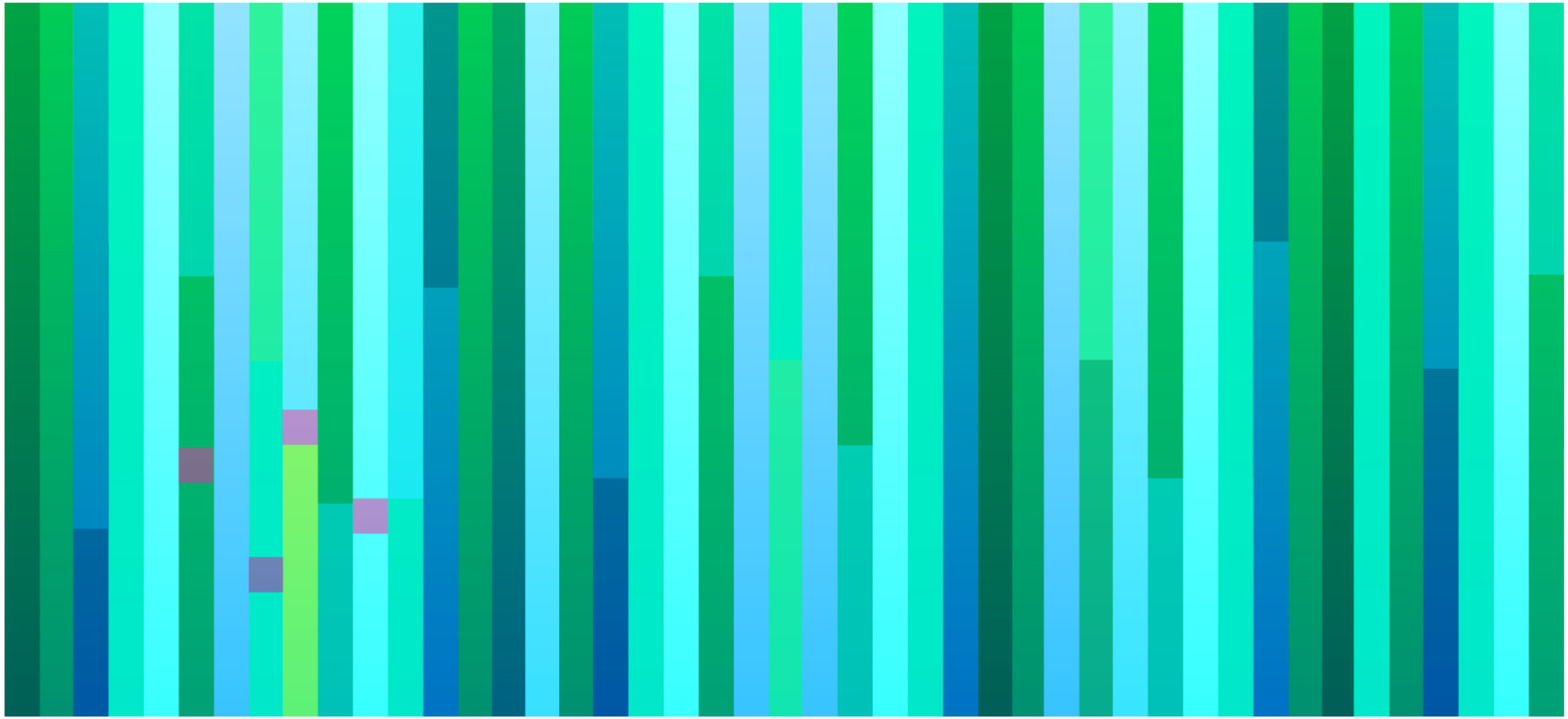
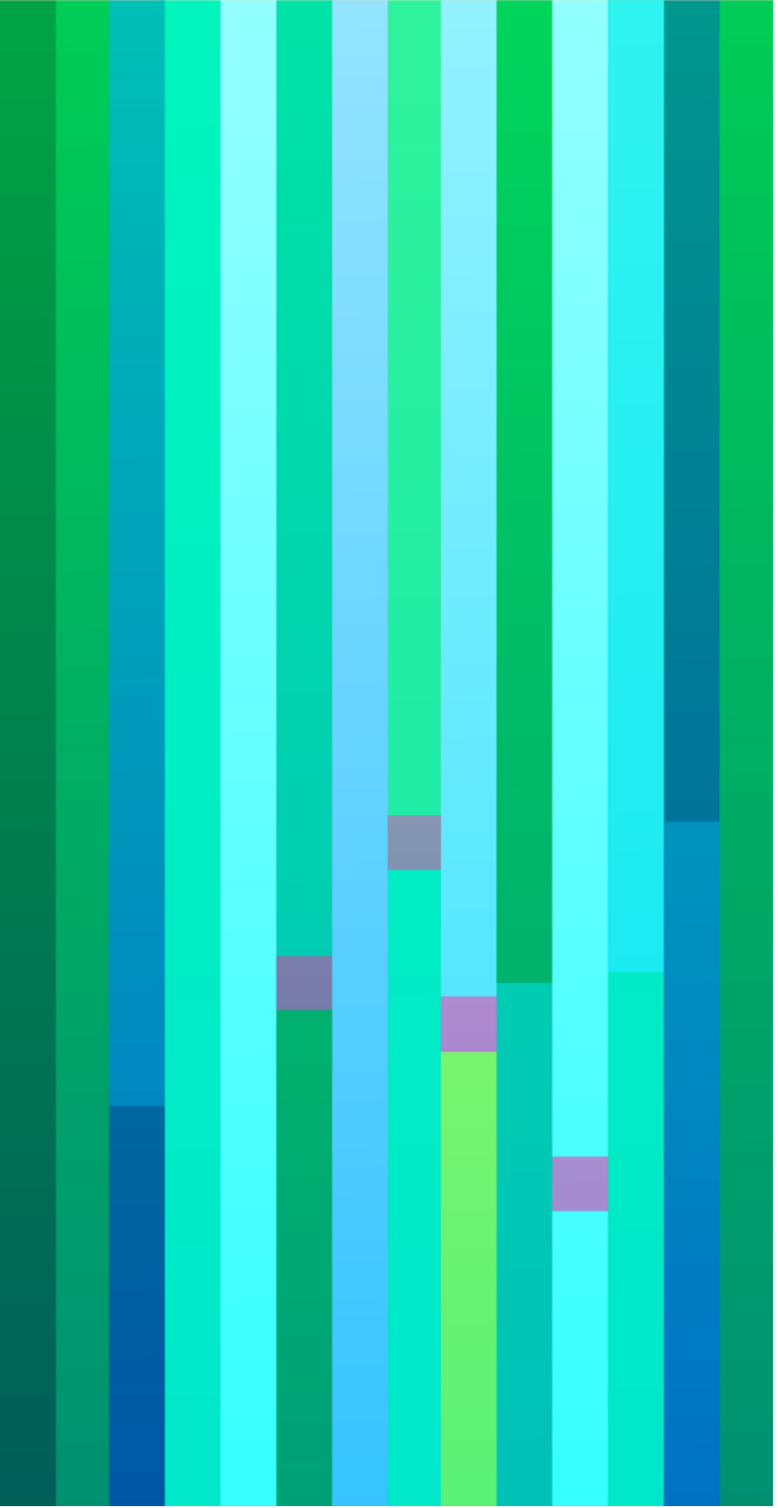


Bringing Magic To Microservice Architecture Development

Nov 2018

garden

- Microservice architectures
- Distributed systems
- Cloud-native applications
- Service-oriented architectures
- Multi-service systems



ellen körbes

developer relations
ellen@garden.io
@ellenkorbes
they/them

Remember monoliths?

Monoliths:

- Service dependencies aren't a problem.
- Your dependency graph is managed by your compiler.
- Writing application-wide tests is easy.

Monoliths:

- It’s easy to learn the system for the first time.
- The required mental context is manageable.
- Good feedback loops.

They were fun.

(Some of them, anyway.)

The magic of programming was there.

Then came multi-service systems.

An amazing new world.

But!

Let's see it.

OFFER OF THE DAY Buy 1000 socks, get a shoe for free!

