Moving Shopify Core to the ⛅

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shopify

Scott Francis

Senior Production Engineer Lead

Edit profile

Location: Ottawa - Elgin, Canada

Discipline: Engineering

Joined: about 5 years ago

97.37% of Shopifolk joined afterwards

80k

requests per second peak

600k+

active merchants

$26b

gmv (2017)

800+

developers

40+

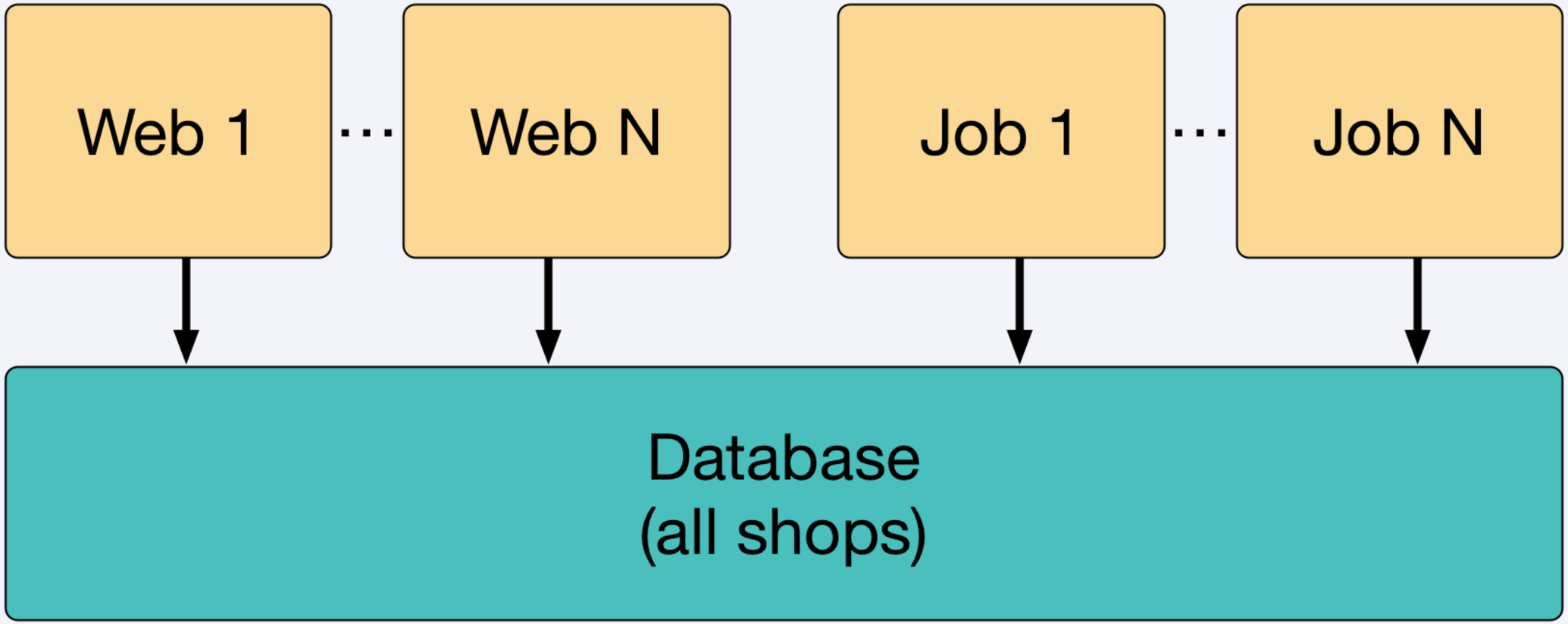
daily deploys

RAILS

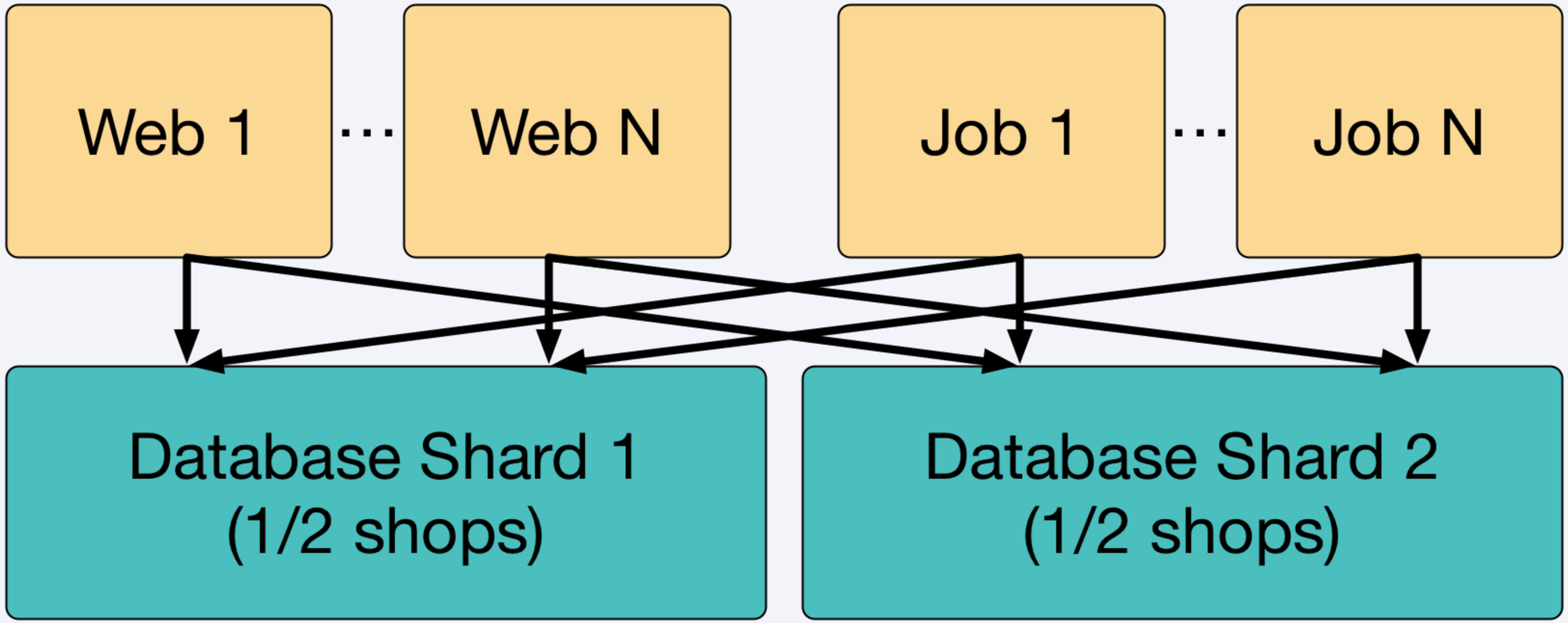
MySQL

Part One: Pre-⛅

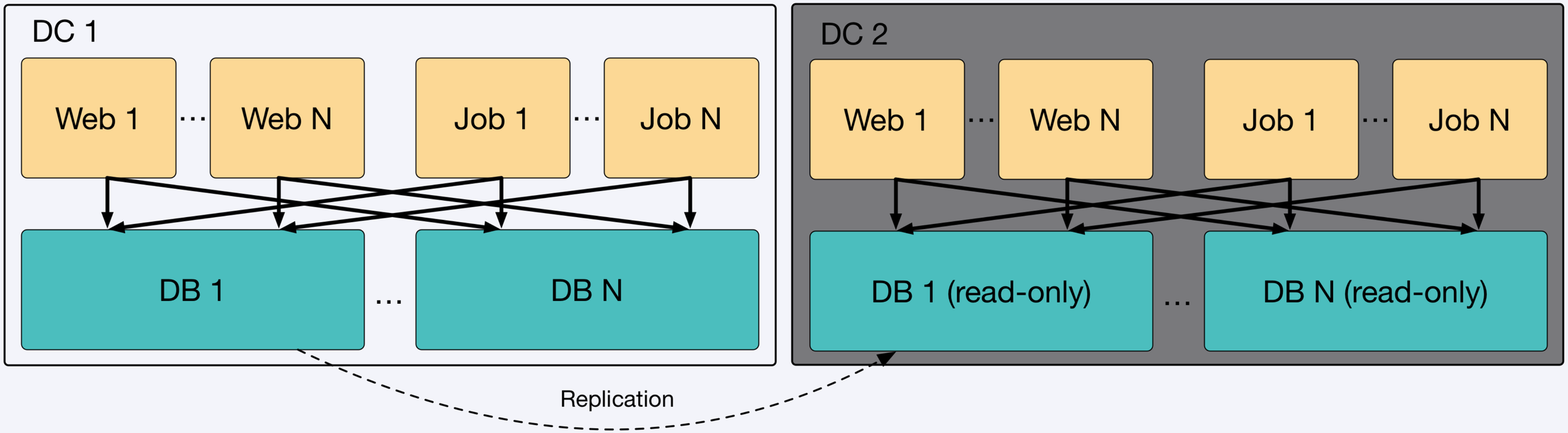
Shopify early 2013



Sharding - 2013



