

MICHIGAN STATE

UNIVERSITY

Project Plan

Self-Improving Assistant

The Capstone Experience

Team Vectorform

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*From Students...
...to Professionals*

Functional Specifications

- Chatbot that answers user queries
- Integrated into Microsoft Teams
- Eliminate help desk associate connection times

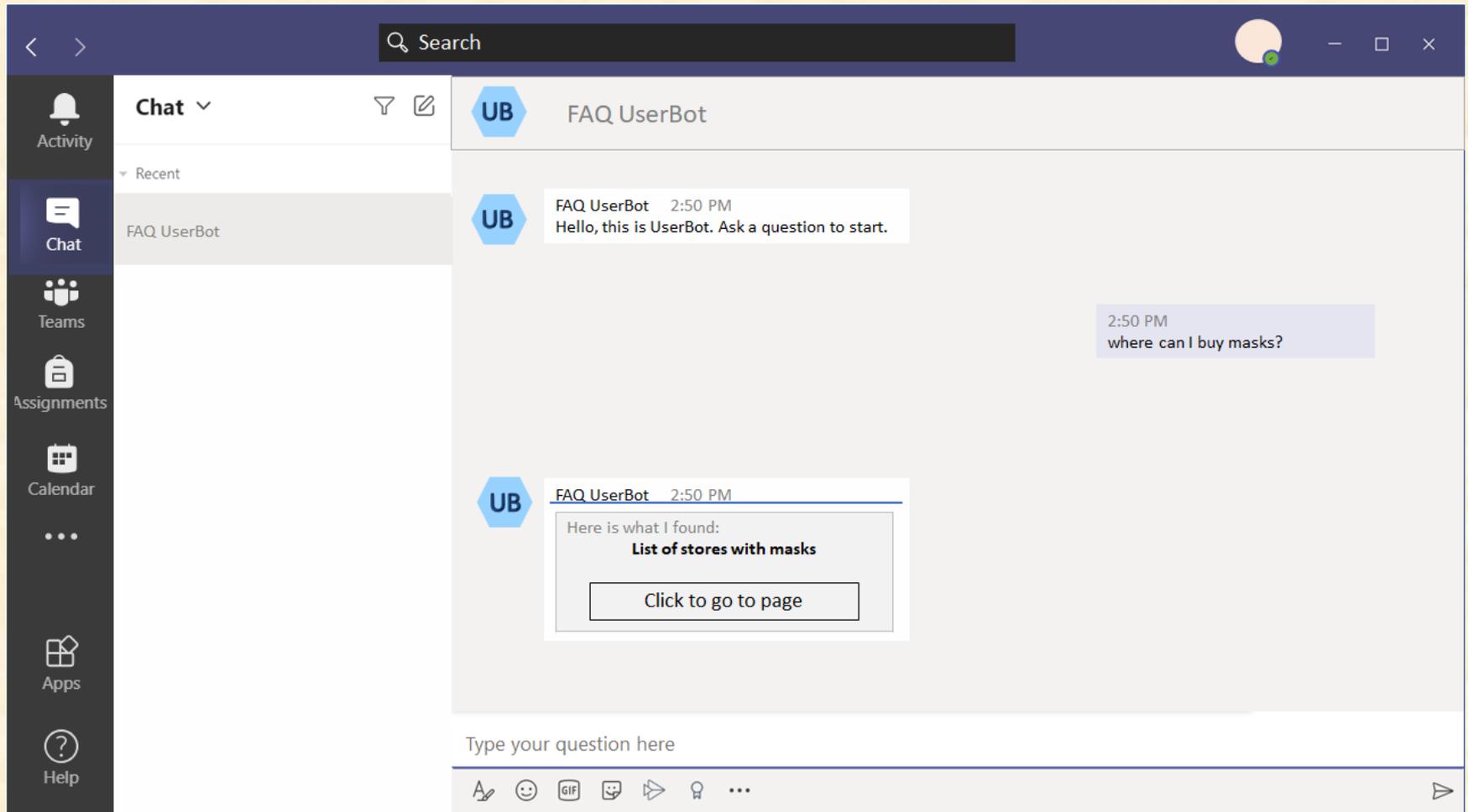


Design Specifications

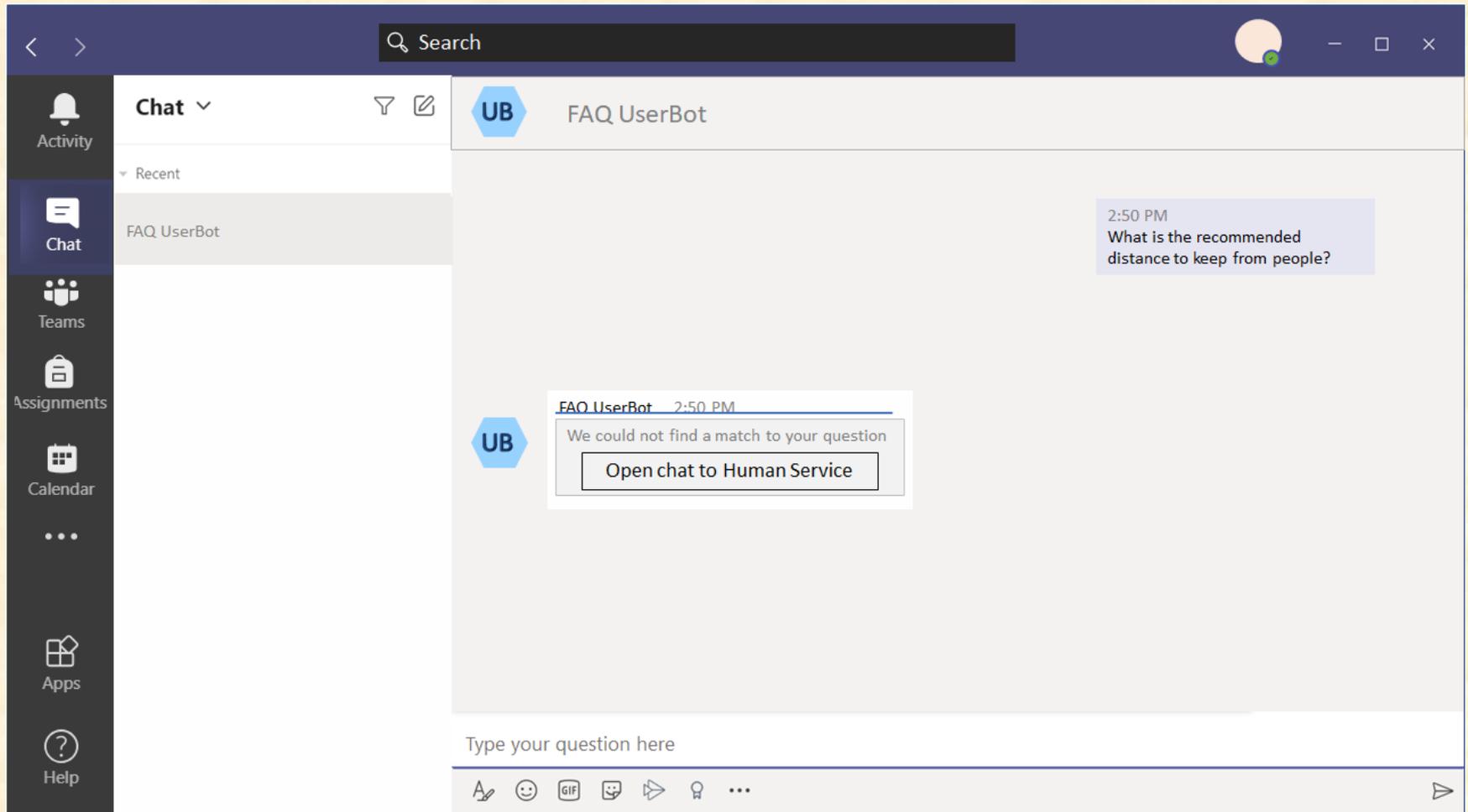
- Adaptive Cards on teams for text, input, buttons, sign in
- Human fail-safe add on to chat
- Human-like bot personality
- Extract question and answer pairs from files or URLs



