Automated Incident Routing System

Implementation Details

Problem

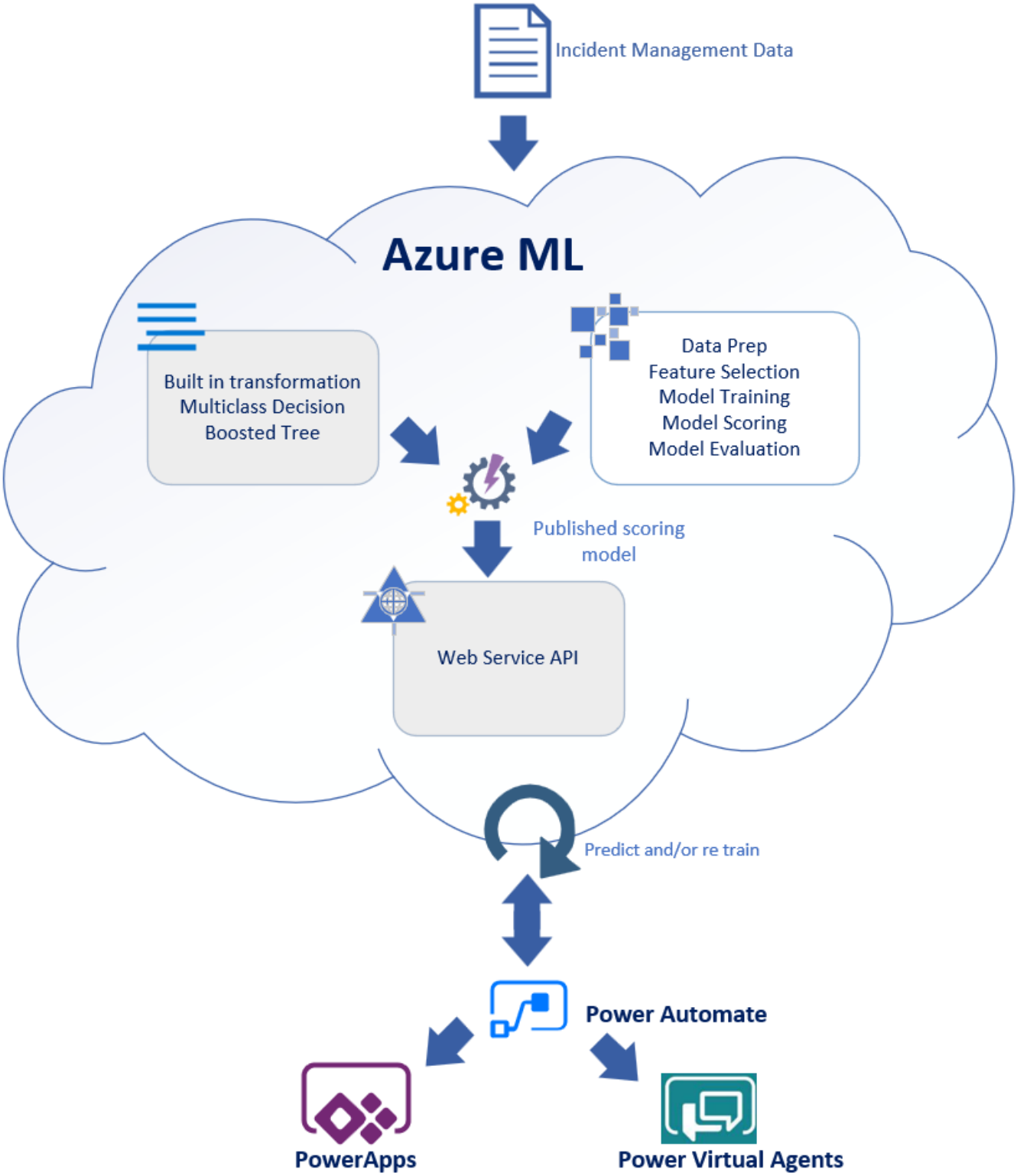
The most of the companies incidents are routed manually to respective team using Incident Routing system (IMS). This may get delayed or not routed to appropriate team based on understanding of the incident. So, this could get into not reaching the SLA or not addressing the incident appropriately.

Hence company would like to implement automated incident routing system using Machine learning to avoid such scenarios.

Technology Used

1. Azure Machine Learning
2. Power Automate
3. PowerApps
4. Power Virtual Agents

High Level Architecture


Incident Management Data
Azure ML
Built in transformation
Multiclass Decision
Boosted Tree
Data Prep
Feature Selection
Model Training
Model Scoring
Model Evaluation
Published scoring model
Web Service API
Predict and/or re train
Power Automate
PowerApps
Power Virtual Agents

Implementation Details

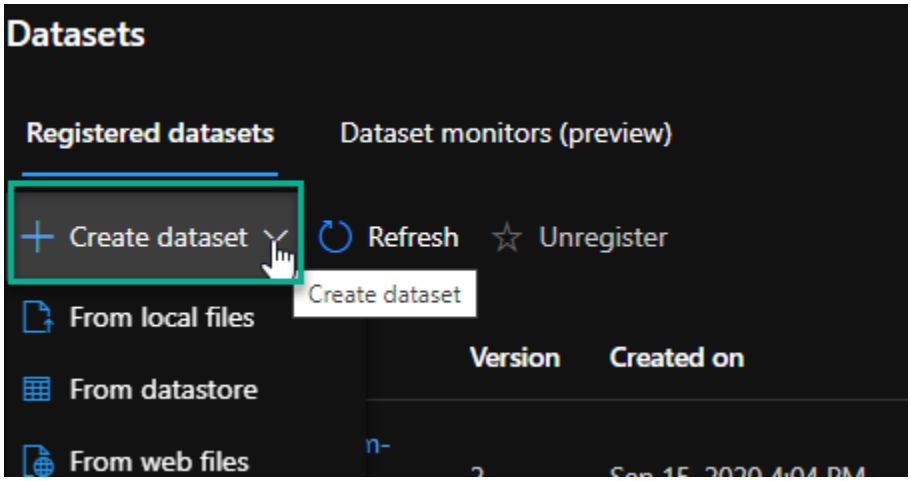
The following sample files used to analyze the incident and route to appropriate team automatically

