

React Workshop

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Christopher Chiche

About me

- Software engineer from EPFL
- Work at OptumSoft on distributed systems
- Passionate about data visualization and front-end technologies
- Top 7 answerer on StackOverflow on d3.js
- Likes climbing

Today's goal

- Build a web application using React.js
- Understand better what reactive programming is about
- Use d3.js if you want to!

Technologies used

- React.js: Logic
- React-bootstrap.js: Twitter's bootstrap components, as react components
- d3.js: (optional) Data visualization

Reactive Programming

- Data flows from the source to the application
- No delays
- The application has the same logic for displaying original data and updates.

What is React ?

- “A JavaScript library for building user interfaces”
- Just the UI: Can be seen as the V of MVC
- Virtual DOM
- One way Data flows
- Build by Facebook

React - Code example

```
1 var HelloMessage_1 = React.createClass({  
2   render: function() {  
3     |   return <div>Hello {this.props.name}</div>;  
4   }  
5 });  
6  
7 React.render(<HelloMessage_1 name="John" />, document.getElementById("example1"));
```

React - update components

```
1 var HelloMessage_2 = React.createClass({
2   render: function() {
3     return <div>Hello {this.props.name}</div>;
4   }
5 });
6
7 React.render(<HelloMessage_2 name="John" />, document.getElementById('example2'));
8
9 window.setTimeout(function() {
10   React.render(<HelloMessage_2 name="Bob" />, document.getElementById('example2'));
11 }, 1000);
```


React - stateful components

```
1 var HelloMessage_3 = React.createClass({
2   |   getInitialState: function() {
3   |     |   return { lastName: "" }
4   |   },
5   |   handleChange: function (event) {
6   |     |   this.setState({lastName: event.target.value});
7   |   },
8   |   render: function () {
9   |     |   var name = this.props.firstName+' '+this.state.lastName;
10  |     |   return <div>
11  |     |     |   Hello {name}<br/>
12  |     |     |   What is you last name? <input type="text" onChange={this.handleChange}/>
13  |     |     </div>;
14  |   }
15  | });
16
17 React.render(<HelloMessage_3 firstName="Bob" />, document.getElementById('example3'));
```

React-Bootstrap

- Wrapper around Bootstrap 3 for react.
- Helps write beautiful front ends very easily
- Example:

```
1 var PanelGroup = ReactBootstrap.PanelGroup;
2 var Panel = ReactBootstrap.Panel;
3 const panelGroupInstance = (
4   <PanelGroup defaultActiveKey="2" accordion>
5     <Panel header="Panel 1" eventKey="1">Panel 1 content</Panel>
6     <Panel header="Panel 2" eventKey="2">Panel 2 content</Panel>
7   </PanelGroup>
8 );
```

d3.js

Data-Driven Documents

- Bind arbitrary data to the DOM
- Efficient for large data sets, extremely fast
- Exposes the full capabilities of web standards

d3 - Selections

```
1 d3.selectAll('#example5 p').style('color','blue');
```

Dynamic properties

```
1 d3.selectAll("#example6 p").style("color", function(d, i) {  
2   return i % 2 ? "blue" : "green";  
3 });
```

d3

enter - exit - update

```
1 var p = d3.select("#example7").selectAll("p")
2   .data([4, 8, 15, 16, 23, 42])
3   .text(String);
4
5 // Enter...
6 p.enter().append("p")
7   .text(String);
8
9 // Exit...
10 p.exit().remove();
```

