

ANGULAR IN 100 MINUTES

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Agenda

- Quiz
- What is Angular?
- Traditional Web Apps vs Angular Apps
- Why Angular? What are its benefits?
- Angular Versions
- Where does Angular fit?
- Angular Dev Environment
- TypeScript - What and Why?
- Angular Building Blocks
- Example Angular Apps
- Q & A

Quiz

1. Angular is a library

- a) True
- b) False

Answer:

b) False

Angular is a framework

Quiz

2. An Angular app runs on a

- a) Client
- b) Server
- c) Both a) and b)
- d) None of the above

Answer:

- a) Client

Quiz

3. The Angular platform enables developers to build

- a) Web applications
- b) Mobile applications
- c) Desktop applications
- d) All of the above

Answer:

- d) All of the above

Quiz

4. Angular app is a

- a) SPA
- b) MPA
- c) Both a) and b)
- d) None of the above

Answer:

a) SPA (Single Page Application)

What is Angular?

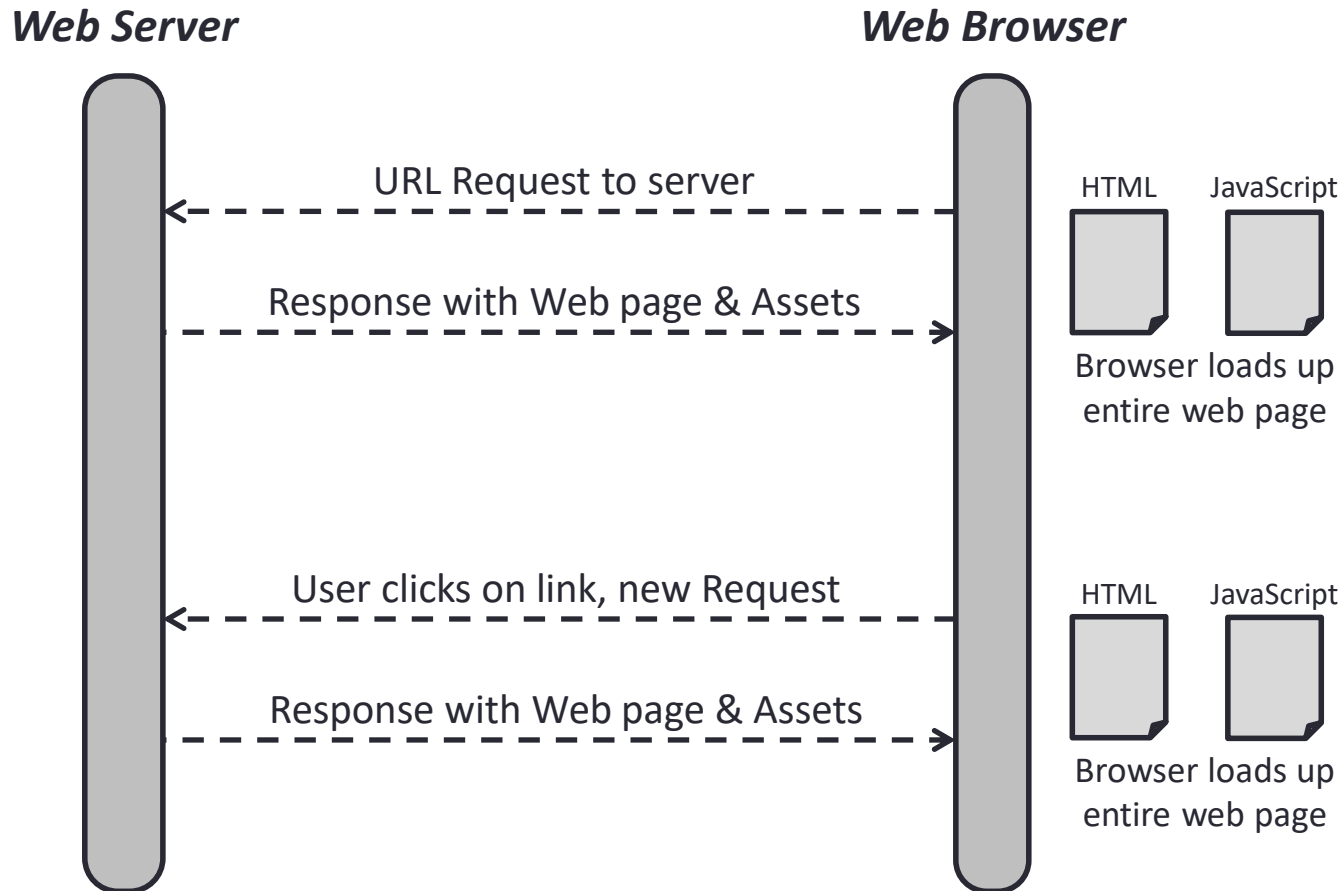
- Developed in 2009 by Misko Hevery
- A platform and framework for building client-side JavaScript applications
- Open-source, TypeScript-based framework
- Currently maintained by Google
- Angular apps
 - Can run on desktop and mobile devices
 - Are generally SPAs
 - Are modern, dynamic, lighter and faster
- 'A' of MEAN stack
 - M – MongoDB
 - E – Express
 - A – Angular
 - N – Node.js

What is Angular?

