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Discover. Collaborate. Deploy.

What’s Next

Michael Dawson

Gibson Fahnestock

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About **Michael Dawson**

IBM Runtimes/IBM Node.js Community Lead

Node.js collaborator
Chair of Technical Steering Committee (TSC)
Community Committee member

Active in many working groups/teams

- Benchmarking
- Build
- Release
- N-API
- Diagnostics
- Security-wg
- User Feedback

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About Gibson Fahnestock

IBM Runtimes SDK Lead

Node.js collaborator
Node.js Technical Steering Committee member
Version 8.x release lead

Active in many working groups/teams

- Build
- Release
- Moderation

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Linkedin: https://www.linkedin.com/in/gibfahn/

Overview

- Learn how to fish
- High level predictions
- Releases
- Working Groups/Teams
- Strategic Initiatives
- Foundation Initiatives
- Wrap-up and Questions

Go Fishing, How to track What’s Next

- Releases

Node v8.9.4 (LTS)

by Gibson Fahnestock, 2018-01-02

Notable Changes

- deps:
  - upgrade npm to 5.6.0 (Kat Marchán) #17535
- build:
  - configure can now be run from any directory (Gibson Fahnestock) #17321

Commits

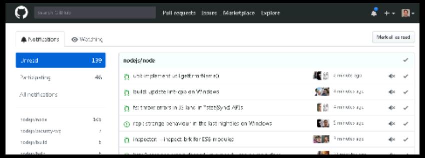
- [e2ad4eea07] - tools/doc: add tools/remark-* to eslintignore (Ivan Wei) #17240
- [[illegible]] - benchmark: [illegible] (Anatoli Papirovski) #17580

https://nodejs.org

- Twitter

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

- GitHub Fire Hose



nodejs/node

- util: implement util.getSystemErrorName() — 2 minutes ago
- build: update lint-cpp on Windows — 4 minutes ago
- fs: throw errors in JS land in fs.fstatSync APIs — 4 minutes ago
- repl: strange behaviour in the last nightlies on Windows — 5 minutes ago
- inspector: --inspect-brk for ES6 modules — 7 minutes ago

https://github.com/nodejs

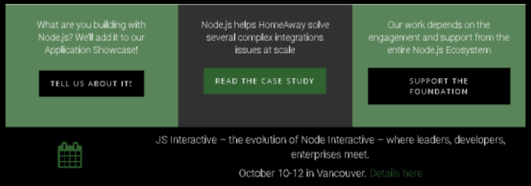
- Working Groups/Teams

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



What are you building with Node.js? We'll add it to our Application Showcase!

Node.js helps HomeAway solve several complex integrations issues at scale

Our work depends on the engagement and support from the entire Node.js Ecosystem

JS Interactive – the evolution of Node Interactive – where leaders, developers, enterprises meet.

October 10-12 in Vancouver. Details here

https://foundation.nodejs.org

High Level Predictions

More user feedback efforts

N-API and http2 out of experimental

Emphasis on Diagnostics

New Nightly Benchmarks

Progress on security triage for 3rd party modules

Functional testing for 3rd party modules (CiTGM)

