

Adventure Time

with

JavaScript & Single Page Apps Workshop Edition

Carl Bergenhem - Web Unleashed 2013 - **@carlbergenhem**

Introductions

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Workshop Schedule

What is a SPA?

Why SPA?

History

What makes up a SPA?

Runthrough of each piece

Popular MV* Frameworks

Backbone JS

Angular JS

Kendo UI

**Content is similar to yesterday's
session**

What is a SPA?

Single Page Application

**A web app that fits in a single
page**

Entire app is loaded at once

Built with a MV* Framework

Server provides the initial app

Section our HTML page in views

Get data via RESTful requests

Bind the data to our UI

Business logic in our MV* framework

MV* framework handles URL requests

Why SPA?

**Create desktop-like apps in the
web**

Increase responsiveness

Reduce loadtime of pages

Less time spent on the server

Control user interactions on the client

Improved end-user experience

History

In the Beginning

Reign of the post back

Everything done on the server

Full page refreshes

We got wiser

Ajax & XHR Requests

Serve some content via server

Do asynchronous calls to server

Partial page refreshes

Focus on responsiveness

Introduce the SPA concept

Move all items over to the client

What makes up a SPA?

MV* Framework

Basic pieces of a MV*

- Model
- View
- *

A full SPA framework also has
Routing

Model

In charge of holding data

Communication with server

Work with server end-points

**Define what data should be
used**

Controller

Control applications'

- State
- Logic
- Behavior

Custom business logic

Communicate between the View and Model

Provide validation

Bind data to our Views (UI)

View

**Responsible for the UI of our
app**

**Modifies and interacts with our
DOM**

**Main point of interaction from
users**

**Bound to the controller for data
and events**

**Often works with a template
engine**

Router

Responds to URL changes via JavaScript

Changes between various views

Browser initiated routes

- Type in a URL
- Hyperlink

Client initiated routes

**Change from one page or a
view to another**

Utilizes hash fragments

```
http://myurl.com/#/products/
```

JS rights to modify page URL

Anything after '#' is fair game

Just like the anchor tag

Examples

Wild SPA Apps

- Gmail
- Facebook
- Twitter
- Trello
- Asana

Popular MV* Frameworks

- **Backbone**
- **Angular**
- **Kendo UI**
- **Ember**
- **Durandal**
- **Meteor**

Today's Focus

Backbone

Angular

Kendo UI

**What we'll do for
each library**

Set up a quick NodeJS server

Wire up basic app structure

**Create the same app from
scratch**

Backbone

Light-weight library

The basic foundation

Not a ton of extra frills

Heavy lifting is up to you

Huge community for tooling

Offers a set of helpful classes

**Each one can
- and will be -
extended**

Backbone main classes

- **Model**
- **Collection**
- **View**
- **Router**

Model

Deals with all of our data

Bound to a view

Syncs back to our server

Backbone.Model

```
var myModel = new Backbone.Model({});
```

Extend Method

```
var Character = Backbone.Model.extend({
  defaults: {
    name: 'Blanks',
    species: 'Human',
    description: 'No description yet.'
  },
  initialize: function() {
    console.log('New character created');
  }
});

var jake = new Character({
  name: 'Jake the Dog',
  species: 'Dog',
  description: 'A magical dog. Best friend, and brother, with F
});
```

Use `get()` or `set()` to change data

```
var finn = new Character({ name: 'Finn the Human' });  
finn.set({ species: 'Human' });  
var name = finn.get('name'); //Finn the Human
```


Collections

Group related models together

Methods for adding/removing models

Simple array-like object

Backbone.Collection

```
var Character = Backbone.Model.extend({
  defaults: {
    name: 'Blanks',
    species: 'Human',
    description: 'No description yet.'
  },
  initialize: function() {
    console.log('New character created');
  }
});

var Cast = Backbone.Collection.extend({
  model: Character
});

var jake = new Character({
  name: 'Jake the Dog',
  species: 'Dog',
  description: 'A magical dog. Best friend, and brother, with F
});

var finn = new Character({
```

