TIBCO ActiveMatrix BusinessWorks™ Plug-in for Microsoft Dynamics CRM User's Guide

Software Release 6.0
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Two-Second Advantage®

Important Information

Contents

TIBCO Documentation and Support Services

All TIBCO documentation is available in the TIBCO Documentation Library, which can be found here:

https://docs.tibco.com

Product-Specific Documentation

The following documents for this product can be found in the TIBCO Documentation Library:

- TIBCO ActiveMatrix BusinessWorks Plug-in for Microsoft Dynamics CRM Installation
- TIBCO ActiveMatrix BusinessWorks Plug-in for Microsoft Dynamics CRM User's Guide
- TIBCO ActiveMatrix BusinessWorks Plug-in for Microsoft Dynamics CRM Release Notes

How to Contact TIBCO Support

For comments or problems with this manual or the software it addresses, contact TIBCO Support as follows:

- For an overview of TIBCO Support, and information about getting started with TIBCO Support, visit this site:

  http://www.tibco.com/services/support

- If you already have a valid maintenance or support contract, visit this site:

  https://support.tibco.com

  Entry to this site requires a user name and password. If you do not have a user name, you can request one.

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http://www.tibcommunity.com

Plug-in Overview

This plug-in enables users to interact with their enterprise CRM data stored in the Microsoft Dynamics CRM Online instance.

TIBCO ActiveMatrix BusinessWorks is an easy to use integration product suite for enterprise, web, and mobile applications. It uses the Eclipse graphical user interface (GUI) for defining business processes and process engines to execute them.

TIBCO ActiveMatrix BusinessWorks supports plug-ins that extend the palette functionality. After installing the plug-in, a Dynamics CRM Palette and a Dynamics CRM shared resource become available in TIBCO Business Studio. You can add activities to the business processes you are designing, and integrate them into the process flow. At runtime, the plug-in activities are executed as part of the TIBCO ActiveMatrix BusinessWorks process execution.

The plug-in allows ActiveMatrix BusinessWorks users to exchange data between intranet and Microsoft Dynamics CRM. It provides the following common functionalities:

- Create, update, and delete entity records.
- Retrieve entity records through entity record IDs or query criteria.
- Listen to the Create, Update, and Delete user events triggered on a specified entity record.

Getting Started

A typical workflow using the plug-in to achieve different goals includes creating a project, designing a process, and deploying the application.

TIBCO ActiveMatrix BusinessWorks enables users to create services and integrate applications, and deploy them at runtime. It uses the Eclipse graphical user interface (GUI) for defining business processes and process engines to execute them.

To design a process and deploy it at runtime, you need to complete the following tasks:

1. Creating a Project
2. Creating a Dynamics CRM Connection
3. Designing a Process
4. Debugging and Running a Process
5. Deploying an Application

Creating a Project

BusinessWorks application modules are Eclipse projects that are created in TIBCO Business Studio.

Procedure

1. Start TIBCO Business Studio.
2. Select **File > New > BusinessWorks Resources**.
3. Click the **BusinessWorks Application Module** resource in the **BusinessWorks Resource** wizard. Click **Next**.

   There are several ways to open the **New BusinessWorks Application Module** dialog and create a new project in TIBCO Business Studio. See the TIBCO ActiveMatrix BusinessWorks documentation for more information.
4. Type a name for the project that you are creating in the **Project name** field.
5. Keep the **Use default location**, **Create empty process**, and **Create Application** check boxes selected. Click **Finish**.

Result

A project and an application are created and displayed in the Project Explorer view. The Process editor opens automatically.

Creating a Dynamics CRM Connection

A Dynamics CRM Connection, which contains all the parameters for connecting to Microsoft Dynamics CRM, is required when using the plug-in activities.

Prerequisites

The Dynamics CRM Connection is available at the Resources level. Before creating a Dynamics CRM Connection, you need to create a project. See Creating a Project.

Procedure

1. Expand the created project in the Project Explorer view.
2. Right-click the **Resources** folder and select **New > Dynamics CRM Connection**.

3. Type a name for the Dynamics CRM Connection shared resource in the **Dynamics CRM Connection** dialog. Click **Finish**.
4. Configure the Dynamics CRM Connection in the Dynamics CRM Connection editor.

   See Dynamics CRM Connection regarding the configuration fields.
5. Click **Discover Service** to discover the organization service information
6. Click **Test Connection** to validate the connection.

Designing a Process

Processes capture and manage the flow of business information in an enterprise between different data sources and destinations. You can design a process by using activities and adding conditions.

By default, an empty process is created when Creating a Project with the **Create empty process** check box selected.

See *TIBCO ActiveMatrix BusinessWorks Application Deployment* for more details about creating processes.

Procedure

1. In the Process editor, select and drop an activity from the Palette view.
2. Click **Link** to create links between the activities.
3. Configure the added activities.
4. Click **File > Save** to save the process.

Debugging and Running a Process

Debug the application you have configured to ensure that the application configuration is correct.

Procedure

1. Open the process you configured in TIBCO Business Studio.
2. On the toolbar, click **Run > Debug Configurations**.
3. Click **BusinessWorks Application > BWApplication** in the left panel.
4. Ensure only the application you want to debug and run is selected in the **Applications** tab in the right panel.
5. Click the **Advanced** tab and click **Browse** to locate the `logback` file.

   By default, the log file resides in the `TIBCO_HOME/bw/6.x/config/design/logback` directory and error logs are captured. See Managing Logs for more details.
6. Click **Debug**.
   TIBCO Business Studio changes to the Debug perspective. Logs are displayed in the Console view.

Checking Output of an Activity

After debugging the application, you can check the output of the activities.

Procedure

1. In the Debug perspective, expand **BWApplication** and click the activity in the upper left panel.
2. In the upper right panel, click the **Job Data** view and click **Output**.

