ECMA SCRIPT

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Schedule

- 1-day class room program with three breaks
  - Lunch break - 45 minutes
  - Refreshment Breaks - 2, each for 15 minutes
- Interspersed with theory and hands-on
  - concepts - 30%
  - demonstrations & exercises - 70%

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Etiquette

- Mute your phones
- Avoid bringing regular work to the class
- No cross discussions
- Stop me for any questions, any time
- Code examples are online, will be shared
  - https://bitbucket.org/glarimy/glarimy-resources/
- Slides are online, will be shared
  - https://bitbucket.org/glarimy/glarimy-resources/
- Attempt all code exercises

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Pre-requisites

- Exposure to basics of programming
  - basics of logic development
  - concepts of object oriented programming
- Exposure to web-ui development
  - basics of HTML
  - basics of CSS
  - basics of Javascript
  - basics of HTTP
- You already know Node and NPM? Wonderful!

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Environment

- Any IDE with Javascript support
  - Visual Studio Code
    - *https://code.visualstudio.com/download*
- Any browser with debugging support
  - Mozilla Firefox, Google Chrome and etc.,
  - Postman or any other REST Client extension
- NodeJS with NPM
  - https://nodejs.org/en/download/
  - Go for LTS

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Krishna Mohan Koyya

- **Technology Consultant**
- **Since 1997 in to the career**
  - With Wipro-Lucent, HP and Cisco till 2005
    - *as engineer and lead*
  - With Sudhari IT Solutions (P) Ltd till 2006
    - *as chief executive officer*
  - With Sasi Institute of Technology & Engineering till 2008
    - *as HoD, Department of Information Technology*
  - With Glarimy Technology Services since 2008
    - *as proprietor and principle consultant*
- **Holds M.Tech (Computer Science & Engineering)**
  - from Andhra University, Visakhapatnam, India
- **Lives in Bengaluru, India**

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Your Introduction, please

- **Your name**
- **Your career span, in year**
- **Your regular work**
  - what you do
  - which technology stack you use more often
- **Your expectation**
  - what is your area of focus in the technology
  - how are you going to apply the learning

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Agenda

- Introduction
- Setup
- The Language System
- Logic Development
- Object Oriented Programming
- Modular Programming
- Functional Programming
- Asynchronous Programming
- UI Development
- Event Driven Programming
- AJAX and Beyond

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ECMA SCRIPT

Introduction

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History of ECMAScript

- Born as LiveScript
  - At Netscape Communications
  - By Brendan Eich
  - In 1995
- Became JavaScript
  - Because of a pact with Sun Microsystems
  - To counter Microsoft Internet Explorer
- Forgotten for a while
  - Non-standard browsers
  - Cumbersome for larger applications
  - Netscape dead, practically

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History of ECMAScript

- **Resurrected again**
  - **By the community**
    - *Mozilla Foundation and Firefox Browser*
  - **DOM standardisation**
    - *by W3C, World Wide Web Consortium*
  - **Javascript Object Notation or JSON**
    - *by Douglas Crockford*
  - **Web 2.0**
    - *REST Services and AJAX*
  - **Server-Side adaptation**
    - *By NodeJS*
- **Subjected for multiple attempts**
  - **JScript, Silverlight, ActionScript, TypeScript and etc.,**
- **Standardised**
  - **As ECMA Script**

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Versions and Features

- Before ECMA 2009 or ES5
  - Baseline features
- ECMA 2015 or ES6
  - Modules, Promises, Classes and Inheritance
  - Block scopes with let and const
  - Template literals
  - Generator functions
  - Spread operators
  - Arrow functions
- ECMA 2016 or ES7
  - Minor additions
- ECMA 2017 or ES8
  - Async and await
- ECMA 2018 or ES9
  - Minor additions

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Purpose and Applications

- **Started as a simple browser scripting language**
- **Became a full blown language**
  - **For desktop browser applications**
    - *event driven programming*
    - *primarily for DOM events*
    - *UI development with HTML and CSS*
    - *Server communication*
  - **For server applications**
    - *single threaded and event driven async programming*
    - *primarily for request processing*
    - *on platforms like NodeJS*
  - **For mobile/device applications**
    - compiled to native code
  - **For serverless applications**
    - *on platforms like AWS Lambda Functions*

