Informatica

Informatica® Cloud Data Integration

Microsoft Dynamics 365 for Sales Connector

Informatica Cloud Data Integration Microsoft Dynamics 365 for Sales Connector
January 2024

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Preface

Use *Microsoft Dynamics 365 for Sales Connector* to learn how to read from or write to Microsoft Dynamics 365 for Sales by using Cloud Data Integration. Learn to create a connection, develop mappings, and run synchronization and mapping tasks in Cloud Data Integration.

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The telephone numbers for Informatica Global Customer Support are available from the Informatica web site at https://www.informatica.com/services-and-training/support-services/contact-us.html.

CHAPTER 1

Introduction to Microsoft Dynamics 365 for Sales Connector

You can use Microsoft Dynamics 365 for Sales Connector to connect to Microsoft Dynamics 365 for Sales from Data Integration. You can connect to Microsoft Dynamics 365 for Sales deployed online or on-premises.

Use Microsoft Dynamics 365 for Sales Connector to securely read data from and write data to Microsoft Dynamics 365 for Sales. You can use Microsoft Dynamics 365 for Sales objects as sources, targets, and lookups in synchronization tasks, mappings, and mapping tasks.

You can switch mappings to advanced mode to include transformations and functions that enable advanced functionality.

When you run a task, the agent uses the OData API to read from or write data to Microsoft Dynamics 365 for Sales based on the operation you configure in the task.

Microsoft Dynamics 365 for Sales Connector assets

Create assets in Data Integration to integrate data using Microsoft Dynamics 365 for Sales Connector.

When you use Microsoft Dynamics 365 for Sales Connector, you can include the following Data Integration assets:

- Dynamic mapping task
- Data transfer task
- Mapping
- Mapping task

For more information about configuring assets and transformations, see *Mappings*, *Transformations*, and *Tasks* in the Data Integration documentation.

Rules and guidelines for Microsoft Dynamics 365 for Sales

Consider the following rules and guidelines when you use Microsoft Dynamics 365 for Sales source and target operations:

- If you use the data driven operation on a Microsoft Dynamics 365 for Sales target, the DD_UPDATE or DD_DELETE constraints do not work.
- If you run a delete operation on a Microsoft Dynamics 365 for Sales entity and the simple navigation field is mapped to the target field, the task fails.
- You cannot write to accountlist_association, contactlist_association, or leadlist_association attributes of the list entity.
- Microsoft Dynamics 365 for Sales Connector supports only the following DateTime format: `yyyy-mm-ddThh:mm:ssZ`. For example, 2016-12-31T00:00:00Z, where Z represents the UTC timezone.
- When you fetch a large number of records from Microsoft Dynamics 365 for Sales, set the JVM options for type DTM to increase the -Xms and -Xmx values in the system configuration details of the Secure Agent, and then restart the Secure Agent.
- You can set the JVM property `-DMSD_SALES_ADAPTER_LOG_LEVEL=ALL` to configure unique request IDs for all the requests so that they can be uniquely identified at the Microsoft Dynamics 365 for Sales server. The request ID is sent as a header with the request when you configure the JVM property.
- When you use the upsert operation, you can enter either a valid, unique guid or a null guid for the record to be inserted. Microsoft Dynamics 365 for Sales Connector first tries to update the record with the guid present in the target object. If the update operation fails, Microsoft Dynamics 365 for Sales Connector inserts the value into the record.
  - If you do not enter any value, Microsoft Dynamics 365 for Sales Connector does not update any value. Microsoft Dynamics 365 for Sales Connector creates an auto-generated guid and inserts this value into the record.
  - If you enter a unique, valid guid, which is not present in the target object, Microsoft Dynamics 365 for Sales Connector does not update the record. Microsoft Dynamics 365 for Sales Connector inserts the guid that you provided into the record.
- The input for Customer, Owner, and Lookup data types should be in the following format: `/LogicalCollectionName(guid)` or `LogicalCollectionName(guid)`
- You can use the `$LastRunTime` variable in a simple data filter for a source object.
- When you write data to Microsoft Dynamics 365 for Sales in batch mode, even if an error row does not contain a primary key or an alternate key, the Secure Agent writes the error row to the error file.
- When you use an in-out parameter of type datetime in the mapping to filter source data that contains date and time values, the mapping truncates the time part while writing the data to the target.

Rules and guidelines for FetchXML query and record name aliases

Consider the following rules and guidelines when you use FetchXML query and record name aliases in Microsoft Dynamics 365 for Sales sources and lookups:

- To configure a FetchXML query, you must select the source type as **Multiple Objects**. Then, select the **Add Sibling** option to add multiple objects. Depending upon the relationship name selected, the related object is shown up for the primary object in the **Add Sibling Object** window.
- The primary entity in the FetchXML query and the primary object in the source should be the same.

- Attributes should not have aliases in the FetchXML query.
- You must specify an alias map in the **Record Name Aliases** field. The map holds the alias names for each linked entity that is part of the FetchXML query. The map is required because the result dataset contains modified field names for the linked objects.
- If you use a single source object, the **Record Name Aliases** field is optional.
- The linked-entity name and alias specified in the **Record Name Aliases** field should be the same as in the FetchXML query.
- The mapped attributes in the field mapping must match the attributes mentioned in the FetchXML query. Otherwise, the non-matching attributes are ignored.
- There is a URL length limit on the FetchXML query. To fetch more elements, use `<all-attributes />` in the FetchXML query.
- You can configure the `$LastRuntime` and `$LastRunDate` parameters as part of the FetchXML query. Do not use quotes when you configure the parameters in the query.
- You can fully parameterize a maximum of 600 characters in the FetchXML query.
- To fetch all the records from Microsoft Dynamics 365 for Sales, enter the term `#INFA_PAGING#` in the FetchXML query.
  For example,

```
<fetch mapping="logical" #INFA_PAGING#>
<entity name="new_alldatatypes">
<attribute name="new_name"/>
<link-entity name="account" from="accountid" to="new_customer" alias="acc" >
<attribute name="name" />
</link-entity>
</entity>
</fetch>
```

- You cannot configure key range partitioning with FetchXML queries.

When you use Microsoft Dynamics 365 for Sales sources and caching-disabled lookups, you can configure a condition in the FetchXML query. In the FetchXML query, set the condition attribute to the value of the lookup field that you used in the lookup condition.

For example, if the lookup fields are `name`, `websiteurl`, and `emailaddress1`, as shown in the following image, the condition values are `#INFA_name#`, `#INFA_websiteurl#`, and `#INFA_emailaddress1#`.



The following FetchXML query shows the condition values `#INFA_name#`, `#INFA_websiteurl#`, and `#INFA_emailaddress1#` for the lookup fields `name`, `websiteurl`, and `emailaddress1`:

```
<fetch mapping="logical" #INFA_PAGING#>
    <entity name="account">
    <attribute name="name"></attribute><attribute name="websiteurl"></
attribute><attribute name="emailaddress1"></attribute>
    <filter type="and">
    <condition attribute="websiteurl" entityname="account" operator="eq"
```

```
value="#INFA_websiteurl#"></condition>
    <condition attribute="name" entityname="account" operator="eq" value="#INFA_name#"></
condition>
    <filter type="or">
    <condition attribute="emailaddress1" entityname="account" operator="eq"
value="#INFA_emailaddress1#">
    </condition><condition attribute="name" entityname="account" operator="eq"
value="#INFA_name#"></condition>
    </filter>
    </filter>
    </entity>
</fetch>
```

Rules and guidelines when you write to collection values

Collection-valued properties represent a collection of entities. The collection could represent either a one-to-many or a many-to-many relationship between the entities. The many-to-many relationship is handled through an entity known as intersect entity.

