



Dynamics 365 Customer Insights

Lab 7 Advanced Topics

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Approximate Time - 120 mins

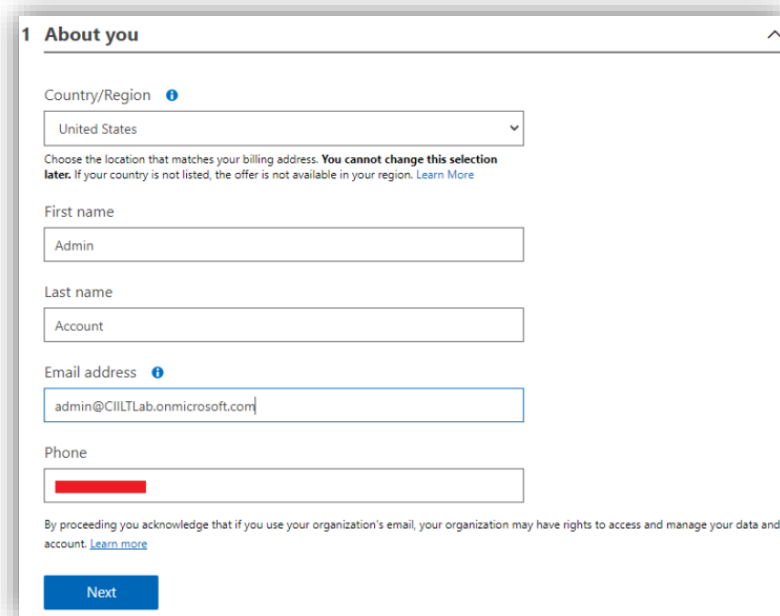
Exercise 1 - Setup an Azure Trial

You'll need an Azure trial account for this lab. The trial provides a \$200 credit for 30 days to use any services within Azure that are not free. In our case we will need this for the Machine Learning Model integration with Customer Insights.

Note: Please be aware that as part of this process you will have to provide a credit card. This is ONLY for verification purposes and there will be no charges on the card. If you exceed the \$200 credit before the end of the 30 days, you will simply no longer have access to any service that requires payment.

If you have previously signed up for Azure or an Azure Trial with a credit card, use a credit card you have not previously used as that will trigger Azure to not allow you to sign up for a trial.

1. To begin, connect to <https://aka.ms/citryazure> and provide your info before clicking **Next**



The screenshot shows a web form titled "1 About you" with a close button in the top right corner. The form contains the following fields and instructions:

- Country/Region**: A dropdown menu with "United States" selected. Below it, a note states: "Choose the location that matches your billing address. You cannot change this selection later. If your country is not listed, the offer is not available in your region. [Learn More](#)".
- First name**: A text input field containing "Admin".
- Last name**: A text input field containing "Account".
- Email address**: A text input field containing "admin@CIILTLab.onmicrosoft.com".
- Phone**: A text input field with a redacted area (red bar).

At the bottom of the form, there is a disclaimer: "By proceeding you acknowledge that if you use your organization's email, your organization may have rights to access and manage your data and account. [Learn more](#)". Below the disclaimer is a blue button labeled "Next".



- Next you will be prompted to enter a phone number to receive a verification code via text or phone call. Enter your phone number and click on **Text me** or **Call me**. When you get the code enter it in the box and click **verify code**.

2 Identity verification by phone

A text or phone call helps us make sure this is you.

Country code
United States (+1)

Phone number

Text me Call me

Verification code

Verify code

- You will now need to enter credit card information to verify your identity and keep spam bots from creating accounts. You will not be charged unless you upgrade your subscription to a paid subscription.

3 Identity verification by card

We ask for your credit card number to verify your identity and to keep out spam and bots.
You won't be charged unless you upgrade.

We accept the following cards:
VISA MASTERCARD DISCOVER

Card number

Cardholder Name

Expires
MM YY

CVV [What is a CVV?](#)

Address line 1

Address line 2 (Optional)

City

State
--Select--

ZIP code

Country/Region
United States

Next

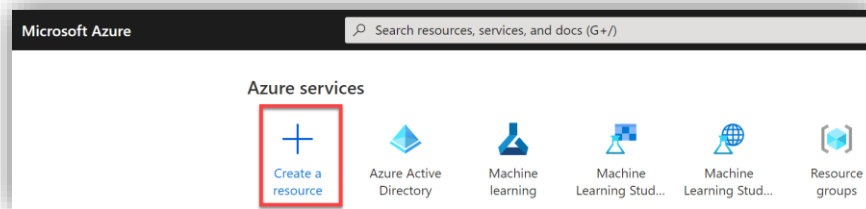
- Finally, simply check the agreement box (read the agreements first of course), and click **Sign up**. Once complete you will get a **Welcome to Azure screen**



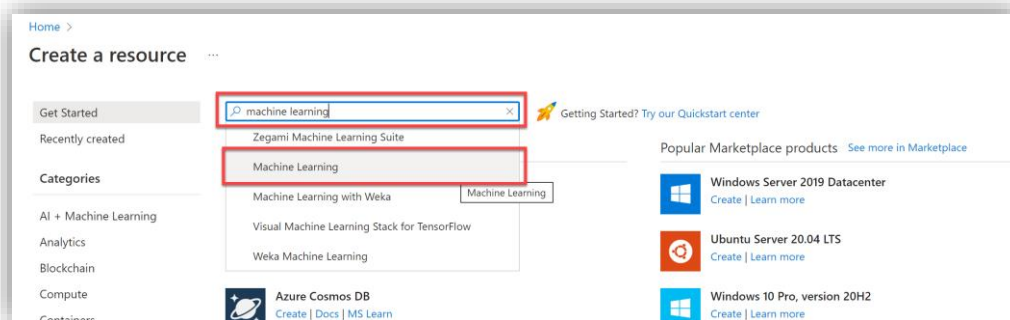
Exercise 2 - Integrating Azure ML Studio with Customer Insights

Task 1 – Create Azure ML Studio Workspace and Build Model

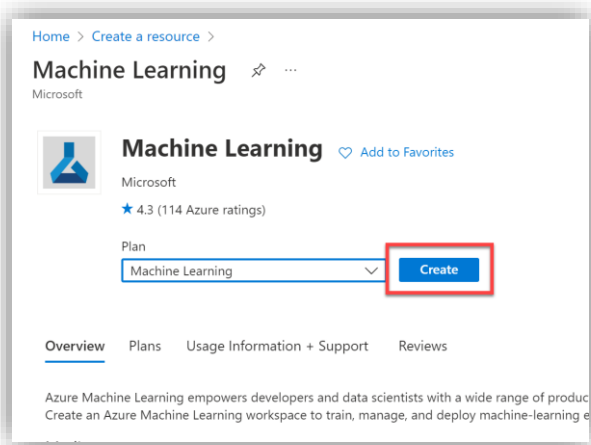
1. Go to the Azure portal: <https://portal.azure.com>
2. Click **+ Create a resource**



3. Search for and select **Machine Learning**



4. Click **Create**





- Under **Resource Group**, click **Create new** and then name it. Name the workspace and select a region near you. Click **Review + Create**

Home > Create a resource > Machine Learning >

Machine learning

Create a machine learning workspace

Basics Networking Advanced Tags Review + create

Resource details

Every workspace must be assigned to an Azure subscription, which is where billing happens. You use resource groups like folders to organize and manage resources, including the workspace you're about to create. [Learn more about Azure resource groups](#)

Subscription * ⓘ Microsoft Azure

Resource group * ⓘ (New) CIAD
[Create new](#)

Workspace details

Configure your basic workspace settings like its storage connection, authentication, container, and more. [Learn more](#)

Workspace name * ⓘ Workspace1 ✓

Region * ⓘ West US 2

Storage account * ⓘ (new) workspace17532388822
[Create new](#)

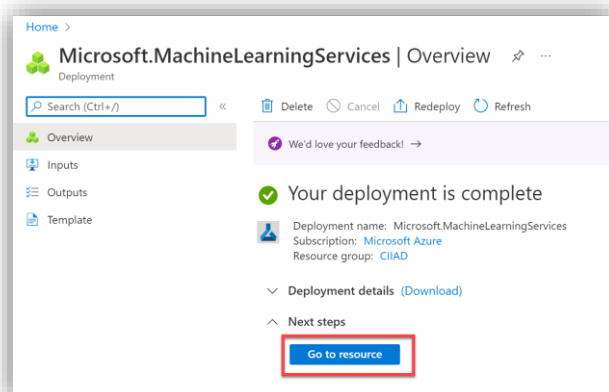
Key vault * ⓘ (new) workspace10796564650
[Create new](#)

Application insights * ⓘ (new) workspace10462076780
[Create new](#)

Container registry * ⓘ None
[Create new](#)

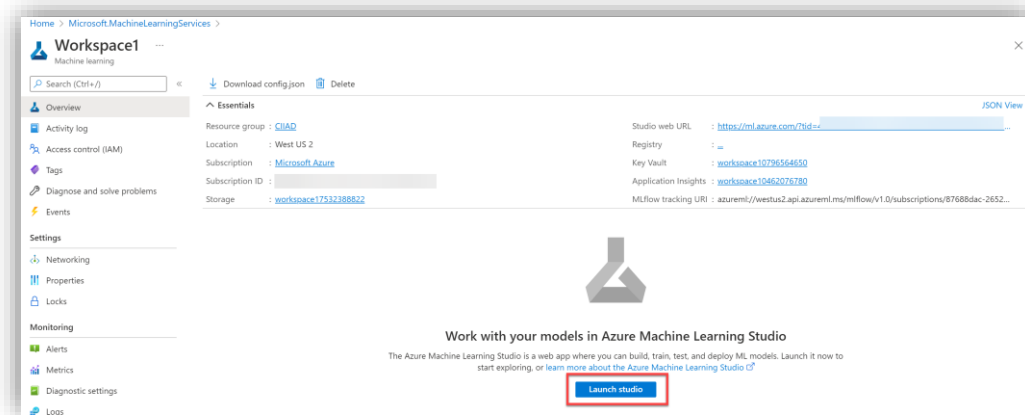
[Review + create](#) < Previous Next : Networking

