



Microsoft Cloud for Healthcare **in a Day**

Lab 06: FHIR Sync Agent Administration Setup and Configuration

Step-by-Step Lab

April 2021

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Overview

Prerequisites

Note: If you are in an official training, the environment has been set up and provided to you. There is no further action required by you in the prerequisite section.

This is the **sixth** lab in a series covering the Microsoft Cloud for Healthcare. The assumption is you have successfully reviewed the preliminary presentations and have completed environment setup.

If you have not completed the environment setup, please reference the following two links:

- [Deploy Microsoft Cloud for Healthcare solutions powered by Dynamics 365](#)
- [Microsoft Cloud for Healthcare Licensing](#)

Before proceeding, Azure API for FHIR and its related Azure components used for FHIR Dataverse Synchronization must be set up, or at least the following Azure services must be deployed in the same tenant:

- [Service Bus namespace and a queue](#)
- [Register an Azure application](#)

Before you begin

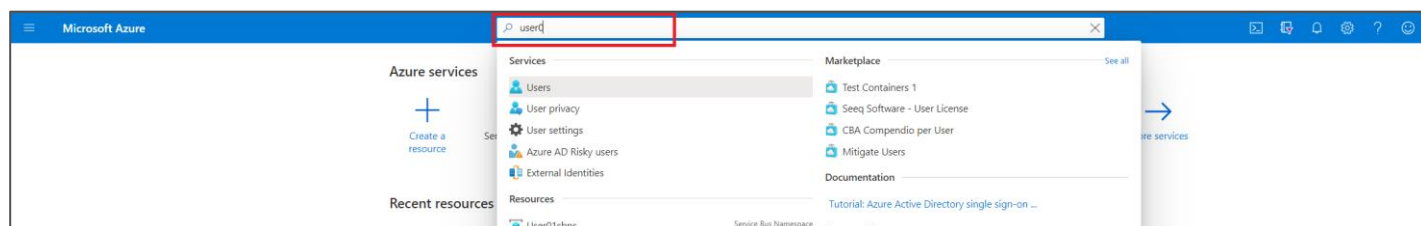
1. You must be connected to the internet.
2. Open an internet browser in either In-Private or Incognito mode.
3. Navigate to [Power Apps](#) and sign-in with your user credentials.
4. Select the correct environment from the upper-right Environment drop down.



*Note: If you notice environment sync issues during the lab, ensure that the assigned environment is **not in the Administration mode** (i.e., Administration mode should be in disabled state).*

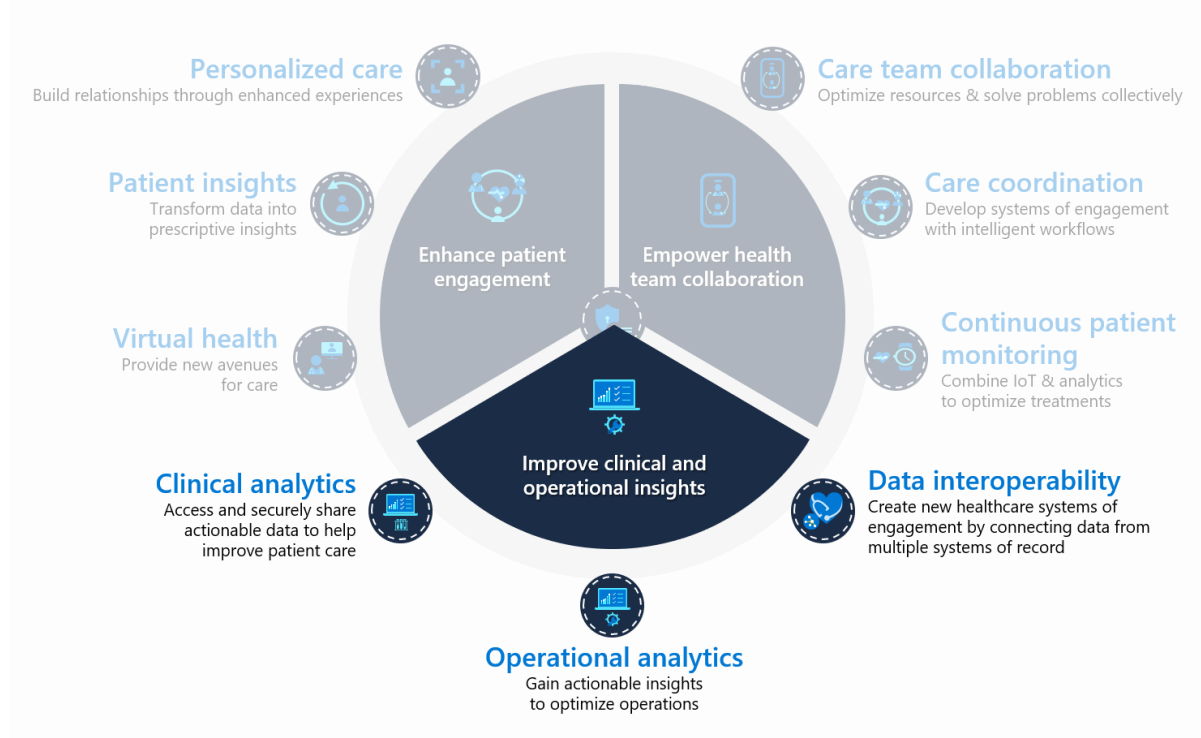
5. On another tab in the same browser, navigate to [Azure Portal](#) and sign-in with the same user credentials as used in Step 3.
6. On the top center of the screen, search for and select the Service Bus Namespace which will be used to define the integration settings in the first exercise of this lab.

Note: If you are in an official training then use the service bus name provided by your lab instructor



Industry Prioritized Scenarios

FHIR Sync Agent focuses on the **Improve clinical and operational insights** priority scenario by connecting data from multiple systems and allowing shared healthcare data to create better analytics.



Recommended Resources

These resources provide a full understanding of the Microsoft Cloud for Healthcare and its components. It is useful throughout this lab and recommended to refer it prior to attempting this lab.

- [Microsoft Cloud for Healthcare Documentation](#)
- [Microsoft Dynamics 365 Documentation](#)
- [Azure API for FHIR Documentations](#)

Lab Goals

After this lesson you will be able to do the following:



- Configure the FHIR Sync Agent Integration Settings.
- Enable/Disable the synchronization for Dataverse entities/Azure FHIR Resources.
- Understand and create new entity maps and attribute maps.
- Synchronize the data from Dataverse entities to the service bus queue.
- Explore Sync Agent Logs to see how data is flowing from Dataverse to the service bus.

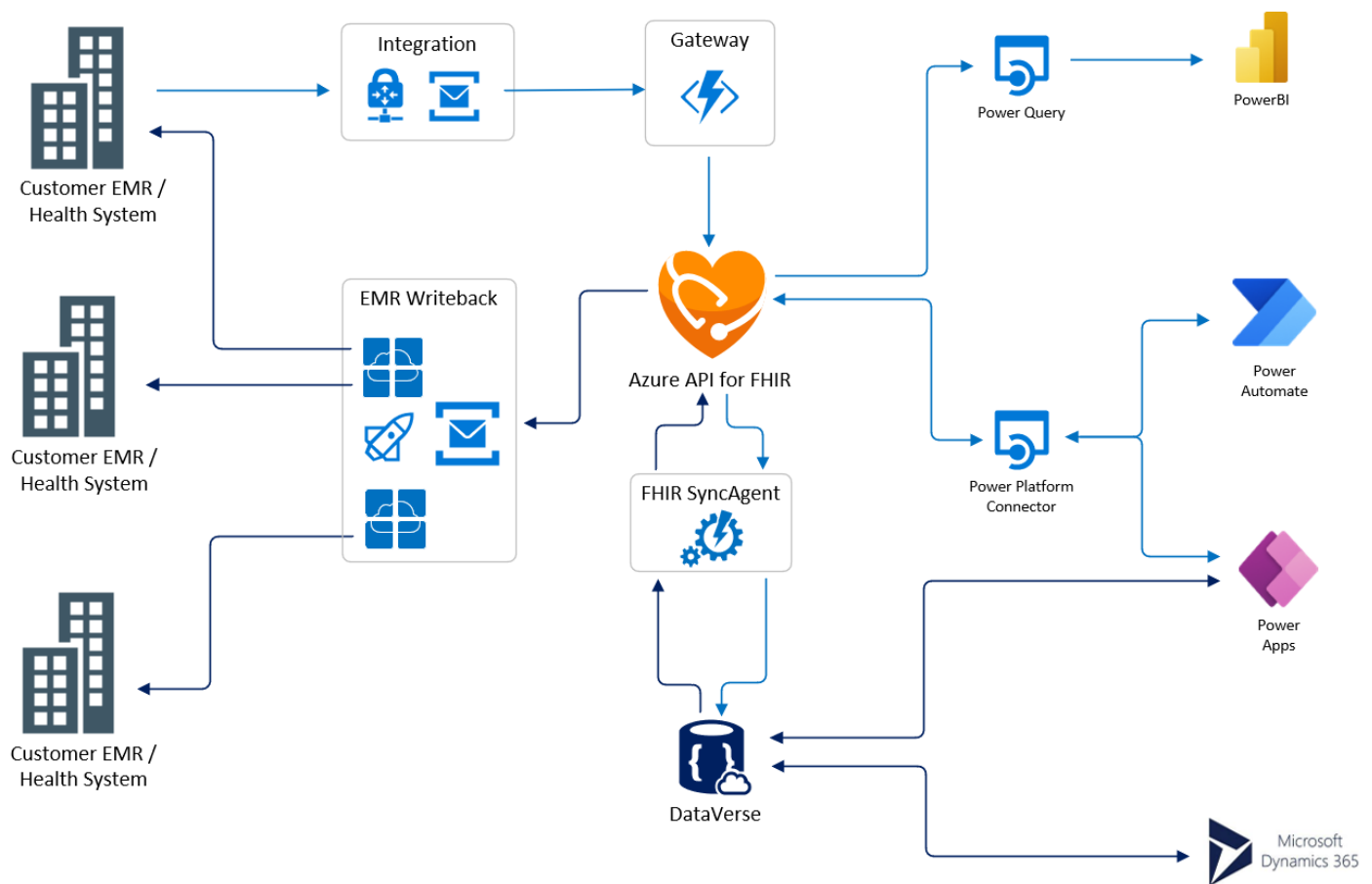


The estimated time to complete this lab is **50** minutes.

Introduction

Imagine Lamna Healthcare has been using **EMR/Health** systems which use data models based on the Fast Healthcare Interoperability Resources (**FHIR**) standards framework. They would like to integrate it with the **Dataverse** tables to access their data from their EMR/Health systems directly in the Microsoft Cloud for Healthcare solution and similarly synchronize the new/updated data from Microsoft Cloud for Healthcare into their EMR systems. This can be achieved by using **the FHIR Sync Administration Agent** and **Azure API for FHIR**. This document will walk through the detailed steps for an IT administrator to setup the FHIR Sync Agent and synchronize the messages into the Service bus queue which is the mechanism to integrate the data between Dataverse and Azure API for FHIR .

