Solution Architecture – SmartSDLC Project

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Project Name: SmartSDLC: AI-Enhanced SDLC Automation Platform

Solution Architecture:

Solution architecture defines the technological structure and operational flow that brings SmartSDLC to life. It outlines how AI services, user interactions, and backend logic collaborate to automate SDLC phases effectively.

Its goals are to:

• Find the best AI-powered approach to streamline SDLC phases.

• Define features, development flow, and key modules for delivery.

• Bridge the gap between traditional SDLC challenges and smart automation.

• Specify a scalable, modular, and maintainable system design.

SmartSDLC Architecture Overview

SmartSDLC follows a modular architecture using Streamlit as the frontend, integrating IBM Watsonx as the backend AI engine to handle prompt-based classification, generation, and summarization.

Key components include:

• Frontend: Streamlit interface with sidebar navigation, file uploader, text input/output modules, and chatbot UI.

• Backend: Python functions using Watsonx API for each SDLC task.

• AI Model: IBM Watsonx Granite-13B for prompt-based code and document generation.

• PDF Parsing: PyMuPDF for extracting requirement text from uploaded documents.

• Session Management: Streamlit session state for preserving chat and module inputs.

• Optional: Integration with LangChain for chatbot memory and context.

Development Phases

• Phase 1: Setup environment and define modular structure.

• Phase 2: Implement requirement classification and AI code generation.

- Phase 3: Add bug fixer, test case generator, and code summarizer.
- Phase 4: Integrate chatbot assistant and session management.
- Phase 5: Optimize and deploy on Streamlit Cloud or IBM Cloud.