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Salient Features

- **High-Level Language without full compilation**
  - **Pure Interpretation Engines**
    - *Old browser technology*
    - *Rhino (Mozilla), JScript (Microsoft)*
  - **JIT (Just-In-Time) Compilation Engines**
    - *New browser technology*
    - *V8 (Google), SpiderMonkey (Mozilla), Nashon (Oracle), Chakra (Microsoft)(*
- **Dynamic or Duck-Type Language**
  - **No way to declare types**
    - *type of variables are computed at runtime*
    - *type of variables can change anytime*
- **Object Oriented Language, almost**
  - **Classes, Objects, Inheritance**
- **Single Threaded (Asynchronous Programming Features)**
  - **Events, Promises, Async and Await**
- **Functional Programming Features**
  - **Closures and Arrow-Functions**

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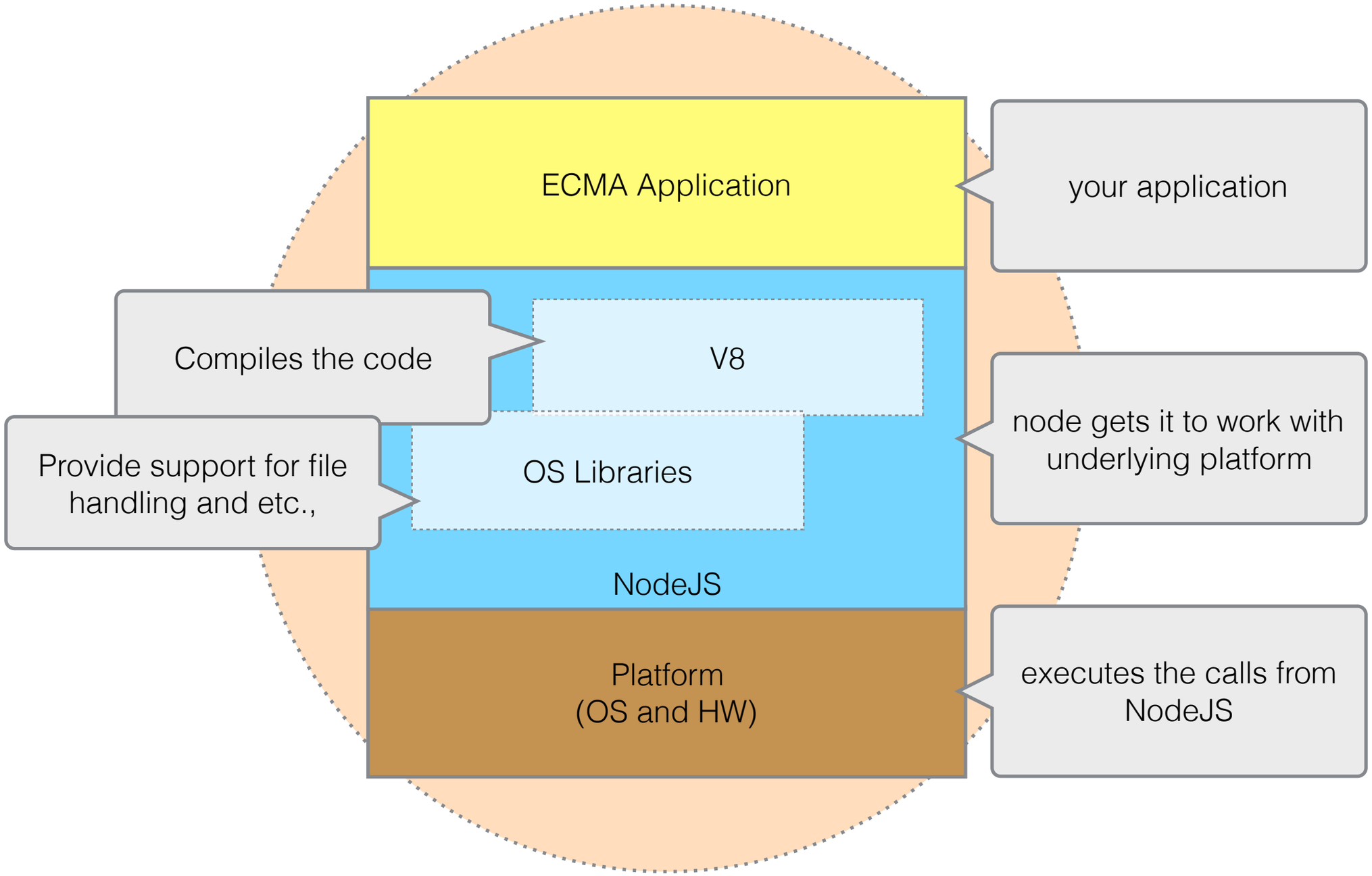
Technology Stack on Server



