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Fastify

Fast and low overhead framework, for Node.js

https://github.com/davidedantonio/wetalk-fastify

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weBeetle

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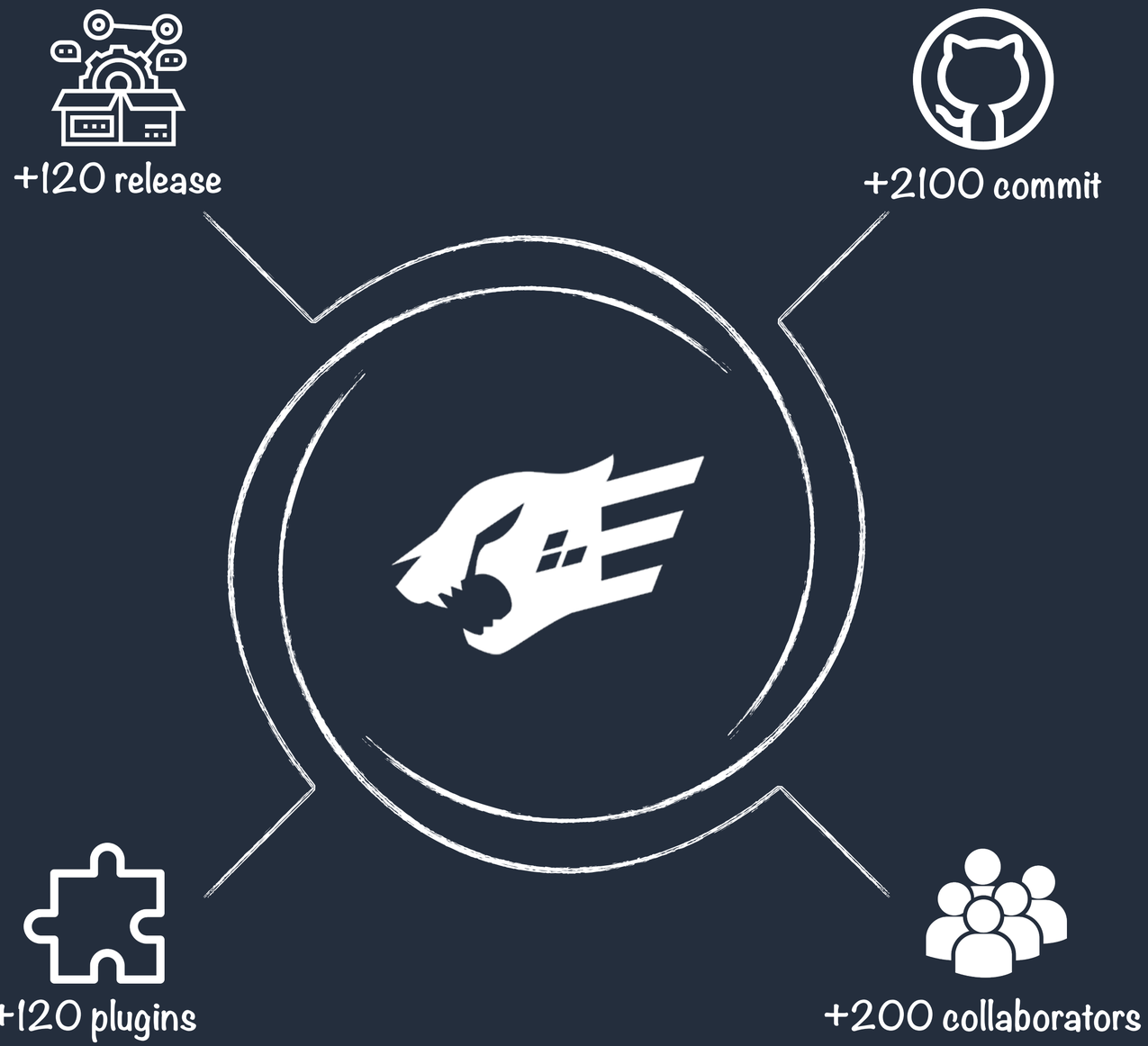
+120 release
+2100 commit
+120 plugins
+200 collaborators

Why Fastify?

CPU-optimized server (Ubuntu 18.04.2 x64 | 8 vCPUs | 32GB | Node 10.15)

