

Node.js What's Next?

Michael Dawson
IBM Community Lead for Node.js



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Agenda Key: 32CF

About Michael Dawson

IBM Community Lead for Node.js

- Active Node.js community member
 - Collaborator
 - Node.js Technical Steering Committee TSC Chair
 - Community Committee member
 - Working group(s) member/leadership



- Twitter: @mhdawson1
- GitHub: @mhdawson
- LinkedIn: <https://www.linkedin.com/in/michael-dawson-6051282>

Overview

- Learn how to fish (why do I need to fish?)
- High level predictions
- Releases
- Working Groups/Teams
- Strategic Initiatives
- Foundation Initiatives
- Wrap-up and Questions

Why do I need to fish?

- Node.js project has no formal roadmap!
 - No single corporate sponsor
 - Decentralized
 - Things make it into release when ready
- But !
 - Still longer term efforts and planning



Go Fishing, How to track What's Next

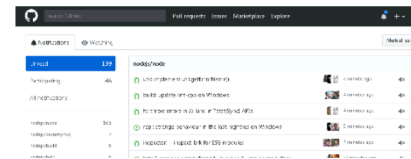
- Releases

<https://nodejs.org>

- Twitter

<https://twitter.com/gibfahn/lists/node-js-news>

- GitHub Fire Hose



- Working Groups/Teams

<https://github.com/nodejs>
<https://nodejs.org/calendar>

- Strategic Initiatives

<https://github.com/nodejs/TSC/blob/master/Strategic-Initiatives.md>
<https://github.com/nodejs/community-committee/blob/master/STRATEGIC-INITIATIVES.md>

- Foundation Initiatives



<https://foundation.nodejs.org>

High Level Predictions

More user feedback efforts

N-API (complete in 10.x) and http2 out of experimental

Completion of Error Messages Migration

Emphasis on Diagnostics

New Nightly Benchmarks

Progress on security triage for 3rd party modules

Continued increase in velocity of consuming V8 updates

Progress on ES6 Modules

Promisification of Core

Releases - Process

Release Types

- Canary
- Nightlies
- Current
 - Every 6 months
 - Even releases promoted to LTS
- LTS
 - Every 12 months
 - 30 Months support (18 active, 12 maintenance)

‘Notable Changes’ in release notes good way to see what’s coming

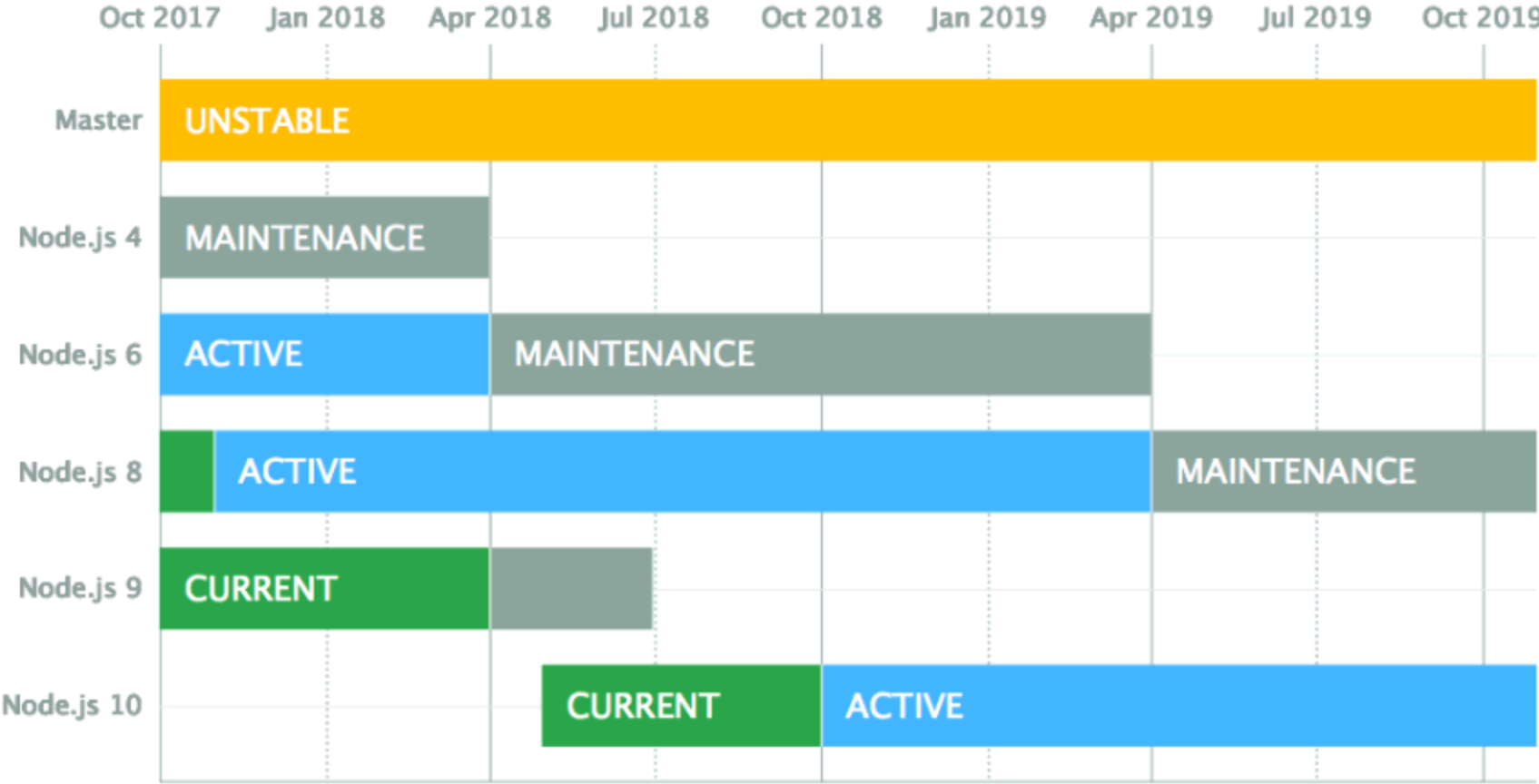
Node v9.4.0 (Current)

