



BPA
Platform

White Paper

Microsoft Dynamics CRM Connector Tool v1.3

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Introduction

The **Microsoft Dynamics CRM Connector** tool is used to operate with data from/to your Microsoft Dynamics CRM system.

The full range of objects in Dynamics CRM can be interacted with, for example, Accounts, Account Leads, Appointments, Calendars, Campaigns, Competitors, Contacts, Contracts, Invoices, Leads, Opportunities, Products, and so on.

The range of objects and the data within them is retrieved dynamically from your installation of Dynamics CRM so that custom changes made to CRM are also included.

The tool transforms incoming XML data into an XML format for the specific Microsoft Dynamics CRM object and operation selected. This XML is then passed to the Dynamics CRM Web Service which does the actual communication with Dynamics CRM via its API. The response is exposed as XML from the tool, which could include details of the object requested, errors from Dynamics CRM, or the values of any automatically generated ID fields.

The tool does not accept a BPA Platform recordset directly as input but BPA Platform variables containing XML data from any source at task runtime may be used. In addition, a BPA Platform recordset can be processed by the **Convert Recordset to XML** tool first to transform it into XML if you have this tool available.

System Requirements

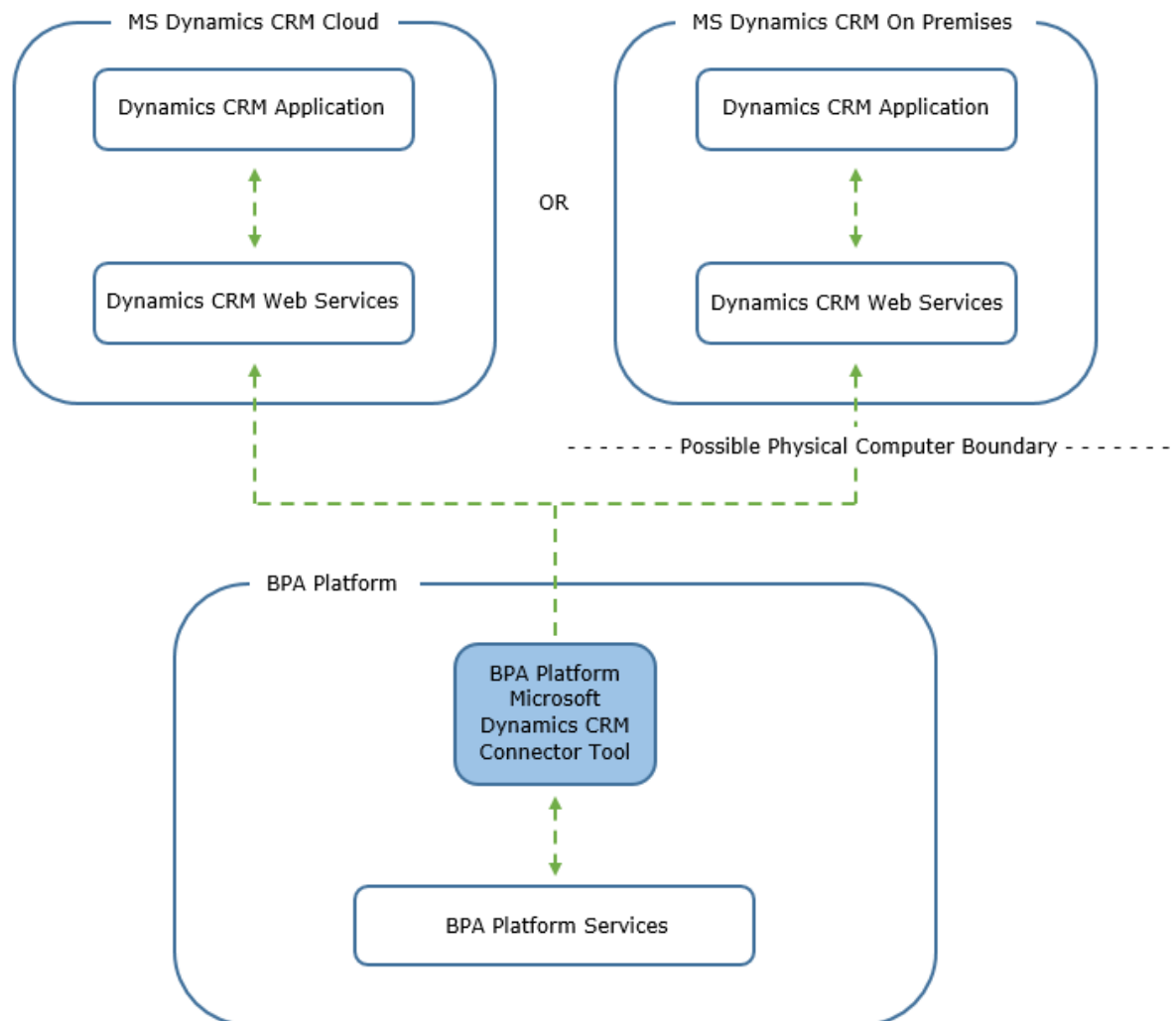
The **Microsoft Dynamics CRM Connector** tool requires BPA Platform (formerly "TaskCentre") 2018 or above.

Supported versions of Microsoft Dynamics CRM are as follows:

- ▶ Microsoft Dynamics CRM 2013: **On-Premises**
- ▶ Microsoft Dynamics CRM 2015: **On-Premises**
- ▶ Microsoft Dynamics 365 (formerly "Dynamics CRM") v8.x: **On-Premises**
- ▶ Microsoft Dynamics 365 for Customer Engagement v9.0: **Online**

Architecture

The image below provides a high-level system architecture diagram of the **Microsoft Dynamics CRM Connector** within the context of BPA Platform and Dynamics CRM.



Microsoft Dynamics CRM could be on-premises or in the cloud.

The BPA Platform **Microsoft Dynamics CRM Connector** tool is used to read and write data into Dynamics CRM through the Dynamics CRM Web Services. It is installed on the BPA Platform Server. It must also be installed on any BPA Platform Client installations that are accessing the BPA Platform Server.

