



MICROSOFT DYNAMICS 365 FOR FINANCE AND OPERATIONS INTERFACE

INSTALLATION DOCUMENTATION

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CONTENTS

MS DYNAMICS 365 FOR FINANCE AND OPERATION INTERFACE.....	2
0 Revision log.....	2
1 Purpose.....	3
1.1 Purpose.....	3
1.2 Scope of the interface.....	3
1.3 Interface technology.....	4
2 Prerequisites.....	5
2.1 General prerequisites	5
2.2 Prerequisites in D365FO	5
2.2.1 Setup the 365 FO integration user account.....	5
2.3 Prerequisites in regard of ProMark.....	9
2.3.1 Installing the <i>BaltimoreCyberTrustRoot</i> certificate.	9
3 Customization of ProMark.....	10
3.1 Setting up the host module manually.....	11
3.1.1 Creating the host for the D365FO interface.....	11
3.1.2 Creating the transaction types for the D365FO host.....	13
3.2 Setting up the host scheduler	15
3.3 Starting the host.....	16
4 FAQ.....	16
4.1 Error code 10060: unknown network error (9318).....	16
4.2 Error code -54: unable to get local issuer certificate: for <i>CERTALIAS</i>	16

MICROSOFT DYNAMICS 365 FOR FINANCE AND OPERATIONS INTERFACE

0 REVISION LOG

Version	Date	By	Remarks
1.00.00	6/1-2020	RAST	Document created
1.01.00	18/9-2020	RAST	Updated screenshots and documented SSL certificate issue when using a proxy
1.02.00	20/11-2020	RAST	Support for host formulas in filter field
1.03	18-11-2022	MOJ	Added details on Azure AD app registration and permissions

1 PURPOSE

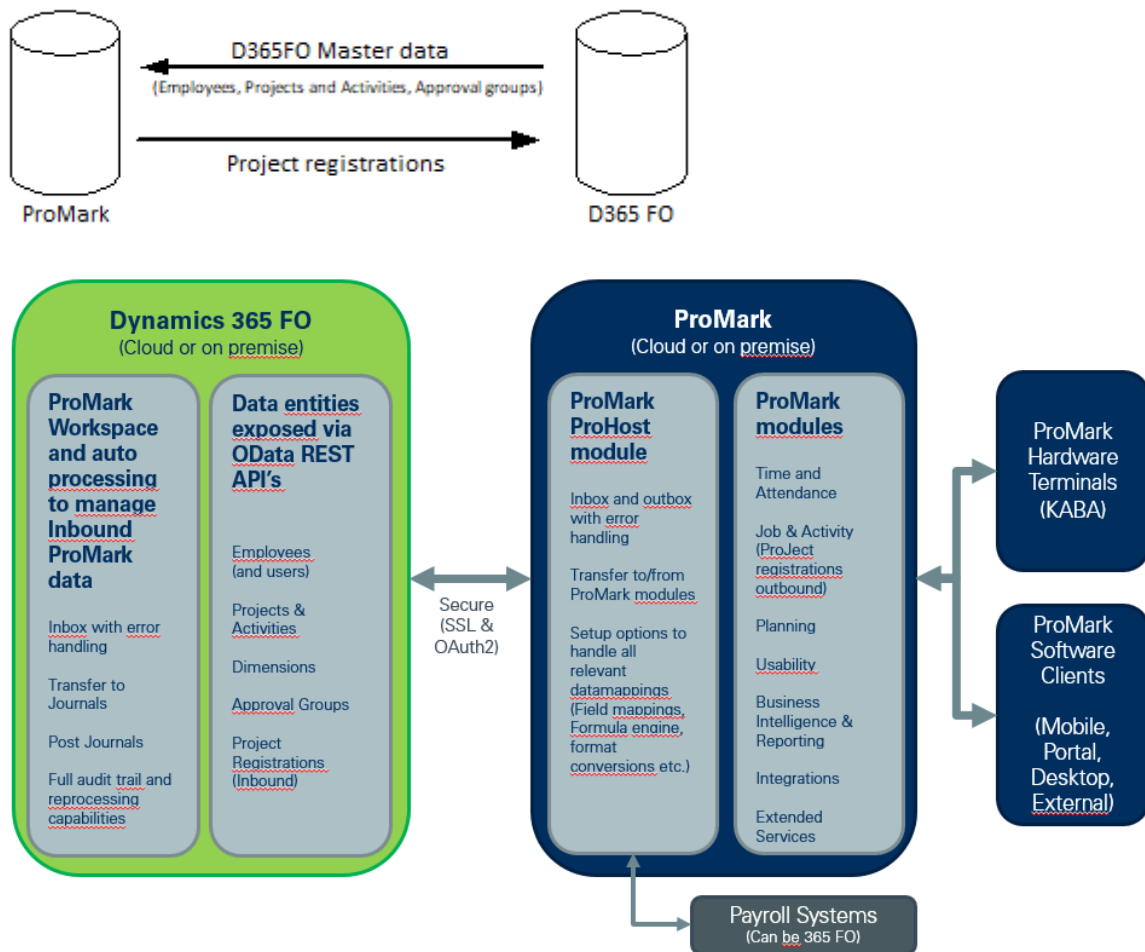
1.1 PURPOSE

This document describes the functional part of the interface between ProMark and Microsoft Dynamics 365 For Finance and Operations. The document describes which functionalities the interface between ProMark and Dynamics 365 For Finance and Operations supports.