Consider the following rules and guidelines when you write to collections values in a Microsoft Dynamics 365 for Sales target:

- To update an association of the existing entities, choose the insert operation and map the primary key or alternate key of the entity and the collection value fields. For example, to associate an account with a lead, map the fields `accountid` and `accountleads_association`.
- To create a new record and add an association to it, choose the insert operation and map the data field and collection valued fields along with a key.
  For example, to insert an account and add an existing association to it, map the fields `name`, `emailaddress1`, `accountid`, and `accountleads_association`. You can insert null values to the `accountid` field because the value is retrieved from the Microsoft Dynamics CRM as a part of insert operation.

  You cannot create a new record and add an association to it in batch mode.
- To delete an existing association, select the delete operation and map the primary key or alternate key of the entity and the collection value fields.
- You can use one of the following formats when you use the collection valued property:

  - `https://xxx.dynamics.com/api/data/v9.0/LogicalCollectionName(guid)`
    For example, `https://informaticallc.api.crm8.dynamics.com/api/data/v9.0/leads(09fa2b1f-a419-e911-a969-000d3af06ac5)`
  - `https://xxx.dynamics.com/api/data/v9.0/leads(alternate_key_name=value)`
    For example, `https://informaticallc.api.crm8.dynamics.com/api/data/v9.0/leads(new_key=5)`
- If the alternate key field contains special characters, operations such as update, upsert, and detete do not work.

CHAPTER 2

Microsoft Dynamics 365 for Sales connections

Create a Microsoft Dynamics 365 for Sales connection to securely read data from and write data to Microsoft Dynamics 365 for Sales. You can use Microsoft Dynamics 365 for Sales connections to specify sources, lookups, or targets in synchronization tasks, mapping, and mapping tasks.

Create a connection and associate it with a synchronization task, mapping, or mapping task to read from or write to Microsoft Dynamics 365 for Sales.

Prepare for authentication

You can configure OAuth 2.0 password grant, OAuth 2.0 client certificate grant, and OAuth 2.0 client secret grant authentications to connect to Microsoft Dynamics 365 for Sales deployed online or on-premises.

Before you configure the connection properties, you need to keep the authentication details handy based on the authentication type that you want to use.

OAuth 2.0 password grant

You need the Microsoft Dynamics 365 for Sales user name and password to configure OAuth 2.0 password grant authentication to access Microsoft Dynamics 365 for Sales deployed online or on-premises. You additionally need the security token service URL to access the instance deployed on-premises.

To get these details, the organization administrator needs to register your on-premises Microsoft Dynamics 365 for Sales application with Azure Active Directory.

For more information about the registration steps with Azure Active Directory, see Register your application.

OAuth 2.0 client secret grant

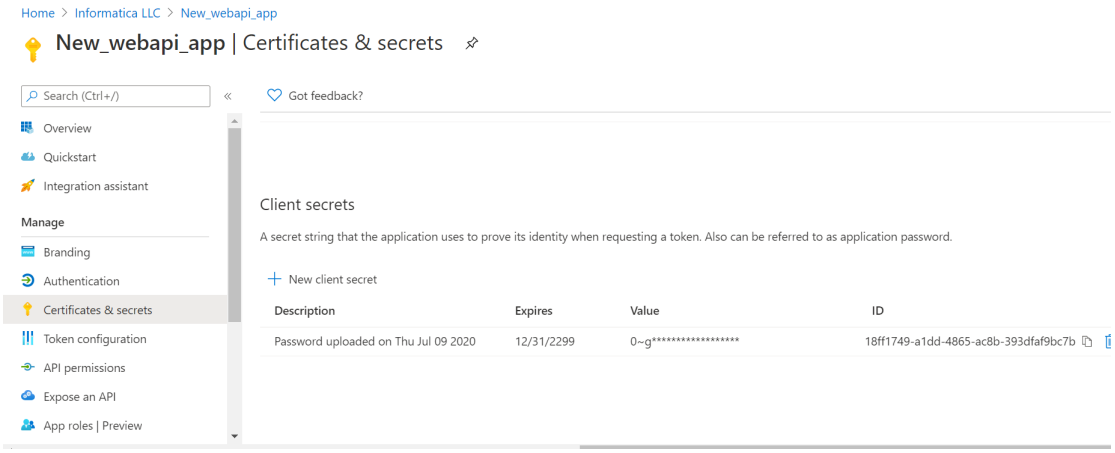
You need the client secret to use OAuth 2.0 client secret grant authentication to access Microsoft Dynamics 365 for Sales.

To get the client secret, you need to register your Microsoft Dynamics 365 for Sales web application and create a new application user for the registered application.

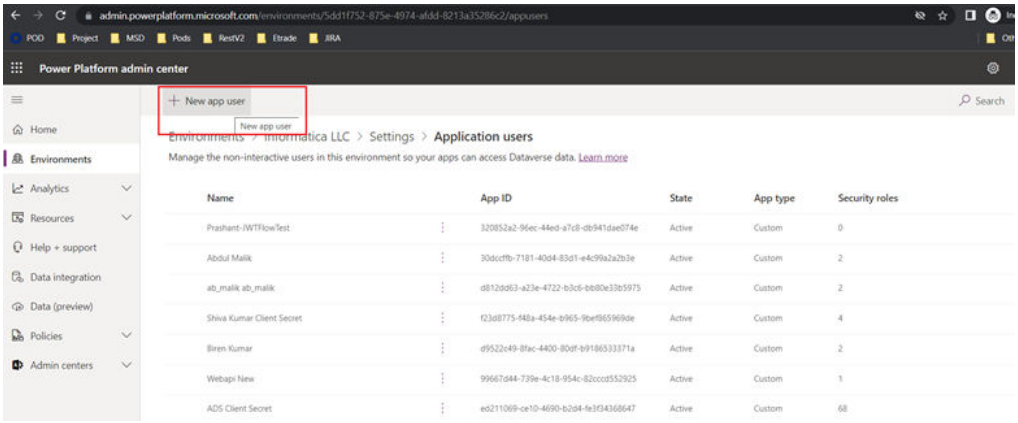
Perform the following tasks to create a new application user for the registered application.

