



Integration Guide for WebSphere Commerce with SAP R/3 using the IBM CrossWorlds System

Version 5.5



Integration Guide for WebSphere Commerce with SAP R/3 using the IBM CrossWorlds System

Version 5.5

Note

Before using this information and the product that it supports, read the information in “Notices” on page 45.

First Edition (August 2003)

This edition applies to IBM WebSphere Commerce Version 5.5 and to all subsequent releases and modifications until otherwise indicated in new editions. Make sure that you are using the correct edition for the level of the product.

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Before you begin

The *Integration Guide for WebSphere® Commerce with SAP® R/3® using the IBM® CrossWorlds® System* is intended for those who want to integrate WebSphere Commerce Version 5.5 to a backend system using the IBM CrossWorlds system. This guide describes how IBM WebSphere Commerce Version 5.5 can be integrated in particular with the SAP R/3 4.6 Enterprise Resource Planning (ERP) system using the CrossWorlds system. The approach described for integrating with SAP R/3 can be used for other backend systems that are supported by the IBM CrossWorlds system. This guide will assist developers and engagement teams developing an integrated solution for any backend system like SAP R/3. Additionally, demonstrators or marketing personnel who want to demonstrate the integration functionality of WebSphere Commerce and CrossWorlds can use this book.

Note: Knowledge of WebSphere Commerce Business Edition 5.5, SAP R/3 Enterprise, and the IBM CrossWorlds system is assumed.

In place of WebSphere Commerce 5.5 Business Edition you can also use WebSphere Commerce 5.5 Professional Edition. This document provides information on how asynchronous and synchronous messages can be exchanged between WebSphere Commerce and SAP through IBM CrossWorlds. It gives an overview of a typical end-to-end flow between the two systems, installation and configuration of the various components, and pointers to the CrossWorlds entities such as maps and collaboration objects.

The samples provided with this reference application are for WebSphere Commerce 5.5, Business Edition. However, the same principal and pattern can apply to WebSphere Commerce 5.5, Professional Edition too.

This guide is divided into the following sections:

Chapter 1. Introduction

A brief overview of the integration of WebSphere Commerce Version 5.5, Business Edition with SAP R/3 using the IBM CrossWorlds system as well as the definition of the terms used in this book, and references to other related documents.

Chapter 2. Prerequisites

Lists the software and hardware pre-requisites for this reference application.

Chapter 3. Integrating WebSphere Commerce business processes with SAP R/3

Describes the asynchronous and synchronous message flow between WebSphere Commerce and SAP through IBM CrossWorlds.

Chapter 4. Installing and configuring

Describes the installation and configuration instructions for the components of this reference application.

Chapter 5. Verification procedure

A list of instructions to verify the synchronous and asynchronous message flows.

Appendix A. Messages integrated for this reference application

A list of the asynchronous and synchronous messages supported by this reference application.

Appendix B. Generic business objects

Contains a list of the generic business objects enabled by this reference application.

Appendix C. Application specific business objects

Contains a list of the application specific business objects (ASBOs) enabled by this reference application.

Appendix D. Collaboration templates

A list of the collaboration templates used by this reference application.

Appendix E. Maps with specific values for WebSphere Commerce and SAP

A list of the hard coded WebSphere Commerce and SAP fields used in the maps provided with this reference application.

Appendix F. Binding maps to business objects

Conventions used in this guide

This guide uses the following conventions:

Boldface type	indicates commands or graphical user interface (GUI) controls such as names of fields, buttons, or menu choices.
<code>monospaced type</code>	indicates examples of text that you enter exactly as shown.
<i>Italic type</i>	is used for emphasis and for variables for which you substitute your own values.

Default paths

This guide uses the following default installation paths:

WC_installdir

This indicates the installation path for WebSphere Commerce. When you see this variable, substitute the installation path for your installation of WebSphere Commerce. For Windows®, substitute C:\IBM\WebSphere\CommerceServer55

WAS_installdir

This indicates the installation path for WebSphere Application Server. When you see this variable, substitute the installation path for your installation of WebSphere Application Server. For Windows, substitute C:\IBM\WebSphere\AppServer

CrossWorlds_installdir

This indicates the installation path for CrossWorlds. When you see this variable, substitute the installation path for your installation of WebSphere Application Server. For Windows, substitute C:\IBM\CrossWorlds

Chapter 1. Introduction

This chapter gives an overview of the integration of WebSphere Commerce 5.5, Business Edition with SAP R/3 using the IBM CrossWorlds system. It defines the terms used in this book and provides references to other related sources of information.

Terminology

The following terms are used in this guide:

Intermediate Documents (IDocs)

Intermediate Documents (IDocs) are used to exchange data between R/3, and non-SAP systems. It is the document format that the SAP R/3 system understands.

BAPI BAPIs (Business Application Programming Interfaces) are open business-oriented programming interfaces that can be used by external systems to access business processes and data in the SAP R/3 system.

Reference data

Reference data is a sample set of products and items included in the reference application that can be used for demonstrations. It is included as part of the sample store, and also as a delimited file that can be loaded onto the SAP R/3 system.

Note: In this guide, the following are used interchangeably:

- WebSphere Commerce and WebSphere Commerce Business Edition
- WebSphere Business Integration Adapter for SAP R/3 and adapter for SAP R/3
- CrossWorlds and IBM CrossWorlds
- SAP and SAP R/3

Overview

As companies use the Internet to open their enterprises to customers, partners, and suppliers, for greater efficiency and productivity such as linking a purchasing department to outside vendors or adjusting inventory levels to match the latest customer buying patterns, they encounter layers of different enterprise systems that have been purchased over time, many of which are unable to operate together.

This reference application is designed to address one such integration process. It integrates SAP R/3 core business processes with the WebSphere Commerce sell-side solution, using the IBM CrossWorlds capabilities. This application provides the e-commerce functionality of WebSphere Commerce, along with the ERP functionality of the SAP R/3 enterprise system as the supplier and fulfillment center. This solution allows you to build, deploy and integrate high-performance Web sites with advanced e-business features using open standards.

WebSphere Commerce also extends the scope of enterprise applications such as SAP R/3 by providing a reliable, scalable, and open-standards based commerce front-end. For example, an organization using SAP R/3 for enterprise functions, when integrated with WebSphere Commerce, can easily add the Internet as a new

sales channel for its products and services. In the scenario described below, the WebSphere Commerce server sell-side is an e-commerce Web front-end to the SAP R/3 enterprise system.

The IBM CrossWorlds system's distributed hub-and-spoke architecture offers process reference applications that automates and streamlines business processes, sophisticated business object management, inter-applications connectivity, and data integration. CrossWorlds with its dynamic configuration capability automatically propagates to the respective adapters or components. CrossWorlds application connectors provide swift integration to packaged, legacy, and mainframe applications as well as e-business enabling technologies.

Business scenario-integration with the seller's backend system

WebSphere Commerce contains information about the products and services of the seller, and the profile and registration information of the customers. WebSphere Commerce processes the buyer's requests, such as placing an order, modifying profile information, checking availability and querying for the status of orders. SAP contains information about the seller's products and fulfillment status. As a result, information will be exchanged between WebSphere Commerce and SAP R/3. The new customers created and material data in the SAP system will be uploaded onto WebSphere Commerce on a regular basis. The nature of transactions in this scenario allows WebSphere Commerce to be updated with material and customer data in the SAP system, and alternatively, SAP to be notified of the buyer's requests in WebSphere Commerce.

Extensibility

This reference application consists of two parts: Integrating WebSphere Commerce with IBM CrossWorlds and integrating IBM CrossWorlds with the SAP backend system.

This reference application can be easily extended to integrate WebSphere Commerce with other backend systems. All that is required is to modify the CrossWorlds maps and connector configuration, specific to the system that is used to connect to your backend system.

Business models enabled

In this integration, WebSphere Commerce provides an e-commerce front-end Internet sales channel to the SAP R/3 enterprise system. Any customer registered with the SAP system can use WebSphere Commerce as the front end to browse and shop for products that are loaded from SAP onto the WebSphere Commerce site.

Using this capability, buyers in any part of the world can shop online for products using the online stores and catalog display functionality provided by WebSphere Commerce. From the WebSphere Commerce site, buyers can place orders, check the price and availability, query for the status of their orders and other relevant information that is present in the SAP system. This synchronization is possible by the initial upload of material data from SAP to WebSphere Commerce; see, "Loading sample store data onto SAP" on page 15. Connectivity in the current implementation enables customer data, material data, and order status from SAP to be updated in WebSphere Commerce through a set of messages. Integrating WebSphere Commerce to an SAP backend system allows sellers to use the WebSphere Commerce rich functionality in personalization, marketing,

merchandising, product management, and user management to provide robust Internet selling sites for B2B direct and consumer direct clients.

Benefits

The following are the benefits of integrating WebSphere Commerce with SAP R/3 using the IBM CrossWorlds system:

- Create channel specific business processes in WebSphere Commerce and change them rapidly without having to change the backend system.
- Easily and quickly add a new Internet sales channel to the enterprise backend system.
- Develop Web channel specific processes that augment the backend process in a flexible manner, adding and collecting data specific for the Web channel without changes in the backend system. This allows more dynamic changes in the Web channel process without any impacts on the backend system. Additional product information such as long or short descriptions, which is not included in SAP, can be added in WebSphere Commerce. This information may be required for specific uses in a Web channel.
- Use WebSphere Commerce as a Web channel to enable customers to integrate SAP and other backend systems providing a single Web channel integrated business process.
- Provide customers with access to Web site functions such as browsing catalogs, placing orders, and making online payments.
- Create online catalogs in WebSphere Commerce from SAP materials.
- Provide multicultural support and personalized content based on profile, history, demographics, and other factors. Synchronize product and customer information between the front end and back end systems.
- Create orders in WebSphere Commerce and send the orders to SAP for order processing and fulfillment. Check the status of the order with SAP from the WebSphere Commerce site.
- Leverage the complex business processes supported by the SAP enterprise system.
- Create commerce sites leveraging WebSphere Commerce product management, customer management, personalization, and merchandising capabilities.
- Manage complex relationships between buyers and sellers, organizations and sub organizations, which helps strengthen relationships with customers, partners, and suppliers.
- Provide highly scalable commerce storefront capabilities utilizing information from a SAP backend system while limiting the load on the SAP system.
- Provide operational and business analytical information based on site statistics, usage scenarios, campaign effectiveness, demographics, and other factors.