You can also check the activity output in the plug-in logs. See Managing Logs for more information.

Deploying an Application

After deploying the applications, you can manage BusinessWorks applications by using TIBCO Enterprise Administrator.

Prerequisites

The following tasks are required before deploying applications:

- Creating a Project
- Generating an EAR File

A complete workflow of deployment includes:

1. Building an EAR file.
2. Uploading the EAR file.
3. Deploying the EAR file.
4. Starting the application.

See *TIBCO ActiveMatrix BusinessWorks Administration* for more details about how to deploy an application.

Generating an EAR File

Application archives are the enterprise archive (EAR) files that are created in TIBCO Business Studio. An EAR file is required to deploy the BusinessWorks application to TIBCO Administrator.

Prerequisites

An application project has already been created, see Creating a Project.

There are many ways to generate an EAR file, the following is one method. See *TIBCO ActiveMatrix BusinessWorks Administration* for more information.

Procedure

1. Go to the File Explorer view and click the **Open Directory to Browse** icon.
2. Select the folder where you want to generate the EAR file and click **OK**.
   The new folder is displayed in the File Explorer view.
3. Drag the application from the Project Explorer view to the new folder in the File Explorer view.

   The EAR file is generated with the name `<name>.<application>_<version>.ear`.

Dynamics CRM Connection

The Dynamics CRM Connection shared resource contains all necessary parameters to connect to Microsoft Dynamics CRM. It is used by all the activities in the Dynamics CRM palette.

General

The **General** panel has the following fields.

Field	Module Property?	Description
Package	No	The name of the package where the shared resource is located.
Name	No	The name for the shared resource.
Description	No	A short description for the shared resource.

Discovery Service Configuration

The **Discovery Service Configuration** panel has the following fields.

Field	Module Property?	Description
Deployment Type	Yes	In this release, only the `On Line` deployment type is available.
Discovery Service	Yes	The organization that the user is a member of, and the endpoint address URL to access the web service for the organization. You can find the Discovery Service by logging into your online instance and navigating to **SETTINGS > Customizations > Developer Resources**.
User Name	Yes	The username used to connect to the Microsoft Dynamics CRM server.
Password	Yes	The password used to connect to the Microsoft Dynamics CRM server.
Timeout (sec)	Yes	The timeout value in seconds that applies to the communication with the Microsoft Dynamics CRM server. The default timeout value is 1800 seconds.

Organization Service Configuration

The **Organization Service Configuration** panel has the following fields.

Field	Module Property?	Description
Organization Service	No	The URL for the organization service, which provides access to the business data and metadata for your organization. You can either specify the value directly or fetch the information automatically by clicking **Discover Service**.
Organization Unique Name	No	The unique name in the organization. You can either specify the value directly or fetch the information automatically by clicking **Discover Service**.

Proxy Configuration

If you use a proxy server to access outside of a firewall, you need to configure the proxy server information on this panel. The **Proxy Configuration** panel has the following fields.

Field	Module Property?	Description
Use Proxy	Yes	Determines whether to use a proxy server to access outside of a firewall.
Proxy Server	Yes	The host name or IP address of the proxy server.
Proxy Port	Yes	The port number of the proxy server.
Proxy Username	Yes	The username used to connect to the proxy server.
Proxy Password	Yes	The password used for the specified username when connecting to the proxy server.

Discover Service Button

Click **Discover Service** to discover the organization service information according to the specified discovery service information in the **Discovery Service Configuration** panel. If the discovery service information is authenticated, the associated organization service information will be automatically specified in the corresponding fields.

Test Connection Button

Click **Test Connection** to test whether the specified configuration fields result in a valid connection to the Microsoft Dynamics CRM server.

Dynamics CRM Palette

The Dynamics CRM palette contains activities that can be used for business process orchestration.

The palette contains the following six activities:

- Entity Event Source
- Create Entity
- Delete Entity
- Retrieve Entity
- Retrieve Multiple Entities
- Update Entity

Entity Event Source

The Entity Event Source activity is used to listen for the create, update, and delete user events triggered on specified entity records.

This activity supports both the HTTP and HTTPS communication modes between the Entity Event Source activity and the Microsoft Dynamics CRM server for receiving user event messages.

Microsoft Dynamics CRM SDK provides a Plugin Registration tool to bind event handlers to entities. See Plugin Registration Tool for more information.

To receive events from the Dynamics CRM server, the process containing this activity must be deployed on a demilitarized zone (DMZ) server. So you need to get a DMZ server and install this plug-in on it. Additionally, the Dynamics CRM server should be set up with components that trigger and publish messages when entity records are created, deleted, or updated. See the postinstallation section in *TIBCO ActiveMatrix BusinessWorks Plug-in for Microsoft Dynamics CRM Installation*.

General

The **General** tab contains the following fields.

Field	Module Property?	Description
Name	No	The name of the activity in the process definition.
Dynamics CRM Connection	Yes	Specifies a shared connection resource. Click the icon to select a Dynamics CRM connection. If no matching Dynamics CRM connections are found, click **Create Shared Resource** in the **Select DynamicscrmResource Resource Template** dialog to create one. See Creating a Dynamics CRM Connection for more details.