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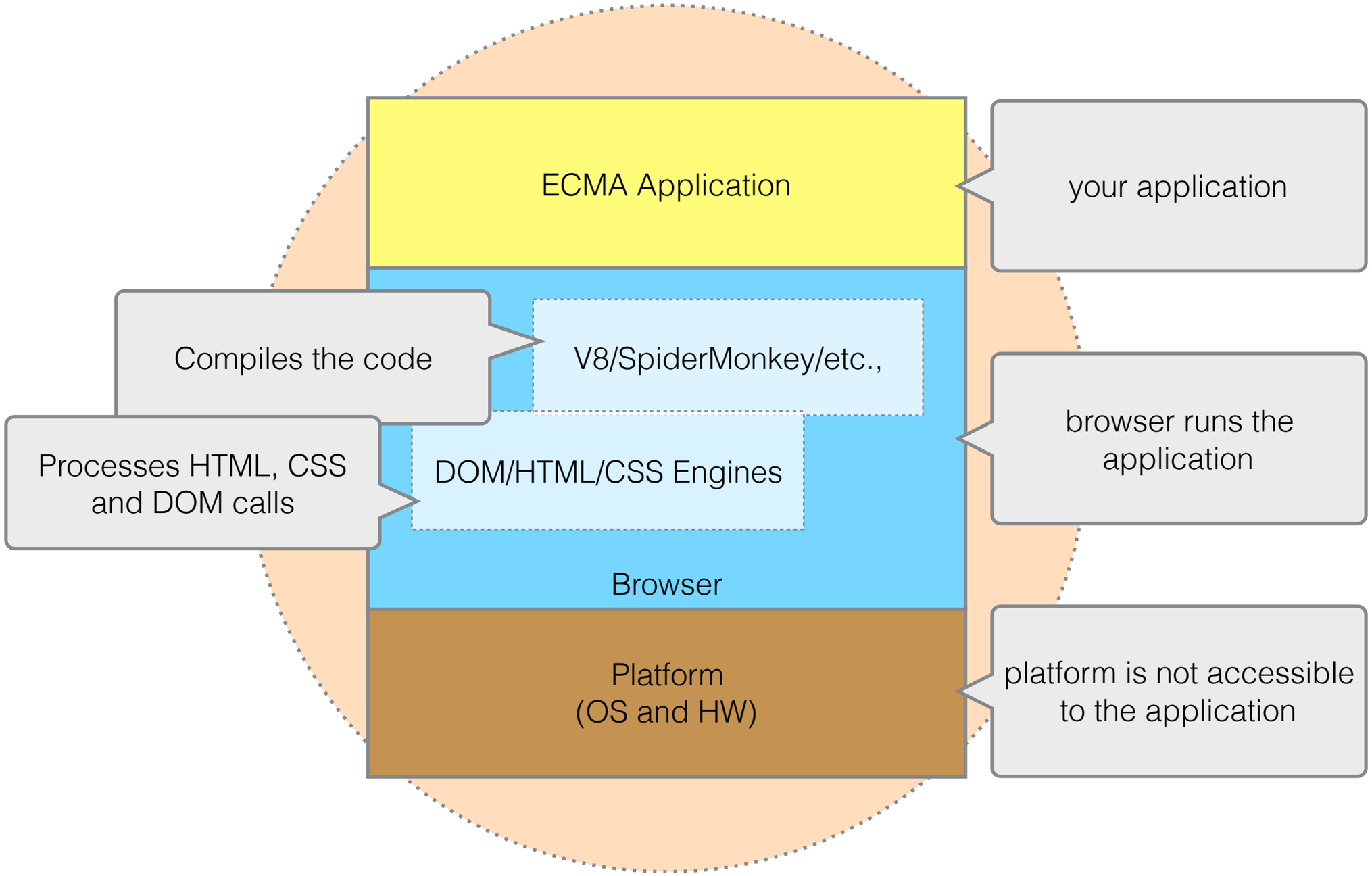
Technology Stack on Browser