- A Software Framework
 - Provides
 - generic functionality
 - you the ability to customize the functionality according to your app needs
 - reusable environment
 - broad generic structure for your app
 - Implements
 - Inversion of Control design principle
- Library vs Framework
 - Library
 - Your code is in charge
 - Calls into the library when necessary
 - Framework
 - Framework is in charge
 - Calls into your code when needed

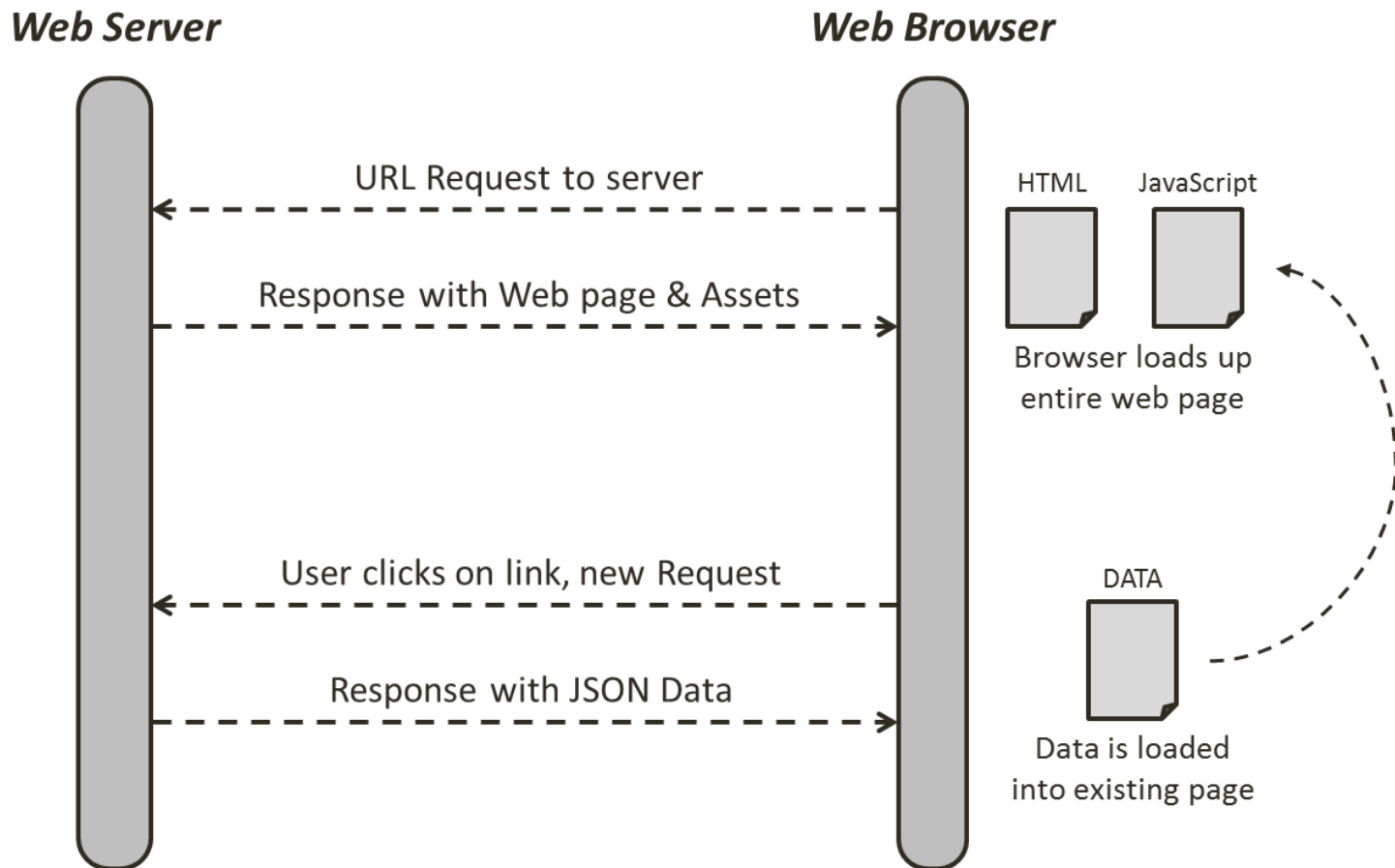
Traditional Web App

Request & Response



Angular App

Request & Response



Why Angular?

