Hono

Multi-Runtime Web Framework for the Edges

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— Travel Startup Founder (Tripfinder.cc)
— Web Dev Studio Founder (Triangle.network)

Plan

1. JS Runtimes
   - Engines & Runtimes
   - Standalone & Cloud Runtimes
   - API Interoperation
2. Hono
   - What Hono is
   - Why Hono is Awesome

JS Runtimes

Engine

Software that executes code

Runtime

The environment in which code is executed

- event loop
- runtime libraries
- APIs

Engines

Standalone Runtimes

Service Runtimes

aws

CLOUDFLARE®

Vercel

Standalone Runtimes API Differences

Node.js

```
import { readFile } from 'fs/promises'

await readFile('file.txt', 'utf-8')
```

Deno

```
await Deno.readTextFile('file.txt')
```

Service Runtimes API Differences

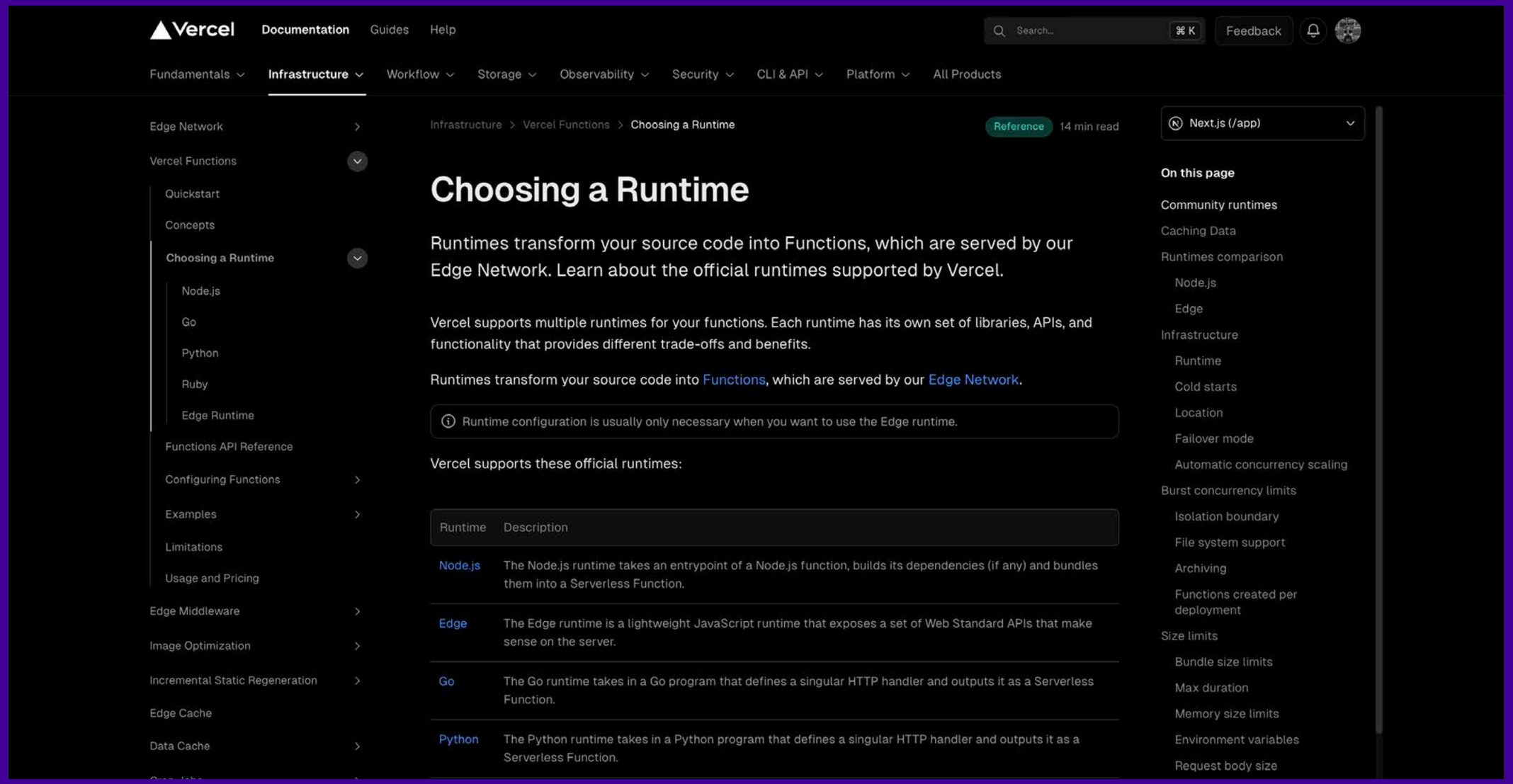
AWS Lambda

```
const handler = async (event, context) => {
  return "Hello";
};

export handler
```