Global Configuration

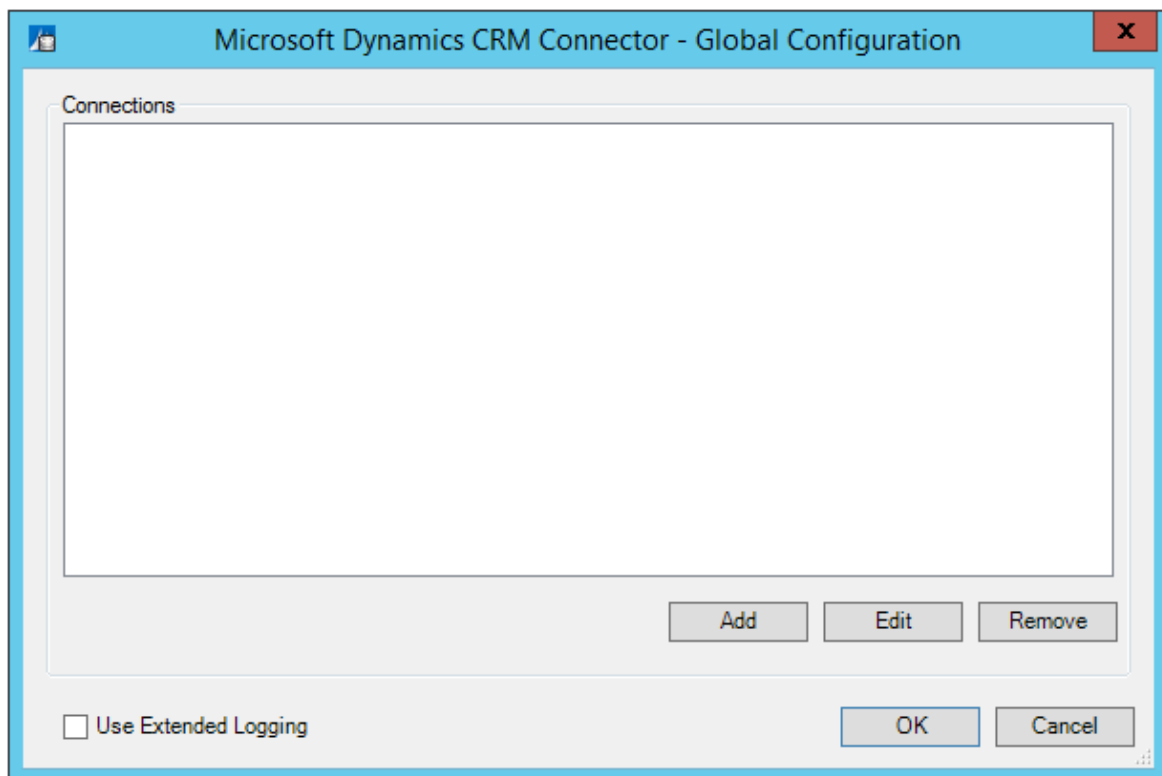
The global configuration for this tool is used to create connections to the Dynamics CRM Web Service, which communicates with Dynamics CRM. When a connection is set up, the available objects and fields of Dynamics CRM will be retrieved.

When the connection is selected at task level, within the tool, you will then be able to select an object to have BPA Platform data mapped to and select the operation that will be performed, i.e. to retrieve data from or deliver data to your Dynamics CRM system.

The global configuration for the tool can be accessed via the toolbar:

Manage > Tools > Data Connectors > Microsoft Dynamics CRM Connector.

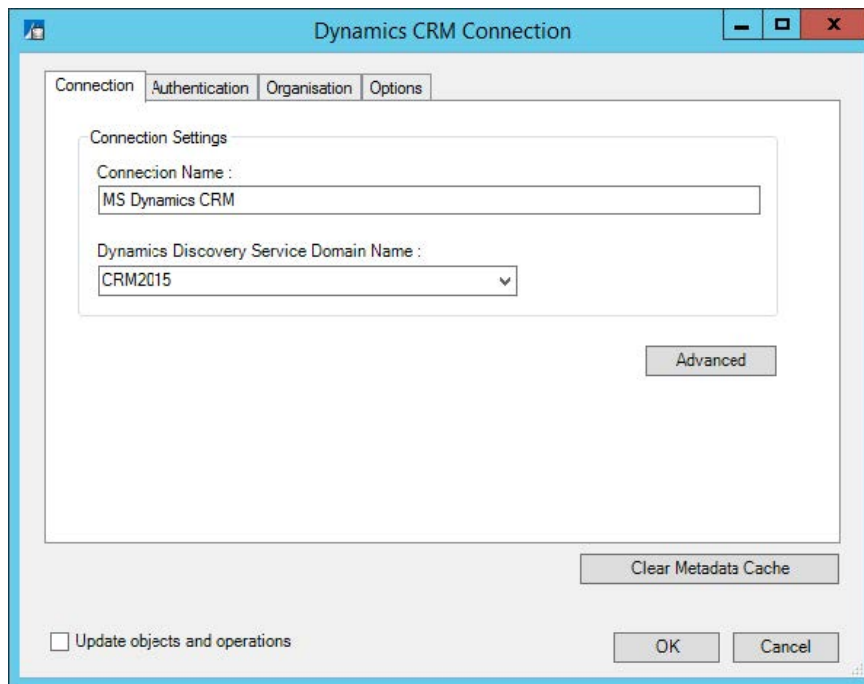
Or, via the BPA Platform system tree under **Data Connectors > Microsoft Dynamics CRM Connector.**



Click **Add** to add a new connection.

About the Connection Tab

The **Connection** tab allows you to provide a name for the global connection and requires you to specify the location of the Dynamics CRM Web Service so communication can be established.



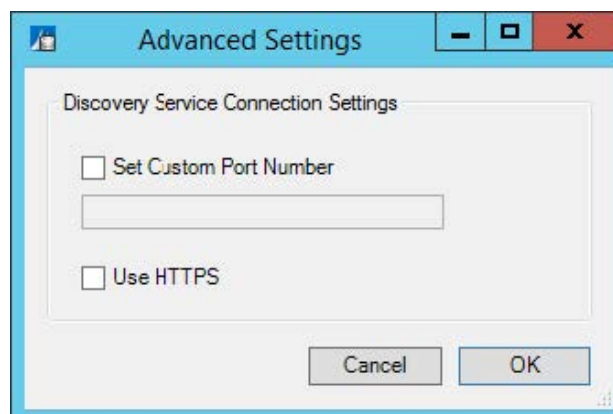
The screenshot shows the 'Dynamics CRM Connection' dialog box with the 'Connection' tab selected. The 'Connection Settings' section contains a 'Connection Name' text box with 'MS Dynamics CRM' and a 'Dynamics Discovery Service Domain Name' dropdown menu with 'CRM2015' selected. An 'Advanced' button is located to the right of the dropdown. At the bottom right is a 'Clear Metadata Cache' button. At the bottom left is an unchecked checkbox labeled 'Update objects and operations'. At the bottom right are 'OK' and 'Cancel' buttons.