- Single Page Apps (SPA)
 - Better user experience
 - Reduced full page reloads
 - Better overall performance
 - Less network bandwidth
- Proven software patterns and practices
 - Model View Controller (MVC)
 - Model View ViewModel (MVVM)
 - Dependency Injection (DI)
- Declarative programming
 - Better readability, concise code
 - Better developer productivity
 - Faster development

Why Angular?

- Component based
 - Reusable
- Structures app code
 - Modular, Maintainable, Scalable
- Cross platform, mobile support
 - Target multiple browsers, platforms & devices
- Decouples DOM manipulation from app logic
 - Testable, TDD
- Move app code forward in the stack
 - Reduces server load, reduces cost
 - Crowd sourcing of computational power

Angular Versions

- AngularJS (v1.x)
 - Initial release, v0.9.0 – Oct 2010
 - Aims to simplify the development and testing of web apps
 - Worked on the concept of scope and controllers
 - Latest release, v1.8.x
 - Currently in LTS period (until December 31, 2021)
- Angular 2
 - Released in Sep 2016
 - Added component as a key building block
 - Complete re-write of AngularJS, no backward compatibility

Angular Versions

- Angular 4
 - Released in Mar 2017
 - Apps are smaller & faster
 - AOT compilation, Angular Universal - SSR
 - Backward compatible with Angular 2
- Angular 5
 - Released in Nov 2017
 - Smaller, faster and easier to use
 - Build optimizer, compiler improvements
 - New HttpClient, pipes, router lifecycle events

Angular Versions

- Angular 6
 - Released in May 2018
 - Synchronized major versions – Framework, Material, CDK and CLI
 - CLI – New commands
 - ng update
 - Can be used to update Angular framework packages to newer version
 - ng add
 - Can be used to add new capabilities to your Angular app
 - CLI has support for
 - workspaces containing multiple projects, such as multiple applications or libraries
 - creating and building libraries
 - Angular Elements
 - Angular components packaged as custom elements, a web standard for defining new HTML elements in a framework-agnostic way
 - Angular Material + CDK –
 - New tree component for displaying hierarchical data is now available
 - Tree Shaking Providers help to reduce app size

Angular Versions

- Angular 7
 - Released in Oct 2018
 - CLI prompts added to common commands
 - Bundle Budgets - make sure your app size is under control
 - CDK includes following features
 - Virtual Scrolling
 - Drag & Drop

Angular Versions

- Angular 8
 - Released in May 2019
 - Ivy
 - new internal rendering engine
 - external API does not change
 - should drastically shrink bundle sizes
 - experimental support
 - Bazel
 - orchestrates build process to optimize overall build flow and speed
 - efficiently controls webpack and other steps involved in building and optimizing an Angular project
 - experimental support

Angular Versions

- Angular 8
 - Differential loading
 - CLI automatically creates multiple production bundles for modern and legacy browsers
 - a small script will detect automatically which browser you are using and loads the right bundles
 - bundle size decrease - 7% to 20% - for modern browsers
 - zero (no) code changes required