Functionality

This reference application provides the following functionality:

- **Order creation:** Buyers can create orders in WebSphere Commerce and the details of the order are sent to SAP in the IDoc format for further processing.
- **Order status:** Whenever there is a change in the status of an order, a message conveying the same can be triggered from SAP and sent to WebSphere Commerce. The three order status messages supported are:
 - Order Confirmation
 - Order Delivery

- Order Invoice
- **Customer creation:** When new customers are created in SAP, the details can be registered in WebSphere Commerce by sending the CustomerCreate message from SAP to WebSphere Commerce.
- **Customer update:** When existing customer information is updated in SAP the changes can be updated in WebSphere Commerce using the CustomerUpdate message.
- **Product price update:** Changes in product prices in SAP can be communicated to WebSphere Commerce using the ProductPriceUpdate message.
- **Product inventory update:** Changes in product inventory in SAP can be sent to WebSphere Commerce using the ProductInventoryUpdate message.
- **Checking the inventory availability:** This message is used to check the inventory availability of a particular product in SAP from WebSphere Commerce using the CheckInventoryAvailabilityBE message.

References

Apart from this guide, the following reference documents are available with their respective products:

- Messaging system information related to the WebSphere Commerce Business Edition can be found in the product documentation at http://www.ibm.com/software/webservers/commerce/wc_be/
- For SAP R/3 documentation refer to <http://help.sap.com>.
- For IBM CrossWorlds documentation refer to <http://www.ibm.com/software/websphere/crossworlds/library/doc/v411/welcome.html>
- For WebSphere MQ documentation refer to <http://www.ibm.com/software/ts/mqseries/messaging>

Chapter 2. Prerequisites

This section covers the software and hardware prerequisites for this reference application. This reference application assumes a Windows operating environment.

Software prerequisites

The software prerequisites include:

WebSphere Commerce 5.5

WebSphere Commerce 5.5, Business Edition is an e-commerce software that has various subsystems. The messaging system gives WebSphere Commerce the ability to communicate with an external environment. This communication includes sending and receiving messages to and from backend systems. This is achieved through the following components:

- A listener for WebSphere MQ to process inbound requests.
- An adapter for WebSphere MQ for outbound requests to allow you to integrate with backend and external systems.
- The adapter for CrossWorlds allows an external process to execute collaborations inside the CrossWorlds InterChange Server. With this adapter, WebSphere Commerce can integrate with external systems by sending synchronous messages.

WebSphere MQ 5.3

WebSphere MQ (formerly MQSeries®) is used as the transport middleware to communicate with various external systems, including CrossWorlds. Refer to the *WebSphere Commerce Additional Software Guide* for information on setting up WebSphere MQ for WebSphere Commerce.

SAP R/3 4.6

This is an ERP system that contains the master data such as catalog and customer information. WebSphere Commerce Business Edition provides the e-commerce functionality. The SAP system interacts with external applications by exchanging information in the form of messages. It generates IDocs to be used by external applications and accepts IDocs or BAPI requests from other applications to be processed by the SAP R/3 system.

IBM CrossWorlds 4.1.1

The IBM CrossWorlds system is a suite of software integration products that include prebuilt modules for common business integration requirements, and development and management tools. These products supply connectivity for leading e-business technologies and enterprise applications. This reference application uses the complete IBM CrossWorlds setup, which includes the CrossWorlds ICS (InterChange Server) and WebSphere Business Integration Adapter for SAP R/3. For more information refer to the documentation that comes with the product.

WebSphere Business Integration Adapters 2.2 for WebSphere Commerce

The connector component of the IBM WebSphere Business Integration Adapter for WebSphere Commerce enables the IBM CrossWorlds InterChange Server (ICS) to exchange messages with WebSphere

Commerce Business Edition. You need to install the adapter for WebSphere Commerce for IBM CrossWorlds 4.1.1. For more information refer to the IBM CrossWorlds documentation.

Hardware prerequisites

For information on hardware prerequisites, refer to the documentation that comes with the appropriate software.

Chapter 3. Integrating WebSphere Commerce business processes with SAP R/3

This section describes the flow for the outbound messages from WebSphere Commerce and inbound messages to WebSphere Commerce that allow integration of WebSphere Commerce business processes with SAP R/3. It explains how messages are used to transport information through various components of this reference application.

WebSphere Commerce outbound process

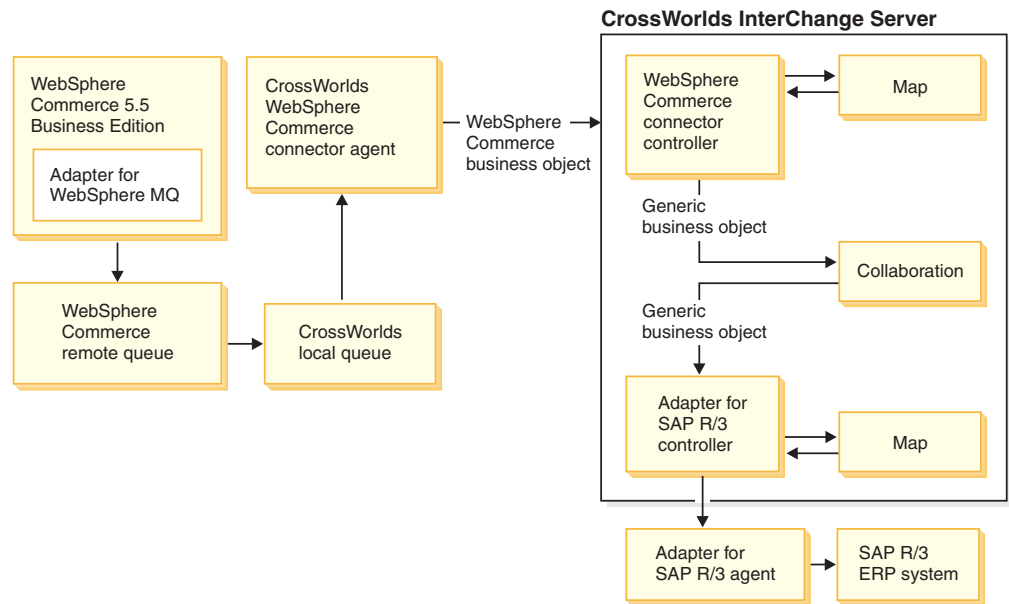
Transactions in WebSphere Commerce can trigger messages to be sent to other applications through the WebSphere Commerce messaging system. In this reference application, the OrderCreate XML message can be generated from WebSphere Commerce to create an order in a backend system.

In this reference application, when an order is created in WebSphere Commerce, it can be configured such that the order related information is sent to another system for further processing like fulfillment. Orders are sent through XML messages from WebSphere Commerce to CrossWorlds. The CrossWorlds system processes this XML message and sends it to other systems like SAP through the application connectors.

When you place an order in WebSphere Commerce:

1. The OrderCreate message in XML format is generated and placed in the WebSphere Commerce remote queue (MQSeries queue) as shown in Figure 1 on page 8
2. The CrossWorlds WebSphere Commerce connector agent constantly polls for new messages in its input queue, which it passes to the WebSphere Commerce connector controller.
3. The controller receives the WebSphere Commerce specific business objects from the XML data handlers and invokes the maps that are bound to generate the GBOs (generic business objects).
4. The GBOs are passed to the corresponding collaboration object, which processes them.
5. The processed generic business objects are sent to the adapter for SAP R/3 controller, which uses the maps to create SAP specific business objects and passes them to the adapter for SAP R/3 agent in SAP specific format.
6. The adapter for SAP R/3 agent sends the message to the SAP R/3 system, to create the order. Similar flows apply to other ERP systems.

Figure 1. Asynchronous message flow from WebSphere Commerce



WebSphere Commerce inbound process

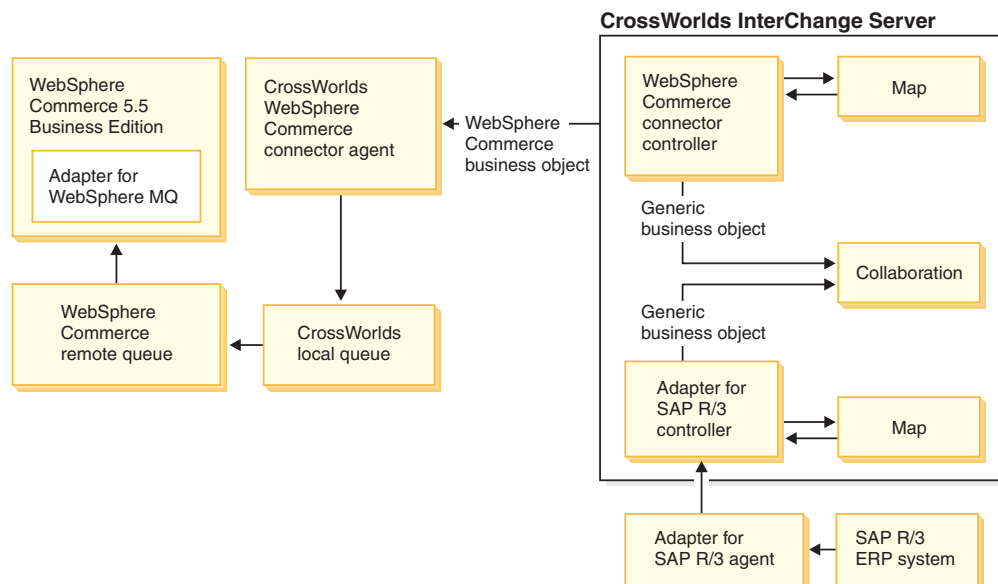
WebSphere Commerce supports processing message requests to invoke certain business logic. In this solution, the existing WebSphere Commerce messages are used to invoke business logic triggered by SAP R/3 processing.

