

Modern Web Development

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2003

HTML

CSS

JavaScript

Problem

Pages, not apps

2011

Backbone

Mustache

jQuery

Sass / Less

Problems

Global CSS

Manual UI updates

No modules

No build process

2016

ES6

Webpack

React

Redux

CSS Modules

ES6

Block-scoped variables

ES5

```
console.log(square); // "undefined"?!?  
for (var i = 0; i < 5; ++i) {  
  var square = i * i;  
  console.log(square);  
}
```

ES6

```
console.log(square); // ReferenceError  
for (let i = 0; i < 5; ++i) {  
  const square = i * i;  
  console.log(square);  
  square = 5; // TypeError  
}
```


String interpolation

ES5

```
var a = 2;  
console.log(a + ' fast ' + Math.sqrt(4) + ' furious');
```

ES6

```
const a = 2;  
console.log(`${a} fast ${Math.sqrt(4)} furious`);
```

Lexical this

ES5

```
var self = this;  
var foo = function() {  
  self.bar();  
};
```

ES6

```
const foo = () => {  
  this.bar();  
};
```

Lambda expressions

ES5

```
var add = function(a, b) {  
  return a + b;  
};
```

ES6

```
const add = (a, b) => a + b; // lambda a, b: a + b
```

```
const add = (a, b) => {  
  return a + b;  
};
```

Modules

ES5 + CommonJS

```
var foo = require('foo.js');  
module.exports = { bar: foo(5) };
```

ES6

```
import foo from 'foo.js';  
export const bar = foo(5);
```

Webpack

- Module bundler
- Build system
- Development server

Module bundler

webpack.config.js

```
{  
  entry: './main.js',  
  output: {  
    filename: 'bundle.js'  
  }  
}
```

Running Webpack

```
$ webpack
```

Build system

Loaders

```
loaders: [  
  { test: /\.scss$/, loader: 'style!css!sass' }  
]
```

output = style(css(sass(input)))

Plugins

```
plugins: [  
  new webpack.optimize.UglifyJsPlugin(),  
  new RemoveEmptyCSSRulesPlugin()  
]
```

In the web rewrite, Webpack...

1. Lints ES6
2. Transpiles JS from ES6 to ES5
3. Combines and minifies JS
4. Runs Sass
5. Combines and minifies CSS
6. Autoprefixes CSS
7. Hot-reloads the dev server at localhost:9000

...on every file save, in under 2 seconds.

React

Replaces Mustache, jQuery, and most of Backbone

Open-sourced by Facebook in 2013

Used by Twitter, Dropbox, Netflix, Instagram, Asana...

Backbone vs. React

index.html

```
<html>
  <head>
    <title>Example</title>
  </head>
  <body>
    <div id="root"></div>
  </body>
</html>
```

Hello Backbone

app.js

```
var AppView = Backbone.View.extend({  
  el: $('#root'),  
  render: function() {  
    this.$el.html(this.template({ name: 'World' }));  
    return this;  
  },  
  template: require('app.tmpl')  
});  
new AppView().render();
```

app.tmpl

```
<p>Hello {{ name }}!</p>
```

Hello React

app.jsx

```
const App = props => <p>Hello {props.name}!</p>;  
const mountNode = document.getElementById('root');  
ReactDOM.render(<App name='World' />, mountNode);
```

Redux

App as state machine

Single source of truth

Update state by dispatching actions

Counter app

Initializing the state machine

```
import { createStore } from 'redux';  
  
const initialState = 0;  
const reducer = (state, action) => state + action;  
const store = createStore(reducer, initialState);
```

State transitioning

```
store.getState(); // Returns 0  
store.dispatch(4);  
store.dispatch(-1);  
store.dispatch(2);  
store.getState(); // Returns 5
```

Connecting components to a store

```
const Counter = props => (  
  <div>  
    <h2>{props.owner}'s Counter</h2>  
    <p>Current value is {props.currentValue}</p>  
    <button onClick={props.handleClick}>Add 1</button>  
  </div>  
);
```

```
import { connect } from 'react-redux';  
const CounterContainer = connect(  
  state => ({ currentValue: state }),  
  dispatch => ({ handleClick: () => dispatch(1) })  
) (Counter);
```

```
<CounterContainer owner='Art' />
```

prev state

▼ Object

- ▶ **config**: Object
- ▶ **courses**: Object
- ▶ **form**: Object
- ▶ **player**: Object
- ▶ **routing**: Object
- ▶ **skills**: Object
- ▶ **ui**: Object
- ▶ **user**: Object
- version**: 3

action

▼ Object

- ▶ **payload**: Object
- type**: "@@router/LOCATION_CHANGE"

next state

- ▶ Object {**player**: Object, **skills**: Object, **config**: Object, **form**: Object, **routing**: Object...}

CSS Modules

What's wrong with CSS?

Global scope

```
.home-page .sidebar button { color: red }
```

Specificity

```
button          { color: red }  
#mutton         { color: yellow }  
button.glutton  { color: green }  
.glutton        { color: blue }
```

```
<button id="mutton" class="glutton">Click me</button>
```

Class list boilerplate

```
<button class="btn btn-blue btn-solid">Click me</button>
```

The solution

Only use single class names as CSS rule selectors

```
.HomePage--practice-button { ... }  
.SkillPage--test-out-button { ... }  
.SkillPage--practice-button { ... }  
.SessionPage--next-button { ... }  
.button--solid { ... }  
.button--medium { ... }
```

Automatic class list generation

```
<button class="HomePage--practice-button button--solid  
  button--medium button--blue">Practice</button>
```

Webpack in CSS Module mode

HomePage.css

```
.practice {  
  composes: solid from 'button.css';  
  width: 100%;  
}
```

```
.HomePage--practice { width: 100% }
```

HomePage.jsx

```
import styles from 'HomePage.css';  
// { practice: 'HomePage--practice button--solid' }  
const HomePage = props => (  
  <button className={styles.practice}>Practice</button>  
>);
```

CSS Modules in production

```
▼ <div class="jR76C">
  ▼ <div class="_1DWXz">
    ▼ <div class="kHldG">
      ▼ <div class="_1mcuw _2P80K">
        ▶ <h3>...</h3>
        <p>la, fille, le, garçon, je, suis, un,
        femme, une</p>
        <a class="_2P867 _2GErh _3QG2 _1vaUe
        _3IS_q _1XnsG _1vaUe _3IS_q" href="/
        skill/fr/Basics-1/1">Redo</a> == $0
      </div>
    </div>
  </div>
  ▶ <div class="kHldG">...</div>
  ▶ <div class="kHldG">...</div>
  </div>
```

```
._3QG2_ {
  font-size: 15px;
  padding: ▶ 7px 21px;
}

._1vaUe {
  border: ▶ 2px solid;
}

._3IS_q {
  border-radius: ▶ 98px;
  cursor: pointer;
  display: inline-block;
  font-weight: 700;
  margin: ▶ 0;
  text-align: center;
```

Demo

Questions?