1. Go to the Azure registered applications page in Azure Active Directory.

2. Select your application.

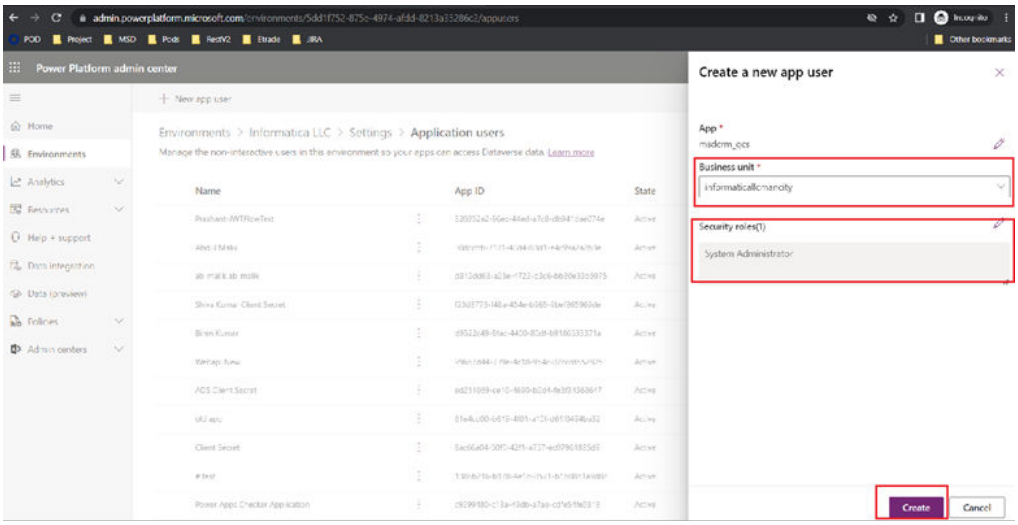


3. Click **New client secret** to generate a client secret.
4. Log in to https://admin.powerplatform.microsoft.com/ to create a new application user for the registered application.
5. Navigate to **Environments** and select the required environment.
6. In the **Settings** option for the environment, click **Users+permissions**.
7. Select the **Applications users** option.
8. Click **+New app user**.



A tab opens on the right requesting for App and User details.

9. Create a new application user and enter the details shown in the following image:



You can choose an App, a Business Unit, and Security role for the new application user.

10. Click **Create**.

Keep the generated application ID and client secret handy to use in a Microsoft Dynamics 365 for Sales connection.

OAuth 2.0 client certificate grant

You need a valid client certificate to use the client certificate grant authentication type.

To get the client certificate, register your Microsoft Dynamics 365 for Sales web application and create a new application user for the registered application.

From the command line, run the following commands from any machine and use the certificates in the Azure Active Directory application.

1. To create a public-private key pair, run the following command:
   ```
   keytool -genkey -alias <keypair_name1> -keyalg <key_algorithm> -validity <number_days> -keystore <path and file name of the generated certificate> -storetype <store_type> -keypass <key_password> -storepass <store_password>
   ```
   For example, `keytool -genkey -alias keyalias -keyalg RSA -validity 1825 -keystore "C:\Cdrive\Cloud\R27\MSDCRM_WebAPI\MSDCRM_WebAPI\certificate\iicsdummy.com\federated.jks" -storetype JKS -keypass keypassword -storepass changeit`
2. To import the root CA certificate(s) followed by the user's signed certificate to the keystore, run the following commands:
   a. `keytool -import -trustcacerts -alias <keypair_name2> -file <CA_certificate_name> -keystore <path and file name of the generated certificate>`
   `keytool -import -trustcacerts -alias <keypair_name2> -file <CA_certificate_name> -keystore <path and file name of the generated certificate>`

b. `keytool -import -trustcacerts -alias <keypair_name1> -file <user's_signed_certificate_name> -keystore <path and file name of the generated certificate>`

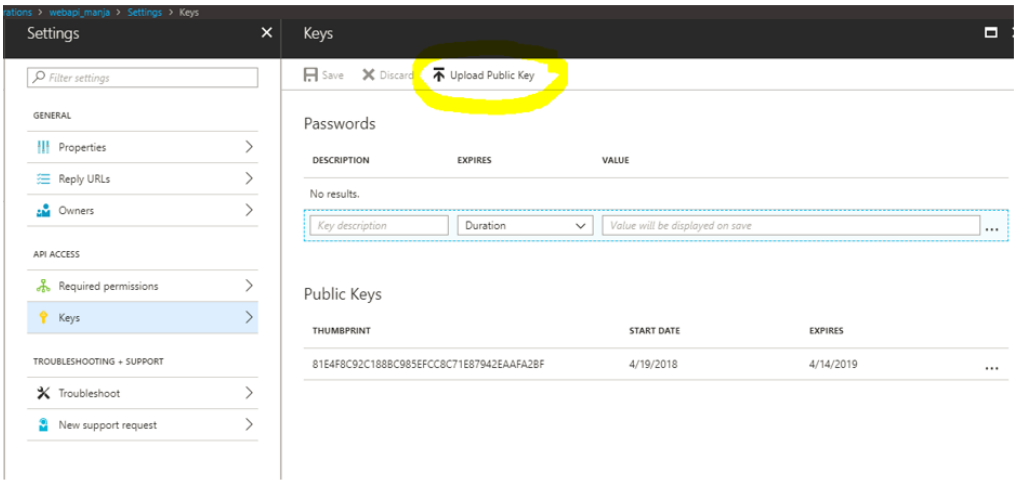
For example, `keytool -import -trustcacerts -alias keyalias -file b2024001944cdb12.crt -keystore "C:\Cdrive\Cloud\R27\MSDCRM_WebAPI\MSDCRM_WebAPI\certificate\iicsdummy.com\federated.jks"`

Note: These steps might vary depending on the types of files you receive from the CA. If you receive a single file with all the certificates, perform only step b. Do not perform these steps for self-signed certificates.

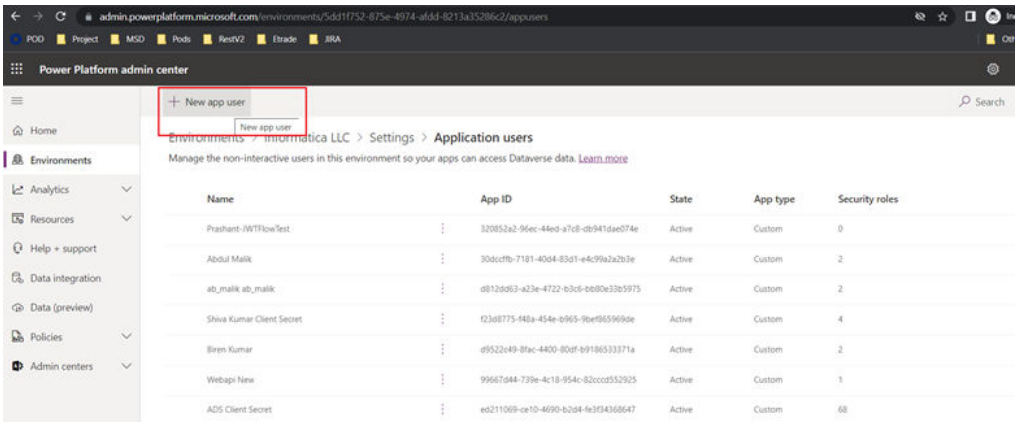
3. To export the certificate from the keystore, run the following command:
`keytool -export -alias <keypair_name1> -file <certificate_name> -keystore <path and file name of the generated certificate>`

For example, `keytool -export -alias keyalias -file keyalias.crt -keystore "C:\Cdrive\Cloud\R27\MSDCRM_WebAPI\MSDCRM_WebAPI\certificate\iicsdummy.com\federated.jks"`

