Project Design Phase

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Team ID	LTVIP2025TMID29114
Project Name	Sustainable Smartcity Assistant Using IBM Granite LLM
Maximum Marks	

Solution Architecture – Sustainable Smart City Assistant

The solution architecture for the Sustainable Smart City Assistant is designed to deliver intelligent, AI-powered civic engagement and decision-support tools for urban stakeholders. It bridges the gap between fragmented data systems and actionable, real-time insights through a unified assistant powered by generative AI. The architecture ensures scalability, usability, and modularity across city functions.

Key Objectives of the Architecture:

- ✅ Develop a scalable and modular system using FastAPI for backend APIs and Streamlit for a citizen- and admin-friendly dashboard interface.
- ✅ Integrate IBM Granite LLM (via HuggingFace) to power natural language understanding and generation tasks such as policy summarization, citizen query handling, and eco-tip generation.
- ✅ Implement role-based access control to differentiate features and data access for citizens, city officials, and administrators.
- ✅ Store and process structured and unstructured city data using Pinecone vector DB (for semantic search), CSV/JSON for real-time inputs, and optionally integrate with external APIs or databases for KPI data.
- ✅ Analyze and visualize city KPIs and anomalies using pandas, Plotly, or Matplotlib, enabling data-driven insights through intuitive graphs and trend lines.

- ✅ Enable real-time feedback collection and analysis through natural language processing (NLP), clustering, and summarization of citizen responses.
- ✅ Ensure extensibility and performance for future additions like chatbot integration, multi-language support, IoT data streams, and ESG reporting.

Solution Architecture Diagram: