N-TIER ARCHITECTURE

What is N-Tier?

An **N-Tier Application** program is one that is distributed among three or more separate computers in a distributed network.

The most common form of n-tier is the 3-tier Application, and it is classified into three categories.

Presentation logic: The user interface (UI) which displays data to the user and accepts input from the user. In a web application, this is the part which receives the HTTP request and returns the HTML response.

Business logic: Handles data validation, business rules and task-specific behavior.

Data Access logic: Communicates with the database by constructing SQL queries and executing them via the relevant API.This architecture model provides Software Developers to create Reusable application/systems with maximum flexibility.

In **N-tier, "N"** refers to a number of tiers or layers are being used like **2-tier, 3-tier or 4-tier, etc**. It is also called "**Multi- Tier Architecture"**.

The N-tier architecture is an industry- proven software architecture model. It is suitable to support enterprise level client-server applications by providing solutions to scalability, security, fault tolerance, reusability, and maintainability. It helps developers to create flexible and reusable applications.

N-Tier Architecture

A diagrammatic representation of an n-tier system depicts here – presentation, application, and database layers.

ARCHITECTURAL DIAGRAM

These three layers can be further subdivided into different sub-layers depending on the requirements.

Some of the popular sites who have applied this architecture are

- MakeMyTrip.com
- Sales Force enterprise application
- Indian Railways – IRCTC
- Amazon.com, etc.

Some common terms to remember, so as to understand the concept more clearly.

- **Distributed Network:** It is a network architecture, where the components located at network computers coordinate and communicate their actions only by passing messages. It is a collection of multiple systems situated at different nodes but appears to the user as a single system.
    - It provides a single data communication network which can be managed separately by different networks.
    - An example of Distributed Network– where different clients are connected within LAN architecture on one side and on the other side they are connected to high-speed switches along with a rack of servers containing service nodes.
- **Client-Server Architecture:** It is an architecture model where the client (one program) requests a service from a server (another program) **i.e.** It is a request-response service provided over the internet or through an intranet.

  In this model, **Client** will serve as one set of program/code which executes a set of actions over the network. While **Server**, on the other hand, is a set of another program, which sends the result sets to the client system as requested.

    - In this, client computer provides an interface to an end user to request a service or a resource from a server and on the other hand server then processes the request and displays the result to the end user.
    - An example of Client-Server Model– an ATM machine. A bank is the server for processing the application within the large customer databases and ATM machine is the client having a user interface with some simple application processing.

- **Platform:** In computer science or software industry, a platform is a system on which applications program can run. It consists of a combination of hardware and software that have a built-in instruction for a processors/microprocessors to perform specific operations.
    - In more simple words, the platform is a system or a base where any applications can run and execute to obtain a specific task.
    - An example of Platform – A personal machine loaded with Windows 2000 or Mac OS X as examples of 2 different platforms.

- **Database:** It is a collection of information in an organized way so that it can be easily accessed, managed and updated.
    - Examples of Database – MySQL, SQL Server, and Oracle Database are some common Db's.

Types of N-Tier Architectures

There are different types of N-Tier Architectures, like **3-tier Architecture, 2- Tier Architecture and 1- Tier Architecture.**

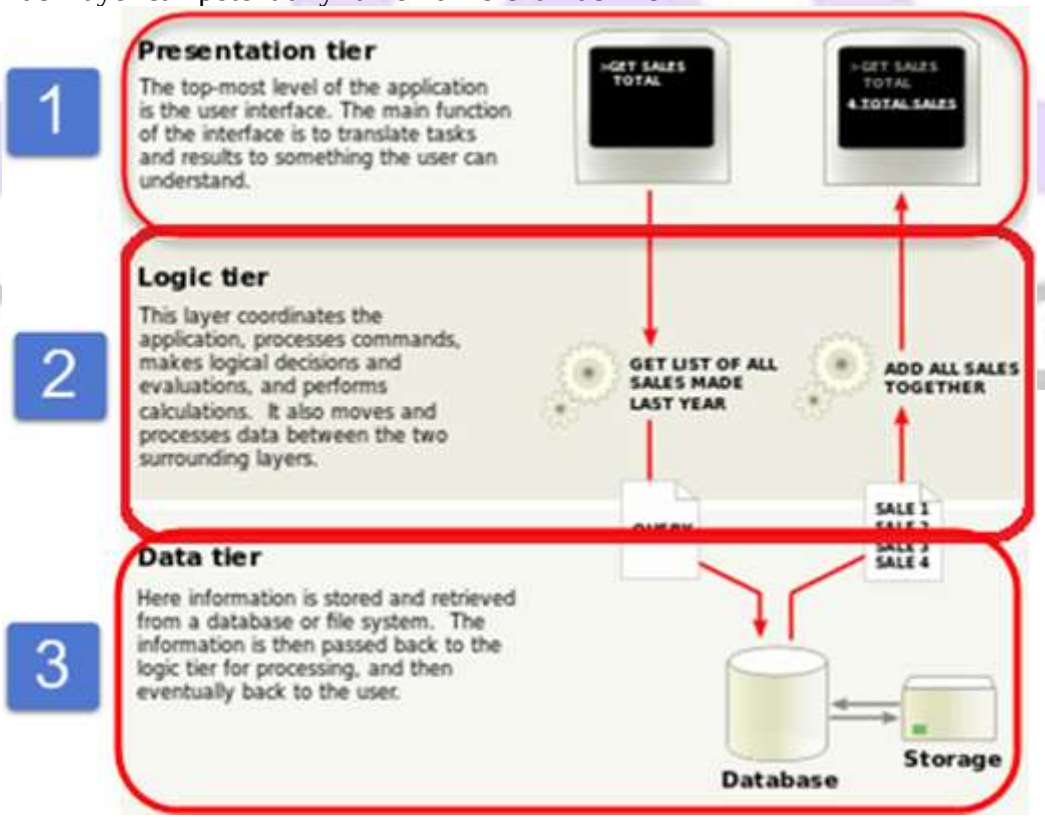
First, we will see 3-tier Architecture, which is very important.

