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Overview of web frameworks

What is web framework

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- A framework is a program structure that is used as a basis for software development.
- If a developer wants to create new software, it makes no sense to start from scratch each time.
- Numerous standard functions in software development offer tried and tested solutions in the form of program codes.
- Web application frameworks work to simplify development of web applications.
- They provide core functionality to work from so applications do not need to be built from the ground up.

Advantages of web frameworks

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- Web frameworks are used to reduce time and cost of software development since codes are basically re-used.
- frameworks promote the generation of clean source codes, since developers can rely on tried and tested building blocks for standard features.

Disadvantages of web frameworks

- The web contains an almost unmanageable number of frameworks for web development. Developers are faced with the problem of selecting the appropriate framework for the intended project.
- Using a framework is linked to specific license terms, which can be problematic when any further development of the framework is stopped.
- Source codes of most web frameworks is freely accessible, this makes web applications vulnerable to hackers

Types of web frameworks

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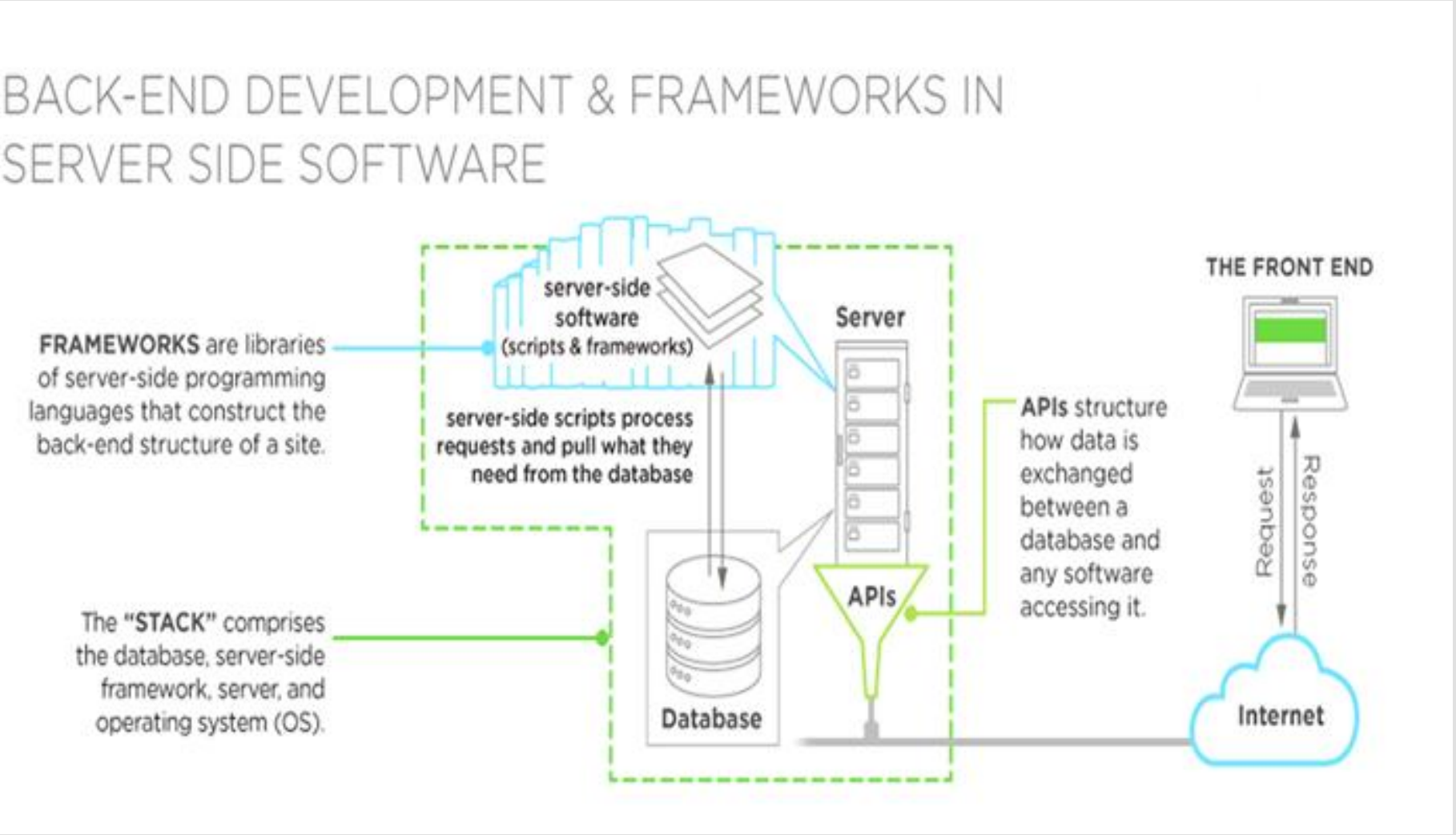
1. Server-side web application frameworks

- A server-side framework deals with backend concerns: Security, database access, file storage, authentication, message queueing, handle HTTP requests, URL mapping and any other logic or process that may need to be on the server.
- The majority of actual coding is done on the backend, and all backend code runs on the server-side rather than the client-side.