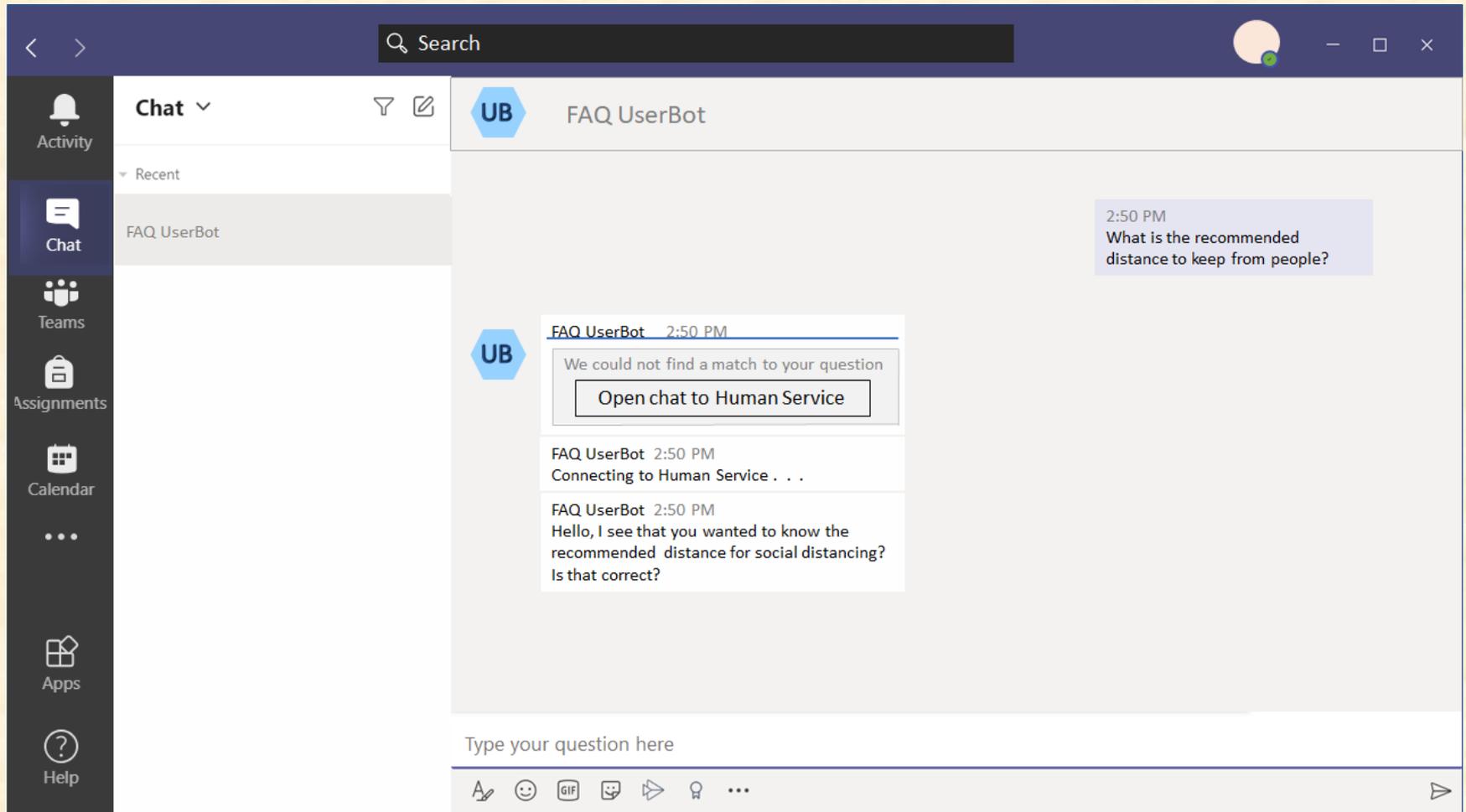
Screen Mockup: Successful Q&A



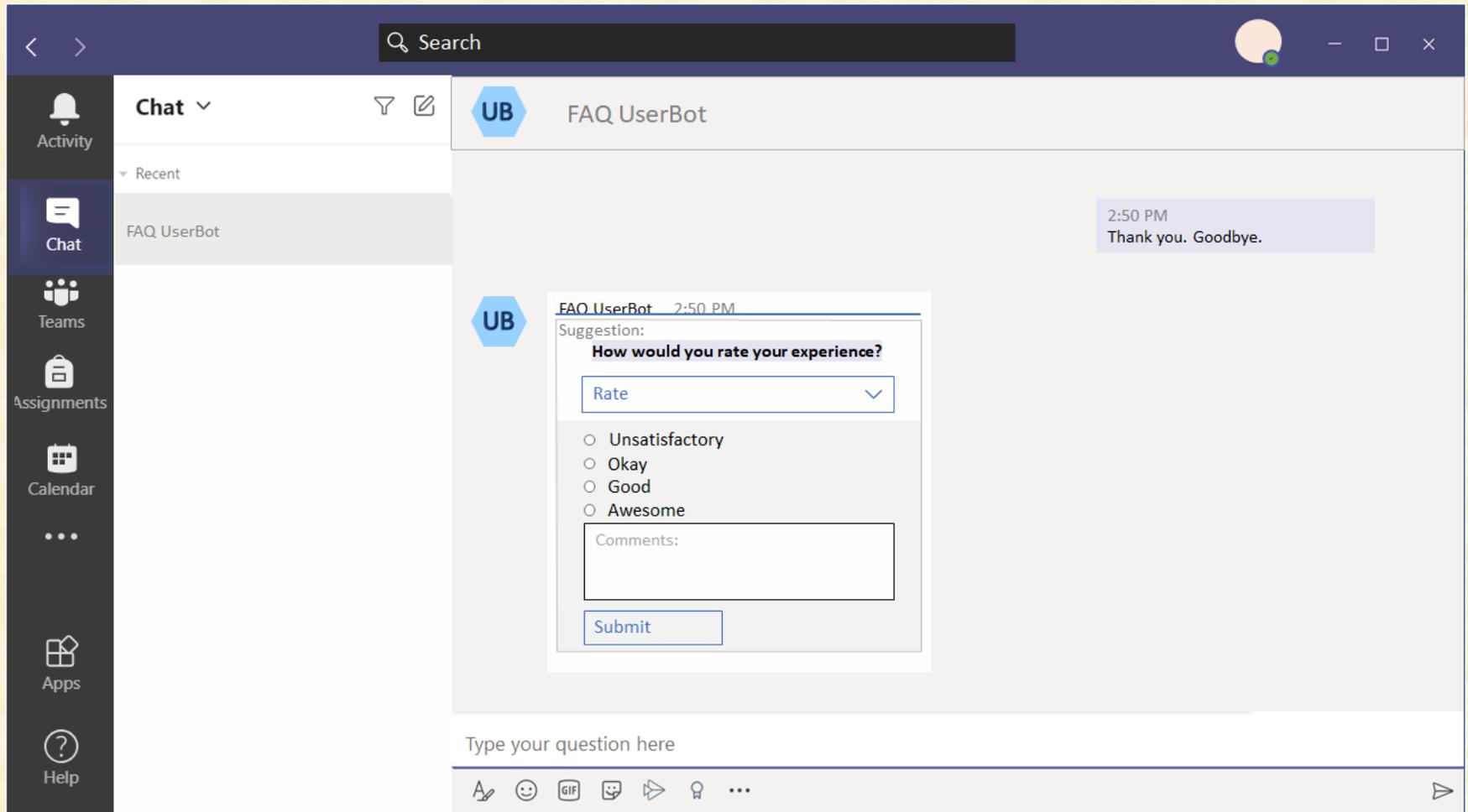
Screen Mockup: Unsuccessful Q&A



Screen Mockup: Human Helper



Screen Mockup: Cards Input Answer

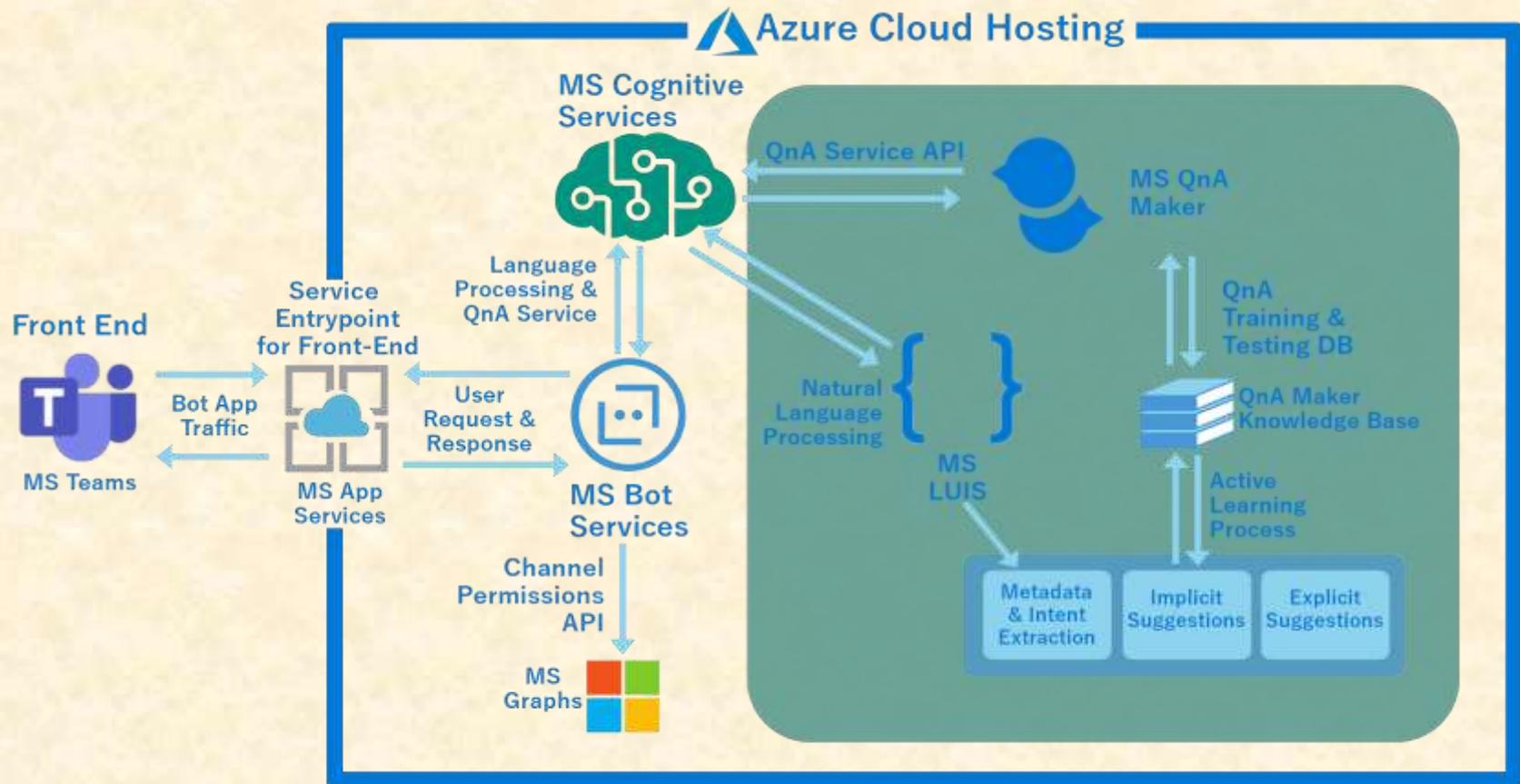


Technical Specifications

- Microsoft Bot Framework and Microsoft Graph used for front-end functionality
- Azure as an App Service hosts the back-end system
- The Azure as an App Service hosts the further services: Microsoft Cognitive Services and Microsoft Bot Service
- Cognitive Services is used for its QnA Maker service, which is used as an endpoint for query strings and responses to the bot
- Cognitive Services also includes LUIS, which is Language Understanding service used to determine intent
- Bot Service acts as an endpoint between the user and the QnA Maker, allowing full function



System Architecture



System Components

- Hardware Platforms
 - Microsoft Azure Cloud Hosting
 - Any device capable of running Microsoft Teams
- Software Platforms / Technologies
 - Front End Components
 - Microsoft Graph API
 - ❖ Handles permissions for Microsoft apps