Dataset: Customer Complaint.txt

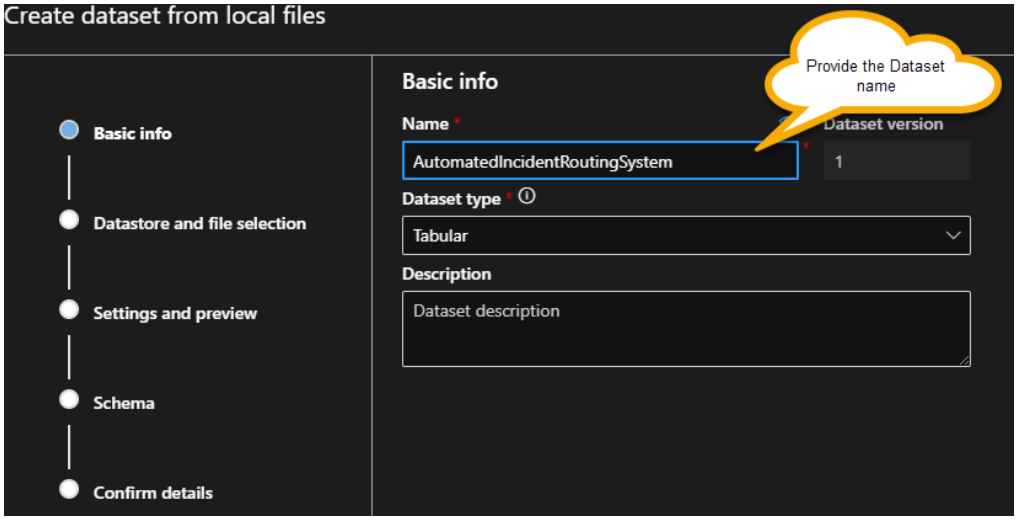
The customer complaint file imported into Azure ML

Data Import Steps:

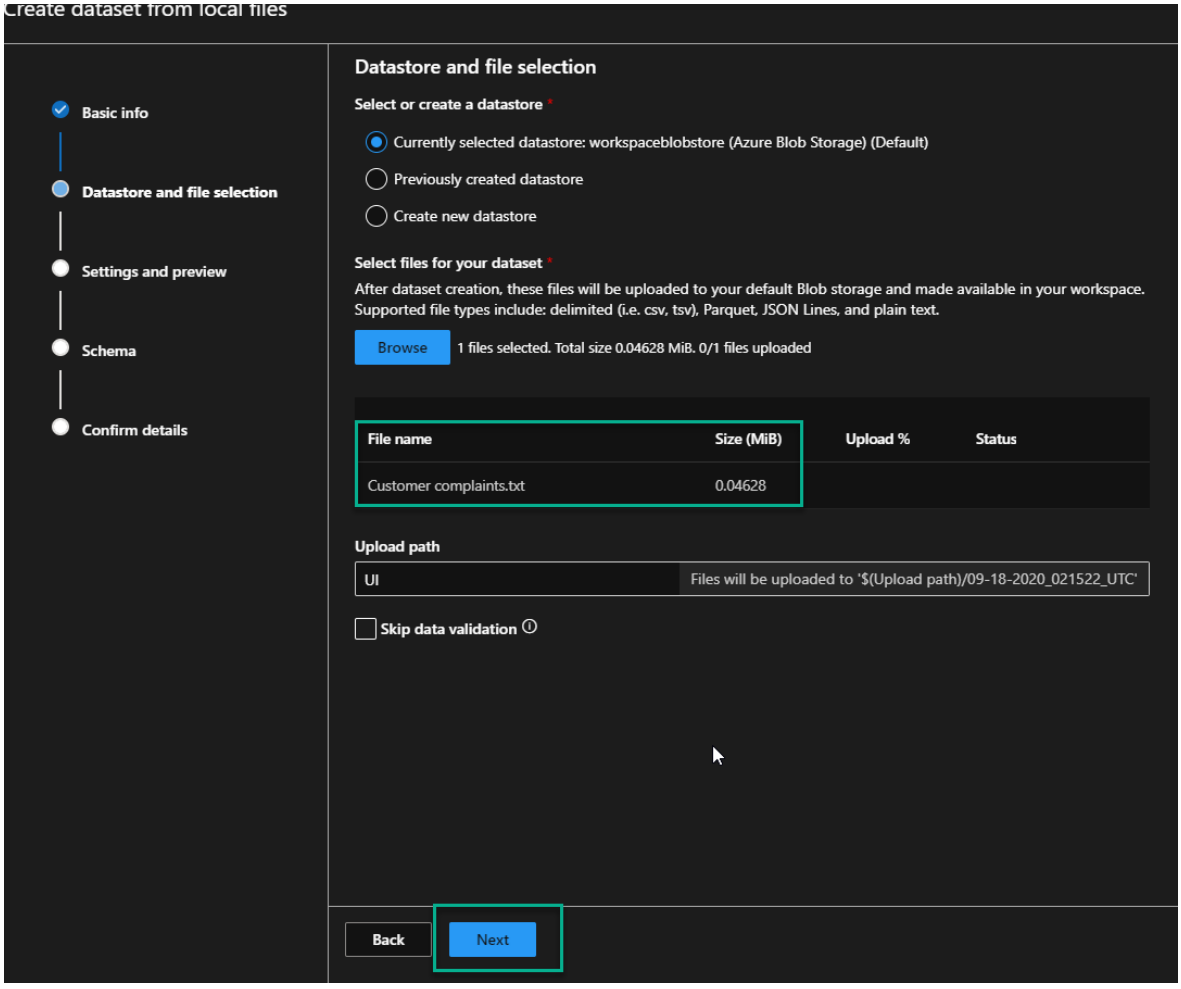
1. Select From local files,



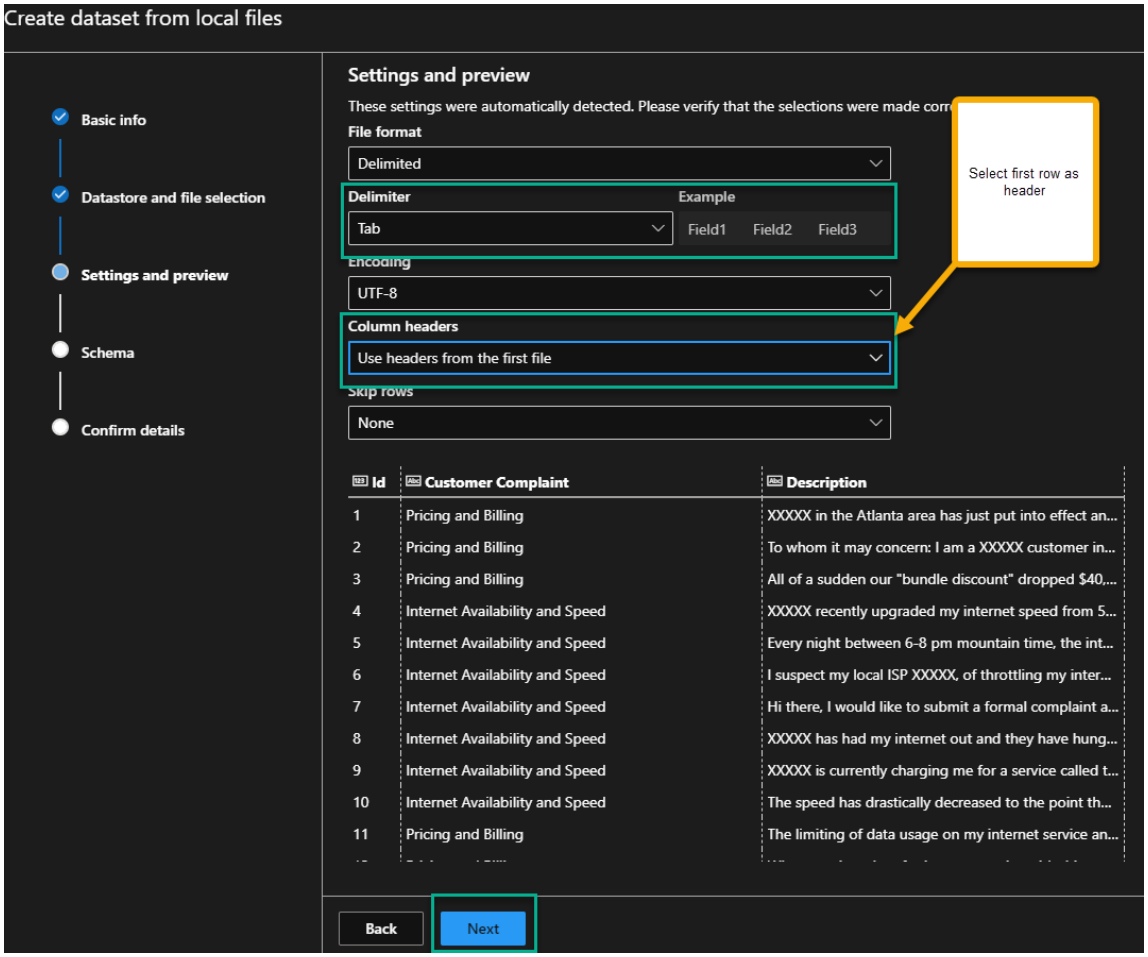
2. Provide the basic information and click next



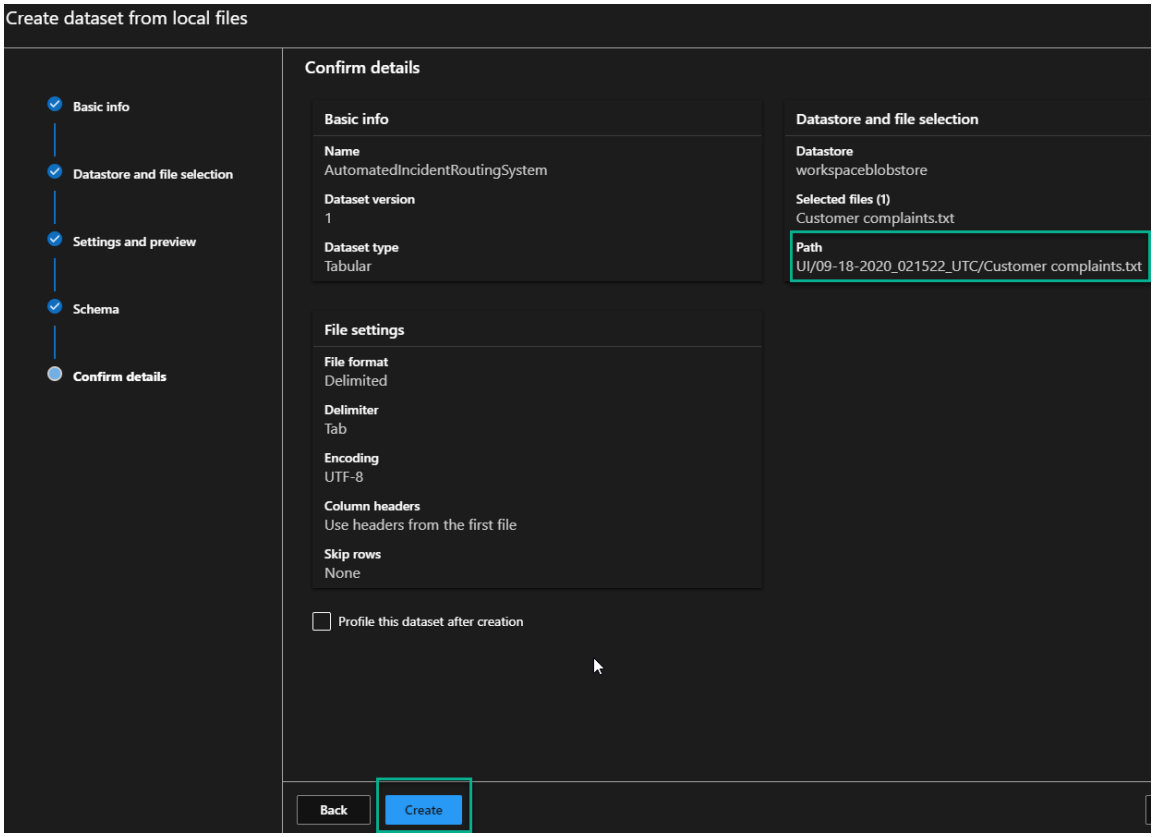
3. Select Datastore and file selection, after click next



4. Update settings and preview and select use heading from the first file, after click next



5. Click Next and create the dataset



Once the dataset is created click Designer (Preview), create new pipeline

Azure Machine Learning Model:

The below picture shows the Automated Incident routing model

The above model developed using Natural language programing, text analytics feature and Multiclass Boosted Decision Tree algorithm.