During business processing in SAP, you can configure SAP to generate messages that will update WebSphere Commerce.

The WebSphere Commerce inbound process involves the following:

1. The CrossWorlds WebSphere Business Integration Adapter for SAP R/3 agent polls for messages, receives and forwards them to the adapter for SAP R/3 controller as shown in Figure 2 on page 9.
2. The controller receives the messages and invokes the maps to convert the SAP business objects to generic business objects that will be processed by the collaboration object.
3. The controller then passes the application specific business objects to the WebSphere Commerce connector agent, which in turn sends the corresponding XML message to WebSphere Commerce.

Figure 2. Asynchronous message flow into WebSphere Commerce



WebSphere Commerce request/reply process

The WebSphere Commerce messaging system allows business logic to initiate request/reply interactions with other systems when information is required in real time from external systems. In this example, the check product availability interface for external systems is used in combination with the WebSphere Commerce adapter for CrossWorlds to receive information about the availability of products from SAP R/3. This model can be used to initiate other interactions with external systems linked to the CrossWorlds system. This reference application supports the CheckInventoryAvailabilityBE synchronous message flow; see Figure 3 on page 10

Sending a request

During normal order processing, WebSphere Commerce checks for the availability of products. When you use the interface for checking product availability in an external system like SAP from WebSphere Commerce, the following takes place:

1. An XML message is generated and passed to the CrossWorlds adapter in WebSphere Commerce.
2. The CrossWorlds adapter sends the message to the Server Access Interface (SAI) in the CrossWorlds system.
3. The SAI invokes the data handler to generate the WebSphere Commerce specific business object.
4. This business object is passed to the subscribed map that generates the GBOs.
5. The GBOs are passed to the collaboration object specified in the CrossWorlds adapter configuration properties.
6. The collaboration object processes the business object.
7. The processed generic business objects are then sent to the Adapter for SAP R/3 controller, which invokes the related maps to create the SAP specific business objects and passes them to the adapter for SAP R/3 agent.

8. The adapter for SAP R/3 agent makes the Material Availability BAPI call using the application specific business objects to the SAP R/3 system.

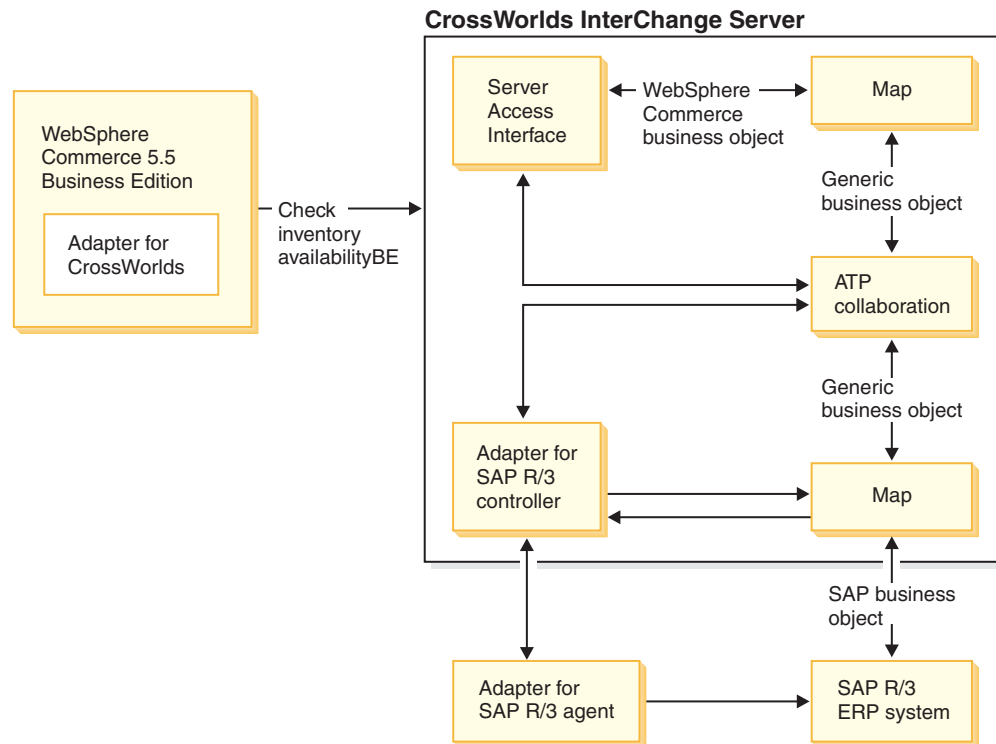
Receiving a response

The SAP system responds with the status of the inventory availability that reaches the adapter for SAP R/3 agent. Receiving a response involves the following:

1. The adapter for SAP R/3 agent receives the message and generates the application specific business objects.
2. The connector agent sends the business objects to the adapter for SAP R/3 controller.
3. The controller invokes the maps to convert the SAP business objects to generic business objects.
4. The controller then passes the generic business objects to the collaboration object, which processes the business objects and sends the processed business objects to the CrossWorlds SAI.
5. The SAI then generates the XML message, using data handlers, and responds to the transport adapter in WebSphere Commerce.

This model can be used for other request/reply interfaces initiated from WebSphere Commerce

Figure 3. Request/reply message flow from WebSphere Commerce to SAP



Chapter 4. Installing and configuring

To enable the WebSphere Commerce Business Edition-SAP integration using CrossWorlds, you must perform the following activities:

- Install and configure WebSphere Commerce 5.5, Business Edition.
- Install and configure WebSphere MQ.
- Configure the WebSphere Commerce messaging system.
- Publish the customized CWSAPToolTech business direct store.
- Synchronize product data between WebSphere Commerce and SAP.
- Install and configure IBM CrossWorlds.
- Configure the SAP R/3 system.
- Load sample store data onto SAP.

Sample topology

Before you begin your installation you must decide on the hardware topology for this reference application. The following is the sample topology used for this integration:

Table 1. Sample topology

Machine 1	Machine 2
WebSphere Commerce 5.5 Business Edition	IBM CrossWorlds
WebSphere MQ 5.3	WebSphere MQ 5.3
	WebSphere Business Integration adapter for SAP R/3 agent
	WebSphere Commerce connector agent

Installing and configuring WebSphere Commerce

Install WebSphere Commerce 5.5, Business Edition. Refer to the *WebSphere Commerce Installation Guide* for the installation instructions and the post-install configuration. The WebSphere Commerce messaging system is equipped to handle messages to interact with backend systems.

You must update the CMDREG table, which is the command registry table in your WebSphere Commerce database to use the XML message format.

To enable the Report_NC_PurchaseOrder message, which is the OrderCreate XML message, update the CMDREG table using the following SQL statement:

```
update cmdreg set classname =  
'com.ibm.commerce.messaging.commands.SendXMLOrderCmdImpl'  
where interfacename = 'com.ibm.commerce.order.commands.OrderMessagingCmd'
```

Note: The above commands will take effect only after restarting the server or refreshing the registry using the WebSphere Commerce Administration Console.

Installing and configuring WebSphere MQ

Install WebSphere MQ 5.3 using the documentation provided with the WebSphere MQ product.

To configure WebSphere MQ to work with WebSphere Commerce, WebSphere Commerce requires a queue manager and a minimum of five queues for integration. The five queues include:

Table 2. Queues

Queue	Queue description
Error	Default error queue. Collects erratic inbound messages.
Inbound	Used by SendReceiveImmediate mode of the adapter for WebSphere MQ.
Parallel inbound	Any message arrive at this queue will be processed in parallel manner.
Serial inbound	Any message arrive at this queue will be processed in serial manner based on first-in-first-out.
Outbound	Used for WebSphere Commerce initiated outbound messages and reply messages from WebSphere Commerce.

This reference application uses the following:

- A queue manager
- Serial inbound queue
- Outbound queue

For instructions on creating a queue manager and queues, refer to the WebSphere MQ documentation.

For the sample topology provided, your outbound queue must be created as a remote queue to enable communication with the remote CrossWorlds System.

The serial inbound queue must be created as a local queue to receive messages from the CrossWorlds system.

Similarly, you must create a queue manager and queues for the CrossWorlds system. The queues required to communicate with the WebSphere Commerce messaging system components are:

- A local queue definition, for processing the messages coming from the WebSphere Commerce system.
- A remote queue definition that will be mapped to the WebSphere Commerce serial inbound queue. This queue will send messages to the WebSphere Commerce system.

The following table shows how the queues must be mapped between WebSphere Commerce and CrossWorlds:

Table 3. Mapping queues between WebSphere Commerce and CrossWorlds

WebSphere Commerce	CrossWorlds
Outbound queue (remote queue)	ICS_Inbound queue (local queue)
Serial inbound queue (local queue)	ICS_Outbound queue (remote queue)

Additionally, you need to create MQ channels for communication between the two WebSphere MQ servers. See, “Installing and configuring WebSphere MQ” on page 12. For more information refer to WebSphere MQ documentation on inter-communication.

