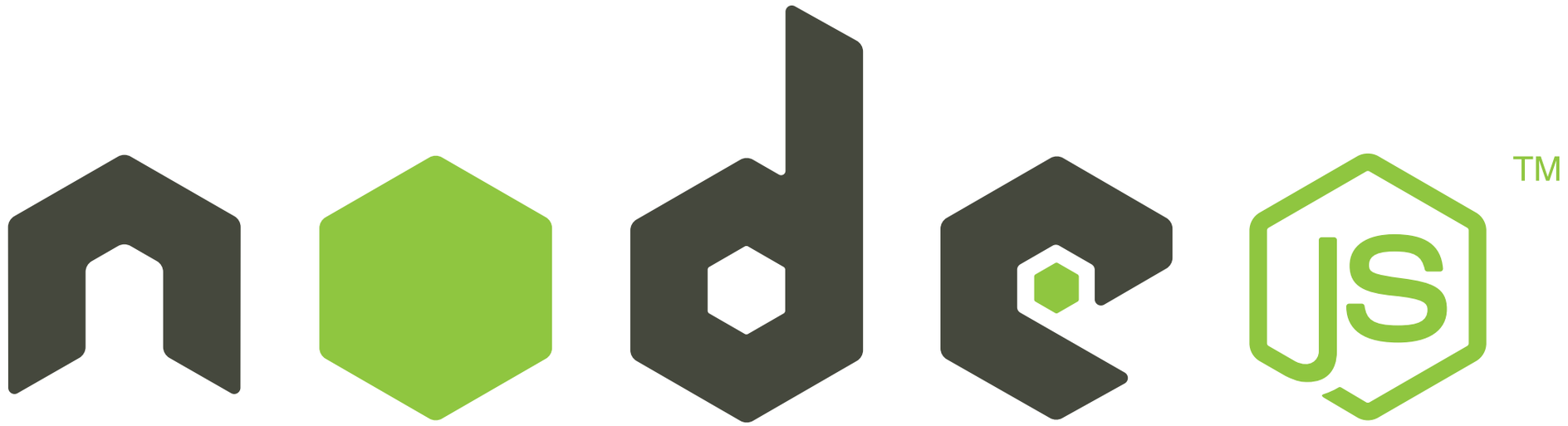


A practical introduction

Felix Geisendörfer

Øredev 09.11.2011 (v1)

@felixge

Twitter / GitHub / IRC

Felix Geisendörfer
(Berlin, Germany)

Audience?

JavaScript?

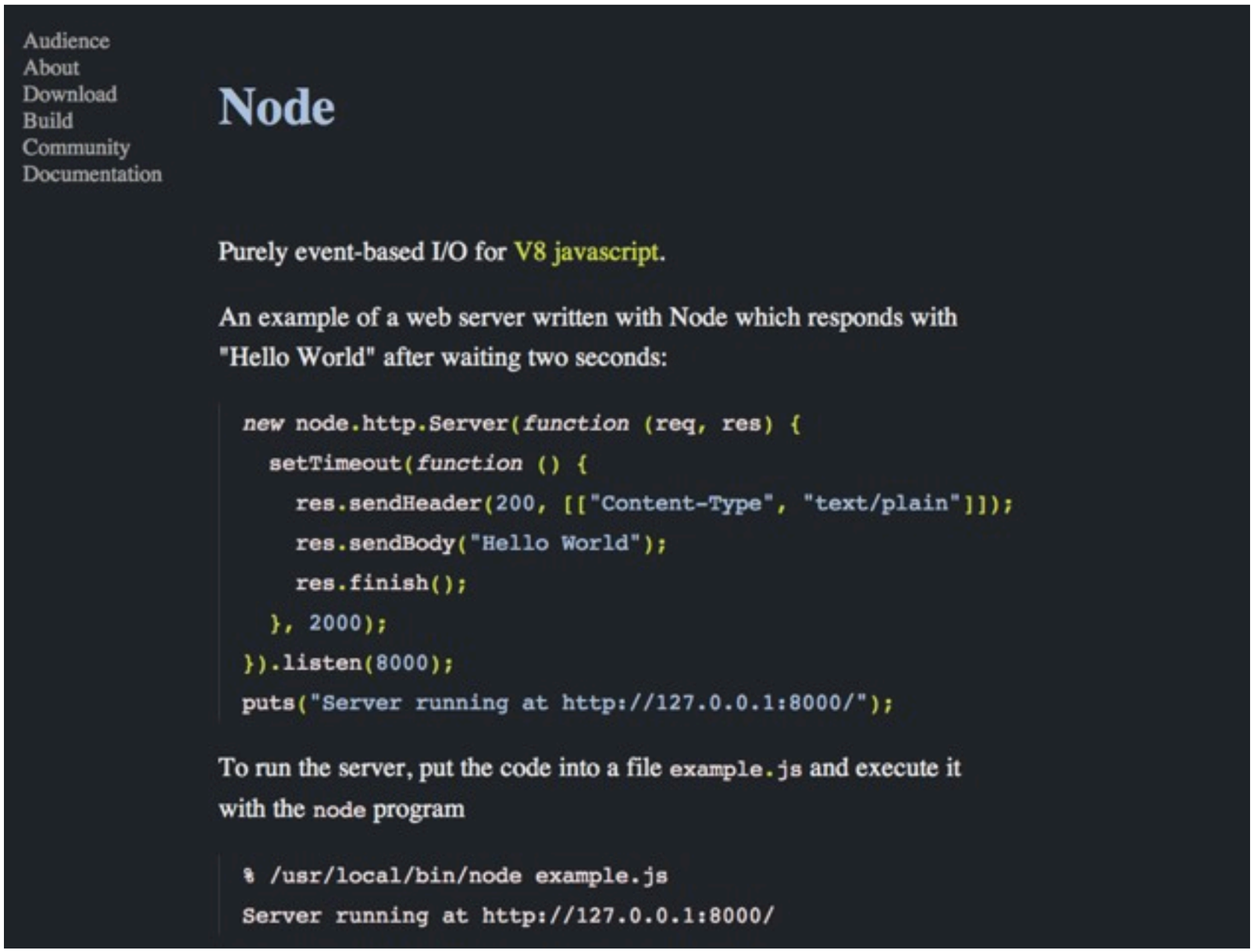
Node.js?