Field	Module Property?	Description
Dynamics CRM Entity	No	Specifies the entity to be listened for events. Click **Fetch Entity** to open the **Entity Selection Dialog** dialog which contains all the available entities. Select an entity from the list and click **OK**. The selected entity will be automatically specified in this field. After selecting the entity, click **Build Schema** to open the **Attributes Selection Dialog** dialog which contains all the available attributes associated with the entity. Select the attributes you want and click **OK**. The selected attributes will be shown in the **Output** tab.
Event On	No	Selects the user event triggered on the entity record that will be listened for data modification: • **Create Entity**: Triggered only when the specified entity record is created. • **Update Entity**: Triggered only when the specified entity record is edited. • **Delete Entity**: Triggered only when the specified entity record is deleted. To successfully receive the messages triggered by user events in the Dynamics CRM server, the SDK message processing steps corresponding to the user events specified in this field must be enabled in the Dynamics CRM sever. See the postinstallation section in *TIBCO ActiveMatrix BusinessWorks Plug-in for Microsoft Dynamics CRM Installation* for the detailed information.
HTTP Connection	Yes	Specifies an HTTP Connector shared resource. Click the icon to select an HTTP connection. If no matching HTTP connector resource, click **Create Shared Resource** to create one. See *TIBCO ActiveMatrix Business works Bindings and Palettes Reference* for more information.
Relative Path	Yes	Specifies a URL path relative to the entity event source instance. It is case sensitive, and must be unique between multiple entity event source instances.
Username	Yes	Specifies the username that is used for the basic authentication to the runtime Entity Event Source activity.
Password	Yes	Specifies the password that is used for the basic authentication to the runtime Entity Event Source activity.

Description

Provide a short description for the activity.

Advanced

The **Advanced** tab contains the following fields.

Field	Module Property?	Description
Sequence Key	N/A	This field contains an XPath expression that specifies which processes should run in a sequence. Process instances with sequence keys that evaluate to the same value are executed sequentially in the order the process instances were created.
Custom Job Id	N/A	This field contains an XPath expression that specifies a custom job ID for the process instance.

Output

The output of this activity varies depending on the entity and attributes selected when configuring the **General** tab. For more detailed information about attributes, see the Microsoft Dynamics CRM documentation.

When listening for the update events, the output only returns the attributes that have been updated.

Fault

The **Fault** tab lists exceptions that are thrown by this activity.

Error Schema Element	Data Type	Description
DynamicsCRMEventSourceFaultException		
message	String	The error message returned by the plug-in.
messageCode	String	The error code returned by the plug-in.

Create Entity

The Create Entity activity is used to create entities in the Dynamics CRM server.

This activity supports batch operations, which means you can create multiple entities at a time. If you want to create a data collection in the Dynamics CRM server in a batch, you can use the `For-Each` statement to map the data collection to the elements in the **Input** field in the Create Entity activity.

General

The **General** tab contains the following fields.

Field	Module Property?	Description
Name	No	The name of the activity in the process definition.

Field	Module Property?	Description
Dynamics CRM Connection	Yes	Specifies a shared connection resource. Click the icon to select a space connection. If no matching Dynamics CRM connections are found, click **Create Shared Resource** in the **Select DynamicscrmResource Resource Template** dialog to create one. See Creating a Dynamics CRM Connection for more details.
Dynamics CRM Entity	No	Specifies the type of entity to be created. Click **Fetch Entity** to open the **Entity Selection Dialog** dialog which contains all the available entities. Select an entity from the list and click **OK**. The selected entity is automatically specified in this field. After selecting the entity, click **Build Schema** to open the **Attributes Selection Dialog** dialog which contains all the available attributes associated with the entity. Select the attributes you want and click **OK**. The selected attributes are shown in the **Input** tab.

Description

Provide a short description for the activity.

Input

The input of this activity varies depending on the entity and attributes selected when configuring the **General** tab. For more detailed information about attributes, see the Microsoft Dynamics CRM documentation.

Output

The ID of the created entity is returned in the **Output** tab. The field name of output varies depending on the type of the created entity .

Fault

The **Fault** tab lists exceptions that are thrown by this activity.

Error Schema Element	Data Type	Description
DynamicsCRMActivityFaultException		
message	String	The error message returned by the plug-in.
messageCode	String	The error code returned by the plug-in.

Delete Entity

The Delete Entity activity is used to delete entity records in the Dynamics CRM server.

This activity supports batch operations, which means you can delete multiple entity records at a time. If you want to delete a data collection in the Dynamics CRM server in a batch, you can use the `For-Each` statement to map the data collection to the elements in the **Input** field in the Delete Entity activity.

General

The **General** tab contains the following fields.

Field	Module Property?	Description
Name	No	The name of the activity in the process definition.
Dynamics CRM Connection	Yes	Specifies a shared connection resource. Click the icon to select a Dynamics CRM connection. If no matching Dynamics CRM connections are found, click **Create Shared Resource** in the **Select DynamicscrmResource Resource Template** dialog to create one. See Creating a Dynamics CRM Connection for more details.
Dynamics CRM Entity	No	Specifies the type of the entity record to be deleted. Click **Fetch Entity** to open the **Entity Selection Dialog** dialog which contains all the available entities. Select an entity from the list and click **OK**. The selected entity is automatically specified in this field. After selecting the entity, click **Build Schema** to download associated attributes from the server. The attributes are shown in the **Input** tab.

Description

Provide a short description for the activity.

Input

The ID of the entity record to be deleted is required in the **Input** tab. The field name that indicates the entity record ID varies depending on the entity selected when configuring the **General** tab.

Output

The ID of the deleted entity record is returned in the **Output** tab. The field names of output varies depending on the type of deleted created entity record.

Fault

The **Fault** tab lists exceptions that are thrown by this activity.

Error Schema Element	Data Type	Description
DynamicsCRMActivityFaultException		
message	String	The error message returned by the plug-in.
messageCode	String	The error code returned by the plug-in.

Retrieve Entity

The Retrieve Entity activity is used to retrieve entity records from the Dynamics CRM server with entity records IDs.

This activity supports batch operations, which means you can retrieve multiple entity records at a time. If you want to retrieve a data collection from the Dynamics CRM server in a batch, you can use the `For-Each` statement to map the data collection to the elements in the **Input** field in the Retrieve Entity activity.

General

The **General** tab contains the following fields.