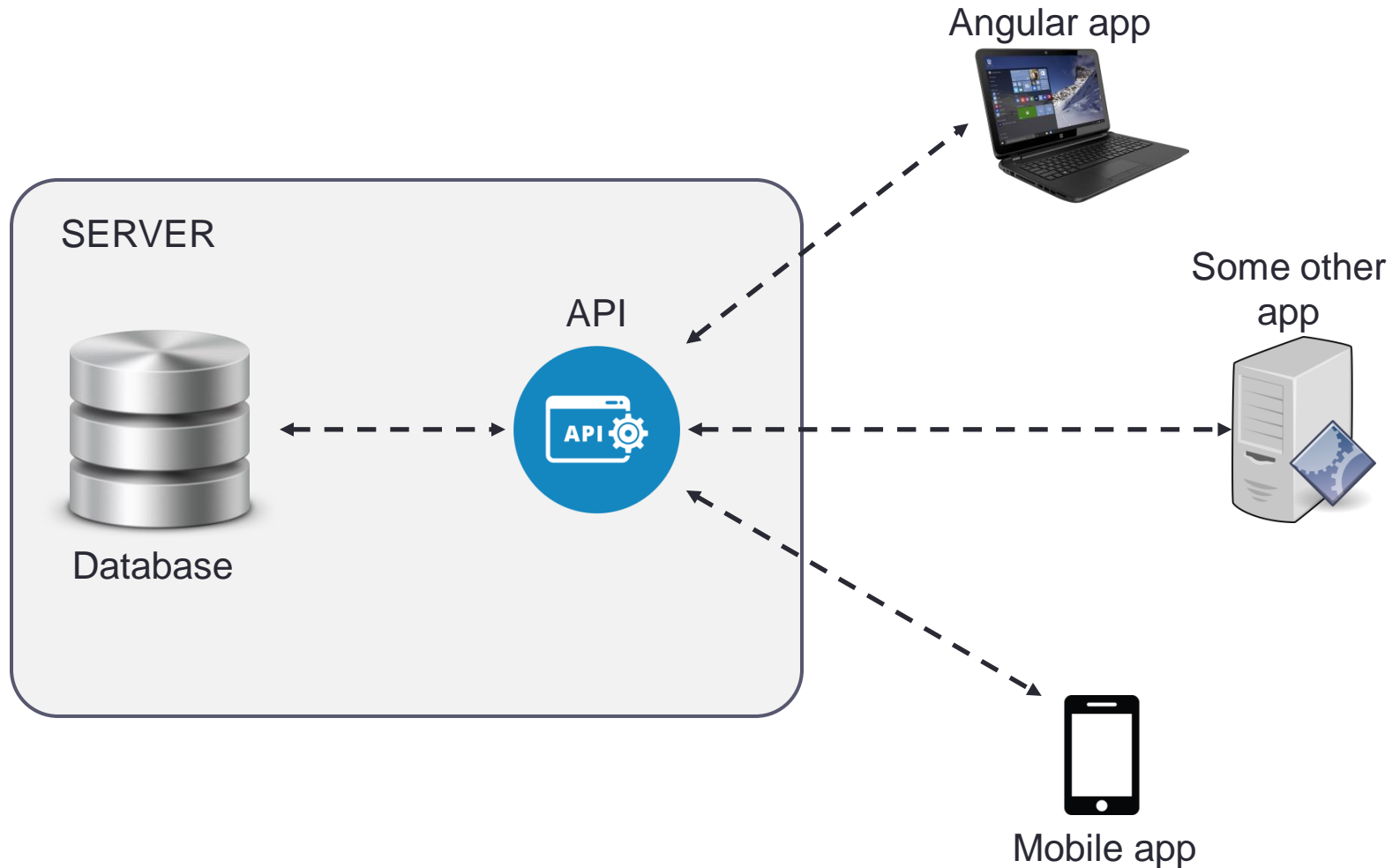
Angular Versions

- Angular 9
 - Released in Feb 2020
 - Ivy
 - a new rendering engine
 - under-the-hood change
 - smaller bundles
 - large apps - size improvements can be significant
 - better runtime performance
 - apps startup faster
 - Template type checking
 - Basic mode
 - Full mode
 - Strict mode
 - Minor Breaking Changes and Deprecations
 - should not affect most projects

