Web Development

Web Engineering

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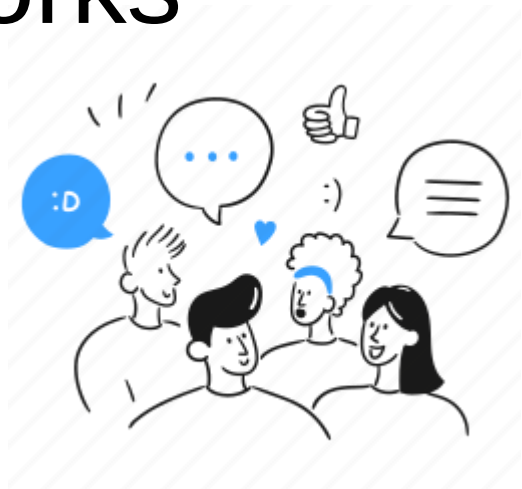
DE TRÁS-OS-MONTES
E ALTO DOURO

Web frameworks

What are Web Frameworks?



Web development is a mess, and web frameworks simplify web development.

Web frameworks simplify web development

Web frameworks

A web framework or web application framework is a software tool that is designed to build and run web apps such as web services, web servers, web sources, web portals, and web APIs. **Frameworks are, in short, libraries that help to develop web applications faster and smarter!**

Web frameworks

Features

- **Automate** repetitive web development tasks
- **Abstract** database interactions
- **Handle** URL requests and URL mapping
- **Provide** templating frameworks
- **Help** with security, caching, sessions, etc.

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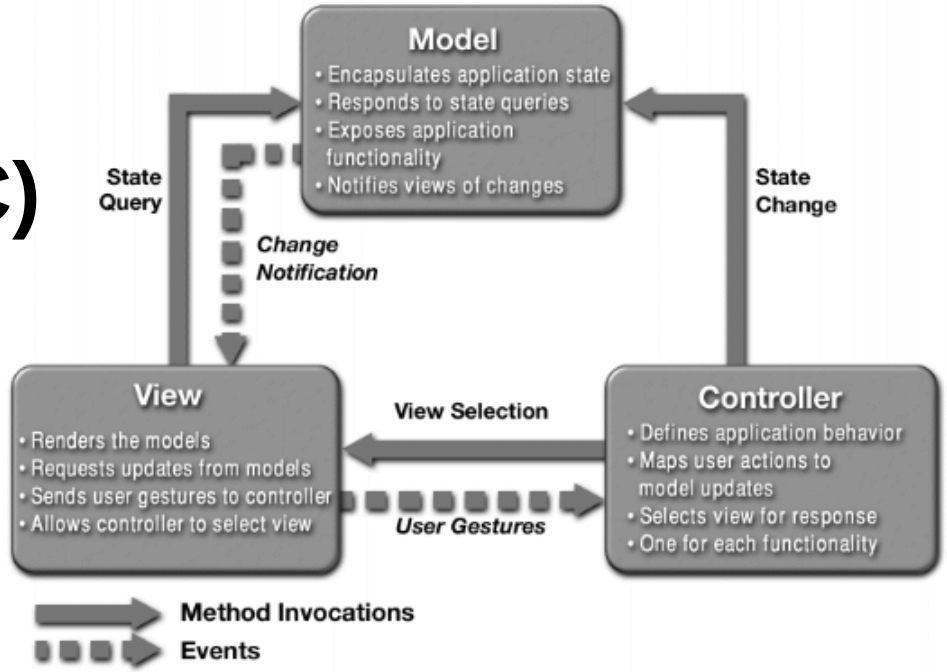
Types of framework architectures

- Model–view–controller (MVC)
- Three-tier organization

Web frameworks

Model-View-Controller (MVC)

- Push-based vs. pull-based



Pull or Push is about data, not about event. In fact, it is about the relation between View and Model. It is the view's responsibility to maintain consistency in its presentation when the model changes. This can be achieved by using a **push model**, where the view registers itself with the model for change notifications, or a **pull model**, where the view is responsible for calling the model when it needs to retrieve the most current data.