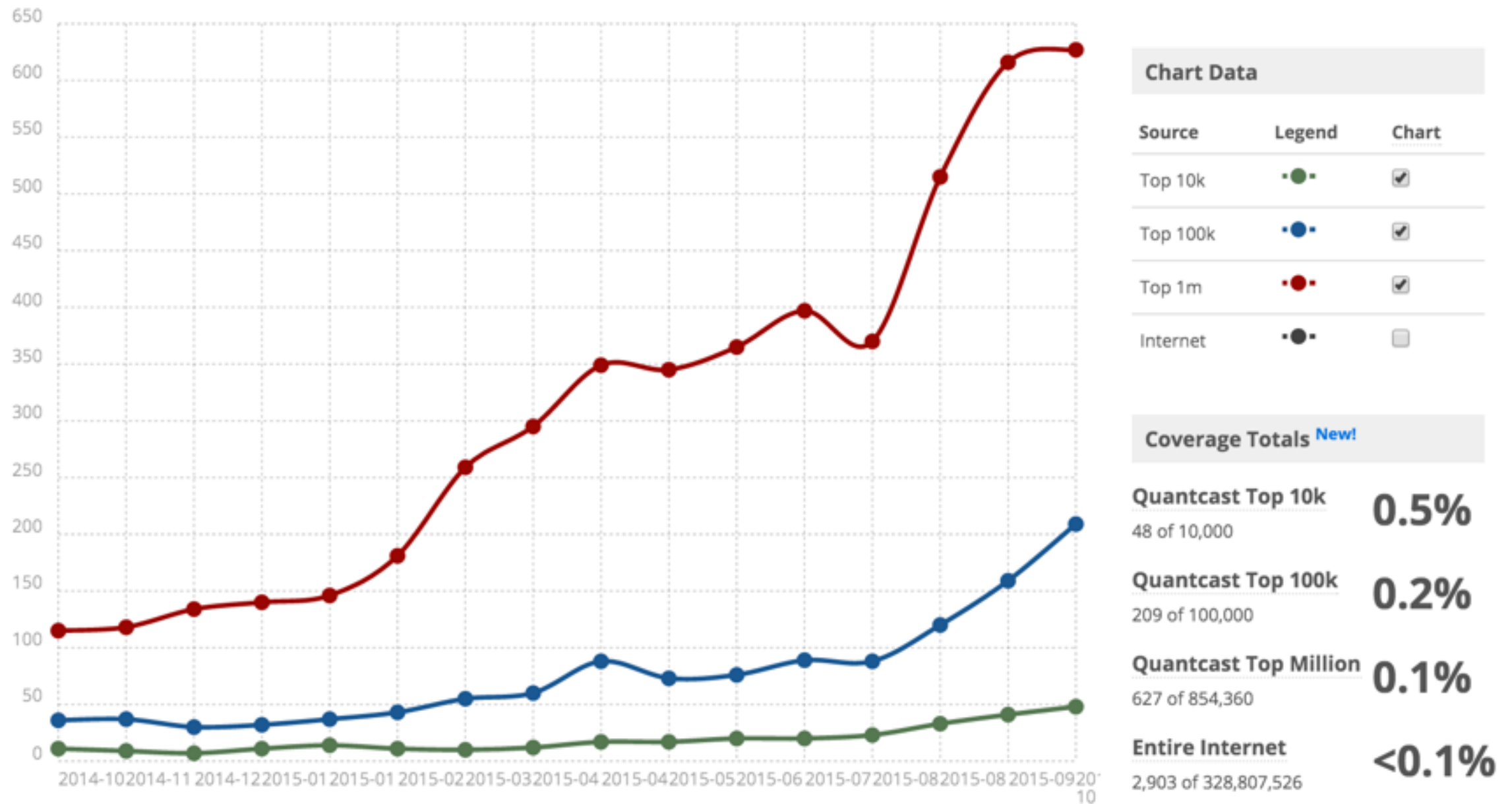
How to use d3.js for your website

- Use another library that is build on top of d3 (nvd3.js, c3.js, dimple...)
- If it's complicated, try to find another library
- If what you do is really specific: use d3.js