- Select **Go to resource** after the deployment is complete

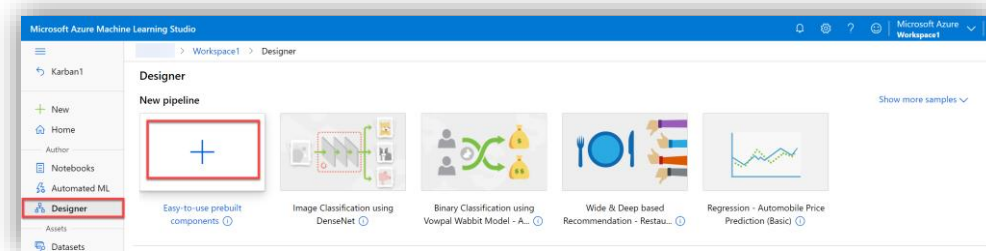




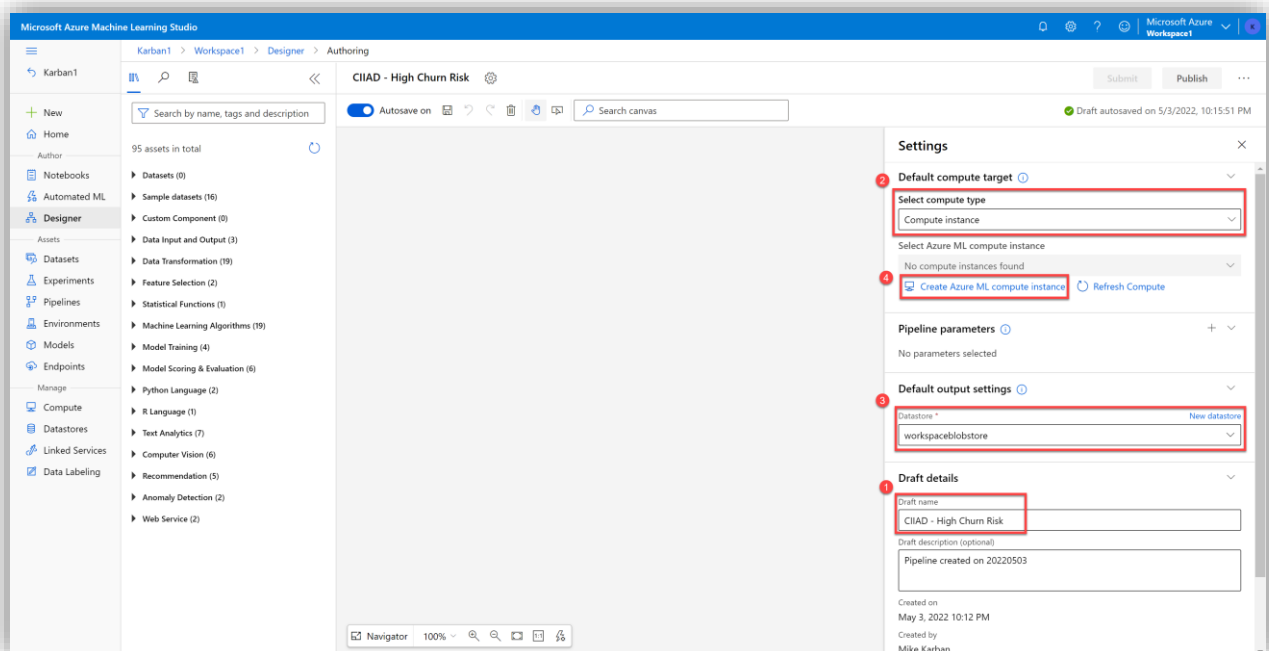
7. Click **Launch studio**



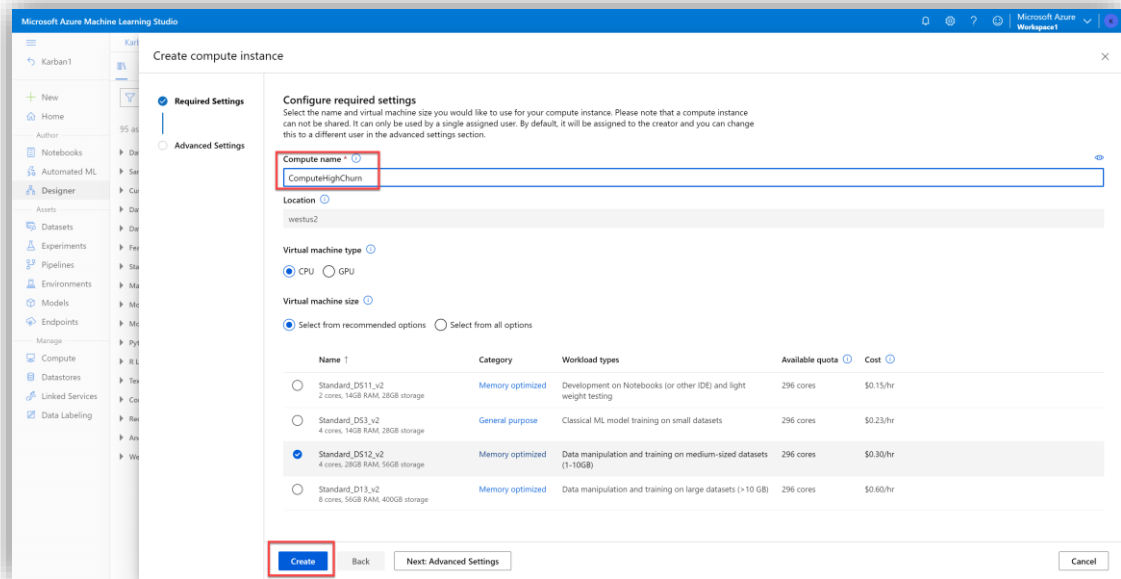
8. Select **Designer** on the left and then the **+** under **New pipeline (Easy-to-use prebuilt components)**



9. Add a name under **Draft details**, select the **compute type** as **Compute instance**, select **workspaceblobstore** as the **Datastore** and then click **Create Azure ML compute instance**



10. Add a **Compute name**, leave the defaults and click **Create**



Microsoft Azure Machine Learning Studio

Create compute instance

Required Settings

Configure required settings

Select the name and virtual machine size you would like to use for your compute instance. Please note that a compute instance can not be shared. It can only be used by a single assigned user. By default, it will be assigned to the creator and you can change this to a different user in the advanced settings section.

Compute name * **ComputeHighChum**

Location **westus2**

Virtual machine type **CPU** ☐ CPU ☐ GPU

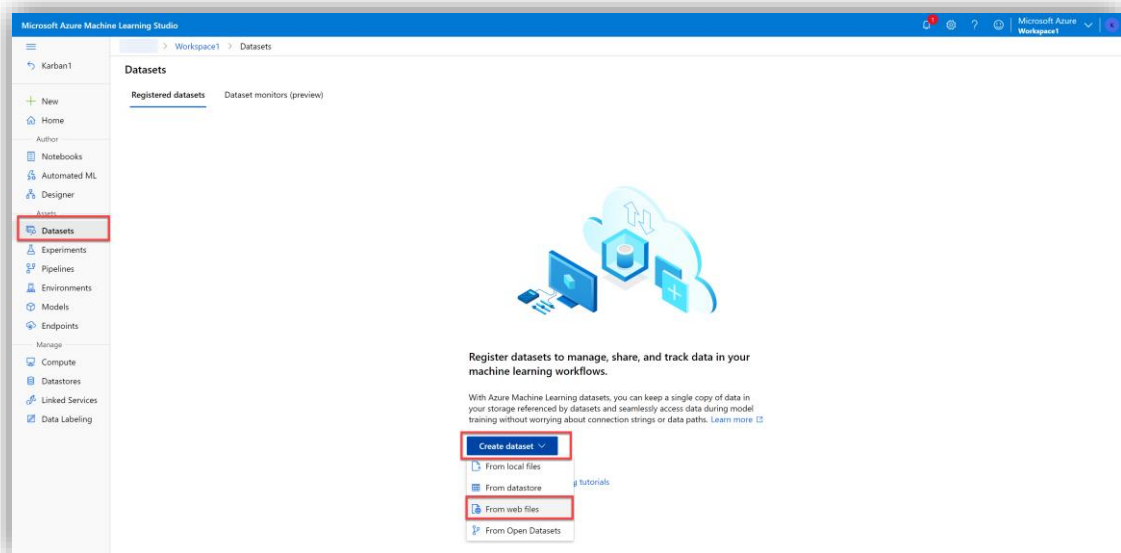
Virtual machine size **Standard_DS12_v2**

☒ Select from recommended options ☐ Select from all options

Name	Category	Workload types	Available quota	Cost
Standard_DS11_v2 2 cores, 14GB RAM, 28GB storage	Memory optimized	Development on Notebooks (or other IDE) and light weight testing	296 cores	\$0.15/hr
Standard_DS3_v2 4 cores, 14GB RAM, 28GB storage	General purpose	Classical ML model training on small datasets	296 cores	\$0.23/hr
Standard_DS12_v2 4 cores, 28GB RAM, 56GB storage	Memory optimized	Data manipulation and training on medium-sized datasets (1-10GB)	296 cores	\$0.30/hr
Standard_DS13_v2 8 cores, 56GB RAM, 400GB storage	Memory optimized	Data manipulation and training on large datasets (> 10 GB)	296 cores	\$0.60/hr

Create Back Next: Advanced Settings Cancel

11. Now create the datasets. On the left under **Assets**, select **Datasets** and then **Create dataset -> From web files**



Microsoft Azure Machine Learning Studio

Workspaces1 Datasets

Datasets

Registered datasets Dataset monitors (preview)

Assets

Datasets

Experiments Pipelines Environments Models Endpoints Manage Compute Datastores Linked Services Data Labeling

Register datasets to manage, share, and track data in your machine learning workflows.

With Azure Machine Learning datasets, you can keep a single copy of data in your storage referenced by datasets and seamlessly access data during model training without worrying about connection strings or data paths. [Learn more](#)

Create dataset

From local files From datastore [Tutorials](#) **From web files** From Open Datasets



12. For the first dataset, name it **HotelActivity** and use the web URL:

https://testamlcustommodel.blob.core.windows.net/custommodels/datasets/ContosoHotel_HotelActivity.txt

Create dataset from web files

Basic info

Web URL *

https://testamlcustommodel.blob.core.windows.net/custommodels/datasets/ContosoHotel_HotelActivity.txt

Name *

HotelActivity

Dataset type *

Tabular

Description

Dataset description

☐ Skip data validation

Back Next

13. Click **Next**. Leave the defaults and then click **Next** again.

Create dataset from web files

Settings and preview

These settings were automatically detected. Please verify that the selections were made correctly or update.

File format

Delimited

Delimiter

Comma

Example

Field1,Field2,Field3

Encoding

UTF-8

Column headers

All files have same headers

Skip rows

None

☐ Dataset contains multi-line data

Note: Processing tabular files with multi-line data is slower because multiple CPU cores cannot be used to ingest the data in parallel. Checking this option may result in slower processing times.

	Id	HotelCustomerID	StayID	CheckInDate	CheckOutDate	RoomType	DollarsSpent	BookingType	TravelCategory	NumberO
1	A000001	S000001		2017-09-07 00:00:00	2017-09-12 00:00:00	Large	440	Online	Business	5
2	A000001	S000002		2015-03-16 00:00:00	2015-03-21 00:00:00	Small	257	Online	Business	5
3	A000001	S000003		2014-09-06 00:00:00	2014-09-08 00:00:00	Large	303	Online	Leisure	2
4	A000001	S000004		2016-04-14 00:00:00	2016-04-19 00:00:00	Small	425	Phone Call	Business	5

Back Next Cancel



14. Leave the defaults again and select **Next**. Click **Create** on the confirm details step

Create dataset from web files

Basic info
Settings and preview
Schema
Confirm details

Schema
Column types are auto-detected based on the first 200 rows of the data. Please make any necessary adjustments. Values not aligning with the specified column type will fail conversion and would be either null-filled or replaced with error value.