1.2 SCOPE OF THE INTERFACE

This integration covers exchange of data between ProMark and Dynamics 365 For Finance and Operations using OData APIs.

The illustrations below shows how the dataflow of the interface works.



1.3 INTERFACE TECHNOLOGY

The communication between ProMark and Dynamics 365 For Finance and Operations is based on a new driver in the ProHost module, which handles OData API calls. OData is a standard protocol for creating and consuming data. The purpose of OData is to provide a Representational State Transfer (REST)-based protocol for Create, Read, Update, and Delete (CRUD)-style operations.

The driver, when scheduled, calls the relevant endpoints to import/export data to/from ProMark

2 PREREQUISITES

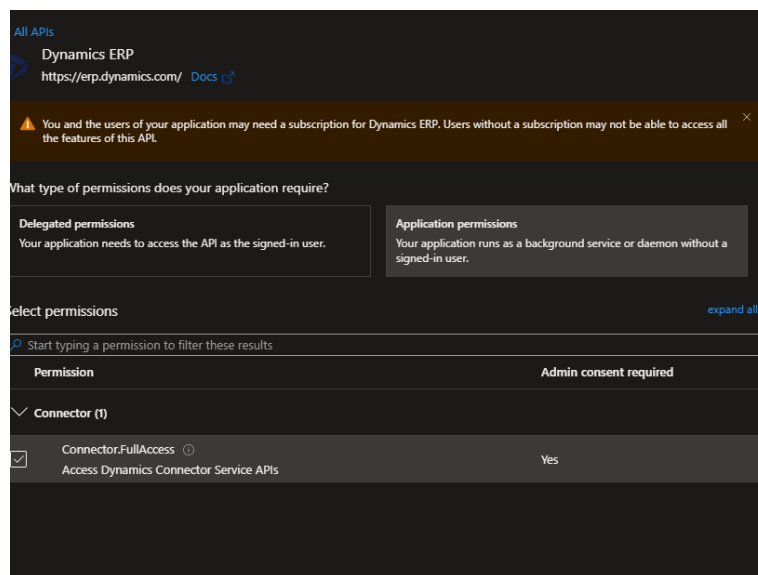
The interface assumes a number of prerequisites, in order to function as described in “Functional documentation”.

2.1 GENERAL PREREQUISITES

Various data needs to be manually synced up between Dynamics 365 For Finance and Operations and ProMark.

2.2 PREREQUISITES IN AZURE AD

An Azure AD App registration must be performed, with the below setup.



API Permission of Connector.FullAccess – means that using this token is allowed to execute/call Microsoft D365FO API/Web services and OData from 3rd party applications. But when ProMark trigger some specific D365FO API (for example ProMarkEmployees OData endpoint) D365FO check the User and User permissions for this specific action and only allow the action if the User has enough permissions.

The ProMark Integration Administrator user role (see later sections) should have access only to ProMark related D365FO features/endpoints (ie ProMarkEmployees, ProMarkProjectActivities, etc.) Most of these D365FO endpoints provide read-only access and only the endpoints ProMarkProjectActivityDeletions and ProMarkTimeRegistrations have update/delete access (so scope is only where ProMark is authorized to write data into D365FO).

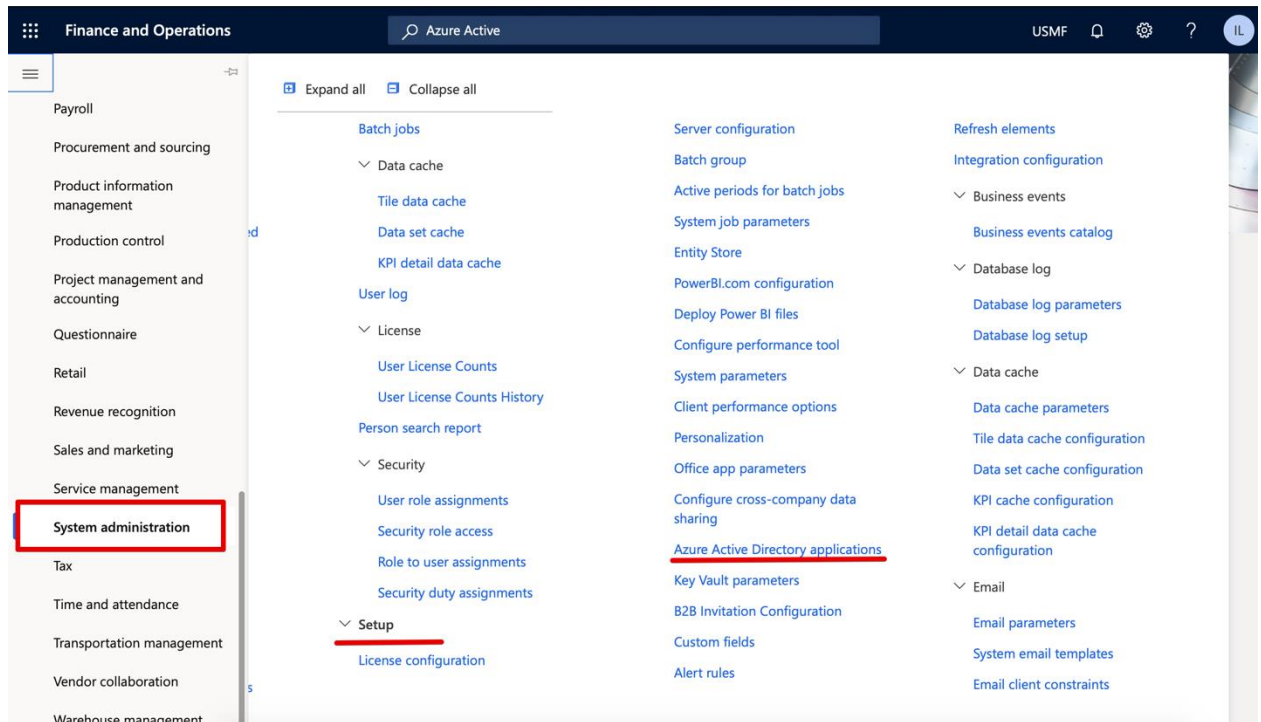
Also please notice that the ProMark D365FO extension uses only standard Microsoft technologies inside and outside of the application.

