

3-Tier System Architecture

The 3-Tier Architecture divides the system into 3 tiers, presentation (User Interface), application, and data layers. This architecture benefits the system by separating concerns which optimizes resource management, and increases scalability, maintainability, and efficiency.

Presentation (UI) Tier:

This tier is the front end of the application, it contains the user interface and interaction. User interface includes web browsers, mobile and desktop applications, it displays information for the user as well as taking input from the user and passes it to the application tier through user interaction logic.

Application Tier:

This tier processes user requests received from the UI tier, then retrieves the requested data from the data tier, or passes data to the data tier for insertion or update. The application tier contains 4 layers:

1. Infrastructure Layer:

Contains a copy from the database (context) that will be used to perform different DML and DQL operations on the data sets in the context, then compares it to the actual data in the database and applies the changes when they are saved. This is the layer responsible for connecting to the database directly.

2. Data Access Layer (DAL):

This layer contains repositories for each entity (model) in the application, and contains methods to perform CRUD operations on the entities. Data access layer performs CRUD operations on the data sets in the context with the help of the models created for each set.

3. Business Logic Layer (BLL):

This layer contains the business logic applied by the application tier, it is divided into services for each repository, and performs processing of data and applying the rules before passing the data to the data access layer.

4. Presentation Layer:

This layer enables the communication between the Presentation tier and Application tier by utilizing APIs for different methods in the BLL, it passes data from user interaction to the BBL, or sends data from BLL to the user interface for display. This layer can also include authentication and validation of data before it enters the application layer.

Data Tier:

This tier is responsible for data management and storage, it consists of a database management system, such as SQL Server, and the database that contains the actual stored data, organized in different database structures such as tables. Data tier ensures the data is consistent and available, and it keeps its integrity, while handling the queries and transactions initiated by the Application Layer.

To conclude, the 3-tier architecture approach provides separation of concern and responsibility which helps to manage the complexity of any system, increasing the scalability, flexibility, and ease of maintenance.