



FLOW

# Testing in Production

*Quality Software Faster*




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Cofounder / CTO Flow

Cofounder / ex-CTO Gilt

**Think about the last  
Feature you deployed  
To production....**

The bottom half of the slide features a decorative graphic consisting of several overlapping, wavy, light blue lines that create a sense of motion and depth, extending across the entire width of the page.

**Is It Working?**



**Right now in production?**

The bottom half of the slide features a decorative graphic consisting of several thin, light blue wavy lines that overlap and create a sense of motion or a digital signal. These lines are positioned horizontally across the width of the slide.

**How do you know?**

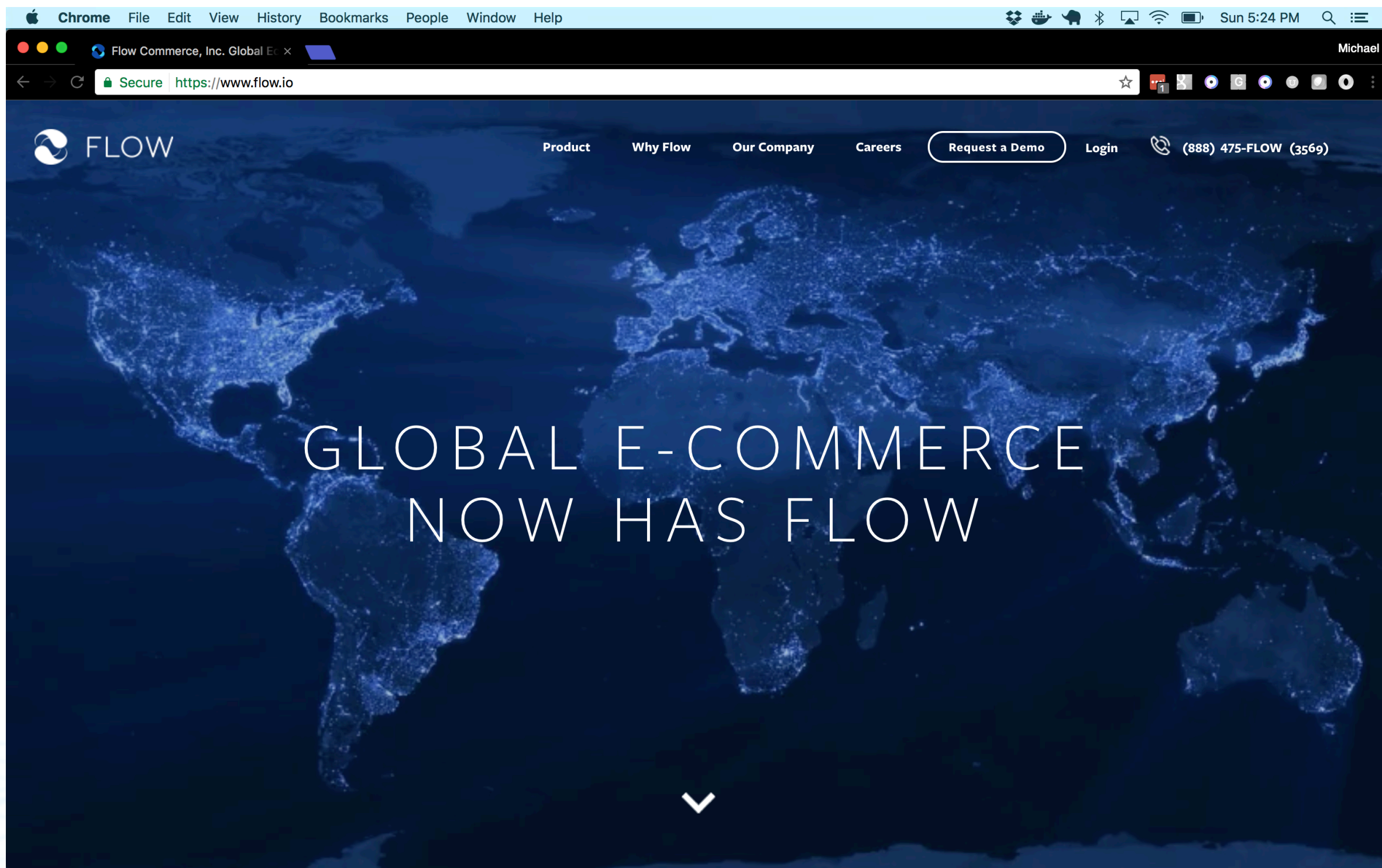


# Feeling anxious?



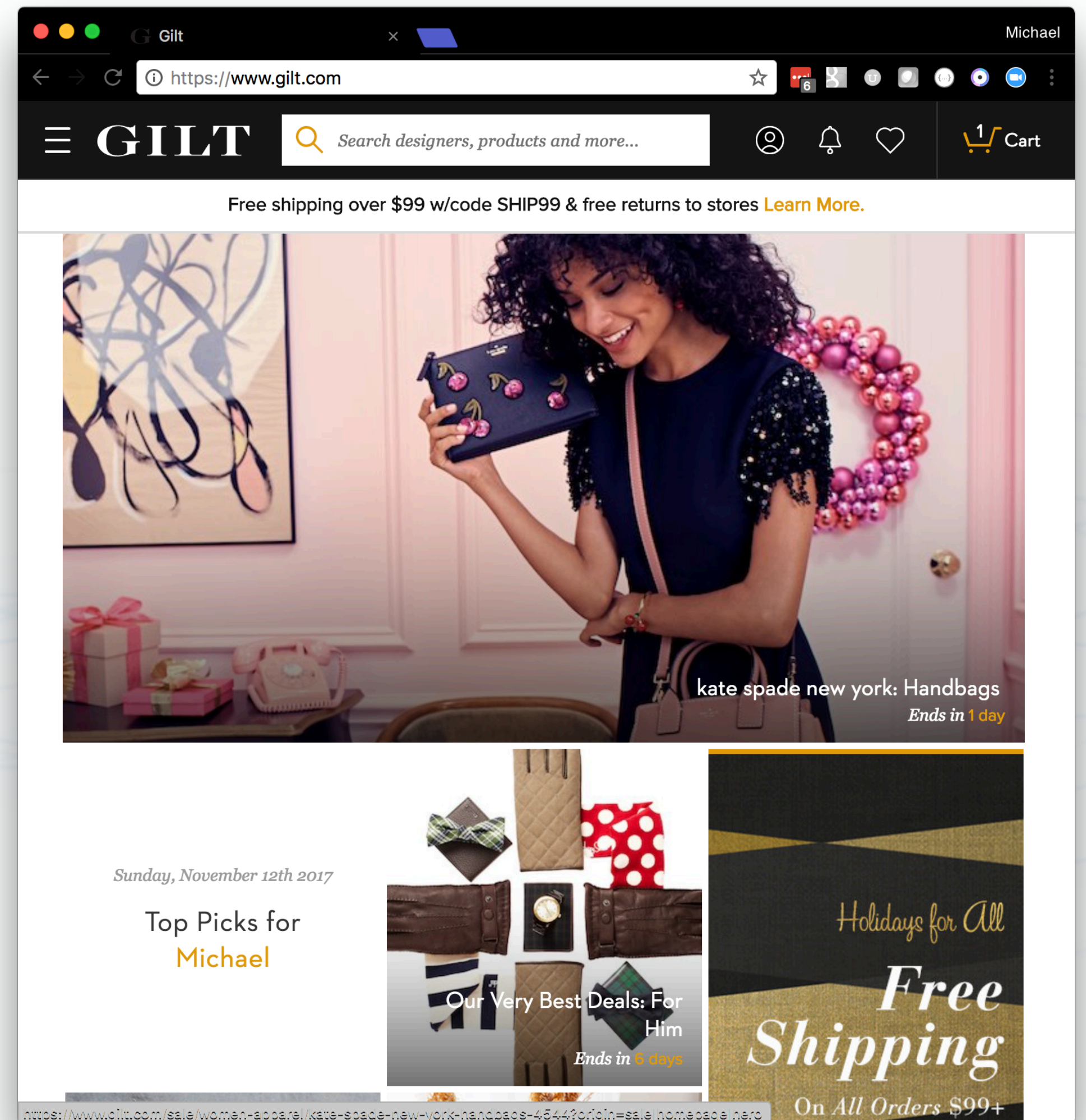
**Let's remove that anxiety**

# About Me



[www.flow.io](https://www.flow.io)

[www.gilt.com](https://www.gilt.com)





