Intro to SPA framework

Modified from a presentation by

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Rise of the Responsive Single Page App

Image: http://johnpolacek.github.io/scrolldeck.js/decks/responsive/

Responsive

- Unified across experiences
- Can be embedded as mobile app
- Better deployment and & maintanence
- Mobile users need to get access to everything

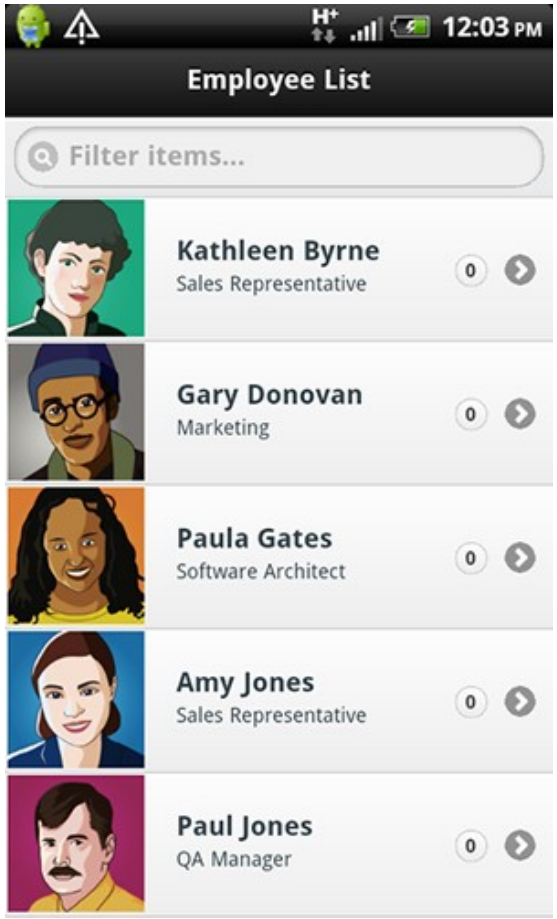


Image: http://coenraets.org/blog/wp--content/uploads/2011/10/directory11.png

Single--page Applications (SPA)

- Web app that fits on **a single web page**
  - Fluid UX, like desktop app
  - Examples like Gmail, Google maps
- Html page contains **mini--views** *(*HTML Fragments*)* that can be loaded in the background
- **No reloading** of the page,
- Requires handling of **browser history, navigation and bookmarks**

JavaScript

- SPAs are implemented using **JavaScript** and **HTML**

Challenges in SPA

- **DOM Manipulation**
  - How to manipulate the view efficiently?
- **History**
  - What happens when pressing back button?
- **Routing**
  - Readable URLs?
- **Data Binding**
  - How bind data from model to view?
- **View Loading**
  - How to load the view?
- Lot of coding! You could **use a framework instead ...**

Single-page Application

Single page apps typically have

- “application like” interaction
- dynamic data loading from the server-side API
- fluid transitions between page states
- more JavaScript than actual HTML

They typically do not have

- support for crawlers (not for sites relying on search traffic)
- support for legacy browsers (IE7 or older, dumbphone browsers)

SPAs Are Good For …

- “App-like user experience”
- Binding to your own (or 3rd party) RESTful API
- Replacement for Flash or Java in your web pages
- Hybrid (native) HTML5 applications
- Mobile version of your web site

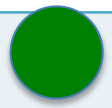
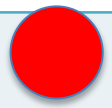
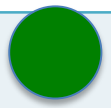
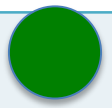
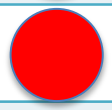
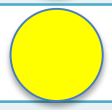
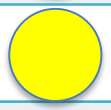
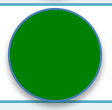
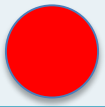
The SPA sweet spot is likely not on web sites,
but on content-rich cross-platform mobile apps

PJAX

Pjax is a technique that allows you to progressively enhance normal links on a page so that clicks result in the linked content being loaded via Ajax and the URL being updated using HTML5 pushState, avoiding a full page load.
In browsers that don't support pushState or that have JavaScript disabled, link clicks will result in a normal full page load. The Pjax Utility makes it easy to add this functionality to existing pages.