Login | Register

weaveworks socks

HOME CATALOGUE

0 items in cart

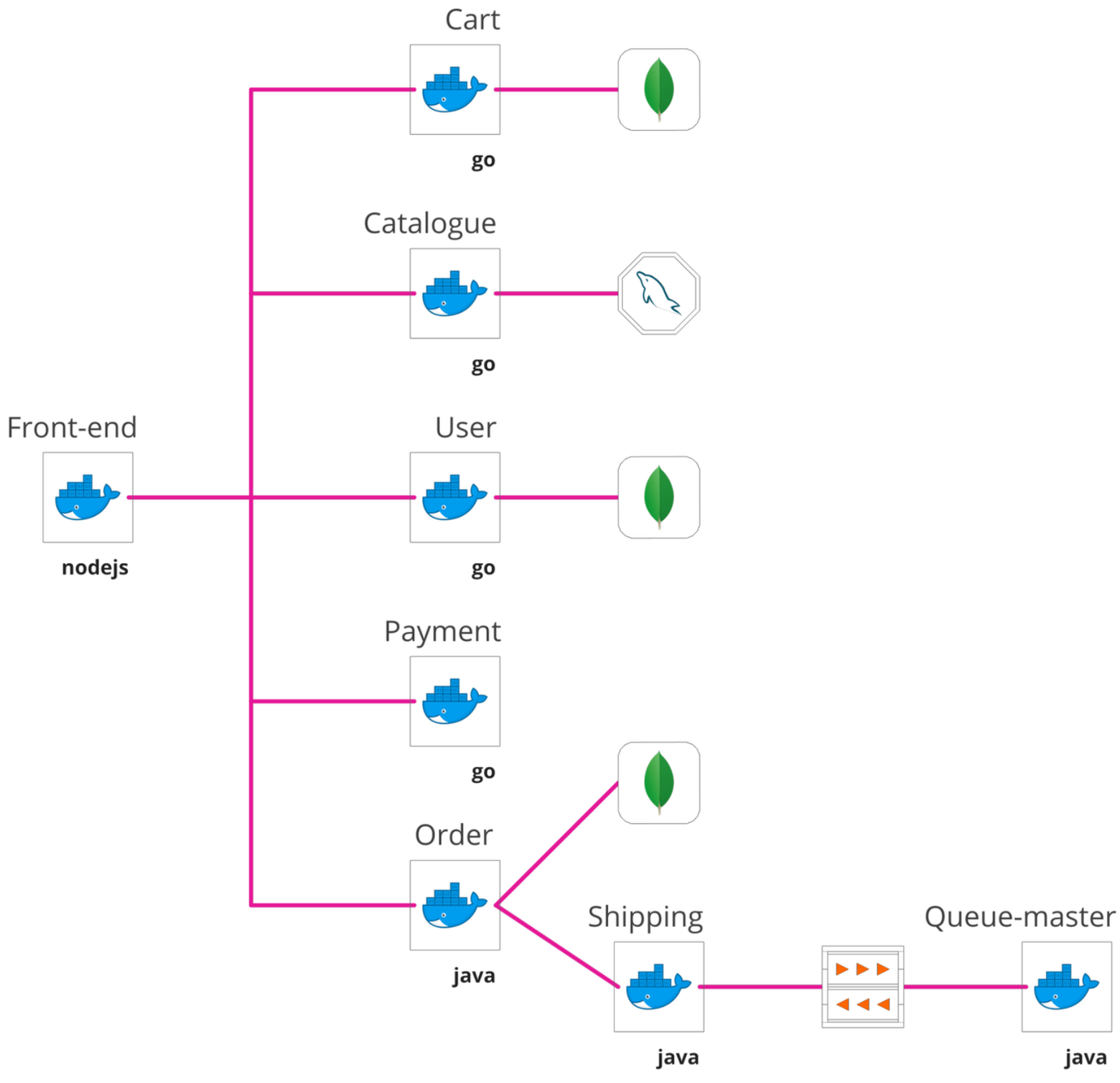
WE LOVE SOCKS!

Fun fact: Socks were invented by woolly

BEST PRICES

We price check our socks with trained monkeys

100% SATISFACTION GUARANTEED

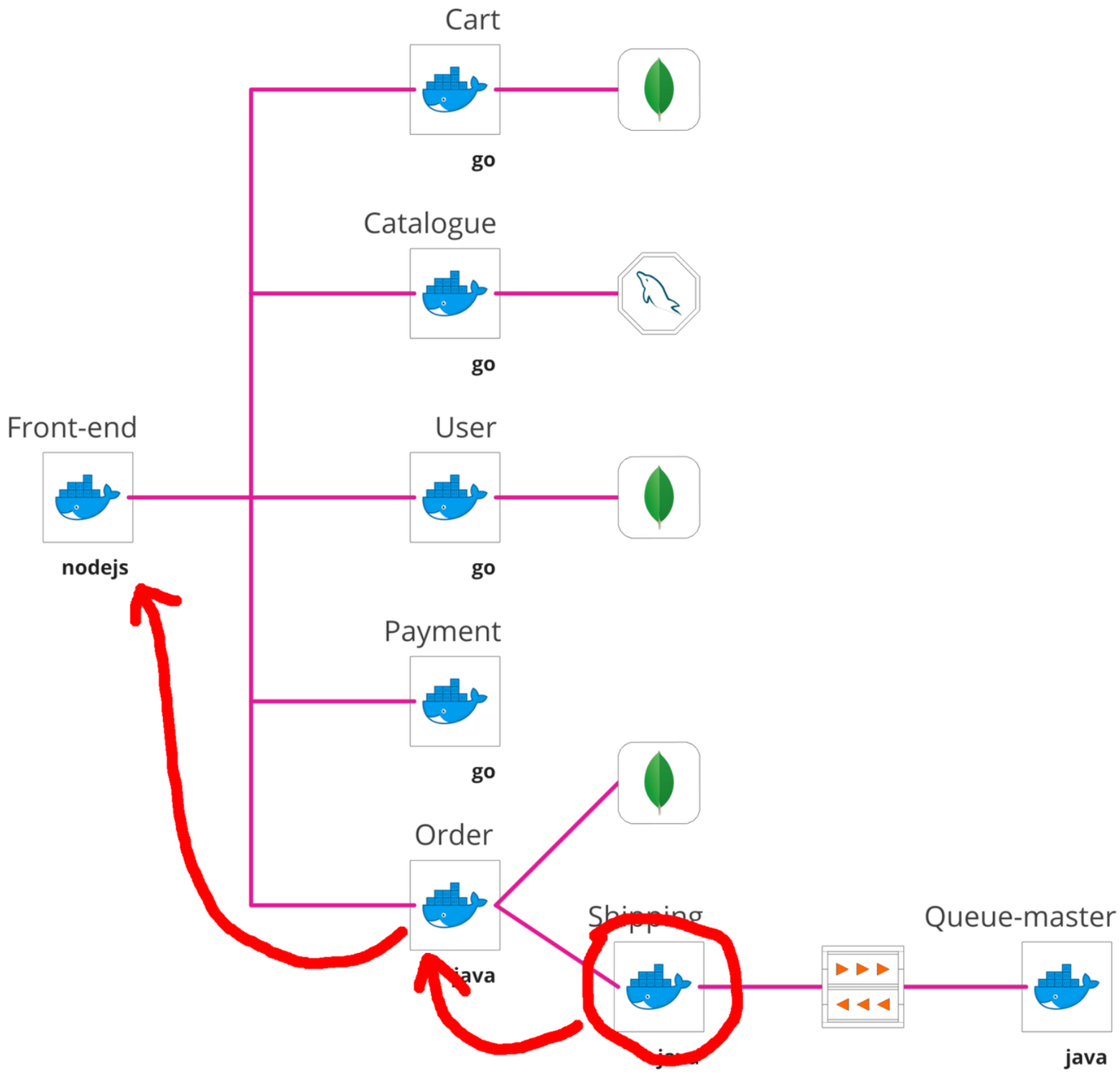

Cart
go
Catalogue
go
Front-end
nodejs
User
go
Payment
go
Order
java
Shipping
java
Queue-master
java

How do you develop on a system like this in practice?

Painfully.

Why?

- Service dependencies are a pain to manage.


Cart
go
Catalogue
go
Front-end
nodejs
User
go
Payment
go
Order
Shipping
Queue-master
java

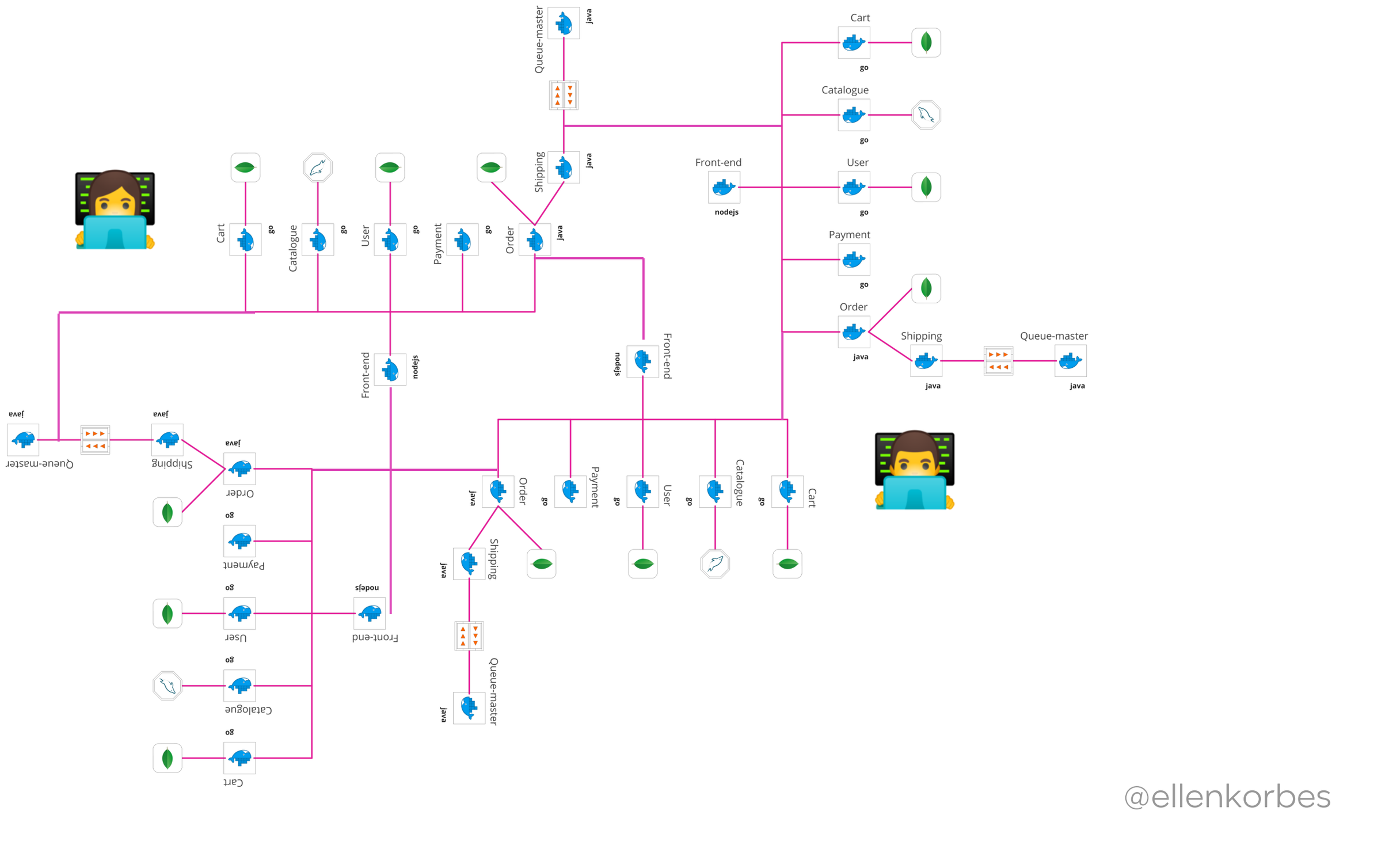
Why?