2.3 PREREQUISITES IN D365FO

The instance of D365FO must have the custom ProMark package deployed.

2.3.1 Setup the Dynamics 365 For Finance and Operations integration user account

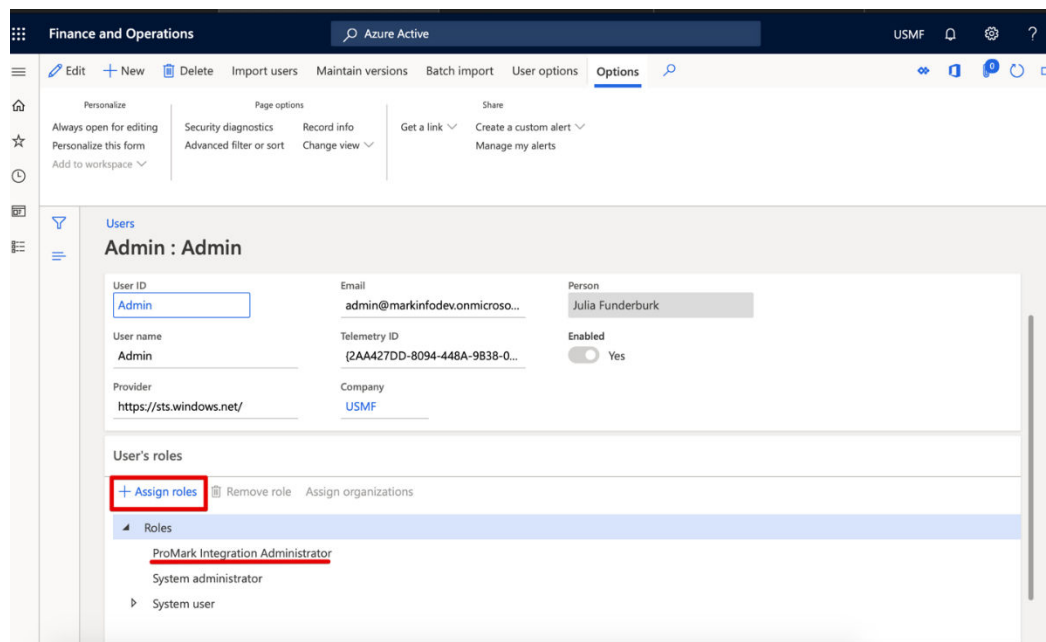
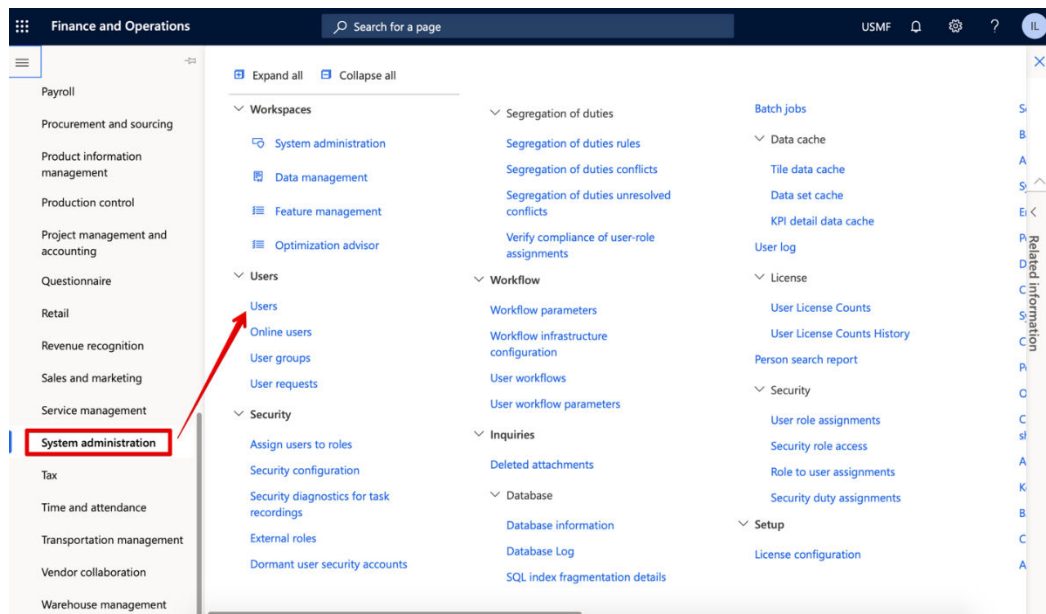
Before running any integrations, Dynamics 365 For Finance and Operations user (further referred as 'integration user') should be specified in Azure Active Directory applications form. Path: System administration > Setup > Azure Active Directory applications.



