



webMethods SAP R/3 Adapter Installation Guide

VERSION 4.6

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Introduction

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Welcome!

This guide describes how to install and upgrade webMethods SAP R/3 Adapter Version 4.6.

Typographical Conventions

Documentation Conventions

For general text, this document uses the following typographical conventions:

Convention	Example
Procedures are designated by a blue box in the left column. Procedures are presented as a series of numbered steps.	1 On the Activity menu, click File .
Terms that identify elements, options, selections, and commands on the screen are shown in bold.	The Service field on the Properties tab specifies the name of the requested service.
Characters that you must type exactly are shown in a typewriter font.	Type: <code>setup</code> , then press ENTER.
Variable information that you must type based on your specific situation or environment is shown in italics.	Type: <i>webMethods\setup</i> , then press ENTER.
Keyboard keys are shown in uppercase.	Press ENTER; then press TAB.
Keys that you must press simultaneously are joined with the "+" symbol.	Press CTRL+ALT+M.
Directory paths are shown with the "\" directory delimiter unless the subject is UNIX-specific. In these cases, the "/" is used. If you are working in a UNIX environment, substitute a "/" for the "\" shown in the procedures in this book.	<i>Developer_directory\packages\Default</i>

Convention	Example
Information that you must read before beginning a procedure or that alerts you to negative consequences of certain actions is denoted using this notation.	 <p>Important! If the folder is not already open in the Service Browser, open it before you start the following procedure.</p>
Notes that provide related, but non-critical, information are denoted using this notation.	 <p>Note: When you start webMethods Developer, you are prompted to log on to a webMethods Integration Server.</p>
Helpful information such as shortcuts and alternatives.	 <p>Tip! You can also use Ctrl+C to copy an object.</p>

Program Code Conventions

For programming code and command syntax, this document uses the following typographical conventions:

Convention	Example
Keywords and values that you must type exactly as printed are shown in typewriter font.	<code>%CoSymbol%</code>
Variable values or parameters that you must supply are shown in italics.	<code>%VarName%</code>
Keywords or values that are optional are enclosed in []. Do not type the [] symbols in your own code.	<code>%loop LoopVar [null=NullValue]%</code>

Related Documentation

The following documents are companions to this guide. Some documents are in PDF format and others are in HTML.

Refer to this book...	For...
<i>webMethods SAP R/3 Adapter User's Guide</i>	This guide describes how to install, configure, and develop applications for the SAP adapter. It contains information for administrators who manage the system and for application developers who create applications that use the system. It explains how to integrate the SAP adapter with SAP products.
<i>webMethods Integration Server Administrator's Guide</i>	This guide contains information about using Server Administrator to configure, monitor, and control the webMethods Integration Server.
<i>webMethods Developer User's Guide</i>	This guide explains how to use webMethods Developer.
<i>webMethods Integration Server Clustering Guide</i>	This guide contains information about installing and using the webMethods integration platform Clustering feature. It also contains information for administrators who configure and manage a webMethods Integration Server system and for application developers who want to create services that interact directly with the webMethods integration platform Cluster Store.
<i>webMethods Certificate Toolkit User's Guide</i>	This guide contains informatio about installing and using the webMethods Certificate Toolkit. It also contains information for administrators and developers of webMethods products about creating and managing digital certificates for use with webMethods products.
<i>webMethods Built-In Services Reference Guide</i>	This guide describes each service provided with Integration Server.
<i>Serialization of ABAP data in XML</i>	This document provides in depth information about how ABAP data is serialized in XML messages. This serialization is used for RFC and BAPI parameters. You will find this document at http://service.sap.com/sbc-download .
<i>RFC-XML Specification</i>	This document provides in depth information about the RFC-XML specifications. You will find this document at http://service.sap.com/sbc-download
<i>XML Format Specifications</i>	This document provides in depth information about how RFCs, BAPIs and IDocs are formatted in XML. You will find this guide at http://service.sap.com/sbc-download

Refer to this book...	For...
<i>webMethods SAP Adapter IDoc Class Documentation</i>	This document provides in depth information about the IDoc Java classes. You will find this guide at <i>Integration Server_directory\packages\SAP\doc\api\index.html</i> .
<i>webMethods Integration Server Java API Reference</i>	This book describes the Java classes and built-in services you use to create SAP adapter services.
<i>Microsoft BizTalk Framework 1.0a Independent Document Specification</i>	This add-on package introduces XML messages that are based on the Microsoft BizTalk Framework. You can find further information on this framework and the XML envelope it defines can be found at http://www.biztalk.org .