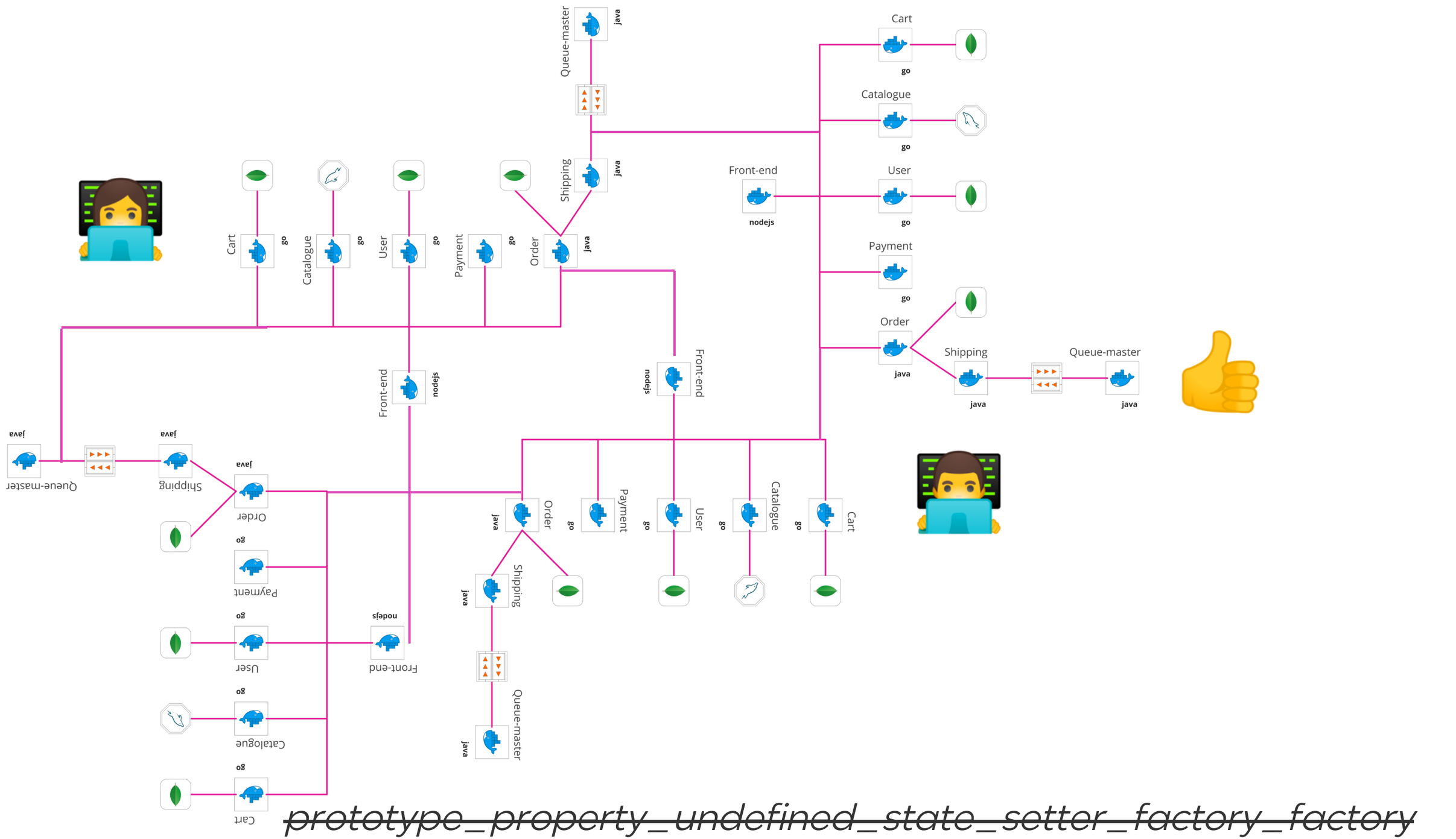
- Service dependencies are a pain to manage.
- Human brains aren't made to be dependency graphs.

Cart
go
Catalogue
go
User
go
Payment
go
Order
java
Shipping
java
Queue-master
java
Front-end
nodejs
Front-end
nodejs
Order
java
Payment
go
User
go
Catalogue
go
Cart
go
Shipping
java
Queue-master
java
Queue-master
java
Shipping
java
Order
java
Payment
go
User
go
Catalogue
go
Cart
go
Front-end
nodejs
Cart
go
Catalogue
go
User
go
Payment
go
Order
java
Shipping
java
Queue-master
java
Front-end
nodejs
Order
java
Payment
go
User
go
Catalogue
go
Cart
go
Queue-master
java
Shipping
java
Order
java
Payment
go
User
go
Catalogue
go
Cart
go
@ellenkorbes

Why?

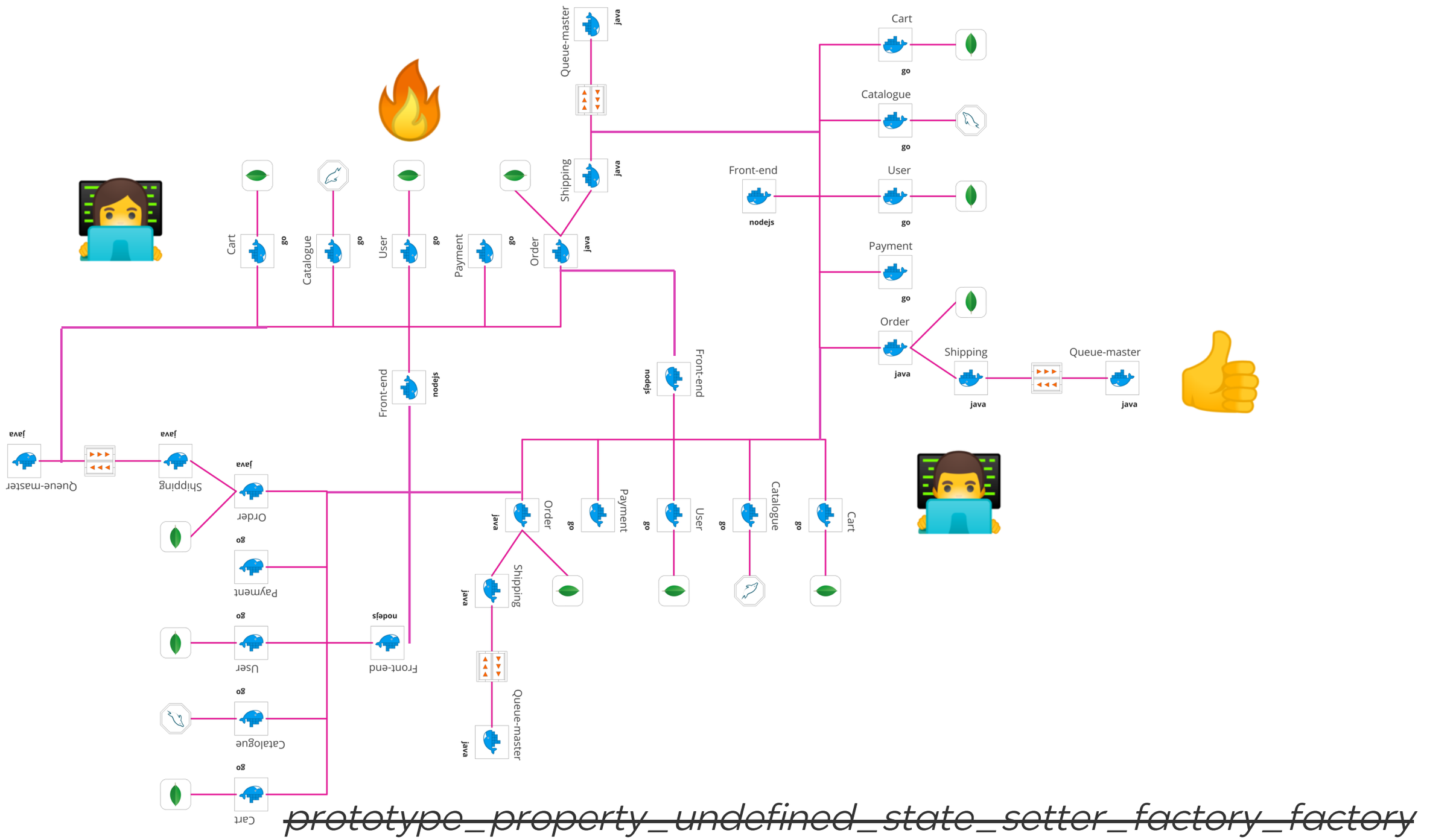
- Service dependencies are a pain to manage.
- Human brains aren't made to be dependency graphs.
- Testing is not trivial.


Queue-master
java
Cart
go
Catalogue
go
Front-end
nodejs
User
go
Payment
go
Shipping
java
Order
java
Queue-master
java
Shipping
java
Order
java
Payment
go
User
go
Catalogue
go
Cart
go
Front-end
nodejs
Front-end
nodejs
Cart
go
Catalogue
go
User
go
Payment
go
Order
java
Shipping
java
Queue-master
java
@ellenkorbes



~~*prototype_property_undefined_state_setter_factory_factory*~~

PrototypePropertyUndefinedStateSetterFactoryFactory



~~*prototype_property_undefined_state_setter_factory_factory*~~

PrototypePropertyUndefinedStateSetterFactoryFactory

Why?