Multi DC - 2015

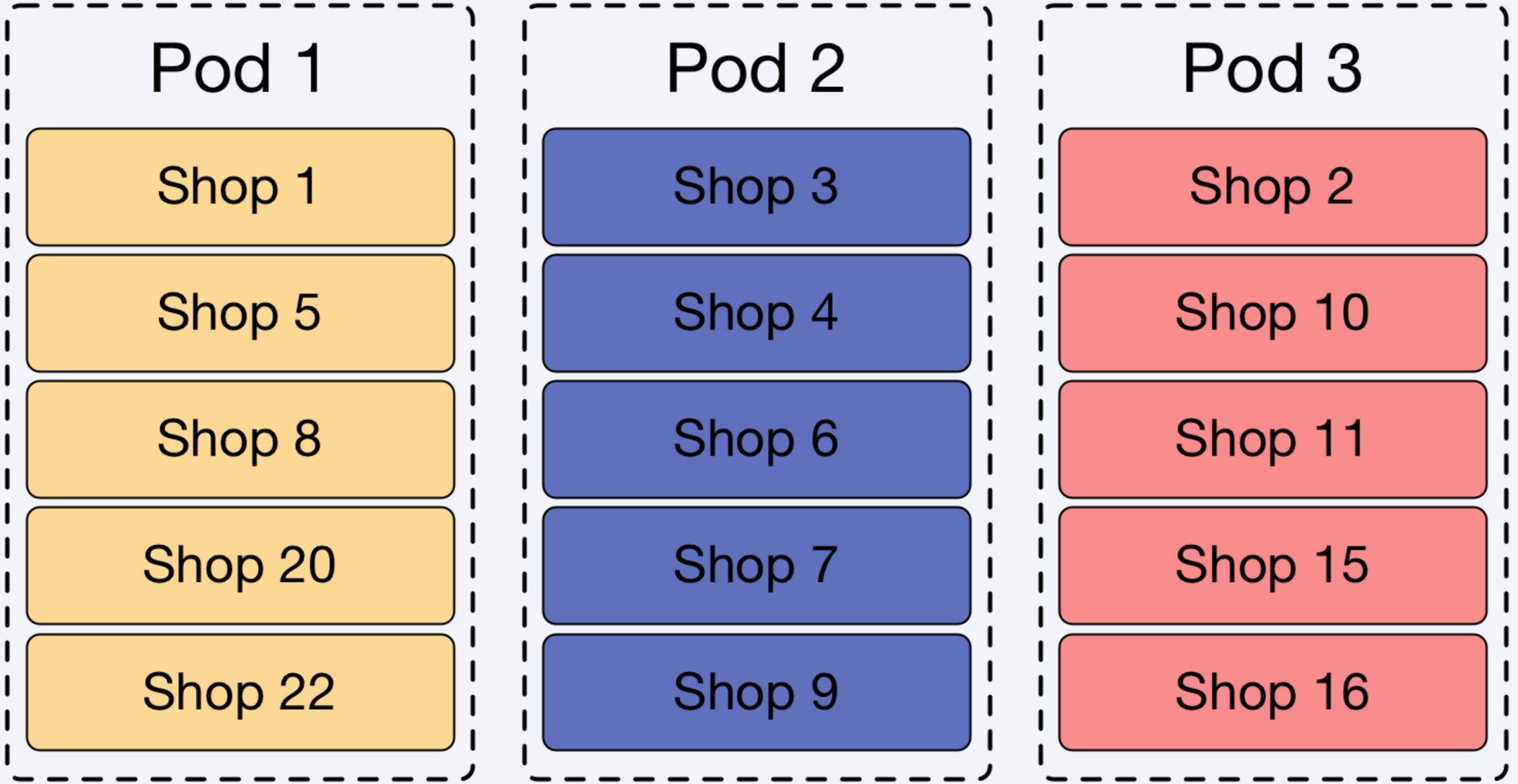


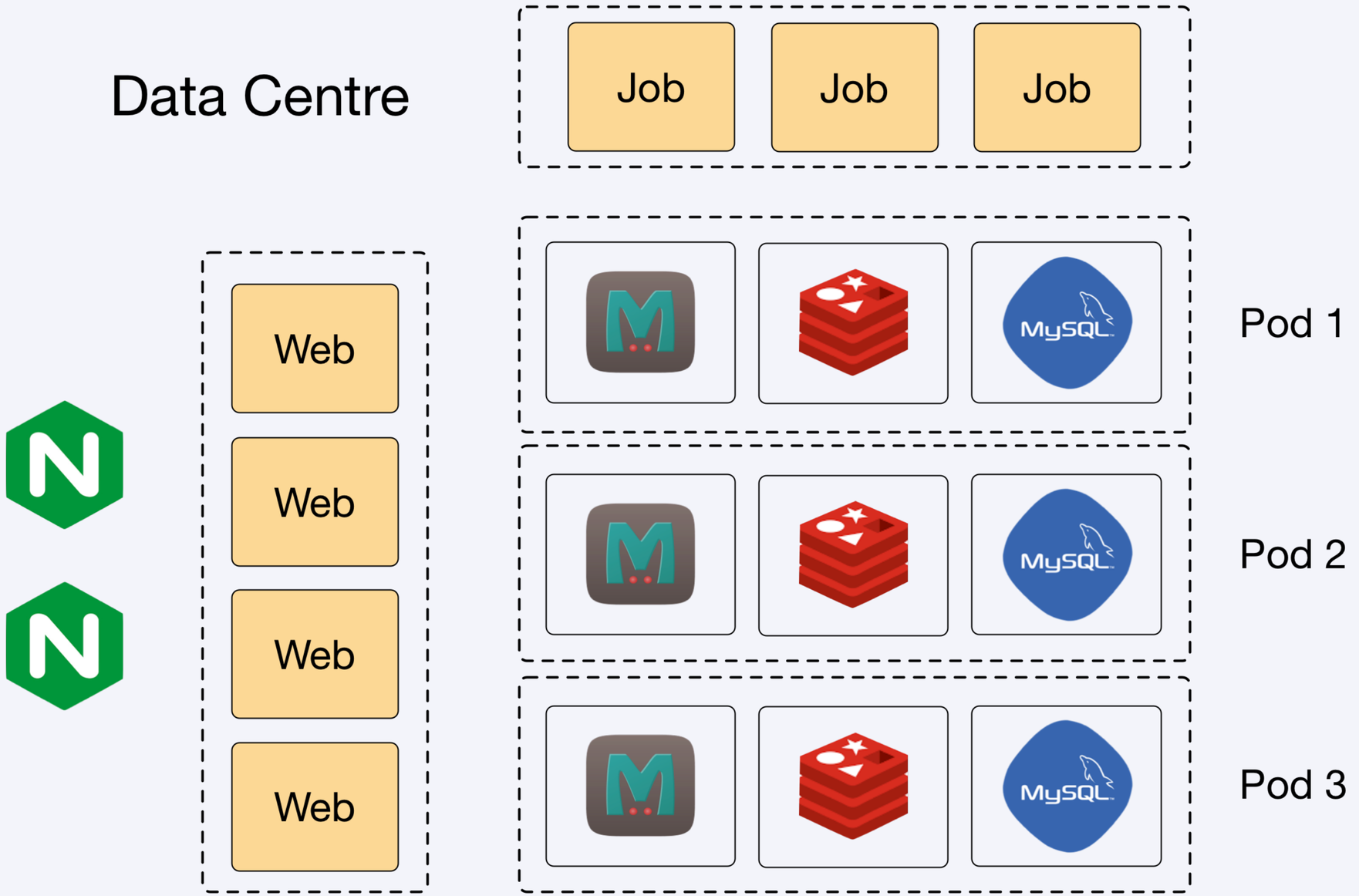
Mission Control Center
FLIGHT DIRECTOR
CAPCOM
EVA
BME
SURGEON
OPS PLANNER
PAO
POSN 4288
POSN 4278

