Node.js

Day 1

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nomades.ch

whoami();

- alex@kaworu.ch
- Open Source enthusiast
- Working daily with Node.js since 2014

Today

- Node.js
  - The event loop
  - CLI and debugging
  - HTTP server
  - release schedule
- npm
  - package.json
- Express.js
- nodemon
- Let’s code!

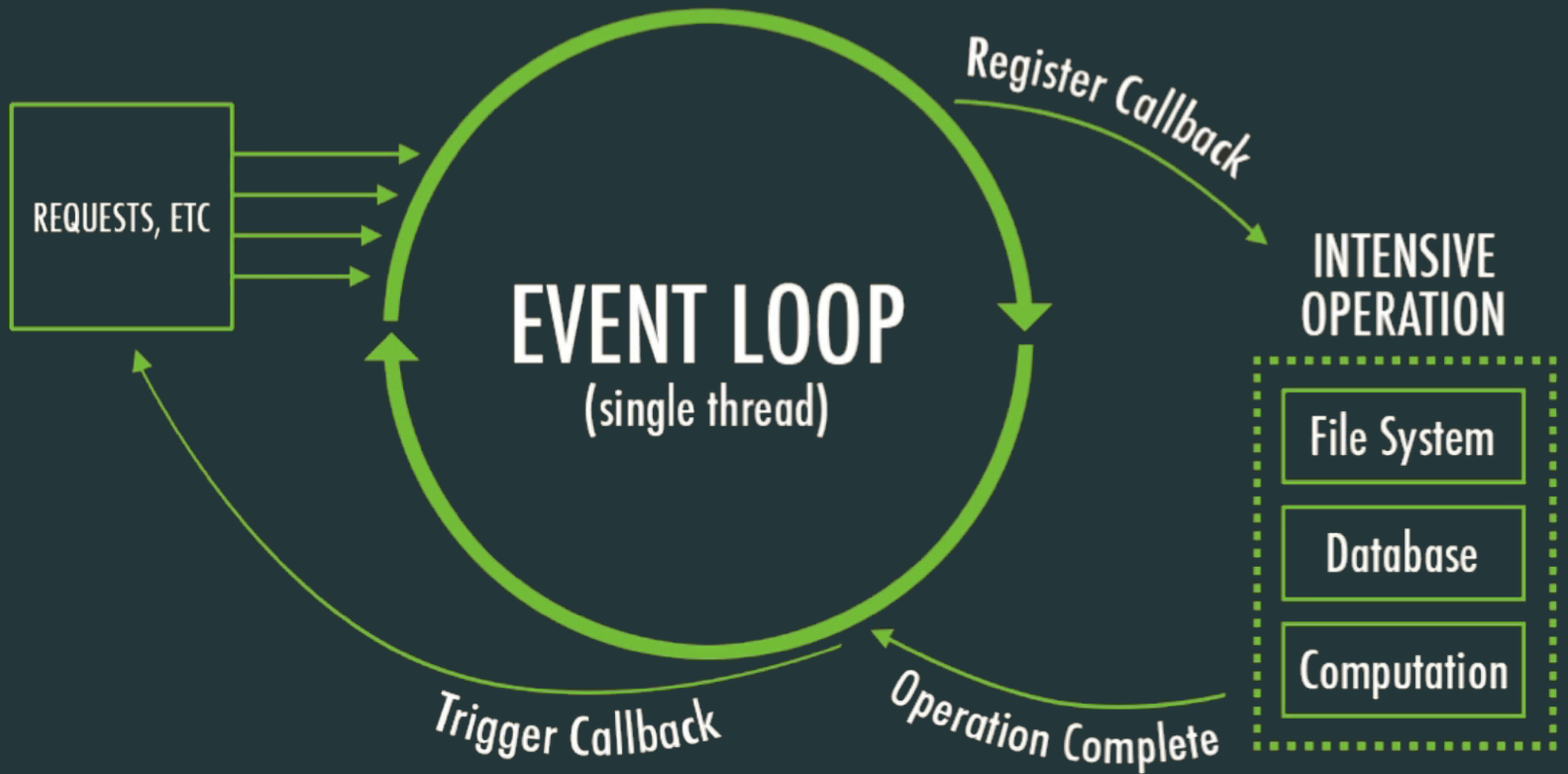
Node.js

What is Node.js?

A server-side Javascript run-time environment.

What is Node.js?