History

Feb 16, 2009

Ryan Dahl starts the node project (first commit)

~June, 2009



Discovered node.js (v0.0.6)

transloadit.com

```
new node.Process(command)
```

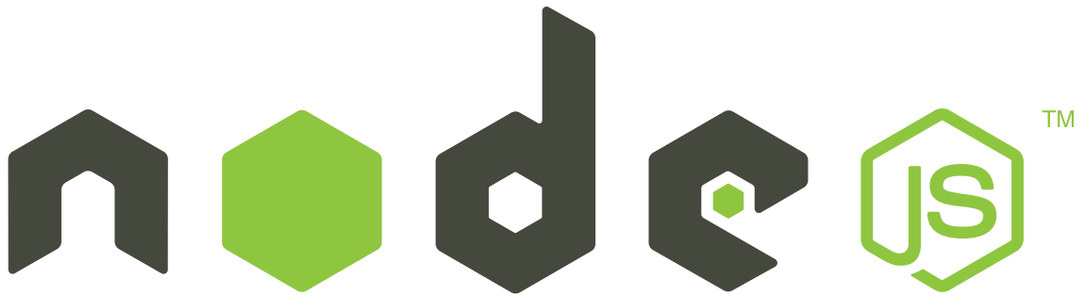
Launches a new process with the given `command`. For example:

```
    var ls = new Process("ls -lh /usr");
```

```
process.pid
```

The PID of the child process.

```
process.onOutput = function (chunk) { };
```



Core Contributor

&

Module Author

node-mysql

node-formidable

+ 30 other modules

Sep 29, 2009

Isaac Schlueter starts the npm package manager (first commit)

Nov 7, 2009

Ryan's talk at JSConf.EU gets people excited about node

Today

Popular Watched Repositories

Explore | **Repositories** | Languages | Timeline | Search

Interesting | Popular Forked | **Popular Watched**

rails Ruby on Rails	rails	10897 watching	all commits ■ commits by owner 52 week participation
node evented I/O for v8 javascript	joyent	10473 watching	all commits ■ commits by owner 52 week participation
jquery jQuery JavaScript Library	jquery	10120 watching	all commits ■ commits by owner 52 week participation
bootstrap HTML, CSS, and JS toolkit from Twitter	twitter	9703 watching	all commits ■ commits by owner 52 week participation
html5-boilerplate Starting HTML/CSS template. So much goodness baked in by default	h5bp	8584 watching	all commits ■ commits by owner 52 week participation