The Text analytics is providing following feature

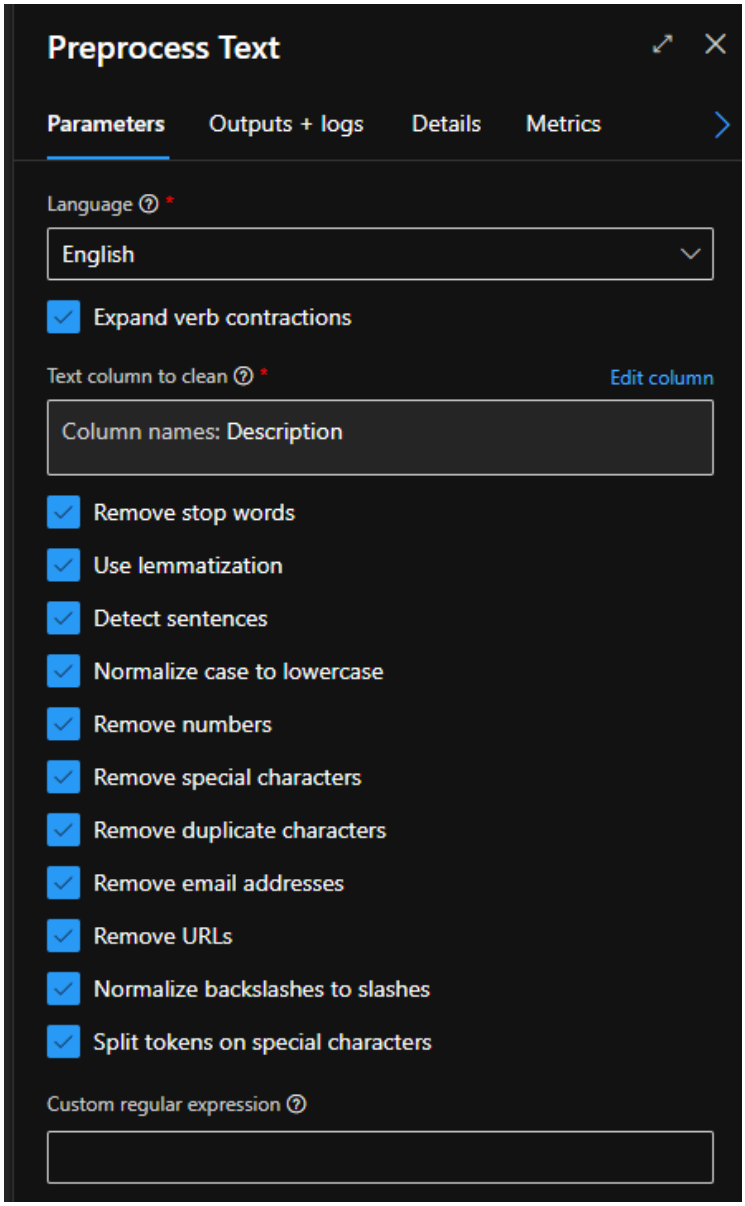
The model using following Asset libraries are used to process the incidents

1. **Process Text:**

   The **Preprocess Text** module to clean and simplify text. It supports these common text processing operations:

   1. Removal of stop-words
   2. Using regular expressions to search for and replace specific target strings
   3. Lemmatization, which converts multiple related words to a single canonical form
   4. Case normalization
   5. Removal of certain classes of characters, such as numbers, special characters, and sequences of repeated characters such as "aaaa"
   6. Identification and removal of emails and URLs

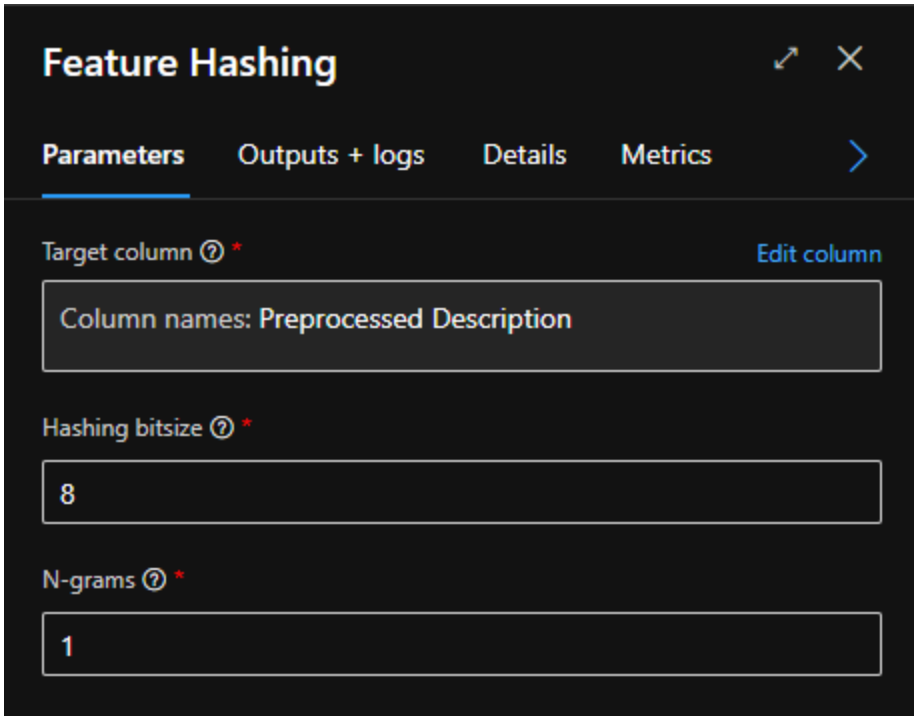
Settings configured:



2. **Feature Hashing:**
   Use the Feature Hashing module to transform a stream of English text into a set of integer features. The feature hashing functionality provided based on the **nimbusml framework.**

   The feature hashing works by converting unique tokens into integers. It operates on the exact strings that you provide as input and does not perform any linguistic analysis or preprocessing.