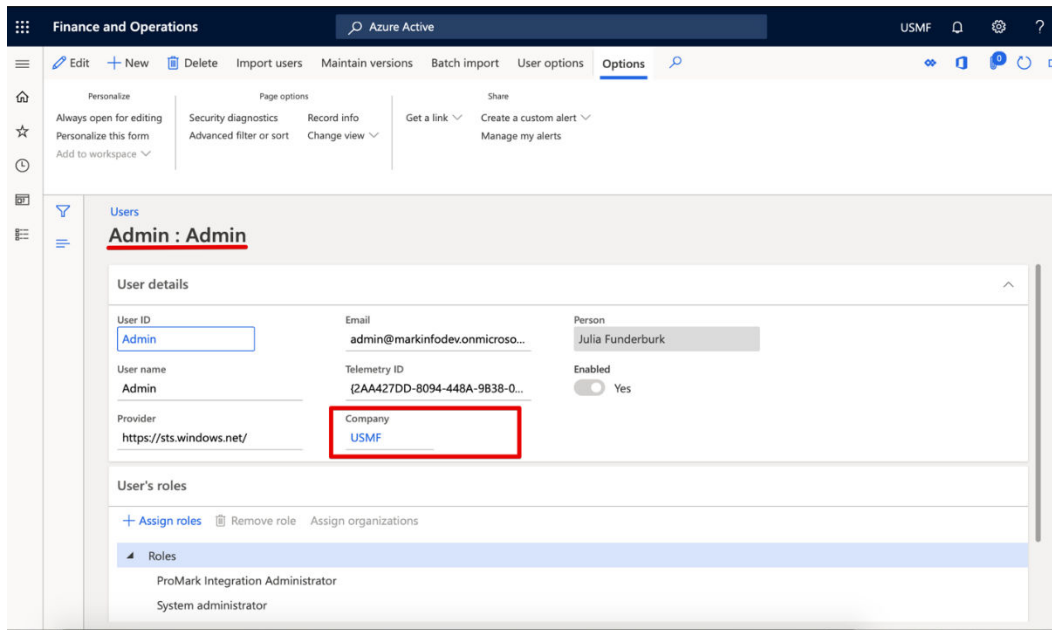
On this form, user must be associated with an appropriate client ID, after that all integrations will be run by that user.

Finance and Operations		
Azure Active Directory applications		
Filter		
Client Id	Name	User ID
1ecc980-2485-4232-8833-195ed8943c9e	AppRegDemo	Admin
58af5083-3db7-48a0-b491-2b23f5cb82a8	ProMarkAPI	Admin

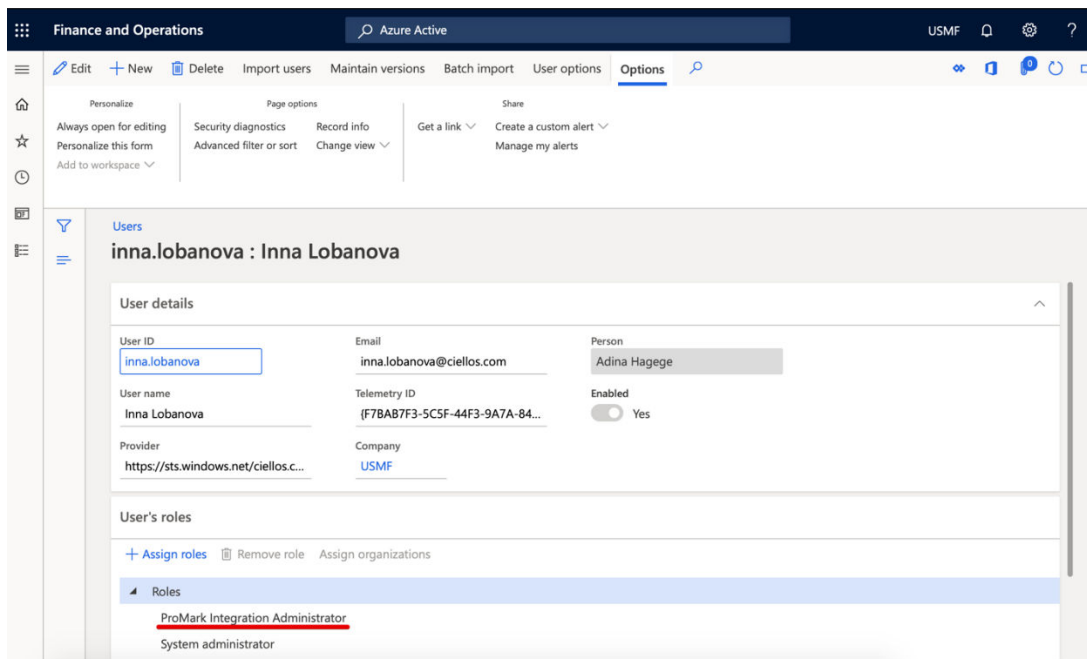
User that is specified on Azure Active Directory applications form must be granted with ProMark Integration Administration role or Admin role. Path: System administration > Users > Users



User that is specified on Azure Active Directory applications form must contain default 365 FO company. Further, all integrations will use integration user default company for export/import data.



