Information Builders

iWay

iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises User's Guide

Version 7.0.x and Higher

August 16, 2018

Contents

Preface

This document is written for system integrators who develop client interfaces between Microsoft Dynamics® CRM and other applications. It describes how to configure and use the iWay Application Adapter for Microsoft Dynamics CRM 2011, which is an interface between Microsoft Dynamics CRM 2011 On-Premises and other applications. It describes how to use the adapter with iWay Explorer to develop online connections to Microsoft Dynamics CRM.

Note: This Release 7.0.x content is currently being updated to support iWay Release 8.0.x software. In the meantime, it can serve as a reference for your use of iWay Release 8. If you have any questions, please contact *Customer_Success@ibi.com*.

How This Manual Is Organized

This manual includes the following chapters:

	Chapter/Appendix	Contents
1	Introducing the iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises	Provides an overview of the iWay Application Adapter for Microsoft Dynamics 2011 CRM On-Premises, including key features and summarizes how to use it to integrate Microsoft Dynamics CRM 2011 systems with other applications.
2	Microsoft Dynamics 2011 CRM Supported Platforms Matrix	Specifies version, platform, and database support information for iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises.
3	Application Adapter for Microsoft Dynamics CRM 2011 Quick Start Guide	Provides a quick start guide for the iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises.
4	Design Time Concepts and Configuration Tasks	Describes design time concepts and configuration tasks for the iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises.
5	Run Time Concepts and Configuration Tasks	Describes run time concepts and configuration tasks for the iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises.
A	Configuring the iWay WCF Routing Service (WCF Router)	Describes how to configure the iWay WCF Routing Service (WCF Router) for the iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises.

	Chapter/Appendix	Contents
B	Application Adapter for Microsoft Dynamics CRM 2011 Samples and Reference Guide	Provides samples and reference information for the iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises.
C	Application Adapter for Microsoft Dynamics CRM 2011 Known Issues and Limitations	Describes known issues and limitations for the iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises.

Documentation Conventions

The following table describes the documentation conventions that are used in this manual.

Convention	Description
THIS TYPEFACE or this typeface	Denotes syntax that you must enter exactly as shown.
this typeface	Represents a placeholder (or variable), a cross-reference, or an important term. It may also indicate a button, menu item, or dialog box option that you can click or select.
underscore	Indicates a default setting.
Key + Key	Indicates keys that you must press simultaneously.
{ }	Indicates two or three choices. Type one of them, not the braces.
|	Separates mutually exclusive choices in syntax. Type one of them, not the symbol.
...	Indicates that you can enter a parameter multiple times. Type only the parameter, not the ellipsis (...).
. . .	Indicates that there are (or could be) intervening or additional commands.

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Help Us to Serve You Better

To help our consultants answer your questions effectively, be prepared to provide specifications and sample files and to answer questions about errors and problems.

The following tables list the environment information our consultants require.

Platform	
Operating System	
OS Version	

JVM Vendor	
JVM Version	

The following table lists the deployment information our consultants require.

Adapter Deployment	For example, JCA, Business Services Provider, iWay Service Manager
Container	For example, WebSphere
Version	
Enterprise Information System (EIS) - if any	
EIS Release Level	
EIS Service Pack	
EIS Platform	

The following table lists iWay-related information needed by our consultants.

iWay Adapter	
iWay Release Level	
iWay Patch	

The following table lists additional questions to help us serve you better.

Request/Question	Error/Problem Details or Information
Did the problem arise through a service or event?	
Provide usage scenarios or summarize the application that produces the problem.	

Request/Question	Error/Problem Details or Information
When did the problem start?	
Can you reproduce this problem consistently?	
Describe the problem.	
Describe the steps to reproduce the problem.	
Specify the error message(s).	
Any change in the application environment: software configuration, EIS/database configuration, application, and so forth?	
Under what circumstance does the problem *not* occur?	

The following is a list of error/problem files that might be applicable.

- ❑ Input documents (XML instance, XML schema, non-XML documents)
- ❑ Transformation files
- ❑ Error screen shots
- ❑ Error output files
- ❑ Trace files
- ❑ Service Manager package to reproduce problem
- ❑ Custom functions and agents in use
- ❑ Diagnostic Zip
- ❑ Transaction log

For information on tracing, see the *iWay Service Manager User's Guide*.

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Chapter 1

Introducing the iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises

This section provides an overview of the iWay Application Adapter for Microsoft Dynamics 2011 CRM On-Premises, including key features and summarizes how to use it to integrate Microsoft Dynamics CRM 2011 systems with other applications.

In this chapter:

Application Adapter for Microsoft Dynamics 2011 CRM Introduction

The iWay Application Adapter for Microsoft Dynamics 2011 CRM On-Premises is developed to interact with Microsoft Dynamics CRM (MS CRM) 2011 and enables you to create, read, update, and delete data within MS CRM. During design time, you can introspect MS CRM metadata and display information about supported entities and applicable operations. Advanced operations that are supported by the adapter enable you to run workflow executions, import data, and additional options.

The iWay Application Adapter for Microsoft Dynamics 2011 CRM On-Premises is implemented as a Java archive, which can be deployed to iWay Service Manager (iSM) or other supported application servers. The adapter uses the Windows Communication Foundation (WCF) Services through an iWay Routing Service host (WCF Router) to integrate with MS CRM 2011. The adapter communicates with MS CRM through the WSDL endpoint and uses Active Directory Authentication for security.

Task: In this chapter, you will learn the key components of the iWay Application Adapter for Microsoft Dynamics 2011 CRM On-Premises, methods, and protocols used for communication with MS CRM 2011.

Supported Versions, Platforms, and Deployments

iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises is certified only for Microsoft Dynamics CRM 2011 Service Pack 8.

The following platforms are supported for the iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises:

- Windows
- Linux
- UNIX (Solaris, HP-UX, HP Itanium, and AIX)

Note: iWay Application Adapter for Microsoft Dynamics 2011 CRM On-Premises only supports the On-Premises MS CRM deployment model. Hosted, CRM Online, or Hybrid deployments of MS CRM are not supported.

HTTPS Support

On Windows platforms, Microsoft offers integrated components for the support of SSL and sockets. On other (non-Windows) platforms, programs, such as OpenSSL, may be required to enable SSL.

Supported Authentication

Windows-based with Active Directory verification, claims-based authentication is not supported. Each user connecting through the adapter must have a valid user ID within the domain where the MS CRM server resides.

Supported Application Adapter for Microsoft Dynamics 2011 CRM Functionality

Capabilities of the iWay Application Adapter for Microsoft Dynamics 2011 CRM On-Premises during design time include the ability to:

- Configure adapter targets using valid credentials and parameters to connect to a MS CRM system.
- Connect to a MS CRM system using a secured channel.
- Build a tree of entities and operations.
- Generate XML schema for input and output messages.
- Display properties of every supported entity.

Capabilities of the adapter during runtime include the ability to:

- Configure adapter targets using valid credentials and parameters to connect to a MS CRM system.
- Connect to a MS CRM system using a secured channel.
- Retrieve entities of a specified type by a given identifier (or other condition).
- Create new entities (including compound entities).
- Update specified entities.
- Delete specified entities.

Installing the Application Adapter for Microsoft Dynamics 2011 CRM

To install the iWay Application Adapter for Microsoft Dynamics 2011 CRM On-Premises, ensure that the following .jar library files are available in the <*ism_home*>\lib folder:

- commons-codex-1.4.jar
- commons-logging-1.1.1.jar
- httpclient-4.1.1.jar
- httpcore-4.1.jar
- iwaf.jar
- iwutil.jar
- mail.jar
- xalan.jar
- saxon9he.jar

Ensure that the iwmscrm2011.jar file is also available in this \lib folder. This file is installed automatically during the iWay Service Manager (iSM) installation process.

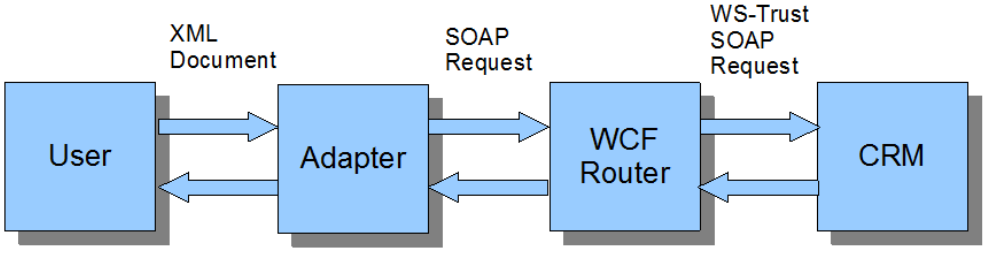
Understanding the Microsoft Dynamics CRM Communication Model

The iWay Application Adapter for Microsoft Dynamics 2011 CRM On-Premises communicates with MS CRM 2011 by sending requests directly to MS CRM to retrieve WSDL files for MS CRM services. Publishing WSDL files does not require user authentication.

For other operations, the adapter sends requests and receives responses using the Windows Communication Foundation (WCF) Routing Service (WCF Router). The WCF Router is a middleware application that redirects SOAP messages and adapts them to the target system.

The Windows Communication Foundation (WCF) is a runtime and a set of APIs in the .NET Framework that is used for building connected, service-oriented applications. It is designed using service oriented architecture (SOA) principles to support distributed computing where services have remote consumers.

The following diagram illustrates the high-level adapter architecture and communication model:



Several mechanisms are used to protect data. The connection channel between the user and adapter can be protected by the iSM infrastructure. The connection channel between the MS CRM system and WCF Router is protected by the HTTPS protocol. Between the WCF Router and the MS CRM system, data is encrypted according to the WS-Trust specification.

WCF Routing Service (WCF Router) Authentication

The following layers of authentication are present:

- Between the adapter and the WCF Router.
- Between the WCF Router and the MS CRM system.

If the HTTPS protocol is enabled, the WCF Router may require the adapter to have a client certificate in order to authenticate itself. This behavior is configured in a configuration file of the WCF Routing Service. If the WCF Routing Service is configured to validate the client certificate, the adapter must provide the certificate or the authentication will fail. If the WCF Routing Service is configured to require no client authentication (transport only security), then the adapter can leave the certificate empty.

MS CRM uses Active Directory validation on the domain and machine where MS CRM is installed. As a result, the WCF Router requires a domain, user name, and password to connect to MS CRM. The adapter passes credentials in SOAP headers. Then WCF Router reads the credentials and passes them to MS CRM. Since communication is implemented over the HTTPS protocol, user credentials are protected.

Component Information for the Application Adapter for Microsoft Dynamics 2011 CRM

The iWay Application Adapter for Microsoft Dynamics 2011 CRM On-Premises works with the following components:

- iWay Service Manager
- iWay Explorer
- iWay Business Services Provider (iBSP)

When hosted in an iWay environment, the adapter is configured through iWay Service Manager (iSM) and iWay Explorer. iWay Explorer is one of the iWay Integration Tools distributed with the iSM package and is used to configure MS CRM connections and create web services.

In this release, the iWay Application Adapter for Microsoft Dynamics 2011 CRM On-Premises is available only in the iSM component environment.

iWay Service Manager

iWay Service Manager is the heart of the Universal Adapter Framework and is an open transport service bus. Service Manager uses graphical tools to create sophisticated integration services without the need for custom integration code by:

- Creating metadata from target applications.
- Transforming and mapping interfaces.
- Managing stateless processes.

Its capability to manage complex adapter interactions makes it an ideal foundation for a service-oriented architecture.

iWay Explorer

iWay Explorer, provided as part of the iWay Integration Tools (iIT) suite, uses a tree metaphor to introspect the MS CRM system metadata. The explorer enables you to create XML schemas and web services for the associated MS CRM entity.

External applications that access MS CRM through the iWay Application Adapter for Microsoft Dynamics 2011 CRM On-Premises use either XML schemas or web services to pass data between the external application and the adapter.

iWay Business Services Provider

The iWay Business Services Provider (iBSP) exposes, as web services, enterprise assets that are accessible from adapters regardless of the programming language or the particular operating system.

iBSP simplifies the creation and execution of web services when running:

- Custom and legacy applications.
- Database queries and stored procedures.
- Packaged applications.
- Terminal emulation and screen-based systems.
- Transactional systems.

Coupled with a platform and language independent messaging protocol called SOAP (Simple Object Access Protocol), XML enables application development and integration by assembling previously built components from multiple web services.

Chapter 2

Microsoft Dynamics 2011 CRM Supported Platforms Matrix

iWay Software is committed to support the diverse environments and varied systems of our users through support for leading enterprise applications, platforms, and databases.

This section specifies version, platform, and database support information for iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises. It is designed to provide a consolidated view of Microsoft Dynamics CRM 2011 and the various operating systems and databases that are supported.

In this chapter:

Microsoft Dynamics 2011 CRM Supported Platform Overview

iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises is available for Microsoft Dynamics CRM servers with Version 2011 and an On-Premises license. The adapter is built to specifications of the Microsoft Dynamics CRM 2011 Software Development Kit (SDK) Version 8, with updates for the latest server patch 16.

The adapter has components built with C# and Java languages.

The adapter has an additional component, the Windows Communication Framework (WCF) Router, which is supported only on the Windows operating system. The adapter can run on any platform, but the router uses WCF and Microsoft Identify Framework components, which can only be run on Windows. If required, the router can be run as an isolated standalone service without iWay Service Manager (iSM).

Deployment

This section summarizes deployment support for the iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises.

Deployment	Supported / Not Supported
On-Premises Deployment Microsoft Dynamics 2011 CRM is installed on site.	Supported
Online or Hosted	Not Supported
Internet-facing Deployment (IFD) Microsoft Dynamics 2011 CRM is installed on site, but faces the Internet (uses a different security API).	Not Supported
Microsoft Azure Cloud or Microsoft Azure Service Bus	Not Supported

Supported Microsoft .NET Versions

iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises supports only the following versions of Microsoft .NET:

- 3.5
- 4.0
- 4.5

Microsoft Dynamics 2011 CRM Operating Systems

iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises supports all of the operating systems that are listed in the *iWay Installation and Configuration Guide* under *Operating System Requirements*.

The Windows Communication Foundation (WCF) Router supports only the following operating systems:

Windows Client:

- Windows 7
- Windows 8
- Windows 8.1

Windows Server:

- Windows 2008
- Windows 2008 R2
- Windows 2012
- Windows 2012 R2

Microsoft Dynamics 2011 CRM Databases

iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises does not work directly with a database and connects only with the Application Programming Interface (API).

Java Development Kit (JDK)

iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises supports the Java Development Kit (JDK) versions that are listed in the *iWay Installation and Configuration Guide* under *Java Requirements*.

Application Adapter for Microsoft Dynamics CRM 2011 Communication Modes

iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises supports the following communication mode:

- **Services (Outbound).** iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises can send messages to Microsoft Dynamics CRM 2011 On-Premises.

Application Adapter for Microsoft Dynamics CRM 2011 Communication Types

iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises supports only synchronous Windows Communication Foundation (WCF) WSHTTP requests. The communication between the WCF Router and the adapter can be standard HTTP, transport security or certificate-based HTTPS. Communication between a client and iWay Service Manager (iSM) can also be based on transport security or certificate-based HTTPS.

Application Adapter for Microsoft Dynamics CRM 2011 Object Types and Interfaces

iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises supports the following object types and Interfaces:

- The adapter uses the rich MSCRM metadata interface to expose core entities and the operations (methods) that are available for each entity. These entity operations are available as schemas and runtime objects.
- The use of Organization and Xrm messages is also possible. MSCRM security permissions are always respected before any operation (either metadata or data).

Application Adapter for Microsoft Dynamics CRM 2011 Operations

iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises supports the following operations:

- Most document style operations are available through the adapter. Operations such as charts, forms, and other visual components are not available through the adapter.
- Standard Create, Retrieve, Update, and Delete (depending on the Entity and permissions) are possible through the adapter.

Application Adapter for Microsoft Dynamics CRM 2011 Data Types

The data types in Microsoft Dynamics CRM correspond to .NET data types whenever possible. These types are directly corresponding to java data types whenever possible. The cases where direct mapping is not possible (for example, *OptionSetValue*) have specific handler classes for marshalling the data from CRM to Java for the adapter.

Other Application Adapter for Microsoft Dynamics CRM 2011 Functions

iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises supports Windows Communication Foundation (WCF) routing.

Support for the following display languages:

- Chinese (simple)
- Japanese
- English (U.S.)
- Spanish

Note: Certain screen elements may be code in English (U.S.) despite the specified display language setting.

Application Adapter for Microsoft Dynamics CRM 2011 Known Limitations

This section lists known issues for iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises.

- The adapter does not support a plug-in for events.
- The adapter uses the WDL endpoint from Microsoft Dynamics CRM.

  There may be a finite data limit (set from the Microsoft Dynamics CRM server) for the WSDL endpoint that may limit the final message size. This limit is found most often in the *RetrieveMultiple* and *BulkData* operation messages. This limit is usually set in the *web.config* file for the Microsoft Dynamics CRM server. For more information on how to increase the default time and size of a request, see the *Microsoft Dynamics CRM 2011* documentation.

Application Adapter for Microsoft Dynamics CRM 2011 Restrictions

iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises should not to be run on Microsoft Dynamics CRM 2011 Online or Microsoft Dynamics CRM 2011 for Azure. The adapter should not be run on any other version of Microsoft Dynamics CRM. Router configuration and security depend on following the procedures described in the *iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises User's Guide*.

Related Information for Application Adapter for Microsoft Dynamics CRM 2011 in Specific iWay Releases

For more information, see the *iWay New Features Bulletin and Release Notes* documentation for a specific release (for example, iWay Version 7.0.6).

Chapter 3

Application Adapter for Microsoft Dynamics CRM 2011 Quick Start Guide

This chapter provides a quick start guide for the iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises.

In this chapter:

Application Adapter for Microsoft Dynamics CRM 2011 Quick Start Overview

This quick start guide summarizes the high-level key steps that are required to install, configure, and use the iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises. The quick start guide does not elaborate on any of the steps in detail. Instead, cross-references are provided for the corresponding sections in the *iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises User's Guide*. Users of the adapter are encouraged to follow the sequence of steps in this guide to quickly connect to Microsoft Dynamics CRM 2011 On-Premises and begin using the adapter. To gain a complete understanding about the adapter, it is recommended for users to review the entire *iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises User's Guide*, as the quick start guide section is not a replacement for that level of detail.

Microsoft Dynamics CRM 2011 Quick Start Guide

This section lists and describes the key configuration steps for configuring the iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises and then integrating with Microsoft Dynamics CRM 2011 On-Premises. Specifically, service mode functionality is described (sending documents to Microsoft Dynamics CRM 2011 On-Premises and receiving a response).

1. Ensure that you are using a supported environment, as described in *Microsoft Dynamics 2011 CRM Supported Platforms Matrix* on page 19.
2. Ensure that when you install iWay Service Manager (iWay Integration Suite) you select and install the *Microsoft Dynamics CRM 2011* adapter, which is grouped under the *Application Adapters* category.

   For more information, see the *iWay Installation and Configuration Guide*.

3. Install the iWay Windows Communication Framework (WCF Router) before using the adapter.

   For more information, see *Configuring the iWay WCF Routing Service (WCF Router)* on page 99.

4. Select the security mode of the WCF Router.

   For more information, see *Using the WCF Router to Connect to MS CRM (Selecting the Connection Mode)* on page 109.

5. Start iWay Service Manager (iSM) and iWay Integration Tools (iIT). Use the iWay Explorer to create a target (connection) to Microsoft Dynamics CRM 2011 On-Premises.

   For more information, see *Working With a Target* on page 32.

6. View and explore the different Microsoft Dynamics CRM Entities in the object tree.

   For more information, see *Navigating the Entity and Operation Tree* on page 44.

7. Select an object from the tree, and create an XML schema.

   For more information, see *Creating an XML Schema* on page 50.

8. Create an iWay Business Service from the Microsoft Dynamics CRM Entity.

   For more information, see *Creating Business Services* on page 56.

9. Create an XML instance document based on the created XML schema or WSDL from an iWay Business Service and populate the fields with data according to the schema description.

10. If you are using an iWay Business Service, use the Test pane to upload or copy the XML instance document into the iWay Business Service.

    For more information, see *How to Create an iWay Business Service* on page 58.

11. Alternately use the Channel Builder in iWay Integration Tools (iIT) to build and deploy a simple iWay application that can be started, stopped, and monitored from iIT.

    For more information, see the *iWay Integration Tools User's Guide*.

Note: The iWay Application Adapter for Microsoft Dynamics CRM 2011 On Premises does not support events.

Chapter 4

Design Time Concepts and Configuration Tasks

This section describes design time concepts and configuration tasks for the iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises. For example, how iWay Explorer is used to create schemas and Business Services to provide integration between the adapter and a Microsoft Dynamics CRM 2011 server.

In this chapter:

Starting iWay Explorer

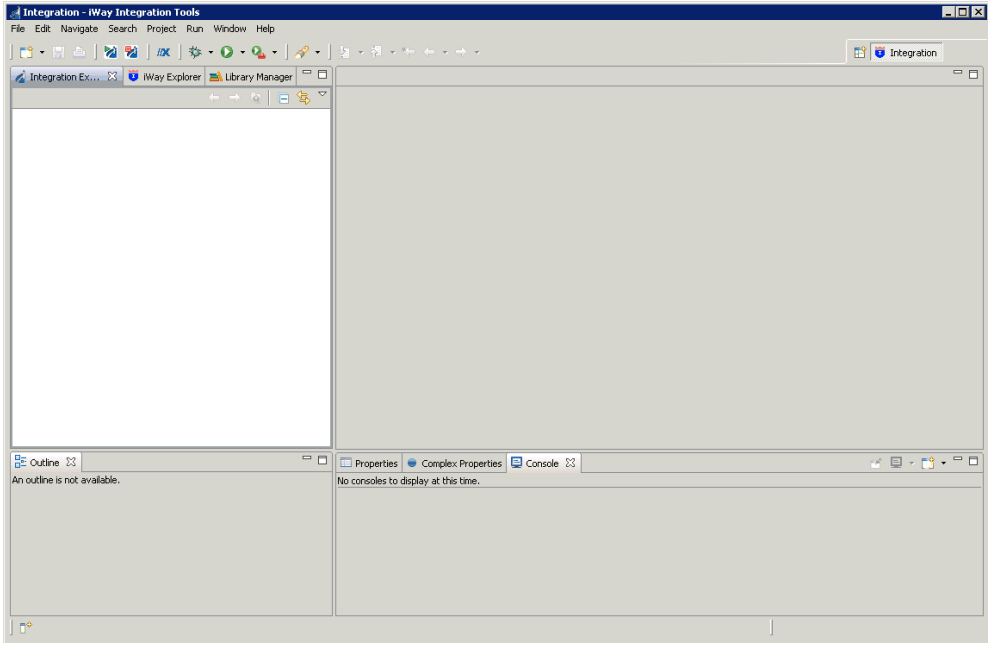
This section describes how to start iWay Explorer.

Procedure: How to Open iWay Integration Tools

To open iWay Integration Tools:

1. Navigate to your local drive where you have iWay Integration Tools installed, and open the *eclipse* folder.
2. Double-click *iit.exe*.

iWay Integration Tools suite opens.

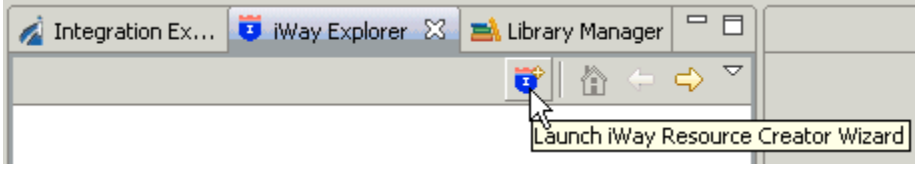


Procedure: How to Create an iWay Explorer Connection to an iSM Server

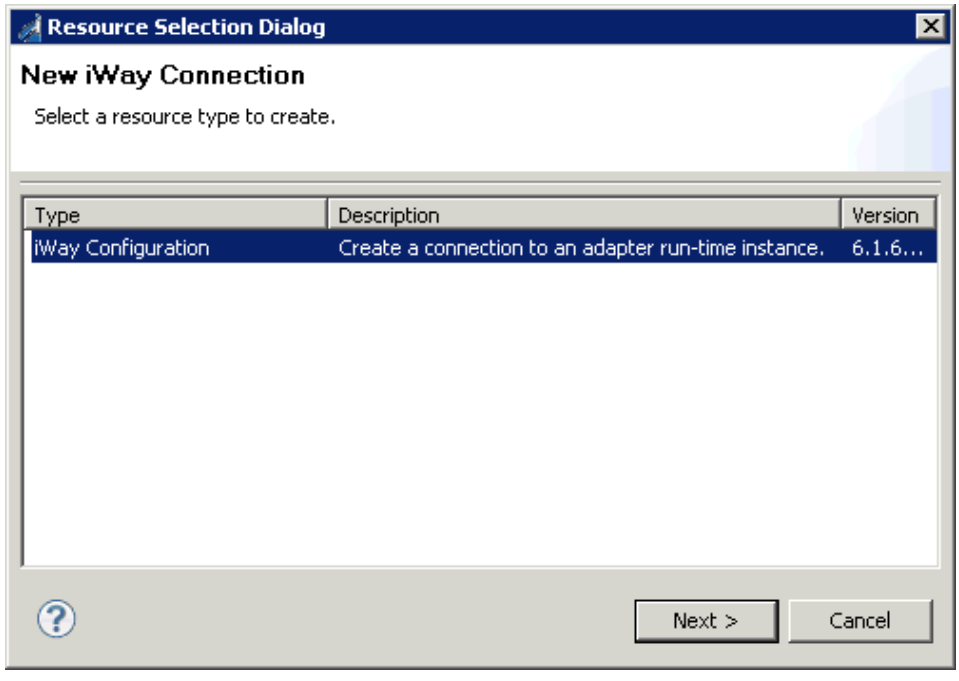
This procedure assumes that you have opened iWay Integration Tools and are in the Workbench.

Note: Before continuing, ensure that iWay Service Manager is started.

1. Click the *iWay Explorer* tab to make it active.
2. Click the *Launch iWay Resource Creator Wizard* button on the tool bar.
   In the following image, the iWay Explorer tab is active, and the cursor is pointing to the Launch iWay Resource Creator Wizard button.



When you click the button, the New iWay Connection dialog box opens.



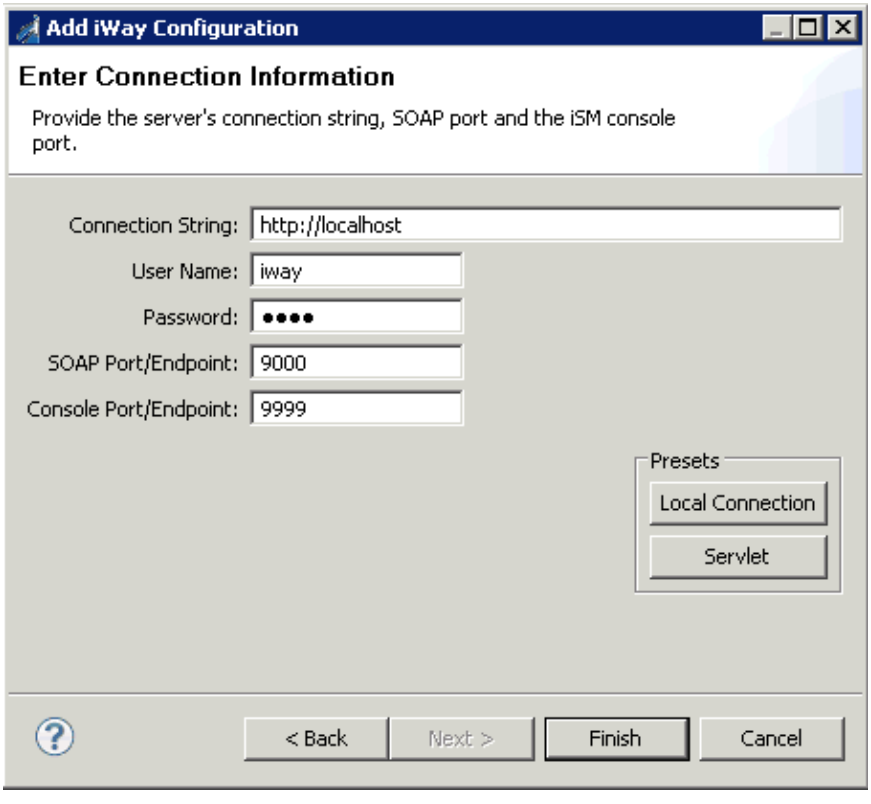
3. Under the Type heading, click *iWay Configuration*, which is the type of resource that you must create.
4. Click *Next*.

   The Select Connection Types dialog box opens.
5. In the Configuration Alias field, click a name from the drop-down list, or type a name for the configuration, for example, *localhost*.

   The drop-down list contains the names of configurations that you have used before.

   Tip: The name that you supply is used only for display purposes in the tree. It is not a server connection property.
6. For Connection Type, click the radio button for the method that you are using to connect to iSM. Ensure *HTTP connection* is selected.
7. Optionally select the *Connect to Host upon Wizard Completion* check box if you want iWay Explorer to automatically connect to this instance of iSM after you have created it. If you select this option, all the explorer environments under the new iSM connection are automatically connected to iSM when this procedure is finished.
   If you do not select this option, the explorer environments are not automatically connected to iSM. You can connect to an individual explorer environment when you want to access it.

8. Click *Next* to continue the procedure.
9. If you selected an HTTP Connection, the Enter Connection Information dialog box opens.



- Verify the values in the three fields, or type the valid value or values.
  - The Connection String field contains the URL that connects to the iSM.
  - The SOAP Port/Endpoint field contains the SOAP port number.
  - The Console Port/Endpoint field contains the port number that the iSM Administration Console is listening on.
- Optionally, under Presets, click *Local Connection* to insert values for a local default iSM connection in the fields, or click *Servlet* to insert values for a sample servlet connection.
- Click *Finish*.

Adding the Microsoft Dynamics CRM 2011 Adapter to iWay Explorer

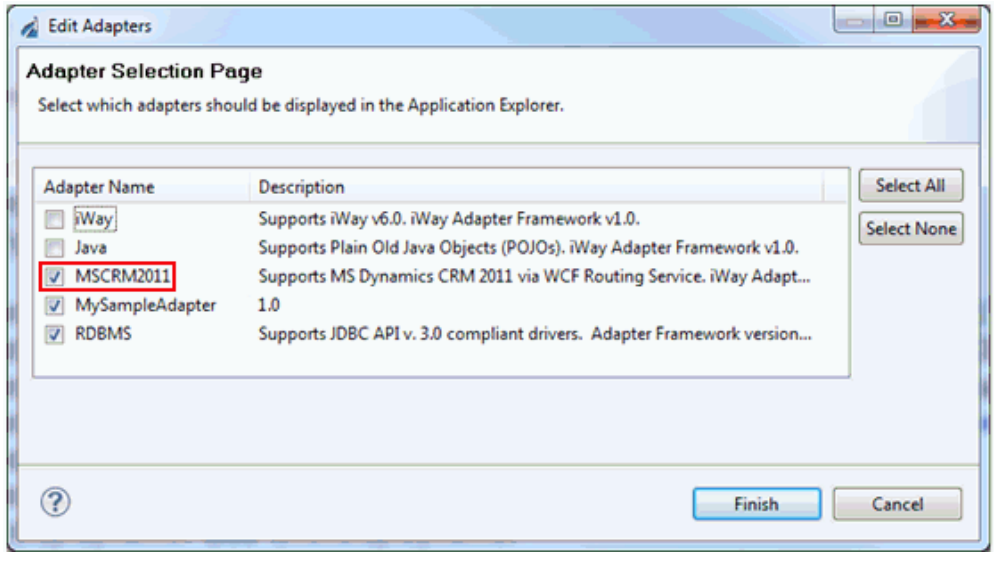
iWay Explorer supports access to many different application systems. When you connect to and expand the Application Explorer node, the iWay adapters for the supported application systems are displayed. They are the iWay adapters that you have installed and are licensed to use.

Procedure: How to Add the Microsoft Dynamics CRM 2011 Adapter to iWay Explorer

In this procedure, you are going to add the iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises to the list of adapters displayed in the Adapters node.

1. Right-click the *Adapters* node, and click *Edit* from the menu.

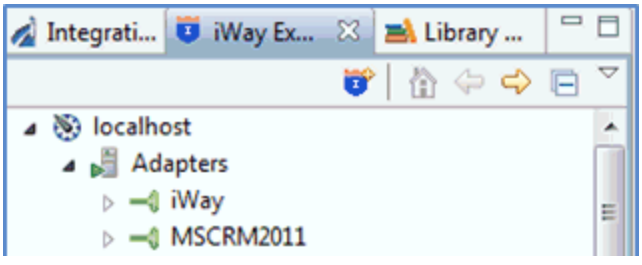
   The Edit Adapters dialog box opens, as shown in the following image.



2. Select the check box for *MSCRM2011*.
3. Click *Finish*.

   The tree is automatically refreshed and displays the new adapter.

In the following image, the MSCRM2011 node is displayed in the Adapters node of iWay Explorer.