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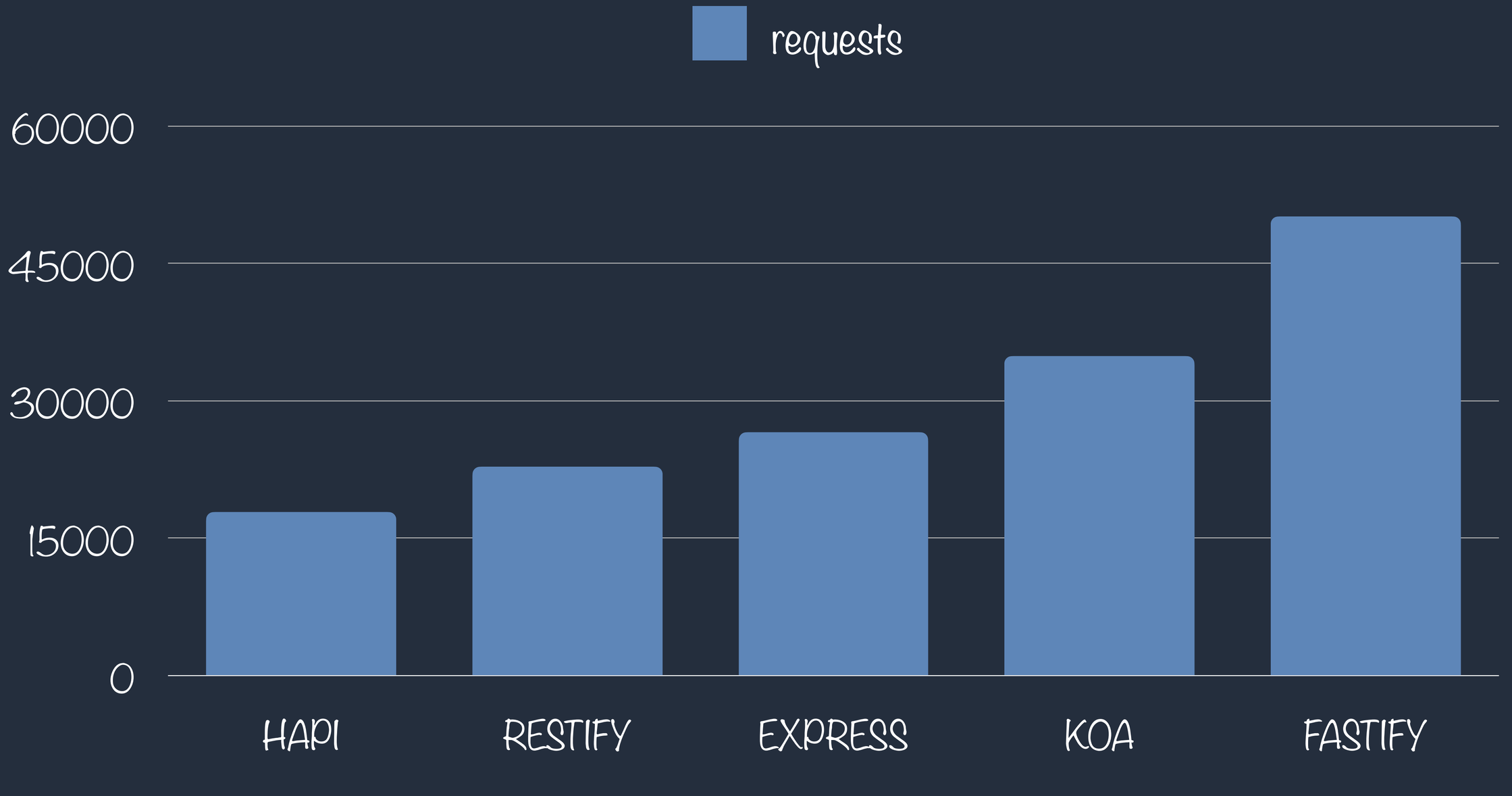

A brief example

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```
const fastify = require('fastify')({ logger: true })

// Declare a route for our application
fastify.get('/', async (req, res) => {
  return { hello: 'world' }
})

const startServer = async port => {
  try {
    await fastify.listen(port)
    fastify.log.info(`Server started on http://localhost:${port}`)
  } catch (e) {
    fastify.log.error(e)
    process.exit(1)
  }
}

startServer(3000)
```

// demo #1 and #2

Extendible via plugins

Fastify plugins

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```
fastify.register(
  require('my-plugin'),
  { options }
)
```

Fastify plugins

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```
function myPlugin (fastify, opts, next) {
  // add another plugin
  fastify.register (...)

  // add an Hook
  fastify.addHook(...)

  // decorate fastify instance
  fastify.decorate(...)

  // add routes
  fastify.route(...)