4. Upload the certificate or public key under a new Web application.

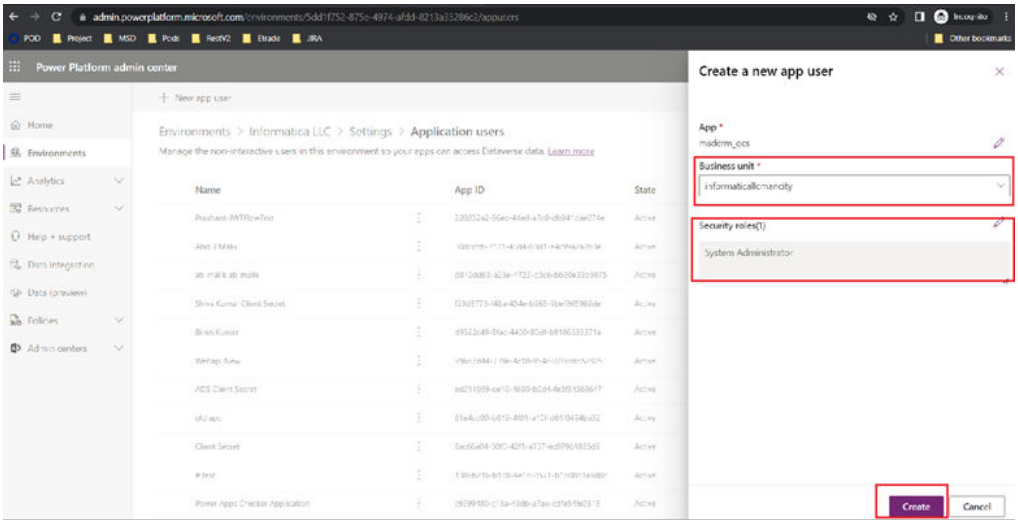


5. Log in to https://admin.powerplatform.microsoft.com/ to create a new application user for the registered application.
6. Navigate to **Environments** and select the required environment.
7. In the **Settings** option for the environment, click **Users+permissions**.
8. Select the **Applications users** option.
9. Click **+New app user**.



A tab opens on the right requesting for App and User details.

10. Create a new application user and enter the details shown in the following image:



You can choose an App, a Business Unit, and Security role for the new application user.

11. Click **Create**.

Keep the generated application ID, keystore file, keystore password, key alias, and key password handy to use in a Microsoft Dynamics 365 for Sales connection.

Connect to Microsoft Dynamics 365 for Sales

Let's configure the Microsoft Dynamics 365 for Sales connection properties to connect to Microsoft Dynamics 365 for Sales.

Before you begin

Before you get started, your organization administrator needs to register your Microsoft Dynamics 365 for Sales application deployed online or on-premises with Azure Active Directory.

You'll need to get information from your Microsoft Dynamics 365 for Sales and Azure Active Directory (AAD) account based on the authentication type that you want to configure to access Microsoft Dynamics 365 for Sales.

Check out "Prepare for authentication" on page 11 to learn more about the authentication prerequisites.

You can watch the following video to find the information you need from your Microsoft Dynamics 365 for Sales and Azure Active Directory (AAD) accounts for each of the authentication types:



Connection details

The following table describes the basic connection properties:

Property	Description
Connection Name	Name of the connection. Each connection name must be unique within the organization. Connection names can contain alphanumeric characters, spaces, and the following special characters: _ . + -, Maximum length is 255 characters.
Description	Description of the connection. Maximum length is 4000 characters.
Type	Microsoft Dynamics 365 for Sales
Runtime Environment	The name of the runtime environment where you want to run tasks. Select a Secure Agent, Hosted Agent, or serverless runtime environment. For more information about how to configure and use the serverless environment, see "Serverless runtime environment setup" in Runtime Environments in the Administrator help. If you want to use the Hosted Agent to access Microsoft Dynamics 365 for Sales, the connection must use OAuth 2.0 Password Grant authentication.

Authentication types

You can select the Microsoft Dynamics 365 for Sales server type as on-premise or online based on where your instance is deployed and the applicable authentication type in the Microsoft Dynamics 365 connection properties to access Microsoft Dynamics 365 for Sales from Data Integration.

Note: For enhanced security, consider using OAuth 2.0 Secret Grant or OAuth 2.0 Certificate Grant authentication type to establish a connection.

OAuth 2.0 password grant authentication

You can configure the OAuth 2.0 Password Grant authentication to connect to Microsoft Dynamics 365 for Sales deployed online or on-premises.

The following table describes the basic connection properties for OAuth 2.0 password grant authentication:

Property	Description
Web API url	The URL of the Microsoft Dynamics 365 for Sales endpoint.
Username	The user name to connect to the Microsoft Dynamics 365 for Sales account.
Password	The password to connect to the Microsoft Dynamics 365 for Sales account.
Application ID	The application ID for Microsoft Dynamics 365 for Sales registered in Azure Active Directory.
Server Type	The Microsoft Dynamics 365 for Sales server that you want to access. You can select the server type from the following list: - Microsoft Dynamics Online. Connects to Microsoft Dynamics 365 for Sales deployed online. - Microsoft Dynamics On-premise. Connects to Microsoft Dynamics 365 for Sales deployed on-premises.
Security Token Service URL	The Microsoft Dynamics 365 for Sales security token service URL. This URL is required when you access Microsoft Dynamics 365 for Sales on-premises. Specify the security token service URL in the following format: `https://sts1.<company>.com/adfs/oauth2/token`

OAuth 2.0 client secret grant authentication

You can configure OAuth 2.0 client secret grant authentication when you connect to Microsoft Dynamics 365 for Sales online.

The following table describes the basic connection properties for OAuth 2.0 client secret grant authentication:

Property	Description
Web API url	The URL of the Microsoft Dynamics 365 for Sales endpoint.
Application ID	The application ID for Microsoft Dynamics 365 for Sales registered in Azure Active Directory.
Tenant ID	The directory ID in Azure Active Directory.
Client Secret	The client secret key to connect to Microsoft Dynamics 365 for Sales account.
Server Type	The Microsoft Dynamics 365 for Sales server that you want to access. Select the Microsoft Dynamics Online server type to connect to Microsoft Dynamics 365 for Sales deployed online.

OAuth 2.0 client certificate grant authentication

You can configure OAuth 2.0 client certificate grant authentication to connect to Microsoft Dynamics 365 for Sales online.

The following table describes the basic connection properties for OAuth 2.0 client certificate grant authentication:

Property	Description
Web API url	The URL of the Microsoft Dynamics 365 for Sales endpoint.
Application ID	The application ID for Microsoft Dynamics 365 for Sales registered in Azure Active Directory.
Tenant ID	The directory ID in Azure Active Directory.
Keystore File	The location and the file name of the key store. This property doesn't apply if you use the Hosted Agent. For the serverless runtime environment, specify the following keystore file path in the serverless agent directory: For example: `/home/cldagnt/SystemAgent/serverless/configurations/ssl_store/<certificate file>`
Keystore Password	The password for the keystore file required for secure communication.
Key Alias	The alias name for the individual key in the keystore file.
Key Password	The password for the individual key in the keystore file used for enhanced secure communication. This property doesn't apply if you use the Hosted Agent.
Server Type	The Microsoft Dynamics 365 for Sales server that you want to access. Select the Microsoft Dynamics Online server type to connect to Microsoft Dynamics 365 for Sales deployed online.