# Software Quality is Hard

Think end to end for entire lifecycle of code

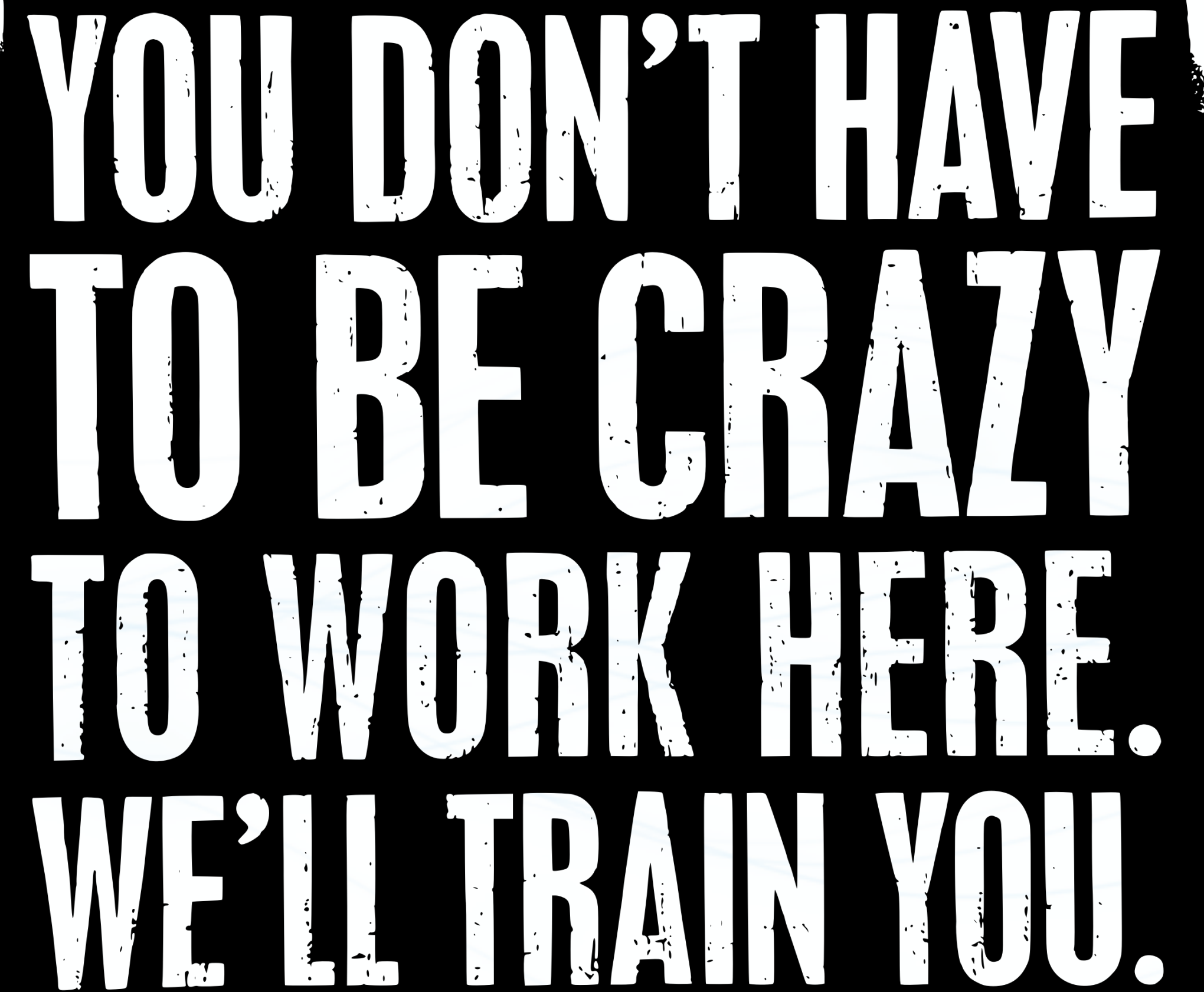
**Testing in Production** is a powerful technique  
to help us build quality software

# Life at Flow: Delivering Quality Software

True continuous delivery

No staging environments

Don't run code locally



**YOU DON'T HAVE  
TO BE CRAZY  
TO WORK HERE.  
WE'LL TRAIN YOU.**

# True Continuous Delivery

Automated tests / No safeguards

Assume Continuous Delivery in Design Process

Many small releases

Desired State
<b>0.3.15</b>
2 instances
<i>Updated 2 hours ago</i>

Last State
<b>0.3.15</b>
2 instances
<i>Updated seconds ago</i>

**“I ❤️ my staging environment”**

*Said Nobody Ever*

# No Staging Environments

Bottlenecks

Fragile

Difficult to understand failure

Expensive (30-40% of budget common)