Working With a Target

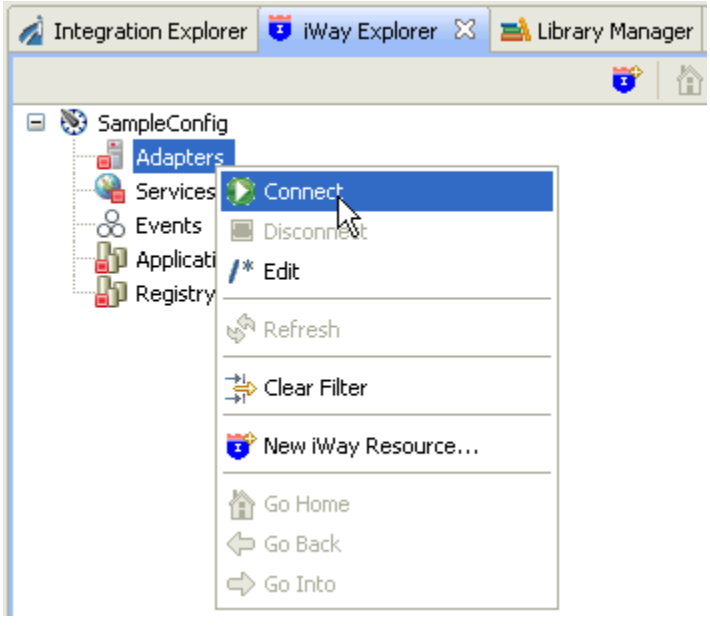
To browse the available entities of a Microsoft Dynamics CRM 2011 server, you must create a target for that server. The target is the means by which you connect to the server and contains the required logon properties.

Using the target, you must establish a connection to a Microsoft Dynamics CRM 2011 server every time you want to browse the entities using iWay Explorer.

Procedure: How to Create a Target

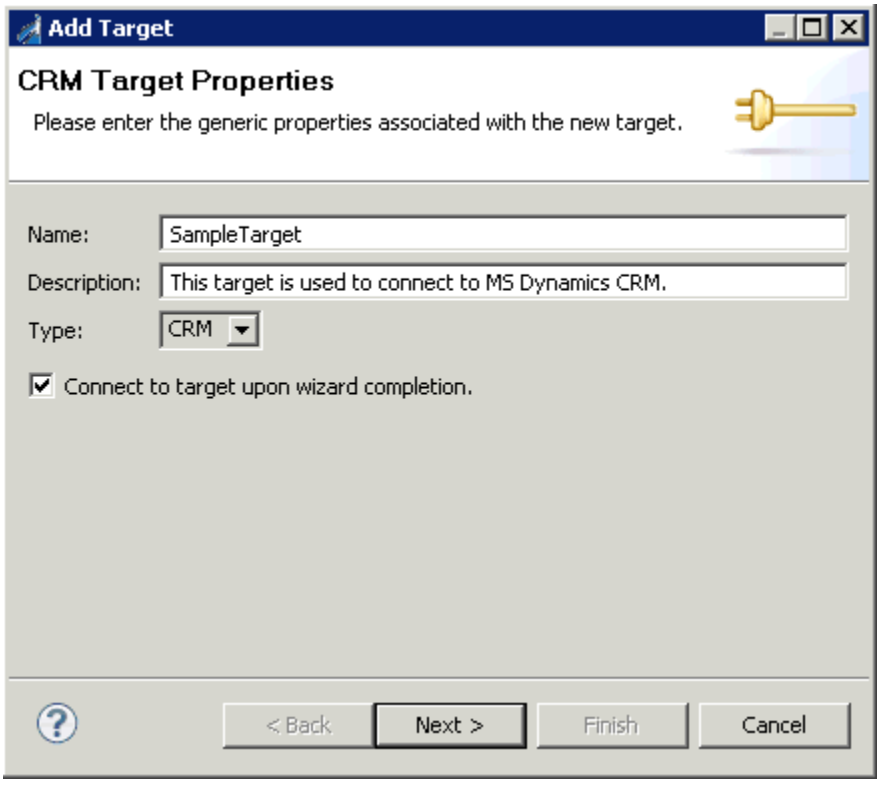
To create a target:

1. Right-click the *Adapters* node, and click *Connect* from the menu.



2. Once you are connected, expand the *Adapters* node.
3. Right-click *MSCRM2011*, and click *Add Target* from the menu.

The CRM Target Properties dialog box opens, as shown in the following image.



4. Supply the values for the fields on the dialog box as follows.

   a. In the Name field, type a descriptive name for the target.

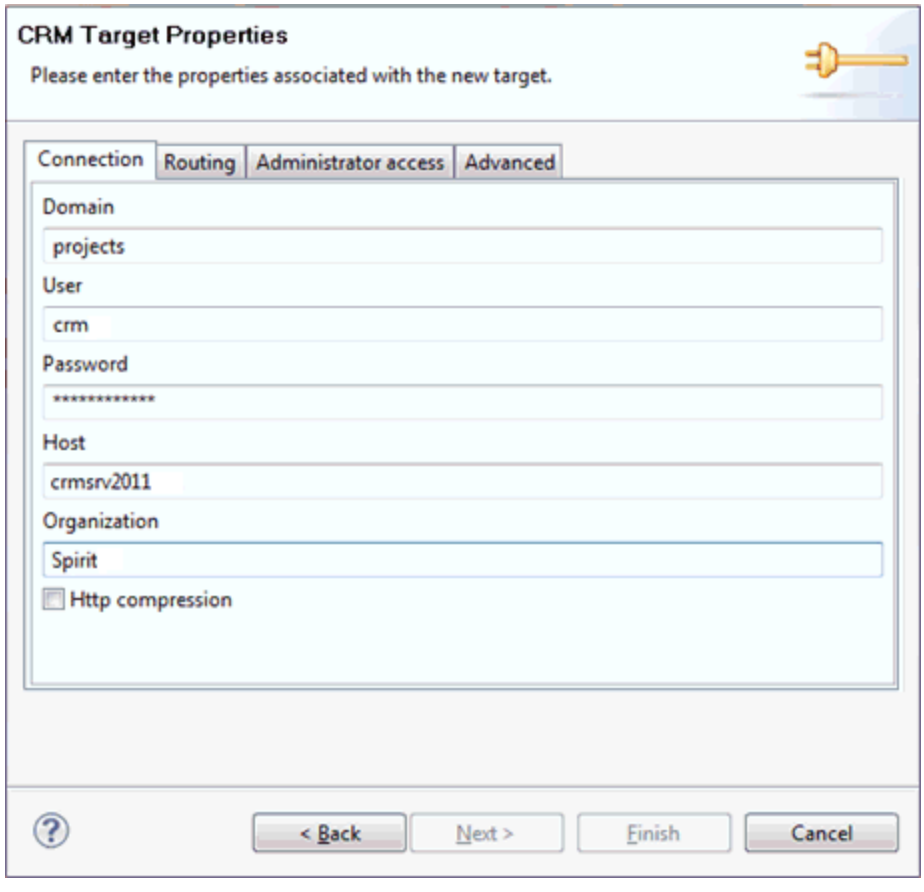
   b. In the Description field, type a brief description of the target (optional).

   c. From the Type drop-down list, select *CRM* (default).

5. Select the *Connect to target upon wizard completion* check box if you want iWay Explorer to automatically connect to this target after you have created it.
   If you deselect this option, iWay Explorer will not automatically connect to the target. From the tree, you can connect to an individual target when you want to access the associated application system.

6. Click *Next*.

The connection properties for the Microsoft Dynamics CRM 2011 server target are displayed, as shown in the following image.



The following tabs are available:

- **Connection tab.** Contains general parameters that are required to connect to a target Microsoft Dynamics CRM 2011 server and authenticate a user.
- **Routing tab.** Contains parameters that are required to establish a connection to the WCF Routing Service (WCF Router), which can also require certificates for security purposes.
- **Administration Access tab.** Contains account information for a user with administrator privileges. This should be an account that has credentials to access metadata.

Note: It is recommended to set the administrator credentials in this tab only for testing purposes. If these administrator credentials are required, then set them through the iWay WCF Routing Service (WCF Router). For more information, see *Storing Administrator Credentials in the WCF Router* on page 108.

- **Advanced tab.** Contains additional parameters that are required to filter entities, configure design time operations, configure caching and connection pooling, set validation levels, and set the user interface.

The following table lists and describes the parameters in each tab.

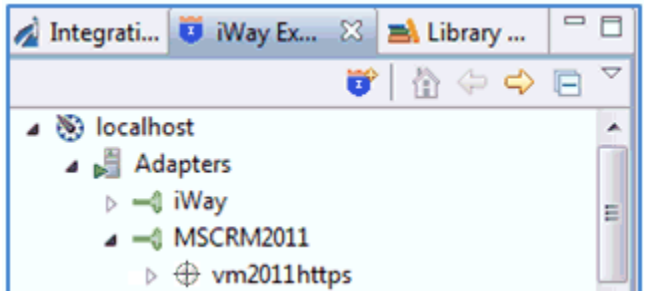
Parameter	Description	Required
Connection tab		
Domain	Specify the Active Directory domain. For example, PROJECTS.	Yes
User	The user name used to connect to the Microsoft Dynamics CRM 2011 server.	Yes
Password	The password that is associated with the user name.	Yes
Host	Specify the name or IP address of the Microsoft Dynamics CRM 2011 server. For example, localhost.	Yes
Organization	Specify the organization name to access the Microsoft Dynamics CRM 2011 server.	Yes
Http compression	Select this check box if you require HTTP traffic to be compressed.	
Routing tab		
WCF Routing Service host	Specify the URL of the WCF Router Service. For example, localhost.	Yes
WCF Routing Service port	Specify the port of the WCF Router Service. For example, 8080.	Yes

Parameter	Description	Required
Protocol	Specify what protocol to use for communication with the WCF Router Service. For example, HTTPS.	
Trusted keystore location	Specify the path to the keystore file containing the trusted certificate. For example, c:\keystores\trustStore.jks.	No
Client keystore location	Specify the path to the keystore file containing the client certificate. For example, c:\keystores\clientStore.jks.	No
Client keystore password	Specify the password that protects the keystore containing the client certificate.	No
Administration Access tab		
Domain	Specify the domain of the user with administrative access. This should be an account that has credentials to access metadata For example, PROJECTS.	No
User	Specify the user name that has administrative access.	No
Password	Specify the password of the user that has administrative access.	No
Advanced tab		
Path to file with filters	Specify the location of a file with custom filters. For example, c:\crm\filter.xml.	No

Parameter	Description	Required
Connection pool size	Specify the number of connections that can be stored in the connection pool. If the number of requests exceeds this value, then the pending requests will be queued and wait for released connections. For example, 10.	Yes
Cache max objects	Specify the number of objects that can be stored in cache. If this limit is reached, then the oldest accessed objects will be removed from cache before any new objects are placed in the cache. For example, 200.	Yes
Validation level	Specify what required level of entity attribute in Microsoft Dynamics CRM 2011 should be treated as mandatory by the adapter. For example, System required.	
User interface language	Specify what language to be used for localized labels (entity names, attribute names, attribute descriptions, and complex properties) during design time. For example, Japanese(Japan). For more information, see *Understanding Localization* on page 39.	

7. Provide the connection information and associated parameters for the target Microsoft Dynamics CRM 2011 server according to your requirements.
8. Click *Finish* when you are done.

The new target is added under the MSCRM2011 adapter node of iWay Explorer, as shown in the following image.



Understanding Localization

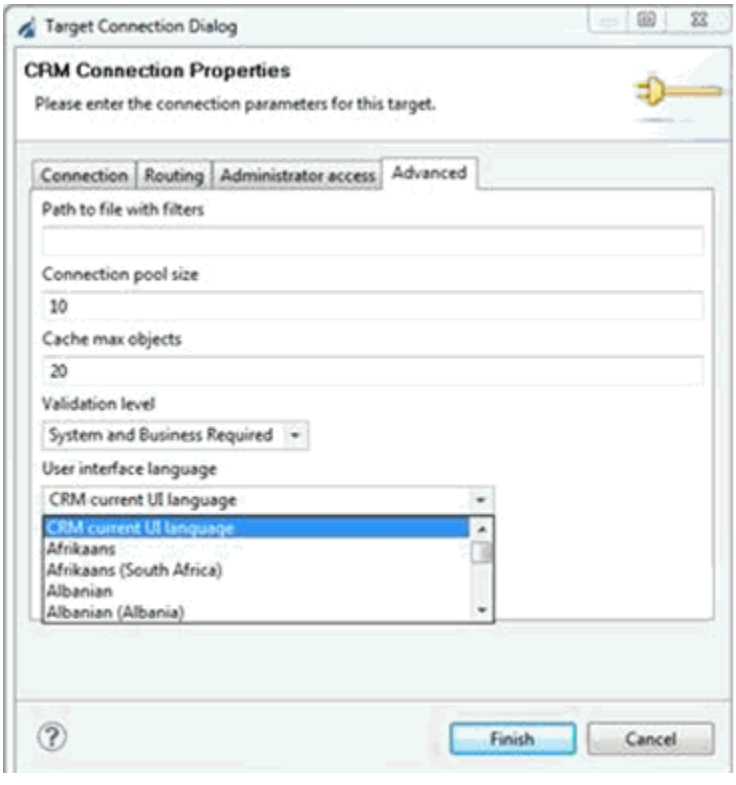
iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises can automatically resolve the current user interface language that is being used in MS CRM. This language will be used for localized labels (entity display names, attribute display names, attribute descriptions, complex properties, and other elements) during design time.

Language packs are specific to an organization within MS CRM. When additional language packs are installed on an organization in MS CRM, the options menu in the MS CRM GUI is used to specify a default language. The adapter will attempt to find the default language based on the user ID specified in the target parameters. If the specified user ID has never logged on to the MS CRM GUI before, no value will be specified for the User interface language parameter by default, and the user must select a language option from the drop-down list. The adapter shows all possible languages for MS CRM, but only the ones installed on the system for the active organization can be selected. If a language option is selected that is not installed and available for an organization in MS CRM, then an error message is displayed. The user should check with the MS CRM administrator to determine the available languages that are supported for their organization before proceeding.

When the user opens XML schemas, the current language is retrieved from MS CRM using only one request. To use this operation, the user must be granted with the prvReadUserSettings privilege. If this privilege is unavailable for the user, then an error message is displayed and the current operation is aborted.

If UI language code was retrieved, it will be inserted to a target context and will be retrieved from it every time it is needed.

Users without the prvReadUserSettings privilege can click on the Advanced tab of the CRM Connection Properties pane and select a language from the User interface language drop-down list, as shown in the following image.

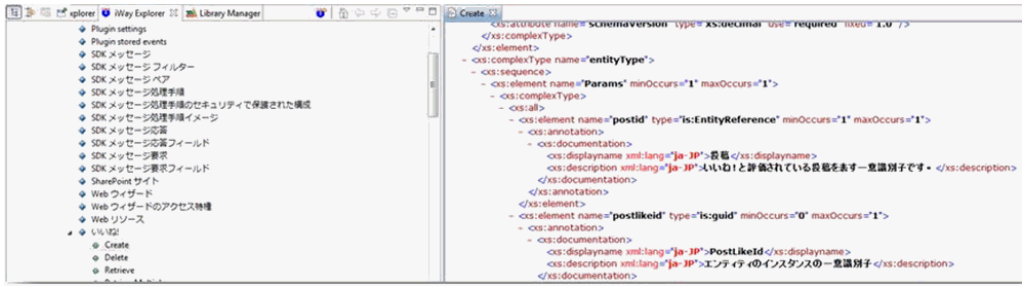


A list of locales contains all locales specified in the following website:

http://www.microsoft.com/resources/msdn/goglobal/default.aspx

If the user selects any language from the drop-down menu, no current UI language will be retrieved from MS CRM even if it is granted with appropriate privileges. If the selected language is unavailable on MS CRM, then an error will be generated. The Error description will contain the list of installed languages so the user can edit target configurations and set the UI language to one listed in the description.

If the selected language exists, then the entity tree items and localized labels in schemas and in complex properties view will be shown in it.



Note: If a newly created user connects to a target, the user may fail to retrieve the current UI language even with appropriate privileges. There are two ways to resolve the issue when creating a user in MS CRM:

- Ask the user to log in MS CRM. After that, the configuration will be applied in the database and be visible in response with all user settings.
- Manually set the user interface language for the current user. For more information, see *Manually Setting User Interface Languages* on page 172.

Understanding Administrative Credentials

For dynamic introspection of metadata, a user requires the following privileges set with *read* authority:

- Entity
- EntityMap
- Field

If a user does not have these privileges, and administrative credentials are specified, then the privileges of the admin user are used to obtain the metadata.

During runtime, the role privileges of the given user are used to execute any specified request.

Procedure: How to Connect to a Target

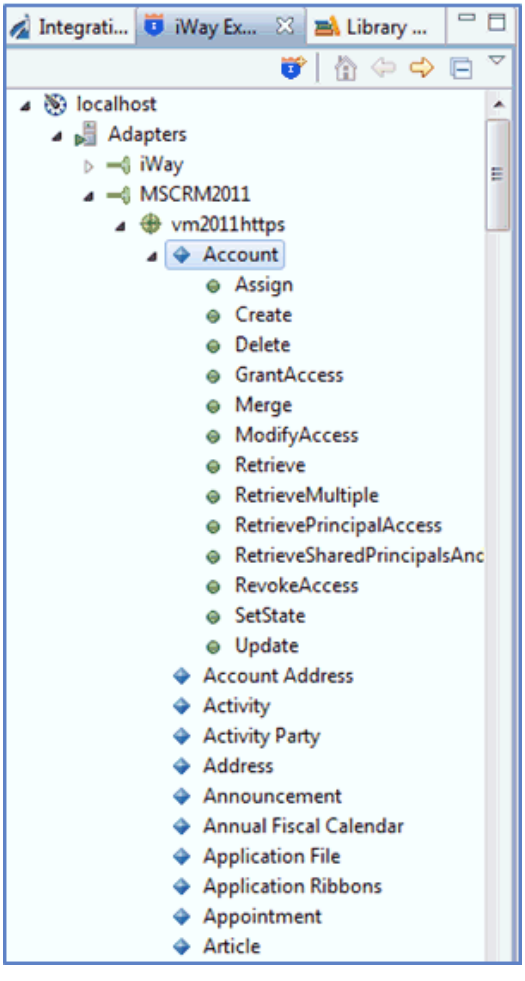
To connect to a target:

1. Expand the *MSCRM2011* node to locate the name of the target to which you want to connect.
2. Right-click the target, and click *Connect* from the menu.

The CRM Target Properties dialog box opens.

3. Enter the password that is used to connect to the Microsoft Dynamics CRM 2011 server.
4. Click *Finish*.

   The MSCRM2011 node icon changes to green, and is expanded to show the available entities on the Microsoft Dynamics CRM 2011 server to which you have connected.



Procedure: How to Disconnect From a Target

Although you can maintain multiple open connections to different application systems, it is a good practice to close a connection that is not in use.

To disconnect from a target:

1. In the tree, expand the *MSCRM2011* node to locate the name of the target from which you want to disconnect.
2. Right-click the target, and click *Disconnect from Target* from the menu.

   The connection to the target Microsoft Dynamics CRM 2011 server is closed.

Procedure: How to Edit a Target

After you create a target, you can edit the information that you provided during the creation procedure.

To edit a target:

1. In the tree, expand the *MSCRM2011* node to locate the name of the target that you want to edit.
2. Right-click the target, and click *Edit Target* from the menu.

   The CRM Target Properties dialog opens and displays the current Microsoft Dynamics CRM 2011 server target properties.
3. Modify the connection properties as required.
4. Optionally, select the *Reconnect to target upon wizard completion* check box if you want iWay Explorer to automatically connect to this target after you have edited it. iWay Explorer will use the modified properties to connect.
5. Click *Finish* when you have made your edits.

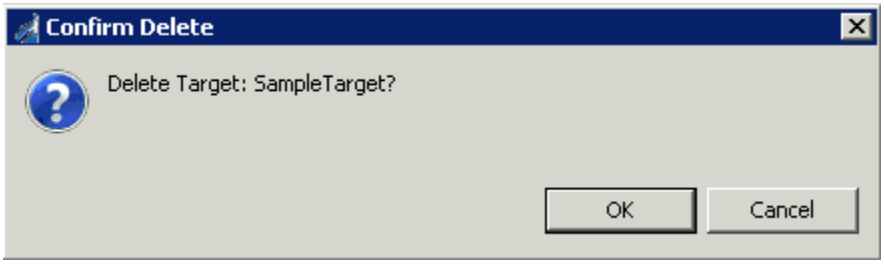
Procedure: How to Delete a Target

You can delete a target that is no longer needed. You can delete it whether or not it is closed. If open, the target automatically closes before it is deleted.

To delete a target:

1. In the tree, expand the *MSCRM2011* node to locate the name of the target that you want to delete.
2. Right-click the target, and click *Delete Target* from the menu.

iWay Explorer displays a prompt, asking you to confirm the deletion of the selected target. An example is shown below in the following image.

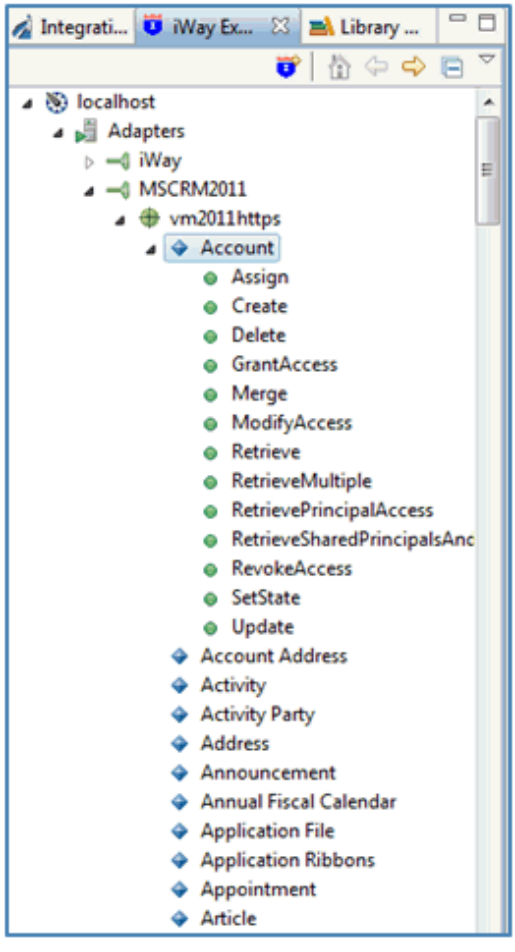


3. Click *OK* to proceed with the deletion.

Navigating the Entity and Operation Tree

After you create and connect to the target for a Microsoft Dynamics CRM 2011 server, iWay Explorer displays the entities and operations that are available on that server. You can explore and browse the metadata for these entities and operations.

The entity and operation tree displays all of the entities that are available in the MS CRM adapter target and operations for each entity. The information is represented hierarchically, where each entity node can be expanded so you can retrieve a list of operations for the selected entity. Entities and operations within an entity are sorted in alphabetical order, as shown in the following image.



The adapter includes a mechanism to filter entities and operations that are not visible. There are two filters provided by the adapter (internal and external). The internal filter contains operations that are not supported by the MS CRM 2011 Web service, according to documentation from the Microsoft website:

http://technet.microsoft.com/en-us/library/gg309493.aspx

To allow the filtering of entities, the iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises also supports an external filter. You must create an XML file using a special format and specify the path to this file in the adapter parameter. While building an entity tree, the adapter loads this file and hides the entities and operations that are specified in that file. To view a sample, see *Filter Document Sample* on page 160.

Understanding Entities in Microsoft Dynamics CRM

In Microsoft Dynamics CRM 2011, entities are used to model and manage business data. For example, entities such as Account, Campaign, and Incident (Case) can be used to track and support sales, marketing, and service activities. An entity has a set of attributes where each attribute represents a data item of a particular type. For example, the account entity includes Name, Address, and OwnerId attributes.

Conceptually, an entity can be thought of as similar to a database table, where the entity attributes correspond to table columns. An entity is both a model and a repository for data. When the entity is a model or referring to the model, it is an *entity*. When referring to data that is typed with that model, it is a plural called *entity data*. When working with a particular record, it is an *entity instance*.

The entities can be thought of in categories, like system (referring to the system itself), business (the organization data), and custom (user or vendor created). iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises supports the use of business and custom entities. Some entities are not exposed as they are used by MS CRM to handle internal processes. You can also create your own filters if you do not want certain entities exposed by the adapter.

Outside the scope of the adapter are screen-related elements, such as forms, controls, and web pages. The adapter is designed for *entities* and *operations* only. iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises only supports the On-Premises MS CRM deployment model. Cloud or Hybrid deployments of MS CRM are not supported. Contact your iWay Software Customer Support Representative if you have any questions or need further information.

After installation, custom entities can be added to MS CRM to address specific business needs of an organization. iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises supports the processing of any custom entity.

MS CRM delivers a set of operations for managing its data (entities). These operations are divided into three groups:

- **Standard.** Contains persistent storage operations, which include:
  - Create

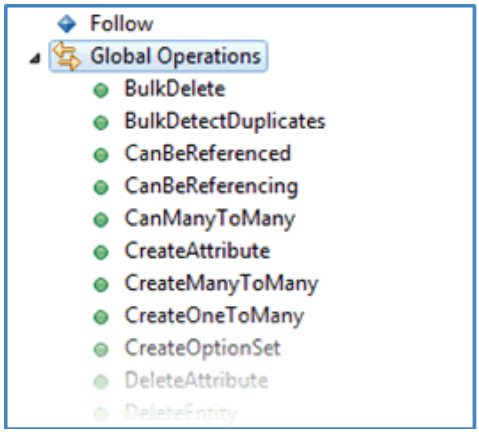
- Update
- Delete
- Retrieve (retrieves a single record)
- RetrieveMultiple (retrieves multiple records by specified criteria)

- **Advanced.** Contains operations that perform advanced manipulations of a specific entity.
- **Global.** Contains various operations for advanced purposes. Since the operations cannot be used by specific business entities, the operations are represented in the adapter entity tree by a special node for all global operations.

For more information, see the Microsoft Developer Network (MSDN) website at *http://msdn.microsoft.com* and search for the topic *Introduction to Entities in Microsoft Dynamics CRM 2011 and Microsoft Dynamics CRM Online*.

Global Operations Node

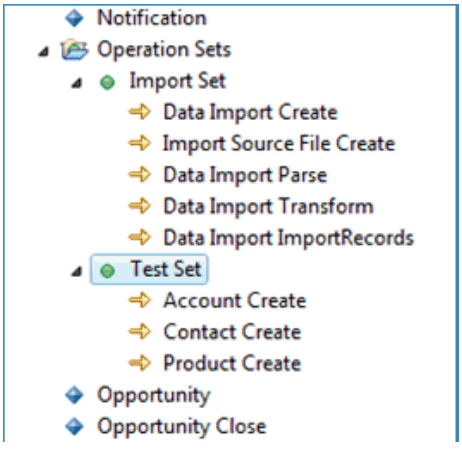
The Global Operations node represents all global operations as if they were owned by an entity with the name global operations.



Operation Sets Node

The Operation Sets node allows you to create and extend operation sets for the current target. Its child nodes represent operation sets with request units (entity/operation pairs). The request unit sequence is a sequence of requests that goes to MS CRM and return responses.

For example, the following image shows an operation set called Import Set.



The Import Set allows you to do the following actions on data import entities in one request:

- Create data import entities.
- Import source files.
- Execute import data.
- Parse import data.
- Transform import data.
- Import operations.

This operation is not transactional as internal requests (request units) are sent to MS CRM and processed there one after another.

The *New Operation Set* option, in the Operation Sets node, allows you to create a new operation set with a specified name. This name must consist of words with all lowercase letters except for the first letter. It may also contain the dash (-) sign.

Each operation set node has the following options:

- **New Request Unit.** This option allows you to create a new request unit. A special wizard is created where you can choose a specific entity and operation for it. The sequence number can also be chosen.
- **Delete.** This option allows you to delete the current operation set.

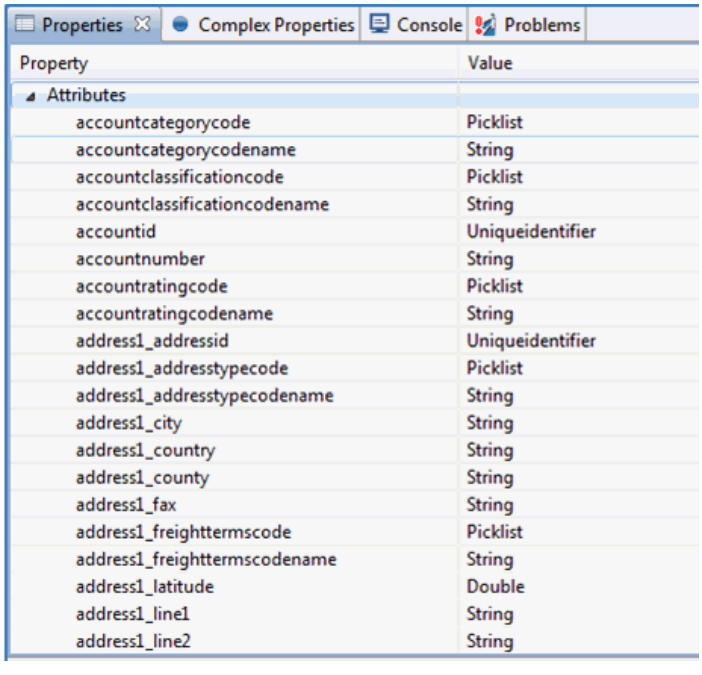
Schema operations are available for operation set nodes.

Each request unit node has the *Delete* option that allows you to delete the current request unit.

All operation sets always appear in iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises, so they will be available even after restarting iWay Service Manager (iSM). To use them in runtime, an identical target configuration must be used.

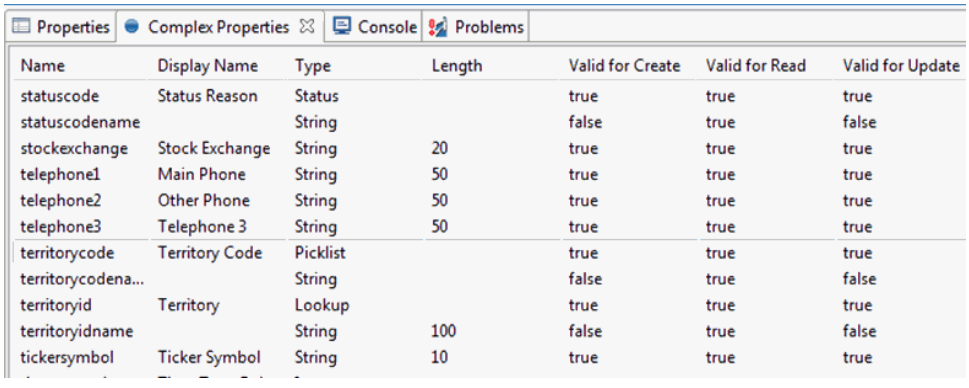
Properties and Complex Properties

Using iWay Integration Tools (iIT), you can analyze MS CRM entities in more detail using the Properties and Complex Properties tabs. For example, the following image shows the attributes for a selected entity in the Properties tab and the type of value that is allowed for each attribute.



The Properties tab displays all attributes for a selected entity in alphabetical order and their value types. It is the easiest way to see what fields are available for an entity.

The Complex Properties tab provides more information about a selected entity, as shown in the following image.



Name	Display Name	Type	Length	Valid for Create	Valid for Read	Valid for Update
statuscode	Status Reason	Status		true	true	true
statuscodename		String		false	true	false
stockexchange	Stock Exchange	String	20	true	true	true
telephone1	Main Phone	String	50	true	true	true
telephone2	Other Phone	String	50	true	true	true
telephone3	Telephone 3	String	50	true	true	true
territorycode	Territory Code	Picklist		true	true	true
territorycodena...		String		false	true	false
territoryid	Territory	Lookup		true	true	true
territoryidname		String	100	false	true	false
tickersymbol	Ticker Symbol	String	10	true	true	true

The Complex Properties tab displays additional readable names of attributes, their length (for string fields), and their availability for different kinds of operations. This information allows you to determine if an attribute is applicable for Create, Read, or Update operations.

Creating an XML Schema

You can create XML request and response schemas for the Microsoft Dynamics CRM 2011 entities that you want to use with your adapter. Optionally, you can store the schemas in a folder (directory) on your file system, using the iWay Explorer export feature.

The iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises supports the following schema types:

- Request schema (for input messages)
- Response schema (for output messages)

When schemas are generated for Create, Read, Update, and Delete (CRUD) operations, the adapter retrieves metadata with attributes from Microsoft Dynamics CRM 2011. For the current entity and its operation, the adapter checks all attributes in the metadata and transforms them to a schema. This allows all entity customizations to be reflected in a schema because the metadata is generated in real time at the moment when the schema is generated.

Schemas for advanced operations (other than CRUD operations) are generated based on MS CRM SDK classes. For more information, see *Schemas for Advanced Operations* on page 152.

There are several standard elements that are common to every XML schema, which are listed and described in the following table.

Standard Element Name	Description
entity.*operation*	Root element for input (request) schema that consists of a logical entity name and an operation separated by a period (.). For example: `account.Create`
entity.*operation*.Response	Root element for output (response) schema that consists of a logical entity name, operation, and the suffix Response separated by a period (.). For example: `account.Delete.Response`
EntityList	The container for entities.
Entity	The container for entity name and parameters.
Params	The container for entity parameters, which are taken from the metadata.

The *entity* is the logical name that is used by Microsoft Dynamics CRM 2011. A name may not always appear as it is used in the GUI. For example, kbarticle, account, and salesorder.

The schema name matches the operation name in the entity tree. For example, the Create Account operation is named Create.

