AI Engineer Path

Project 10

DEVELOP A CHABOT TO HELP CUSTOMERS MAKE HOLIDAY RESERVATIONS

CONTENTS

PART ONE

Overview

Introduction

Company Sponsor

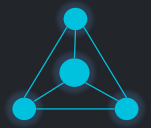
Fly me is a travel provider for individuals and professionals.

They need a Chatbot to help users choose a travel offer.

Target

First Phase of the project :

A Minimum Viable Product to help employees to easily book airline tickets.



Tools

Microsoft Bot Framework

Azure LUIS Cognitive Service

Application Insight

Minimum features

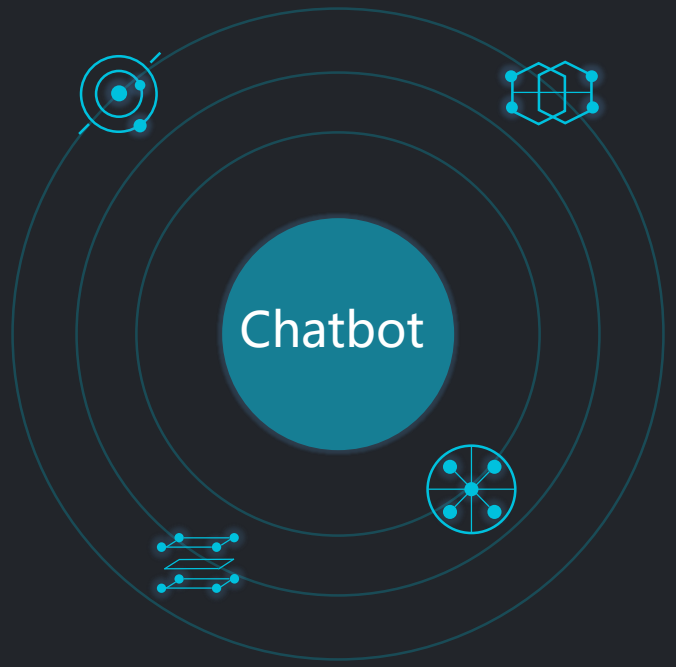
First phase

Identify

Departure city
Destination city
Departure date
Return date
Budget (max)

Ask

Relevant question
If one element is missing



Reformulate

The users request

Ask

For confirmation

PART TWO

Training

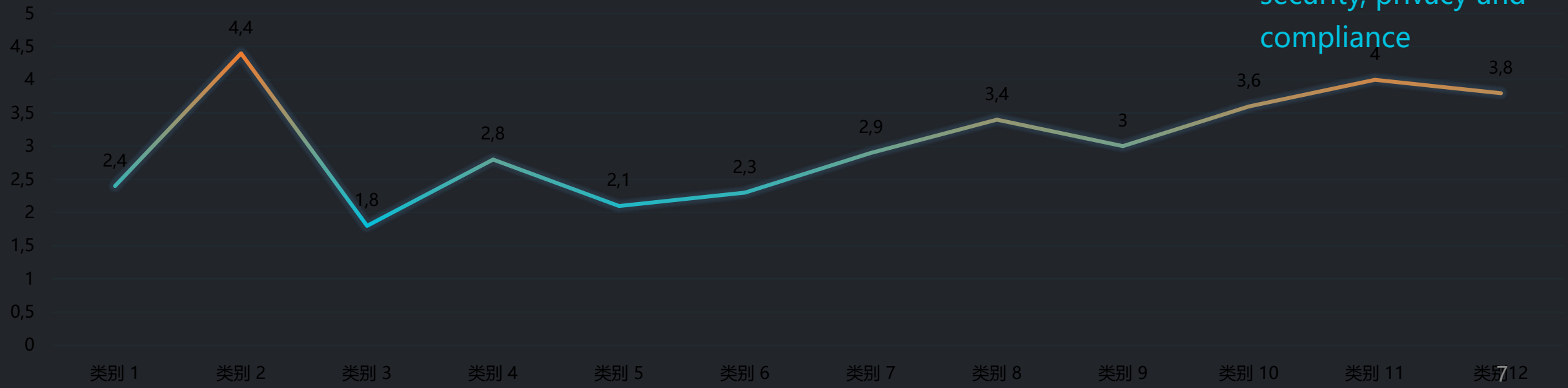
LUIS Cognitive Service

Description

Simplicity
Pre-designed machine learning platform for Natural Language Processing