Vercel Node.js

```
const handler = async (req, res) => {
  res.send("Hello!");
}

export handler
```

1 Service != 1 Runtime



Possible Service Runtime Limitations

- Limited NPM package access
- Limited API set (Web Standard APIs only)
- No direct database access

Vercel Edge Limitations

Also, `Buffer` is globally exposed to maximize compatibility with existing Node.js nodules.

Unsupported APIs

The Edge runtime has some restrictions including:

- Some Node.js APIs other than the ones listed above **are not supported**. For example, you can't read or write to the filesystem
- `node_modules` *can* be used, as long as they implement ES Modules and do not use native Node.js APIs
- Calling `require` directly is **not allowed**. Use `import` instead

The following JavaScript language features are disabled, and **will not work:**

API	Description
`eval`	Evaluates JavaScript code represented as a string
`new Function(evalString)`	Creates a new function with the code provided as an argument
`WebAssembly.compile`	Compiles a WebAssembly module from a buffer source
`WebAssembly.instantiate`	Compiles and instantiates a WebAssembly module from a buffer source

Supported AP
Network AP
Encoding A
Stream API
Crypto API
Other Web
Check if you'r runtime
Compatible N
Unsupported
Environment
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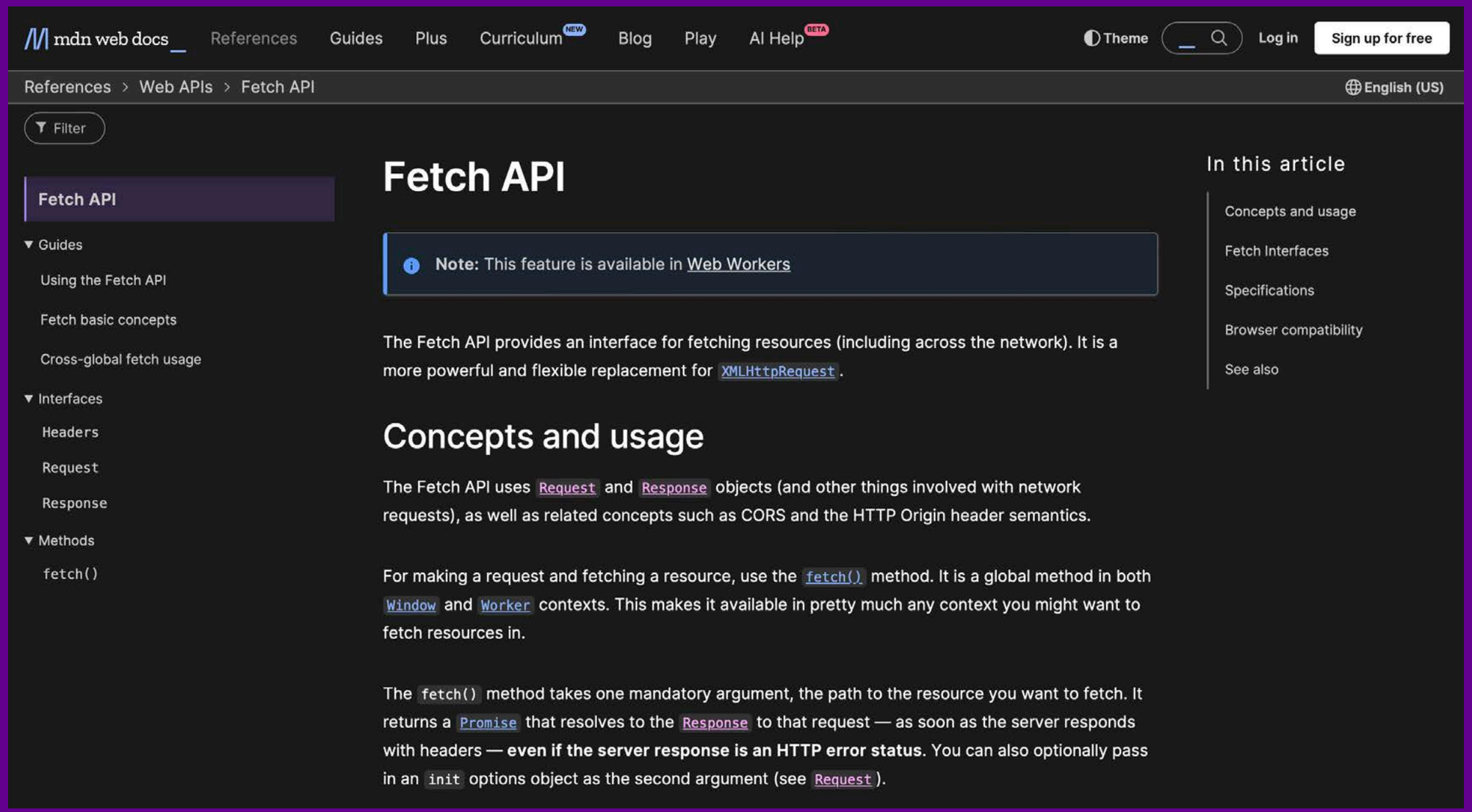
Web Standard APIs