Please note that this document does not cover the Azure API for FHIR setup.



Exercise 1: Configure Integration Settings

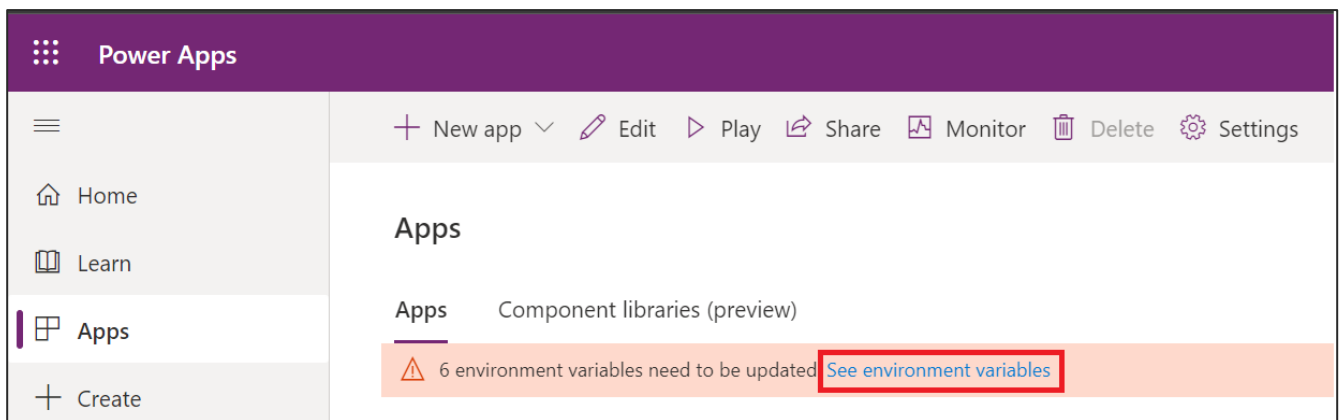
In this exercise, you will be configuring the integration settings in the FHIR Sync Agent Administration.

Task 1: Update Environment Variables/Integration Settings

In this task, you will configure the environment variables/integration settings for the Dataverse environment to communicate with Service bus.

Before beginning the exercises, navigate to [Make Power Apps](#) and confirm that you are in the desired environment for the labs.

1. In the left pane, select **Apps**. You will notice a warning to update the environment variables. Click on the **See environment variables** link to update the Sync Agent integration settings.



2. This will pop-up a screen to provide the required environment variables for the FHIR Sync Agent. Populate the values as per the below details and then click on **Save and close**.

Environment variables ✕

Entity Updater Service Bus URI

****Important**:** Do not delete this environment variable or change the Schema Name. This is used by internal logic. Note: The internal logic will first try to pull the default value. If it does not find a default value, then it will try to pull a defined value. Definition: This represents the URI used for the Service Bus that will receive JSON based CDS record changes. Example: mservicebus.servicebus.windows.net

Sync Agent Logging Enabled

****Important**:** Do not delete this environment variable or change the Schema Name. This is used by internal logic. This setting globally enables / disables the logging of transactions that are made to the Azure FHIR Sync Agent service bus.

Entity Updater Service Bus Shared Access Key

****Important**:** Do not delete this environment variable or change the Schema Name. This is used by internal logic. Note: The internal logic will first try to pull the default value. If it does not find a default value, then it will try to pull a defined value. Definition: The Key used to connect / authenticate to the Service Bus. This is used in conjunction with the Key Name and acts as the password.

Entity Updater Service Bus Shared Access Key Name

****Important**:** Do not delete this environment variable or change the Schema Name. This is used by internal logic. Note: The internal logic will first try to pull the default value. If it does not find a default value, then it will try to pull a defined value. Definition: The Shared Access Key Name that is used when communicating with the Service Bus.

Entity Updater Client ID

****Important**:** Do not delete this environment variable or change the Schema Name. This is used by internal logic. Note: The internal logic will first try to pull the default value. If it does not find a default value, then it will try to pull a defined value. Definition: Client ID / Application ID used by the Entity Updater Service. The internal logic will use this client ID to ensure that we aren't creating a loop when updating / creating records during the sync processes.

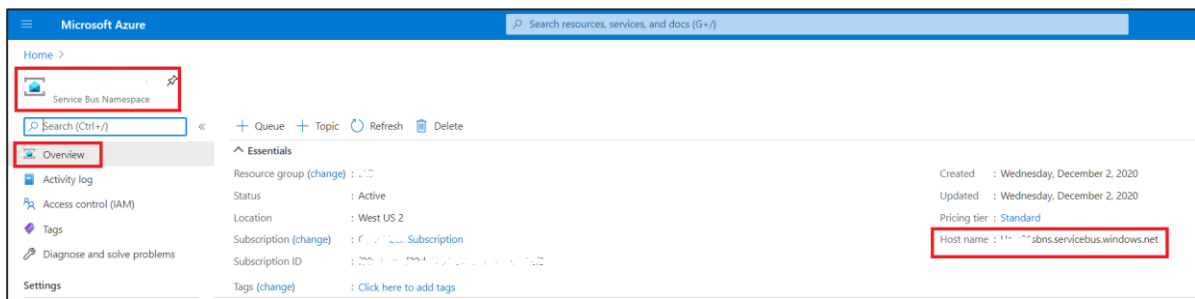
Entity Updater Service Bus Queue

****Important**:** Do not delete this environment variable or change the Schema Name. This is used by internal logic. Note: The internal logic will first try to pull the default value. If it does not find a default value, then it will try to pull a defined value. Definition: The name of the queue that is used by CDS to send JSON message to. Example: myqueue

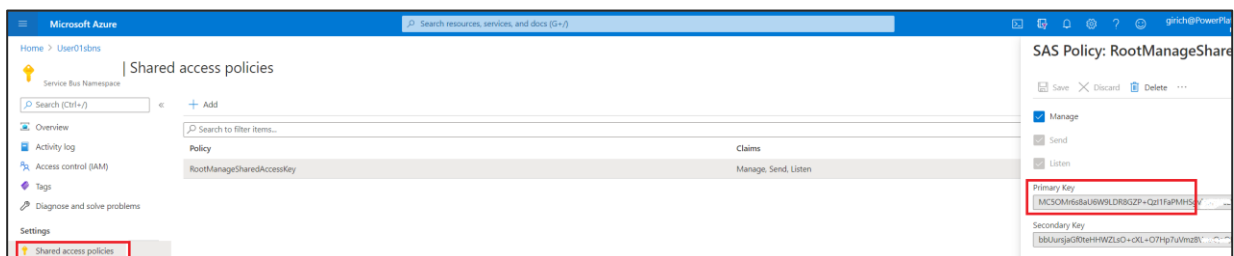
Save and close

Cancel

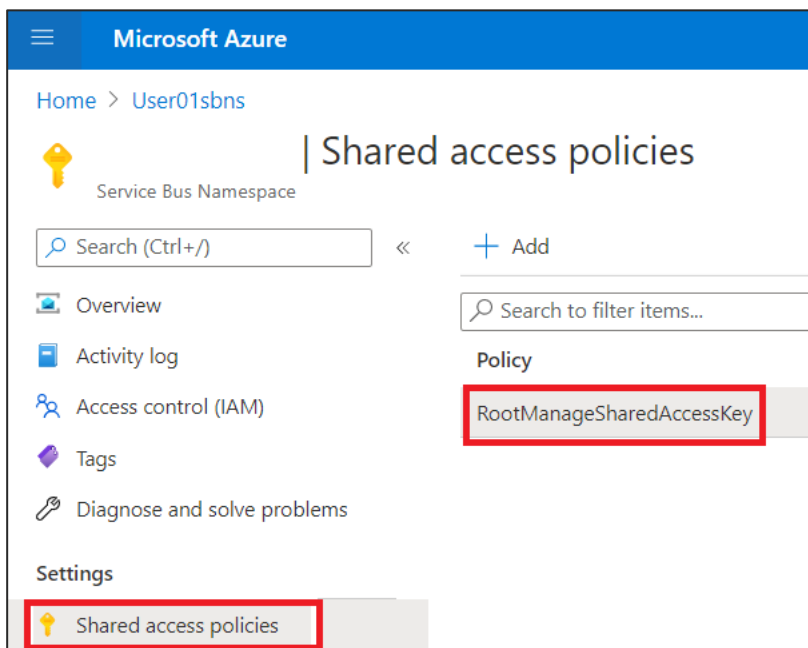
- a. **Entity Updater Service Bus URI:** Provide the Service Bus URI (For Example: mservicebus.servicebus.windows.net) that will receive JSON based Dataverse record changes. It is the value in host name in the Service Bus Namespace.



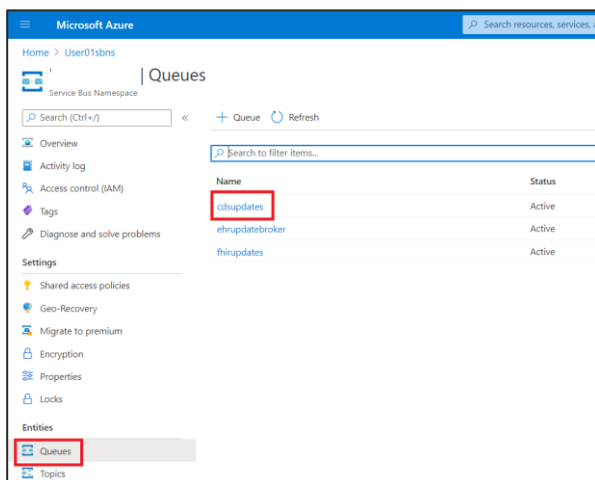
- b. **Sync Agent Logging Enabled:** Select "True" (If you observe only "Yes" and "No" options in the drop-down then select "Yes") and it will enable the logging of transactions that are made to the Azure FHIR Sync Agent service bus.
- c. **Entity Updater Service Bus Shared Access Key:** Provide the Key used to connect / authenticate to the Service Bus. This is used in conjunction with the Key Name and acts as the password. The value can be copied from the Service Bus Queue. On the left pane in the service bus namespace, click on the **Shared Access Policies**. Double click on the Policy (For Ex: RootManageSharedAccessKey) to open a pop-up screen on the right. Copy and use the value from the field **Primary Key**.



- d. **Entity Updater Service Bus Shared Access Key Name:** Provide the Shared Access Key Name that will be used when communicating with the Service Bus. The value can be copied from the Service Bus Queue. On the left pane in the service bus namespace, click on the **Shared Access Policies**. Copy and use the value (The value is usually RootManageSharedAccessKey) displayed in the column **Policy**.