React vs. d3 - Features

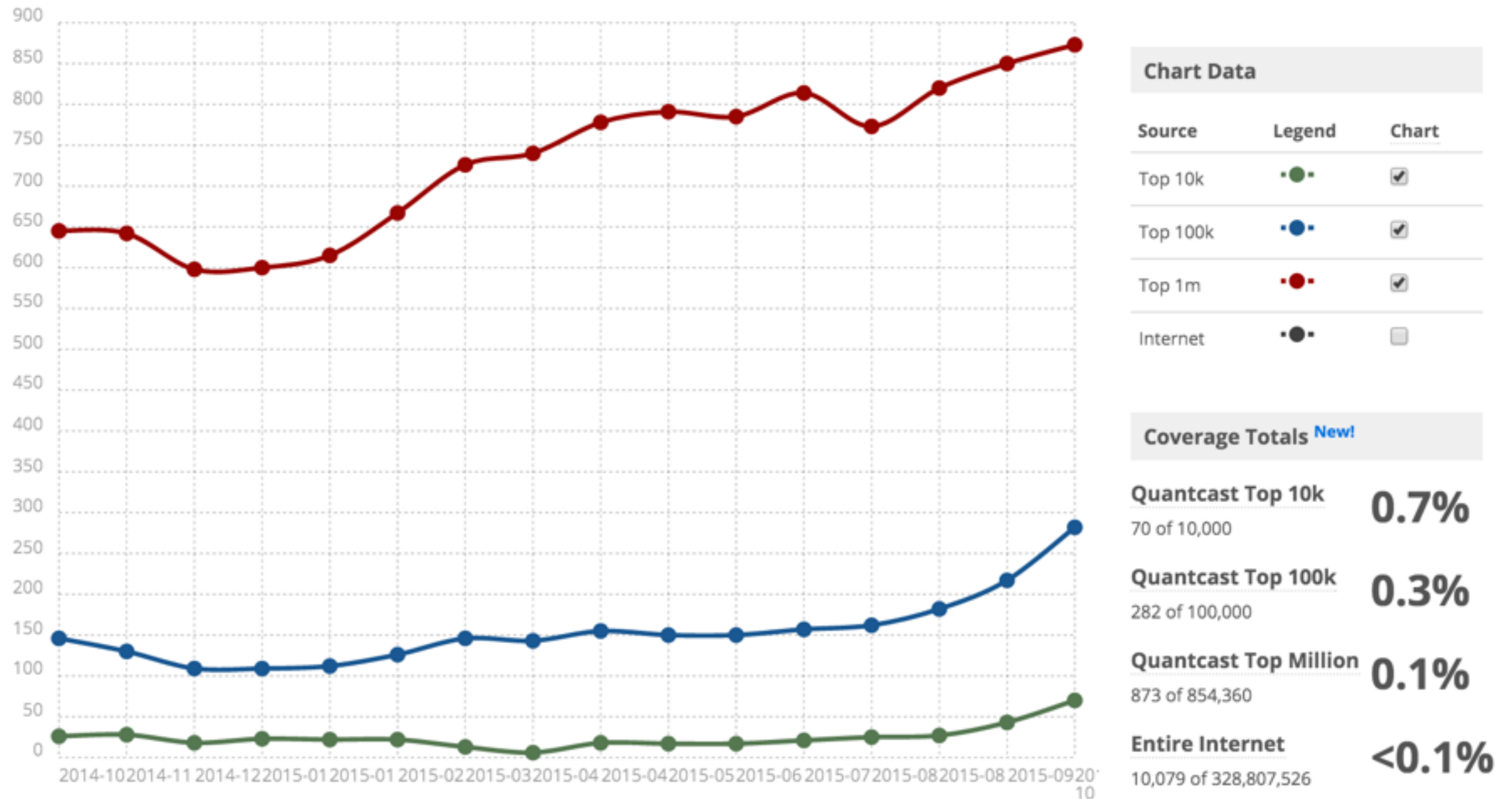
	React.js	d3.js
Interacts with the DOM	YES	YES
Has a DOM-like syntax	YES	NO
Explicit about update mechanisms	NO	YES
Optimized for Data Visualization	NO	YES
Easy to learn	YES	NO
Works with all web components	NO (some svg parts)	YES

React - Market Shares



Source: <http://trends.builtwith.com/javascript/React>

d3.js - Market Shares



Source: <http://trends.builtwith.com/javascript/D3-JS>

React with d3

Combine them!

- Use React to interact with the DOM
- Use d3.js for all charting specific functions (svg, scaling, axis...)
- Keep it simple by wrapping d3 elements in React components
- Use <https://reactiva.github.io/react-d3-website/>

Some more JavaScript experience

- Use modules. CommonJS or ES6
- Write your code in ES6 and ES7 and use babel to be compatible with all browsers
- Compile your code, bundle it, minimize it! Browsers will follow but they don't lead anymore.
- Test your front-end code! After all it's what your user see, it's also what they can break easily
- Never write JavaScript inline in the HTML. Just don't.

What are we going to do today?

- Visualize immigration data in a web application
- Server:
 - GET /data/summary
 - GET /data/country/:countryName:
- Browser: we provide a basic template and an advanced template depending on what you want to work on.