Before

```
const handler = async (req, res) => {
    res.status(200)
    res.send('Hello!')
    return
}

export default handler
```

After

```
const handler = async (req: Request) =>
    return new Response('Hello!', 200)
}

export default handler
```

Why API Design Matters

```
const handler = (res, req) => {
    res.status(200)
    res.json({ ok: true })

    // forget a return and do something else

    res.status(200)
    res.json({ ok: true, hello: "world" })
}
```

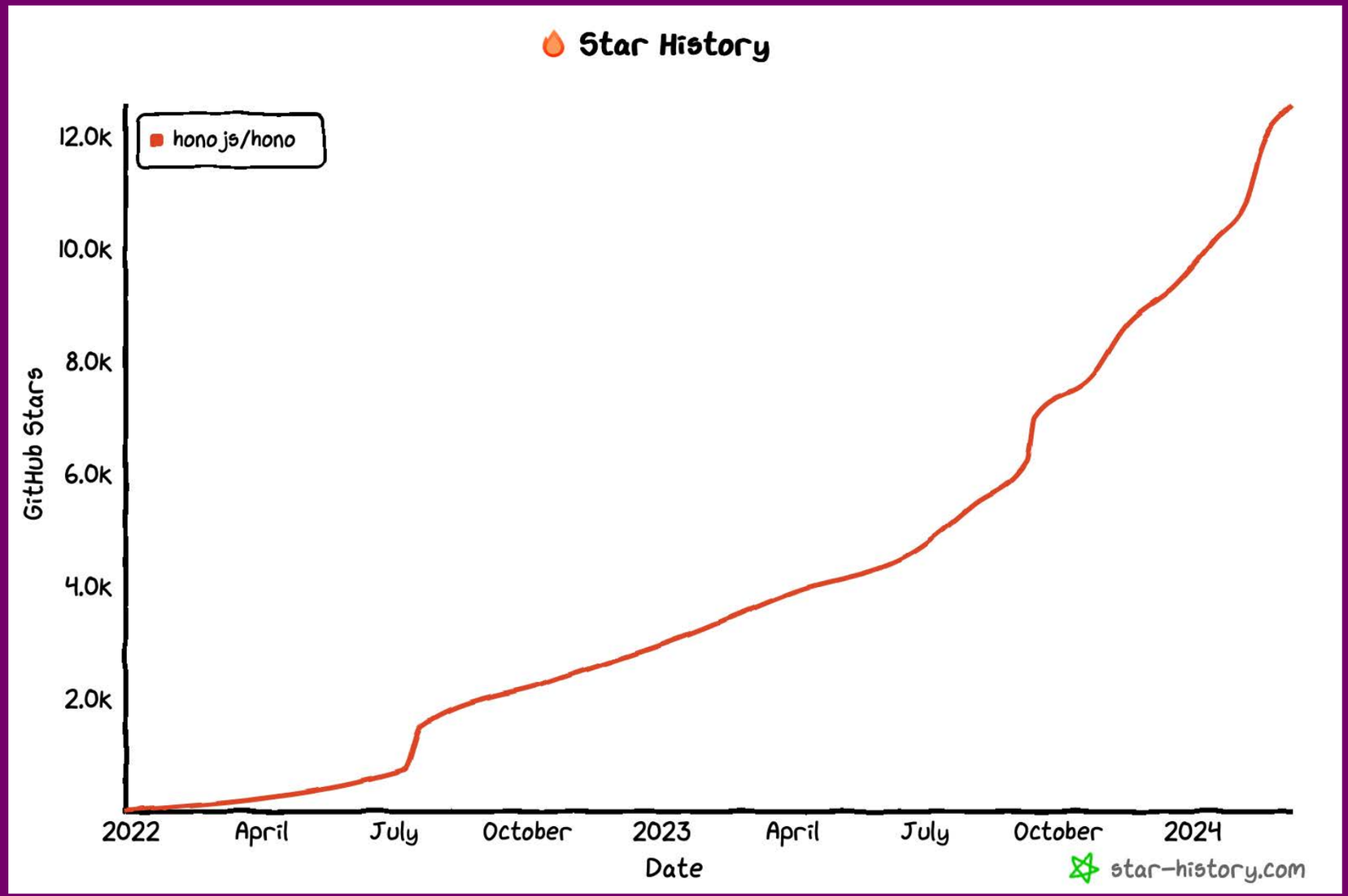
Hono

Hono is flame 🔥 in Japanese

Created by Yusuke Wada, Developer Advocate @ Cloudflare

— small
— simple
— fast
— flexible
— great developer experience

Gaining Popularity



What it Looks Like

```
import { Hono } from 'hono'

const app = new Hono()

app.get('/hello', (c) => {
  return c.json({
    message: `Hello!`,
  })
})
```

Why It's Awesome

Flexible

- Can migrate Server -> Serverless and vice versa
- Can switch runtimes
- Can switch hosting services
- Can be standalone or as part of a Next.js project, for example

Flexible

- Node.js
- Deno
- Bun
- Cloudflare Workers
- Fastly Compute
- Vercel
- Netlify
- AWS Lambda
- Lambda@Edge

Very Fast

- Fastest router for Cloudflare Workers
- Fastest router for Deno
- 3x faster than Express even with Node.js adapter

```
• short static - GET /user
------------------------------------------------------------------------------
Hono RegExpRouter                          64 ns/iter  (59.19 ns … 141.52 ns)
Hono TrieRouter                       217.17 ns/iter  (201.96 ns … 291.4 ns)
@medley/router                        104.57 ns/iter  (98.58 ns … 178.28 ns)
find-my-way                            89.87 ns/iter  (83.84 ns … 108.24 ns)
koa-tree-router                        87.57 ns/iter   (81.6 ns … 109.58 ns)
trek-router                           116.13 ns/iter (110.79 ns … 135.48 ns)
express (WARNING: includes handling)  633.89 ns/iter  (624.01 ns … 657.1 ns)
koa-router                              2 µs/iter     (1.98 µs … 2.05 µs)

summary for short static - GET /user
  Hono RegExpRouter
   1.37x faster than koa-tree-router
   1.4x faster than find-my-way
   1.63x faster than @medley/router
   1.81x faster than trek-router
   3.39x faster than Hono TrieRouter
   9.9x faster than express (WARNING: includes handling)
   31.29x faster than koa-router
```