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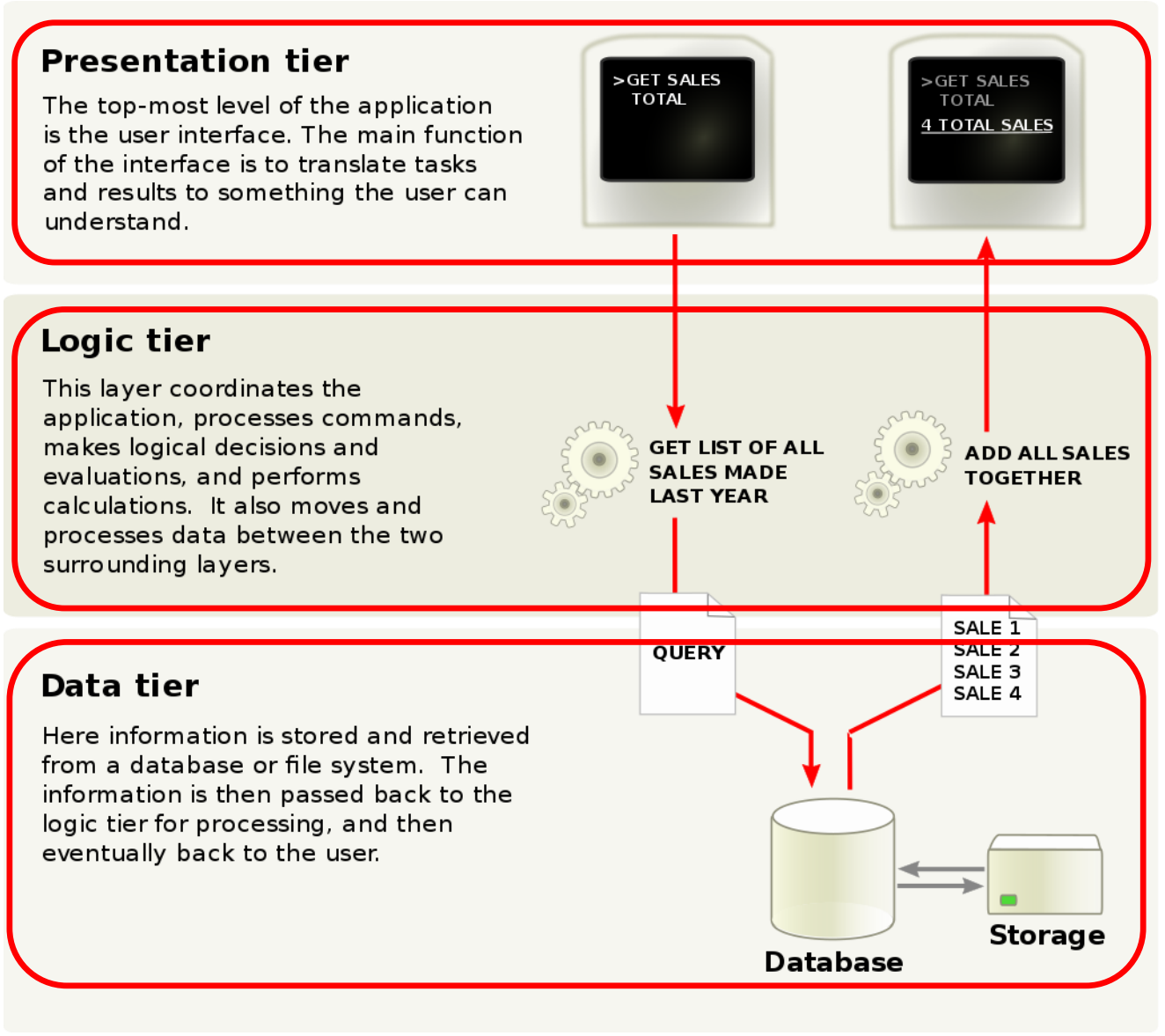
Three-tier organization

- Presentation layer
- Business Logic layer
- Database layer



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N-Tier Architectures

3-Tier Architecture…

2-Tier Architecture:

It is like Client-Server architecture, where communication takes place between client and server.

In this type of software architecture, the presentation layer or user interface layer runs on the client side while dataset layer gets executed and stored on server side.

There is no Business logic layer or immediate layer in between client and server.

Single Tier or 1-Tier Architecture:

It is the simplest one as it is equivalent to running the application on the personal computer. All of the required components for an application to run are on a single application or server.

Presentation layer, Business logic layer, and data layer are all located on a single machine.

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N-Tier Architectures

Advantages	Disadvantages
•Scalability	•Increase in Effort
•Data Integrity	•Increase in Complexity
•Reusability	
•Reduced Distribution	
•Improved Security	
•Improved Availability	

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Framework applications

- General-purpose website frameworks
    - Server-side
    - Client-side
- Discussion forums, wikis and weblogs
    - Content management system, CMS

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Backend vs Frontend

- The **frontend** of a web application is the part you see and interact with. It consists of the web design and the interaction of the site. In terms of programming languages, this is almost always comprised of the CSS, HTML, and JavaScript of the page

- The **backend** consists of the server, the database, and the code that interacts with them. This also consists of the code that gives dynamic data to the frontend of the site. This can be handled in most programming languages.

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User Interface Frameworks

Help create stylized and professional looking web applications.

Most include some sort of grid system so that you align elements, they have color schemes so that is handled for you, and they stylize your HTML components using CSS so that they look clean and professional.

These are within the frontend domain; however, normally when we refer to frontend frameworks we are talking about JavaScript frameworks.

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User Interface Frameworks

- Bootstrap
- JQuery UI
- Materialize
- Foundation
- Semantic UI
- Grommet
- …

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Frontend Frameworks

Are, in most cases, written in JavaScript and are for organizing the functionality, interactivity of your website.

- Vue
- AngularJS
- Angular 2+
- React
- Ember
- …

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Backend Frameworks

Are written in a variety of programming languages and have a wide variety of features.

- Spring MVC
- Django
- Flask
- Ruby on Rails
- Meteor
- Express
- …

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Content Management System

Computer software used to manage the creation and modification of digital content (content management).

A CMS typically has two major components: a content management application (CMA), as the front-end user interface that allows a user, even with limited expertise, to add, modify, and remove content from a website without the intervention of a webmaster; and a content delivery application (CDA), that compiles the content and updates the website.

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Content Management System

- WordPress
- Joomla
- Drupal
- Magento (for eCommerce stores)
- Squarespace
- Wix
- TYPO3
- …

The end!