Shakras and Hot Stone Therapy (SHST)

Modern techniques for relaxation using ancient methods

(a hands-on approach)

Server Architectures with Node

Why should the browser folk have all the fun?

Your friendly presenter

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Somewhat Recent Javascript Convert

Javascript Convert?

Javascript Convert?

Actually, yes

However, there's beauty in there

However, there's beauty in there

This may take a bit of time to find.

Efficient use of resources makes me happy.

Efficient use of resources makes me happy.

(hapi?)

This thing is *thin*

Customer production server from pm2:

```
$ pm2 status

│ SERVER (PROD) │ online │ 12D     │ 0%   │ 148.7 MB │
```

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12 days of uptime

Customer production server from pm2:

```
$ pm2 status

│ SERVER (PROD) │ online │ 12D      │ 0%   │ 148.7 MB │
```

12 days of uptime

150MB of RAM!

```
java -Xmx4G -Xms4G -jar app.jar
```

```
 :: Spring Boot ::        (v2.0.3.RELEASE)

Started TestApp in 24.351 seconds (JVM running for 24.811)
```

Single threaded

Code isomorphism between client and server

If you use JS on the client...

Fun to write, to be honest

JS is a gateway drug to Lambda

Node architecture makes me happy

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(hapi?)

Node was born from two neat pieces of technology

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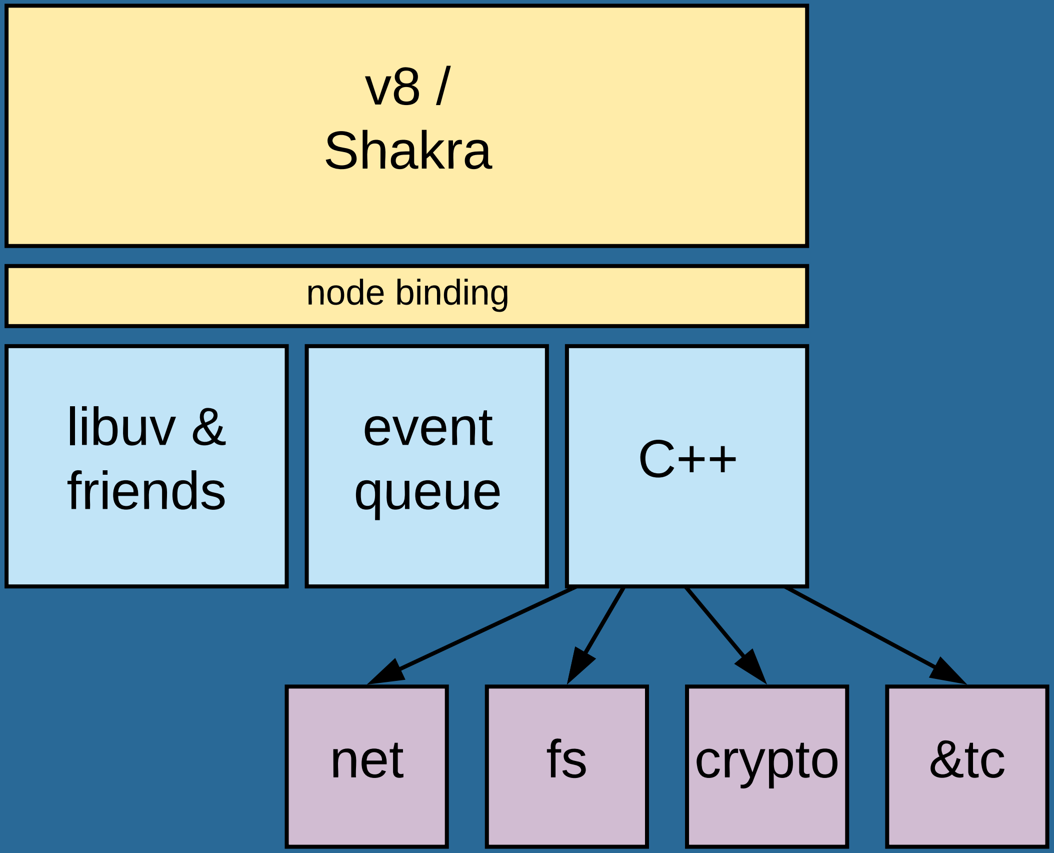
`libuv`

