



Node.js What's Next?

About Michael Dawson



Node.js lead for Red Hat and IBM

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Node.js Collaborator, Node.js Technical Steering Committee,

Active in a number of Working group(s)

Active OpenJS Foundation member

Voting Cross Project Council Member

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Overview

- Following What's Next
- Next-10
- What's new/interesting?

Following What's Next - from the Ground up

- GitHub Notifications
- Working Groups and Teams - <https://nodejs.org/calendar>
- Strategic Initiatives - <https://github.com/nodejs/node/blob/master/doc/guides/strategic-initiatives.md>
- Next-10 - <https://github.com/nodejs/next-10>
- Releases - <https://github.com/nodejs/release>





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nodejs/nodejs... 2

nodejs/build 1

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		2021-10-19, Version 17.0.0 (Current)				
<input checked="" type="checkbox"/>	<input type="checkbox"/>	nodejs/nodejs.dev #1772		assigned		1 hour ago
		Node.js Website Redesign Strategic Initiative Meeting 2021-09-01				
<input checked="" type="checkbox"/>	<input type="checkbox"/>	nodejs/nodejs.dev #1820		assigned		1 hour ago
		Node.js Website Redesign Strategic Initiative Meeting 2021-09-15				
<input checked="" type="checkbox"/>	<input type="checkbox"/>	nodejs/build #2763	+1	assigned		1 hour ago
		Node.js Build WorkGroup Meeting 2021-09-21				

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Following What's Next - from the Ground up

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Node.js Project Calendar

Today September 2021

Print Week Month Agenda

Sun	Mon	Tue	Wed	Thu	Fri	Sat
29	30	31	Sep 1	2	3	4
	5pm Moderation Team Recert	12pm Build WG Meeting - ear 4pm Node.js Outreach Meetin	6pm Node.js Website Redesign		3pm Node.js N-API team week 5pm Loaders Team Meeting 5pm Node.js Mentorship Program 6pm Node.js i18n WG Meeting 8pm Node.js Tooling Group tea	
5	6	7	8	9	10	11
		7pm Package Maintenance Te	3pm Diagnostics WG Meeting 5pm Node.js Social Team 6pm Node.js Website Redesign	2pm Node.js Release Working 9pm Node.js TSC Meeting	3pm Node.js N-API team week 5pm Node.js Mentorship Program 6pm Node.js i18n WG Meeting	
12	13	14	15	16	17	18
	3pm Node.js Next 10 years	4pm Node.js Outreach Meeting	3pm Node.js TSC Meeting 6pm Node.js Website Redesign	2pm Node.js Security-WG meeting	3pm Node.js N-API team week 5pm Node.js Mentorship Program 6pm Node.js i18n WG Meeting 8pm Node.js Tooling Group tea	
19	20	21	22	23	24	25
		5pm Loaders Team Meeting 10pm Build WG Meeting	3pm Diagnostics WG Meeting 5pm Node.js Social Team 6pm Node.js Website Redesign	2pm Node.js Release Working 5pm Node.js TSC Meeting 5pm Package Maintenance Te	3pm Node.js N-API team week 5pm Node.js Mentorship Program 6pm Node.js i18n WG Meeting	
26	27	28	29	30	Oct 1	2
	3pm Node.js Next 10 years	4pm Node.js Outreach Meeting	6pm Node.js Website Redesign 9pm Loaders Team Meeting	9pm Node.js TSC Meeting	3pm Node.js N-API team week 5pm Node.js Mentorship Program 6pm Node.js i18n WG Meeting 8pm Node.js Tooling Group tea	

Events shown in time zone: Greenwich Mean Time

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Following What's Next - from the Ground Up

42 lines (34 sloc) | 2.93 KB

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Strategic initiatives

The Node.js project has several strategic initiatives underway. A review of the current initiatives is a standing item on the Technical Steering Committee agenda to ensure they are active and have the support they need.