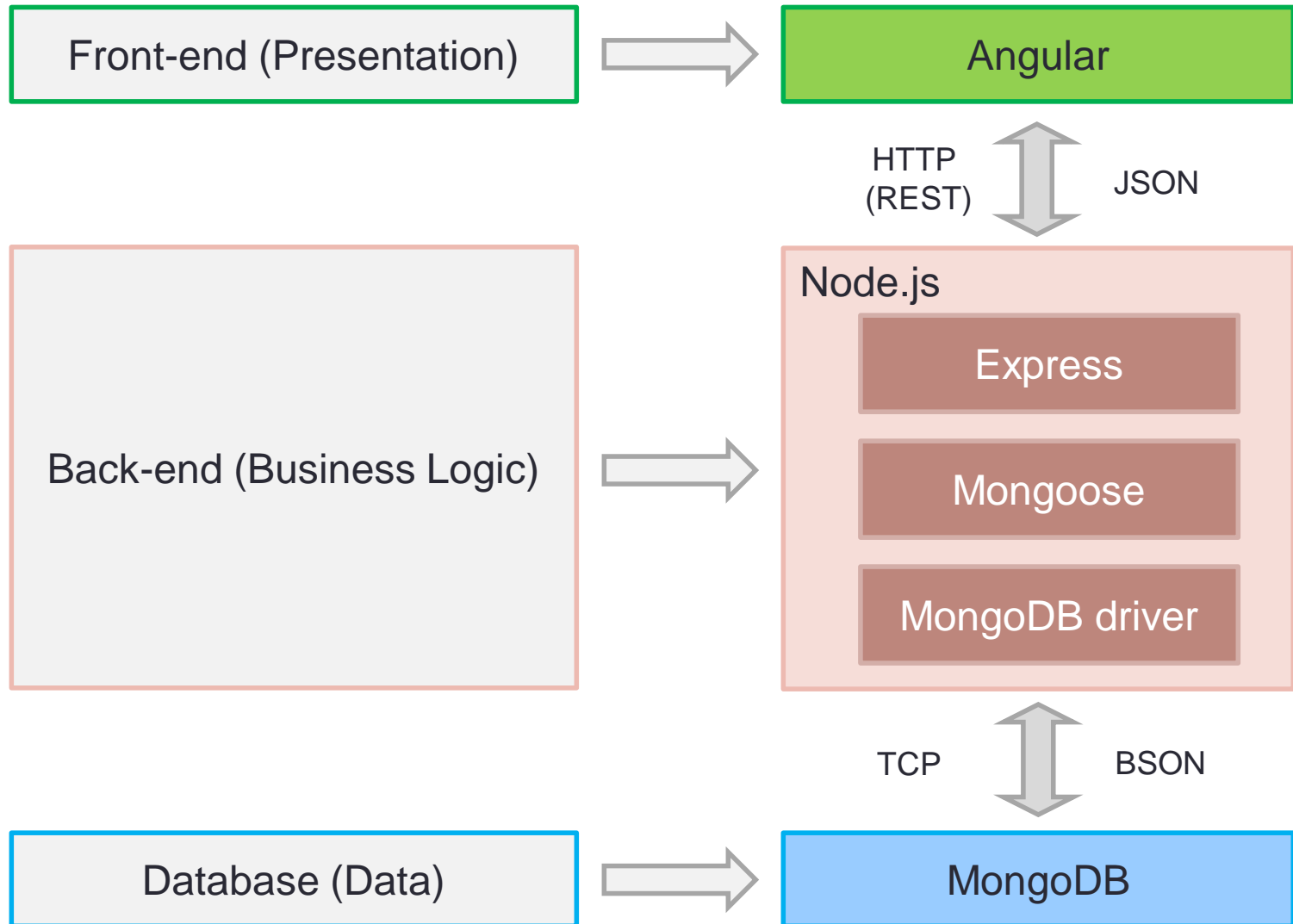
Angular Versions

- Angular 10
 - Released in June 2020
 - New Date Range Picker
 - Optional stricter project settings
 - Keeping up-to-date with the Ecosystem
 - TypeScript v3.9
 - TSLib v2.0
 - TSLint v6.0
 - New default browser configuration

Where does Angular fit?



Where does Angular fit?



Angular Dev Environment

Software / Tool	Purpose
Node.js (https://nodejs.org/en/)	<ul style="list-style-type: none">• Provides a dev environment to build Angular apps• Needed for setting up various dev tools and dependencies for Angular apps
Angular CLI (https://cli.angular.io/)	<ul style="list-style-type: none">• A command-line interface tool that you use to initialize, develop, scaffold, and maintain Angular applications directly from a command shell
Code Editor / IDE	<ul style="list-style-type: none">• Visual Studio Code• Atom• Sublime Text• Webstorm
Browser	<ul style="list-style-type: none">• Google Chrome• Mozilla Firefox• Safari• Microsoft Edge

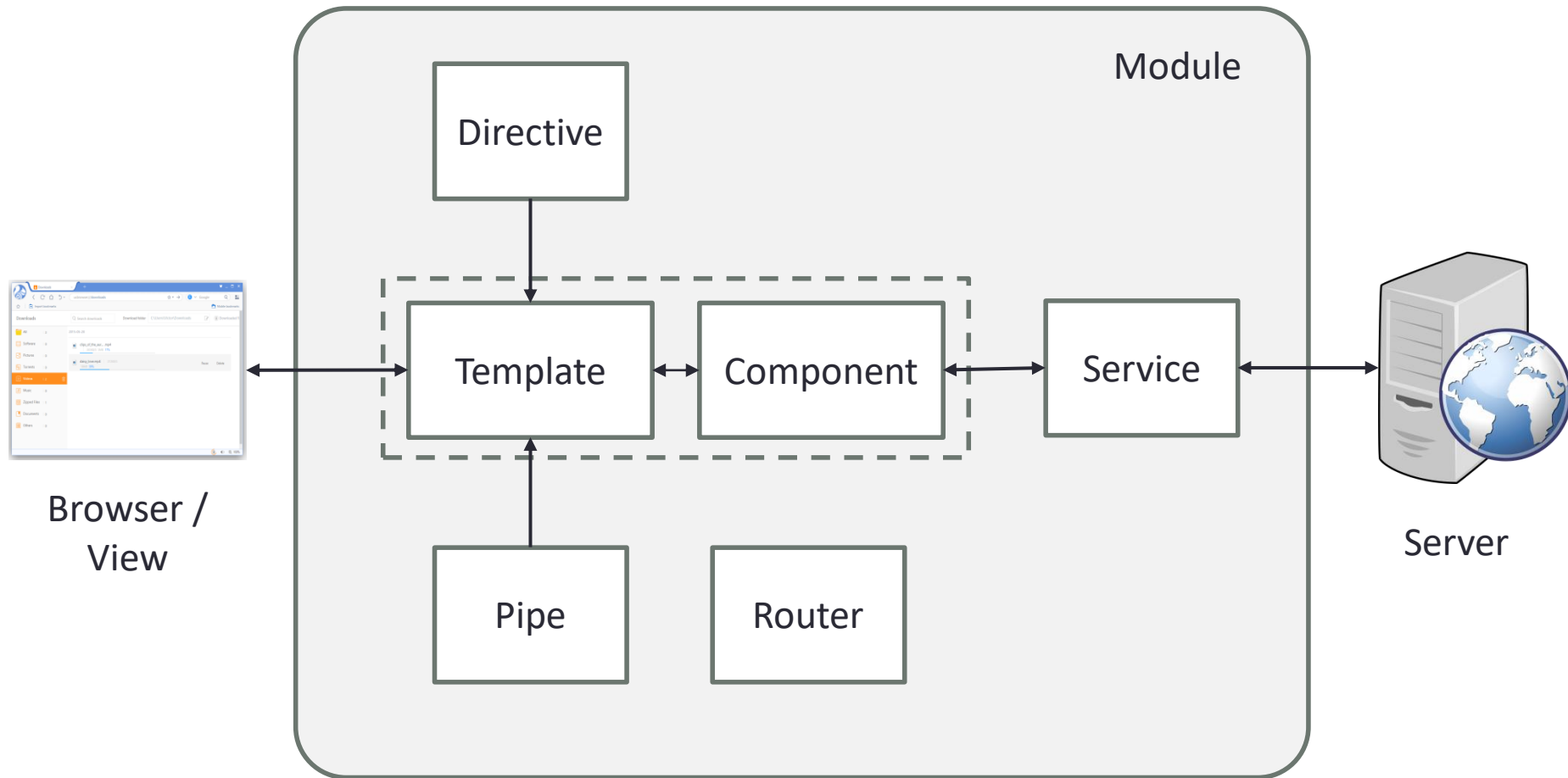
TypeScript - What and Why?