Advanced settings

The following table describes the advanced connection properties:

Property	Description
Retry Error Codes	HTTP error codes for temporary issues or failures in network requests or operations for which the Microsoft Dynamics 365 for Sales connection attempts retries. You can enter HTTP error codes, each separated by a comma.
Retry Count	The total number of retries to get the response from the Microsoft Dynamics 365 for Sales endpoint, determined by the retry interval you specify. Default is 5.
Retry Interval	The wait time in seconds to wait before the Microsoft Dynamics 365 for Sales connection makes another attempt to receive a response. Default is 60 seconds.

Configure the serverless runtime environment

You can choose to use the serverless runtime environment when you connect to Microsoft Dynamics 365 for Sales.

For more information about how to configure and use the serverless environment, see "Serverless runtime environment setup" in Runtime Environments in the Administrator help.

When you use the serverless runtime environment, you cannot use a proxy server to connect to Informatica Intelligent Cloud Services.

To use the serverless runtime environment with client certificate grant authentication, you require the client certificates in the serverless runtime location.

Perform the following tasks to configure a serverless runtime environment to use with client certificate grant authentication:

1. Create the following structure for the serverless agent configuration in AWS: `<Supplementary file location>/serverless_agent_config`
2. Add the certificates in the Amazon S3 bucket in the following location in your AWS account: `<Supplementary file location>/serverless_agent_config/SSL`
3. Copy the following code snippet to a text editor:

```
version: 1
agent:
  agentAutoApply:
    general:
      sslStore:
        - fileCopy:
            sourcePath: SSL/<certificate_file_name>
```

   where the source path is the directory path of the certificate files in AWS.
4. Ensure that the syntax and indentations are valid, and then save the file as `serverlessUserAgentConfig.yml` in the following AWS location: `<Supplementary file location>/serverless_agent_config`
   When the .yml file runs, the SSL certificates are copied from the AWS location to the serverless agent directory.
5. In the Microsoft Dynamics 365 for Sales connection properties, specify the following certificate path in the serverless agent directory in the **Trust Store** and **Key Store** fields: `/home/cldagnt/SystemAgent/serverless/configurations/ssl_store/<cert.p12>`

Troubleshooting a Microsoft Dynamics 365 for Sales connection

If the test connection takes a long time, ensure that the vocabularies.odata.org and login.microsoftonline.com domains have access in the network firewall of the agent server and then retest the connection.

For more information, you can see Domain access in firewall Knowledge base article.

CHAPTER 3

Synchronization tasks with Microsoft Dynamics 365 for Sales Connector

Use the Synchronization task to synchronize data between a source and target.

You can configure a synchronization task using the Synchronization Task wizard.

When you create a task, you can associate it with a schedule to run it at specified times or on regular intervals. Or, you can run it manually. You can monitor tasks that are currently running in the activity monitor and view logs about completed tasks in the activity log.

Microsoft Dynamics 365 for Sales sources in synchronization tasks

You can use a Microsoft Dynamics 365 for Sales object as a single source in a synchronization task. You can configure the Microsoft Dynamics 365 for Sales source properties on the **Source** page of the Synchronization Task Wizard.

The following table describes the Microsoft Dynamics 365 for Sales source properties:

Property	Description
Connection	The source connection for the task.
Source Type	Type of the source object. Select **Single** to read data from a single source or **Multiple** to read data from multiple sources.
Source Object	The source object for the task. Select the source object for a single source.
Display technical names instead of labels	Displays technical names instead of business names.
Display source fields in alphabetical order	Displays source fields in alphabetical order instead of the order returned by the source system.

You can configure the advanced source properties on the **Schedule** page of the Synchronization Task Wizard.

The following table describes the Microsoft Dynamics 365 for Sales advanced source properties:

Advanced Property	Description
Row Limit	The maximum number of rows that the Secure Agent processes. Specify a number to process a specific number of rows.
Page Size	Size of the page set to retrieve the maximum number of entries for each page. Default value is 100.
FetchXML Query	The native Microsoft query format to read data from Microsoft Dynamics 365 for Sales. Enter the FetchXML query defined in Microsoft Dynamics 365 for Sales. You can use one or any combination of paging, filter, sort, and join operations in the FetchXML query. If you do not add a FetchXML query for multiple sources, an implicit join will take place and the primary object and sibling object relationship will be used. The implicit join is used, by default.
Record Name Aliases	The map that holds the alias names for each linked entity that is part of the FetchXML query. Enter the record name aliases as a name-value pair. Use the following format: {"<EntityName1>" : "<EntityAlias1>","<EntityName2>" : "<EntityAlias2>"} For example, {"lead":"lead","contact":"con"}
Read Picklist Values	Reads string values for picklist fields. By default, the check box is not selected.

Microsoft Dynamics 365 for Sales targets in synchronization tasks

You can use a single object as a target in a synchronization task. You can configure Microsoft Dynamics CRM target properties on the **Target** page of the Synchronization Task Wizard. When the source is partitioned and you write data to Microsoft Dynamics CRM, the Secure Agent uses the pass-through partitioning.

The following table describes the Microsoft Dynamics CRM target properties:

Property	Description
Connection	Name of the target connection.
Target Object	Name of the target object.
Display technical names instead of labels	Displays technical names instead of business names.
Display target fields in alphabetical order	Displays target fields in alphabetical order instead of the order returned by the source system.

When you configure a synchronization task to use a Microsoft Dynamics CRM target, you can configure advanced target properties. Advanced target properties appear on the **Schedule** page of the Synchronization Task Wizard.

The following table describes the Microsoft Dynamics CRM advanced target properties:

Advanced Property	Description
Ignore Null Values	If you select the check box, the update operation ignores the null value for the column. By default, the **Ignore Null Values** check box is not selected, and the update operation updates the column with the null value.
Alternate Key Name	Specifies the name of the key created in Microsoft Dynamics 365 for Sales. You can use alternate key in update, delete, and upsert operations. Alternate key contains one or more fields. Map all the fields or attributes that are part of the alternate key. If you map both primary key and alternate key attributes in a mapping, the primary key takes precedence over the alternate key.
Write Picklist Values	Writes string values for picklist fields. By default, the check box is not selected.
Write to Collection Values	Writes to the collection valued fields of the entity. You can use insert operation to add an association. You can use delete operation to delete an association. By default, the check box is not selected.
Run as Batch	Writes records in batch mode during data load. In batch mode, you can write multiple records in a batch. By default, the **Run as Batch** check box is not selected and the Secure Agent does not write records in batch mode.
Batch size	Determines the maximum number of records that the Secure Agent can write in a batch. The default value is 10. The maximum value is 1000.
Transactional Write	Writes each record in a single transaction. The transactional write mode supports the following operations: - Insert. - Update/Upsert. - Delete. By default, the **Transactional Write** check box is not selected.
Batch Retry	Indicates whether the Secure Agent must attempt connection retries in the event of a connection failure while writing data in batch mode. By default, the **Batch Retry** check box is not selected.
Batch Error File Path	The location and file name where the Secure Agent stores the error log. Applicable only if the **Run as Batch** check box is selected.
Success File Directory	Not applicable.
Error File Directory	Not applicable.

