

Project Design Phase Solution Architecture

Date	19/05/2025 – 30/06/2025
Team ID	LTVIP2025TMID31711
Project Name	HealthAI: Intelligent Healthcare Assistant Using IBM Granite
Maximum Marks	4 Marks

Solution Architecture:

What is Solution Architecture?

Solution Architecture defines how a software solution addresses a specific business problem using the right technologies. In the case of HealthAI, the goal is to provide AI-powered medical assistance (symptom understanding, disease identification, and treatment suggestions) using IBM Watsonx, with Streamlit as the front end and cloud infrastructure for deployment.

🔗 Goals of the Solution Architecture

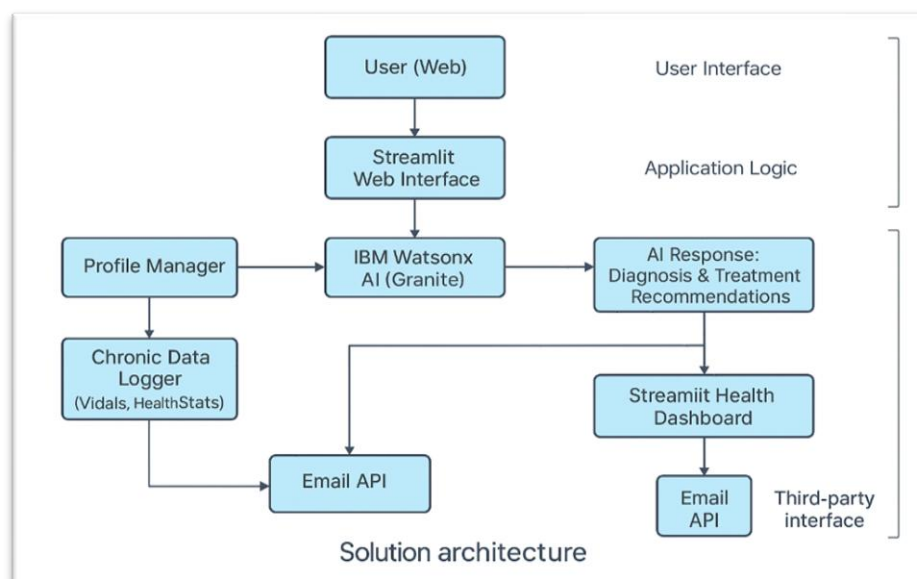
1. **Solve the business problem:**
Help users get intelligent health suggestions without needing medical expertise.
2. **Describe software behavior:**
Show how users, AI, APIs, and databases interact.
3. **Define features and development stages:**
From profile input to AI response and analytics.
4. **Specify technologies and flow:**
Clear backend-frontend interaction with IBM Watsonx on IBM Cloud.

Solution Architecture Diagram – HealthAI

Below is a conceptual layout of how your app functions internally. It includes:

Key Components:

- User Interface (Streamlit)
- Application Logic (Python)
- AI Backend (IBM Watsonx)
- Local Storage / IBM Cloudant (optional)
- Email API (optional)



1. Find the Best Tech Solution to Solve Existing Business Problems

Business Problem:

- Citizens often lack quick access to preliminary medical advice.
- They struggle with symptom understanding, treatment options, or when to see a doctor.
- There is no single multilingual AI-based health assistant available on-demand.

Tech Solution:

- HealthAI provides a Generative AI-powered assistant using IBM Watsonx, deployed via Streamlit.
- It enables users to:
 - Input symptoms in their preferred language
 - Receive AI-generated diagnosis and treatment advice
 - Log and track health data (e.g., glucose, heart rate)
 - Access their analytics via an interactive dashboard
- IBM Cloud ensures scalability, speed, and security.

2. Describe the Structure, Characteristics, Behavior, and Other Aspects of the Software to Project Stakeholders

Aspect	Details
Structure	Modular components (UI, AI logic, storage, analytics) integrated using Python and APIs
Front-end	Built using Streamlit – responsive, interactive
Back-end	Python-based logic that communicates with IBM Watsonx for AI responses
AI Behavior	IBM Watsonx (Granite model) interprets symptoms and generates natural-language diagnosis and treatment
Storage	User profile and logs stored locally (SQLite) or on IBM Cloudant if deployed on cloud
Security	Email confirmation (optional), app hosted on trusted platforms (IBM Cloud, Streamlit Cloud)
Scalability	Cloud-compatible architecture for future API integrations, ML-based upgrades, or voice interfaces

3. Define Features, Development Phases, and Solution Requirements

Key Features

- Health Profile Setup (mandatory)
- Symptom-to-Disease Diagnosis
- Treatment Advice Generation
- Chronic Disease Logger (Glucose, Heart Rate)
- Health Analytics Visualization
- Email Delivery (optional)
- Multilingual Support (via prompt formatting)

Development Phases

Phase	Feature
Phase 1	Streamlit Interface & Profile Setup
Phase 2	IBM Watsonx AI Integration
Phase 3	Logging Module + Health Analytics
Phase 4	Output + Deployment Testing

Solution Requirements

- **Functional:** Symptom checker, treatment generator, health logger, dashboard
- **Non-functional:** Fast response (<2s), user-friendly UI, secure storage, always available

4. Provide Specifications for Definition, Management, and Delivery

Spec Type	Details
Technology Stack	Streamlit (UI), Python (Backend), IBM Watsonx (AI), SQLite/IBM Cloudant (DB), Gmail API (email)
Architecture	Component-based, loosely coupled modules
Deployment	Streamlit Cloud or IBM Cloud
Model Integration	IBM Watsonx API using secure keys
Versioning & Management	Code managed via GitHub, modular scripts, and updated prompts
Delivery	Fully functional web app delivered as Streamlit link or cloud-hosted app (with optional ZIP for offline use)