- is based on Google’s V8 Javascript Engine
- has an event-driven architecture
- handle I/O asynchronously


REQUESTS, ETC
EVENT LOOP
(single thread)
Register Callback
INTENSIVE OPERATION
File System
Database
Computation
Trigger Callback
Operation Complete

The event loop

You already know how the event loop work from the browser:

```
1  // executed immediately by the main thread.
2  console.log("zero seconds");
3
4  // register a callback that will be executed once the operation is completed.
5  // In this case the "operation" is waiting two seconds.
6  setTimeout(() => console.log("two seconds."), 2000);
7
8  // the same as previously, although this operation will be completed faster.
9  // Thus, this callback will be executed before the previous one by the main
10 // thread.
11 setTimeout(() => console.log("one second."),  1000);
12
13 // As the first console.log(), this will be executed immediately by the main
14 // thread.
15 console.log("some seconds");
```

The event loop

Node.js script example

```
1  // always start with this for clarity and speed.
2  "use strict";
3
4  // this is how modules are "imported"
5  const fs = require("fs");
6
7  // console.log() works in Node.js too
8  console.log("sync ready");
9  // NOTE: readFileSync() I/O is executed in the main thread,
10 // could throw an Error.
11 let buf = fs.readFileSync("/etc/hosts");
12 console.log("done reading.");
13 console.log(buf.toString());
14
15 console.log("async ready");
16 // NOTE: readFile() I/O is executed in a worker thread,
17 // could callback an Error.
18 fs.readFile("/etc/hosts", function callback(err, buf) {
19     console.log(buf.toString());
20 });
21 console.log("done reading?");
```

command line interface (CLI)

REPL

```
% node
> console.log("hello form the REPL :)")
hello form the REPL :)
undefined
> x = 1.9
1.9
> x
1.9
> _
1.9
> x === 1.8 + 0.1
false
```

command line interface (CLI)

debugging

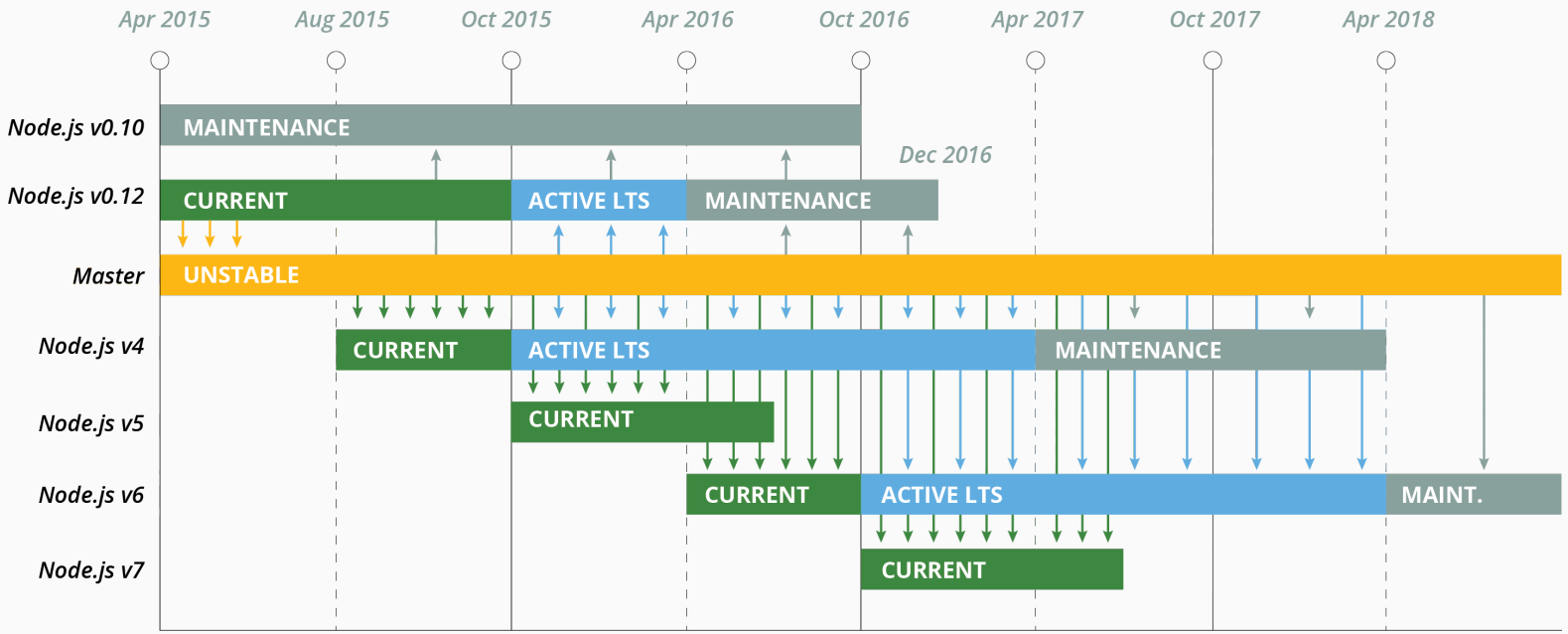
```
% node debug ./event-loop.js
< Debugger listening on [::]:5858
connecting to 127.0.0.1:5858 ... ok
break in event-loop.js:2
  1 // always start with this for clarity and speed.
> 2 "use strict";
  3
  4 // this is how modules are "imported"
debug> help
Commands: run (r), cont (c), next (n), step (s), out (o), backtrace (bt),
      setBreakpoint (sb), clearBreakpoint (cb),
watch, unwatch, watchers, repl, exec, restart, kill, list, scripts, breakOnException,
       breakpoints, version
```