http://yuilibrary.com/yui/docs/pjax/

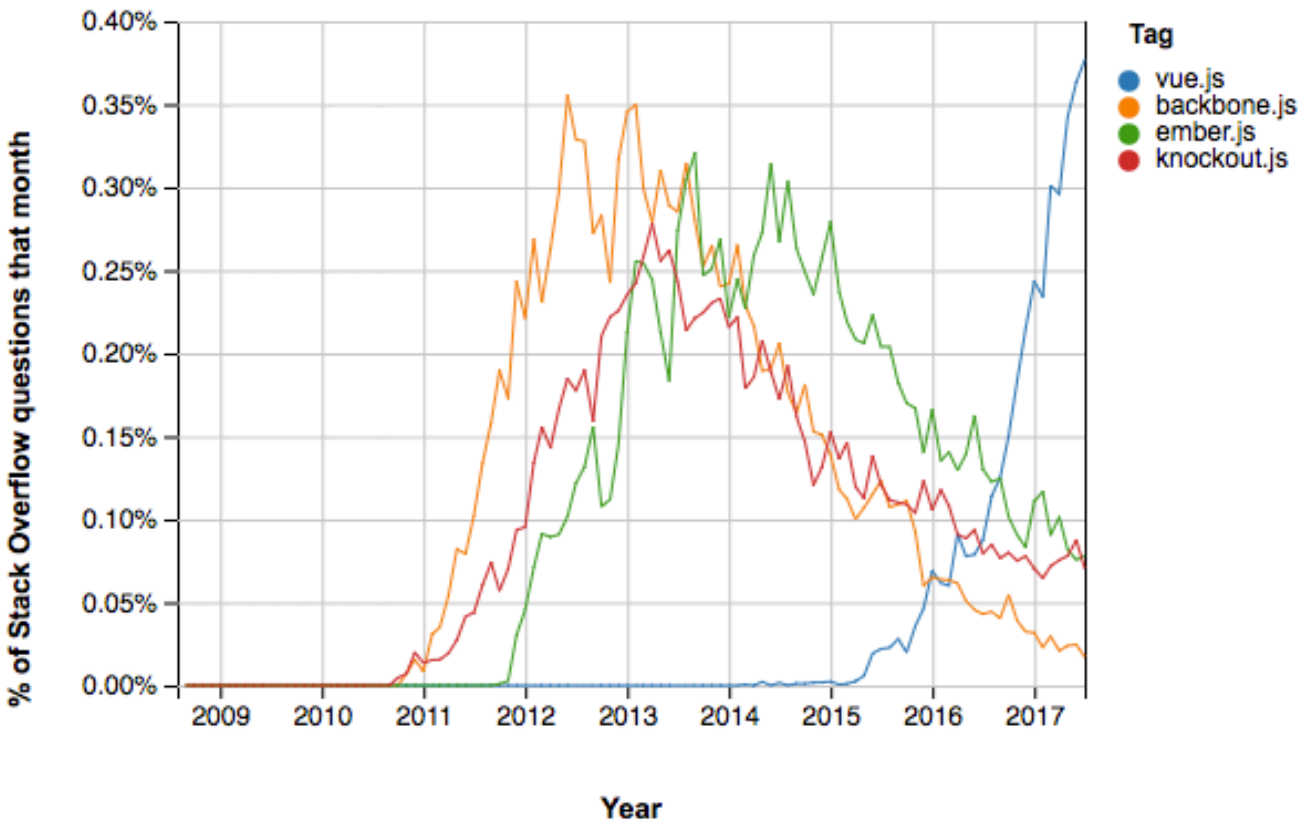
SPAs and Other Web App Architectures

	Server-side	Server-side + AJAX	PJAX	SPA
What	Server round-trip on every app state change	Render initial page on server, state changes on the client	Render initial page on server, state changes on server, inject into DOM on client-side	Serve static page skeleton from server; render every change on client-side
How	UI code on server; links & form posting	UI code on both ends; AJAX calls, ugly server API	UI code on server, client to inject HTTP, server API if you like	UI code on client, server API
Ease of development				
UX & responsiveness				
Robots & old browsers				
Who's using it?	Amazon, Wikipedia; banks, media sites etc.	Facebook?; widgets, search	Twitter, Basecamp, GitHub	Google+, Gmail, FT; mobile sites, startups

