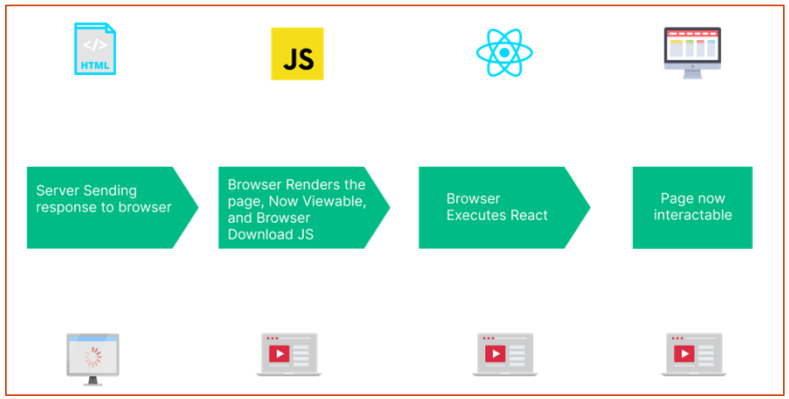
WEB DEVELOPMENT OVERVIEW

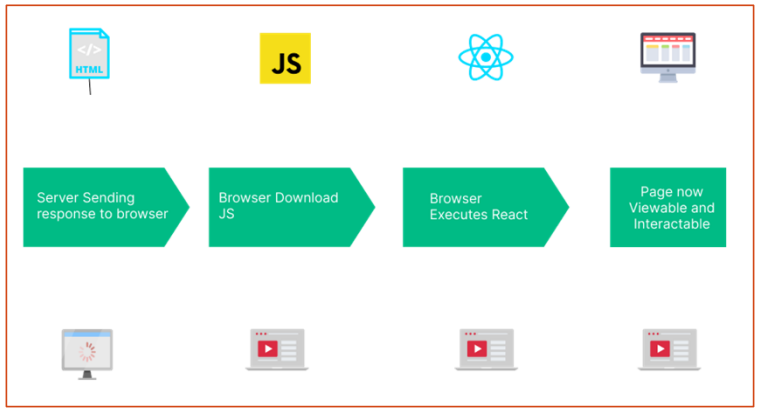
WEB DEVELOPMENT ARCHITECTURE STRATEGIES

- **Server-side rendering**
  - without API: Front-end & back-end share data directly
  - 1 project (technology/framework) for both front-end & back-end
  - Examples:
    - PHP: Laravel, Symfony
    - Java: Spring MVC, Spring Boot
    - .NET: .NET MVC, .NET Core
  - Typical websites:
    - VnExpress
    - Zing News
    - Thegioididong



WEB DEVELOPMENT ARCHITECTURE STRATEGIES

- **Client-side rendering (Single-page app)**
  - with API: Front-end & back-end share data indirectly through API (JSON)
  - 2 independent projects (technologies/frameworks)
  - Examples:
    - Front-end: ReactJS, AngularJS, VueJS, NestJS, SveltJS,…
    - Back-end: Spring Boot, Laravel, .NET Core, ExpressJS,…
  - Typical websites:
    - Facebook, Instagram, Netflix (React)
    - Trello, Paypal (AngularJS)
    - Gitlab, Xiaomi, Alibaba (VueJS)



WEB DEVELOPMENT ARCHITECTURE STRATEGIES

- **Universal web app (hybrid web app)**
  - with API & without API
  - Both Server-side rendering & Client-side rendering
  - Examples:
    - Admin/Management site: Server-side rendering
    - User/Customer site: Client-side rendering

WEB DEVELOPMENT ARCHITECTURE STRATEGIES

	Server-side rendering	Client-side rendering
Advantages	Better SEO (Search Engine Optimization) and page positioning	Less load on server
	Fast initial loading	Better User Interface (UI)
	Faster Largest Contentful Paint (LCP)	Reduced server-side resource
Disadvantages	Frequent server requests	Slower initial load time
	Slower time-to-interactive	Low SEO score (if implemented incorrectly)
	Slower time to page redirection	Caching is not possible until page is fully loaded

DATABASE FOR WEB APPLICATION

- **SQL**
  - SQL: Structured Query Language
  - Relational databases
  - Examples:
    - MySQL
    - SQL Server
    - SQL Lite
    - Oracle
    - PostgreSQL

DATABASE FOR WEB APPLICATION

- **No-SQL**
  - No-SQL: Not only SQL
  - Non-relational databases
  - Examples:
    - MongoDB
    - GraphQL
    - Neo4j
    - Cassandra
    - Couchbase

DATABASE FOR WEB APPLICATION

	SQL	No-SQL
Data Model	Tables with fixed rows and columns	Document, Key-value, Wide-column, Graph
Schema	Strict: Fixed, static or predefined schema	Flexible: Dynamic schema
Scalability	Vertical scalable (upgrade RAM, CPU, SSD,…)	Horizontal scalable (add more servers,..)
Joins	Required	Not required
Data to Object Mapping	Requires ORM (Object-Relational Mapping)	Do not requires ORM

FULL-STACK WEB DEVELOPMENT TECHNOLOGIES

- **MERN:**
  - MongoDB: database
  - ExpressJS: middleware
  - ReactJS: front-end
  - NodeJS: back-end

- **MEAN:**
  - MongoDB: database
  - ExpressJS: middleware
  - AngularJS: front-end
  - NodeJS: back-end

- **MEVN:**
  - MongoDB: database
  - ExpressJS: middleware
  - VueJS: front-end
  - NodeJS: back-end

CLOUD SERVICES FOR WEB DEPLOYMENT