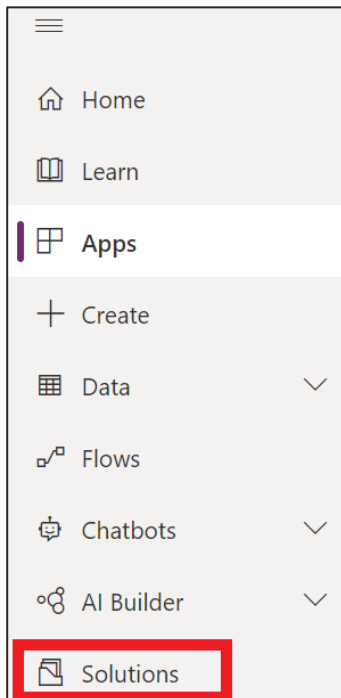


- e. **Entity Updater Client ID:** In Azure Active Directory set up an app registration as per the instructions in the pre-requisites link, and that will give you your client ID. *[Note : If you are in an official training then use the Client ID provided by your lab instructor].* Update that client ID which will be used by the Entity Updater Service. The internal logic will use this client ID to ensure that we are not creating a loop when updating / creating records during the sync processes.
- f. **Entity Updater Service Bus Queue:** Provide the name of the queue (For Example: cdsupdates) which will be used by Dataverse to send JSON messages. This value can be retrieved from the Service bus namespace in Azure Portal. On the left pane in the service bus namespace, click on the **Queues**. Copy and use the queue name as advised by the instructor. (Usually, the queue name would be cdsupdates)

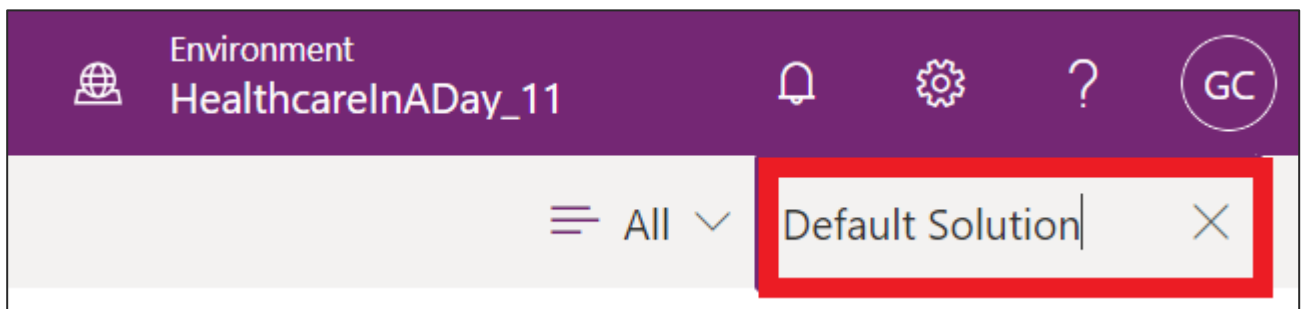


3. On click of **Save & Close**, these parameters are saved. The same configurations can later be updated/verified in the **Default Solution** in Solutions.

4. In the left pane, click **Solutions**.



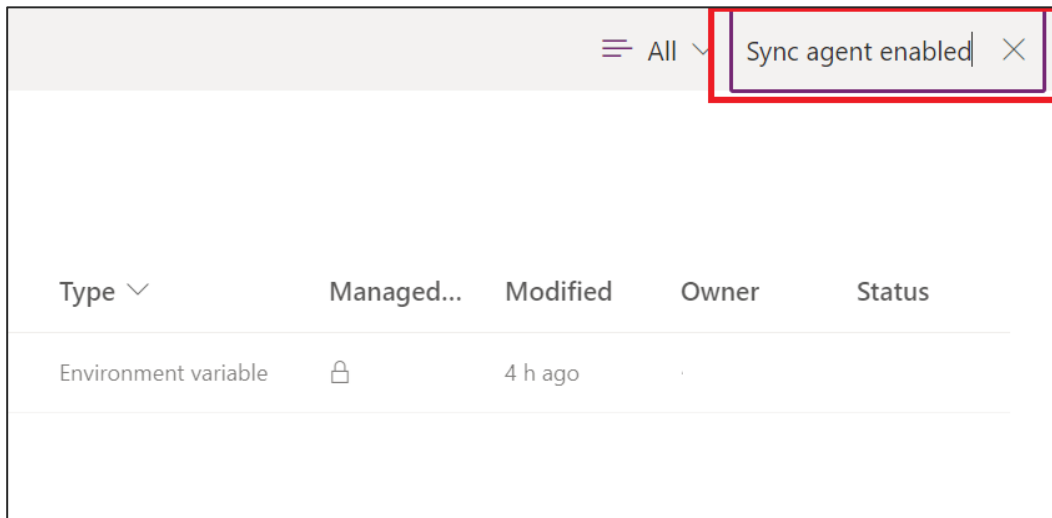
5. On the top right corner, search for the term **Default Solution**.



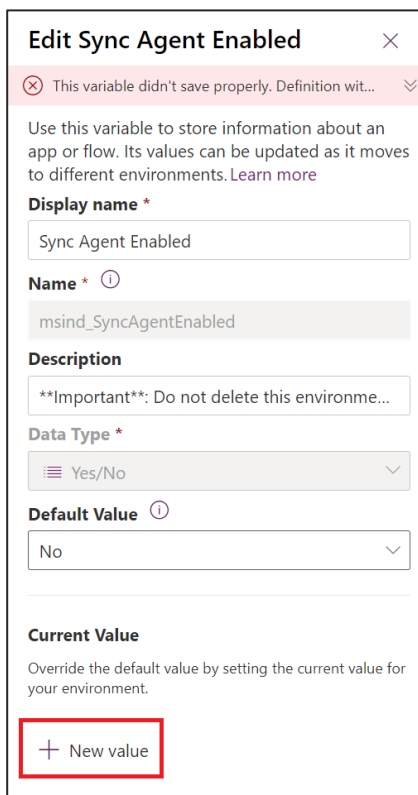
6. Click on **Default Solution** and it will display all the environment variables.

Solutions		
Display name		Name
Common Data Services Default Solution	...	Crea701
Default Solution	...	Default

7. To enable FHIR Sync Agent, search for the environment variable **Sync Agent Enabled**



8. Click on **Sync Agent Enabled** and then click on **+ New value** to select **Yes**. Click on Save button
[Note: If any error message pops up while opening the pop-up or saving the data, then ignore the error message and click on cancel button]



Edit Sync Agent Enabled ✕

✕ This variable didn't save properly. Definition wit... ▾

Use this variable to store information about an app or flow. Its values can be updated as it moves to different environments. [Learn more](#)

Display name *

Sync Agent Enabled

Name * ⓘ

msind_SyncAgentEnabled

Description

Important: Do not delete this environme...

Data Type *

Yes/No ▾

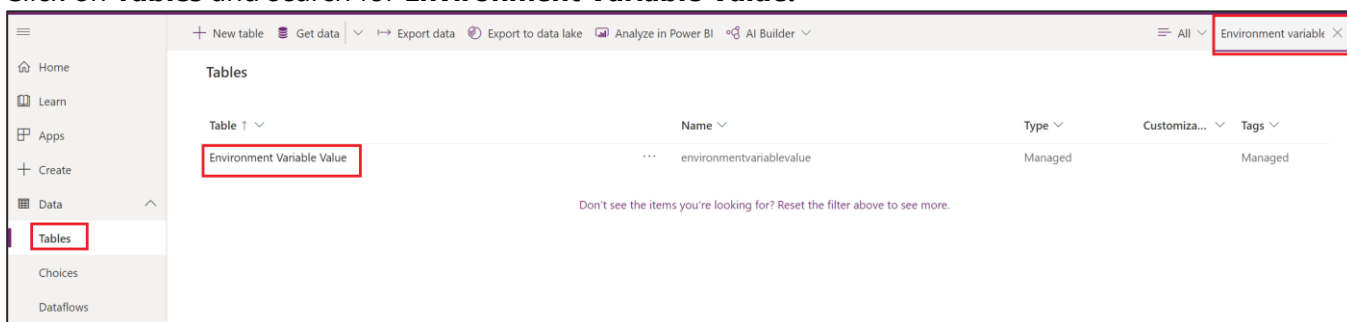
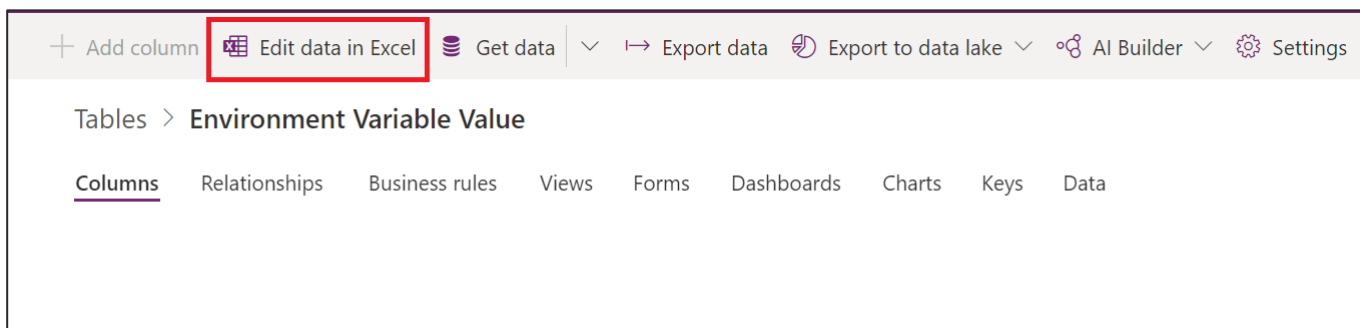
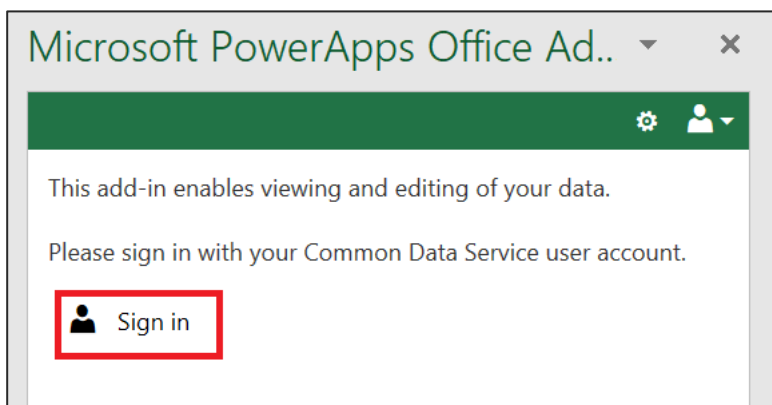
Default Value ⓘ