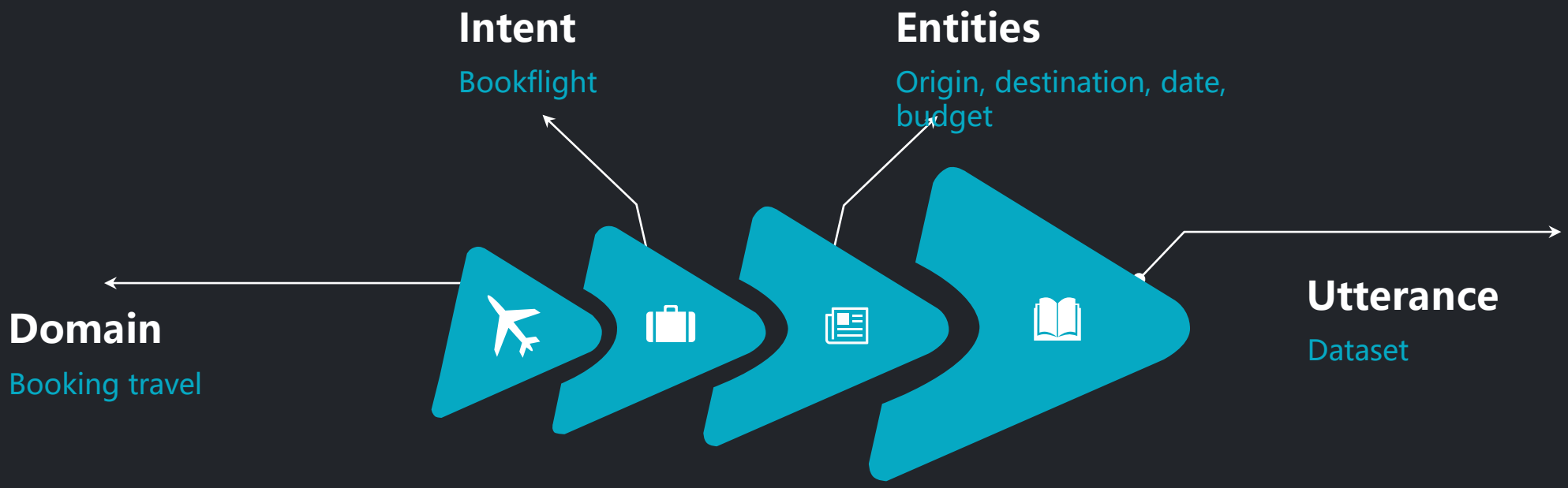
Integration
Easily integrate with other Microsoft services

Security and Privacy
LUIS is supported by Azure which offers entreprise-grade security, privacy and compliance



LUIS App

Task : identify



An intent is the desired outcome of the whole utterance while entities are pieces of data extracted from utterance.

Intent = action the app should take

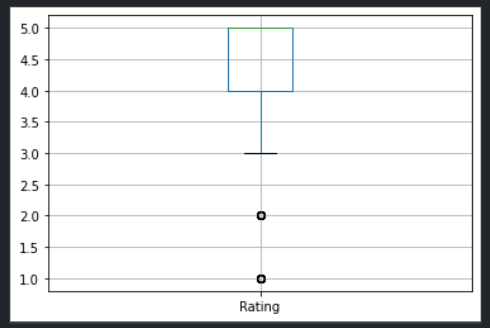
Entities = information needed to perform the action

Dataset

Preparation

Overview

1,369 dialogues with multiple turn between user and wizzard
109 cities
4,57 rating (on dialogue)



Cleaning

Only turn 0 of each dialogue
➔ Enough for phase 1 of MVP

Rating ➔ without outlier
➔ Out of context request from user

Split 80/20

Budget format detection:
$2000 and 2000

Preparation

JSON object :
Text
Intent
Entity

```
{'entityLabels': [{'endCharIndex': 49,
   'entityName': 'dst_city',
   'startCharIndex': 39}],
 'intentName': 'BookingIntent',
 'text': 'Hello, I am planning to book a trip to pittsborgh'}
```

Turn 0: I'd like to book a trip to Atlantis from Caprica on Saturday, August 13, 2016 for 8 adults. I have a tight budget of 1700.
Turn 6: I suppose I'll speak with my husband to see if we can choose other dates, and then I'll come back to you.Thanks for your help

LUIS App

Performance after training

99,9%

Correct prediction

Accuracy

Analysis of incorrect prediction :

- Confusion between date.
- Budget

Remarks :

Bias dataset regarding intent detection : 100% of the dataset is about booking a flight.