Viewing this Document

To view this document, which is in PDF format, you must have Acrobat Reader™ 4.0 or later installed on your system. If you have an earlier version of Acrobat Reader, you will receive the following error message when you open this document and Acrobat Reader will not display the images in this document:

```
Could not find the ColorSpace named 'Cs8.'
```

If you do not have this software or you do not have the correct version, you can download a free copy from:

<http://www.adobe.com/supportservice/custsupport/download.html>.

Printing this Guide

To produce a hard copy of this guide, print this document from Acrobat Reader.

Installing, Upgrading, and Uninstalling the webMethods SAP R/3 Adapter

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Overview

If you are an advanced user who is either working with large-scale integration projects or trying to determine whether your hardware setup is sufficient for running the webMethods SAP R/3 Adapter (SAP adapter), see Chapter 3, “Sizing Your webMethods SAP R/3 Adapter Installation”, on page 19 before you install the SAP adapter.

System Requirements and Product Compatibilities

Platform and Operating System Requirements

The following table lists the supported platforms for the SAP adapter and the JVM to use to run the product on each platform.

In the table, the **Supported JVMs** column lists the JVMs you can use while the **Certified JVMs** column lists the JVMs that have been specifically tested by webMethods. When webMethods has tested more than one JVM on a platform, an asterisk (*) indicates the recommended JVM.

Platform and Operating System Level	Supported JVMs	Certified JVMs
Microsoft Windows NT 4.0 SP4 and later	JRE 1.2.2 and later	IBM JRE 1.3.0* Sun JRE 1.2.2
Microsoft Windows 2000	JRE 1.2.2 and later	IBM JRE 1.3.0* Sun JRE 1.2.2
Hewlett-Packard HP-UX 11.0 and later	JRE 1.2.2 and later	HP JRE 1.2.2
IBM AIX 5.1 and later	JRE 1.2.2 and later	IBM JRE 1.2.2
Linux SuSE 7.2 and later	JRE 1.2.2 and later	IBM JRE 1.2.2, Build 1118-20000325, native threads
Linux Kernel 2.2.2 and later, libstdc++-libc6.2-2.so	JRE 1.2.2 and later	IBM JRE 1.2.2, Build 1118-20000325, native threads
Sun Solaris 8	JRE 1.2.2 and later	Sun/Javasoft JRE 1.2.2, native threads

The JVMs recommended in this table are for runtime only. If you want to create Java services using the SAP adapter, you must install a Java compiler. The SAP adapter runs with JDK 1.2.x and JDK 1.3.x; IBM JDK 1.3 and Sun JDK 1.2.2 are recommended. Add the compiler to your system path before you start Integration Server.

Software Requirements

webMethods Software Requirements

The following table lists the webMethods components you must install before you install the SAP adapter.

Required Components	Version
webMethods Integration Server	4.6
webMethods Developer	4.6 or later

Third-Party Requirements

The following table lists third-party software you must install before you can install the SAP adapter.

Product	Version	Notes
One of the following:		
■ SAP R/3	3.1H or later	
■ mySAP.com license		
One of the following Internet browsers:		
■ Netscape Navigator	4.0 or later	Version 6.2 is recommended.
■ Netscape Communicator	4.0 or later	Version 6.2 is recommended.
■ Microsoft Internet Explorer	4.0 or later	Version 5.0 is recommended.

You can use the SAP database as the Message Store for the SAP adapter. The SAP database is available at <http://www.sapdb.org>.

SAP systems earlier than version 4.0A do not support asynchronous BAPI calls via ALE. If you are using the SAP adapter BAPI browser on a SAP system that is earlier than version 4.0A, you must apply the SAP support package to the SAP system. The support package contains API extensions the SAP adapter needs to retrieve metadata from SAP business objects and ALE services on SAP systems. The API enhances performance of metadata retrieval and allows asynchronous calls to the SAP systems via BAPI interfaces. The package enables the SAP adapter to handle synchronous BAPI calls via XML.