- On-boarding is difficult.

microservices-demo/catalogue - Google Chrome

Secure | https://github.com/microservices-demo/catalogue

Catalogue

A microservices-demo service that provides catalogue/product information. This service is built, tested and released by travis.

Bugs, Feature Requests and Contributing

We'd love to see community contributions. We like to keep it simple and use Github issues to track bugs and feature requests and pull requests to manage contributions.

API Spec

Checkout the API Spec here

To build this service

Dependencies

```
go get -u github.com/FiloSottile/gvt
gvt restore
```

microservices-demo/shipping: Shipping service for microservices-demo application - Google Chrome

Secure | https://github.com/microservices-demo/shipping

shipping

A microservices-demo service that provides shipping capabilities.

This build is built, tested and released by travis.

Build

Java

```
mvn -DskipTests package
```

Docker

```
GROUP=weaveworksdemos COMMIT=test ./scripts/build.sh
```

Test

microservices-demo/front-end: Front-end application for ALL the microservices - Google Chrome

Secure | https://github.com/microservices-demo/front-end

Build

Dependencies

Name	Version
Docker	>= 1.12
Docker Compose	>= 1.8.0
Make (optional)	>= 4.1

Node

```
npm install
```

Docker

```
make test-image
```

How to Install Apache Maven on Ubuntu 16.04 - Vultr.com - Google Chrome

Secure | https://www.vultr.com/docs/how-to-install-apache-maven-on-ubuntu-16-04

Table of Contents

Next, rename the extracted directory.

```
sudo mv apache-maven-3.3.9 maven
```

Step 4: Setup environment variables

Next, you will need to setup the environment variables such as `M2_HOME`, `M2`, `MAVEN_OPTS`, and `PATH`. You can do this by creating a `mavenenv.sh` file inside of the `/etc/profile.d/` directory.

```
sudo nano /etc/profile.d/mavenenv.sh
```

Add the following lines:

```
export M2_HOME=/opt/maven
export PATH=${M2_HOME}/bin:${PATH}
```

Save and close the file, update its permissions, then load the environment variables with the following command:

```
sudo chmod +x /etc/profile.d/mavenenv.sh
sudo source /etc/profile.d/mavenenv.sh
```

Step 5: Verify installation

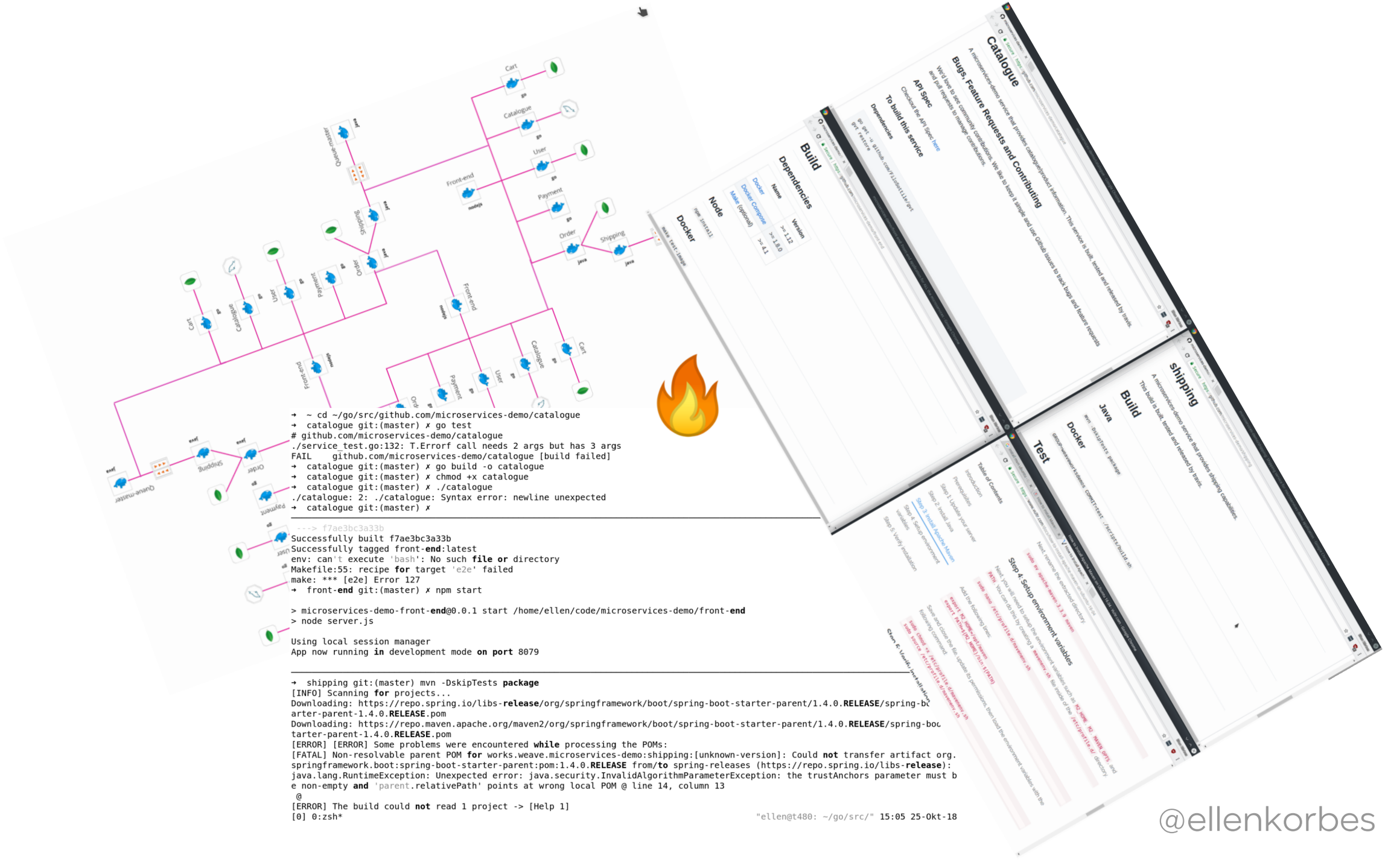
```
➜  ~ cd ~/go/src/github.com/microservices-demo/catalogue
➜  catalogue git:(master) ✗ go test
# github.com/microservices-demo/catalogue
./service_test.go:132: T.Errorf call needs 2 args but has 3 args
FAIL    github.com/microservices-demo/catalogue [build failed]
➜  catalogue git:(master) ✗ go build -o catalogue
➜  catalogue git:(master) ✗ chmod +x catalogue
➜  catalogue git:(master) ✗ ./catalogue
./catalogue: 2: ./catalogue: Syntax error: newline unexpected
➜  catalogue git:(master) ✗
```

```
 ---> f7ae3bc3a33b
Successfully built f7ae3bc3a33b
Successfully tagged front-end:latest
env: can't execute 'bash': No such file or directory
Makefile:55: recipe for target 'e2e' failed
make: *** [e2e] Error 127
➜  front-end git:(master) ✗ npm start

> microservices-demo-front-end@0.0.1 start /home/ellen/code/microservices-demo/front-end
> node server.js

Using local session manager
App now running in development mode on port 8079
```

```
➜  shipping git:(master) mvn -DskipTests package                                [15/446]
[INFO] Scanning for projects...
Downloading: https://repo.spring.io/libs-release/org/springframework/boot/spring-boot-starter-parent/1.4.0.RELEASE/spring-boot-starter-parent-1.4.0.RELEASE.pom
Downloading: https://repo.maven.apache.org/maven2/org/springframework/boot/spring-boot-starter-parent/1.4.0.RELEASE/spring-boot-starter-parent-1.4.0.RELEASE.pom
[ERROR] [ERROR] Some problems were encountered while processing the POMs:
[FATAL] Non-resolvable parent POM for works.weave.microservices-demo:shipping:[unknown-version]: Could not transfer artifact org.springframework.boot:spring-boot-starter-parent:pom:1.4.0.RELEASE from/to spring-releases (https://repo.spring.io/libs-release): java.lang.RuntimeException: Unexpected error: java.security.InvalidAlgorithmParameterException: the trustAnchors parameter must be non-empty and 'parent.relativePath' points at wrong local POM @ line 14, column 13
 @
[ERROR] The build could not read 1 project -> [Help 1]
[0] 0:zsh*                                          "ellen@t480: ~/go/src/" 15:05 25-Okt-18
```

