFCs** tab, enter details about the additional RFCs that you would like to be able to invoke as part of your testing.

In the **Function filter** field, you can enter wildcards (*, ?) and multiple comma-separated terms. In the **Group filter** field, you can enter wildcards.

7. Click **Refresh** to introspect the RFC Repository on the SAP server to display a list of available function calls.

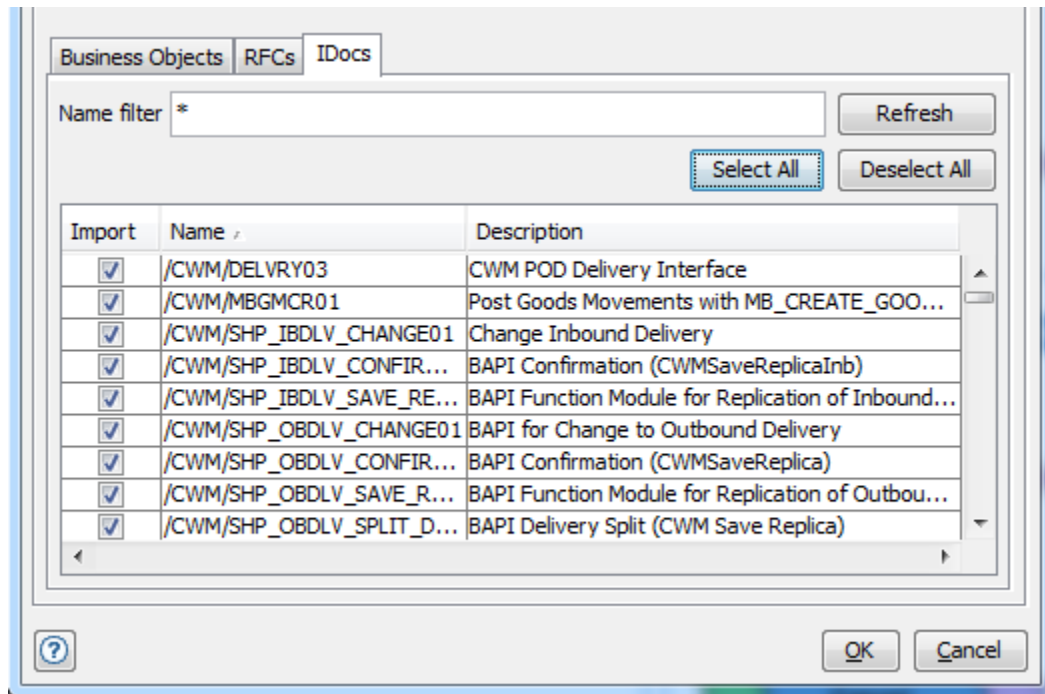


8. Under **Import**, select the check box of each RFC that you want to import. To prevent the importation of a particular RFC, clear its check box.

NOTE: To select or deselect all RFCs quickly, click **Select All** or **Deselect All**, as desired.

NOTE: To find a specific RFC quickly, you can click on any of the column headers to sort the data (in ascending or descending order) by that column.

9. On the **IDocs** tab, click **Refresh** to introspect the IDoc repository on the SAP server to display a list of available IDocs.



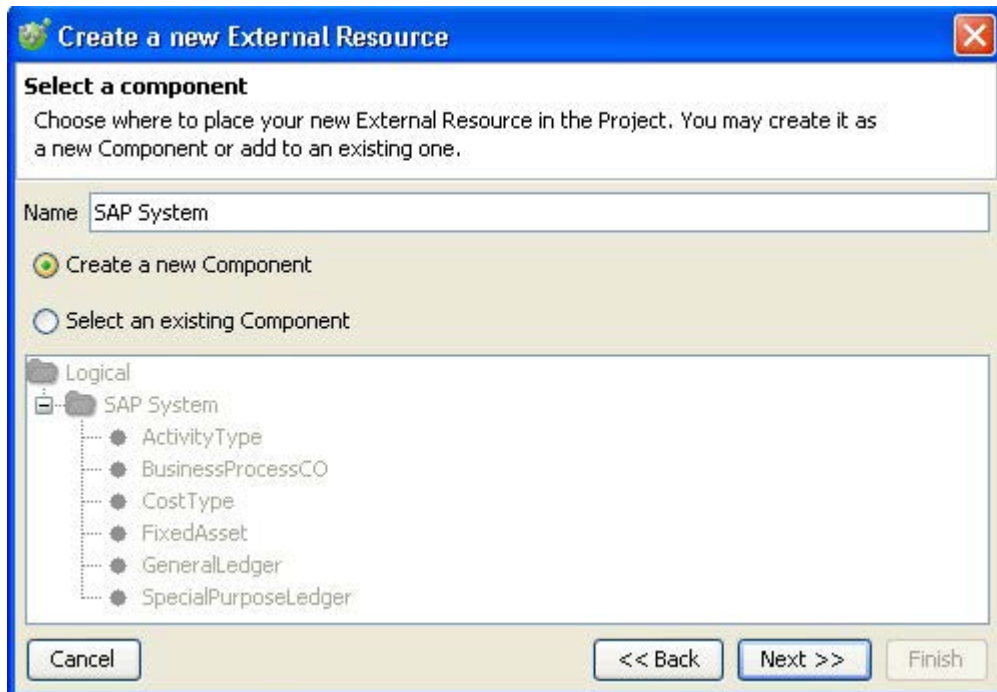
10. Under **Import**, select the check box of each IDoc that you want to import. To prevent the importation of a particular IDoc, clear its check box.