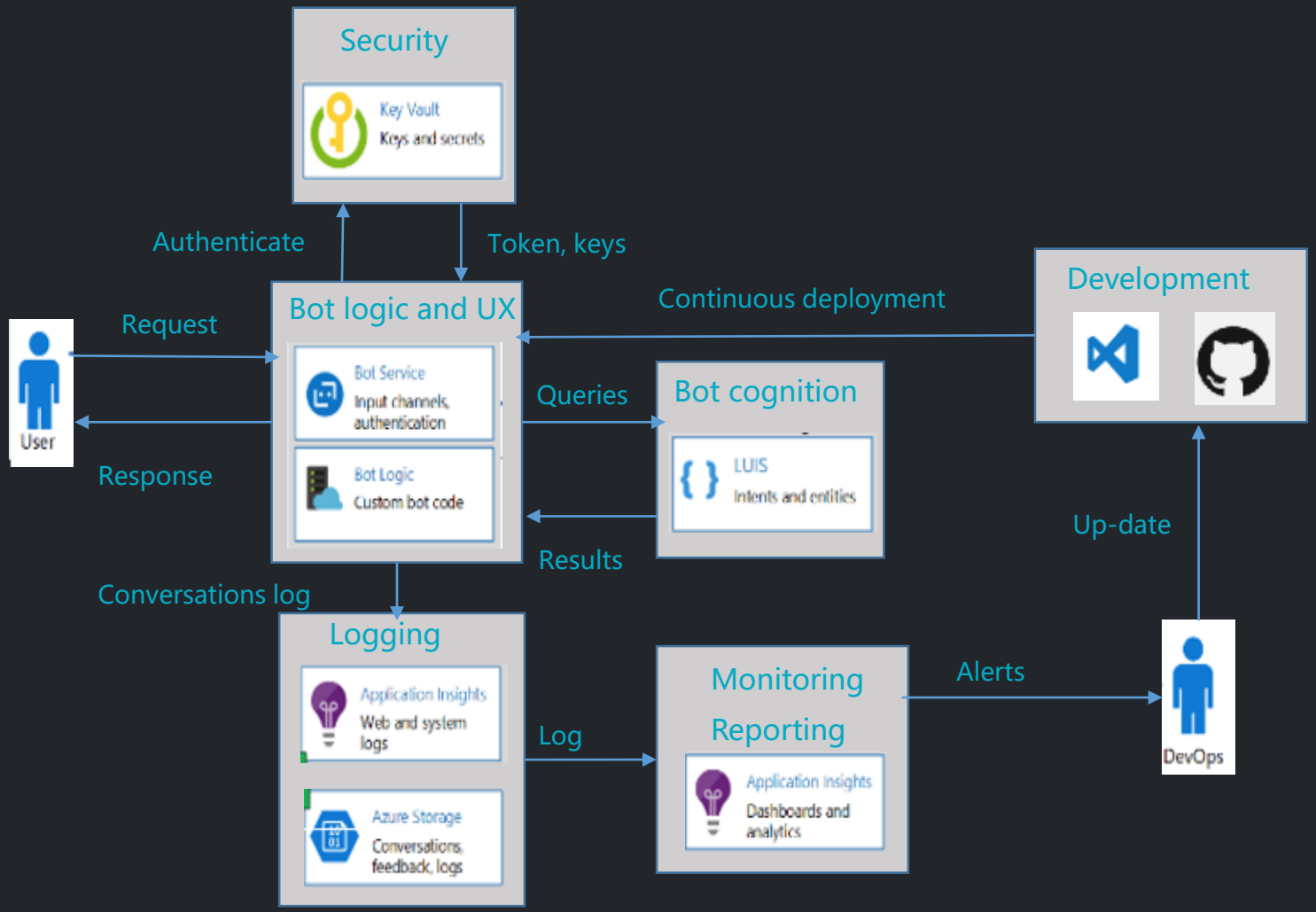
PART THREE

Architecture

Architecture

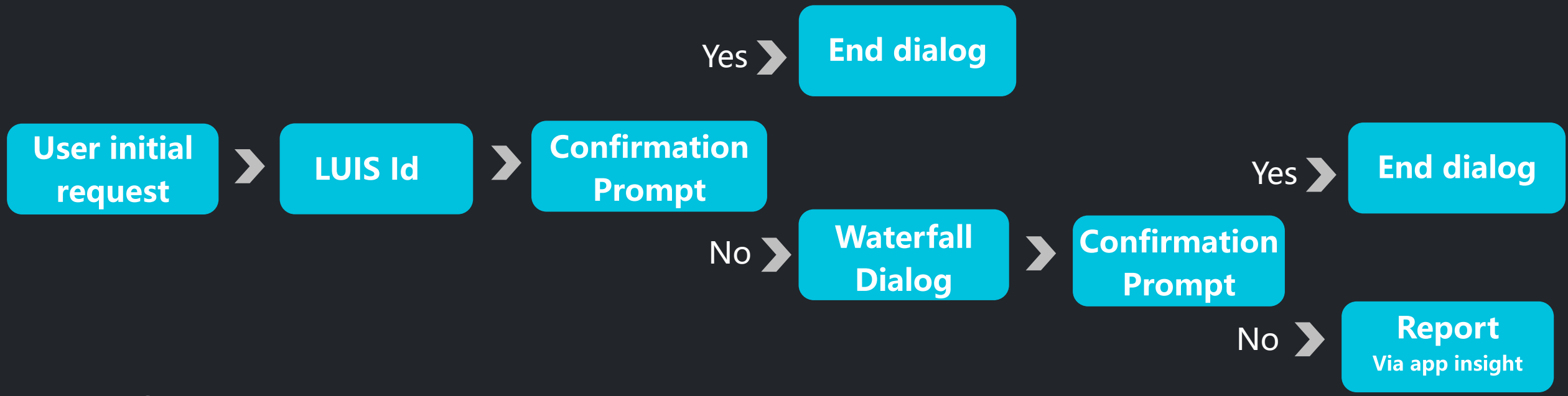
MVP phase 1

1. User request ➔ Bot logic
2. Queries ➔ Bot cognition and intelligence
3. Response ➔ user
4. Feedback and log ➔ alert



Bot Framework

Conception



Concept

Conversational user experience (CUX) based on Natural Language Processing : mimic communication between human during first interaction.
According to the international journal of human-computer studies volume 161* CUX significantly increase the user experience (hedonic quality)