NASA
Jet Propulsion Laboratory
California Institute of Technology
Thermal
Propulsion

A (Shopify) pod is an isolated unit of one or more shops.

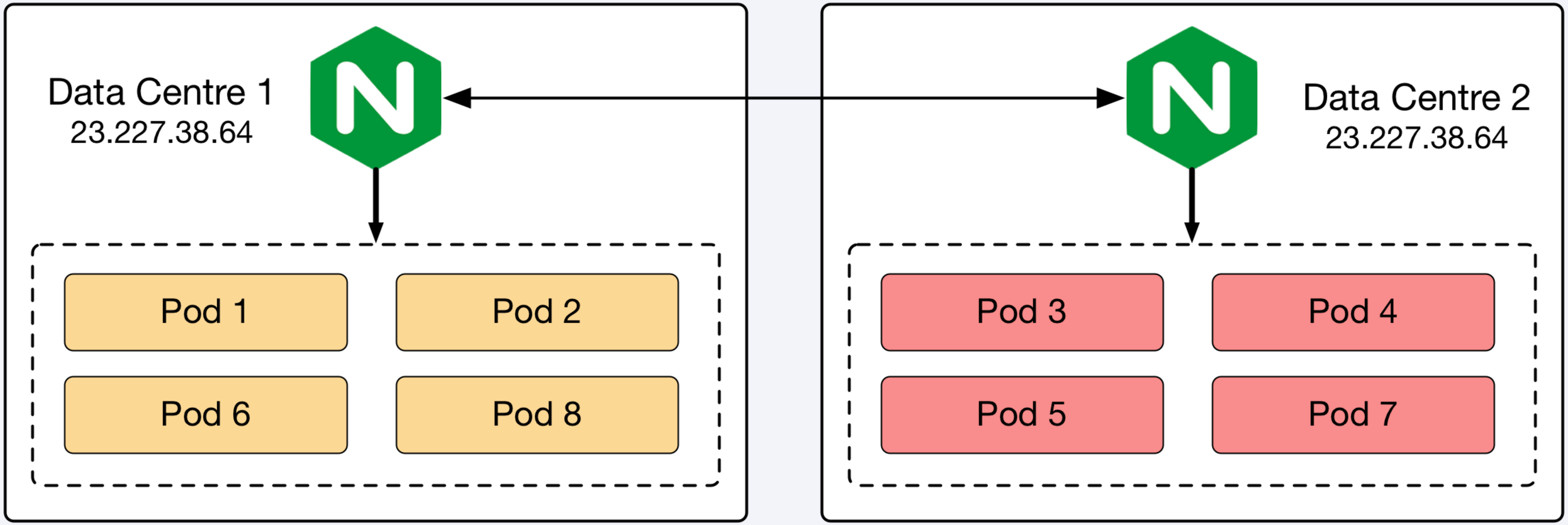
Pods - 2016


Pod 1
Shop 1
Shop 5
Shop 8
Shop 20
Shop 22
Pod 2
Shop 3
Shop 4
Shop 6
Shop 7
Shop 9
Pod 3
Shop 2
Shop 10
Shop 11
Shop 15
Shop 16


Data Centre
Job
Job
Job
Web
Web
Web
Web
MySQL
MySQL
MySQL
Pod 1
Pod 2
Pod 3

Lua

Pod Routing


Data Centre 1
23.227.38.64
Pod 1
Pod 2
Pod 6
Pod 8
Data Centre 2
23.227.38.64
Pod 3
Pod 4
Pod 5
Pod 7

Part Two: ⛅

Building for the long term.