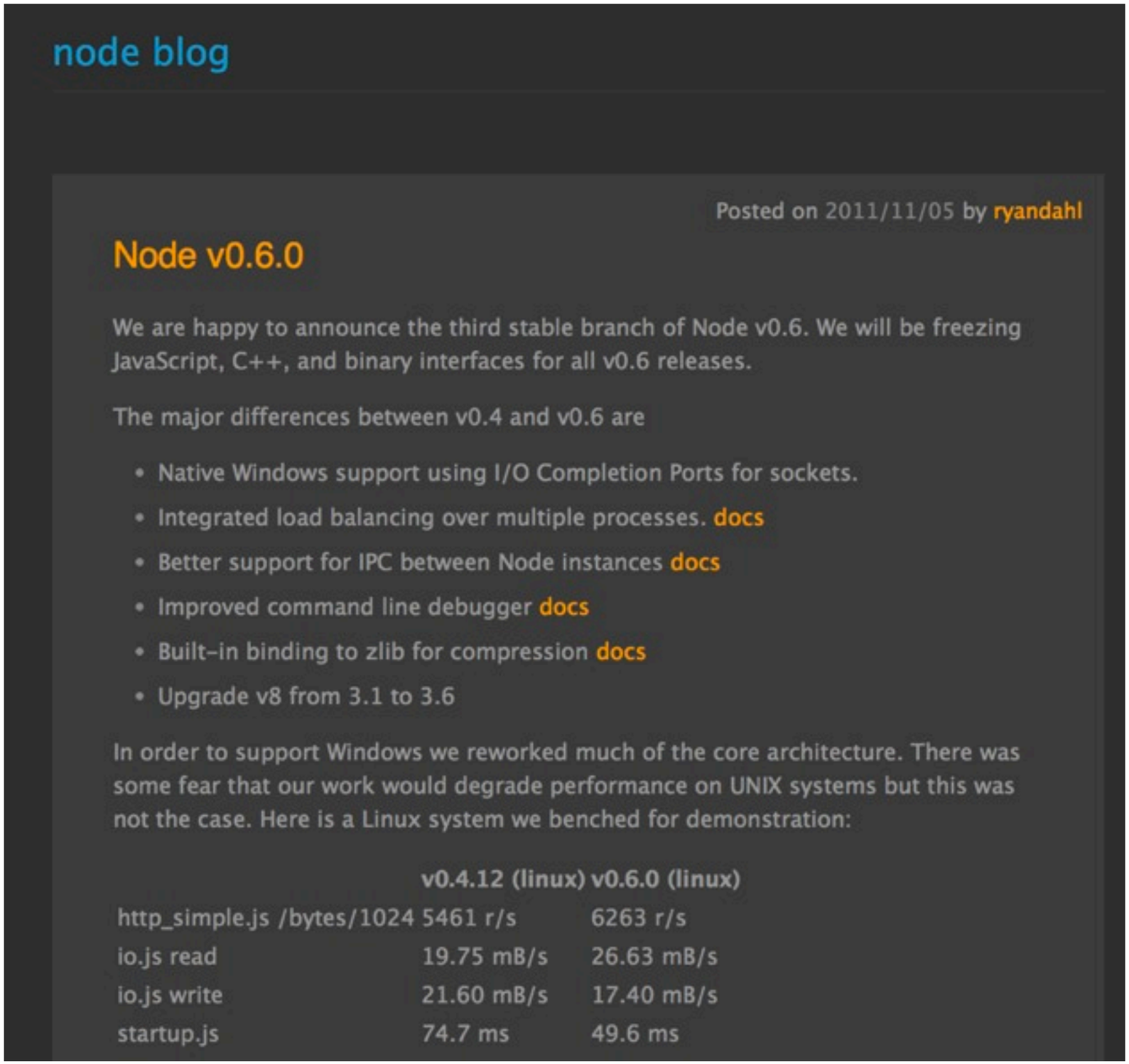
#2

2nd most watched repository on GitHub

230 contributors to joyent/node

	ry (Ryan Dahl)	Follow
	bnoordhuis (Ben Noordhuis)	Follow
	piscisaureus (Bert Belder)	Follow
	isaacs (Isaac Z. Schlueter)	Follow
	felixge (Felix Geisendörfer)	
	koichik (Koichi Kobayashi)	Follow
	indutny (Fedor Indutny)	Unfollow
	miksago (Micheil Smith)	Follow
	igorzi (Igor Zinkovsky)	Follow
	herby (Herbert Vojčík)	Follow
	thughes (Tom Hughes)	Follow
	mscdex (Brian White)	Follow
	HenryRawas (Henry Rawas)	Follow
	pquerna (Paul Querna)	Follow