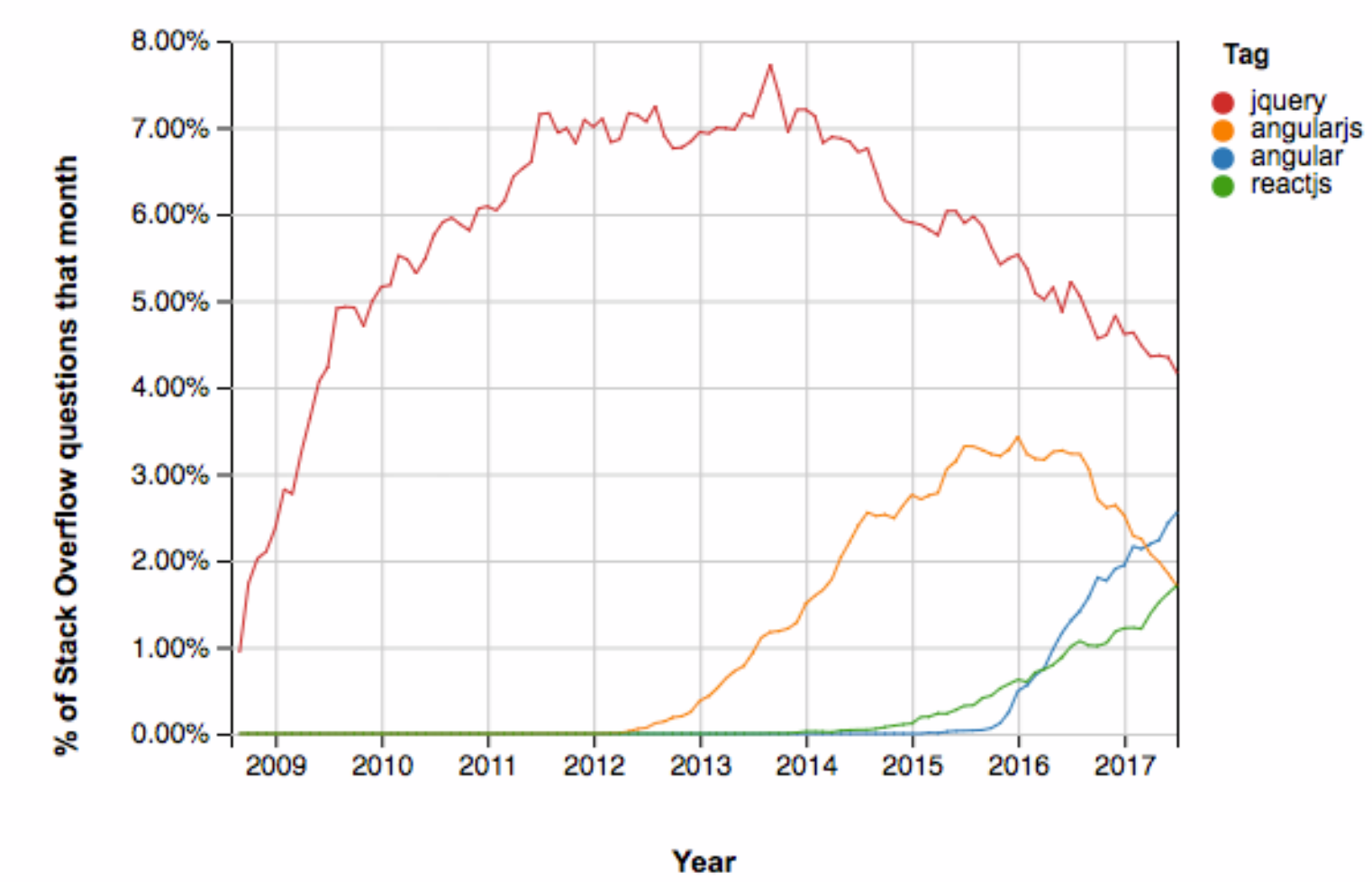
FROM: LAURI SVAN

Lifecycle of new JS frameworks

There appears to be a quick ascent, as the framework gains popularity and then a slightly less quick but steady decline as developers adopt newer technologies. These lifecycles only last a couple of years.