To view a sample XML schema, see:

- *XML Request Schema Sample* on page 170
- *XML Response Schema Sample* on page 172

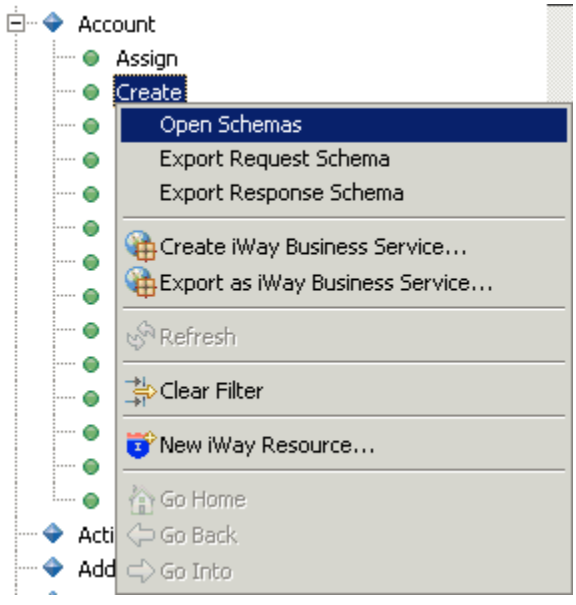
Procedure: How to Create an XML Schema

To create an XML schema:

1. Expand the connected target node and locate the method for which you want to create XML request and response schemas.

   For example, for Microsoft Dynamics CRM 2011, expand *Account* and select *Create*.

2. Right-click *Create*, and click *Open Schemas* from the menu.



iWay Explorer creates request and response schemas for the selected method. By default, the Response tab in the right pane is selected (active), and iWay Explorer displays the response schema in that pane.

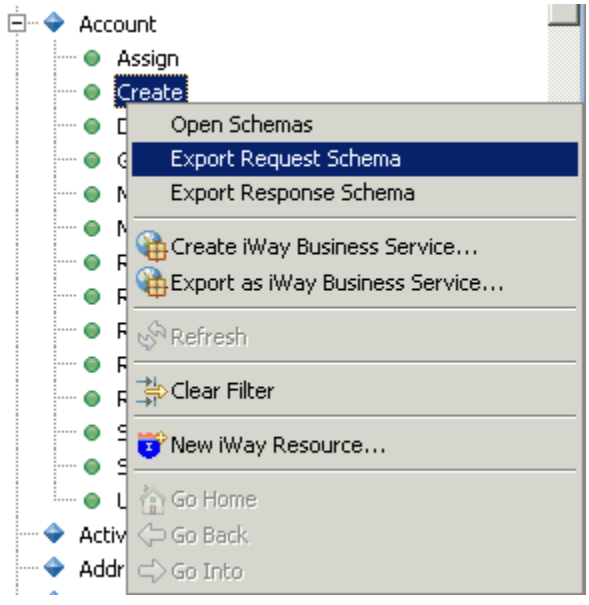
3. In the right pane, click the *Request* tab to display the request schema.

Procedure: How to Export an XML Schema

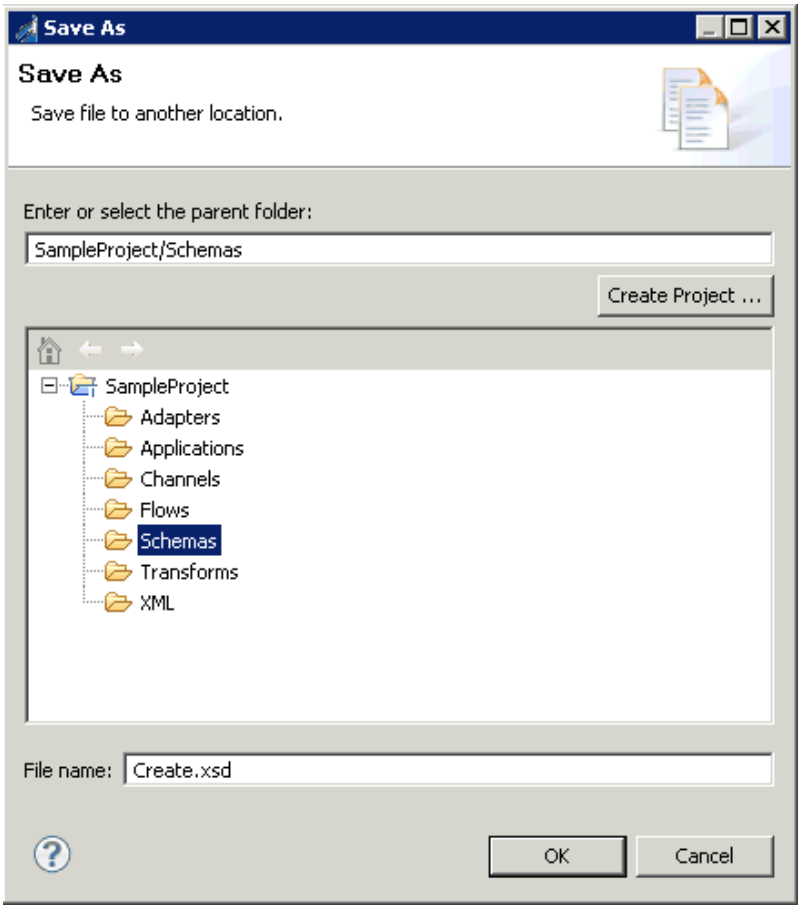
To export an XML schema:

1. Right-click the method whose schemas you want to export, for example, *Create*.

2. From the menu, click either *Export Request Schema* or *Export Response Schema*.

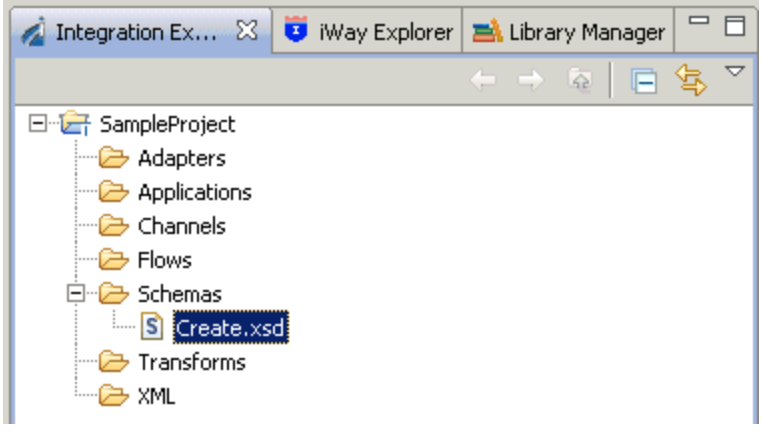


The Save As dialog box opens, as shown in the following image.



3. Select the project folder in which to store the exported schema. By default, iWay Explorer stores project files in your workspace folder.
4. Type a name for the exported schema using the following naming convention: entityname_operation.xsd. For example, *account_create*. By default, the file name extension is .xsd.
5. Click *OK* when you are done.

iWay Explorer stores the exported schema in the project folder that you selected, using the name that you supplied. An example is shown below in the following image.



Working With Adapter Schemas

When an XML schema is generated using iWay Explorer based on a selected entity and associated operation, the XML schema will also be used to create or validate an XML instance during run time. It is helpful to understand the structures of the XML schema and their relation to MS CRM parameters.

The beginning (top) of the XML schema is represented by an element that identifies the entity and operation (for example, account.Create). The sub-sequence element called EntityList allows multiple instances of the same entity and operation to be specified in the same XML instance.

The next element is called *entityType* and has a sub-sequence element called *Params* that contains the message parameters. These are the attributes that are displayed in the iWay Explorer tree and property views. Only valid parameters for the message type are represented in these parameters. If a parameter is required, it has a *minOccurs* attribute set to 1 (minOccurs="1"). If a parameter is not required, it has a *minOccurs* attribute set to 0 (minOccurs="0").

Note: While parameters are optional, if you put a parameter name in a request document, you are required to provide a value for it, even if it is not required.

Each attribute has a name, a display name, and a description, which may reflect localization if it is applied. If a parameter is a basic MS CRM data type, then its type and length are represented in the *restriction* element. If a parameter has a *droplist* type, then the values for the *droplist* selection are represented lower in the schema, within the advanced option section. The *RelatedEntities* element allows specification of the global unique ID of other entities that may be referenced in this request.

The MS CRM optional parameters Suppress Duplicates and Calculate Match codes Synchronously are advanced operations to control processing of the message.

While the XML schema for an entity and operation may contain 100 fields or more, the XML instance may have only a small number of fields necessary for the current operation. To view sample XML request and response schemas for MS CRM, see:

- *XML Request Schema Sample* on page 170
- *XML Response Schema Sample* on page 172

Creating Business Services

iWay Explorer provides developers with a simple, consistent mechanism for extending the capabilities of an iWay adapter. The iWay Business Services Provider (iBSP) exposes iWay functionality as a number of web services. It serves as a gateway to heterogeneous backend applications and databases.

A web service is a self-contained, modularized function that you can publish and access across a network using open standards. It is the implementation of an interface by a component, and is an executable entity. For the caller or sender, a web service can be considered a black box that may require input while typically delivering a result.

Web services integrate within an enterprise, and across enterprises on any communication technology stack, whether asynchronous or synchronous, in any format.

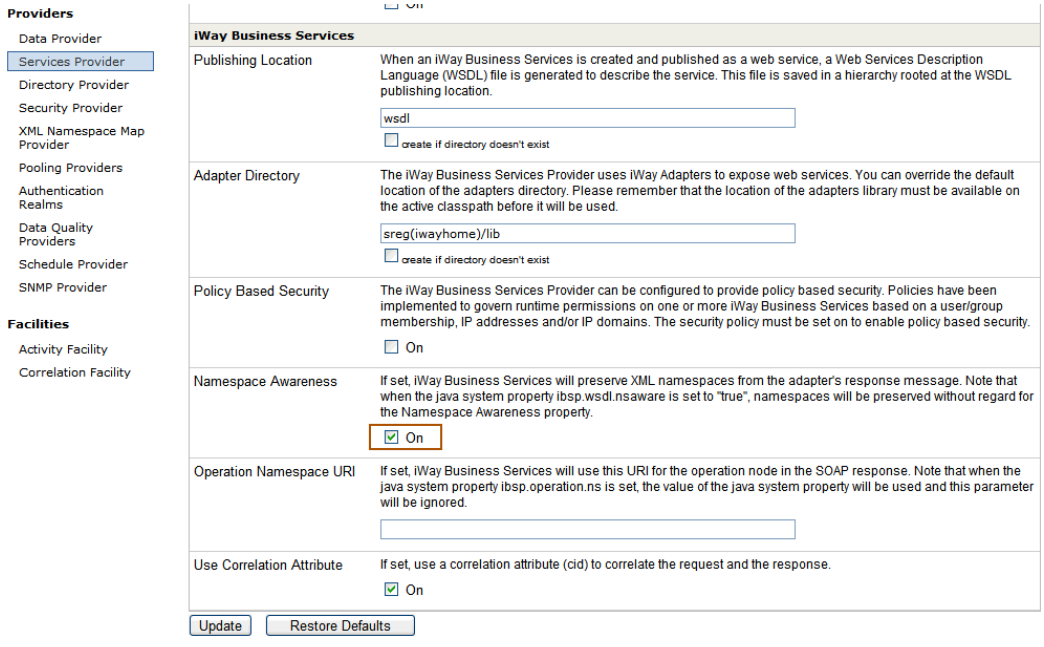
Creating an iWay Business Service

After you generate XML schemas for a Microsoft Dynamics CRM 2011 entity using iWay Explorer, you can create an iWay Business Service for that entity. iWay Business Services can be created for all operations exposed by iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises, including Global Operations and Custom Operation sets.

The Web Service Description Language (WSDL) file is an XML file that describes the web service documents and provides access to the service. It specifies the location of the service and the operations (or methods) that the service exposes.

You can delete an iWay Business Service that is no longer required.

Note: To generate valid WSDL files, the Namespace Awareness option must be enabled (set to On) in the Services Provider page of the iWay Service Manager Administration Console before iWay Business Services are created. For example:

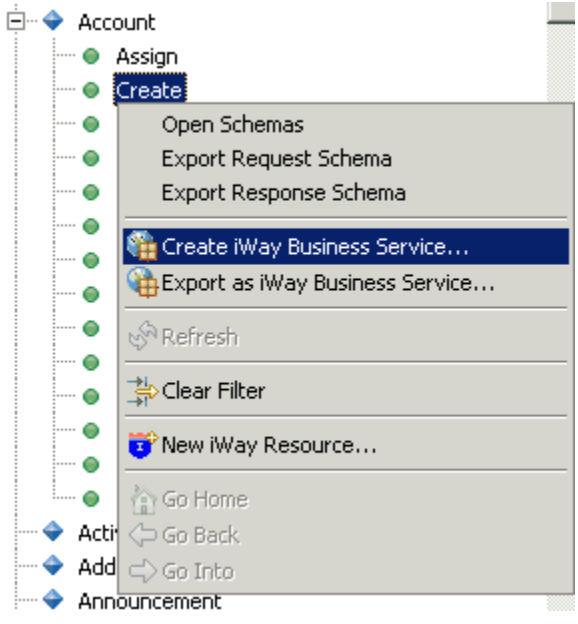


Note: For compatibility with Microsoft web services, uncheck the Use Correlation Attribute parameter.

Procedure: How to Create an iWay Business Service

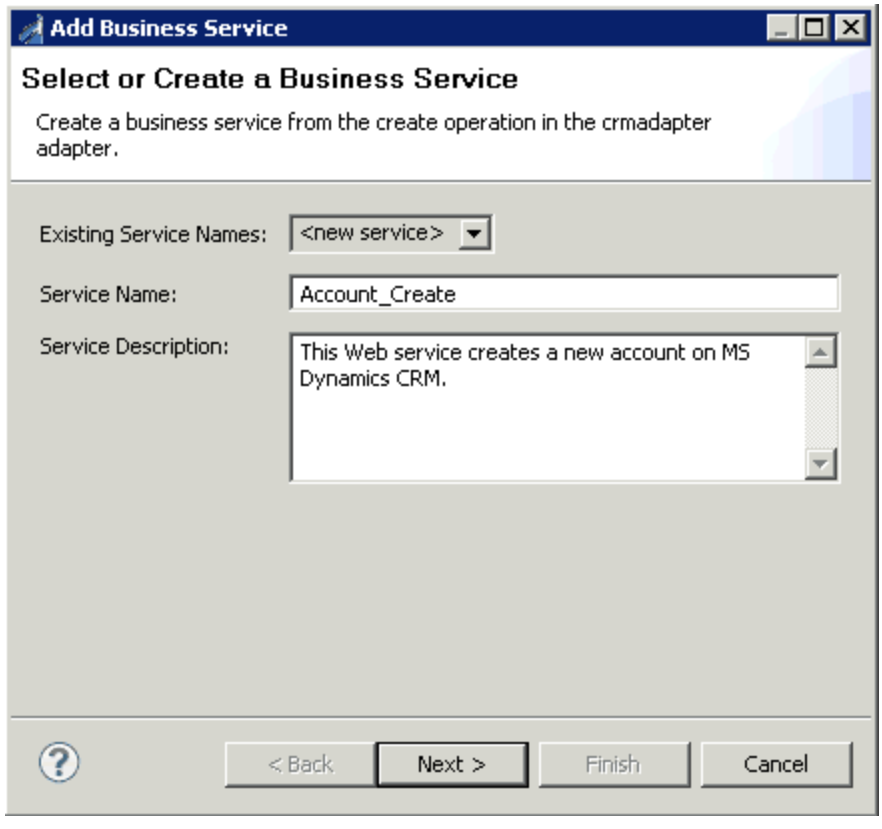
To create an iWay Business Service:

1. In iWay Explorer, expand the target node to which you are connected and locate the method for which you want to create an iWay Business Service. For example:



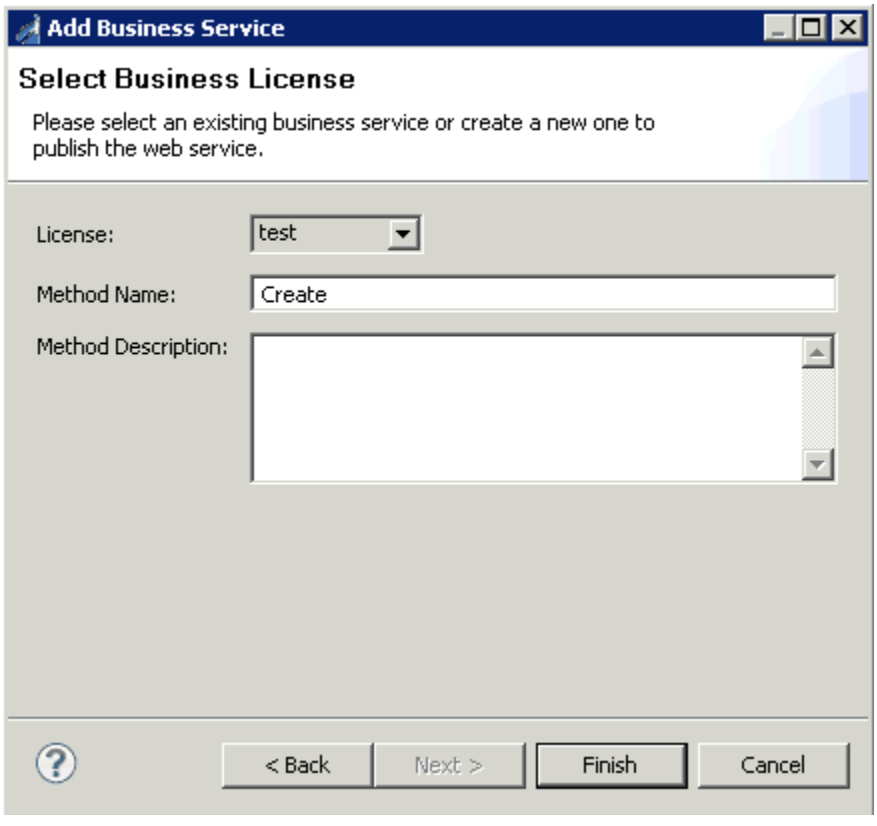
2. Right-click the method, for example, *Create*, and click *Create iWay Business Service* from the menu.

The Select or Create a Business Service dialog box opens, prompting you for information about the new service.



3. Supply the values for the fields on the dialog box as follows.
   a. From the Existing Service Names drop-down list, click *<new service>* if you want to create a new service name, or select an existing service name.
   b. If you are creating a new service name, type the name in the Service Name field, for example, *Account_Create*.
   c. In the Service Description field, optionally type a brief description of the new business service.
4. Click *Next*.

The Select Business License dialog box opens.



5. Supply the values for the fields on the dialog box as follows.

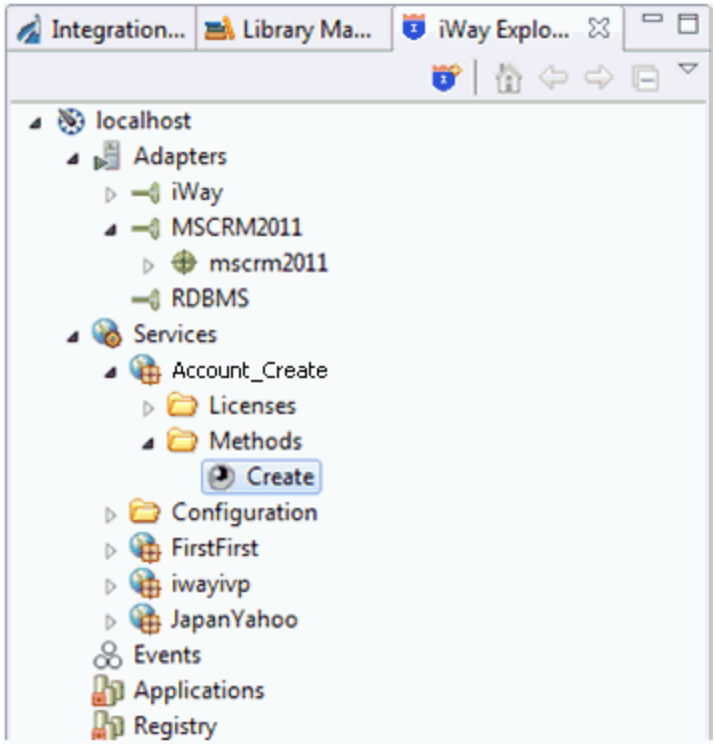
   a. From the License drop-down list, select the license definition that you want to use with this business service.

   b. In the Method Name field, accept the default value, or type a descriptive name for the method that the service exposes.

   c. In the Method Description field, optionally type a brief description of the method.

6. Click *Finish*.

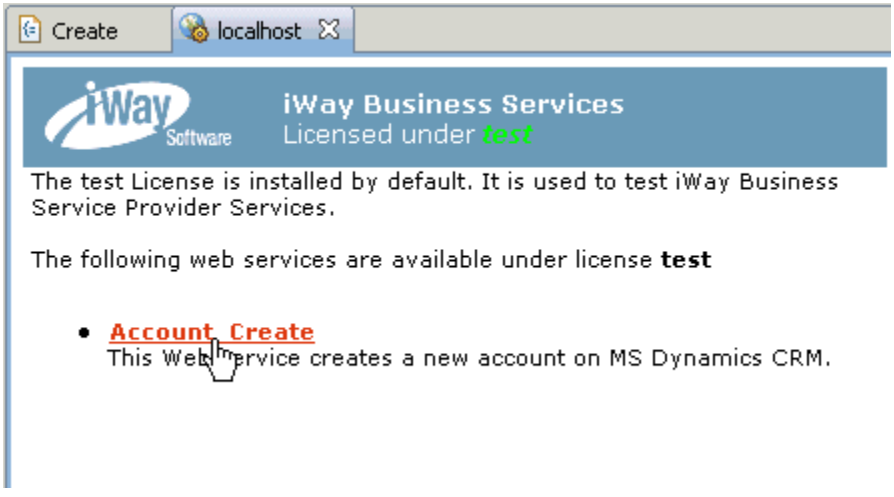
The new iWay Business Service is listed under the Services node in the tree, as shown in the following image.



The right pane displays the available licenses.

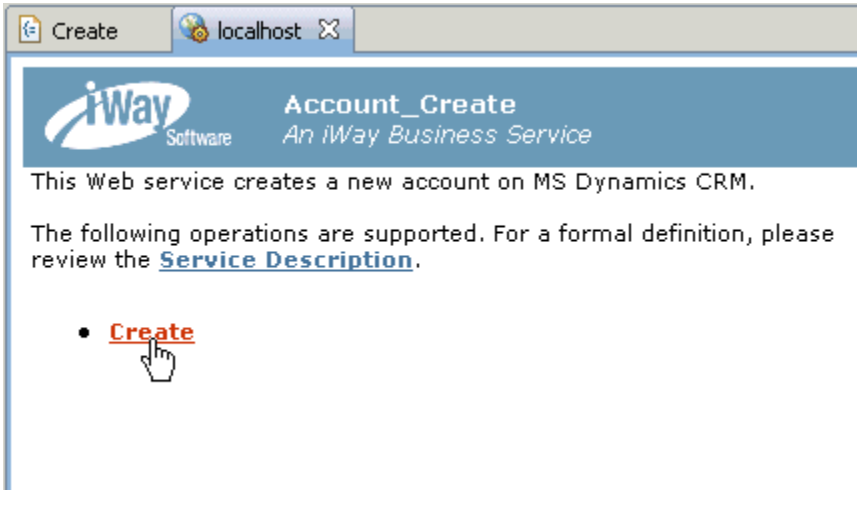
7. To test the new iWay Business Service, click the *test* link in the right pane.

The iWay Business Services that are licensed under test are displayed.



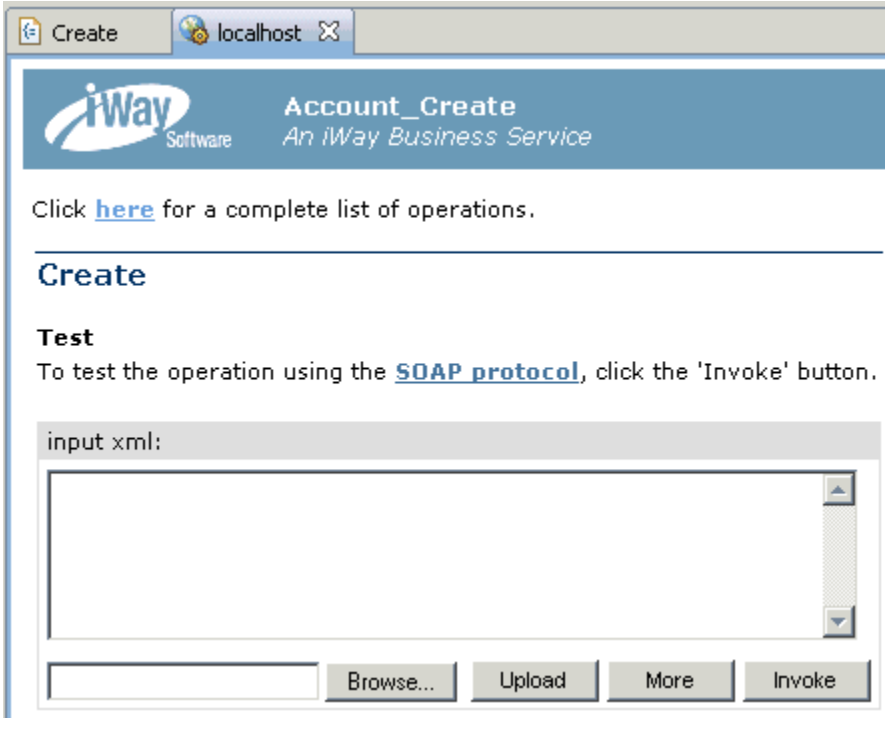
8. Click the *Account_Create* link.

   The operations (methods) that are supported by the iWay Business Service are displayed.



9. Click the *Create* link.

The test pane for the Create method opens.

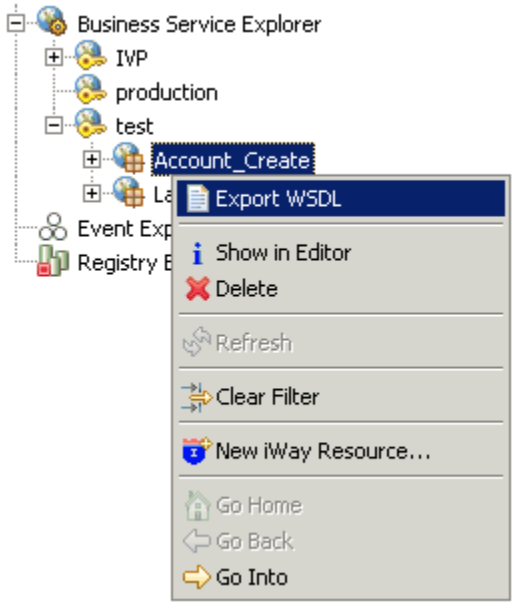


10. In the input xml field, enter an XML request document that queries the iWay Business Service named Account_Create.
11. Click *Invoke*.
    The result of the test is displayed in the right pane.

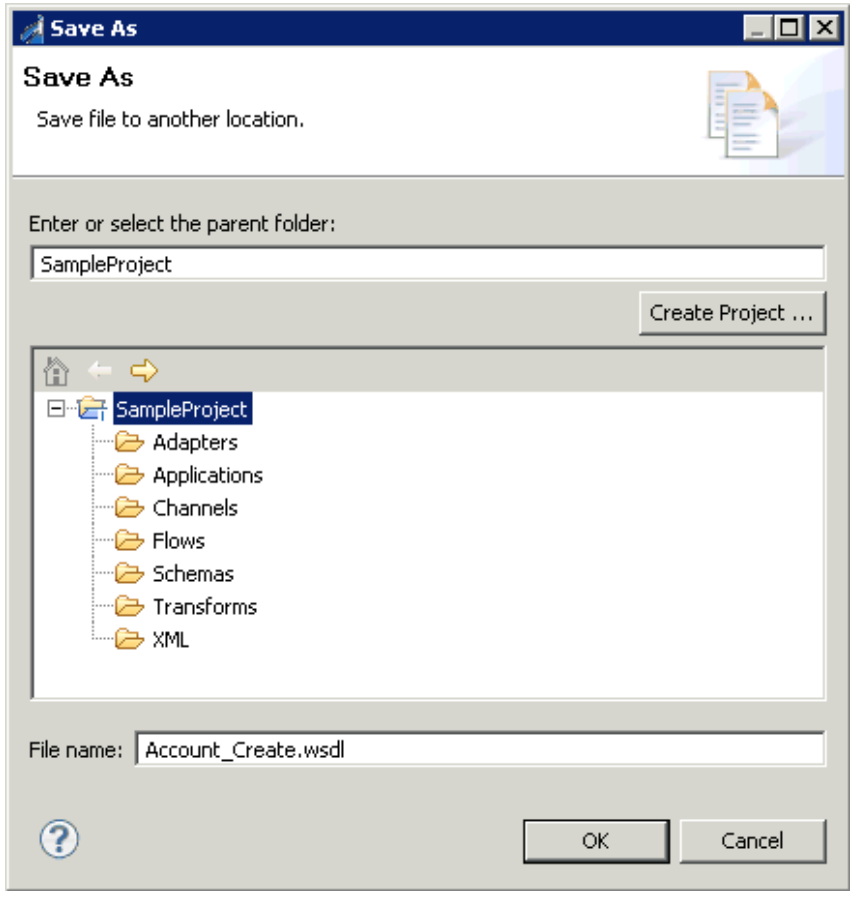
Procedure: How to Export a WSDL File

1. Expand the tree in the Services node to locate the name of the iWay Business Service whose WSDL file you want to export.

2. Right-click the name of the iWay Business Service, for example, *Account_Create*, and click *Export WSDL* from the menu.

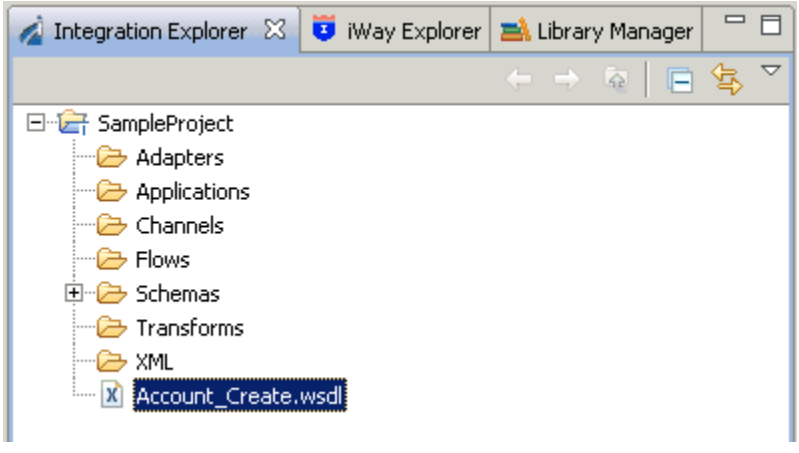


The Save As dialog box opens, as shown in the following image.



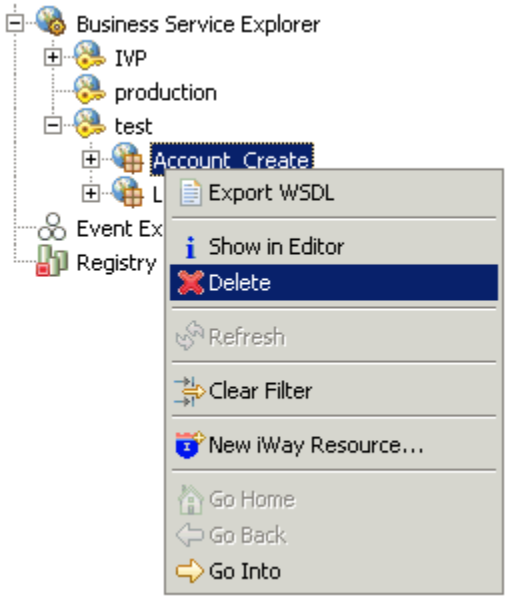
3. Select the project folder in which to store the exported WSDL file. By default, iWay Explorer stores project files in your workspace folder.
4. Type a name for the exported WSDL file. By default, the file name extension is .wsdl.
5. Click *OK* when you are done.

The exported WSDL file is stored in the project folder that you selected, using the name that you supplied. For example:

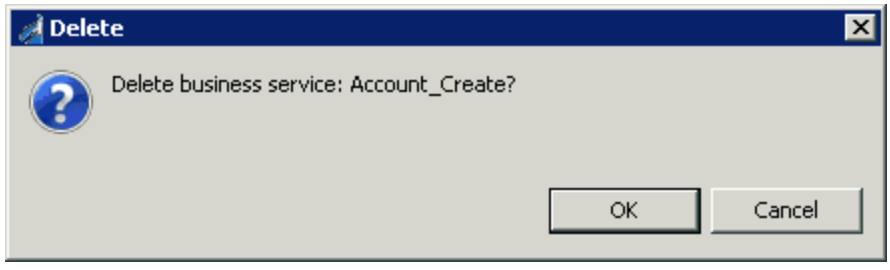


Procedure: How to Delete an iWay Business Service

1. Expand the tree in the Services node to locate the name of the iWay Business Service that you want to delete.
2. Right-click the name of the iWay Business Service, for example, *Account_Create*, and click *Delete* from the menu.



A prompt is displayed, asking you to confirm the deletion of the selected iWay Business Service, as shown in the following image.



3. Click *OK* to proceed with the deletion.

Chapter 5

Run Time Concepts and Configuration Tasks

This section describes run time concepts and configuration tasks for the iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises.

In this chapter:

Create, Read, Update, and Delete Operations

The iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises can perform Create, Read, Update, and Delete operations for entities that support these operations (subject to validation rules). To view sample request and response documents, see *Create and Update Operation Samples* on page 162.

Related entities are part of the entity class from MS CRM SDK. For more information, see the following website:

http://msdn.microsoft.com/en-us/library/microsoft.xrm.sdk.entity.relatedentities.aspx

Compound Operations

Compound operations allow you to create or update a parent entity and its children as one action. For example, you can place an entity order with ordered products and invoice with invoiced products. For a complete list, consult the Microsoft documentation for MS CRM 2011.

Compound operations are supported for the following entities:

- invoice
- salesorder

- duplicaterule
- quote

Since compound operation request messages have been deprecated in MS CRM 2011, it is recommended to use Create and Update operations with the related entities.