Search

Include	Column name	Properties	Type	Format settings and example	Date format
<input type="checkbox"/>	Path	Not applicable to selected type	String		Not applicable to selected type
<input checked="" type="checkbox"/>	HotelCustomerId	Not applicable to selected type	String	A000001, A000001, A000001	Not applicable to selected type
<input checked="" type="checkbox"/>	StayID	Not applicable to selected type	String	S000001, S000002, S000003	Not applicable to selected type
<input checked="" type="checkbox"/>	CheckinDate	None	Date	2017-09-07 00:00:00, 2015-03-16 00:00:...	%m/%d/%Y %H:%M
<input checked="" type="checkbox"/>	CheckoutDate	None	Date	2017-09-12 00:00:00, 2015-03-21 00:00:...	%m/%d/%Y %H:%M
<input checked="" type="checkbox"/>	RoomType	Not applicable to selected type	String	Large, Small, Large	Not applicable to selected type
<input checked="" type="checkbox"/>	DollarsSpent	Not applicable to selected type	Integer	440, 257, 303	Not applicable to selected type
<input checked="" type="checkbox"/>	BookingType	Not applicable to selected type	String	Online, Online, Online	Not applicable to selected type
<input checked="" type="checkbox"/>	TravelCategory	Not applicable to selected type	String	Business, Business, Leisure	Not applicable to selected type
<input checked="" type="checkbox"/>	NumberOfNights	Not applicable to selected type	Integer	5, 5, 2	Not applicable to selected type

Back **Next** Cancel

Create dataset from web files

Basic info
Settings and preview
Schema
Confirm details

Confirm details

Basic info

Name
HotelActivity

Dataset type
Tabular

Web URL
https://testamlcustommodel.blob.core.windows.net/custommodels/datasets/Contosohotel_HotelActivity.txt

☐ Profile this dataset after creation

File settings

File format
Delimited

Delimiter
Comma

Encoding
UTF-8

Column headers
All files have same headers

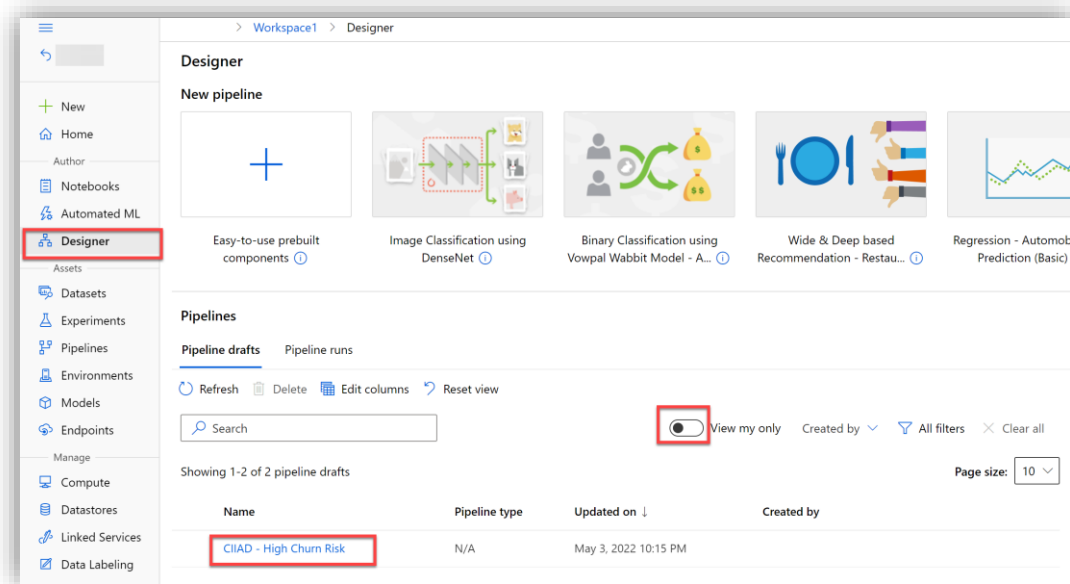
Skip rows
None

Back **Create** Cancel

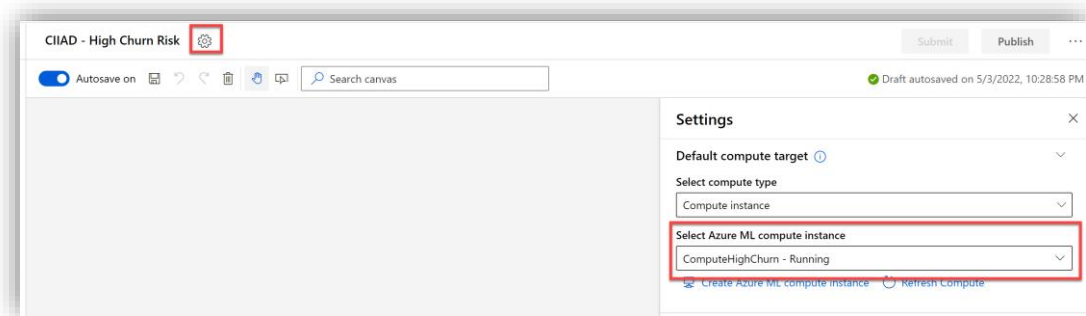
15. Repeat steps 11-14 to create 2 more datasets:

- Name: **Customers** | URL:
<https://testamlcustommodel.blob.core.windows.net/custommodels/datasets/Customer.csv>
- Name: **ServiceUsage** | URL:
https://testamlcustommodel.blob.core.windows.net/custommodels/datasets/Contosohotel_ServiceUsage.txt

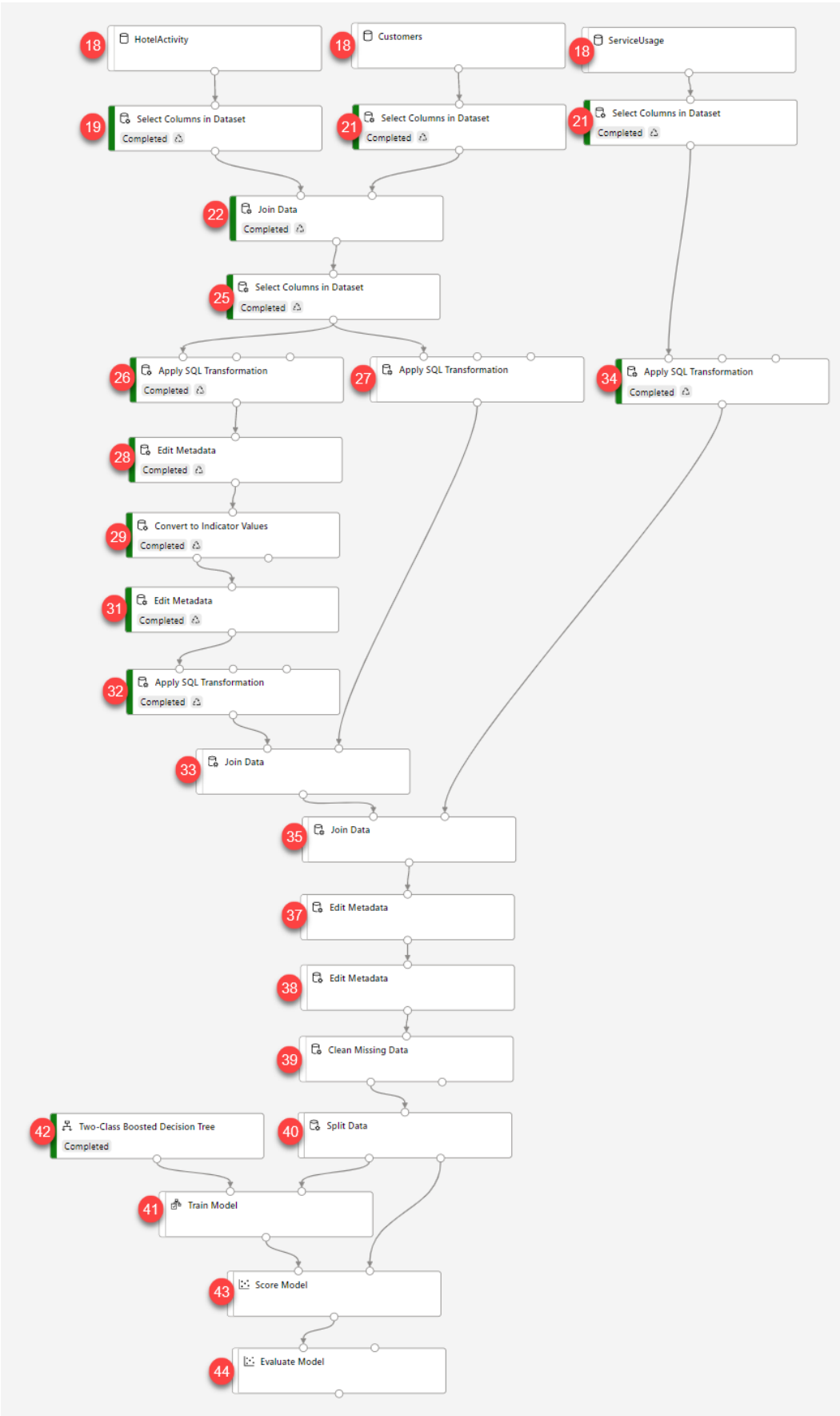
16. Click **Designer** on the left and then the Pipeline you created earlier. (if you don't see it listed, move the slider for View my only)



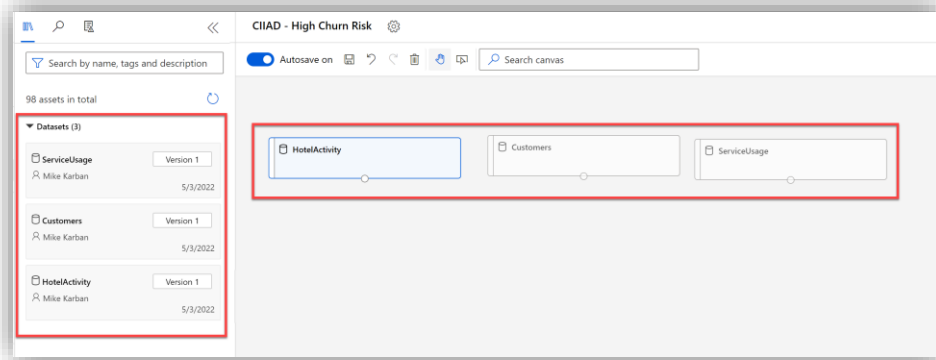
17. Click on the **settings gear** and select the **Azure ML compute instance** you created earlier



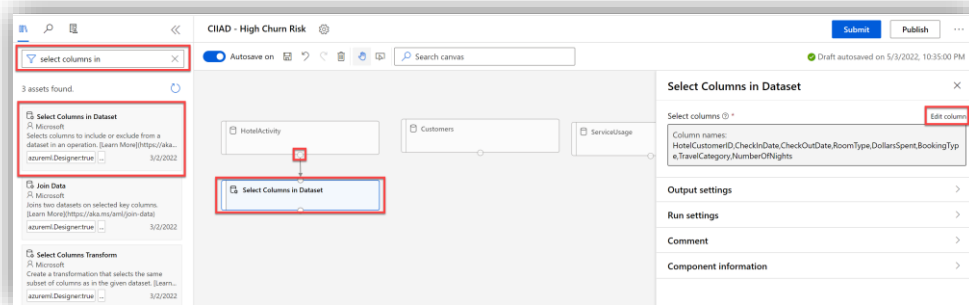
There are a lot of steps needed to create the model and it can be a little difficult to follow, so the next page has a reference diagram with the step numbers next to each component.