Continued increase in velocity of consuming V8 updates

Progress on ES6 Modules

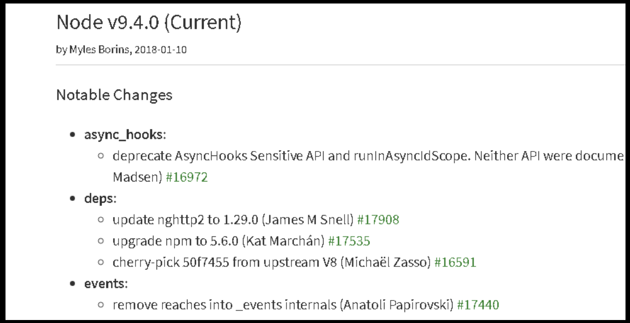
Promisification of Core

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



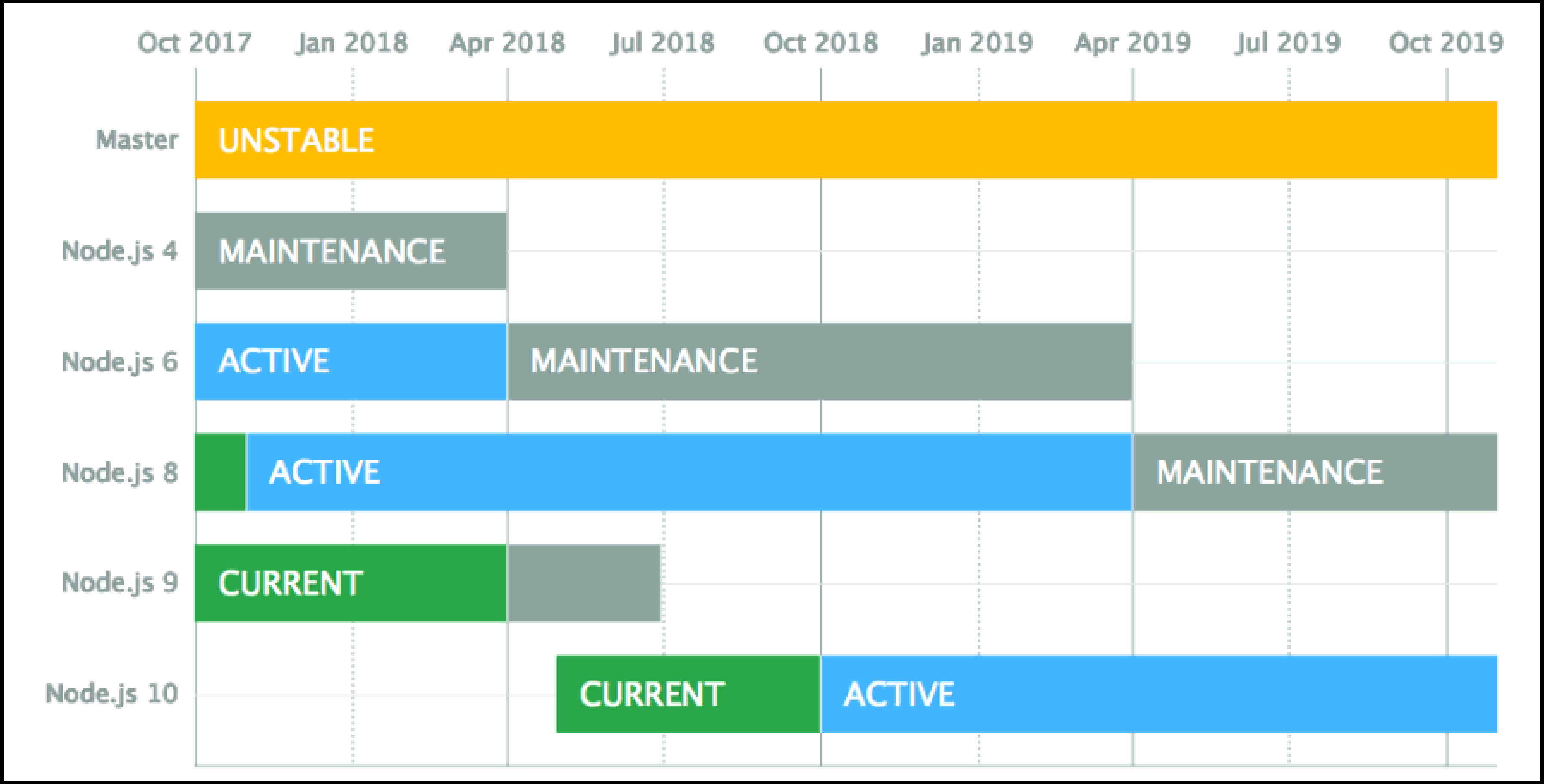
Node v9.4.0 (Current)

by Myles Borins, 2018-01-10

Notable Changes

- **async_hooks**:
  - deprecate AsyncHooks Sensitive API and runInAsyncIdScope. Neither API were docume
    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

https://github.com/nodejs/benchmarking

Key Goals

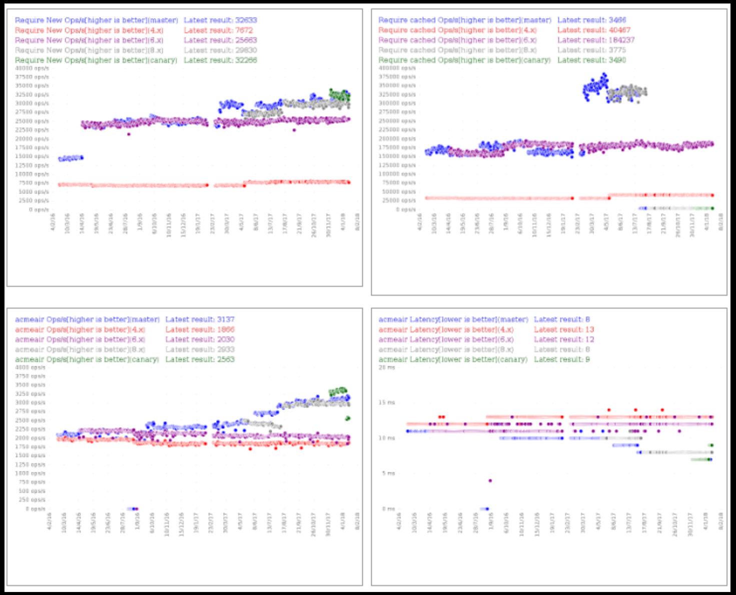
Avoid Regressions
Track and Evangelize gains between releases

How ?