Jquery, Angular JS, Angular, React



ANGULAR_JS

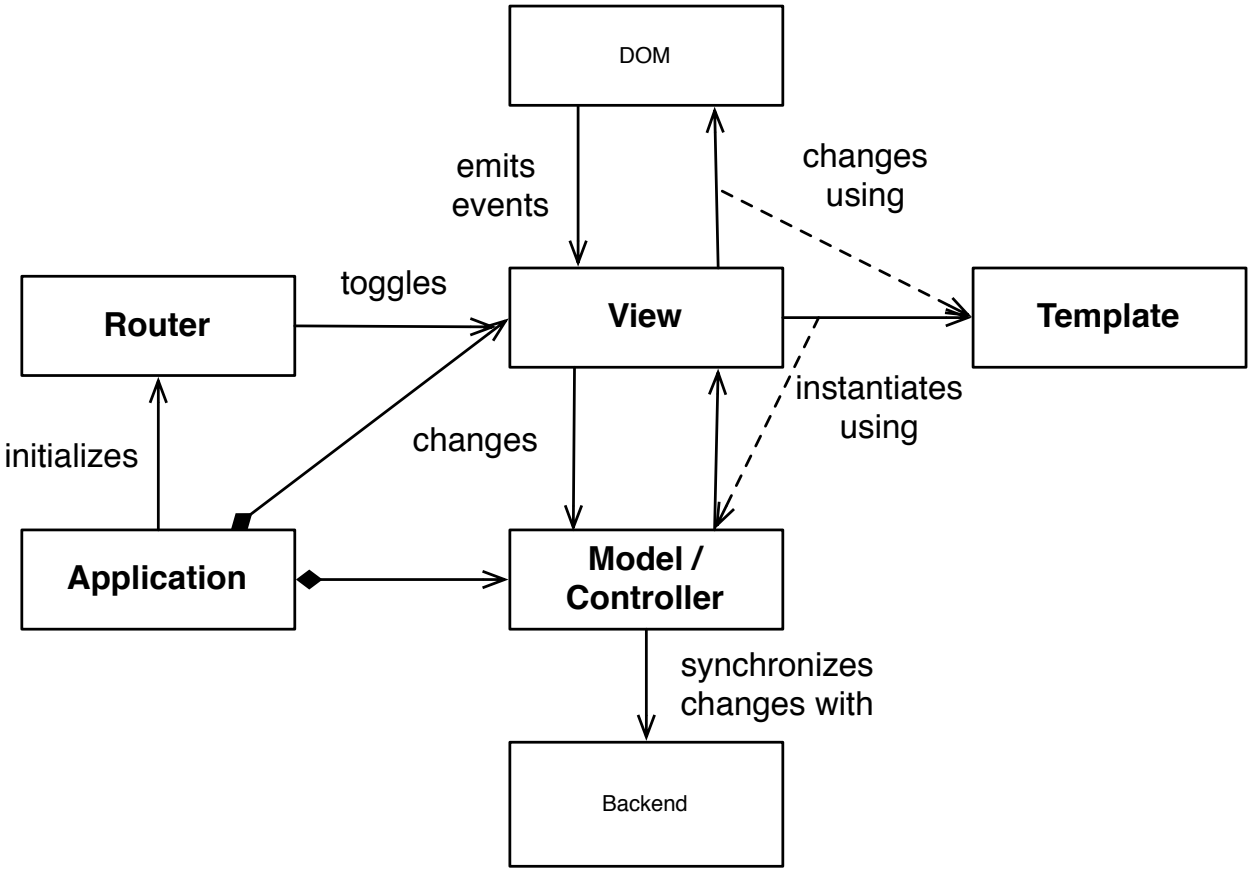
Angular JS

- **Single Page App Framework** for JavaScript
- Implements client--side **MVC** pattern
  - Separation of presentation from business logic and presentation state
- **No direct DOM** manipulation, less code
- Support for all major browsers
- Supported by Google
- Large and fast growing community