Field	Module Property?	Description
Name	No	The name of the activity in the process definition.
Dynamics CRM Connection	Yes	Specifies a shared connection resource. Click the icon to select a Dynamics CRM connection. If no matching Dynamics CRM connections are found, click **Create Shared Resource** in the **Select DynamicscrmResource Resource Template** dialog to create one. See Creating a Dynamics CRM Connection for more details.
Dynamics CRM Entity	No	Specifies the type of the entity records to be retrieved. Click **Fetch Entity** to open the **Entity Selection Dialog** dialog which contains all the available entities. Select an entity from the list and click **OK**. The selected entity is automatically specified in this field. After selecting the entity, click **Build Schema** to open the **Attributes Selection Dialog** dialog which contains all the available attributes associated with the entity. Select the attributes you want and click **OK**. The selected attributes are shown in the **Output** tab.

Description

Provide a short description for the activity.

Input

The ID of entity record to be retrieved is required in the **Input** tab. The field name that indicates the entity record ID varies depending on the entity selected when configuring the **General** tab.

Output

The output of this activity varies depending on the entity and attributes selected when configuring the **General** tab. For more detailed information about attributes, see the Microsoft Dynamics CRM documentation.

Fault

The **Fault** tab lists exceptions that are thrown by this activity.

Error Schema Element	Data Type	Description
DynamicsCRMActivityFaultException		
message	String	The error message returned by the plug-in.
messageCode	String	The error code returned by the plug-in.

Retrieve Multiple Entities

The Retrieve Multiple Entities activity is used to retrieve entity records from the Dynamics CRM server that match the specified query criteria.

General

The **General** tab contains the following fields.

Field	Module Property?	Description
Name	No	The name of the activity in the process definition.
Dynamics CRM Connection	Yes	Specifies a shared connection resource. Click the icon to select a Dynamics CRM connection. If no matching Dynamics CRM connections are found, click **Create Shared Resource** in the **Select DynamicscrmResource Resource Template** dialog to create one. See Creating a Dynamics CRM Connection for more details.

Field	Module Property?	Description
Dynamics CRM Entity	No	Specifies the type of the entity record to be retrieved. Click **Fetch Entity** to open the **Entity Selection Dialog** dialog which contains all the available entities. Select an entity from the list and click **OK**. The selected entity is automatically specified in this field. After selecting the entity, click **Build Schema** to open the **Attributes Selection Dialog** dialog which contains all the available attributes associated with the entity. Select the attributes you want and click **OK**. The selected attributes are shown in the **Input** tab or **Output** tab. In simple mode, you can select attributes to be shown in both **Input** tab and **Output** tab. In FetchXML mode, only the attributes shown in **Output** tab can be selected.
Retrieve Mode	No	Specifies the retrieve mode, **Simple** or **FetchXML**.

Description

Provide a short description for the activity.

Input

The input of this activity varies depending on the entity and attributes selected when configuring the **General** tab. The following table lists the possible input of the activity.

Input Item	Data Type	Description
The following four fields are displayed in the simple mode.		
pagenumber	integer	Specifies the number of pages to be returned in the **Output** tab.
pagesize	integer	Specifies the maximum number of entity records to be returned on each page.
pagingcookie	string	Specifies the value of paging cookie, which is used for retrieving next set of entity records. It is required when there are more than 5000 entity records matching the retrieve criteria.
attributes	string	Each attribute is associated with values and search operators. See the Microsoft Dynamics CRM documentation for more information on the condition operators.
The following field is displayed in the FetchXML mode.		

Input Item	Data Type	Description
FetchXML	string	Specifies the retrieve criteria in XML format. • The format of the XML string must conform to the FetchXML syntax specified by Microsoft. See the Microsoft Dynamics CRM documentation for more information on the FetchXML query specification and usage. • Paging cookie is not supported in the FetchXML mode.

Output

The output of this activity varies depending on the entity and attributes selected when configuring the **General** tab. The following table lists the possible output of the activity.

Output Item	Data Type	Description
pagenumber	integer	The number of pages that are returned in this tab.
pagesize	integer	The maximum number of entity records that are returned on each page.
pagingcookie	string	The value of paging cookie. Paging cookie is only supported in the simple mode.
totalcount	integer	The total number of entity records that have been retrieved.

Fault

The **Fault** tab lists exceptions that are thrown by this activity.

Error Schema Element	Data Type	Description
DynamicsCRMActivityFaultException		
message	String	The error message returned by the plug-in.
messageCode	String	The error code returned by the plug-in.

Update Entity

The Update Entity activity is used to update entity records in the Dynamics CRM server.

This activity supports batch operations, which means you can update multiple entity records at a time. If you want to update a data collection in the Dynamics CRM server in a batch, you can use the `For-Each` statement to map the data collection to the elements in the **Input** field in the Update Entity activity.

General

The **General** tab contains the following fields.

Field	Module Property?	Description
Name	No	The name of the activity in the process definition.
Dynamics CRM Connection	Yes	Specifies a shared connection resource. Click the icon to select a Dynamics CRM connection. If no matching Dynamics CRM connections are found, click **Create Shared Resource** in the **Select DynamicscrmResource Resource Template** dialog to create one. See Creating a Dynamics CRM Connection for more details.
Dynamics CRM Entity	No	Specifies the type of the entity record to be retrieved. Click **Fetch Entity** to open the **Entity Selection Dialog** dialog which contains all the available entities. Select an entity from the list and click **OK**. The selected entity is automatically specified in this field. After selecting the entity, click **Build Schema** to open the **Attributes Selection Dialog** dialog which contains all the available attributes associated with the entity. Select the attributes you want to update and click **OK**. The selected attributes are shown in the **Input** tab.

Description

Provide a short description for the activity.

Input

The input of this activity varies depending on the entity and attributes selected when configuring the **General** tab.