Node was born from two neat pieces of technology

`libuv`

`v8`


v8 /
Shakra
node binding
libuv &
friends
event
queue
C++
net
fs
crypto
&tc

v8 & shakra

libuv

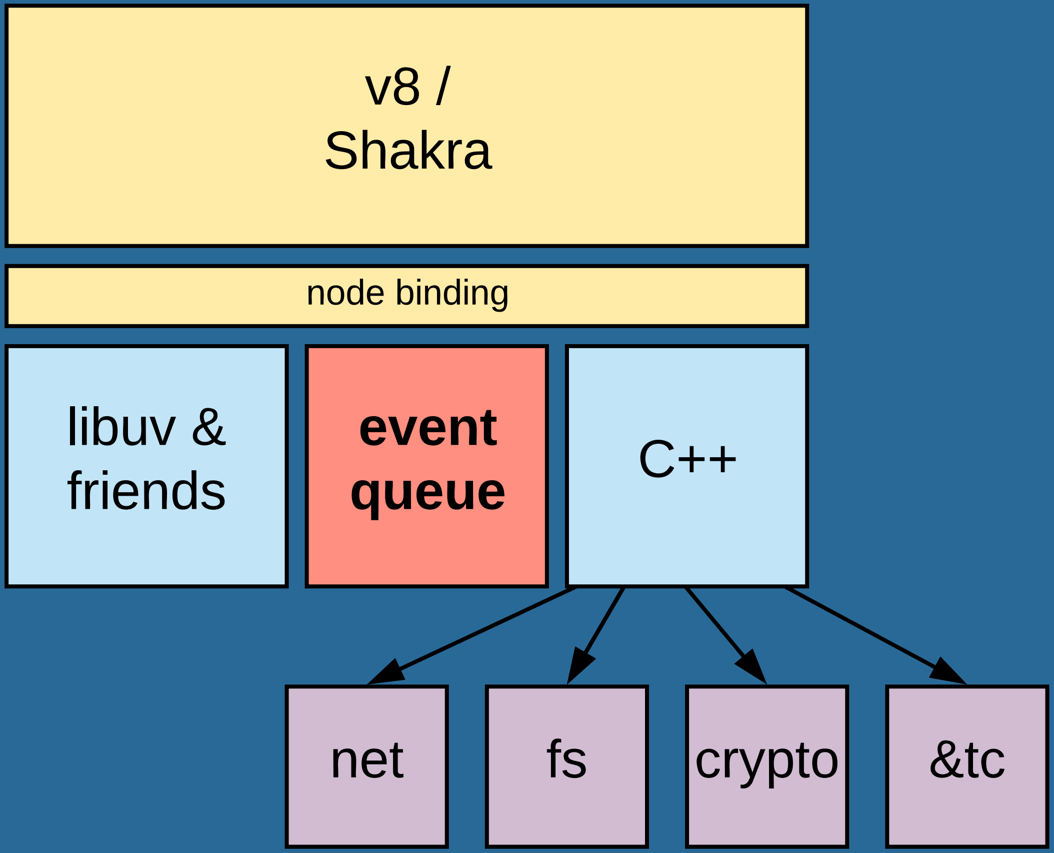
Only a matter of time

What, exactly, is it good for?

IO

IO

Like, *tons* of IO


v8 /
Shakra
node binding
libuv &
friends
**event
queue**
C++
net
fs
crypto
&tc

Try not to do too much

All CPU use on node is crimethink

Get in, get out

A humorous vingette...

`bcrypt(3)`*!!!!!*

WARNING:

Handrails are not available

There really is only one real method in node that matters.