For information on accessing and implementing the SAP support package, see SAP OSS note 214780, available at <http://service.sap.com/notes>.

Hardware Requirements

The SAP adapter has no hardware requirements beyond those of webMethods Integration Server and the SAP server.

Install the webMethods SAP R/3 Adapter

The SAP adapter is delivered to you in a package called SAP. To install the SAP adapter, you must install and configure the SAP package on your Integration Server. (These instructions assume you have already installed Integration Server on your machine.)

Install on a Windows System

- 1 Shut down Integration Server.
- 2 Go to the webMethods software download Web site, download the SAP.zip file, and unzip the file into the *Integration Server_directory*\packages directory.
- 3 Restart Integration Server.
- 4 If you are using a Windows NT or 2000 system and the SAP GUI is installed on your machine, your librfc32.dll file must be Product Version 6.20 or you will experience crashes and other unexpected behavior when accessing the SAP R/3 system. If your librfc32.dll is not Product Version 6.20, follow these steps:
 - a Shut down Integration Server.
 - b Rename the existing librfc32.dll file or copy it to another directory.
 - c Navigate to the *Integration Server_directory*\packages\SAP\code\libs directory and move the librfc32.dll file from that directory to your %SystemRoot%\System32 directory.
 - d Restart Integration Server.
- 5 The SAP adapter supports all SAP character encodings that have an equivalent ISO code page. To enable the SAP adapter to convert characters from the SAP code page to the ISO code page correctly, set the environment variable SAP_CODEPAGE to your local code page.



Note: The JRE bundled with Integration Server supports the use of character sets other than ISO8859-1 (Latin).

Install on a UNIX System

- 1 Shut down Integration Server.
- 2 Go to the webMethods software download Web site, download the SAP.zip file, and unzip the file into the *Integration Server_directory*\packages directory.
- 3 Restart Integration Server.
- 4 Identify the location of the JDK you want the SAP adapter to use by setting the appropriate environment variables, as follows:

a Specify the path to the JDK installation directory; for example, enter:

```
- setenv JDKDIR JDKdirectory
```

b Specify the path to the native thread Java libraries, as follows:

Platform	Example
AIX	- setenv LIBPATH \${JDKDIR}/jre/bin/classic The path to the native thread libraries might vary based on the release of your JDK. The example above is for JRE 1.3.0 IBM build ca130-20010330. For some JDKs, the LIBPATH might not be necessary.
HP-UX	- setenv SHLIB_PATH \${JDKDIR}/lib/PA_RISC/native_threads
Linux	- setenv LD_LIBRARY_PATH \${JDKDIR}/lib/linux/native_threads
Solaris	- setenv LD_LIBRARY_PATH \${JDKDIR}/lib/sparc/native_threads

- 5 Copy the shared, multithreaded C libraries to your Integration Server installation directory as shown below.



Note: If you do not have the C library you need for your UNIX platform, contact webMethods.

Platform	Command
AIX	- cp librfccm.o <i>Integration Server_directory</i> /packages/SAP/code/libs - cp libjRFC12.so <i>Integration Server_directory</i> /packages/SAP/code/libs
HP-UX	- cp librfccm.sl <i>Integration Server_directory</i> /packages/SAP/code/libs - cp libjRFC12.sl <i>Integration Server_directory</i> /packages/SAP/code/libs

Platform	Command
Linux	- cp librfccm.so <i>Integration Server_directory/packages/SAP/code/libs</i> - cp libjRFC12.so <i>Integration Server_directory/packages/SAP/code/libs</i>
Solaris	- cp librfccm.so <i>Integration Server_directory/packages/SAP/code/libs</i> - cp libjRFC12.so <i>Integration Server_directory/packages/SAP/code/libs</i>

- 6 The SAP adapter supports all SAP character encodings that have an equivalent ISO code page. To enable the SAP adapter to convert characters from the SAP code page to the ISO code page correctly, set the environment variable `SAP_CODEPAGE` to your local code page.



Note: The JRE bundled with Integration Server supports the use of character sets other than ISO8859-1 (Latin).

