11-GTRI-Azure Migration Cost Calculator - with AI

CS4850/04

Fall

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Project Overview

- **Web-Based Application:**
  - Develop a web-based platform that provides enterprises with a streamlined way to evaluate cloud migration costs.

- **AI-Powered Analysis:**
  - Leverage AI language processing to analyze user input and provide tailored cost and migration recommendations.

- **Azure Cost Calculation:**
  - Utilize dedicated Azure Pricing APIs to generate precise cost analysis reports for cloud services.

- **Migration assistant:**
  - Users will be able to describe their applications and workloads, and tool will provide a detailed analysis of migration costs, performance considerations, and potential cloud strategies.

Understanding the current problems

1   Lack of automated, accurate tools to assess cloud migration costs.

2   Need for precise cost-benefit analysis tool with quick recommendations.

3   External AI tools like Copilot or Meta AI pose potential security risks by exposing sensitive data to third parties.

4   Need for an internal tool to significantly boost productivity by automating time-consuming tasks and streamlining processes.

Egbert

An AI-powered Assistant for Azure that offers intelligent recommendations and expert solutions for managing cloud resources across any workload.

Optimizes

current infrastructure to enhance efficiency and cost-effectiveness.

Recommends

optimal migration strategies tailored to any migration goals

Streamlines

the migration assessment process through AI-driven insights.

Secures

sensitive data with industry standard encryption

Scales

Workloads by providing cloud migration recommendations

Technology Stack

- Frontend:
  - Framework: React
  - UI Design: Full page chatbot interface for user interaction.
- Backend:
  - Language: Python
  - Framework: Flask for efficient API development.
- LLM Integration:
  - API: Ollama API
  - Purpose: Analyze natural language input to extract Azure migration requirements.
- Cloud Services:
  - API: Azure pricing API
  - Queries Azure services to provide cost estimations based on the provided user data.
- Data Storage:
  - Schema: Relational
  - Database: MySQL database solution to manage structured data, offering scalability, flexibility for user queries, and robust security for data storage.
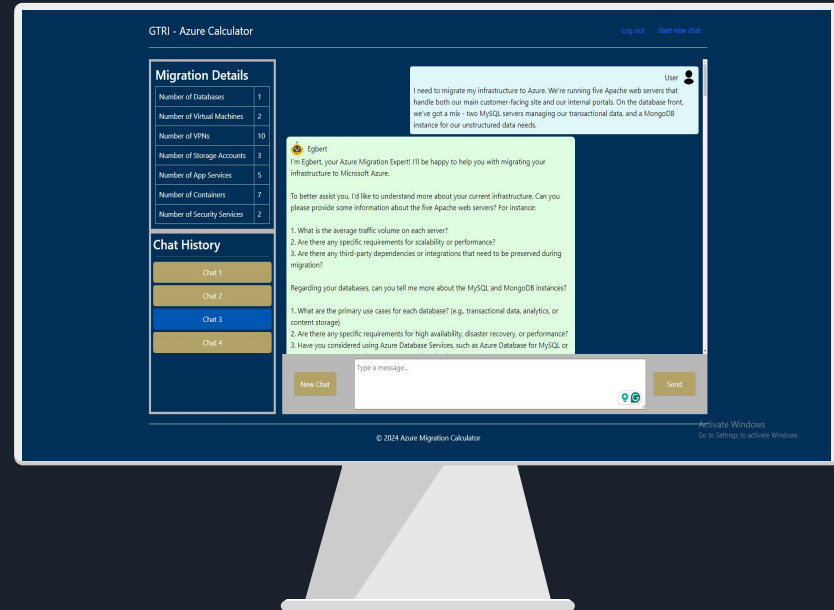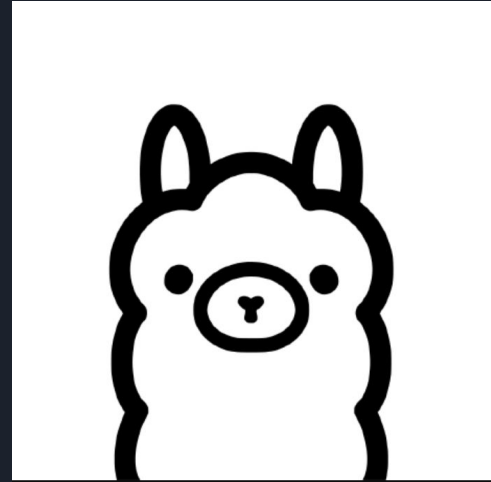
Egbert