Settings configured:

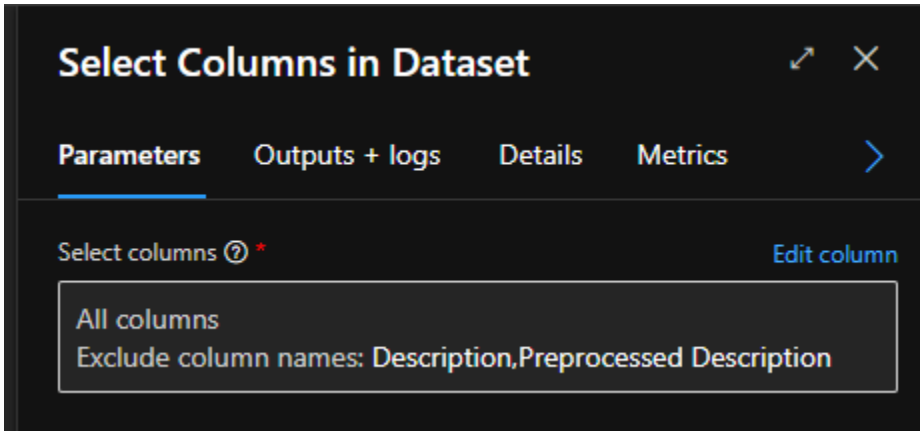


Hashing bitsize: Specify the number of bits to use when you're creating the hash table. We need to provide more space to avoid collisions, depending on the size of the n-grams vocabulary in the training text

N-grams: Defines the maximum length of the n-grams to add to the training dictionary.

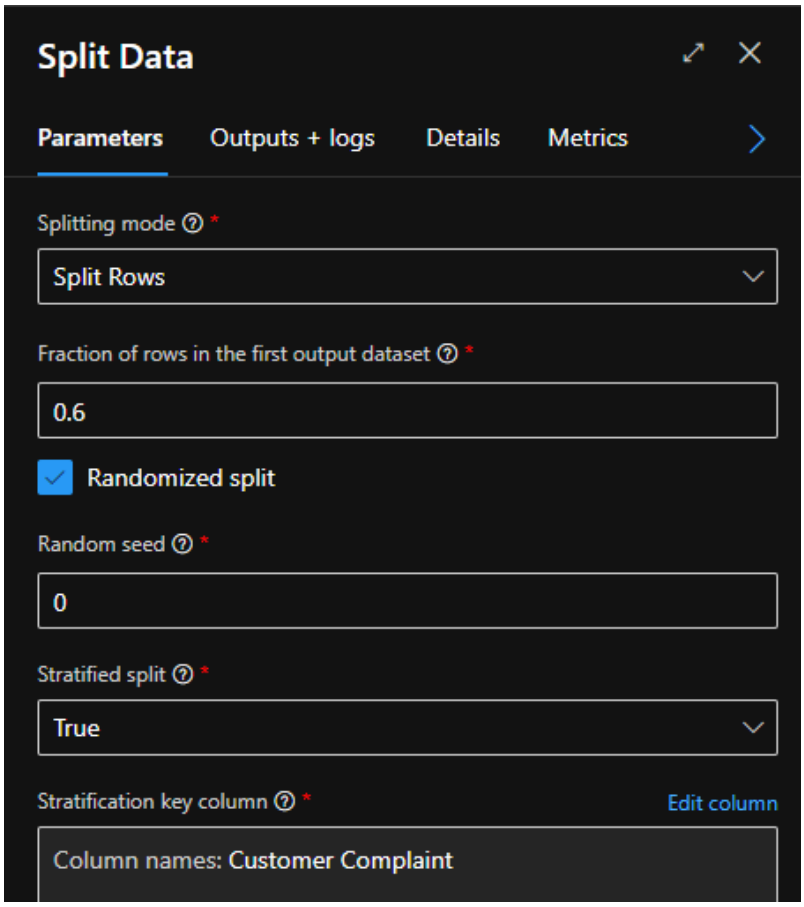
Select Columns in Dataset: Choose a subset of columns to use in downstream operations

Settings configured:



Split Data: Split Data module to divide a dataset into two distinct sets.

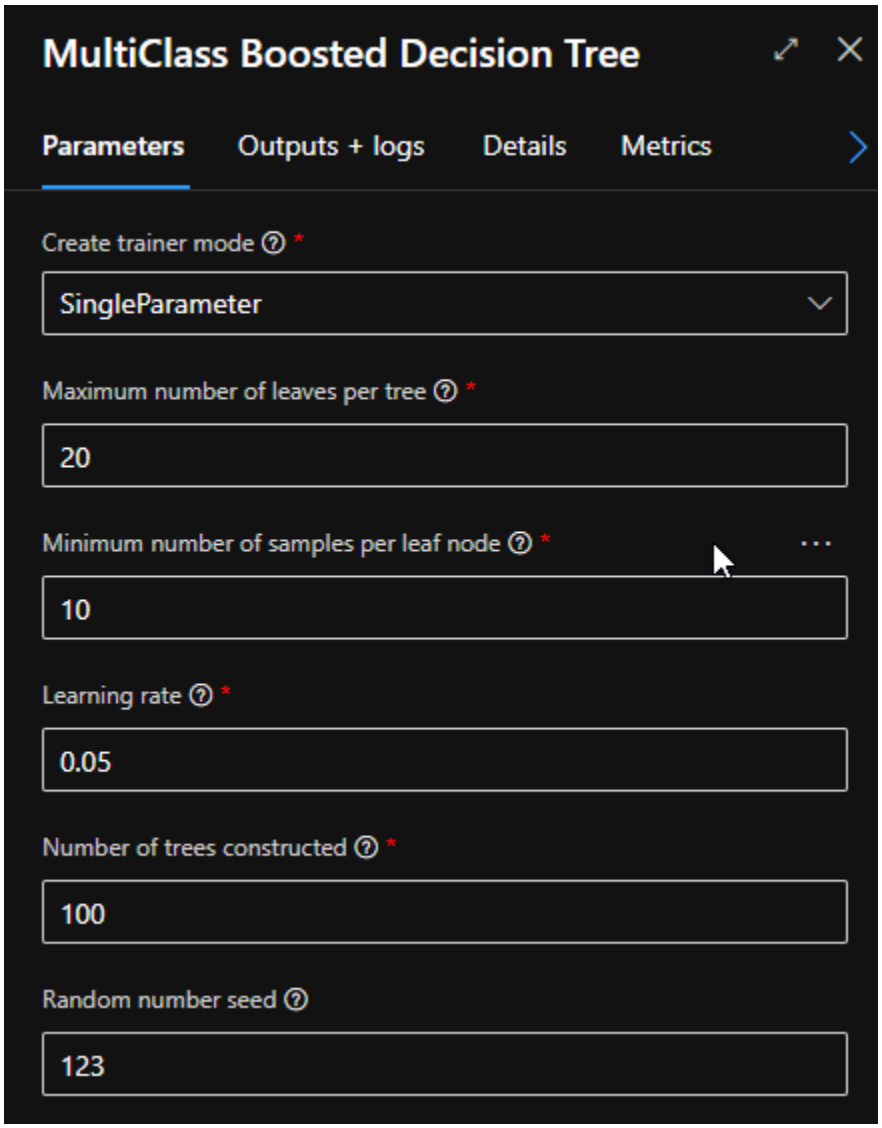
Settings configured:



Multiclass Boosted Decision Tree:

A boosted decision tree is an ensemble learning method in which the second tree corrects for the errors of the first tree, the third tree corrects for the errors of the first and second trees, and so forth. Predictions are based on the ensemble of trees together.