Different Routers

1. RegExpRouter – fastest in the JavaScript world
2. TrieRouter – slower than RegExp, but supports all patterns
3. SmartRouter – auto selection of best router from the above
4. LinearRouter – better for "one shot" environments eg Fastly Compute
5. PatternRouter – smallest, best for environments with limited resources

Type Safety

```
6
7   const app = new Hono()
8
9   app.get('/entry/:date/:id', (c) => {
10
11    const date = c.req.param("
12    const id = c.req.param("id")
13
14
15    return c.text('This is permalink')
```

```
param(key: "date" | "id"): string
```

Autogenerated Client

```ts
import { Hono } from 'hono'

const app = new Hono()

app.get('/hello', (c) => {
  return c.json({
    message: `Hello!`,
  })
})

type AppType = typeof app

import { hc } from 'hono/client'

const client = hc<AppType>('/api')
const res = await client.hello.$get()
```

Middleware

```
// match any method, all routes
app.use(logger())

// specify path
app.use('/posts/*', cors())

// specify method and path
app.post('/posts/*', basicAuth())
```

Included

- Basic Authentication
- Bearer Authentication
- Cache
- Compress
- CORS
- CSRF Protection
- ETag
- JSX Renderer
- JWT
- Timing
- Logger
- Pretty JSON
- Secure Headers

Third-party

- GraphQL Server
- Sentry
- Firebase Auth
- Zod Validator
- Qwik City
- tRPC Server
- TypeBox Validator
- Verify RSA JWT
- Typia Validator
- Valibot Validator
- Zod OpenAPI
- Clerk Auth
- Swagger UI
- Scalar API Reference
- esbuild Transpiler
- Prometheus Metrics
- Auth.js(Next Auth)

Custom Middleware

```
// Custom logger
app.use(async (c, next) => {
  console.log(`[${c.req.method}] ${c.req.url}`)
  await next()
})

// Add a custom header
app.use('/message/*', async (c, next) => {
  await next()
  c.header('x-message', 'This is middleware!')
})

app.get('/message/hello', (c) => c.text('Hello
Middleware!'))
```

Validation

```ts
import { zValidator } from '@hono/zod-validator'
import { z } from 'zod'

const schema = z.object({
  name: z.string(),
})

app.get(
  '/hello',
  zValidator('query', schema),
  (c) => {
    const { name } = c.req.valid('query')
    return c.json({
      message: `Hello! ${name}`,
    })
  }
)
```

OpenAPI

```ts
import { OpenAPIHono } from '@hono/zod-openapi'

const app = new OpenAPIHono()

app.openapi(route, (c) => {
  const { id } = c.req.valid('param')
  return c.json({
    id,
    age: 20,
    name: 'Ultra-man',
  })
})

// The OpenAPI documentation will be available at /doc
app.doc('/doc', {
  openapi: '3.0.0',
  info: {
    version: '1.0.0',
    title: 'My API',
  },
})
```

General Takeaways

- Standardised Web APIs
- Reusable objects with fetch (Request + Response)
- Improved interoperability of runtimes

Thanks WinterCG!

Hono Takeaways

- [x] Runs everywhere
- [x] Easy migration
- [x] Excellent DevEx
- [x] Easy to get going
- [x] Easily extendable

Try it!

Hono Links

https://github.com/honojs/hono

https://twitter.com/honojs

https://discord.gg/KMh2eNSdxV

https://github.com/yusukebe

Thank You!

My Links

https://twitter.com/kolyasapphire

https://github.com/kolyasapphire

https://ks.gg