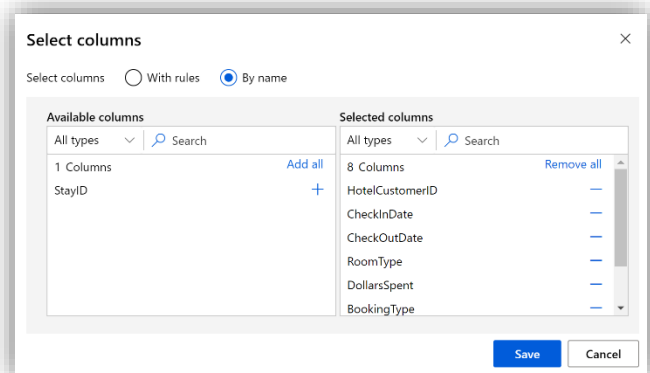
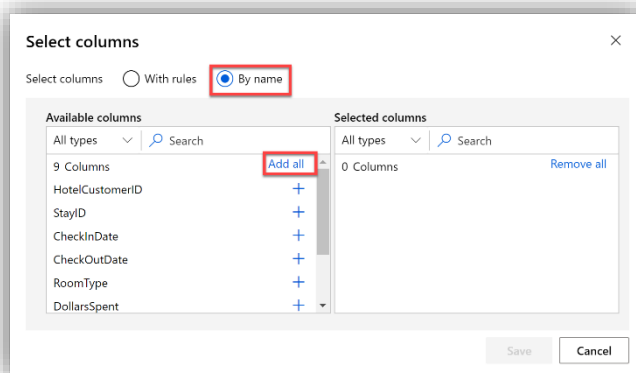
18. Expand **Datasets** in the Asset Library and drag the 3 you just created to the canvas in order from left to right: **HotelActivity**, **Customers** and **ServiceUsage**



19. Add **Select Columns in Dataset** under **Hotel Activity** and connect them. Click **Edit column**

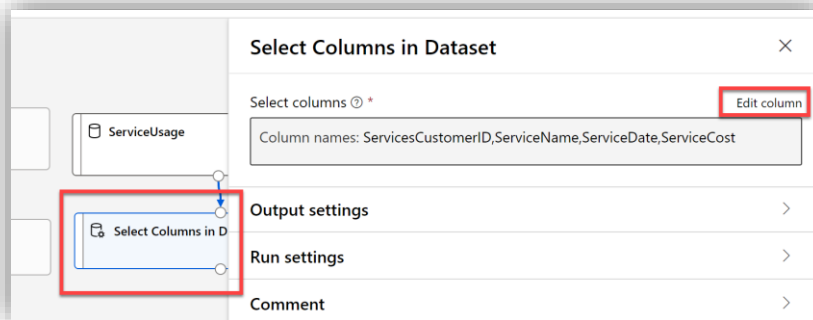
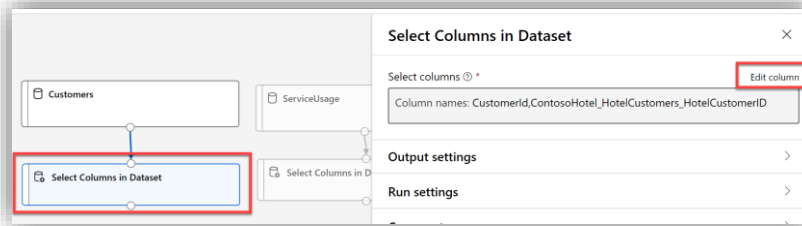


20. Add all of the columns except StayID. The quickest way is to select **By name**, **Add all** and click the **–** next to **StayID** to remove it. You could also click the **+** next to each column to add individually. Click **Save** when done.

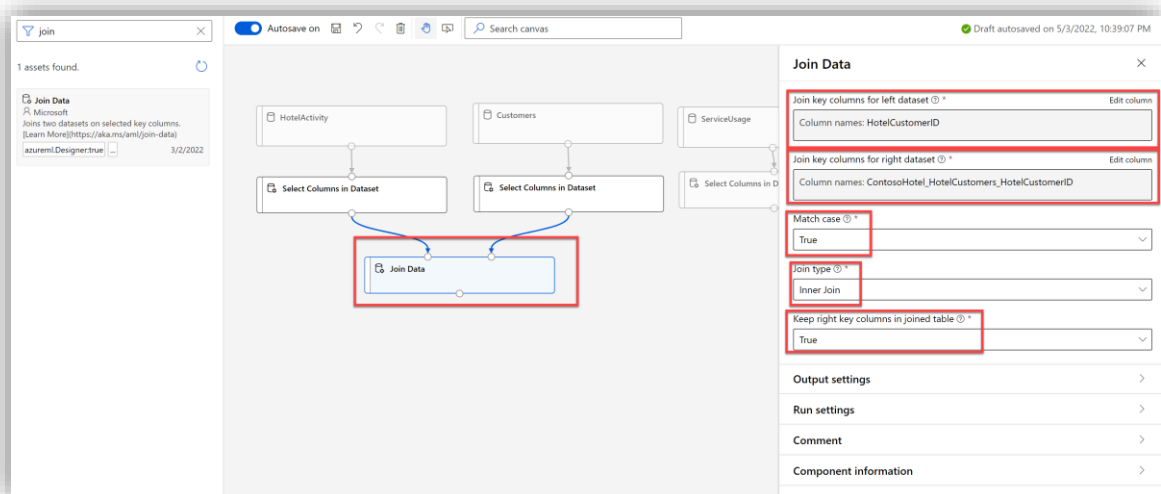


21. Now add a **Select Columns in Dataset** component (like step 19) to the **Customers** and **ServiceUsage** datasets.

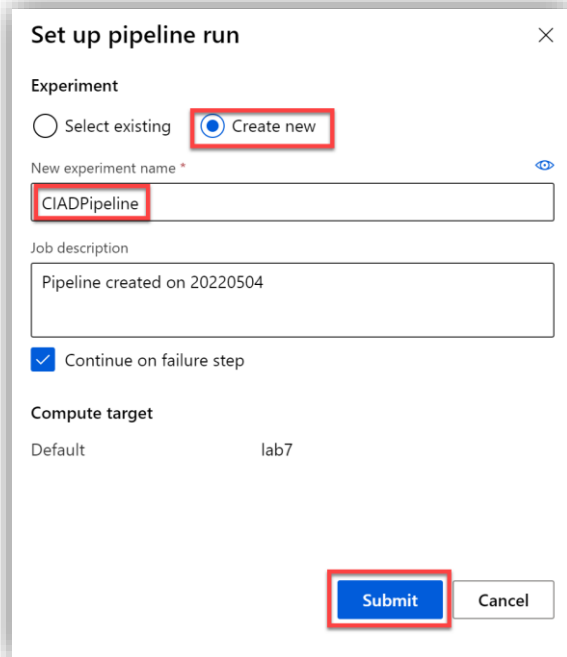
- For **Customers**, add the columns: **CustomerID** and **ContosoHotel_HotelCustomers_HotelCustomerID**
- For **ServiceUsage**, add the columns: **ServiceCustomerID**, **ServiceName**, **ServiceCost** and **ServiceDate**.



22. Add **Join Data**, connect it and change the settings as shown. **HotelCustomerID** for the left dataset join key columns and **ContosoHotelCustomers_HotelCustomerID** for the right dataset.



23. You need to process all the steps thus far, in order to use the outputs in future steps, so you'll need to submit now to process. Click **Submit** in the top right, select **Create new experiment** and name it (e.g. CIADPipeline). Click **Submit**



Set up pipeline run

Experiment

☐ Select existing ☒ Create new

New experiment name *

CIADPipeline

Job description

Pipeline created on 20220504

☒ Continue on failure step

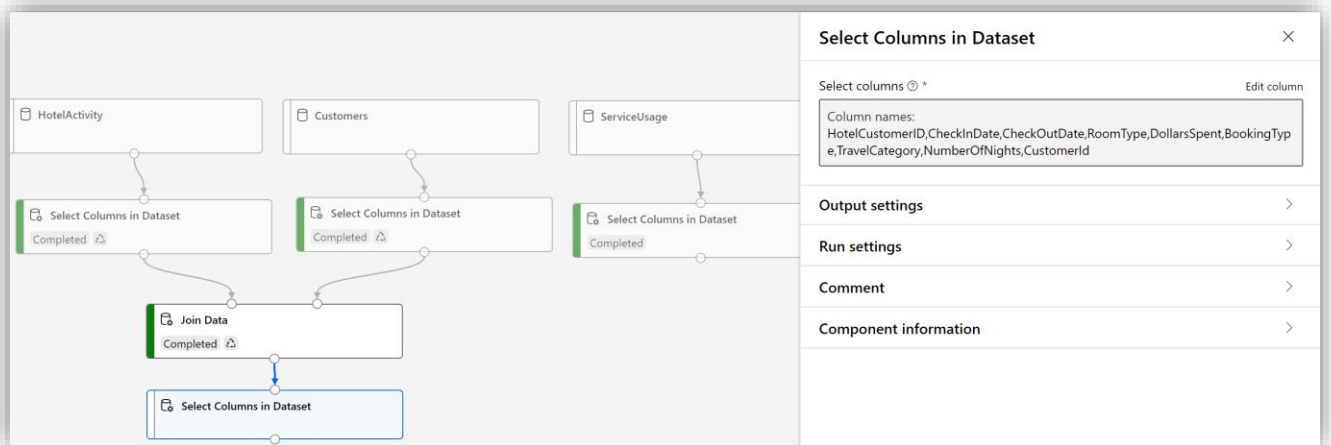
Compute target

Default lab7

Submit Cancel

24. After it has completed running, continue to the next step

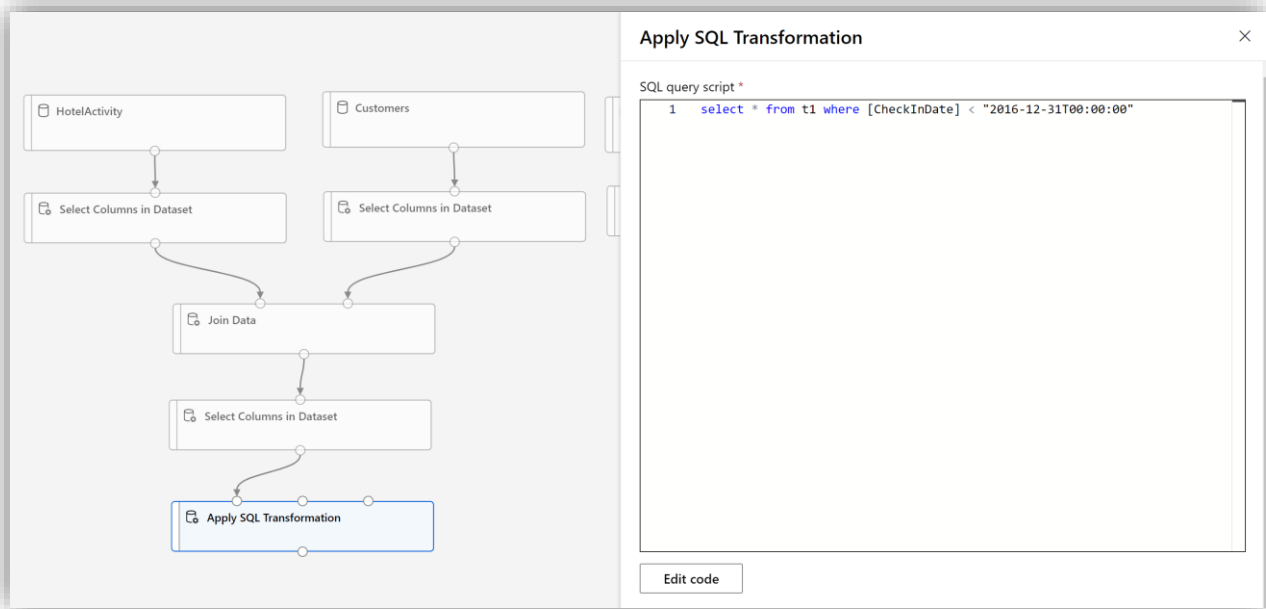
25. Add **Select Columns in Dataset** and connect to **Join Data**. Edit columns and select the following (All columns except ContosoHotel_HotelCustomers_HotelCustomerID):
HotelCustomerID, CheckInDate, CheckOutDate, RoomType, DollarsSpent, BookingType, TravelCategory, NumberOfNights, CustomerId





26. Add **Apply SQL Transformation** under connect **Join Data** to the left side. Add the following **SQL query script** to filter the data:

```
select * from t1 where [CheckInDate] < "2016-12-31T00:00:00"
```