Settings configured:



Maximum number of leaves per tree: limits the maximum number of terminal nodes (leaves) that can be created in any tree.

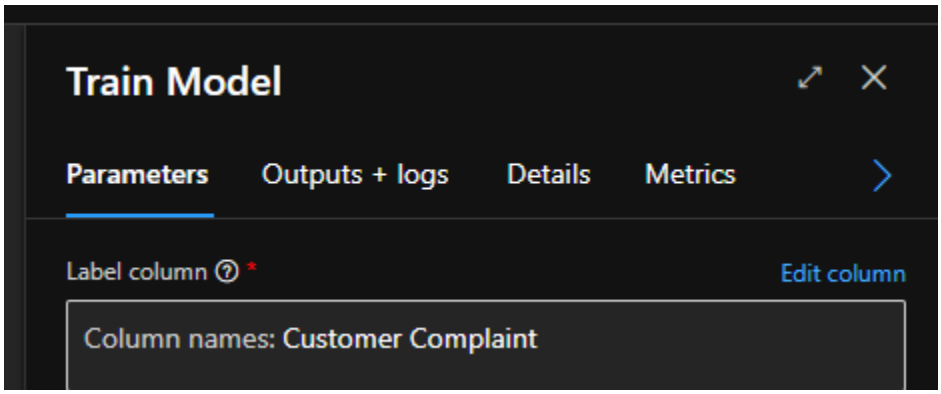
Minimum number of samples per leaf node: indicates the number of cases required to create any terminal node (leaf) in a tree.

Learning rate: defines the step size while learning. Enter a number between 0 and 1.

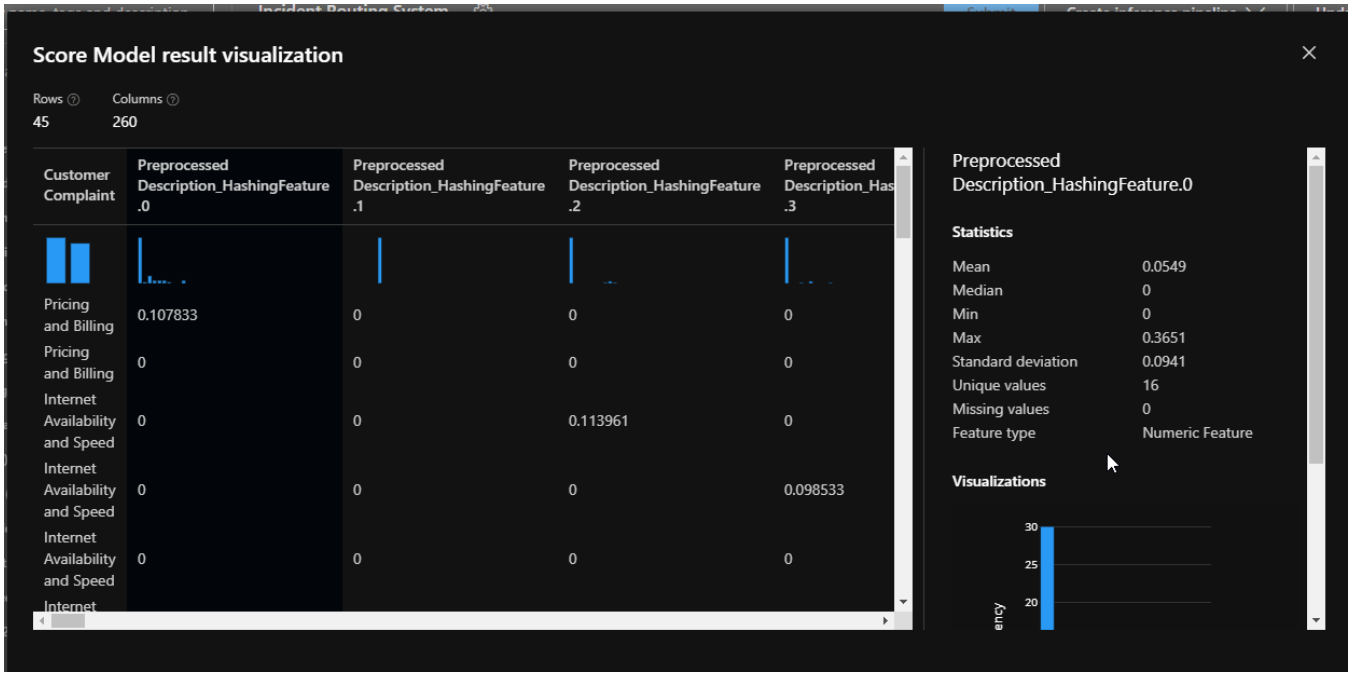
Number of trees constructed indicates the total number of decision trees to create in the ensemble.

Train Model: Train the module to train a classification or regression model.