View

The link between models and the UI

**Renders the models and their
data**

**Views are bound to models or
collections**

**Receives events from the
Model and HTML document**

The 'el' property

- Every view has an 'el' property
- If not defined, a blank div is created
- References the view's DOM object
- Pass in a HTML element to modify it
- Can be a jQuery object via \$el

Backbone.View

```
var FinnView = Backbone.View.extend({
  tagName: 'div',
  id: 'finnDiv',
  className: 'finnClass',
  attributes: {
    'data-custom': 12345
  }
});

var quickView = new FinnView();

$('#placeholder').prepend(quickView.el);
```

Resulting HTML

```
<div data-custom="12345" id="sampleDiv" class="sampleClass"></div>
```

Default templates by Underscore

jsBin.com/IWewESE/8/

Router

Use of hash fragments

```
http://myurl.com/#/characters/
```


**Parses URL and finds
appropriate function**

Uses HTML5 History API if possible

Backbone.Router

```
var SampleRouter = Backbone.Router.extend({
  routes: {
    'character/:name': 'character' //route pattern : handler
  },
  character: function(name) { //handler
    //...
  }
});
```

Backbone Sample

Grab BackboneJS

<http://backbonejs.org/>

Grab Underscore
<http://underscorejs.org/>

And jQuery

<http://jquery.com/download/>

Let's dive in!

Backbone Summary

Barebones tools to build our app

Emphasis on data and Models

Not a ton of tools for the View

.extend({}) everything

Backbone main classes

- **Model**
- **Collection**
- **View**
- **Router**

Model deals with all of our data

**A collection has multiple
Models**

View needs a Model
Works with Model and DOM

**Router works with URL to serve
correct View**

Angular

Created by Google

**Believes HTML can be more
powerful**

Extends HTML vocabulary

**Tries to follow a pure HTML
path**

Angular components

- Expressions
- Controllers
- Directives
- Routing

Expressions

**Allows us to bring data to the
view**

Uses a simple syntax

```
{{ model.FieldName }}
```

One-way binding

```
<div ng-controller="SampleController">  
  <span>{{ character.name }}</span>  
</div>
```

Two-way binding

```
<select ng-model="selectedCharacter">  
  <option value="0">Finn</option>  
  <option value="1">Jake</option>  
  <option value="2">BMO</option>  
</select>
```

Controllers

Central component of Angular apps

Contains data, logic, and states

**Creates a scope for the HTML
element**

\$scope variable

Sample Controller

```
var sampleAppControllers = angular.module('sampleAppControllers', []);

sampleAppControllers.controller('ShowController', ['$scope',
function ShowController($scope) {
    $scope.sampleVariable = 1;
    $scope.sampleArray = [{
        fieldOne: 0,
        fieldTwo: "Test"
    },
    {
        fieldOne: 1,
        fieldTwo: "Sample"
    }
    ]
    $scope.sampleFunction: function() {
        //Function logic
    }
}]);
```

\$scope only available within the
HTML element it is defined in

Directives

HTML-like attributes

Declared in view code

Helps with setting up

- **Angular App**
- **Controllers and binding**
- **Attributes**
- **Conditional display**
- **Events**

Sample Directives

- `ng-app="appName"`
- `ng-controller="SampleCtrl"`
- `ng-model="ScopeVar"`
- `ng-src="{{scopeUrlVar}}"`
- `ng-click="eventHandler()"`

Routing

Works with URL like you'd think

Single main view
Placeholder element for content

Load other views via partials

Just HTML pages

Simple structure for routing

```
var sampleApp = angular.module('sampleApp', [  
    'ngRoute',  
    'myControllers'  
]);  
  
sampleApp.config(['$routeProvider',  
    function($routeProvider) {  
        $routeProvider.when('/test', { templateUrl: 'partials/test.html' });  
        $routeProvider.when('/sample:id', { templateUrl: 'partials/sample.html' });  
        $routeProvider.otherwise({ redirectTo: '/' });  
    }]);
```

Angular Sample

Hit up Angular
<http://angularjs.org/>

Grab the latest (1.2.0-rc.3)

Also get angular-routing!

