## Solution Architecture – Sustainable Smart City Assistant

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**Team ID:** LTVIP2025TMID32000  
**Project Name:** Sustainable Smart City Assistant Using IBM Granite LLM

**Solution Architecture:**

Solution architecture is a complex process – with many sub-processes – that bridges the gap between business problems and technology solutions. Its goals are to:

* Find the best tech solution to solve existing city governance and sustainability problems
* Describe the structure, characteristics, behavior, and other aspects of the smart assistant to stakeholders
* Define features, development phases, and solution requirements
* Provide specifications according to which the solution is defined, managed, and delivered

**Smart City Assistant Solution Architecture Overview**

The proposed Sustainable Smart City Assistant follows a modular architecture optimized for scalable and citizen-centric services. It leverages IBM Watsonx LLMs, real-time feedback loops, and interactive dashboards to help city administrators, planners, and citizens make data-driven decisions.

**Key Components Include:**

* **Front-end:** Streamlit-based dashboard for uploading policies, submitting feedback, exploring KPIs, and generating reports
* **Backend:** FastAPI + Python modules for routing, logic, and ML predictions
* **AI Models:** IBM Watsonx Granite LLM for summarization, report writing, eco-tip generation, and chat interactions
* **Vector Search:** Pinecone used for semantic search of uploaded policies and planning docs
* **Modules:** Policy summarization, citizen feedback classification, KPI forecasting, anomaly detection, eco advice, report generation
* **File Storage:** Supports .txt and .csv uploads via local or cloud integration

**Development Phases**

* **Phase 1:** Build Streamlit UI for document upload and user interaction
* **Phase 2:** Integrate Watsonx Granite LLM for summarization and chat-based guidance
* **Phase 3:** Add Pinecone vector search for intelligent document queries
* **Phase 4:** Implement anomaly detection and KPI forecasting visualizations
* **Phase 5:** Enable PDF report generation and cloud deployment for public access