After you create the queues, follow the instructions given in the WebSphere MQ section from the *WebSphere Commerce Additional Software Guide*. The instructions include information on how to use WebSphere Commerce and WebSphere Application Server with WebSphere MQ.

Configuring the WebSphere Commerce messaging system

Configuring the WebSphere Commerce messaging system involves:

1. Ensure that you have completed the steps in “Installing and configuring WebSphere MQ” on page 12.
2. Start the WebSphere Commerce Administration Console. Login as a Site Administrator, go to the Configuration section and choose the Transport option. Select WebSphere MQ as your transport and change the status to active.
3. Log out from the Administration Console.

Note: When you complete publishing the store as described in *Publishing the store*, log into the WebSphere Commerce Administration Console as a Store Administrator and select the CWSAPToolTech store. From the **Configuration** section add **MQ Transport** to the store.

Publishing the CWSAPToolTech store

This section covers the following:

1. Instructions required before you publish the CWSAPToolTech store.
2. Publishing the CWSAPToolTech store

Before publishing the store

Before publishing the store unzip CWSAPToolTechStore.zip present in the WCBE-CrossWorlds-SAP_Integration.zip into any directory.

Note: For information on the directory structure, refer to the readme.txt that comes with the integration package that you have downloaded.

Populating the units of measure

This reference application provides a massloadable XML file to upload all the units of measures defined in SAP to WebSphere Commerce. Complete the following on the machine where you have installed WebSphere Commerce:

1. Edit the ImportUOM.bat from the \store\uom directory, in a text editor and change the class paths and database information in accordance with your WebSphere Commerce installation. Save this file.
2. From a DB2[®] command window, go to the \store\uom directory and run the following command:

```
ImportUOM -infile UnitOfMeasure.xml -method sqlimport
```

This populates the unit of measures in the WebSphere Commerce tables according to the standard SAP R/3 installation. The UnitOfMeasure.xml file is present in the \store\uom directory.

Populating the state codes

This reference application provides a massloadable XML file to upload all of the state codes defined in SAP for United States of America, Canada, and Japan to WebSphere Commerce. To populate the state codes, do the following on the machine where you have installed WebSphere Commerce:

1. Open the file `StateCodes.xml` from `\store\statecode` directory in an editor and populate it with the appropriate state codes used in your SAP R/3 installation. Save the changes.

Note: This step is required only if you want to add new state codes for other countries or modify the state codes provided in the `StateCodes.xml` file.

2. Open the file `ImportStateCode.bat` from the `\store\statecode` directory in an editor and change the class paths, and database information in accordance with your WebSphere Commerce installation. Save this file and execute it from a DB2 command window as shown below:

```
ImportStateCode -infile StateCodes.xml -method sqlimport
```

3. This uploads the state codes to WebSphere Commerce according to your SAP R/3 installation.

Publishing the store

The `CWSAPToolTech.sar` provided with this solution uses WebSphere Commerce Payments. For details about installing and configuring WebSphere Commerce Payments refer to the *WebSphere Commerce Installation Guide*.

Creating a new store

The `CWSAPToolTech.sar` file is present in the `\store` directory. This store archive file is built on top of the business direct store model that comes as part of the WebSphere Commerce Business Edition standard installation.

To enable the store model do the following:

1. Copy the `CWSAPToolTech.sar` file and `Feature_cwsaptooltech_en_US.html` from the `\store` directory, to `WC_installdir/samplestores/BusinessDirect` folder.
2. Edit `WC_installdir/xml/tools/devtools/SARRegistry.xml` to add the following lines before `<SAR-properties>` and save the file:

```
<SampleSAR fileName="CWSAPToolTech.sar" relativePath="BusinessDirect">
<html locale="en_US"
featureFile="BusinessDirect/Feature_cwsaptooltech_en_US.html"
sampleSite="BusinessDirect/preview/en_US/index.html"/>
</SampleSAR>
```

3. Launch the Administration Console for publishing this store. In the Store Archives page select the `.sar` file created in the previous step and click **Publish**. It may take a few minutes to complete publishing the `.sar` file. When complete, the status changes from **Publishing** to **Publishing completed successfully**.

Configuring the SAP R/3 system

This section covers how to configure the SAP R/3 system for this reference application. Typically, a SAP consultant configures the various settings. The information provided here is a quick reference to the different configurations required in the SAP R/3 system.

For more information on how to configure each of the following, refer to the SAP documentation or the SAP online help:

Defining an organization structure:

or this integration, you can use your existing organization structure or create a new one. Some of the required entities are Company code, Controlling Area, Plant, Storage location, sales area, and shipping point.

Customizing master data

Create a new account group and make the REGION and TERMS OF PAYMENT fields mandatory. In addition, assign the sold-to party, ship-to party, bill-to party, and payer partner functions to the new account group.

Configuring price, freight, and tax

Create the necessary condition tables, condition records, and access sequences for price, freight, and tax calculation.

Customizing order numbers

You must customize the corresponding field in SAP to store and send the WebSphere Commerce order number in the order status messages, for example, SISCO01, SISDEL01, and SISINV01 IDocs.

Configuring partner profile communication

Configure the partner profile communication to enable the SAP ALE layer to communicate with the external system; send and receive requests from the WebSphere Business Integration Adapter for SAP R/3. The configurations include defining logical systems, RFC destination, maintaining partner profiles, creating and assigning message types, and enabling change pointers

Synchronizing product data between WebSphere Commerce and SAP

To synchronize product data between WebSphere Commerce and SAP after you complete publishing the store and configuring SAP, you can do one of the following:

- Load the material data from the SAP system onto WebSphere Commerce. This involves synchronizing the material data in the WebSphere Commerce and the SAP systems. See, "Loading sample store data onto SAP."
- Load the reference data provided with the sample CWSAPToolTech store onto the SAP system. See, "Loading sample store data onto SAP."

Loading sample store data onto SAP

To demonstrate this integration you can also use the reference data provided with this reference application. A portion of the sample store model items is packaged as reference data. You must import this data into the SAP R/3 system. This allows the synchronization of WebSphere Commerce and SAP R/3 material data.

BDC_MaterialInput.txt in the store\data\load\referencedata directory contains the material reference data that you must load onto SAP using a Batch Data Conversion (BDC) program in the following format:

Note: The prerequisite to load material data is to define the material groups in the SAP R/3 system. Use "SAP Customizing" to do this.

Table 4. Material reference data

Serial number	Description	Data element as in SAP	Length	Depends on existent SAP configurations and data

Table 4. Material reference data (continued)

1	Material Number	MATNR	18	No
2	Industry Sector	MBRSH	1	Yes
3	Material Type	MTART	4	Yes
4	Plant	WERKS	4	Yes
5	Sales Organization	VKORG	4	Yes
6	Distribution Channel	VTWEG	2	Yes
7	Material Description	MAKTX	40	No
8	Unit of Measure	MEINS	3	Yes
9	Material Group	MATKL	9	Yes, you need to define this using SAP customizing
10	General item Category Group	MTPOS_MARA	4	Yes
11	Gross Weight	BRGEW	17	No
12	Weight Unit	GEWEI	3	Yes
13	Net Weight	NTGEW	17	No
14	Size/Dimensions	GROES	32	No
15	Description Language	DESC_LANGU_GDTEXT	18	Yes
16	Document Number	ZEINR	22	No
17	Class Type	KLART	3	Yes
18	Class Number	CLASS	18	Yes
19	Cash Discount Indicator	SKTOF	1	No
20	First Entry Displayed	PAGPOS	3	No
21	Delivering Plant	DWERK	4	Yes
22	Item Category Group from Mat master	MPOS	4	Yes
23	Checking Group for Availability Check	MTVFP	2	Yes
24	Transport Group	TRAGR	4	Yes
25	Loading Group	LADGR	4	Yes
26	MRP Type	DISMM	2	Yes
27	MRP Controller	DISPO	3	Yes
28	Lot Size	DISLS	2	No
29	Procurement Type	BESKZ	1	Yes
30	In-house Production Line	DZEIT	3	No
31	Scheduling Margin Key for Floats	FHORI	3	Yes
32	Period Indicator	PERKZ	1	No
33	Planning Strategy group	STRGR	2	No

Table 4. Material reference data (continued)

34	Total Replenishment Lead time	WZEIT	3	No
35	Valuation Class	BKLAS	4	Yes
36	Price Control Indicator	VPRSV	1	No
37	Price Unit	PEINH	6	No
38	Standard Price	STRPS	18	No

BDC_SellingPriceInput.txt in the store\dataload\referencedata directory contains the standard price for material reference data that you must load onto SAP using a BDC program in the following format:

Note: The prerequisite to load this data is to define the price condition in SAP system.

Table 5. Standard price for material reference

Serial number	Description	Data element as in SAP	Length	Depends on existent SAP configurations and data
1	Pricing Condition Type	KSCHL	4	Yes
2	Material Number	MATNR	18	No
3	Material Selling Price	KBETR	16	No
4	Currency	KONWA	5	No

To import reference data into SAP as a batch process from the input file, you need a BDC program. This program requires you to record the transaction to load the data. To do this, use transaction SHDB and do the following:

1. Using the SAP client, from the SAP Easy Access screen go to SHDB transaction and enter the record name. Follow the on screen instructions to record the MM01 transaction and then record the VK12 transaction.
2. Based on the values in your SAP installation, make the necessary changes to the data in the reference data files before importing.
3. Use transaction SE38 to execute the recorded programs.
4. After loading the reference data, you have to create the inventory records before placing any orders for these materials.