Current initiatives

Initiative	Champion	Links
Core Promise APIs	Antoine du Hamel	
Future of Build Toolchain	Mary Marchini	https://github.com/nodejs/TSC/issues/901 , https://github.com/nodejs/build-toolchain-next
QUIC / HTTP3	James M Snell	https://github.com/nodejs/quic
Startup performance	Joyee Cheung	https://github.com/nodejs/node/issues/17058 https://github.com/nodejs/node/issues/21563
V8 Currency	Michaël Zasso	

► List of completed initiatives

[es/strategic-](#)

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- Working G
- Strategic I
- Next-10
- Releases

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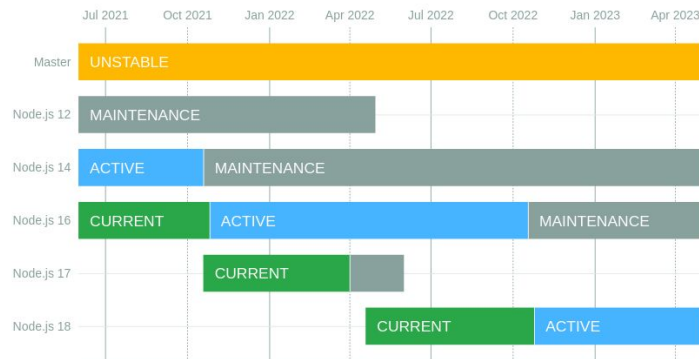
README.md

Node.js Release Working Group

Release schedule

Release	Status	Codename	Initial Release	Active LTS Start	Maintenance Start	End-of-life
12.x	Maintenance	Erbium	2019-04-23	2019-10-21	2020-11-30	2022-04-30
14.x	Active LTS	Fermium	2020-04-21	2020-10-27	2021-10-19	2023-04-30
16.x	Current		2021-04-20	2021-10-26	2022-10-18	2024-04-30
17.x	Pending		2021-10-19	-	2022-04-01	2022-06-01
18.x	Pending		2022-04-19	2022-10-25	2023-10-18	2025-04-30

Dates are subject to change.



The Release schedule is available also as a [JSON](#) file.

nodejs.org/calendar

nodejs.org/master/doc/guides/strategic-

- <https://github.com/nodejs/release>

Following What's Next - from the Ground up

- GitHub Notif
- Working Grc
- Strategic Init
- Next-10 - [ht](#)
- Releases -

2021-09-22, Version 16.10.0 (Current), @BethGriggs

Notable Changes

- [[7b226ff2ee](#)] - (SEMVER-MINOR) **crypto**: add rsa-pss keygen parameters (Filip Skokan) [#39927](#)
- [[85296b7311](#)] - **deps**: upgrade npm to 7.24.0 (npm team) [#40167](#)
- [[98f56d179c](#)] - **deps**: update Acorn to v8.5.0 (Michaël Zasso) [#40015](#)
- [[9655329772](#)] - **doc**: add Ayase-252 to collaborators (Qingyu Deng) [#40078](#)
- [[59ff925be](#)] - (SEMVER-MINOR) **fs**: make `open` and `close` stream override optional when unused (Antoine Maréchal) [#40082](#)
- [[a63a4bce90](#)] - (SEMVER-MINOR) **http**: limit requests per connection (Artur K) [#40082](#)
 - The maximum number of requests a socket can handle before closing keep alive connection can be set with `server.maxRequestsPerSocket`.
- [[9a672961fa](#)] - (SEMVER-MINOR) **src**: add `--no-global-search-paths` cli option (Cheng Zhao) [#39754](#) [node/blob/master/doc/guides/strategic-de/blob/master/doc/guides/strategic-](#)
 - Adds the `--no-global-search-paths` command-line option to not search modules from global paths like `$NODE_PATH`.
- [[fe920b6cbf](#)] - (SEMVER-MINOR) **src**: make `napi_create_reference` accept symbol (JckXia) [#39926](#)
- [[97f3072ceb](#)] - (SEMVER-MINOR) **stream**: add signal support to pipeline generators (Robert Nagy) [#39067](#)