Output

The ID of the updated entity record is returned in the **Output** tab. The field name of output varies depending on the type of updated entity record.

Fault

The **Fault** tab lists exceptions that are thrown by this activity.

Error Schema Element	Data Type	Description
DynamicsCRMActivityFaultException		
message	String	The error message returned by the plug-in.
messageCode	String	The error code returned by the plug-in.

Plugin Registration Tool

The Plugin Registration tool is used to register specific messages for the plug-in.
You need to download the Dynamics CRM SDK from the Microsoft website. The Plugin Registration tool is located in the `SDK_HOME\Tools\PluginRegistration\pluginregistration.exe` directory.

Before using this tool to register messages, you need to import the Dynamics CRM solution to Dynamics CRM server. See *TIBCO ActiveMatrix Plug-in for Microsoft Dynamics CRM Installation* for more information.

Procedure

1. Open the Plugin Registration tool and click **CREATE NEW CONNECTION**.
2. Enter the connection information on the **Login** page and click **Login**.
3. Register a step for the Create, Update, and Delete messages respectively.
   a) Right-click the **TIBCO.BW.DynamicsCRMPluginEventListenerPlugin** node and select **Register New Step**.
   b) Configure the step information.
   Ensure that the following values are specified in the corresponding fields:

Field or check box	Values to be specified
Message	Create, Update, or Delete
Event Handler	Tibco.BW.DynamicsCRM.Plugin.EventListenerPlugin
Eventing Pipeline Stage of Execution	Post-operation
Execution Mode	Synchronous
Deployment	Server

   c) Click **Register New Step**.
4. Register an image with the Delete step.
   a) Right-click the Delete step and select **Register New Image**.
   b) Configure the Image Information.
   Ensure that the following values are specified in the corresponding fields:

Field or check box	Values to be specified
Image Type	Pre Image
Name	PreImageEntityAlias
Entity Alias	PreImageEntityAlias

   c) Click **Register Image**.

See the Microsoft documentation for detailed information regarding the Plugin Registration tool.

Managing Logs

Logs are used to trace and troubleshoot exceptions. The plug-in allows users to set up log levels and export logs.

A `logback.xml` file is located in the *TIBCO_HOME*`\bw\6.x\config\design\logback` directory, you can update this file to Setting Up Log Levels and Exporting Logs to a File.

Log Levels

The plug-in captures logs at different levels.

Log Level	Description
ERROR	Indicates that an unrecoverable error occurred. Depending on the error severity, the plug-in may continue with the next operation or may stop altogether. If the ERROR log level is selected, logs only in the ERROR level will be captured.
WARN	Indicates that an abnormal condition was found. Processing will continue, but special attention from an administrator is recommended. If the WARN log level is selected, logs in the ERROR and WARN levels will be captured.
INFO	Indicates normal plug-in operations. No action is needed. A tracing message tagged with Info indicates that a significant processing step have been reached and logged for tracking or auditing purposes. Only info messages preceding a tracking identifier are considered as significant steps. If the INFO log level is selected, logs in the ERROR, WARN, and INFO levels will be captured.
DEBUG	Indicates a developer-defined tracing message. If the DEBUG log level is selected, logs in the ERROR, WARN, INFO, and DEBUG levels will be captured.
TRACE	Includes all the information regarding the running process. If the Trace log level is selected, logs in all the levels, ERROR, WARN, INFO, DEBUG, and TRACE will be captured.

Setting Up Log Levels

By default, the log level is `Error`. You can change the log level to trace different messages.

If neither the plug-in log nor the BusinessWorks log is configured in the `logback.xml` file, the error logs of the plug-in will be displayed in the Console view by default.

If the plug-in log is not configured but the BusinessWorks log is configured in the `logback.xml` file, the configuration for BusinessWorks log is implemented by the plug-in.

Procedure

1. Navigate to the *TIBCO_HOME*\bw\6.x\config\design\logback directory and open the logback.xml file.
2. Add the following node in the User loggers area to specify the log level for the plug-in.

```
<logger name="com.tibco.bw.palette.dynamicscrm.runtime">
   <level value="DEBUG"/>
</logger>
```

> When the `level` is set to `Debug`, the input and output for the plug-in activities are also displayed in the Console view. See Log Levels for more details regarding each log level.

3. Add the following node in User loggers area to specify the log level for an activity.

```
<logger name="com.tibco.bw.palette.dynamicscrm.runtime.ActivityName Activity">
   <level value="DEBUG"/>
</logger>
```

> For the activities that do not configure with specific log levels, they still inherit the log level configured for the plug-in or BusinessWorks.

For example, if you want to set the log level of the Create Entity activity to `Debug`, you need to add the following node:

```
<logger name="com.tibco.bw.palette.dynamicscrm.runtime.CreateEntityActivity">
   <level value="DEBUG"/>
</logger>
```

> For the Entity Event Source activity, the node added in Console Appender area is different.
>
> ```
> <logger
> name="com.tibco.bw.palette.dynamicscrm.runtime.EntityEventSourceActivity">
>    <level value="DEBUG"/>
> </logger>
> ```

4. Save the file.

Exporting Logs to a File

You can export the plug-in logs to a file by modifying the `logback.xml` file.

Procedure

1. Navigate to the *TIBCO_HOME*\bw\6.x\config\design\logback directory and open the logback.xml file.

> When deploying an application in TIBCO Enterprise Administrator, you need to navigated to the *TIBCO_HOME*\bw\domains*mydomain*\appnodes*myspace**mynode* directory to find the `logback.xml` file.

2. Add the following node to specify the file location.

```
<appender name="FILE" class="ch.qos.logback.core.FileAppender">
   <file>c:/bw6-dynamicscrm.log</file>
      <encoder>
        <pattern>%d{HH:mm:ss.SSS} [%thread] %-5level %logger{36}-%msg%n</pattern>
      </encoder>
</appender>
```

The `file` tag defines the location to which the log is exported and the value is the absolute path of the file that is detailed to the file name.

