Case study:

Development of a Virtual Dietitian using GenAI

SERVICE / APPLICATION:

Online platform and mobile application for meal and diet planning tailored to specific dietary preferences.

FIELD:

Health & Wellness

DESCRIPTION:

Implementation of a GenAI-powered virtual dietitian to provide personalized user support, automate interactions, and enhance the operational efficiency of the dietary platform.

TIME FRAME OF THE PROJECT:

July 2024 - October 2024

AWS SERVICES USED FOR IMPLEMENTATION:

- AMAZON SAGEMAKER
- AMAZON LEX
- AMAZON KENDRA

SOLUTIONS USED FOR THE IMPLEMENTATION:

- AUTOMATION
- GENAI
- APPLICATION SCALING

1 Client

The dietary industry is evolving rapidly and maintaining a competitive edge requires not only adapting to changes but also driving innovation and setting new industry standards. Our client, a leading provider in this field, operates an online platform and mobile application that allows users to **create customized meal plans** and **recipes based on their chosen diet.** Recently, the company explored AI-driven solutions to enhance the user experience.

The platform serves approximately 10,000 customers monthly, offering various diet plans such as ketogenic, vegan, sports, and gluten-free. It caters to individuals with dietary restrictions as well as those focused on health and fitness through a personalized approach.

2 Challenges

The client identified specific challenges and recognized GenAI's potential in addressing them. The primary objectives included:

Enhancing user experience

- Faster and more accurate dietary recommendations and improved recipe search,
- Personalized meal plans with ingredient substitution while maintaining nutritional balance.

Improving communication with users

- Instant and precise responses to user inquiries to increase satisfaction and engagement.

Cost optimization

- Reducing support costs by automating responses to repetitive queries,
- Supporting staff in handling more complex customer interactions.

2 Challenges

A critical requirement was ensuring the highest level of data security. User data needed to be stored in a secure, isolated environment, ensuring that the trained AI model was exclusively available to the client.

Additionally, the goal was to provide users with an **experience comparable to consulting a real specialist**, fostering a sense of support and understanding. The virtual dietitian was designed not only to give dietary advice but also to suggest meals tailored to individual preferences, taking into account user history and seasonal ingredient availability. This approach increased the platform's usability, making it more user-friendly and intuitive.

Innovation was also a key focus. The client aimed to maintain a reputation as the most innovative and competitive platform by improving operational efficiency.

3 Implemented solutions

The implemented solution provided the dietary platform with a modern interface powered by advanced **AWS technologies**. Users can interact with the virtual dietitian via voice or text, with Amazon Lex handling input processing, identifying user intent, and extracting key information.

The query is then routed through Amazon API Gateway to an AWS Lambda function that orchestrates the entire process. AWS Lambda leverages Amazon Kendra for information retrieval and Amazon SageMaker for generating personalized responses using a **Fine-Tuned Custom Model**, further enhanced by AWS Bedrock with models **Claude** and **Titan.**

3 Implemented solutions

The final response is sent back to **Amazon Lex**, which delivers it in either text or voice format based on user preference. This allows users to ask natural language questions such as:

- "What are some low-calorie meal options?"
- "Can you suggest a diet plan for lactose intolerance?"
- "I need a high-protein meal plan for the next week.

The system interprets these queries, **retrieves relevant information** and **generates tailored responses**, ensuring a personalized and dynamic user experience. This architecture not only improves platform usability but also delivers an unparalleled level of service quality.