Create the wrong incentives

Don't run code locally

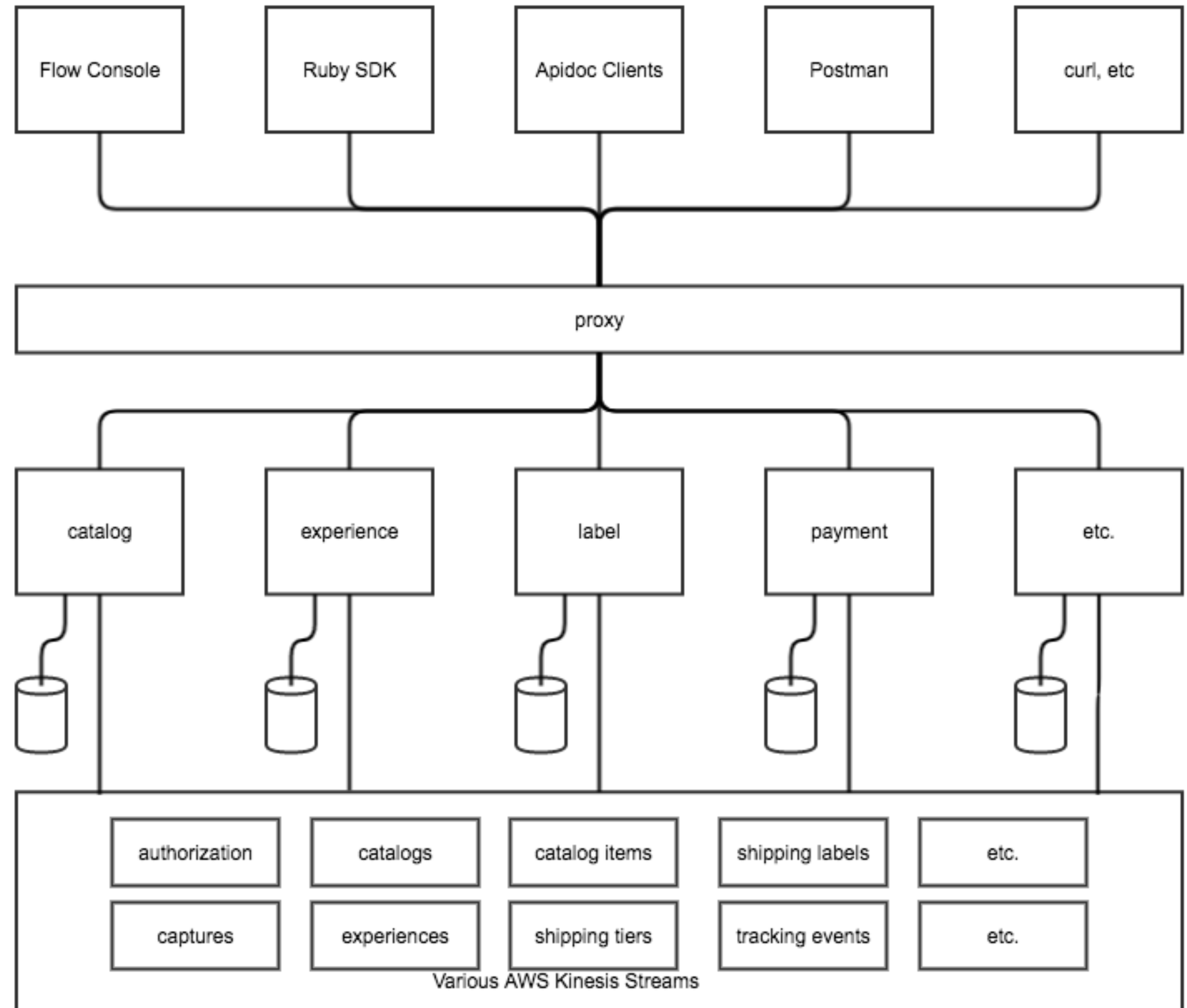
If unsure, write the test!