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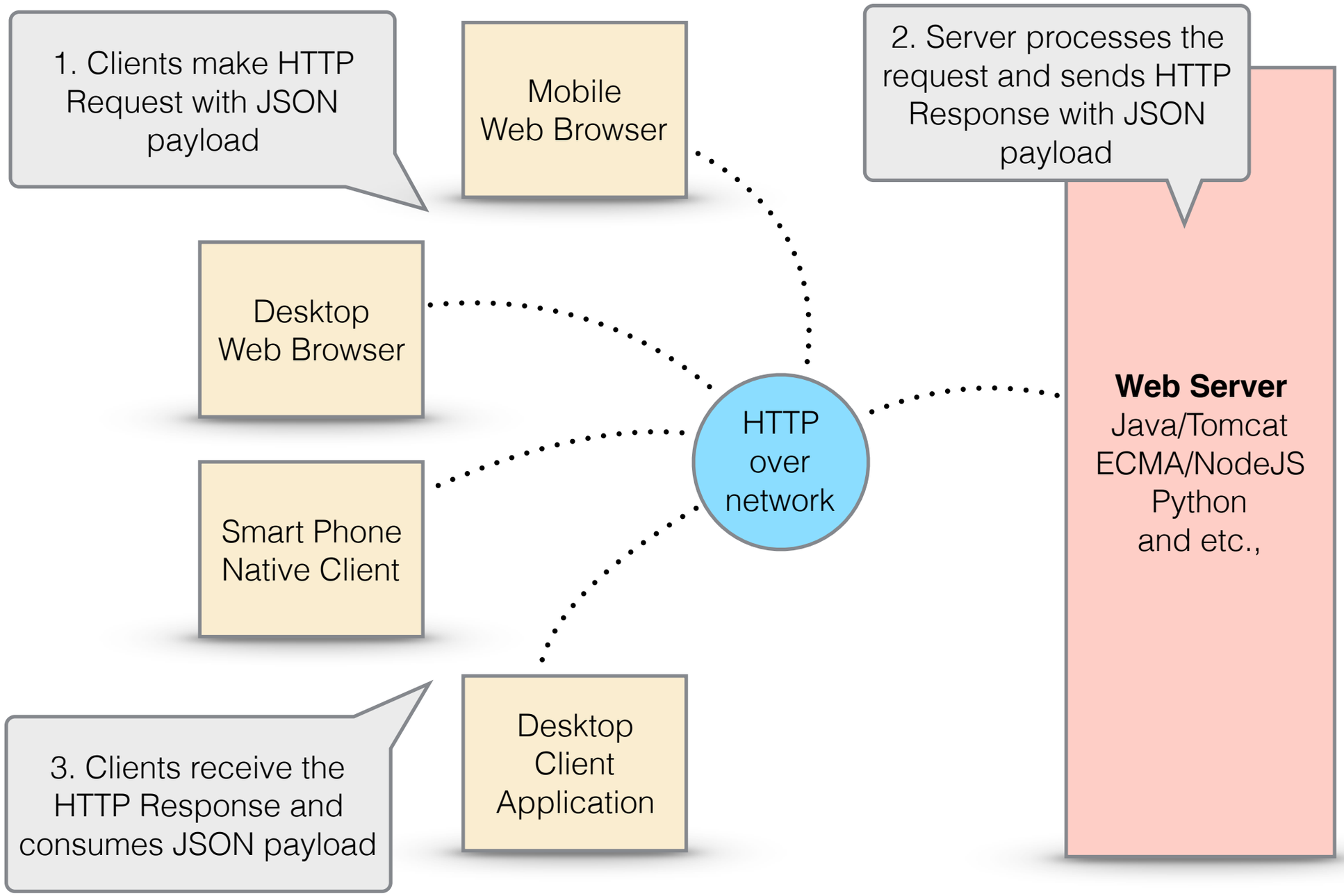
Client/Server Architecture