NOTE: To select or deselect all IDocs quickly, click **Select All** or **Deselect All**, as desired.

NOTE: To find a specific IDoc quickly, you can click on any of the column headers to sort the data (in ascending or descending order) by that column.

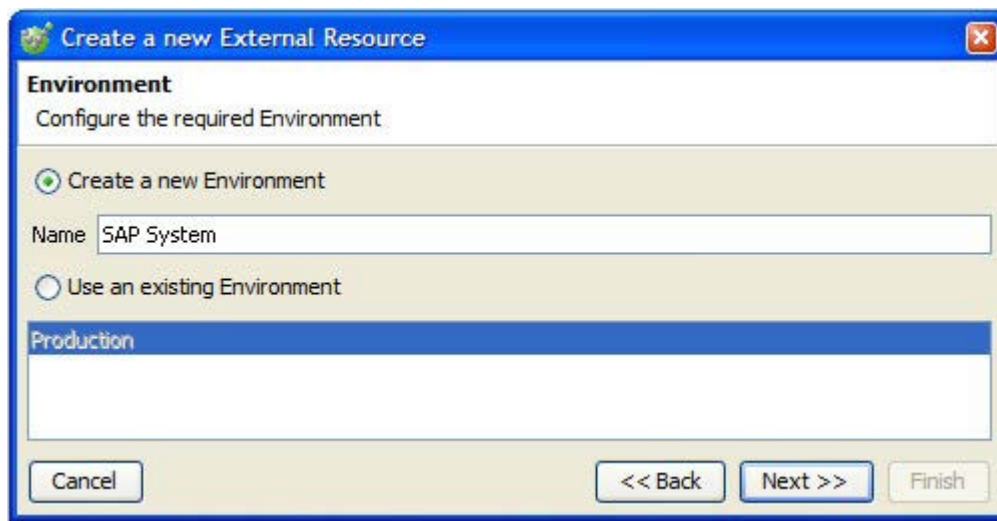
11. Click **Next** to proceed.

The **Select a Component** dialog is displayed, letting you specify where to create the SAP System artifact in your project (that is, in a new or existing Service Component).



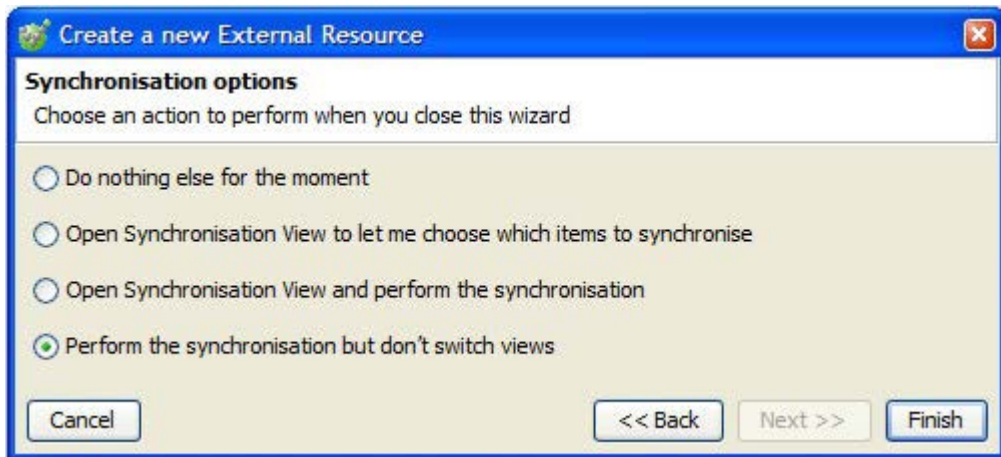
12. Select the desired option (providing a name for a new component or selecting the desired existing component), then click **Next**.

If one or more environments exist in your project, the **Environment** dialog is displayed, letting you create a new environment or use an existing one for the variables and bindings that will be imported.



13. Select the desired option (providing a name for a new environment or selecting an existing environment), then click **Next**.

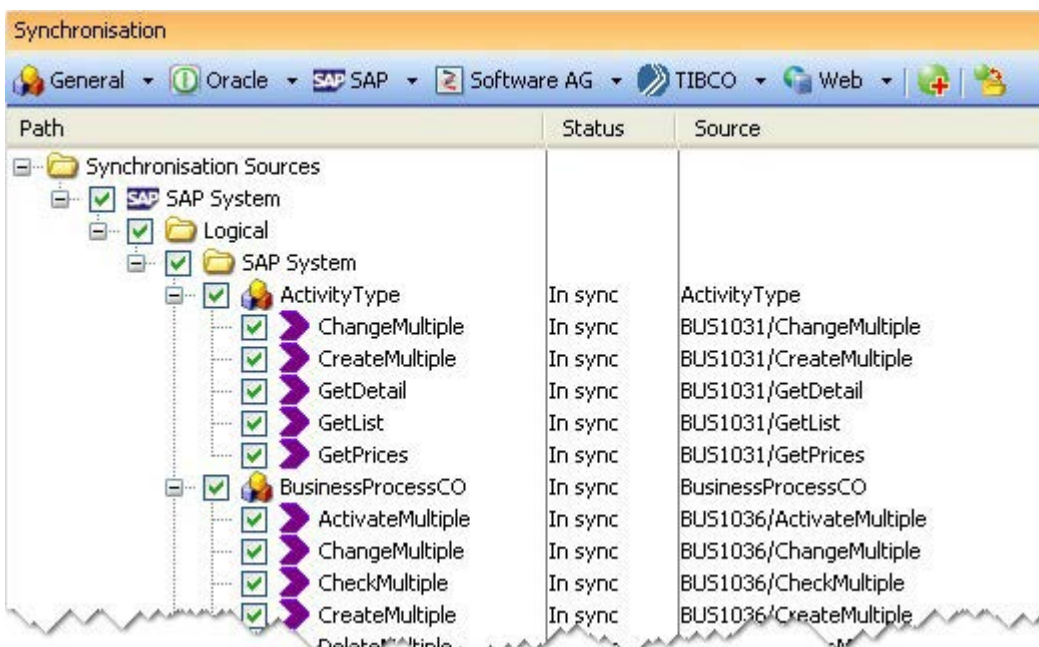
The **Synchronisation Options** dialog is displayed.



14. Select the last option (“Perform the synchronisation ...”) and click **Finish**.

NOTE: Depending on how many business objects were selected and the contents of each object, the synchronisation step could take several minutes to complete.

When done, a hierarchy of the Business Object artifacts will be created in the project.

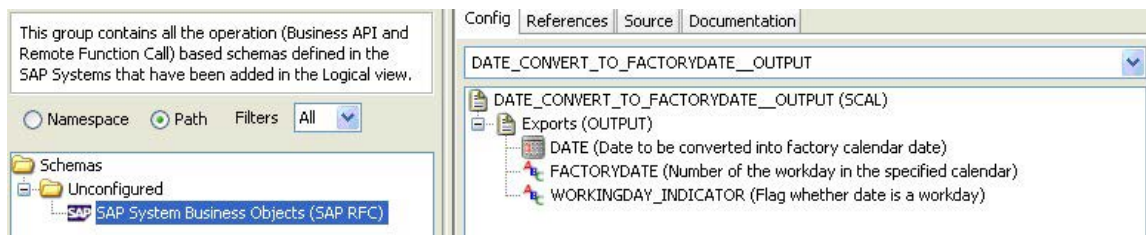


2.3 Refreshing RFC and IDoc Definitions

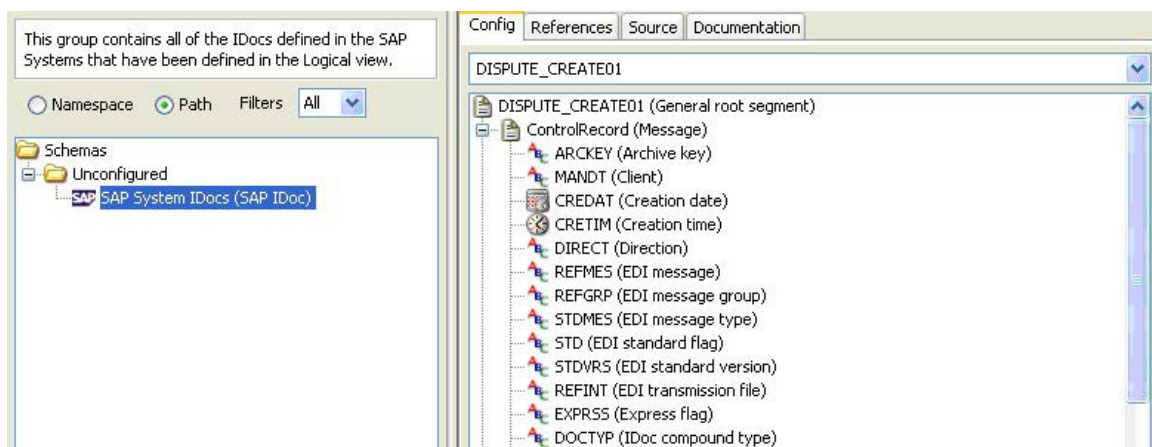
Within the schema library of Architecture School are two tabs for SAP, one for the RFC calls and one for the IDocs.



The BAPI/RFC tab will show all of the configured RFC calls available and allow the user to navigate through those that have been configured.



Similarly the list of configured and available IDocs can be seen from the other tab.



These artifacts and schema definitions can now be used in the main test actions of Rational Integration Tester.

Testing SAP Business Objects

Contents

Overview

Test Actions using the SAP System Transport

Example

This chapter provides an overview of how to use actions in Rational Integration Tester to test business objects (BAPIs) and ABAP procedures (RFCs) on a configured SAP system.

