

# BI4Dynamics Application

## Installation Manual for Dynamics 365 Finance and Operations on Azure Virtual Machine

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**Revision 1.5**

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# 1. Installation

## 1.1. Introduction

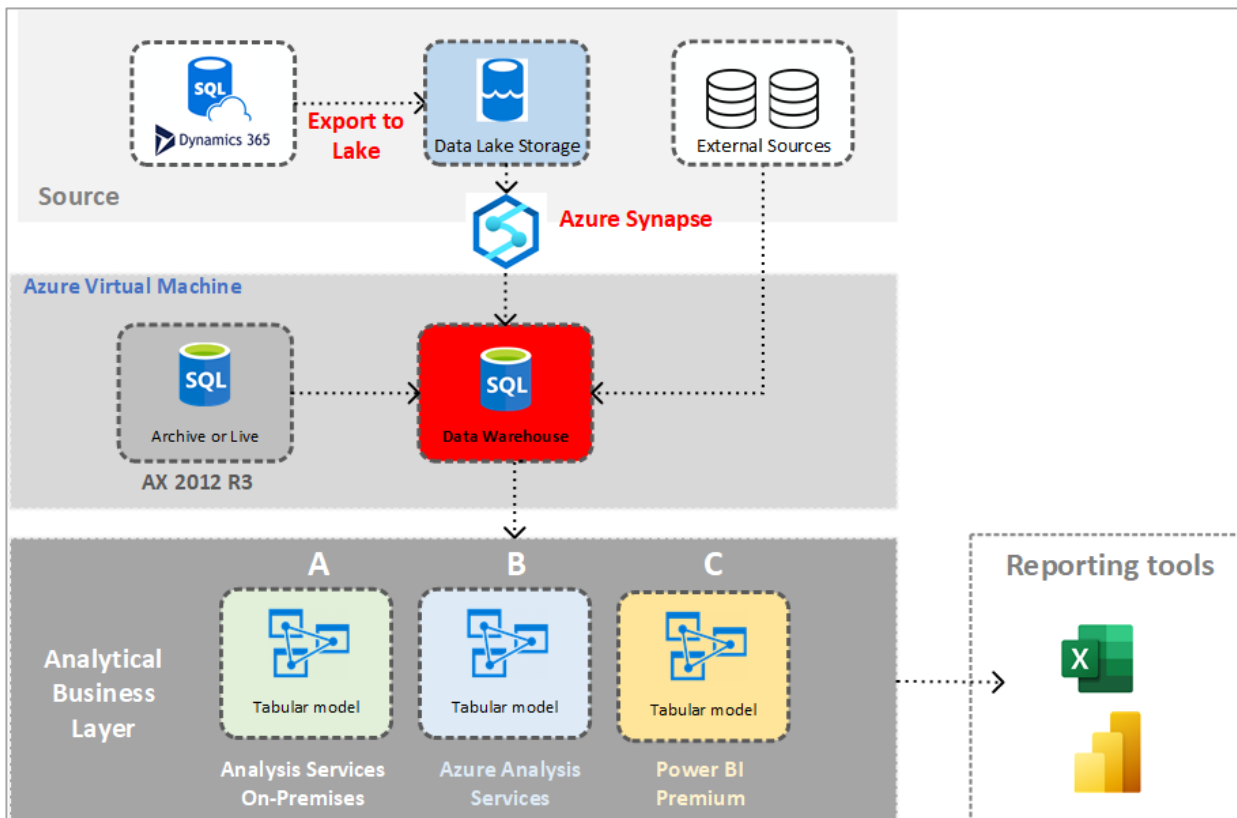
This document covers the process of BI4Dynamics application installation on the Azure Virtual Machine (VM).

It is comprised of prerequisites for BI4Dynamics installation, actual steps needed to execute the installation as well as instructions on managing the instance once it is created and connecting Excel and Power BI reports to the analytical database.

The document oversees three options for installation based on where analytical database will be deployed:

- **Option A: Local Analytical Server** – the best case in case you already have some excess computing capacities, is not recommended in conjunction with Azure VM due to not being a cost/performance effective option
- **Option B: Azure Analysis Server** – dedicated Azure resource that hosts analytics. Is priced on per/hour basis, there is no limitation on number of users, however, performance will be impeded if numerous users a connected to low-tier analytics.
- **Option C: Power BI Premium Per User** – costs 20\$ per month/per user and provides superior performance 24/7. This option is recommended in case organization already applies Power BI Premium/PRO. Power BI Premium per User would also be a way to go for organizations that have just a few BI users.

The data flow is as follows:



## 1.2. Prerequisites

### 1.2.1. Azure resources

#### Azure Storage

Description	Value
Subscription	Pay-As-You-Go
Resource Group	vm-bi4-demo
Azure Storage Account Name	vmbi4demostorage

Permissions: user is Contributor and Storage Blob data Contributor.

#### Azure Synapse

Description	Value
Serverless SQL endpoint	bi4dynamicsuat-ondemand.sql.azuresynapse.net
SQL admin username	sqladminuser
Azure Synapse Analytics	Klrhvirehfg33urf

Permissions: AAD user (!) must be Synapse administrator on Synapse workspace.

#### Azure SQL VM

Description	Value
RDP Public IP (or RDP file)	51.132.66.72
SQL server name (as seen in Azure)	vm-bi4-demo.westeurope.cloudapp.azure.com
VM Admin Account	vm-admin-user
VM Admin Account Password	6!dJ2yS34MbbQiPHs@rd

Permissions: this user is administrator (default).

#### Azure Analysis Services option:

Description	Value
Azure Analysis Services	asazure://westeurope.asazure.windows.net/bi4dynamicshybrid
Username (AAS admin)	<a href="mailto:mg@bi4dynamics.com">mg@bi4dynamics.com</a>
Password	Qpewoicsj490wkss

Permissions: user is administrator.

#### Power BI Premium option:

Description	Value
Azure Analysis Services	powerbi://api.powerbi.com/v1.0/myorg/BI4Dynamics%20XML%20endpoint
Username (AAS admin)	<a href="mailto:pa@bi4dynamics.com">pa@bi4dynamics.com</a>
Password	Qpdggfweicsj490wkss

Permissions: user is workspace administrator.

### 1.2.2. D365 F&O credentials

Description	Value
D365 F&O Admin User	<a href="mailto:adminuser@bi4dynamics.onmicrosoft.com">adminuser@bi4dynamics.onmicrosoft.com</a>
D365 F&O Admin User Password	rtPxXqxJ2IkOIJFR9Eki#8

Permissions: user must be administrator in DFO (no need to share this credential with BI4Dynamics or installation partner, just needed to be entered at the time of installation),

## 1.3. Installing BI4Dynamics application

**IMPORTANT!** Before installing BI4Dynamics, please check hardware and software requirements, make sure you have sufficient permissions and an active internet connected.

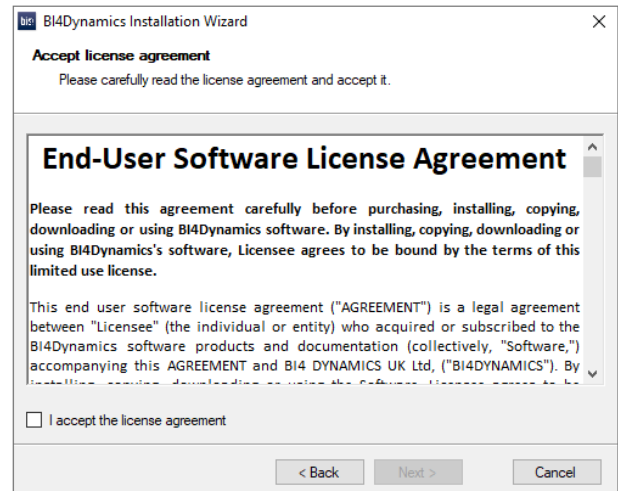
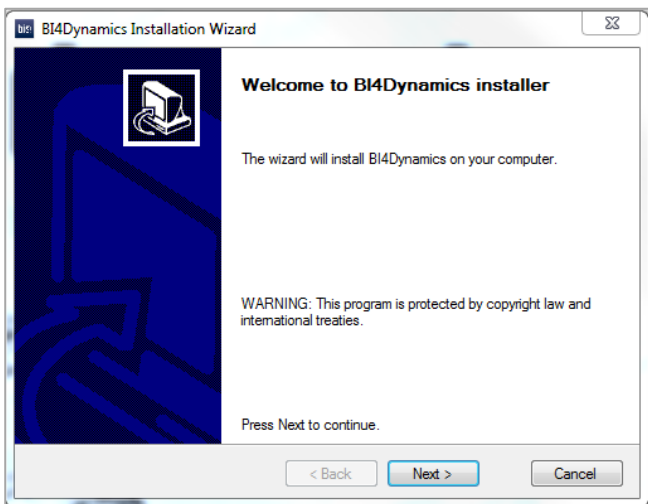
**IMPORTANT!** The installation process must be started on VM where BI4Dynamics Data Warehouse will be created.

1. Double-click **BI4Dynamics.exe** to start the installation\*.

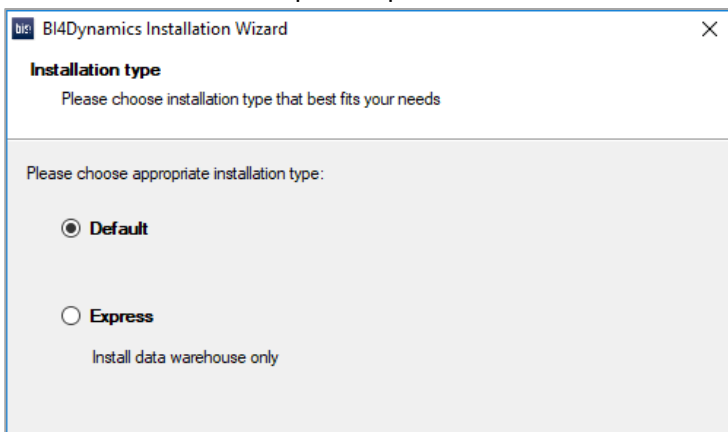
*\*Always start BI4Dynamics as an administrator.*

*Note: The name of the file varies based on the version you are using.*

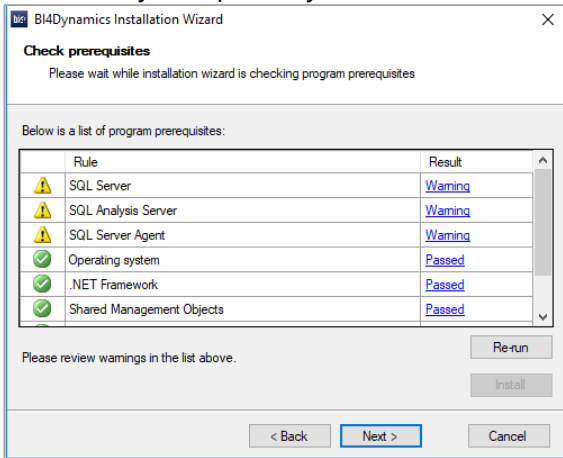
2. Follow the instructions on screen and accept the license agreement.



3. Choose Default or Express option

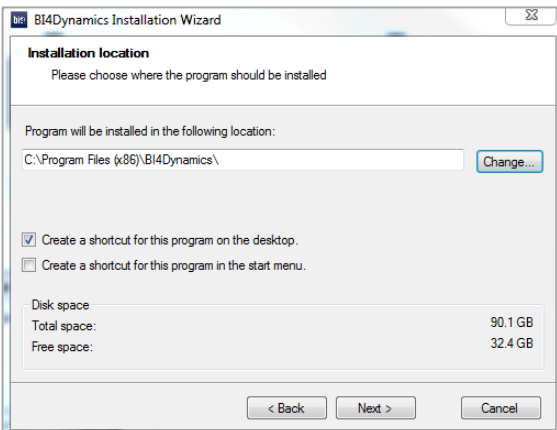


4. The installer will check for some of the prerequisites. If any of the tests will fail you can click on the result to see the error. You must fix the problem before repeating the test. Once all the tests are successfully completed you can continue with the installation.



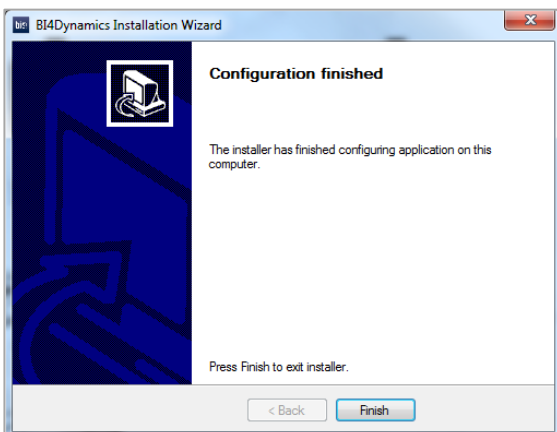
5. If a correct version of Shared Management Objects, Analysis Management Objects or .NET Framework is not installed, please click the **Install** button, which will trigger the installation of correct version of SMO's, AMO's, CLR Types or .NET Framework.

6. Select the folder where you would like to install BI4Dynamics. You can choose to create a shortcut on the desktop and/or in the start menu. Click **Next**.



7. Confirm the configuration and begin the installation of BI4Dynamics.

8. Click **Finish** after the installation is completed.



## 1.4. Creating BI4Dynamics instance

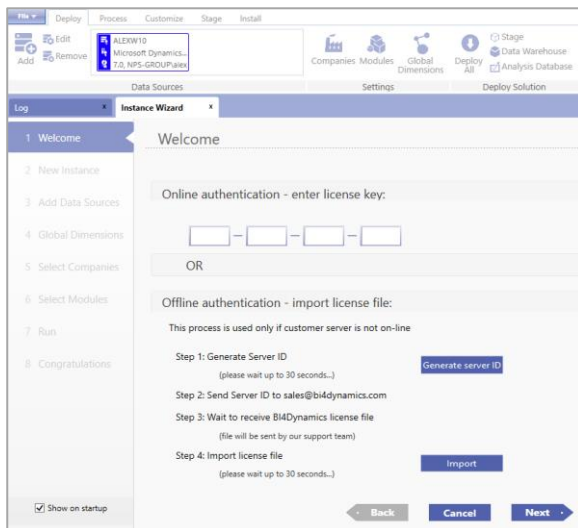
Deploying a BI4Dynamics solution is a seven-step process:

1. Providing license information
2. Creating an instance
3. Adding the data sources
4. Selecting global dimensions
5. Selecting companies
6. Selecting Framework module
7. Completing installation

When you open the application, an instance wizard will start to guide you through the configuration.

### 1.4.1. Providing license information

- 1) Launch **BI4Dynamics.exe** from the folder where BI4Dynamics was installed to open the application.

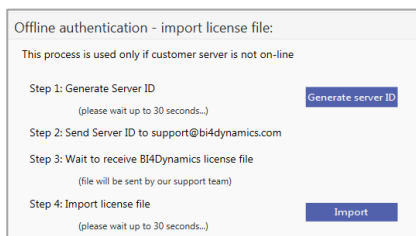


Note: BI4Dynamics is 64-bit application, but the default installation location is C:\Program Files (x86)\BI4Dynamics AX. Application can also be started from the Desktop shortcut or from the Start Menu shortcut.

- 2) Enter the BI4Dynamics **online license key**

OR

- 3) Follow the instructions on screen to receive an **offline license key** (in case you do not have the internet connection or port 80 on the server is closed).



Note: If you experience any problems with authorization, please contact us via [support@bi4dynamic.com](mailto:support@bi4dynamic.com).

- 4) Click **Next**.

## 2. Implementation option A: Local Analysis Services

### Instance properties

1. Type the **Name** of the new instance.
2. Select what **Language** the solution will be deployed in.

### SQL server

3. Keep or change **Database Name** of the BI4Dynamics Data Warehouse.
4. Type **SQL server name** (Use local server name).
5. Select or Type in the **SQL Server Instance** name where the BI4Dynamics Data Warehouse will be deployed.
6. **Authentication** type: **Windows**

### Analysis Services

7. Keep or change the **Analysis Database Name** of the Analysis Services instance.
8. Keep or change the **Analysis Database Server** name where the Analysis Services model will be deployed.
9. **Authentication** type: **Windows**.

### Integration Services

10. Check **SQL Integration Service** to process BI4Dynamics using the Integration services (parallel processing).

### Refresh

11. Click **Refresh** to set default values for **SQL Database file Locations** (data and log files) and **SQL Database Collation** are entered automatically. Modify if necessary.

The screenshot shows the 'New Instance' configuration wizard. The left sidebar contains a navigation menu with steps: 1 Welcome, 2 New Instance (selected), 3 Add Data Sources, 4 Global Dimensions, 5 Select Companies, 6 Select Modules, 7 Run, and 8 Congratulations. The main content area is titled 'New Instance' and contains the following sections:

- Instance properties:** Instance name: BI4Dynamics DFO; Language: English (United States).
- SQL Server:** Database Name: BI4Dynamics DFO; SQL Server Name: ANDRIIW10; Authentication: Windows; SQL Database File Locations: Data: C:\Program Files\Microsoft SQL Server\MSSQL...; Log: C:\Program Files\Microsoft SQL Server\MSSQL...; SQL Database Collation: SQL\_Latin1\_General\_CP1\_CI\_AS.
- Analysis Services:** Analysis Database Name: BI4Dynamics DFO; SQL Analysis Server Name: ANDRIIW10; Authentication: Windows; SQL Analysis Server Option: Tabular; Model: Import.
- Integration Services:** SQL Integration Service: ; SSIS Server name: ANDRIIW10; Ver.: 15.0.

At the bottom of the wizard, there are two buttons: 'Refresh' and 'Test Connectivity'.

Click **Next**.



## 2.1. Adding data source – D365 F&O Cloud Source

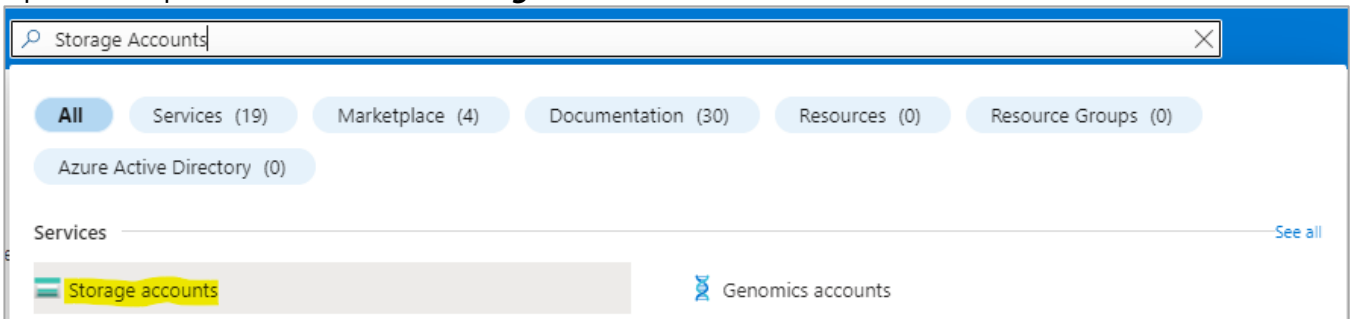
### 2.1.1. Setup BLOB Subscription

This information is about adding Data Source(s) for BI4Dynamics instance.

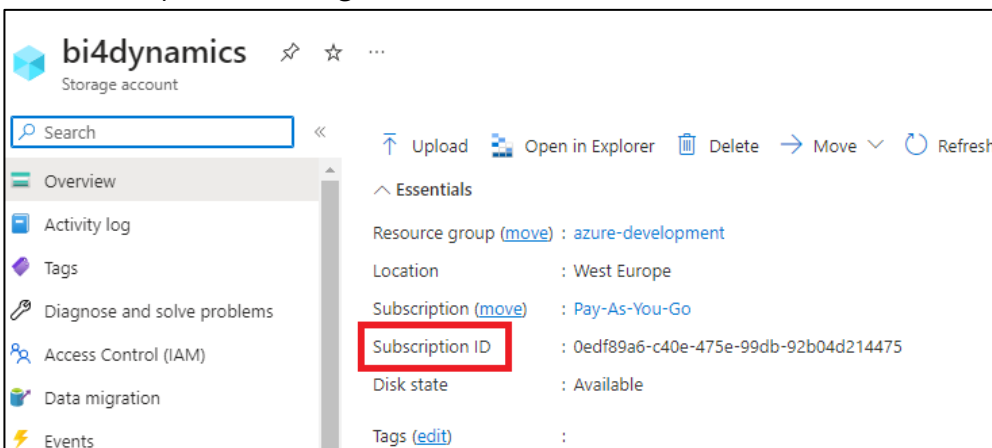
#### Setup Storage Account

- Tenant ID and Account Name

Open Azure portal and search for **Storage accounts**.



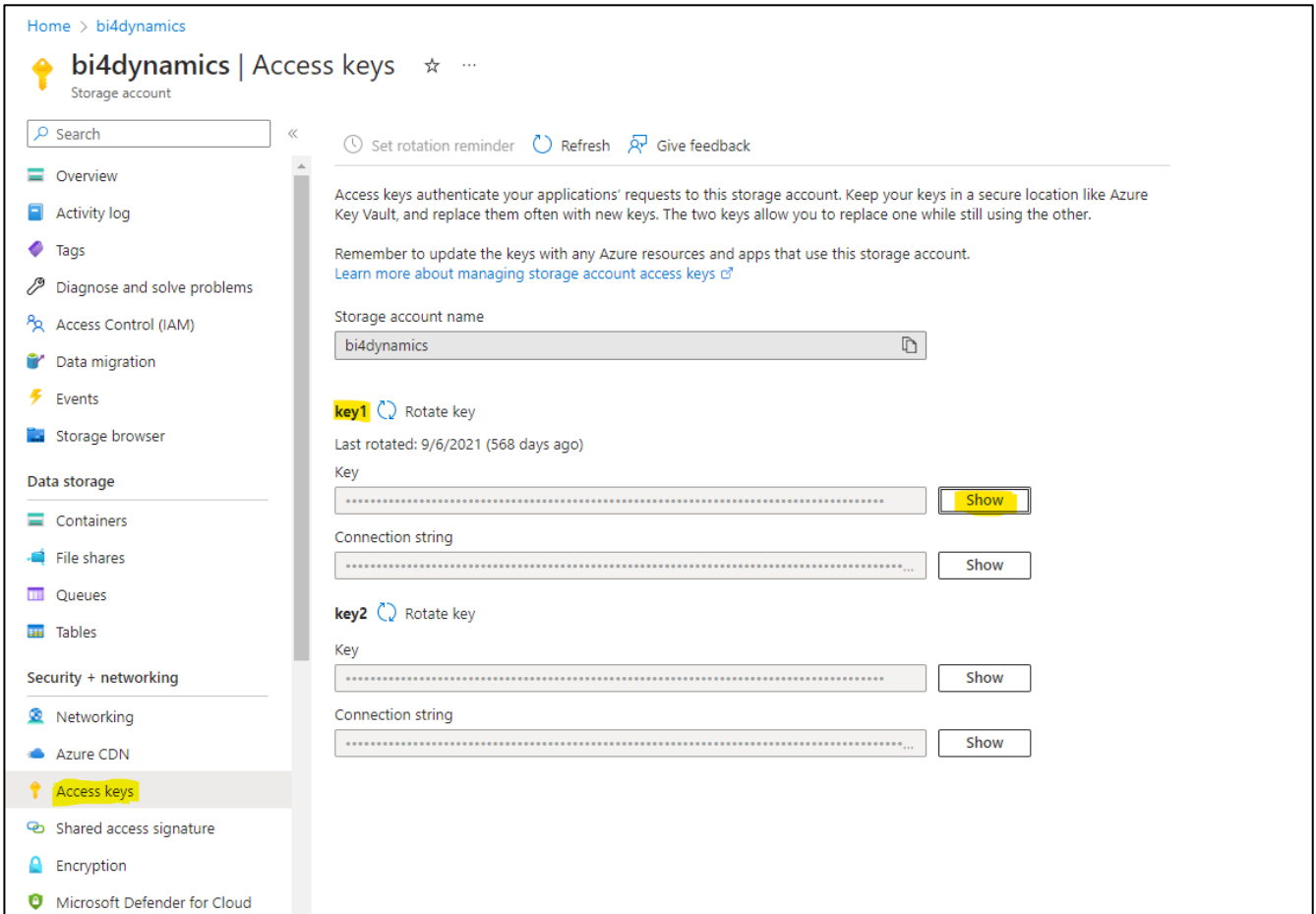
Select and open the **Storage account** used for the installation.



Copy and paste its Subscription ID and Account Name into corresponding field in the application.

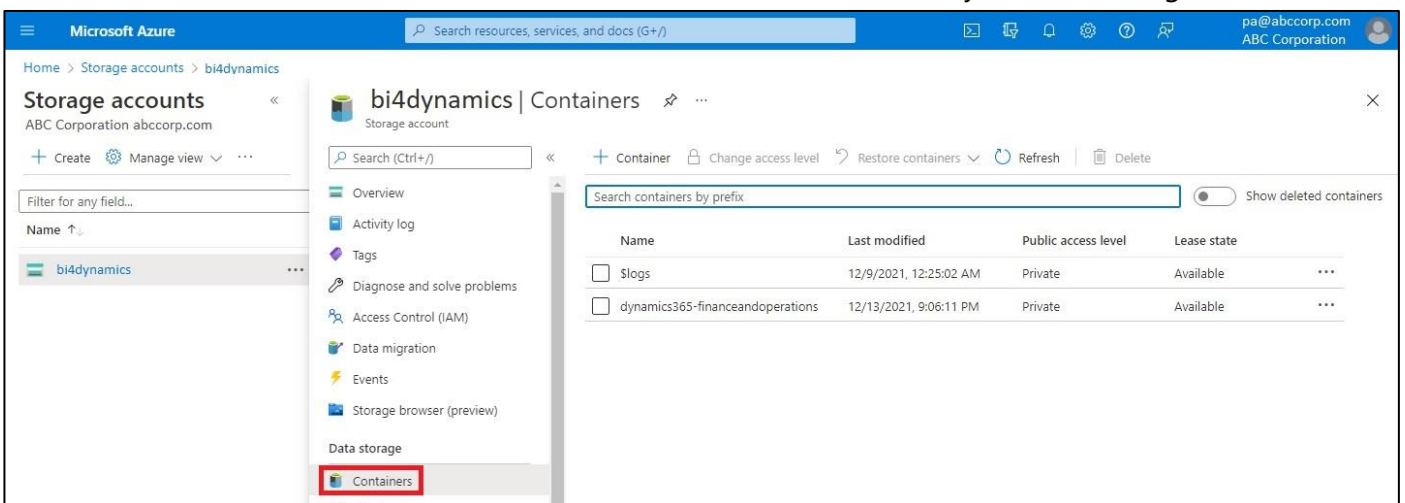
- Blob Key

Navigate to the storage account you use and select **Access keys** from the menu on the left. Unhide **key1** and copy value to the corresponding field in the BI4Dynamics application.



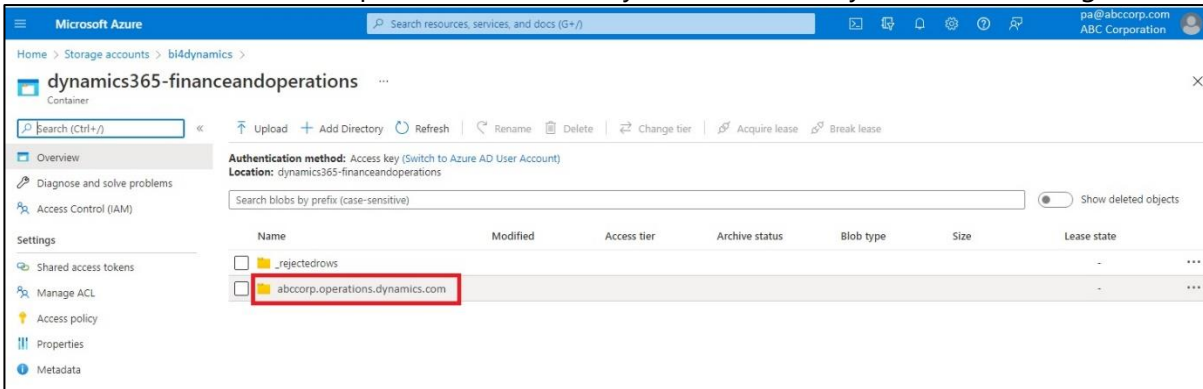
- Container Name

Select **Containers** from the menu on the left. Select the container that you will be using.