Commits

- [[b7dc651884](#)] - **build**: run modified internet tests on GitHub Actions (Rich Trott) [#40100](#)
- [[8d5787a043](#)] - **build**: add `.mailmap/AUTHORS` to paths-ignore for test-macos (Rich Trott) [#40109](#)
- [[9793e7ff08](#)] - **build**: add `.mailmap/AUTHORS` to path-ignore for test-asan (Rich Trott) [#40109](#)
- [[886921de38](#)] - **build**: add paths-ignore for build-tarball workflow (Rich Trott) [#40109](#)
- [[01b1946b38](#)] - **build**: only lint version numbers for pull requests (Michaël Zasso) [#40027](#)
- [[c804d970a6](#)] - **build**: add daily/on-demand internet test workflow (Rich Trott) [#40086](#)
- [[7bdda6cbf4](#)] - **build**: add YAML linting to GitHub Actions (Rich Trott) [#40007](#)
- [[5a20f9055c](#)] - **build**: add YAML linting (Rich Trott) [#40007](#)
- [[0b39867c08](#)] - **build**: run AUTHORS update weekly (Rich Trott) [#40004](#)
- [[22a78a75ee](#)] - **build**: preserves symbols during LTO with macOS linker (Jesse Chan) [#39839](#)
- [[70dec58043](#)] - **crypto**: fix webcrypto ed(25519/448) spki/pkcs8 import (Filip Skokan) [#40131](#)
- [[d80082f3eb](#)] - **crypto**: use `validateObject` (Voltrex) [#39872](#)
- [[d657ae6f8a](#)] - **crypto**: fix RSA-PSS default saltLength (Tobias Nießen) [#39999](#)
- [[fc45cbe7a8](#)] - **crypto**: fix default MGF1 hash for OpenSSL 3 (Tobias Nießen) [#40031](#)

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

Next 10

Strategic directions

How do we
ensure
continued
success?

for the next

What do
stakeholders
need ?

10 years of Node.js

What's crucial?

How will
JavaScript
Evolve?

Who are the key
Node.js
Stakeholders?

Next 10 - Foundation

- Technical Values and Priorities - <https://github.com/nodejs/node/blob/master/doc/guides/technical-values.md>
- Constituencies - <https://github.com/nodejs/next-10/blob/main/CONSTITUENCIES.md>
- Constituencies Needs - <https://github.com/nodejs/next-10/blob/main/CONSTITUENCY-NEEDS.md>



Trott doc: use "Long Term Support" in technical values doc ...

Latest commit 0ba7da6 on May 29



4 contributors



74 lines (63 sloc) | 2.77 KB

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Technical values and priorities

The project uses these technical values to establish priorities and guide collaboration.

These are the shared values as of this writing and will evolve. We hope they are useful to people new to the project in order to better understand which contributions will be aligned with the current direction and as thinking points when trading off between conflicting goals.

The factors influencing every discussion/decision are different and priority 1 does not always trump priority 2 and so on.

Values and priority level

- Priority 1 - Developer experience
- Priority 2 - Stability
- Priority 3 - Operational qualities
- Priority 4 - Node.js maintainer experience
- Priority 5 - Up to date technology and APIs

Value descriptions

1 - Developer experience

We value ensuring that developers are productive and enjoy developing with Node.js. Some key elements of this include:

</doc/gu></-NEEDS.md>

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Next 10

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List of constituencies

- Direct end users
 - Users who run tools themselves (install Node.js, run tool, deal with errors including writing/using scripts)
- Application operators
 - Users who interact with existing, running applications (regardless if they wrote the application or not)
 - Service and infrastructure providers
- Application Developers
 - Front-end tool consumers
 - Back-end server authors
 - Hobby developers
 - Professional developers
 - Tool authors
- Library/package authors
 - Users who write libraries and packages to be included on other applications
- Node.js contributors
 - Developers working directly on [nodejs/node](#)
 - Individuals participating in Working Groups and teams
- Organizations with investments in Node.js (eg: Enterprises, Government bodies, startups, non-profits, standards groups like TC39)
 - C level executives (CTO, CEO, etc.)
 - Planning/program offices
 - Managers
- Education
 - Teachers
 - Students
 - Organizations who help people learn Node.js (colleges, University, boot camps, online learning resources, etc.)
 - Programs to help people demonstrate capability (certification programs, etc.)
- Security Practitioners
 - People involved in the life-cycle of handling security issues including:
 - Penetration testing
 - Incident response
 - CVE scanning/remediation,
 - Legal, Public relations

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[TUENCY-NEEDS.md](#)

Next 10 - Foundation

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Needs of the Node.js Constituencies

Need	Users	Ops	AppDev	LibDev	Orgs	NodeMaint
Good understanding of the direction of the project	X	X	X	X	X	X
Ability to affect the direction of the project	X	X	X	X	X	X
Consumable APIs and docs	X		X	X		X
Predictable and stable releases	X	X	X	X	X	
Innovation at a consumable pace	X		X	X	X	X
Easy Installation	X					
Easy issue reporting, resolution and collaboration	X	X	X	X	X	
Broad deployment platform support	X	X			X	
Broad desktop platform support	X		X	X		X
Consistent and intuitive error handling	X	X	X	X		