27. Add **Apply SQL Transformation** to the right of the one you just did and connect its left side to the same **Select Columns in Dataset**. Enter the following **SQL query script** (note it continues onto the next page):

```
with StayInfo as (
select HotelCustomerID,
sum(case when [CheckOutDate] <= "2016-12-
31T00:00:00" then [NumberOfNights] else 0 end) as StayDayCount,
sum(case when [CheckOutDate] <= "2016-12-31T00:00:00" and [CheckOutDate] >= "2015-01-
01T00:00:00" then [NumberOfNights] else 0 end) as StayDayCount2016,
sum(case when [CheckOutDate] <= "2015-12-31T00:00:00" and [CheckOutDate] >= "2014-01-
01T00:00:00" then [NumberOfNights] else 0 end) as StayDayCount2015,
sum(case when [CheckOutDate] <= "2014-12-31T00:00:00" and [CheckOutDate] >= "2013-01-
01T00:00:00" then [NumberOfNights] else 0 end) as StayDayCount2014,
sum(case when [CheckOutDate] <= "2016-12-31T00:00:00" then 1 else 0 end) as StayCount,
sum(case when [CheckOutDate] <= "2016-12-31T00:00:00" and [CheckOutDate] >= "2015-01-
01T00:00:00" then 1 else 0 end) as StayCount2016,
sum(case when [CheckOutDate] <= "2015-12-31T00:00:00" and [CheckOutDate] >= "2014-01-
01T00:00:00" then 1 else 0 end) as StayCount2015,
sum(case when [CheckOutDate] <= "2014-12-31T00:00:00" and [CheckOutDate] >= "2013-01-
01T00:00:00" then 1 else 0 end) as StayCount2014,
min([CheckInDate]) as FirstStay,
max([CheckOutDate]) as LastStay
from t1
```




group by HotelCustomerID)

```
select HotelCustomerID, StayDayCount, StayDayCount2016, StayDayCount2015, StayDayCount2014, StayCount,
StayCount2016, StayCount2015, StayCount2014, julianday("2016-12-
31T00:00:00") - julianday(FirstStay) as UsageTenure, case when LastStay > "2016-12-
31T00:00:00" then 0 else 1 end as Label from StayInfo;
```

Apply SQL Transformation

SQL query script *

```
1 with StayInfo as (
2   select HotelCustomerID,
3   sum(case when [CheckOutDate] <= "2016-12-31T00:00:00" then [NumberOfNights]
4   sum(case when [CheckOutDate] <= "2016-12-31T00:00:00" and [CheckOutDate] >=
5   sum(case when [CheckOutDate] <= "2015-12-31T00:00:00" and [CheckOutDate] >=
6   sum(case when [CheckOutDate] <= "2014-12-31T00:00:00" and [CheckOutDate] >=
7   sum(case when [CheckOutDate] <= "2016-12-31T00:00:00" then 1 else 0 end) as
8   sum(case when [CheckOutDate] <= "2016-12-31T00:00:00" and [CheckOutDate] >=
9   sum(case when [CheckOutDate] <= "2015-12-31T00:00:00" and [CheckOutDate] >=
10  sum(case when [CheckOutDate] <= "2014-12-31T00:00:00" and [CheckOutDate] >=
11  min([CheckInDate]) as FirstStay,
12  max([CheckOutDate]) as LastStay
13  from t1
14  group by HotelCustomerID)
15
16  select HotelCustomerID, StayDayCount, StayDayCount2016, StayDayCount2015, S
```

Edit code

28. Add Edit Metadata under the SQL Transformation on the left and change these settings:

Columns: **RoomType, BookingType, TravelCategory**

Categorical: **Categorical**

Fields: **Features**

Edit Metadata

Column * Edit column

Column names: RoomType,BookingType,TravelCategory

Data type * Unchanged

Categorical * Categorical

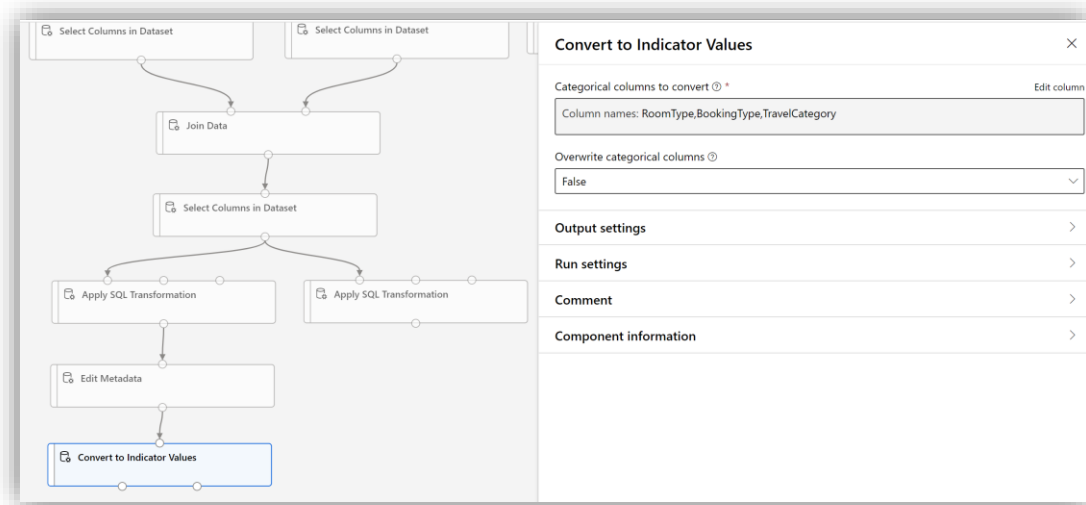
Fields * Features

New column names

Output settings

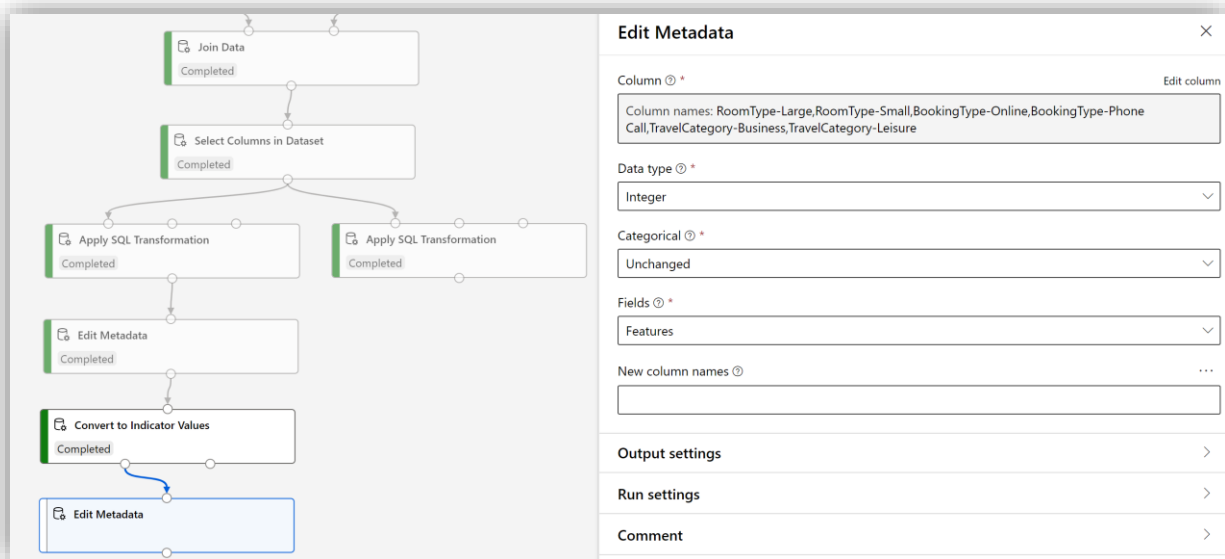


29. Add **Convert to Indicator Values** under **Edit Metadata** and add the **Categorical columns to convert: RoomType, BookingType, TravelCategory**



30. Before moving to the next step, it must be run/submitted again to get the latest steps up to date. Click **Submit** and **Submit** again. This will use the existing pipeline that you ran last time. Move to the next step when it is completed.

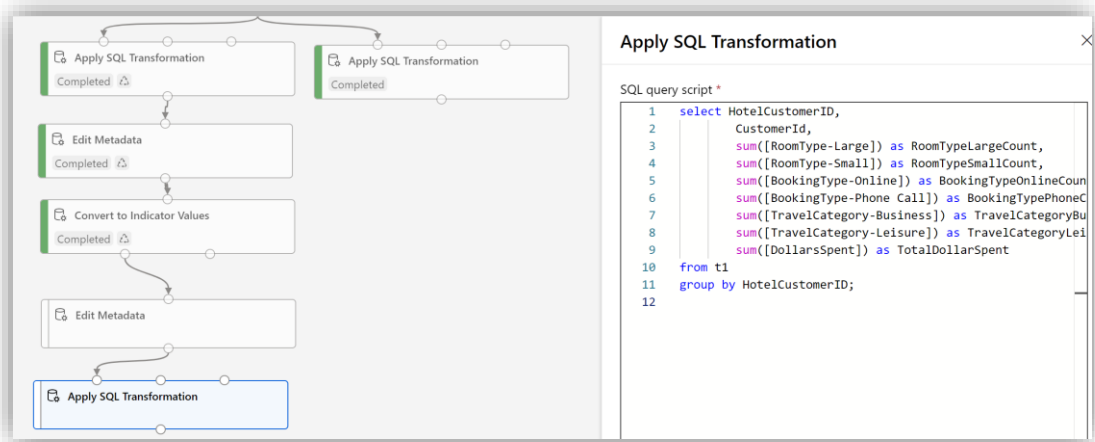
31. Add **Edit Metadata** and connect to **Convert Indicator Values**. Change the following settings: **Data type – Integer, Fields – Features** and add these columns: **RoomType-Large, RoomType-Small, BookingType-Online, BookingType-Phone Call, TravelCategory-Business, TravelCategory-Leisure**



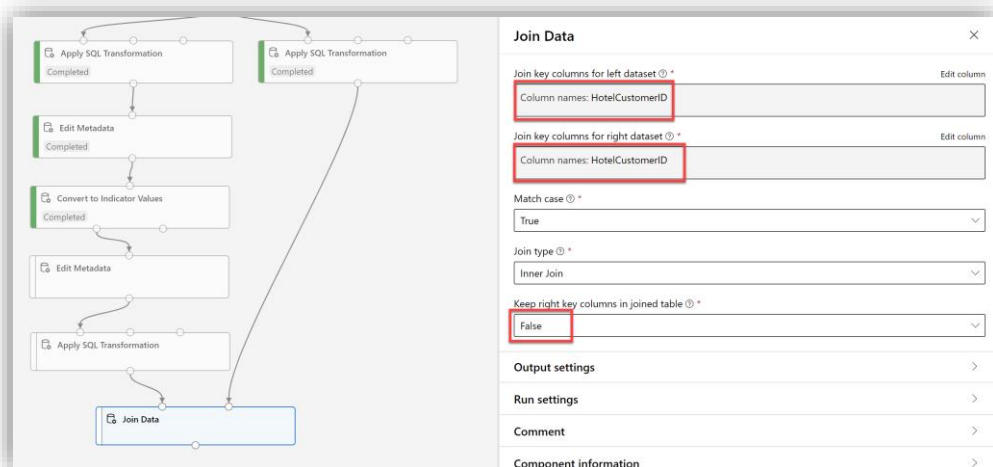


32. Add Apply SQL Transformation and connect the left side to Edit Metadata. Add this SQL query script:

```
select HotelCustomerId,
       CustomerId,
       sum([RoomType-Large]) as RoomTypeLargeCount,
       sum([RoomType-Small]) as RoomTypeSmallCount,
       sum([BookingType-Online]) as BookingTypeOnlineCount,
       sum([BookingType-Phone Call]) as BookingTypePhoneCallCount,
       sum([TravelCategory-Business]) as TravelCategoryBusinessCount,
       sum([TravelCategory-Leisure]) as TravelCategoryLeisureCount,
       sum([DollarsSpent]) as TotalDollarSpent
from t1
group by HotelCustomerId;
```



33. Add Join Data and connect to the SQL Transformation you just created and the SQL Transformation from step 27. Join key column for left dataset is HotelCustomerId and Join key column for right dataset is HotelCustomerId. Set Keep right key columns in joined table to False





34. Add SQL Transformation to Select Columns in Dataset under ServiceUsage in the top right. Connect to the left side and use this SQL query script:

```
select ServicesCustomerID,
sum(case when ServiceName='concierge' then ServiceCost else 0 end) as ConciergeUsage,
sum(case when ServiceName='courier' then ServiceCost else 0 end) as CourierUsage,
sum(case when ServiceName='dry_cleaning' then ServiceCost else 0 end) as DryCleaningUsage,
sum(case when ServiceName='gym' then ServiceCost else 0 end) as GymUsage,
sum(case when ServiceName='phone' then ServiceCost else 0 end) as PhoneUsage,
sum(case when ServiceName='restaurant' then ServiceCost else 0 end) as RestaurantUsage,
sum(case when ServiceName='spa' then ServiceCost else 0 end) as SpaUsage,
sum(case when ServiceName='television' then ServiceCost else 0 end) as TelevisionUsage,
sum(case when ServiceName='wifi' then ServiceCost else 0 end) as WifiUsage
from t1 where ServiceDate < "2016-12-31T00:00:00"
group by ServicesCustomerID;
```

35. Add Join Data and connect it to the Join Data in step 33 and the SQL Transformation from step 34. Join key column for left dataset is HotelCustomerID and Join key column for right dataset is ServicesCustomerID. Set Keep right key columns in joined table to False.