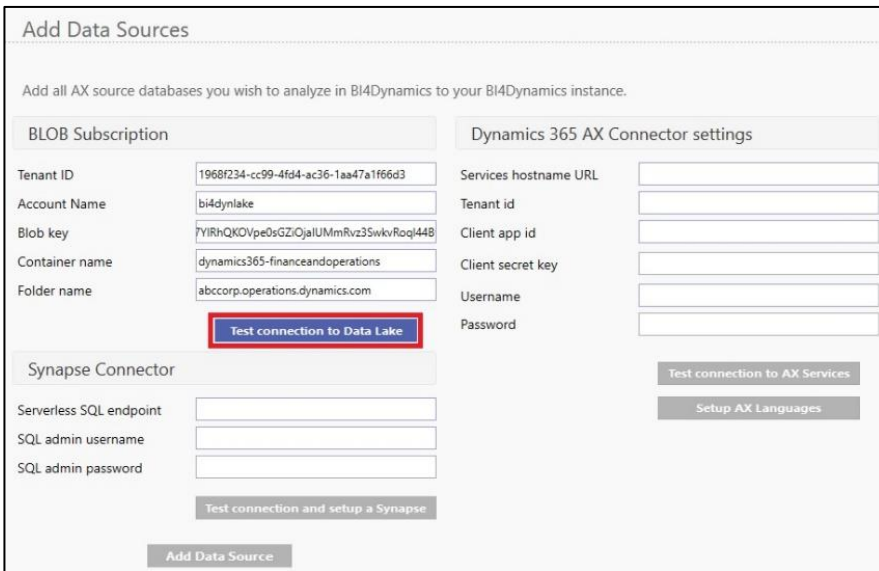
- Folder Name

Select the folder that correspond to Microsoft Dynamics instance you are connecting.



Copy Folder name and paste it into corresponding field in BI4Dynamics application.

Enter all parameters and press **Test connection to Data Lake**.

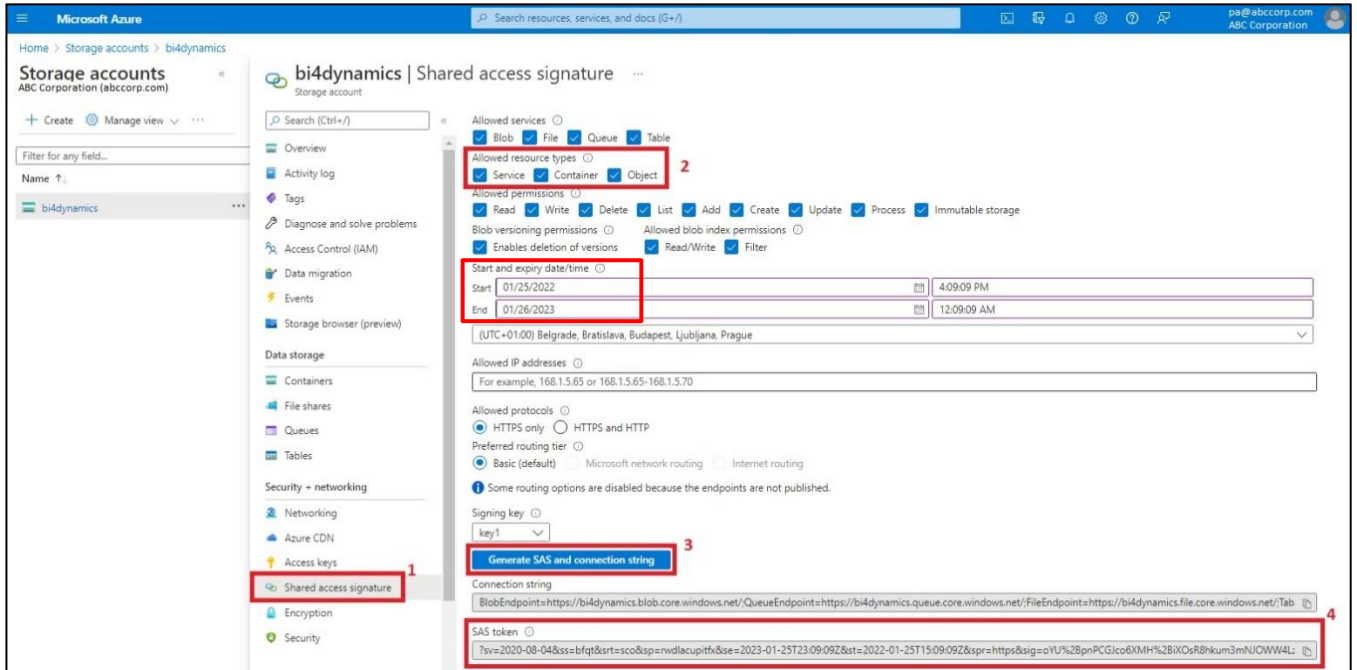


Following window should appear:

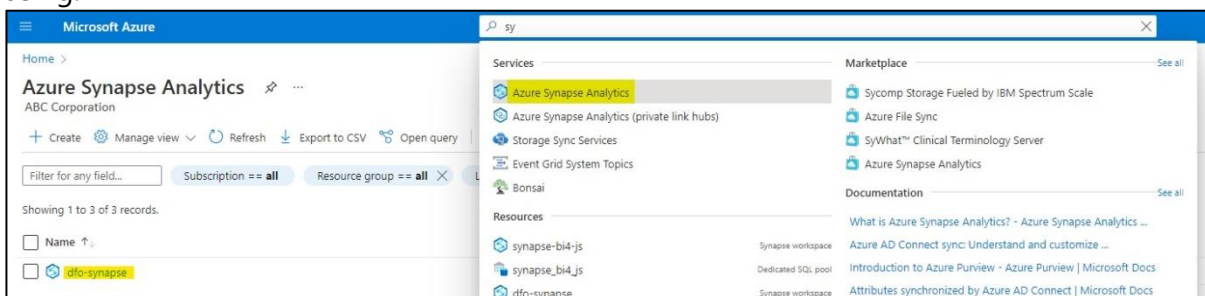


### 2.1.2. Setup Azure Synapse

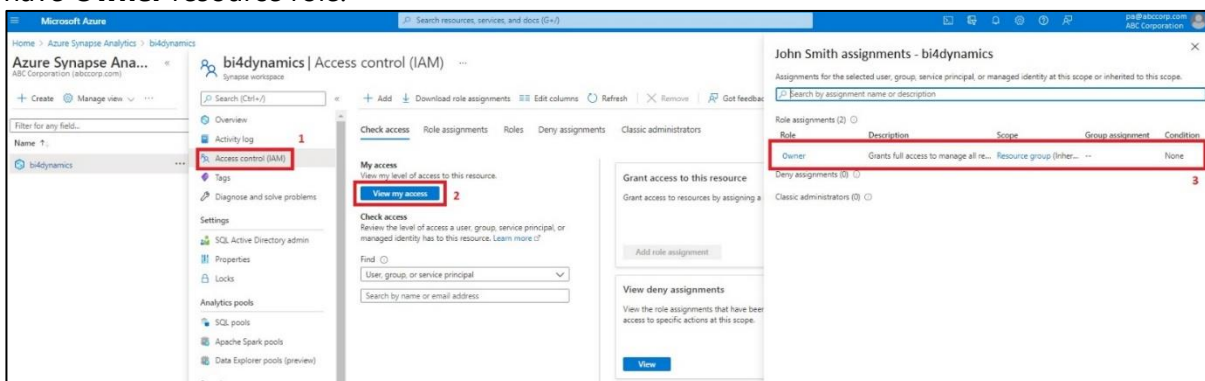
1. In storage account navigate to **Shared access signature** from the menu on the left.
2. Select all three options under Allowed resource types.
3. Select Start and Expiry date (usually 1 year)
4. Press Generate SAS and connection string.
5. Copy SAS token value.



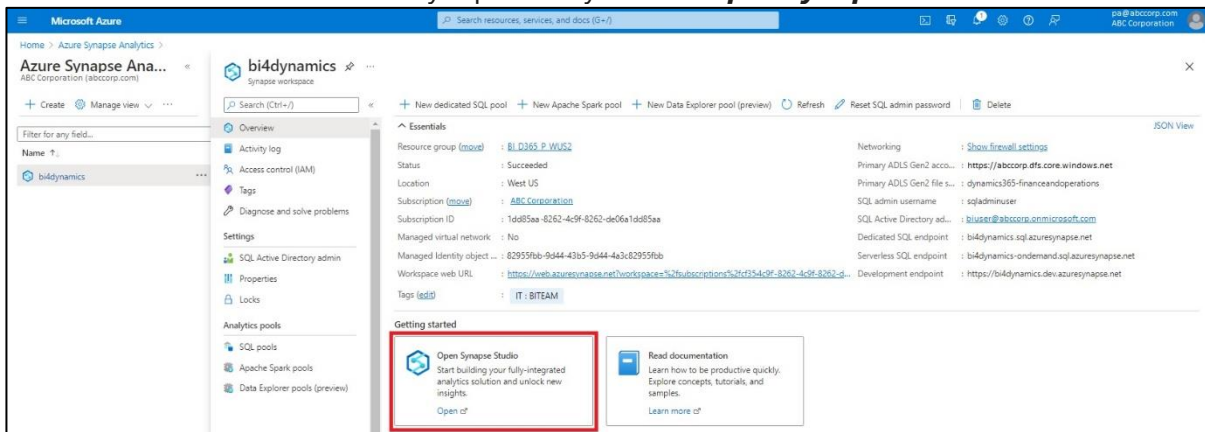
Open Azure portal and search for **Azure Synapse Analytics**. Select the Azure Synapse Analytics you are using.



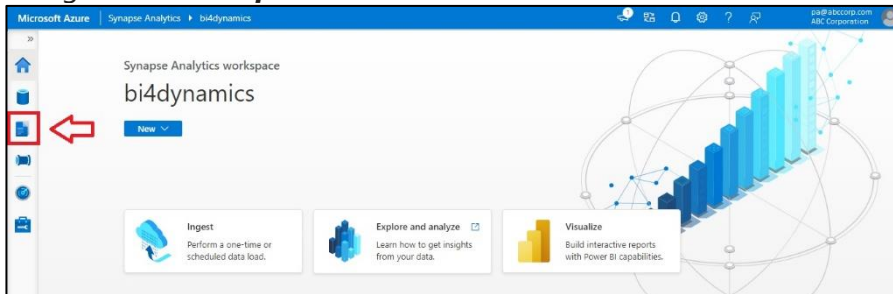
Select **Access control (IAM)** from the menu on left. Press **View my access** button and make sure you have **Owner** resource role.



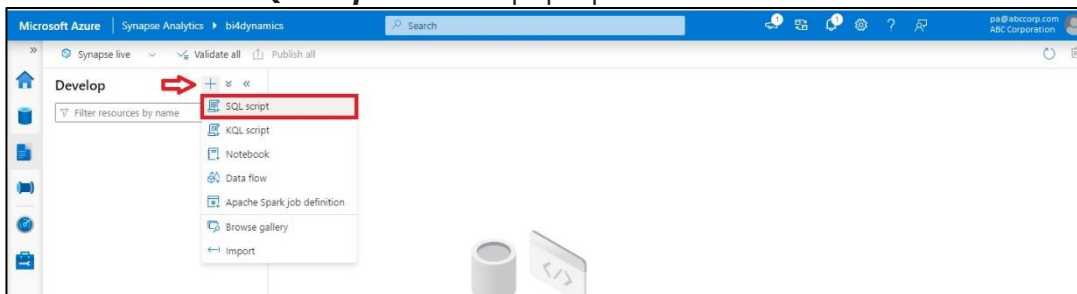
Come back to **Overview** tab of Synapse Analytics and **Open Synapse Studio**.



Navigate to **Develop** tab.



Press + and select **SQL script** from the pop-up menu.



Prepare script with shared access signature, paste it into the newly opened query, edit it and click **Run**.

**SQL script template**

```
CREATE CREDENTIAL [https://@storageAccount.dfs.core.windows.net/@containerName] WITH
IDENTITY = 'SHARED ACCESS SIGNATURE', SECRET = '@SAS Token'
```

Replace parameters with real values:

Parameter	Description	Value (example)
@storageAccount	Name of the storage account	bi4dynamicsuat
@containerName	Container name	dynamics365-financeandoperations
@SAS Token	Value you have generated in previous steps; <b>delete the first character in token string "?"</b>	sv=2020-08-04&ss=bfqt&srt=sco&sp=rwdlacupx&se=2022-02-01T21:33:14Z&st=2023-02-01T13:33:14Z&spr=https&sig=KS%2ULnU%3D

**Prepared SQL script (example):**

CREATE CREDENTIAL [https://bi4dynamicsuat.dfs.core.windows.net/dynamics365-financeandoperations] WITH IDENTITY = 'SHARED ACCESS SIGNATURE', SECRET = 'sv=2020-08-04&ss=bfqt&srt=sco&sp=rwdlacupx&se=2022-02-01T21:33:14Z&st=2023-02-01T13:33:14Z&spr=https&sig=KS%2ULInU%3D'

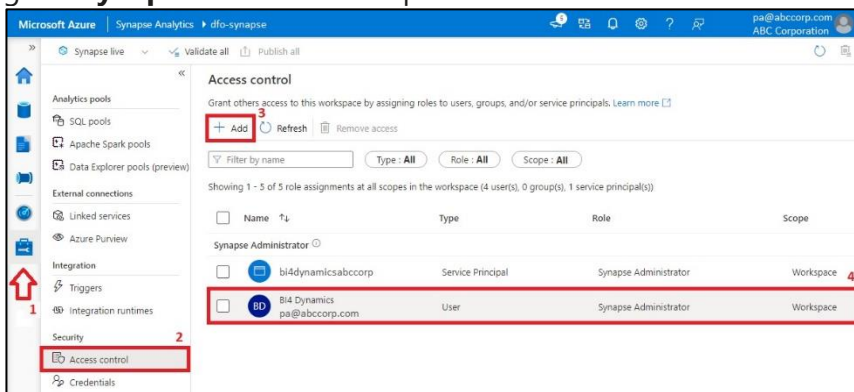
**Important:**

Once the **Expiry Date of Storage Account** is reached, the application would not be able to connect to DFO services. To make the connection we need to set a new **Expiry Date** in **Shared Access Signature** tab of **Storage Account** and update credentials in **Synapse Studio**.

**Note:**

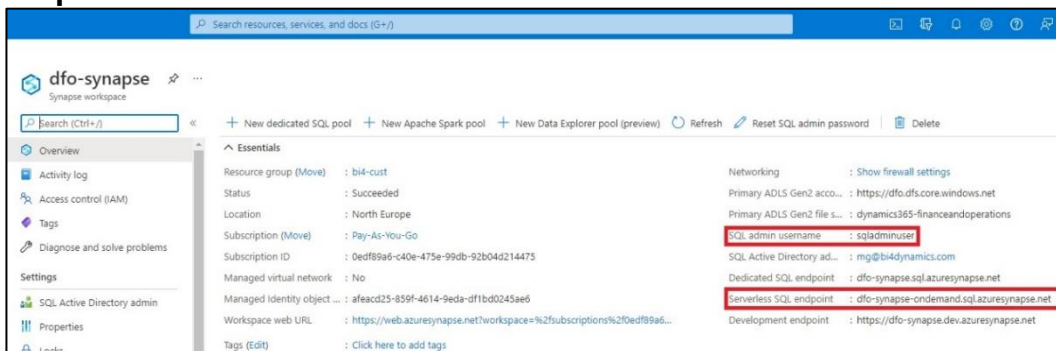
Before adding updated credentials with a new **SAS Token**, you need to use **DROP CREDENTIAL** to remove the old script with credentials and only after that the new **SQL Script Template** with the updated values can be executed.

Navigate to **Manage** tab. Select **Access control** tab from the menu on the left. Press **Add** button and grant **Synapse Administrator** permissions to the user that will be used by BI4Dynamics application.



- Serverless SQL endpoint and SQL admin username

Come back to **Overview** page of Synapse workspace. Copy **SQL admin username** and **Serverless SQL endpoint**.



Enter all parameters and press **Test connection and setup a Synapse**.

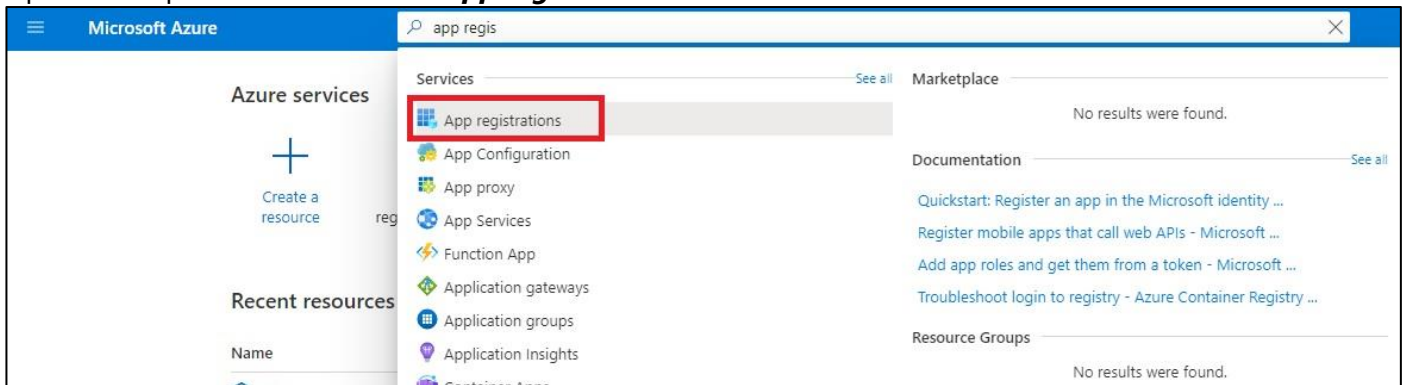
Following window should appear:



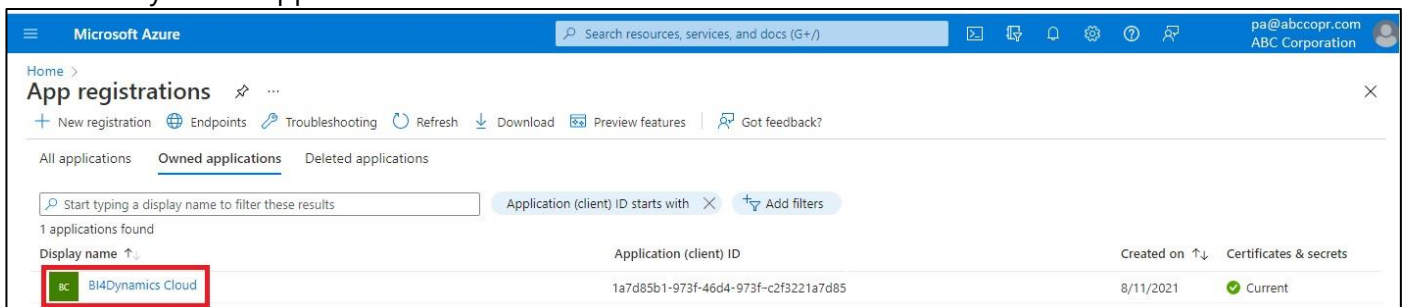
### 2.1.3. Setup Dynamics 365 AX Connector

- Service hostname URL - link to Microsoft Dynamics Finance and Operations (abccorp.operations.dynamics.com).
- Tenant ID – same as Blob Tenant ID.
- Client app id

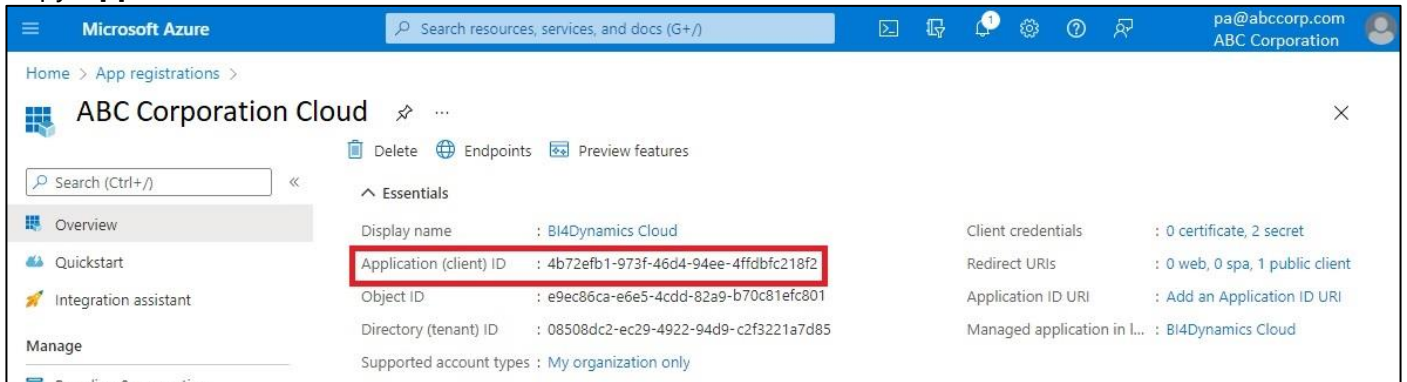
Open Azure portal and search for **App registrations**.



Select BI4Dynamics app.

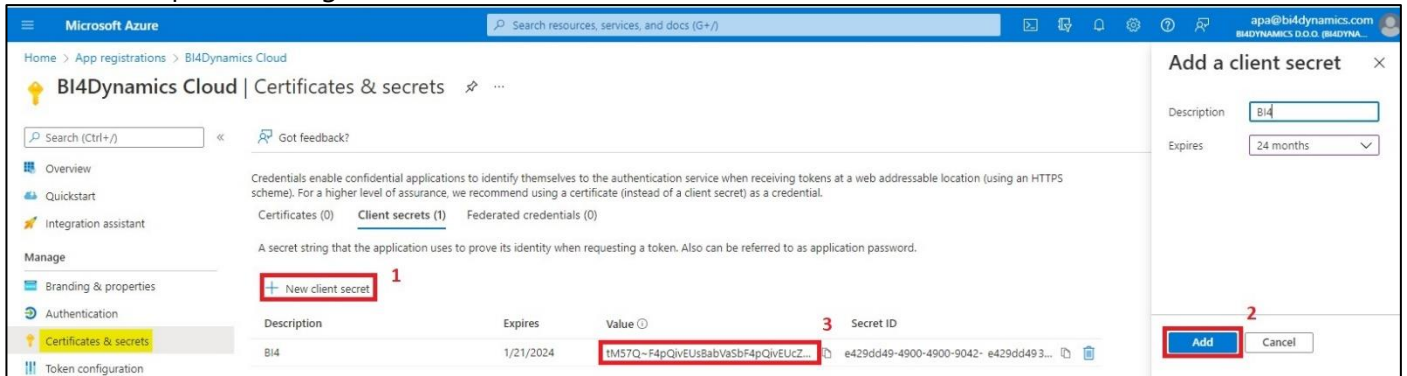


Copy **Application (client) ID** value.



- Client secret key

Select **Certificates & secrets** from the menu on the left. Create a new client secret and save value, since it will not be possible to get it later.

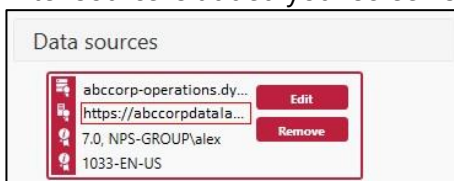


- Username & Password to Microsoft Dynamics.

**Test connection to AX Services**, following window should appear:



Once all credentials are imported, press **Add Data source** and wait... After source is added your screen should look like this:



You have successfully added data source

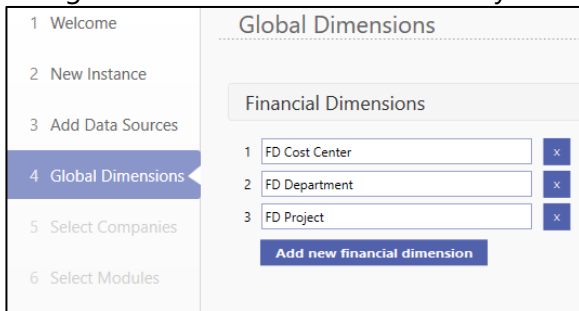
Click **Next**.



## 2.2. Setting up instance

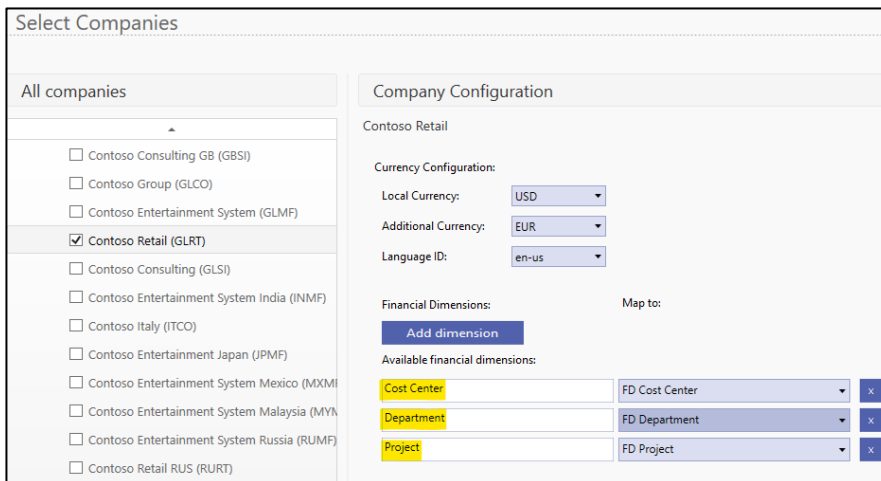
### 2.2.1. Selecting Global Dimensions

Add global financial dimensions from your D365 F&O.



### 2.2.2. Selecting Companies

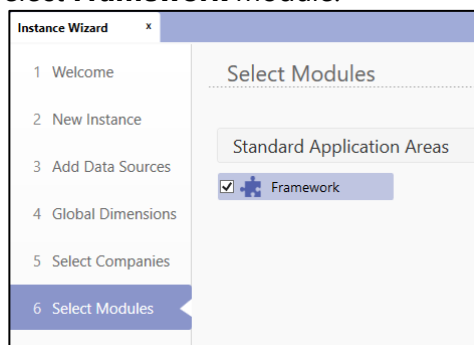
1. From the list of companies **tick the ones you want to include in your instance** and configure additional settings for each selected company:
  - a. **Local Currency**: local currency code (e.g. GBP) – get data from D365 F&O.
  - b. **Additional Currency**: select the additional currency code for this company (e.g. USD).
  - c. **Select Language ID** from the pop-up menu.
  - d. Add financial dimension and relate them with global financial dimensions.



2. Click **Next**.

### 2.2.3. Selecting Modules

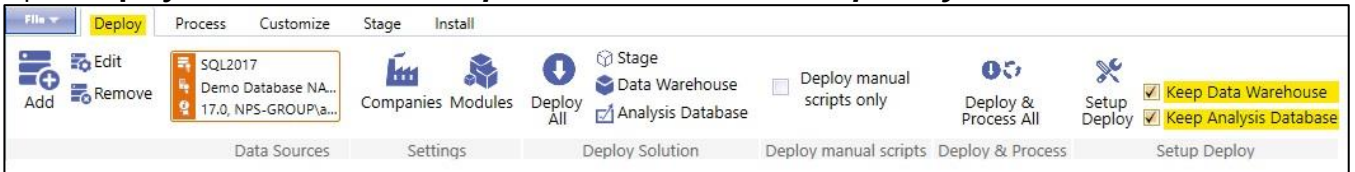
Select **Framework** module.