4 We used the following technologies:

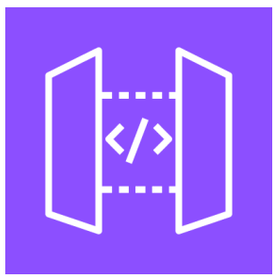
Amazon SageMaker

Amazon Lex

Amazon Kendra

Amazon S3

Amazon Lambda

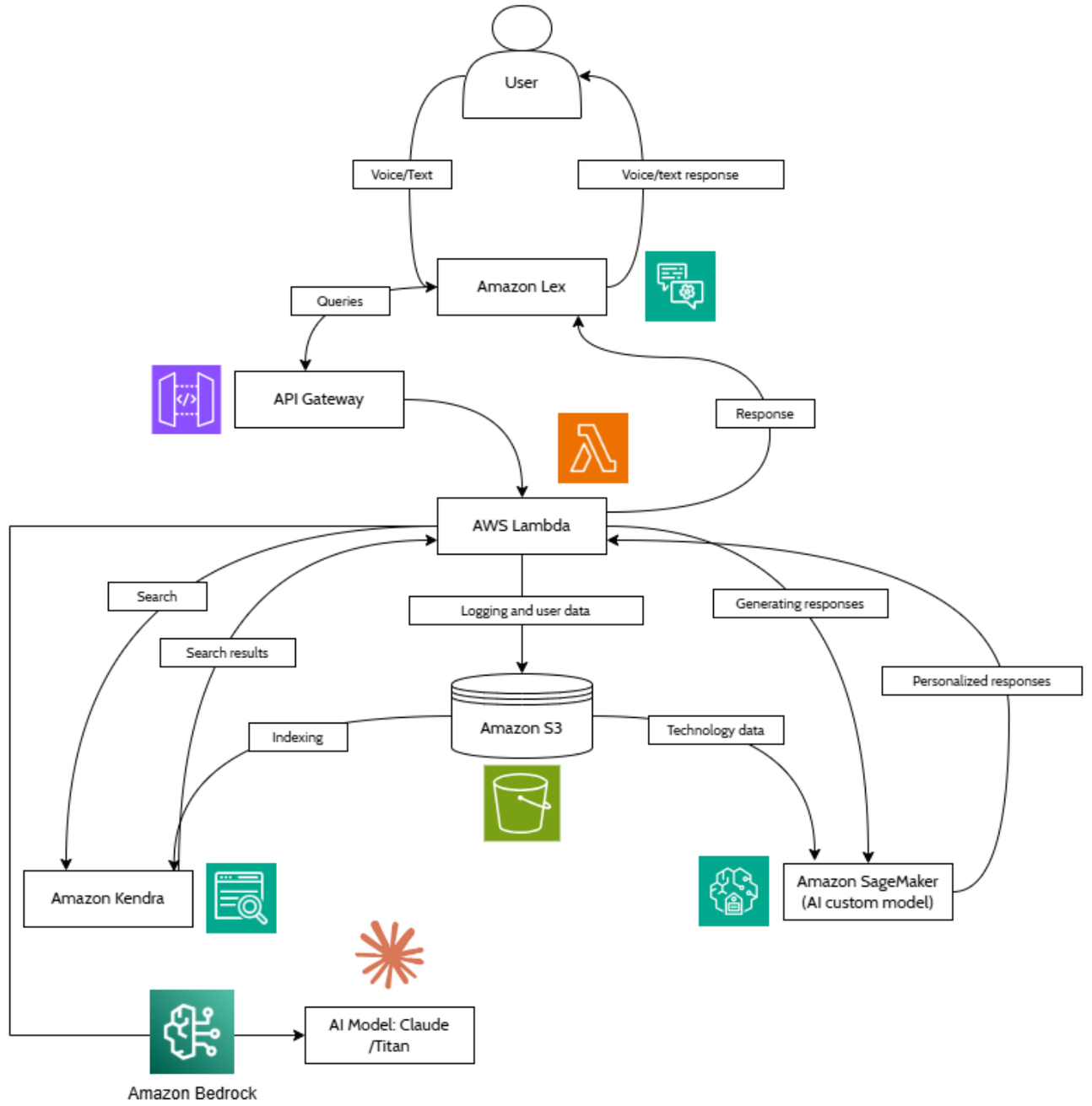


Amazon API Gateway

AI Model: Claude

AI Model: Amazon Titan

5 Diagram of the infrastructure architecture



6 Results

The new solution allows users to **directly ask questions about diets and recipes**, with the ability to modify them based on individual preferences. The virtual dietitian processes inquiries in real-time using advanced AI algorithms for precise interpretation.

As a result, the system provides **highly personalized dietary recommendations** aligned with the platform's offerings. This innovation not only enhances user convenience but also strengthens the perception of individualized service—an essential factor in building customer loyalty.

7 Achieved effects

Reduced Customer Support Costs

- Automating responses to repetitive queries allowed employees to focus on more complex customer interactions.

Real-Time Personalized Support

- The virtual dietitian delivers instant and highly relevant information, making users feel understood and improving satisfaction levels.

Scalable and Flexible Infrastructure

- The AWS-powered solution is scalable, ensuring consistent service quality even during peak traffic periods.

7 Achieved effects

Faster User Decision-Making

- Instant and personalized recommendations help users quickly find suitable meal plans, reducing decision-making time.

Increased User Engagement Through Dynamic Personalization

- GenAI continuously adjusts recommendations based on user history, ingredient seasonality, and preferences, leading to higher engagement and retention.

Secure Data Processing and Storage

- All data is stored in compliance with legal regulations, reinforcing the company's commitment to user privacy protection.

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