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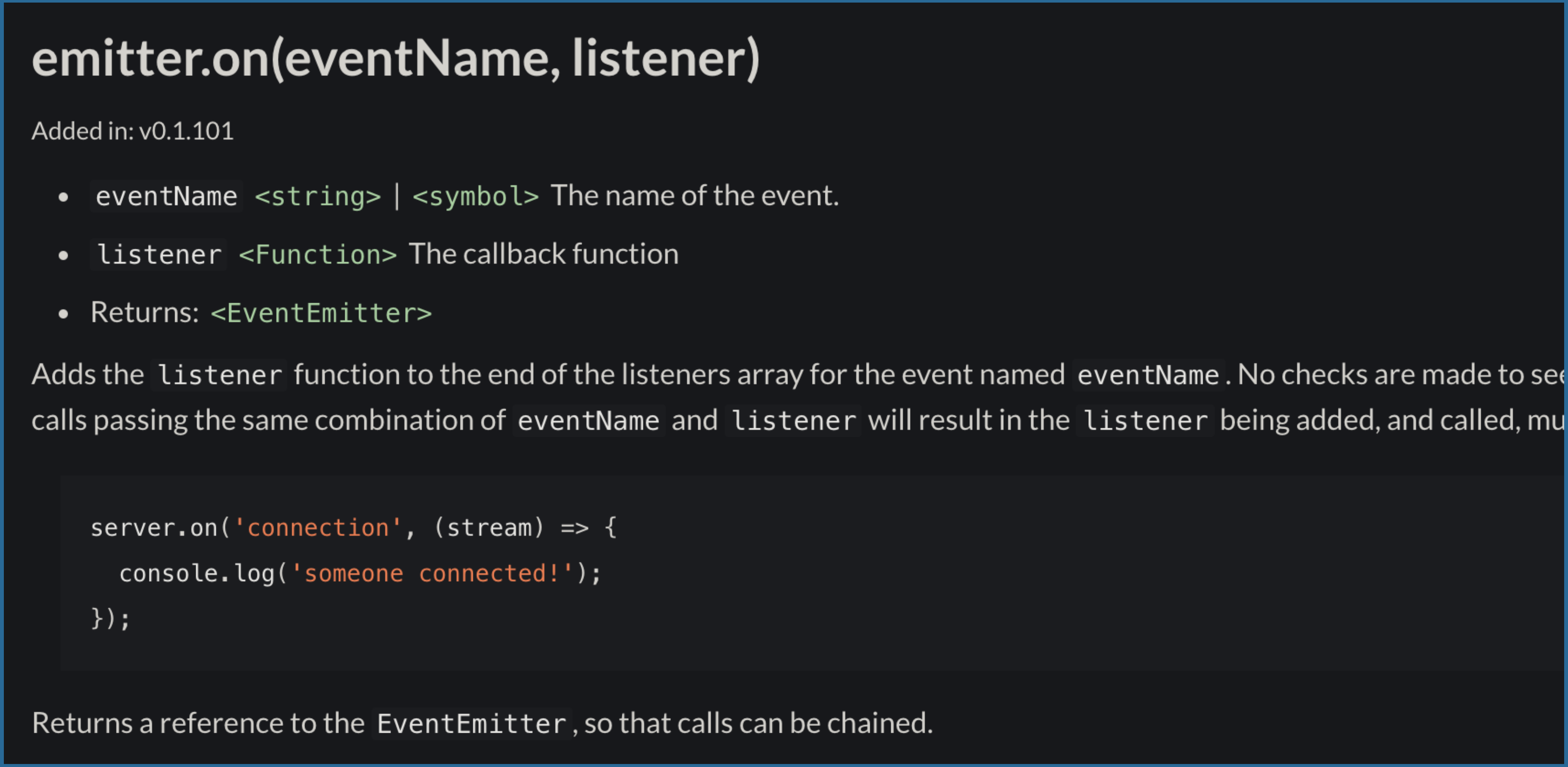
`on()`



emitter.on(eventName, listener)

Added in: v0.1.101

- `eventName` `<string>` | `<symbol>` The name of the event.
- `listener` `<Function>` The callback function
- Returns: `<EventEmitter>`

Adds the `listener` function to the end of the listeners array for the event named `eventName`. No checks are made to see
calls passing the same combination of `eventName` and `listener` will result in the `listener` being added, and called, mu

```
server.on('connection', (stream) => {
  console.log('someone connected!');
});
```

Returns a reference to the `EventEmitter`, so that calls can be chained.

Looks familiar?

```
server.on('request', (req, res) => {
    // node HTTP server
})

observer.subscribe((x) => {
    // Angular HttpClient
})
```

The fundamental unit of javascript is the *continuation*.

Javascript is a *continuation oriented* language.

```
whenItIsDone(thing, (result) => {
    doSomethingElse(result)
})
```

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

fs.readFile('./foo.txt', 'utf8', (err, contents) => {
    console.log(contents)
});
```

The *continuation* is a lambda

The *continuation* is a lambda

It executes later.

The *continuation* is a lambda

It executes later.

You can never get here from there.