230 Contributors

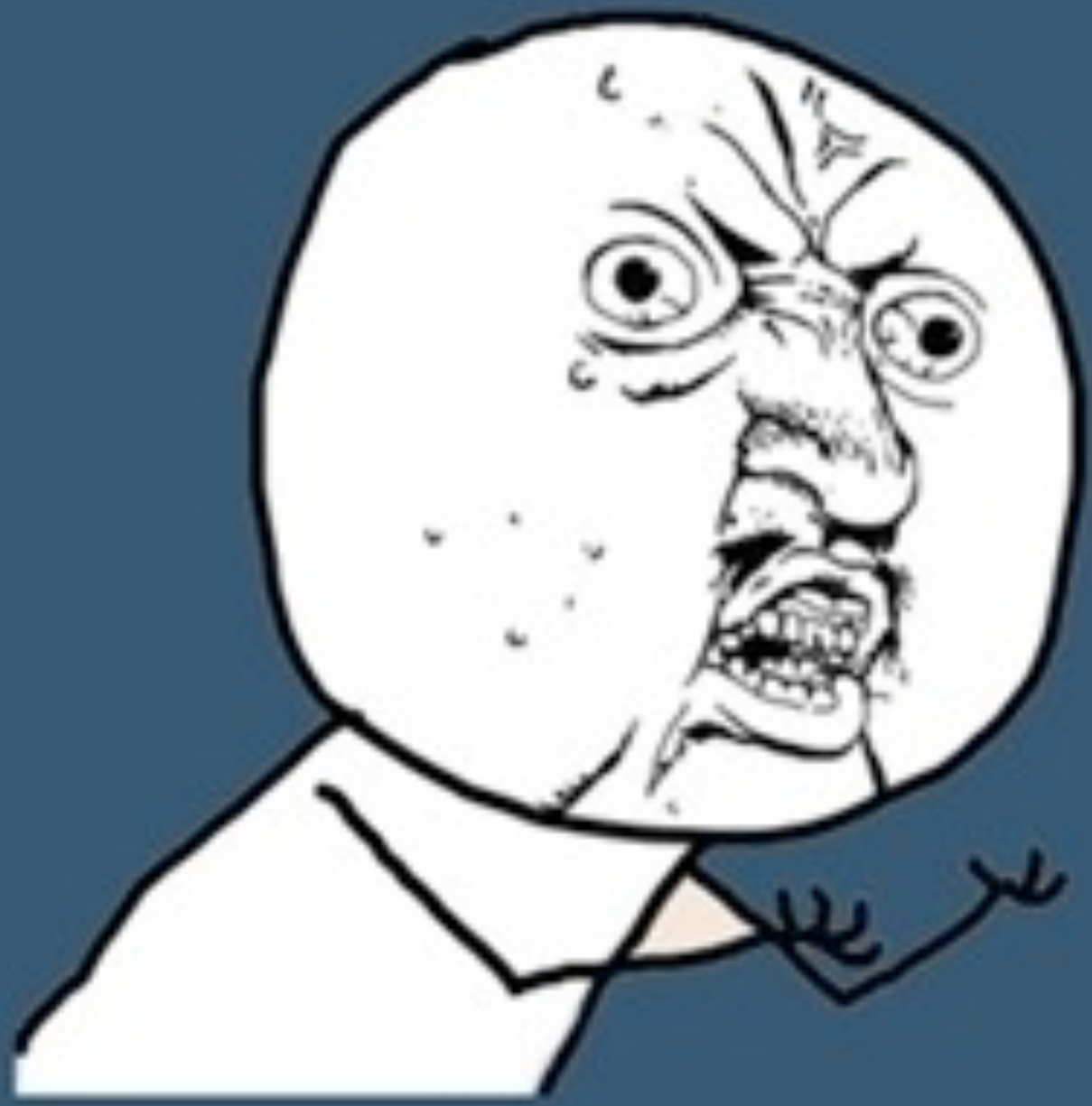


0.6.0 was released 4 days ago (Nov 5)

Companies using node

- GitHub (for Downloads)
- Palm/HP (in WebOS)
- Yahoo! Mail
- Dow Jones & Company (for WJS social site)
- LinkedIn (Mobile Web App)
- Rackspace (Cloudkick monitoring)
- Voxxer (Push to Talk mobile app)

PRACTICAL INTRODUCTION



Y U NO SHOW CODEZ?