* *https://www.sciencedirect.com/science/article/pii/S1071581922000179*

App insight

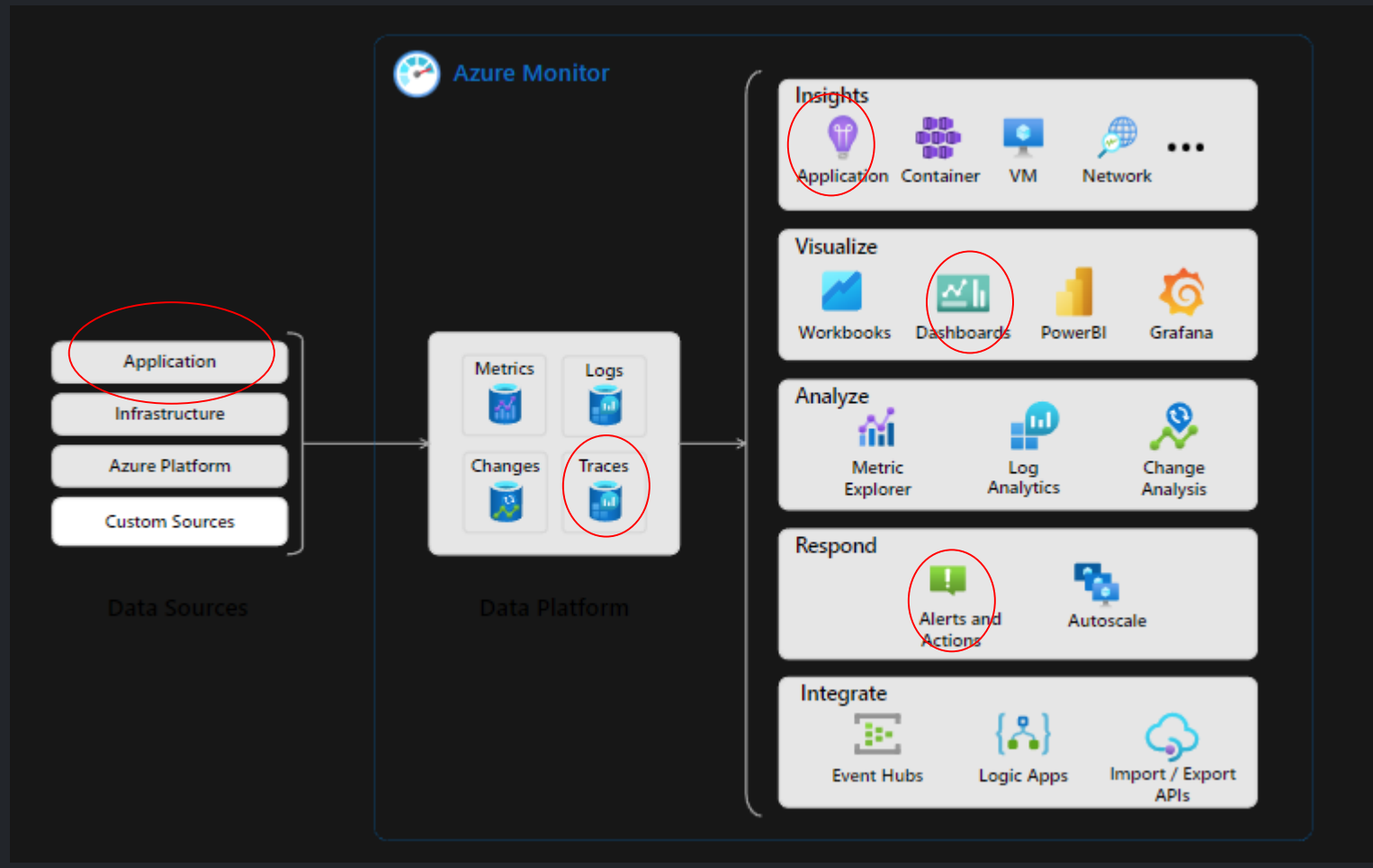
Monitor performance

Implementation:
Via VS studio in the bot framework SDK

DATA monitoring:
4 types. Saved for analysis and future training.

Traces :
Bot-user interaction

Alert :
Set up alert to report in real time via email on a given criteria



App insight

Custom Metrics

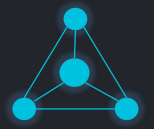
Usage

- Number of users
- Most active day and time
- How many dialog per user

➔ Telemetry

Intents (LUIS)

- Which intent perform better
- Failing to understand intent
- Bot intent match rate
- Bot design misunderstand the way consumers express their intents



Engagement

- Percentage of users that stays through the entire bot flow
- Happy path to intent resolution (not finding a flight vs not offering the right flight)
- Negative feedback

App insight

Issue and fixes

Issue type	Description	Possible fixes
Stuck in a loop	The consumer is stuck in an unintentional loop.	Improve the dialog/conversation flow
Ignored consumer question	The bot doesn't acknowledge the consumer's query and instead forces the consumer through a dialog flow.	Add intent detection (LUIS) Add menu options
Doesn't understand	The bot fails to understand the consumer's intent and is not offering to repair the conversation.	Improve poor-performing intents Add intents Move to a menu-based approach

Add data validation during dialog* :
- Budget
- Date

Prompt multi-choice Menu

* Microsoft text recognizer : *https://github.com/microsoft/Recognizers-Text/tree/master/Python*

Deployment

Continuous via Github Azure Actions

From VS code to Web App :