Dynamics 365 For Finance and Operations user that is going to work with ProMark integrations through D365FnO interface must be granted with the same *ProMark Integration Administration* role. Once a user is granted with this role, ProMark integration workspace and all ProMark data entities become available for a user.

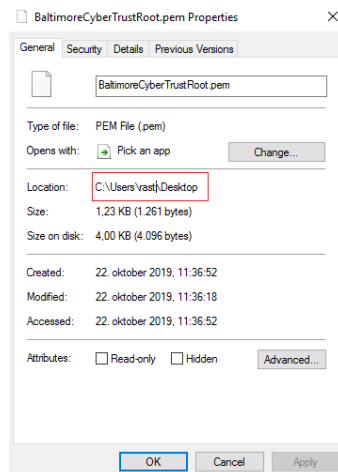


2.4 PREREQUISITES IN REGARD OF PROMARK

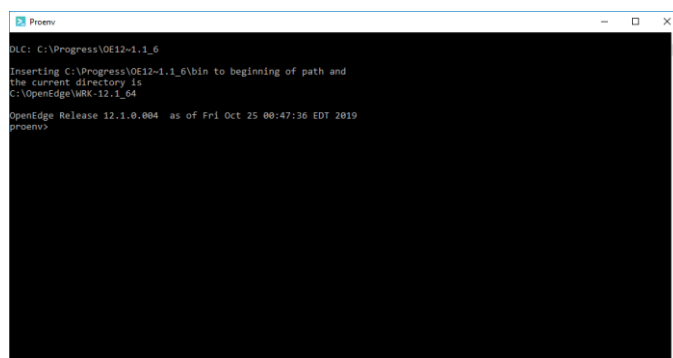
It is assumed that ProMark is in version 4.90.00 or newer, the modules ProTime and ProHost needs to be a part of the installation and activated. Also, *BaltimoreCyberTrustRoot* certificate must be imported into the Progress installation for SSL communication to be possible. If requests are routed through a HTTPS proxy, additional root certificates may be needed, they should be imported the same way from a .pem file.

2.4.1 Installing the *BaltimoreCyberTrustRoot* certificate.

- 1) Copy the file *BaltimoreCyberTrustRoot.pem* somewhere on the server where ProMark is installed. Right click on the file and copy the location path.



- 2) Open Proenv



Navigate to the path of the file from step 1 using the command "cd <path of file>", where "<path of file>" is the location copied during step 1. If the file is on a different drive (ex: Progress is installed on drive C: and the file is located on drive D:), run the command "D:" before "cd <path of file>", where *D* being the drive where the file is located.

- 3) Run the command "certutil -import BaltimoreCyberTrustRoot.pem". If "Importing trusted certificate to alias name: XXXXXXXX" is shown, the import was successful.

Do step 2 and 3 again for proenv64, to allow scheduling on 64-bit host

3 CUSTOMIZATION OF PROMARK

The host module consists of a driver and a number of transaction types. For this interface the OData-driver, and the transaction types 373 (Import of employee master data), 210 (Import of project and activities), 222(Import of project validation data), 212(Import of project and activities deletions) and 220(Export of activity time transactions).

To set up the host module in ProMark follow these steps:

1. Create the host
2. Create the transaction types
3. Create and attach a scheduler
4. Configure the communication

Setup of the host module can be done in two ways:

1. Import of a ProHost definition file
2. Setup the ProHost configuration manually

3.1 SETTING UP THE HOST MODULE MANUALLY

Set-up of ProMark's standard host module is done via: *Set-up > Host > Set-up*. To setup a host covers the creation, defining of formats and attachment of a scheduler.

3.1.1 Creating the host for the Dynamics 365 For Finance and Operations interface

All relevant fields, and their recommended settings are shown here:

Host set-up

Driver set-up | Formats | Schedule | Load PHD file | Save PHD file

Host	Beskrivelse
D365FO	OData driver 365fo
DB	DB standard
DIST	Distribution host
EXCH	Echange driver
FGN	FGN host
HLC	hlc file driver
HLCXML	hlc xml driver

Host:

Description:

Driver type:

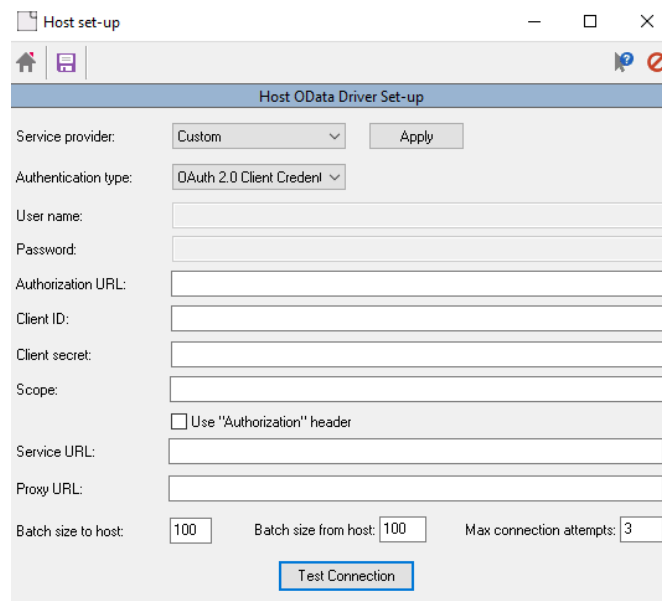
External status file:

Number of host data records retained:

Received:	<input type="text" value="10,000"/>	Received (erroneous / discarded):	<input type="text"/>	<input checked="" type="checkbox"/> Keep all
Transferred:	<input type="text" value="10,000"/>	Not transferred (erroneous):	<input type="text"/>	<input checked="" type="checkbox"/> Keep all

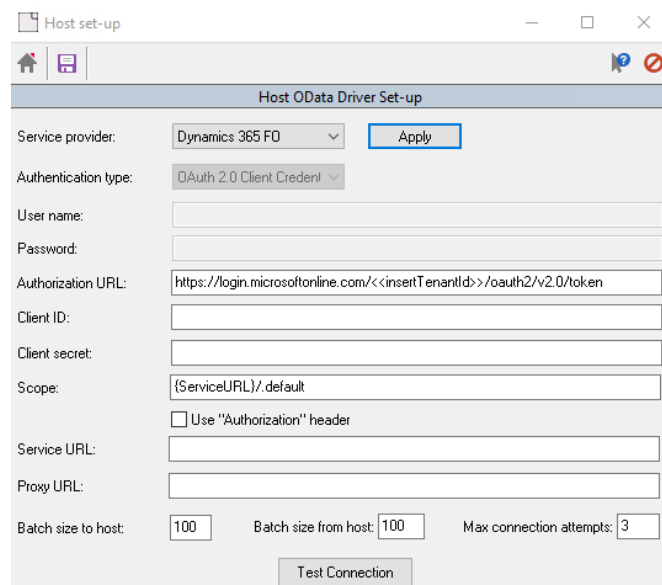
3.1.1.1 Setting up the driver

Next step is to set-up the OData driver. Click on *Driver set-up*.



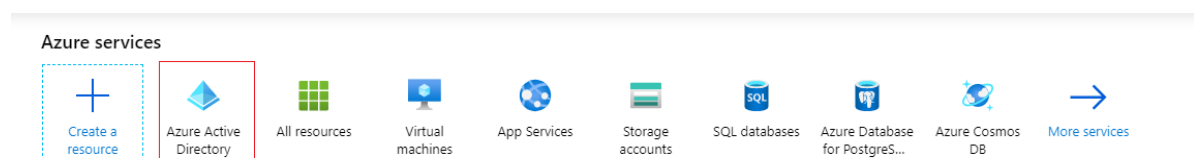
The screenshot shows the 'Host OData Driver Set-up' window. It has a title bar 'Host set-up' and a toolbar with a home icon and a save icon. The main area is titled 'Host OData Driver Set-up'. It contains several input fields and buttons. The 'Service provider' dropdown is set to 'Custom' with an 'Apply' button next to it. The 'Authentication type' dropdown is set to 'OAuth 2.0 Client Credential'. Below these are fields for 'User name', 'Password', 'Authorization URL', 'Client ID', 'Client secret', and 'Scope'. There is a checkbox for 'Use "Authorization" header'. Below these are fields for 'Service URL' and 'Proxy URL'. At the bottom, there are three input fields: 'Batch size to host' (100), 'Batch size from host' (100), and 'Max connection attempts' (3). A 'Test Connection' button is at the bottom center.

From the quick fill menu, select *Dynamics 365FO* and click *Apply*. The quick fill will auto-complete the fields which are not tied to the specific instance of *Dynamics 365 For Finance and Operations*.



The screenshot shows the 'Host OData Driver Set-up' window after selecting 'Dynamics 365 FO' from the 'Service provider' dropdown. The 'Apply' button is highlighted. The 'Authentication type' dropdown is still 'OAuth 2.0 Client Credential'. The 'Authorization URL' field is now populated with 'https://login.microsoftonline.com/<<insertTenantId>>/oauth2/v2.0/token'. The 'Scope' field is populated with '{ServiceURL}/.default'. The 'Batch size to host' (100), 'Batch size from host' (100), and 'Max connection attempts' (3) fields remain the same. The 'Test Connection' button is still at the bottom center.

In order to complete the set-up, "<<insertTenantId>>" should be replaced with the tenant id of the Dynamics 365FO instance which can be found in the Azure Active Directory(<https://portal.azure.com/>)



The *Client ID* and *Client secret* must be generated from Azure Active Directory by registering a new application (Go to <https://portal.azure.com/>, *Azure Active Directory*>*App registrations*>*New registration*).