AngularJS – Main Concepts

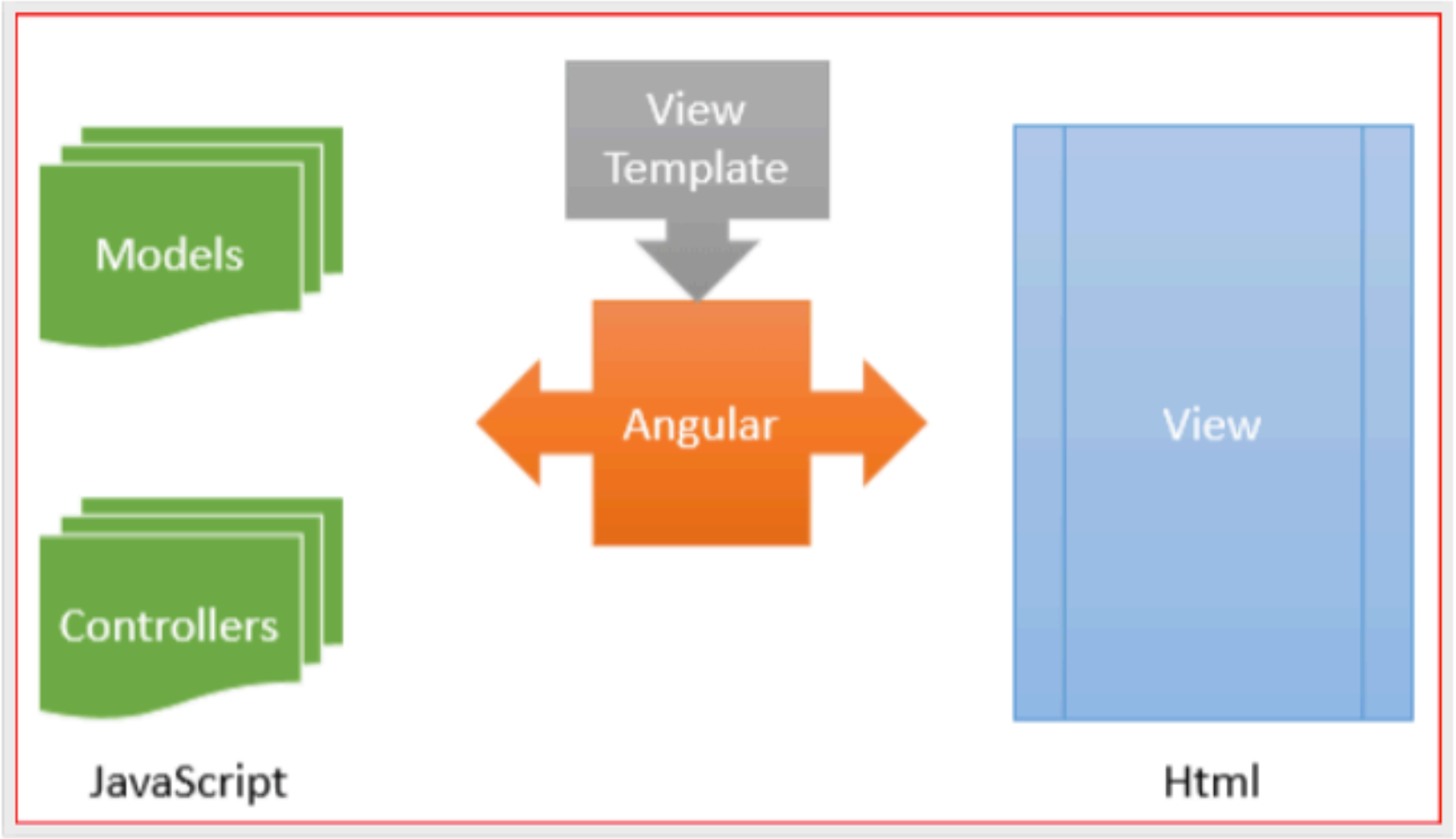
- Templates
- Directives
- Expressions
- Data binding
- Scope
- Controllers
- Modules
- Filters
- Services
- Routing