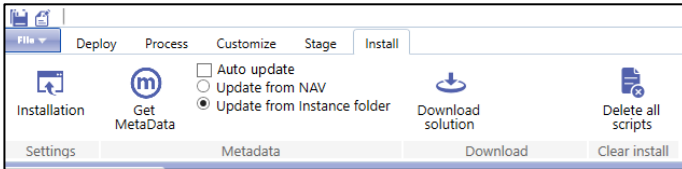
Click **Next**.

### 2.2.4. Completing installation

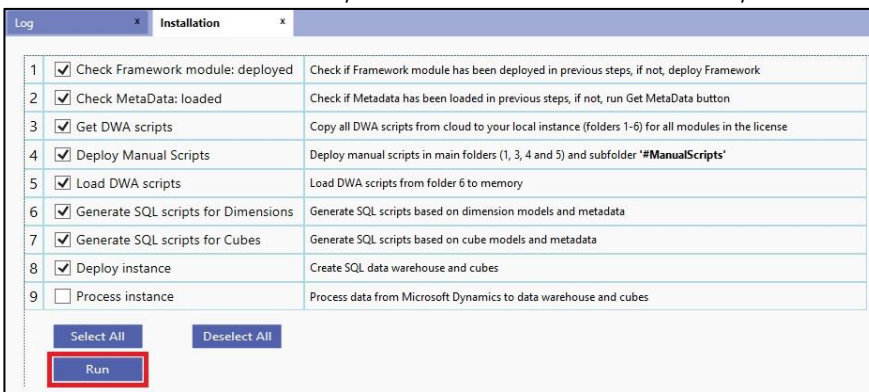
Open **Deploy** tab and make sure **Keep Data Warehouse** and **Keep Analysis Database** are checked



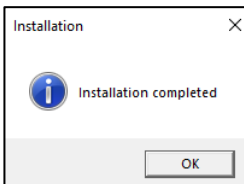
Move to **Install** tab and click **Installation** button.



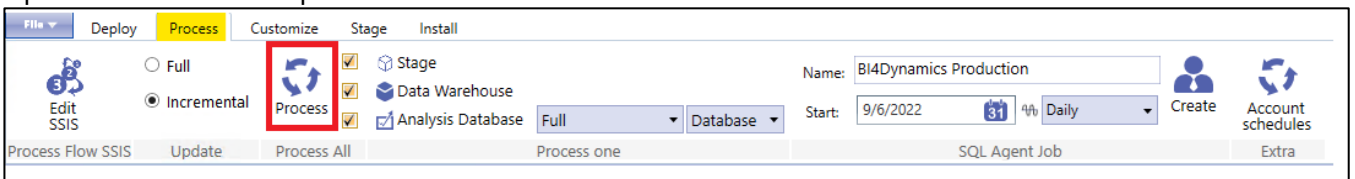
On the **Installation** screen, uncheck **#9 Process Instance**, click **Run**



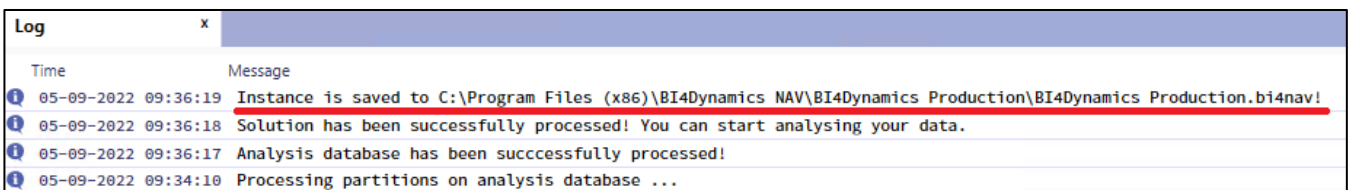
Wait for the **"Installation Completed"** message.



Open **Process** tab and press **Process** button



Wait until the instance is processed



You have successfully deployed and processed data warehouse and analytics.

## 3. Implementation option B: Azure Analysis Services

If you plan to use Azure Analysis Services, complete chapters **Installing On-premises Data Gateway** and **Installing Azure Analysis Services**. Come back when finished.

### Instance properties

1. Type the **Name** of the new instance.
2. Select what **Language** the solution will be deployed in.

### SQL server

3. Keep or change **Database Name** of the BI4Dynamics Data Warehouse.
4. Type **SQL server name** (Use local server name).
5. Select or Type in the **SQL Server Instance** name where the BI4Dynamics Data Warehouse will be deployed.

### Azure Analysis Services

- **SQL Analysis Server name:** enter the name of the Azure Analysis Services (see in Chapter 2)
- **Authentication:** Azure Active Directory
- **Username:** email of the admin user ([adminuser@domain.com](mailto:adminuser@domain.com)) that has been entered when creating Azure Analysis Services
- **Password:** enter password for Azure Active Directory

### Integration Services

Check **SQL Integration Service** to process BI4Dynamics using the Integration services (parallel processing).

### Refresh

Click **Refresh** to set default values for **SQL Database file Locations** (data and log files) and **SQL Database Collation** are entered automatically. Modify if necessary.

The screenshot shows the 'New Instance' configuration window. On the left is a navigation pane with steps: 1 Welcome, 2 New Instance (selected), 3 Add Data Sources, 4 Global Dimensions, 5 Select Companies, 6 Select Modules, 7 Run, 8 Congratulations. The main area is titled 'New Instance' and contains the following sections:

- Instance properties:** Instance name: BI4Dynamics DFO; Language: English (United States).
- SQL Server:** Database Name: BI4Dynamics DFO; SQL Server Name: ANDRIIW10; Authentication: Windows; SQL Database File Locations: Data: C:\Program Files\Microsoft SQL Server\MSSQL; Log: C:\Program Files\Microsoft SQL Server\MSSQL; SQL Database Collation: SQL\_Latin1\_General\_CP1\_CI\_AS.
- Analysis Services:** Analysis Database Name: BI4Dynamics DFO; SQL Analysis Server Name: ANDRIIW10; Authentication: Windows; SQL Analysis Server Option: Tabular; Model: Import.
- Integration Services:** SQL Integration Service: ; SSIS Server name: ANDRIIW10; Ver: 15.0.

Buttons for 'Refresh' and 'Test Connectivity' are located at the bottom of the configuration area.

Click **Next**.

### 3.1. Adding data source – D365 F&O Cloud Source

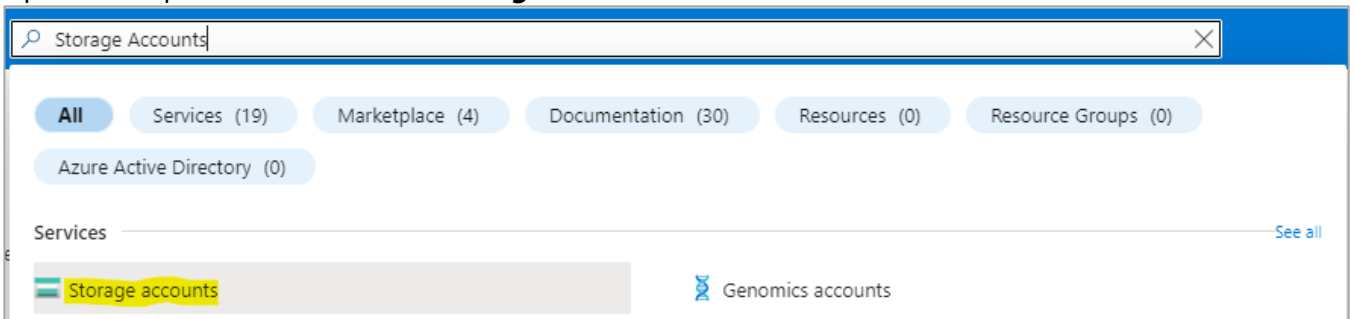
#### 3.1.1. Setup BLOB Subscription

This information is about adding Data Source(s) for BI4Dynamics instance.

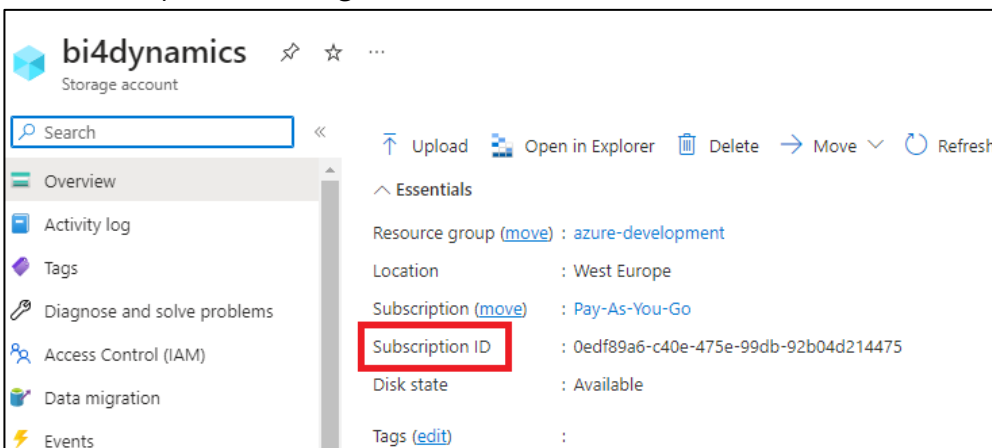
#### Setup Storage Account

- Tenant ID and Account Name

Open Azure portal and search for **Storage accounts**.



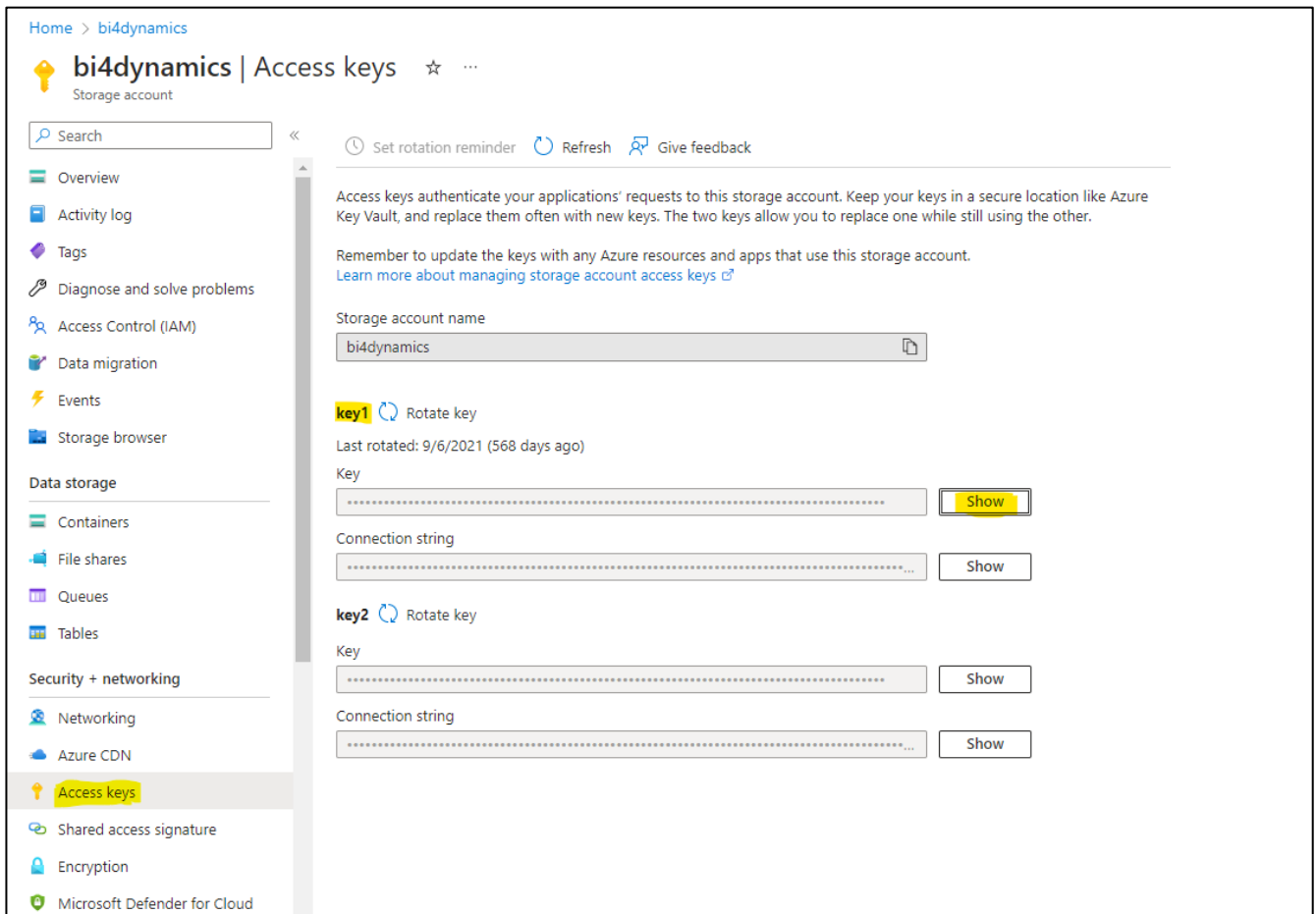
Select and open the **Storage account** used for the installation.



Copy and paste its Subscription ID and Account Name into corresponding field in the application.

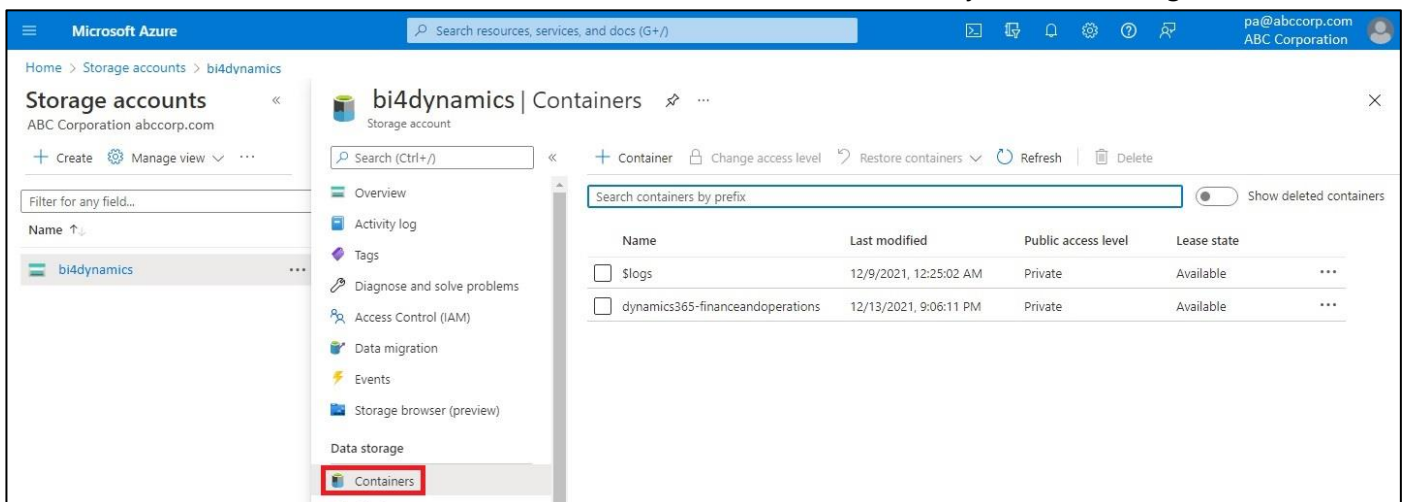
- Blob Key

Navigate to the storage account you use and select **Access keys** from the menu on the left. Unhide **key1** and copy value to the corresponding field in the BI4Dynamics application.



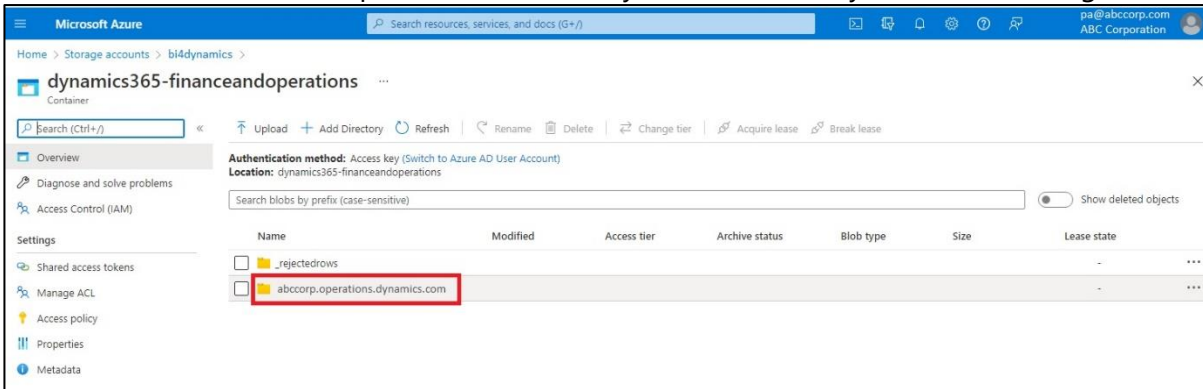
- Container Name

Select **Containers** from the menu on the left. Select the container that you will be using.



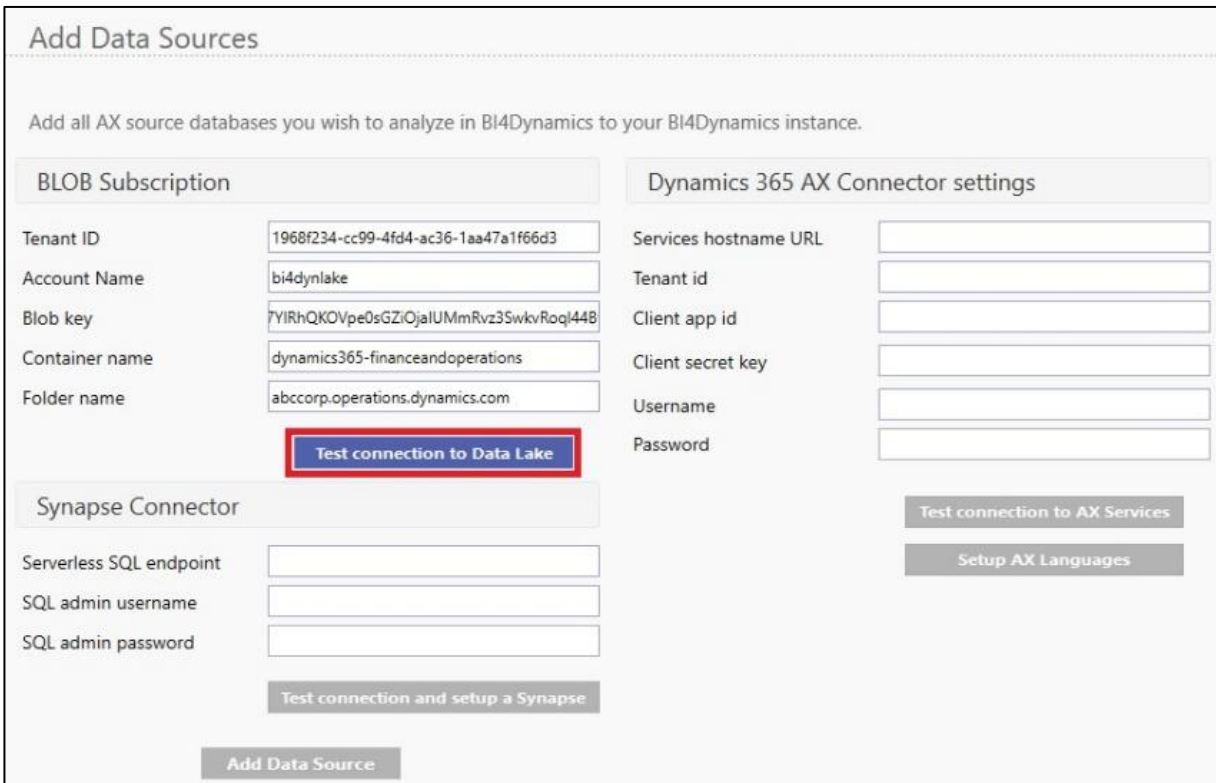
- Folder Name

Select the folder that correspond to Microsoft Dynamics instance you are connecting.



Copy Folder name and paste it into corresponding field in BI4Dynamics application.

Enter all parameters and press **Test connection to Data Lake**.

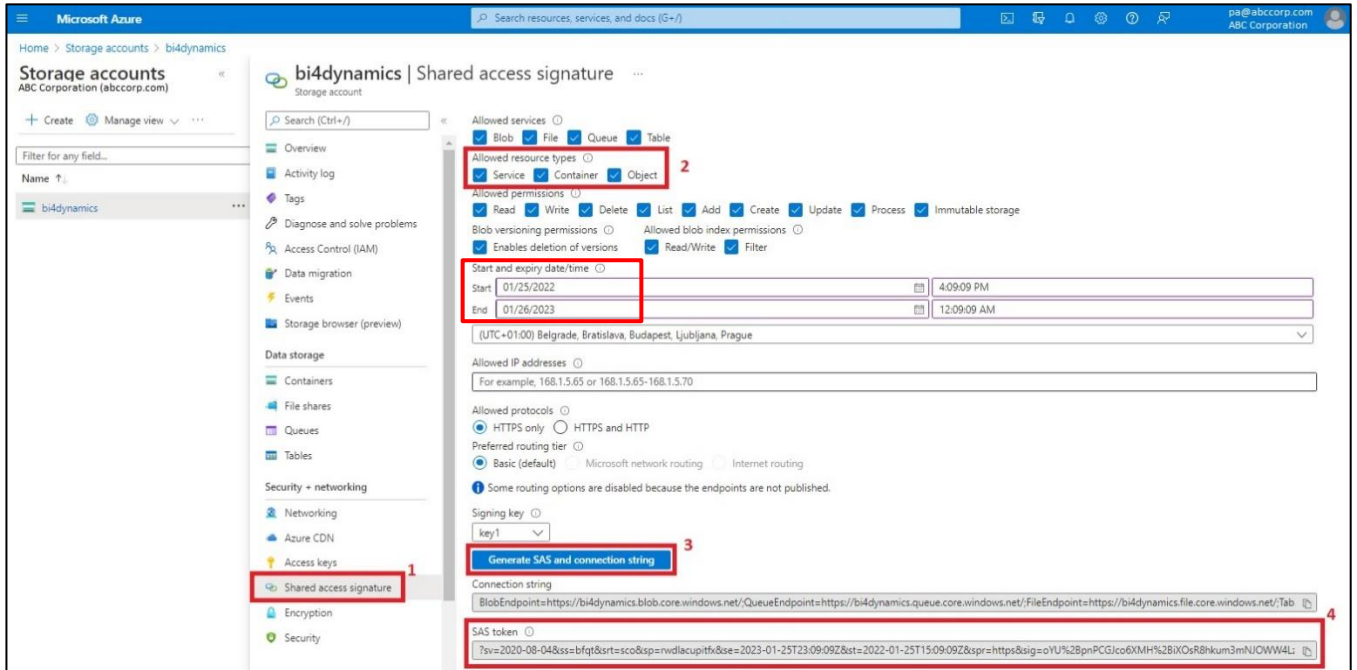


Following window should appear:

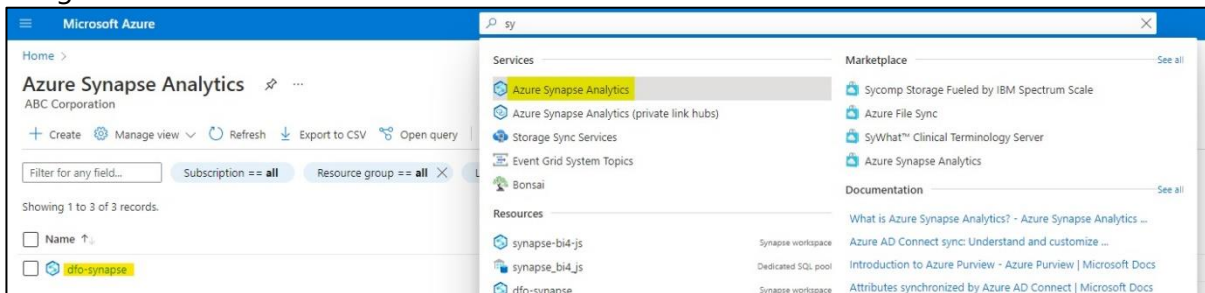


### 3.1.2. Setup Azure Synapse

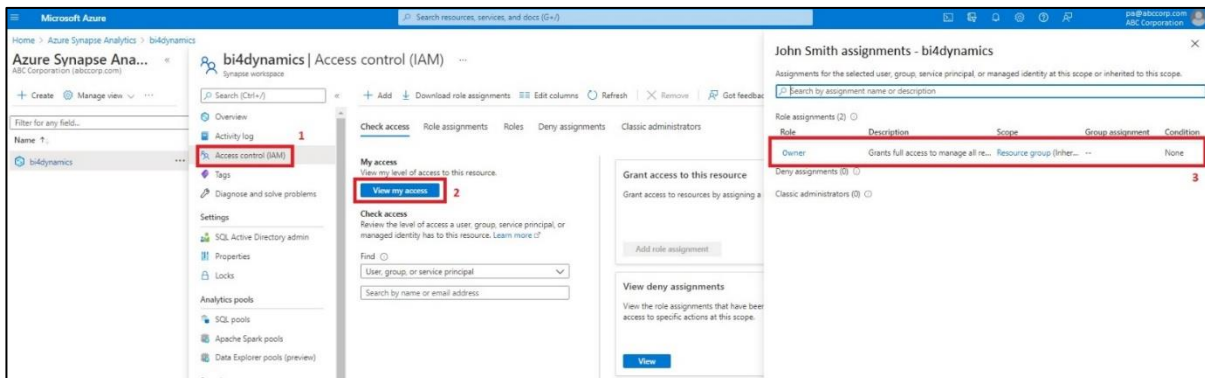
6. In storage account navigate to **Shared access signature** from the menu on the left.
7. Select all three options under Allowed resource types.
8. Select Start and Expiry date (usually 1 year)
9. Press Generate SAS and connection string.
10. Copy SAS token value.



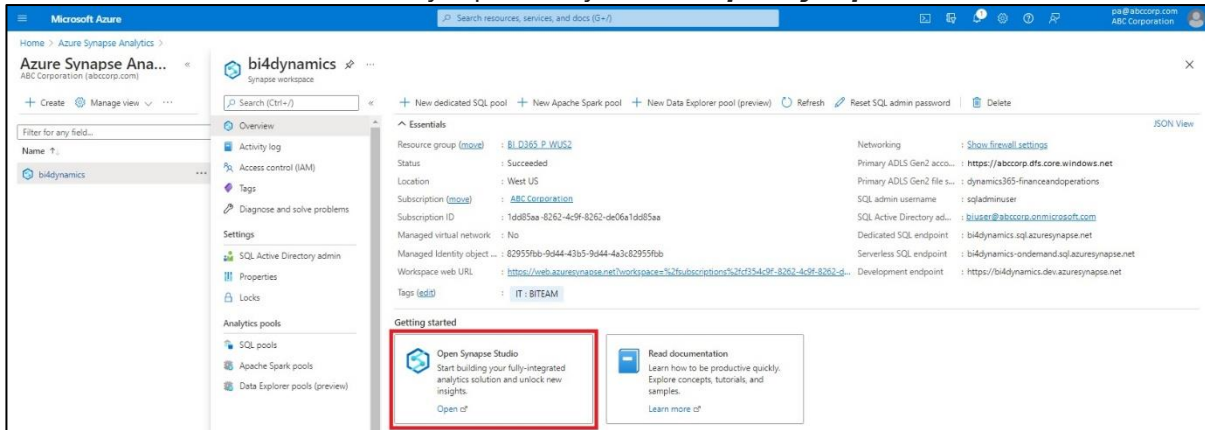
Open Azure portal and search for **Azure Synapse Analytics**. Select the Azure Synapse Analytics you are using.