The **Connection Name** field is the display name of the connection e.g. **Microsoft Dynamics CRM**. Any text entered here will be visible when selecting the connection at task level.

The **Dynamics Discovery Service Domain Name** field requires either the name of the Dynamics Server (i.e. **dynsvr01**), the fully qualified domain name of the discovery service (i.e. **dev.mydomain.com**), or the Dynamics Online platform; which can be selected from the drop down list.

Advanced Connection Settings

An **Advanced** button within the tab allows the port number to be changed.



The screenshot shows the 'Advanced Settings' dialog box. The 'Discovery Service Connection Settings' section contains two unchecked checkboxes: 'Set Custom Port Number' and 'Use HTTPS'. Below the 'Set Custom Port Number' checkbox is an empty text box. At the bottom are 'Cancel' and 'OK' buttons.

By default, the connection to the Dynamics CRM server operates on port **80**, or port **443** if HTTPS is used.

Alternatively, a custom port number can be set if required. You may need to change the port if another connection is already using it. Some firewalls and routers also allow for "Port Translation", this means that a service behind a firewall might be on port 443 but the firewall exposes it as an alternative port number. This UI allows specification of the translated port number to use.

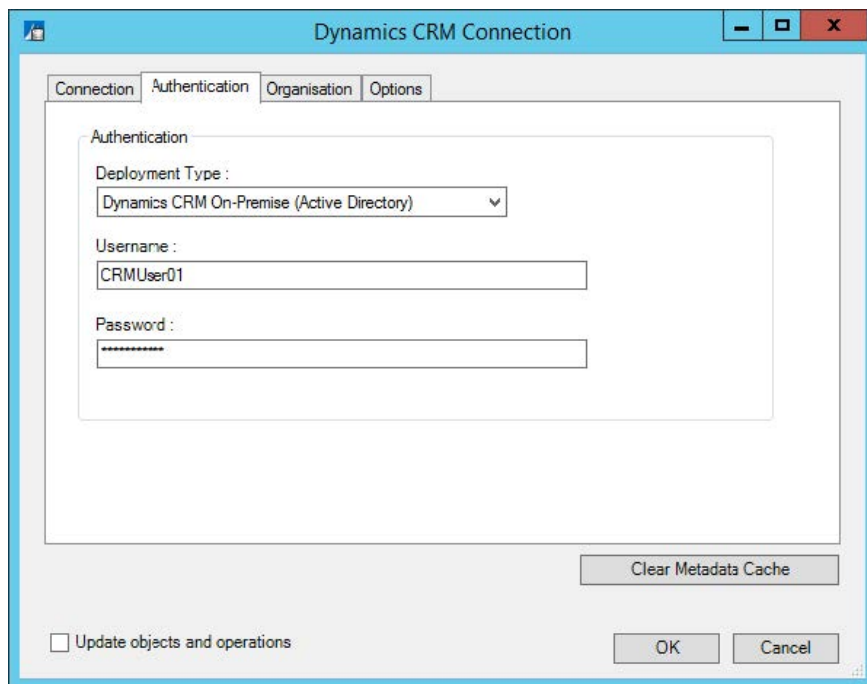
The **Use HTTPS** checkbox allows the connection to the Dynamics CRM server to be made using HTTPS. This would be required when using Dynamics 365 and when connecting to Internet Facing Deployments.

About the Authentication Tab

The **Authentication** tab requires the credentials of a Dynamics CRM account that has access to the discovery endpoint and/or the required organisations of Dynamics CRM.

This account will be used to establish communication with the server and will also be used by tasks to read data from and write data to an organisation within your Dynamics CRM system.

The **Deployment Type** drop down list requires you to select the type of account authentication in use. This will be dependent on how your Microsoft Dynamics CRM package has been deployed, i.e. online or on premise.

The screenshot shows a Windows-style dialog box titled "Dynamics CRM Connection". It has four tabs: "Connection", "Authentication" (which is selected), "Organisation", and "Options". The "Authentication" tab contains a section titled "Authentication" with a "Deployment Type" dropdown menu set to "Dynamics CRM On-Premise (Active Directory)". Below this are text boxes for "Username" (containing "CRMUser01") and "Password" (containing masked characters). At the bottom right of the dialog is a "Clear Metadata Cache" button. At the very bottom, there is a checkbox labeled "Update objects and operations" which is unchecked, and "OK" and "Cancel" buttons.

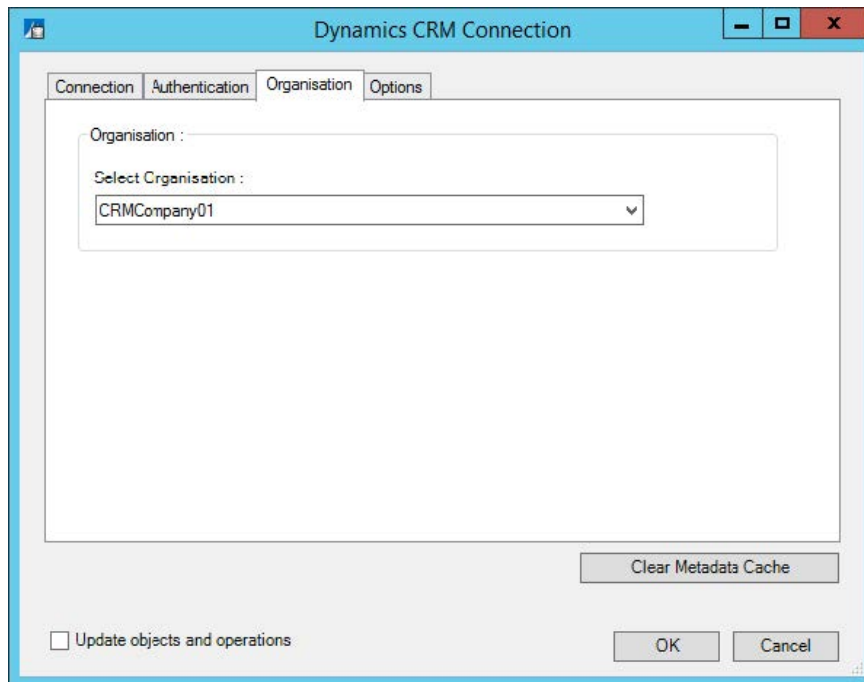
The following options are available:

- ▶ **Dynamics CRM On-Premise (Active Directory)** — Used in installations on premise where Windows Authentication is being used
- ▶ **Dynamics CRM On-Premise (IFD)** — Used in installations on premise where claims-based authentication is used and the dynamics server is configured for IFD (Internet Facing Deployment) mode
- ▶ **Dynamics 365 (Office 365 Account)** — Used when connecting to Dynamics 365 and an Office 365 account is being used

- ▶ **Dynamics 365 (Microsoft Account)** — Used when connecting to Dynamics 365 and a Windows Live account is being used

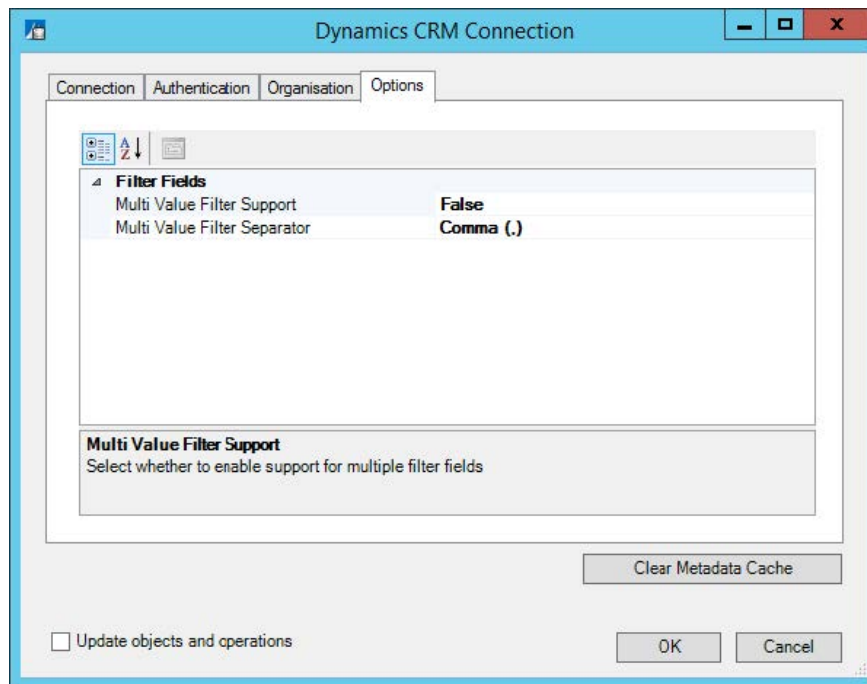
About the Organisation Tab

The **Organisation** tab displays a list of organisations after valid connection details for the Dynamics CRM server have been supplied.



Use the drop-down list to select an organisation for the **Microsoft Dynamics CRM Connector** tool to operate with, i.e. expose the available objects and operations for mapping at task level.

About the Options Tab



Multi Value Filter Support enables the use of the Multi Value Filter. The Multi Value Filter allows you to perform searches within lists such as xxx in 111,222,333,444 etc.

Multi Value Filter Separator sets the separator to be used when passing multiple values for filtering. i.e. (/) (,) (:) (#)

Update Objects and Operations & Clear Metadata Cache

The global configuration provides two other options which are visible on every tab, they allow for new object data to be obtained from Microsoft Dynamics CRM in the event of a change.

The options are as follows:

- ▶ **Update objects and operations** – If changes are made to objects and their schemas in Microsoft Dynamics CRM, i.e. a new user defined field is added, then this option will need to be checked and the connection re-saved. This will enable a refresh of the schemas within the tool and allow all changes to be visible.

The same applies if you have upgraded to a newer release of the **Microsoft Dynamics CRM Connector** tool whilst existing connections are still present.

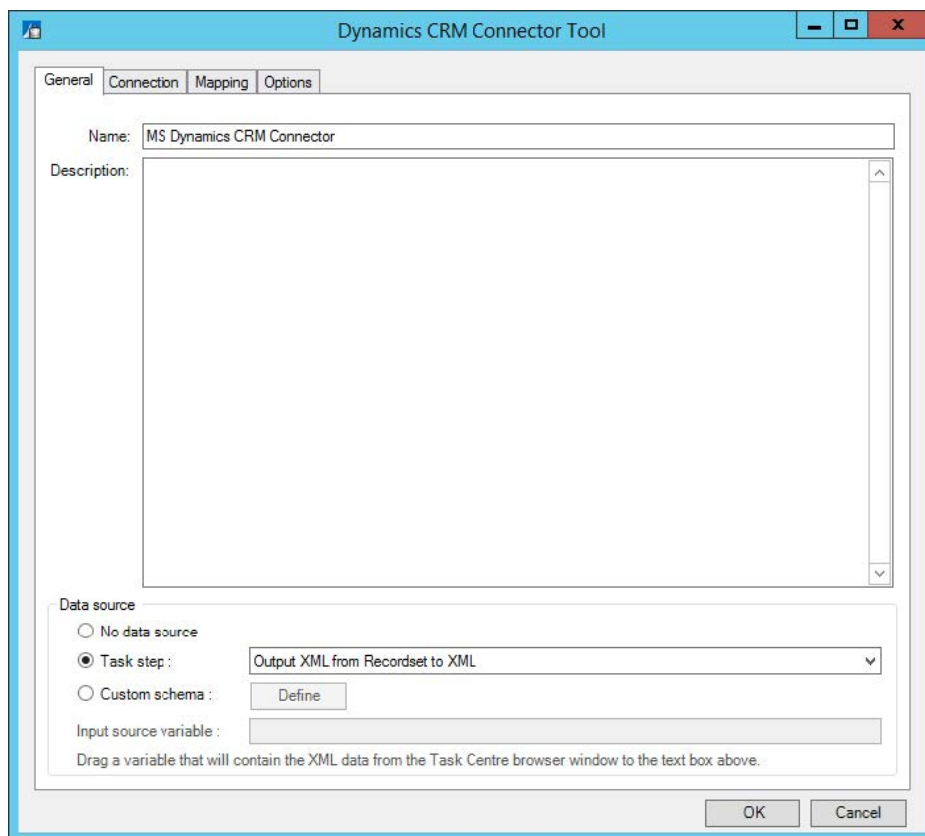
- ▶ **Clear Metadata Cache** – When an object and an operation is selected from within the connector tool, the associated fields for mapping are downloaded and listed within the tool UI. This information is cached locally to speed up the process of displaying the list when the same object and operation is selected again.