by Myles Borins, 2018-01-10

Notable Changes

- **async_hooks:**
 - deprecate AsyncHooks Sensitive API and runInAsyncIdScope. Neither API were documented (Madsen) [#16972](#)
- **deps:**
 - update nghttp2 to 1.29.0 (James M Snell) [#17908](#)
 - upgrade npm to 5.6.0 (Kat Marchán) [#17535](#)
 - cherry-pick 50f7455 from upstream V8 (Michaël Zasso) [#16591](#)
- **events:**
 - remove reaches into _events internals (Anatoli Papirovski) [#17440](#)

Releases - Schedule for 2018



Working Groups

Working Groups - Build/Automation

Key Goals

- Support infrastructure to deliver Node.js

What's Next

- More automation tools/scripts

- Changes to supported OS levels

 - Incremental platform test coverage

 - Dropping coverage for older OS's

 - Addition of newer OS's

- Requirement for higher gcc levels

<https://github.com/nodejs/node/blob/master/BUILDING.md>

Working Groups - Release

Key Goals

- Predicable, regular Release

- Stable releases

What's Next

- No major changes planned to release process

- More automation

- Increase/improve safety net

- Easier to find/consume releases

- More visible release schedule

Working Groups - Benchmarking

Key Goals

Avoid Regressions

Track and Evangelize gains between releases

How ?

Define Use Cases

Identify/Build Benchmarks

Run/Capture results

What's Next

New workloads, promises?

<https://github.com/nodejs/benchmarking>



<https://benchmarking.nodejs.org/>

Working Groups - Security-wg

Key Goals

- Define and Document security policies
- Help implement those policies

Progress last year (and this year)

- Documented initial processes
- Became CVE issuing authority (CNA)
- Defined initial processes for 3rd party vulnerability management
- Bug Bounty Program

What's Next

- Complete ramp up of team to triage 3rd party vulnerabilities
- Become CVE issuer for 3rd party modules?

Working Groups - Diagnostics

Key Goals

First class

- Tracing
- Profiling
- Heap and memory analysis
- Step debugging
- Post mortem analysis



<https://github.com/nodejs/diagnostics/issues/121>

What's Next

Hardening of Async Hooks

Greater integration (node-report, heapdump, llnode metadata maintenance)

Leveraging new trace engine

Post mortem with promises

Testing

Node Report integration

Strategic Initiatives

Strategic Initiatives - Community Building

Mentorship Initiative

Node Together

Strategic Initiatives - User Feedback

Surveys

Regular meeting with end users

- General
- Tooling
- Enterprise users

Strategic Initiatives - Http2

- Major revision of HTTP
- Experimental status, but no flag
- 2 new APIs
 - Core API
 - Compatibility API
- Uses Nghttp2
- Expect to exit experimental in 2018

<https://nghttp2.org/>

Strategic Initiatives - Modules

- Context
 - Node.js has pre-existing module system
 - ES6 Standardized new module system
- Goals
 - Browser compatible ES6 implementation (as possible)
 - Co-existence with existing module system
- Experimental version in Node.js master

<https://nodejs.org/api/esm.html>

--experimental-modules

```
module.exports = function() {
  console.log('Hello');
}
```

```
const test =
require('./helloTest.js');
test();
```

```
export function test() {
  console.log('Hello');
}
```

```
import { test } from
'./helloTest.mjs';
test();
```