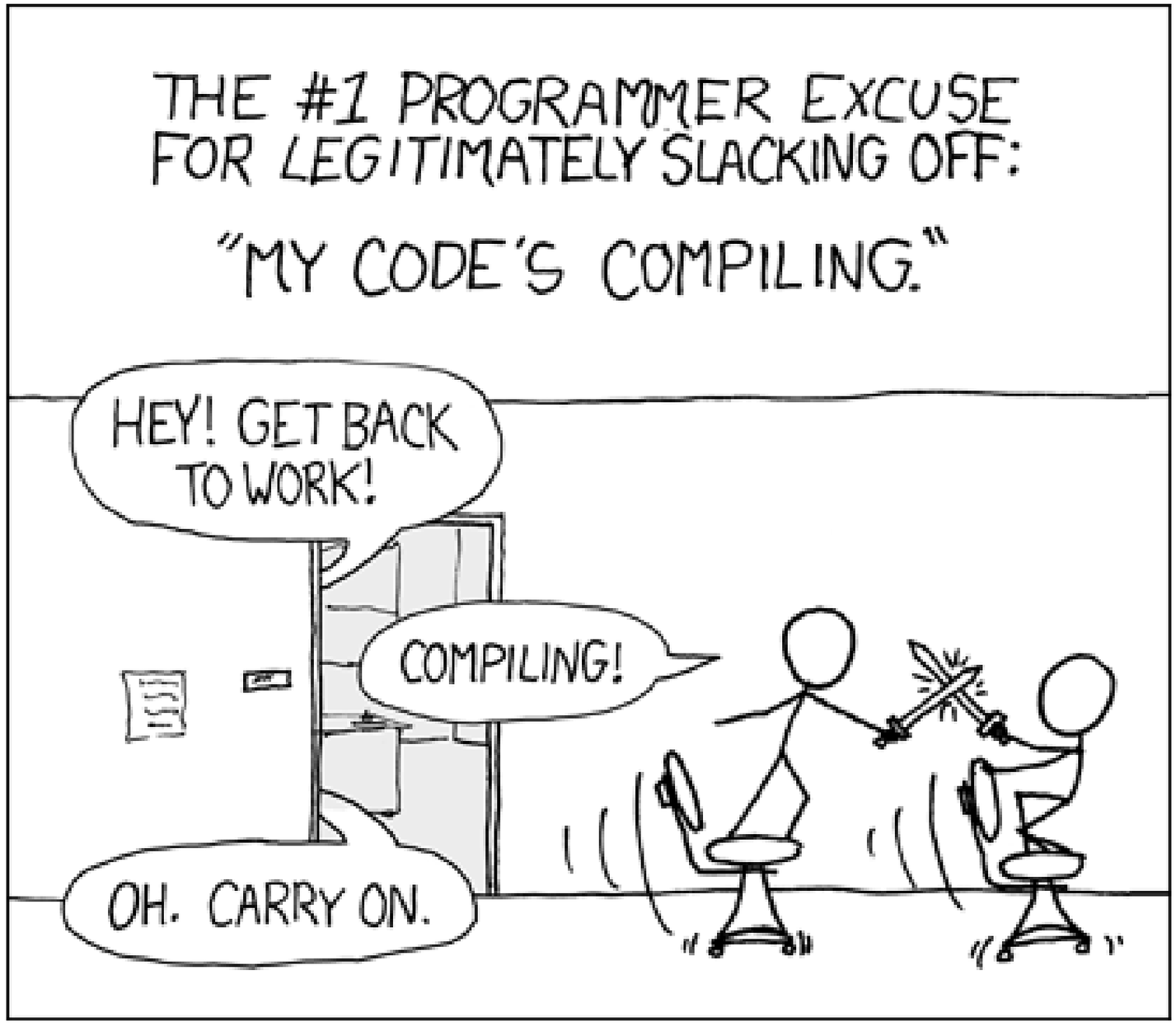
Why?

- Onboarding is difficult.
- The amount of mental overhead is exhausting.


Cart
Catalogue
User
Payment
Order
Shipping
Front-end
Queue-master
Catalogue
Build
Dependencies
Docker
Node
Docker Compose
Make (optional)
Bugs, Feature Requests and Contributing
API Spec
To build this service
Dependencies
shipping
Build
Java
Docker
Test
Step 4 Setup environment variables
➜ ~ cd ~/go/src/github.com/microservices-demo/catalogue
➜ catalogue git:(master) ✗ go test
github.com/microservices-demo/catalogue
./service_test.go:132: T.Errorf call needs 2 args but has 3 args
FAIL github.com/microservices-demo/catalogue [build failed]
➜ catalogue git:(master) ✗ go build -o catalogue
➜ catalogue git:(master) ✗ chmod +x catalogue
➜ catalogue git:(master) ✗ ./catalogue
./catalogue: 2: ./catalogue: Syntax error: newline unexpected
➜ catalogue git:(master) ✗
---> f7ae3bc3a33b
Successfully built f7ae3bc3a33b
Successfully tagged front-end:latest
env: can't execute 'bash': No such file or directory
Makefile:55: recipe for target 'e2e' failed
make: *** [e2e] Error 127
➜ front-end git:(master) ✗ npm start
> microservices-demo-front-end@0.0.1 start /home/ellen/code/microservices-demo/front-end
> node server.js
Using local session manager
App now running in development mode on port 8079
➜ shipping git:(master) mvn -DskipTests package
[INFO] Scanning for projects...
Downloading: https://repo.spring.io/libs-release/org/springframework/boot/spring-boot-starter-parent/1.4.0.RELEASE/spring-boot-starter-parent-1.4.0.RELEASE.pom
Downloading: https://repo.maven.apache.org/maven2/org/springframework/boot/spring-boot-starter-parent/1.4.0.RELEASE/spring-boot-starter-parent-1.4.0.RELEASE.pom
[ERROR] [ERROR] Some problems were encountered while processing the POMs:
[FATAL] Non-resolvable parent POM for works.weave.microservices-demo:shipping:[unknown-version]: Could not transfer artifact org.springframework.boot:spring-boot-starter-parent:pom:1.4.0.RELEASE from/to spring-releases (https://repo.spring.io/libs-release): java.lang.RuntimeException: Unexpected error: java.security.InvalidAlgorithmParameterException: the trustAnchors parameter must be non-empty and 'parent.relativePath' points at wrong local POM @ line 14, column 13
@
[ERROR] The build could not read 1 project -> [Help 1]
[0] 0:zsh*
"ellen@t480: ~/go/src/" 15:05 25-Okt-18
@ellenkorbes

Why?

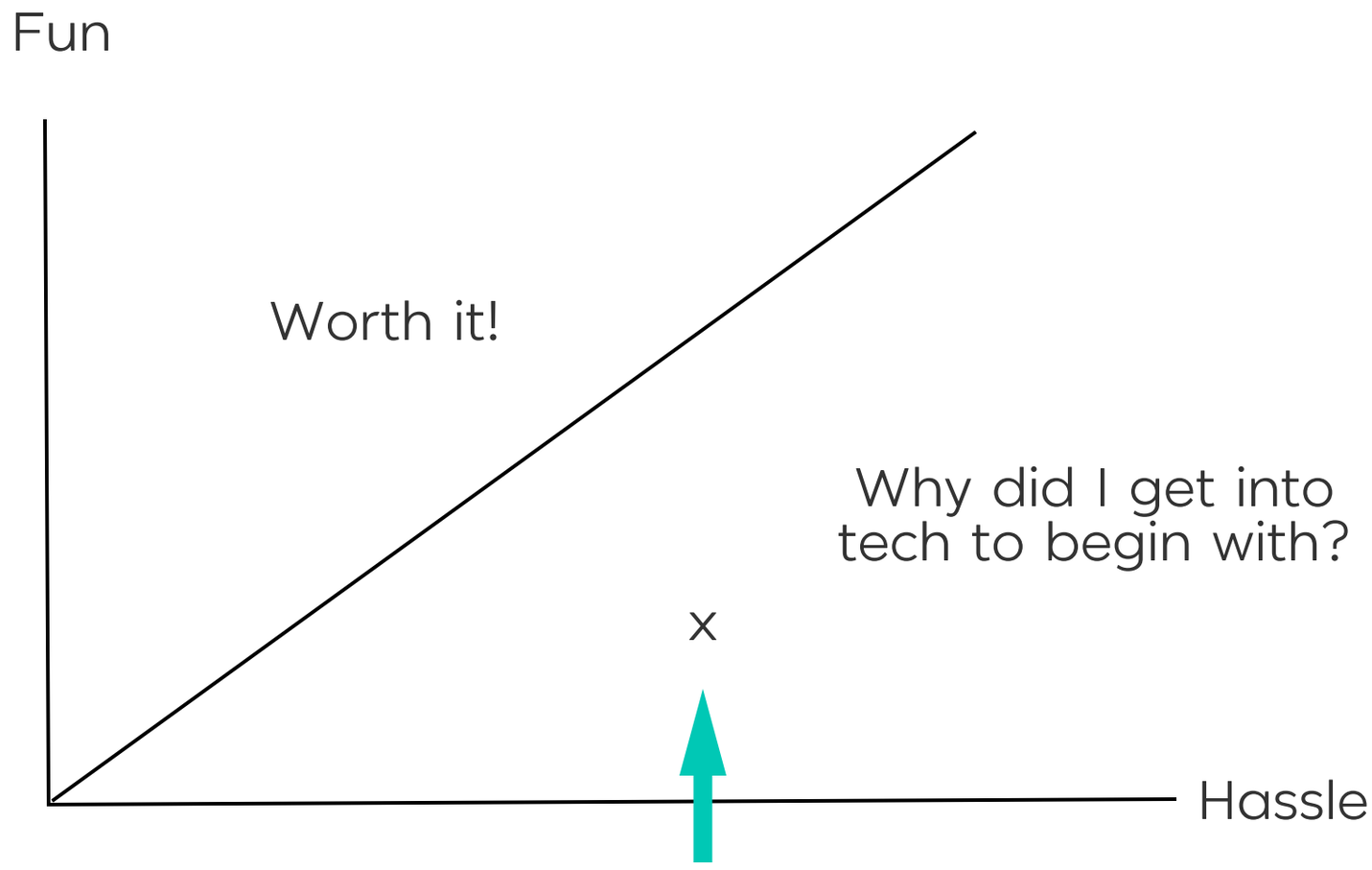
- Onboarding is difficult.
- The amount of mental overhead is exhausting.
- And the feedback loops?


THE #1 PROGRAMMER EXCUSE FOR LEGITIMATELY SLACKING OFF:
"MY CODE'S COMPILING."
HEY! GET BACK TO WORK!
COMPILING!
OH. CARRY ON.

xkcd.com

i.e. not fun.

The amount of hassle takes all the magic away.


Fun
Worth it!
Why did I get into tech to begin with?
x
Hassle
Multi-container systems development

Let's solve this problem.


garden

“Garden is a development engine for Kubernetes that makes developing, building and testing multi-service systems fast, easy, and fun.”