No ▾

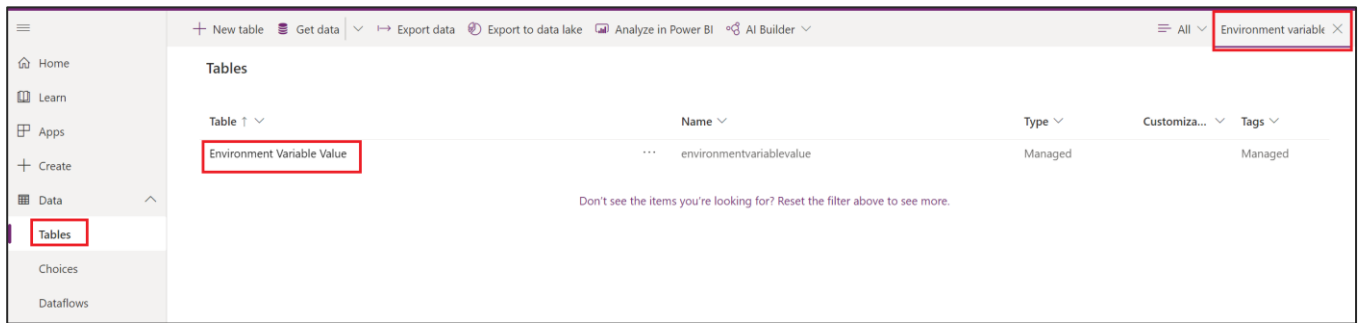
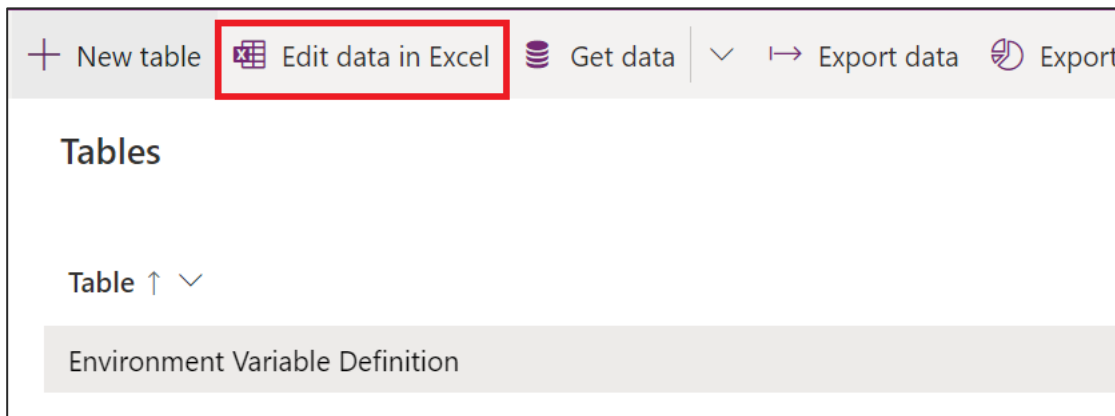
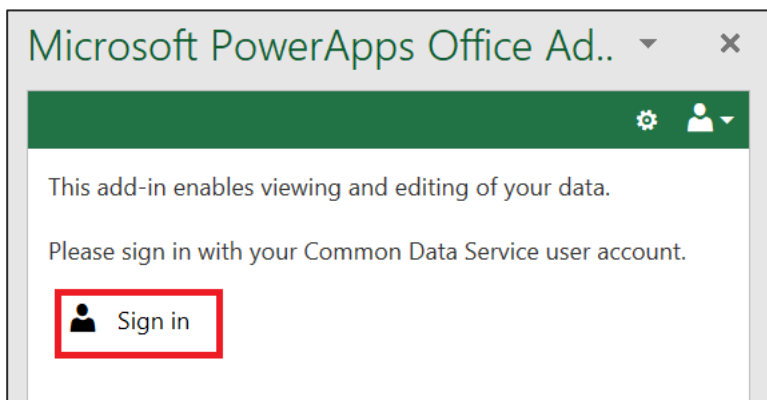
Current Value

Override the default value by setting the current value for your environment.

+ New value

9. Click on **Tables** and search for **Environment Variable Value**.10. Click on **Environment Variable Value** table and then click on **Edit data in Excel** and an excel file will be downloaded into your system.11. Open the excel file. Click on **Sign in** button on the Office Add-in and enter the credentials provided to you by your instructor.12. Ensure that the values for the environment variables **msind_SyncAgentLoggingEnabled** and **msind_SyncAgentEnabled** are set as **true**. If you observe any other values like false, no, or yes then change it to **true** and click on **Publish** button to save the changes into Dataverse.

Component State	Environment Variable Definition (Lookup)	Value
Published	msind_EntityUpdaterServiceBusSharedAccessKeyName	RootManageSharedAccessKey
Published	msind_EntityUpdaterServiceBusURI	;.servicebus.windows.net
Published	msind_EntityUpdaterClientID	
Published	msind_EntityUpdaterServiceBusSharedAccessKey	:
Published	msind_SyncAgentLoggingEnabled	true
Published	msind_EntityUpdaterServiceBusQueue	fhirupdates
Published	msind_SyncAgentEnabled	true

13. Click on **Tables** and search for **Environment Variable Value**.14. Click on **Environment Variable Definition** table and then click on **Edit data in Excel** and an excel file will be downloaded into your system.15. Open the excel file. Click on **Sign in** button on the Office Add-in and enter the credentials provided to you by your instructor.16. Ensure that the Default values for the environment variables **Sync Agent Logging Enabled** and **Sync Agent Enabled** are set as **true**. If you observe any other values like false, no, or yes then change it to **true** and click on **Publish** button to save the changes into Dataverse.

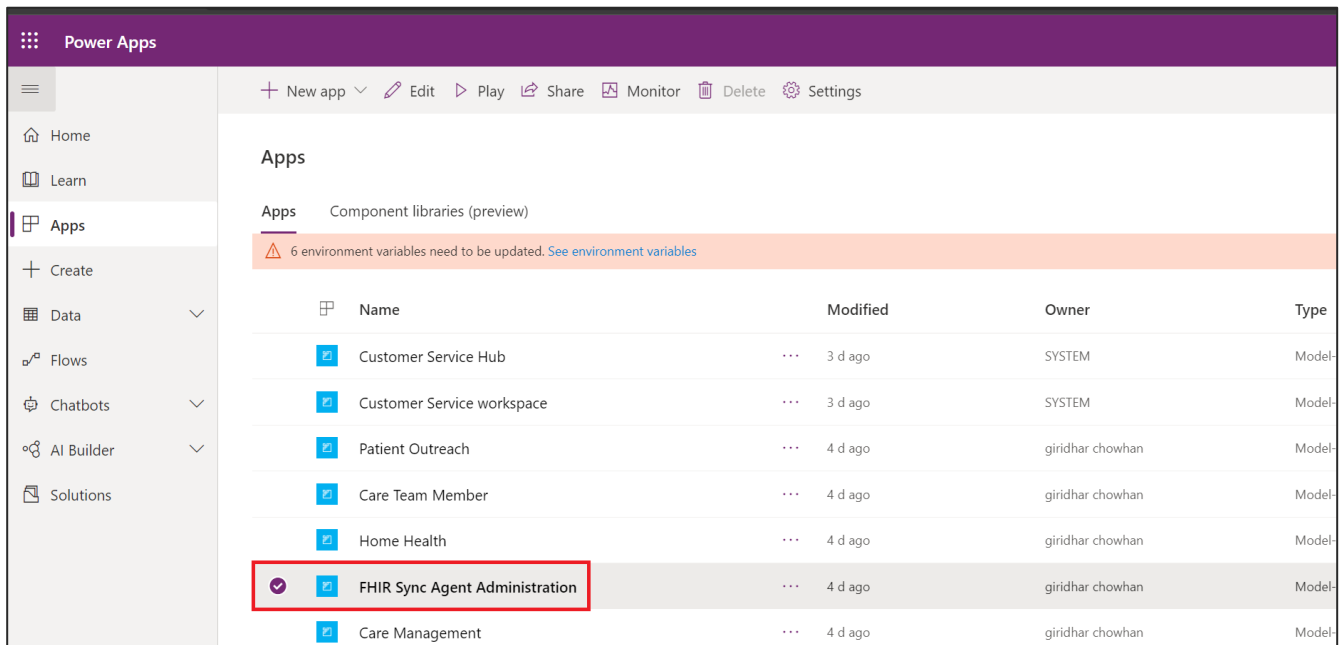
Display Name	Default Value
Sync Agent Logging Enabled	true
Sync Agent Enabled	true

Congratulations! You have completed the steps to setup the Integration Settings. This setup will be used in the last exercise while testing the synchronization.

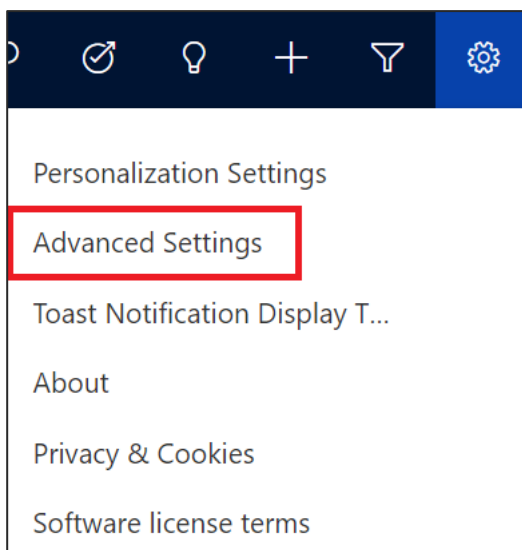
Task 2: Create an Application User for Application ID

In this task, you will be creating an application user to synchronize the data.