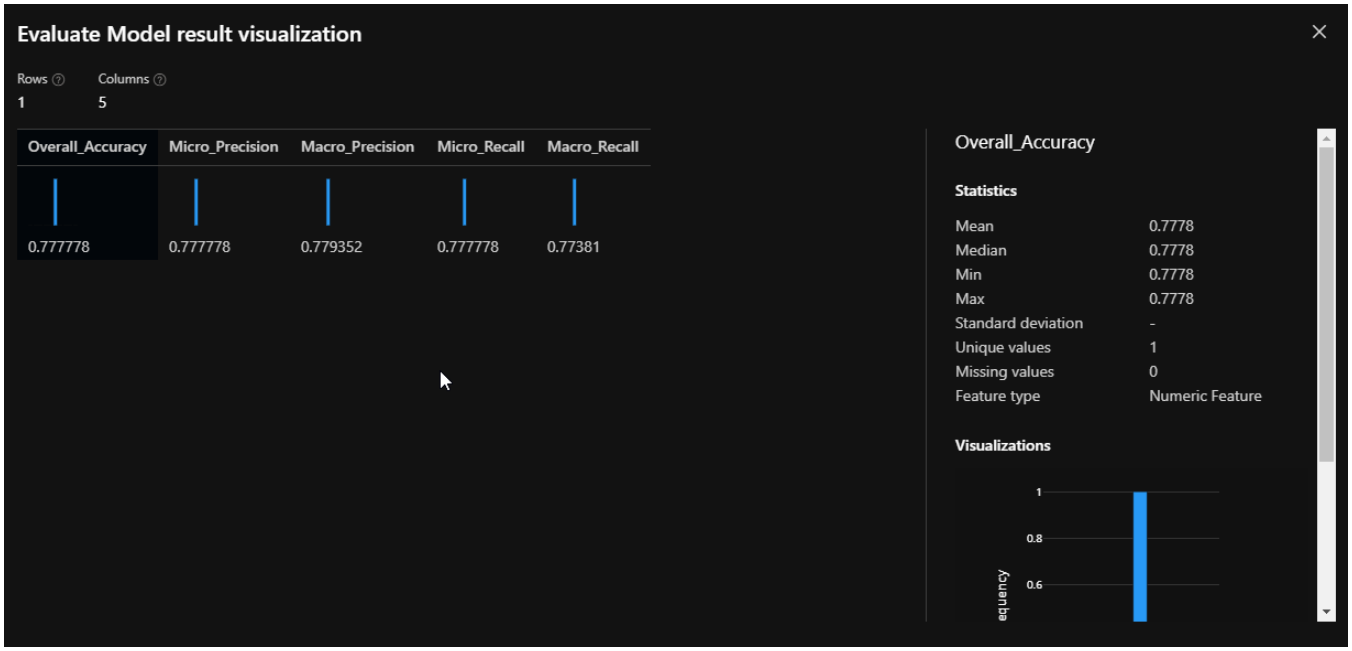
Settings configured:



Once model is scored here is output



Evaluate Model:



Once the model is developed after created Real-Time inference pipeline to get the data.

After inference pipeline deployed as microservice in the **Azure Kubernetes services** by using compute instances

Instance:

Virtual machine size
STANDARD_DS3_V2 (4 Cores, 14 GB RAM, 28 GB Disk)

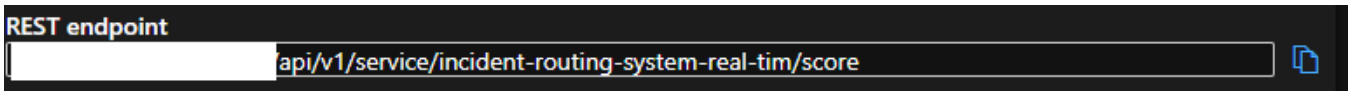
Cluster:

Virtual machine size
STANDARD_D12_V2 (4 Cores, 28 GB RAM, 200 GB Disk)

Interface:

Azure Kubernetes services

Once model deployed as microservice, it provides REST end points to connect service from external system.



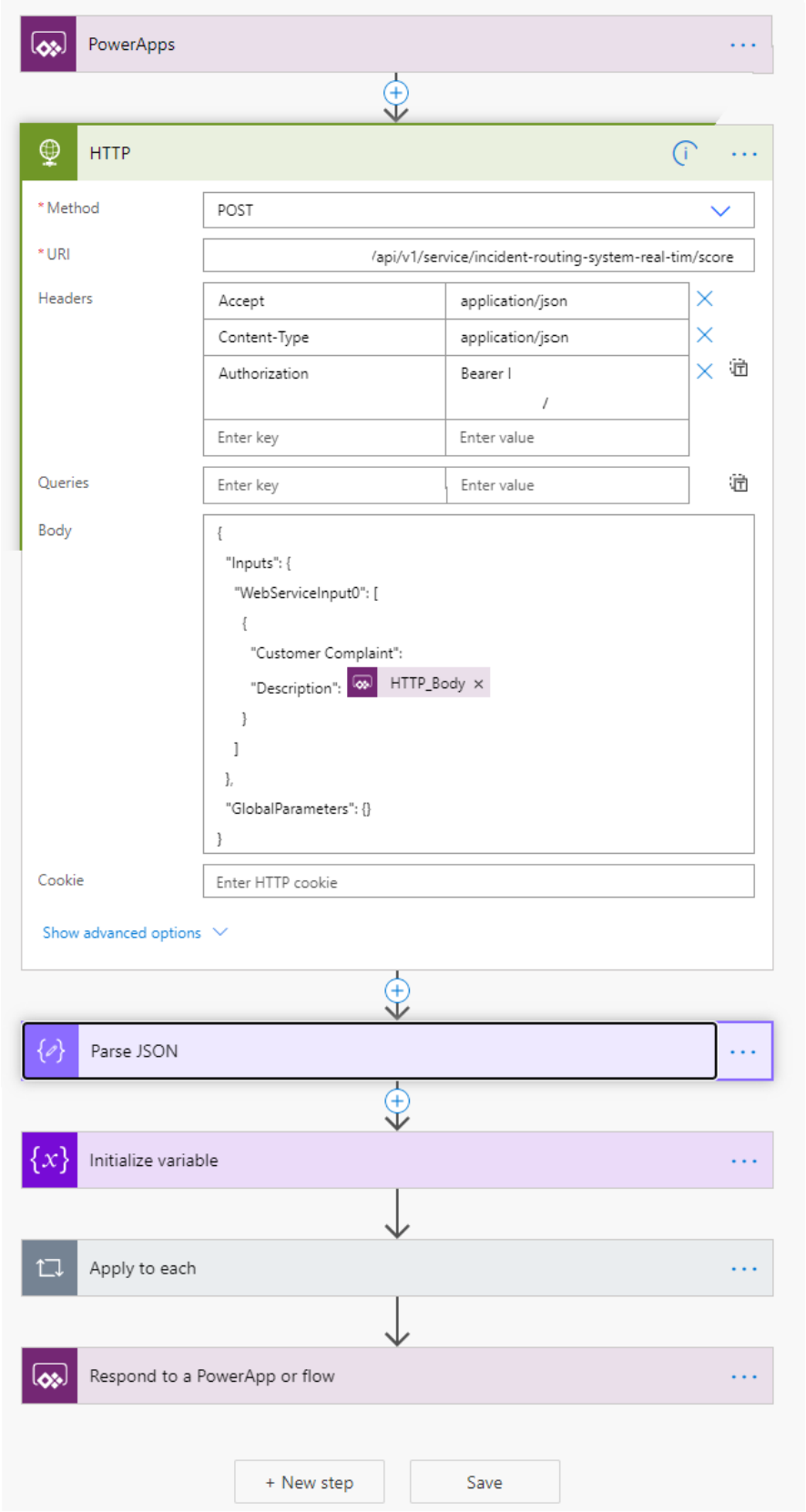
So, microservice is consumed using key based authentication from the Power Automate.