HTTP server

The classic Hello World

```
1  "use strict"; // always
2
3  // "http" and "util", like "fs", are standard Node.js module.
4  // see https://nodejs.org/dist/latest-v6.x/docs/api/
5  const http = require("http");
6  const util = require("util");
7
8  // the port on which our server will listen on.
9  const port = 8080;
10
11 // create a http server to handle requests.
12 const server = http.createServer((req, res) => {
13     // util.inspect() is helpful for debugging. See also console.dir().
14     console.log(util.inspect(req.socket.address(), {colors:true}));
15     res.end(`Welcome to ${req.url}\n`); // ES6 Template literals
16 });
17
18 // listen() will register into the event loop.
19 server.listen(port, () => console.log("listening on port " + port));
20
21 // just like "done reading?" in our previous example, this will be printed
22 // *before* the server is listening.
23 console.log("EOF");
```

LTS release schedule

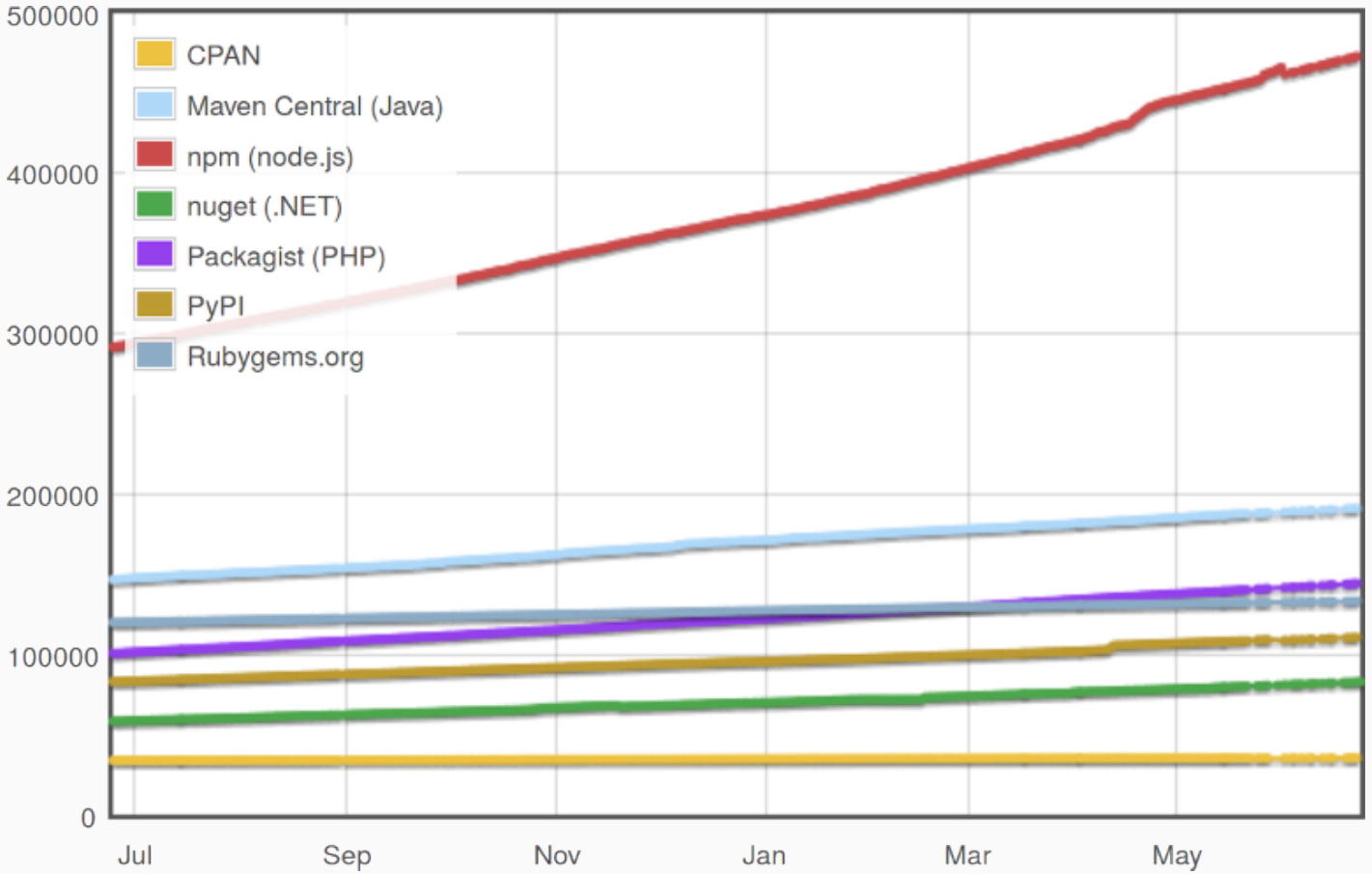


npm

What is npm?

npm is the Node.js package manager. It is a command line tool that is primarily used to interact with the *npm registry* (for example to install modules).

the npm registry



modulecounts.com

module installation

```
% npm install express
```

will install the ”express” module from the registry into the `node_modules/` directory. Once installed, you may *require* it:

```
const express = require("express");
```

package.json

`package.json` contains the dependencies of your project (and some other metadata). The usual way to create it is by calling:

```
% npm init
```

Consider setting `private` to avoid accidently publishing your module to the public registry.

Once your project has a `package.json`, you can tell npm to install a module and save it as a dependency:

```
% npm install --save express
```

More later and at https://docs.npmjs.com