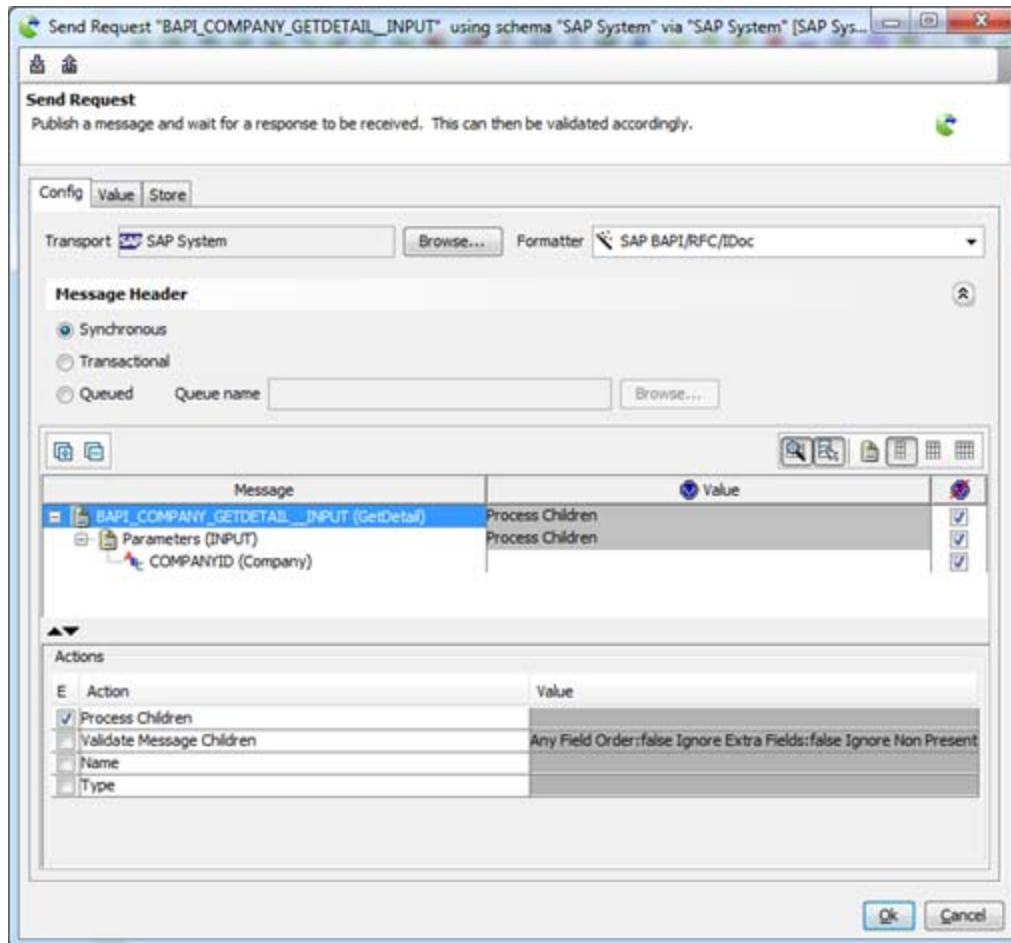
3.1 Overview

As a BAPI invocation is a synchronous operation it is modeled in Rational Integration Tester as two schema items, one defining the parameters that should be passed in to the system, and a second that defines the resulting return information; usually a structure and sometimes a table. Data dictionary structures are used within SAP to describe these inputs and outputs.

The majority of Return code information will include one of the RETURN structures, this includes fields such as Message Type - blank or 'S' for success, (E)rror, (W)arning, (I)nformational, (A)bort. Along with other fields carrying information such as Message, Application Log number, Message serial number, and so on.

3.2 Test Actions using the SAP System Transport

Rational Integration Tester currently supports BAPI/RFC invocation through the use of the Send Request / Receive Reply messaging actions.

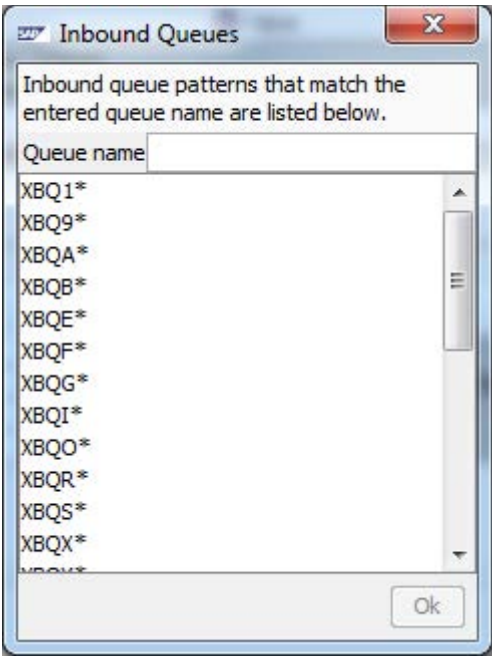


The following table outlines the three styles of function invocation that are supported.

Function Invocation Style	Description
Synchronous	Normal procedure call semantics. Sends a request and blocks until a reply is received.