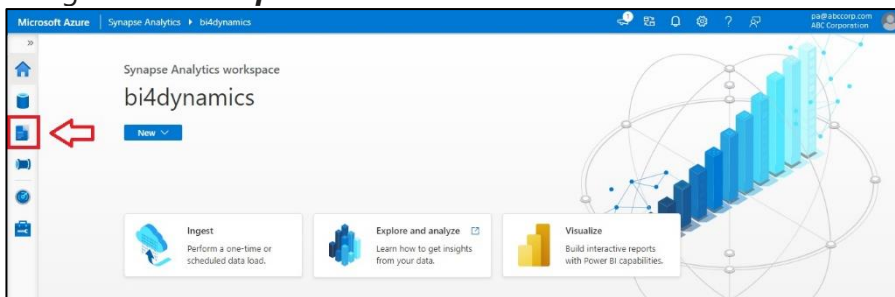
Select **Access control (IAM)** from the menu on left. Press **View my access** button and make sure you have **Owner** resource role.



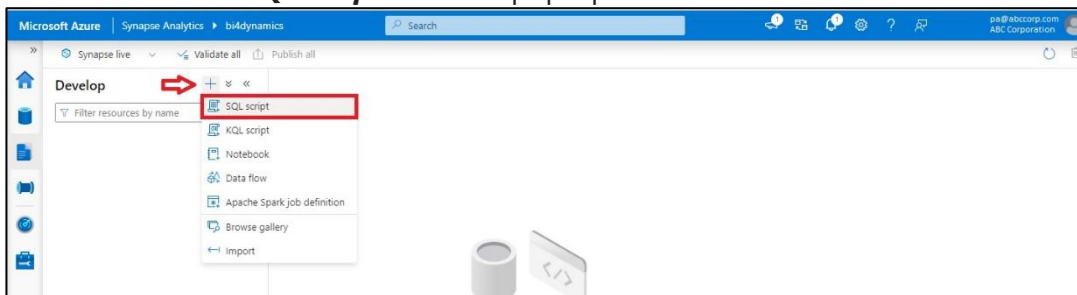
Come back to **Overview** tab of Synapse Analytics and **Open Synapse Studio**.



Navigate to **Develop** tab.



Press **+** and select **SQL script** from the pop-up menu.



Prepare script with shared access signature, paste it into the newly opened query, edit it accordingly and click **Run**.

**SQL script template**

```
CREATE CREDENTIAL [https://@storageAccount.dfs.core.windows.net/@containerName] WITH
IDENTITY = 'SHARED ACCESS SIGNATURE', SECRET = '@SAS Token'
```

Replace parameters with real values:

Parameter	Description	Value (example)
@storageAccount	Name of the storage account	bi4dynamicsuat
@containerName	Container name	dynamics365-financeandoperations
@SAS Token	Value you have generated in previous steps; <b>delete the first character in token string "?"</b>	sv=2020-08-04&ss=bfqt&srt=sco&sp=rwldacupx&se=2022-02-01T21:33:14Z&st=2023-02-01T13:33:14Z&spr=https&sig=KS%2ULnU%3D



**Prepared SQL script (example):**

CREATE CREDENTIAL [https://bi4dynamicsuat.dfs.core.windows.net/dynamics365-financeandoperations] WITH IDENTITY = 'SHARED ACCESS SIGNATURE', SECRET = 'sv=2020-08-04&ss=bfqt&srt=sco&sp=rwdlacupx&se=2022-02-01T21:33:14Z&st=2023-02-01T13:33:14Z&spr=https&sig=KS%2ULInU%3D'

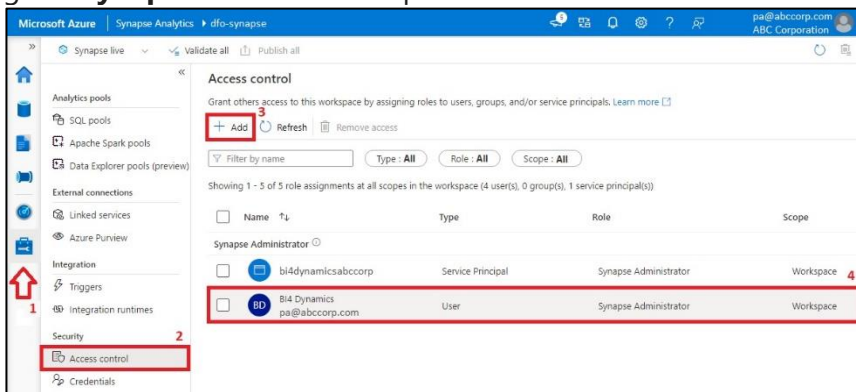
**Important:**

Once the **Expiry Date of Storage Account** is reached, the application would not be able to connect to DFO services. To make the connection we need to set a new **Expiry Date** in **Shared Access Signature** tab of **Storage Account** and update credentials in **Synapse Studio**.

**Note:**

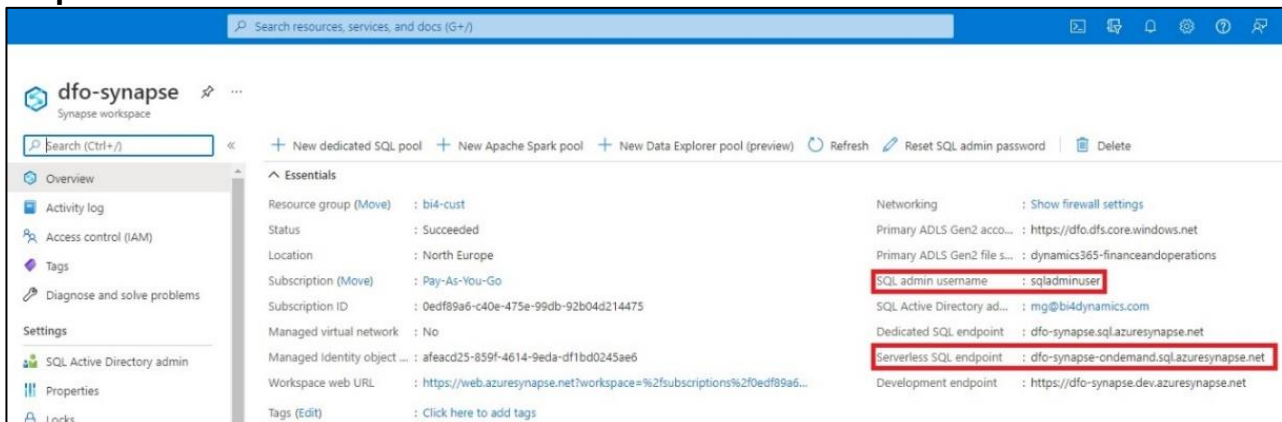
Before adding updated credentials with a new **SAS Token**, you need to use **DROP CREDENTIAL** to remove the old script with credentials and only after that the new **SQL Script Template** with the updated values can be executed.

Navigate to **Manage** tab. Select **Access control** tab from the menu on the left. Press **Add** button and grant **Synapse Administrator** permissions to the user that will be used by BI4Dynamics application.



- Serverless SQL endpoint and SQL admin username

Come back to **Overview** page of Synapse workspace. Copy **SQL admin username** and **Serverless SQL endpoint**.



Enter all parameters and press **Test connection and setup a Synapse**.

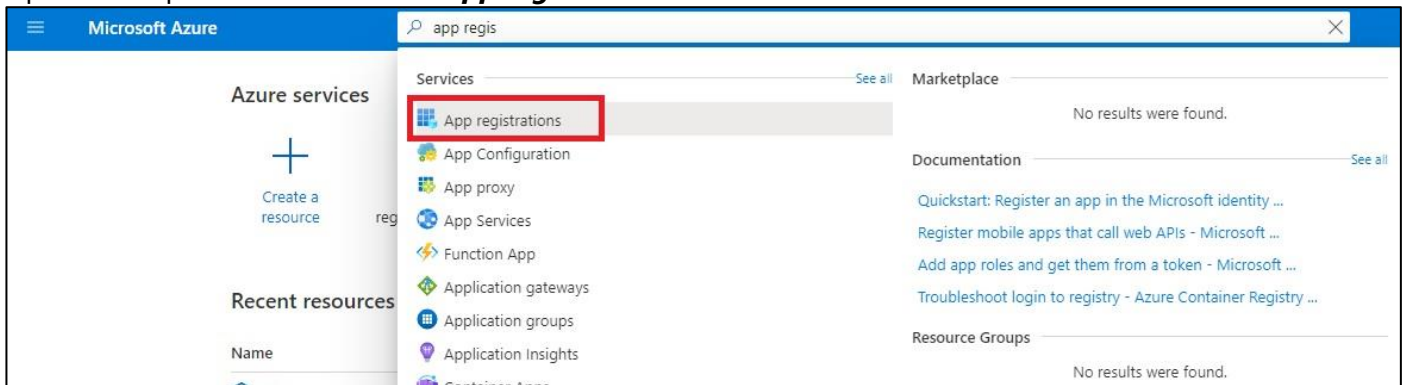
Following window should appear:



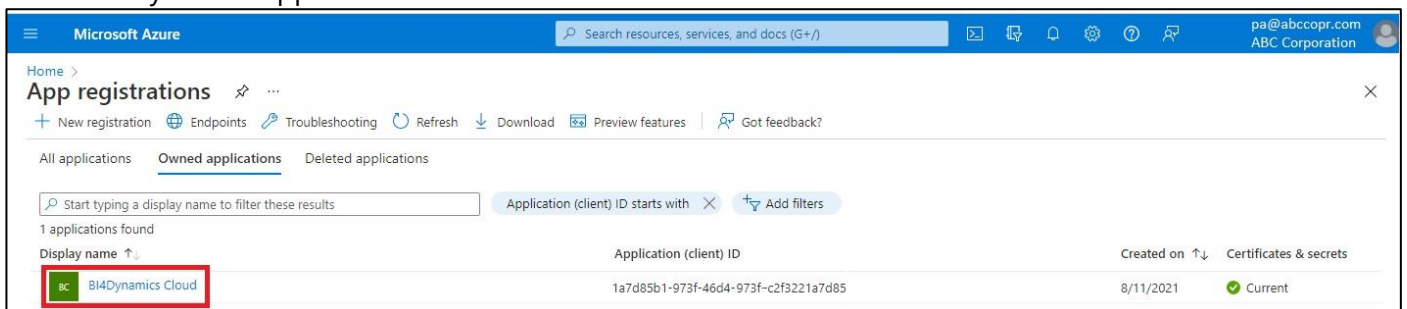
### 3.1.3. Setup Dynamics 365 AX Connector

- Service hostname URL - link to Microsoft Dynamics Finance and Operations (abccorp.operations.dynamics.com).
- Tenant ID – same as Blob Tenant ID.
- Client app id

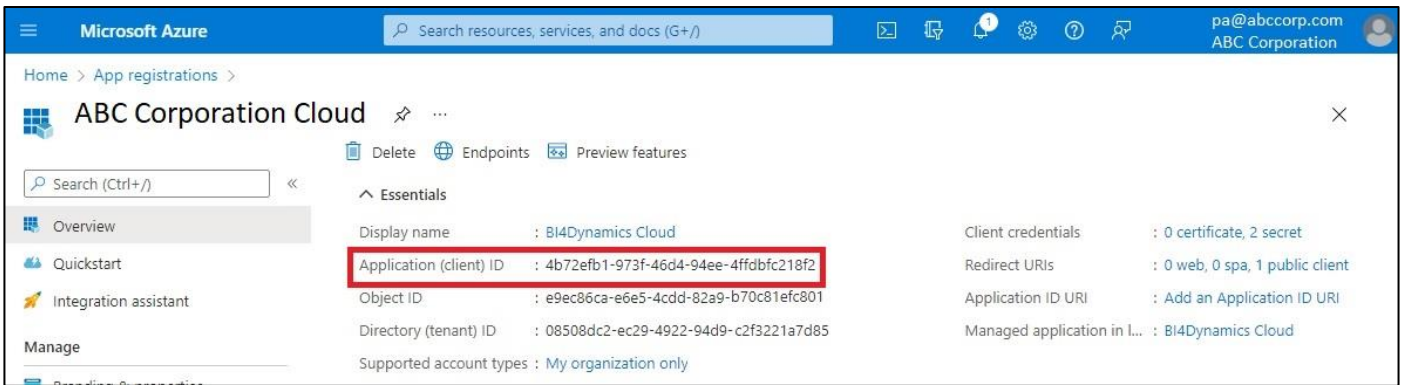
Open Azure portal and search for **App registrations**.



Select BI4Dynamics app.

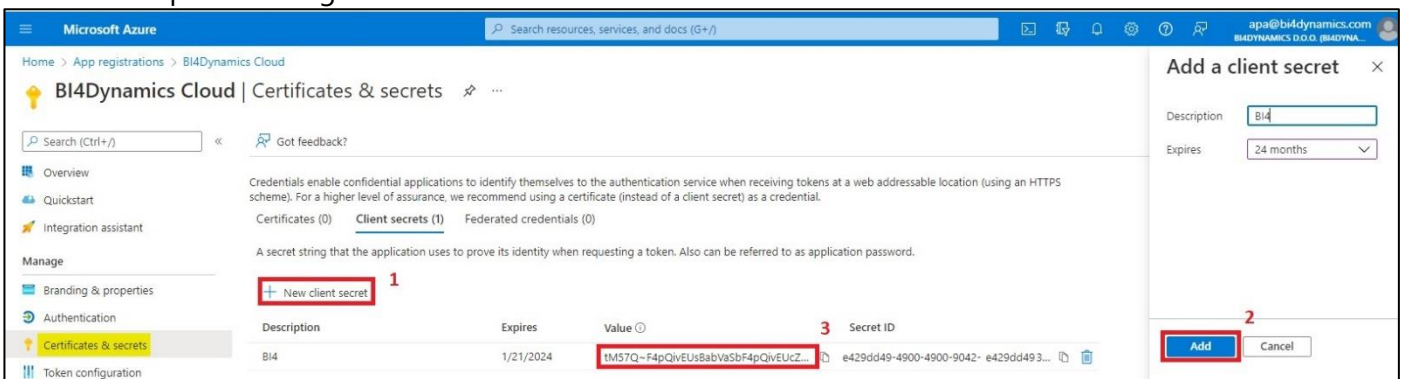


Copy **Application (client) ID** value.



- Client secret key

Select **Certificates & secrets** from the menu on the left. Create a new client secret and save value, since it will not be possible to get it later.



- Username & Password to Microsoft Dynamics.

**Test connection to AX Services**, following window should appear:



Once all credentials are imported, press **Add Data source** and wait...

After source is added your screen should look like this:



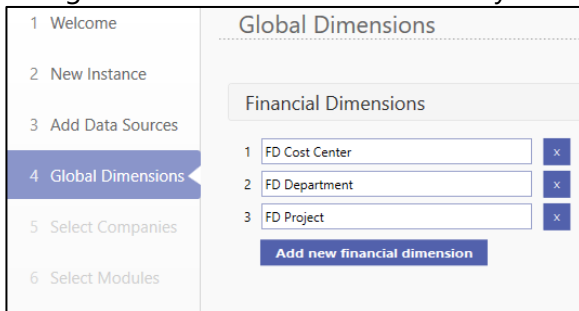
You have successfully added data source

Click **Next**.

## 3.2. Setting up instance

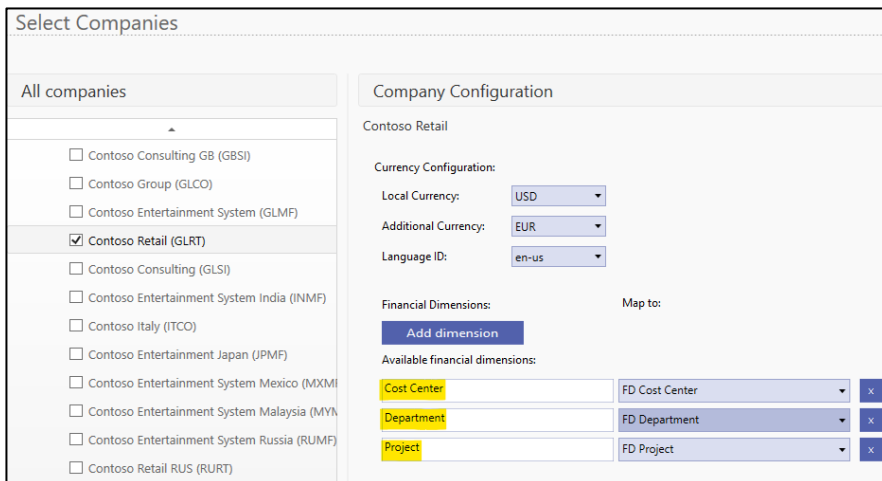
### 3.2.1. Selecting Global Dimensions

Add global financial dimensions from your D365 F&O.



### 3.2.2. Selecting Companies

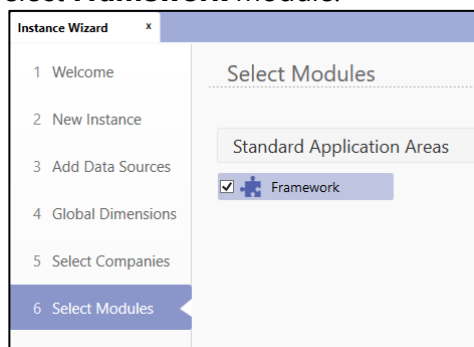
3. From the list of companies **tick the ones you want to include in your instance** and configure additional settings for each selected company:
  - a. **Local Currency**: local currency code (e.g. GBP) – get data from D365 F&O.
  - b. **Additional Currency**: select the additional currency code for this company (e.g. USD).
  - c. **Select Language ID** from the pop-up menu.
  - d. Add financial dimension and relate them with global financial dimensions.



4. Click **Next**.

### 3.2.3. Selecting Modules

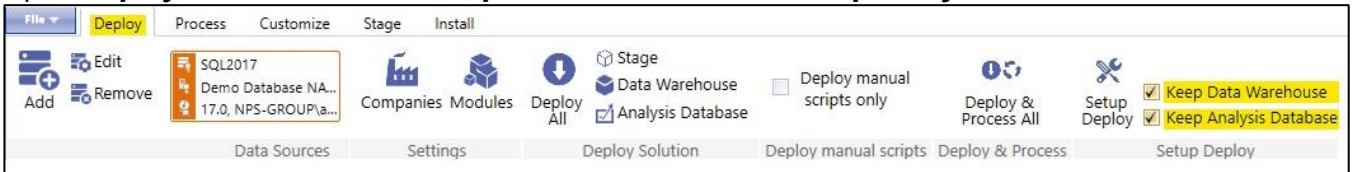
Select **Framework** module.



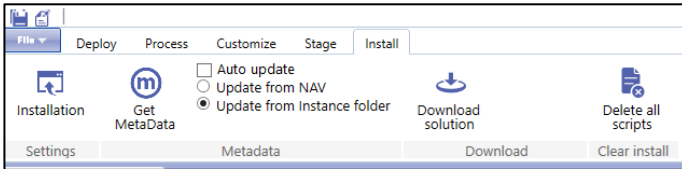
Click **Next**.

### 3.2.4. Completing installation

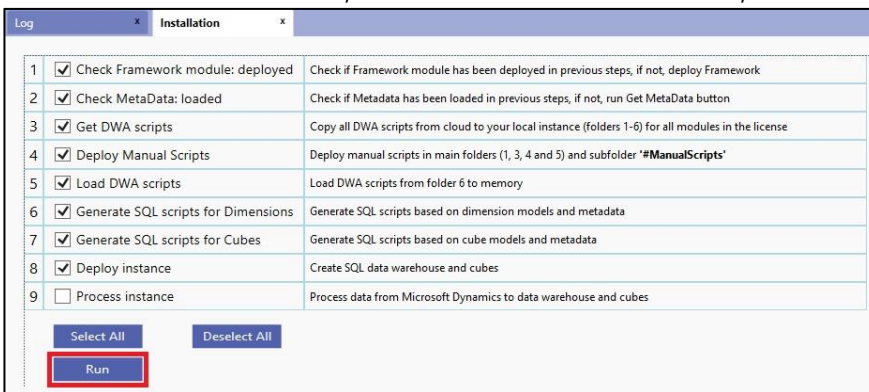
Open **Deploy** tab and make sure **Keep Data Warehouse** and **Keep Analysis Database** are checked



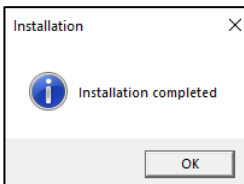
Move to **Install** tab and click **Installation** button.



On the **Installation** screen, uncheck **#9 Process Instance**, click **Run**



Wait for the **"Installation Completed"** message.



## 3.3. Installing On-premises Data Gateway

When you choose to install analytics as Azure Analysis Services, you need to install following:

- Azure Analysis Service in Azure portal
- On-Premises Gateway on your BI server

We recommend to first install On-premises Gateway and later Azure Analysis Services as we enter parameters from on-Premises gateway to Azure Analysis Service settings.

### 3.3.1. Install On-Premises data gateway on virtual machine

#### Download On-Premises data gateway to virtual machine

Download On-Premises Data gateway from Microsoft site:

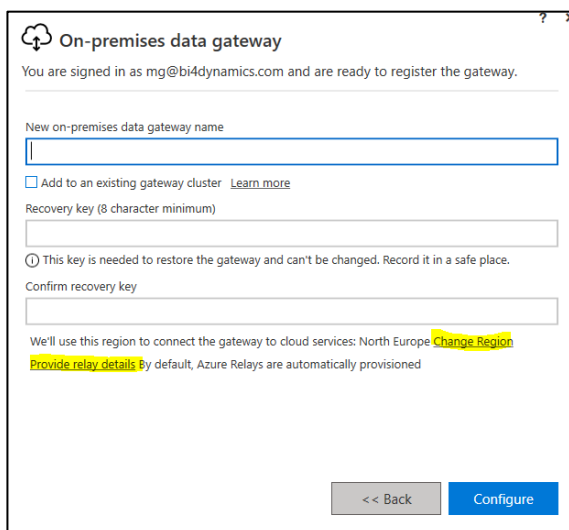
<https://www.microsoft.com/en-us/download/details.aspx?id=53127>

#### Install On-premises data gateway

Follow the documentation from Microsoft site:

<https://docs.microsoft.com/en-us/data-integration/gateway/service-gateway-install>

Note: Please be very careful when selecting the right region. Installation process will set On-Premises Gateway to your default region that may not be the same as Azure Analysis Services. The feature is not so exposed during installation so it can easily go unnoticed.



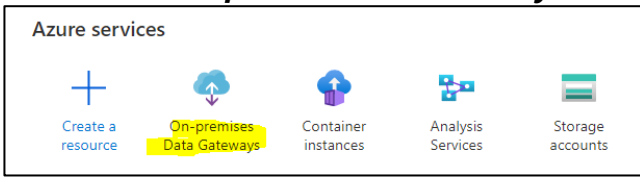
The screenshot shows the 'On-premises data gateway' configuration window. At the top, it says 'On-premises data gateway' with a cloud icon. Below that, it states 'You are signed in as mg@bi4dynamics.com and are ready to register the gateway.' There are several input fields: 'New on-premises data gateway name' (empty), 'Recovery key (8 character minimum)' (empty), and 'Confirm recovery key' (empty). A checkbox labeled 'Add to an existing gateway cluster' is unchecked, with a 'Learn more' link next to it. Below the recovery key fields, there is a note: 'This key is needed to restore the gateway and can't be changed. Record it in a safe place.' At the bottom, there is a message: 'We'll use this region to connect the gateway to cloud services: North Europe' with a 'Change Region' link. Below that, it says 'Provide relay details: By default, Azure Relays are automatically provisioned'. At the bottom right, there are two buttons: '<< Back' and 'Configure'.

If you have set the wrong Region, and your Gateway does not appear in the available list of gateways of your Azure Analysis Services than you must re-install On-Premises data gateway.

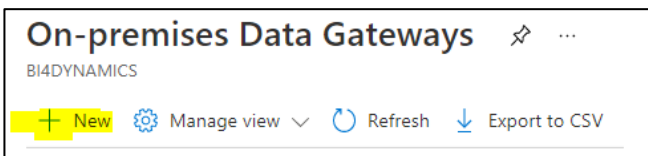
### 3.3.2. Setup On-Premises Data Gateway as Azure Service

Go to **Azure portal**

Click on icon **On-premises Data Gateway**

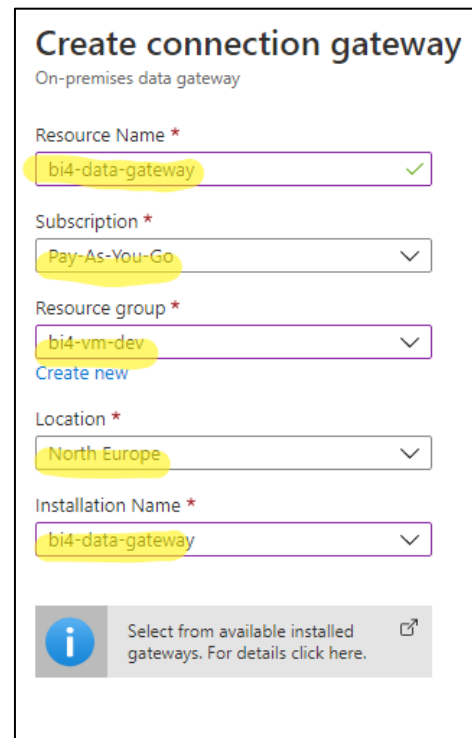


Click on **+ New**



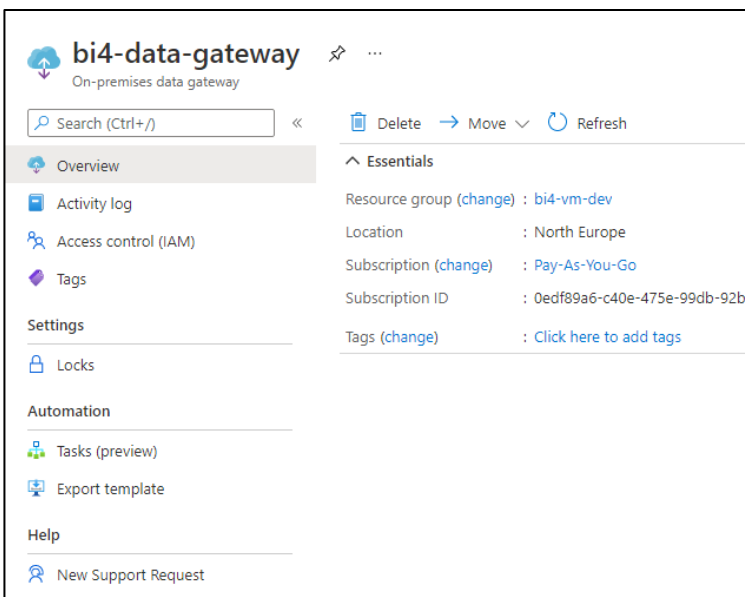
Enter all fields:

- **Resource name**
- **Subscription**
- **Resource group**
- **Location**
- **Installation name:** select on-premises gateway that you have created in previous step from the list of available gateways



Then click **Create**

Click **Go to Resource:**



You have successfully created an On-premises Data Gateway as Azure Service.

On-premises Data Gateway must be selected on Azure Service like Azure Analysis Services that will use this gateway to receive On-premises data.