  next()
}

module.exports = myPlugin
```

async await
is supported as well

Plugins encapsulation

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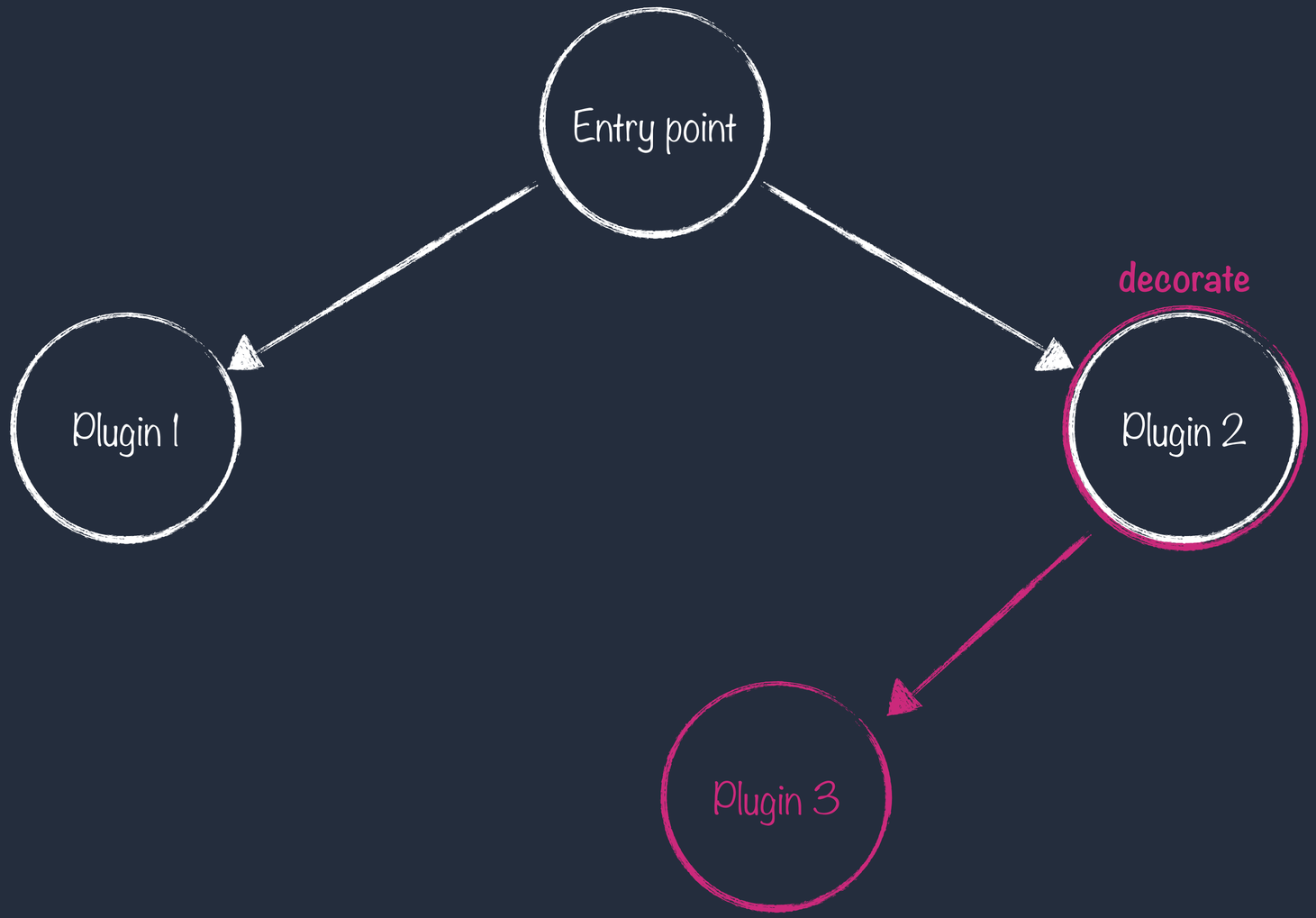

Exposing functionality to parents