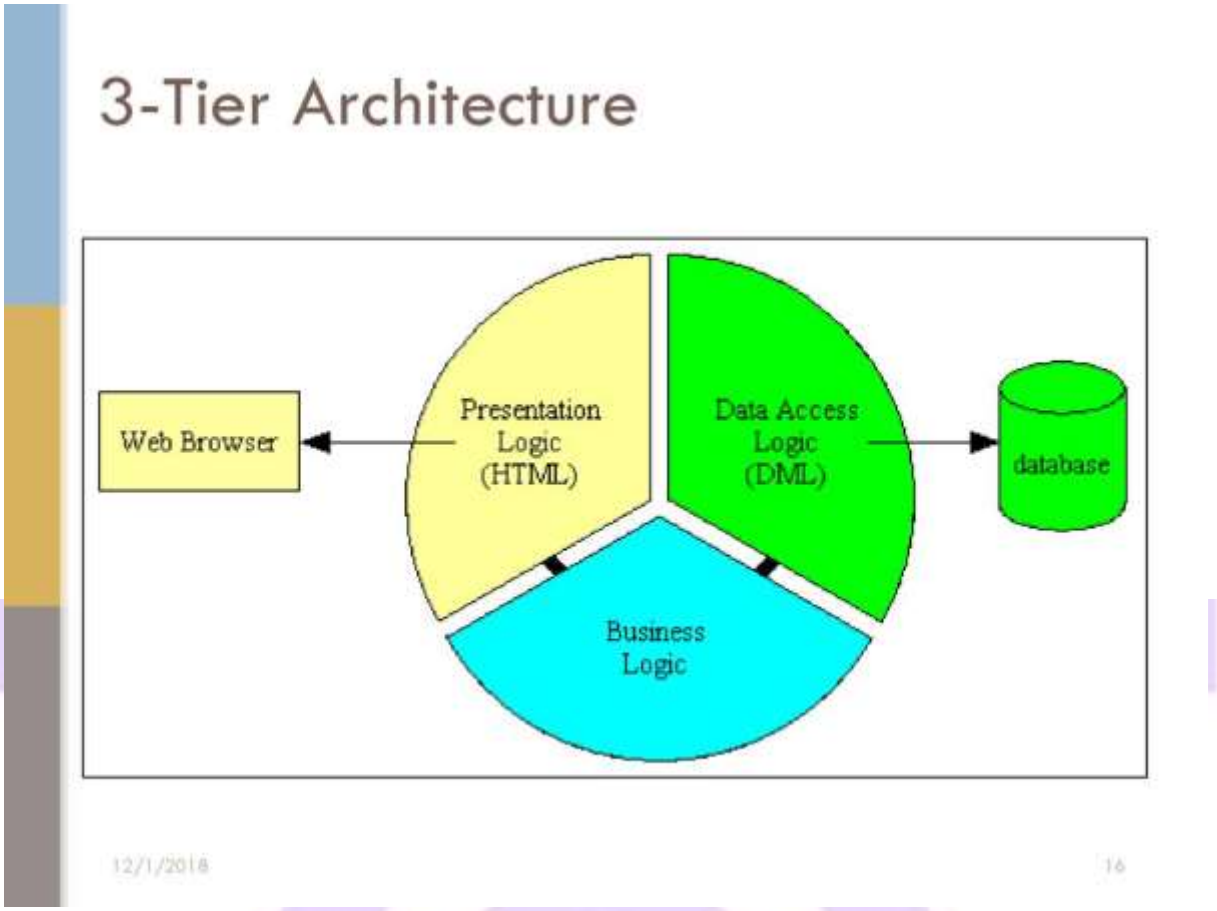
3-TIER ARCHITECTURE

By looking at the below diagram, you can easily identify that **3-tier architecture** has three different layers.