Loading material data

To load the material data onto WebSphere Commerce using the massload scripts provided, ensure that you extract the material data from the SAP R/3 system in the following sequence with a delimiter. The delimiter expected by the massload script is "~". If you are using a different delimiter, you need to change this in the import schema files provided with this reference application.

Note: The sample store provided with this reference application includes the reference data. The instructions mentioned here apply only if you want to import any other materials that exist in your SAP system.

Table 6. Sequence to extract material data from SAP

Sequence number	Data at position	Data description	Corresponding fields in SAP
1	MaterialPartNumber	Part number of the material	MARA-MATNR (Mandatory)
2	MaterialGroupPartNumber	Part number of the material group	MARA-MATKL (Mandatory)
3	Language	Language specification in SAP. An example of language specification in WCS is en_US, for English.	T002T-SPTXT (Mandatory)
4	MaterialName	Name of the material	MAKT-MAKTX (Optional)
5	MaterialShortDescription	Short description of the material	(Optional)
6	MaterialLongDescription	Long description of the material	(Optional)
7	MaterialImageName	Filename of the image/picture of the material.	(Optional)
8	MaterialLastUpdatedOn	Indicates the last time the material was updated.	MARA-LAEDA (Optional)
9	MaterialPrice	Amount of the material price.	MBEW-STPRS (Mandatory)
10	Currency	Currency of the material price.	T001-WAERS (Mandatory)
11	MaterialWeightMeasure	The unit of measurement for weight.	MARA-GEWEI (Optional)
12	MaterialSizeMeasure	The unit of measurement for length, width and height.	MARA-MEABM (Optional)
13	MaterialQuantityMeasure	The unit of measure for nominal quantity.	MARA-MEINS (Mandatory)
14	MaterialWeight	The nominal weight associated with the material	MARA-BRGEW (Optional)
15	MaterialLength	The nominal length associated with the material.	MARA-LAENG (Optional)
16	MaterialWidth	The nominal width associated with the material.	MARA-BREIT (Optional)
17	MaterialHeight	The nominal height associated with the material.	MARA-HOEHE (Optional)

Table 6. Sequence to extract material data from SAP (continued)

18	MaterialNominalQuantity	Nominal quantity for a material, used for pricing. For example, if a material is priced as "3 for a dollar", then the nominal quantity of the material is 3, and the price of the material is one dollar.	MVKE-AUMNG (Mandatory)
19	MaterialDataIndicator	An indicator that specifies whether the data for that material is for CREATE or UPDATE	CDHDR-CHANGE_IND (Mandatory)
20	ManufacturerName	The name of the manufacturer of this material	(Optional)
21	ManufacturerPartNumber	The part number used by the manufacturer to identify this material	(Optional)

The attributes information for items in WebSphere Commerce is optional. You can load the materials without attributes. If you are loading the attributes for materials, then extract the characteristics information for these materials in the following format with the delimiter "~". If you are using a different delimiter, you need to change this in the import schema files provided with this reference application.

Table 7. Format to extract material attribute information from SAP

Sequence number	Data at position	Data description	Corresponding fields in SAP
1	MaterialPartNumber	Part number of the material	AUSP-OBJEK (Mandatory)
2	MaterialGroupPartNumber	Part number of the AUSP-KLART (Mandatory) material group	MARA-MATKL (Mandatory)
3	MaterialCharacteristicName	Name given to the material characteristic.	CABN-ATNAM (Mandatory)
4	MaterialCharacteristicValue	Value of the respective material characteristic name Language specification in SAP.	AUSP-ATWRT (Mandatory)
5	Language	An example of language specification in WCS is en_US, for English.	T002T-SPTXT (Mandatory)

To upload material data in the specified format do the following:

1. Use SAP transaction SE38 to execute the ABAP programs written to extract the material information and material characteristics (optional) from SAP. Move the extracted files into the \store\dataload\material directory.
2. Open ManifestFile.txt from the \store\dataload\material directory, and replace itabmara.txt with the output file name derived from the material information extract program. Replace itab.txt with the output file name derived from the

material characteristics extract program. If the program for material characteristics is not executed then delete the following lines:

```
itab.txt,Import_cif_Schema10.xml,Output.xml,Append  
itab.txt,Import_cif_Schema11.xml,Output.xml,Append
```

Note: For information on the directory structure, refer to the readme.txt in WCBE-CrossWorlds-SAP_Integration.zip.

3. Save and close this file.
4. Open the batch file MaterialUpload.bat from the \store\dataload\material directory, in an editor and change the following parameters in accordance with your WebSphere Commerce installation:
 - *DB_NAME*—The type of database, which is DB2 in this case.
 - *WCS_DBNAME* —WebSphere Commerce instance database name, for example, mall.
 - *WCS_DBUSER*—Database user ID.
 - *WCS_DBPWD*—Database user password.
5. Edit the following line to include your commerce installation path:
WC_installdir\bin\setenv.bat
6. Change the following literal in accordance with your installation. For example,
set DB2_HOME=D:\Websphere\sqllib
7. Change the parameter values passed to the XMLTransformer according to your installation. You can find the values for these parameters in the WebSphere Commerce database tables.
 - *MemberIdValue*—Identifier of the storeowner (ORGENCY.ORGENTY_ID).
 - *TradingPositionName*—Trading position name associated with the store (TRADEPOSCN.NAME).
 - *CatalogName*—Catalog identifier of the store (CATALOG.IDENTIFIER).
 - *ImportLocation* *WC_installdir\schema\xml\wcs.dtd*—This is the location of the wcs.dtd file.
 - *StoreIdentifier*—Identifier of the store published to showcase this reference application (STORE.STORE_ID).
 - *FulfillmentCenterName*—The fulfillment center name that is associated with the store (FFMCENTER.NAME).
8. Save the changes made and run the MaterialUpload.bat batch file from a DB2 command window, on the machine where you have installed WebSphere Commerce.
9. Launch the store and check for the products and items under **SAP Products⇒ SAP Category 1 hierarchy**.

Note: Any item that is not specifically grouped under a product in SAP can be found under the product SAP10001 in the same hierarchy.

When manufacturer details are not present for a product, by default the product takes "SAP Tools" as the manufacturer name and product part number as the manufacturer part number.

When the short description details are not available for a product, by default, the material name is used as the short description.

When massloading the material data, only names of the product images are loaded. To view the product images on the corresponding page of the store you must manually copy the image files into the following directory:

```
WAS_install\installedApps\  
WC_Enterprise_App_instance_name.ear\wcstores.war\store_name\images.
```

Where, *instance_name.ear* is the name of the commerce instance in your installation and *store_name* is the name of the store to which the materials were uploaded.

Store customizations

The following changes are made to the business direct store to achieve the SAP integration functionality:

Reference Data

The catalog related XMLs are modified to populate the reference data. The list of XMLs includes catalog.xml, en_US/catalog.xml, offering.xml, and so on.

Inventory

Storefulfill.xml is modified to populate the inventory details for the reference catalog items.

Store Language

The store.xml is updated to support the English language only. Only en_US locale specific properties are provided for this reference application.

Address page

Modifications to the AddressForm.jsp are made provide a selection box to select the country and state codes. This information is mandatory in SAP for customer registration.

Shoppingcart page

Modifications to the CurrentOrderDisplay.jsp are made to provide selection of order items and a button to check inventory. Another column was added to show the estimated available dates. This column will be blank before the user clicks **Check Availability**. When the user clicks **Check Availability** this column will display the date provided by SAP.

Shipping page

Modifications to BillingShippingDisplay.jsp are made to pass, re-merge, merge, and check parameters.

Order Display Pending and Order Confirmation pages

The OrderSubmitForm.jsp and OrderConfirmation.jsp are modified not to include subtotals, tax, and shipping details.

Track Order Status

Modifications to the OrderStatusDisplay.jsp allows you to retrieve the list of orders confirmed, shipped, or invoiced, based on details available in ORDSTAT and ORDISTAT tables. The possible status values of the orders are: C (Confirmed), S (Shipped), and I (Invoiced). A link is provided for each of the orders in the list to view the detailed order status.

Order Status Details

Modification to OrderDetailDisplay.jsp displays the detailed order status available in the order status tables.

Shipping Modes

Shipping.xml is modified to replace the shipping codes A1, A2, A3 with

BYTRUCK, BYRAIL, BYAIR respectively, and shipping carrier 'XYZ Carrier' with CFR. en_US/Shipping.xml is modified to set the description for the preceding shipping modes to 'CFR-TRUCK', 'CFR-RAIL', and 'CFR-AIR' respectively. The changes to the Shipping.xml are made to match the shipping modes provided by SAP. These shipping modes need be used when placing the order using the default contract. If any other contracts are created, then you can use these shipping modes while defining terms and conditions, otherwise create new shipping modes before they are used in the terms and conditions of the contract. For more details, refer to the WebSphere Commerce documentation.

Installing and configuring CrossWorlds

To install and configure CrossWorlds, refer to the *CrossWorlds System Installation Guide for Windows* provided with the product. In addition to installing the CrossWorlds InterChange Server, installing WebSphere Commerce and WebSphere Business Integration Adapter for SAP R/3 agents are also mandatory for this solution. This reference application supports CrossWorlds 4.1.1

Loading the business object definitions, maps, and collaboration objects

This reference application comes with a set of components such as business object definitions, collaboration objects, and maps for each asynchronous and synchronous message. For the list of application specific business objects, see "Appendix C. Application specific business objects" on page 37. You can obtain these files from <http://www-3.ibm.com/software/integration/wbicollaborations/support/>. Type the search terms "WBI WebSphere Commerce Edition with IBM CrossWorlds" and click Submit. You can download the readme.txt and the WCBE_SAP_CW reference application.

Note: Some of the WebSphere Commerce and SAP system specific fields in the maps are hard coded. See, "Appendix E. Maps with specific values for WebSphere Commerce and SAP" on page 41 for details. You must change these fields according to your WebSphere Commerce and SAP configuration.

The following list of files contains the components that you must load into the CrossWorlds repository:

Table 8. Components to be loaded into the CrossWorlds repository

File name	Remarks
MO_WCSConfig.out	Contains the definition for the WebSphere Commerce connector Meta object
OrderCreate.out	Contains the definition for the collaboration object, business objects, and maps
ProductPriceUpdate.out	Contains the definition for the collaboration object, business objects, and maps
OrderConfirmationStatus.out	Contains the definition for the collaboration object, business objects, and maps
OrderDeliveryStatus.out	Contains the definition for the collaboration object business objects, and maps
OrderBillingStatus.out	Contains the definition for the collaboration object, business objects, and maps

Table 8. Components to be loaded into the CrossWorlds repository (continued)

ProductQuantityUpdate.out	Contains the definition for the collaboration object, business objects, and maps
CustomerCreateUpdate.out	Contains the definition for the collaboration object, business objects, and maps
CheckAvailability.out	Contains the definition for the collaboration object, business objects, and maps

1. Before loading any of the files listed in Table 9, ensure that you copy the files from `crossworlds\message_dir\NativeMapfiles` to `CrossWorlds_install\DLMS\classes\NativeMaps`. Where `message_dir` is the name of the message.
2. Load the `Sap_idoccontrol.out` into the CrossWorlds repository before you load the other flat files. The `Sap_idoccontrol` object is used as a child object in all other SAP specific business objects. Refer to the WebSphere Business Integration Adapter for SAP R/3 document for details about the `SAP_IdocControl` business object definition.
3. The application specific information text and the message type for the supported verbs for SAP specific ASBOs are updated with the appropriate values.

To load the definition files into the repository use the `repos_copy` utility. For example, to load `ProductQuantityUpdate.out`, use the following command:

```
repos_copy -i ProductQuantityUpdate.out -ai -sCrossWorlds -uAdmin -pNull
```

Where, `ProductQuantityUpdate.out` is the business object definition file, in the `crossworlds\ProductQuantityUpdate\repos_copy\`, which is the directory where the definition files are stored.

`CrossWorlds` is the CrossWorlds Interchange Server name, which is `CrossWorlds` in this case.

`Admin` is the user name for the CrossWorlds Interchange Server, which is `admin` in this case.

`Null` is the password for the CrossWorlds Interchange Server, which is `null` in this case.

Note: Repeat executing the `repos_copy` utility for each definition file. You can also import the definitions using the CrossWorlds System Manager (CSM). For more information refer to the CrossWorlds documentation.

MO_WCSCConfig meta object

The WebSphere Commerce connector static meta-object consists of a list of conversion properties defined for all the specific business objects that WebSphere Commerce supports. For this reference application, the meta object is provided in the `crossworlds\WCSCConfig\MO_WCSCConfig.out` file. You must load this meta object into the CrossWorlds repository, and specify the value for the property `ConfigurationMetaObject` as `'MO_WCSCConfig'` in the definition for WebSphere Commerce connector as mentioned in the following section. Open this meta object in the business object designer tool and update the application specific information with the queue manager name that is used in this solution.

Configuring the WebSphere Commerce connector agent

The WebSphere Commerce connector agent allows CrossWorlds collaborations to asynchronously exchange business objects with the WebSphere Commerce Server, which issues and receives messages over its messaging system using WebSphere MQ.

Configuring WebSphere Commerce connector involves setting the values for the generic and agent specific configuration properties. You must provide the following details:

1. Specify the list of generic and application specific business objects supported by the WebSphere Commerce connector. For more information see, “Appendix B. Generic business objects” on page 35 and “Appendix C. Application specific business objects” on page 37 respectively.
2. Specify the MetaConfiguration object used by the WebSphere Commerce connector agent to receive messages for the supported business objects. The value is MO_WCSConfig.

Note: You must load the business objects and other components as specified in the section, “Loading the business object definitions, maps, and collaboration objects” on page 22 before configuring for the connectors.

3. Specify the associated maps with Explicit Binding for the supported business objects. See, “Appendix F. Binding maps to business objects” on page 43 to identify the business objects that require maps to be specified.

4. Set the BO prefix

The application specific business objects for the WebSphere Commerce application are generated with the ‘WCS’ prefix. Ensure that ‘WCS’ is set for the BOPrefix property of the MO_DataHandler_Default object. Use the Business Object Designer tool to navigate to the following object hierarchy:

- MO_DataHandler_Default—The parent business object
- Text.xml—The child object of MO_DataHandler_Default
- BOPrefix—Property name (Set WCS as the value for this property)

For more information on how to configure the WebSphere Commerce connector agent, refer to the *Guide to the IBM WebSphere Business Integration Adapter for WebSphere Commerce Connector Version 2.2.x*

Configuring the WebSphere Business Integration Adapter for SAP R/3 agent

The CrossWorlds connector for SAP R/3 enables the CrossWorlds InterChange Server to exchange business objects with SAP applications. The CrossWorlds SAP business objects are defined in SAP as IDocs. IDocs are part of the Application Link Enabling (ALE) module. The IDoc definitions are stored in the Business Object Repository in SAP. CrossWorlds provides an IDoc Handler that supports business objects developed using IDocs.

To install the adapter for SAP R/3 agent, refer to the *CrossWorlds System Installation Guide for Windows*. The WebSphere Business Integration Adapter for SAP R/3 components can be found in the \connectors\SAP directory.

SAP modules

The three SAP modules used in this reference application include:

- ALE module

- BAPI module
- RFCServer module

To set values to the configuration properties of the WebSphere Business Integration adapter for SAP R/3 refer to the *Guide to the CrossWorlds Connector for SAP R/3 Version 4.x, Connector Version 4.5.x* in the CrossWorlds documentation.

Configuring the adapter for SAP R/3 involves setting the values for the generic and agent specific configuration properties. You must provide the following details:

1. Specify the list of generic and application specific business objects that the adapter for SAP R/3 supports. For more information see, “Appendix B. Generic business objects” on page 35 and “Appendix B. Generic business objects” on page 35 respectively.
2. For the supported business object specify the associated map with the ‘Explicit Binding’ option selected. See, “Appendix F. Binding maps to business objects” on page 43 to identify the business objects that require maps for conversion.
3. To set up the Transaction ID (TID) management, refer to the *Guide to the CrossWorlds Connector for SAP R/3 Version 4.x, Connector Version 4.5.x* in the CrossWorlds documentation. The corresponding objects are provided as part of the WebSphere Business Integration Adapter for SAP R/3 installation.
4. To support the BAPI module, copy the following files from the `crossworlds\CheckAvailability\genfiles` to `CrossWorlds_install\connectors\SAP\Bapi\client`
 - `Bapi_material_availability.java`
 - `Bapi_material_availability.class`

Notes:

1. To support the ALE, BAPI, and RFCServer modules in the adapter for SAP R/3 agent, set the modules property value as ‘ALE, BAPI, RFCServer’ in the adapter for SAP R/3 definition properties.
2. Before connecting to the SAP system, you must configure the RFC Destination with the program ID that you have set in the connector properties. To do this, refer to the *Guide to the CrossWorlds Connector for SAP R/3 Version 4.x, Connector Version 4.5.x* in the CrossWorlds documentation

Port connector

The collaboration ports that are not used in a collaboration object to support a message are bound to the port connector. For details, see “Appendix D. Collaboration templates” on page 39

Creating and configuring the collaboration objects

The collaboration objects associated with the synchronous and asynchronous messages are provided in the definition files listed in Table 9. You must have the corresponding collaboration templates to use these objects.

Before you execute the `CheckInventoryAvailabilityBE` message, modify the ATP collaboration template. This modification enables the ATP collaboration to populate the `ATPLine` business object values. To do this,

1. Open the ATP collaboration template in the process designer.
2. Open Scenarios ⇒ Main ⇒ Sync Logic(9) ⇒ Line Iteration(59) ⇒ Send Verb(299).
3. In the scenarios diagram for send Verb(299), right click the action box with the UID 386 **Create** and select **Properties**.

4. In the Action properties window, comment the following code segment:

```
ToLineBusObj.setKeys(ATPLine);  
Add the following code segment:  
ToLineBusObj.copy(ATPLine);
```

5. Click **Apply**.
6. 6. Save and compile the ATP template.

For the list of collaboration templates and the corresponding binding information, see “Appendix D. Collaboration templates” on page 39.

Loading and starting the maps

Use the maps provided with this solution to transform the application specific business objects to generic business objects and vice versa. See, “Appendix F. Binding maps to business objects” on page 43 for details.

Note: The control segment properties for the SAP IDocs are set in the SAP specific inbound maps, for example, Sap_OrderCreate_Map. You must change these values according to the SAP configuration for partners. Refer to the *Guide to the CrossWorlds Connector for SAP R/3 Version 4.x, Connector Version 4.5.x* in the CrossWorlds documentation. To edit the values, open the SAP specific maps in the Map Designer tools and change them.

Configuring the CrossWorlds queue manager

This reference application requires you to configure a WebSphere MQ Queue Manager and a WebSphere MQ Listener at the CrossWorlds side. Refer to the CrossWorlds documentation for more information.

Enabling asynchronous communication

This section details the steps required for enabling communication between WebSphere Commerce MQSeries and CrossWorlds MQSeries.

Configuring the WebSphere Commerce MQ

Channels are used to communicate between two MQSeries systems. Refer to the MQSeries documentation to create the sender and receiver channels.

Create the sender and receiver channels in the CrossWorlds and the WebSphere Commerce systems using MQSeries Explorer.