Function Invocation Style	Description
Transactional (tRFC)	Asynchronous procedure call semantics. A request is sent and control returns immediately to the caller. No reply will be received, so meaningful testing relies upon knowledge of any side-effects in the SAP system. This style does not guarantee execution order on the server.
Queued (qRFC)	Asynchronous procedure call semantics. A request is sent to the specified server queue and control returns immediately to the caller. No reply will be received, so meaningful testing relies upon knowledge of any side-effects in the SAP system. This style guarantees execution order on the server for all RFC invocations to a particular queue.

A valid queue name must be provided in order for the invocation to be processed successfully. Clicking **Browse** displays a pop-up window that shows all inbound queue patterns that match the given queue name.

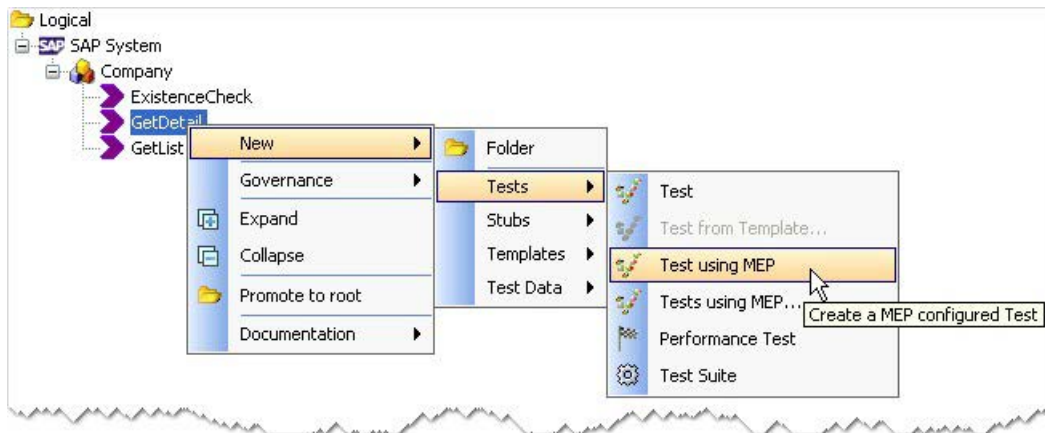


Entering text in the **Queue name** field filters the list of matching patterns.

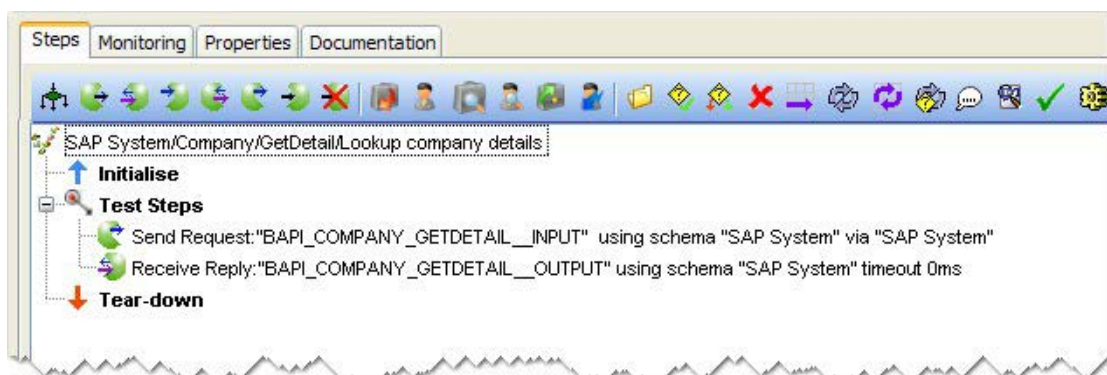
3.3 Example

The following example illustrates how to create and execute a test against a synchronised business object.

1. Follow the steps in [SAP Resources](#) to create the required SAP resources and configure the SAP application server.
2. After synchronizing, open the Test Factory (**F10**) and create a test from MEP under the desired operation.