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Ability to embed and bundle the Node.js runtime			X			
A well maintained and secure standard library			X	X	X	
Assets that show Node.js is a good choice	X		X	X	X	

Good understanding of the direction of the project

- An understanding of the work happening in the Node.js project (what features do I have to look forward to, what's the project direction). Changes between releases. Info on how new changes affect end users/developers

Technical Priorities

<https://github.com/nodejs/node/pull/40235>

- Modern HTTP
- Suitable types for end-users
- Documentation
- Web Assembly
- ESM
- Observability
- Permissions/policies/security model
- Better multithreaded support
- Single Executable Applications
- Support for features from the latest ECMAScript spec

121 lines (98 sloc) 6.08 KB

Technical Priorities

This list represents the current view of key technical priorities recognized by the project as important to ensure the ongoing success of Node.js. It is based on an understanding of the Node.js [constituencies](#) and their [needs](#).

The initial version was created based on the work of the [Next-10 team](#) and the [mini-summit](#) on August 5th 2021.

They will be updated on a regular basis and will be reviewed by the next-10 team and the TSC on a 6 month basis.

Modern HTTP

Base HTTP support is a key component of modern cloud native applications and built-in support was part of what made Node.js a success in the first 10 years. The current implementation is hard to support and a common source of vulnerabilities. It is important that we work towards an implementation which is easier to support and makes it easier to integrate the new http versions (HTTP3, quick) and to support efficient implementations of different versions concurrently.

Suitable types for end-users

Using typings with JavaScript can allow a richer experience when using Visual code (or any other IDEs) environments, more complete documentation of APIs and the ability to identify and resolve errors earlier in the development process. These benefits are important to a large number of Node.js developers (maybe 50%). Further typing support may be important to enterprises that are considering expanding their preferred platforms to include Node.js. It is, therefore, important that the Node.js project work to ensure there are good typings available for the public Node.js APIs.

Documentation

The current documentation is great for experienced developers or people who are aware of what they are looking for. On the other hand, for beginners this documentation can be quite hard to read and finding the desired information is difficult. It is important that we have documentation that is suitable for beginners in order to continue the rapid growth in use. This documentation should include more concrete examples and a learning path for newcomers.

Web Assembly

The use of Web Assembly has been growing over the last few years. In order to ensure Node.js continues to be part of solutions where a subset of the solution needs the performance that Web Assembly can deliver it is important that Node.js provide good support for running Web Assembly components along with the JavaScript that makes up the rest of the solution. This includes implementations of "host" APIs like WASI.

ESM

The CommonJS module system was one of the key components that led to the success of Node.js in its first 10 years. ESM is the standard

Next 10 - How can I help

- Join the effort
 - We need your ideas/input
- Participate in the team's survey's
- Support key initiatives

Let's make sure the next 10 years are just as successful as the first

What's new/interesting?

- Major Releases
 - Boring.....
- SemVer Minor is where its at!
 - features (but not all) flow into Current/LTS lines
- Majors still a good time to party
 - Talk about recent new features
 - Promotion to LTS

New Features

macOS ARM64 support (16.x - LTS)

Downloads

Latest Current Version: 16.9.1 (includes npm 7.21.1)

Download the Node.js source code or a pre-built installer for your platform, and start developing today.



Windows Installer (.msi)

Windows Binary (.zip)

macOS Installer (.pkg)

macOS Binary (.tar.gz)

Linux Binaries (x64)

Linux Binaries (ARM)

Source Code

32-bit	64-bit
32-bit	64-bit
64-bit / ARM64	
64-bit	ARM64
64-bit	
ARMv7	ARMv8
node-v16.9.1.tar.gz	

16.x will be first LTS release that includes ARM64 for macOS

Additional Platforms

Docker Image

Linux on Power LE Systems

Linux on System z

AIX on Power Systems

Official Node.js Docker Image
64-bit
64-bit
64-bit

<https://nodejs.org/en/download/>

OpenSSL 3 (17.x)

- Biggest impact
 - Users of smaller key sizes
 - Legacy algs no longer available by default
 - Native modules - Deprecation warnings

OpenSSL Migration Guide -

https://www.openssl.org/docs/man3.0/man7/migration_guide.html



<https://www.openssl.org/blog/blog/2021/09/07/OpenSSL3.Final/>

Promise APIs

- readline (v17.0.0)
- timers (V16.0.0)
- stream (v15.0.0)
- fs (v14.0.0)
- dns (v11.14.0)