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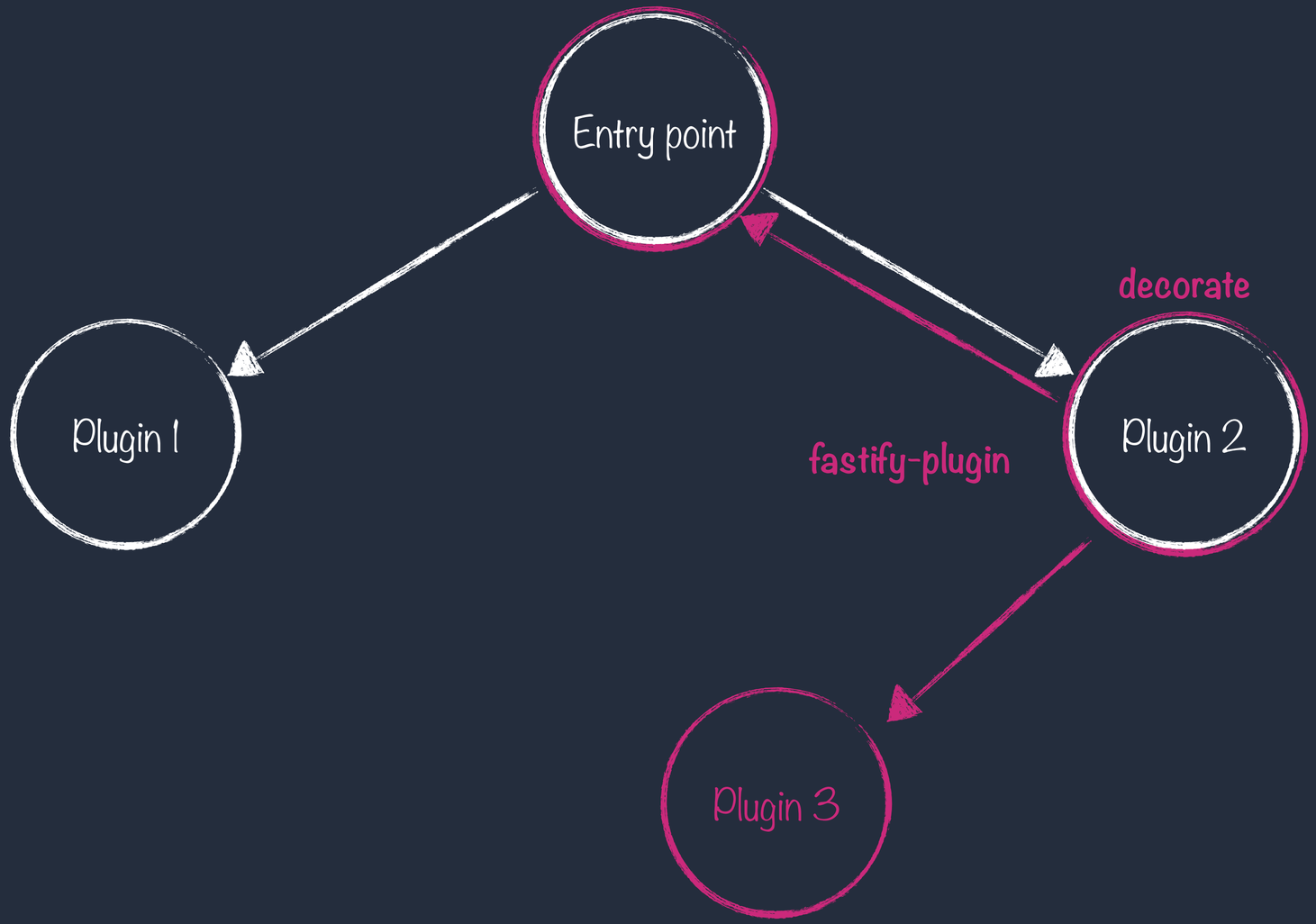
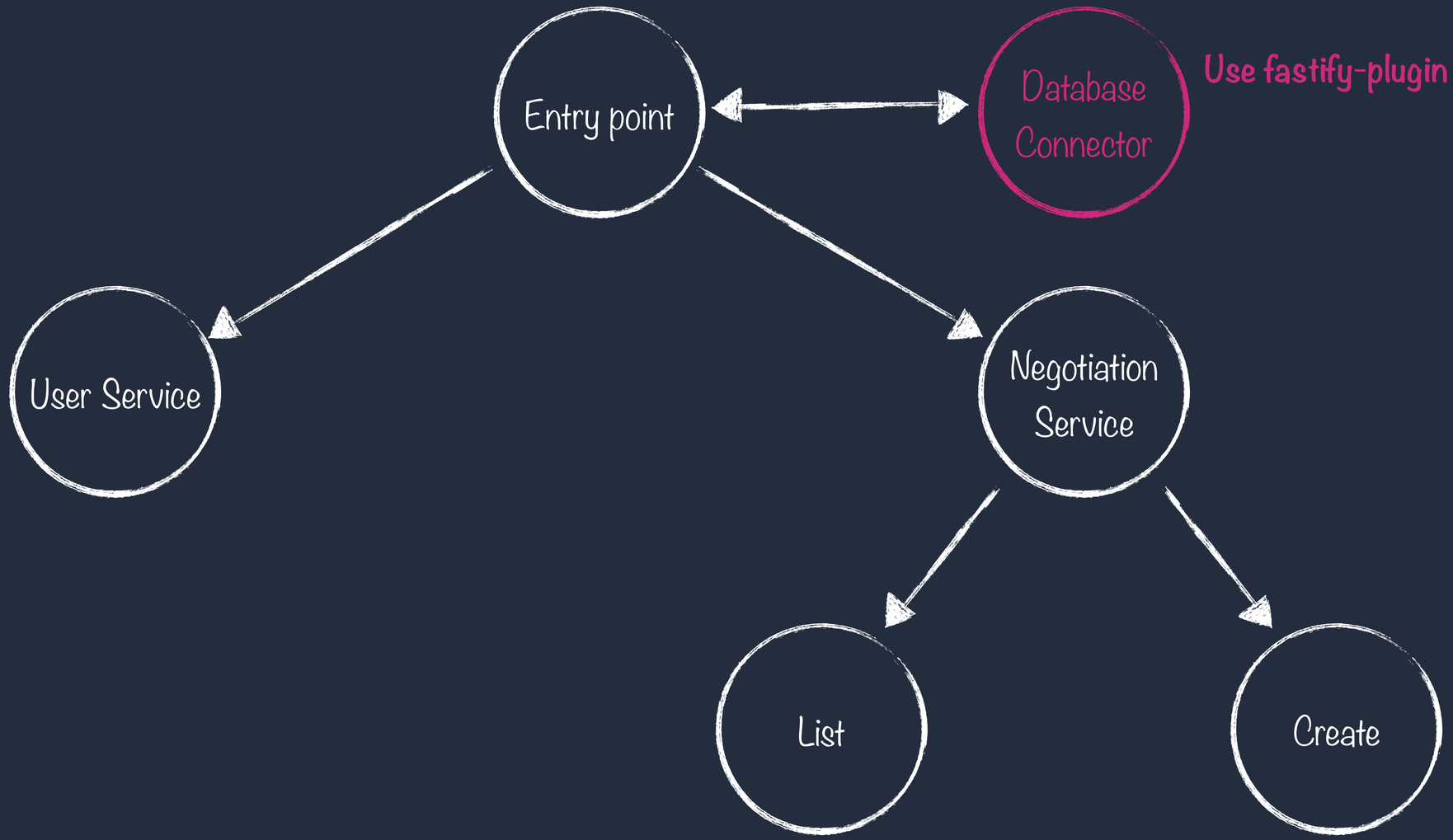
```
const fp = require('fastify-plugin')
const plugin2 = require('plugin-2')