You will want to clear the cache if, for example, new user defined fields are added within Dynamics CRM and you want them to be downloaded and displayed in the tool UI for mapping, instead of displaying an older schema from cached memory. This applies to both online and on-premise versions of Microsoft Dynamics CRM.

Step Configuration

About the General Tab

The **General** tab allows the step to be named and described. An XML data source can also be selected for the tool to consume. This will expose the XML data within the tool and allow it to be mapped to objects of a Dynamics CRM organisation.



The screenshot shows the 'Dynamics CRM Connector Tool' window with the 'General' tab selected. The 'Name' field is set to 'MS Dynamics CRM Connector'. The 'Description' field is empty. Under the 'Data source' section, the 'Task step' radio button is selected, and the dropdown menu shows 'Output XML from Recordset to XML'. The 'Custom schema' radio button is unselected, and the 'Define' button is visible. The 'Input source variable' field is empty. A note at the bottom of the data source section reads: 'Drag a variable that will contain the XML data from the Task Centre browser window to the text box above.' The 'OK' and 'Cancel' buttons are at the bottom right.

The **Data source** can be either be an existing task step, or a custom source allowing the use of a task variable.

The **Task Step** drop-down list allows you to select an available step in the task that is capable of natively exposing an XML document. For example, a **Convert Recordset to XML** step or even another **Microsoft Dynamics CRM Connector** step. Selecting this option will consume the output XML of the step and will automatically determine the schema (XSD). The schema will then be presented within the **Mapping** tab for the XML data to be mapped to the fields of an object.

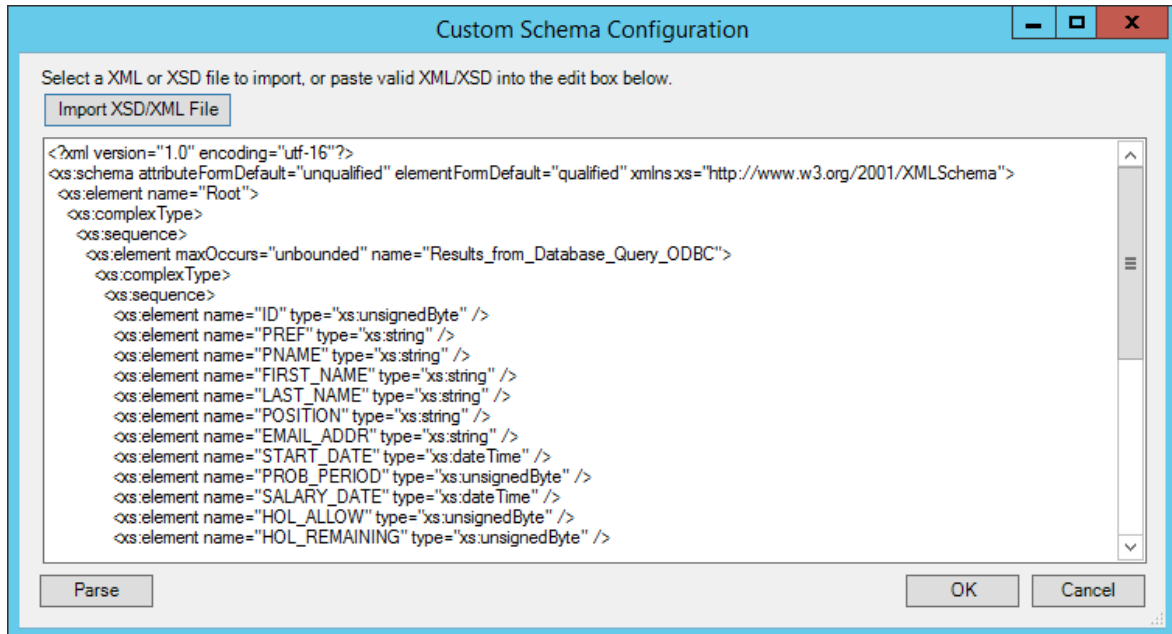
Selecting **Custom Schema** allows the use of a task variable containing XML as its value. The variable is dragged from the task browser and placed in the Input Source Variable field. The schema describing the structure of the XML in the variable must then be supplied using the **Define** button.

Custom Schema Configuration

The **Custom Schema Configuration** is used to define the schema of the XML stored by a variable.

An XML schema describes the structure of the XML, in terms of what tags are present and the nesting of the tags.

The format used by the **Microsoft Dynamics CRM Connector** tool is the industry standard XSD format.

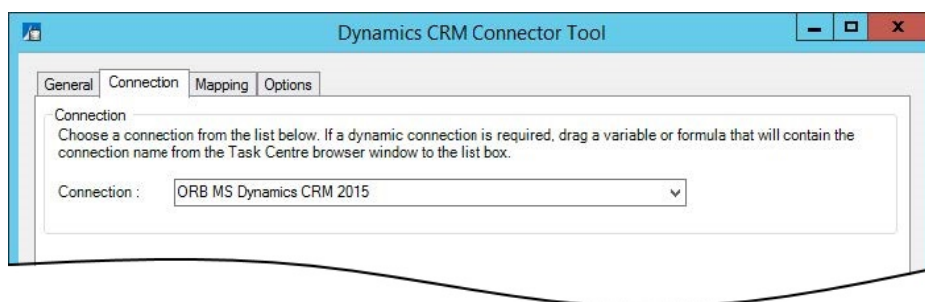


If an XSD schema file is available for the XML that is to be used as the input data, then this can be loaded in from a file on disk (via the **Import XSD/XML File** button) or copied directly into the text box shown. Any XML passed into the step at runtime must conform to this schema otherwise an error will be reported.

Using an XSD schema file is the recommended way of defining the XML schema. However, if an XSD schema is not available, then an example of the XML that will be used at runtime can be loaded in or copied into the text box. If an XML document is used, then the schema can be determined by pressing the **Parse** button.

About the Connection Tab

The **Connection** tab is used to select a connection to the Microsoft Dynamics CRM server which will expose the available objects for mapping within the **Mapping** tab.



The drop-down list displays all available connections previously created in the tool global configuration.