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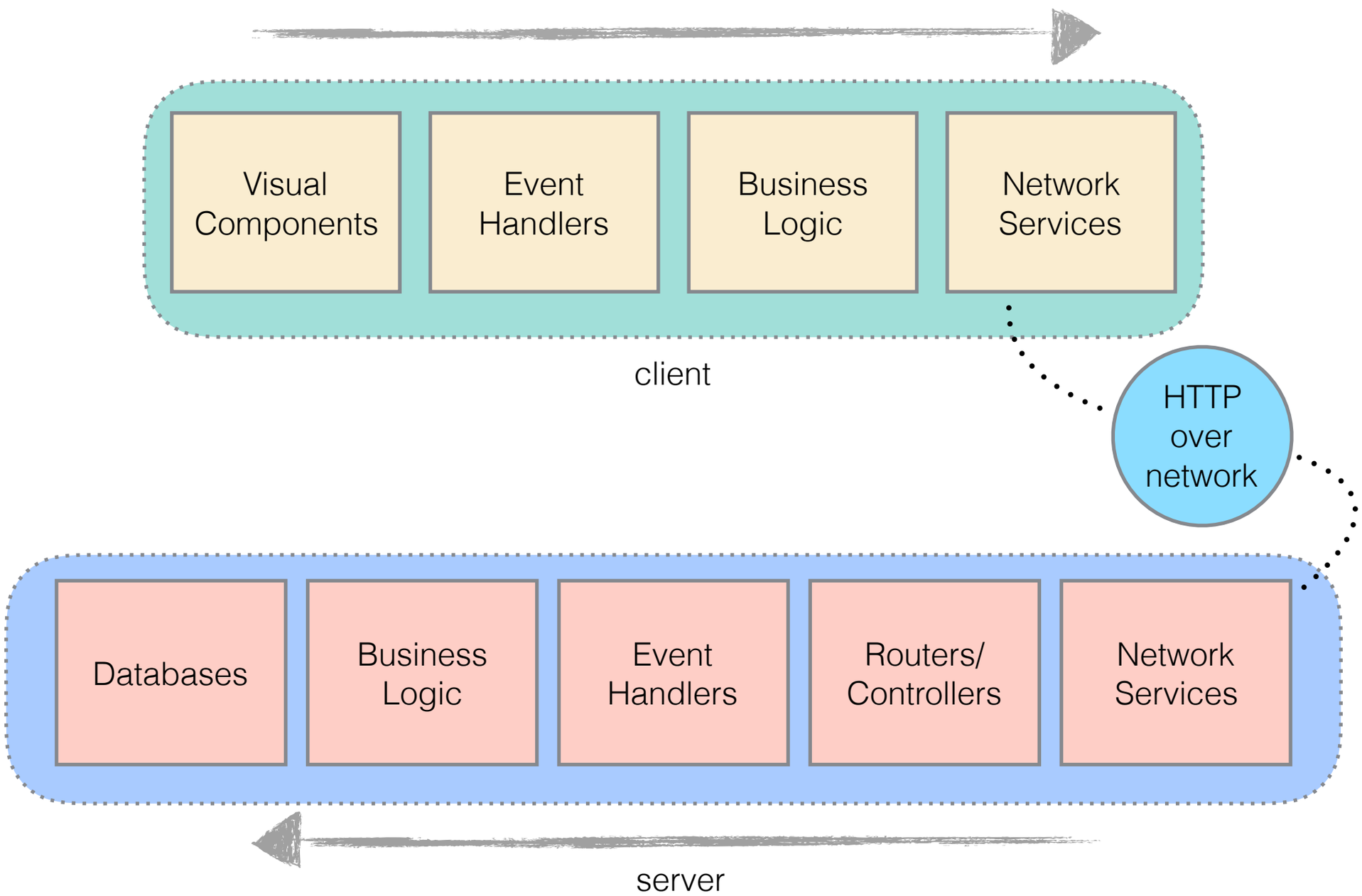
Application Architecture