function myPlugin (fastify, opts, next) {
  fastify.decorate('plugin2', plugin2)
  next()
}

module.exports = fp(myPlugin)
```

Plugins encapsulation



Real world example



Encapsulation is the keystone of fastify

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```
const fastify = require('fastify')()
fastify.register(require('./api/v1'), {
  prefix: '/v1',
  logLevel: 'error'
})

fastify.register(require('./api/v2'), {
  prefix: '/v2',
  logLevel: 'debug'
})
```

EVERYTHING
is a plugin

// demo #3

Hooks

Request/Response Hooks

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By using the hooks you can interact directly inside the lifecycle of Fastify. There are seven different Hooks that you can use (in order of execution):

- ✓onRequest
- ✓preParsing
- ✓preValidation
- ✓preHandler
- ✓preSerialization
- ✓onError
- ✓onSend
- ✓onResponse

Request/Response Hooks - Example

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```
fastify.addHook('onError', (request, reply, error, next) => {
  // apm stands for Application Performance Monitoring
  apm.sendError(error)
  next()
})
```

Application Hooks

You are able to hook into the application-lifecycle as well. It's important to note that these hooks aren't fully encapsulated. The **`this`** inside the hooks are encapsulated but the handlers can respond to an event outside the encapsulation boundaries.

- ✓`onClose`
- ✓`onRoute`

Application Hooks - onClose

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Triggered when **`fastify.close()`** is invoked to stop the server

```
fastify.addHook('onClose', (instance, done) => {
  // some code
  done()
})
```

Application Hooks - onRoute

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Triggered when a new route is registered

```
fastify.addHook('onRoute', (routeOptions) => {
  // some code
  routeOptions.method
  routeOptions.schema
  routeOptions.url
  routeOptions.bodyLimit
  routeOptions.logLevel
  routeOptions.prefix
})
```

Route level Hooks

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```
fastify.route({
  method: 'GET',
  url: '/',
  schema: { ... },
  preValidation: function (request, reply, done) {
    // this hook will always be executed after the shared `preValidation` hooks
    done()
  },
  preHandler: function (request, reply, done) {
    // this hook will always be executed after the shared `preHandler` hooks
    done()
  },
  handler: function (request, reply) {
    reply.send({ hello: 'world' })
  }
})
```

// demo #4

Decorators

Decorators

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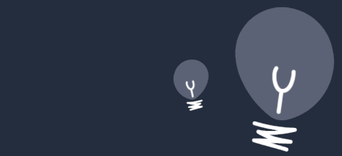
The API allows you to add new properties to the Fastify instance. Possible values are not restricted by type and could be functions, objects or strings, for example.

```
fastify.decorate('sum', (a, b) ⇒ {
  return a + b
})

fastify.decorate('conf', {
  db: 'some.db',
  port: 3000
})

console.log(fastify.sum(5, 3))
console.log(fastify.conf.db)
```



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JSON schema

JSON schema ... Why?

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- Standard
- Fast
- You can use http://www.jsonschema.net to generate all schemas you want

JSON schema ... Example

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```
fastify.post('/login', {
    schema: {
      body: S.object()
        .prop('username', S.string().required())
        .prop('password', S.string().required()),
      response: {
        200: S.object()
          .prop('token', S.string()),
        400: S.object()
          .prop('message', S.string()),
        404: S.object()
          .prop('message', S.string()),
        500: S.object()
          .prop('message', S.string())
      }
    }
  }, async function (req, reply) {…}
```

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Create Fastify App

https://github.com/davidedantonio/create-fastify-app

Create an app with create-fastify-app

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```
$ npm install -g create-fastify-app
$ npx create-fastify-app generate:project -d ./your-project-name
$ cd ./your-project-name
$ npm install
$ npm run dev
```

create-fastify-app project folder

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```
./services/service-name
├── docker-compose.yml
├── Dockerfile
├── package.json
├── README.md
├── src
│   ├── hooks
│   │   ├── onError.js
│   │   ├── onRequest.js
│   │   ├── onResponse.js
│   │   ├── onSend.js
│   │   ├── preHandler.js
│   │   ├── preParsing.js
│   │   ├── preSerialization.js
│   │   └── preValidation.js
│   ├── index.js
│   ├── plugins
│   │   ├── README.md
│   │   └── support.js
│   └── services
│       ├── hello
│       │   └── index.js
│       ├── README.md
│       └── root.js
└── test
```

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Our application

Ticketing System

Step 1 - Let's add a Database

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```
$ fastify-app add:mongo
  ? Host:  localhost
  ? Port:  27017
  ? Collection:  wetalk
  ? User:
  ? Password:
 $ npm install
```

Step 1 - Let's add a Database

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```
'use strict'

const fp = require('fastify-plugin')
const MongoDB = require('fastify-mongodb')

module.exports = fp(async (fastify, opts) => {
  let mongoOpts = Object.assign({}, {
    useNewUrlParser: true,
    url: process.env.MONGODB_URL || 'mongodb://localhost:27017/wetalk',
  }, opts.mongodb)

  if (process.env.MONGODB_USER) {
    mongoOpts = Object.assign(mongoOpts, {
      auth: {
        user: process.env.MONGODB_USER || 'root',
        password: process.env.MONGODB_PASSWORD || ''
      }
    })
  }

  fastify.register(MongoDB, mongoOpts)
})
```

Step 2 - Let's create ticket endpoints

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```
$ fastify-app generate:service

 ? Service Name: ticket
 ? What methods do you want to generate
  ◉ DELETE
  ◉ GET
  ◯ HEAD
  ◯ PATCH
  ◉ POST
  ◉ PUT
 ❯◯ OPTIONS
? Route Prefix /api
File /ticket/index.js generated successfully with DELETE, GET, POST, PUT methods
File /ticket/README.md generated successfully
File /test/services/ticket.test.js generated successfully
Service ticket generated successfully
```

Step 2 - Let's create ticket endpoints

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```
module.exports = async function(fastify, opts) {
  fastify.delete('/ticket', async function (request, reply) {

    // Implement your business logic here...

    return reply
      .code(200)
      .send({data: 'DELETE ok!'})
  })

  fastify.get('/ticket', async function (request, reply) {

    // Implement your business logic here...

    return reply
      .code(200)
      .send({data: 'GET ok!'})
  })

  fastify.post('/ticket', async function (request, reply) {

    // Implement your business logic here...

    return reply
      .code(200)
      .send({data: 'POST ok!'})
  })

  fastify.put('/ticket', async function (request, reply) {

    // Implement your business logic here...