Anatomy of a Backbone SPA



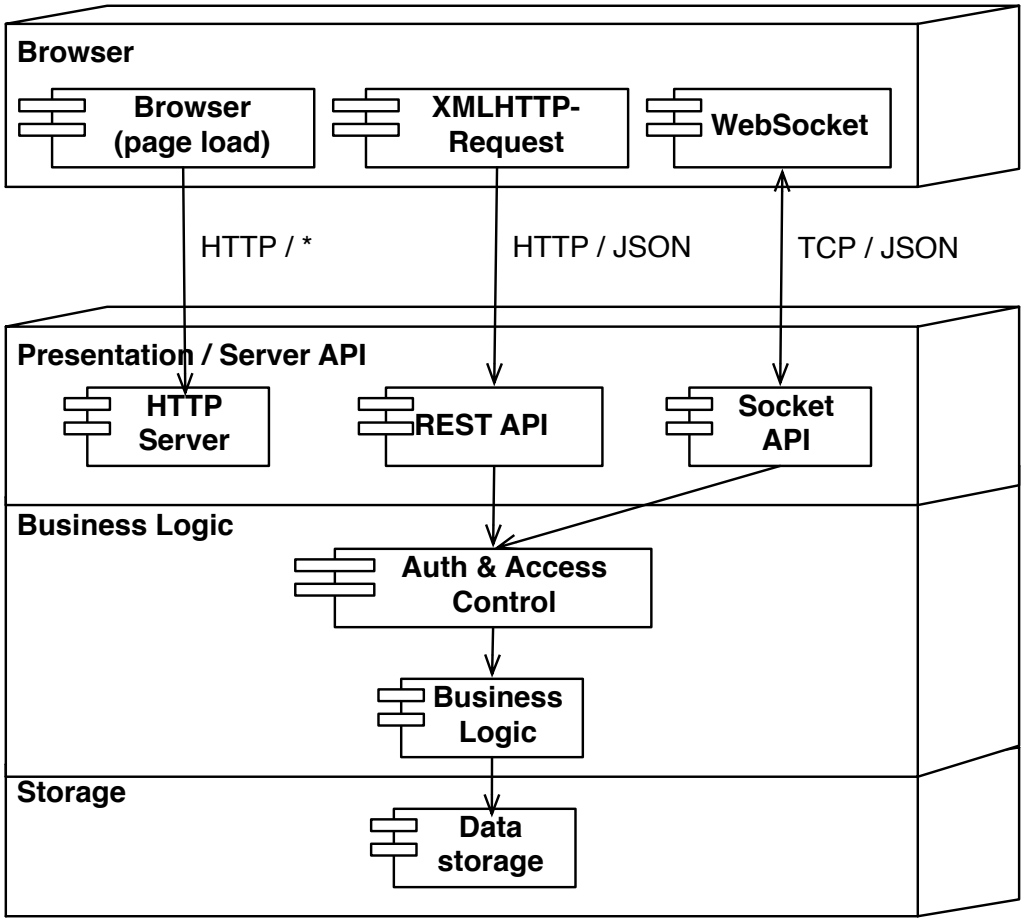
- Application as a ‘singleton’ reference holder
- Router handles the navigation and toggles between views
- Models synchronize with Server API
- Bulk of the code in views
- All HTML in templates