Microsoft Dynamics 365 for Sales lookups in synchronization tasks

You can create lookups for objects in a Microsoft Dynamics 365 for Sales connection. You can retrieve data from a Microsoft Dynamics 365 for Sales lookup object based on the specified lookup condition.

When you configure a lookup in Microsoft Dynamics 365 for Sales, you select the lookup connection and lookup object. You also define the behavior when a lookup condition returns more than one match.

The following table describes the Microsoft Dynamics 365 for Sales lookup object properties that you can configure in a Lookup transformation in synchronization tasks:

Property	Description
Lookup Connection	Name of the lookup connection.
Lookup Object	Name of the lookup object for the synchronization task.
Row Limit	The maximum number of rows that the Secure Agent processes. Specify a number to process a specific number of rows.
Page Size	Size of the page set to retrieve the maximum number of entries for each page. Default value is 100.
Display technical names instead of labels	Displays technical names instead of business names.
Display fields in alphabetical order	Displays lookup fields in alphabetical order instead of the order returned by the source system.
Lookup Fields	The fields used to define the lookup condition. Select **Source Fields** and **Lookup Fields**. The synchronization task compares the value of the source field against the lookup field, and then returns a value based on the match. You can define multiple conditions in a lookup. If you define more than one lookup condition, all lookup conditions must be true to find the match.

Note: A Lookup transformation in a synchronization task is uncached.

The following table describes the lookup return value properties that you can configure:

Lookup Return Value Property	Description
Output Field	The field from the lookup table that you want to use.
Multiplicity	Defines how the synchronization task handles multiple return values. Select one of the following values: - Error, if more than one output value. Select if the synchronization task should display an error when the lookup condition returns multiple values. The synchronization task rejects rows when multiple matches are found, writing them to the error rows file. This is the default. - Randomly pick one output value. Select if the synchronization task should choose the first returned value when a lookup condition returns multiple values. Different systems might use different orders to return lookup values. **Note:** When you select **Randomly pick one output value** and more than 20 records match the lookup condition, an error appears and the Secure Agent does not write any records to the next transformation.
Expression	A simple expression that uses $OutputField to represent the selected output field. By default, synchronization tasks pass the lookup return value without alteration with the following expression: `$OutputField`

CHAPTER 4

Mappings and mapping tasks with Microsoft Dynamics 365 for Sales Connector

Use the Data Integration Mapping Designer to create a mapping. In advanced mode, the Mapping Designer updates the mapping canvas to include transformations and functions that enable advanced functionality.

Microsoft Dynamics 365 for Sales sources in mappings

In a mapping, you can configure a Source transformation to represent a Microsoft Dynamics 365 for Sales source.

The following table describes the Microsoft Dynamics 365 for Sales source properties that you can configure in a Source transformation:

Property	Description
Connection	Name of the source connection.
Source Type	Type of the source object. Select Single Object, Multiple Object or Parameter.
Object	Name of the source object for the mapping.
Filter	Filter value in a read operation. You can add conditions to filter records and reduce the number of rows that the Secure Agent reads from the source.
Sort	Sorts records based on the conditions you specify. Click Configure to add conditions to sort records and reduce the number of rows that the Secure Agent reads from the source.

The following table describes the Microsoft Dynamics 365 for Sales advanced properties that you can configure in a Source transformation:

Property	Description
Row Limit	The maximum number of rows that the agent processes. Specify a number to process a specific number of rows.
Page Size	Size of the page set to retrieve the maximum number of entries for each page. Default is 100.
Tracing Level	Amount of detail that appears in the log for this transformation. You can choose terse, normal, verbose initialization, or verbose data. Default is normal.
FetchXML Query	The native Microsoft query format to read data from Microsoft Dynamics 365 for Sales. Enter the FetchXML query defined in Microsoft Dynamics 365 for Sales. You can use one or any combination of paging, filter, sort, and join operations in the FetchXML query. If you do not add a FetchXML query for multiple sources, an implicit join will take place and the primary object and sibling object relationship will be used. The implicit join is used, by default.
Record Name Aliases	The map that holds the alias names for each linked entity that is part of the FetchXML query. Enter the record name aliases as a name-value pair. Use the following format: {"<EntityName1>" : "<EntityAlias1>","<EntityName2>" : "<EntityAlias2>"} For example, {"lead":"lead","contact":"con"}
Read Picklist Values	Reads string values for picklist fields. By default, the check box is not selected.

Key range partitioning

You can configure key range partitioning when you use a mapping task to read data from Microsoft Dynamics 365 for Sales sources. With key range partitioning, the Secure Agent distributes rows of source data based on the fields that you define as partition keys. The Secure Agent compares the field value to the range values for each partition and sends rows to the appropriate partitions.

Use key range partitioning for columns that have an even distribution of data values. Otherwise, the partitions might have unequal size. For example, a column might have 10 rows between key values 1 and 1000 and the column might have 999 rows between key values 1001 and 2000. If the mapping includes multiple sources, use the same number of key ranges for each source.

When you define key range partitioning for a column, the Secure Agent reads the rows that are within the specified partition range. For example, if you configure two partitions for a column with the ranges as 10

through 20 and 30 through 40, the Secure Agent does not read the rows 20 through 30 because these rows are not within the specified partition range.

You can configure a partition key for fields of the following data types:

- String
- Any type of number data type. However, you cannot use decimals in key range values.
- Date/time type. Use the following format: MM/DD/YYYY HH24:MI:SS

You cannot use key range partitions when a mapping includes any of the following transformations:

- Web Services
- XML to Relational

Configuring key range partitioning

Perform the following steps to configure key range partitioning for Microsoft Dynamics 365 for Sales sources:

1. In the Source Properties, click the **Partitions** tab.
2. In the **Partition Key** field, select the required partition key from the list.
3. In the **Key Ranges** section, click **Add New Key Range** to define the number of partitions and the key ranges based on which the Secure Agent must partition data.

   Use a blank value for the start range to indicate the minimum value. Use a blank value for the end range to indicate the maximum value.

Microsoft Dynamics 365 for Sales targets in mappings

In a mapping, you can configure a Target transformation to represent a single Microsoft Dynamics CRM target or Microsoft Dynamics CRM parameter. When the source is partitioned and you write data to Microsoft Dynamics CRM, the Secure Agent uses the pass-through partitioning.

The following table describes the Microsoft Dynamics CRM target properties:

Property	Description
Connection	Name of the target connection.
Target Type	Type of the target object. Select **Single Object** or **Parameter**.
Object	Name of the target object for the mapping.
Operation	Target operation. Select **Insert, Update, Upsert**, or **Delete**.

