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An Intro to JavaScript Web Apps on Oracle Database

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Agenda

1. Why JavaScript?
2. Creating a JavaScript App
3. Using the Oracle Database Node.js Driver
4. Reactive/Real-time data demo

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JavaScript is…

- Your browser's native language
  - Remember Java applets & Flash?
- Continually improving
  - ES6 brings many powerful constructs and features
- Everywhere
  - Can run on the server thanks to Node.js
  - Countless open source frontend and backend projects
- The world's most popular programming language
  - According to RedMonk

What is AngularJS?

- A JavaScript MVC framework
  - Others include Backbone, Ember, & Knockout
- Created by and maintained by Google
- Typically used to build single page applications (SPA)

Client Side Logic

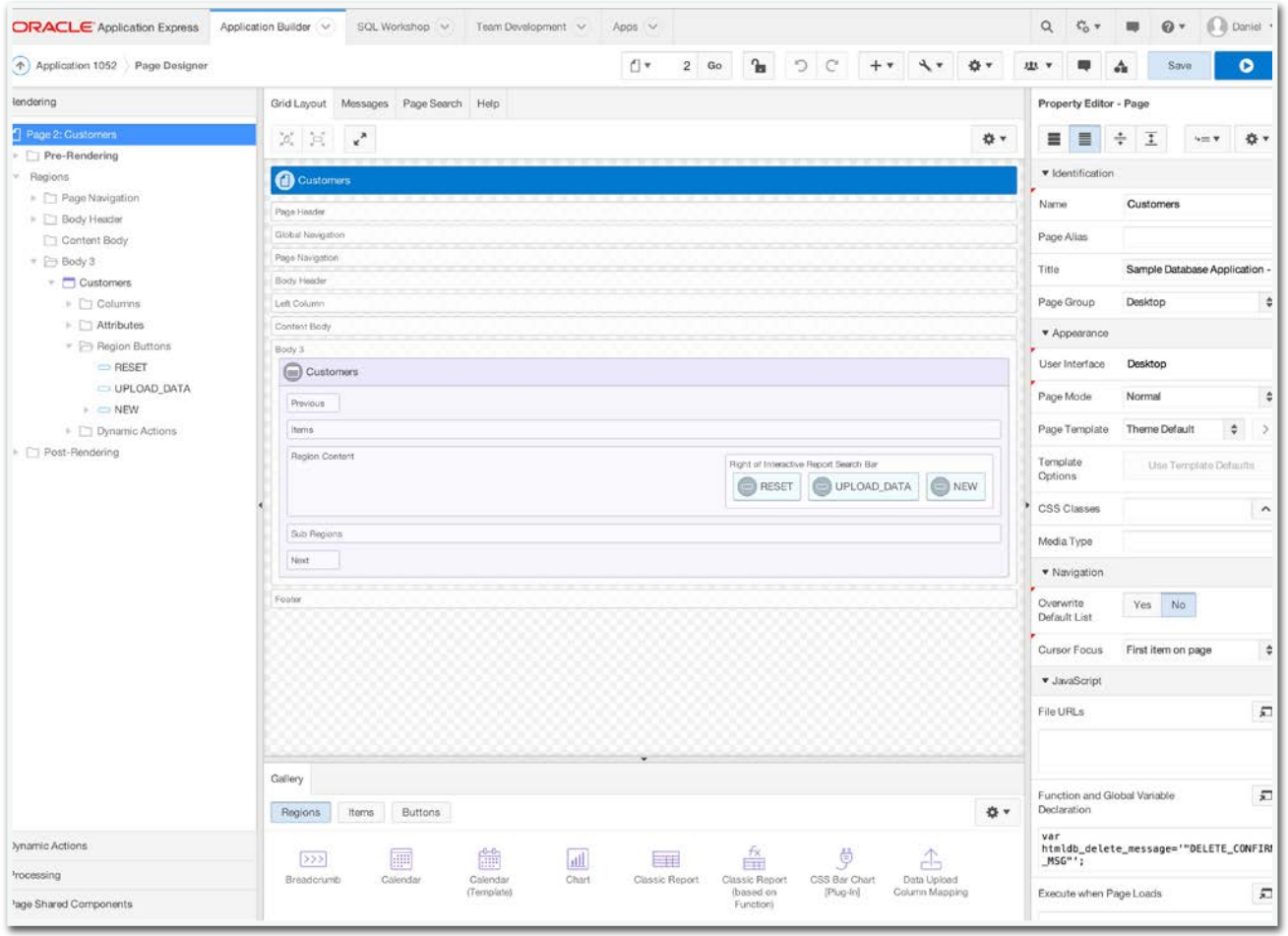
Advantages

- Avoid full page refreshes
- Snappier applications
- Reduced network traffic

Disadvantages

- Increased development time
- Data can’t be trusted
  - must re-validate server side