*Learn to trust your tests*

# Quality Through Architecture

## Extreme Isolation

- Rich event streams
- Own DNS, load balancer
- Private database
- No shared state
- Stop cascading failures
- “Delay” not “Outage”



**Let's look at real examples**

**Successfully “testing in production”**



# Example: Know That Checkout Works

**GILT** *Noir* | Checkout [Continue Shopping](#)

*Ship To* Michael Bryzek  
[Redacted]  
Glen Rock, NJ 07452-2209 [Change](#)  
🇺🇸 United States  
9174941197

*Payment* Michael Bryzek  
**VISA** Visa xxxx-[Redacted] [Change](#)  
01/2019  
United States

**Submit Your Order**

Subtotal	\$41.30
Shipping <a href="#">?</a>	\$0.00
<b>Total:</b>	<b>\$41.30</b>

*You're saving: \$183.70  
Insider Point Value: 206*

Bot places an order every few minutes

Identify test orders and immediately cancel

## Example: Support “Sandbox” Accounts

“SaaS” – even for internal accounts

Mark individual accounts as sandbox

One API Key for all sandbox accounts

***“every service is a third party”***

## Example: End to End Integration Tests

Create Sandbox Org

Run tests

Delete Sandbox Org

***“Safe and Repeatable”***

# Example: Using Sandbox Account for Test Orders

```
order = api_wrapper.create_order(experience.key, country, currency, items, first, last)
puts " - order: #{order.number}: #{order.total.label}"
auth = api_wrapper.create_auth(order, card.token)
puts " - auth: #{auth.id}"
capture = api_wrapper.create_capture(auth.id)
puts " - capture: #{capture.id}"
```

✓ master Michael Bryzek	CRON Randomize credit cards used in demo orders	👍 #34 passed e7ef4a9	🕒 6 min 13 sec 📅 5 days ago	🔒
✓ master Michael Bryzek	CRON Randomize credit cards used in demo orders	👍 #33 passed e7ef4a9	🕒 1 min 2 sec 📅 6 days ago	🔒
✓ master Michael Bryzek	CRON Randomize credit cards used in demo orders	👍 #32 passed e7ef4a9	🕒 2 min 3 sec 📅 7 days ago	🔒
✓ master Michael Bryzek	CRON Randomize credit cards used in demo orders	👍 #31 passed e7ef4a9	🕒 2 min 16 sec 📅 8 days ago	🔒
✓ master Michael Bryzek	CRON Randomize credit cards used in demo orders	👍 #30 passed e7ef4a9	🕒 5 min 13 sec 📅 9 days ago	🔒
✓ master Michael Bryzek	CRON Randomize credit cards used in demo orders	👍 #29 passed e7ef4a9	🕒 3 min 10 sec 📅 10 days ago	🔒

## Example: Verifying Proxy Server Works as Expected

```
$ eval $(AWS_PROFILE=flowvault dev sbt --env production)
```

```
API Proxy Tests against http://localhost:7000  
All tests Passed
```



Operating As Expected

But sometimes things go wrong

Even to the best of teams



## Considerations

Make production access explicit (not the default)

Use defined paths (e.g. API calls)

Restrict sensitive data

Design for side effects



# Unexpected Benefits



# Perfect Documentation

The screenshot shows a web browser window displaying the Flow Commerce API documentation. The browser's address bar shows the URL `https://docs.flow.io/getting-started#how-to-authenticate`. The page title is "API Documentation - Flow Commerce". The user's name "Michael" is visible in the top right corner of the browser window.

The documentation page has a dark sidebar on the left with the "FLOW" logo and navigation links. The main content area is white and contains the following text:

All authentication to the Flow Commerce API is via HTTP Basic Authorization. Your API Key is your username, and there is no password.

Note: when using curl, if you append a ":" after your API Key, curl will not prompt you for your password.

For example:

```
curl -u <your api key>: https://api.flow.io/organizations
```

You should see a response similar to:

```
[
  {
    "id": "flow",
    "name": "Flow Commerce",
    "environment": "production",
    "discriminator": "organization"
  },
  {
    "id": "flow-sandbox",
    "name": "Flow Sanbdox",
    "environment": "sandbox",
    "parent": {
      "id": "flow"
    },
    "discriminator": "organization"
  }
]
```

Note that you will also see which environment your organization belongs to (production or sandbox).

### Types

The entire Flow API is strongly typed and friendly to use from the command line. We design our API by declaring types for every field and object with no exception, and then use this type information to validate inbound JSON.

Internally, we use [apidoc](#) to create our API - providing documentation and great native language client libraries.