3. Add the following node to the `root` node at the bottom of the `logback.xml` file to enable exporting logs to a file.

```
<root level="DEBUG">
   <appender-ref ref="STDOUT" />
   <appender-ref ref="FILE" />
</root>
```

4. Save the file.

Sample Projects

Working through the sample project helps you understand how TIBCO ActiveMatrix BusinessWorks Plug-in for Microsoft Dynamics CRM works.

TIBCO ActiveMatrix BusinessWorks Plug-in for Microsoft Dynamics CRM packages one sample project and one sample data file within the installer, which is located in the `TIBCO_HOME\bw\palettes\dynamicscrm\6.0\Samples` directory.

The sample project contains the following processes:

- CreateEntity
- DeleteEntity
- EntityEventSource
- RetrieveEntity
- RetrieveMultipleEntities_FetchXML
- RetrieveMultipleEntities_Simple_Paging
- RetrieveMultipleEntities_Simple
- Scenario
- UpdateEntity

Importing Sample Project

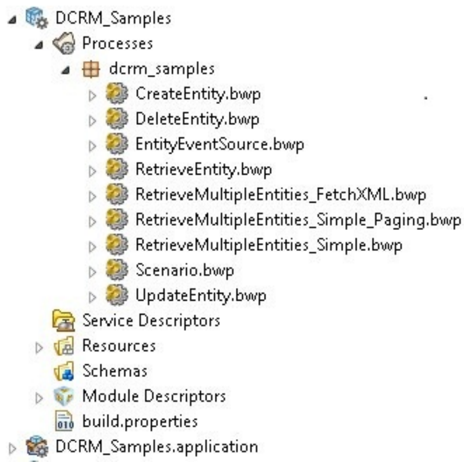
Only one sample project is packaged with the plug-in. Before running the project, you need to import the project to TIBCO Business Studio.

Procedure

1. Navigate to the `TIBCO_HOME\bw\palettes\dynamicscrm\6.0\samples` directory and unzip the `DCRM_Sample.zip` file to the directory.
2. Start TIBCO Business Studio.
3. Click **File > Import**.
4. In the **Import** dialog, expand the **General** folder and select **Existing Studio Projects into Workspace**. Click **Next**.
5. Click **Browse** next to the **Select root directory** field to locate the samples. Click **Finish**.

Result

The sample project is imported to TIBCO Business Studio.



Configuring the Shared Resource

All the processes in the sample project require a Dynamics CRM Connection. You must configure the Dynamics CRM Connection shared resource packaged in the sample before running the processes.

Procedure

1. Expand the DCRM_Samples project in the Project Explorer view.
2. Click **Resources > dcrm_samples**.
3. Double-click **NewDynamicsCRMConnection.dynamicscrmResource**.
4. Configure the Dynamics CRM Connection shared resource.
   See Dynamics CRM Connection for more information.

Working with the EntityEventSource Process

The EntityEventSource process shows how to listen to the Create, Update, and Delete user events triggered on the entity record.

Prerequisites

Before running the process, you need to complete the following steps:

1. Importing Dynamics CRM Solution to Dynamics CRM Server. See *TIBCO ActiveMatrix BusinessWorks Plug-in for Microsoft Dynamics CRM Installation* for more information.
2. Importing Sample Project.
3. Configuring the Shared Resource.

Procedure

1. Expand the DCRM_Samples project in the Project Explorer view.
2. Configure the HTTP Connector shared resource.
   a) Click **Resources > dcrm_samples**.
   b) Double-click **HTTPConnectorResource.httpConnResource**.
   c) Configure the HTTP Connector shared resource.
3. Expand **Processes > dcrm_samples**.
4. Double-click **EntityEventSource.bwp**.

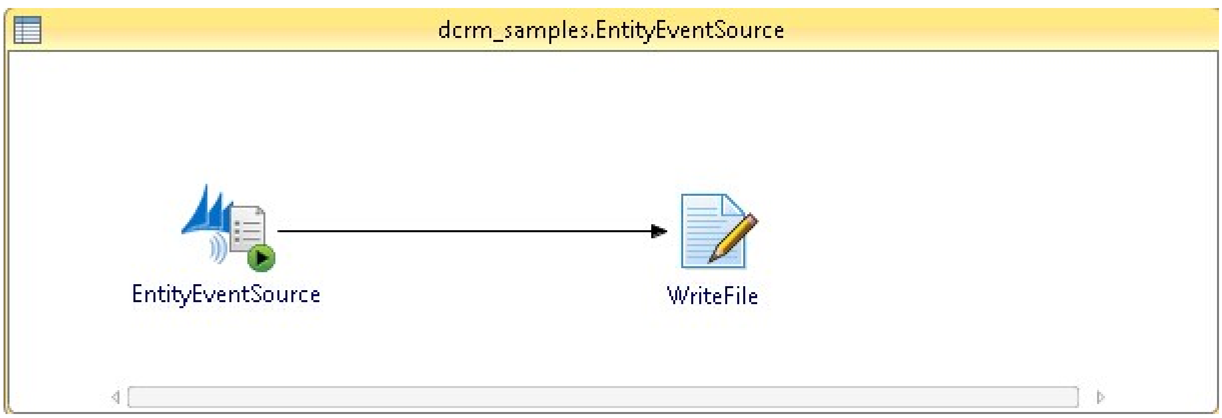
5. Right-click the Record Listener activity in Process Editor and select **Show Properties View** from the menu that is displayed.
6. Configure the EntityEventSource activity.