3. The new test is opened with pre-configured Send Request / Receive Reply actions in it.



4. The test can be executed or the test actions can be edited to suit the needs of your testing.

Testing SAP Using IDocs

Contents

Publishing IDocs using the SAP System Transport

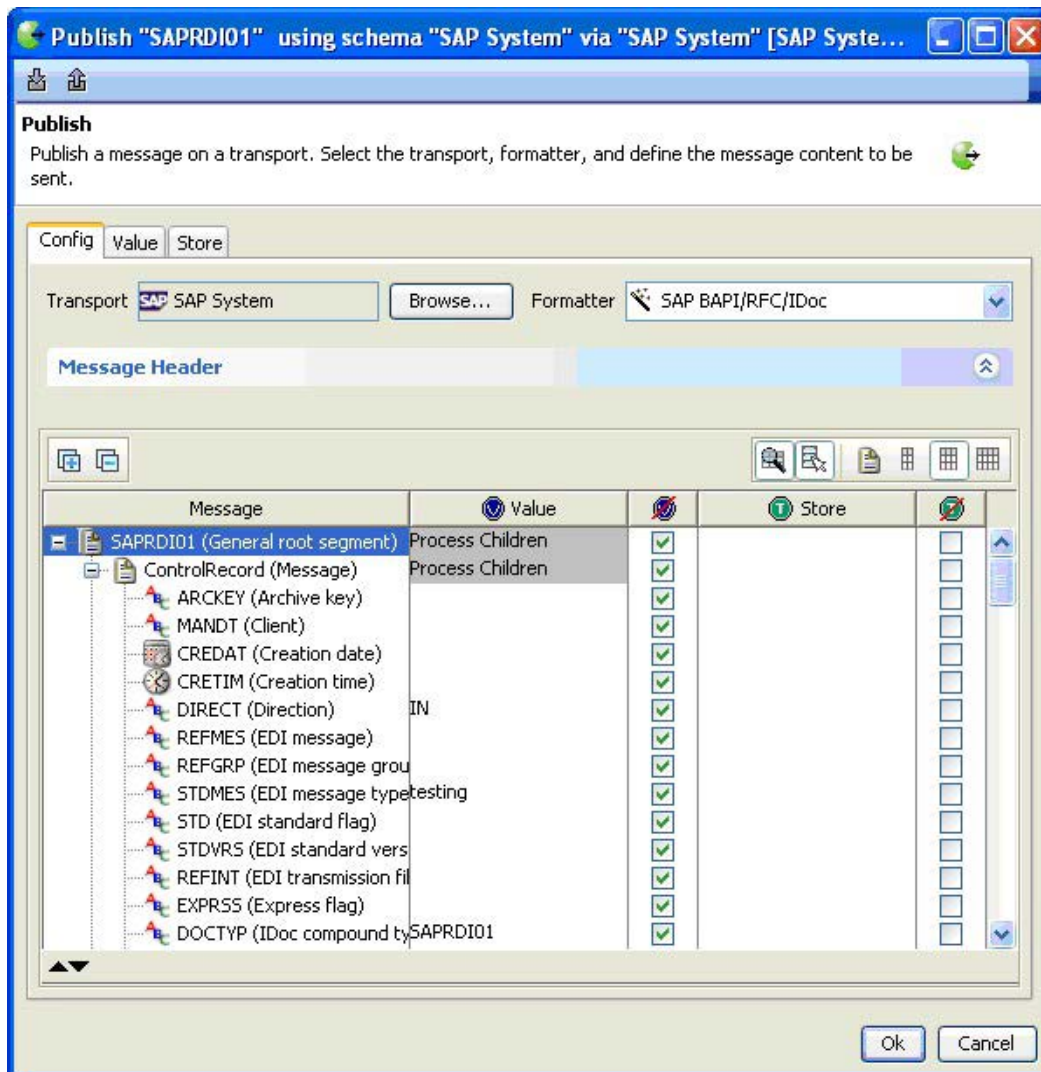
Processing IDocs to/from Other Systems

This chapter provides an overview of how to use the publish action in Rational Integration Tester to send IDocs to a configured SAP system.

Rational Integration Tester also provides the ability to enter information into the SAP system by means of publishing IDocs. Those IDocs that are available will have been configured in the logical component and then made available by means of the schema library.

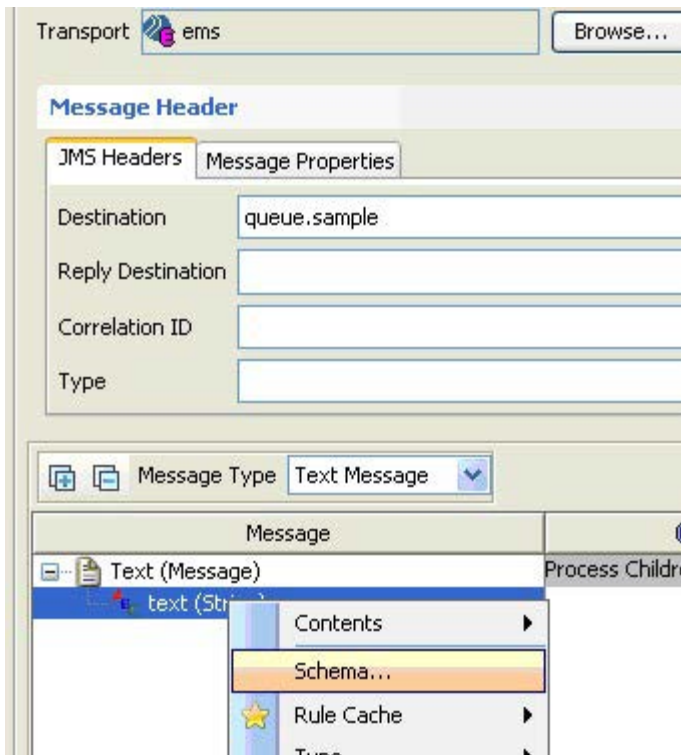
4.1 Publishing IDocs using the SAP System Transport

Rational Integration Tester currently supports IDoc publication through the publish messaging action.