```
                                            (err, contents) => {
    console.log(contents)
});
```

```
fs.readFile('./foo.txt', 'utf8', (err, contents) => {
    console.log(contents)
});

fs.readFile('./bar.txt', 'utf8', (err, contents) => {
    console.log(contents)
});
```

This is the beauty of nodejs

Handle your result

This is the beauty of nodejs

Handle your result *later*

Man, it can get ugly fast

```
const fs = require('fs')
const dns = require('net')

fs.readFile('./foo.txt', 'utf8', (err, contents) => {
    fs.writeFile('./bar.txt', 'utf8', (err, contents) => {
        dns.lookup(contents, (err, address, family) => {
            console.log(address)
        })
    })
})
```

```
do(foo, bar => {
    some(bar, baz => {
        thing(baz, quux => {
            complex(quux, quuz => {
                eventually(quuz, waldo => {
                    go(waldo, fred => {
                        crazy(fred, thud => {
                            console.log(thud)
                        })
                    })
                })
            })
        })
    })
})
```

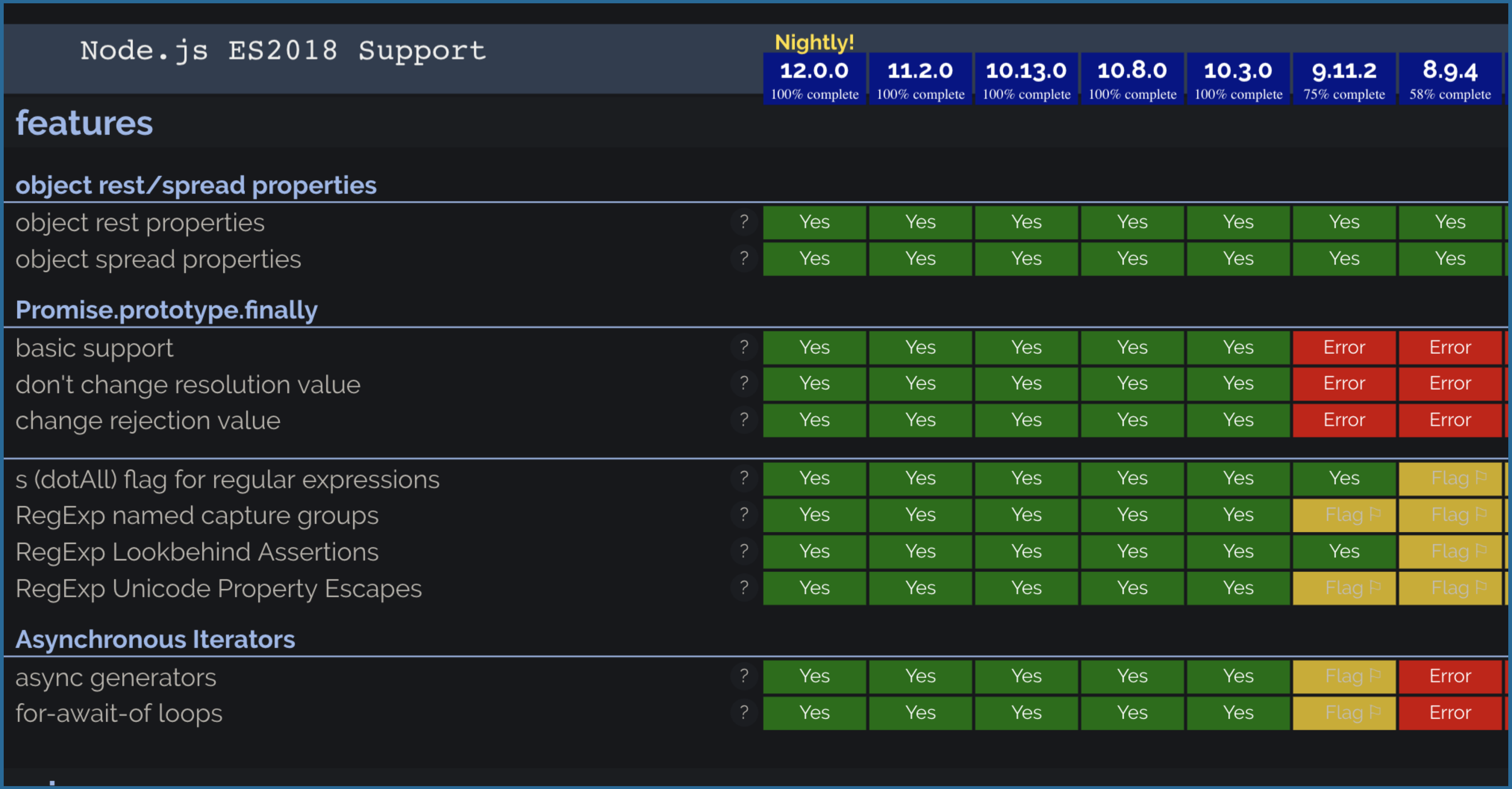
Promises are syntactic sugar