    return reply
      .code(200)
      .send({data: 'PUT ok!'})
  })

}

module.exports.autoPrefix = '/api'
```

// demo #5

Authentication

JWT

Step 3 - Add fastify-jwt

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```
$ npm install –save fastify-jwt
$ npm install –save secure-password
```

Step 3 - Add fastify-jwt

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```
'use strict'

const fp = require('fastify-plugin')
const JWT = require('fastify-jwt')

module.exports = fp(async (fastify, opts) => {

  let jwtOpts = Object.assign({}, {
    secret: process.env.JWT_SECRET || 'ThisIsSecret'
  }, opts.jwt)

  fastify.register(JWT, jwtOpts)
})
```

Step 3 - Add fastify-jwt

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```
fastify.post('/signup', { … }, async function (request, reply) {
  ……
  ……
  ……
})

fastify.post('/signin', { … }, async function (request, reply) {
  ……
  ……
  ……
})
```

Step 3 - Add fastify-jwt

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```
module.exports = fp(async (fastify, opts) => {
  fastify.addHook('preHandler', async (request, reply) => {

    const regex = new RegExp('\/api\/*')
    const url = request.raw.originalUrl

    if (regex.test(url))
      return request.jwtVerify()
  })
})
```

Step 4 - make tickets specific for users

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```
fastify.post('/ticket', {
  schema: { … }
}, async function (request, reply) {

  const ticket = request.body
  Object.assign(ticket, {
    username: request.user.username
  })

  const data = await ticketsCollection.insertOne(ticket)
  const _id = data.ops[0]._id

  return Object.assign({
    _id
  }, ticket)
})
```

Step 4 - make tickets specific for users

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```
fastify.get('/tickets', {
  schema: { … }
}, async function (request, reply) {

  const tickets = await ticketsCollection.find({
    username: request.user.username
  }).sort({
    _id: -1 // new tickets first
  }).toArray()