- A programming language developed and maintained by Microsoft
- Superset of JavaScript
 - Any valid JavaScript code is also valid TypeScript code
- TypeScript does not run in the browser, it is compiled to JavaScript (by CLI)
- Chosen as main language by Angular
- By far most documentation & example-base uses TypeScript
- Why TypeScript?
 - Strong Typing
 - reduces compile-time errors, provides IDE support
 - Next Gen JS Features
 - Modules, Classes, Import, Export, ...
 - Missing JS Features
 - Interfaces, Generics, ...

TypeScript - What and Why?

- Benefits
 - Strong typing
 - More predictable and easier to debug
 - Object-oriented features
 - Classes, Interfaces, Modules, Properties, Generics, etc.
 - Compile-time errors
 - Great tooling
 - Intelli-sense

Angular Building Blocks



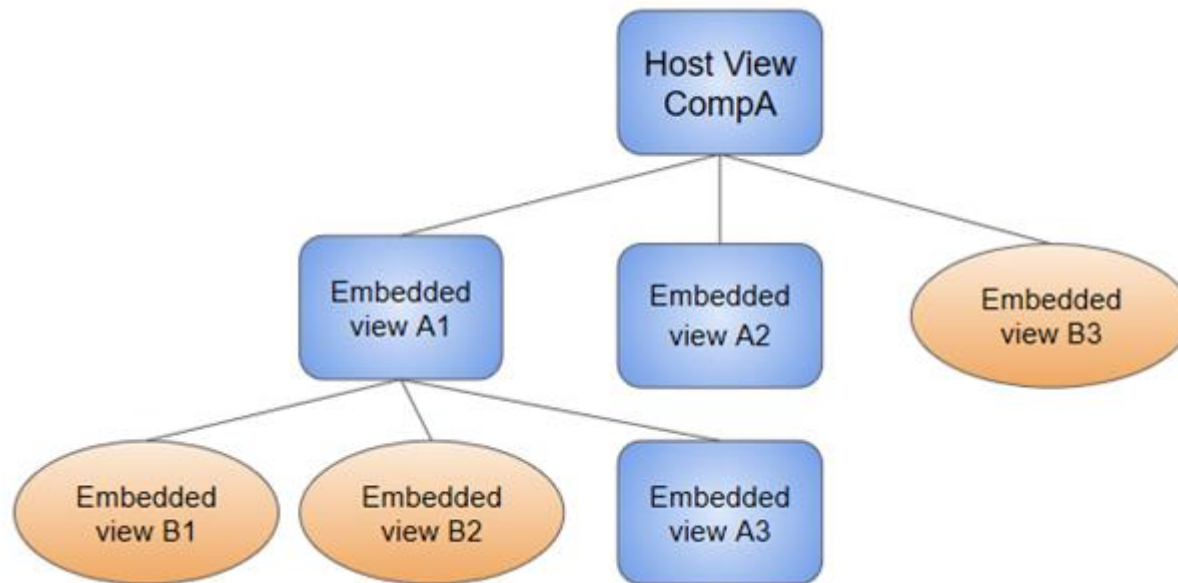
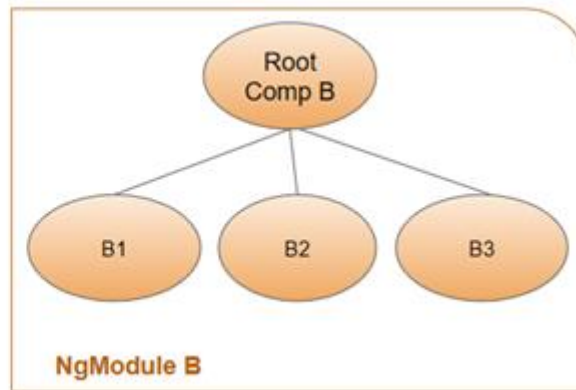
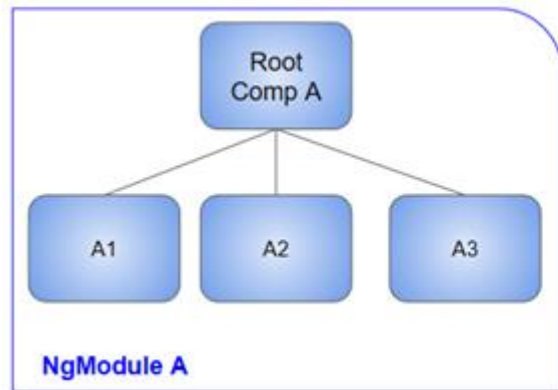
Angular Building Blocks