```
do(foo)
    .then(bar => {
        some(bar)
    }).then(baz => {
        thing(baz)
    }).then(quux => {
        complex(quux)
    }).then(quuz => {
        eventually(quuz)
    }).then(waldo => {
        go(waldo)
    }).then(fred => {
        crazy(fred)
    }).then(thud => {
        console.log(thud)
```

`async` / `await` are the new hotness

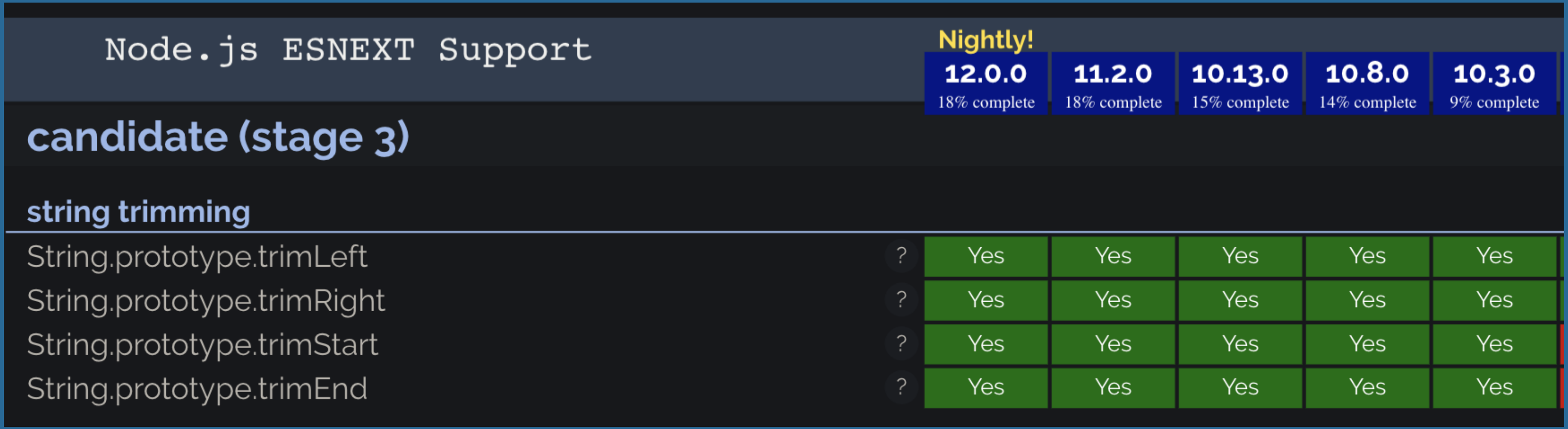
```
try{
    const bar   = await do(foo)
    const baz   = await some(bar)
    const quux  = await thing(baz)
    const quuz  = await complex(quux)
    const waldo = await eventually(quuz)
    const fred  = await go(waldo)
    const thud  = await crazy(fred)
    console.log(thud)
}catch(err){
    // whoops
}
```

```
const p = do(foo);

const bar = await p;
const util = require('util')

const readFileAsync = util.promisify(fs.readFile)