### 3.4. Installing Azure Analysis Services

Analysis Services can be deployed on:

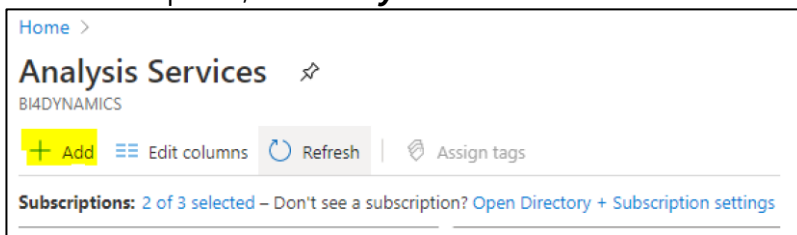
- A. **Same computer** that is hosting Data Warehouse (VM or Local Server)  
Use this for BI development instance and when users connect to service that is running in LAN (local area network)
- B. As **Azure Analysis Services**  
Use this option (also described as **Hybrid** option) for most Production environments where users connect to service with AAD (Azure Active Directory).

In this chapter option B is described.

#### 3.4.1. Create Azure Analysis Services

Before installing BI4Dynamics app you need to have available Azure Analysis Services that will host BI4Dynamics database.

Go to Azure portal, find **Analysis Services** and click **+Add**



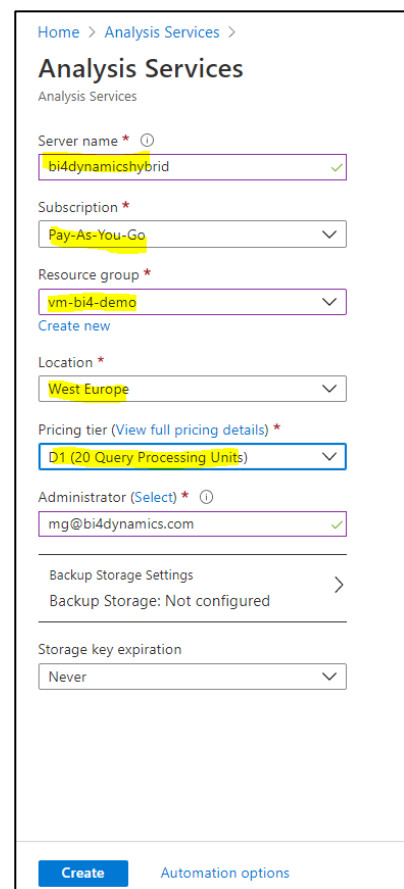
Enter the following fields:

- **Server name**: unique name of Analysis Server
- **Subscription**
- **Resource group**
- **Location**
- **Pricing tier**

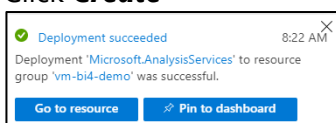
Database size (GB) will depend on data type, cardinality, and number of rows in your data warehouse

QPUS (number of processing units) will depend on database size and number of users that will query the data

Suggestion: start with lower tier, check if data can fit into database and if response time from your BI tool (Excel or Power BI) is good enough. If not, go for higher tier. It takes 60 seconds to change tier to next level.



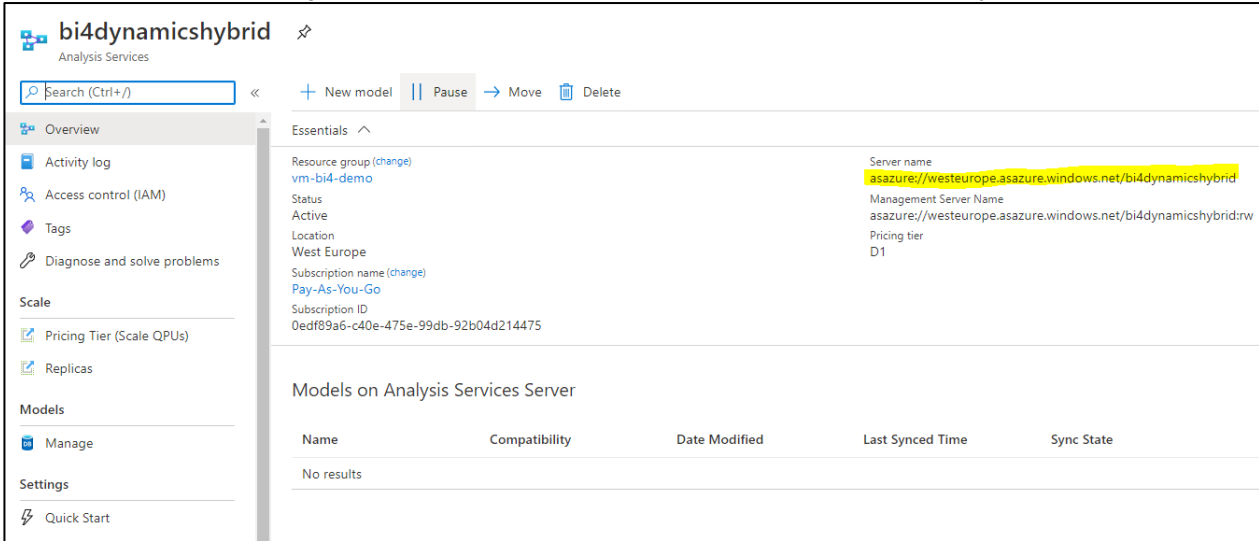
Click **Create**



You have successfully created Azure Analysis Services



**Go to resource** and **copy Server name** to notepad as it will be used in BI4Dynamics app installation.



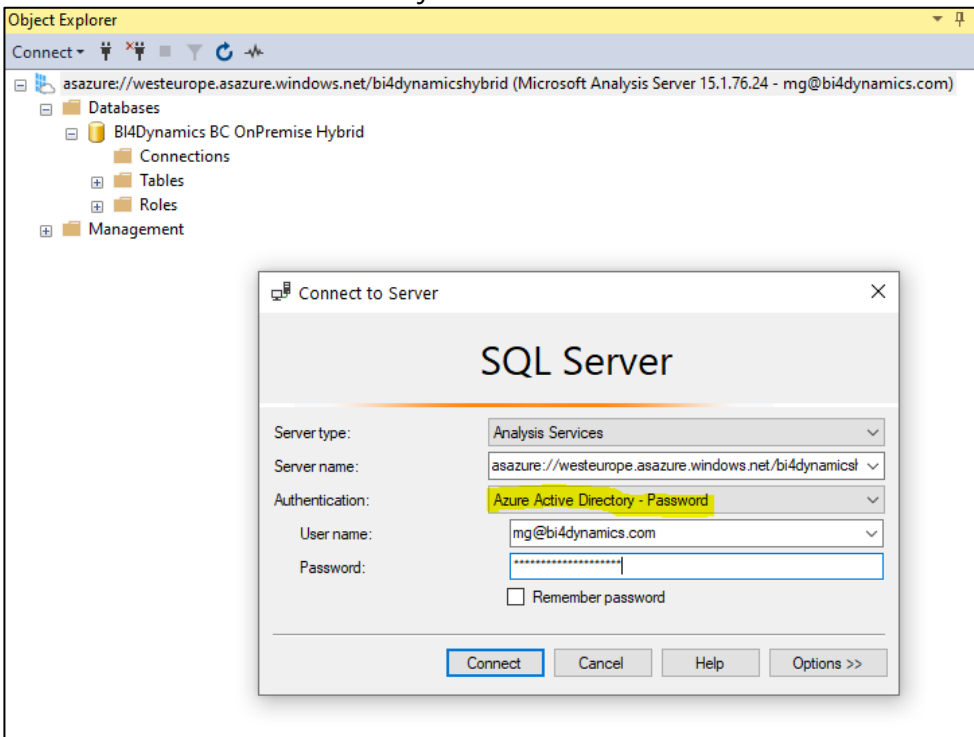
In our example server name is: **asazure://westeurope.asazure.windows.net/bi4dynamicshybrid**

### 3.4.2. Connect to Azure Analysis Services

To verify installation, connect to **Analysis Services Server** use **SSMS** (SQL Server Management Studio) and enter:

- **Server Type:** Analysis Services
- **Server name**
- **Authentication:** Azure Active Directory
- **Username**
- **Password**

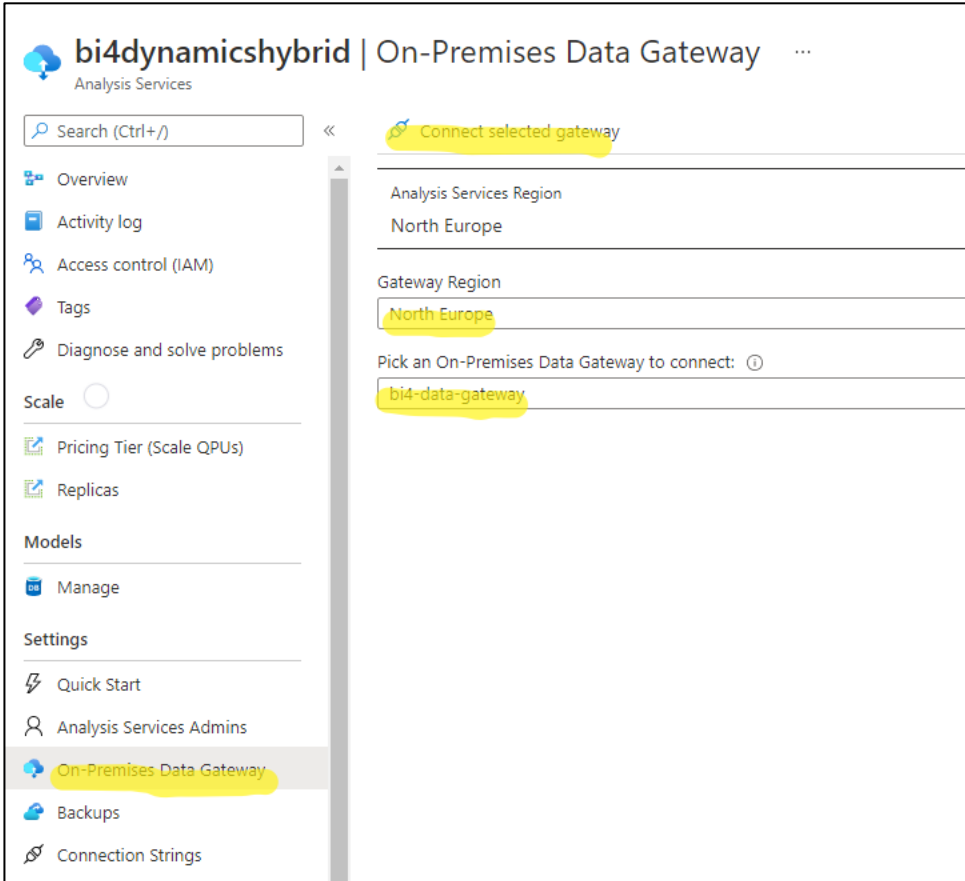
Here is a database that we have just created:



### 3.4.3. Select On-Premises Data Gateway

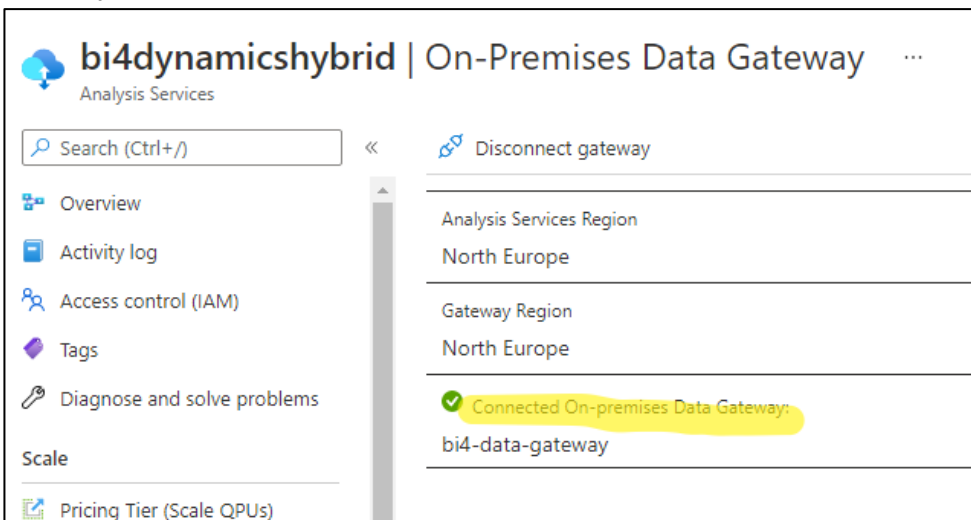
On-Premises Data Gateway is needed when Azure Service received data from On-Premises. When Azure Analysis Services is receiving data from On-Premises source than this option must be selected.

Click on **On-premises data gateway**  
 And **Pick an On-Premises Data Gateway to connect**

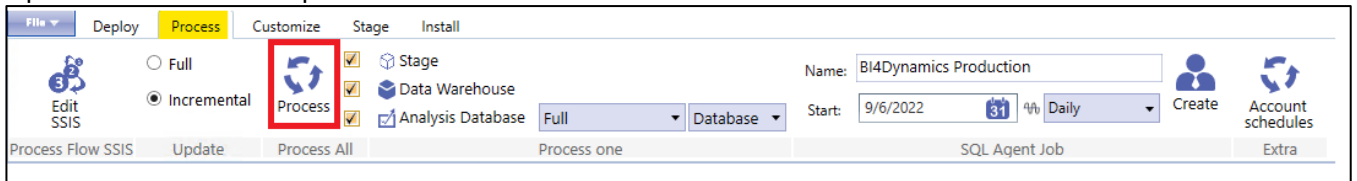


Click **Connect selected gateway**.

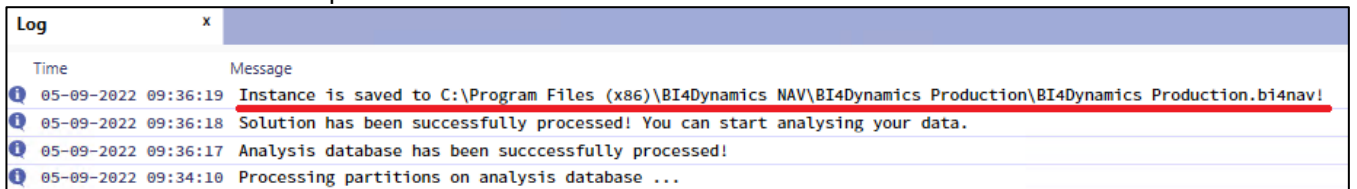
Gateway is now connected:



Open **Process** tab and press **Process** button



Wait until the instance is processed



You have successfully deployed and processed data warehouse and analytics.

## 4. Implementation option C: Power BI Premium

If you plan to use Azure Analysis Services, complete chapters **Installing On-premises Data Gateway** and **Installing power BI Premium workspace**. Come back when finished.

### Instance properties

1. Type the **Name** of the new instance.
2. Select what **Language** the solution will be deployed in.

### SQL server

3. Keep or change **Database Name** of the BI4Dynamics Data Warehouse.
4. Type **SQL server name** (Use local server name).
5. Select or Type in the **SQL Server Instance** name where the BI4Dynamics Data Warehouse will be deployed.

### Analysis Services

- **Analysis Database Name:** define how XMLA endpoint should be called
- **SQL Analysis Server Option:** select Power BI (XMLA endpoint)
- **Authentication:** Azure Active Directory
- **Username:** email of the admin user ([adminuser@domain.com](mailto:adminuser@domain.com)) that has been entered when creating Azure Analysis Services
- **Password:** enter password for Azure Active Directory
- **Workspace:** paste the link to the Power BI XMLA endpoint

### Integration Services

Check **SQL Integration Service** to process BI4Dynamics using the Integration services (parallel processing).

### Refresh

Click **Refresh** to set default values for **SQL Database file Locations** (data and log files) and **SQL Database Collation** are entered automatically. Modify if necessary.

This is how setting should look (showing Power BI Premium option):

The screenshot shows the 'New Instance' configuration window. The left sidebar contains a navigation menu with steps: 1 Welcome, 2 New Instance (selected), 3 Add Data Sources, 4 Global Dimensions, 5 Select Companies, 6 Select Modules, 7 Run, and 8 Congratulations. The main content area is titled 'New Instance' and contains the following sections:

- Instance properties:** Instance name: BI4Dynamics DFO; Language: English (United States).
- SQL Server:** Database Name: BI4Dynamics DFO; SQL Server Name: ANDRIIW10; Authentication: Windows; SQL Database File Locations: Data: C:\Program Files\Microsoft SQL Server\MSSQL...; Log: C:\Program Files\Microsoft SQL Server\MSSQL...; SQL Database Collation: SQL\_Latin1\_General\_CP1\_CI\_AS.
- Analysis Services:** Analysis Database Name: BI4Dynamics DFO; SQL Analysis Server Name: ANDRIIW10; Authentication: Windows; SQL Analysis Server Option: Tabular; Model: Import.
- Integration Services:** SQL Integration Service: ; SSIS Server name: ANDRIIW10 Ver. 15.0.

Buttons for 'Refresh' and 'Test Connectivity' are located at the bottom of the configuration area.

Click **Next**.

## 4.1. Adding Data source – D365 F&O Cloud Source

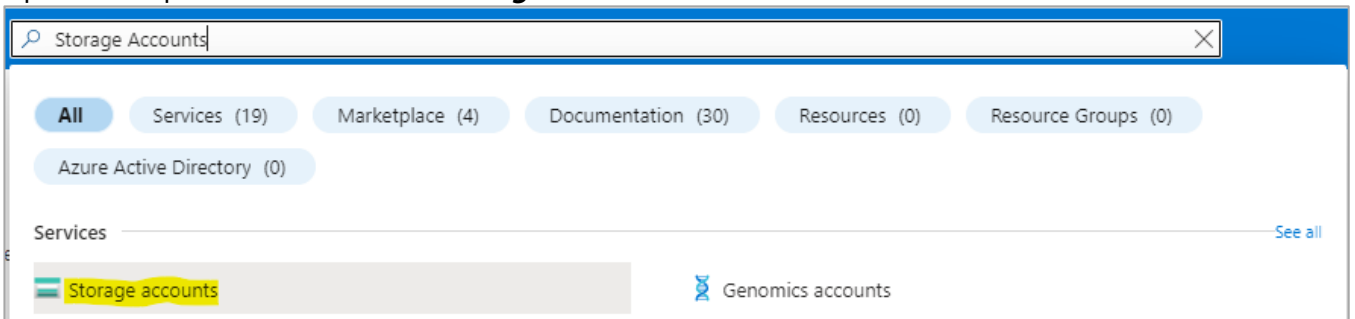
### 4.1.1. Setup BLOB Subscription

This information is about adding Data Source(s) for BI4Dynamics instance.

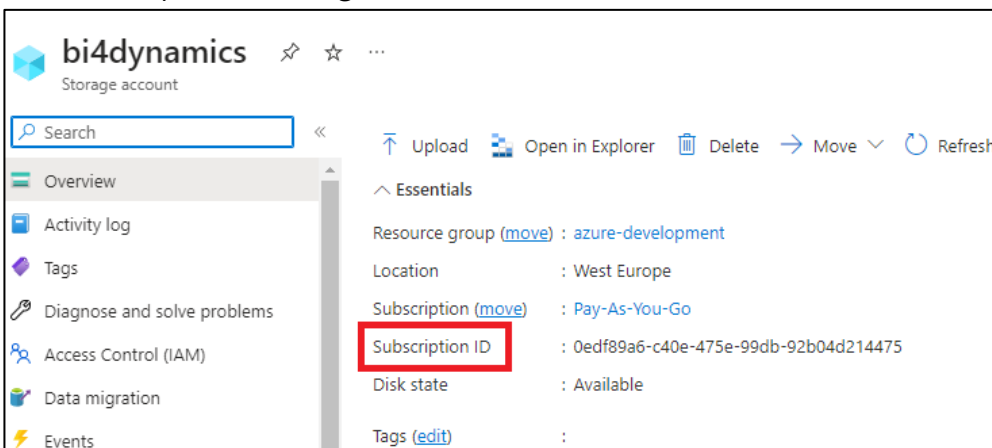
#### Setup Storage Account

- Tenant ID and Account Name

Open Azure portal and search for **Storage accounts**.



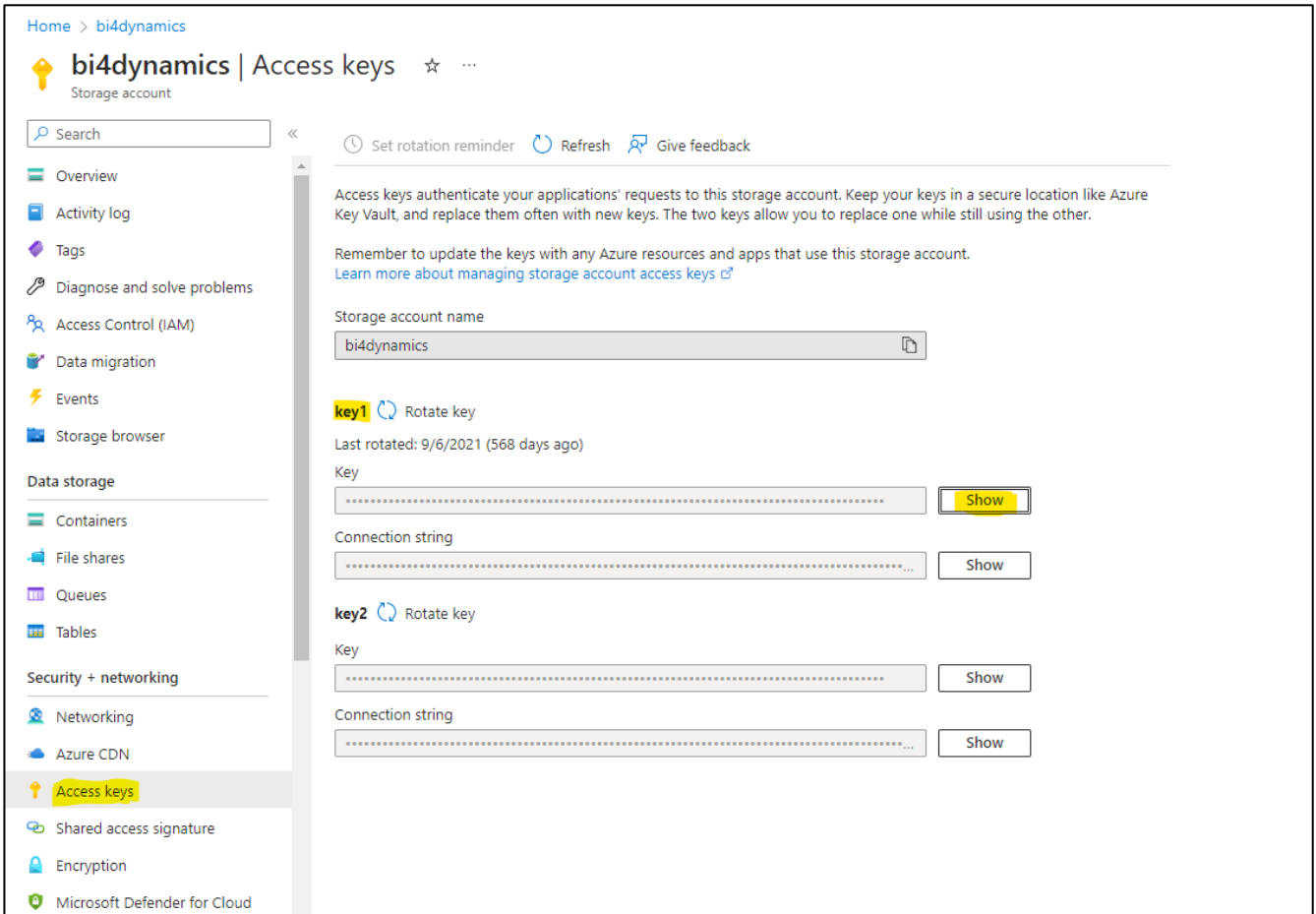
Select and open the **Storage account** used for the installation.



Copy and paste its Subscription ID and Account Name into corresponding field in the application.

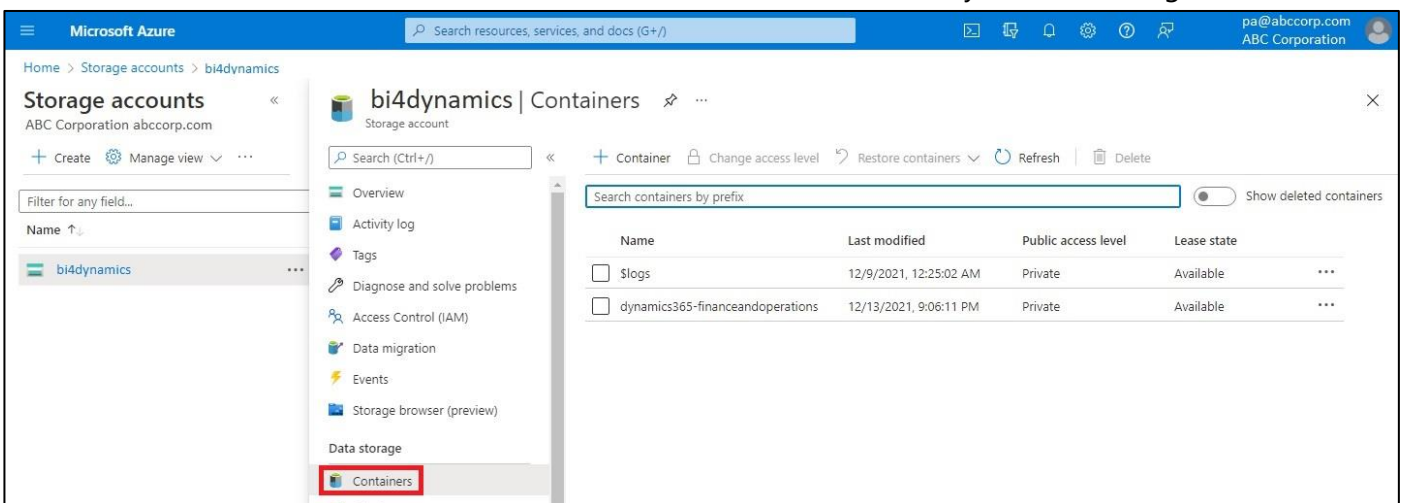
- Blob Key

Navigate to the storage account you use and select **Access keys** from the menu on the left. Unhide **key1** and copy value to the corresponding field in the BI4Dynamics application.



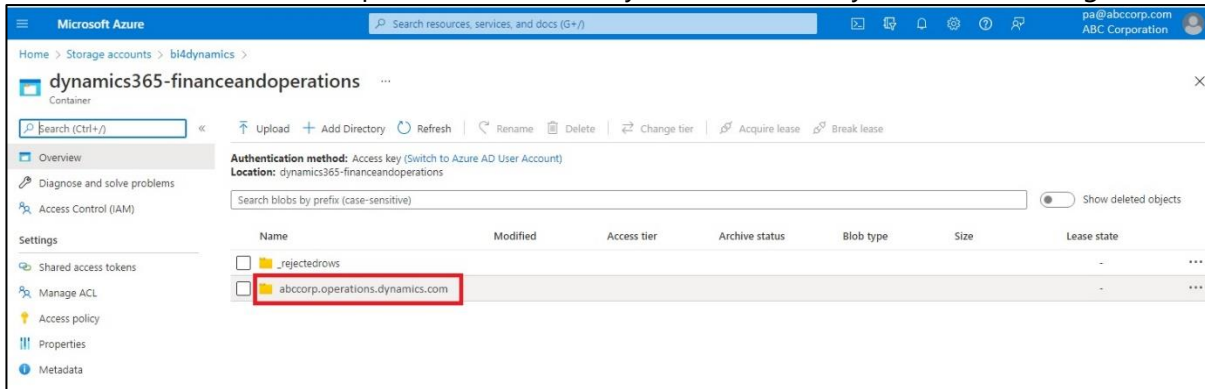
- Container Name

Select **Containers** from the menu on the left. Select the container that you will be using.