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Frameworks

- JQuery
  - A simple library to handle browser discrepancies
  - A wrapper on top of Javascript
  - One of the very early and popular libraries
- AngularJS
  - A 2-way binding framework from Google
  - Very popular at it's peak
- ReactJS with Redux
  - A simple component framework from Facebook
  - Tops the current trends
- NG or Angular
  - A re-vamped AngularJS From Google
  - Component framework with Typescript
- Dojo, Sencha ExtJS, GWT
  - Comprehensive frameworks
  - Passed their prime

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Questions

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Quickies

- **Javascript is a strongly typed language**
  - Yes
  - No
- **ECMA 2015 is also called ES6**
  - Yes
  - No
- **Google V8 engine runs on Chrome and NodeJS**
  - Yes
  - No
- **Most of the browsers do not support ES6 fully**
  - Yes
  - No

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Quickies

- **Javascript is a strongly typed language**
  - No, it's a dynamically typed language
- **ECMA 2015 is also called ES6**
  - Yes, it is called because it's 6th version released in 2015
- **Google V8 engine runs on Chrome and NodeJS**
  - Yes, V8 engine is open sourced JIT compiler
- **Most of the browsers do not support ES6 fully**
  - Yes, only ES5 works on most of the current browsers

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Thanks

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Setup

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Setup

- **Install NodeJS**
  - **Update the `path`, if needed!**
- **Open a terminal**
  - **Verify the installation**

    ```
    node -v
    npm -v
    ```
  - **Create a working folder**

    ```
    {/path/to/home}/ecma/labs
    ```
- **Install and Launch Visual Studio Code**
  - **Open integrated terminal**
  - **verify the versions of Node and npm**
  - **Open the working folder**

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Hello World

- **Create a file** `hello.js`
  - **under the working folder**
- **Enter the code and save the file**

```
console.log("Hello World!");
```

- **Run the command from the terminal**

```
cd <working-folder>
node hello.js
```

- **Check the results**

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Hello World

- **Create and move to folder** `hello`

  ```
  cd {workingfolder}
  mkdir hello
  cd hello
  ```

- **Run the command and answer the questions**

  ```
  npm init
  ```

- **Update** `package.json`
  - **Add the following under scripts**

  ```
  "start": "node index.js"
  ```

- **Run the command from the terminal**

  ```
  npm start
  ```

- **Check the results**

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Hello World

- **Create a file** `hello.html`
  - **under the working folder**
- **Enter the code and save the file**

```
<html>
 <head>
  <script>
   console.log("Hello World!");
  </script>
 </head>
</html>
```

- **Open the file in a browser**
- **Verify the results in the browser console**

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Hello World

- **Create a file** `hello.html`
  - **under the working folder**
- **Enter the code and save the file**

```
<html>
  <head>
    <script src="hello.js"></script>
  </head>
</html>
```

- **Open the file in a browser**
- **Verify the results in the browser console**

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Questions

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Quickies

- **The command `npm start` runs the `start` script in the `package.json`**
  - Yes
  - No
- **The function `console.log()` always writes on the server terminal**
  - Yes
  - No
- **The HTML code runs also on NodeJS**
  - Yes
  - No
- **The `npm` tool helps in creating, downloading, installing and running packages on NodeJS**
  - Yes
  - No

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Quickies

- **The command `npm start` runs the `start` under `scripts` in the `package.json`**
  - Yes, it's a short cut to run different scripts in a package
- **The function `console.log()` always writes on the server terminal**
  - No, it writes on the terminal of the current environment in which it is running
- **The HTML code runs also on NodeJS**
  - No, only javascript code runs on NodeJS
- **The `npm` tool helps in creating, downloading, installing and running packages on NodeJS**
  - Yes, the tool also handles dependency management

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Thanks

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The Language System

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Object Oriented Programming

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Modular Programming

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Functional Programming

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Asynchronous Programming

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UI Development

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Event Driven Programming

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AJAX and Beyond

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