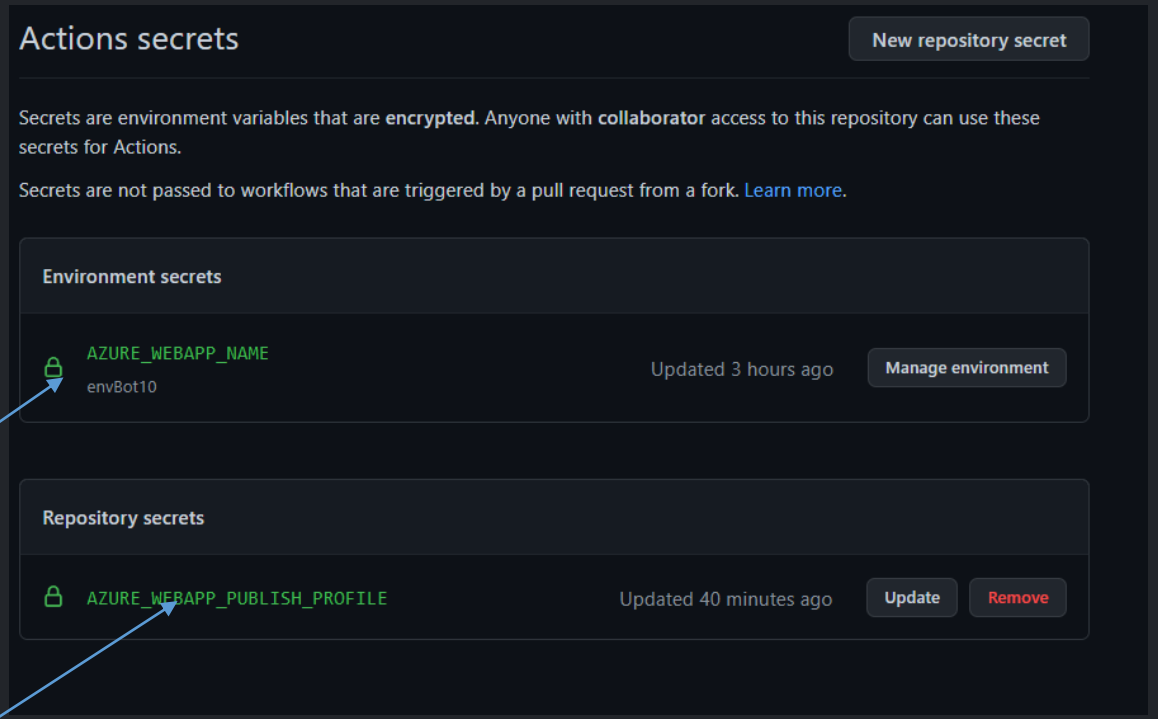
Git Action ARM trigger on push branch main

```yaml
name: Build and deploy Python app to Azure Web App

env:
  AZURE_WEBAPP_NAME: BotProj10   # set this to your application's name
  PYTHON_VERSION: '3.8'              # set this to the Python version to use

on:
  push:
    branches:
      - main
```

```yaml
    - name: 'Deploy to Azure Web App'
      id: deploy-to-webapp
      uses: azure/webapps-deploy@0b651ed7546ecfc75024011f76944cb9b381ef1e
      with:
        app-name: ${{ env.AZURE_WEBAPP_NAME }}
        publish-profile: ${{ secrets.AZURE_WEBAPP_PUBLISH_PROFILE }}
```



Secret key hold on Github

* Github Azure Actions to deploy python app: *https://docs.github.com/en/actions/deployment/deploying-to-your-cloud-provider/deploying-to-azure/deploying-python-to-azure-app-servic*

PART FOUR.