const contents = await readFileAsync('./foo.txt', 'utf8')
```



Node.js ES2018 Support

features	Nightly! 12.0.0 100% complete	11.2.0 100% complete	10.13.0 100% complete	10.8.0 100% complete	10.3.0 100% complete	9.11.2 75% complete	8.9.4 58% complete
object rest/spread properties							
object rest properties ?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
object spread properties ?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Promise.prototype.finally							
basic support ?	Yes	Yes	Yes	Yes	Yes	Error	Error
don't change resolution value ?	Yes	Yes	Yes	Yes	Yes	Error	Error
change rejection value ?	Yes	Yes	Yes	Yes	Yes	Error	Error
s (dotAll) flag for regular expressions ?	Yes	Yes	Yes	Yes	Yes	Yes	Flag ⚐
RegExp named capture groups ?	Yes	Yes	Yes	Yes	Yes	Flag ⚐	Flag ⚐
RegExp Lookbehind Assertions ?	Yes	Yes	Yes	Yes	Yes	Yes	Flag ⚐
RegExp Unicode Property Escapes ?	Yes	Yes	Yes	Yes	Yes	Flag ⚐	Flag ⚐
Asynchronous Iterators							
async generators ?	Yes	Yes	Yes	Yes	Yes	Flag ⚐	Error
for-await-of loops ?	Yes	Yes	Yes	Yes	Yes	Flag ⚐	Error



Node.js ESNEXT Support

candidate (stage 3)

string trimming		Nightly! 12.0.0 18% complete	11.2.0 18% complete	10.13.0 15% complete	10.8.0 14% complete	10.3.0 9% complete
String.prototype.trimLeft	?	Yes	Yes	Yes	Yes	Yes
String.prototype.trimRight	?	Yes	Yes	Yes	Yes	Yes
String.prototype.trimStart	?	Yes	Yes	Yes	Yes	Yes
String.prototype.trimEnd	?	Yes	Yes	Yes	Yes	Yes

```
const f = (a, b) => {
    return a + b
}

const p = f('a', ?)

assert(p('b') === 'ab')
```

Let's do some actual *work*.

REST servers

- Express
- HAPI
- Restify
- Loopback
- Sails
- ... probably a baker's dozen more by now

Express.js is the gold standard

Does whatcha need

```
const express = require('express')
const app = express()
const port = 80

app.get('/', (req, res) => res.send('Hello World!'))

app.listen(port, () => console.log(`Example app listening on po
```

C'mon get HAPI

git@bitbucket.org:chariotspaday/server.git

Things to like

In this desolate wasteland of `~0.0.9`

Vibrant plugins, easy API to write your own

- good
- boom
- nes
- confidence
- poop
- bell
- blipp

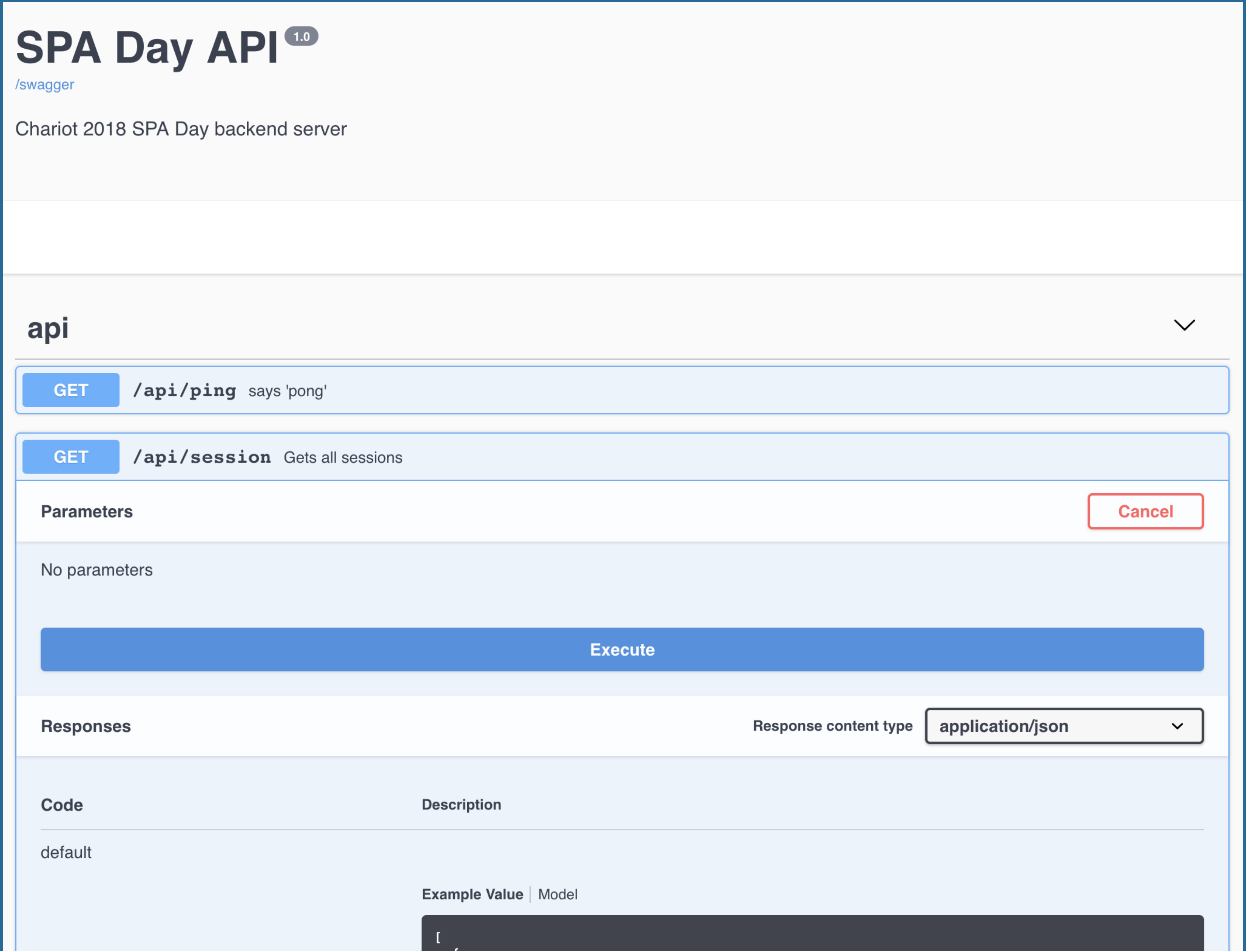
```
server.route({
    method: 'GET',
    path: '/',
    handler: function (request, h) {
        return 'Hello!'
    }
})
```

hapi ❤️ joi