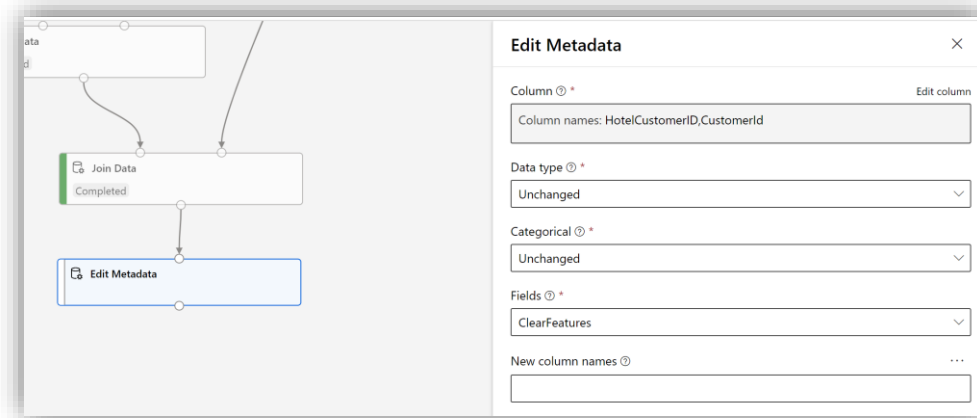
The screenshot shows the Data Studio interface. On the left, a pipeline diagram is visible with several steps: 'Join Data', 'Select Columns in Dataset', 'Apply SQL Transformation', and another 'Join Data'. The 'Join Data' step is highlighted in blue. On the right, the configuration panel for the 'Join Data' step is open. It shows the following settings:

- Join key columns for left dataset:** Column names: HotelCustomerID
- Join key columns for right dataset:** Column names: ServicesCustomerID
- Match case:** True
- Join type:** Inner Join
- Keep right key columns in joined table:** False
- Output settings:** (expandable)
- Run settings:** (expandable)
- Comment:** (expandable)
- Component information:** (expandable)

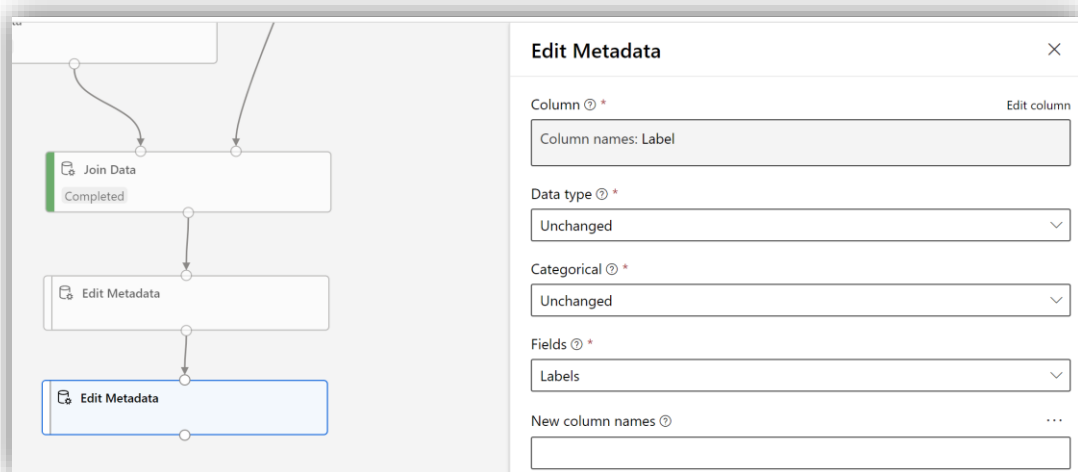
36. Before moving to the next step, it must be run/submitted again to get the latest steps up to date. Click **Submit and **Submit** again. This will use the existing pipeline that you ran last time. Move to the next step when it is completed.**



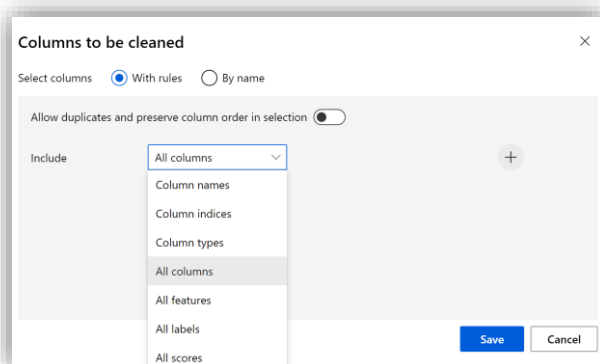
37. Add Edit Metadata and connect to Join Data from step 35. Add the columns: HotelCustomerID and CustomerID and change Fields to ClearFeatures.



38. Add another Edit Metadata step with the following settings: Column – Label, Fields – Labels



39. Add Clean Missing Data and add All columns as Columns to be cleaned. When you click Edit column, leave the selection as With Rules and select All columns from the Include dropdown. Leave the defaults for everything else



Join Data

Completed

↓

Edit Metadata

↓

Edit Metadata

↓

Clean Missing Data

Clean Missing Data

×

Columns to be cleaned ⓘ *

Edit column

All columns

Minimum missing value ratio ⓘ *

...

0.0

Maximum missing value ratio ⓘ *

...

1.0

Cleaning mode ⓘ *

Custom substitution value

Replacement value ⓘ

...

0

Generate missing value indicator column ⓘ *

False

Output settings

>

40. Add **Split Data**. Change the **Fraction of rows in the first output dataset** to **0.7**

↓

Edit Metadata

↓

Edit Metadata

↓

Clean Missing Data

↓

Split Data

Split Data

×

Splitting mode ⓘ *

Split Rows

Fraction of rows in the first output dataset ⓘ *

...

0.7

Randomized split ⓘ *

True

Random seed ⓘ *

...

0

Stratified split ⓘ *

False

41. Add **Train Model** and connect **Split Data** to the right side. Select **Label** as the column name.

Clean Missing Data

↓

Split Data

↓

Train Model

Train Model

×

Label column ⓘ *

Edit column

Column names: Label

Model explanations ⓘ

False

Output settings

>

Run settings

>

Comment

>

Component information

>



42. Add **Two-Class Boosted Decision Tree** and connect to the **left side of Train Model**. Leave the default settings

Two-Class Boosted Decision Tree

Create trainer mode *

SingleParameter

Maximum number of leaves per tree *

20

Minimum number of samples per leaf node *

10

Learning rate *

0.2

Number of trees constructed *

100

Random number seed

43. Add **Score Model** and connect **Train Model** to the left and the **right of Split Data** to the **right**

Score Model

Append score columns to output *

True

Output settings >

Run settings >

Comment >

Component information >

44. Add **Evaluate Model**

Evaluate Model

No parameter

Output settings >

Run settings >

Comment >

Component information >

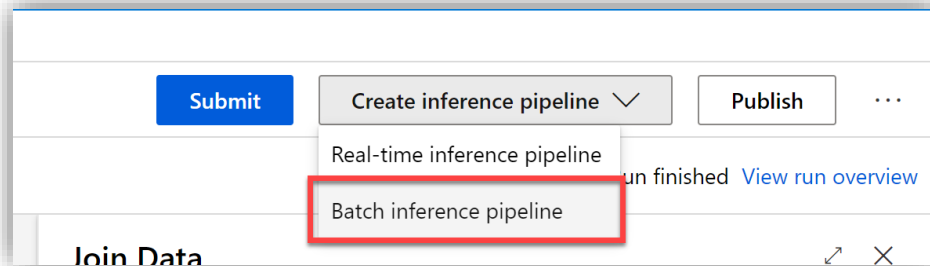
45. All the steps are complete! Click **Submit to run**. Keep Existing experiment and click **Submit again**

46. After it is finished running, move to the next step



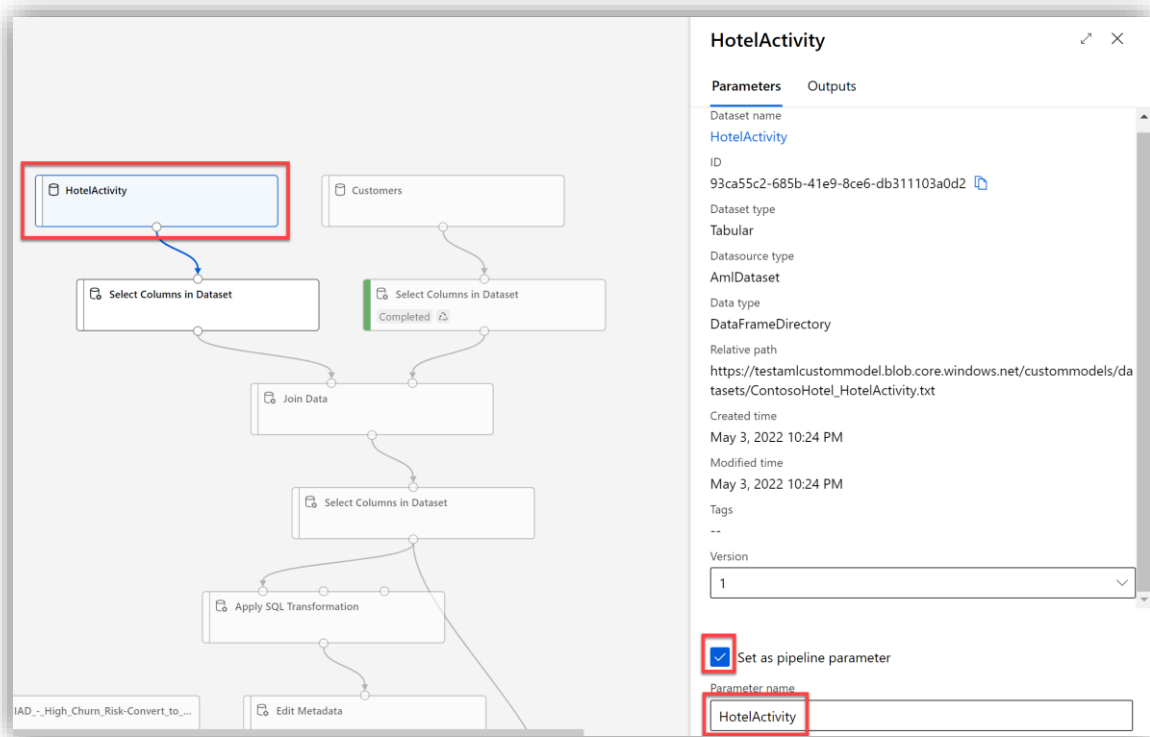
Task 2 - Create Inference Pipeline in order to connect to Customer Insights.