For more information, see the Microsoft Developer Network (MSDN) website at *http://msdn.microsoft.com* and search for the topic *Messages Deprecated in Microsoft Dynamics CRM 2011*. The following is the current URL for this topic:

http://msdn.microsoft.com/en-us/library/gg509038.aspx

To view a sample compound operation document, see *Compound Operation Sample* on page 165.

Advanced Operations

The iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises also supports advanced operations that are declared in WSDL documents. These operations are specific for each entity. It is possible to generate XML schemas for advanced operations that are supported and create input messages based on the schema. For more information, see *Advanced Operations* on page 133 and *Schemas for Advanced Operations* on page 152.

Operation Sets

Operation sets (linked operations) can be executed as follows:

- The input message is validated according to the generated input schema for the current operation set. This operation set must be continued for the current target configuration (adapter target). This means that you must create it using iWay Explorer before processing. If no operation with a defined name is found, then the corresponding exception is generated. If an XPath expression is found as a value for some node, then it will not be validated.
- The input message is separated into request units. These request units are simple requests for some entity or operation pair. Each request unit is processed without validation. If an XPath expression is found as a value for some node, then the corresponding value from the previous response will be substituted. If no value is found, then an empty value is returned. An invalid XPath expression returns a corresponding exception.

  The following is an example of an XPath expression:

  ```
  <is:Status>${//crm:account.Create.Response/crm:EntityList/crm:Entity/
  crm:Status}</is: Status >
  ```

Note: XML Path Language (XPath) version 1.0 is currently supported.

- To view a sample output file that is returned where all responses are merged, see *Linked Operation Output Sample* on page 167.

Retrieving Multiple Requests

The RetrieveMultiple operation provides more capabilities to select data from Microsoft Dynamics CRM. The following types of RetrieveMultiple operations can be configured:

- **SelectById.** This operation enables iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises to search for the specified entity by the specified GUID. In a situation where the entity with such a GUID does not exist, an empty result is returned. This is one of the primary differences between this operation and the Retrieve operation. The Retrieve operation returns an error message instead of an empty result. Another difference is that Microsoft Dynamics CRM truncates long text data in results of RetrieveMultiple operations up to 2000 characters.

- **SelectAll.** In this operation, the adapter returns all of the entities for the specified type. No data is truncated for this type of RetrieveMultiple operation.

  Note: Because of a large amount of entities, the adapter can take an extended period of time to perform this operation, which can exhaust your system memory resources.

- **SelectByCondition.** This is the most flexible type of RetrieveMultiple operation. You can specify several conditions and logical operators for this operation. The following is the structure of a SelectByCondition:

  ```
  <AttributeName>...</AttributeName>
  <Operator>...</Operator>
  <Value>...</Value>
  ```

  The following SelectByCondition example uses sample parameters:

  ```
  <AttributeName>invoice_number</AttributeName>
  <Operator>Equal</Operator>
  <Values>
      <Value>1234567</Value>
  </Values>
  ```

  You can specify as many conditions as you require. All of the conditions are added with only one logical operator, *And* or *Or*. The *And* logical operator only returns entities that satisfy all of the specified conditions. The *Or* logical operator only returns entities that satisfy at least one specified condition. You can combine different conditions.

Note: Specifying more conditions will return more specific data from Microsoft Dynamics CRM. However, a lower number of results are returned. Specifying less conditions will return a greater number of results. However, these results tend to be less accurate.

The following table shows the logical operators for attributes and values that iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises supports.

Operator	Description
BeginsWith	The string occurs at the beginning of another string.
Between	The value is between two values.
ChildOf	Currently unsupported.
DoesNotBeginWith	The string does not begin with another string.
DoesNotEndWith	The string does not end with another string.
EndsWith	The string ends with another string.
Equal	The values are compared for equality.
EqualBusinessId	The value is equal to the specified business ID.
EqualUserId	The value is equal to the specified user ID.
EqualUserLanguage	The value is equal to the language for the user.
EqualUserTeams	The record is owned by teams that the user is a member of.
GreaterEqual	The value is greater than or equal to the compared value.
GreaterThan	The value is greater than the compared value.
In	The value exists in a list of values.

Operator	Description
InFiscalPeriod	The value is within the specified fiscal period.
InFiscalPeriodAndYear	The value is within the specified fiscal period and year.
InFiscalYear	The value is within the specified year.
InOrAfterFiscalPeriodAndYear	The value is within or after the specified fiscal period and year.
InOrBeforeFiscalPeriodAndYear	The value is within or before the specified fiscal period and year.
Lasy7Days	The value is within the last seven days including today.
LastFiscalPeriod	The value is within the last fiscal period.
LastFiscalYear	The value is within the last fiscal year.
LastMonth	The value is within the last month including first day of the last month and last day of the last month.
LastWeek	The value is within the previous week including Sunday through Saturday.
LastXDays	The value is within last X days.
LastXFiscalPeriods	The value is within the last X (specified value) fiscal periods.
LastXFiscalYears	The value is within the last X (specified value) fiscal periods.
LastXHours	The value is within the last X hours.
LastXMonths	The value is within the last X (specified value) months.

Operator	Description
LastXWeeks	The value is within the last X (specified value) weeks.
LastXYears	The value is within the last X years.
LastYear	The value is within the previous year.
LessEqual	The value is less than or equal to the compared value.
LessThan	The value is less than the compared value.
Like	The character string is matched to the specified pattern.
Mask	The value is found in the specified bit-mask value.
MaskSelect	Currently unsupported.
Next7Days	The value is within the next seven days.
NextFiscalPeriod	The value is within the next fiscal period.
NextFiscalYear	The value is within the next fiscal year.
NextMonth	The value is within the next month.
NextWeek	The value is within the next week.
NextXDays	The value is within the next X (specified value) days.
NextXFiscalPeriods	The value is within the next X (specified value) fiscal period.
NextXFiscalYears	The value is within the next X (specified value) fiscal years.
NextXHours	The value is within the next X (specified value) hours.

Operator	Description
NextXMonths	The value is within the next X (specified value) months.
NextXWeeks	The value is within the next X weeks.
NextXYears	The value is within the next X years.
NextYear	The value is within the next year.
NotBetween	The value is not between two values.
NotEqual	The two values are not equal.
NotEqualBusinessId	The value is not equal to the specified business ID.
NotEqualUserId	The value is not equal to the specified user ID.
NotIn	The given value is not matched to a value in a subquery or a list.
NotLike	The character string does not match the specified pattern.
NotMask	The value is not found in the specified bit-mask value.
NotNull	The value is not null.
Null	The value is null.
OlderthanXMonths	The value is older than the specified number of months.
On	The value is on a specified date.
OnOrAfter	The value is on or after a specified date.
OnOrBefore	The value is on or before a specified date.

Operator	Description
ThisFiscalPeriod	The value is within the current fiscal period.
ThisFiscalYear	The value is within the current fiscal year.
ThisMonth	The value is within the current month.
ThisWeek	The value is within the current week.
ThisYear	The value is within the current year.
Today	The value equals the date today.
Tomorrow	The value equals the date tomorrow.
Yesterday	The value equals the date yesterday.

Many of the operators are type-specific. For some logical operators (for example, In), it is possible to specify more than one value for an attribute. In this case, all <Value> elements must be included within the <Values> element, as shown below:

```
<Values>...</Values>
```

Other logical operators require no values. For such operations, the <Value> element must be omitted.

The condition operator, *Like*, allows you to perform pattern matching.

You can choose from the following patterns:

- **Percent Character (%).** This allows you to match any string of any length (including zero length).
- **Underscore Character (_).** This allows you to match a single character.

The following example shows the use of a percent character (%) wildcard:

```
<Condition>
    <AttributeName>name</AttributeName>
    <Operator>Like</Operator>
    <Values>
        <Value>My%</Value>
    </Values>
</Condition>
```

The result returns all entities whose name begins with *My*.

The following example shows the use of an underscore character (_) wildcard:

```
<Condition>
    <AttributeName>name</AttributeName>|
    <Operator>Like</Operator>
    <Values>
        <Value>My_ccount1</Value>
    </Values>
</Condition>
```

The result returns the entity whose name is 10 characters long, where the first two characters are *My*, and the last seven characters is *ccount1*.

The following is an example of a condition by multiple fields.

```
<Criteria>
    <Conditions>
        <ConditionExpression>
            <AttributeName>name</AttributeName>
            <Operator>Equal</Operator>
            <Values>
                <Value>Some Account</Value>
            </Values>
        </ConditionExpression>
    </Conditions>
    <FilterOperator>And</FilterOperator>
    <Filters>
        <is:FilterExpression>
            <is:Conditions>
                <is:ConditionExpression>
                    <is:AttributeName>accountnumber</is:AttributeName>
                    <is:Operator>Equal</is:Operator>
                    <is:Values>
                        <is:Value>2</is:Value>
                    </is:Values>
                </is:ConditionExpression>
            </is:Conditions>
            <is:FilterOperator>And</is:FilterOperator>
        </is:FilterExpression>
    </Filters>
</Criteria>
```

FilterExpression can also contain other filter expressions. It allows the creation of very complex and powerful conditions.

The RetrieveMultiple request contains the following parameters:

Parameter	Description	Operation
ColumnSet	This defines the attributes, which are included in the response document. All the existing attributes will be returned by MS CRM in an instance document, when this element is skipped.	All
LinkEntities	This defines the filtering of records in a response document by the values of attributes of some related entities.	All
NoLock	This retrieves or sets a value that indicates that no shared locks are issued against the data that would prohibit other transactions from modifying the data in the records returned from the query.	All
Distinct	This retrieves or sets whether the results of the query contain duplicate entity instances.	SelectAll, SelectByCondition
Orders	This is the order in which the entity instances are returned from the query.	SelectAll, SelectByCondition
PageInfo	This retrieves or sets the number of pages and the number of entity instances per page returned from the query. The response contains related information, including the total record count (if requested) and paging cookie (a string generated from requested paging criteria that may be used in the next requests to fasten data retrieval).	Select All, SelectByCondition

Note: Use paging if you expect large datasets to be returned. Large amounts of data may cause excessive memory consumption in the adapter, and cause errors or exceptions to be generated. Try to restrict the returned data with more precise selections and retry the request.

Validating Input Messages

Every input message that is received by iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises is validated before being sent to Microsoft Dynamics CRM. The validation decreases the load on the target MS CRM system, and provides faster return times in the event of invalid messages.

MS CRM has internal validation rules on many attributes, and it is more efficient to allow MS CRM to validate these values. MS CRM metadata can be changed by customization or updates, so strict validation of messages could prevent the execution of some important operations.

The adapter checks contain a limited set of rules that are required. These rule names are derived from the XML parser exceptions of the same name, which are derived from W3C implementation guidelines. The rules are listed and described in the following table. Validation mechanisms allow checked rules to be easily extended.

Code	Message	Comment
`cvc-attribute.3`	The value *{2}* of attribute *{1}* on element *{0}* is not valid with respect to its type, *{3}*.	The input value of the indicated attribute must match the fixed list of attribute values provided.
`cvc-complex-type.3.1`	The value *{2}* of attribute *{1}* of element *{0}* is not valid with respect to the corresponding attribute use. The attribute *{1}* has a fixed value of *{3}*.	The input value of the indicated attribute in a complex type (structure) must match the fixed list of attribute values provided.
`cvc-complex-type.4`	The attribute *{1}* must appear on element *{0}*.	A required attribute for an element in a complex type is missing.
`cvc-complex-type.2.4.a`	An invalid content was found starting with element *{0}*. One of *{1}* is expected.	A required element in a complex type is missing.

Code	Message	Comment
cvc-complex-type.2.4.b	The content of element *{0}* is not complete. One of *{1}* is expected.	A complete group of elements to form a complex type is not provided, the data is incomplete.
cvc-pattern-valid	The value *{0}* is not facet-valid with respect to pattern *{1}* for type *{2}*.	The data provided is not valid for the pattern defined for the set of values.
cvc-complex-type.2.2	Element *{0}* must have no element (children), and the value must be valid.	The data defined must not be part of a set, and must match the restrictions defined in the schema.

If the validator fails the input message, then an XML document similar to the one reproduced below is received, which contains an error description:

```
<crm:account.Create.Response schemaVersion="1.0"
xmlns:crm="urn:iwaysoftware:adapter:MSCRM2011:account:Create.Response"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
    <crm:Error>cvc-complex-type.2.4.b The content of element
&amp;apos;crm:Params&amp;apos; is not complete. One of
&amp;apos;
{&amp;quot;urn:iwaysoftware:adapter:MSCRM2011:account:Create&amp;quot;:accountcategorycode,
&amp;quot;urn:iwaysoftware:adapter:MSCRM2011:account:Create&amp;quot;:overriddencreatedon,
&amp;quot;urn:iwaysoftware:adapter:MSCRM2011:account:Create&amp;quot;:ownerid,
&amp;quot;urn:iwaysoftware:adapter:MSCRM2011:account:Create&amp;quot;:ownershipcode,
&amp;quot;urn:iwaysoftware:adapter:MSCRM2011:account:Create&amp;quot;:preferredequipmentid,
&amp;quot;urn:iwaysoftware:adapter:MSCRM2011:account:Create&amp;quot;:preferredserviceid}&amp;apos;
 is expected.
    </crm:Error>
</crm:account.Create.Response>"
```

The message is taken from the validator without any further processing.

If the validator finds more than one error, then all of the errors will be displayed. The request will not be sent to MS CRM in case of a validation failure.

Validation Level

Due to business reasons, you may have to weaken validation or disable it all together. For this purpose, iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises has a special parameter named Validation Level. It is represented as a drop-down list containing the following options:

- **System Required.** Only attributes, which have this required level in MS CRM metadata, are mandatory in the input XML.
- **System and Business Required.** Attributes having one of these required levels must be marked as required and validated. This is the most strict validation level and is also the level by default.
- **None.** No attributes should be marked as mandatory and therefore no attributes are validated.

Note: This parameter affects entity attributes only. Other elements, such as EntityList, are structural elements that must be present in all input messages. These elements are always validated.

For a complete understanding of validation and security, see:

http://msdn.microsoft.com/en-us/library/gg309524.aspx

If this link is not available, then search for the Microsoft MSDN topic called *The Security Model of Microsoft Dynamics CRM*.

Users are assigned to roles. Privileges are assigned to roles. Privilege depth or access level determine the validation of the *System Required*, *System and Business Required*, and *None* settings of the adapter.

For more information, see *Understanding Administrative Credentials* on page 41.

Error Handling

If a message is valid against the formal rules of the validator, it is transformed to a SOAP request and sent to Microsoft Dynamics CRM. MS CRM verifies the request against business rules and may produce an error message. iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises handles such messages and produces XML documents according to XML schemas with error messages. Each response has the following two elements:

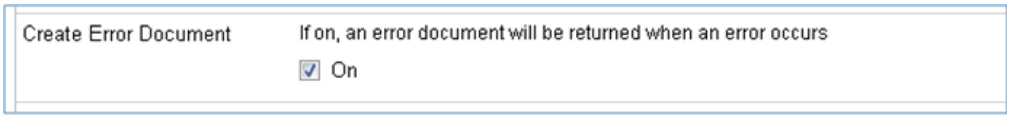
- Error
- Status

```
<xs:element name="Error" type="xs:string" minOccurs="0" />
<xs:element name="Status" minOccurs="1" maxOccurs="1">
    <xs:simpleType>
        <xs:restriction base="xs:string">
            <xs:enumeration value="Fail" />
            <xs:enumeration value="Success" />
        </xs:restriction>
    </xs:simpleType>
</xs:element>
```

Element Status indicates whether the result of the execution was a success or failure. Since this element is mandatory, it is present in each response produced by iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises.

Element Error is present only when the request execution failed. This element contains error messages as it is returned by MS CRM.

An error may occur before the message is processed in MS CRM. For example, you can receive an error if the network is unreachable or if the authentication has failed. In this case, the infrastructure of the adapter is responsible for the error message. Each adapter has additional parameters in runtime which regulates how to process any non-business errors.



If the Create Error Document checkbox is selected (set to On), then the following XML document is received, which contains an error description:

```
<AdapterException AdapterClass="com.ibi.mscrm2011.adapter.CRMAdapter">
  Error occurred during processing input CRM message: The target server
failed to respond
</AdapterException>
```

If the Create Error Document checkbox is not selected, then the following low-level error message is received:

```
<eda>
    <error timestamp="2012-08-16T16:00:51Z" code="6" stage="AGENT"
source="com.ibi.agents.XDAdapterAgent">
Problem processing agent request, type FAIL, source AGENT: getMessage():
Error occurred during processing input CRM message int getError(): Client
getAdapterCode():
null getVendorThrowable(): com.ibi.mscrm2011.adapter.XmlException: Parse
failure: org.xml.sax.SAXParseException: Premature end of file.
<data type="xml">
<?xml version="1.0" encoding="UTF-8"?> <account.Assign
xmlns="urn:iwaysoftware:adapter:MSCRM2011:account:Assign" xmlns:xsi="http://
www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="urn:iwaysoftware:adapter:MSCRM2011:account:Assign
file:/D:/iway/project/CRM2011NativeMode/Adapter/src/main/resources/
NewXMLSchema.xsd" schemaVersion="1.0">
<EntityList>
    <Entity>
        <Params>
            <Target> <Id>0B096E25-07D7-E111-BC89-0050568845D9</Id>
                <LogicalName>account</LogicalName>
                <Name>www</Name>
            </Target>
            <Assignee>
                <Id>EFBDF25E-3D8D-E111-A4C8-0050568845D9</Id>
                <LogicalName>systemuser1</LogicalName>
                <Name>Name1</Name>
            </Assignee>
        </Params>
    </Entity>
</EntityList>
</account.Assign>
</data>
</error>
</eda>
```

Caching

iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises caching provides a mechanism that transparently stores data so that future requests for that data can be served faster. The current adapter cache implementation stores the following two types of data:

- MS CRM 2011 metadata
- Input/output schema instances

Each unique target configuration owns its own cache instance. Two targets are unique if their parameters are completely equal. For example, if a user connects to a target, then its cache instance is created and stored in a cache collection. If this user (or another user) connects to a different target with identical parameters, the cache instance is reused and is not created. Cache instances are removed when the last user that uses it disconnects from a target.

The following two ways are used if a user wants to reset the cache:

- Disconnect from all targets that use the same cache instance.
- Restart iWay Service Manager (iSM).

Metadata Caching

Caching of metadata allows you to control time and traffic while requesting it from MS CRM. Metadata is needed for schema generation, input and output transformation, generation of the iIT tree, and better performance. Memory saving all metadata is filtered so that it contains only information necessary for regular adapter execution.

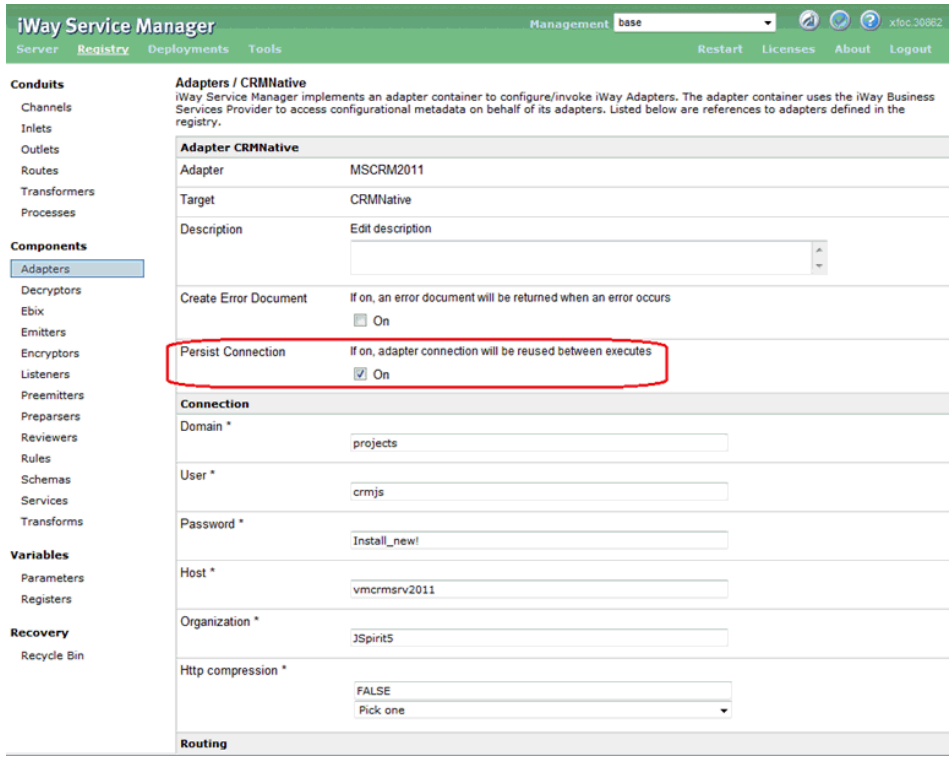
Schemas Caching

If you select any operation for a specific entity, input and output schemas will be saved to the cache and can be retrieved from it at a later time. Cached schemas are also used for input file validation.

Configuring Cache

Cache configuration is represented only by the *Cache max objects* option within the *Advanced* group in the iIT target creation wizard. This setting defines the maximum number of objects in a cache. If the limit of cache expires, the most rarely used object is removed. It is recommended to set this number to less than 100, since the average filtered metadata size is about 600-800 kb. Greater numbers may lead to out of memory errors, especially if multiple targets are used simultaneously.

Each target has its own cache instance. A cache instance is released when an adapter is passivated, or released. For runtime, the Persist Connection option must be enabled or else the cache will be released after every document execution cycle. To enable the Persist Connection option, logon to the iSM Administration Console, click *Registry*, and then click *Adapters* in the left pane. From the list of available adapters, select the target that is configured for the MS CRM 2011 adapter. For the Persist Connection option that is listed, select the *On* check box, as shown in the following image.



When the iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises is deployed as a component in a process flow, change the Persist Connection property to *true* in the iIT Adapter Object page. The Persist Connection property should also be set to *On* in iSM.

iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises can receive small values in parameters from the user, but it can also use greater and more reasonable values (currently, it is 20). Using a smaller amount of cache is almost useless.

Connection Pool

Since the iWay Service Manager (iSM) infrastructure allows input message processing in parallel threads, single connections for multiple adapter instances can slow traffic which impacts performance dramatically. To increase performance, iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises supports a pool of HTTP connections which can be used in parallel. Every time when an adapter instance needs to send a request and get a response from MS CRM, it takes a connection from that pool and returns it back when the request is processed. You can edit or modify the connection pool. You can also use a special parameter which specifies how many connections can be pooled.

A connection can remain idle for 100 seconds before being reused. This value is defined internally and cannot be set from any configuration.

To process messages, the adapter uses the following two connections:

- An administrative account to retrieve information about field type.
- A regular user account.

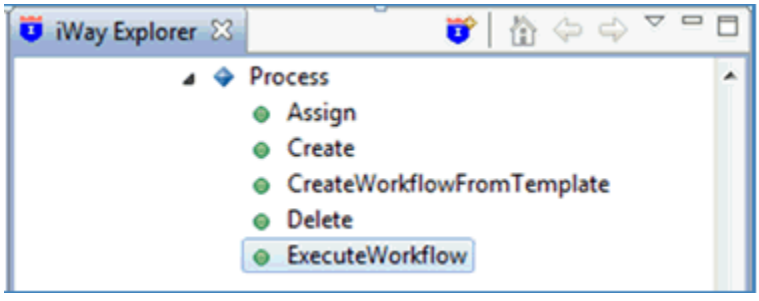
Since the connections use different accounts, they cannot be mixed and therefore they are stored in different pools. The connection pool size determines the maximum number of connections in each pool. That means that the adapter can have double the number of connections. But due to metadata being cached, administrative connections are used much less.

The pool can have as many connections as you want, but many connections can consume system resources. The number of connections should be reasonable.

Note: When using a connection pool and configuring the iWay Adapter Service (com.ibi.agents.XDAdapterAgent) in the iSM Administration Console or as a Service object in a process flow, ensure that the Persist Connection parameter is set to *persist* (agent). If this parameter is set to *none*, then the adapter connection and the connection pool is destroyed after every call is made to MS CRM.

Executing Processes (Workflow)

The iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises allows you to execute workflows and obtain results. The ExecuteWorkflow operation under the Process node is used for this purpose, as shown in the following image.



The following example shows the command that is used to execute the workflow.

```
<?xml version="1.0" encoding="UTF-8"?>
<is:workflow.ExecuteWorkflow schemaVersion="1.0"
xsi:schemaLocation="urn:iwaysoftware:adapter:MSCRM2011:workflow:ExecuteWorkf
low ExecuteWorkflow_request.xsd" xmlns:xsi="http://www.w3.org/2001/
XMLSchema-instance"
xmlns:is="urn:iwaysoftware:adapter:MSCRM2011:workflow:ExecuteWorkflow">
    <is:ResponseLevel>WorkflowGuid</is:ResponseLevel>
    <is:EntityList>
        <is:Entity>
        <is:Params>
            <is:EntityId>EEEEEEEE-EEEE-EEEE-EEEE-EEEEEEEEE005</is:EntityId>
            <is:WorkflowId>EEEEEEEE-EEEE-EEEE-EEEE-EEEEEEEEE002</
is:WorkflowId>
        </is:Params>
        </is:Entity>
    </is:EntityList>
</is:workflow.ExecuteWorkflow>
```

The workflow GUID and entity GUID are required and must be specified. Since every workflow in Microsoft Dynamics CRM is associated with some entity, the specific entity must be specified.

The ResponseLevel parameter is an important aspect of a workflow execution request. There are three values that can be specified for this parameter:

- **WorkflowGuid.** The adapter sends a request to execute a workflow, retrieves the GUID of the asynchronous operation started in the thread of the workflow, and returns that GUID. The adapter does not wait until the workflow is completed. You must run additional requests to retrieve any details of the executed workflow. The GUID is a primary key of the entity Process Log.

- **WorkflowLog.** The adapter sends a request to execute a workflow, retrieves the GUID of the asynchronous operation, waits for the workflow execution to complete (polling requests and checks for the final workflow step is performed), then sends a request to retrieve the entire workflow execution log and returns the log. You can find all of the steps performed in the thread of the workflow in the log and see the GUIDS of all affected entities. No data from the entities is returned in the log.
- **EntityDetails.** The adapter sends a request to execute a workflow, waits for the workflow execution to complete, retrieves and analyzes the log, finds all affected entities, and then retrieves their details. This parameter value takes the most amount of time to process.

  Note: If workflow contains any Wait Condition steps, then it is strongly recommended to set the response level to WorkflowGuid. If this is not done, it can take much more time for the Wait condition to become true and the adapter will be hanging and waiting for the Workflow end to collect log or entity details.

Importing Bulk Data

The data import feature allows you to upload data from various MS CRM systems and data sources into Microsoft Dynamics CRM. You can also import new data or update existing data in Microsoft Dynamics CRM. With the data import feature, you can import data into standard and customized attributes of most entity types, including custom entities.

Preparing Data Source Files for Import

The data source files that are used for import and data migration can be formatted as comma-separated values (CSV) files or XML Spreadsheet 2003 files. The first row in the source file contains column headings. If you do not include the headings in the CSV-formatted file, use the importfile.isfirstrowheader property to specify that the first row represents actual data. In this case, default column headings are created with the names Col1, Col2, and for as many column headings as columns exist. You can easily create CSV-formatted files using Microsoft Excel.

Creating Data Maps for Data Import

The data maps are used to map source data contained in the comma-separated values (CSV) source files to Microsoft Dynamics CRM entity attribute types. This process is performed by mapping a column in the source file to an appropriate Microsoft Dynamics CRM entity attribute. The data in the unmapped columns is not imported during the data import operation.

The following table lists the mappings in the data map.

Mapping Type	Description
Column	Maps a column in an import or data migration source file to a Microsoft Dynamics CRM entity attribute. Use the column mapping entity to implement column mapping.
List Value	Maps a list value in an import or data migration source file to a list value in Microsoft Dynamics CRM. Use the picklist mapping (value list mapping) entity to implement list value mapping.
Lookup	Maps a lookup value in an import or data migration source file to a Microsoft Dynamics CRM entity attribute of lookup type. Use the lookup mapping entity to implement lookup mapping.

Configuring Data Import

The configuration information that is required for running data import is contained in the import (data import) and import file entities. The import entity contains status and ownership information for an import job. To run the import, the import entity must be created. Then, import file entities should be assigned to this import. These files are shown on the import page in MS CRM. If custom mapping is used, then column mapping entities must be assigned to each import file for every column. After all entities have been created, you can run the import.

Data import runs directly on the Microsoft Dynamics CRM server. To run data import, set up asynchronous jobs to run in the background that execute in the following order:

1. Parse (import.Parse) source data that is contained in the import file.
2. Transform (import.Transform) parsed data by using the data map.
3. Import (import.ImportRecords) transformed data into Microsoft Dynamics CRM.

You must let each job complete successfully before you can submit a new message request for the next asynchronous job.

Known Issues

This section lists and describes known issues for the data import feature.

- Next elements in the import file entity are not mandatory due to the schema. If you skip these elements in the request, an error response is returned.

```
<xs:element name="targetentityname" minOccurs="0" maxOccurs="1">
<xs:element name="importid" minOccurs="0" maxOccurs="1">
<xs:element name="name" minOccurs="0" maxOccurs="1">
```

- Updating data using CSV files with Web services in MS CRM is not possible because there is a condition operator in the Web service that generates exceptions when CSV with the update option is being executed.
- Elements without mandatory attributes can be processed successfully. For example, "importmapid" (Column Mapping entity) has a required attribute "name", that can be skipped.
- Scheduling the Bulk import process when a Bulk delete process is scheduled to run, or running, can cause the Bulk import process to fail.

  If the bulk import process fails, navigate to System, Administration, and then System Jobs in the MS CRM GUI. From the available import jobs that are listed, select the job that failed and open the dialog. The reason for the failure is provided in the Details area. A common error message that is displayed is: *This system job was canceled because a referenced record was deleted*.

Deleting Bulk Data

The bulk delete feature helps you manage system storage consumption and maintain data quality by removing old, obsolete, or invalid data from the system.

The bulk data that can be removed using the bulk delete feature includes:

- Stale data.
- Data not relevant to business.
- Old test or sample data.
- Data incorrectly imported from other systems.

Bulk delete can run asynchronously in the background without blocking other system activities.

You can use bulk delete to perform the following:

- Delete data across multiple entities.
- Delete entity instances for a given entity.
- Receive an e-mail notification when bulk delete is finished.
- Delete data periodically.
- Schedule the start time of a recurring bulk delete.
- Retrieve the information about the failures that occurred during bulk delete.

The job of bulk delete is represented by the bulk delete operation entity instance. It includes the following information:

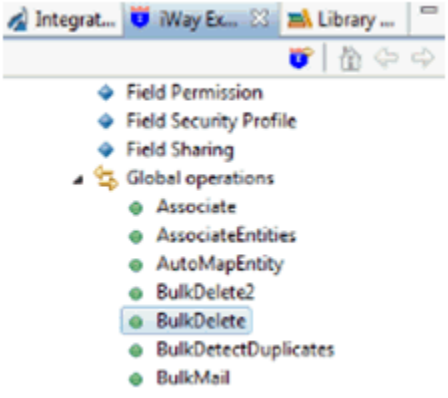
- Number of successfully deleted entity instances by this particular bulk delete operation.
- Number of entity instances that this particular bulk delete operation failed to delete.
- Whether the bulk delete job is a recurring job or not.
- Start time of the bulk delete job.

The asynchronous job of bulk delete performs the following operations:

- Deletes the entity instances that match the query expressions passed in the QuerySet property of BulkDeleteRequest. The bulk delete job deletes the entity instances that were created before the job execution starts.
- Retrieves the failures that occur during bulk delete. The failures are represented by the bulk delete failure entity instances that contain a description of the failure and the error number. You can retrieve the bulk delete failures by using the Retrieve method or the RetrieveMultiple method.

If a bulk delete job fails or terminates prematurely, any entity instances that were deleted before the failure or termination of the job are not rolled back and remain deleted.

For executing bulk delete requests, you need to generate a schema for operation BulkDelete, which does not link to any entity. In iIT, you can find this operation in the Global Operations node, as shown in the following image.



During run time, iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises does not respond to the user for delete confirmations.

To view a sample bulk delete operation, see *Bulk Delete Sample* on page 168.

Optimizing Microsoft Dynamics CRM 2011 Using HTTP Compression

Internet Information Service (IIS) automatically compresses many types of content including script, images, and CSS files to help improve network performance by minimizing the amount of data required to be transferred between the client and the server. MS CRM responses are not compressed by default by IIS. They have the following mimetype:

```
application/soap+xml;charset=UTF-8
```

With HTTP compression enabled, you can see up to a 30% reduction in response size. This is shown by analyzing network traffic before and after it is enabled.

Note: Do not enable compression in IIS if you are using an external compression utility.