#### Primitive Types:

Type	Description	Example
------	-------------	---------

# Capture request/response of API Calls

```
curl -u <your api key>: https://api.flow.io/organizations
```

```
[
  {
    "id": "flow",
    "name": "Flow Commerce",
    "environment": "production",
    "discriminator": "organization"
  },
  {
    "id": "flow-sandbox",
    "name": "Flow Sanbdox",
    "environment": "sandbox",
    "parent": {
      "id": "flow"
    },
    "discriminator": "organization"
  }
]
```

```
items
items/get
items/get/scrapbook-demo
items/get/scrapbook-demo/catalog
items/get/scrapbook-demo/catalog/items
items/get/scrapbook-demo/catalog/items/sku-1
items/get/scrapbook-demo/catalog/items/sku-1/simple.response.json
items/get/scrapbook-demo/catalog/items/sku-2
items/get/scrapbook-demo/catalog/items/sku-2/simple.response.json
items/get/scrapbook-demo/catalog/targetings
items/get/scrapbook-demo/catalog/targetings/scrapbook-targetings-example
items/get/scrapbook-demo/catalog/targetings/scrapbook-targetings-example/simple.response.json
items/post
items/post/:organization
items/post/:organization/catalog
items/post/:organization/catalog/items
items/post/:organization/catalog/items/advanced.request.json
items/post/:organization/catalog/items/advanced.response.json
items/post/:organization/catalog/items/simple.request.json
items/post/:organization/catalog/items/simple.response.json
```

✓ master

 Michael Bryzek

CRON Wait 90 seconds for metric

👍 #299 passed

 443707a

🕒 1 min 23 sec

📅 27 about a minute ago

# Great Demos

Flow Console Michael

Secure | <https://console.flow.io/demo/analytics>

FLOW Analytics Flow Commerce Demo **SANDBOX**

Experiences | Product Catalog | Harmonization | Currency Functions | Restrictions | Customer Service | **Analytics** | Utility & Tools | Organization Settings

GMV Revenue | **Number of Orders** | Date Range: Last 7 Days (11/06/2017 - 11/12/2017)

Total Number of Orders 100

Number of Orders Over Time Time Zone: Coordinated Universal Time

Date	Number of Orders
Nov 06	10
Nov 07	10
Nov 08	10
Nov 09	10
Nov 10	10
Nov 11	30
Nov 12	20

Country: All Countries | Time Interval: Daily

Number of Orders by Country

Country	Number of Orders	%
Guatemala	22	22%
Maldives	20	20%
Mexico	15	15%
Malaysia	15	15%
France	5	5%

API Reference

API | BUILDER

Log In with Github

Fork on Github

# Simple, Comprehensive Tooling for Modern APIs

Get Started

- Amazing native libraries and code generators
- Beautiful documentation for modern APIs
- Complete API lifecycle management
- Open Source and Compatible

Version control for APIs  
Backwards Compatibility  
High Quality Mocks

# High Quality Mocks – From Specs

```
@javax.inject.Singleton
class MockLocationClient @javax.inject.Inject() (
  override val addresses: MockAddresses
) extends io.flow.location.v0.mock.Client

@javax.inject.Singleton
class MockAddresses() extends io.flow.location.v0.mock.MockAddresses {
```

