Javascript on the Server

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Node.js

- Runs on Chrome V8 Javascript engine
- Non blocking-IO (a.ka asynchronous, a. k.a event-driven)
- No restrictions (unlike when js is running on the browser)

Example

src/node/readfile.js

```
const fs = require('fs');


fs.readFile('helloworld.txt', 'utf8', function(err, data) {
    if (err) console.log(err);
    return console.log("output 1");
});


console.log("output 2");
```

console

```
$ node example.js
output 2
output 1
```

Building an HTTP server with Node.js

src/node/httpserver.js

```
const http = require('http');
const PORT = 3000;

var handler = function(req, res){
    console.log("Method:", req.method);
    console.log("Url:",req.url);
    console.log("Headers:", req.headers);
    res.end('hello world!');
};

http.createServer(handler).listen(PORT, function (err) {
    if (err) console.log(err);
    else console.log("HTTP server on http://localhost:%s", PORT);
});
```

Routing HTTP requests

Process HTTP requests and execute different actions based on

- the request method
- the url path
- whether the user is authenticated
- ect . . .

- A router can be written from scratch (but it is tedious)
- Use the backend framework ***Express.js***

Express.js - HTTP Methods

src/express-examples/01_httpmethods.js

```
const express = require('express')
const app = express();

// curl localhost:3000/
app.get('/', function (req, res, next) {
    res.end("Hello Get!");
});

// curl -X POST localhost:3000/
app.post('/', function (req, res, next) {
    res.end("Hello Post!");
});

const http = require('http');
const PORT = 3000;

http.createServer(app).listen(PORT, function (err) {
    if (err) console.log(err);
    else console.log("HTTP server on http://localhost:%s", PORT);
});
```

Express.js - Routing based on the path

src/express-examples/02_routing.js

```
// curl localhost:3000/
app.get('/', function (req, res, next) {
    res.end(req.path + ": the root");
});

// curl localhost:3000/messages/
app.get('/messages/', function (req, res, next) {
    res.end(req.path + ": get all messages");
});

// curl localhost:3000/messages/1234/
app.get('/messages/:id/', function (req, res, next) {
    res.end(req.path + ": get the message " + req.params.id);
});
```

Express.js - body encoding

The body of HTTP request and response is a string

- ➡ **Problem:** how to send data structure between the frontend and backend?
- ➡ **Solution:** encode them either using:
  - ✓ URI encoding (sometimes used)
    see src/express-examples/04_body-uri-encoded.js
  - ✓ XML encoding (rarely used these days)
  - ✓ JSON encoding (very frequently used these days)
    See src/express-examples/05_body-json-encoded.js