Procedure: How to Enable Compression Using a Command Line

To enable compression using a command line:

1. Open the Command Prompt on the MS CRM Server.
2. Run the following command:

```
%SYSTEMROOT%\system32\inetsrv\appcmd.exe set config -
section:system.webServer/httpCompression /+"dynamicTypes.
[mimeType='application/soap+xml; charset=UTF-8',enabled='true']" /
commit:apphost
```

3. Reset IIS for the setting to take effect.

Procedure: How to Enable Compression Manually

To manually enable compression:

1. On the MS CRM Server, navigate to the applicationHost.config file (for example, C:\Windows\System32\Inetsrv\Config\applicationHost.config) and open it using any text editor.
2. Locate the section “<httpCompression directory=”, its child node, “<dynamicsTypes>”, and its entry, <add mimeType="application/x-javascript" enabled="true" />, and add the following line below it:

   ```
   <add mimeType="application/soap+xml; charset=UTF-8? enabled="true" />
   ```

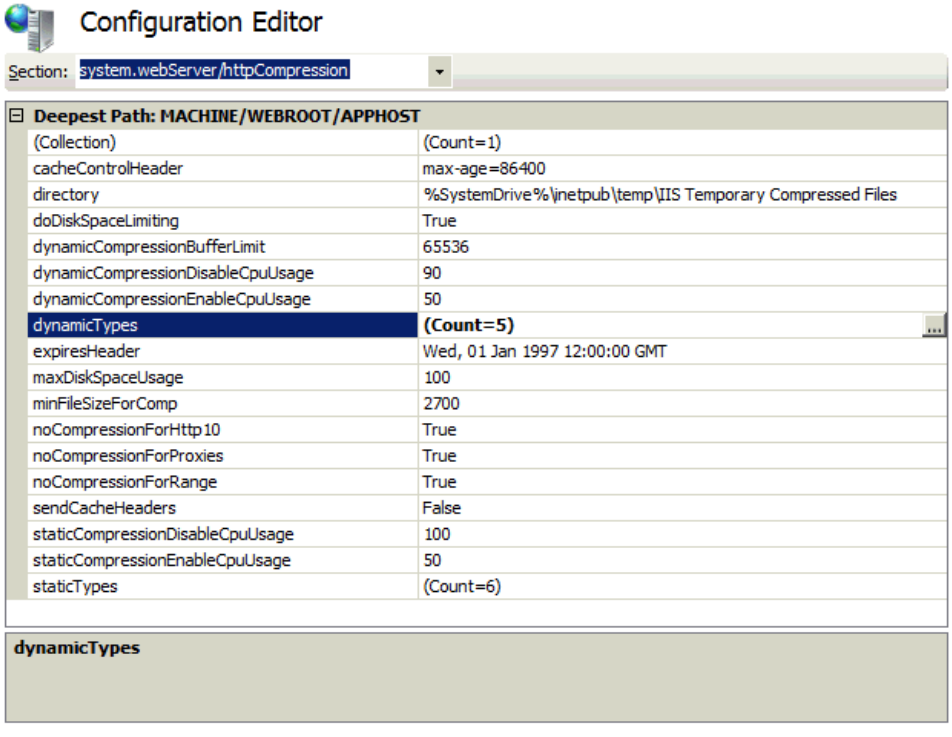
3. Save the file and reset IIS for the setting to take effect.

Procedure: How to Enable Compression in IIS Using Configuration Editor

To enable compression in IIS using the Configuration Editor:

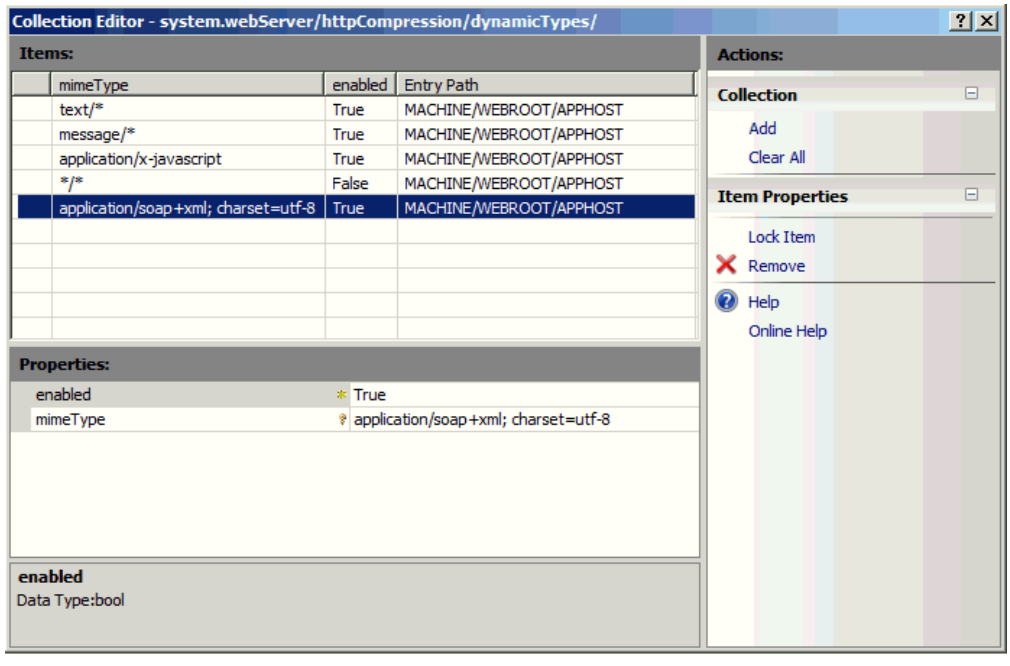
1. Open IIS on the MS CRM Server.

2. Open the Configuration Editor and navigate to system.webServer/httpCompression, as shown in the following image.



3. Select and right-click *dynamicTypes*, and click *Open* to add the new mimeType.
4. Click *Add* to add a new item, and enter the following mimeType:

```
application/soap+xml; charset=UTF-8
```



5. Enable the mimeType and close the window.
6. Select *Apply* on the Configuration Editor, and then reset IIS for the setting to take effect.

   Note: Ensure you test this thoroughly in a test environment before configuring your production environment with this setting.

Internalization

iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises can operate MS CRM with different locales. It also supports special characters such as dollar or euro signs, copyrights, trade mark, and other symbolic characters. To avoid any problems with non-Latin symbols, MS CRM must be configured to use UTF-8 encoding, which is the default setting.

Known Runtime Issues

This section lists and describes known runtime issues for the iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises.

- Some entities, such as *ColumnSet*, may not completely restrict columns. MS CRM 2011 can return fields that are not explicitly specified in a request. The most common instances involve:
  - Activity entity columns *to*, *from*, *cc*, and *bcc* are returned even if they are not enumerated in the list of requested columns.
  - *transactioncurrencyid* is returned when any field of Money type is requested.
- Fields that are optional, according to metadata, are required by MS CRM 2011. The following table describes the list of fields.

Entity	Attribute
importfile	targetentityname
columnmapping	targetattributename
lookupmapping	columnmappingid, transformationparametermappingid
connection	record1id, record2id
salesorderdetail	productid, uomid, productdescription
quotedetail	productid, uomid, productdescription
invoicedetail	productid, uomid, productdescription

- Some fields are declared as required, but MS CRM 2011 processes messages successfully when the fields are not populated. An example of this is the field with the entity name *email* and its attribute of *messageiddupcheck*.
- Compound operations are not executed in a transaction, causing some records to be created while the rest are not created. The total result of this type of request execution will be *Fail*.
- The *RetrieveMultiple* adapter request schemas are different from the MS CRM SDK definition. The Root query type is *QueryExpression*. This implementation is used because all other query types can be represented by this type.

- Some operators that are available for conditions in *RetrieveMultiple* request are not currently supported by MS CRM 2011, such as *Contains*, *DoesNotContain*, and *NotOn*. They are automatically eliminated from the generated schema.
- A process (workflow), which contains the execution of a child process (workflow), returns a response that contains entity details that are updated according to the main process (workflow) only. The details of the entity affected by the child process (workflow) cannot be returned because the process (workflow) log of the main process (workflow) contains only the GUID of the child process (workflow), without additional information needed to get the process (workflow) log for the child entity.
- For the operations *SearchByBody*, *SearchByTitle*, *SearchByKeywords* (Article entity), and *Rollup*, the element *QueryExpression* (Query for Rollup operation) must be of type *QueryExpression* only. It is used for filtering attributes by specifying the *ColumnSet* element only.
- For all advanced operations, the element *Value* under the complex type *OptionSetValue* must be treated as mandatory for input, although it is represented as optional in schemas.
- In Operations, *invoice.SetRelated* and *invoice.RemoveRelated*, the element *EntityReference* should have two and only two occurrences (minOccurs=2 and maxOccurs=2) in schema representation. Only when this condition is satisfied will the operation execute successfully.
- The element *Principal* under the *PrincipalAccess* complex type should be considered mandatory, although it is represented as optional in schemas.
- *Distinct* does not work in roll-up operations for the *Order* entity.
- Formatted values that contain currency symbols can also contain broken characters if the encoding of the system is not UTF-8. These symbols represent currency symbol and offset values. To avoid this issue, use UTF-8 encoding (default for MS CRM 2011 instances) for XML request files. In this case, UTF-8 encoded responses with valid formatted values will be produced.
- All parameters for advanced operations are declared as optional in schemas. Some parameters may be required, and MS CRM 2011 will not perform the operations without them. During design time, it is not possible to determine what is optional or required because MS CRM 2011 does not provide information about mandatory fields. As a result, it is not possible to set proper *minOccurs* attributes in the schemas.
- When an MS CRM 2011 Organization is disabled, MS CRM 2011 returns a status code of 200. This code is not processed in a special way. If you receive a status code of 200, then consult your system administrator.

- In the *Bulk Delete* message, *ColumnSet*, *Distinct*, and *Paging Info* values are not evaluated during processing. Only *ConditionExpression* and *LinkEntities* function in this request.
- The validator may fail if a very long value is specified for elements that are not of type *string*. For example, some long text in a node of type *integer*. This is a known issue logged at:

  https://issues.apache.org/jira/browse/XERCESJ-589

  Even though this is a very rare case, if it does occur, the error will be logged and an attempt to process a request in the regular way will continue.
- In iWay Explorer, do not use the *Refresh* option on a MS CRM 2011 adapter target. Using the *Refresh* option can lead to unpredictable results with caches and connection pools. If you need to refresh the list of entities in the adapter tree, then disconnect from the adapter target and then connect to the adapter target.
- If a new user was created in MS CRM but did not log in first in MS CRM after connecting to a target with the current UI language selected, the target initialization may fail. The user must go to MS CRM and log in for the first time to apply the configuration. The UI language ID can also be set explicitly by the administrator. For more information, see *Understanding Localization* on page 39.

Appendix A

Configuring the iWay WCF Routing Service (WCF Router)

This section describes how to configure the iWay WCF Routing Service (WCF Router) for the iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises.

In this appendix:

iWay WCF Routing Service Overview

The iWay WCF Routing Service (WCF Router) is Microsoft™ .NET™ assembly that can route SOAP messages (version 1.1 and 1.2) to a Microsoft WCF endpoint.

The WCF Router can be run as a standalone application or installed as a Windows service. The WCF Router also provides flexible configuration. The following features can be configured within the XML configuration file:

1. Format of input SOAP messages (SOAP version 1.1 or 1.2).
2. Input message encryption using the HTTPS protocol.
3. Output messages format.
4. Connection pool configuration.
5. Service logging level and logging output.

Installing the WCF Router

This section describes how to install the iWay WCF Routing Service (WCF Router) as a standalone application or as a Windows service.

Prerequisites

Before installing the iWay WCF Routing Service (WCF Router), ensure that Microsoft .NET Framework Version 3.5 or higher version is installed on the system that will be used to run the WCF Router.

For more information on how to install Microsoft .NET Framework Version 4.0, refer to the following website:

http://www.microsoft.com/en-us/download/details.aspx?id=17851

Procedure: How to Install the WCF Router as a Standalone Application

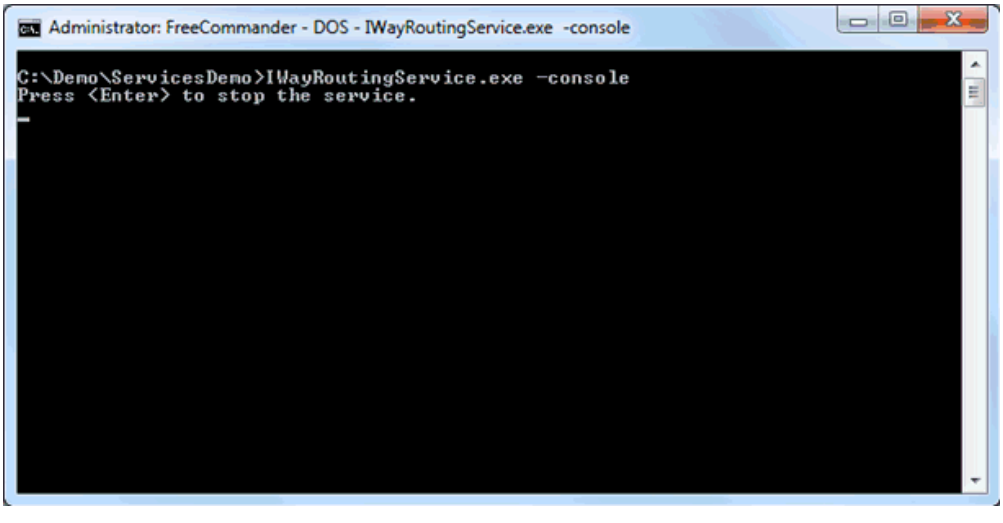
1. Open a command prompt (as an administrator) on your system and navigate to the location where the IWayRoutingService.exe file is located.
2. Execute the following command:

   ```
   IWayRoutingService.exe -console
   ```

   or

   ```
   IWayRoutingService.exe -c
   ```

   For example:



Note: The IWayRoutingService.exe file should not be run without specified parameters. If the IWayRoutingService.exe file is running in command mode, then the command window must remain open for the duration of the MS CRM session. Closing the command window will instantly disconnect the router. The command window is recommended only for testing purposes and is not considered safe for information disclosure. Always run the routing service as a service in a production environment.

Procedure: How to Install the WCF Router as a Windows Service

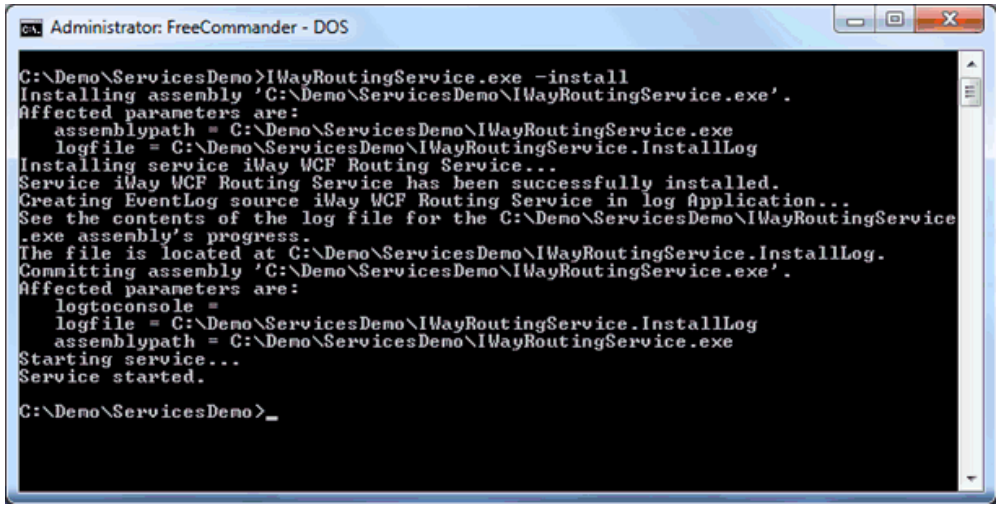
1. Open a command prompt (as an administrator) on your system and navigate to the location where the IWayRoutingService.exe file is located.
2. Execute the following command:

   ```
   IWayRoutingService.exe -install
   ```

   or

   ```
   IWayRoutingService.exe -i
   ```

   For example:



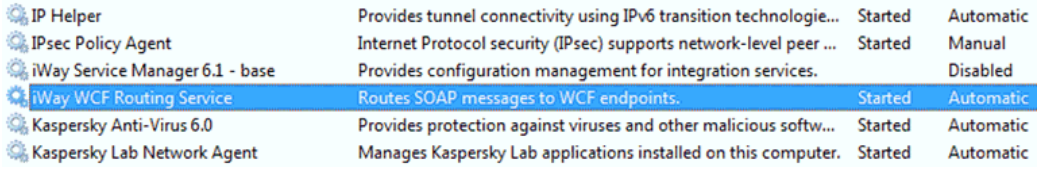
   If the command runs successfully, the WCF Router will be installed as a Windows service.

Note:

- After the WCF Router is installed as a Windows service, the IWayRoutingService.exe file and the XML configuration file must remain in the same folder until the service is uninstalled. Moving or deleting the IWayRoutingService.exe file after installation will prevent you from uninstalling the WCF Router.
- If the IWayRoutingService.exe file path contains more than two subfolders, problems with installing as a Windows service are possible. Avoid using any subfolders in this path.

Procedure: How to Start and Stop the WCF Router Windows Service

You can start and stop the WCF Router Windows Service using the Windows Services dialog, as shown in the following image.



Procedure: How to Uninstall the WCF Router as a Windows Service

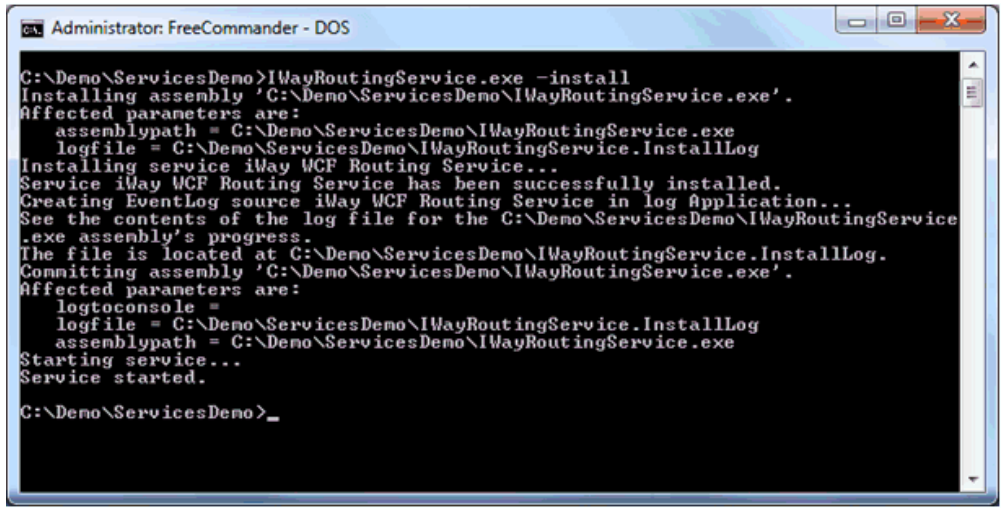
1. Open a command prompt (as an administrator) on your system and navigate to the location where the IWayRoutingService.exe file is located.
2. Execute the following command:

   ```
   IWayRoutingService.exe -uninstall
   ```

   or

   ```
   IWayRoutingService.exe -u
   ```

For example:



If the command runs successfully, the WCF Router will be uninstalled as a Windows service.

Note:

- Ensure that you run the uninstallation command from the same path where the WCF Router Windows Service was installed.
- If you have issues with this uninstallation process, the SC tool can be used, which provides capabilities similar to the Services dialog found in the Administrative Tools. You can specify *sc delete "iWay WCF Routing Service"*. After this command is executed, restart the machine. For more information on using the SC tool, see *http://support.microsoft.com/kb/251192*.

Configuring the WCF Router

This section describes how to configure various aspects of the iWay WCF Routing Service (WCF Router). The WCF Router can run in the following modes:

- Basic http
- https with transport binding (no certificate)
- https with certificate binding (client and server certificates)

Configuring Inbound Binding

This section describes how to configure inbound binding for the WCF Router.

Using SOAP Version 1.1 and 1.2

To use SOAP Version 1.1 to retrieve incoming messages, edit the XML configuration file. The value of the *binding* attribute of the /configuration/system.serviceModel/services/service/endpoint element must be set to *basicHttpBinding*.

For example:

```
<?xml version="1.0" encoding="utf-8" ?>
<configuration>
  <system.serviceModel>
    <services>
      <service name="com.ibi.routingservice.RoutingService">
        <endpoint binding="basicHttpBinding" contract="com.ibi.routingservice.IMessageRoutingService"/>
        <host>
          <baseAddresses>
            <add baseAddress="http://localhost:8080/RoutingService" />
          </baseAddresses>
        </host>
      </service>
    </services>
```

For SOAP Version 1.2, the value of the *binding* attribute must be set to *wsHttpBinding*. For more information, see the following website:

http://msdn.microsoft.com/en-us/library/ms731092.aspx

Enabling the HTTPS Protocol

You can enable HTTPS for input messages if the client program can support this protocol. Perform the following steps to enable the HTTPS protocol:

1. Edit the XML configuration file.
2. Modify address of service endpoint to specify *https* instead of *http* in the *baseAddress* attribute of the /configuration/system.serviceModel/services/service/host/baseAddresses/add element

For example:

```
<?xml version="1.0" encoding="utf-8" ?>
<configuration>
  <system.serviceModel>
    <services>
      <service name="com.ibi.routingservice.RoutingService">
        <endpoint binding="basicHttpBinding" contract="com.ibi.routingservice.IMessageRoutingService"/>
        <host>
          <baseAddresses>
            <add baseAddress="https://localhost:8080/RoutingService" />
          </baseAddresses>
        </host>
      </service>
    </services>
```

3. Modify the binding section set transport security mode for inbound binding. The following is an example for *basicHttpBinding*:

```
<?xml version="1.0" encoding="utf-8" ?>
<configuration>
  <system.serviceModel>
    <services>
      <service name="com.ibi.routingservice.RoutingService">
        <endpoint binding="basicHttpBinding" contract="com.ibi.routingservice.IMessageRoutingService"/>
        <host>
          <baseAddresses>
            <add baseAddress="https://localhost:8080/RoutingService" />
          </baseAddresses>
        </host>
      </service>
    </services>

    <bindings>
      <basicHttpBinding>
        <binding>
          <security mode="Transport">
            <transport clientCredentialType="Certificate"/>
          </security>
        </binding>
      </basicHttpBinding>
```

To modify the default behavior of the selected binding, a new element *basicHttpBinding* was created in /configuration/system.serviceModel/bindings. The sub-element binding/security has the *mode* attribute set to *Transport* and the sub-element transport with the *clientCredentialType* attribute. The *clientCredentialType* attribute must be set to *None* to disable client certificate checking.

4. Install the server and root certificates and bind the server certificate to the service port, as described in *Using SSL Server Certificates* on page 111.

Configuring Outbound/Custom Binding

Outbound binding configuration can be set in the /configuration/system.serviceModel/bindings/customBinding/binding[@name=' CustomBinding_IOrganizationService'] element.

The following is an example of custom binding that can work with Microsoft Dynamics CRM 2011 On-Premises endpoints:

```
<customBinding>
  <binding name="CustomBinding_IOrganizationService">
    <security defaultAlgorithmSuite="Default" authenticationMode="SspiNegotiated"
        requireDerivedKeys="true" securityHeaderLayout="Strict" includeTimestamp="true"
        keyEntropyMode="CombinedEntropy" messageProtectionOrder="SignBeforeEncryptAndEncryptSignature"
        messageSecurityVersion="WSSecurity11WSTrustFebruary2005WSSecureConversationFebruary2005WSSecurityPolicy11BasicSecurityProfile10"
        requireSecurityContextCancellation="true" requireSignatureConfirmation="false">
    <localServiceSettings detectReplays="true" issuedCookieLifetime="10:00:00"
          maxStatefulNegotiations="128" replayCacheSize="900000" maxClockSkew="00:05:00"
          negotiationTimeout="00:01:00" replayWindow="00:05:00" inactivityTimeout="00:02:00"
          sessionKeyRenewalInterval="15:00:00" sessionKeyRolloverInterval="00:05:00"
          reconnectTransportOnFailure="true" maxPendingSessions="128"
          maxCachedCookies="1000" timestampValidityDuration="00:05:00" />
      <secureConversationBootstrap />
    </security>
    <textMessageEncoding maxReadPoolSize="64" maxWritePoolSize="16"
        messageVersion="Default" writeEncoding="utf-8">
      <readerQuotas maxDepth="32" maxStringContentLength="8192" maxArrayLength="16384"
          maxBytesPerRead="4096" maxNameTableCharCount="16384" />
    </textMessageEncoding>
    <httpTransport manualAddressing="false" maxBufferPoolSize="524288"
        maxReceivedMessageSize="6553600" allowCookies="false" authenticationScheme="Anonymous"
        bypassProxyOnLocal="false" decompressionEnabled="true" hostNameComparisonMode="StrongWildcard"
        keepAliveEnabled="true" maxBufferSize="6553600" proxyAuthenticationScheme="Anonymous"
        realm="" transferMode="Buffered" unsafeConnectionNtlmAuthentication="false"
        useDefaultWebProxy="true" />
  </binding>
</customBinding>
```

For more information about configuring custom bindings, see *http://msdn.microsoft.com/en-us/library/ms731377.aspx*.

Configuring Traces

The WCF Router includes a tracing service named com.ibi.routingservice. You can configure other tracing services in the XML configuration file. For more information, see *http://msdn.microsoft.com/en-us/library/zs6s4h68*.

In following example, a user enables com.ibi.routingservice and redirects its output to the Windows event log with the source name iWay WCF Routing Service.

```
<system.diagnostics>
  <sources>
    <source name="com.ibi.routingservice" switchValue="All">
      <listeners>
        <add name="eventView"/>
      </listeners>
    </source>
  </sources>
  <sharedListeners>
    <add type="System.Diagnostics.EventLogTraceListener" name="eventView" initializeData="iWay WCF Routing Service"/>
  </sharedListeners>
  <trace autoflush="true" />
</system.diagnostics>
```

Note: The recommended value of the *switchValue* attribute in a production environment is *Warning*, *Error*, or *Critical* instead of *All*.

There are additional trace configurations that are provided by the .Net framework, which make the following debug processes available:

- System.ServiceModel
- System.ServiceModel.MessageLogging

```
<source name="System.ServiceModel" switchValue="Information,ActivityTracing"
        propagateActivity="true">
  <listeners>
    <add name="eventView" />
  </listeners>
</source>
<source name="System.ServiceModel.MessageLogging">
  <listeners>
    <add name="eventView" />
  </listeners>
</source>
```

For deeper logging, you can add a diagnostics section into the /configuration/system.serviceModel element. For example:

```
    <diagnostics>
        <messageLogging logEntireMessage="true"
          maxMessagesToLog="300"
          logMessagesAtServiceLevel="true"
          logMalformedMessages="true"
          logMessagesAtTransportLevel="true" />
    </diagnostics>
</system.serviceModel>
```

Note: It is recommended to disable all other trace sources and remove the diagnostics section in a production environment. Tracing source messages causes the entire input SOAP message (including any passwords that are being transmitted in the headers) to be written to the Windows Event log.

Configuring Connection Pooling and Load Balancing

The following parameters can be configured for connection pooling and load balancing:

- com.ibi.routingservice.oneMessagePerChannel
- com.ibi.routingservice.connectionPoolSize

If com.ibi.routingservice.oneMessagePerChannel is set to *true*, a new channel and security session is created for each message. Setting this parameter to *true* can be useful in load-balanced environments if the environment does not support features, such as sticky sessions.

The com.ibi.routingservice.connectionPoolSize parameter determines how many connections could exist simultaneously for the WCF Router. When the connection pool is full, the WCF Router attempts to recycle connections that are not in use. If all of the connections in the pool are in use, then the WCF Router will wait for free connections to be recycled.

For example:

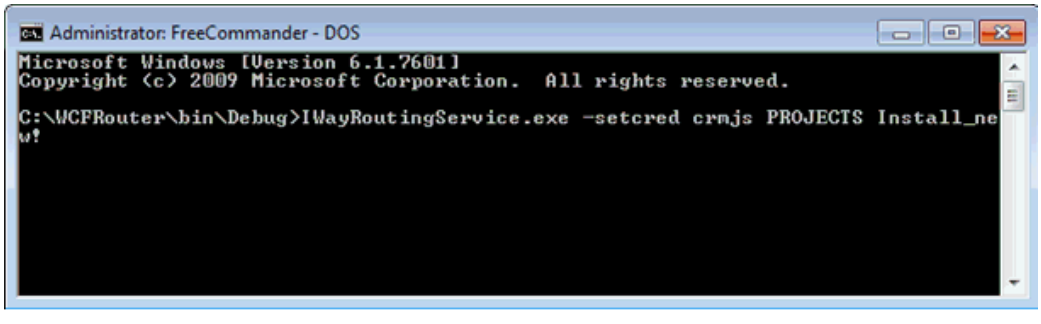
```
<configuration>
  <appSettings>
    <add key="com.ibi.routingservice.oneMessagePerSession" value="false"/>
    <add key="com.ibi.routingservice.connectionPoolSize" value="20"/>
  </appSettings>
```

Storing Administrator Credentials in the WCF Router

Administrator credentials could be stored on the WCF Router side in an encrypted file and used when the client application does not provide the credentials. When a client application provides administrator credentials, the stored credentials are ignored.

To create an encrypted credentials file, invoke the WCF Router using the *-setcred* command. For example:

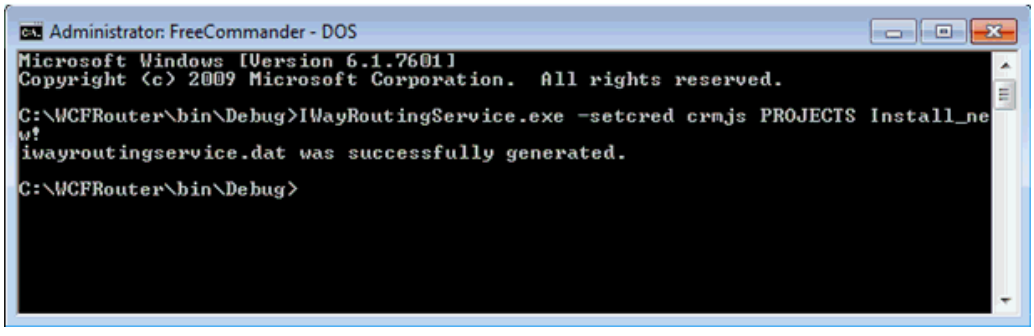
```
IWayRoutingService.exe -setcred <user
name> <domain> <password>
```



If the command is executed successfully, then following message is displayed:

```
iwayroutingservice.dat was successfully generated.
```

For example:



The WCF Router can now be run in console mode and use saved credentials.

Note: In order to allow usage of saved credentials by the WCF Router in service mode, the iwayroutingservice.dat file must be moved into the windows\system32 directory. If the WCF Router is unable to find the iwayroutingservice.dat file in service mode, an appropriate message will be prompted into the log if the WCF Router logging is enabled and configured.

Using the WCF Router to Connect to MS CRM (Selecting the Connection Mode)

All messages between the WCF Router and MS CRM use WCF message security and encryption with a known user name client. Messages between the adapter and the WCF Router can exist in any of the following modes:

- **Simple HTTP Mode (Unencrypted).** Use this mode when security is not a significant concern. For example, an internal LAN or for development and test environments. Using this mode, the data is unencrypted between the WCF Router and the adapter.
- **Transport Security Without Certificates (HTTPS Mode Without Client Certificate Checking).** Use this mode for HTTPS encryption when the connecting party is a known entity and external network access is not an issue.
- **Transport Security With Certificates (HTTPS With Client Certificate Checking).** Use this mode for the highest security between the adapter and the WCF Router. The channel and the client have stored binary certificates authenticating who they are and the messages are encrypted.

Simple HTTP Mode (Unencrypted)

To configure the WCF Router to work with HTTP incoming messages, ensure the following:

- The base address of the WCF Router service begins with *http*.

- The /configuration/system.serviceModel/bindings/basicHttpBinding element is empty.

For example:

```
<system.serviceModel>
  <services>
    <service name="com.ibi.routingservice.RoutingService">
      <endpoint binding="basicHttpBinding" contract="com.ibi.routingservice.IMessageRoutingService"/>
      <host>
        <baseAddresses>
          <add baseAddress="http://localhost:8080/RoutingService" />
        </baseAddresses>
      </host>
    </service>
  </services>
  <bindings>
    <basicHttpBinding>
    </basicHttpBinding>
```

Transport Security Without Certificates (HTTPS Mode Without Client Certificate Checking)

To configure the WCF Router to work with HTTPS incoming messages without client certificate checking, ensure the following:

- The appropriate certificate is installed and bound to the WCF Router service port.
- The appropriate root certificate is used on the client side.
- The base address of the WCF Router service begins with *https*.
- The /configuration/system.serviceModel/bindings/basicHttpBinding/binding/security/transport@ clientCredentialType attribute is set to *None*.

For example:

```
<system.serviceModel>
  <services>
    <service name="com.ibi.routingservice.RoutingService">
      <endpoint binding="basicHttpBinding" contract="com.ibi.routingservice.IMessageRoutingService"/>
      <host>
        <baseAddresses>
          <add baseAddress="https://localhost:8080/RoutingService" />
        </baseAddresses>
      </host>
    </service>
  </services>

  <bindings>
    <basicHttpBinding>
      <binding>
        <security mode="Transport">
          <transport clientCredentialType="None"/>
        </security>
      </binding>
    </basicHttpBinding>
```

Transport Security With Certificates (HTTPS With Client Certificate Checking)

To configure the WCF Router to work with HTTPS incoming messages with client certificate checking, ensure the following:

- The appropriate certificate is installed and bound to the WCF Router service port.
- The appropriate client and root certificates are used on the client side.
- The base address of the WCF Router service begins with *https*.
- The /configuration/system.serviceModel/bindings/basicHttpBinding/binding/security/transport@ clientCredentialType attribute is set to *Certificate*.