  return tickets
})
```

// demo #6

Our application

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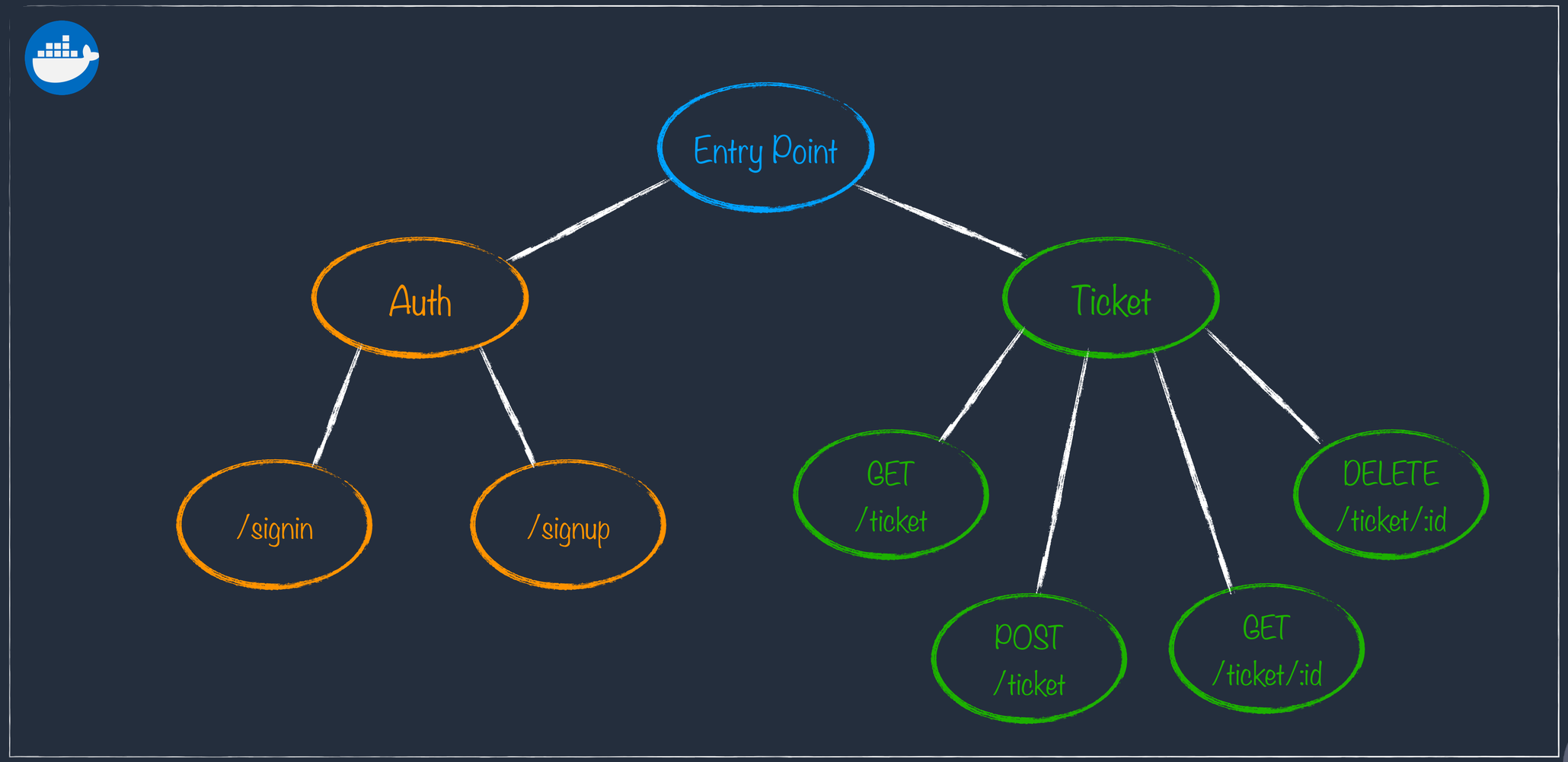

Towards microservices

How we change our application

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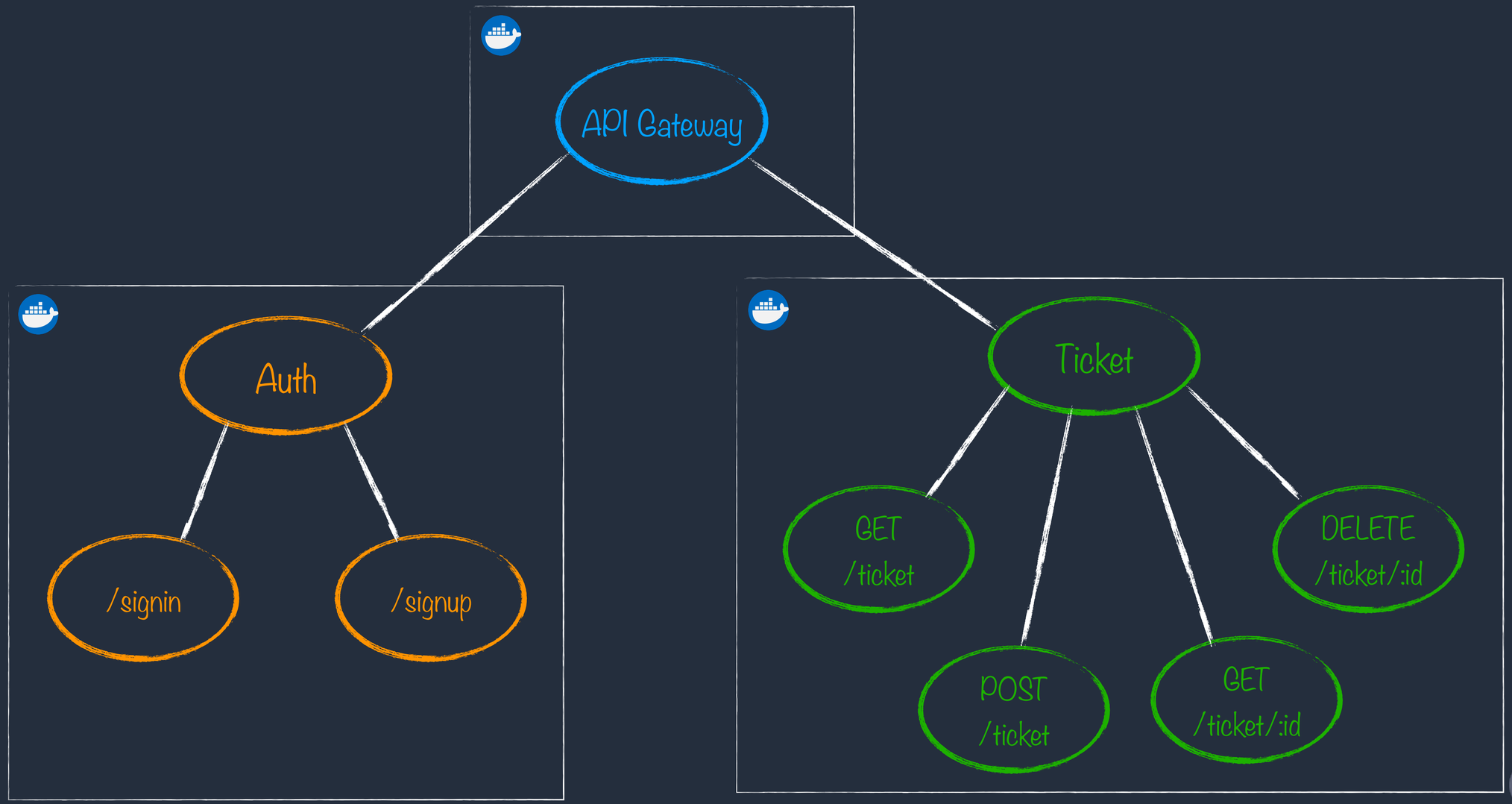