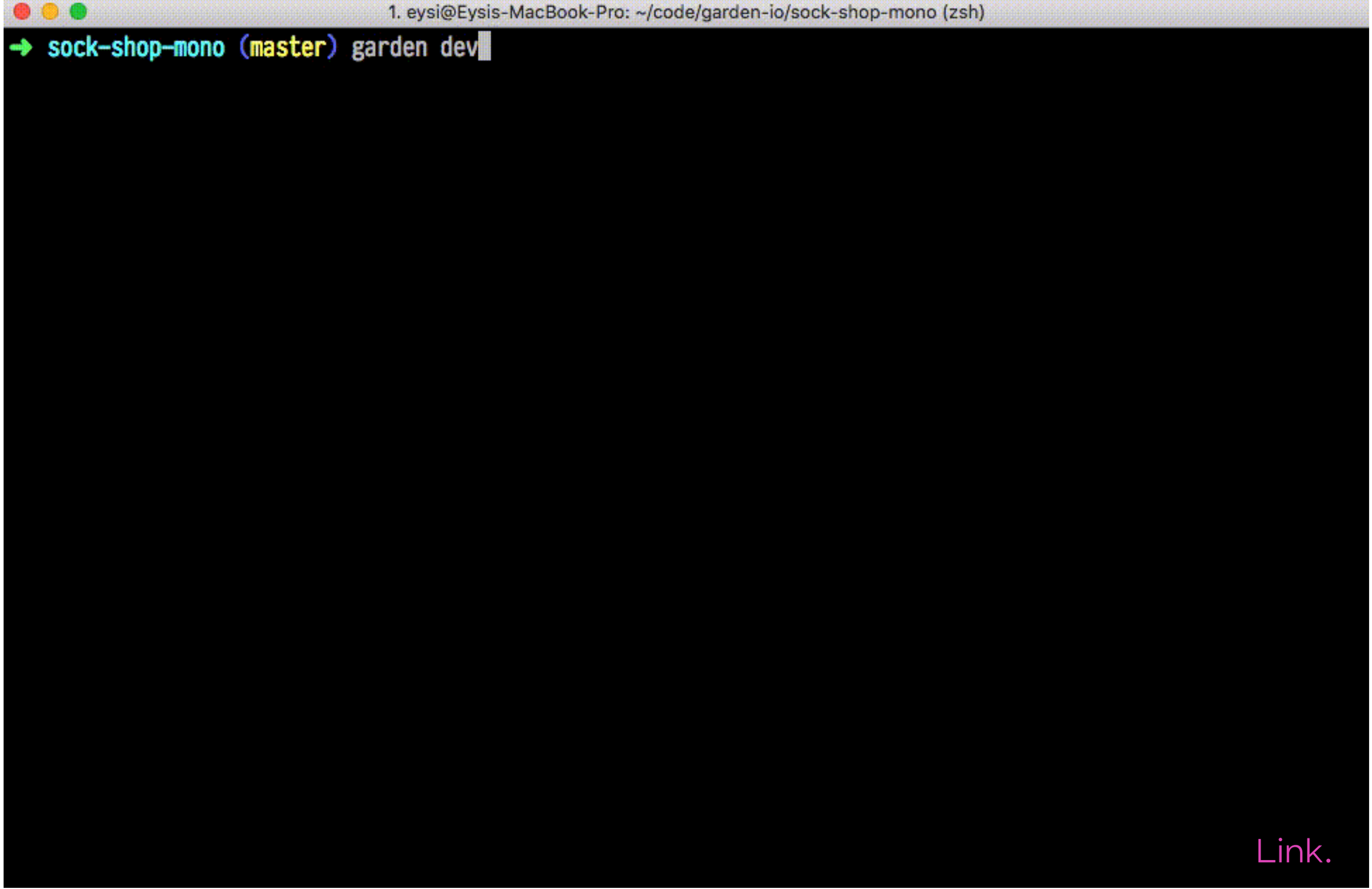
garden

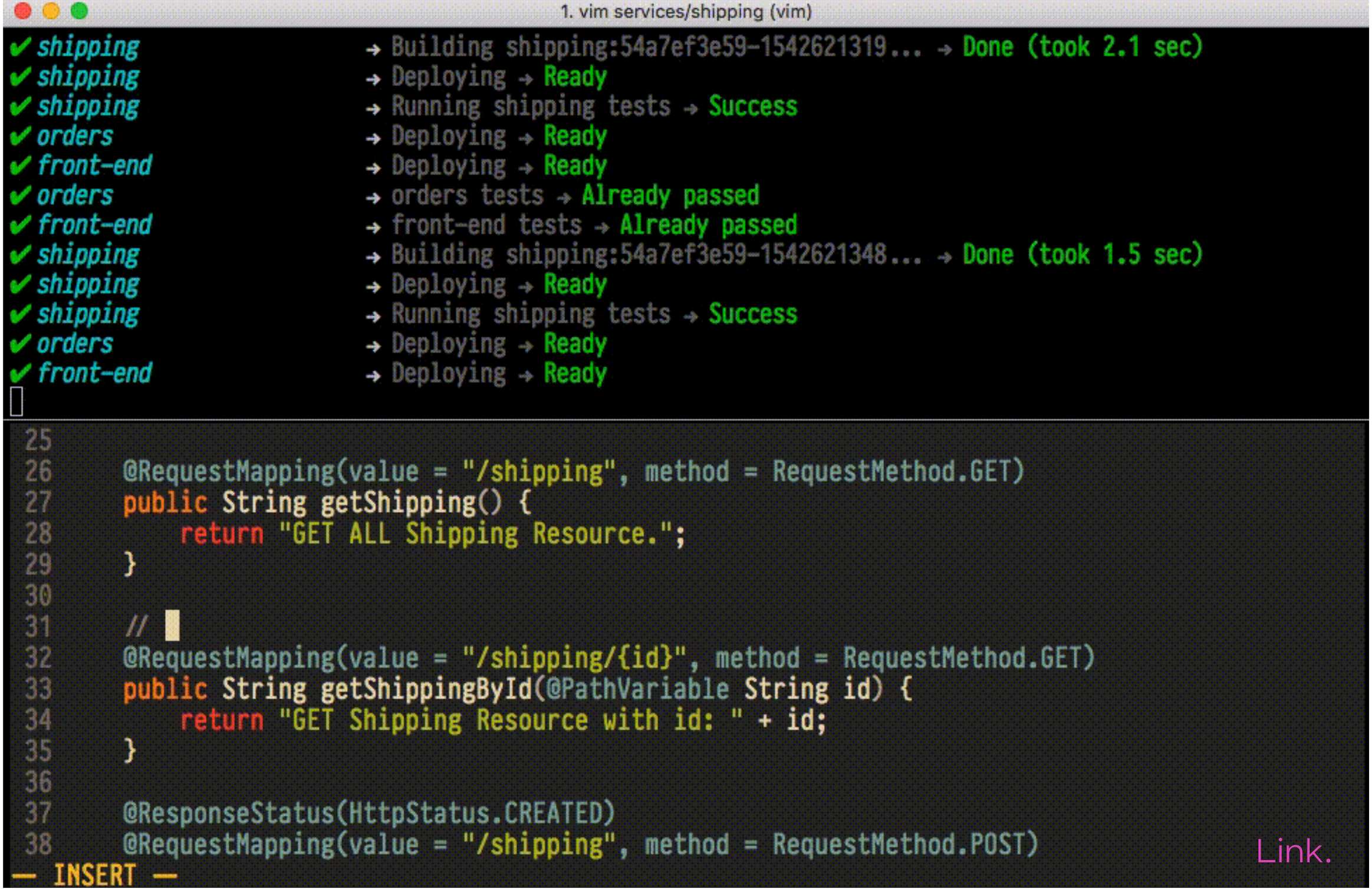
@ellenkorbes

"A what, now?"

That whole pile of hassle
we just talked about?

Gone.


1. eysi@Eysis-MacBook-Pro: ~/code/garden-io/sock-shop-mono (zsh)
➜ sock-shop-mono (master) garden dev
Link.