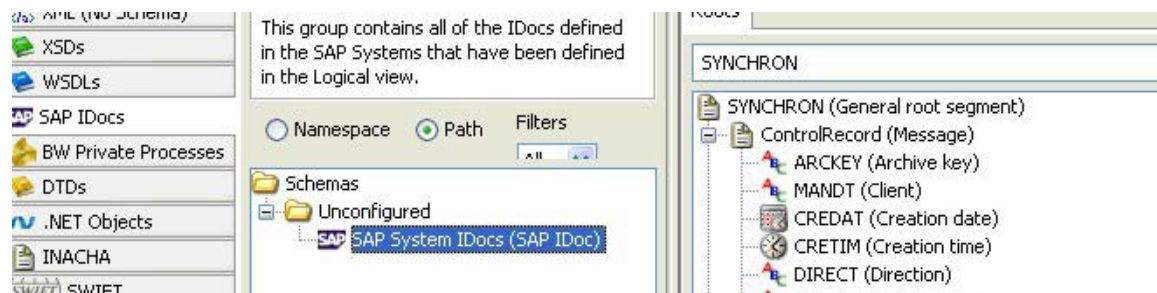


4.2 Processing IDocs to/from Other Systems

Rational Integration Tester also has the ability to send an XML encoded version of an IDoc to any appropriate receiver. This is achieved through the use of an IDoc field expander on a String based node within any other message type.



1. On a suitable string field, use the context menu to select a schema that will be applied to the node.



2. From the schema wizard select the IDoc that you wish to be applied to the node.

Transport: ems Browse... Formatter: EMS

Message Header

JMS Headers **Message Properties**

Destination: queue.sample

Reply Destination: ☐ Use T...

Correlation ID: Delivery M...

Type: Priority: 0 Time To Li...

Message Type: Text Message

Message	Value		
Text (Message)	Process Children		
text (String) {SAP IDoc}	Expanded Content		
SYNCHRON (General root segment)	Process Children		
ControlRecord (Message)	Process Children		
ARCKEY (Archive key)			
MANDT (Client)			
CREDAT (Creation date)	15:48:04.500 2010/10/12		
CRETIM (Creation time)	15:48:04.500		
DIRECT (Direction)			
REFMES (EDI message)			
REFGRP (EDI message group)			
STDMES (EDI message type)			

In the above example an IDoc has been applied to the text body of an EMS message, this can be done for any string field within Rational Integration Tester (that is, ending, receiving, generation, and so on).

4.3 Recording Studio

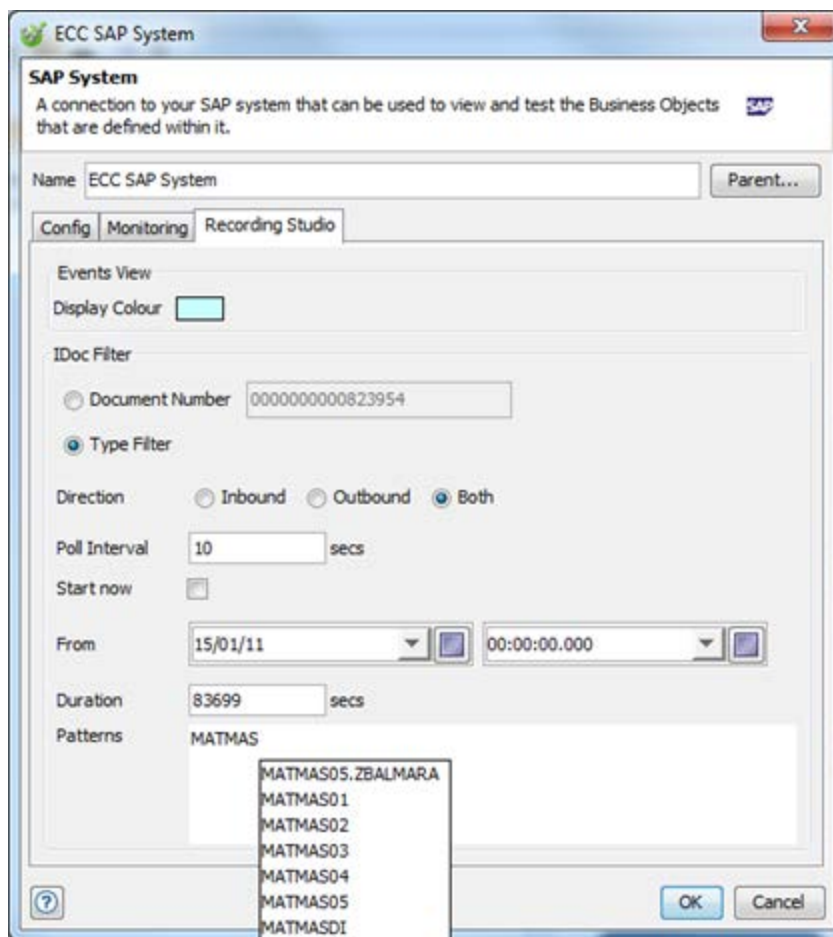
Rational Integration Tester can record incoming IDocs for a SAP instance. The recording parameters can be defined in either of the following:

- The logical SAP system's transport.
- A subscribe operation.

The following sections describe both configuration methods.

4.3.1 Configuring a Logical SAP System's Transport


In the Architecture School perspective's Logical View, open the relevant SAP System and click the **Recording Studio** tab.



The following table describes how to use the fields and controls on the tab.