Upgrade the webMethods SAP R/3 Adapter

If you want to migrate configuration data for your SAP systems, listeners, RFC maps, and so on from a previous Integration Server/SAP adapter installation to your new Integration Server/SAP adapter installation, follow these steps:

- 1 Back up the files and directory indicated below.
 - Navigate to the *Integration Server_installation\packages\SAP\config* directory in your previous installation. If the `sap.cnf` and `cbr.cnf` files exist, create backup copies.
 - Navigate to the *Integration Server_installation\packages\WmPartners\config* directory in your previous installation. Create backup copies of the `gateway.cnf`, `xtn.log`, and `xtn_audit.log` files.
 - Create a backup copy of the *Integration Server_installation\packages\WmPartners\pub\mailbox* directory.
- 2 Copy the backed up files and directory to the equivalent locations in your new installation.
- 3 Use Server Administrator's package replication facility to create zip files for any packages from your previous Integration Server installation in which you have generated routing rules or inbound maps. The facility stores the zip files you create in the *Integration Server_installation\replicate\outbound* directory in your previous installation.
- 4 Move the zip files to the *Integration Server_installation\replicate\inbound* directory in your new installation, then use Server Administrator's package installation facility to install them.

Uninstall the webMethods SAP R/3 Adapter

Uninstall the SAP adapter using the package management facility of webMethods Server Administrator. See the *webMethods Integration Server Administrator's Guide* for instructions.

Sizing Your webMethods SAP R/3 Adapter Installation

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Overview

This chapter is for advanced users who are either working with large-scale integration projects or trying to determine whether your hardware setup is sufficient for running the SAP adapter.

See the *webMethods SAP R/3 Adapter User's Guide* for information on RFC Listeners, sessions, and other SAP concepts discussed in this chapter.

CPU Sizing

For detailed information on CPU sizing, see *BC Performance Test* at <http://service.sap.com/sbc-download>. This document helps you to adjust SAP adapter parameters and hardware and operating system parameters to obtain the best performance possible.

To Internet-enable an SAP system, an average PC will be sufficient, while for heavy-load scenarios SAP recommends you use hardware comparable to that of an ordinary ITS.

Disk Space

The average SAP adapter requires the following minimum amount of disk space:

Component	Disk Space (MB)
Basic Installation	80
Customer packages (each)	About 5
Additional packages (BBP and MarketSet)	22
Message Store (1000 ORDERS per day, kept for two weeks)	280
Log files (kept for two weeks)	280
Total	667

To determine the proper amount of disk space for your SAP adapter installation, you must determine what kind of business scenario you want to establish by answering these questions:

- Will you need to do your own development? If so, how big do you expect your scenario to be?

Package	Disk Space
Small	Less than 1MB

Package	Disk Space
Medium	Less than 5MB
Large	10MB

- In what kind of scenario will you be using the SAP adapter?

Package	Disk Space (MG)
Standalone	No further packages needed except the self-developed ones.
BBP Scenario	Allow about about 1.7MB of disk space for the BBP packages.
MarketSet Connect Scenario	Allow about 20MB of disk space for the MarketSet packages.

- What kind of data flow do you expect? What kind of messages (transactions) and or what size? How many messages per day? How long do you want to keep the messages in the SAP adapter Message Store after they are completed (confirmed)?
- Do you need to keep statistical information like that written to the Integration Server audit log and the session log? (See the *webMethods Integration Server Administrator's Guide* for information on Integration Server logs.)

Transaction Store

You must determine how much storage space you need for temporarily stored transactions. Use this formula:

(size of transaction) x (number of transactions per day) x (number of days you want to keep "confirmed" transaction for reference)

You can calculate the size of one transaction as follows:

- 1 Determine the current size of the *Integration Server_directory/packages/WmPartners/pub/mailbox* directory, including its subdirectories.
- 2 Send 100 "typical" transactions that you will be using in production through the SAP adapter.
- 3 Measure the size of the *Integration Server_directory/packages/WmPartners/pub/mailbox* directory again and divide the difference by 100. (A "typical" ORDERS IDoc is between 13KB and 35KB in size).
- 4 Add this number as disk space for the Message Store (the *Integration Server_directory/packages/WmPartners/pub/mailbox* directory). You might want to

schedule the Integration Server service `wm.PartnerMgr.xtn.Sweeper:sweepTRX` to administer the growth of the transaction store.