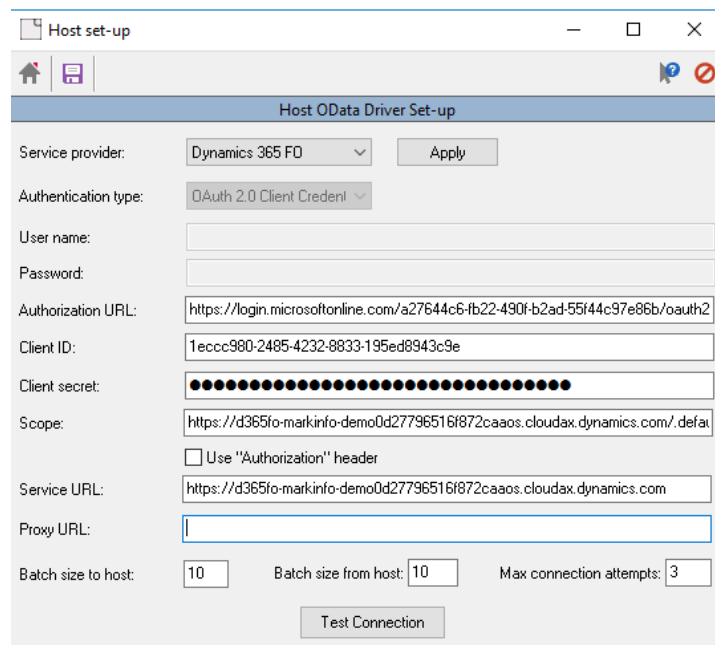
The *Service URL* is the homepage of D365FO.

(Ex: <https://d365fo-markinfo-demo0d27796516f872caa0s.cloudax.dynamics.com/>)

The *Test Connection* button is used to test the authentication. If the correct fields are entered, a pop-up with "Connection successful" will appear. If not, an error message will be displayed.

The *Proxy URL* can be used to route all requests through an HTTP proxy.

Here is an example of a working setup:

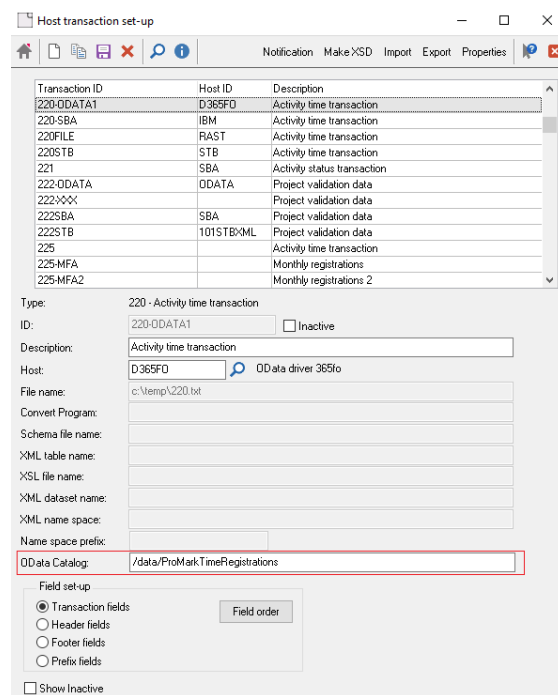


The 'Host OData Driver Set-up' window contains the following fields and controls:

- Service provider: Dynamics 365 FO (dropdown), Apply button
- Authentication type: OAuth 2.0 Client Credential (dropdown)
- User name: (text field)
- Password: (text field)
- Authorization URL: https://login.microsoftonline.com/a27644c6-fb22-490f-b2ad-55f44c97e86b/oauth2
- Client ID: 1eccc980-2485-4232-8833-195ed8943c9e
- Client secret: (password field)
- Scope: https://d365fo-markinfo-demo0d27796516f872caa0s.cloudax.dynamics.com/default
- Use "Authorization" header: (checkbox)
- Service URL: https://d365fo-markinfo-demo0d27796516f872caa0s.cloudax.dynamics.com
- Proxy URL: (text field)
- Batch size to host: 10, Batch size from host: 10, Max connection attempts: 3
- Test Connection button

3.1.2 Creating the transaction types for the Dynamics 365 For Finance and Operations host

In each transaction set-up, if an OData host is selected, the field *OData Catalog* is enabled. It is important to be filled correctly because this field in combination with the driver set-up is used to build the OData requests.



The 'Host transaction set-up' window displays a list of transaction types and their details. The 'OData Catalog' field is highlighted with a red box.

Transaction ID	Host ID	Description
220-ODATA1	D365FO	Activity time transaction
220-SBA	IBM	Activity time transaction
220-FILE	RAST	Activity time transaction
220-STB	STB	Activity time transaction
221	SBA	Activity status transaction
222-ODATA	ODATA	Project validation data
222-XXX		Project validation data
222SBA	SBA	Project validation data
222STB	101STBXML	Project validation data
225		Activity time transaction
225-MFA		Monthly registrations
225-MFA2		Monthly registrations 2

Details for 220 - Activity time transaction:

- Type: 220-ODATA1 (dropdown), Inactive checkbox
- Description: Activity time transaction
- Host: D365FO (dropdown), OData driver 365fo
- File name: c:\temp\220.txt
- Convert Program: (text field)
- Schema file name: (text field)
- XML table name: (text field)
- XML file name: (text field)
- XML dataset name: (text field)
- XML name space: (text field)
- Name space prefix: (text field)
- OData Catalog: /data/ProMarkTimeRegistrations (text field, highlighted with a red box)
- Field set-up: Transaction fields (radio button), Header fields (radio button), Footer fields (radio button), Prefix fields (radio button), Field order button
- Show Inactive checkbox

The solution also allows inserting an OData filter value, which will filter what data is returned from the Odata catalog (webservice). E.g. inserting a filter of *ProMarkUserId ne ''*. Ne means "not equals", eq means "equals". More info about the operators that can be used with the filter can be found at: <https://docs.microsoft.com/en-us/dynamics365/fin-ops-core/dev-itpro/data-entities/odata>, in the section about \$filter.

The OData filter also supports host formulas (can be found in the file *ProMark_Formulas_EN*) defined between curly brackets {"{ }"}.

OData filter with host formulas **examples**:

- To get activities that end in the last 30 days:
ActivityEndDate gt {DATETIME(TODAY()-30)} and *ActivityEndDate lt {DATETIME(TODAY())}*
- To get projects created in the last two months:
ProjectCreatedDateTime ge {DATETIME(ADD-MONTHS(TODAY(),-2))}

For transactions that import data into ProMark, in the "Field order" set-up, the button "Preview" is enabled. When clicking this button, assuming the driver set-up and the "Odata Catalog" is correct, an example of a received record is displayed in order to facilitate the set-up of the fields.

The screenshot shows a dialog box titled "Selection of fields in external host transaction". It contains the following elements:

- Transaction ID:** 222-ODATA - Project validation data
- Transaction type:** 222 - Project validation data
- Trans. filter:** (empty text box)
- Error ID:** (empty text box)
- Fields in internal host transaction:** A table with 7 fields: 1. Setup id, 2. Extra info id, 3. Description, 4. Validation value, 5. Delete, 6. Inactivate, 7. Division id.
- Fields in external host transaction:** A table with 3 fields: 1. 4 Validation value, 2. 3 Description, 3. DimensionId.
- Data type:** Character
- Default:** (empty text box)
- Field length:** 0
- Field tag:** DimensionValue
- Buttons:** OK, Cancel, Help, To Clipboard, Preview (highlighted with a red box), Reset, Initialise.

For each transaction used in this integration, all the field set-ups (including the OData catalog) are described in the "D365FO_Transaction_Fields.xlsx" file.

3.2 SETTING UP THE HOST SCHEDULER

Before the created transaction types can be used, they need to be added to a scheduler, which again needs to be attached to the host. Creation of the scheduler is done via: *Set-up > Host > Schedules*.

First create the scheduler and then add those transaction types the scheduler should handle.

The image shows two overlapping screenshots of the Dynamics 365 Host Scheduler setup interface. The background window is 'Host schedule header set-up' and the foreground window is 'Host schedule lines set-up'.

Host schedule header set-up

Type	Description
ODATA	ODATA schedule
ODATA210	ODATA 210
ODATA212	
ODATA222	
ODATA432	
ODATAPUT	ODATA schedule
PMR	PMR's schedule

Schedule ID: ODATA
Description: ODATA schedule

Schedule lines

Interval	Transaction types
00:00 - 23:59	373-ODATA

Host schedule lines set-up

Schedules: ODATA ODATA schedule

Transaction types

373-ODATA : Create/modify extended employee data

☐ All transactions

Schedule lines

Transmission interval: 00:00 - 23:59 Cycle: 10:00

Schedule lines

Interval	Transaction types
00:00 - 23:59	373-ODATA

The scheduler then must be attached to the Dynamics 365 For Finance and Operations host.

The screenshot shows the 'Host set-up' window in Dynamics 365. The title bar says 'Host set-up'. The main area is titled 'Host communication set-up'.

Host: D365FO OData driver 365fo

Weekday

Weekday	Type
Sunday	ODATA
Monday	ODATA
Tuesday	ODATA
Wednesday	ODATA
Thursday	ODATA
Friday	ODATA
Saturday	ODATA

Host's closed interval: 00:00 - 23:59

Weekday: Friday
Type: ODATA ODATA schedule

Schedule lines

Interval	Transaction types
00:00 - 23:59	373-ODATA

3.3 STARTING THE HOST

When the set-up of ProMark's host module is finished, the host can be started.

Remember to setup the host in the ProMark Manager to ensure it runs as a service on the server.

4 FAQ

4.1 ERROR CODE 10060: UNKNOWN NETWORK ERROR (9318)

Ensure there is internet connectivity to the URL's specified in the ProHost driver setup. Test via other tools on the server than ProMark, i.e. browser, telnet etc.

4.2 ERROR CODE -54: UNABLE TO GET LOCAL ISSUER CERTIFICATE: FOR *CERTALIAS*

Make sure the Baltimore Cybertrust Root certificate is installed using both ProEnv 32-bit and 64-bit. If the error persists and a HTTPS proxy is set-up with the driver, additional root certificates that match the proxy may be needed (until now DigiCert Global Root G2 was required in one instance, when *CERTALIAS* was 607986c7.0). If unknown, missing certificates may be identified by searching *CERTALIAS* on the internet.