FROM: LAURI SVAN



From Gary Arora

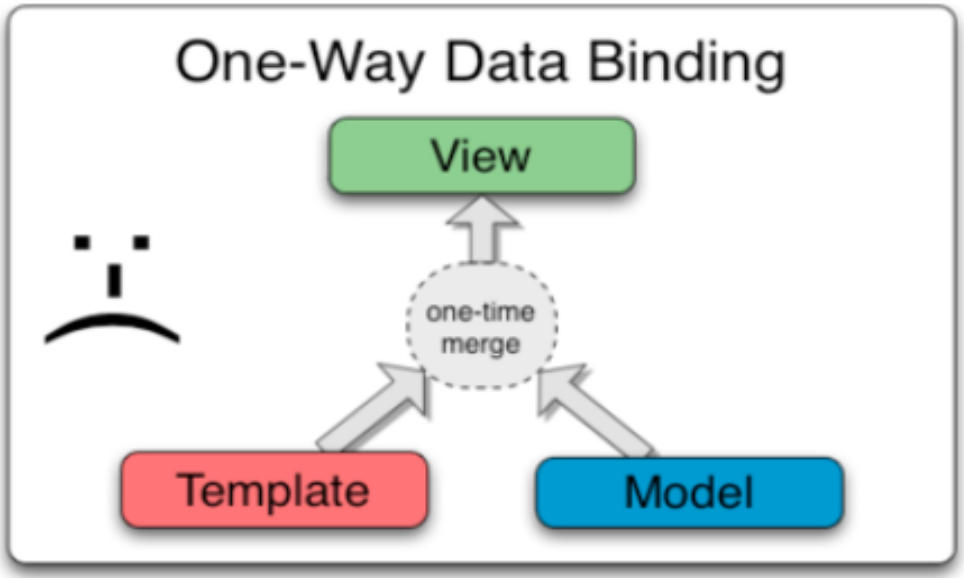
SPA Client-Server Communication

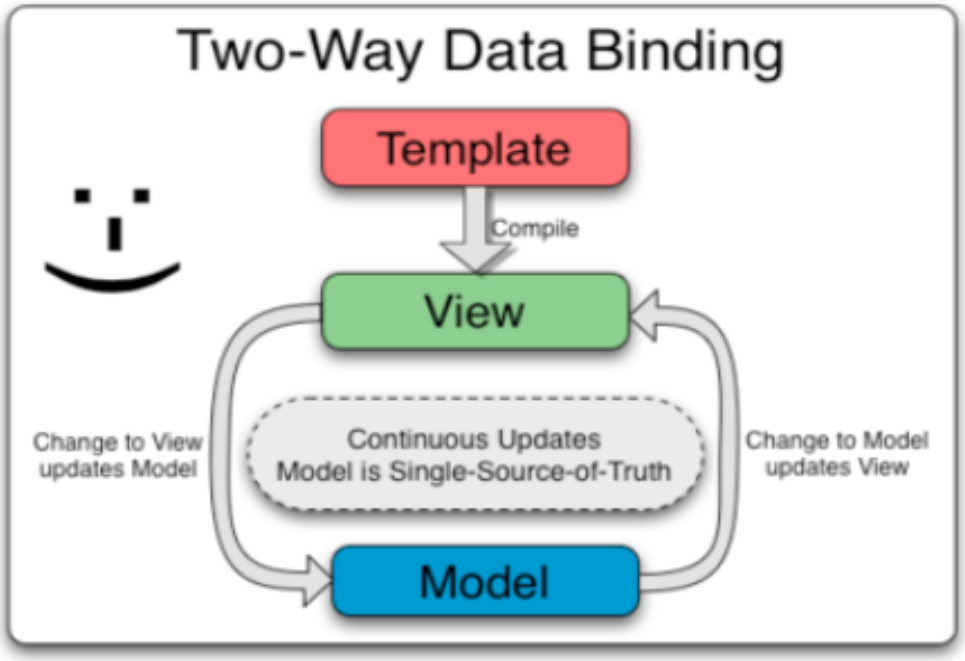


- HTML and all the assets are loaded in first request
- Additional data is fetched over XMLHTTPRequest
- If you want to go real-time, WebSockets (socket.io) can help you
- When it gets slow, cluster the backend behind a caching reverse proxy like Varnish

FROM: LAURI SVAN

HOW IT WORKS?





From Rouson

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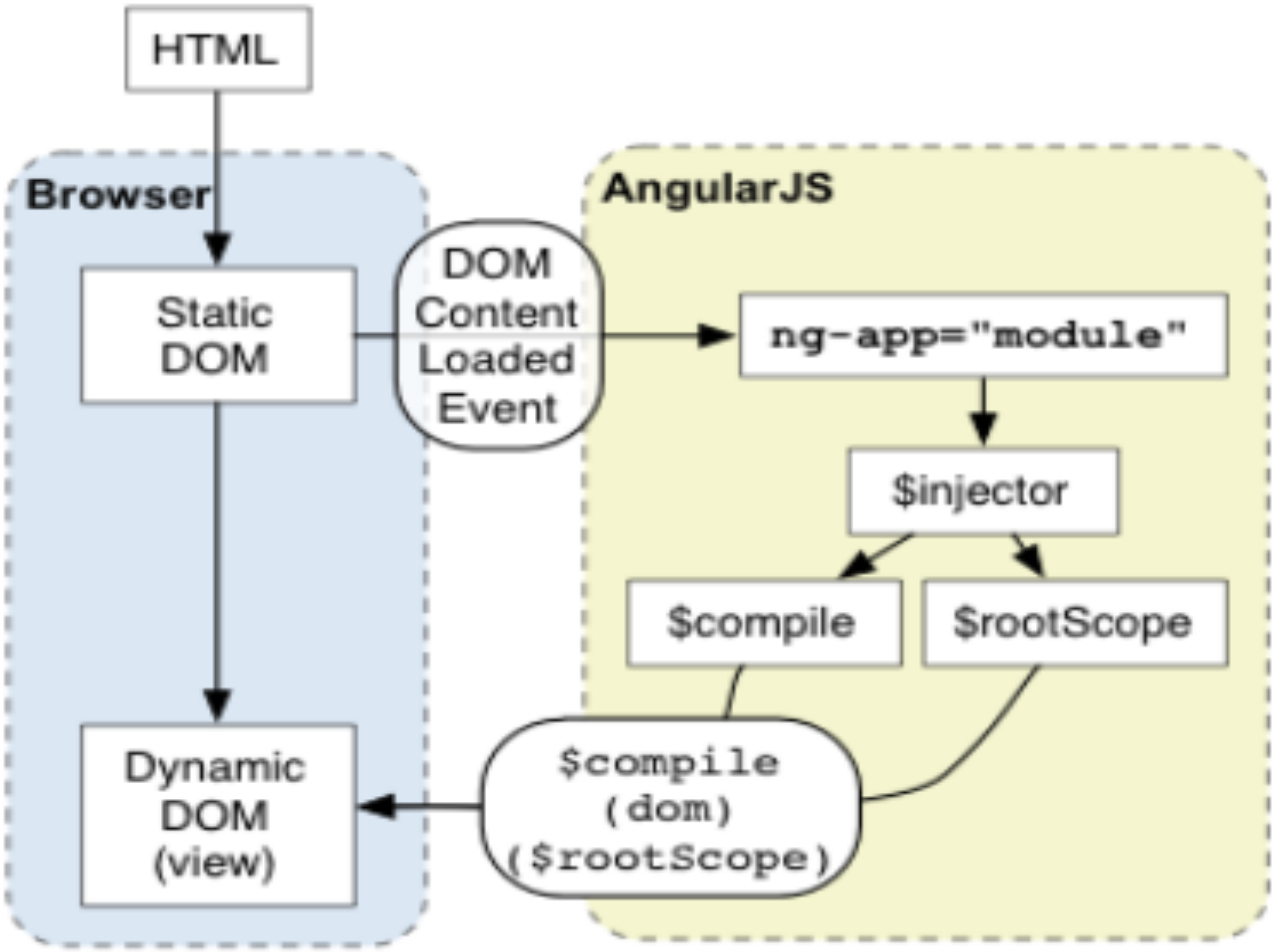