Express.js

Express.js

Express.js is a very popular minimalist web server framework for Node.js inspired by Sinatra.

Express.js

Hello Express:

```
1  /* see http://expressjs.com/en/starter/hello-world.html */
2  const express = require('express')
3  const app = express()
4
5  app.get('/', function (req, res) {
6    res.send('Hello World!')
7  })
8
9  app.listen(3000, function () {
10   console.log('Example app listening on port 3000!')
11 })
```

HTTP methods examples:

```
app.get("/login",         (req, res) => ...); // HTTP GET
app.post("/login",        (req, res) => ...); // HTTP POST
app.put("/users/:id",     (req, res) => ...); // HTTP PUT
app.patch("/users/:id",   (req, res) => ...); // HTTP PATCH
app.delete("/users/:id", (req, res) => ...); // HTTP DELETE
```

Full documentation and examples at expressjs.com

nodemon

nodemon

nodemon is a tool to automatically restart your application when it crash or you make changes.

Local installation:

```
% npm install --save-dev nodemon
```

Usage:

```
% ./node_modules/.bin/nodemon --verbose
```

More about nodemon at https://nodemon.io

Let’s code!

Yet Another Blog Engine

Write a simple blogging server with express. For now we'll use a static hardcoded array of posts items:

```
app.locals.posts = [
    {_id: 1, title: "Bacon Avocado Salad", body: "Place bacon in a large..."},
    {_id: 2, title: "Crispy Orange Beef", body: "Lay beef strips out in..."},
    {_id: 3, title: "Simple BBQ Ribs", body: "Place ribs in a large..."},
];
// create
app.post("/api/posts", (req, res) => ...);
// read
app.get("/api/posts",     (req, res) => ...);
app.get("/api/posts/:id", (req, res) => ...);
// update
app.put("/api/posts/:id", (req, res) => ...);
// destroy
app.delete("/api/posts/:id", (req, res) => ...);
```

Questions?

Read on later

Farewell Node.js by TJ Holowaychuk.