- Presentation layer
- Business Logic layer
- Database layer

Each layer can potentially run on different machine



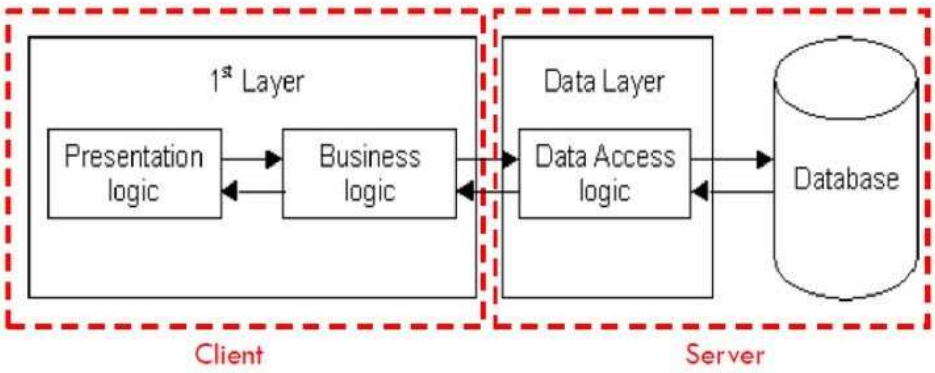


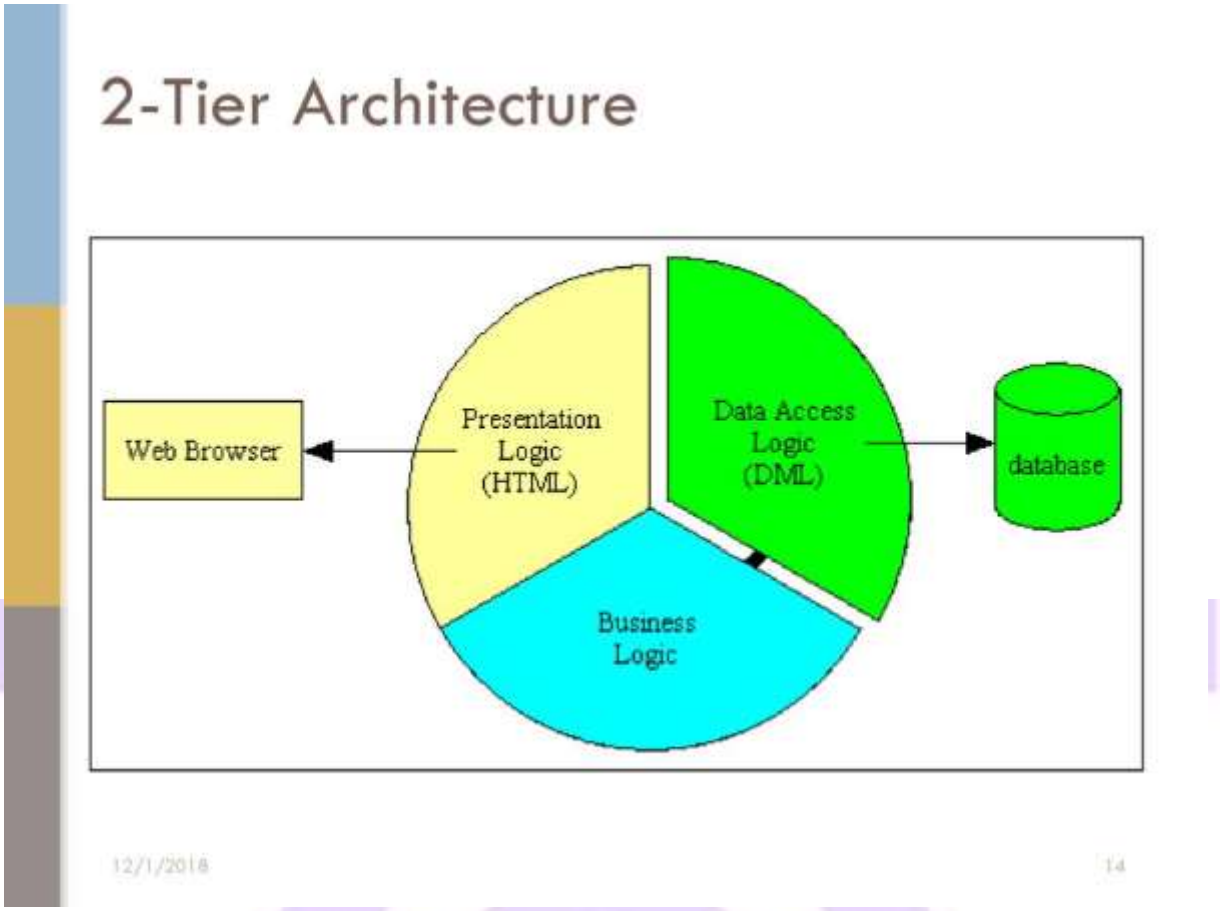
Here we have taken a simple example of student form to understand all these three layers. It has information about a student like
– Name, Address, Email, and Picture.