For example:

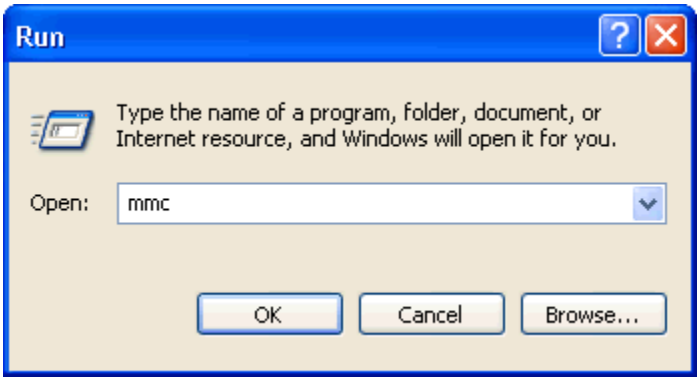
```
<system.serviceModel>
  <services>
    <service name="com.ibi.routingservice.RoutingService">
      <endpoint binding="basicHttpBinding" contract="com.ibi.routingservice.IMessageRoutingService"/>
      <host>
        <baseAddresses>
          <add baseAddress="https://localhost:8080/RoutingService" />
        </baseAddresses>
      </host>
    </service>
  </services>

  <bindings>
    <basicHttpBinding>
      <binding>
        <security mode="Transport">
          <transport clientCredentialType="Certificate"/>
        </security>
      </binding>
    </basicHttpBinding>
```

Using SSL Server Certificates

This section describes how to configure SSL server certificates.

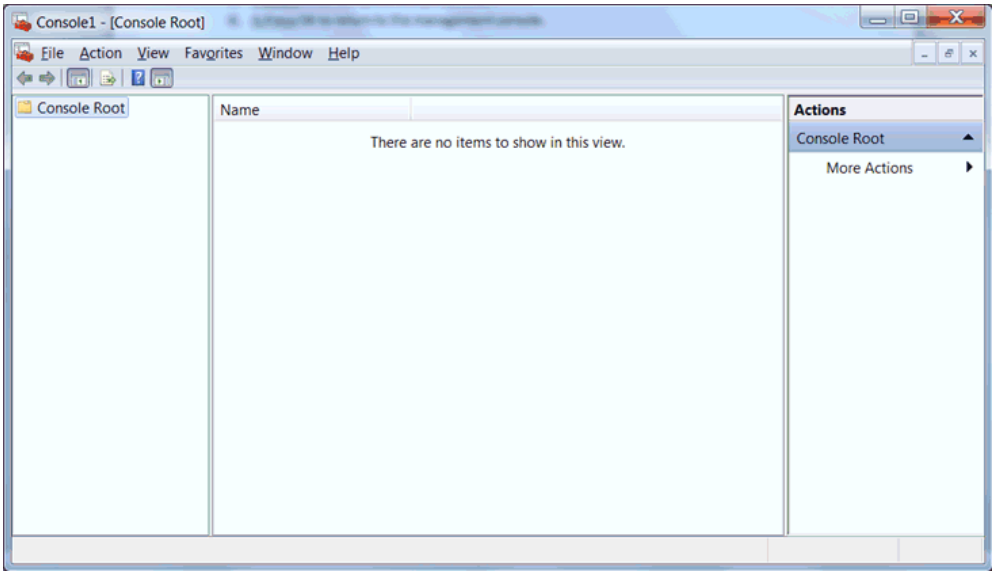
Procedure: How to Add a Local System Account to the Certificates Console

1. Open the Microsoft Management Console on your system. From the Windows Start menu, click *Run* and type *mmc*, as shown in the following image.



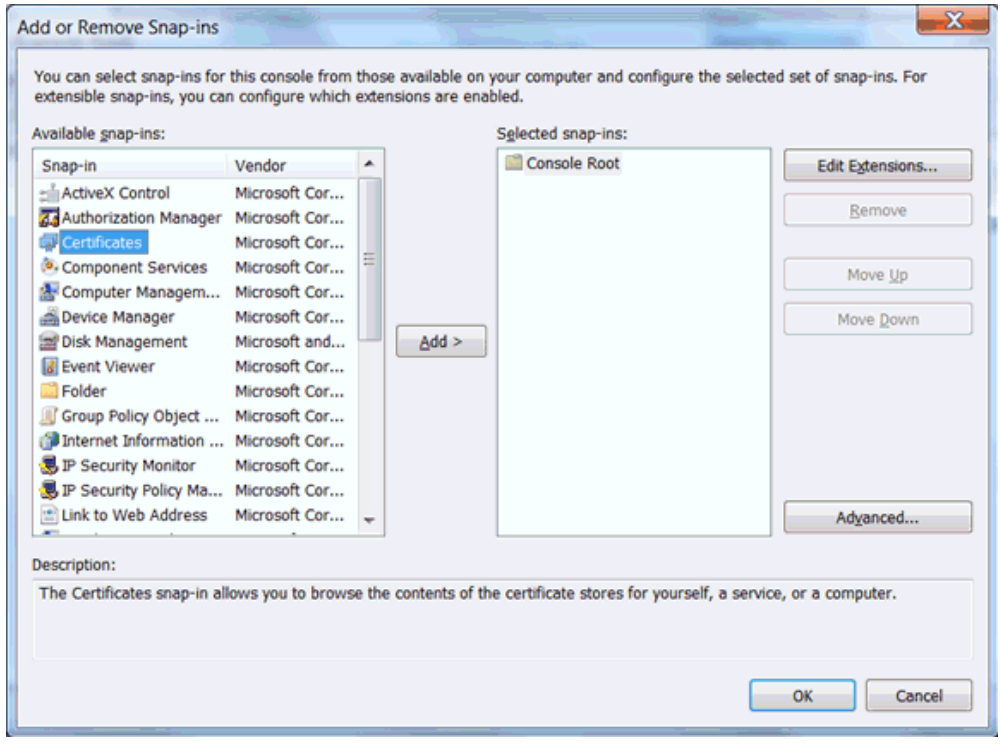
2. Click *OK*.

   The Microsoft Management Console (Console1) opens, as shown in the following image.



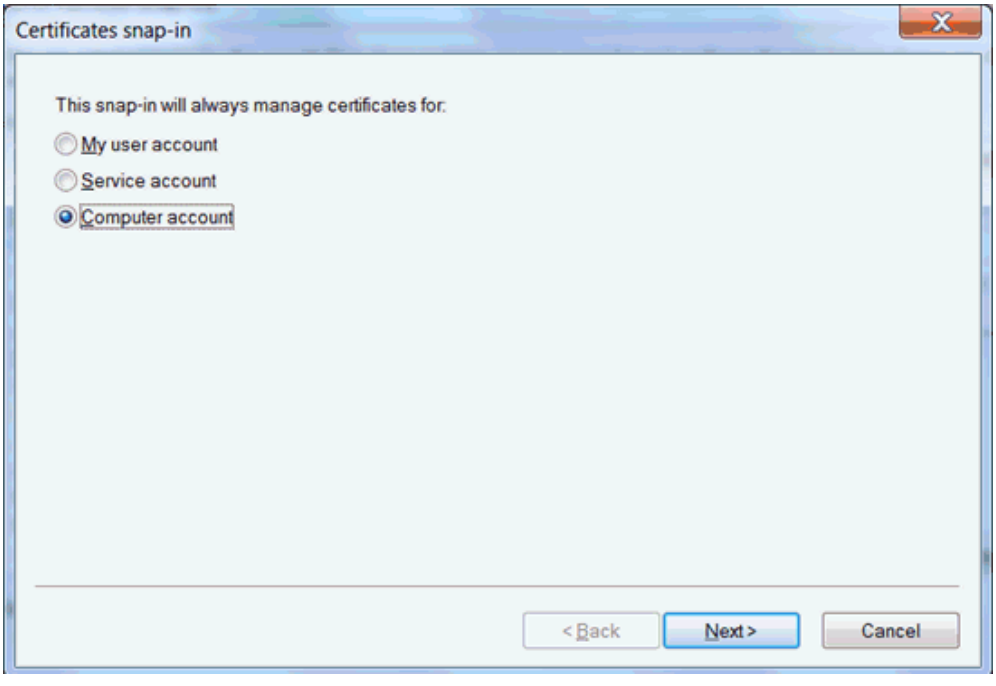
3. Click *File* and then select *Add/Remove Snap-in* from the menu.

The Add or Remove Snap-ins dialog opens, as shown in the following image.



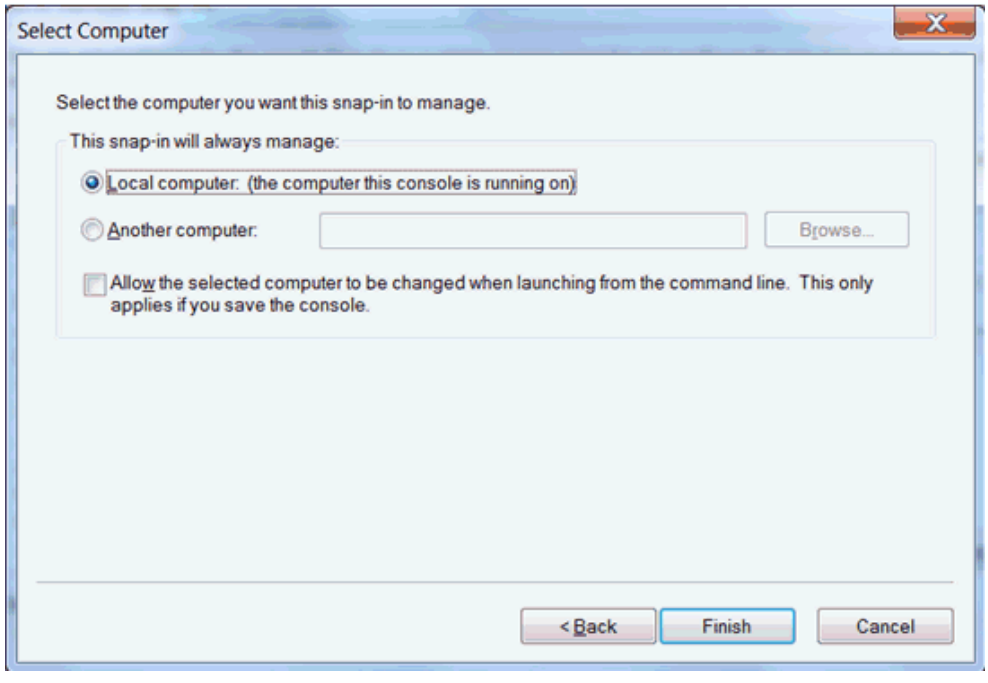
4. In the Available snap-ins section, select *Certificates* and click *Add*.

The Certificates snap-in dialog opens, as shown in the following image.



5. Select *Computer account* and then click *Next*.

The Select Computer dialog opens, as shown in the following image.



6. Select *Local Computer* and then click *Finish*.

   You are returned to the Add or Remove Snap-ins dialog.

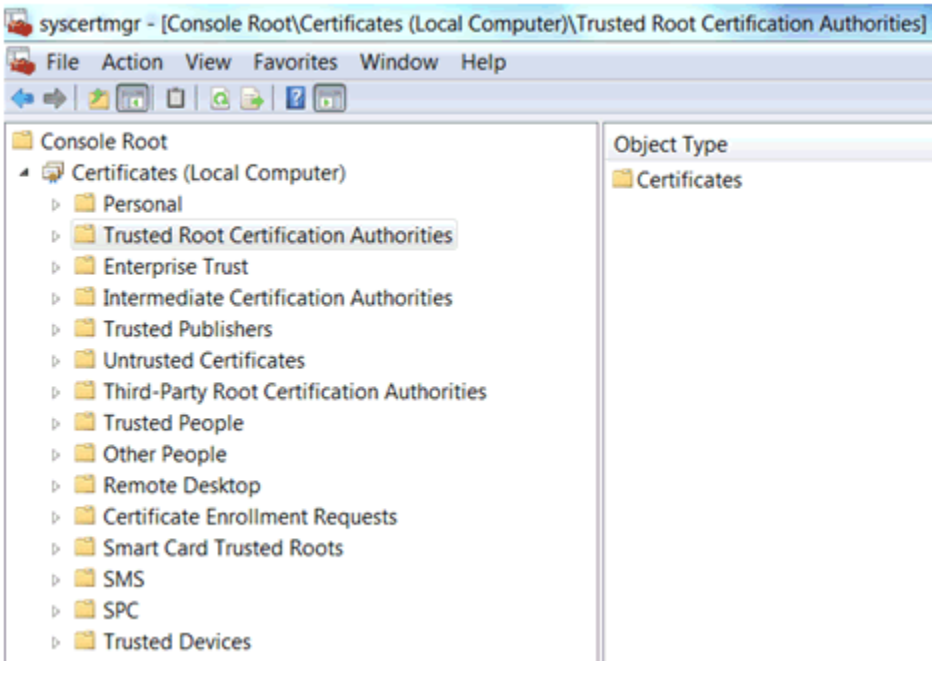
7. Click *OK*.

   You are returned to the Microsoft Management Console (Console1).

8. Click *File* and then select *Save As* from the menu to save the updated console settings.

Procedure: How to Install a Certificate to the Local System Account

1. Open the Certificates console for the Local Computer storage option. For more information, see *How to Add a Local System Account to the Certificates Console* on page 112.

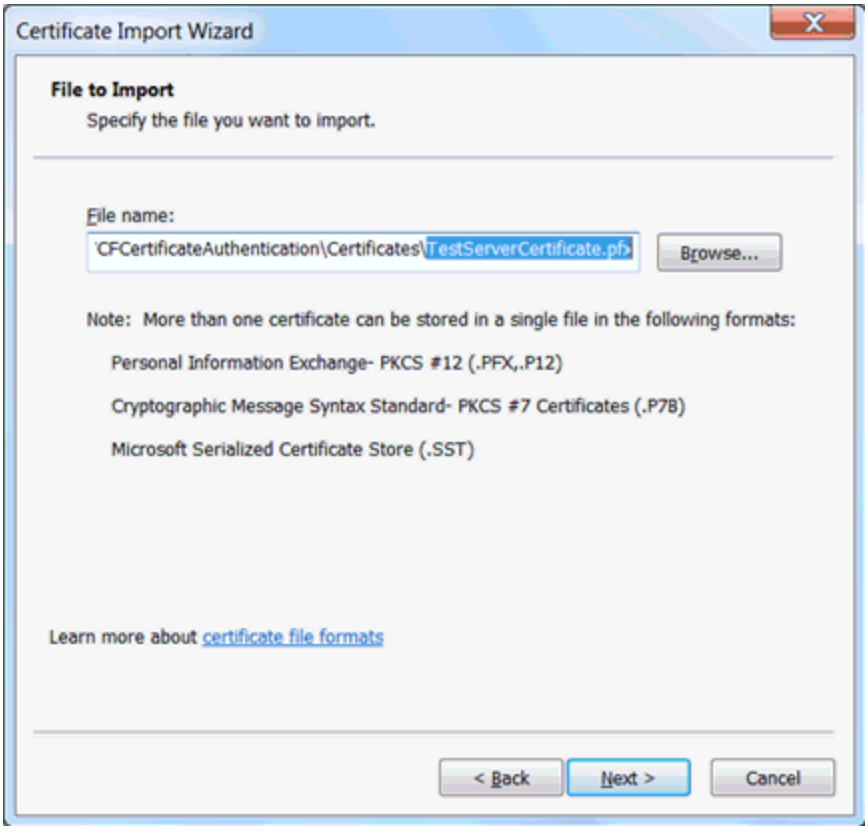


2. Select a certificate store from the tree (for example, Trusted Root Certification Authorities or Personal).
3. Select *All Tasks*, and then *Import* from the context menu.

The Certificate Import Wizard opens, as shown in the following image.

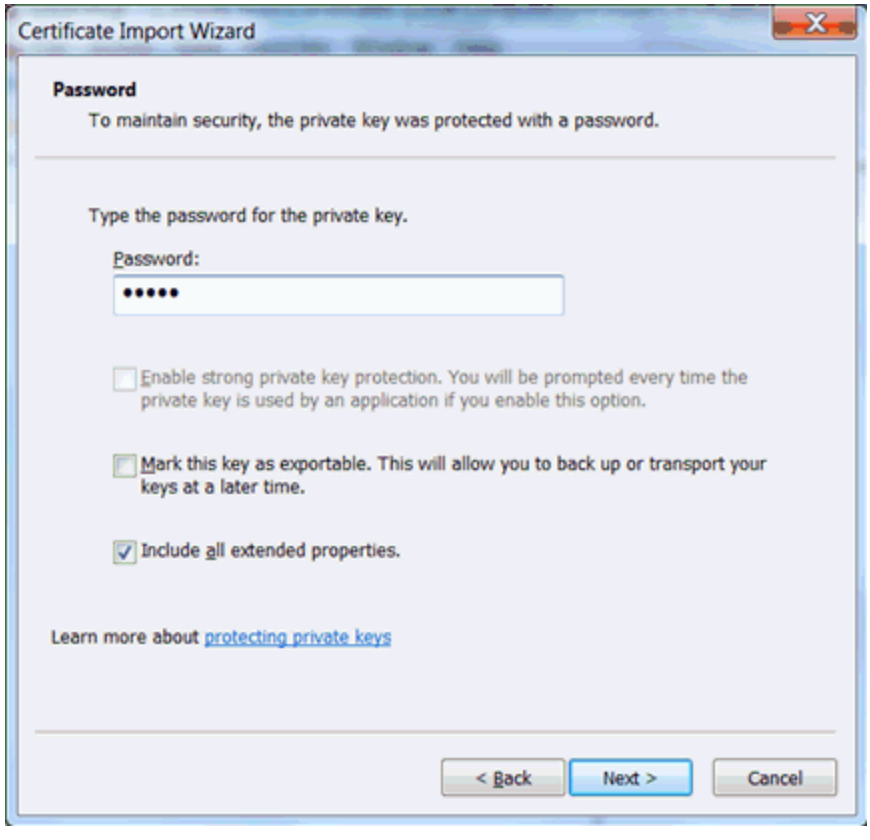
4. Click *Next*.

The File to Import pane of the Certificate Import Wizard opens, as shown in the following image.



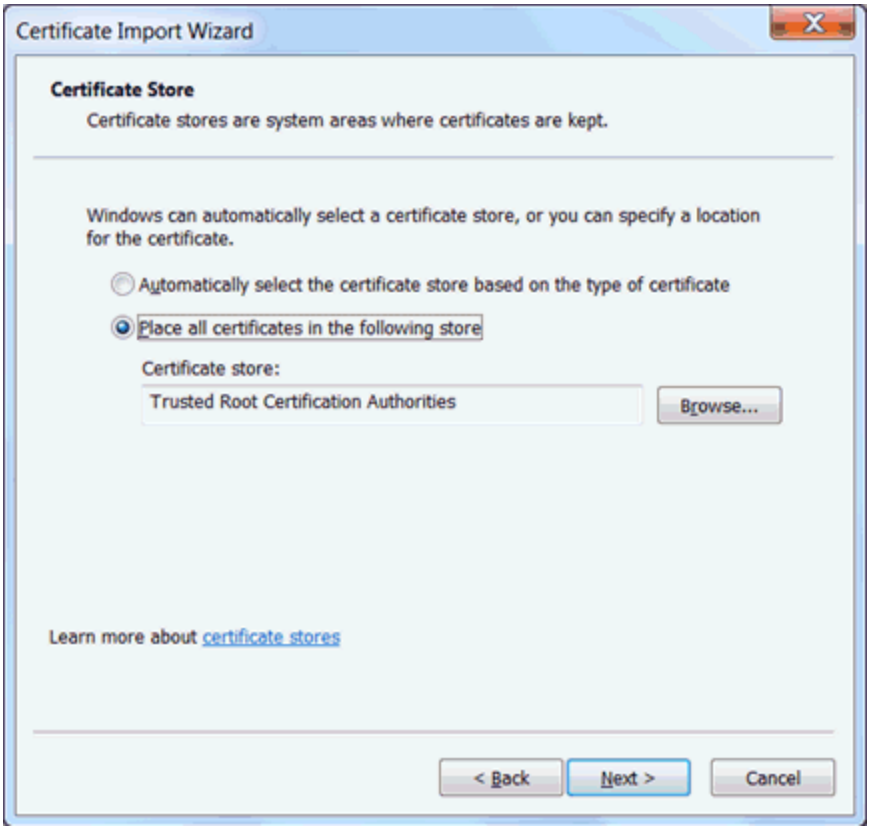
5. In the File name field, provide the path to the certificate file (*.cer or *.pfx) on your file system and click *Next*.

If you are importing a certificate in PFX format (*.pfx file), then the Password pane opens, as shown in the following image.



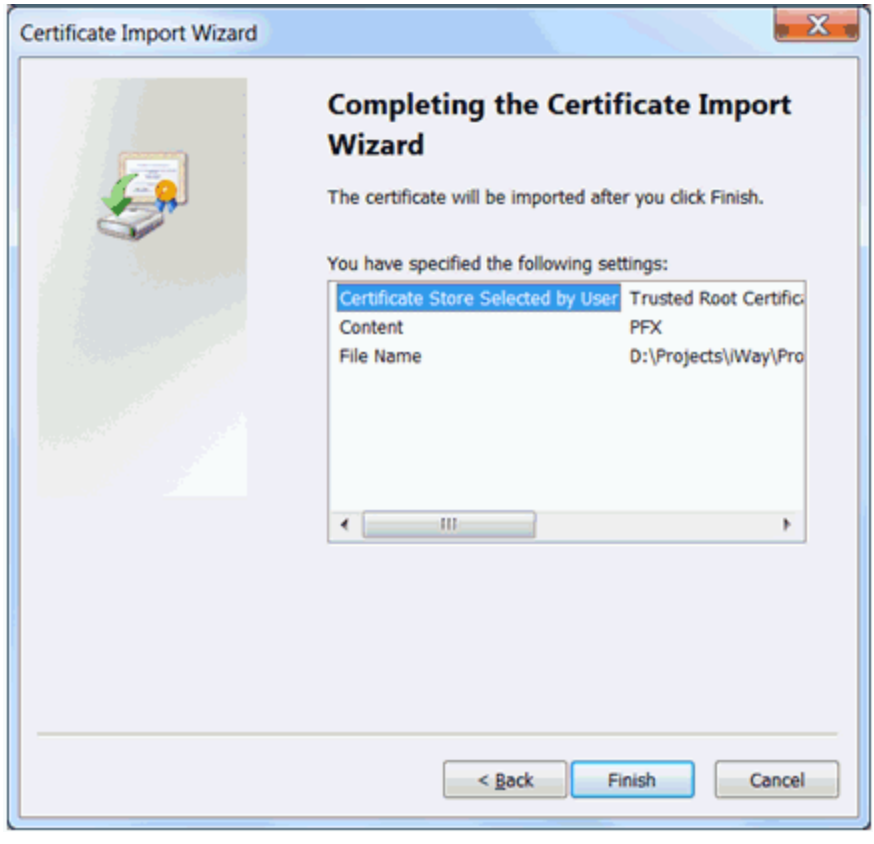
You are prompted for the private key password for the certificate. Type a valid password and click *Next*.

The Certificate Store pane of the Certificate Import Wizard opens, as shown in the following image.



6. Accept the default values and click *Next*.

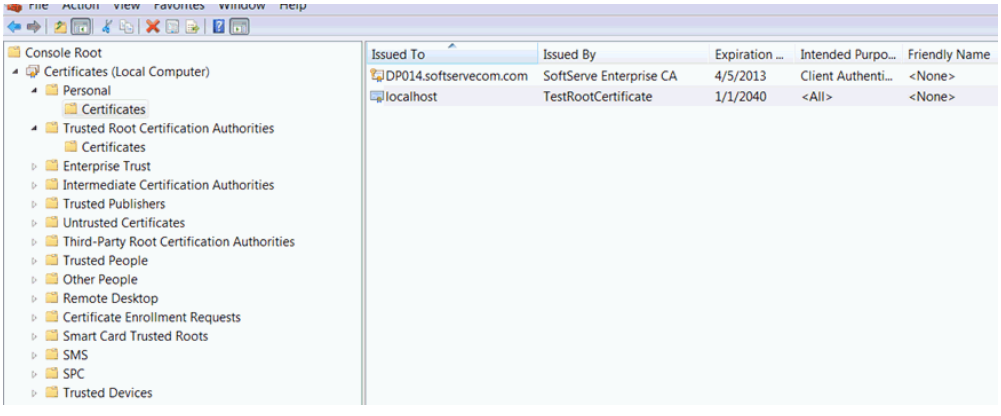
The Completing the Certificate Import Wizard pane opens, as shown in the following image.



7. Click *Finish*.

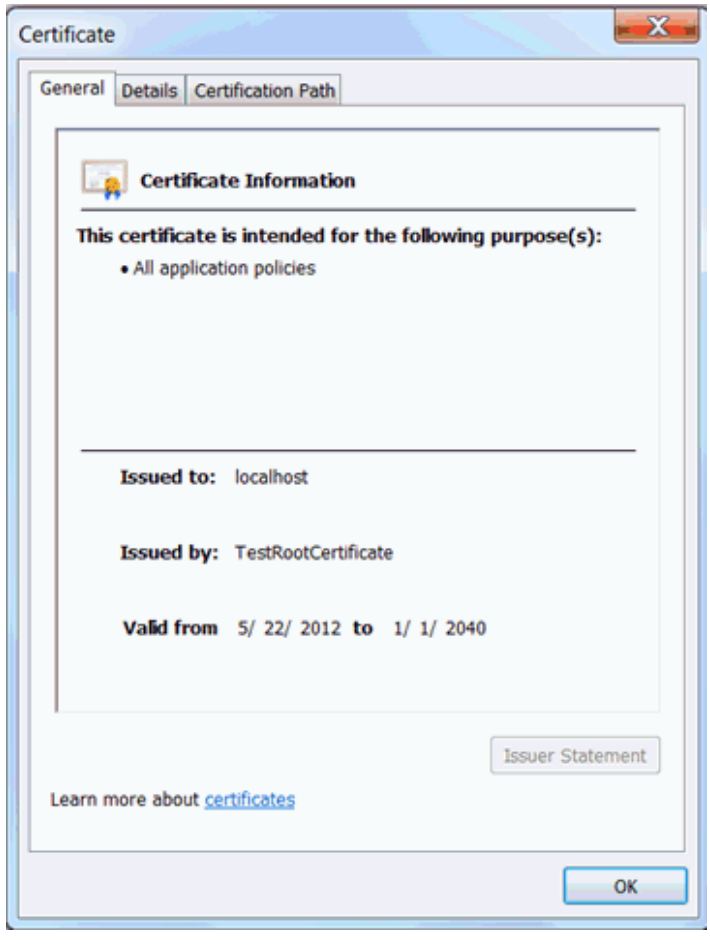
Procedure: How to Configure the Port With the SSL Certificate

1. Open the Certificates console for the Local Computer storage option. For more information, see *How to Add a Local System Account to the Certificates Console* on page 112.

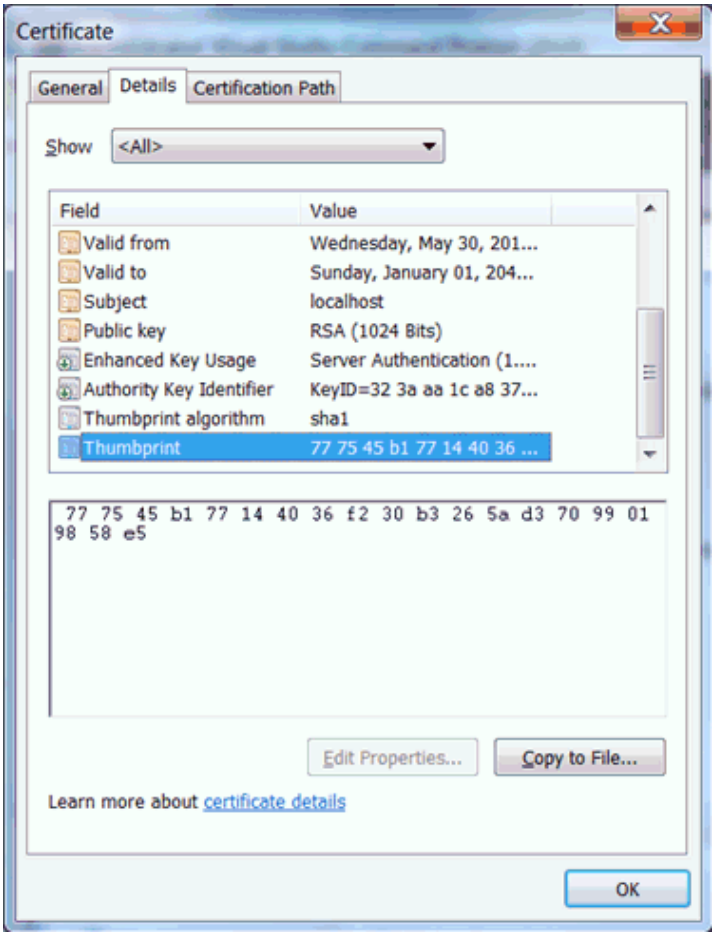


2. Double-click on a certificate from the list.

The Certificate dialog opens, as shown in the following image.



3. Click the *Details* tab and select *Thumbprint* from the list of properties, as shown in the following image.



4. Copy and paste the thumbprint to the text editor. Remove all spaces.

   For example:

   ```
   4a8d631c5b0e9c79d2d1e61d91f671a7658ca66b
   ```

5. Open a command prompt with administrator privileges.
6. Type the following command and substitute accordingly.

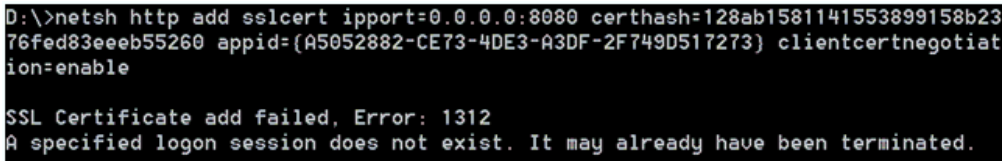
   ```
   netsh http add sslcert ipport=0.0.0.0:8080
   certhash=777545b177144036f230b3265ad37099019858e5 appid=
   {A5052882-CE73-4DE3-A3DF-2F749D517273} clientcertnegotiation=enable
   ```

   In this example, the port is 8080.

You may receive the following type of error message:

```
SSL Certificate add failed, Error: 1312. A specified logon session does
not exist. It may already have been terminated.
```

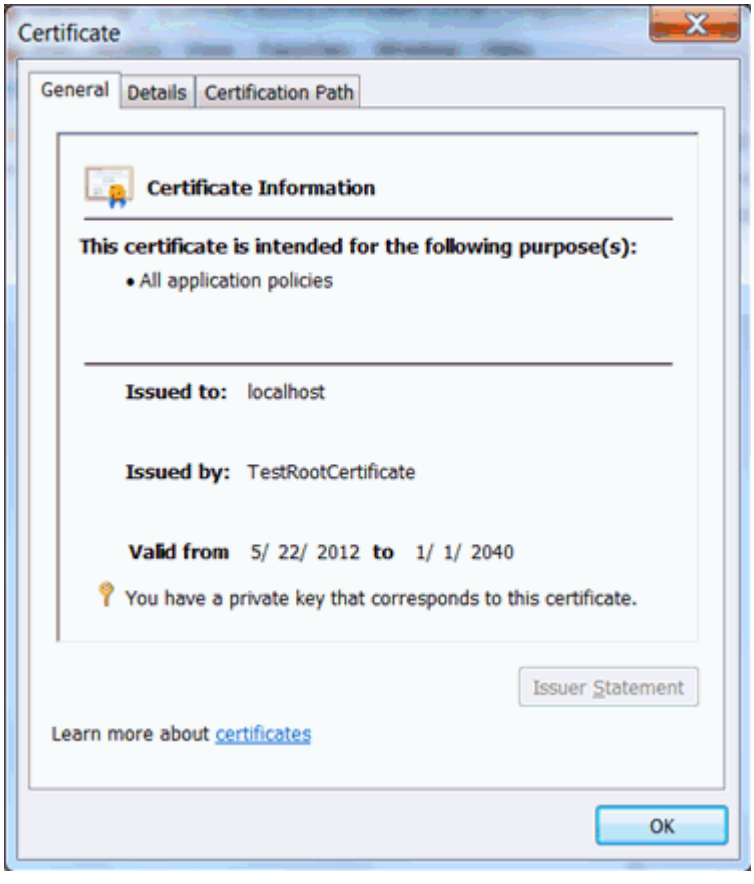
For example:



In this case, check the following:

- Ensure that you run the console with administrator privileges.
- Ensure that you installed the certificate to the Personal storage, and not Trusted Root Certification Authorities.

- ❑ Ensure the text *You have a private key that corresponds to this certificate* appears in the General tab, as shown in the following image.



If this text does not appear, then verify that you imported a *.pfx file, and not a *cer file.

7. To delete an SSL certificate from a port, enter the following command:

```
netsh http delete sslcert ipport=0.0.0.0:8080
```

In this example, the port is 8080.

8. To retrieve information about SSL certificates that are bound to ports, enter the following command:

```
netsh http show sslcert
```

The following are some useful online references:

- *http://msdn.microsoft.com/en-us/library/ms734695.aspx*
- *http://msdn.microsoft.com/en-us/library/ms733791.aspx*

Configuring the WCF Router to Work With the Adapter Through HTTPS

This section describes how to configure the WCF Router to work with the iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises through HTTPS.

Procedure: How to Configure the WCF Router to Work With the Adapter Through HTTPS

1. Perform the following steps to prepare your certificates:
   a. Ensure the root certificate is available in the *.cer and *.jks files.
   b. Ensure the server certificate is available in the *.pfx file.
   c. Ensure the client certificate is available in the *.jks file (optional).
2. Perform the following steps on the system where the WCF Router is installed:
   a. Import the root certificate in the *.cer file into the Trusted Root Certification Authorities branch as described in *How to Install a Certificate to the Local System Account* on page 116.
   b. Import the server certificate in the *.pfx file to the Personal branch as described in *How to Install a Certificate to the Local System Account* on page 116.
   c. Bind the server certificate to the port that will be used by the WCF Router as described in *How to Configure the Port With the SSL Certificate* on page 122.
   d. Open the routing service configuration file and edit it according to *Transport Security Without Certificates (HTTPS Mode Without Client Certificate Checking)* on page 110 or *Transport Security With Certificates (HTTPS With Client Certificate Checking)* on page 111.