1. Go to **Create inference pipeline** and select **Batch Inference pipeline**



2. In this step, we'll parameterize the 3 datasets so that we can pass in new data from Customer Insights for making predictions.

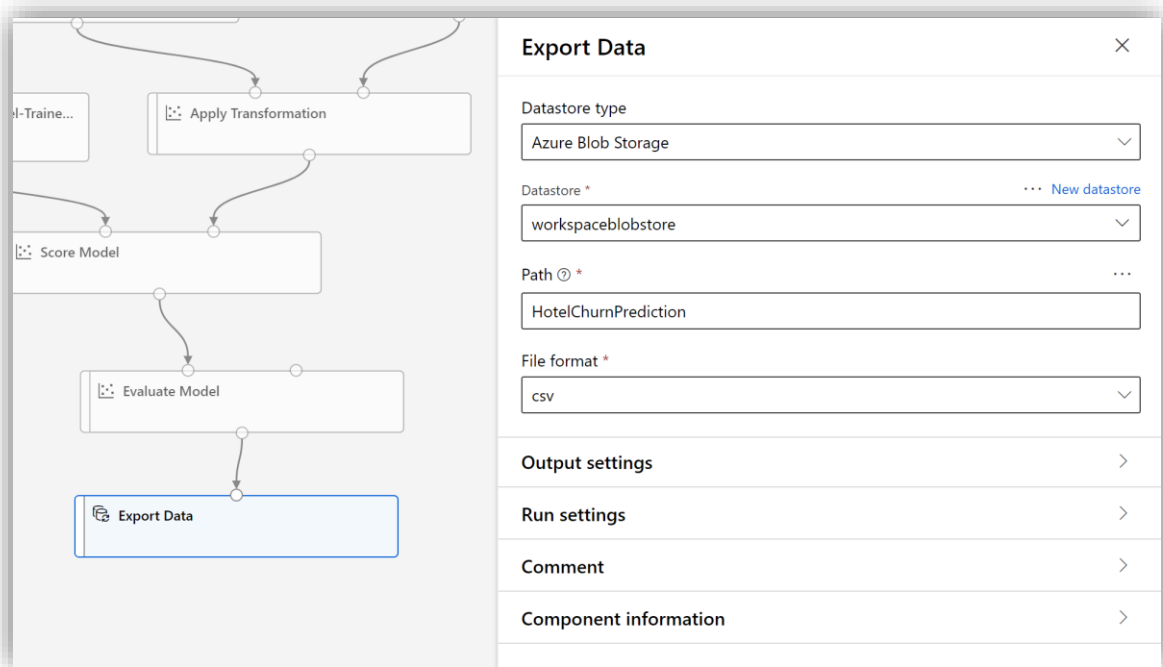
Select the **HotelActivity** dataset node, and check the *Set as pipeline parameter* checkbox in the **Parameters** tab of the right side pane. Enter a **Parameter name**, for example, **HotelActivity**, to represent the selected dataset. Repeat for the **Customers** and **ServiceUsage** datasets.



3. Add the **Export Data** module to your Batch inference pipeline. This module allows us to get our predicted results into Customer Insights. Connect the bottom of the **Score Model** module to the **Export Data** module.

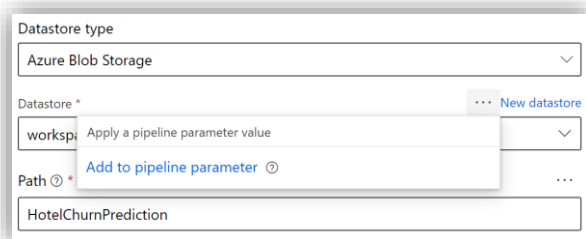
Click on the Export Data module to open the side pane. Make the following changes:

- **Datastore type:** Select *Azure Blob Storage*
- **Datastore:** Select *workspaceblobstore*
- **Path:** Enter a name for your predictions output. E.g. *HotelChurnPrediction*
- **File format:** Select *csv*



4. Now parameterize the Export Data module so that our predictions can be imported and used within Customer Insights.

Click on the Export Data module to open the side pane and then click on the ellipses on top of the datastore dropdown.





- Click on Add to pipeline parameter. Enter a name in the **Parameter Name** textbox that you can easily identify in Customer Insights. Click Save. Repeat for the Path field.

Parameter name

Output_data_store

Value

workspaceblobstore

Save Cancel

Parameter name

Output_path

Value

HotelChurnPrediction

Save Cancel

- Submit** the batch inference pipeline. Once it has completed successfully, click on **Publish** to open the published pipeline dialog. Select **Create new** and enter a name for your endpoint. Enter a name that you can easily identify later on. Click on **Publish** to publish your batch inference pipeline endpoint. It is now discoverable in Customer Insights!

Task 3 – Integrate Contoso Hotel data with Contoso Coffee

Here, you will break the data silos between Contoso Hotel and Contoso Coffee and ingest the Contoso Hotel data into Customer Insights instance.

- Ingest Hotel Data

NOTE: The datasource **Must** be named **ContosoHotel** or this lab will not work. The name must match what the model is looking for and it looks for ContosoHotel

Datasource	EntityName	CSV Location
ContosoHotel	HotelActivity	https://aka.ms/ciadhotelactivity
ContosoHotel	HotelCustomers	https://aka.ms/ciadhotelcustomers
ContosoHotel	ServiceUsage	https://aka.ms/ciadserviceusage

- All are CSVs and you should transform each table via the **Tranform Table -> Use First Row as Headers** menu option like we did back in Module 1.
 - For **HotelActivity** set the following column types

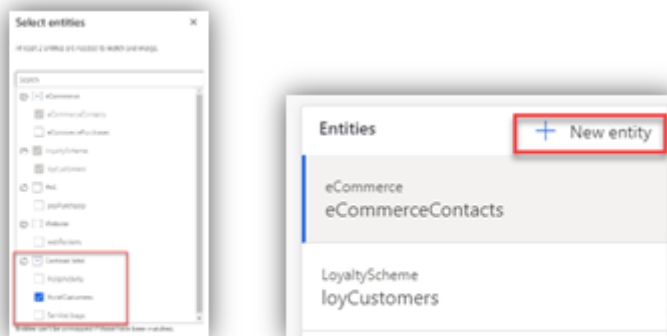
Column Heading	New Data Type
DollarsSpent	WholeNumber
NumberOfNights	WholeNumber

- For **ServiceUsage** set the following column types

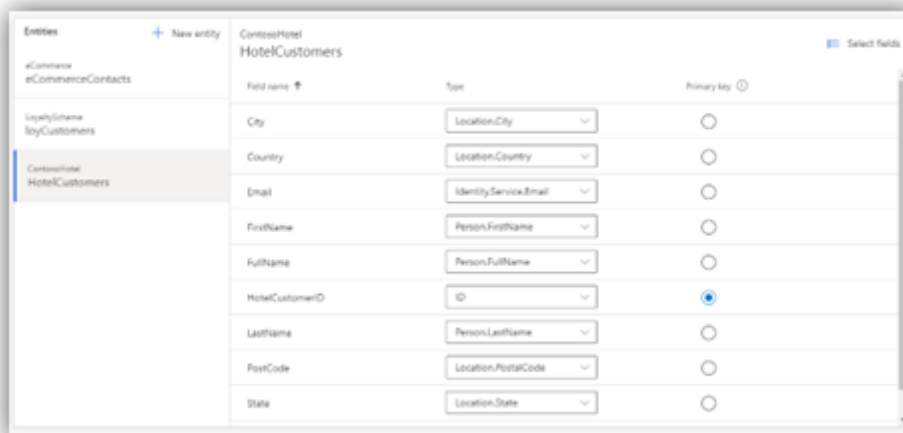
Column Heading	New Data Type
ServiceCost	WholeNumber
ServiceID	WholeNumber


- Now we need to go through the Unify process, first we'll Map the HotelCustomers Entity. Click on **Data -> Unify -> Map** in the left-hand menu

- Click on **New Entity** and check the **HotelCustomers** entity, then press **Done**



- Click on **HotelCustomers** in the entity list and confirm that **HotelCustomerID** is the Primary Key



- Click **Save**. We now need to add **HotelCustomers** to our match rules. Click on the **Match** tab.
- To add the HotelCustomers click on the **Edit**  button on the top of the Match Order grid, then select **Add entity** and add **HotelCustomers : ContosoHotel**, selecting **Include all records** before clicking **Done**.



Set order of entities

If you include all records, every record in the entity will be a unique customer and matched to every following entity. Entities can't be cleared if they've been merged.

Entity order	Entity name	Include all records
Primary ⓘ	eCommerceContacts : eCommerce	<input checked="" type="checkbox"/>
2	loyCustomers : LoyaltyScheme	<input checked="" type="checkbox"/>
3	HotelCustomers : ContosoHotel	<input checked="" type="checkbox"/>

8. Now we'll need to add a new match rule for **HotelCustomers** with our **eCommerceContacts** on **FullName**. Click the **Create new rule** button and configure a new rule as shown and click **Done**.

New rule

Set conditions on how you will match by choosing equivalent fields in entities.

Rule name *

FullName

You can change this later.

Conditions

Condition 1

Entity	Field
eCommerceContacts : eCommerce	FullName
Entity	Field
HotelCustomers : ContosoHotel	FullName

Normalize

Select options

Precision level

Basic

Precision

Low Medium High Exact

+ Add condition

9. Click **Save** and then **Run**

Observe that only 7.5% (approximately, your numbers may be slightly different) of Customers matched between Contoso Coffee and Hotel. This is expected since the two are different companies entirely! Improving the match score is out of scope, but CI provides the tools to help improve the match.

10. Finally you can click the **Merge** tab. Everything here is setup as we need it so just click **Run** to complete the process. Once the Merge is done running, which can take some time, you can



Task 4 – Create a Scoring workflow

1. Go back to your Customer Insights environment and in the left-hand menu click on **Intelligence** and then **Custom Models**.
2. Click the **New Workflow** button and create your workflow like the below steps show. For Tenant that contains your web service, make sure you choose your own tenant (in place of Contoso in Screenshot).

New workflow

Create a workflow that sends data to your Azure machine learning model and brings the results into Customer Insights.

Workflow details

Name *
MyScoringEndpoint

Tenant that contains your web service
Contoso

Web service that contains your model *
Hotel-Churn (Predictive Exp.)

Next **Cancel**

New workflow

Create a workflow that sends data to your Azure machine learning model and brings the results into Customer Insights.

Workflow details

Select data to send

The selected entities will be sent to the web service as inputs.

Web service input

Entity

hotelActivity
HotelActivity : ContosoHotel

customer
Customer : CustomerInsights

servicesUsage
ServiceUsage : ContosoHotel

Next **Back**

New workflow

Create a workflow that sends data to your Azure machine learning model and brings the results into Customer Insights.

Workflow details

Select data to send

Relate results to customer data

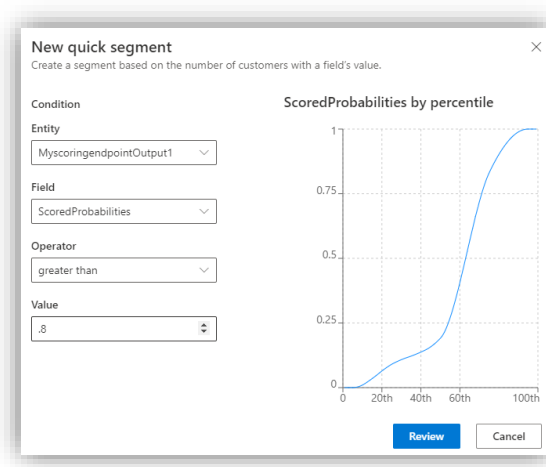
Customer ID in results
Select the field that is equivalent to the Customer ID field in the Customer entity.
customerid

Back **Save**

3. Click on **Save** then **Done**.
4. Now **Run/Refresh** the workflow.

Task 5 – Setup a Segment of High Churn-risk hotel customers

1. Open the **Segments** section from the left-hand menu. We will manually create a new dynamic segment, click **New** in the top menu bar. You'll notice there is now an **Intelligence** options in the **New -> Create From** section. Choose the new **Intelligence** option.
2. Select your scoring endpoint and setup the segment like this.



