

Solution Architecture – SmartSDLC Project

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Project Name: SmartSDLC: AI-Enhanced Software Development Lifecycle

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 business problems
- * Describe the structure, characteristics, behavior, and other aspects of the software to project stakeholders
- * Define features, development phases, and solution requirements
- * Provide specifications according to which the solution is defined, managed, and delivered

SmartSDLC Solution Architecture Overview:

The proposed SmartSDLC system follows a modular architecture that enhances each phase of the software development lifecycle using AI. It enables developers to perform SDLC tasks with high efficiency, guided by AI-driven insights.

Key components include:

- * Front-end: Streamlit-based web interface for interactive and modular SDLC task execution
- * Backend: Python-powered logic using IBM Watsonx APIs for natural language processing and generation
- * AI Models: IBM Granite foundation models (Granite-3-3-8b-instruct) for classification, generation, summarization, and problem-solving
- * Document Processor: PyMuPDF (fitz) for extracting content from uploaded PDF requirement documents
- * Data Storage: Session state management in Streamlit and optional file export or database hooks for logs

Development Phases:

- * Phase 1: User interface setup and module navigation with Streamlit
- * Phase 2: Integration of requirement classification and user story generation
- * Phase 3: Addition of AI code generation, bug fixing, and test case creation
- * Phase 4: Implementation of code summarizer and chat-based SDLC assistant
- * Phase 5: Optimization for performance, accuracy, and multi-user usage

This architecture ensures flexibility, modularity, and rapid response to developer tasks within the software development lifecycle.