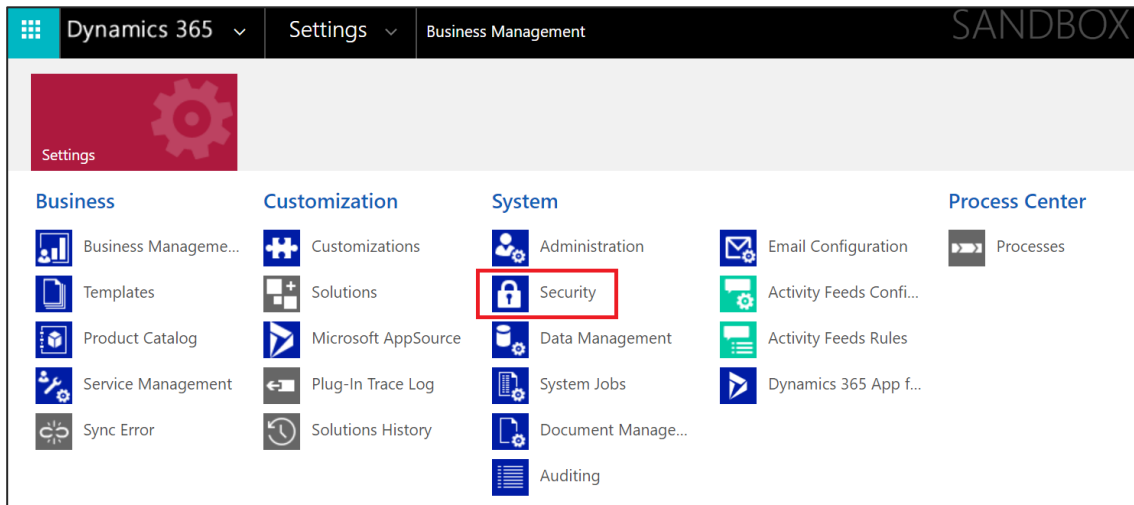
1. Click on **FHIR Sync Agent Administration** app to open it.



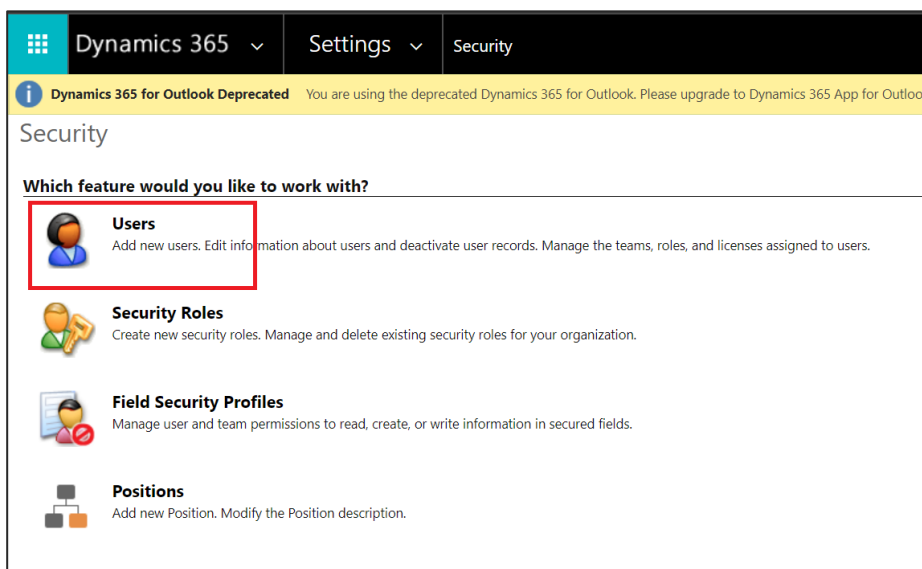
2. In the top right of the screen, click on the ⚙ icon and then click **Advanced Settings**, settings will pop-up in a new tab page.



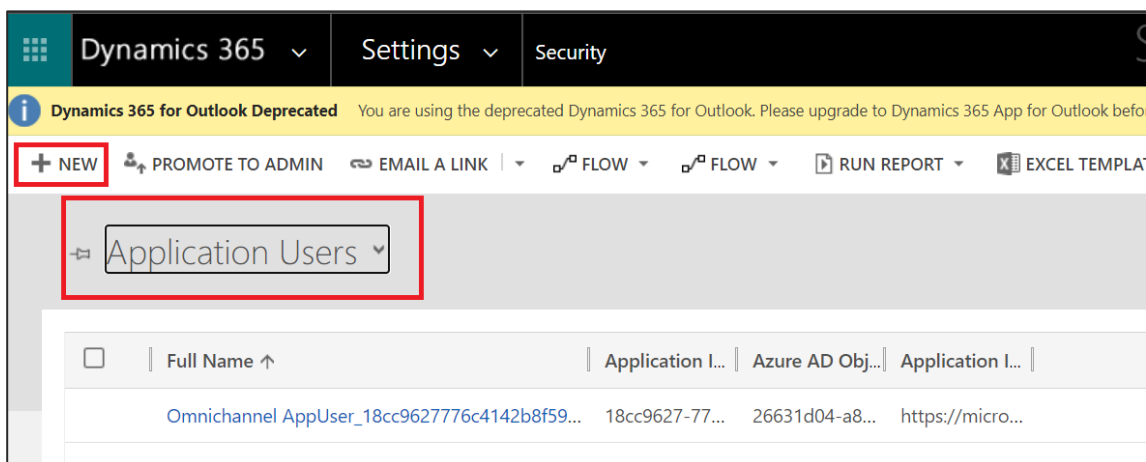
3. Click on **Settings > Security**.



4. On the Security page, click on **Users**.



5. On the **Users** page, make sure the view is set to **Application Users** (if it is on a different view then change the view to **Application Users**) and then click on **New** button.



- On the **New User** screen, make sure the view is **Application User** (if it is on a different view then change the view to **Application User**). On the field **Application ID**, provide the same application ID used in Exercise 1->Task 1-> 2 (e) and then click on **Save**. Upon saving all other fields will be auto populated.

USER : APPLICATION USER

New User

! The information provided in this form is viewable by the entire organization.

Summary

Account Information

User Name

Application ID *

Application ID URI

Azure AD Object ID

User Information

Full Name *

Primary Email

User type: Application user

Congratulations! You have completed the steps to setup the FHIR Sync Application User. This setup will be used in the last exercise while testing the synchronization.

Task 3: Assign Roles to FHIR Sync Application User

In this task, you will provide the required access to the FHIR sync application user.

- Click on **Manage Roles** and then assign security roles named **FHIR Sync Agent App Reg User** and **Healthcare User** to the user created in step 5. This security role gives the sync agent, the access it needs in Dataverse to access attribute and entity maps, and to access the FHIR entities in Dataverse.

Manage User Roles

What roles would you like to apply to the 1 User you have selected?

Role Name	Business Unit
<input type="checkbox"/> Event Planner	
<input type="checkbox"/> EventManagement S2SInbound	
<input type="checkbox"/> Export Customizations (Solution Check..	
<input checked="" type="checkbox"/> FHIR Sync Agent App Reg User	
<input type="checkbox"/> FHIR Sync Agent Config Administrator	
<input type="checkbox"/> Field Service - Administrator	
<input type="checkbox"/> Field Service - Dispatcher	
<input type="checkbox"/> Field Service - Inventory Purchase	

OK Cancel

Manage User Roles

What roles would you like to apply to the 1 User you have selected?

Role Name	Business Unit
<input type="checkbox"/> FileStoreService App Access	
<input type="checkbox"/> Finalize Registration Service	
<input type="checkbox"/> Forecast manager	
<input type="checkbox"/> Forecast user	
<input checked="" type="checkbox"/> Healthcare User	
<input type="checkbox"/> Help Page Author	
<input type="checkbox"/> Help Page Consumer	

OK Cancel

Congratulations! You have completed the steps to setup the required for the FHIR Sync Application user. This setup will be used in the last exercise while testing the synchronization.

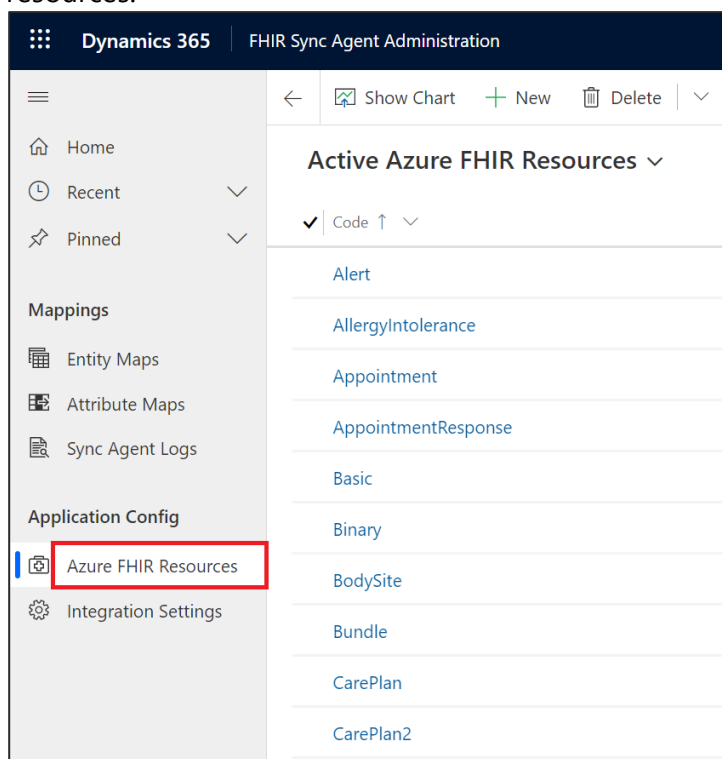
Exercise 2: Explore Azure FHIR Resources and Enable Entity maps

In this exercise, you will explore the Azure FHIR Resources screen and enable Entity and Attribute maps.

Task 1: Explore Standard Azure FHIR Resources

In this task, you will explore standard Azure FHIR Resources. Azure FHIR Resources defines the universe of FHIR resources. Because you cannot see inside of FHIR entities directly to see all the resources, the FHIR Sync Agent defines all the resources in an entity. The FHIR resources are primarily used in entity maps. You should be able to add any custom Azure FHIR Resources in this form.

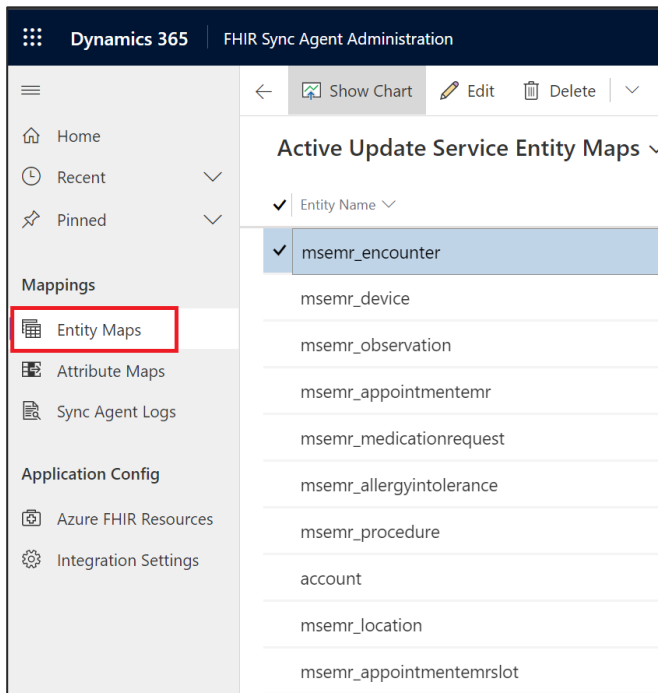
1. On the left pane, click on **Azure FHIR Resources** and you can view the list of standard Azure FHIR resources.