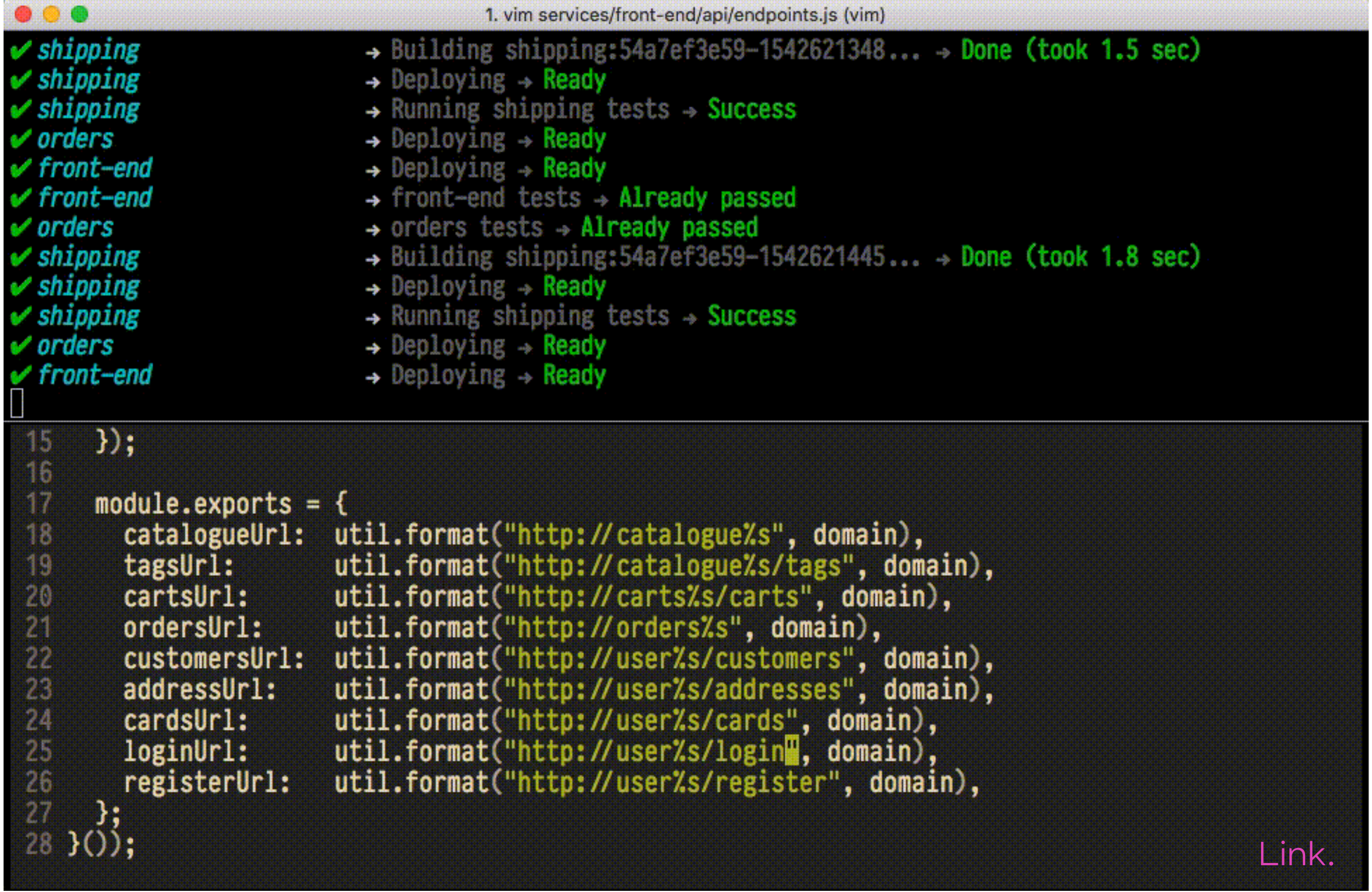

1. vim services/shipping (vim)
✔ shipping → Building shipping:54a7ef3e59-1542621319... → Done (took 2.1 sec)
✔ shipping → Deploying → Ready
✔ shipping → Running shipping tests → Success
✔ orders → Deploying → Ready
✔ front-end → Deploying → Ready
✔ orders → orders tests → Already passed
✔ front-end → front-end tests → Already passed
✔ shipping → Building shipping:54a7ef3e59-1542621348... → Done (took 1.5 sec)
✔ shipping → Deploying → Ready
✔ shipping → Running shipping tests → Success
✔ orders → Deploying → Ready
✔ front-end → Deploying → Ready
25
26 @RequestMapping(value = "/shipping", method = RequestMethod.GET)
27 public String getShipping() {
28 return "GET ALL Shipping Resource.";
29 }
30
31 //
32 @RequestMapping(value = "/shipping/{id}", method = RequestMethod.GET)
33 public String getShippingById(@PathVariable String id) {
34 return "GET Shipping Resource with id: " + id;
35 }
36
37 @ResponseStatus(HttpStatus.CREATED)
38 @RequestMapping(value = "/shipping", method = RequestMethod.POST)
— INSERT —
Link.

Hot reload demo

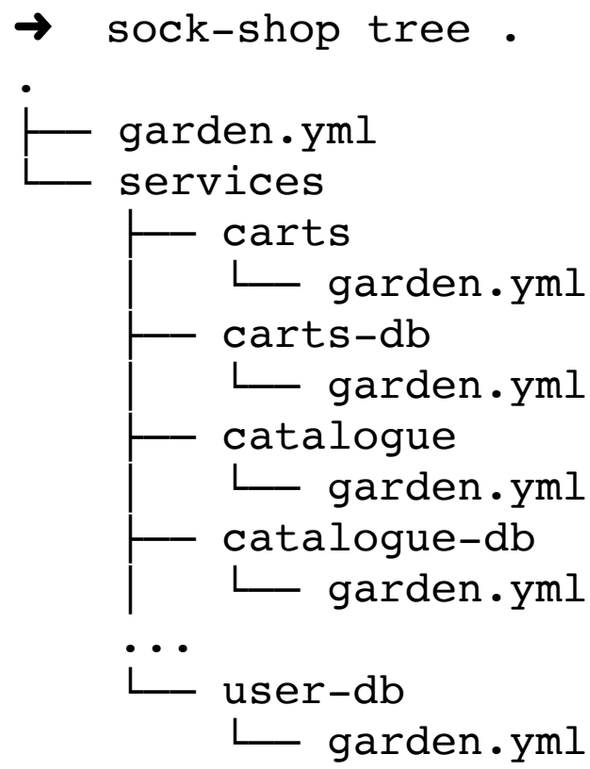
We're using Garden's hot reload functionality in combination with Gatsby (running inside a container) to live-update this page.

```
import Layout from '../components/layout'

const IndexPage = () => (
  <Layout>
    <h1>Hot reload demo</h1>
    <p>We're using Garden's hot reload
functionality in combination with <a
href="https://github.com/gatsbyjs/
gatsby">Gatsby</a> (running inside a
container) to live-update this page.</p>
  </Layout>
)

export default IndexPage
~
~
~
~
~
~
~
~
~
minimal/src/pages/index.js  7,9                All
"minimal/src/pages/index.js" 12L, 364C
```

Link.


1. vim services/front-end/api/endpoints.js (vim)
✔ shipping → Building shipping:54a7ef3e59-1542621348... → Done (took 1.5 sec)
✔ shipping → Deploying → Ready
✔ shipping → Running shipping tests → Success
✔ orders → Deploying → Ready
✔ front-end → Deploying → Ready
✔ front-end → front-end tests → Already passed
✔ orders → orders tests → Already passed
✔ shipping → Building shipping:54a7ef3e59-1542621445... → Done (took 1.8 sec)
✔ shipping → Deploying → Ready
✔ shipping → Running shipping tests → Success
✔ orders → Deploying → Ready
✔ front-end → Deploying → Ready
});
module.exports = {
catalogueUrl: util.format("http://catalogue%s", domain),
tagsUrl: util.format("http://catalogue%s/tags", domain),
cartsUrl: util.format("http://carts%s/carts", domain),
ordersUrl: util.format("http://orders%s", domain),
customersUrl: util.format("http://user%s/customers", domain),
addressUrl: util.format("http://user%s/addresses", domain),
cardsUrl: util.format("http://user%s/cards", domain),
loginUrl: util.format("http://user%s/login", domain),
registerUrl: util.format("http://user%s/register", domain),
};
}());
Link.

How does it work?

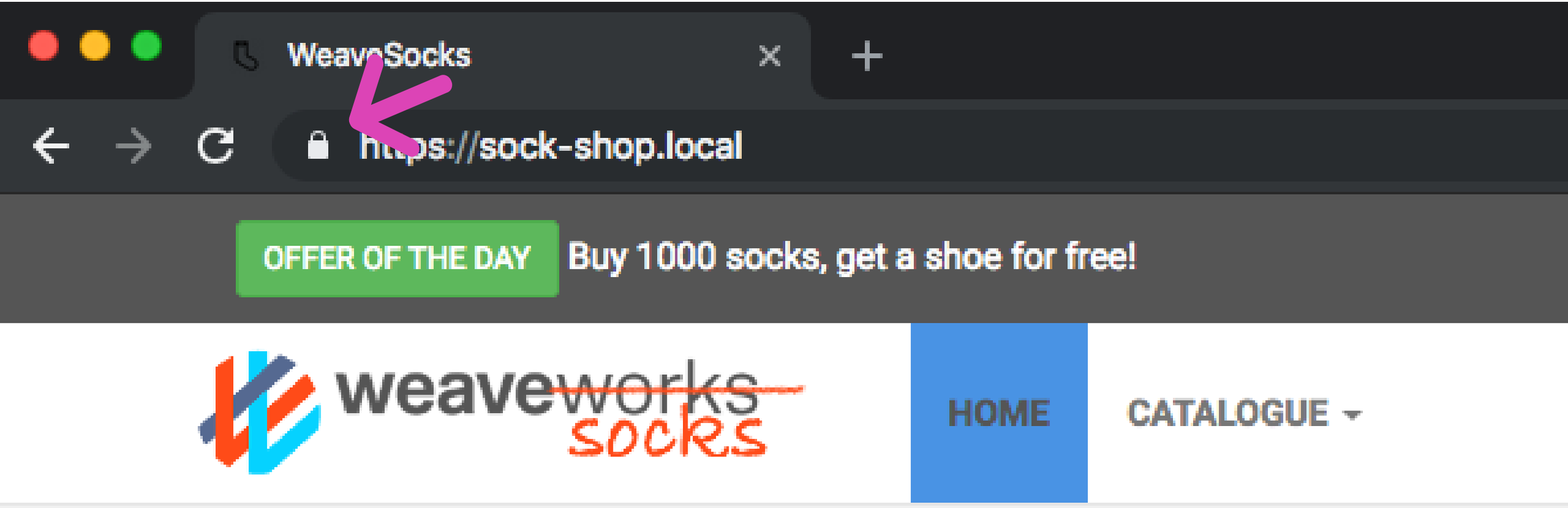

➜ sock-shop tree .
.
├── garden.yml
└── services
    ├── carts
    │   └── garden.yml
    ├── carts-db
    │   └── garden.yml
    ├── catalogue
    │   └── garden.yml
    ├── catalogue-db
    │   └── garden.yml
    ...
    └── user-db
        └── garden.yml

```
project:
  name: sock-shop
  environments:
    - name: local
      providers:
        - name: local-kubernetes
```

```
module:
  description: Catalogue service
  type: container
  name: catalogue
  dockerfile: /docker/catalogue/Dockerfile
  services:
    - name: catalogue
      ports:
        - name: http
          containerPort: 80
      dependencies:
        - catalogue-db
```

```
module:
  description: Front end service
  type: container
  name: front-end
  services:
    - name: front-end
      command: [/usr/local/bin/npm, start]
      ports:
        - name: http
          containerPort: 8080
      ingresses:
        - path: /
          port: http
      dependencies:
        - orders
        - payment
        - user
        - catalogue
        - carts
  tests:
    - name: unit
      command: [npm, test]
    - name: e2e
      command: [npm, test-e2e]
      dependencies:
        - orders
        - payment
        - user
```