      Use only the *basicHttpBinding* binding type.
3. Perform the following steps on the system where the iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises is installed:
   a. Attach your root certificate (*.jks file) to the adapter target as described in the documentation.
   b. If you have chosen step 2d with client certificate checking, then attach your client certificate to the adapter target as described in the documentation.

Installing a Certificate as a Trusted Certificate in the Java Keystore

If you are creating your own certificates for testing purposes, then consult the Microsoft documentation on using the Certificate Creation Tool (MakeCert.exe), or see the following website, which provides an article describing how to create temporary certificates for use during development:

http://msdn.microsoft.com/en-us/library/ms733813.aspx

Note: You must generate a PFX file instead of a CER file to be able to assign a SSL certificate to a port.

The following certificates are required:

- A *root* certificate either from a signing authority or a self signed certificate (root.cer).
- A *server* certificate, created from the root certificate (server.cer).
- A *client* certificate, created from the root certificate (client.cer).

PFX files are used to store the certificates and keys in one file on Windows systems (Personal Information Exchange PKCS#12 or PFX format). The *PEM* format can be used on non-Windows systems.

A PFX copy of the server certificate is required, installed into the Windows certificate store, which can be created using the Certificate Creation Tool (MakeCert.exe).

A PFX copy of the client certificate is required, which can be created using the Certificate Creation Tool (MakeCert.exe).

The server certificate PFX file (server.pfx) is installed in the host credentials store file, and the certificate *thumbprint* is used to bind the SSL Socket for communication over HTTPS. The Java Virtual Machine (JVM) of the adapter server will be used to create a keystore containing the server certificate and (optionally) a client certificate.

Before you create a SSL (HTTPS) connection using the iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises, the certificate for the machine running the adapter must first be installed as a trusted certificate in the Java keystore.

Procedure: How to Create a Java Trust Store File for the Server and Add a Server Certificate to the Java Trust Store File

1. Obtain a copy of the root certificate in the *DER (X.509 binary)* format to create the trust store.
2. Copy the root.cer file to the following directory:

   ```
   JAVA_HOME\jre\bin\root.cer
   ```

where:

JAVA_HOME

Is the root installation directory of your Java Runtime Environment (JRE).

Note: The root.cer file contains the CN=machine.domain.idomain setting of the machine running iWay Service Manager (iSM) and the adapter. For example:

```
CN=Server24.mySite.com
```

where:

Server24

Is the name of the machine as located by the DNS server (Domain Name System). This value is case-sensitive.

mySite

Is the domain that identifies where the machine is running.

com

Is the Internet-level domain where the domain (for example, mySite) is located.

3. Open a command prompt window with Administrator privileges and navigate to the following directory:

```
JAVA_HOME\jre\bin
```

4. Execute the following command:

```
keytool -importcert -file drive:\path\root.cer -keystore -file drive:
\path\trustStore.jks -storetype jks -alias crm2011AdapterKeyStore
```

where:

-importcert

Is the command used to import the certificate.

-file drive:\path\root.cer

Is the path to the root certificate. For example, c:\certs.

-keystore

Is the command used to create the keystore.

-file drive:\path\trustStore.jks

Is the path and name of the keystore file to be created during the import process.

-storetype

Specifies what type of storage to be created. The type must be jks (Java KeyStore).

-alias

Is a unique name for the keystore. It is also an alternate name for the keystore to help understand its usage.

5. When prompted to enter a password, type a password that has a minimum length of six characters.
6. Retype this same password for validation purposes.

   The keytool program displays information about the imported *root* certificate used in the keytool command. The keytool program provides a prompts, which asks you whether you want to trust the certificate.
7. Type *Yes* and press Enter.

   If executed successfully, a message is displayed indicating that the certificate was added to the keystore and a new file called trustStore.jks has been created.

   The server.pfx file is imported into the Windows certificate store as described in *Using SSL Server Certificates* on page 111.

Procedure: How to Create a Java Trust Store File for the Client and Add a Client Certificate to the Java Trust Store File

1. Create a copy of the client.pfx file that was created from the client.cer (certificate) file.

   Note: In this example, the root.cer file has been used to create the client.cer file.
2. Open a command prompt window with Administrator privileges and navigate to the following directory:

   ```
   JAVA_HOME\jre\bin
   ```

   where:

   JAVA_HOME

   Is the root installation directory of your Java Runtime Environment (JRE).
3. Execute the following command:

   ```
   keytool -importkeystore -deststorepass destpass -destkeystore
   drive:\path\clientStore.jks -srckeystore drive:\path\client.pfx -
   srcstoretype PKCS12 -srcstorepass 123456
   ```

where:

-importkeystore

Is the command used to import the keystore.

-deststorepass

Is a password for the keystore to be created. The password must be a standard alphanumeric 32-character password.

-destkeystore drive:\path\clientStore.jks

Is the path for the destination keystore and where the client certificate should be imported.

-srckeystore drive:\path\client.pfx

Is the source file (keystore) where the client certificate with the private key is located.

-srcstoretype

Is the type of the original source. This value must always be set to PKCS12.

-srcstorepass

Is the password for the keystore source file (client.pfx). This password was specified at the time the file was created, and must be a standard alphanumeric 32-character password.

Note: As of iSM Version 6.1.7, clientStore.jks must be the file name used for the client store.

4. When the trustStore.jks and clientStore.jks files have been created, copy these files to the following directory:

   iwayhome\lib

   where:

   iwayhome

   Is the root location where iWay Service Manager (iSM) is installed.

5. When the adapter target is being created, specify the following parameter values:

   if you are using HTTPS/SSL with client authentication:

   - Trusted keystore location:

     iwayhome\lib\trustStore.jks

If you are using the client keystore:

- Client keystore location:

  ```
  {iwayhome}\lib\clientStore.jks
  ```

- Client keystore password:

  This must be the same password that was specified for the *-deststorepass* setting in step 3.

6. In the router configuration file, ensure that the line in the router for the *baseAddress* matches exactly the CN used for the server.pfx file, and the port matches the bound SSL port number, as shown below:

   ```
   <baseAddresses>
       <add baseAddress="https://server.site.com:port/RoutingService"/>
   </baseAddresses>
   ```

7. Ensure that the correct binding type is set in the router configuration file, as shown below:

   ```
   <binding>
         <security mode="Transport">
             <transport clientCredentialType="Certificate"/>
         </security>
   </binding>
   ```

Appendix B

Application Adapter for Microsoft Dynamics CRM 2011 Samples and Reference Guide

This section provides samples and reference information for the iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises.

In this appendix:

Advanced Operations

The iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises also supports Advanced Operations that are declared in WSDL files. These Advanced Operations are specific for each entity. You can retrieve XML schemas for every Advanced Operation and create input XML documents based on the schemas.

Supported Advanced Operations

The following table lists and describes the supported Advanced Operations.

Supported Advanced Operations	Description
AddItemCampaignActivity	Add an item to a campaign activity.
AddItemCampaign	Add an item to a campaign.
AddListMembersList	Add members to the list.
AddMemberList	Add a member to a list (marketing list).
AddMembersTeam	Add members to a team.
AddPrivilegesRole	Add a set of existing privileges to an existing role.
AddProductToKit	Add a product to a kit.
AddRecurrence	Add recurrence information to an existing appointment.
AddSolutionComponent	Add a solution component to an unmanaged solution.
AddToQueue	Move an entity record from a source queue to a destination queue.
Appointment	Provides the details of an appointment request for the Search operation
Assign	Assign the specified record to a new owner (user or team) by changing the OwnerId attribute of the record.
Associate	Create a link between records.
AutoMapEntity	Generate a new set of attribute mappings based on the metadata.
BackgroundSendEmail	Send email messages asynchronously.
Book	Schedule or book an appointment, recurring appointment, or service appointment (service activity).

Supported Advanced Operations	Description
BulkDelete	Submit a bulk delete job that deletes selected records in bulk. This job runs asynchronously in the background without blocking other activities.
BulkDetectDuplicates	Submit an asynchronous system job that detects and logs multiple duplicate records.
BulkOperationStatusClose	For internal use only.
CalculateActualValue-Opportunity	Calculate the value of an opportunity that is in the Won state.
CalculateTotalTimeIncident	Calculate the total time, in minutes, that you used while you worked on an incident (case).
CanBeReferenced	Check whether the specified entity can be the primary entity (one) in a one-to-many relationship.
CanBeReferencing	Check whether an entity can be the referencing entity in a one-to-many relationship.
CancelContract	Cancel a contract.
CancelSalesOrder	Cancel a sales order (order).
CanManyToMany	Check whether an entity can participate in a many-to-many relationship.
CheckIncomingEmail	Check whether the incoming email message is relevant to the Microsoft Dynamics CRM system.
CheckPromoteEmail	Check whether the incoming email message should be promoted to the Microsoft Dynamics CRM system.
CleanUpBulkOperation	For internal use only.
CloneContract	Copy an existing contract and its line items.
CloseIncident	Close an incident (case).
CloseQuote	Close a quote.

Supported Advanced Operations	Description
CompoundUpdateDuplicate-DetectionRule	Update a duplicate rule (duplicate detection rule) and its related duplicate rule conditions.
ConvertKitToProduct	Convert a kit to a product.
ConvertProductToKit	Convert a product to a kit.
ConvertQuoteToSalesOrder	Convert a quote to a sales order.
ConvertSalesOrderToInvoice	Convert a sales order to an invoice.
CopyCampaign	Copy a campaign.
CopyCampaignResponse	Create a copy of the campaign response.
CopyDynamicListToStatic	Create a static list from the specified dynamic list and add the members that satisfy the dynamic list query criteria to the static list.
CopyMembersList	Copy the members from the source list to the target list without creating duplicates.
CopySystemForm	Create a new entity form that is based on an existing entity form.
CreateActivitiesList	Create a quick campaign to distribute an activity to members of a list (marketing list).
CreateAttribute	Create a new attribute, and optionally, to add it to a specified unmanaged solution.
CreateEntity	Create a custom entity and to optionally add it to a specified unmanaged solution.
CreateException	Create an exception for the recurring appointment instance.
CreateInstance	Create future unexpanded instances for the recurring appointment master.
CreateManyToMany	Create a new Many-to-Many (N:N) entity relationship.

Supported Advanced Operations	Description
CreateOneToMany	Create a new One-to-Many (1:N) entity relationship.
CreateOptionSet	Create a new global option set.
CreateWorkflowFromTemplate	Create a workflow (process) from a workflow template.
DeleteAttribute	Delete an attribute.
DeleteAuditData	Delete all audit data records up until a specified end date.
DeleteOpenInstances	Delete instances of a recurring appointment master that have an Open state.
DeleteOptionSet	Delete a global option set.
DeleteOptionValue	Delete an option value in a global or local option set.
DeleteRelationship	Delete an entity relationship.
DeliverIncomingEmail	Create an email activity instance from an incoming email message.
DeliverPromoteEmail	Create an email activity record from the specified email message.
DeprovisionLanguage	Deprovision a language.
Disassociate	Delete a link between records.
DistributeCampaignActivity	Create a bulk operation that distributes a campaign activity. The appropriate activities, such as a phone call or fax, are created for the members of the list that is associated with the specified campaign activity.
DownloadReportDefinition	Download a report definition.
ExecuteByIdSavedQuery	Execute a saved query (view) that has the specified ID.
ExecuteByIdUserQuery	Execute the user query (saved view) that has the specified ID.

Supported Advanced Operations	Description
ExecuteWorkflow	Execute a workflow.
ExpandCalendar	Convert the calendar rules to an array of available time blocks for the specified period.
ExportMappingsImportMap	Export a data map as an XML formatted data.
ExportSolution	Export a solution.
ExportTranslation	Export all translations for a specific solution to a compressed file.
FetchXmlToQueryExpression	Convert a query in FetchXML to a QueryExpression.
FindParentResourceGroup	Find a parent resource group (scheduling group) for the specified resource groups (scheduling groups).
FulfillSalesOrder	Fulfill the sales order (order).
GenerateInvoiceFromOpportunity	Generate an invoice from an opportunity.
GenerateQuoteFromOpportunity	Generate a quote from an opportunity.
GenerateSalesOrder-FromOpportunity	Generate a sales order (order) from an opportunity.
GetAllTimeZonesWith-DisplayName	Retrieve all the time zone definitions for the specified locale and to return only the display name attribute.
GetDecryptionKey	Obtain the key that is used to encrypt or decrypt the email credentials of a user or queue that are stored in the Microsoft Dynamics CRM database.
GetDistinctValuesImportFile	Retrieve distinct values from the parse table for a column in the source file that contains list values.
GetHeaderColumnsImportFile	Retrieve the source-file column headings; or retrieve the system-generated column headings if the source file does not contain column headings.

Supported Advanced Operations	Description
GetInvoiceProductsFrom-Opportunity	Retrieve the products from an opportunity and copy them to the invoice.
GetQuantityDecimal	Get the quantity decimal value of a product for the specified entity in the target.
GetQuoteProductsFrom-Opportunity	Retrieve the products from an opportunity and copy them to the quote.
GetReportHistoryLimit	Retrieve the history limit for a report.
GetSalesOrderProducts-FromOpportunity	Retrieve the products from an opportunity and copy them to the sales order (order).
GetTimeZoneCodeBy-LocalizedName	Retrieve the time zone code for the specified localized time zone name.
GetTrackingTokenEmail	Return a tracking token that can then be passed as a parameter to the SendEmailRequest message.
GetValidManyToMany	Retrieve a list of all the entities that can participate in a Many-to-Many entity relationship.
GetValidReferencedEntities	Contains the data that is needed to retrieve a list of entity logical names that are valid as the primary entity (one) from the specified entity in a one-to-many relationship.
GetValidReferencingEntities	Retrieve the set of entities that are valid as the related entity (many) to the specified entity in a one-to-many relationship.
GrantAccess	Grant a security principal (user or team) access to the specified record.
ImportMappingsImportMap	Import the XML representation of a data map and create an import map (data map) based on this data.
ImportRecordsImport	Submit an asynchronous job that uploads the transformed data into Microsoft Dynamics CRM.

Supported Advanced Operations	Description
ImportSolution	Import a solution.
ImportTranslation	Import translations from a compressed file.
InitializeFrom	Initialize a new record from an existing record.
InsertOptionValue	Insert a new option value for a global or local option set.
InsertStatusValue	Insert a new option into a StatusAttributeMetadata attribute.
InstallSampleData	Install the sample data.
InstantiateFilters	Instantiate a set of filters for Microsoft Dynamics CRM for Outlook for the specified user.
InstantiateTemplate	Contains the parameters that are needed to create an email message from a template (email template).
IsComponentCustomizable	Determine whether a solution component is customizable.
IsValidStateTransition	Validate the state transition.
LocalTimeFromUtcTime	Retrieve the local time for the specified Coordinated Universal Time (UTC).
LockInvoicePricing	Lock the total price of products and services that are specified in the invoice.
LockSalesOrderPricing	Lock the total price of products and services that are specified in the sales order (order).
LogFailureBulkOperation	For internal use only.
LogSuccessBulkOperation	For internal use only.
LoseOpportunity	Set the state of an opportunity to Lost.
Merge	Merge the information from two entity records of the same type.

Supported Advanced Operations	Description
ModifyAccess	Replace the access rights on the target record for the specified security principal (user or team).
OrderOption	Set the order for an option set.
ParseImport	Submit an asynchronous job that parses all import files that are associated with the specified import (data import).
ProcessInboundEmail	Process the email responses from a marketing campaign.
ProcessOneMemberBulk-Operation	For internal use only.
PropagateByExpression	Create a quick campaign to distribute an activity to accounts, contacts, or leads that are selected by a query.
ProvisionLanguage	Provision a new language.
PublishAllXml	Publish all changes to solution components.
PublishDuplicateRule	Submit an asynchronous job to publish a duplicate rule.
PublishXml	Publish specified solution components.
QualifyLead	Qualify a lead and create account, contact, and opportunity records that are linked to the originating lead record.
QualifyMemberList	Qualify the specified list and either override the list members or remove them according to the specified option.
QueryExpressionToFetchXml	Convert a query, which is represented as a QueryExpression class, to its equivalent query, which is represented as FetchXML.

Supported Advanced Operations	Description
QueryMultipleSchedules	Search multiple resources for available time block that match the specified parameters.
QuerySchedule	Search the specified resource for an available time block that matches the specified parameters.
ReassignObjectsOwner	Reassign all records that are owned by the security principal (user or team) to another security principal (user or team).
ReassignObjectsSystemUser	Reassign all records that are owned by a specified user to another security principal (user or team).
Recalculate	Recalculate system-computed values for rollup fields in the goal hierarchy.
RemoveItemCampaignActivity	Remove an item from a campaign activity.
RemoveItemCampaign	Remove an item from a campaign.
RemoveMemberList	Remove a member from a list (marketing list).
RemoveMembersTeam	Remove members from a team.
RemoveParent	Remove the parent for a system user (user) record.
RemovePrivilegeRole	Remove a privilege from an existing role.
RemoveProductFromKit	Remove a product from a kit.
RemoveRelated	Use the Disassociate message. Remove the relationship between the specified records for specific relationships.
RemoveSolutionComponent	Remove a component from an unmanaged solution.
RenewContract	Renew a contract and create the contract details for a new contract.
ReplacePrivilegesRole	Replace the privilege set of an existing role.

Supported Advanced Operations	Description
Reschedule	Reschedule an appointment, recurring appointment, or service appointment (service activity).
ResetUserFilters	Reset the offline data filters for the calling user to the default filters for the organization.
RetrieveAbsoluteAndSite-CollectionUrl	Retrieve the absolute URL and the site collection URL for a SharePoint location record in Microsoft Dynamics CRM.
RetrieveAllChildUsers-SystemUser	Retrieve the collection of users that report to the specified system user (user).
RetrieveAllEntities	Retrieve metadata information about all the entities.
RetrieveAllManagedProperties	Retrieve all managed property definitions.
RetrieveAllOptionSets	Retrieve information about all global option sets.
RetrieveApplicationRibbon	Retrieve the data that defines the content and behavior of the application ribbon.
RetrieveAttributeChangeHistory	Retrieve all metadata changes to a specific attribute.
RetrieveAttribute	Retrieve attribute metadata.
RetrieveAuditDetails	Retrieve the full audit details from an Audit record.
RetrieveAuditPartitionList	Retrieve the list of database partitions that are used to store audited history data.
RetrieveAvailableLanguages	Retrieve the list of language packs that are installed on the server.
RetrieveBusinessHierarchy-BusinessUnit	Retrieve all business units (including the specified business unit) from the business unit hierarchy.
RetrieveByGroupResource	Retrieve all resources that are related to the specified resource group (scheduling group).
RetrieveByResourceResource-Group	Retrieve the resource groups (scheduling groups) that contain the specified resource.

Supported Advanced Operations	Description
RetrieveByResourcesService	Retrieve the collection of services that are related to the specified set of resources.
RetrieveByTopIncidentProduct-KbArticle	Retrieve the top-ten articles about a specified product from the knowledge base of articles for your organization.
RetrieveByTopIncidentSubject-KbArticle	Retrieve the top-ten articles about a specified subject from the knowledge base of articles for your organization.
RetrieveDependenciesFor-Delete	Retrieve a collection of dependency records that describe any solution components that would prevent a solution component from being deleted.
RetrieveDependenciesFor-Uninstall	Retrieve a list of the solution component dependencies that can prevent you from uninstalling a managed solution.
RetrieveDependentComponents	Retrieves a list of dependencies for solution components that directly depend on a solution component.
RetrieveDeploymentLicense-Type	Retrieve the type of license for a deployment of Microsoft Dynamics CRM.
RetrieveDeprovisioned-Languages	Retrieve a list of language packs that are installed on the server that have been disabled.
RetrieveDuplicates	Detect and retrieve duplicates for a specified record.
RetrieveEntity	Retrieve entity metadata.
RetrieveEntityRibbon	Retrieve ribbon definitions for an entity.
RetrieveExchangeRate	Retrieve the exchange rate.
RetrieveFilteredForms	Retrieve the entity forms that are available for a specified user.

Supported Advanced Operations	Description
RetrieveFormattedImport-JobResults	Retrieve the formatted results from an import job.
RetrieveFormXml	For internal use only.
RetrieveInstalled-LanguagePacks	Retrieve the list of language packs that are installed on the server.
RetrieveInstalledLanguage-PackVersion	Retrieve the version of an installed language pack.
RetrieveLicenseInfo	Retrieve the number of used and available licenses for a deployment of Microsoft Dynamics CRM.
RetrieveLocLabels	Retrieve localized labels for a limited set of entity attributes.
RetrieveManagedProperty	Retrieve a managed property definition.
RetrieveMembersBulk-Operation	Retrieve the members of a bulk operation.
RetrieveMissingComponents	Retrieve a list of missing components in the target organization.
RetrieveMissingDependencies	Retrieve any required solution components that are not included in the solution.
RetrieveMultiple	Retrieve a collection of records that satisfy the specified query criteria.
RetrieveOptionSet	Retrieve a global option set.
RetrieveOrganizationResources	Retrieve the resources that are used by an organization.
RetrieveParentGroups-ResourceGroup	Contains the data needed to retrieve the collection of the parent resource groups of the specified resource group (scheduling group).
RetrieveParsedDataImportFile	Retrieve the data from the parse table.

Supported Advanced Operations	Description
RetrievePersonalWall	Retrieve pages of posts, including comments for each post, for all records that the calling user is following.
RetrievePrincipalAccess	Retrieve the access rights of the specified security principal (team or user) to the specified record.
RetrievePrincipalAttribute-Privileges	Retrieves all the secured attribute privileges a user or team has through direct or indirect (through team membership) associations with the FieldSecurityProfile entity.
RetrievePrivilegeSet	Contains the data needed to retrieve the set of privileges defined in the system.
RetrieveProvisionedLanguage-PackVersion	Retrieve the version of a provisioned language pack.
RetrieveProvisionedLanguages	Retrieve the list of provisioned languages.
RetrieveRecordChangeHistory	Retrieve all attribute data changes for a specific entity.
RetrieveRecordWall	Retrieve pages of posts, including comments for each post, for a specified record.
RetrieveRelationship	Retrieve entity relationship metadata.
RetrieveRequiredComponents	Retrieve a collection of solution components that are required for a solution component.
RetrieveRolePrivilegesRole	Retrieve the privileges that are assigned to the specified role.
RetrieveSharedPrincipals-AndAccess	Retrieve all security principals (users or teams) that have access to, and access rights for, the specified record.
RetrieveSubGroups-ResourceGroup	Retrieve the collection of child resource groups from the specified resource group (scheduling group).
RetrieveTeamPrivileges	Retrieve the privileges for a team.

Supported Advanced Operations	Description
RetrieveTimestamp	Retrieves a time stamp for the metadata.
RetrieveUnpublishedMultiple	Retrieve a collection of unpublished organization-owned records that satisfy the specified query criteria.
RetrieveUnpublished	Retrieve an unpublished record.
RetrieveUserPrivileges	Contains the data needed to retrieve the privileges a system user (user) has through his or her roles in the specified business unit.
RetrieveVersion	Retrieve the version number of the Microsoft Dynamics CRM Server.
ReviseQuote	Set the state of a quote to Draft.
RevokeAccess	Replace the access rights on the target record for the specified security principal (user or team).
Rollup	Retrieve all the entity records that are related to the specified record.
SearchByBodyKbArticle	Search for knowledge base articles that contain the specified body text.
SearchByKeywordsKbArticle	Search for knowledge base articles that contain the specified keywords.
SearchByTitleKbArticle	Search for knowledge base articles that contain the specified title.
Search	Contains the data needed to search for available time slots that fulfill the specified appointment request.
SendBulkMail	Send bulk email messages.
SendEmailFromTemplate	Send an email message using a template.
SendEmail	Send an email message.
SendFax	Send a fax.

Supported Advanced Operations	Description
SendTemplate	Send a bulk email message that is created from a template.
SetBusinessEquipment	Assign equipment (facility/equipment) to a specific business unit.
SetBusinessSystemUser	Move a system user (user) to a different business unit.
SetLocLabels	Set localized labels for a limited set of entity attributes.
SetParentBusinessUnit	Set the parent business unit for a business unit.
SetParentSystemUser	Contains the data needed to set a new parent system user (user) for the specified user.
SetParentTeam	Contains the data needed to set the parent business unit of a team.
SetRelated	Contains the data needed to create a relationship between a set of records that participate in specific relationships.
SetReportRelated	Contains the data needed to link an instance of a report entity to related entities.
SetState	Set the state of an entity record.
StatusUpdateBulkOperation	For internal use only.
TransformImport	Submit an asynchronous job that transforms the parsed data.
TriggerServiceEndpointCheck	Validate the configuration of a Windows Azure platform service endpoint of AppFabric solution.
UninstallSampleData	Uninstall data samples.
UnlockInvoicePricing	Unlock pricing for an invoice.
UnlockSalesOrderPricing	Unlock pricing for a sales order (order).

Supported Advanced Operations	Description
UnpublishDuplicateRule	Submit an asynchronous job to unpublish a duplicate rule.
UpdateAttribute	Update the definition of an attribute.
UpdateEntity	Contains the data that is needed to update the definition of an entity.
UpdateOptionSet	Contains the data that is needed to update the definition of a global option set.
UpdateOptionValue	Update an option value in a global or local option set.
UpdateRelationship	Contains the data that is needed to update the definition of an entity relationship.
UpdateStateValue	Update an option set value in for a StateAttributeMetadata attribute.
UtcTimeFromLocalTime	Retrieve the Coordinated Universal Time (UTC) for the specified local time.
ValidateRecurrenceRule	Validate a rule for a recurring appointment.
Validate	Verify that an appointment or service appointment (service activity) has valid available resources for the activity, duration, and site, as appropriate.
ValidateSavedQuery	Contains the data that is needed to validate a saved query (view).
VerifyProcessStateData	For internal use only.
WhoAmI	Retrieve the system user ID for the currently logged on user or the user under whose context the code is running.
WinOpportunity	Set the state of an opportunity to Won.

Supported Advanced Operations	Description
WinQuote	Set the state of a quote to Won.

Unsupported Advanced Operations

The following table lists and describes the unsupported Advanced Operations.

Unsupported Advanced Operations	Description
AddSubstituteProduct	Deprecated. Use the Associate operation. Adds a link between two entity instances in a many-to-many relationship.
AssociateEntities	Deprecated. Use the Associate operation. Add a link between two entity instances in a many-to-many relationship.
CompoundCreate	Deprecated. Use the Create operation. This operation creates a compound entity, such as a sales order (order), invoice, quote, or duplicate rule (duplicate detection rule). It also creates its related entity, such as a sales order detail (order product), invoice detail (invoice product), quote detail (quote product), or duplicate rule condition.
CompoundUpdate	Deprecated. Use the Create operation. Update a compound record, such as a sales order (order), invoice, quote, or duplicate rule (duplicate detection rule). You can also update its related detail record, such as a sales order detail (order product), invoice detail (invoice product), quote detail (quote product), or duplicate rule condition.
DisassociateEntities	Deprecated. Use the Disassociate message. Remove a link between two entity instances in a many-to-many relationship.

Unsupported Advanced Operations	Description
ExecuteFetch	Deprecated. Use the RetrieveMultiple operation.
IsBackOfficeInstalled	Deprecated. Checks whether Microsoft Dynamics GP 9.0 is installed.
MakeAvailableTo-OrganizationReport	Deprecated. Use the Update message.
MakeAvailableTo-OrganizationTemplate	Deprecated. Use the Update message.
MakeUnavailableTo-OrganizationReport	Deprecated. Use the Update message.
MakeUnavailableTo-OrganizationTemplate	Deprecated. Use the Update message.
RemoveSubstituteProduct	Deprecated. Use the Disassociate message.
RetrieveMembersTeam	Deprecated. Use the RetrieveMultiple operation.
RetrieveSubsidiaryTeams-BusinessUnit	Deprecated. Use the RetrieveMultiple message. Contains the data needed to retrieve a collection of entity instances based on the specified query criteria.
RetrieveSubsidiaryUsers-BusinessUnit	Deprecated. Use the RetrieveMultiple message. Contains the data needed to retrieve all user information from the child business units of the specified business unit.
RetrieveTeamsSystemUser	Deprecated. Use the RetrieveMultiple message. Contains the data needed to retrieve the list of teams of which the specified user is a member.
RetrieveUserSettingsSystemUser	Deprecated. Use the RetrieveMultiple message. Contains the data needed to retrieve the user settings for the specified system user (user).

Unsupported Advanced Operations	Description
UpdateUserSettingsSystemUser	Deprecated. Use the Update operation.

Schemas for Advanced Operations

Schemes for advanced operations (other than Create, Read, Update, and Delete (CRUD) operations) are generated based on MS CRM SDK classes. They do not require attributes from metadata and are not affected by entity customization. These schemes are generated using logic that is implemented in C# and stored in the resources of the adapter. During design time, Java mechanisms replace specific types with placeholders. The following table lists the 42 schemas with such elements.

Operation	Placeholder	Execution Entity
AddRecurrenceRequest	appointment	recurringappointment
AddToQueueRequest	queueItem	queueitem
BookRequest	appointment, recurringappointment, or serviceactivity	appointment, recurringappointment, or serviceactivity
CancelSalesOrderRequest	orderclose	salesorder
CloneContractResponse	contract	contract
CloseIncidentRequest	caseresolution	case
CloseQuoteRequest	quoteclose	quote
CompoundCreateRequest	-*	invoice, order, quote, duplicaterule
CompoundUpdateDuplicate-DetectionRuleRequest	-*	duplicaterule
CompoundUpdateRequest	-*	invoice, order, quote

Operation	Placeholder	Execution Entity
ConvertQuoteToSalesOrder-Response	order	quote
ConvertSalesOrderTo-InvoiceResponse	invoice	order
CopySystemFormRequest	systemform	systemform
CreateActivitiesListRequest	activity	marketinglist
CreateExceptionRequest	appointment	appointment
CreateInstanceRequest	appointment	recurringappointment
CreateRequest	-*	-*
DeleteOpenInstancesRequest	recurringappointment	recurringappointment
DeliverPromoteEmail-Request	email	email
DistributeCampaign-ActivityRequest	activity	campaignactivity
FulfillSalesOrderRequest	orderclose	order
GenerateInvoiceFrom-OpportunityResponse	invoice	invoice
GenerateQuoteFrom-OpportunityResponse	quote	quote
GenerateSalesOrderFrom-OpportunityResponse	salesorder	salesorder
InitializeFromResponse	Returns initialized instance	**
LoseOpportunityRequest	opportunityclose	opportunity
MergeRequest	Entity attributes to be set during the merge operation	account, contact, lead, mailmergetemplate

Operation	Placeholder	Execution Entity
ProcessOneMemberBulk-OperationRequest	For internal use only	bulkoperation
PropagateByExpression-Request	activity	email
RenewContractResponse	contract	contract
RescheduleRequest	appointment, recurringappointment, serviceactivity	appointment, recurringappointment, or serviceactivity
RetrieveDuplicatesRequest	all entities	**
RetrieveResponse	-*	-*
RetrieveUnpublished-Response	all entities	savedqueryvisualization, organizationui, savedquery, webresource, sitemap, systemform
RetrieveUserSettings-SystemUserResponse	usersettings	user
ReviseQuoteResponse	quote	quote
SendEmailFromTemplate-Request	email	email
UpdateRequest	-*	-*
UpdateUserSettingsSystem-UserRequest	usersettings	user
ValidateRecurrence-RuleRequest	recurrencerule	recurrencerule
WinOpportunityRequest	opportunityclose	opportunity
WinQuoteRequest	quoteclose	quote

Note:

- * Schema was implemented in scope of Create, Read, Update, and Delete (CRUD) operations.
- ** Operation is missing in all entities.

Global Operations

Microsoft Dynamics CRM 2011 On-Premises provides operations that are not related to any entity. These operations are called Global Operations.

Supported Global Operations

The following table lists and describes the supported Global Operations.

Supported Global Operation	Description
BulkDelete	Submits an asynchronous bulk delete job.
BulkDeleteDuplicates	Submits an asynchronous duplicates detection job.
CanBeReferenced	Check whether the specified entity can be the primary entity (one) in a one-to-many relationship.
CanBeReferencing	Check whether an entity can be the referencing entity in a one-to-many relationship.
CanManyToMany	Check whether an entity can participate in a many-to-many relationship.
CreateAttribute	Create a new attribute, and optionally, can add it to a specified unmanaged solution.
CreateManyToMany	Create a new Many-to-Many (N:N) entity relationship.
CreateOneToMany	Create a new One-to-Many (1:N) entity relationship.
CreateOptionSet	Create a new global option set.
DeleteAttribute	Delete an attribute.
DeleteEntity	Delete an entity.

Supported Global Operation	Description
DeleteOptionSet	Delete a global option set.
DeleteOptionValue	Delete an option value in a global or local option set.
DeleteRelationship	Contains the data that is needed to delete an entity relationship.
GetInvoiceProductsFrom-Opportunity	Retrieves the products from an opportunity and copies them to the specified invoice.
GetValidManyToMany	Retrieve a list of all the entities that can participate in a Many-to-Many entity relationship.
GetValidReferencedEntities	Retrieve a list of entity logical names that are valid as the primary entity (one) from the specified entity in a one-to-many relationship.
GetValidReferencingEntities	Retrieve the set of entities that are valid as the related entity (many) to the specified entity in a one-to-many relationship.
InsertOptionValue	Insert a new option value for a global or local option set.
InsertStatusValue	Insert a new option into a StatusAttributeMetadata attribute.
OrderOption	Set the order for an option set.
ResetUserFilters	Resets the offline data filters for the calling user to the default filters for the organization.
RetrieveAllOptionSets	Retrieve information about all global option sets.
RetrieveAttribute	Retrieve attribute metadata.
RetrieveAvailableLanguages	Retrieves the list of available languages.
RetrieveDeprovisioned-Languages	Retrieves the list of language packs installed on the server that have been disabled.
RetrieveEntity	Retrieves the metadata for the specified entity.