Define Use Cases
Identify/Build Benchmarks
Run/Capture results

What’s Next

New workloads, promises?


Require New Ops/s[higher is better](master) Latest result: 32633
Require New Ops/s[higher is better](4.x) Latest result: 7672
Require New Ops/s[higher is better](6.x) Latest result: 25663
Require New Ops/s[higher is better](8.x) Latest result: 29830
Require New Ops/s[higher is better](canary) Latest result: 32266
Require cached Ops/s[higher is better](master) Latest result: 3466
Require cached Ops/s[higher is better](4.x) Latest result: 40467
Require cached Ops/s[higher is better](6.x) Latest result: 184237
Require cached Ops/s[higher is better](8.x) Latest result: 3775
Require cached Ops/s[higher is better](canary) Latest result: 3490
acmeair Ops/s[higher is better](master) Latest result: 3137
acmeair Ops/s[higher is better](4.x) Latest result: 1866
acmeair Ops/s[higher is better](6.x) Latest result: 2030
acmeair Ops/s[higher is better](8.x) Latest result: 2933
acmeair Ops/s[higher is better](canary) Latest result: 2563
acmeair Latency[lower is better](master) Latest result: 8
acmeair Latency[lower is better](4.x) Latest result: 13
acmeair Latency[lower is better](6.x) Latest result: 12
acmeair Latency[lower is better](8.x) Latest result: 8
acmeair Latency[lower is better](canary) Latest result: 9
20 ms
15 ms
10 ms
5 ms
0 ms

https://benchmarking.nodejs.org/

Working Groups - Security-wg

Key Goals

Define and Document security policies
Help implement those policies

Progress last year

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

What’s Next

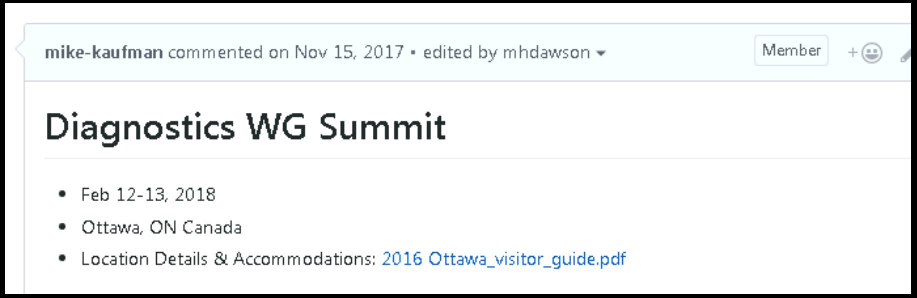
Complete ramp up of team to triage 3rd party vulnerabilities
Become CVE issuer for 3rd party modules?
Early access program?
Bug Bounty Program?

Working Groups - Diagnostics

Key Goals

First class

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


mike-kaufman commented on Nov 15, 2017 • edited by mhdawson

Diagnostics WG Summit

- Feb 12-13, 2018
- Ottawa, ON Canada
- Location Details & Accommodations: 2016 Ottawa_visitor_guide.pdf

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

Strategic Initiatives

Strategic Initiatives - Community Building

Mentorship Initiative

Node.js People Everywhere

Node Together

Strategic Initiatives - User Feedback

Surveys

Regular meeting with end users

Enterprise Advisory Board

Strategic Initiatives - Http2

- Major revision of HTTP
- Experimental status, but no flag
- 2 new APIs
  - Core API
  - Compatibility API
- Uses Nghttp2 https://nghttp2.org/
- Expect to exit experimental in 2018

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

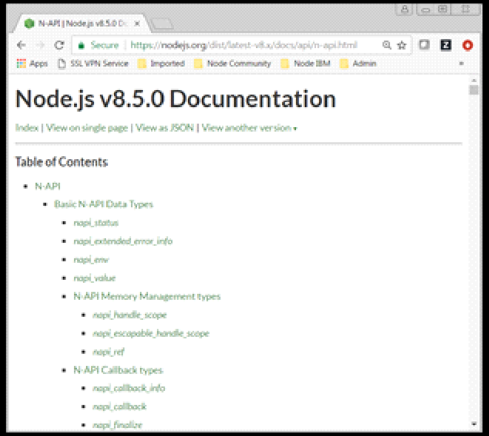
```
--experimental-modules
```

```
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;
}
```