The following table describes the Microsoft Dynamics CRM advanced target properties that you can configure in a Target transformation:

Advanced Property	Description
Ignore Null Values	If you select the check box, the update operation ignores the null value for the column. By default, the **Ignore Null Values** check box is not selected, and the update operation updates the column with the null value.
Alternate Key Name	Specifies the name of the key created in Microsoft Dynamics 365 for Sales. You can use alternate key in update, delete, and upsert operations. Alternate key contains one or more fields. Map all the fields or attributes that are part of the alternate key. If you map both primary key and alternate key attributes in a mapping, the primary key takes precedence over the alternate key.
Write Picklist Values	Writes string values for picklist fields. By default, the check box is not selected.
Write to Collection Values	Writes to the collection valued fields of the entity. You can use insert operation to add an association. You can use delete operation to delete an association. By default, the check box is not selected.
Run as Batch	Writes records in batch mode during data load. In batch mode, you can write multiple records in a batch. By default, the **Run as Batch** check box is not selected and the Secure Agent does not write records in batch mode.
Batch size	Maximum number of records that the Secure Agent can write in a batch. The default value is 10. The maximum value is 1000.
Transactional Write	Writes each record in a single transaction. The transactional write mode supports the following operations: - Insert. - Update/Upsert. - Delete. By default, the **Transactional Write** check box is not selected.
Batch Retry	Indicates whether the Secure Agent must attempt connection retries in the event of a connection failure while writing data in batch mode. By default, the **Batch Retry** check box is not selected.
Batch Error File Path	The location and file name where the Secure Agent stores the error log. Applicable only if the **Run as Batch** check box is selected.
Success File Directory	Not applicable.
Error File Directory	Not applicable.
Forward Rejected Rows	Not applicable.

Microsoft Dynamics 365 for Sales lookups in mappings

You can create lookups for objects in a Microsoft Dynamics 365 for Sales connection. You can retrieve data from a Microsoft Dynamics 365 for Sales lookup object based on the specified lookup condition.

When you configure a lookup in Microsoft Dynamics 365 for Sales, you select the lookup connection and lookup object. You also define the behavior when a lookup condition returns more than one match.

The following table describes the Microsoft Dynamics 365 for Sales lookup object properties that you can configure in a Lookup transformation:

Property	Description
Connection	Name of the lookup connection.
Source Type	Type of the source object. Select **Single Object**.
Lookup Object	Name of the lookup object for the mapping.
Multiple Matches	Behavior when the lookup condition returns multiple matches. Select **Return any row**, **Return all rows**, or **Report error**.
Filter	Not applicable.
Sort	Not applicable.

The following table describes the Microsoft Dynamics 365 for Sales lookup object advanced properties that you can configure in a Lookup transformation in mappings:

Advanced Property	Description
Row Limit	The maximum number of rows that the Secure Agent processes. Specify a number to process a specific number of rows.
Page Size	Size of the page set to retrieve the maximum number of entries for each page. Default value is 100.
FetchXML Query	The native Microsoft query format to read data from Microsoft Dynamics 365 for Sales. Enter the FetchXML query defined in Microsoft Dynamics 365 for Sales. You can use one or any combination of paging, filter, sort, and join operations in the FetchXML query.
Record Name Aliases	Not applicable.

The following table describes the advanced properties for Lookup transformations in mappings:

Property	Description
Tracing Level	Determines the detail level of error and status messages written to the Activity Log. You can choose terse, normal, verbose initialization, or verbose data. Default is normal.
Lookup Caching Enabled	Determines whether to cache lookup data during the runtime session. When you enable caching, the Data Integration Server queries the lookup source once and caches the values for use during the session. Caching the lookup values can improve session performance. When you disable caching, each time a row passes into the transformation. Default is enabled.
Lookup cache directory name	Specifies the directory to store cached lookup data when you select Lookup Caching Enabled. The directory name can be an environment variable.
Lookup Data Cache Size	Sets the maximum size that the Secure Agent allocates to the data cache in memory. Select Auto to determine the cache size at runtime. Select Value to specify a maximum amount of memory to allocate to the cache. If the server cannot allocate the specified maximum amount when the session is initialized, the session fails. When the cached data is more than the available memory, it is paged to disk. Default is Auto.
Lookup Index Cache Size	Sets the maximum size the agent allocates to the index cache in memory. Select Auto to determine the cache size at runtime. Select Value to specify a maximum amount of memory to allocate to the cache. If the server cannot allocate the specified maximum amount when the session is initialized, the session fails. When the cached data is more than the available memory, it is paged to disk. Default is Auto. Default is Auto.
Null ordering	Determines how the null values are ordered. You can choose to sort null values high or low. By default, null values are sorted high. This overrides configuration to treat nulls in comparison operators as high, low, or null.
Sorted Input	Indicates whether or not the lookup file data is in sorted order. This increases lookup performance for file lookups. If you enable sorted input and the condition columns are not grouped, the session fails. If the condition columns are grouped but not sorted, the lookup is processed as if you did not configure sorted input.
Pre-build Lookup Cache	Specifies to build the lookup cache before the Lookup transformation receives data. Multiple lookup cache files can be built at the same time to improve performance.
Optional	Determines whether the transformation is optional. If a transformation is optional and there are no incoming fields, the task can run and the data can go through another branch in the data flow. If a transformation is required and there are no incoming fields, the task fails. For example, you might configure a parameter for the source connection. In one branch of the data flow, you add a Lookup transformation with a field rule so that only Date/Time data enters the transformation. You specify that the Lookup transformation is optional. When you configure the mapping task, you select a source that does not have Date/Time data. The mapping task ignores the branch with the Lookup transformation, and the data flow continues through another branch of the mapping.

Troubleshooting a session to set the logging level

The session log does not print a verbose message when you write data to a Microsoft Dynamics 365 for Sales target

When you run a Microsoft Dynamics 365 for Sales mapping, the Secure Agent does not print log messages for every row that you write to the target. Also, when you run mappings from the earlier release, some of the log messages that appeared previously might be missing.

If you want to get the log statements for every row that you write to the target, perform the following tasks to set the LOGLEVEL property for the Data Integration Service to INFO.

1. In Administrator, select **Runtime Environments**.
2. Select the Secure Agent for which you want to increase memory from the list of available Secure Agents.
3. On the upper-right corner of the page, click **Edit**.
4. In the **Custom Configuration Details** section, select the **Type** as **DTM** for the Data Integration Server.
5. Add the **LOGLEVEL** property and set the value to **INFO**.
6. Restart the Secure Agent.

CHAPTER 5

Data type reference

Data Integration uses the following data types in Microsoft Dynamics 365 for Sales mappings ,synchronization, and mapping tasks:

- Microsoft Dynamics 365 for Sales native data types appear in the source and target transformations when you choose to edit metadata for the fields.
- Transformation data types. Set of data types that appear in the transformations. These are internal data types based on ANSI SQL-92 generic data types, which the Secure Agent uses to move data across platforms. They appear in all transformations in a mapping.

When the Secure Agent reads source data, it converts the native data types to the comparable transformation data types before transforming the data. When the Secure Agent writes to a target, it converts the transformation data types to the comparable native data types.