   Make sure the values specified in the **Relative Path**, **Username**, and **Password** fields are respectively consistent with the values configured for the Dynamics CRM solution.
7. Right-click **EntityEventSource.bwp** in the Project Explorer view and click **Run As > Launch BusinessWorks** from the menu that is displayed.
8. Click the Terminate icon to stop the process.

Description of the EntityEventSource Process

The EntityEventsSource process listens for the Create, Update, and Delete user events triggered on the specified entity.

The process is designed with the following activities:



Activity	Description
EntityEventSource	Listens for the Create, Update, and Delete user events triggered on the specified entity.
WriteFile	Writes the IDs of the entity records that have been listened for user events.

Working with Other Processes

All the processes except for the EntityEventSource process have similar steps to perform.

Prerequisites

Before running the processs, you need to complete the following steps:

1. Importing Sample Project.
2. Configuring the Shared Resource.

Procedure

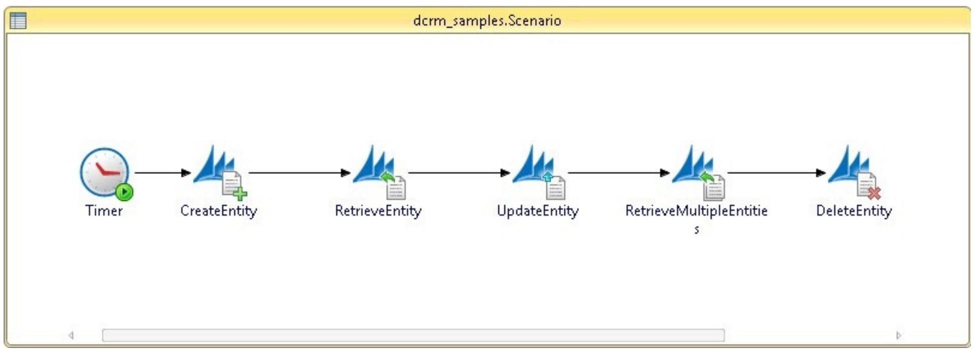
1. Expand the DCRM_Samples project in the Project Explorer view.
2. Expand **Processes > dcrm_samples**.
3. Right-click the processs you want to run and click **Run As > Launch BusinessWorks** from the menu that is displayed.

4. Click the Terminate icon to stop the process.

Description of the Scenario Process

The Scenario process uses transaction activities to create, retrieve, update, and delete the entity records in the Dynamics CRM server.

The process is designed with the following activities:



Activity	Description
Timer	Starts the process at the specified time.
CreateEntity	Creates an Account type of entity record in the Dynamics CRM server.
RetrieveEntity	Retrieves the entity record created by the CreateEntity activity through the account ID.
UpdateEntity	Updates the name of the entity record.
RetrieveMultipleEntiti es	Retrieves the entity record through the account ID in the simple mode.
DeleteEntity	Deletes the entity record.

Error Codes

The exceptions that are thrown by the plug-in are listed with corresponding descriptions and resolutions.

Error Code and Error Message	Role	Description	Resolution
TIBCO-BW-RUNTIME-DYNAMICSCRM-100001 `Common error:{0}.`	errorRole	An error ocurred when you did not specify a Dynamics CRM Connection shared resource for the activity.	Specify a Dynamics CRM Connection for the activity.
TIBCO-BW-RUNTIME-DYNAMICSCRM-200001 `Common error:{0}.`	debugRole	Describes general Debug information.	No action.
TIBCO-BW-RUNTIME-DYNAMICSCRM-300000 `Retrieve Information: [ Entity Name: {0}, Retrieve Mode:{1}, Is Paging:{2} ]`	InfoRole	Describes retrieval information.	No action.
TIBCO-BW-RUNTIME-DYNAMICSCRM-300001 `Start Query By QueryExpression.`	InfoRole	Starts to query entities according to the specified query expression.	No action.
TIBCO-BW-RUNTIME-DYNAMICSCRM-300002 `Start Query By FetchXML;`	InfoRole	Starts to query entities in FetchXML mode.	No action.
TIBCO-BW-RUNTIME-DYNAMICSCRM-300003 `QueryExpression Condition:[Attribute Name:{0}, Values[{1}],Operator:{2}]`	InfoRole	Describes the query expression.	No action.
TIBCO-BW-RUNTIME-DYNAMICSCRM-300004 `Start connect server.`	InfoRole	Starts to connect the Microsoft Dynamics CRM server.	No action.
TIBCO-BW-RUNTIME-DYNAMICSCRM-300005 `Initialize entity event source activity.`	InfoRole	Initializes the Entity Event Source activity.	No action.

Error Code and Error Message	Role	Description	Resolution
TIBCO-BW-RUNTIME-DYNAMICSCRM-300006 `Starting entity event source.`	InfoRole	Starts the Entity Event Source activity.	No action.
TIBCO-BW-RUNTIME-DYNAMICSCRM-300007 `Entity event source is listening on:{0}.`	InfoRole	The Entity Event Source activity is listening to user events triggered on the {0} entity .	No action.
TIBCO-BW-RUNTIME-DYNAMICSCRM-300008 `Entity event source starting is failed, details:{0}.`	InfoRole	The Entity Event Source activity was failed to start running.	No action.
TIBCO-BW-RUNTIME-DYNAMICSCRM-300009 `Stopping entity event source activity.`	InfoRole	Stops running the Entity Event Source activity.	No action.
TIBCO-BW-RUNTIME-DYNAMICSCRM-300010 `Entity event source is stopped.`	InfoRole	The Entity Event Source activity has stopped running.	No action.
TIBCO-BW-RUNTIME-DYNAMICSCRM-300011 `Entity event source stopping is failed,details:{0}.`	InfoRole	The Entity Event Source activity was failed to stop running.	No action.
TIBCO-BW-RUNTIME-DYNAMICSCRM-300012 `Event source listener received the request from CRM server, the HTTP method is:{0}.`	InfoRole	The Entity Event Source activity received the request from the Dynamics CRM server. The HTTP method is:{0}.	No action.
TIBCO-BW-RUNTIME-DYNAMICSCRM-300013 `The post data from request is empty, please send the post data from the CRM plugin in CRM server.`	InfoRole	The post data from request is empty. Send the post data from the plugin to the Dynamics CRM server.	No action.