The Power Automate connects microservice to get the data based on user inputs and pass the details to PowerApps and Power Virtual Agents

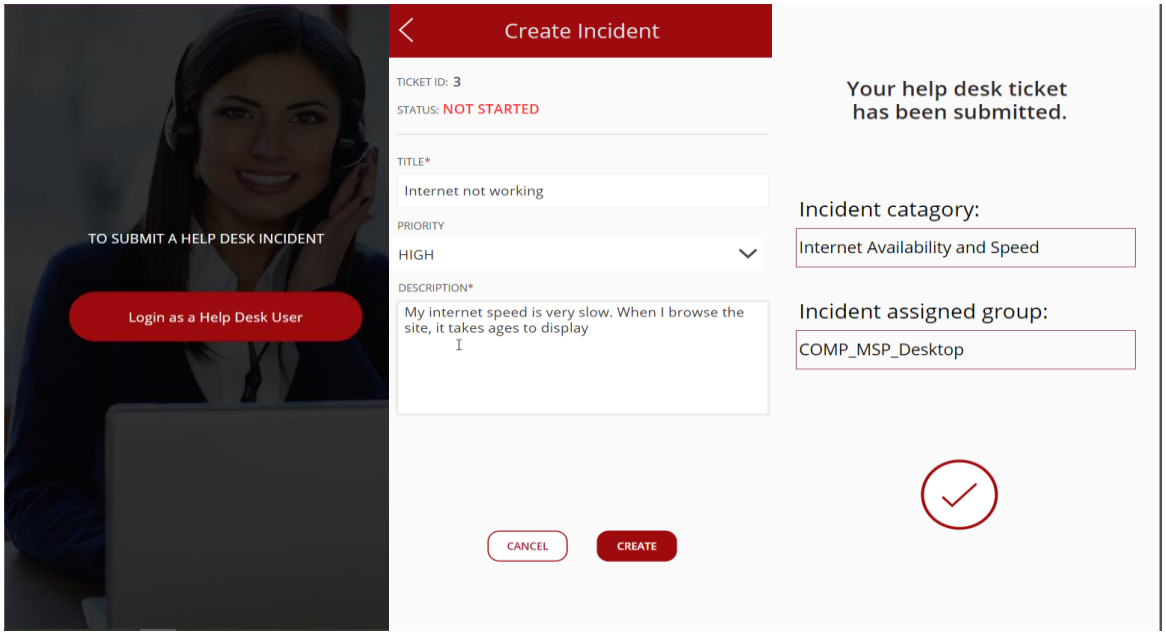
Here are the sample screenshots from each system

Power Automate:

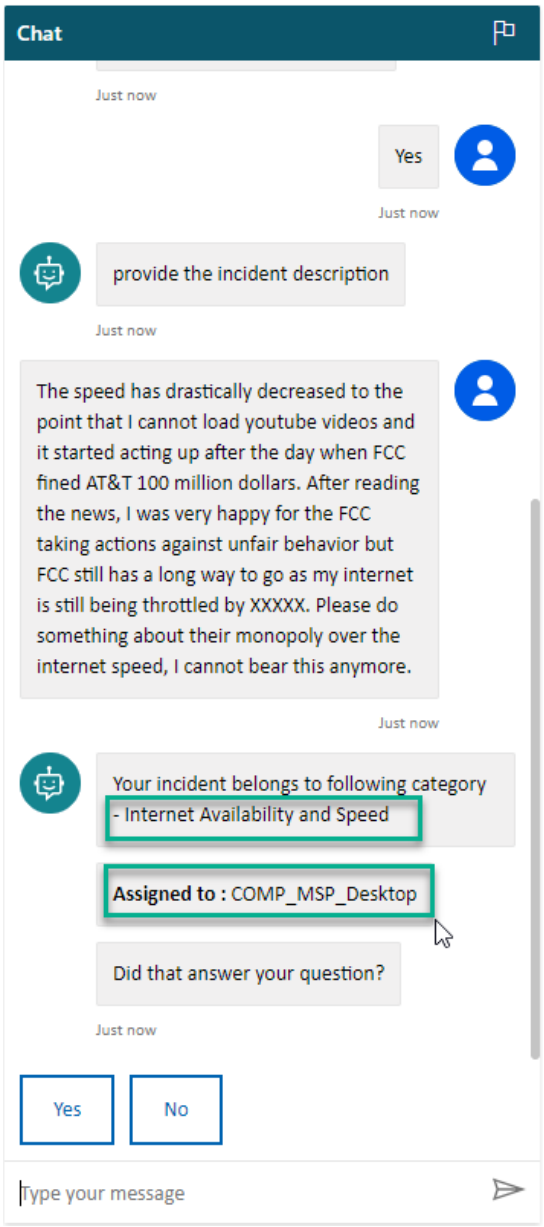
The Power Automate consume Incident Management service from Azure ML by passing the incident description. The service processes the request and response score labels.


PowerApps
HTTP
* Method
POST
* URI
/api/v1/service/incident-routing-system-real-tim/score
Headers
Accept
application/json
Content-Type
application/json
Authorization
Bearer I
/
Enter key
Enter value
Queries
Enter key
Enter value
Body
{
"Inputs": {
"WebServiceInput0": [
{
"Customer Complaint":
"Description":
HTTP_Body
}
]
},
"GlobalParameters": {}
}
Cookie
Enter HTTP cookie
Show advanced options
Parse JSON
Initialize variable
Apply to each
Respond to a PowerApp or flow
+ New step
Save

PowerApps:



Power Virtual Agents:


Chat
Just now
Yes
Just now
provide the incident description
Just now
The speed has drastically decreased to the point that I cannot load youtube videos and it started acting up after the day when FCC fined AT&T 100 million dollars. After reading the news, I was very happy for the FCC taking actions against unfair behavior but FCC still has a long way to go as my internet is still being throttled by XXXXX. Please do something about their monopoly over the internet speed, I cannot bear this anymore.
Just now
Your incident belongs to following category - Internet Availability and Speed
Assigned to : COMP_MSP_Desktop
Did that answer your question?
Just now
Yes
No
Type your message