From Rouson

GETTING STARTED WITH ANGULAR_JS

Basic Concepts

- **1) Templates**
  - HTML with additional markup, directives, expressions, filters ...
- **2) Directives**
  - Extend HTML using `ng-app`, `ng-bind`, `ng-model`
- **3) Filters**
  - Filter the output: `filter`, `orderBy`, `uppercase`
- **4) Data Binding**
  - Bind model to view using expressions `{{ }}`

Name: pippo

pippo

First Example – Template

Template

```
<!DOCTYPE html>
<html>
 <head>
 <title>Title</title>
 <meta charset="UTF-8" />
 <style media="screen"></style>
 <script
src="https://ajax.googleapis.com/ajax/libs/angularjs/1.4.8/angu
lar.min.js"></script>
 </head>
 <body>
 <div ng-app>
<!-- store the value of input field into a variable name -->
<p>Name: <input type="text" ng-model="name"></p>
<!-- display the variable name inside (innerHTML) of p -->
<p ng-bind="name"></p>
</div>
</body>
</html>
```

2) Directives

- **Directives** apply special behavior to attributes or elements in HTML
  - Attach behaviour, transform the DOM
- Some directives
  - **ng-app**
    - Initializes the app
  - **ng-model**
    - Stores/updates the value of the input field into a variable
  - **ng-bind**
    - Replace the text content of the specified HTML with the value of given expression

About Naming

- AngularJS HTML Compiler supports multiple formats
  - ng-bind
    - Recommended Format
  - data-ng-bind
    - Recommended Format to support HTML validation
  - ng_bind, ng:bind, x-ng-bind
    - Legacy, don't use

Lots of Built in Directives

- ngApp
- ngClick
- ngController
- ngModel
- ngRepeat
- ngSubmit
- ngDblClick
- ngMouseEnter
- ngMouseMove
- ngMouseLeave
- ngKeyDown
- ngForm

2) Expressions

- Angular **expressions** are JavaScript--like code snippets that are usually placed in bindings
  - `{{ expression }}.`
- Valid Expressions
  - `{{ 1 + 2 }}`
  - `{{ a + b }}`
  - `{{ items[index] }}`
- Control flow (loops, if) are not supported!
- You can use **filters** to format or filter data

3) Filter

- With **filter,** you can **format or filter** the output
- **Formatting**
  - currency, number, date, lowercase, uppercase
- **Filtering**
  - filter, limitTo
- **Other**
  - orderBy, json

API Reference

https://docs.angularjs.org/api/ng/filter/filter