Summary

Summary

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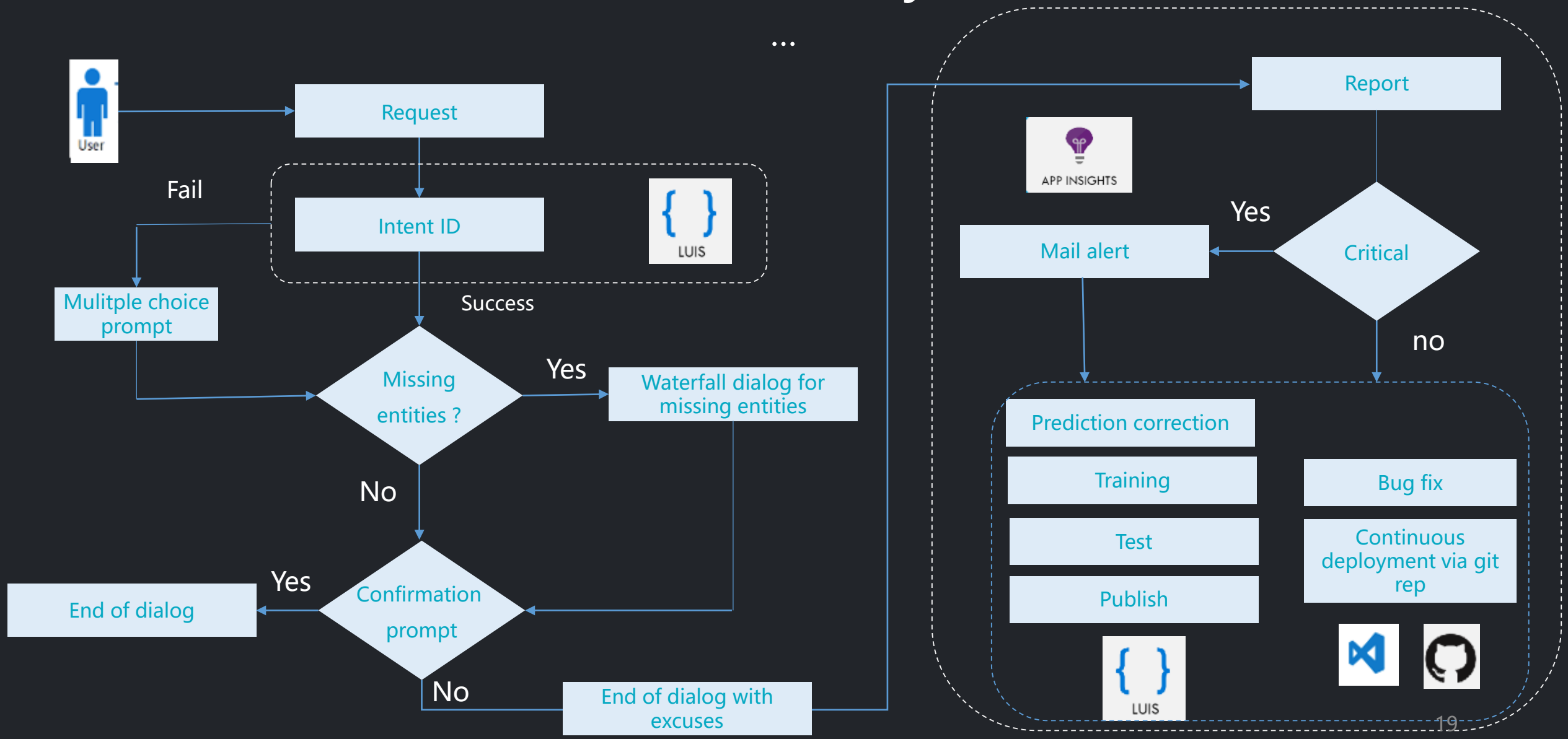
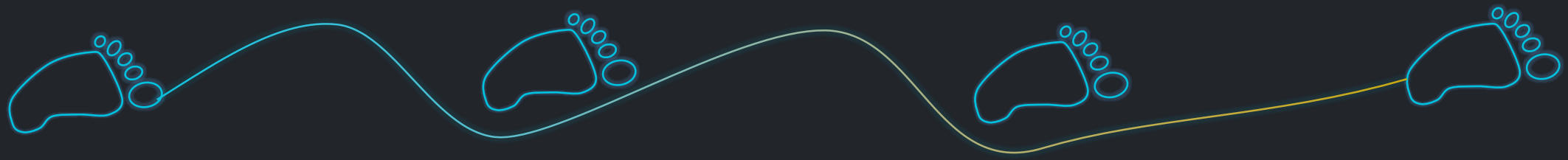

User
Request
Fail
Intent ID
LUIS
Mulitple choice prompt
Success
Missing entities ?
Yes
Waterfall dialog for missing entities
No
Confirmation prompt
Yes
End of dialog
No
End of dialog with excuses
Report
APP INSIGHTS
Yes
Mail alert
Critical
no
Prediction correction
Training
Test
Publish
LUIS
Bug fix
Continuous deployment via git rep

Way ahead

Add different intent

Solve prompt infinite loop



Load a database for destination.

Enable NLP recognition to make proposition for misspelt destination

Transfers feature to human agent.

Question?