- Modules
 - A block of highly related classes
- Components
 - Encapsulates the template, data and the behavior of a view
 - Completely decoupled from DOM
- Directives
 - To modify DOM elements and/or extend their behavior
 - Built-in or custom
- Pipes
 - Takes in data as input and transforms it to a desired output
- Services
 - Encapsulates any non-UI logic
 - Http calls, logging, business logic, etc
 - Any logic not related to a view is delegated to a service
- Routers
 - Responsible for navigation from one view to another

Angular Module (ngModule)

- Angular modularity system
- Container for a cohesive block of code dedicated to
 - an app feature
 - a workflow
 - a set of related capabilities
- Contains
 - Component(s)
 - Directive(s)
 - Pipe(s)
 - Service(s)
- Every Angular app should have at least one ngModule
- Promotes reusability and maintainability

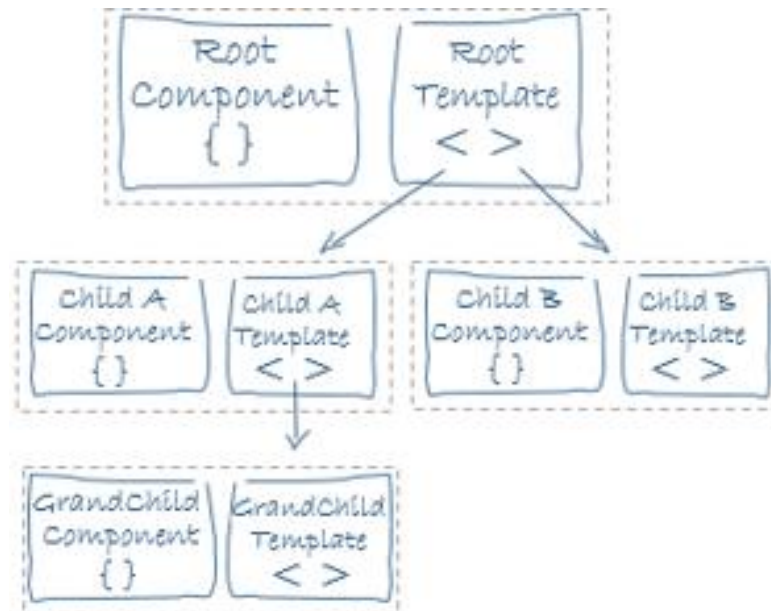
Angular Module (ngModule)



Component

- Key feature of Angular
- Allows you to break a complex web page into smaller, manageable & reusable parts
- Encapsulates the template, data and the behavior of a view
- A Component has its own
 - Template – HTML markup
 - Style – CSS styles
 - Business logic (data and behavior) – TypeScript code
- Promotes reusability and testability

Component



Pipe

- Transforms strings, currency amounts, dates, and other data for display
- Accepts an input value and returns a transformed value for display in a view
- Angular provides several built-in pipes
 - UpperCasePipe
 - LowerCasePipe
 - DatePipe
 - CurrencyPipe
- You can also create your own custom pipes