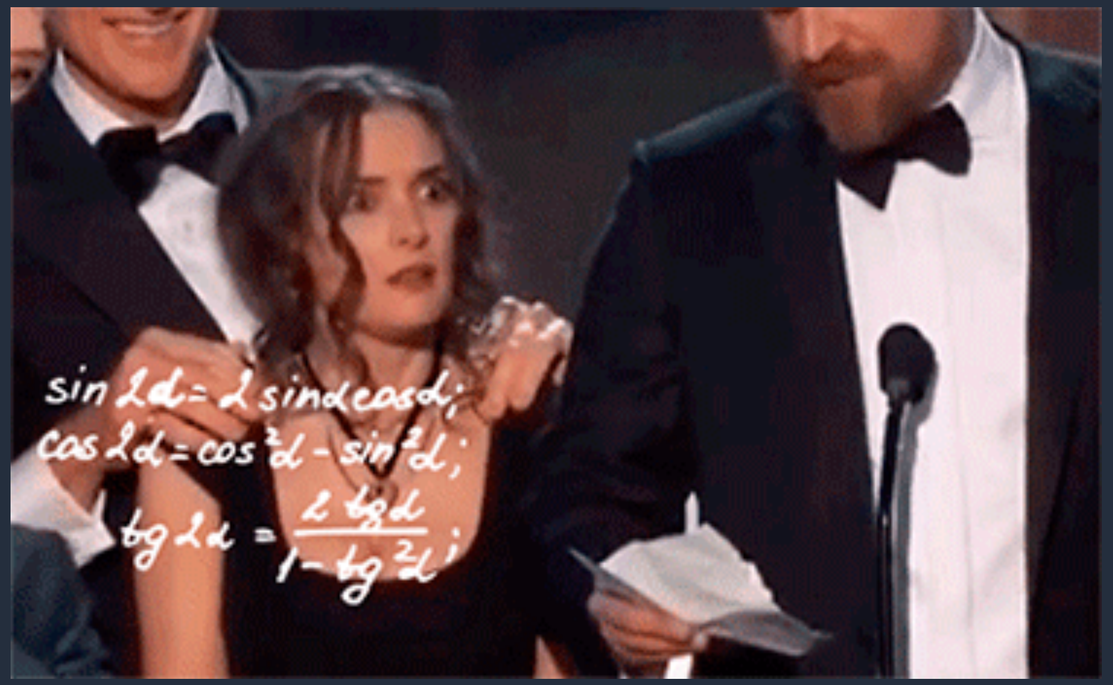


How we monitor our application?



elastic-apm-node

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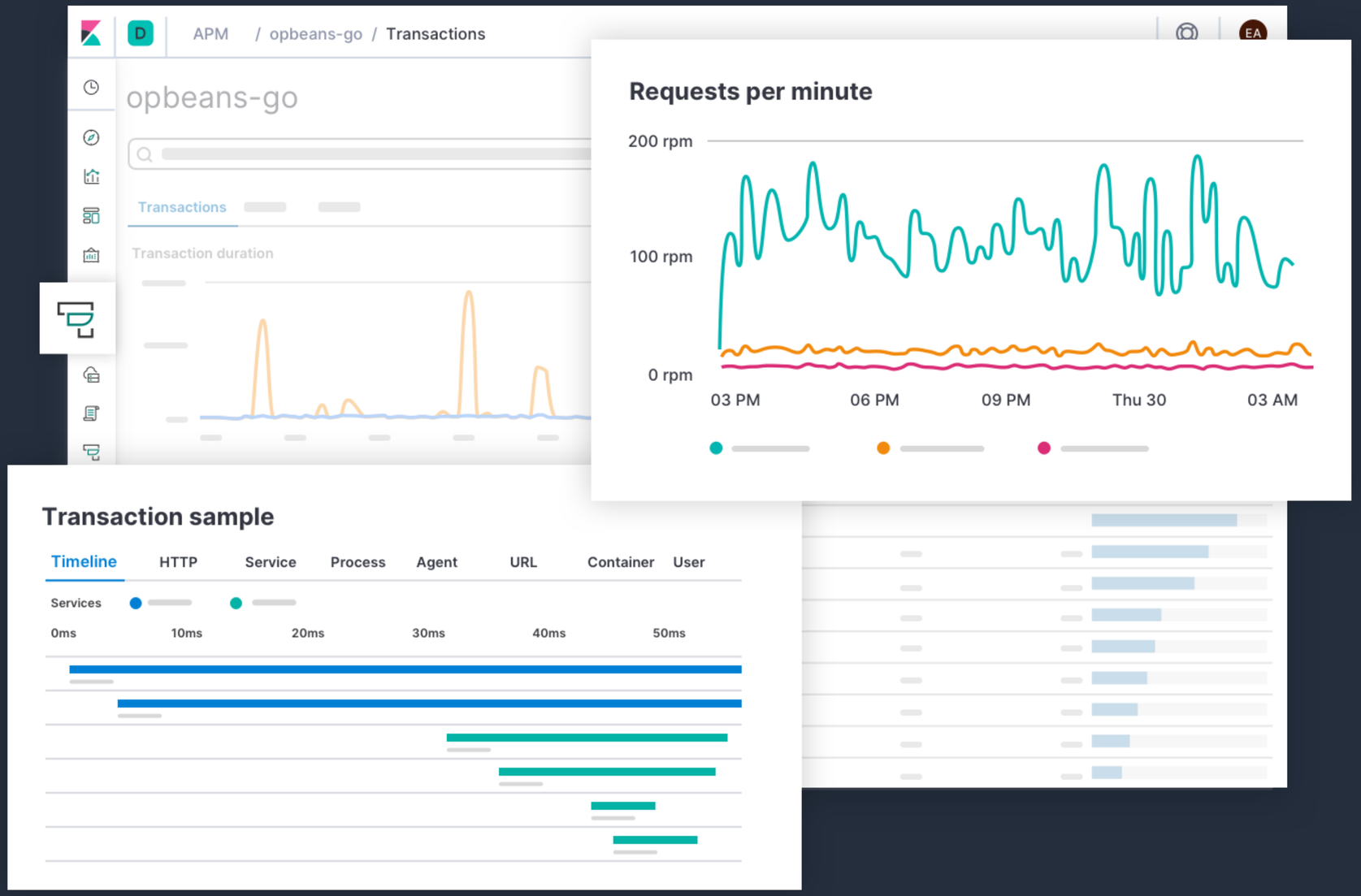

// demo #7

So long and thanks

but I am the fish