Types of web frameworks



Types of web frameworks

Among the most popular MVC-based server-side web frameworks are:

- Laravel (PHP)
- Django (Python)
- Express (Node.js/JavaScript)
- Ruby on Rails (Ruby)
- ASP.NET (C#)

Types of web frameworks

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2. Client-side web application frameworks

- A client side framework deals with frontend concerns: Showing controls, rendering, accepting and routing input, playing sound or video.
- Examples of client side frameworks

❖ Bootstrap
❖ React.js
❖ Angular.js
❖ Backbone
❖ Semantic-UI.

Framework vs. Library vs. Environment

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- Bootstrap is a front-end framework.
- JQuery is a library.
- Node.js is a cross-platform JavaScript run-time environment.

The question is what is a framework? what is a library? what is a run-time environment?
What is the difference between framework and library?

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Library

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- A library refers to code that provides functions that you can call from your own code to deal with common tasks.
- For example a math library.
- Programming languages usually have libraries for all sorts of tasks such as data processing, plotting of graphs, text parsing, etc.
- libraries save you the trouble of writing all those functions yourself.

Framework

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- A Framework is a collection of APIs designed to make building of applications simpler.
- A framework is a generic structure that provides a skeleton architecture with which specific software can be implemented.
- The abstraction allows for common design patterns to be easily reused while still allowing the specific details to be left to the developers.
- Reusing common design patterns means having the general structure for solving similar sorts of problems.

Framework vs Library

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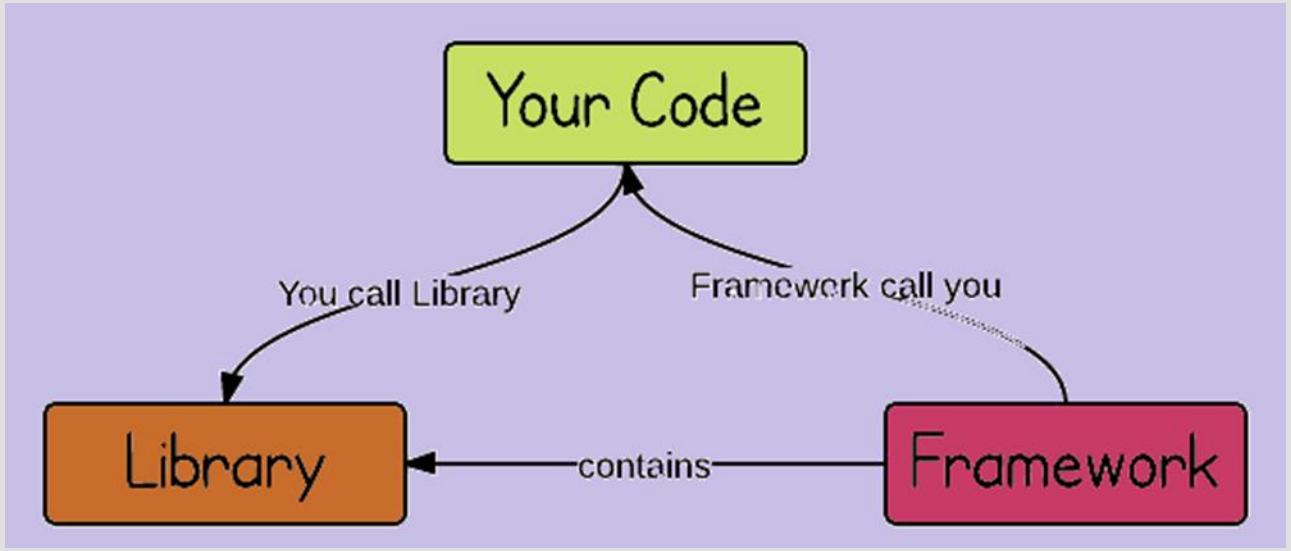
The key difference between a library and a framework can be summarised in a word: Inversion Of Control.

- When you use a feature from a library you are in control.
- With a framework the control is inverted; the framework use you:



Environment

- The runtime environment is literally just the environment your application is running in.
- This can be used to describe both the hardware and the software that is running your application.
- reusable programs or "routines" are built and packaged as a "runtime library."
- These routines can be linked to and used by any program when it is running

Web Framework Architecture

- More than 80% of all web app frameworks rely on the Model View Controller architecture.
- This is a strict separation of application logic and presentation layer and divides software into three areas: **model** (data model), **view** (presentation), and **controller** (program control).

1. **Model**

- It contains the data to be displayed as well as the application logic and rules.
- Data retrieval and change requests are processed by the methods provided for this purpose.

Web Framework Architecture

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2. View

- It is the app's frontend.
- It knows the layout and the way a user can interact with any of its parts.
- The View receives user input, communicates it to the Controller for analysis and updates or reassembles itself according to the Model's instructions (or the Controller's, if a change is minor).

Web Framework Architecture

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3. Controller

- the controller acts as an interface between the *model* and the *view*.
- To do this, it manages one or several *views*, evaluates user input and reacts accordingly e.g. by passing data to the *model* or by making changes to the *view*.

Separating the application logic and presentation layer should mean that it's easier to make changes later on as well as adding extensions and reusing individual components.

Web Framework Architecture

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the MVC architecture allows:

- Parallel development (less time to deliver)
- Code reuse
- Fixing or modifying one of the components without having to update the others
- Setting SEO-friendly URLs.