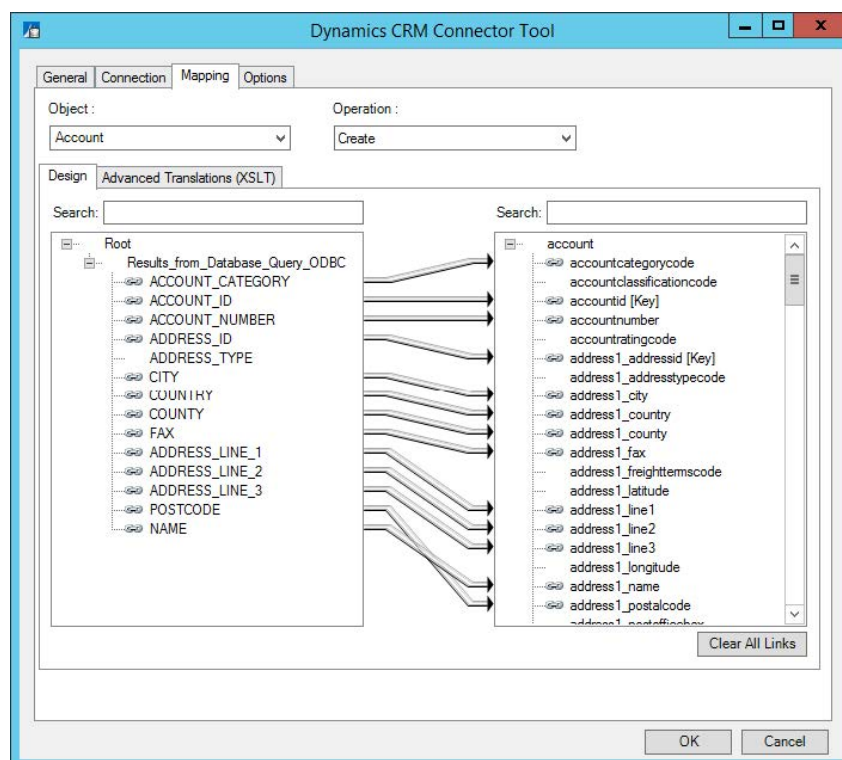
As an alternative to selecting a connection that has been previously created, a BPA Platform variable may be utilised by dragging it from the task browser into the **Connection** field to create a dynamic connection. If the dynamic option is used, then at runtime the text in the variable should match the name of one of the connections set up in the **Global Configuration** — see [Global Configuration](#).

About the Mapping Tab

The **Mapping** tab is used to define links between the incoming data of the XML data source, and the outgoing data that is to be sent to Microsoft Dynamics CRM. Once a connection has been specified the objects and operations available will be exposed for selection.

An object is first selected followed by the operation required. The XML structure of the incoming data source is displayed in the left-hand pane whilst the Microsoft Dynamics CRM object data is displayed in the right.

A mapping is completed by dragging a field from the data source left XML tree to a field on the tool input right XML tree, a visual link of the mapping will then be displayed in the middle.



The **Object** drop-down list displays the available objects of the selected Microsoft Dynamics CRM connection. The **Operation** drop-down list displays the operations that the selected object supports, in all cases this will be **Create**, **Read**, **Update**, **Delete**, and **Search**.

Selecting an object and an operation will change the tree display in the right pane to reflect the fields and child objects available for that selected operation.

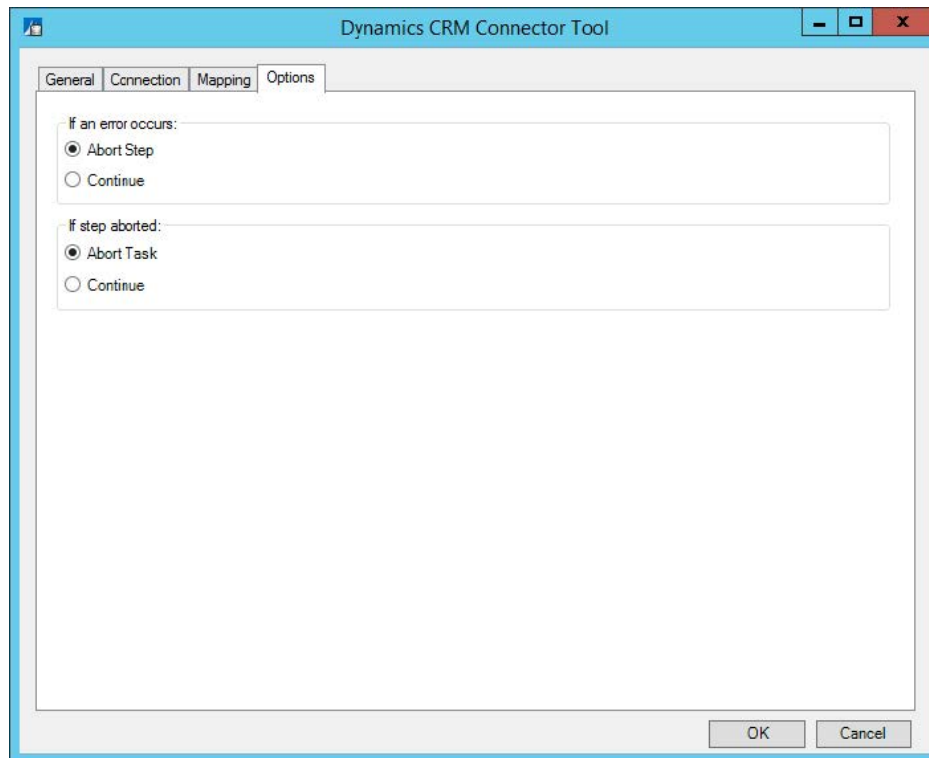
For a detailed description of the supported objects and operations, see [Supported Objects](#).

Additionally, a field is present in each objects operation named **SupplementaryReference**. It allows for traceability throughout the process of transferring data. When mapped, the data will reside locally at run time. It is added to the output and creates a record for your reference purposes only, this means you can choose to map any kind of

information to this field to assist with, for example, advising where the data originated from or at what time data transfer occurred.

About the Options Tab

The **Options** tab allows you to define how errors in this step are handled at task runtime.



If an error occurs, you can decide whether the step should **Continue** processing, or terminate the step immediately (**Abort Step**).

If the step is aborted, you can choose to **Continue** processing onto the next step in the task, or terminate the whole task immediately (**Abort Task**). Allowing the task to continue allows you to use the error XML received back in a **Save File** step for investigation purposes, for example.






All errors are recorded to the BPA Platform Event Log (***Manage > Event Log***).