Full Mock Generated

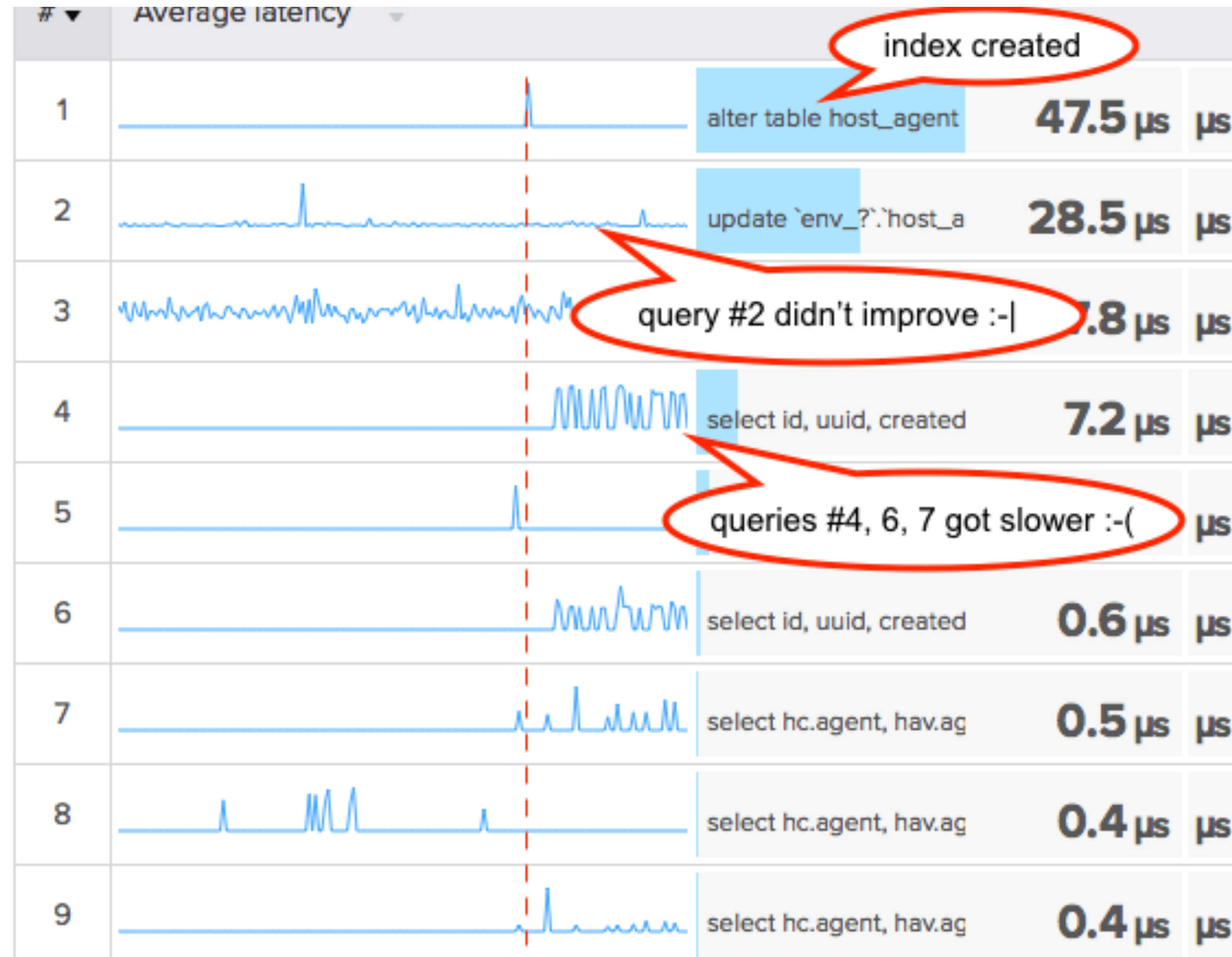
Implement Only What  
You Need To Test

```
def setAddress(ip: String, address: Address) {
  ips += (ip -> address)
}

override def get(
  address: _root_.scala.Option[String] = None,
  ip: _root_.scala.Option[String] = None,
  requestHeaders: Seq[(String, String)] = Nil
)(implicit ec: scala.concurrent.ExecutionContext) = Future {
  ip match {
    case None => Nil
    case Some(ipAddress) => Seq(ips.get(ipAddress)).flatten
  }
}
```



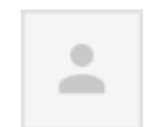
# Tooling: Real Time DB Monitoring



# Tooling: Super Simple Alerts from Log



## Log a prefix Schedule a real time alert



Sumo Logic

to tech ▾

Jun 17 (8 days ago)

Saved Search	<a href="#">FlowAlertError - ReconcileSubmittedOrdersInShopify</a>
Search String	"FlowAlertError [ReconcileSubmittedOrdersInShopify]"
Time Range	06/17/2017 12:00:00 PM EDT to 06/17/2017 12:15:00 PM EDT
Run Frequency	Every 15 minutes
Notification Threshold	Greater than 0
Run At	06/17/2017 12:18:14 PM EDT

```
{  
  "log": "FlowAlertError [ReconcileSubmittedOrdersInShopify] - ...",  
  "stream": "stdout",  
  "time": "2017-06-17T18:30:36.131267324Z"  
}
```



## Key Takeaways – Design Production to be Testable

Trust your tests, run in production

Leverage continuous delivery

Invest in techniques like sandbox accounts, mocks

Instrument production for real-time feedback



FLOW

**Thank You!**

We're hiring: <https://www.flow.io/careers>



Michael Bryzek

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Cofounder / ex-CTO Gilt