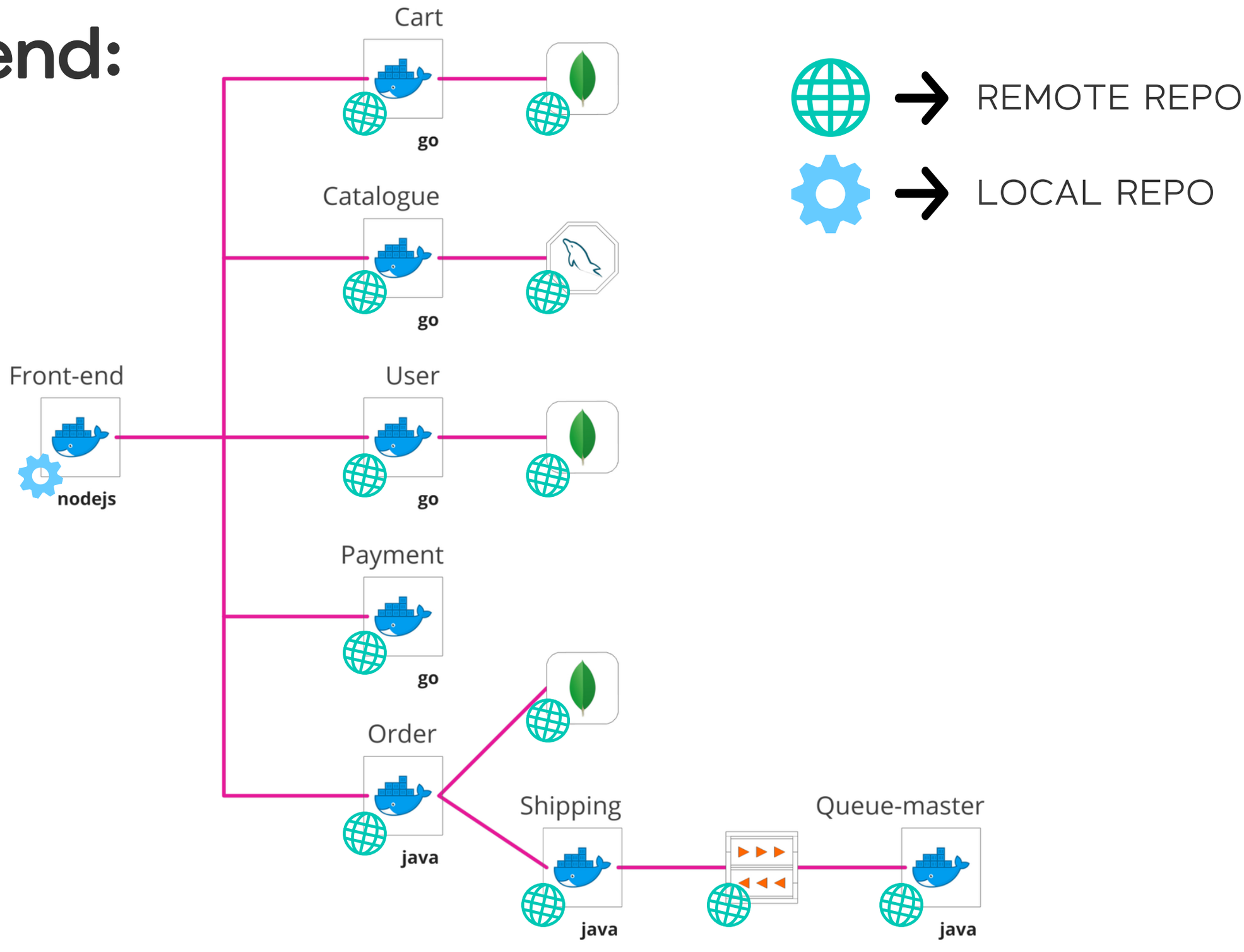
garden



garden

@ellenkorbes

Front-end:


Cart
go
Catalogue
go
Front-end
nodejs
User
go
Payment
go
Order
java
Shipping
java
Queue-master
java
REMOTE REPO
LOCAL REPO

Front-end:

```
module:
  description: Orders service
  type: container
  name: orders
  repositoryUrl: https://github.com/microservices-demo/orders.git#0.4.7
  dockerfile: /docker/orders/Dockerfile
  serv
    -
```

```
module:
  description: Front end service
  type: container
  name: front-end
  services:
    - name: front-end
      command: [/usr/local/bin/npm, start]
      ports:
        - name: http
        ...
```

```
  dockerfile: /docker/carts/Dockerfile
  services:
    - name: carts
      ...
```

garden

Garden:

- Dependency management is built in and virtually free for all build, test, and deploy tasks.
- The workflow is consistent, reliable, and low maintenance.
- Dramatically shorter feedback loops.

Our vision.

A layer between orchestration and development.

Currently, you declare:

- Your infrastructure/orchestration.
- How your stack looks when done.

Now, you can declare:

- Your development workflow.
- How your stack gets to done.

The context humans used to have to carry becomes codified.

A system that knows
how your stack works.

Remote development environment.

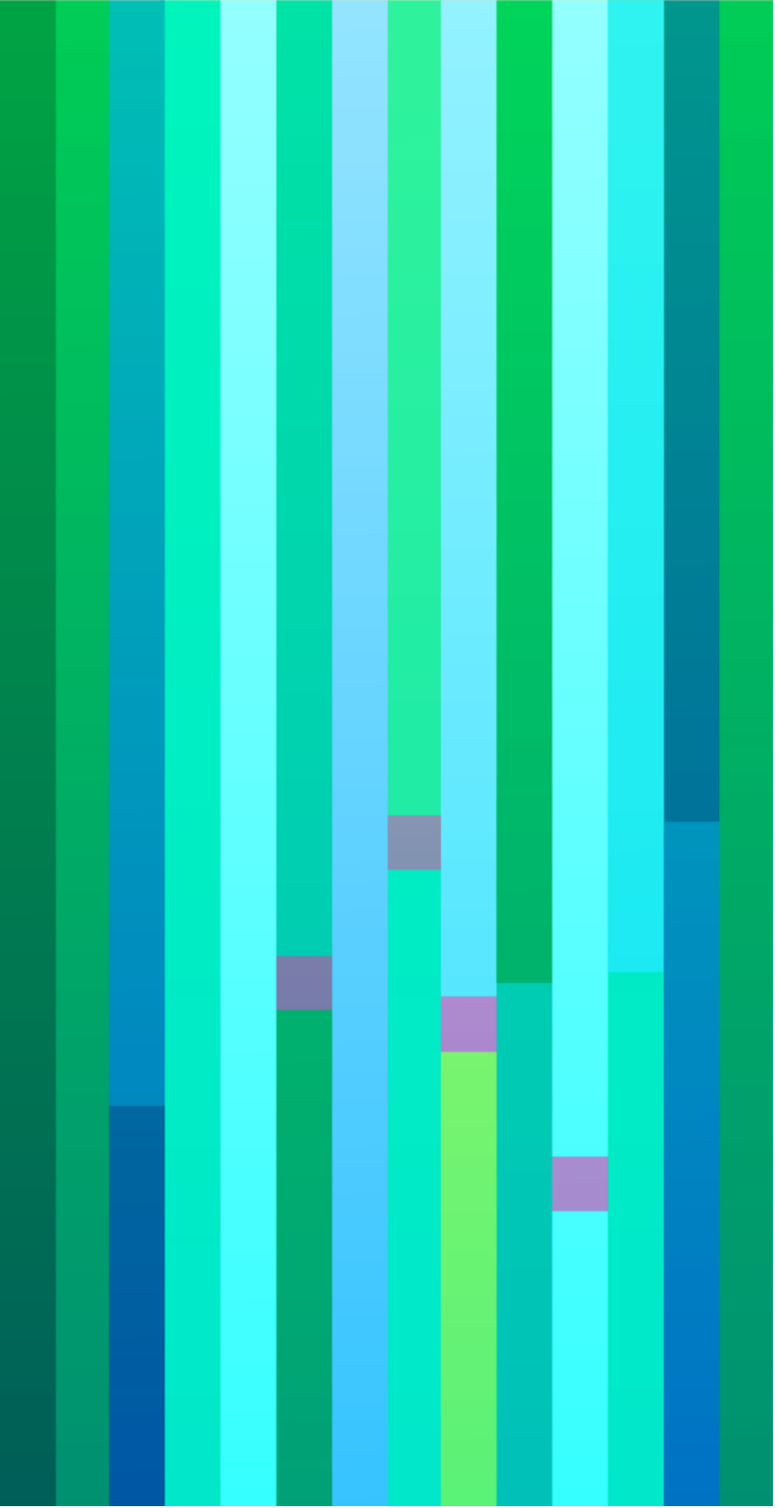
How about, as you code:

- Machine learning code analysis
- Security test plugins
- Performance analysis

The development environment of the future is not an IDE.

The development environment of the future is a system that knows how your stack works.

Open source. Alpha stage.
Eager to hear from you.



Focus on the fun part and let Garden do the rest.

garden

ellen@garden.io | @ellenkorbes