Field /Control	Description
Document Number	Click this option button if you want to record a specific IDoc.
Type Filter	Click this option button if you want to record by IDoc-type.
Direction	An IDoc's direction can be inbound, or outbound, or both.
Poll Interval	Specify the number of seconds between server queries.
Start now	Select this check box if you want polling to start when a recording session is started.
From	If the Start now check box is cleared, specify the query's start date and time. NOTE: Query start and end date/time values will be passed to the SAP Server as literals, not as UTC values. Therefore, unexpected results may occur if Rational Integration Tester and the SAP System are in different time zones.
Duration	If the Start now check box is cleared, specify (in seconds) the duration of a query.
Patterns	The set of IDoc name patterns to query. The * and ? wildcards may be used. Only IDocs selected on the IDoc tab of the logical transport are displayed in an auto-complete list under the edit line.

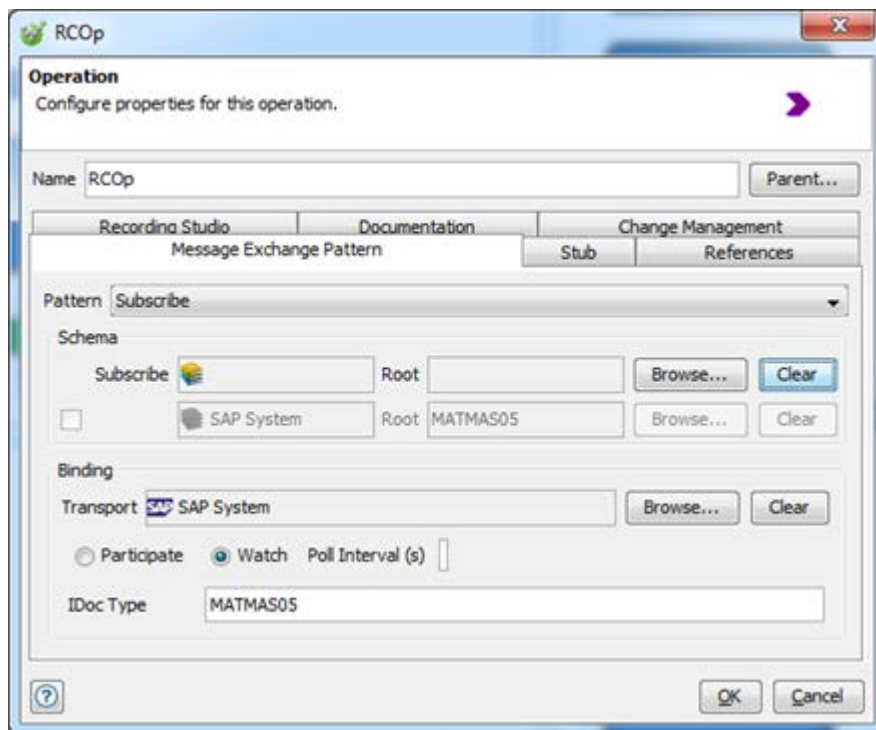
To use the configured SAP System for recording events:

1. In the Recording Studio perspective, click the plus button () on the Event Monitors toolbar to create a new event monitor.
2. On the Select a Resource dialog box, click the **Show/Hide Recordable Resources** button.
3. Select the relevant SAP System.
4. Click **OK**.

You can now use the configured SAP System for recording events.

4.3.2 Configuring a Subscribe Operation

To record against an operation, it is necessary to create a subscribe operation on the logical SAP System manually.



NOTE: Query start and end date/time values will be passed to the SAP Server as literals, not as UTC values. Therefore, unexpected results may occur if Rational Integration Tester and the SAP System are in different time zones.

To configure that the subscribe operation to be recordable:

1. On the **Message Exchange Pattern** tab, click the **Watch** option button.
2. In the **IDoc Type** field, specify a particular IDoc-type (you can also enter wildcards).

NOTE: It is not necessary to set the schema root.

After it is defined, the operation can be selected in the Recording Studio perspective (see [Configuring a Logical SAP System's Transport](#)).

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.
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.
Publisher-Subscriber	A messaging paradigm whereby a messaging network consists of Publishers and Subscribers.
Transport	Informally, the messaging software in use. For instance, TIBCO Rendezvous, 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.
ABAP	Advanced Business Application Programming is a programming language used to manipulate information within a SAP system. It is similar to COBOL.
RFC	Remote Function Calls allow non-SAP and SAP applications to execute SAP (ABAP) functions that have been RFC-enabled. They are similar to BAPIs in functionality but are not attached to SAP Business Objects. The underlying technology for RFCs and BAPIs is the same.

Term	Description
BAPI	Business Application Programming Interfaces are the standard SAP interfaces. BAPIs play an important role in the technical integration and in the exchange of business data between SAP components, and between SAP and non-SAP components. ^a BAPIs are the recommended integration interface over RFCs.
IDoc	Intermediate Documents are document containers for business transactional data, such as a new Order from a customer or the issuing of an invoice corresponding to the Order.
ALE	Application Link Enabling is the mechanism by which SAP achieves cross business functionality, this can be thought of as SAPs middleware. This is typically done in an asynchronous, event driven way that utilizes IDocs to express transactions.

a. SAP Library, “General Introduction to BAPIs (CA-BFA)”

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