Strategic Initiatives - N-API

```
#include <node_api.h>

napi_value RunCallback(napi_env env, const napi_callback_info info) {
    napi_status status;

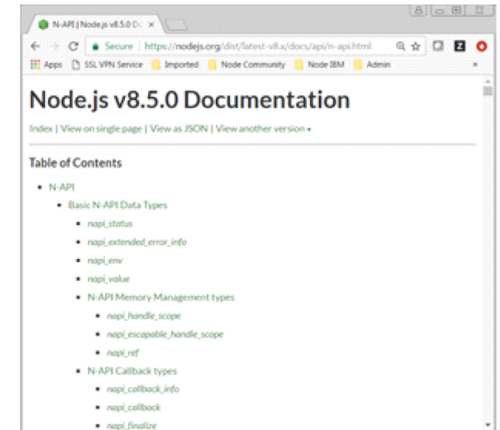
    size_t argc = 1;
    napi_value args[1];
    status = napi_get_cb_info(env, info, &argc, args, nullptr, nullptr);

    napi_value cb = args[0];

    napi_value argv[1];
    status = napi_create_string_utf8(env, "hello world", NAPI_AUTO_LENGTH, argv);

    napi_value global;
    status = napi_get_global(env, &global);

    napi_value result;
    status = napi_call_function(env, global, cb, 1, argv, &result);
    return nullptr;
}
```



<https://nodejs.org/dist/latest/docs/api/n-api.html>
<https://github.com/nodejs/node-addon-api>

Strategic Initiatives - Error Messages

- Add error code – error.code
- toString()
 - Error[error-code]: message
- Changes to message !SemVer major

```

1  try {
2    // make a Node.js API call here
3  } catch (error) {
4    if (error.message === 'This is th message') {
5      // do something
6    } else {
7      // do something else
8    }
9  }

```

<https://medium.com/the-node-js-collection/node-js-errors-changes-you-need-to-know-about-dc8c82417f65>

```

1  try {
2    // make a Node.js API call here
3  } catch (error) {
4    if (error.code === 'ERR_INVALID_URL_SCHEME') {
5      // do something
6    } else {
7      // do something else
8    }
9  }

```

Strategic Initiatives - Async Hooks

- Context across Asynchronous calls

https://nodejs.org/api/async_hooks.html

```
function init(asyncId, type, triggerAsyncId, resource) { }
function before(asyncId) { }
function after(asyncId) { }
function destroy(asyncId) { }
function promiseResolve(asyncId) { }
```

```
const asyncHook = async_hooks.createHook({ init, before, after, destroy, promiseResolve });
```

```
asyncHook.enable();
asyncHook.disable();
```

FSEVENTWRAP, FSREQWRAP, GETADDRINFOREQWRAP, GETNAMEINFOREQWRAP, HTTPPARSER, JSSTREAM, PIPECONNECTWRAP, PIPEWRAP, PROCESSWRAP, QUERYWRAP, SHUTDOWNWRAP, SIGNALWRAP, STATWATCHER, TCPCONNECTWRAP, TCPSERVER, TCPWRAP, TIMERWRAP, TTYWRAP, UDPSSENDWRAP, UDPWRAP, WRITWRAP, ZLIB, SSLCONNECTION, PBKDF2REQUEST, RANDOMBYTESREQUEST, TLSWRAP, Timeout, Immediate, TickObject

Strategic Initiatives - Core Promise APIs

- Initial promise support
 - util.promisify
 - util.callbackify
- Initial experimentation promised based APIs in core
 - fs

<https://github.com/nodejs/node/pull/18297>

Strategic Initiatives - New Stream APIs

- Several versions over the years
- A fresh look to find a better approach
- Very early in process, little to say...

Strategic Initiatives - Workers

Computation blocks all requests

Some Current Solutions

- Multiple Instances Node.js
- Offloading
- Native add-ons

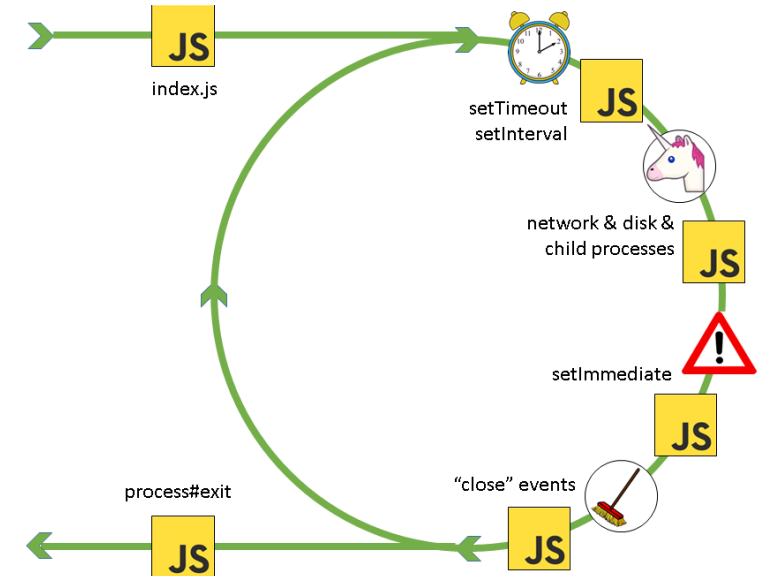
Goal is to make it easier/more efficient

Options

Web Workers API (from browser land)

New APIs

Processes/Threads



<https://github.com/nodejs/worker>

Foundation Initiatives



Foundation Initiatives

End User Feedback

Industry Neutral Certification

Interaction among the JS Ecosystem

Summary and Questions