The name of the sender channel in CrossWorlds must be identical to the name of the receiver channel in WebSphere Commerce. The name of the receiver channel in CrossWorlds must be identical to the name of the sender channel in WebSphere Commerce.

After you finish configuring the WebSphere Commerce and CrossWorlds MQSeries start the receiver channel and then the sender channel. The status must be “running”.

Configuring the WebSphere Commerce adapter for CrossWorlds

This adapter provides a new transport mechanism for WebSphere Commerce. The adapter for CrossWorlds provides synchronous connectivity to the external systems through the CrossWorlds collaborations utilizing the capabilities of the existing

WebSphere Commerce messaging subsystem. To configure the adapter in WebSphere Commerce, refer to the *WebSphere Commerce Additional Software Guide*.

Enabling the message flow

To enable a synchronous or an asynchronous message flow, do the following:

1. Ensure that the corresponding application specific business objects (for WebSphere Commerce and SAP) and maps are loaded into the CrossWorlds repository. For details, see “Appendix D. Collaboration templates” on page 39.
2. Open the Properties window for the WebSphere Commerce connector. Specify the WebSphere Commerce specific business objects in the Supported Business Objects tab. Select the Agent supported check box for the objects. Specify the related generic business objects. Clear the Agent supported check box. For more details about the supported objects, see “Appendix B. Generic business objects” on page 35. Repeat this step for the adapter for SAP R/3 with the SAP specific business objects.
3. Ensure that the collaboration objects are configured and bound with the appropriate connectors. See, “Appendix D. Collaboration templates” on page 39 for details.
4. Ensure that the business objects and solution specific maps are explicitly bound for the connectors. For details see, “Appendix F. Binding maps to business objects” on page 43.
5. Ensure that the collaborations, connectors, and maps are running.
6. Start the WebSphere Commerce and WebSphere Business Integration adapter for SAP R/3 agents. Initiate the message flow.

You have now completed the following:

- Installing and configuring WebSphere MQ
- Configuring the WebSphere Commerce messaging system
- Publishing the CWSAPToolTech store
- Installing and configuring CrossWorlds
- Configuring the CrossWorlds queue manager
- Configuring the WebSphere Commerce adapter for CrossWorlds
- Enabling the message flow

WebSphere Commerce is now enabled to communicate with CrossWorlds. The CrossWorlds system is configured to connect to your SAP R/3 backend system. You have loaded the business objects, maps and collaboration objects, published the CWSAPToolTech store, and loaded the master data. To test the synchronous and asynchronous message flows see, Chapter 5, “Verification procedure,” on page 29.

Chapter 5. Verification procedure

This chapter provides the procedural details for ensuring the end-to-end flow for each message. Before you begin to verify, confirm that the MQSeries queue manager and the channels are running and are in the active stage. Ensure that the WebSphere Commerce and adapter for SAP R/3 agents are running.

Any errors can be detected in the Interchange system log, adapter for SAP R/3 and WebSphere Commerce connector agent logs or WebSphere Commerce Business Edition logs respectively. In WebSphere Commerce, the logging for the messaging component must be enabled.

Verifying the messages

To verify the messages do the following:

Customer create or update message (DEBMAS05)

To create or update customer information in SAP and sending the inbound message to WebSphere Commerce, do the following:

1. Generate a DEBMAS05 IDOC message by creating a new customer using the SAP transaction xd01 or by changing the details of an existing customer using the SAP transaction xd02.
2. Enter the details for the customer and save the details.
3. Execute SAP transaction se38 to generate the IDoc. Select the program RBDMIDOC and run the program.
4. On the next screen type DEBMAS as the message and run the program. This creates the IDoc but does not dispatch it.
5. To send the IDoc, go to SAP transaction se38 and run the RBDOUTPU program.
6. Select **dispatch** on the next page and run the program.
7. Type DEBMAS05 as the basic type on the next page and run the program. This sends the DEBMAS05 IDoc.
8. To verify whether the IDoc message is sent out of the SAP system, run transaction we02 and check whether the DEBMAS message generated is listed in the outbound list.
9. In WebSphere Commerce, check for the corresponding values in the USERREG, ADDRESS and USERS tables.
10. Log into the CWSAPToolTech store. Select the **Account** and click **Change Personal Information**. Note the change in the address.

CheckInventoryAvailabilityBE request or response message

To check the available inventory for the products in SAP do the following:

1. Log into the WebSphere Commerce store as a customer, using a valid user ID. You can use the logon ID of the customer created in the SAP side as detailed with the previous procedure.
2. Add products to the shopping cart.
3. Select the check box displayed against the products in the shopping cart.
4. Click the **Check Inventory availability** button.

5. The page will be refreshed with the details of available quantity and available dates for the products selected, by sending a request to SAP and updating the results in WebSphere Commerce.

Order create message (ORDERS05)

To create an order in WebSphere Commerce and check whether the order is created and processed correctly in the SAP system, do the following:

1. Ensure that the customer, product, pricing, and inventory data in WebSphere Commerce is consistent with that in the SAP system.
2. Log into the WebSphere Commerce store as a customer, using a valid user ID. You must use the logon ID of the customer created in SAP. After creating the customer in the WebSphere Commerce from SAP, assign the role of Registered Customer to the newly created user. Complete this step before logging into the store.
3. Add products to the shopping cart and submit an order. This must generate the XML order create message. It may take some time to deliver the message, as determined by the scheduler configuration in WebSphere Commerce. By default, the scheduler process for sending messages into WebSphere MQ runs at an interval of five minutes. Note down the created order number in the order Confirmation page.
4. To check, whether the order create XML was successfully parsed, formatted, and sent to the SAP system, run the SAP transaction we02. ORDERS05 IDoc message must be listed in the inbound section.
5. Check the status under which the ORDERS05 is displayed. It should be under status 53, which means order created successfully

Order confirmation status message (SISCSO01)

To check if the order confirmation status message is generated and processed correctly do the following:

1. In response to a successful order creation in SAP, the order confirmation status message is sent automatically by SAP. The IDoc message for this is SISCSO01. The generation of this IDoc message can be verified using SAP transaction we02.
2. Log into the CWSAPToolTech store. Select **Order Status** and look for the order in the Orders Confirmed section.
3. The corresponding order in WebSphere Commerce is set to G in the ORDERS table. The respective entries are made in the ORDSTAT and ORDISTAT tables.

Order delivery status message (SISDEL01)

To generate the order delivery status message for the confirmed order do the following in the SAP system:

1. To create the SISDEL01 IDoc, run SAP transaction va02.
2. Type the order number generated by SAP. This can be obtained from the SISCSO01 IDoc that was generated previously; alternatively you can enter the purchase order number or customer number to search for the orders created.
3. When the Order Details page displays, select **Sales Document - Deliver** from the menu.
4. This process creates the delivery message and sends the IDoc message, unless an error occurs. The SAP client in the error log shows the errors.
5. Log into the CWSAPToolTech store. Select **Order Status** and look for the order in the Orders Shipped section.

6. To verify the status, check the ORDSTAT and ORDISTAT tables in WebSphere Commerce. The status of the corresponding order items must be S.

Note: Note: WebSphere Commerce allows order status messages to be versioned. Depending on the option selected, either the existing status record will be updated or a new record will be added to these tables. By default, the order status header and the order status item are not versioned.

Product inventory update message (INVCON01)

To check if the product inventory update message is generated and processed correctly for a single product, do the following:

1. To generate INVCON01 IDoc, run transaction mb1c.
2. Type the movement type, plant, and storage location details and press F8.
3. Enter the product SKU number and the quantity. This message supports the inventory update of a single product only.
4. To verify in WebSphere Commerce, check the inventory of the ordered material in the INVENTORY table.

Order invoice status message (SISINV01)

To verify the generation of the order invoice status message and process it correctly, do the following:

1. Run the transaction vf01. A page displays asking for the billing type.
2. Select Invoice (F1) from the menu. This automatically retrieves the document number for the delivery created previously.
3. If the document number does not display, then select the document number from the menu. This creates the SISINV01 IDoc.
4. Login to the CWSAPToolTech store. Select **Order Status** and look for the order in the Orders Invoiced section.
5. To verify that the IDoc is created, check the ORDSTAT and ORDISTAT tables in WebSphere Commerce. The status of the corresponding order should be set to 'I'.

Note: WebSphere Commerce allows order status messages to be versioned. Depending on the option selected, either the existing status record will be updated or a new record will be added to these tables. By default, the order status header and the order status item are not versioned.

Product price update message (COND_A02)

To check if the product price update message is generated and processed correctly do the following:

1. To generate the product price update message, run SAP transaction vk12. When prompted for the condition type, enter the appropriate pricing condition you have created.
2. When the transaction runs, you will be asked for the key combination. Based on your preference, select the option. Enter the required fields on the next screen, and execute (F8).
3. In the next screen, change the rate for a WCBE-known material and save the document.
4. Run SAP transaction se38 to generate the IDocs.
5. Type RBDMIDOC as the program name and execute (F8).

6. On the next page, type COND_A as the message type and run the program. This creates the IDoc but the IDoc will not be sent at this stage.
7. To send the IDoc, again go to SAP transaction se38 and run the RBDOUTPU program.
8. Select **dispatch** on the next page and run the program.
9. On the next screen type COND_A02 as the basic type and run the program. This should dispatch the COND_A02 IDOC.
10. Log into the CWSAPToolTech store. Check the price of the order item after adding it to the shopping cart.
11. Verify the change in price by checking the OFFERPRICE and OFFER table in WebSphere Commerce.

Appendix A. Messages integrated for this reference application

This section describes the asynchronous and synchronous messages enabled by this reference application. These messages are used to exchange information between the WebSphere Commerce and SAP systems. For example, order status, inventory update, and so on.