Note: The SAP adapter always stored the message body in the file system, even if you configure a database as transaction store. If you use a database as your transaction store, the SAP adapter stores the transaction status in the database. If you decide to administer the transaction store manually, then, make sure you maintain the file system as well as the database.

Log Files

The Integration Server log files need additional disk space. If you are going to run the SAP adapter at a high debug level during the implementation and test phase, the adapter could easily write 1GB of data per day. If you are going to run the SAP adapter at a standard debug level of 4 or lower, typical data volumes are between 10KB and 40MB per day, depending on traffic.

Most of the data is consumed by the audit and session logs, which are used for statistical evaluations. You can turn off these logs to save disk space; the SAP adapter then writes only a few KB each day to the error and server logs. However, webMethods does not recommend you turn off the audit and session logs; you will only save a few KB of space at the cost of eliminating all data that would help you determine the cause of errors.

Memory

By default, Integration Server starts with 96MB RAM. After you use this section to calculate the amount of memory your SAP adapter should use, navigate to the *Integration Server_directory/bin* directory, open the `server.bat` or `server.sh` file, modify the setting of the `JAVA_MAX_MEM=96M` parameter, and restart Integration Server.

To determine the proper amount of memory for your SAP adapter installation, answer these questions:

- How many tasks (RFCs, HTTP requests, FTP connections, started Listeners, and RFC Listeners) will Integration Server have to handle simultaneously at the peak time of the day?
- For how many SAP systems will the SAP adapter register an RFC Listener? How many threads do these Listeners have?
- How many messages (XML documents, IDocs, and RFC calls) go through Integration Server simultaneously at the peak time of the day? Is there any expensive mapping to be done?

Integration Server needs about 80MB RAM to start up and just run without any heavy load on it. Depending on the load and expected traffic on Integration Server, you need to add to the amount of memory needed as indicated in the following sections.

Consumption Per Session

Each task Integration Server handles (RFCs, HTTP requests, FTP connections, started Listeners, and RFC Listeners) requires one Integration Server session. If n is the number of sessions, add $\frac{1}{2} n$ MB of RAM. If n proves to be much bigger than 75, use Server Administrator to change the `watt.server.threadPool` parameter so Integration Server can handle more than 75 tasks in parallel. You can also increase the value of the `watt.server.threadPoolMin` parameter to improve performance.

When setting these parameters, be careful to avoid unnecessary memory overload. For example, if you keep a pool of 1000 sessions and Integration Server never really needs more than 100, you will waste both memory and resources.

See the *webMethods Integration Server Administrator's Guide* for information on modifying Integration Server parameters.



Note: The extent to which you can change these parameters depends on your hardware.

Consumption for RFC Listeners

You will need extra memory for every RFC Listener thread. For each Listener thread, add 10MB.

Choose the number of threads for a Listener conservatively; if the number of threads is too high, the SAP adapter consumes a lot of memory and the adapter's performance might slow.

On the other hand, if the number of threads you choose is too small, the SAP system will not be able to send RFCs in parallel and the RFCs will be queued until a SAP adapter thread is free to process them. The SAP system's work processes that are trying to send RFCs become blocked and the SAP system's performance slows down considerably.

To optimize the number of threads, determine the average number of work processes the SAP system will use for sending RFCs.

Payload

Calculate memory for documents that are to be processed simultaneously. Add the following to your memory:

(payload consumption) = (document size x memFactor + RFCSize) x (number of parallel documents)

where

RFCSize = 0, if no RFC is involved in transporting the document.

RFCSize = (1063bytes x number of segments + 524bytes) x number of IDocs in package, if the IDocs are either sent or received via RFC.

memFactor = 3 + number of INVOKE statements in the Mapping Service (if there are mappings done between document formats and different XML dialects) + SSL.

SSL = 0 or 1, according to whether documents are encrypted with SSL or not.

If in doubt, run a few tests and watch how much the memory actually increases during processing of one document.