Error Code and Error Message	Role	Description	Resolution
TIBCO-BW-RUNTIME-DYNAMICSCRM-300014 `Event listener received the data and began to handle with the data.`	InfoRole	The Entity Event Source activity received data and began to process the data.	No action.
TIBCO-BW-RUNTIME-DYNAMICSCRM-300015 `Error happened when process the posted data, details:{0}.`	InfoRole	An error occurred when processing the posted data.	No action.
TIBCO-BW-RUNTIME-DYNAMICSCRM-300016 `Send response to client, code={0},text={1}.`	InfoRole	Sends response to the client server.	No action.
TIBCO-BW-RUNTIME-DYNAMICSCRM-300017 `Received a {0} entity event with entity name: {1}.`	InfoRole	A {0} user event triggered on the {1} entity is received.	No action.
TIBCO-BW-RUNTIME-DYNAMICSCRM-300018 `Start to process the {0} entity event.`	InfoRole	Starts to process the {0} entity event.	No action.
TIBCO-BW-RUNTIME-DYNAMICSCRM-300019 `Set the {0} entity event subtask {1} attribute "{2}"="{3}".`	InfoRole	Sets the {0} entity event subtask {1} attribute "{2}"="{3}".	No action.
TIBCO-BW-RUNTIME-DYNAMICSCRM-300020 `Set the {0} entity event subtask {1} attribute {2}: "{3}"="{4}".`	InfoRole	Sets the {0} entity event subtask {1} attribute {2}: "{3}"="{4}".	No action.
TIBCO-BW-RUNTIME-DYNAMICSCRM-300021 `Set the {0} entity event subtask {1} attributes successfully.`	InfoRole	Sets the {0} entity event subtask {1} attributes successfully.	No action.

Error Code and Error Message	Role	Description	Resolution
TIBCO-BW-RUNTIME-DYNAMICSCRM-300022 `Built the {0} entity event output successfully.`	InfoRole	Builds the {0} entity event output successfully.	No action.
TIBCO-BW-RUNTIME-DYNAMICSCRM-300023 `The {0} entity event output XML structure: {1}.`	InfoRole	The {0} entity event output XML structure: {1}.	No action.
TIBCO-BW-RUNTIME-DYNAMICSCRM-300024 `Start to build the {0} entity event output.`	InfoRole	Starts to build the {0} entity event output.	No action.
TIBCO-BW-RUNTIME-DYNAMICSCRM-300025 `Start to process the {0} entity event subtask.`	InfoRole	Starts to process the {0} entity event subtask.	No action.
TIBCO-BW-RUNTIME-DYNAMICSCRM-300026 `Start to set the {0} entity event subtask {1} attributes.`	InfoRole	Starts to set the {0} entity event subtask {1} attributes.	No action.
TIBCO-BW-RUNTIME-DYNAMICSCRM-300027 `Executing the {0} entity event subtask request.`	InfoRole	Executes the {0} entity event subtask request.	No action.
TIBCO-BW-RUNTIME-DYNAMICSCRM-300028 `Executed the {0} entity subtask request successfully.`	InfoRole	The {0} entity subtask request has been executed successfully.	No action.
TIBCO-BW-RUNTIME-DYNAMICSCRM-300029 `Processed the {0} entity event subtask successfully.`	InfoRole	The {0} entity event subtask has been processed successfully.	No action.

Error Code and Error Message	Role	Description	Resolution
TIBCO-BW-RUNTIME-DYNAMICSCRM-300030 `Processed the {0} entity event successfully.`	InfoRole	The {0} entity event has been processed.	No action.
TIBCO-BW-RUNTIME-DYNAMICSCRM-400001 `{0}`	warnRole	Describes the general warning information.	No action.
TIBCO-BW-RUNTIME-DYNAMICSCRM-500000 `{0}`	errorRole	Describes the general error information.	No action.
TIBCO-BW-RUNTIME-DYNAMICSCRM-500001 `Error threw when process the event, details: {0}.`	errorRole	An error occurred when processing events.	No action.
TIBCO-BW-RUNTIME-DYNAMICSCRM-500002 `Parsing the Authorization HTTP header information throw exception:{0}`	errorRole	An exception is thrown when parsing the Authorization HTTP header information.	No action.
TIBCO-BW-RUNTIME-DYNAMICSCRM-500003 `Error threw when executed the {0} entity, details:{1}`	errorRole	An error occurred when executing an entity.	Specify valid configuration values for the activity.
TIBCO-BW-RUNTIME-DYNAMICSCRM-500004 `Error threw when start to build output for {0} entity, details:{1}`	errorRole	An error occurred when starting to build output for an entity.	Specify valid configuration values and input values for the activity.
TIBCO-BW-RUNTIME-DYNAMICSCRM-500005 `Error threw when serializable Xml document for {0} entity, details:{1}`	errorRole	An error occurred when creating serializable XML document for an entity.	Specify correct configuration information.

Error Code and Error Message	Role	Description	Resolution
TIBCO-BW-RUNTIME-DYNAMICSCRM-500006 `Dynamics CRM entity event source exception: {0}`	errorRole	An exception is thrown when executing the Entity Event Source activity.	No action.
TIBCO-BW-RUNTIME-DYNAMICSCRM-500011 `IOException occurred while retrieving XML Output for activity [{0}].`	errorRole	An IOException occurred when retrieving XML output for an activity.	Specify correct configuration.