Task 2: Explore and Enable Standard Entity Maps

In this task, you will explore and enable the mappings between the standard Azure FHIR Resources and standard Healthcare Dataverse tables.

1. On the left pane, click on **Entity Maps** and you can view the list of Azure FHIR Resources and Healthcare Dataverse tables.



2. Select an entity mapping record for entity **contact** <-> **Patient** for which the sync needs to be enabled and then click on **Edit** button.
 - a. By default, the sync is disabled and to enable the sync, set the **Is Disabled?** toggle field to **No**.
 - b. To enable the updates back to FHIR, set the **Enable Write Back to FHIR** toggle to **Yes**. This setting means that when changes are occurring in Dataverse, you want those changes to write back to FHIR. If you select **No**, the data updates on the Patient table in Dataverse will not flow back into Azure API for FHIR.

The screenshot shows the 'contact <-> Patient' update service entity map configuration in the Dynamics 365 FHIR Sync Agent Administration interface. The 'Entity Details' section is highlighted with a red box, showing the 'Is Disabled?' toggle set to 'No' and the 'Enable Write Back to FHIR' toggle set to 'Yes'. Below this, the 'Related Attribute Maps' table lists several mappings:

Attribute Name	FHIR Required Attribute	FHIR Element Map	Attribute Type	FHIR Element Type	Entity Name	Azure FHIR Resource (U...	Action
mobilephone	No	["s": "\$.telecom[?(@use=...	String	string	contact	Patient	Copy
emailaddress1	No	["s": "\$.telecom[?(@syste...	String	string	contact	Patient	Copy
telephone1	No	["s": "\$.telecom[?(@syste...	String	string	contact	Patient	Copy
msemr_generalpractitioner	No	["s": "\$.generalPractitioner...	Lookup	string	contact	Patient	FK Re...
msemr_contacttype	No	---	Picklist	string	contact	Patient	Set De...

Note: No Action is required for the below step as it is only informational for you to explore the attribute mapping on an existing map

3. Select a field mapping in the bottom grid and click on **Edit** button to update any of the attribute mapping's properties. Clicking on the Edit button will pop up the **Update Service Attribute Map** screen.
 - a. To enable/disable the attribute mapping, set the toggle field **Disable** to **No/Yes**.
 - b. If this attribute is required in FHIR Resource, then set the toggle on the field **FHIR Required Attribute** to **Yes** else **No**.

The screenshot shows the 'msemr_encounter.msemr_azurefhirlastupdatedon' update service attribute map configuration. The 'Map Configuration' section is highlighted with a red box, showing the 'Disabled' toggle set to 'No' and the 'FHIR Required Attribute' toggle set to 'No'. Below this, the 'Value Maps' section shows a table with columns for 'OptionSet Label', 'Value', and 'Azure FHIR Value'. The 'Configuration Details' section shows the 'Attribute Type' set to 'DateTime'.

Congratulations! You have completed the steps to enable a standard entity map. This setup will be used in the last exercise while testing the synchronization.

Exercise 3: Create New Mappings

In this exercise, you will create new entity mappings and attribute mappings of different attribute types.

Task 1: Create a New Entity Map

In this task, you will create new entity and attribute mappings of different attribute types for the Dataverse table **Coverage (msemr_coverage)** and Azure FHIR Resource **Coverage**. This will ensure that the data changes made in the Coverage entity is synchronized.

1. On the **Azure FHIR Resources** page, filter on the code **Coverage**. If it does not exist, then click on the **New** button and create a new record for **Coverage**.

2. On the **Entity Maps** page, click on **New** button.

Entity Name	Code (Azure FHIR Resource)	Supported Messages	Is Disabled	Enable Write Back to FHIR
msemr_encounter	Encounter	Update	No	Yes
msemr_device	Device	Update	Yes	Yes
msemr_observation	Observation	Update	Yes	Yes
msemr_appointmentemr	Appointment	Create; Update	Yes	Yes
msemr_medicationrequest	MedicationRequest	Update	Yes	Yes
msemr_allergyintolerance	AllergyIntolerance	Update	Yes	Yes
msemr_procedure	Procedure	Update	Yes	Yes
account	Organization	Update	Yes	Yes
msemr_location	Location	Update	Yes	Yes
msemr_appointmentemrslot	Appointment	Update	Yes	Yes
msemr_relatedperson	RelatedPerson	Update	Yes	Yes
msemr_claim	Claim	Update	Yes	Yes
msemr_diagnosticreport	DiagnosticReport	Update	Yes	Yes
msemr_condition	Condition	Update	Yes	Yes
msemr_medication	Medication	Update	Yes	Yes
msemr_careplan	CarePlan	Update	Yes	Yes
msemr_slot	Slot	Update	Yes	Yes

3. On the **New Entity map** page, populate the values as mentioned below and click on **Save**.
 - a. By default, the toggle field **Is Disabled?** is set to **Yes**. Do not set it to **No** until the mapping is complete.
 - b. To enable the updates back to FHIR, set the **Enable Write Back to FHIR** toggle field to **Yes**. This setting means that when data changes are occurring in this Dataverse table, you want those changes to write back to FHIR.
 - c. On the field **EntityName**, select the Dataverse table **Coverage (msemr_coverage)**.
 - d. On the field **Azure FHIR Resource**, select the Azure FHIR Resource **Coverage**.
 - e. On the field **Supported Messages**, **click select all** which will select both **Create** and **Update**. With the setting of **Create**, a record created in Dataverse is sent back to FHIR. With **Update**, if a record is changed in Dataverse, the changes are sent to FHIR.

Congratulations! You have completed the steps to create a new entity map.

Task 2: Create New Attribute Maps

In this task, you will learn to create new attribute maps for different attribute types.

1. On click of **Save** button in the **New Entity map screen**, the bottom grid **Related Attribute Maps** gets enabled. Click on the button **New Update Service Attribute Map** to add new attribute mappings.

2. On the **New Update Service Attribute Map**, populate the values as mentioned below and then click on **Save & Close**.
 - a. By default, the toggle field **Disabled** is set to **No**. Do not set it to **Yes** as this attribute mapping needs to be enabled.
 - b. This attribute is not required in FHIR Resource so set the toggle on the field **FHIR Required Attribute** to **No**.
 - c. On the field **Attribute Name**, select the value **Azure FHIR ID (msemr_azurefhirid)**.
 - d. On the field **Action Type**, select the value **Copy Data**. This setting means that string data on one system is copied to the other system.
 - e. On the field **FHIR Element Map**, add the JSON search string **{"s": "\$.id"}**.

msemr_coverage.msemr_azurefhirid
Update Service Attribute Map

General Related

Map Configuration

Disabled

☒ No

FHIR Required Attribute

☒ No

Attribute Name

*

Azure FHIR ID (msemr_azurefhirid)

Action Type

*

Copy Data

FHIR Element Map

{"s": "\$.id"}

FHIR Element Type

string

Configuration Details

Attribute Type

String

3. On the **New Entity map** screen for the entity map **Coverage**, click on the button **New Update Service Attribute Map** to add new attribute mapping of type Pick list. Populate the values as mentioned below and then click on **Save & Close**.
 - a. By default, the toggle field **Disabled** is set to **No**. Do not set it to **Yes** as this attribute mapping needs to be enabled.

- b. This attribute is not required in FHIR Resource so set the toggle on the field **FHIR Required Attribute** to **No**.
- c. On the field **Attribute Name**, select the value **Status (msemr_coveragestatus)**.
- d. On the field **Action Type**, select the value **Mapped Value**. Because it is a pick list, you map values between what is the FHIR pick list value and what is the Dataverse pick list value.
- e. On the field **FHIR Element Map**, add the JSON search string **{"s": "\$.coveragestatus"}**.
- f. Click on save and behind the scenes, the system has determined that this is an option set and auto-populates the options in the **Value Maps** grid.
- g. On the **Value Maps** grid, enter the Azure FHIR Value to map for the option set. For example, enter active for the Active option (Dataverse value is 935000000), and enter cancelled for the Cancelled option (Dataverse value is 935000001).

New Update Service Attribute Map
Update Service Attribute Map

msemr_coverage <-> Coverage
Update Service Entity Map

msemr_coverage
Entity Name

Active
Status

No
IsTemplate

General Related

Map Configuration

Disabled ☐ No

FHIR Required Attribute ☐ No

Attribute Name * Status (msemr_coveragestatus)

Action Type * Mapped Value

FHIR Element Map {"s": "\$.coveragestatus"}

FHIR Element Type string

Configuration Details

Attribute Type Picklist

Value Maps

+ New Attribute Value ...

Group By: (no grouping)

OptionSet Label	Value	Azure FHIR Value
Active	935000000	active
Cancelled	935000001	cancelled
Draft	935000002	draft
Entered In Error	935000003	entered in error

Page 1

4. On the **New Entity map** screen for the entity map **Coverage**, click on the button **New Update Service Attribute Map** to add new attribute mapping of type DateTime. Populate the values as mentioned below and then click on **Save & Close**.
 - a. By default, the toggle field **Disabled** is set to **No**. Do not set it to **Yes** as this attribute mapping needs to be enabled.
 - b. This attribute is not required in FHIR Resource so set the toggle on the field **FHIR Required Attribute** to **No**.
 - c. On the field **Attribute Name**, select the value **Azure FHIR Last Updated On (msemr_azurefhirlastupdatedon)**.
 - d. On the field **Action Type**, select the value **Copy Data**.
 - e. On the field **FHIR Element Map**, add the JSON search string **{"s": "\$.meta.lastUpdated"}**.

msemr_coverage.msemr_azurefhirlastupdatedon
Update Service Attribute Map

General Related

Map Configuration

Disabled

☐ No

FHIR Required Attribute

☐ No

Attribute Name

*

 Azure FHIR Last Updated On (msemr_a

Action Type

*

 Copy Data

FHIR Element Map

{**"s"**: **"\$.meta.lastUpdated"**}

FHIR Element Type

string

Configuration Details

Attribute Type

DateTime

5. On the **New Entity map** screen for the entity map **Coverage**, click on the button **New Update Service Attribute Map** to add new attribute mapping of type String. Populate the values as mentioned below and then click on **Save & Close**.
- By default, the toggle field **Disabled** is set to **No**. Do not set it to **Yes** as this attribute mapping needs to be enabled.
 - This attribute is not required in FHIR Resource so set the toggle on the field **FHIR Required Attribute** to **No**.
 - On the field **Attribute Name**, select the value **Name(msemr_name)**.
 - On the field **Action Type**, select the value **Copy Data**.
 - On the field **FHIR Element Map**, add the JSON search string **{**"s"**: **"\$.name"**}**.

msemr_coverage.msemr_name
 Update Service Attribute Map

General Related

Map Configuration

Disabled ☐ No

FHIR Required Attribute ☐ No

Attribute Name * Name (msemr_name)

Action Type * Copy Data

FHIR Element Map {"s": "\$.name"}

FHIR Element Type string

Configuration Details

Attribute Type String

6. On the **New Entity map** screen for the entity map **Coverage**, click on the button **New Update Service Attribute Map** to add new attribute mapping of type **DateTime**. Populate the values as mentioned below and then click on **Save & Close**.
 - a. By default, the toggle field **Disabled** is set to **No**. Do not set it to **Yes** as this attribute mapping needs to be enabled.
 - b. This attribute is not required in FHIR Resource so set the toggle on the field **FHIR Required Attribute** to **No**.
 - c. On the field **Attribute Name**, select the value **Policy Holder (Patient) (msemr_policyholderpatient)**.
 - d. On the field **Action Type**, select the value **FK Reference**.
 - e. On the field **FHIR Element Map**, add the JSON search string `{"s": "$.patient.reference", "c":{"p": "patient", "a": [{"reference": "%%%"}, {"type": "%%%"}]}}`.
 - f. On the field **FHIR Resource Reference**, select the value **Patient**.

msemr_coverage.msemr_beneficiarypatient
 Update Service Attribute Map

General Related

Map Configuration

Disabled ☒ No

FHIR Required Attribute ☒ No

Attribute Name * Policy Holder (Patient) (msemr_policyh

Action Type * FK Reference

FHIR Element Map {"s": "\$.patient.reference", "c":{"p": "patient", "a": [{"reference": "%%%"}, {"type": "%%"}]}}

FHIR Element Type string

Configuration Details

Attribute Type Lookup

Entity Reference contact

FHIR Resource Reference Patient

7. On the **New Entity map** screen for the entity map **Coverage**, click on the button **New Update Service Attribute Map** to add new attribute mapping of type String. Populate the values as mentioned below and then click on **Save & Close**.
 - a. By default, the toggle field **Disabled** is set to **No**. Do not set it to **Yes** as this attribute mapping needs to be enabled.
 - b. This attribute is not required in FHIR Resource so set the toggle on the field **FHIR Required Attribute** to **No**.
 - c. On the field **Attribute Name**, select the value **Azure FHIR Version ID (msemr_azurefhirversion)**.
 - d. On the field **Action Type**, select the value **Copy Data**.
 - e. On the field **FHIR Element Map**, add the JSON search string `{"s": "$.meta.versionId"}`.

msemr_coverage.msemr_azurefhirversion

Update Service Attribute Map

General Related

Map Configuration

Disabled	<input checked="" type="checkbox"/> No
FHIR Required Attribute	<input checked="" type="checkbox"/> No
Attribute Name	* Azure FHIR Version (msemr_azurefhirve
Action Type	* Copy Data
FHIR Element Map	{"s": "\$.meta.versionId"}
FHIR Element Type	string

Configuration Details

Attribute Type	String
----------------	--------

Congratulations! You have completed the steps to create attribute maps for different data types.

Task 3: Enable the Coverage Entity map

1. On the **New Entity map** screen for the entity map **Coverage**, set the toggle field **Is Disabled?** to No. With this, the synchronization will be enabled.

Exercise 4: Test Synchronization from Dataverse to Service Bus Queue

In this exercise, we are going to test the synchronization from Dataverse to Service bus queue based on the configuration done in the earlier exercises.

1. On the bottom left edge, click on **Agent Admin** and change the area to **Healthcare Data**. The Healthcare Data module allows the map administrators to view and interact with the user data that is flowing into the system. This helps the map administrators understand and troubleshoot the data. Map administrators use the Healthcare Data module to view the data and understand what is occurring as they build the maps, and to ensure that the data is coming over correctly and coming over into the right field.

The screenshot shows the Dynamics 365 interface for 'FHIR Sync Agent Administration' in a 'SANDBOX' environment. The left sidebar has a 'Change area' section with 'Agent Admin' selected and 'Healthcare Data' highlighted with a red box. The main content area is titled 'New Update Service Attribute Map' and shows the 'Update Service Attribute Map' configuration. The 'General' tab is active, displaying the 'Map Configuration' section with the following details:

- Disabled: ☒ No
- FHIR Required Attribute: ☒ No
- Attribute Name: * Policy Holder (Patient) (msemr_policyh)
- Action Type: * FK Reference
- FHIR Element Map: {"s": "\$patient.reference", "c": {"p": "patient", "a": [{"reference": "%%%"}, {"type": "%%%"}]}}
- FHIR Element Type: string

The 'Configuration Details' section shows:

- Attribute Type: Lookup
- Entity Reference: contact
- FHIR Resource Reference: * Patient

On the right, the 'Value Maps' section is visible, showing a 'Group By' dropdown set to '(no grouping)' and a table with columns for 'OptionSet Label', 'Value', and 'Azure FHIR Value'.

2. On left menu, click on **People**, select **Patients FHIR View**.

Dynamics 365 | FHIR Sync Agent Administration SANDBOX

Navigation: Home, Recent, Pinned, Administration, People, Organizations, Locations, Care Management, Care Plans, Care Teams

Patients FHIR View

Group By: (no grouping)

✓ Azure FHIR ID	Azure FHIR Last Updated On	Azure FHIR Sync Enabled	Azure FHIR Version	Full Name	Medical Record Number	Address 1	Mobile Pho...	Birthday
✓ ---	---	No	---	Amber R...	MRN2631-2120	8582 PALMITER...	555-555-0...	11/15/1965
---	---	No	---	Casey Jensen	MRN1156-6243	8387 DONNERBER...	555-555-0...	8/18/2004
---	---	No	---	Elizabeth M...	MRN4278-7517	3442 ENGBERSON...	555-555-0...	1/29/2001
---	---	No	---	Jessie Irwin	MRN6734-1484	3551 GONDEK La...	555-555-0...	7/1/2014
---	---	No	---	Kayla Lewis	MRN1070-8538	3683 PEVAHOUSE ...	555-555-0...	2/29/1976
---	---	No	---	Madison Bu...	MRN8445-6444	2361 ENKE Drive L...	555-555-0...	8/21/1981
---	---	No	---	Monica Tho...	MRN4420-0553	4383 MAUSEY Str...	555-555-0...	2/3/1985

3. If the values on the fields **Azure FHIR ID**, **Azure FHIR Last Updated On** and **Azure FHIR Sync Enabled** are blank on all the Patient records then on the first record, update the fields for the first record with **Azure FHIR ID** as 1234, **Azure FHIR Last Updated On** as today's date and time and **Azure FHIR Sync Enabled** as Yes and then click on **Save**. The data gets synced from Azure API for FHIR to Dataverse and vice versa only when these three fields are filled in. In the real-world scenario, a user isn't expected to populate the data into these fields manually, instead these are expected to be either synchronized from Azure API for FHIR or during the initial data migration.

Amber Rodrigue
Contact

Summary Clinical Timeline Care Team Ca

Home Phone
555-555-0100

Mobile Phone
555-555-0100

Business Phone
423-555-0101

Contact Method
Any

Gender
Male

Azure FHIR Sync Enabled
Yes

Azure FHIR ID
1234

Azure FHIR Last Updated On
11/30/2020 4:00 PM

Azure FHIR Version

- Update the last name or mobile number on the same Patient record (the record used in step 3) and click on **Save**.
- Change** the area to **Agent Admin** and click on **Sync Agent Logs** in the left menu. You can find the status of every synchronized/errored record in this page with valid reasons.

Transaction Date	Category	Description	CDS Entity Type	CDS Entity Id	Azure FHIR Resource Id
11/18/2020 9:34 PM	Information	Sent message to Service Bus	contact	5f95aa0d-c701-eb11-a813...	1234
11/18/2020 2:03 AM	Information	Sent message to Service Bus	contact	5f95aa0d-c701-eb11-a813...	1234
11/13/2020 12:38 PM	Information	Sent message to Service Bus	contact	5f95aa0d-c701-eb11-a813...	1234
11/13/2020 12:34 PM	Error	Error sending message to Service Bus	contact	5f95aa0d-c701-eb11-a813...	1234
11/12/2020 12:19 PM	Error	Invalid Sync Agent Enabled Variable	---	---	---

- You will notice the status of the synced record in the field **Description** as "Sent message to Service Bus". If you select that **Description**, you see the message in Sync Agent Logs. The message specifies the attribute that changed and what it sent to the service bus. The message in Sync Agent Logs indicates that you changed the attribute "mobilephone" and "lastname", shows the Dataverse record ID, shows the FHIR ID for the record, that the entity name is "contact", that the FHIR resource name is "Patient", and the message was an "Update".

Sent message to Service Bus	
Sync Agent Log	
Category	Information
Transaction Date	11/18/2020 9:34 PM
Azure FHIR Resource Id	1234
CDS Entity Id	5f95aa0d-c701-eb11-a813-000d3a33f42d
CDS Entity Type	contact
Description	* Sent message to Service Bus
Message	Changes have been sent to the service bus. JSON payload: { "azureFHIRID": "1234", "azureFHIRSyncEnabled": true, "changedAttributes": ["mobilephone", "lastname"], "entityID": "5f95aa0d-c701-eb11-a813-000d3a33f42d", "entityName": "contact", "fhirResourceName": "Patient", "messageName": "Update" }

- You can view the same message in [Azure Portal](#) using **Service Bus Explorer** in **Service Bus Queue**.

The screenshot displays the Microsoft Azure portal interface for the 'fhirsync' Service Bus queue. The left sidebar contains navigation links: Overview, Access control (IAM), Diagnose and solve problems, Settings, Shared access policies, Service Bus Explorer (preview) (highlighted with a red box), Properties, Locks, Automation, Tasks (preview), Export template, Support + troubleshooting, and New support request. The main pane shows the 'Peek' tab for the 'fhirsync' queue. It indicates 3 Active messages, 0 Dead-lettered messages, and 0 Scheduled messages. A table lists the messages with columns for Sequence Number, Message ID, Enqueued Time, and Delivery Count. A message is selected, and its details are shown in a right-hand pane, including Custom Properties and Broker Properties.

Sequence Number	Message ID	Enqueued Time	Delivery Count
1	09d43875db984be28c4384e4619e88d8	Fri, 13 Nov 2020 20:38:28 GMT	1
2	8f93d4aaa663497283fab97ef666c195	Wed, 18 Nov 2020 10:03:46 GMT	1
3	30e14c150cba428a9d63f2f76175ef6b	Thu, 19 Nov 2020 05:34:27 GMT	1

The selected message details are as follows:

Message
Content Type: application/json; charset=utf-8
Content: {"azureFHIRID": "1234", "azureFHIRID": "1234"}

Custom Properties

Name	Value
request-id	"148599893-4bc50f"

Broker Properties

Name	Value
MessageId	30e14c150cba428a
DeliveryCount	1
EnqueuedTimeUtc	Thu, 19 Nov 2020 05:34:27 GMT
SequenceNumber	3
SessionId	5f95aa0d-c701-eb
PartitionKey	5f95aa0d-c701-eb

8. You can similarly add/update the coverage details for a patient record and view the sync status in **Sync Agent Logs** and **Service Bus Queue**.