Example

Suppose your Integration Server is as follows:

- Integration Server handles 1000 ORDERS per day.
- Integration Server has one standard RFC Listener with three threads.
- You expect a peak load of three documents in parallel that result in three parallel sessions. Allow another session for an administrator or developer to log on occasionally. Together with the session created by the RFC Listeners, you need a total of eight parallel Integration Server sessions and 4MB of memory.
- At its peak, Integration Server is to handle three documents in parallel, and the MarketSet Package is doing a bit of mapping when converting the IDoc to xCBL. For a relatively small document of 20KB in a 50 segment IDoc, you need memory consumption of (20KB x 6 + 52.4KB) x 3= 517.2KB. You can round this up to 1MB.

<u>Task</u>	<u>Required RAM (MB)</u>
Server core functionality	80
Sessions	4
RFC Listeners	30
Document processing	1
Total	115

In this example, roughly 128MB of memory for the SAP adapter should be sufficient. Adding a bit for operating system and other tasks, a 256MB machine would be more than adequate.

Performance

This section explains how to improve the performance of your SAP adapter installation.

Audit Logs

If your production scenario involves thousands of service invocations in a short time period, you can improve performance significantly by turning off Integration Server audit logging. To do so, use Server Administrator to set the `watt.server.auditLog` parameter to off.

See the *webMethods Integration Server Administrator's Guide* for information on modifying Integration Server parameters.

Encryption

If you use SSL to encrypt XML documents, the time the SAP adapter needs to process a document will increase by a factor of 3. In this case, you need to take a CPU from the next higher class.

You also have to change the formula for calculating the RAM needed for processing documents; increase *memFactor* by one.

IDoc Packets

You can vastly improve SAP adapter performance by using IDoc Packets of a well-chosen size. If the packet size is too small, you will not be taking full advantage of the performance improvement; if it is too big, Integration Server might run out of memory or start swapping. You will have to do some testing to find the optimum size. The optimum size depends on the IDoc type as well as the size of your machine.

Connection Pool

Count the number of outbound (that is, SAP adapter to SAP system) RFC connections you might need for one SAP system at one time. By default, the RFC connection pool is limited to 10 concurrent connections. If this number of connections is not sufficient, use Server Administrator to increase the setting of the `watt.sap.connection.poolSize` parameter.

See the *webMethods Integration Server Administrator's Guide* for information on modifying Integration Server parameters.

Security

For information on setting up security for the SAP adapter, the *webMethods SAP Adapter 4.6 Security Best Practices Guide*.

For instructions on setting up SSL properties for Integration Server, see the *webMethods Integration Server Administrator's Guide*.

If you want to use private keys and certificates with the SAP adapter, see the *webMethods Certificate Toolkit User's Guide* for instructions on downloading and installing the webMethods Certification Toolkit.

SAP OSS Notes

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SAP OSS Notes

For helpful information on the SAP adapter, see the SAP OSS notes listed below. The notes are available at <http://service.sap.com/notes>.



Note: The OSS notes were written for the SAP Business Connector, but most of them are equally applicable to the webMethods SAP adapter.

Number	Description
309834	General information, LibRFC, platform release
214780	SAP support package
118227	RFC as "Thread safe shared library" under Unix
171356	SAP software on Linux: Essential comments
508129	BC Connector Link from one rec to another doesn't work
484313	Japanese characters are not displayed properly
483296	Supported Codepages in the SAP Business Connector
452610	Using a Database as Message Store in BC 4.0.1
434979	Startup/stop script templates for Unix
388269	Email listener behind firewall causes errors
382897	Problems with mapping to transformFlatToHierarchy
380172	SAP Business Connector: Connection to R/2
379137	Sending IDoc in R/3 terminates with RfcIndirectCall
366842	RFC-XML documents cannot be polled from the portal
356836	Installation of a new SAP Package
314681	IDoc cannot be displayed with "View as"
314679	Calling Inbound/Outbound Map causes crash of BC
314651	Field sequence of a structure is modified
214780	Business Connector and business documents
208106	SAP Business Connector Sizing
206689	Problems when executing a Function Module from the BC
206068	Error when calling a BAPI from the Business Connector
206063	New fix for nonfunctional Loop over R/3 table
205885	Adding a line in a loop leads to n identical lines

Number	Description
205883	FTP Transport in Routing Rule
184071	Workaround for missing SBCHEADER Table
154004	Trace information for RFC via SAP Business Connector
149759	Business Connector - Creating an RFC server