System Architecture and Workflow
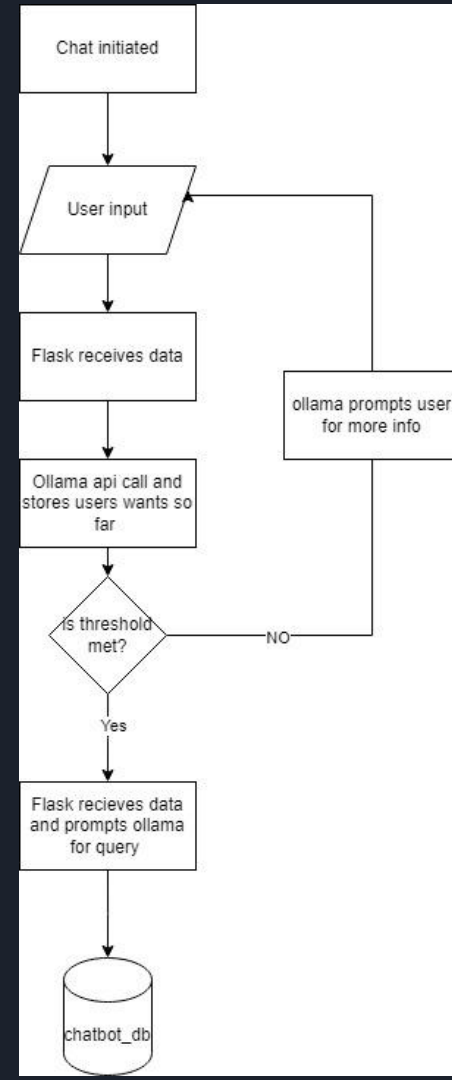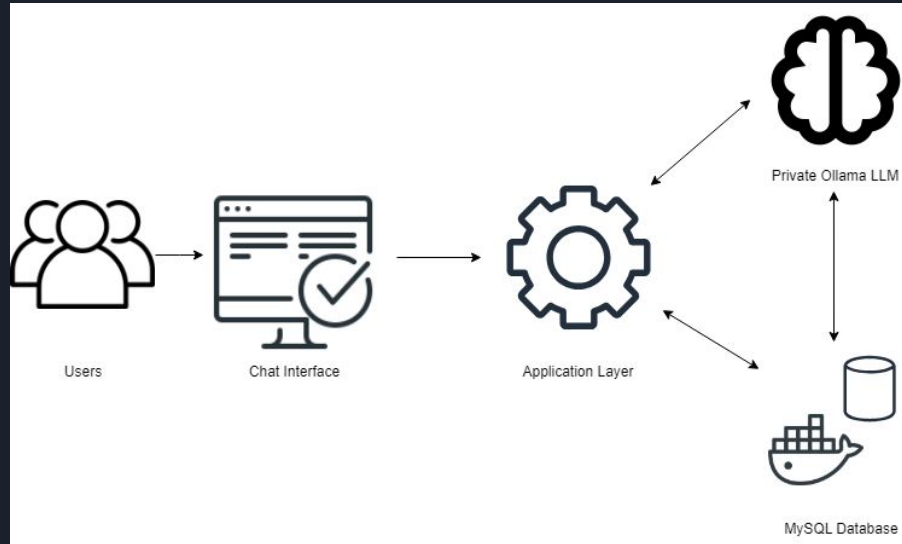
User Interface Design

- **User-friendly experience:**
  - Enhances engagement with an easy to understand layout.
- **Chat history:**
  - Allows users to quickly review previous interactions and recommendations.
- **Migration details:**
  - Displays key migration cost estimates and recommendations in a clear structured format.

Large Language Model

- Interpret Complex Migration-Related Queries:
  - Leverages natural language processing to interpret and analyze user queries related to cloud migration.
- Refine Responses Through Iterative Questioning:
  - Engages users in a dialogue, refining its responses based on follow-up questions to ensure tailored and relevant recommendations.
- Handles Incomplete Inputs:
  - Effectively manages vague or partial information, making it easy for users to receive accurate recommendations without the need for extensive upfront data.
- Real-Time Cost Data:
  - Retrieves up-to-date pricing for Azure services based on specific configurations with automated updates.

With Egbert it is as easy as...
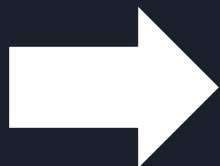
Assess → **Strategize** → **Execute**
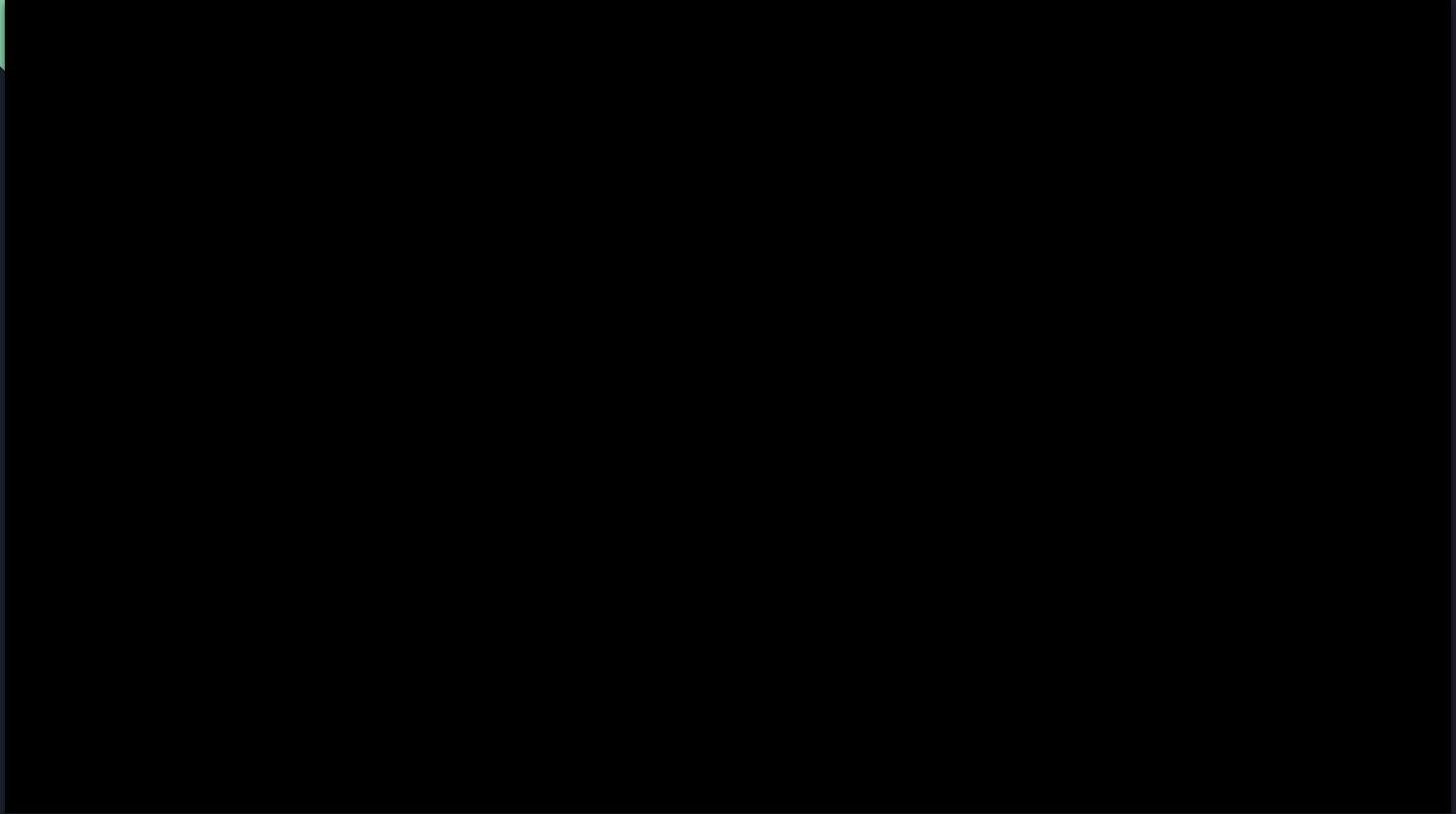
Demo

Challenges & Solutions

- Optimizing Performance:
    - Optimized API calls and backend processes.
    - Implemented caching for frequently accessed data.
    - Limited redundant requests to reduce response time.
- Handling Incomplete User Input:
    - Egbert's LLM asks follow-up questions to gather necessary information.
    - Provides accurate recommendations even with incomplete input by providing suggestions.

Testing & Results

- Performance Metrics:
  - Egbert processes user requests in under 3 seconds, optimal for complex queries and real-time Azure Pricing API interactions.
- User Feedback:
  - High user satisfaction noted for ease of use and clarity of cost reports; users valued the iterative questioning approach for clarifying migration options.
- Consistency Testing:
  - We asked the same question across multiple conversations, and Egbert consistently provided the same high-quality migration recommendation.
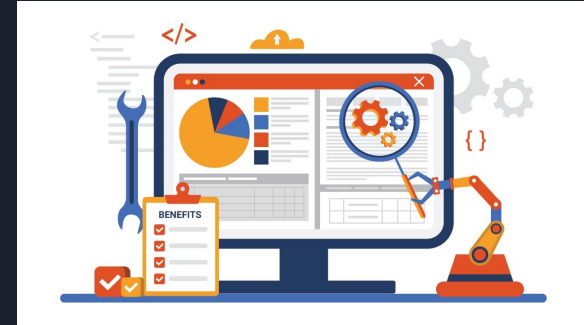
Future Improvements

- Multi-Cloud Integration
- Migration Scenario Simulation and Comparison
- Automated Discovery Agent
- Benchmarking Tools
- Integration with CI/CD Pipelines
- Alerts and Notifications

Egbert
Your Azure Migration Expert

Q&A

(We submitted our powerpoint slides prior to this presentation)