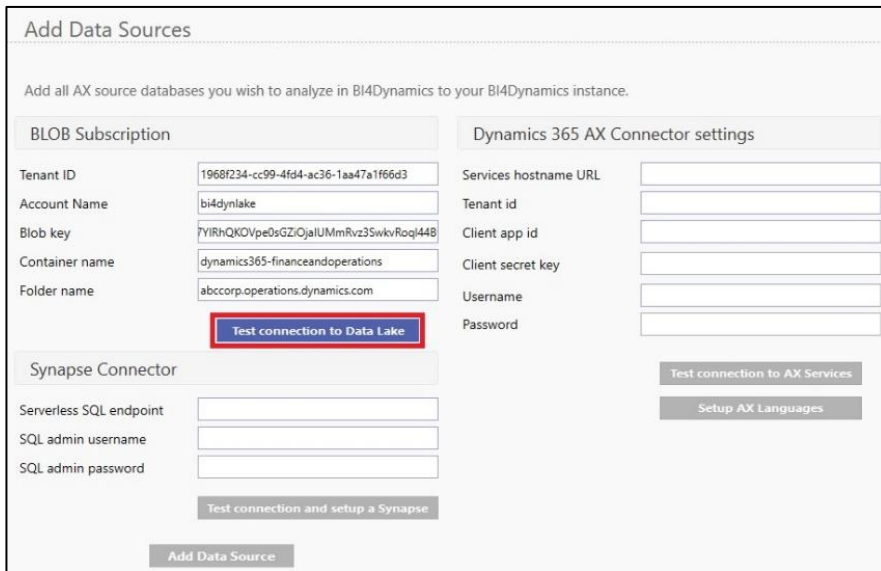
- Folder Name

Select the folder that correspond to Microsoft Dynamics instance you are connecting.



Copy Folder name and paste it into corresponding field in BI4Dynamics application.

Enter all parameters and press **Test connection to Data Lake**.

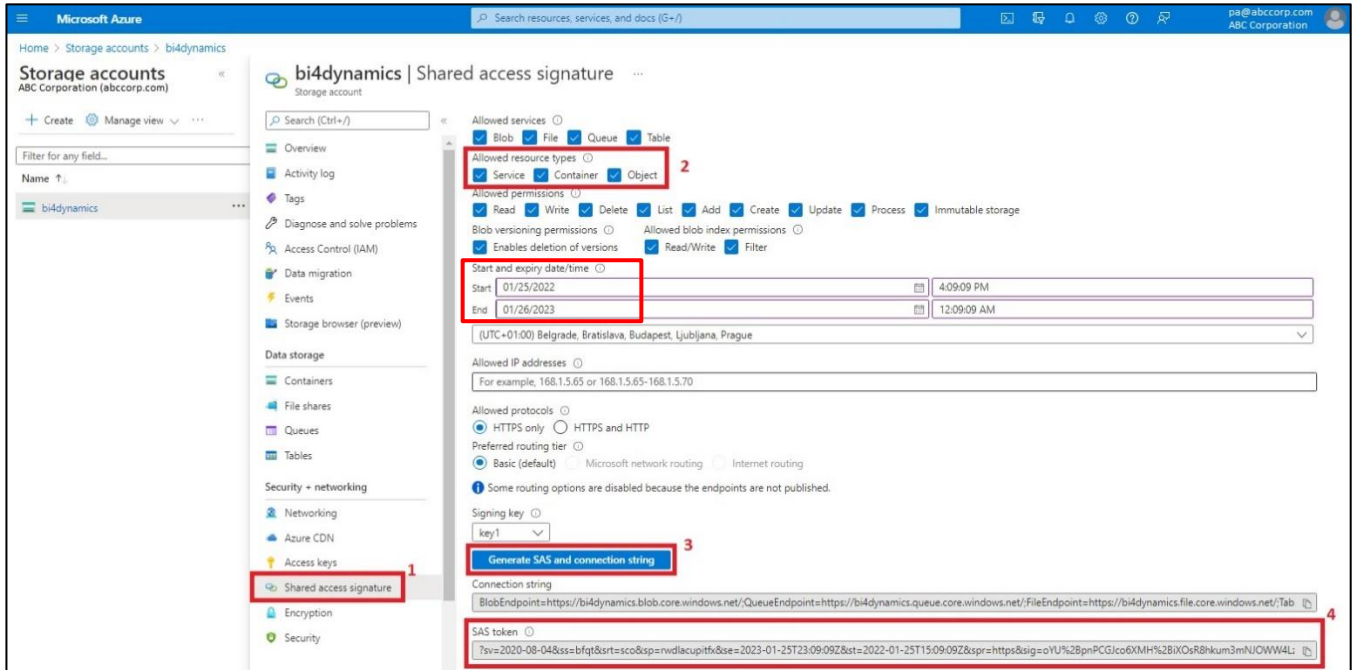


Following window should appear:

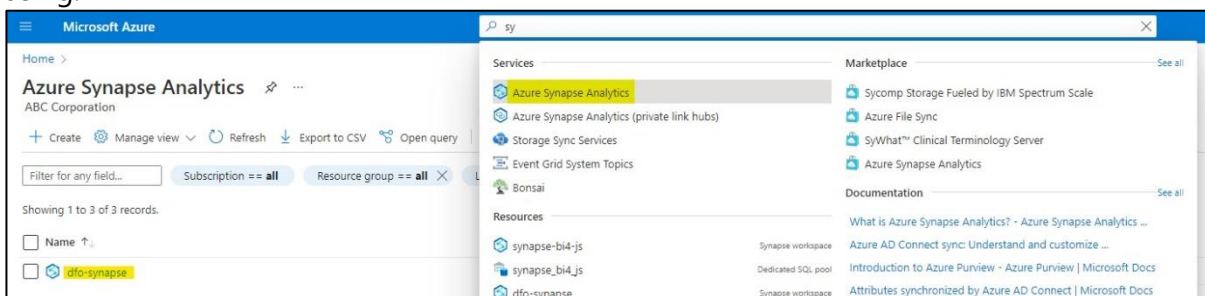


### 4.1.2. Setup Azure Synapse

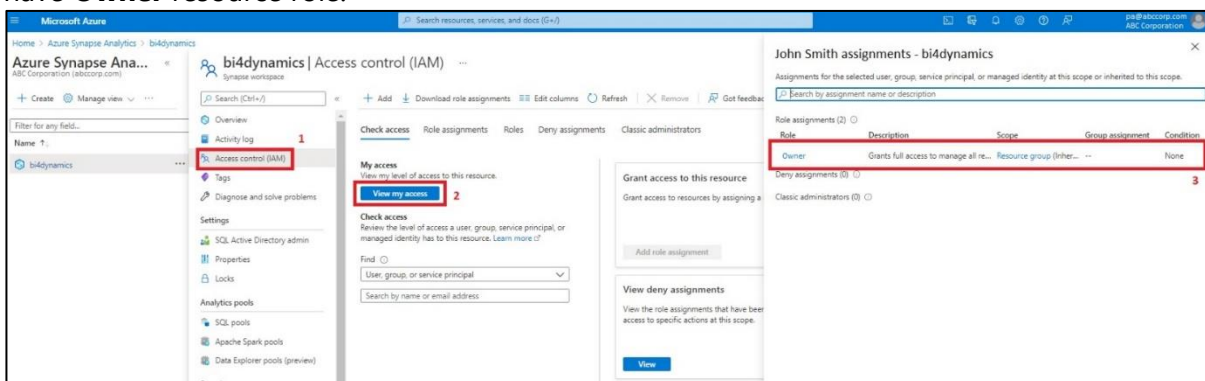
11. In storage account navigate to **Shared access signature** from the menu on the left.
12. Select all three options under Allowed resource types.
13. Select Start and Expiry date (usually 1 year)
14. Press Generate SAS and connection string.
15. Copy SAS token value.



Open Azure portal and search for **Azure Synapse Analytics**. Select the Azure Synapse Analytics you are using.

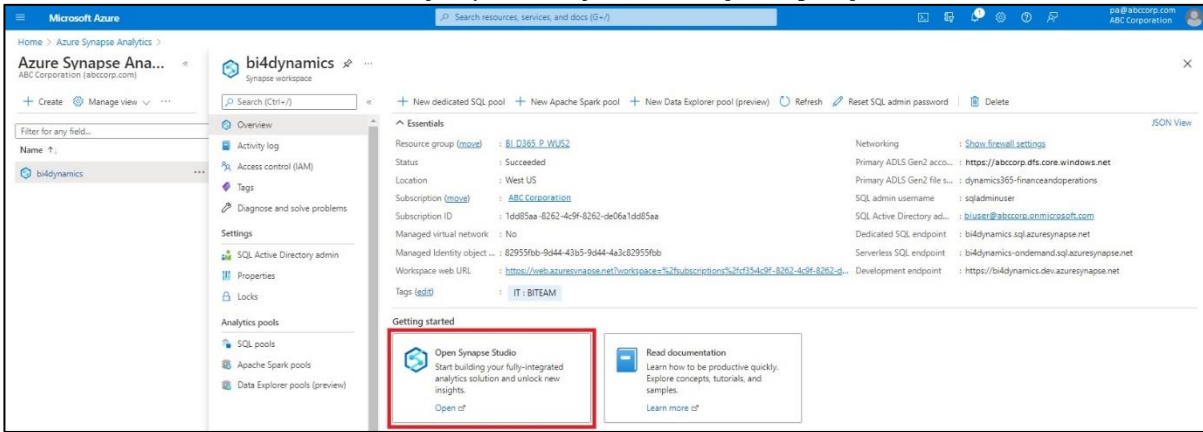


Select **Access control (IAM)** from the menu on left. Press **View my access** button and make sure you have **Owner** resource role.

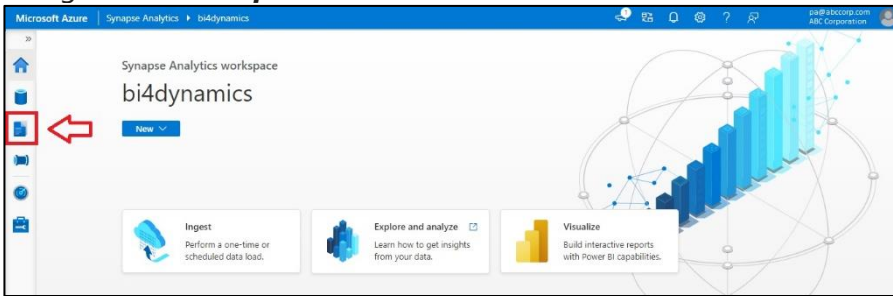




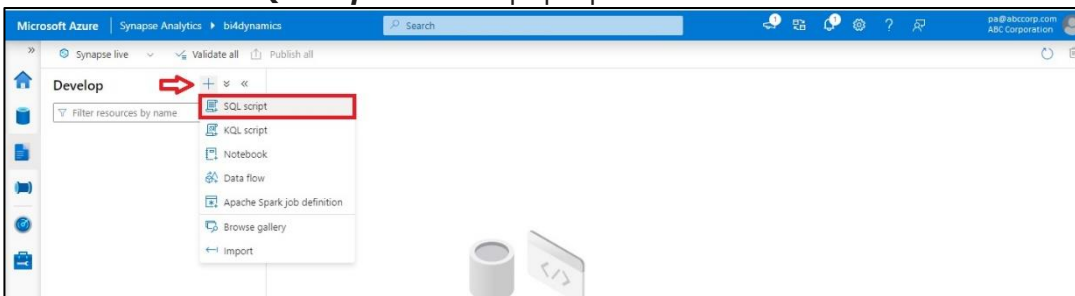
Come back to **Overview** tab of Synapse Analytics and **Open Synapse Studio**.



Navigate to **Develop** tab.



Press **+** and select **SQL script** from the pop-up menu.



Prepare script with shared access signature, paste it into the newly opened query, edit it accordingly and click **Run**.

**SQL script template**

```
CREATE CREDENTIAL [https://@storageAccount.dfs.core.windows.net/@containerName] WITH IDENTITY = 'SHARED ACCESS SIGNATURE', SECRET = '@SAS Token'
```

Replace parameters with real values:

Parameter	Description	Value (example)
@storageAccount	Name of the storage account	bi4dynamicsuat
@containerName	Container name	dynamics365-financeandoperations
@SAS Token	Value you have generated in previous steps; <b>delete the first character in token string "?"</b>	sv=2020-08-04&ss=bfqt&srt=sco&sp=rwdlacupx&se=2022-02-01T21:33:14Z&st=2023-02-01T13:33:14Z&spr=https&sig=KS%2ULnU%3D

**Prepared SQL script (example):**

```
CREATE CREDENTIAL [https://bi4dynamicsuat.dfs.core.windows.net/dynamics365-financeandoperations] WITH IDENTITY = 'SHARED ACCESS SIGNATURE', SECRET = 'sv=2020-08-04&ss=bfqt&srt=sco&sp=rwdlacupx&se=2022-02-01T21:33:14Z&st=2023-02-01T13:33:14Z&spr=https&sig=KS%2ULInU%3D'
```

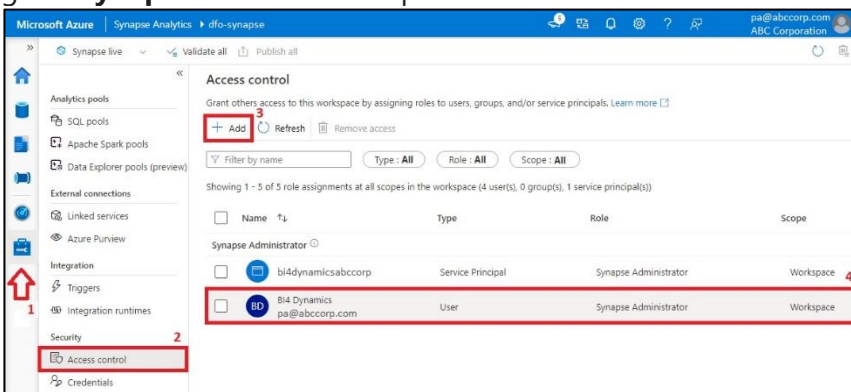
**Important:**

Once the **Expiry Date of Storage Account** is reached, the application would not be able to connect to DFO services. To make the connection we need to set a new **Expiry Date** in **Shared Access Signature** tab of **Storage Account** and update credentials in **Synapse Studio**.

**Note:**

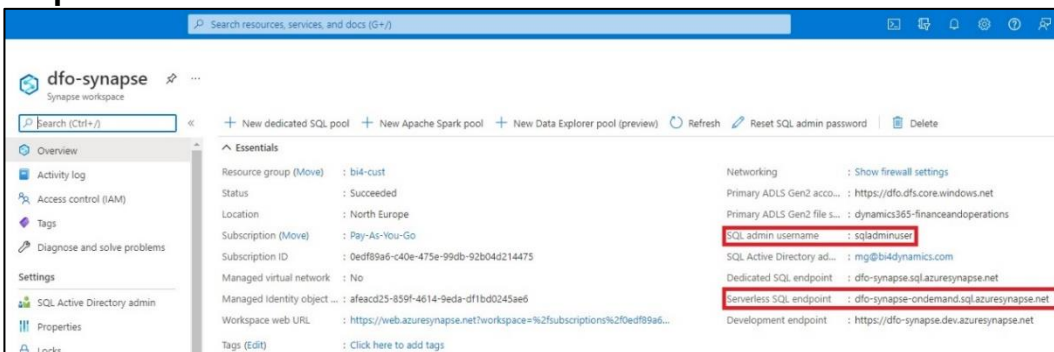
Before adding updated credentials with a new **SAS Token**, you need to use **DROP CREDENTIAL** to remove the old script with credentials and only after that the new **SQL Script Template** with the updated values can be executed.

Navigate to **Manage** tab. Select **Access control** tab from the menu on the left. Press **Add** button and grant **Synapse Administrator** permissions to the user that will be used by BI4Dynamics application.



- Serverless SQL endpoint and SQL admin username

Come back to **Overview** page of Synapse workspace. Copy **SQL admin username** and **Serverless SQL endpoint**.



Enter all parameters and press **Test connection and setup a Synapse**.

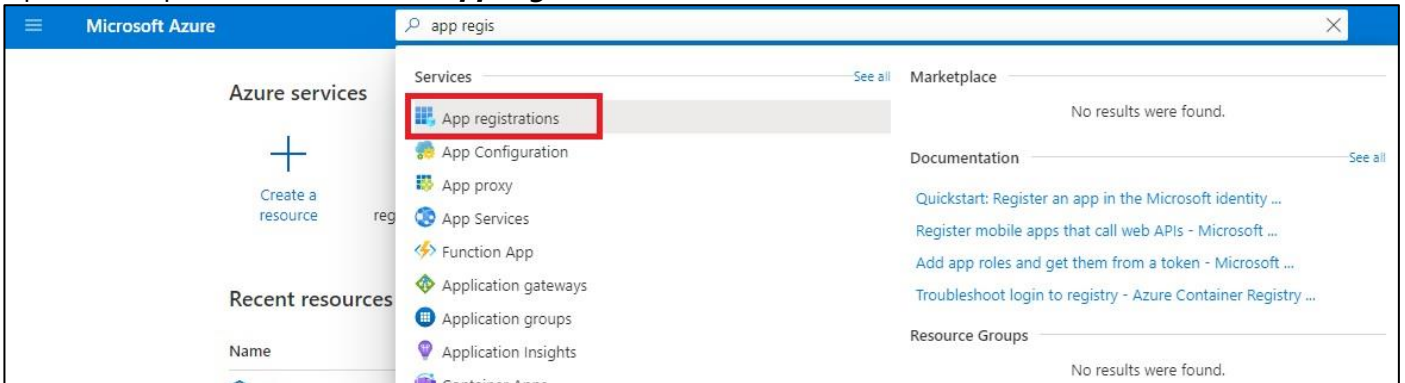
Following window should appear:



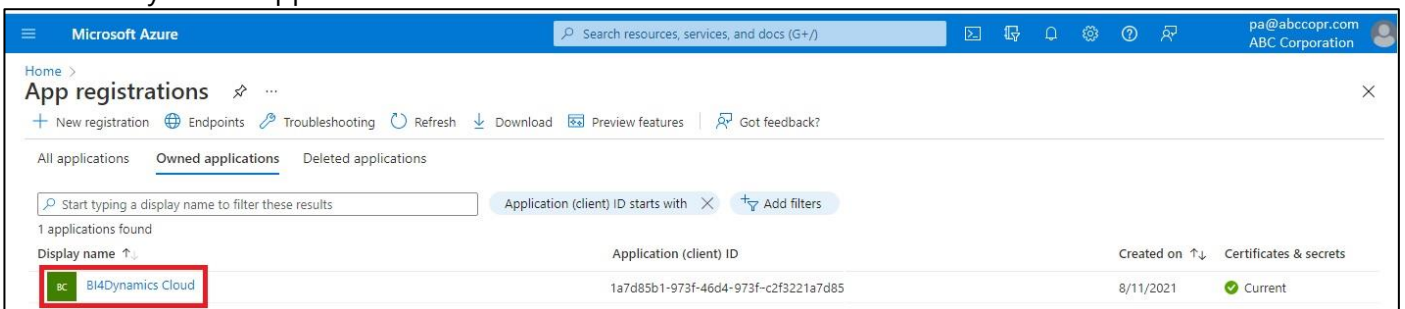
### 4.1.3. Setup Dynamics 365 AX Connector

- Service hostname URL - link to Microsoft Dynamics Finance and Operations (abccorp.operations.dynamics.com).
- Tenant ID – same as Blob Tenant ID.
- Client app id

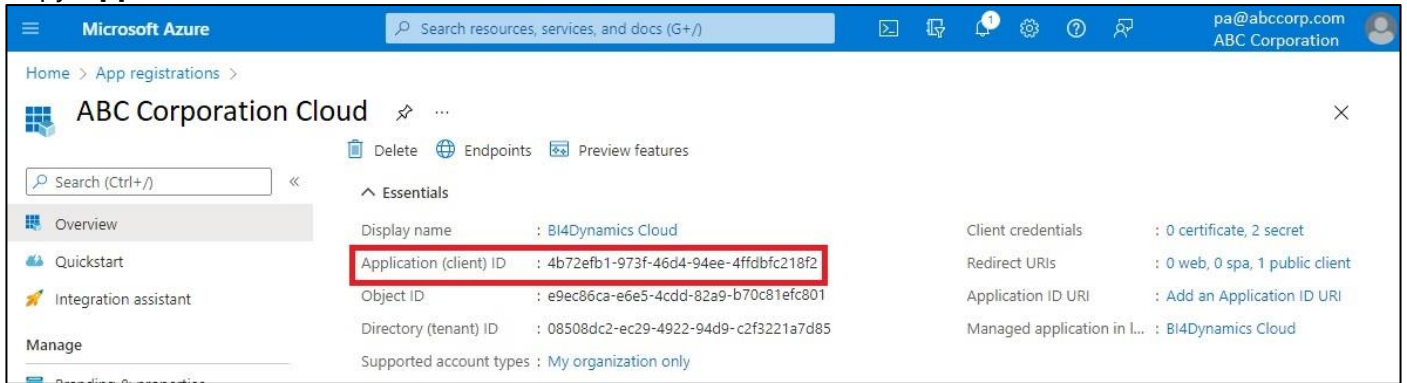
Open Azure portal and search for **App registrations**.



Select BI4Dynamics app.

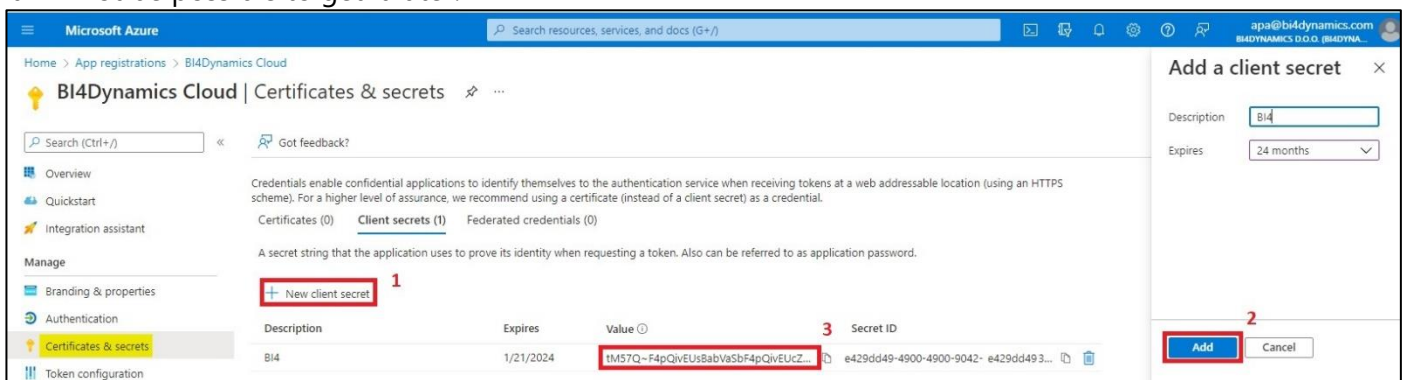


Copy **Application (client) ID** value.



- Client secret key

Select **Certificates & secrets** from the menu on the left. Create a new client secret and save value, since it will not be possible to get it later.

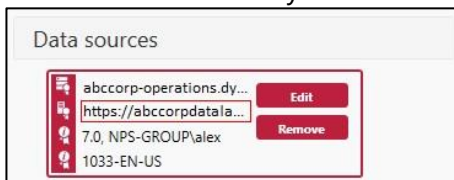


- Username & Password to Microsoft Dynamics.

**Test connection to AX Services**, following window should appear:



Once all credentials are imported, press **Add Data source** and wait... After source is added your screen should look like this:



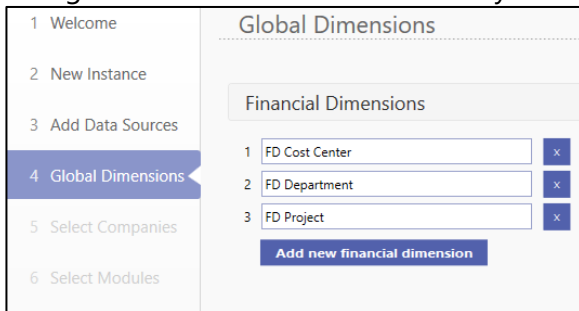
You have successfully added data source

Click **Next**.

## 4.2. Setting up instance

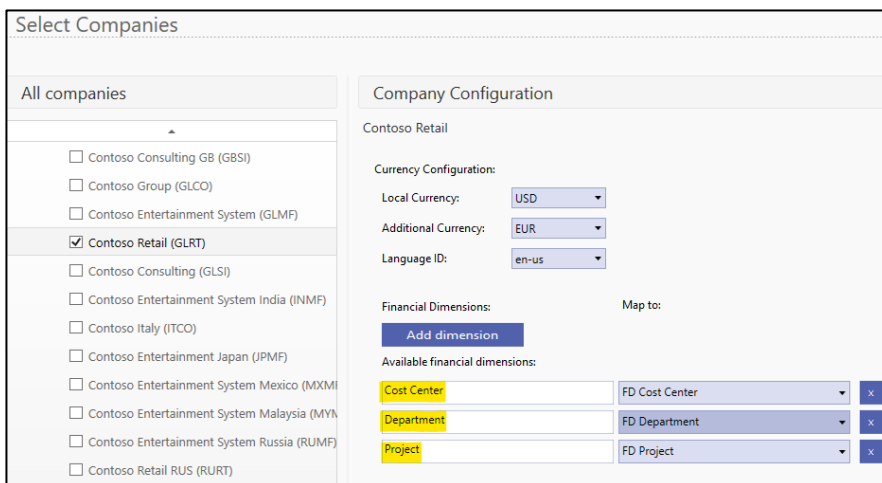
### 4.2.1. Selecting Global Dimensions

Add global financial dimensions from your D365 F&O.



### 4.2.2. Selecting Companies

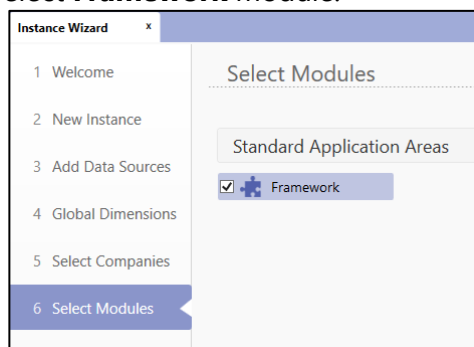
5. From the list of companies **tick the ones you want to include in your instance** and configure additional settings for each selected company:
  - a. **Local Currency**: local currency code (e.g. GBP) – get data from D365 F&O.
  - b. **Additional Currency**: select the additional currency code for this company (e.g. USD).
  - c. **Select Language ID** from the pop-up menu.
  - d. Add financial dimension and relate them with global financial dimensions.



6. Click **Next**.

### 4.2.3. Selecting Modules

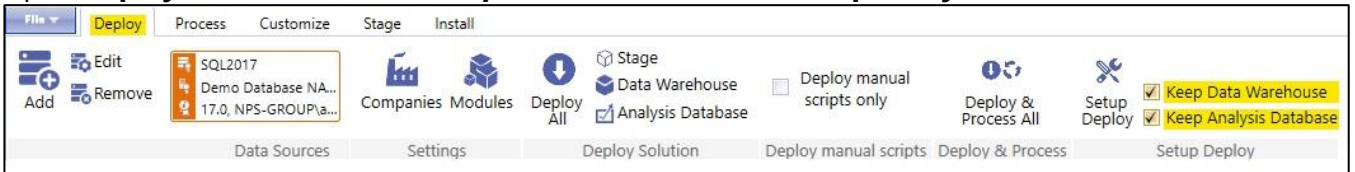
Select **Framework** module.