Congratulations! You have completed testing the synchronization from Dataverse to Service Bus queue which will then be synchronized to Azure API for FHIR when Azure API for FHIR is enabled.

Troubleshooting Tips

1. If you don't see any data in the Sync Agent Logs after completing step 5 in Exercise 4 then
 - a. Verify if the Patient entity map is enabled for sync as per Exercise 2->Taks 2->Step 2.
 - b. Verify if the FHIR Sync fields are populated for the Patient record as per Exercise 4->Step 3.
 - c. In **Integration parameters**, verify the values in the records **msind_SyncAgentEnabled** and **msind_SyncAgentLoggingEnabled**. The values should be exactly same, as per the screenshots in Exercise 1->Task 1->Steps 12 and 16.
 - d. Verify the roles assigned to the application user are as per Exercise 1->Task 3.
 - e. Ensure that the assigned environment is **not in** the [Administration mode](#) (i.e., Administration mode should be in disabled state).

2. **Error:** Invalid Sync Agent Logging Enabled Variable.

Invalid Sync Agent Logging Enabled Variable

Sync Agent Log

General

Related

Category	Error	Transaction Date	12/3/2020	7:54 PM
Azure FHIR Resource Id	---			
CDS Entity Id	---			
CDS Entity Type	---			
Description	<div> <div>*</div> <div>Invalid Sync Agent Logging Enabled Variable</div> </div>			
Message	<div> <div>The current value of the Sync Agent Logging Enabled environment variable is incorrect. Valid values are: true and false.</div> </div>			

Resolution: In **Integration parameters**, verify the values in the record **msind_SyncAgentLoggingEnabled**. The values should be exactly same as per the screenshot in Exercise 1->Task 1->Steps 12 and 16.

3. **Error:** Invalid Sync Agent Enabled Variable.

Invalid Sync Agent Enabled Variable

Sync Agent Log

General

Related

Category	Error	Transaction Date	12/3/2020
Azure FHIR Resource Id	---		
CDS Entity Id	---		
CDS Entity Type	---		
Description	* Invalid Sync Agent Enabled Variable		
Message	The current value of the Sync Agent Enabled environment variable is incorrect. Valid values are: true and false.		

Resolution: In **Integration parameters**, verify the values in the record **msind_SyncAgentEnabled**. The values should be exactly same as per the screenshot in Exercise 1->Task 1->Steps 12 and 16.

4. **Error:** Sync Disabled.

Sync Disabled			
Sync Agent Log			
General		Related	
Category	Information	Transaction Date	12/3/2020
Azure FHIR Resource Id	---		
CDS Entity Id	---		
CDS Entity Type	---		
Description	* Sync Disabled		
Message	The sync agent is disabled globally. Changes to CDS will not be written to the service bus.		

Resolution: In **Integration parameters**, verify the value in the field **Default Value** in the record **msind_SyncAgentEnabled**. The value should be exactly same as per the screenshot in Exercise 1->Task 1->Steps 12 and 16.

5. **Error:** Error sending message to Service Bus (Invalid Authorization token signature)

Error sending message to Service Bus			
Sync Agent Log			
General		Related	
Category	Error	Transaction Date	12/3/2020 8:12 PM
Azure FHIR Resource Id	5555512		
CDS Entity Id	9d744e11-c901-eb11-a813-000d3a33f42d		
CDS Entity Type	contact		
Description	* Error sending message to Service Bus		
Message	<p>Changes could not be sent to the service bus.</p> <p>Service Bus URI: https://User10sbns.servicebus.windows.net/cdsupdates/messages</p> <p>JSON payload:</p> <pre>{ "azureFHIRID": "5555512", "azureFHISyncEnabled": true, "changedAttributes": [{ "msemr_azurefhirid": "msemr_azurefhirid", "msemr_azurefhirlastupdatedon": "msemr_azurefhirlastupdatedon" }], "entityID": "9d744e11-c901-eb11-a813-000d3a33f42d", "entityName": "contact", "fhirResourceName": "Patient", "messageName": "Consent" }</pre> <p>Reason: SubCode=40103: Invalid authorization token signature</p>		

Resolution: In **Integration Settings**, verify the values in the variables **msind_EntityUpdaterServiceBusQueue**, **msind_EntityUpdaterServiceBusSharedAccessKey**, **msind_EntityUpdaterServiceBusSharedAccessKeyName** and **msind_EntityUpdaterServiceBusURI**. The values in those variables should be as per the details mentioned in Exercise 1->Task 1-> Step 2.

6. **Error:** Error sending message to Service Bus (Forbidden)

Error sending message to Service Bus

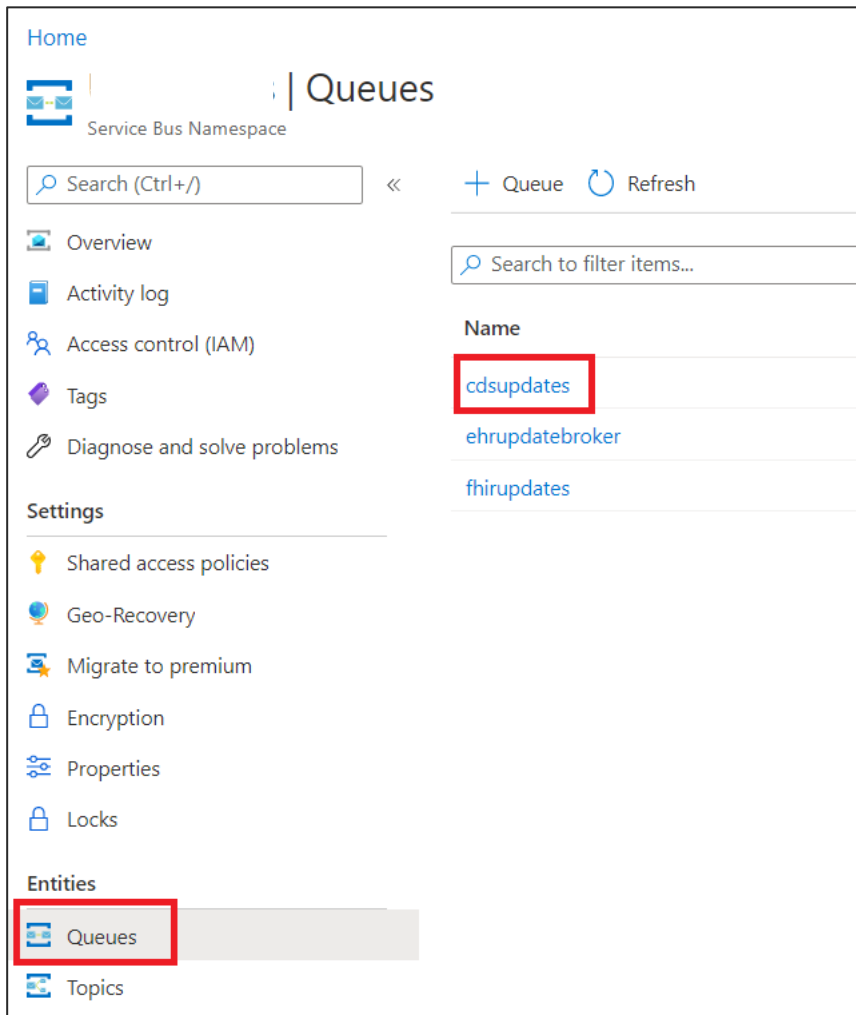
Sync Agent Log

General Related

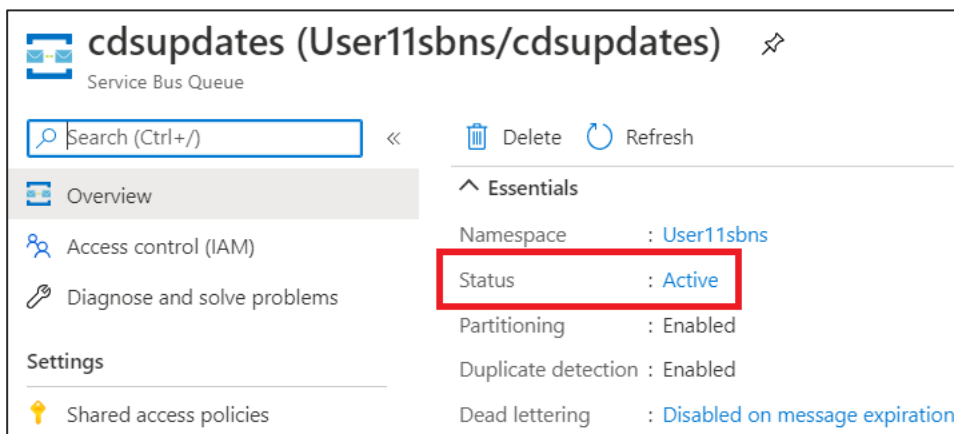
Category	Error	Transaction Date	12/4/2020
Azure FHIR Resource Id	1234		
CDS Entity Id	5f95aa0d-c701-eb11-a813-000d3a33f42d		
CDS Entity Type	contact		
Description	* Error sending message to Service Bus		
Message	<p>Changes could not be sent to the service bus.</p> <p>Service Bus URI: https://User11sbns.servicebus.windows.net/fhirupdates/messages</p> <p>JSON payload:</p> <pre>{ "azureFHIRID": "1234", "azureFHIRSyncEnabled": true, "changedAttributes": ["mobilephone"], "entityID": "5f95aa0d-c701-eb11-a813-000d3a33f42d", "entityName": "contact", "fhirResourceName": "Patient", "messageName": "Update" }</pre> <p>Reason: Forbidden</p>		

Resolution:

- In **Azure Portal**, Navigate to **Service Bus Namespace** and click on **Queues** in the left pane.



- b. Click on the queue **cdsupdates** and verify that value in **Status** should be **Active**.



Summary

In this lab, you have learned to do the following:

- Configure the FHIR Sync Agent Integration Settings.
- Enable/Disable the synchronization for Dataverse entities/Azure FHIR Resources.
- Explore and enable the existing entity maps.
- Create new entity maps and attribute maps.
- Synchronize the data from Microsoft Cloud for Healthcare entities (Dataverse entities) to the service bus queue.
- Explore Sync Agent Logs to see how data is flowing from Dataverse to the service bus.
- Troubleshoot issues (if any).

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You may provide feedback for each module as you complete it or at the end once you have completed all the modules. Thank you!

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