Technical Summary

Working with Other Tools






Consuming from Other Tools

Below is a list of other tools that a **Microsoft Dynamics CRM Connector** step can directly interact with to consume information from:

| Icon | Tool Name | Tool Category |
|---|---|-----------------|
|  | Import Flat File | Input |
|  | Import XML Document | Input |
|  | Convert Recordset to XML | Format |
|  | Web Service Connector | Data Connectors |
|  | Microsoft Dynamics CRM Connector | Data Connectors |

Exposing to Other Tools

A **Microsoft Dynamics CRM Connector** step can also directly expose its output for use by the following steps listed below:

| Icon | Tool Name | Tool Category |
|---|---|-----------------|
|  | Convert XML to Recordset | Format |
|  | Run Microsoft Reporting Services | Format |
|  | Save File | Output |
|  | Web Service Connector | Data Connectors |
|  | Microsoft Dynamics CRM Connector | Data Connectors |

Data Processing

When a task containing a **Microsoft Dynamics CRM Connector** step runs, the Connector Step itself performs all of the processing of data from other steps in the task. It assembles an XML document containing all of the information that the Web Service needs to perform the operation on the object that the step is configured for.

This information includes the data itself to be passed from other steps, connection details for the Microsoft Dynamics CRM API, and the operation to be performed on the Dynamics CRM web service. The XML is then transmitted to the Web Service (if required, via a secure HTTPS connection).

The Web Service then parses the XML and performs the required operation by generating a call to the Microsoft Dynamics CRM API. An XML document is then created which contains the response from the Microsoft Dynamics CRM API. This may be information about the requested object data if for instance the operation was a read or search operation, or it could be a confirmation if an **Update** operation was attempted.

This XML is then returned to the **Microsoft Dynamics CRM Connector** Tool for use in subsequent steps.

Supported Objects

The objects and operations available are read from your installation of Dynamics CRM.



NOTE:

This information references Microsoft Dynamics CRM 2016. Please check the documentation for your version to find out which objects are available for you to use.

Each objects supports the following operations:

▶ Create

▶ Read

▶ Update

▶ Delete

▶ Search

[A](#) [B](#) [C](#) [D](#) [E](#) [F](#) [G](#) [H](#) [I](#) [J](#) [K](#) [L](#) [M](#) [N](#) [O](#) [P](#) [Q](#) [R](#) [S](#) [T](#) [U](#) [V](#) [W](#) [X](#) [Y](#) [Z](#)