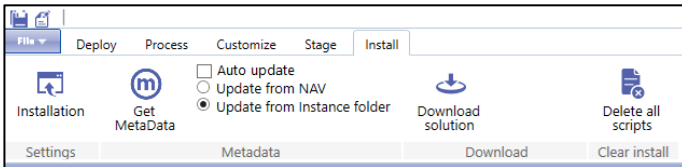
Click **Next**.

### 4.2.4. Completing installation

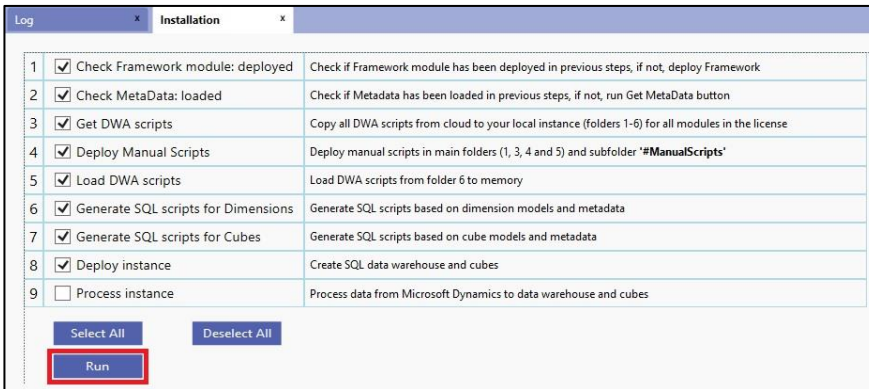
Open **Deploy** tab and make sure **Keep Data Warehouse** and **Keep Analysis Database** are checked



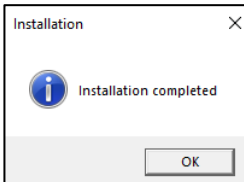
Move to **Install** tab and click **Installation** button.



On the **Installation** screen, uncheck **#9 Process Instance**, click **Run**



Wait for the **"Installation Completed"** message.



## 4.3. Installing On-premises Data Gateway

When you choose to install analytics as Azure Analysis Services, you need to install following:

- Azure Analysis Service in Azure portal
- On-Premises Gateway on your BI server

We recommend to first install On-premises Gateway and later Azure Analysis Services as we enter parameters from on-Premises gateway to Azure Analysis Service settings.

### 4.3.1. Install On-Premises data gateway on virtual machine

#### Download On-Premises data gateway to virtual machine

Download On-Premises Data gateway from Microsoft site:

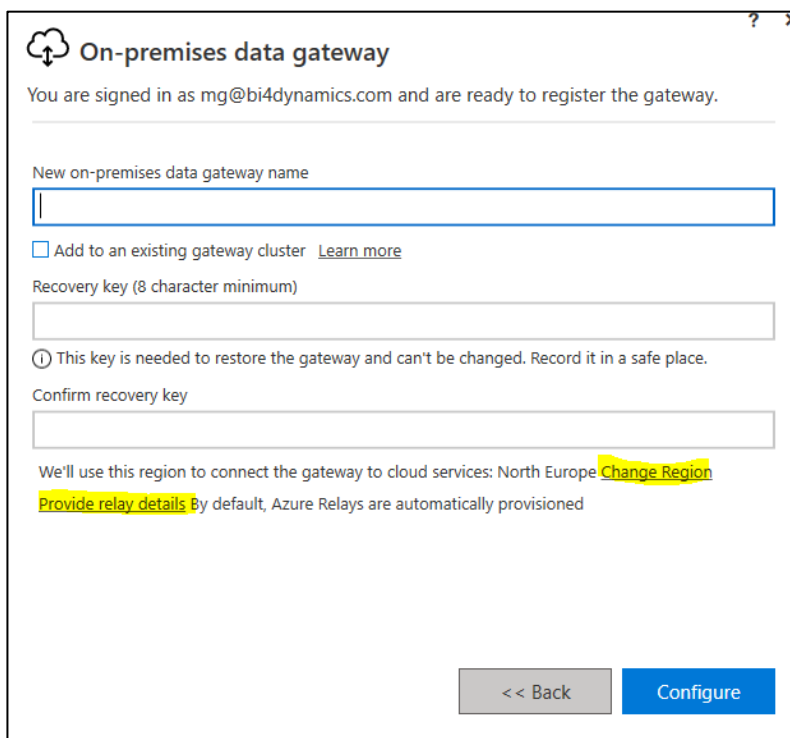
<https://www.microsoft.com/en-us/download/details.aspx?id=53127>

#### Install On-premises data gateway

Follow the documentation from Microsoft site:

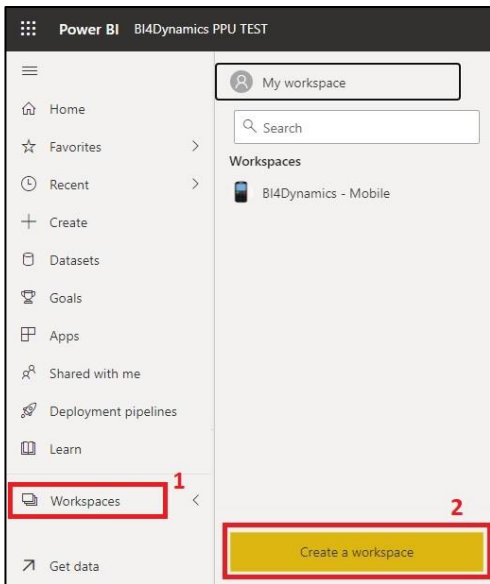
<https://docs.microsoft.com/en-us/data-integration/gateway/service-gateway-install>

Note: Please be very careful when selecting the right region. Installation process will set On-Premises Gateway to your default region that may not be the same as Azure Analysis Services. The feature is not so exposed during installation so it can easily go unnoticed.

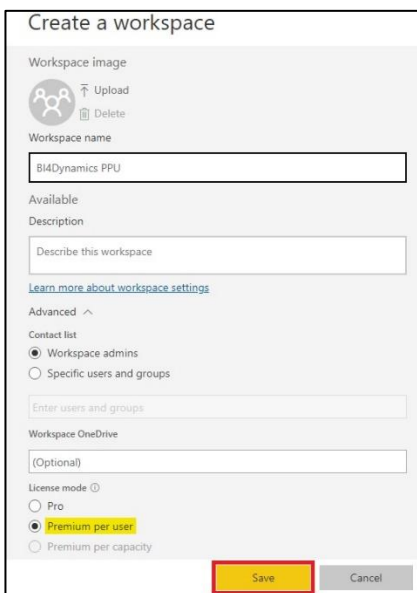


The screenshot shows a web-based configuration window titled "On-premises data gateway". At the top, it indicates the user is signed in as "mg@bi4dynamics.com" and is ready to register the gateway. Below this, there is a text input field for the "New on-premises data gateway name". A checkbox labeled "Add to an existing gateway cluster" is present, with a "Learn more" link next to it. There is a "Recovery key (8 character minimum)" input field, followed by a warning icon and text: "This key is needed to restore the gateway and can't be changed. Record it in a safe place." Below that is a "Confirm recovery key" input field. A message states: "We'll use this region to connect the gateway to cloud services: North Europe" with a "Change Region" link. Another link, "Provide relay details", is followed by the text "By default, Azure Relays are automatically provisioned". At the bottom, there are two buttons: "<< Back" and "Configure".

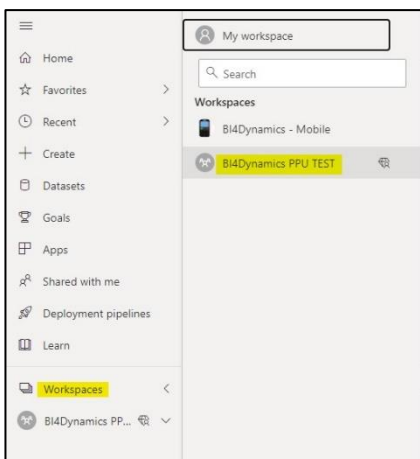
1. Open Power BI portal, press **Workspaces** and **Create a workspace**.



2. Name the workspace and select **Premium per user** under License mode

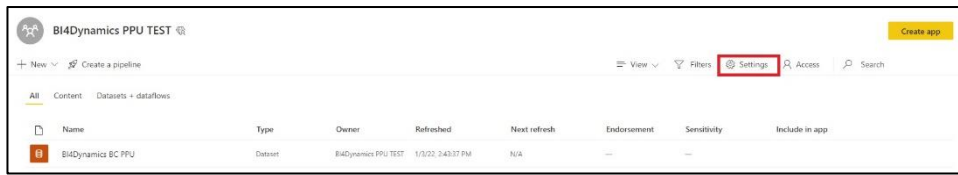


3. Navigate to your Workspace



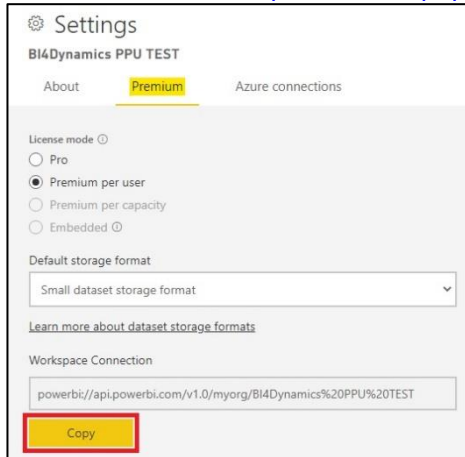


4. Press Settings button



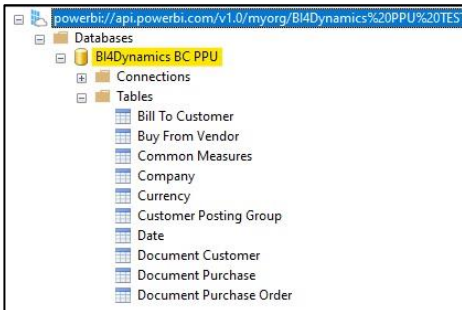
5. Select Premium tab and Premium per user option and copy Workspace Connection.

Link should look like that: [powerbi://api.powerbi.com/v1.0/myorg/BI4Dynamics%20PPU%20TEST](https://powerbi://api.powerbi.com/v1.0/myorg/BI4Dynamics%20PPU%20TEST)

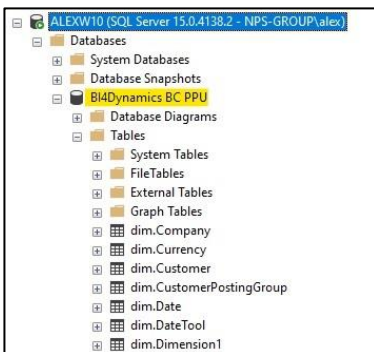


### 4.4. Completing Power BI Premium option installation

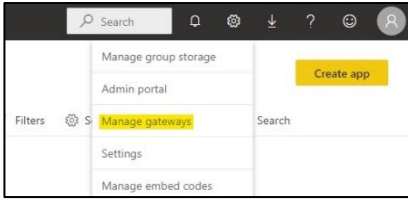
Open **SQL Server Management Studio** and connect to Power BI workspace. Newly created analysis database should have tables, which are currently still empty since data is not yet processed.



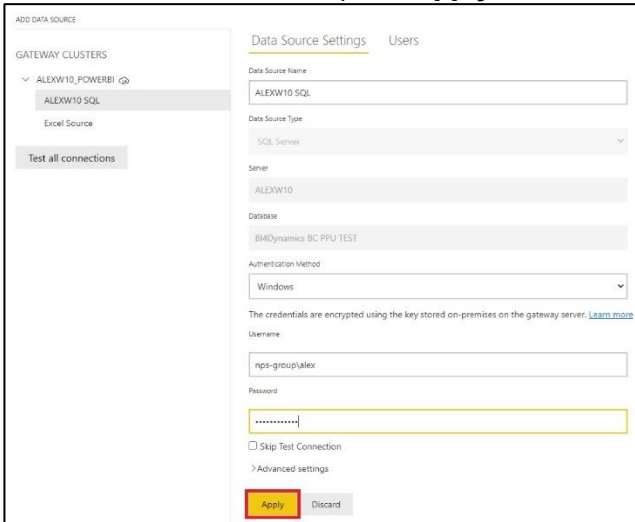
Connect to local Database SQL server to check that instance database has been created.



Add this database as data source, to do that open Power BI portal and navigate to **Manage gateways**.



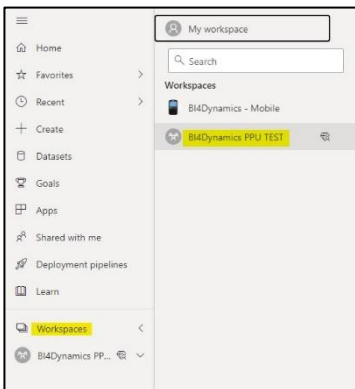
Add new data source and press **Apply**.



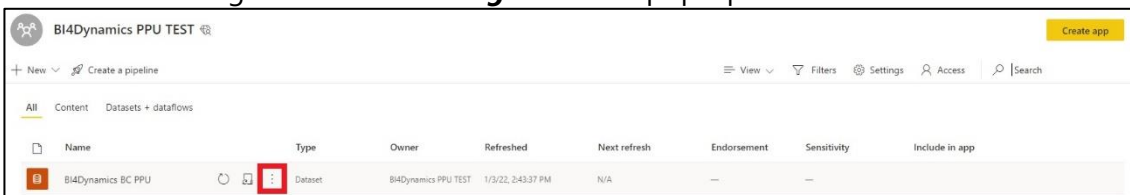
Make sure that connection was established successfully.



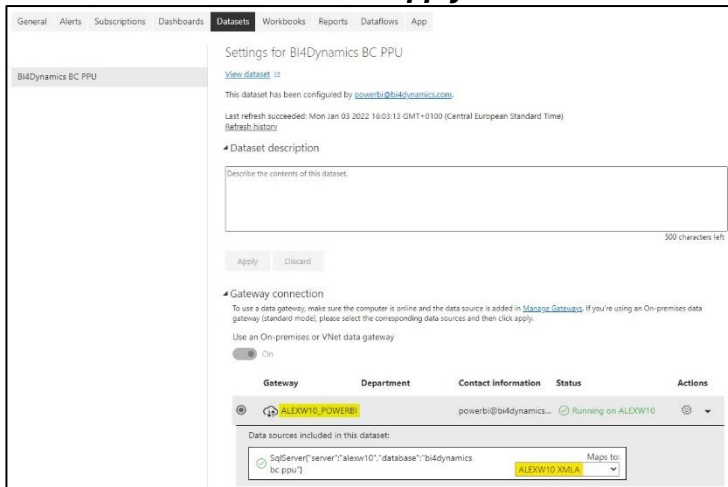
Relate Power BI database with gateway data source. To do that navigate to your workspace.



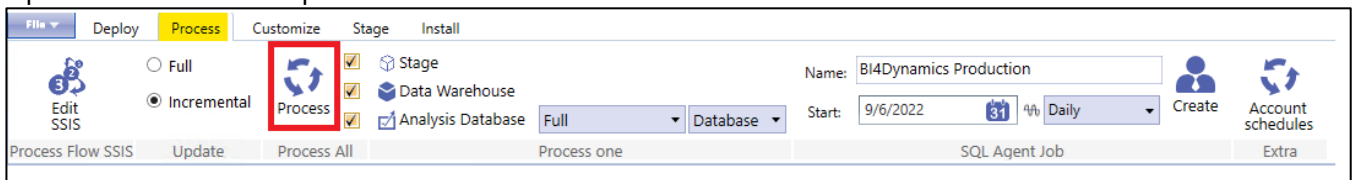
Press three-dot sign and select **Settings** from the pop-up menu



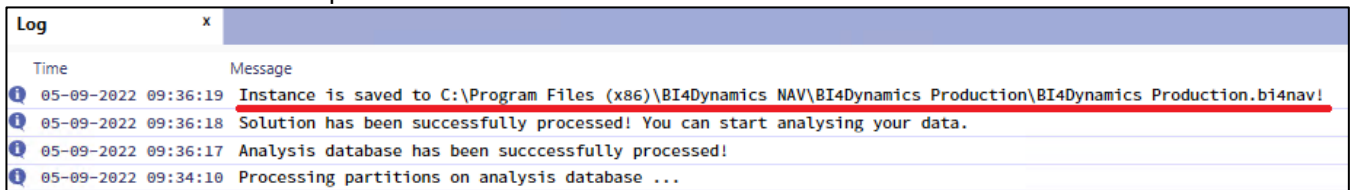
Under **Gateway connection** select the gateway you have installed on your computer and map gateway to the data source used, click **Apply**.



Open **Process** tab and press **Process** button



Wait until the instance is processed



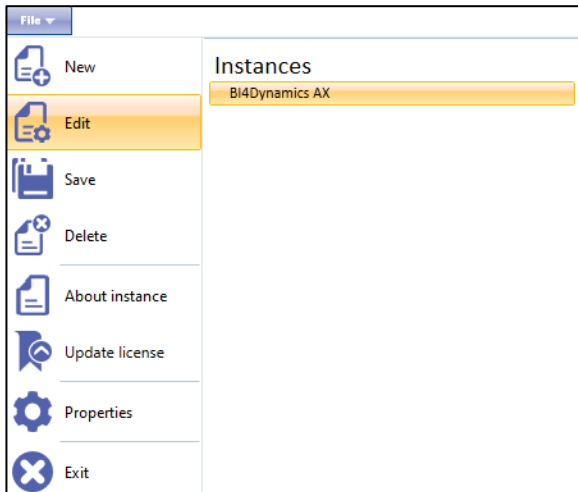
You have successfully deployed and processed data warehouse and analytics.

## 5. Managing instance

### 5.1. Edit instance

To edit existing BI4Dynamics instance do the following:

1. Open instance
2. Click on **File** and press **Edit**



3. Make changes to instance. For example, in order to move analysis services to Azure change **Authentication** to "Azure Active Directory" and input username and password to Azure portal in the corresponding fields.

 A screenshot of the 'Edit instance' dialog box. The dialog is divided into several sections:
 

- Instance properties:** Instance name: BI4Dynamics AX; Language: English (United States).
- Copy Instance:** Copy current instance:
- SQL Server:** Database Name: BI4Dynamics AX; SQL Server Name: ALEXW10; Authentication: Windows; Username: NPS-GROUP\alex; Password: [masked]; SQL Database File Locations: Data: D:\SQL2019\MSSQL15.MSSQLSERVER\MSSQL\; Log: D:\SQL2019\MSSQL15.MSSQLSERVER\MSSQL\; SQL Database Collation: Latin1\_General\_CI\_AS.
- Analysis Services:** Analysis Database Name: BI4Dynamics AX; SQL Analysis Server Name: asazure://eastus.asazure.windows.net; Authentication: Azure Active Directory; Username: apa@bi4dynamics.com; Password: [masked]; SQL Analysis Server Option: Tabular; Model: Import.
- Integration Services:** SQL Integration Service: ; SSIS Server name: ALEXW10; Ver.: 15.0.

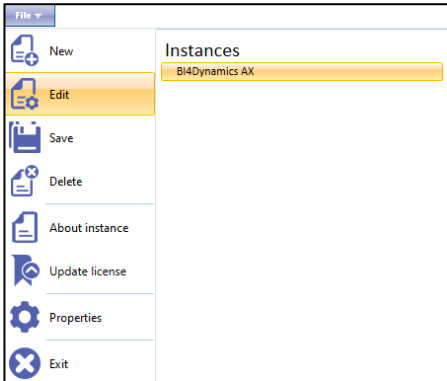
 At the bottom, there are buttons for 'Refresh', 'Test Connectivity', and 'Save & Restart Instance' (which is highlighted with a red box).

4. Click **Save & Restart Instance**.

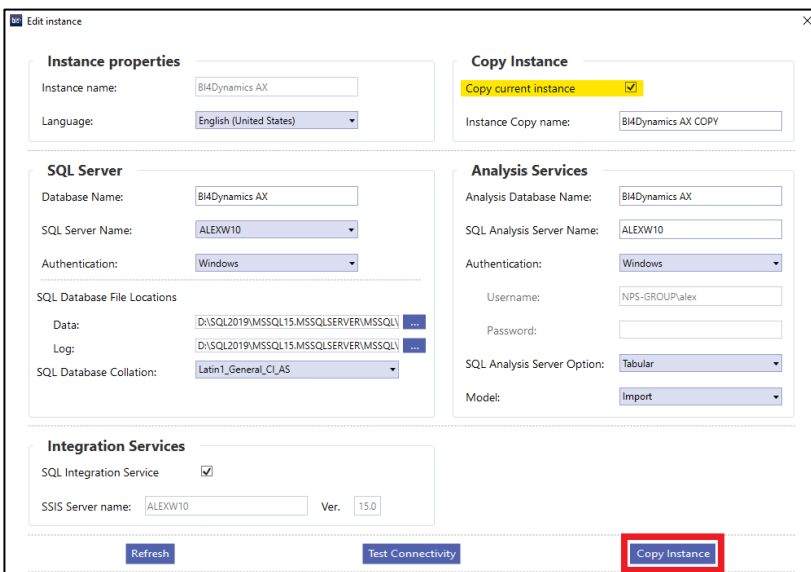
## 5.2. Copy instance

To copy an existing BI4Dynamics instance do the following:

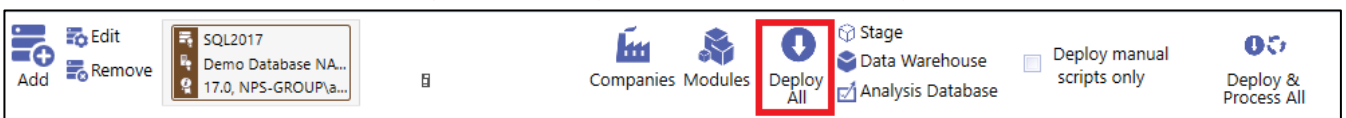
5. Open instance
6. Click on **File** and press **Edit**



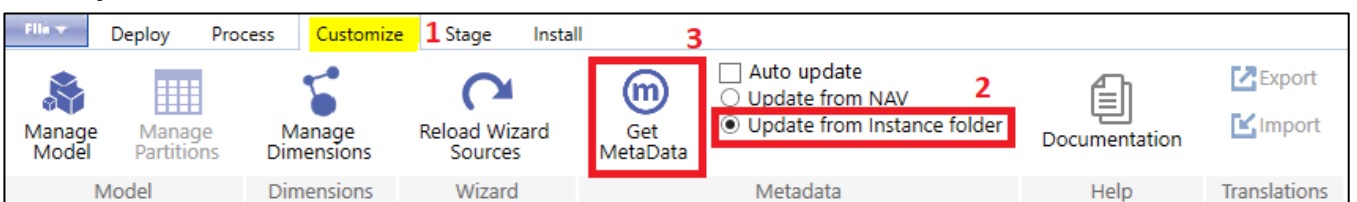
7. Check **Copy current instance** and enter name for the instance that you create.  
Note: copy name and all other modifications, i.e. database name, analysis database name are saved to the copy, not current instance.



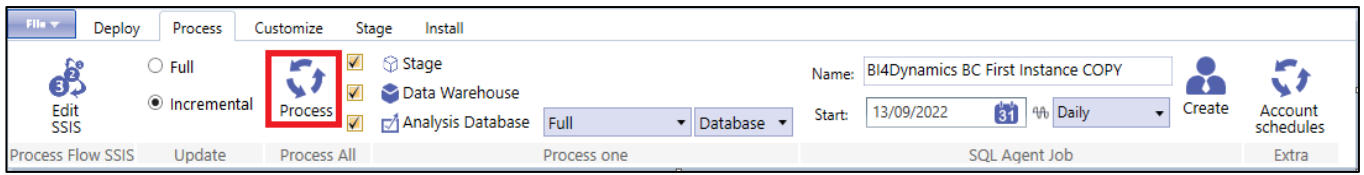
8. Press **Copy Instance** button, button is disabled when entered settings are not valid - instance with such name already exists, connection to servers cannot be established, etc.
9. Open copied instance, navigate to **Deploy** tab and Click on **Deploy All**.



10. Once the instance is successfully deployed open **Customize** tab, make sure **Update from Instance folder** is selected, and **Get Metadata**.



11. As a last step, Open **Process** tab and click **Process**.

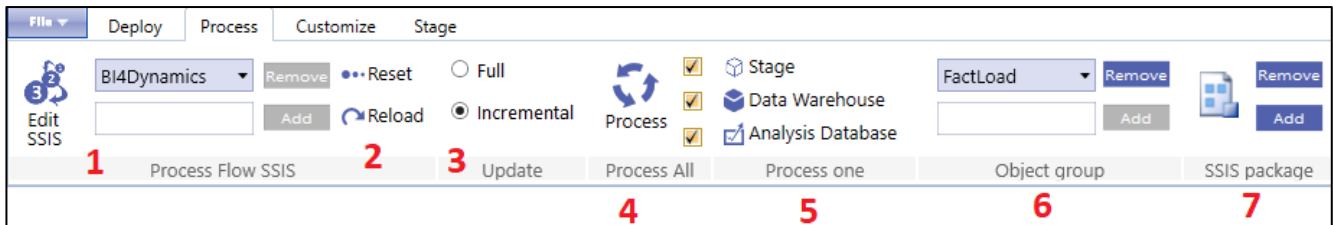


You have successfully copied an instance.

### 5.3. Edit process flow

Process flow is used to determine the sequence of execution of stored procedures when processing data with BI4Dynamics. Editing process flow is completely optional and it is usually connected with custom development.

#### 5.3.1. Explanation of process flow top form functionality



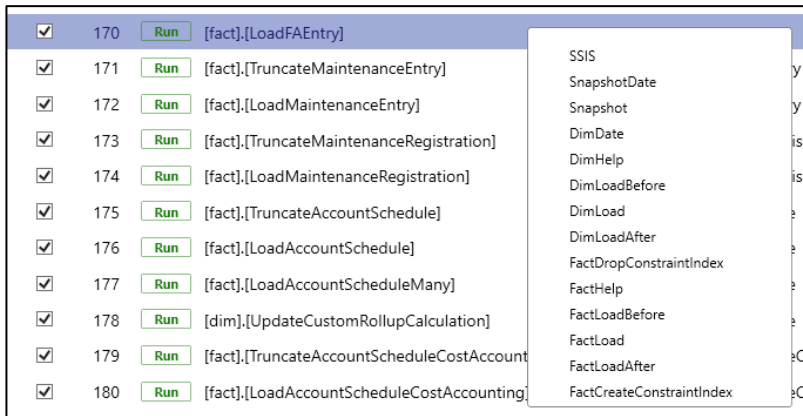
1. **Edit existing** Process flow or **Add** a new one
2. **Reset** the Process flow (return to original state) or **Reload** Process flow (include stored procedures saved in BI4Dynamics folder structure)
3. Select **Full** or **Incremental** Processing type
4. Process **All (Stage, Data Warehouse and Analysis Database)**
5. Process **just one** on the above.
6. Create a new **Object Group** (standard 1-13)
7. Add or Remove a **SSIS package** from file

#### 5.3.2. Explanation of process flow table functionality

Object group 1		Process steps 4							Rename 5		
No	Name	Custom	Include	Order	Process	Object Name	Object subgroup	Executed	Custom	Last exec time (sec)	Object subgroup
0	SSIS	✓	✓	166	Run	[fact],[TruncateExecutionLog]	CubeFramework	✓		0	Current AccountSchedule
1	SnapshotDate		✓	167	Run	[fact],[TruncateEmployeeAbsence]	EmployeeAbsence	✓	✓	0	New
2	Snapshot		✓	168	Run	[fact],[LoadEmployeeAbsence]	EmployeeAbsence	✓	✓	0	Update
3	DimDate		✓	169	Run	[fact],[TruncateFAEntry]	FAEntry	✓	✓	0	
4	DimHelp		✓	170	Run	[fact],[LoadFAEntry]	FAEntry	✓	✓	0	
5	DimLoadBefore		✓	171	Run	[fact],[TruncateMaintenanceEntry]	MaintenanceEntry	✓	✓	0	
6	DimLoad		✓	172	Run	[fact],[LoadMaintenanceEntry]	MaintenanceEntry	✓	✓	0	
7	DimLoadAfter		✓	173	Run	[fact],[TruncateMaintenanceRegistration]	MaintenanceRegistration	✓	✓	0	
8	FactDropConstraintIndex		✓	174	Run	[fact],[LoadMaintenanceRegistration]	MaintenanceRegistration	✓	✓	0	
9	FactHelp		✓	175	Run	[fact],[TruncateAccountSchedule]	AccountSchedule	✓	✓	0	
10	FactLoadBefore		✓	176	Run	[fact],[LoadAccountSchedule]	AccountSchedule	✓	✓	0	
11	FactLoad		✓	177	Run	[fact],[LoadAccountScheduleMany]	AccountSchedule	✓	✓	0	
12	FactLoadAfter		✓	178	Run	[dim],[UpdateCustomRollupCalculation]	AccountSchedule	✓	✓	0	
13	FactCreateConstraintIndex		✓	179	Run	[fact],[TruncateAccountScheduleCostAccounting]	AccountScheduleCostAccounting	✓	✓	0	

1. **Object group name.**  
All stored procedures **within** object group are executed before the next Object group is executed. Each Object group forms a separate **SSIS package** which is executed on processing.
2. **Select/unselect** a stored procedure to be executed on processing
3. **Run** the stored procedure manually from the application
4. **Object subgroup name.** Stored procedures within an Object subgroup are executed **successively**, while different Object subgroups within same Object group are executed **in parallel**.
5. **Rename** Object Subgroup option

### 5.3.3. Moving stored procedure from one object group to another



**Right-click** on a stored procedure gives you an option to **move** it to a different **Object group** if needed (on reset Process flow the stored procedure will be moved back to original Object subgroup).