Asynchronous messages

Asynchronous messages do not elicit an immediate response to a request. For example, when WebSphere Commerce executes the OrderCreate message it does not expect an immediate reply from the SAP system. As a result, the buyer is not updated immediately regarding the status of the order. The asynchronous messages in this reference application are supported on Windows, AIX®, Solaris, and iSeries™ platforms. This reference application supports the following asynchronous messages:

Order create message (outbound from WebSphere Commerce)

WebSphere Commerce Business Edition generates this message when an order is submitted in the commerce server.

Order status message (inbound to WebSphere Commerce)

The SAP system generates this message. There are three order status messages:

- Order confirm status: Generated when orders are confirmed by SAP.
- Order delivery status: Generated when delivery for the order is complete at the SAP end.
- Order invoice status: Generated when the order is invoiced in SAP.

Customer new message (inbound to WebSphere Commerce)

SAP generates this message when a new customer is registered in SAP.

Customer update message (inbound to WebSphere Commerce)

SAP generates this message when an existing customer's information is updated in SAP.

Product price update message (inbound to WebSphere Commerce)

SAP generates this message when the product price is updated in SAP.

Product quantity update message (inbound to WebSphere Commerce)

SAP generates this message when the product quantity is updated in SAP. This could occur when the inventory is:

- Reduced at the time of goods issue for an order or
- Updated manually

Synchronous messages

A synchronous message elicits an immediate response to a request. For example, when WebSphere Commerce requests the SAP system to check the inventory availability, the SAP system replies immediately with the details of the inventory check. As a result the buyer gets a real-time response and can view the availability status before placing the order. The synchronous message in this reference

application is supported on Windows, AIX, and Solaris platforms. This reference application supports the following synchronous message:

Inventory availability check message (outbound from WebSphere Commerce)

This message is used to check the available inventory of a product in SAP from WebSphere Commerce.

To enable and use the CheckInventoryAvailabilityBE message using the CrossWorlds adapter, refer to the *WebSphere Commerce Administration Guide* and WebSphere Commerce Production and Development online help.

Appendix B. Generic business objects

Ensure that the Adapter for SAP R/3, WebSphere Commerce connector, and the Port connector are bound to the following generic business objects.

Note: Disable the agent support for all generic business objects

Table 9. Supported generic business objects

WebSphere Commerce connector	WebSphere Business Integration Adapter for SAP R/3	Port connector
Customer	ATP	ATP
CustomerPartner	ATPLine	ATPLine
InventoryLevel	Customer	Contact
InventoryLocation	CustomerPartner	Customer
Item	InventoryLevel	Item
Order	InventoryLocation	Order
OrderBillingStatus	Item	
OrderDeliveryStatus	Order	
OrderStatus	OrderBillingStatus	
PriceRecord	OrderDeliveryStatus	

Note: The port connector is used to bind those ports of a collaboration that do not require a process flow through the application specific connectors.

Appendix C. Application specific business objects

Ensure that the WebSphere Commerce connector and Adapter for SAP R/3 are bound to the following application specific business objects.

Note: Enable agent support for all application specific business objects.

Table 10. Supported application specific business objects

WebSphere Commerce connector	WebSphere Business Integration Adapter for SAP R/3
MO_DataHandler_Default	MO_Server_DataHandler 1
MO_WCSConfig	sap_bapi_material_availability
WCS_Create_WCS_Customer	sap_cond_a02
WCS_Update_WCS_Customer	sap_debmas05
WCS_Report_NC_PurchaseOrder	sap_invcon0
WCS_Update_WCS_OrderStatus	sap_orders05
WCS_Update_WCS_ProductInventory	sap_sisco01
WCS_Update_WCS_ProductPrice	sap_sisdel01
WCS_Request_WCS_BE_ProductInventory (Synchronous)	sap_sisinv01
	SAP_TransId

Appendix D. Collaboration templates

The following table lists the messages, their collaboration templates and ports:

Table 11. Collaboration templates

Message	Collaboration object	Collaboration template name	From port	To port	Destination App Retrieve	Other ports
Inventory Check from SAP	Product Quantity Update_From_Sap	InventoryLevel Manager	SAP Connector	WebSphere Commerce Connector	WebSphere Commerce Connector	ToItem Wrapper - SAP Connector
Product Price Update from SAP	ProductPrice Update_From_Sap	PriceManager	SAP Connector	WebSphere Commerce Connector	WebSphere Commerce Connector	ToItem Wrapper - Port Connector
OrderBilling Status from SAP	OrderBilling Status_From_Sap	OrderBilling Status	SAP Connector	WebSphere Commerce Connector	WebSphere Commerce Connector	
Order Delivery Status from SAP	Order Delivery Status_From_Sap	OrderDelivery Status	SAP Connector	WebSphere Commerce Connector	WebSphere Commerce Connector	
Order Confirmation Status	Order Confirmation Status_From_Sap	OrderStatus	SAP Connector	WebSphere Commerce Connector	WebSphere Commerce Connector	
Customer Create/ Update from SAP	Customer Create Update_From_Sap	CustomerSync	SAP Connector	WebSphere Commerce Connector	WebSphere Commerce Connector	To Customer Partner Wrapper - Port Connector
Check Inventory Availability BE	SAP_Check Inventory Availability	ATP	External Connector Incoming map: WC_REQUEST_PROD_INV_TO_GBO Outgoing map: GBO_TO_EC_REQUEST_PROD_INV	SAP Connector	SAP Connector	ToLine - SAP Connector Destination App Retrieve Line - SAP Connector

Table 11. Collaboration templates (continued)

Order Create from WebSphere Commerce	OrderCreateFrom_WCBE	SalesOrder Processing	WebSphere Commerce Connector	SAP Connector	SAP Connector	To Customer Wrapper - Port Connector ToContact Wrapper - Port Connector ToItem Wrapper - Port Connector
Product Quantity Update	Product Quantity Update_From_Sap.out	InventoryLevel Manager	SAP Connector	WebSphere Commerce Connector	WebSphere Commerce Connector	ToItem Wrapper - SAP Connector

Note: When using external connectors you must explicitly specify the incoming and outgoing maps.

Refer the WebSphere Business Integration Adapter for SAP R/3 document, for creating and configuring the collaboration object for Sap_transId.

Appendix E. Maps with specific values for WebSphere Commerce and SAP

The following are WebSphere Commerce and SAP specific values in the maps provided with this reference application. You can change them according to your configuration settings.

Table 12. Maps with WebSphere Commerce and SAP specific values

Map name	Hard coded attributes
GBO_ATPLine_To_SAP	Unit_of_measure_for_display, Plant, Checking_rule
GBO_CustomerCreate_To_WCS	Value, AddressType, Type
GBO_CustomerUpdate_To_WCS	PreferredLanguage, CustomerStatus, value, AddressType, type
Sub_GBO_DeliveryStatusLine_To_WCS	Type
GBO_OrderCreate_To_SAP	Name_of_table_structure Partner_type_of_recipient Partner_number_of_recipient Partner_type_of_sender Sender_port Partner_number_of_sender SAP_Release_for_Idoc Name_of_basic_typeIdoc_type Logical_message_type EDI_message_type Partner_function_e_g_sold_to_party Qualifier_for_IDOC_date_segment IDOC_qualifier_reference_document
Sub_GBO_OrderCreate_To_SAP	Plant IDOC_object_identification_such_as_material_no_ customer IDOC_qualifier_reference_document
GBO_ProductPriceUpdate_From_SAP	PriceListId (Edit the custom code and replace the hardcoded values within quotes to WebSphere Commerce specific values) For example: if your store owner (Websphere Commerce) member_id is 700000000000000002 then set (sapSalesOrg.equals("WSO1")) sapSalesOrg = "700000000000000002";)
GBO_ProductPriceUpdate_To_WCS	Precedence Published
GBO_ProductQuantityUpdate_To_WCS	MerchantID FulfillmentCenterID
GBO_ProductQuantityUpdate_from_SAP	Plant InvLocationId

Note: Ensure that the values entered in the fields described previously are in accordance with your configuration settings.

Appendix F. Binding maps to business objects

The following tables list the maps that you must explicitly bind to the business objects for WebSphere Commerce connector and WebSphere Business Integration Adapter for SAP R/3:

WebSphere Commerce connector

Table 13. WebSphere Commerce connector business objects and maps

Business object	Map
OrderBillingStatus	GBO_BillingStatus_To_WCS
OrderStatus	GBO_ConfirmationStatus_To_WCS
WCS_Report_NC_PurchaseOrder	GBO_OrderCreate_From_WCS
PriceRecord	GBO_ProductPriceUpdate_To_WCS
Customer	GBO_CustomerCreateUpdate_polymap
OrderDeliveryStatus	GBO_DeliveryStatus_To_WCS
InventoryLevel	GBO_ProductQuantityUpdate_To_WCS

WebSphere Business Integration Adapter for SAP R/3

Table 14. WebSphere Business Integration Adapter for SAP R/3 business objects and maps

Business object	Map
ATPLine	GBO_ATPLine_To_SAP
sap_sisco01	GBO_ConfirmationStatus_From_SAP
sap_sisdel01	GBO_DeliveryStatus_From_SAP
sap_sisinv01	GBO_BillingStatus_From_SAP
Order	GBO_OrderCreate_To_SAP
sap_debmas05	GBO_CustomerCreateUpdate_From_SAP
sap_invcon01	GBO_ProductQuantityUpdate_From_SAP
SAP_TransId	SAP_TransId_Mgmt
sap_bapi_material_availability	GBO_ATPLine_From_SAP
sap_cond_a02	GBO_ProductPriceUpdate_From_SAP

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