2-Tier Architecture:

The 2-tier Architecture consists of only 2 layers where the presentation layer is directly linked to the data link layer.

- Database Runs on Server
- Easy to switch to different database
- Heavy load on server
- Potential Congestion on network
- Presentation still tied to business logic



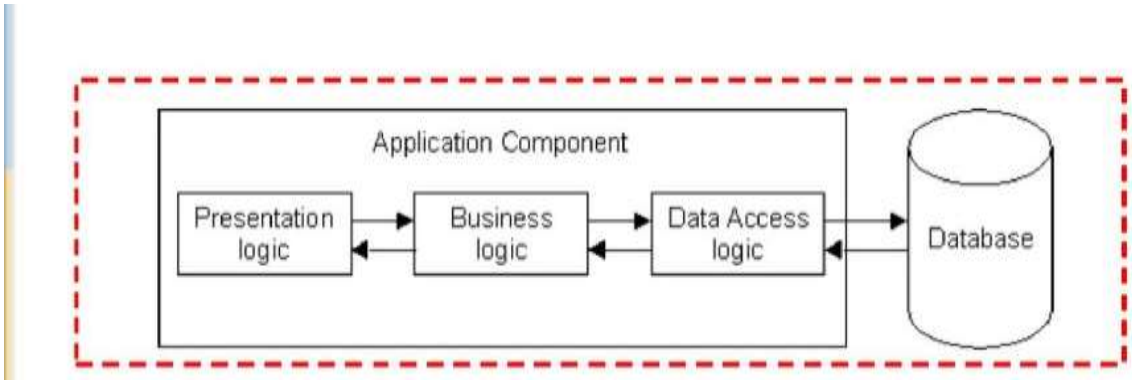


1-TIER ARCHITECTURE

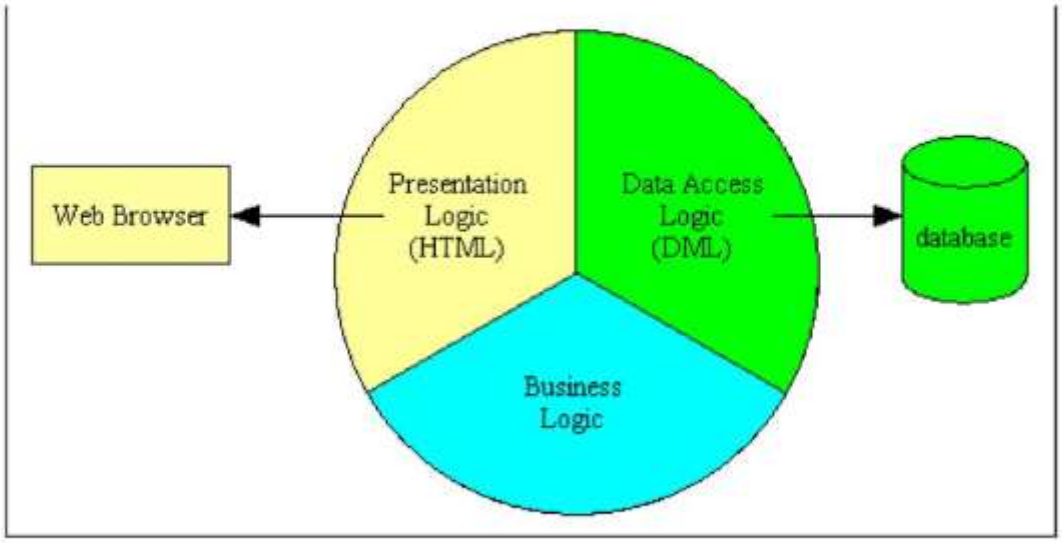
Here all codes and processing kept on a single machine.

All the 3 layers are connected tightly.

The properties like Scalability, Portability and Maintenance are well done.



1-Tier Architecture



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