Supported Global Operation	Description
RetrieveFormattedImport-JobResults	Retrieves the formatted results from an import job.
RetrieveInstalledLanguage-Packs	Retrieves the list of language packs installed on the server.
RetrieveInstalledLanguage-PackVersion	Retrieves the version of an installed language pack.
RetrieveLocLabels	Retrieves the localized labels for the specified attribute.
RetrieveManagedProperty	Retrieve a managed property definition.
RetrieveMissingComponents	Retrieves a list of missing components for the target organization.
RetrieveOptionSet	Retrieve a global option set.
RetrieveOrganizationResources	Retrieves the resources used by an organization.
RetrievePersonalWall	Retrieve pages of posts, including comments for each post, for all records that the calling user is following.
RetrieveProvisionedLanguages	Retrieves the list of language packs installed on the server that are enabled.
RetrieveRecordWall	Retrieve pages of posts, including comments for each post, for a specified record.
RetrieveRelationship	Retrieve entity relationship metadata.
RetrieveTimestamp	Retrieve a time stamp for the metadata.
RetrieveUserPrivileges	Retrieve the privileges a system user (user) has through his or her roles in the specified business unit.
RetrieveVersion	Retrieve the version number of the Microsoft Dynamics CRM Server.
Search	Search for available time slots that fulfill the specified appointment request.

Supported Global Operation	Description
SetLocLabels	Set localized labels for a limited set of entity attributes.
UnlockInvoicePricing	Unlock pricing for an invoice.
UnlockSalesOrderPricing	Unlock pricing for a sales order (order).
UpdateAttribute	Update the definition of an attribute.
UpdateEntity	Update the definition of an entity.
UpdateOptionSet	Update the definition of a global option set.
UpdateOptionValue	Update an option value in a global or local option set.
UpdateRelationship	Update the definition of an entity relationship.
UpdateStateValue	Update an option set value in for a StateAttributeMetadata attribute.
Validate	Verify that an appointment or service appointment (service activity) has valid available resources for the activity, duration, and site, as appropriate.
WhoAmI	Retrieve the system user ID for the currently logged on user or the user under whose context the code is running.

Unsupported Global Operations

The following table lists and describes the unsupported Global Operations.

Unsupported Global Operation	Description
AssociateEntities	Deprecated. Adds a link between two records in a many-to-many relationship. Use Associate.
AutoMapEntity	Creates the attribute mappings between two entities.
DeprovisionLanguage	Deprovisions a language.

Unsupported Global Operation	Description
DisassociateEntities	Deprecated. Removes a link between two records in a many to many relationship. Use Disassociate.
ExportSolution	Exports a managed or unmanaged solution.
ImportTranslation	Imports all translations from a compressed file.
InstallSampleData	Installs sample data for an organization.
IsBackOfficeInstalled	Deprecated. Checks if Microsoft Great Plains is installed.
ProvisionLanguage	Provisions a language.
RemoveProductFromKit	Removes a product from a kit.
RetrieveAllEntities	Retrieves the metadata for all entities.
RetrieveAllManagedProperties	Retrieve all managed property definitions.
RetrieveDeploymentLicense-Type	Retrieves the type of license for a deployment of Microsoft Dynamics CRM.
RetrieveLicenseInfo	Retrieves the number of licenses for a deployment of Microsoft Dynamics CRM.
RetrievePrincipalAttribute-Privileges	Retrieves all the secured attribute privileges a user or team has through direct or indirect (through team membership) associations with the FieldSecurityProfile entity.
RetrievePrivilegeSet	Retrieves the set of privileges defined in the system.
RetrieveProvisionedLanguage-PackVersion	Retrieves the version of the language packs installed on the server.
RetrieveTeamPrivileges	Retrieve the privileges for a team.
UninstallSampleData	Delete sample data for organization.

Filter Document Sample

To enable external filtering with the adapter, the filter document must match the following XML schema:

```
<?xml version="1.0" encoding="UTF-8"?>
<schema xmlns="http://www.w3.org/2001/XMLSchema"
targetNamespace="urn:iwaysoftware:adapter:MSCRM2011:filter"
xmlns:f="urn:iwaysoftware:adapter:MSCRM2011:filter">
    <element name="filter">
        <complexType>
            <sequence>
                <element name="entities" minOccurs="1" maxOccurs="1"
type="f:EntitiesType" />
                <element name="operations" minOccurs="1" maxOccurs="1"
type="f:OperationType" />
            </sequence>
        </complexType>
    </element>
    <complexType name="EntitiesType">
        <sequence>
            <element name="logicalname" minOccurs="0" maxOccurs="unbounded"
type="string" />
        </sequence>
    </complexType>
    <complexType name="OperationType">
        <sequence>
            <element name="entity" minOccurs="0" maxOccurs="unbounded">
                <complexType>
                    <sequence>
                        <element name="entityName" minOccurs="1"
maxOccurs="1" type="string" />
                        <element name="operations" minOccurs="1"
maxOccurs="1">
                            <complexType>
                                <sequence>
                                    <element name="operation" minOccurs="0"
maxOccurs="unbounded" type="string" />
                                </sequence>
                            </complexType>
                        </element>
                    </sequence>
                </complexType>
            </element>
        </sequence>
    </complexType>
</schema>
```

The following document is a sample of a filter file.

```
<f:filter xmlns:f="urn:iwaysoftware:adapter:MSCRM2011:filter" >
    <entities>
        <logicalname>account</logicalname>
    </entities>
    <operations>
        <entity>
            <entityName>any</entityName>
            <operations>
                <operation>SetStateDynamicEntity</operation>
            </operations>
        </entity>
        <entity>
        <entityName>appointment</entityName>
            <operations>
                <operation>Handle</operation>
                <operation>Route</operation>
            </operations>
        </entity>
    </operations>
</f:filter>
```

Note: The SetStateDynamicEntity operation is filtered for *any* entity due to using *any* as entity name. This makes it easier to prepare filter files.

Input Message Sample

Input messages contain several required tags that determine what operation should be performed and what entity is affected. The following is an example of an input message:

```
<?xml version="1.0" encoding="ISO-8859-1" ?>
<crm:account.Create schemaVersion="1.0"
xmlns:crm="urn:iwaysoftware:adapter:MSCRM2011:account:Create"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
   <crm:EntityList>
      <crm:Entity>
         <crm:Params>
            <crm:accountcategorycode>1</crm:accountcategorycode>
            <crm:accountratingcode>1</crm:accountratingcode>
            <crm:name>account1</crm:name>
            <crm:numberofemployees>1234</crm:numberofemployees>
            <crm:ownershipcode>1</crm:ownershipcode>
            <crm:participatesinworkflow>0</crm:participatesinworkflow>
            <crm:paymenttermscode>1</crm:paymenttermscode>
         </crm:Params>
      </crm:Entity>
      <crm:Entity>
         <crm:Params>
            <crm:accountcategorycode>1</crm:accountcategorycode>
            <crm:accountratingcode>1</crm:accountratingcode>
            <crm:name>account2</crm:name>
            <crm:numberofemployees>1234</crm:numberofemployees>
            <crm:ownershipcode>1</crm:ownershipcode>
            <crm:participatesinworkflow>0</crm:participatesinworkflow>
            <crm:paymenttermscode>1</crm:paymenttermscode>
         </crm:Params>
      </crm:Entity>
   </crm:EntityList>
</crm:account.Create>
```

In this example, the input message contains a command to create two accounts (Batch Account 1 and Batch Account 2). The input message can contain only one action, but multiple entities. Each entity is processed as a separate request to MS CRM. Since iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises does not support transactions, some of the entities can be created while others may fail.

Create and Update Operation Samples

The following is an example of a Create request document:

```
<?xml version="1.0" encoding="ISO-8859-1" ?>
<crm:account.Create schemaVersion="1.0"
xmlns:crm="urn:iwaysoftware:adapter:MSCRM2011:account:Create"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <crm:EntityList>
      <crm:Entity>
         <crm:Params>
            <crm:address1_telephone1>123456789</
crm:address1_telephone1>
            <crm:name>account1</crm:name>
            <crm:numberofemployees>1234</crm:numberofemployees>
         </crm:Params>
      </crm:Entity>
  </crm:EntityList>
</crm:account.Create>
```

It contains the requested action, the entity to be created, and the parameters of the new entity. The entity identifier is a required parameter. A value must be specified, which is used by MS CRM to create an entity with a specified GUID. The following is an example of the response document for a successful Create operation:

```
<?xml version="1.0" encoding="ISO-8859-1" ?>
<crm:account.Create.Response schemaVersion="1.0"
xmlns:crm="urn:iwaysoftware:adapter:MSCRM2011:account:Create.Response"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
   <crm:EntityList>
      <crm:Entity>
         <crm:CreateResult>7B9520AD-AB21-E111-B7A6-005056887347</
crm:CreateResult>
         <crm:Status>Success</crm:Status>
      </crm:Entity>
   </crm:EntityList>
</crm:account.Create.Response>
```

Information about the performed operation, entity, and the GUID of the created entity is returned.

The following is an example of an Update request:

```
<?xml version="1.0" encoding="ISO-8859-1" ?>
<crm:account.Update schemaVersion="1.0"
xmlns:crm="urn:iwaysoftware:adapter:MSCRM2011:account:Update"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
   <crm:EntityList>
      <crm:Entity>
         <crm:Params>
            <crm:accountid>7B9520AD-AB21-E111-B7A6-005056887347</
crm:accountid>
            <crm:address1_telephone1>123456789</
crm:address1_telephone1>
            <crm:name>updated_account</crm:name>
            <crm:numberofemployees>367184873</crm:numberofemployees>
         </crm:Params>
      </crm:Entity>
   </crm:EntityList>
</crm:account.Update>
```

It contains the requested action, the entity to be updated, the identifier of the entity to update, and a set of new parameters. The entity identifier must always be present in the request because MS CRM defines by identifier which entity to update. Parameters which are not specified in the input message will not be affected.

The following is an example of a successful response:

```
<?xml version="1.0" encoding="ISO-8859-1" ?>
<crm:account.Update.Response schemaVersion="1.0"
xmlns:crm="urn:iwaysoftware:adapter:MSCRM2011:account:Update.Response"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
   <crm:EntityList>
      <crm:Entity>
         <crm:Status>Success</crm:Status>
      </crm:Entity>
   </crm:EntityList>
</crm:account.Update.Response>
```

Information about the executed operation and updated entity is returned.

The following XML must be used in order to read a single entity object by its GUID.

```
<?xml version="1.0" encoding="ISO-8859-1" ?>
<crm:account.Retrieve schemaVersion="1.0"
xmlns:crm="urn:iwaysoftware:adapter:MSCRM2011:account:Retrieve"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
   <crm:EntityList>
      <crm:Entity>
         <crm:Params>
            <crm:Id>7B9520AD-AB21-E111-B7A6-005056887347</crm:Id>
         </crm:Params>
      </crm:Entity>
   </crm:EntityList>
</crm:account.Retrieve>
```

It contains the requested action, entity to be updated, the identifier of the entity to Read.

The following is an example of a response document that contains standard tags with operations, entity names, and a set of attributes.

```
<?xml version="1.0" encoding="ISO-8859-1" ?>
<crm:account.Retrieve.Response schemaVersion="1.0"
xmlns:crm="urn:iwaysoftware:adapter:MSCRM2011:account:Retrieve.Response"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
   <crm:EntityList>
      <crm:Entity>
         <crm:Params>
            <crm:accountid>7B9520AD-AB21-E111-B7A6-005056887347</
crm:accountid>
            <crm:address1_telephone1>123456789</
crm:address1_telephone1>
            <crm:name> updated_account </crm:name>
            <crm:numberofemployees formattedValue="367,184,873">367184873</
crm:numberofemployees>
         </crm:Params>
         <crm:Status>Success</crm:Status>
      </crm:Entity>
   </crm:EntityList>
</crm:account.Retrieve.Response>
```

The request and response for Delete are the same for Retrieve operations except the action name and namespace URL.

For Create and Update operations, you can specify related entities which must be created or updated along with the main entity. For example, MS CRM can create an account and several letters for that account in one request. There is a special element named RelatedEntities in the request for this purpose. Since a related entity can be almost anything (for the account, it can be email, letter, contact, or other entity types), iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises does not list parameters for related entities and defines the content of the related entities as any element. To get real attributes applicable for a certain related entity, the entity must be a schema.

Compound Operation Sample

The following is a sample create compound of the Quote entity with the QuoteDetails entity:

```
<?xml version="1.0" encoding="UTF-8"?>
<is:quote.CompoundCreate
xsi:schemaLocation="urn:iwaysoftware:adapter:MSCRM2011:quote:CompoundCreate
CompoundCreate_request_quote.xsd" xmlns:xsi="http://www.w3.org/2001/
XMLSchema-instance"
xmlns:is="urn:iwaysoftware:adapter:MSCRM2011:quote:CompoundCreate">
  <is:EntityList>
    <is:Entity>
      <is:Target>String</is:Target>
      <is:Params>
        <is:Quote>
          <is:Params>
            <is:customerid>
              <is:Id>E0CB7AA8-DDE2-E111-BC89-0050568845D9</is:Id>
              <is:LogicalName>account</is:LogicalName>
            </is:customerid>
            <is:name>QuoteForTestCompoundCreate</is:name>
            <is:ownerid>
              <is:Id>CE94241B-E8C4-E111-8BA2-0050568845D9</is:Id>
              <is:LogicalName>systemuser</is:LogicalName>
            </is:ownerid>
            <is:pricelevelid>
              <is:Id>EEEEEEEE-EEEE-EEEE-EEEE-EEEEEEEEE203</is:Id>
              <is:LogicalName>pricelevel</is:LogicalName>
            </is:pricelevelid>
            <is:quotenumber>QUOTE-001</is:quotenumber>
            <is:transactioncurrencyid>
              <is:Id>856A5E86-E8C4-E111-8BA2-0050568845D9</
is:Id>              <is:LogicalName>transactioncurrency</is:LogicalName>
            </is:transactioncurrencyid>
          </is:Params>
        </is:Quote>

        <is:QuoteDetails>
          <is:quotedetail>
            <is:Params>
              <is:quantity>5</is:quantity>
              <is:productid>
                <is:Id>B95C1222-62D6-E111-BC89-0050568845D9</is:Id>
                <is:LogicalName>product</is:LogicalName>
              </is:productid>
              <is:uomid>
                <is:Id>7F921CD4-B519-43C0-A4A1-BAA5CBA20C51</is:Id>
                <is:LogicalName>uom</is:LogicalName>
              </is:uomid>
            </is:Params>
          </is:quotedetail>
        </is:QuoteDetails>
      </is:Params>
    </is:Entity>
  </is:EntityList>
</is:quote.CompoundCreate>
```

Linked Operation Output Sample

In a Operation set (Linked Operation), all responses are merged together in one output file and returned, as shown in the following example.

```
<crm:operationset.TestSet.Response
xmlns:crm="urn:iwaysoftware:adapter:MSCRM2011:operationset:TestSet.Response"
 xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" schemaVersion="1.0">
   <crm:EntityList>
      <crm:Entity>
         <crm:Params>
            <crm:account.Create.Response>
               <crm:EntityList>
                  <crm:Entity>
                     <crm:CreateResult>204f6a76-ecfb-e111-
a2cf-005056887543</crm:CreateResult>
                     <crm:Status>Success</crm:Status>
                  </crm:Entity>
               </crm:EntityList>
            </crm:account.Create.Response>
            <crm:contact.Create.Response>
               <crm:EntityList>
                  <crm:Entity>

                     <crm:CreateResult>214f6a76-ecfb-e111-
a2cf-005056887543</crm:CreateResult>
                     <crm:Status>Success</crm:Status>
                  </crm:Entity>
               </crm:EntityList>
            </crm:contact.Create.Response>
         </crm:Params>
      </crm:Entity>
      <crm:Entity>
         <crm:Params>
            <crm:account.Create.Response>
               <crm:EntityList>
                  <crm:Entity>
                     <crm:CreateResult>224f6a76-ecfb-e111-
a2cf-005056887543</crm:CreateResult>
                     <crm:Status>Success</crm:Status>
                  </crm:Entity>
               </crm:EntityList>
            </crm:account.Create.Response>
            <crm:contact.Create.Response>
               <crm:EntityList>
                  <crm:Entity>
```

```
                    <crm:CreateResult>234f6a76-ecfb-e111-
a2cf-005056887543</crm:CreateResult>
                    <crm:Status>Success</crm:Status>
                 </crm:Entity>
              </crm:EntityList>
           </crm:contact.Create.Response>
        </crm:Params>
     </crm:Entity>
  </crm:EntityList>
</crm:operationset.TestSet.Response>
```

Bulk Delete Sample

The following is a sample of a bulk delete operation.

```
<?xml version="1.0" encoding="UTF-8"?>
<is:globaloperations.BulkDelete
xmlns:is="http://com.ibi.crm/inputSchema/globaloperations/BulkDelete"
xmlns:xs="http://www.w3.org/2001/XMLSchema"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
<EntityList>
<Entity>
<QuerySet>
<QueryBase xsi:type="is:QueryExpression">
<EntityName>account</EntityName>
<ColumnSet xsi:type="is:AllColumns"/>
<Distinct>true</Distinct>
<is:NoLock>true</is:NoLock>
<Criteria>
<FilterOperator>And</FilterOperator>
<Conditions>
<Condition>
<AttributeName>name</AttributeName>
<Operator>Equal</Operator>
<Values>
<Value xsi:type="xs:string">account_name</Value> <!-- xsi:type is required
element! -->
</Values>
</Condition>
</Conditions>
<Filters/>
</Criteria>
</QueryBase>
</QuerySet>
<JobName>New Delete Job</JobName>
<SendEmailNotification>false</SendEmailNotification>
<ToRecipients />
<CCRecipients/>
<RecurrencePattern/>
<StartDateTime>2012/04/09T02:30:00-07:00</StartDateTime> <!--Format with
timezone (e.g. 02:00:00 = 12:00:00, 07:30:00 = 17:30:00) -->
</Entity>
</EntityList>
</is:globaloperations.BulkDelete>
```

The following table describes the date and time specification from MSDN.

Parameter	Specification
User time only	`yyyy-MM-ddTHH:mm:ss`
UTC only	`yyyy-MM-ddTHH:mm:ss Z`
Both	`yyyy-MM-ddTHH:mm:ss OffsetWhere Offset is one of the following: +##:## -##:##`

where:

`MM`

Is the month (01 - 12)

`dd`

Is the day of the month (01 - 31)

`cc`

Is the century (00 - 99)

`yy`

Is the year (00 - 99)

`hh`

Is the hour (0 - 23)

`mm`

Is the minutes (0 - 59)

`ss`

Is the seconds (1 - 59)

`#`

Is a digit between 0 and 9

Valid Values

Minimum value: 1900/1/1 00:00:00

Maximum value: 9999/12/30 23:59:59

Example

The following example shows how to set a date/time attribute value.

```
CrmDateTime dateTime = new CrmDateTime();

dateTime.Value = "2006/5/27T17:00:00";
```

XML Request Schema Sample

The following is a sample XML request schema document that is generated by iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises.

```
<? xml version="1.0" encoding="UTF-8"?>
<xs: schema targetNamespace="urn:iwaysoftware:adapter:MSCRM2011:account:Create" xmlns:
xs="http://www.w3.org/2001/XMLSchema"
    xmlns:is="urn:iwaysoftware:adapter:MSCRM2011:account:Create" xmlns:xsi="http://
www.w3.org/2001/XMLSchema-instance">
    <xs:element name="account.Create">
        <xs:complexType>
            <xs:sequence>
                <xs:element name="Action" minOccurs="1" maxOccurs="1" type="xs:string"
fixed="Create" />
                <xs:element name="EntityList">
                    <xs:complexType>
                        <xs:sequence>
                            <xs:element name="Entity" type="is:entityType"
minOccurs="1" maxOccurs="unbounded" />
                        </xs:sequence>
                    </xs:complexType>
                </xs:element>
            </xs:sequence>
        </xs:complexType>
    </xs:element>
    <xs:complexType name="entityType">
        <xs:sequence>
            <xs:element name="LogicalName" minOccurs="1" maxOccurs="1"
type="xs:string" fixed="account" />
            <xs:element name="Params" minOccurs="1" maxOccurs="1">
                <xs:complexType>
                    <xs:all minOccurs="0">
                        <xs:element name="accountid" minOccurs="0" maxOccurs="1"
type="is:guidType">
                            <xs:annotation>
                                <xs:documentation>
                                    <xs:displayname>Account</xs:displayname>
```

```
                                <xs:description>
                                    Unique identifier of the account.
                                </xs:description>
                            </xs:documentation>
                        </xs:annotation>
                    </xs:element>
                    <xs:element name="accountnumber" minOccurs="0" maxOccurs="1">
                        <xs:annotation>
                            <xs:documentation>
                                <xs:displayname>Account Number</xs:displayname>
                                <xs:description>
                                    User-provided account number used in
                                    correspondence about the account.
                                </xs:description>
                            </xs:documentation>
                        </xs:annotation>
                        <xs:simpleType>
                            <xs:restriction base="xs:string">
                                <xs:maxLength value="20" />
                            </xs:restriction>
                        </xs:simpleType>
                    </xs:element>
                    <xs:element name="name" minOccurs="1" maxOccurs="1">
                        <xs:annotation>
                            <xs:documentation>
                                <xs:displayname>Account Name</xs:displayname>
                                <xs:description>Name of the account.</
xs:description>
                            </xs:documentation>
                        </xs:annotation>
                        <xs:simpleType>
                            <xs:restriction base="xs:string">
                                <xs:maxLength value="160" />
                            </xs:restriction>
                        </xs:simpleType>
                    </xs:element>
                    <xs:element name="ownerid" minOccurs="0" maxOccurs="1">
                        <xs:complexType>
                            <xs:attribute name="dsc" type="xs:integer" />
                            <xs:attribute name="name" type="xs:string"
use="required" />
                            <xs:attribute name="type" type="xs:integer"
use="required" />
                            <xs:attribute name="yominame" type="xs:string"
use="required" />
                        </xs:complexType>
                    </xs:element>
                </xs:all>
            </xs:complexType>
        </xs:element>
    </xs:sequence>
</xs:complexType>
<xs:simpleType name="guidType">
    <xs:restriction base="xs:string">
        <xs:pattern value="GUID_PATTERN" />
    </xs:restriction>
</xs:simpleType>
</xs:schema>
```

XML Response Schema Sample

The following is a sample XML response schema document that is generated by iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises for another operation.

```
<?xml version="1.0" encoding="UTF-8" ?>
<xs:schema
targetNamespace="urn:iwaysoftware:adapter:MSCRM2011:account:Delete.response"
 xmlns:xs="http://www.w3.org/2001/XMLSchema"
    xmlns:os="urn:iwaysoftware:adapter:MSCRM2011:account:Delete.response"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
    <xs:element name="account.Delete.Response">
        <xs:complexType>
            <xs:sequence>
                <xs:element name="EntityList">
                    <xs:complexType>
                        <xs:sequence>
                            <xs:element name="Entity" type="os:entityType"
minOccurs="0" maxOccurs="unbounded" />
                        </xs:sequence>
                    </xs:complexType>
                </xs:element>
            </xs:sequence>
        </xs:complexType>
    </xs:element>
    <xs:complexType name="entityType">
        <xs:sequence>
            <xs:element name="Error" type="xs:string" minOccurs="0" />
            <xs:element name="Status" minOccurs="1" maxOccurs="1">
                <xs:simpleType>
                    <xs:restriction base="xs:string">
                        <xs:enumeration value="Fail" />
                        <xs:enumeration value="Success" />


                    </xs:restriction>
                </xs:simpleType>
            </xs:element>
        </xs:sequence>
    </xs:complexType>
    <xs:simpleType name="guidType">
        <xs:restriction base="xs:string">
            <xs:pattern value="GUID_PATTERN" />
        </xs:restriction>
    </xs:simpleType>
</xs:schema>
```

Manually Setting User Interface Languages

If a newly created user connects to a target, the user may fail to retrieve the current UI language even with appropriate privileges. To set the User Interface Language manually:

Run the following request from the admin account:

```
<?xml version="1.0" encoding="UTF-8"?>
<is:usersettings.Update schemaVersion="1.0"
xsi:schemaLocation="urn:iwaysoftware:adapter:MSCRM2011:usersettings:Update
Untitled1.xsd" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:is="urn:iwaysoftware:adapter:MSCRM2011:usersettings:Update">
   <is:EntityList>
      <is:Entity>
         <is:Params>
            <is:systemuserid>00000000-0000-0000-0000-000000000000</
is:systemuserid>
            <is:uilanguageid>1033</is:uilanguageid>
         </is:Params>
      </is:Entity>
   </is:EntityList>
</is:usersettings.Update>
```

In the above sample, 00000000-0000-0000-0000-000000000000 should be changed to the user ID that has an issue.

Appendix C

Application Adapter for Microsoft Dynamics CRM 2011 Known Issues and Limitations

This section describes known issues and limitations for the iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises.

In this appendix:

Application Adapter for Microsoft Dynamics CRM 2011 General Known Issues

- *ColumnSet* may not function properly in all cases. Microsoft Dynamics CRM 2011 can return fields that are not specified in the request. This is most likely to occur in the following cases:
  - For activity entities columns *to*, *from*, *cc*, and *bcc* are returned even if they are not enumerated in the list of requested columns.
  - For all entities, *transactioncurrencyid* is returned when any field of Money type is requested.
- Certain fields that are indicated as optional according to the metadata are required by Microsoft Dynamics CRM 2011. The following table provides a list of these fields.

Entity	Attribute
importfile	targetentityname
columnmapping	targetattributename targetentityname
lookupmapping	columnmappingid transformationparametermappingid

Entity	Attribute
connection	record1id record2id
salesorderdetail	productid uomid productdescription
quotedetail	productid uomid productdescription
invoicedetail	productid uomid productdescription

- Some fields are declared as required, but Microsoft Dynamics CRM 2011 processes messages successfully even when the fields are not populated. The following table provides a list of these fields.

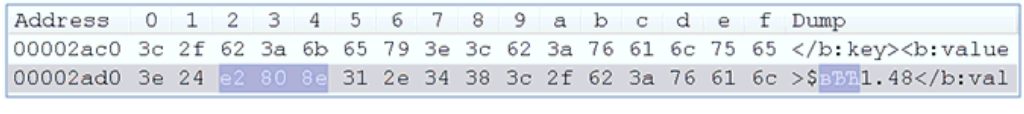
Entity	Attribute
email	messageiddupcheck

- Compound operations are not executed in transactions, so it is possible that some records will be created, while the remaining records will not. The result of the executed request will be *Fail*.
- For improved readability, the schemas for RetrieveMultiple requests were generated manually. As a result, the schema structures are slightly different from the MSDN definition. The root query type is *QueryExpression*, but according to MSDN (and the MS CRM SDK), the root query type is an abstract type *QueryBase*. The current implementation is used because all other query types can be represented by it.
- The following operators that are available as conditions in RetrieveMultiple requests are not supported by Microsoft Dynamics CRM 2011:
  - Contains

- DoesNotContain
- NotOn

They are eliminated from the schema.

- A workflow, which also contains executions of child workflows, returns a response that contains entity details that are updated according to the primary workflow only. The adapter cannot return entity details, which are affected by a child workflow. This is the case because the workflow log of the primary workflow contains only the GUID of the child workflow, without additional information that is required to retrieve the workflow log for the child entity.
- For SearchByBody, SearchByTitle, and SearchByKeywords (Article entity) operations, the rollup element QueryExpression (Query for Rollup operation) must be of type *QueryExpression* only. It is used for filtering attributes by only specifying the ColumnSet element.
- For all advanced operations, the Value element under the *OptionSetValue* complex type must be set as required. It is currently set as optional in the schemas because of Microsoft Dynamics CRM 2011.
- For invoice.SetRelated and invoice.RemoveRelated operations, the EntityReference element must have minOccurs=2 and maxOccurs=2. These are the only settings that will execute the invoice.SetRelated and invoice.RemoveRelated operations successfully.
- The Principal element under the *PrincipalAccess* complex type must be set as required. It is currently set as optional in the schemas because of Microsoft Dynamics CRM 2011.
- Distinct does not work in Rollup operations for Order entities.
- Formatted values that contain currency symbols may also contain broken characters. This is a Microsoft Dynamics CRM 2011 issue as it inserts redundant bytes. This was checked in Microsoft Dynamics CRM 2011 traces where broken characters were also present. This can be resolved if you know the specified byte sequence being used by Microsoft Dynamics CRM 2011 for separating the currency sign and value.



As a workaround, use UTF-8 encoding (default for Microsoft Dynamics CRM 2011) for XML request documents. In this case, UTF-8 encoded responses with valid formatted values will be produced.

- All of the parameters for Advanced operations are declared as optional in the XML schemas. However, some parameters may be required and Microsoft Dynamics CRM 2011 will not perform the requested Advanced operation if these parameters are not defined. Since the MS CRM SDK does not provide information about required fields, it is currently not possible to set proper minOccurs attribute values in the schemas.
- When Organization is disabled, Microsoft Dynamics CRM 2011 returns a status code of 200. The adapter does not process this code in any special way.
- ColumnSet, Distinct, and Paging Info values in request messages for Bulk Delete operations are not taken into account during processing. Only ConditionExpression and LinkEntities work correctly.
- Due to the MSDN definition, the request schema for BulkDelete operations should contain the QuerySet element of abstract type QueryBase for instances of FetchExpression, QueryExpression, or QueryByAttribute. In MS CRM SDK this element is of type QueryExpression. Since the adapter schemas are generated from SDK classes, the same types are being used. All other expressions (FetchExpression and QueryByAttribute) may be represented by QueryExpression.
- The validator may fail if a long value is specified for elements that are not of type string (for example, long text in a node that is of type integer). This is the case because of a known issue in the validator implementation that is used in Sun JVM. For more information, see the following website:

  https://issues.apache.org/jira/browse/XERCESJ-589

  This is rare case, but if it occurs, the error will be logged and the request will proceed with processing.
- For CreateException operations, the following exception is generated:

  ```
  Unable to create exception, SeriesId missing
  ```

  The SeriesId element is not specified in the MSDN definition or MS CRM SDK, so no changes were applied to the schemas.
- If a new user is created in Microsoft Dynamics CRM 2011, but has not yet logged into the Microsoft Dynamics CRM 2011 system (after connecting to a target with the current UI language selected), the target initialization may fail. As a workaround, the user must first log into the Microsoft Dynamics CRM 2011 system and apply the configuration, or have a system administrator set the appropriate UI language ID explicitly. For more information, see *Understanding Localization* on page 39.

- Do not use the Refresh option in the context menu for the adapter target in iWay Integration Tools (iIT). The caching mechanism that is used by this option may behave unexpectedly for the adapter target configuration. Use the Disconnect and Connect options for the adapter target instead.

Unsupported Schemas

The following table lists all of the schemas that are not supported by the iWay Application Adapter for Microsoft Dynamics CRM 2011 On-Premises.

Entity	Logical Name	Operation	Comment
Article	kbarticle	SearchByBodyLegacy	
Article	kbarticle	SearchByKeywordsLegacy	
Article	kbarticle	SearchByTitleLegacy	
SharePoint Site	sharepointsite	RetrieveAbsoluteAnd-SiteCollectionUrl	
Solution Component	solutioncomponent	AddSolutionComponent	
Solution Component	solutioncomponent	IsComponentCustomizable	
Solution Component	solutioncomponent	RemoveSolutionComponent	
Solution Component	solutioncomponent	RetrieveExternalRoots	
Application Ribbons	ribboncustomization	RetrieveApplicationRibbon	
Application Ribbons	ribboncustomization	RetrieveEntityRibbon	
Lead	lead	QualifyLead	

Entity	Logical Name	Operation	Comment
Campaign Response	campaignresponse	CopyCampaignResponse	
Site Map	sitemap	RetrieveReferenceSiteMap	
Subscription	subscription	ResetSyncState	Not visible for user
Auditing	audit	DeleteAuditData	
Auditing	audit	RetrieveAttribute-ChangeHistory	
Auditing	audit	RetrieveAuditDetails	
Auditing	audit	RetrieveAuditPartitionList	
Auditing	audit	RetrieveRecordChange-History	
Saved Query	savedquery	InstantiateFilters	Not visible for user
Recurring Appointment	recurringappointment-master	AddRecurrence	
Recurring Appointment	recurringappointment-master	CreateInstance	
Recurring Appointment	recurringappointment-master	DeleteOpenInstances	
Appointment	appointment	CreateException	
Service Endpoint	serviceendpoint	TriggerServiceEndpoint-Check	

Entity	Logical Name	Operation	Comment
SharePoint Site	sharepointdocument-location	RetrieveAbsoluteAnd-SiteCollectionUrl	
Goal	goal	Recalculate	
Queue Item	queueitem	AddToQueue	
Dialog Session	processsession	VerifyProcessStateData	
System Form	systemform	CopySystemForm	
System Form	systemform	RetrieveFilteredForms	
Dependency	dependency	RetrieveDependenciesFor-Delete	
Dependency	dependency	RetrieveDependenciesFor-Uninstall	
Dependency	dependency	RetrieveDependent-Components	
Dependency	dependency	RetrieveMissing-Dependencies	
Dependency	dependency	RetrieveRequired-Components	
Marketing List	list	AddListMembers	
Marketing List	list	CopyDynamicListToStatic	
Marketing List	list	RetrieveCustomersNot-PlacedOrders	
Recurrence Rule	recurrencerule	ValidateRecurrenceRule	

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iWay

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