Let's get to it!

Angular Summary

Extension of HTML

**Empowering your regular HTML
code**

Controllers rule all

**Data can be bound one- or two-
way**

DOM manipulation via controller

Drop that jQuery ;)

Directives are extremely helpful
Wire up events and such

Routers use partials of HTML

Kendo UI

Part of Kendo UI Web

Combine SPA and MVVM Frameworks

Additional helpful items

- **Template engine**
- **Effects and animations**
- **UI widgets**
- **Charts and gauges**

**Tooling across all parts of your
SPA**

Kendo UI key pieces

- **Observable**
- **View**
- **Layout**
- **Router**

Observable

Part of the Kendo UI MVVM framework

All fields are observable

All changes will propagate

kendo.observable

```
var finnModel = kendo.observable({  
    name: 'Finn the Human',  
    species: 'Human',  
    description: 'The last human in the Land of Ooo. Hangs out wi  
});
```

Use get() or set() with fields

```
var finnModel = kendo.observable({
    name: 'Finn the Human',
    species: 'Dog',
    description: 'The last human in the Land of Ooo. Hangs out wi
});

finnModel.set('species', 'Human');

var species = finnModel.get('species'); //Human
```

View

**Can be defined with simple
HTML string**

Works with Kendo UI templates

**Tie in with our observables to
create data bound UI**

kendo.View()

```
var index = new kendo.View('<span>Adventure Time!</span>');  
index.render('#placeholder');
```

With Kendo UI Templates and Observables

jsbin.com/imAnimo/5/

Layout

**Provides a layout for views to
adhere to**

MasterPages for you .NET folks

**Easily display views in content
section**

Can also be nested

kendo.Layout

```
var view = new Kendo.View('<span>Finn the Human</span>');  
  
var layout = new kendo.Layout('<header>Header</header><div id="content"></div><footer>Footer</footer>');  
  
layout.render($('#app'));  
  
layout.showIn('#content', view);
```

Router

**Responsible for application
state**

Navigate between views

Use of hash fragments

```
http://myurl.com/#/characters/
```

Can programmatically navigate

**Use with Layout to show new
content**

kendo.Router()

```
var router = new kendo.Router();
router.route('/', function () {
    layout.showIn('#content', homeView);
});

router.route('/character', function () {
    layout.showIn('#content', characterView);
});

$(function() {
    router.start(); //very important

    router.navigate('/character');
});
```


Kendo UI Sample

Register on Kendoui.com

<http://www.kendoui.com/>

Grab Kendo UI Complete (Trial)

Let's also get jQuery

<http://jquery.com/download/>

**Time to become Kendo UI
Ninjas!**

Kendo UI Summary

Tools across the board

Classes for dealing with data

Helpful UI and View classes

Large set of UI widgets

Kendo UI SPA key items

- Observable
- View
- Layout
- Router

**What did we
learn today?**

Overall ideas of a SPA

- Load entire page at once
- Handle interactions on the client
- Communicate via RESTful services

Developed an application with

- Backbone JS
- Angular JS
- Kendo UI

**Each library has a different
approach**

Backbone

- Bare bones framework
- Powerful core classes
- Opens up for integration
- Relies on community for tools
- More hands-on

Angular

- **Extends HTML**
- **A very "pure" approach**
- **Directives**
- **Controllers are king**

Kendo UI

- **Wide spectrum of tooling**
- **MVVM, DataSource, and SPA**
- **UI Widgets**
- **Covers a bit of everything**

The End

Thanks for attending!

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github.com/bergenhem/talks