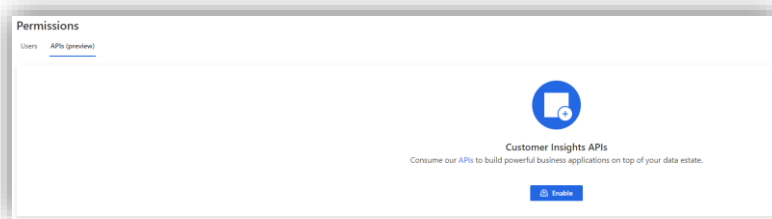
3. Click Review and name your new Segment like as **Name:** HighRiskForChurnHotelCustomers, **Display name:** High Risk For Churn Hotel Customers
4. Click **Save**



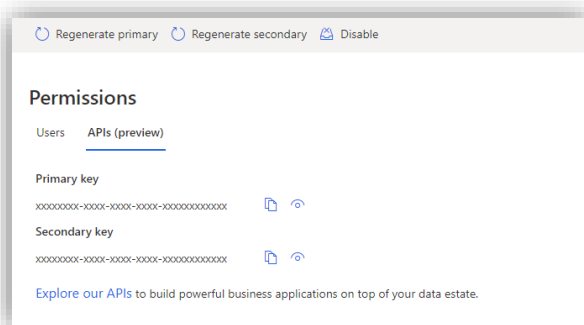
Exercise 4 - API

Task 1 - Enable APIs in Customer Insights environment

1. To use APIs, you need to enable API feature in your environment.
2. Go to <https://home.ci.ai.dynamics.com/> and log in.
3. Navigate to **Security** under the **Admin** section.
4. Switch to **APIs** tab and click the **Enable** button.



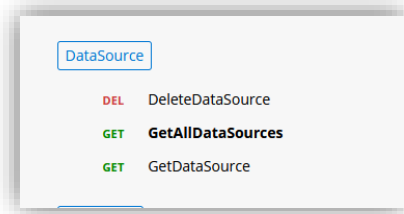
5. You can find the subscription keys and option to regenerate them whenever necessary for security. These keys need to be passed as headers with any request we make to the APIs. They help in validating the subscription and monitoring the usage. Any Customer Insights user can use these keys to make requests.



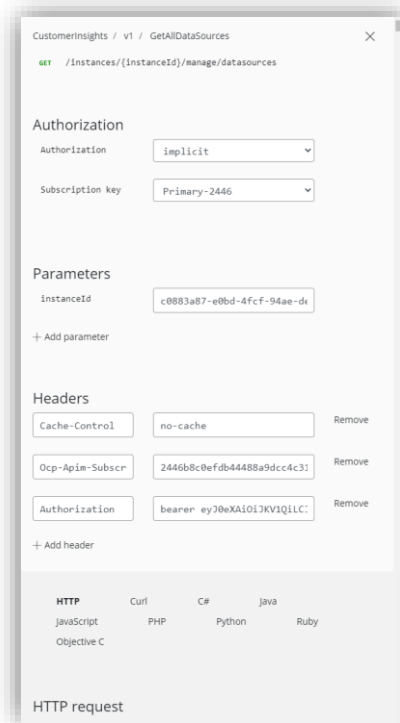
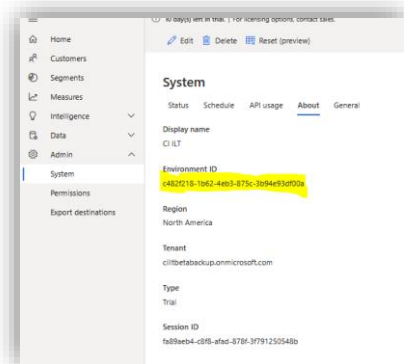


Task 2 - Get the list of data sources via API

1. Click on **Explore our APIs** link in **APIs(preview)** window.
2. Select **GetAllDataSources** API call under **DataSource** list and click on **Try it** button.



3. In the side panel that opens, select the drop-down labeled **Authorization** and choose **implicit**. This should automatically fill the Authorizationheader with a bearer token. Your subscription key will be automatically populated.
4. Go back to your Customer Insights environment and copy your environment/instance ID within Admin->System->About and paste it under parameters beside **instanceId**.



5. Scroll to the bottom of the panel, and click the **Send** button



- The HTTP response will soon appear below.

```

HTTP response

HTTP/1.1 200 OK

api-supported-versions: 2018-10-01
content-type: application/json; charset=utf-8
date: Wed, 07 Oct 2020 18:46:39 GMT
transfer-encoding: chunked
x-content-type-options: nosniff
x-ms-request-id: 9f564a6b-645c-45d9-9d4a-29460feafalc

[[
  "dataSourceMetadata": {
    "kind": "PowerQuery",
    "description": "",
    "isActive": true,
    "dataSourceId": "545d31f7-8225-4b8f-8a53-067ce1de23
9",
    "name": "eCommerce",
    "friendlyName": "eCommerce",
    "entityInformation": [
      {
        "entityName": "eCommerceContacts",
        "primaryKey": "ContactId",
        "entityType": "Unspecified",
        "semanticLabels": [
          {
            "attributeName": "ContactId",
            "label": "ID"
          },
          {
            "attributeName": "FirstName",
            "label": "Person.FirstName"
          },
          {
            "attributeName": "LastName",
            "label": "Person.LastName"
          },
          {
            "attributeName": "FullName",
            "label": "Person.FullName"
          }
        ]
      }
    ]
  }
]

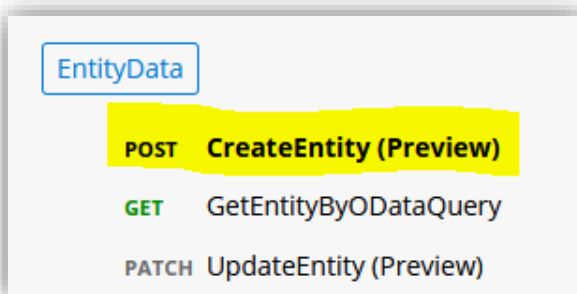
```

- You can look at all the data sources that are in your environment in the HTTP response.

Task 3 - Real-time Ingestion via API

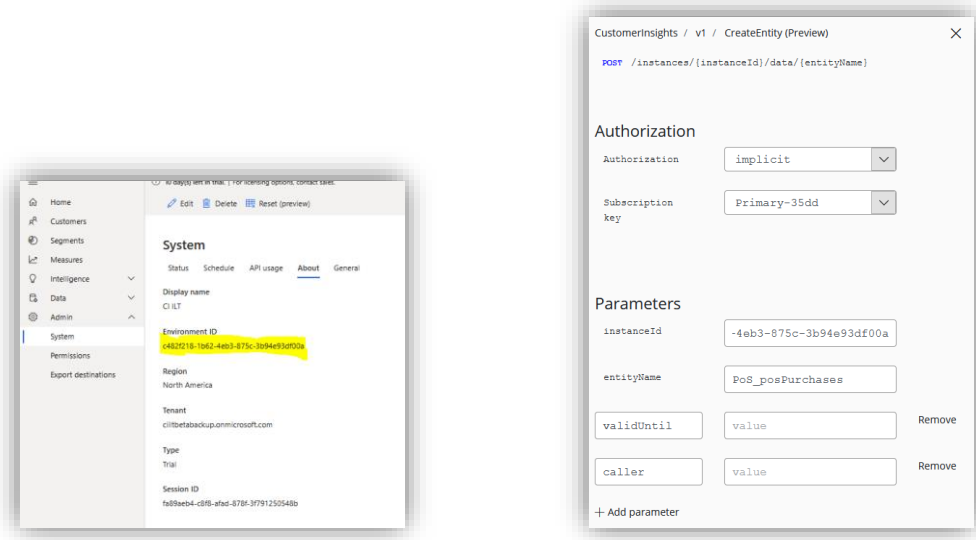
Say Abbie Moss has purchased a coffee machine in store just now, we can have the POS system use the APIs in the background to record that purchase data and send it to Customer Insights right away to have it readily available instead of waiting to get it until next refresh. Let's see how to do this with developer APIs with in Customer Insights.

- Open your Customer Insights environment.
- Click on **Explore our APIs** link in **APIs(preview)** window with in **Permissions** tab.
- Select **CreateEntity** API call under **DataSource** list and click on **Try it** button.



- In the side panel that opens, select the drop-down labeled **Authorization** and choose **implicit**. This should automatically fill the Authorization header with a bearer token. Your subscription key will be automatically populated.

- Go back to your Customer Insights environment and copy your environment/instance ID within Admin->System->About and paste it under parameters beside **instanceld**. Enter the entity name as **POS_posPurchases**. (If you have used different name for the entity, make sure to add it this way: DatasourceName_EntityName.)

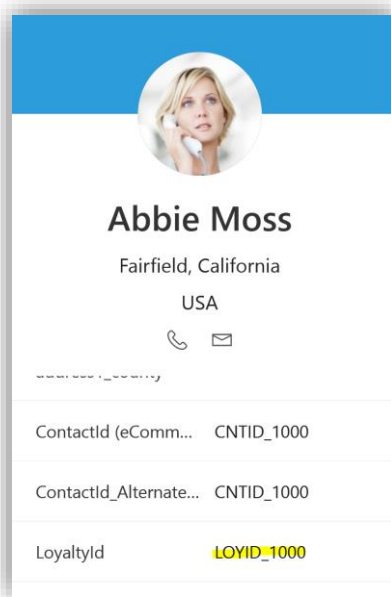


- With in body, you need to give a JSON payload with the values for all the columns with in your entity. Copy the below JSON and make sure to use a unique value for **PurchaseId** column everytime you try to ingest as it is the primary key in posPurchases entity.

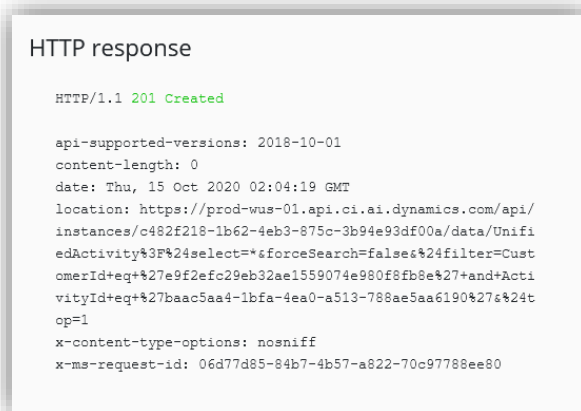
```
{
  "LoyaltyId": "LOYID_1001",
  "PurchaseId": "PID_1uu00000",
  "ProductId": "ProdID_1000",
  "PurchasedOn": "2020-10-14T00:00:00Z",
  "TotalPrice": 151,
  "RewardPointsAdded": 75,
  "ActivityTypeDisplay": "POS Purchase",
  "Subject": "Purchased a product In-Store"
}
```



- For **LoyaltyId** value, go to Customers page and search for **Abbie Moss** and choose the LoyaltyId value as below and paste it in the payload in place of sample ID LOYID_1001.



- Change the date to today's date for **PurchasedOn** in this format **YYYY-MM-DDT00:00:00Z**. For example., 2020-10-21T00:00:00Z
- Scroll to the bottom of the panel, and click the **Send** button
- The HTTP response will soon appear below.



- You can go to Customers page in Customer Insights environment and search for **Abbie Moss** to find this new activity in the timeline.