Module name	Promise replacement candidate
<code>child_process</code>	<i>TBD</i>
<code>cluster</code>	<i>TBD</i>
<code>crypto</code>	Web Crypto API
<code>dns</code>	<code>dns/promises</code>
<code>fs</code>	<code>fs/promises</code>
<code>http / http2 / https</code>	<code>undici</code> + <code>fetch</code> (<i>TBD</i>)
<code>readline</code>	<code>readline/promises</code>
<code>stream</code>	<code>stream/promises</code>
<code>timers</code>	<code>timers/promises</code>
<code>zlib</code>	<i>TBD</i>

Timer Promises API

```
const setTimeout = require('timers/promises').setTimeout;

async function run() {
  await setTimeout(5000);
  console.log('Hello from NodeConf.eu');
}

run();
```

Node.js version in stack trace

Uncaught Exceptions:

```
[midawson@drx-hemera ~]$ node throw.js
/home/midawson/throw.js:1
throw new Error('An error');
^
Error: An error
    at Object.<anonymous> (/home/midawson/throw.js:1:7)
    at Module._compile (node:internal/modules/cjs/loader:1101:14)
    at Object.Module._extensions..js (node:internal/modules/cjs/loader:1153:10)
    at Module.load (node:internal/modules/cjs/loader:981:32)
    at Function.Module._load (node:internal/modules/cjs/loader:822:12)
    at Function.executeUserEntryPoint [as runMain] (node:internal/modules/run_main:81:12)
    at node:internal/main/run_main_module:17:47

Node.js v17.0.0-pre
[midawson@drx-hemera ~]$
```

Can disable with `--no-extra-info-on-fatal-exception`

Async Local Storage (Stable as of v16.4.0)

- Need to share data across asynchronous calls
 - Transaction traces, APMs
- Easier for synchronous thread based runtimes (ex ThreadLocal)

■ Asynchronous Context Tracking

- Introduction
- Class: AsyncLocalStorage
 - `new AsyncLocalStorage()`
 - `asyncLocalStorage.disable()`
 - `asyncLocalStorage.getStore()`
 - `asyncLocalStorage.enterWith(store)`
 - `asyncLocalStorage.run(store, callback[, ...args])`
 - `asyncLocalStorage.exit(callback[, ...args])`
- Usage with `async/await`
- Troubleshooting: Context loss

https://nodejs.org/dist/latest-v16.x/docs/api/async_context.html

Async Local Storage (Stable as of v16.4.0)

```
const AsyncLocalStorage = require('async_hooks').AsyncLocalStorage;
const asyncLocal1 = new AsyncLocalStorage();
let sharedFlowId = "";
```

```
function asyncflow(flowid) {
  setTimeout( () => {
    asyncLocal1.run(new Object(), () => {
      sharedFlowId = flowid;
      asyncLocal1.getStore()['flowid'] = flowid;
      setTimeout(() => {
        console.log(flowid + ':' + sharedFlowId + ':' +
asyncLocal1.getStore()['flowid']);
      }, Math.random()*500);
    });
  }, Math.random()*500);
}
```

```
asyncflow('flow1');
asyncflow('flow2');
asyncflow('flow3');
```

Same object as in run

Output - sharedFlowID varies

flow2:flow1:flow2
flow3:flow3:flow3
flow1:flow3:flow1

ECMAScript Modules (v14.17.0)

CommonJS

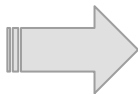
```
module.exports = function() {  
  console.log('Hello');  
}  
  
const test = require('./helloTest.js');  
test();
```

ES6 Modules

```
export function test() {  
  console.log('Hello ES6');  
}  
  
import { test } from './helloTest.mjs';  
test();
```

package.json

```
{  
  "name": "test",  
  "type": "module"  
}
```



```
import { test } from './helloTest2.js';  
test();
```

ECMAScript Modules - Experimental APIs

- Loaders API:

\$ node --experimental-loader ./custom-loader.mjs ./main.mjs

- JSON Modules: --experimental-json-modules

import packageConfig from './package.json';

- WASM Modules: --experimental-wasm-modules

import * as M from './module.wasm';

New Language Features

- Error Cause

```
const error1 = new Error('Error one');  
const error2 = new Error('Error two', { cause: error1 });  
// error2.cause === error1
```

