Project Design Phase

Solution Architecture

Date	2 NOV 2025
Team ID	NM2025TMID05455
Project name	Calculating family expenses using ServiceNow
Maximum Marks	5 Marks

Solution Architecture

1. Goals of the Architecture

The main goal of the solution architecture is to provide a structured and scalable design for developing the Family Expense Calculation System.

It ensures smooth data flow, easy user interaction, secure data management, and efficient processing**.**

Specific Goals:

To design a modular and user-friendly system for managing family expenses.

To ensure data accuracy, security, and privacy.

To support real-time expense tracking and reporting.

To allow easy scalability for future enhancements (like income tracking or AI analytics).

To maintain high performance and reliability during multiple user access.

2. Key Components of the Architecture

Component Description

Component	Description
User Interface (Frontend)	The front-end interface where users interact with the system through forms, dashboards, and reports. Built using HTML, CSS, and JavaScript for responsive design.
Application Layer (Backend Logic)	Handles all core functions like expense management, calculations, and report generation using Python (Django) or Node.js.
Database Layer	Stores user data, expense records, categories, and reports using MySQL or SQLite. Ensures data integrity and security.
Authentication Module	Manages user registration, login, password protection, and session handling.
Reporting Module	Generates visual graphs and summaries of expenses (monthly/yearly) using libraries like Chart.js or Matplotlib.
Notification Module	Sends alerts or reminders when expenses exceed the budget limit.
Security Layer	Implements encryption, access control, and secure data transmission.

3. Development Phases

Phase Description

Step	Phase Name	Description
1	**Requirement Analysis**	Understanding **user needs**, defining system goals, and identifying necessary features.
2	**System Design**	Creating **architecture diagrams**, database schemas, and defining data flow between modules.
3	**Frontend Development**	Building **user interface components** for input forms, dashboards, and visualization.
4	**Backend Development**	Implementing logic for **calculations, data storage, authentication,** and **reporting**.
5	**Integration & Testing**	**Connecting frontend and backend**, testing modules for accuracy, and fixing bugs.
6	**Deployment**	**Hosting the system** on a web server or local system for user access.
7	**Maintenance & Updates**	Regularly **updating features**, fixing issues, and improving performance.

4. Solution Architecture Description

The Family Expense Calculation System follows a Three-Tier Architecture, which includes:

Presentation Layer (Frontend):

Provides user interface for expense entry, viewing reports, and setting budgets.

Ensures easy navigation and interactive design for better user experience.

Application Layer (Business Logic):

Processes user inputs, performs expense calculations, categorization, and budget comparisons.

Acts as a bridge between frontend and database.

Database Layer (Data Storage):

Stores all user data, expense records, and generated reports.

Ensures data consistency, retrieval, and security through proper schema design.

Data Flow Description:

User → Enters data via UI → Backend processes and stores it in Database → Processed results and reports are displayed to the user.

Example: Solution architecture design:

Solution Architecture

Family Expense Calculation System

1. Goals of the Architecture

- Structured & Scalable Design
- Smooth Data Flow
- Secure Data
- Efficient Processing

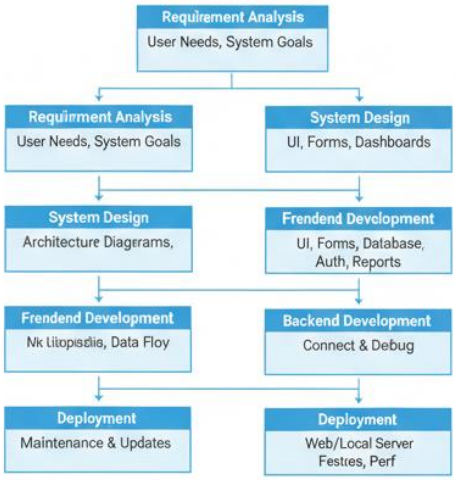
Specific Goals

- Modular Design
- Data Acuiracy & Security
- Real-time Tracking
- Scalabiły (AI Analytics)
- High Performance

2. Key Components of the Architecture

Component	Description
User Interface (Frentend)	HTMI., CSS, JS; Forms, Dashboards
Python ßlan Layer (Backend Logic)	Python (DjangoıJS, Expense Mgmt, Calcs,
Database Layer	MYSOL/SQITE, User, Pxpense Data
Authentiation Module	Chart js/Matpaliitc; Visual Graphs
Notification Module	Alerts for Budget Excedance
Security Layer	Encyption, Access Control

3. Development Phases



4. Solution Architecture Description