Engini

Home Assignment – AI Engineer

Overview

Your task is to build an async, stateless Python API service that allows users to create diagrams using agents or multi-agents frameworks, powered by a Large Language Model (LLM).

The goal is to enable users to describe diagram components, nodes or flow in natural language and get back either a rendered image.

Examples of how the service is expected to work can be found on this page.

Requirements

- Use **Python** and an async framework (e.g. FastAPI, Starlette, etc.)
- Use **UV** for Python package management.
- The service must be **stateless** — no user session or database required.
- Containerize your project with **Docker**, and include a `docker-compose.yml` for easy setup.
- **Agent(s)** must operate through tools built around the `diagrams` package for Python.
  - Consider the package a "black box" for the LLM; Do not assume it has knowledge of the `diagrams` package.
  - Build your own tools that operate the package and can be used by the agent, in any way or architecture you see fit.
  - Instructions like "write a code for python's diagrams package" or "using the diagrams package for python" are not acceptable.
  - Support **at least** 3 node types of your choice.
- Integrate with an **LLM API** of your choice (Gemini is recommended as it offers a free plan).
- All LLM prompt logic must be **visible and documented in code** (not hidden behind opaque framework calls).

Core Functionality

The service should expose:

- An endpoint which generates and returns a full diagram image based on a natural language description.
- (Bonus Points) An assistant-style endpoint that understands the user's intent and responds helpfully — either by generating code, returning an image, explaining how to build the diagram or asking questions back to understand better.

Submission Guidelines

- Provide a `.env.example` or equivalent for configuration.
- Include a **README.md** with:
    - Setup and run instructions (local & Docker)
    - Example inputs/outputs
    - Any considerations or limitations
- Make sure temporary files (if used) are cleaned up.

Bonus Points For

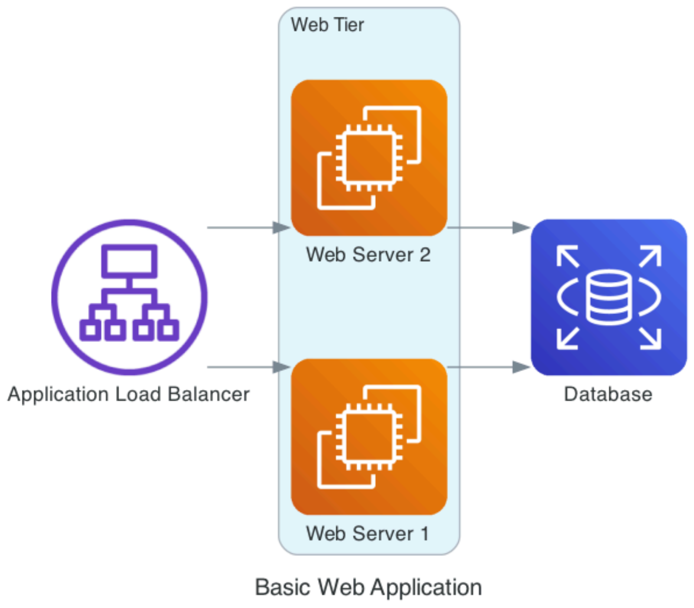
- Implementing a helpful assistant-style interface, with context and memory.
- Good structure, modularity, and clean code.
- Mocking LLM calls for local development or fallback behavior.
- Error handling and logging.
- Unit tests.

Examples

Example 1

Input: "Create a diagram showing a basic web application with an Application Load Balancer, two EC2 instances for the web servers, and an RDS database for storage. The web servers should be in a cluster named 'Web Tier'."

Output:

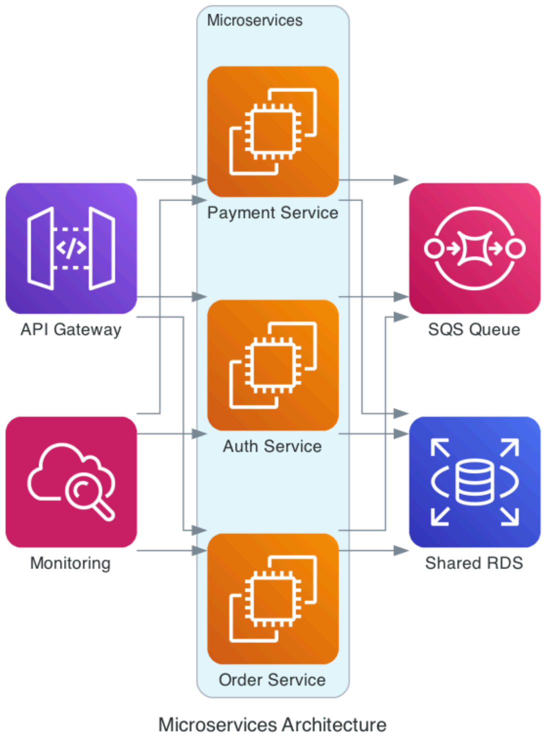


Engini

Example 2

Input: "Design a microservices architecture with three services: an authentication service, a payment service, and an order service. Include an API Gateway for routing, an SQS queue for message passing between services, and a shared RDS database. Group the services in a cluster called 'Microservices'. Add CloudWatch for monitoring."

Output:


Microservices
Payment Service
API Gateway
SQS Queue
Auth Service
Monitoring
Shared RDS
Order Service
Microservices Architecture