Microsoft Dynamics 365 for Sales and transformation data types

The following table lists the Microsoft Dynamics 365 for Sales data types that Data Integration supports and the corresponding transformation data types:

Microsoft Dynamics 365 for Sales Data Type	Microsoft Dynamics 365 Web API Specific DataType	Range and Description	Transformation Data Type
Bigint	Int64	You can specify the maximum and minimum values between 922, 337, 203, 685, 477 and 922, 337, 203, 685, 477.	Bigint
Boolean	Boolean	You can specify the text for both options. When added to a form, the field properties control whether the attribute is displayed as two radio buttons, a check box, or a list. Input must be True or False.	String

Microsoft Dynamics 365 for Sales Data Type	Microsoft Dynamics 365 Web API Specific DataType	Range and Description	Transformation Data Type
Customer	String	Customer attribute represents a type of lookup where either an account or contact is a valid type of record. Input must be in the following format: `/LogicalCollectionName(guid)` or `LogicalCollectionName(guid)` For example, `/accounts(4fca93d7-b73d-e011-b010-005056a8019b)` or `accounts(4fca93d7-b73d-e011-b010-005056a8019b)` The source field uses the following naming convention: `_<name>_value`, where `<name>` matches the name of the Customer data type. For example, `_customerid_value` The target field uses the following naming convention: `<name>_<reference>`, where `<reference>` is an entity that has a relationship with the object. For example, `customerid_account` **Note:** A field name starting with an underscore character (_), for example `_customerid_value`, also appears under the target object. However, you cannot write the field to the target object. For more information about the naming convention, refer to the following URL: https://msdn.microsoft.com/en-in/library/mt607990.aspx#bkmk_properties To use an alternate key, input must be in the following format: `\LogicalCollectionName(<field1name>=value,<field2name>=value,...)`, where field name is the alternate key defined in the LogicalCollectionName.	String
DateTime	DateTimeOffset	Date and time values. All DateTime values in the Microsoft Dynamics 365 for Sales connector gets converted to UTC standard time. The minimum value is 1900-01-01T00:00:00.000Z. The maximum value is 9999-12-30T23:59:59Z.	Date/Time
Decimal	Decimal	You can specify the level of precision up to ten decimal places and the minimum and maximum values from -1,000,000,000 to 1,000,000,000.	Decimal
Double	Double	A decimal attribute. You can specify the level of precision up to five decimal places and the minimum and maximum values from -1,000,000,000 to 1,000,000,000.	Double
EntityName	String	The entity attribute represents the logical name of an entity. You cannot write the EntityName data type.	String
Integer	Int32	Integer values. You can specify the maximum and minimum values from -2,147,483,648 to 2,147,483,647.	Integer

Microsoft Dynamics 365 for Sales Data Type	Microsoft Dynamics 365 Web API Specific DataType	Range and Description	Transformation Data Type

Lookup	String	The lookup attribute represents the relationship attribute on the related entity. The valid type for the lookup is established in the relationship. Input must be in the following format:
		`/LogicalCollectionName(guid)` or `LogicalCollectionName(guid)`
		For example, `/accounts(4fca93d7-b73d-e011-b010-005056a8019b)` or `accounts(4fca93d7-b73d-e011-b010-005056a8019b)`
		The source field uses the following naming convention:
		`_<name>_value`, where `<name>` matches the name of the Lookup data type.
		For example, `_lookupid_value`
		The target field uses the following naming convention:
		`<name>`
		For example, `lookupid`
		Note: A field name starting with an underscore character (_), for example `_lookupid_value`, also appears under the target object. However, you cannot write the field to the target object.
		For more information about the naming convention, refer to the following URL:
		https://msdn.microsoft.com/en-in/library/mt607990.aspx#bkmk_properties
		To use an alternate key, input must be in the following format:
		`\LogicalCollectionName(<field1name>=value,<field2name>=value,...)`, where field name is the alternate key defined in the LogicalCollectionName.
			String

Memo	String	The memo attribute represents a multiline text box.	String
Money	Decimal	You can specify the maximum and minimum values between -922,337,203,685,477 and 922,337,203,685,477. You can set the precision as one, two, or three.	Decimal

Microsoft Dynamics 365 for Sales Data Type	Microsoft Dynamics 365 Web API Specific DataType	Range and Description	Transformation Data Type

Owner	String	The owner attribute represents the relationship attribute on the related entity. The valid type for the owner is established in the relationship. Input must be in the following format:
		`/LogicalCollectionName(guid)` or `LogicalCollectionName(guid)`
		For example, `/accounts(4fca93d7-b73d-e011-b010-005056a8019b)` or `accounts(4fca93d7-b73d-e011-b010-005056a8019b)`
		The source field uses the following naming convention:
		`_<name>_value`, where `<name>` matches the name of the Owner data type.
		For example, `_ownerid_value`
		The target field uses the following naming convention:
		`<name>`
		For example, `ownerid`
		Note: A field name starting with an underscore character (_), for example `_ownerid_value`, also appears under the target object. However, you cannot write the field to the target object.
		For more information about the naming convention, refer to the following URL:
		https://msdn.microsoft.com/en-in/library/mt607990.aspx#bkmk_properties
		To use an alternate key, input must be in the following format:
		`\LogicalCollectionName(<field1name>=value,<field2name>=value,...)`, where field name is the alternate key defined in the LogicalCollectionName.
			String

Picklist	Int32	The picklist attribute provides a set of options that are displayed in a list. You can create the picklist attribute so that it contains its own options or uses a set of global options. Data Integration adds a new picklist attribute with the suffix _value for each picklist field. An option value of a picklist is an integer that corresponds to the option description. For information on values and description for the default entities, see the Microsoft Dynamics CRM documentation. For example, for an AccountRole picklist, to set the picklist value to Decision Maker, the option value is 1.	Integer
State	Int32	The state attribute is automatically created when you create an entity. The state attribute internally represents the status of the entity. A value of a state is an integer that corresponds to the state description. You can find the state values and description for the default entities in the Microsoft Dynamics CRM documentation. For example, to set the state as Open, the value is 0 for the Activity entity.	Integer

Microsoft Dynamics 365 for Sales Data Type	Microsoft Dynamics 365 Web API Specific DataType	Range and Description	Transformation Data Type
Status	Int32	The status attribute is automatically created when you create an entity. Each of the options must be associated with the state attribute for the entity. The status attribute displays the value of state to the end user. A value of a status is an integer that corresponds to the status description. You can find the status values and description for the default entities in the Microsoft Dynamics CRM documentation. For example, to set the status as Active, the value is 1 for the Account entity.	Integer
String	String	The string attribute represents a single line of text.	String
UniqueIdentifier	Guid	UniqueIdentifier represents an attribute that is the guid of another entity instance. UniqueIdentifier must be in the guid format. For example, `4fca93d7-b73d-e011-b010-005056a8019b`	String

Finding the LogicalCollectionName

To find the LogicalCollectionName for Lookup, Customer, and Owner data types, perform the following steps:

1. Log in to the Microsoft Dynamics 365 Sales instance.
2. Install the Entity Metadata Browser solution. To install the Entity Metadata Browser solution, perform the steps given in the following URL:

   `https://msdn.microsoft.com/en-us/library/hh547411.aspx`
3. Click **Settings** > **Solutions**. Select **MetadataBrowser**.

   The **Metadata Browser Tool** window opens.
4. Click **Open Metadata Browser**.
5. In the **Metadata Browser** window, under `Schema Name`, select the required entity.
6. Under `Property`, select the corresponding value of LogicalCollectionName.

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