Node.js v8.5.0 Documentation

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    - napi_status
    - napi_extended_error_info
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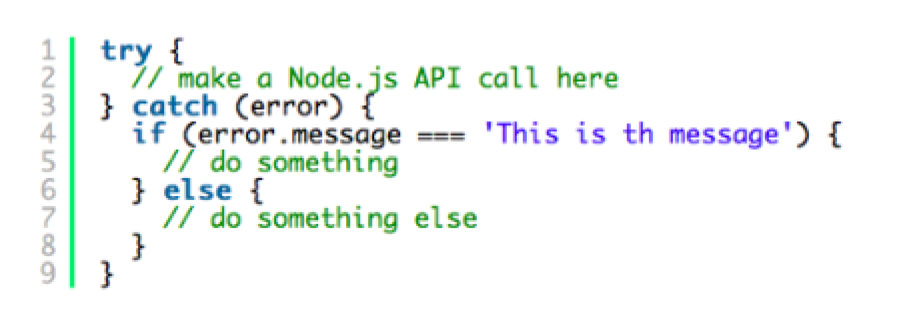
    - napi_value
    - N-API Memory Management types
      - napi_handle_scope
      - napi_escapable_handle_scope
      - napi_ref
    - N-API Callback types
      - napi_callback_info
      - napi_callback
      - napi_finalize

Look for N-API to exit Experimental in 2018

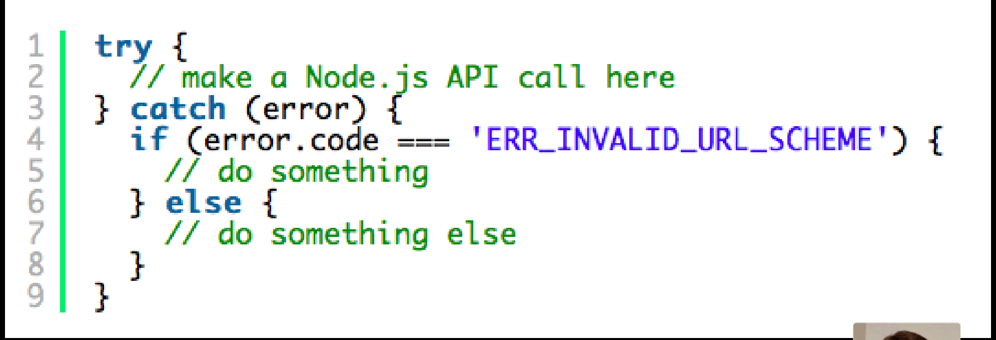
https://nodejs.org/dist/latest/docs/api/n-api.html
https://github.com/nodejs/node-addon-api

Strategic Initiatives - Error Messages

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

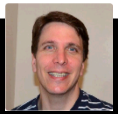


```
try {
  // make a Node.js API call here
} catch (error) {
  if (error.message === 'This is th message') {
    // do something
  } else {
    // do something else
  }
}
```



```
try {
  // make a Node.js API call here
} catch (error) {
  if (error.code === 'ERR_INVALID_URL_SCHEME') {
    // do something
  } else {
    // do something else
  }
}
```

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



Strategic Initiatives - Async Hooks

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

- Context across Asynchronous calls

```
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, UDPSENDWRAP, UDPWRAP, WRITEWRAP, 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

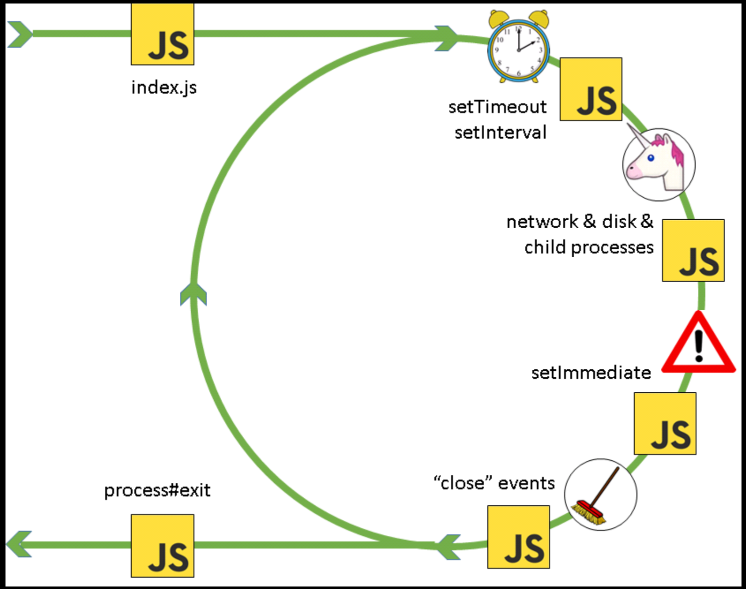
Goal is to make it easier/more efficient

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

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Michael Dawson

Gibson Fahnestock