 - Microsoft Bot Framework
 - ❖ Specialized chat-bot SDK for Teams
 - ❖ .NET Core 3.1, C#
 - ❖ Visual Studio 2019
 - Adaptive Cards Schema
 - ❖ Implemented within Bot Framework, provides a customized form capable of interaction, written in JSON
 - Back End Components
 - Microsoft Bot Services (Microsoft App Services)
 - ❖ Used to register bot created for teams within Bot Framework
 - ❖ Communicates with both Front and Back End through API calls
 - MS Cognitive Services
 - ❖ Umbrella service responsible for learning capabilities
 - ❖ Microsoft LUIS
 - » Determines intent of the question, and processes metadata
 - ❖ Microsoft QnA Maker
 - » Provides database of question and answer pairs, applies machine learning techniques to incoming strings, and utilizes active learning to improve the dataset



Risks

- **Data Quality**
 - **Description:** The data being used to train the assistant may be poor in quality, leading to unwanted and unnecessary assistant function.
 - **Mitigation:** Continually test for unwanted function during prototyping using various types of known-bad data to identify conditions causing said functionality.
- **Allow Any Administrator to Use Data of Any Size**
 - **Description:** Any administrator should be allowed to upload a data source of varying size whether it be kilobits or terabytes.
 - **Mitigation:** Parse and test various example data sources of varying sizes.
- **Azure Cloud Management**
 - **Description:** Configuration and coordination of the suite of Azure Cloud Services relies on a lot of hosted services working together with a high level of abstraction, I.E. it is hard to make simple changes to components.
 - **Mitigation:** An iterative design process based on early prototyping making use of all relevant systems.
- **Speech Functionality Feature**
 - **Description:** Allowing users to use speech to ask questions is a stretch goal relying on every other main feature being successful, and a challenge learning to navigate another set of Microsoft service.
 - **Mitigation:** Plan to get a successful build of the bot deployed and assign tasks to research additional services to implement speech to text technology.



Questions?

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