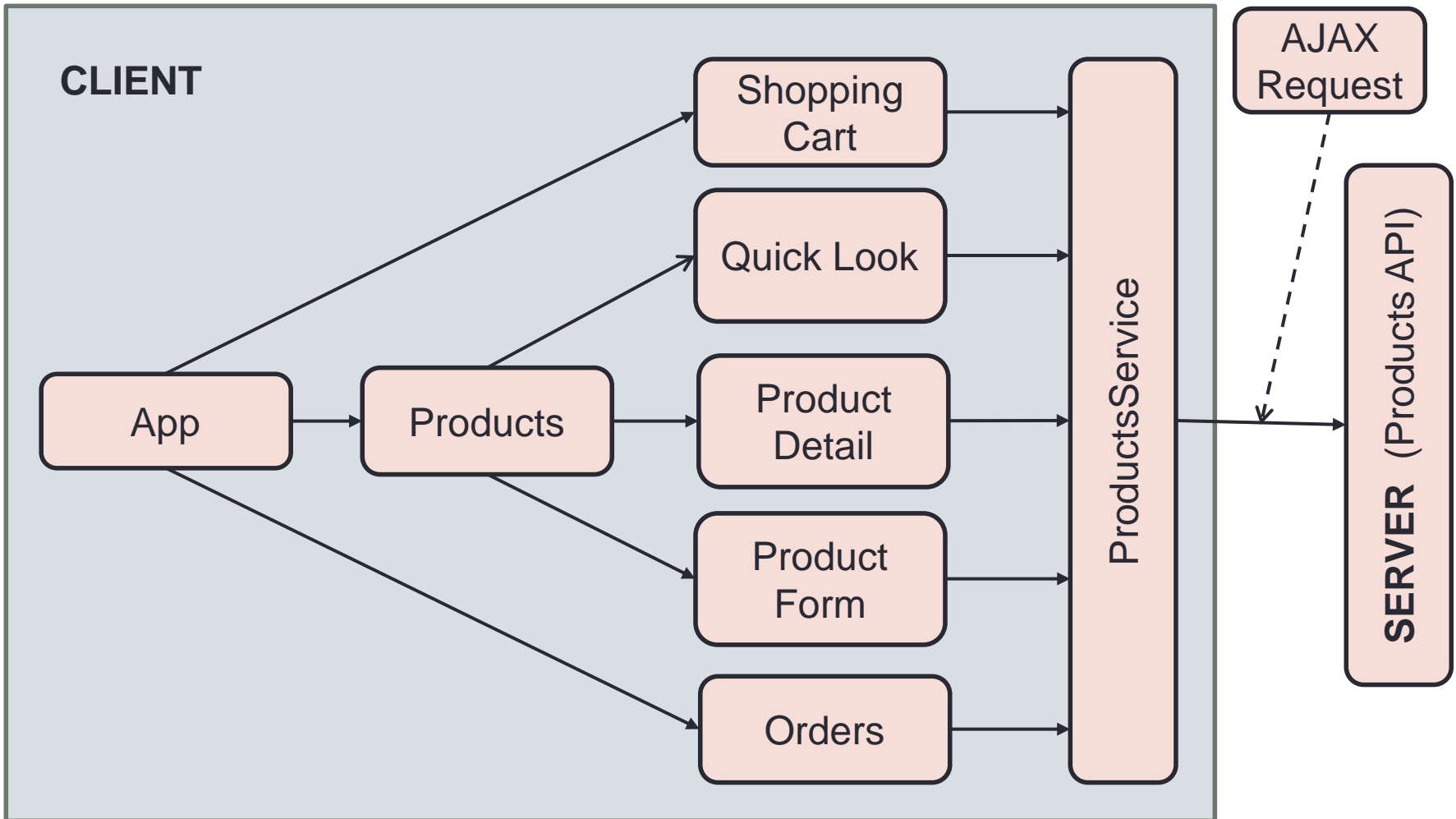
Directive

- Instruction to transform DOM elements and/or extend their behavior
- Components are directives with template
- Can be built-in or custom
- Two types
 - Attribute directives
 - Look like a normal HTML attribute
 - Modify the behavior of HTML elements, attributes, properties, and components
 - E.g. ngModel, ngStyle, ngClass
 - Structural directives
 - Shape or reshape the DOM's structure by adding, removing, and replacing elements in DOM
 - Have a leading *
 - E.g. *ngIf, *ngFor, *ngSwitch

Service

- A class with a narrow, well-defined purpose
 - For e.g.
 - Logging service
 - Data service
 - Tax calculator
 - App configuration
 - Message bus
- A component can delegate certain tasks to services
 - fetching data from the server
 - validating user input
 - logging data to the console
- A component consumes a service using Dependency Injection (DI) pattern

Service



Router

- Provides navigation among views and URL manipulation capabilities
- Enables navigation by interpreting a browser URL as an instruction to change the view

Example Angular Apps

- Gmail
 - Developed by Google and launched in 2004
- YouTube TV
 - Created with Angular 2 and launched in 2017
- Forbes
 - One of the world's most visited websites is one of the Angular examples
- PayPal
 - PayPal allows transfers of money between individuals and companies. There are more than 305 million active users on the platform.
- Weather.com
 - With 126 million visitors per month, this website is absolutely worth taking a look at when you analyze Angular websites
- Udacity
 - One of the world's most widely recognized resources for electronic learning (eLearning) and online courses
- <https://www.madewithangular.com/>
- <https://medium.com/@infinijith/top-20-angular-application-examples-4c3c24e8b3f>

Q & A

- Thank you!