When is Client Side Logic Useful?



Complex, highly interactive UI

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Prerequisites

- Oracle Database
  - 11g or 12c
  - Access to HR
- Node.js installed
- Oracle Database Node.js Driver installed “globally”
- Detailed instructions here
  - https://jsao.io/2015/01/up-and-running-with-node-js-oracle/

Start your engines!

- Create a directory to hold the project
- Add a “public” sub-directory
- Add an index.html file to public

A dead simple web server with http

```
1  var http = require('http');
2
3  http.createServer(function(req, res) {
4      res.writeHead(200, {'Content-Type': 'text/plain'});
5      res.end('Hello World!');
6  }).listen(3000);
7
8  console.log('Server running at http://localhost:3000/');
```

A dead simple web server with Express

```
1  var express = require('express');
2  var app = express();
3
4  app.use('/', function(req, res) {
5      res.end('Hello World.');
6  });
7
8  app.listen(3000, function() {
9      console.log('Server running at http://localhost:3000/');
10 });
```

Serve static files in “public” with serve-static

```
1  var express = require('express');
2  var app = express();
3  var serveStatic = require('serve-static');
4
5  app.use('/', serveStatic(__dirname + '/public'));
6
7  app.listen('3000', function() {
8      console.log('Server running at http://localhost:3000/');
9  });
```

Add AngularJS to the project via Bower

- Install Bower via npm
  - Use “-g” for global install
  - May need to run with sudo
- Use Bower to install AngularJS
- Add static file handling for bower_components
- Add script tag to html file

Start using AngularJS

- Create app.js
  - Will contain our AngularJS application logic
  - Start with a module and a controller
- Update index.html to accommodate AngularJS
  - Add ng-app and ng-controller to html element
  - Add script tag that points to app.js
- Move “Hello World” text to the “model”

Add an employee report with static data

- Add an employees array to the model
  - Later we'll fetch the employees from Oracle Database
- Add a table to index.html to display the employees

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Create a RESTful API to get employees

- Add another end point for “/api/employees”
  - Use the Oracle Database Node.js Driver to fetch employees
- Update app.js to fetch the employees via the API

Consider using ORDS over manual API creation

- ORDS can automate RESTfully enabling tables
- Node can still act as the web server
  - Talks to the database via ORDS rather than the driver
- ORDS can handle sorting, pagination, filtering, etc.

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Imagine this scenario

- You're building an app where users should see updates in real-time
  - Think gmail, twitter, a dashboard, whatever!
- You have ~1000 concurrent users all the time
- You could use polling (every 10 seconds?)
  - 1000 users * 6 polls/min * 60 min/hr * 24 hr/day
  - 8,640,000
- Or you could push when the data changes (every 10 seconds?)
  - 6 changes/min * 60 min/hr * 24 hr/day
  - 8,640

But how???

- Node.js
  - Web server, but you knew that already
- Socket.io
  - Makes working with web sockets easy (push changes to client)
- Oracle Database's Continuous Change Notification
  - Object Change Notification (OCN)
  - Query Result Change Notification (QRCH)
  - Allow us to "register" queries and "execute" PL/SQL when changes occur

Recipe for Pushing Data

- Node.js
  - Web server, but you knew that already
- Socket.io
  - Makes working with web sockets easy (push changes to client)
- Oracle Database's Continuous Query Notification (CQN)
  - Object Change Notification (OCN)
  - Query Result Change Notification (QRCH)
  - Allows us to "register" queries and "execute" PL/SQL when changes occur

Summary

- JavaScript is an amazingly powerful language
- Oracle Database is an amazingly powerful database
- Using both yields super awesome apps!


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