Installing

```
$ git clone \
git://github.com/joyent/node.git
$ cd node
$ git checkout v0.6.0
$ ./configure
$ sudo make install
```

(windows users: download node.exe)

Hello World

hello.js

```
console.log('Hello World');
```

```
$ node hello.js
Hello World
```

Hello World (REPL)

```
$ node
> console.log('Hello World')
Hello World
```

Http Server

http_server.js

```
var http = require('http');
var server = http.createServer(function(req, res) {
  res.end('Hi, how are you?');
});

server.listen(8080);
```

```
$ node http_server.js
```

```
$ curl localhost:8080
Hi, how are you?
```

"Come on, server side JS has been around since 1996"

What is so special about node?

Speed

Speed

- Node can do ~6000 http requests / sec per CPU core (hello world, 1kb response,)

- It is no problem to handle thousands of concurrent connections which are moderately active

V8 JavaScript Engine

V8 JavaScript Engine

- Developed by Google in Aarhus, Denmark for Google Chrome
- Translates JavaScript in Assembly Code
- Crankshaft JIT (enabled in 0.6.0 by default)

V8 JavaScript Engine

- You can expect to be within ~10x of C performance usually
- Certain code can run within 2-3x of C
- Getting faster all the time

Non-Blocking I/O

Blocking I/O

read_file_sync.js

```
var fs = require('fs');
var one = fs.readFileSync('one.txt', 'utf-8');
console.log('Read file one');
var two = fs.readFileSync('two.txt', 'utf-8');
console.log('Read file two');
```

```
$ node read_file_sync.js
Read file one
Read file two
```

Non-Blocking I/O

read_file_async.js

```
var fs = require('fs');
fs.readFile('one.txt', 'utf-8', function(err, data) {
  console.log('Read file one');
});
fs.readFile('two.txt', 'utf-8', function(err, data) {
  console.log('Read file two');
});
```

```
$ node read_file_async.js
Read file two
Read file one
```


MADNESS?!
memegenerator.net

Blocking I/O

Read one.txt (20ms)

Read two.txt (10ms)

Total duration (30ms)

Non-Blocking I/O

Read one.txt (20ms)

Read two.txt (10ms)

Total duration (20ms)

Non-Blocking I/O

- Close to ideal for high concurrency / high throughput, single execution stack

- Forces you to write more efficient code by parallelizing your I/O

- Feels pretty much like AJAX in the browser

WebSockets
(Push)

WebSockets

- Persistent connection between browser/server
- Very hard / awkward to do on traditional stacks
- Hard to scale on traditional stacks

Socket.IO (community module)

- WebSocket
- Adobe® Flash® Socket
- AJAX long polling
- AJAX multipart streaming
- Forever Iframe
- JSONP Polling

Chooses most capable transport at runtime!

Streams

"Streams are to time as arrays are to space."

-- Jed Schmidt @ JSConf.eu 2010

Streams in node.js

- Readable
- Writable
- Both

Streams

```
var http = require('http');
var server = http.createServer(function(req, res) {
  req.on('data', console.log);
});
server.listen(8080);
```

```
$ node stream.js &
$ curl -F file=@stream.js localhost:8080
------------------------------41e92562223e
Content-Disposition: form-data; name="file"; filenam
Content-Type: application/octet-stream

var http = require('http');
var server = http.createServer(function(req, res) {
```

Streams

```
var http = require('http');
var spawn = require('child_process').spawn;

http.createServer(function(req, res) {
  var params = req.url.split('/');
  var args = [params[1], '-resize', params[2], '-'];
  var convert = spawn('convert',  args);

  convert.stdout.pipe(res);
}).listen(8080);
```

On Github

felixge/node-convert-example

NPM package manager

NPM

- Puts dependencies in the right place, then gets out of your way

- No modification of a global load path (require.paths is gone in 0.6.0)

- 4700+ Modules in npm, > 10 new modules / day

So what is node good for?

Use cases

- WebSockets/Push applications
- Proxying data streams
- Backend for single page apps

Use cases

- Spawning other programs (processes) to do work / IPC

- Parallelizing I/O

So what is node ***not***
good for?

Anti-Use cases

- Actual Realtime Systems
- Number crunching / huge in-memory datasets
- (CRUD apps)

Join the Community

- Mailing list (nodejs, nodejs-dev)
- IRC (#node.js) - 700+ User online

Thank you!

Questions?

@felixge

Thank you!

Bonus Slide

What's next?

- Domains
- Improved Stream API