- Array.prototype.at

```
const array = [1, 2, 3];  
  
console.log(array.at(-1));  
// Prints: 3
```

CorePack - Experimental

```
[midawson@drx-hemera ~]$ corepack enable
[midawson@drx-hemera ~]$ yarn add kube-service-bindings
yarn add v1.22.11
info No lockfile found.
[1/4] Resolving packages...
[2/4] Fetching packages...
[3/4] Linking dependencies...
[4/4] Building fresh packages...
success Saved lockfile.
success Saved 1 new dependency.
info Direct dependencies
└─ kube-service-bindings@0.0.3
info All dependencies
└─ kube-service-bindings@0.0.3
Done in 1.23s.
[midawson@drx-hemera ~]$
```

yarn
pnpm

Web Streams (Experimental)

```
import { ReadableStream, WritableStream } from 'stream/web';  
// Or from 'node:stream/web'
```

- Raw API is available
- Working on integrating into other APIs

https://developer.mozilla.org/en-US/docs/Web/API/Streams_API

Source Maps (v12.x, v13.x, ...)

- Source code does not always match what's running

- Transpilers (ex Babel)
- Flow, TypeScript, CoffeeScript, etc.

- Causes problems for

- Observability
- Code Coverage
- ...

- Source Map V3

- <https://sourcemap.info/spec.html>
- Embedded in source with special comment - `//# sourceMappingURL=test2-babel.js.map`

Same file with running
source + .map



```
//# sourceMappingURL=test2-babel.js.map
```

Source Maps (v12.x, v13.x, ...)

- What support does Node.js have so far?
 - Environment variable - `NODE_V8_COVERAGE` (v12.11.0)
 - `--enable-source-maps` (v12.12.0) - incomplete
 - Public API - <https://nodejs.org/api/module.html> (v13.7.0)

- Source map v3 support
 - `module.findSourceMap(path)`
 - Class: `module.SourceMap`
 - `new SourceMap(payload)`
 - `sourceMap.payload`
 - `sourceMap.findEntry(lineNumber, columnNumber)`

To read more, great blog by @bcoe

<https://nodejs.medium.com/source-maps-in-node-js-482872b56116>

Source Maps (v12.11.0, v13.7.0, ...)

```
1 class myClass {  
2   constructor(){  
3     throw new Error();  
4   }  
5 }  
6  
7 new myClass();
```

```
[midawson@midawson babel]$ node test2-babel.js  
/home/midawson/demos/babel/test2-babel.js:6  
  throw new Error();  
    ^  
Error  
    at new myClass (/home/midawson/demos/babel/test2-babel.js:6:9)  
    at Object.<anonymous> (/home/midawson/demos/babel/test2-babel.js:9:1)  
    at Module._compile (internal/modules/cjs/loader.js:999:30)  
    at Object.Module._extensions..js (internal/modules/cjs/loader.js:1027:10)  
    at Module.load (internal/modules/cjs/loader.js:863:32)  
    at Function.Module._load (internal/modules/cjs/loader.js:708:14)  
    at Function.executeUserEntryPoint [as runMain] (internal/modules/run_main.js:60:12)  
    at internal/main/run_main_module.js:17:47
```

Source Maps (v12.11.0, v13.7.0, ...)

```
1 class myClass {  
2   constructor(){  
3     throw new Error();  
4   }  
5 }  
6  
7 new myClass();
```

```
[midawson@midawson babel]$ node --enable-source-maps test2-babel.js  
Error  
    at new myClass (/home/midawson/demos/babel/test2-babel.js:6:9)  
    -> /home/midawson/demos/babel/test2.js:3:11  
    at Object.<anonymous> (/home/midawson/demos/babel/test2-babel.js:9:1)  
    -> /home/midawson/demos/babel/test2.js:7:1  
    at Module._compile (internal/modules/cjs/loader.js:999:30)  
    at Object.Module._extensions..js (internal/modules/cjs/loader.js:1027:10)  
    at Module.load (internal/modules/cjs/loader.js:863:32)  
    at Function.Module._load (internal/modules/cjs/loader.js:702:16)  
    at Function.executeUserEntryPoint [as runMain] (internal/modules/run_main.js:60:12)  
    at internal/main/run_main_module.js:17:47
```

Review

- Following What's Next
- Next-10
- What's new/interesting?

Thank You

Thank You

Questions?

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