### 5.3.4. Setting up process flow property manually in stored procedure

**Permanently moving** a stored procedure to a different Object group is possible by adding a **DECLARE** clause in the stored procedure itself:

```
EXEC dbo.DropObject 'fact.LoadInventoryState', 'P'
GO

CREATE PROCEDURE fact.LoadInventoryState
    @InsertedRowCount int = 0 OUTPUT,
    @Output nvarchar(max) = NULL OUTPUT
AS
    DECLARE @ObjectGroup nvarchar(255)='FactLoadAfter'
```

By adding or changing declare statement store procedure's execution flow is determined.

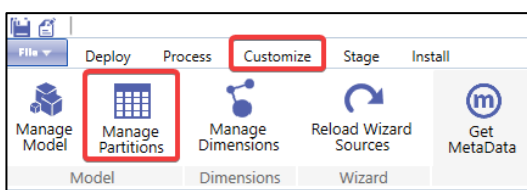


## 5.4. Manage Partitions

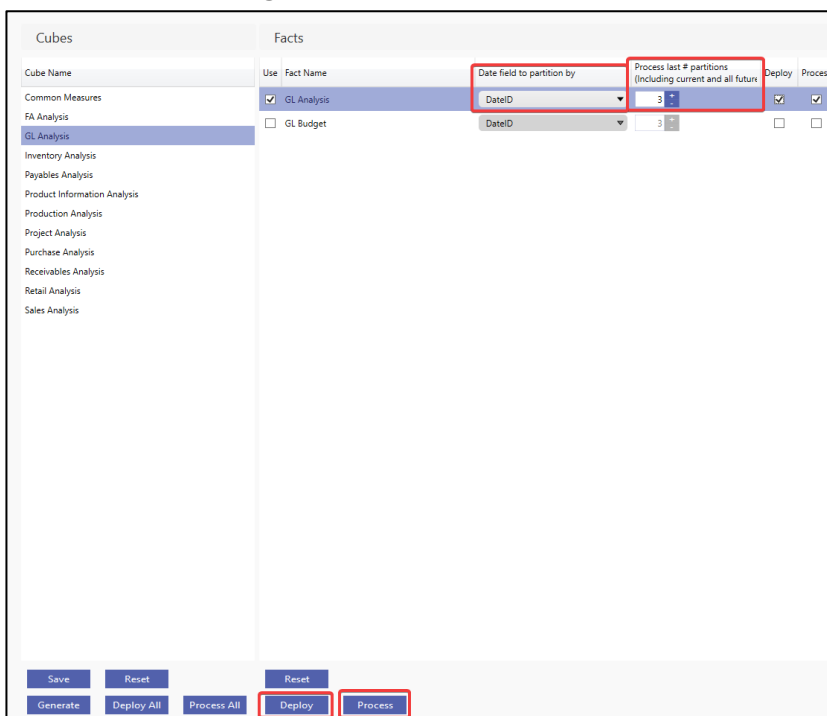
Partitions divide portions of data you need to process (refresh) frequently from data that can be processed less frequently. For example, a fact table may include certain row sets that contain data that rarely changes, but other row sets have data that changes often. There's no need to process all of the data when only a portion of it needs to be processed.

Partitions work by dividing a table into logical partition objects. Individual partitions, each containing a unique segment of data, can then be incrementally processed either sequentially or in parallel independent of other partitions, or excluded from processing operations altogether.

This feature can be only used with SQL server enterprise edition or with PowerBI premium.



1. Open the **Customize** ribbon
2. Select **Manage Partitions**



1. Select the Cube.
2. Select the **Fact**.
3. Select the **Date field to Partition by**.
4. Select the **number of last partitions processed** (this is determined by how much backdating is done).
5. **Deploy** the fact.
6. **Process**.

## 5.5. Setup BI4Dynamics precision

Numeric data types can be stored in SQL with different precision, scale, and length. Precision is the total number of digits that can be stored both to the left and right of the decimal place. Scale is the number of digits to the right of the decimal point in a number. Length is the number of bytes that are used to store the number.

In SQL the default maximum precision and scale for a particular length is the following:

- 19,5 = 9 bytes
- 27,10 = 13 bytes
- 38,20 = 17 bytes

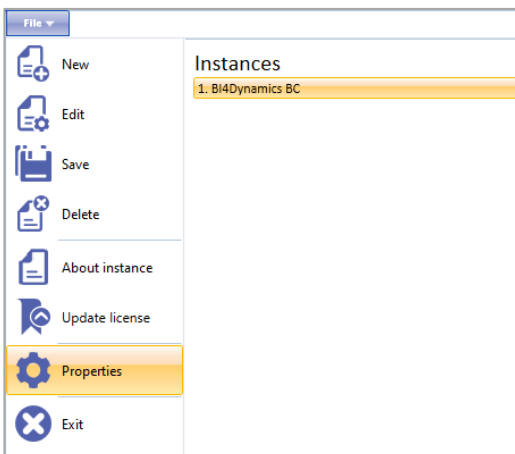
During the installation, the following error might occur on stage:

Some errors occurred during executing package SSIS Stage: [G\_L Entry].[dtsx].  
Detail msg: Arithmetic overflow error converting numeric to data type numeric.!

It should be addressed by increasing the precision (e.g. from 19 to 38) and scale (e.g. from 5 to 20). The default maximum precision of numeric and decimal data types is 38.

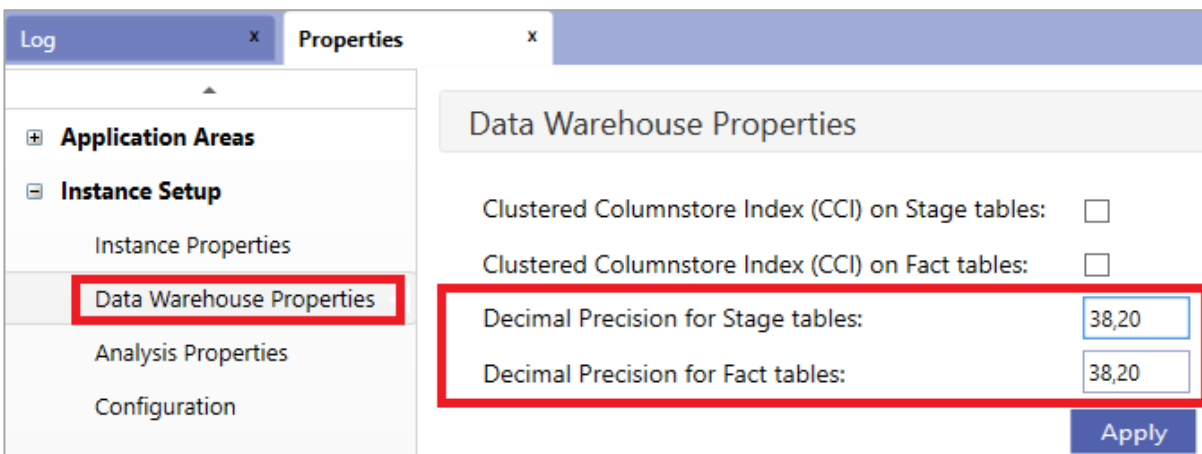
To change it in application you need to:

1. Open the instance and click **File > Properties**.



2. Under **Instance Setup > Data Warehouse Properties** precision could be set up for:

- Stage tables
- Datawarehouse tables



## 5.6. Adding Calculation groups

Calculation groups are a collection of items, which are treated as a dimension but are in fact a collection of measures. Usually, calculation groups are created in Tabular Editor, however, BI4Dynamics provides several calculation groups out of the box and makes creating new calculation groups easier.

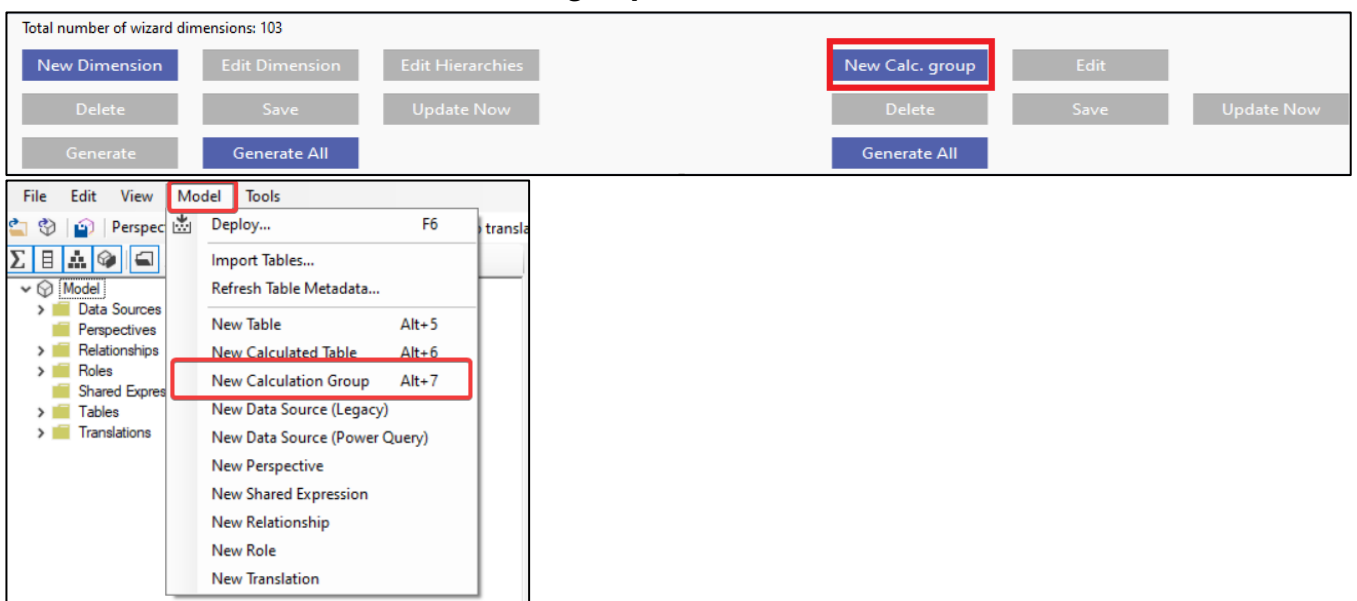
For example, using Calculation Group functionality, one can create P&L calculation group, that would include all components of P&L such as Net Sales, Operating Profit, etc. without need to pick all measures separately. P&L "dimension" simply should be placed on rows, Date dimension on columns.

The result would be as follows:

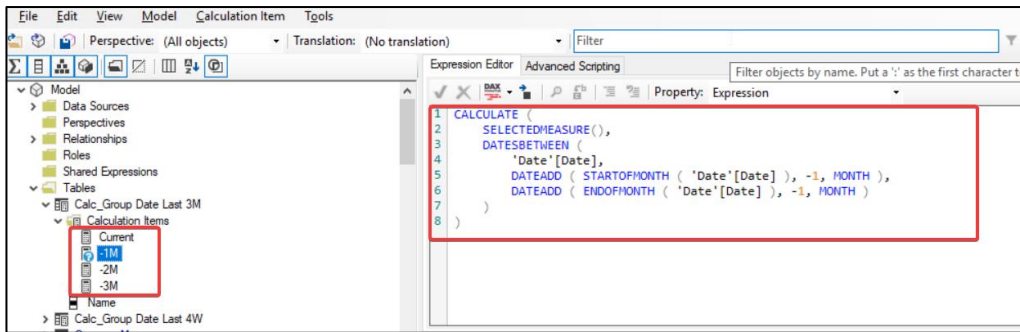
	2020 - Q1	2020 - Q2	2020 - Q3	2020 - Q4
Target 1	1,090,684	1,313,746	1,256,367	1,256,193
Net Sales	1,101,701	1,289,251	1,239,021	1,254,938
Cost of Sales	570,040	804,241	592,299	580,501
Gross Profit	531,661	485,010	646,722	674,437
Target 2	50.00 %	50.00 %	50.00 %	50.00 %
Gross Profit %	48.26 %	37.62 %	52.20 %	53.74 %
Research and development	98,051	112,165	101,600	112,944
Sales and marketing	47,373	54,149	74,341	64,002
General and administrative	22,034	30,942	28,497	28,864
Target 3	381,739	459,811	439,728	439,668
Operating Profit	364,202	287,755	442,283	468,627
Operating Profit %	33.06 %	22.32 %	35.70 %	37.34 %
Other income	2,203	7,736	3,717	7,530
Income before taxes	361,999	280,019	438,566	461,097
Provision for taxes (19%)	68,780	53,204	83,328	87,609
Net Income	293,219	226,816	355,239	373,489
Net Income %	26.62 %	17.59 %	28.67 %	29.76 %

To create calculation groups:

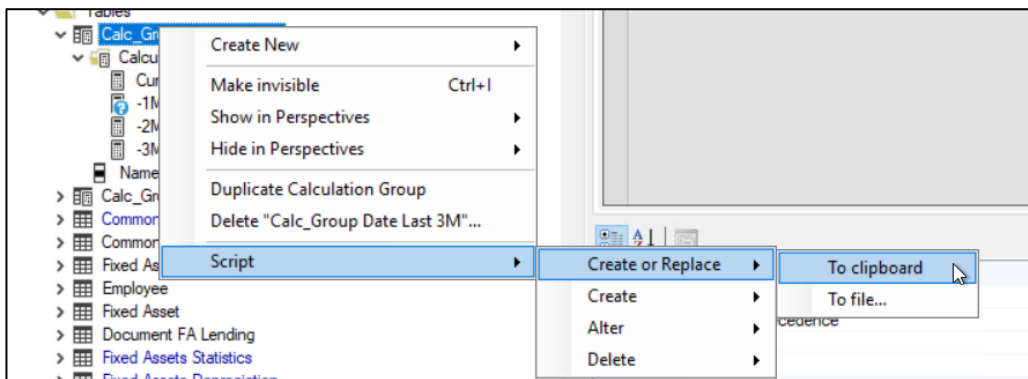
1. Open **Tabular editor**
2. Go to **File > Open > From DB**
3. Select the **Server** and **Instance** where you want to create calculation groups
4. Select **Model** and **New Calculation group**



5. Add **new Calculation items** with DAX query



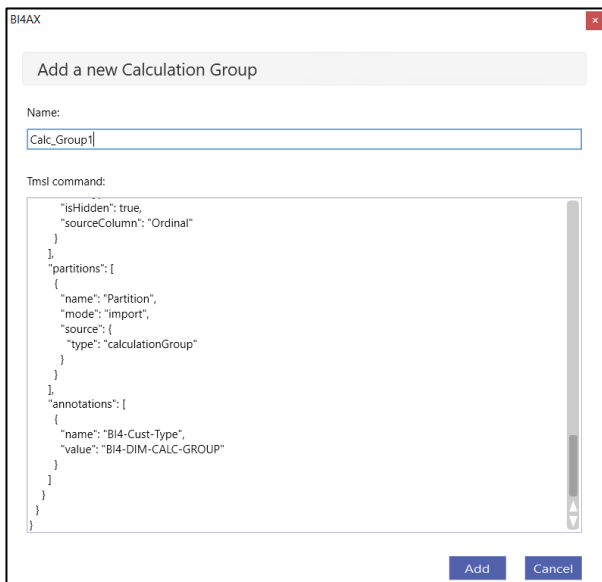
6. Right click the new Calculation group, select **Script > Create or Replace > To Clipboard**



7. Open **BI4Dynamics application** and **open instance**

8. Go to **Customize** tab > **Manage Dimensions**

9. Select **New Calc. Group**, add a **name** and copy the **script**



10. **Update** and **Generate all** under Calculation groups

11. **Deploy** and **Process analysis database**

## 5.7. Deleting instance

1. Open the instance you would like to delete by clicking **File** and selecting the instance in the list on the right.
2. Click **File > Delete**.
3. Click **Yes** to confirm the action.

**IMPORTANT!** When deleting an instance, the Data Warehouse and Analysis Database will be deleted.

*Note: BI4Dynamics Instance folders and the log file are not removed during the delete process.*

### Uninstalling BI4Dynamics

1. Click **Start > Settings > Control Panel**.
2. Click **Add or Remove Programs**.
3. From the list of installed programs, select **BI4Dynamics**.
4. Click **Remove**.
5. Follow the instructions on screen.

**IMPORTANT!** User files will not be removed when uninstalling the solution.

## 6. Connecting Excel and Power BI reports

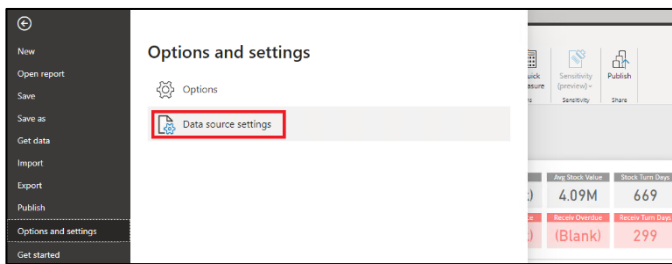
### 6.1. Downloading Excel and PowerBI reports

1. **Open** Instance
2. Go to **Install** tab
3. Click **Download reports**
4. Select the destination
5. **Standard reports** will be downloaded that are included with BI4Dynamics

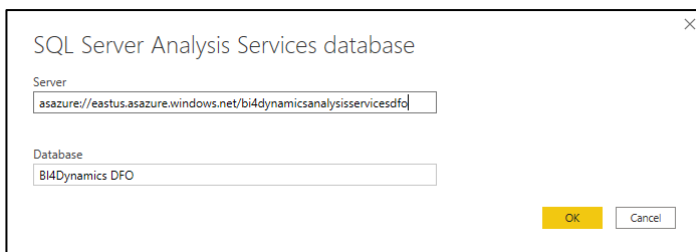
### 6.2. Connecting Power BI reports

#### 6.2.1. Changing connection

1. **Open** Power BI report
2. Click **Edit Queries > Data source settings**

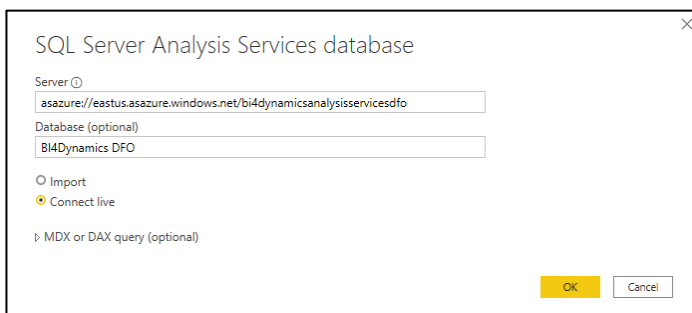


3. Type the **Server name** to the **Server** field. Type the **Database name** to the **Database** field



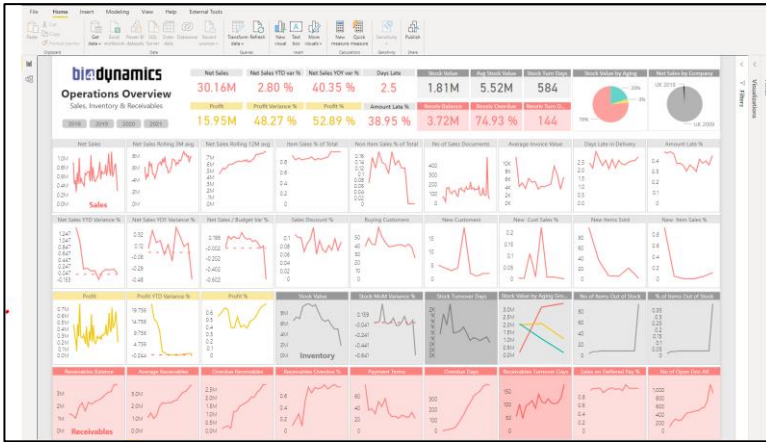
#### 6.2.2. Creating a new connection

4. **Open** Power BI Desktop
5. Click Get data
6. Choose **Analysis Services**
7. Type the **Server name** and **Database name**
8. Choose **Connect live**



9. Click **OK** and start exploring your data

You should see this screen:



You have successfully connected Power BI to Analysis Services model.

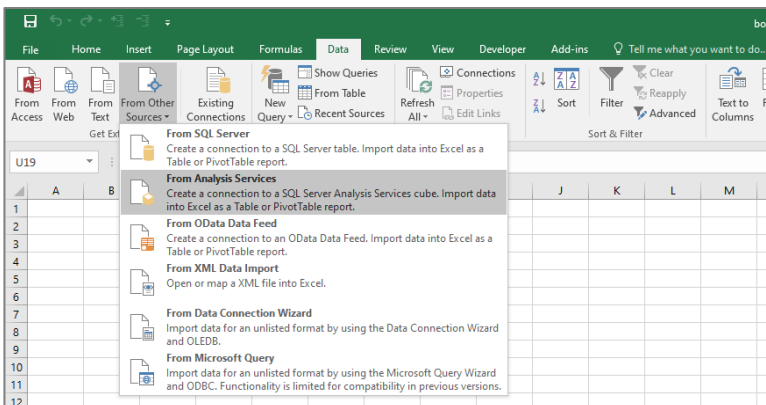
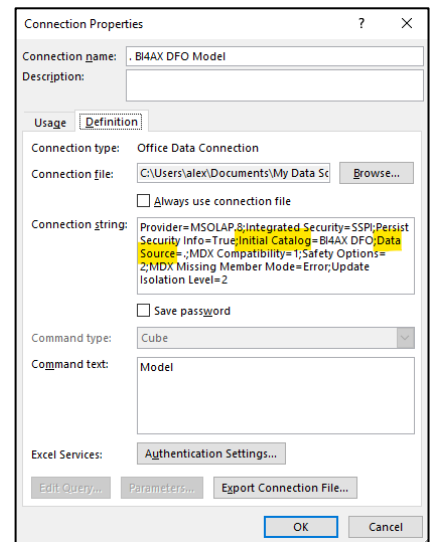
## 6.3. Connecting Excel reports

### 6.3.1. Changing connection

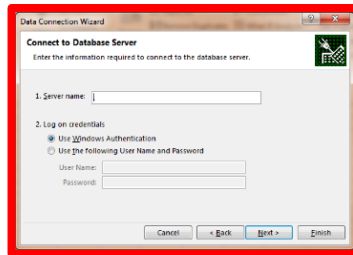
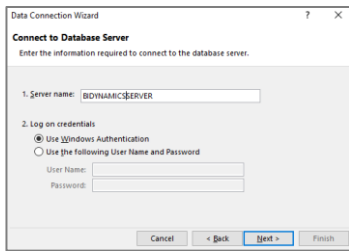
1. **Open** Excel report
2. Click **Data > Connections > Properties > Definition**
3. Type the **database name** to the **Initial Catalog** property of the **Connection string**. Type the **Server name** to the **Data source** property of the **Connection string**.

### 6.3.2. Creating a new connection (local service)

4. **Open** Microsoft Excel
5. Click **Data > Get External Data > From other Data source > From Analysis Services**.

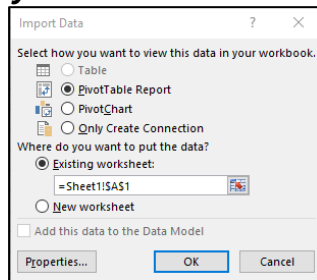
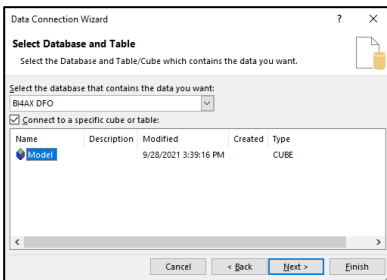


6. Insert a **Server name**



do not enter "." for local server as this connection will not work on another PC

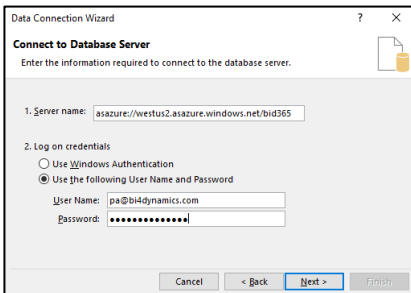
7. Click **Next** and select **Analysis database** from the dropdown menu and select **Model**



8. Click **Finish** and **OK** on next form.

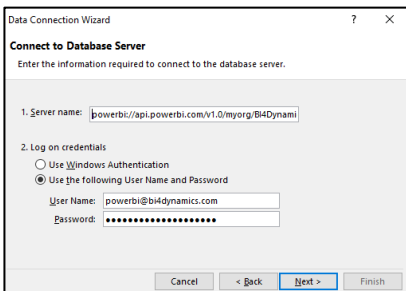
### 6.3.3. Creating a new connection (Azure Analysis Services)

- **Server Name** – Azure Analysis Services: `asazure://westus2.asazure.windows.net/bid365`
- **Username and Password** – to Azure Active Directory:



### 6.3.4. Creating a new connection (Power BI Premium)

- **Server Name** – Power BI Premium workspace: `powerbi://api.powerbi.com/v1.0/myorg/BI4Dynamics%20XML%20endpoint`
- **Username and Password** – to Power BI Premium portal:





9. Start exploring your data by dragging and dropping dimensions and measures in pivot table

The screenshot shows an Excel spreadsheet with a PivotTable. The PivotTable is located in the range A4:E12. The PivotTable Fields task pane is open on the right side of the window. The PivotTable shows data for years 2008 to 2014, with a Grand Total row. The PivotTable Fields task pane shows the following configuration:

- Filters:** Company, Customer by Posting Group
- Columns:** Values
- Rows:** Date YMD
- Values:** Avg Receivables, Customer Net Change, % Receivables Overdue

Row Labels	Avg Receivables	Customer Net Change	% Receivables Overdue	Sales On Credit
2008	1.012.801,74	762.146,85	,17	6.053.834,29
2009	1.113.668,65	24.070,24	,31	6.770.320,55
2010	1.010.116,26	563.732,89	,38	7.915.596,64
2011	1.656.079,38	1.980.774,71	,43	11.393.663,21
2012	3.330.724,69		1,00	
2013	3.330.724,69		1,00	
2014	3.330.724,69		1,00	
<b>Grand Total</b>	<b>3.330.724,69</b>	<b>3.330.724,69</b>	<b>100,00%</b>	<b>32.133.414,69</b>

You have successfully connected Excel to Analysis Services model.