```
const session = joi.object().keys({
    id: joi.number().integer().min(1).required(),
    name: joi.string().trim(true).min(1).required(),
    date: joi.string().trim(true).isoDate().required()
})
```

```
method: 'GET',
options: {
    tags: ['api'],
    description: 'Gets all subscriptions for a session',
    path: '/session/{id}/subscriptions',
    validate: {
        params: {
            id: joi.number().integer().min(1)
        }
    },
response: {
        options: {
            abortEarly: false
        },
        sample: 100,
        schema: joi.array().items(joiSchemas.registration)
    }
```

```
"/api/session": {
    "get": {
        "responses": {
            "default": {
                "description": "",
                "schema": {
                    "type": "array",
                    "items": {
                        "$ref": "#/definitions/IdNameDateModel"
                    }
                }
            }
        },
        "produces": ["application/json"],
        "tags": ["api"],
```



SPA Day API 1.0

/swagger

Chariot 2018 SPA Day backend server

api

GET /api/ping says 'pong'

GET /api/session Gets all sessions

Parameters

Cancel

No parameters

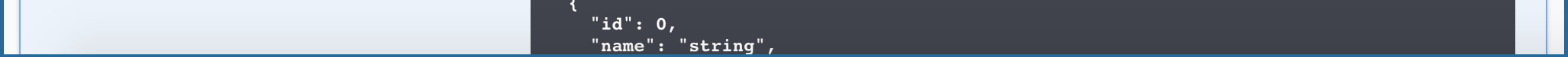
Execute

Responses

Response content type application/json

Code	Description
default	**Example Value** | Model

```
[
```



```
  {
    "id": 0,
    "name": "string",
```

Stupid node tricks with hapi, express, and websockets

```
const hapi = require('hapi')
const ws = require('ws')

const server = new hapi.Server({port: 8000})
const listener = server.listener

const wss = new WebSocket.Server({
    server: listener,
    path: '/api/chat'
})

await server.start()
```

```
this._removeListeners = addListeners(this._server, {
    listening: this.emit.bind(this, 'listening'),
    error: this.emit.bind(this, 'error'),
    upgrade: (req, socket, head) => {
        this.handleUpgrade(req, socket, head, (ws) => {
        this.emit('connection', ws, req);
        });
    }
});
```

```
server.events.on('log', (event, tags) => {
server.events.on('request', (request, event, tags) => {
server.events.on('response', (request) => {
```

Takeaway (whew!)

- Understand on()
- Grok continuations, how code moves through node
- Never eat CPU.
- Use cool language features
- Be Javascripty on the server