A

Account

AccountLeads

ActivityMimeAttachment

ActivityParty

ActivityPointer

AdvancedSimilarityRule

Annotation

AnnualFiscalCalendar

ApplicationFile

Appointment

AsyncOperation

Attachment

AttributeMap

Audit

AuthorizationServer

AzureServiceConnection

B

BookableResource

BookableResourceBooking

BookableResourceBookingHeader

BookableResourceCategory

BookableResourceCategoryAssn

BookableResourceCharacteristic

BookableResourceGroup

BookingStatus

BulkDeleteFailure

BulkDeleteOperation

BulkOperation

BulkOperationLog

BusinessDataLocalizedLabel

BusinessProcessFlowInstance

BusinessUnit

BusinessUnitMap

BusinessUnitNewsArticle

C

Calendar

CalendarRule

Campaign

CampaignActivity

CampaignActivityItem

CampaignItem

CampaignResponse

Category

ChannelAccessProfile

ChannelAccessProfileEntryAccessLevel

ChannelAccessProfileRule

ChannelAccessProfileRuleItem

ChannelProperty

ChannelPropertyGroup

Characteristic

ChildIncidentCount

ClientUpdate

ColumnMapping

Commitment

Competitor

CompetitorAddress

CompetitorProduct

CompetitorSalesLiterature

ComplexControl

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ContactLeads

ContactOrders

ContactQuotes

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ConvertRuleItem

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CustomControlDefaultConfig

CustomControlResource

CustomerAddress

CustomerOpportunityRole

CustomerRelationship

D

DataPerformance

DelveActionHub

Dependency

DependencyFeature

DependencyNode

Discount

DiscountType

DisplayString

DisplayStringMap

DocumentIndex

DocumentTemplate

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DuplicateRule

DuplicateRuleCondition

DynamicProperty

DynamicPropertyAssociation

DynamicPropertyInstance

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E

Email

EmailHash

EmailSearch

EmailServerProfile

EmailSignatureE

Entitlement

EntitlementChannel

EntitlementContacts

EntitlementProducts

EntitlementTemplate

EntitlementTemplateChannel

EntitlementTemplateProducts

EntityMap

Equipment

ExchangeSyncIdMapping

ExternalParty

ExternalPartyItem

F

Fax

Feedback

FieldPermission

FieldSecurityProfile

FilterTemplate

FixedMonthlyFiscalCalendar

G

Goal

GoalRollupQuery

H

HierarchyRule

HierarchySecurityConfiguration

I

ImageDescriptor

Import

ImportData

ImportEntityMapping

ImportFile

ImportJob

ImportLog

ImportMap

Incident

IncidentKnowledgeBaseRecord

IncidentResolution

IntegrationStatus

InternalAddress

InterProcessLock

InvalidDependency

Invoice

InvoiceDetail

IsvConfig

K

KbArticle

KbArticleComment

KbArticleTemplate

KnowledgeArticle

KnowledgeArticleIncident

KnowledgeArticlesCategories

KnowledgeArticleViews

KnowledgeBaseRecord

KnowledgeSearchModel

L

LanguageLocale

Lead

LeadAddress

LeadCompetitors

LeadProduct

Letter

License

List

ListMember

LocalConfigStore

LookupMapping

M

Mailbox

MailboxStatistics

MailboxTrackingFolder

MailMergeTemplate

MetadataDifference

Metric

MobileOfflineProfile

MobileOfflineProfileItem

MobileOfflineProfileItemAssociation

MonthlyFiscalCalendar

MsDynPostAlbum

MsDynPostConfig

MsDynPostRuleConfig

msdynwallsavedquery

MsDynWallSavedQueryUserSettings

MultiEntitySearch

MultiEntitySearchEntities

N

Notification

O

OfficeDocument

OfficeGraphDocument

Opportunity

OpportunityClose

OpportunityCompetitors

OpportunityProduct

OrderClose

Organization

OrganizationStatistic

OrganizationUI

OrgInsightsMetric

Owner

OwnerMapping

P

PartnerApplication

PersonalDocumentTemplate

Phonecall

PicklistMapping

PluginAssembly

PluginTraceLog

PluginType

PluginTypeStatistic

Position

Post

PostComment

PostFollow

PostLike

PostRegarding

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PriceLevel

PrincipalAttributeAccessMap

PrincipalEntityMap

PrincipalObjectAccess

PrincipalObjectAccessReadSnapshot

PrincipalObjectAttributeAccess

PrincipalSyncAttributeMap

Privilege

PrivilegeObjectTypeCodes

ProcessSession

ProcessStage

ProcessTrigger

Product

ProductAssociation

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ProductSalesLiterature

ProductSubstitute

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PublisherAddress

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QuarterlyFiscalCalendar

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QueueItem

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QueueMembership

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RatingModel

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RoutingRule

RoutingRuleItem

S

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SalesLiteratureItem

SalesOrder

SalesOrderDetail

SalesProcessInstance

SavedOrgInsightsConfiguration

SavedQuery

SavedQueryVisualization

SdkMessage

SdkMessageFilter

SdkMessagePair

SdkMessageProcessingStep

SdkMessageProcessingStepImage

SdkMessageProcessingStepSecureConfig

SdkMessageRequest

SdkMessageRequestField

SdkMessageResponse

SdkMessageResponseField

SemiAnnualFiscalCalendar

Service

ServiceAppointment

ServiceContractContacts

ServiceEndpoint

SharePointData

SharePointDocument

SharePointDocumentLocation

SharePointSite

SimilarityRule

Site

SiteMap

SLA

SLAItem

SLAKPIInstance

SocialActivity

SocialInsightsConfiguration

SocialProfile

Solution

SolutionComponent

SQLEncryptionAudit

StatusMap

StringMap

Subject

Subscription

SubscriptionClients

SubscriptionManuallyTrackedObject

SubscriptionStatisticsOffline

SubscriptionStatisticsOutlook

SubscriptionSyncEntryOffline

SubscriptionSyncEntryOutlook

SubscriptionSyncInfo

SubscriptionTrackingDeletedObject

SyncAttributeMapping

SyncAttributeMappingProfile

SyncError

SystemApplicationMetadata

SystemForm

SystemUser

SystemUserBusinessUnitEntityMap

SystemUserLicenses

SystemUserManagerMap

SystemUserPrincipals

SystemUserProfiles

SystemUserRoles

SystemUserSyncMappingProfiles

T

Task

Team

TeamMembership

TeamProfiles

TeamRoles

TeamSyncAttributeMappingProfiles

TeamTemplate

Template

Territory

TextAnalyticsEntityMapping

Theme

TimeStampDateMapping

TimeZoneDefinition

TimeZoneLocalizedName

TimeZoneRule

Topic

TopicHistory

TopicModel

TopicModelConfiguration

TopicModelExecutionHistory

TraceAssociation

TraceLog

TraceRegarding

TransactionCurrency

TransformationMapping

TransformationParameterMapping

U

UnresolvedAddress

UoM

UoMSchedule

UserApplicationMetadata

UserEntityInstanceData

UserEntityUISettings

UserFiscalCalendar

UserForm

UserMapping

UserQuerUserQueryVisualization

UserSettings

W

WebResource

WebWizard

WizardAccessPrivilege

WizardPage

Workflow

WorkflowDependency

WorkflowLog

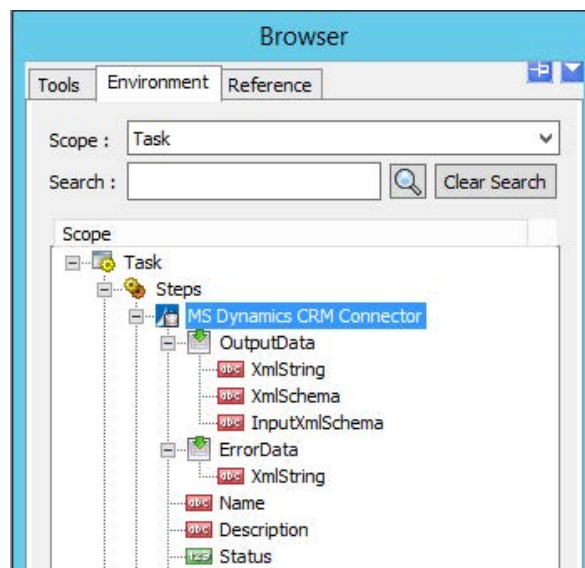
WorkflowWaitSubscription

Tool Output

The **Microsoft Dynamics CRM Connector** tool can output either a "success" or "error" XML document depending on whether the execution of the step at run time is successful or not.

Each of these XML documents can then be used within other BPA Platform tools, either as is or through a conversion to a BPA Platform recordset using the **Convert XML to Recordset** tool. In this case, the **Microsoft Dynamics CRM Connector** step is selected as the input data source by a subsequent step.

This can be beneficial if you wish to log the outcome of a call.



"Success" XML Document

Where successful, the output provides you with the response back from Dynamics CRM and displays the sum total of its processing, i.e. the structure of successful calls.

The object the tool interacted with and the exchange of data between the object fields will all be presented in an XML schema.

The structure of this schema is defined by the chosen mappings made within the **Mapping** tab of the tool — see [About the Mapping Tab](#).

"Error" XML Document

An error XML output is always produced when a call is unsuccessful, this may be generated internally by the **Microsoft Dynamics CRM Connector** tool or received by the tool from Dynamics CRM.

Any errors that occur are created as an **<ERROR>** node. Similar to a "success" document, it will be presented in an XML schema showing any attempted interaction with a chosen object.

Runtime

The incoming XML is translated into the XML format for the object and operation selected in the configuration. The data for the linked fields is brought across into the output XML — only those fields that were linked are brought across. The XML is passed to the connector tool, which then:

- ▶ Processes the data
- ▶ Performs the operation requested
- ▶ Sends back an XML document containing the response

The XML can then be used by other BPA Platform steps.

Error Handling

Errors are written to the BPA Platform Event Log (**Manage > Event Log**). You define how errors are handled in the **Options** tab of the **Microsoft Dynamics CRM Connector** tool.

Reasons for the errors could include:

- ▶ Web service connection errors
- ▶ User privilege errors
- ▶ Errors from the Microsoft Dynamics CRM API
- ▶ Warnings and messages from the Microsoft Dynamics CRM API

Microsoft Dynamics CRM Accounts Security

The Microsoft Dynamics CRM API is the only method used to connect to a Microsoft Dynamics CRM database, and perform read / write tasks — all security present in the API is used.

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