Compliance

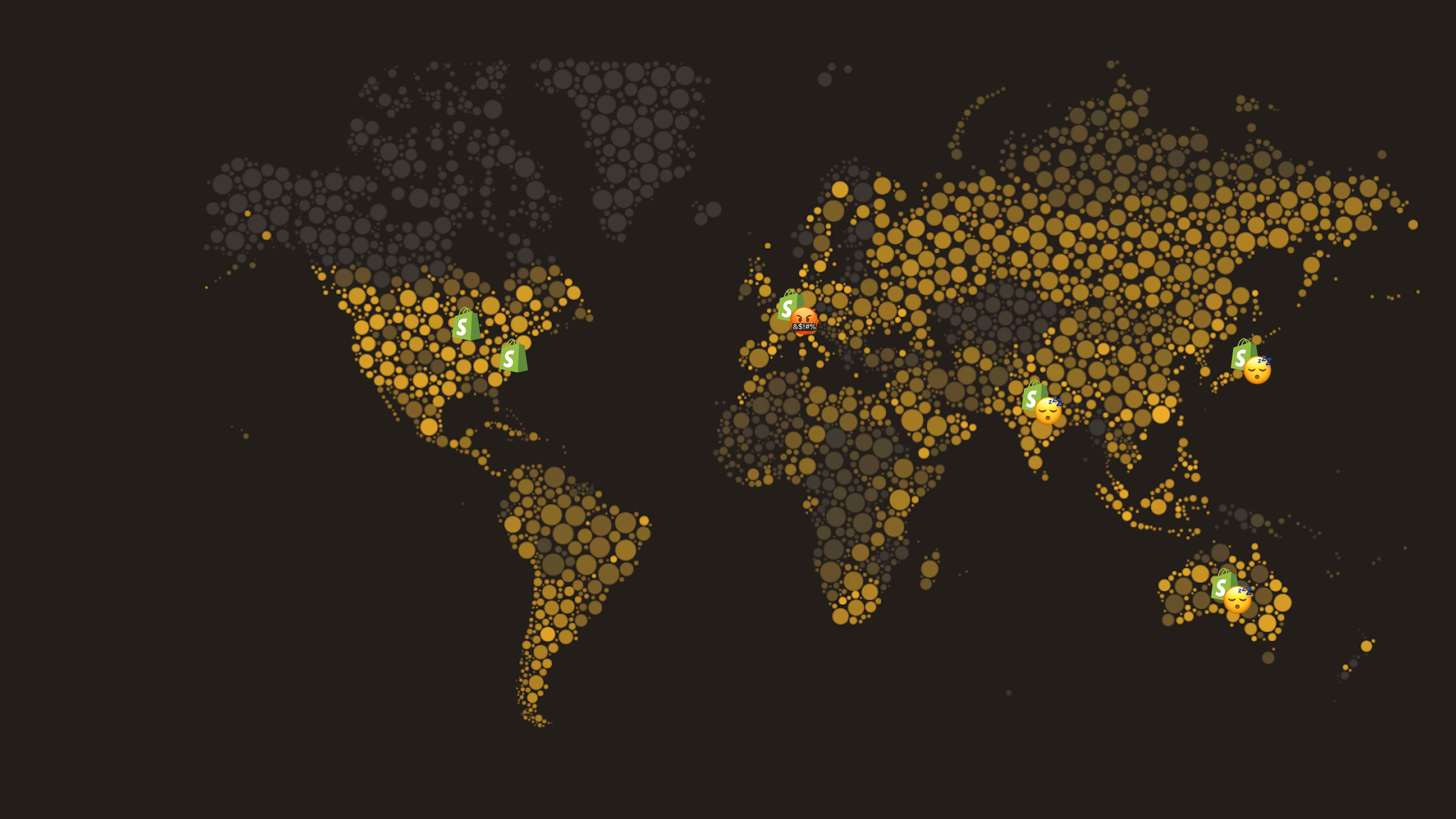
U.S. ★ EU

SAFEHARBOR

U.S. DEPARTMENT OF COMMERCE

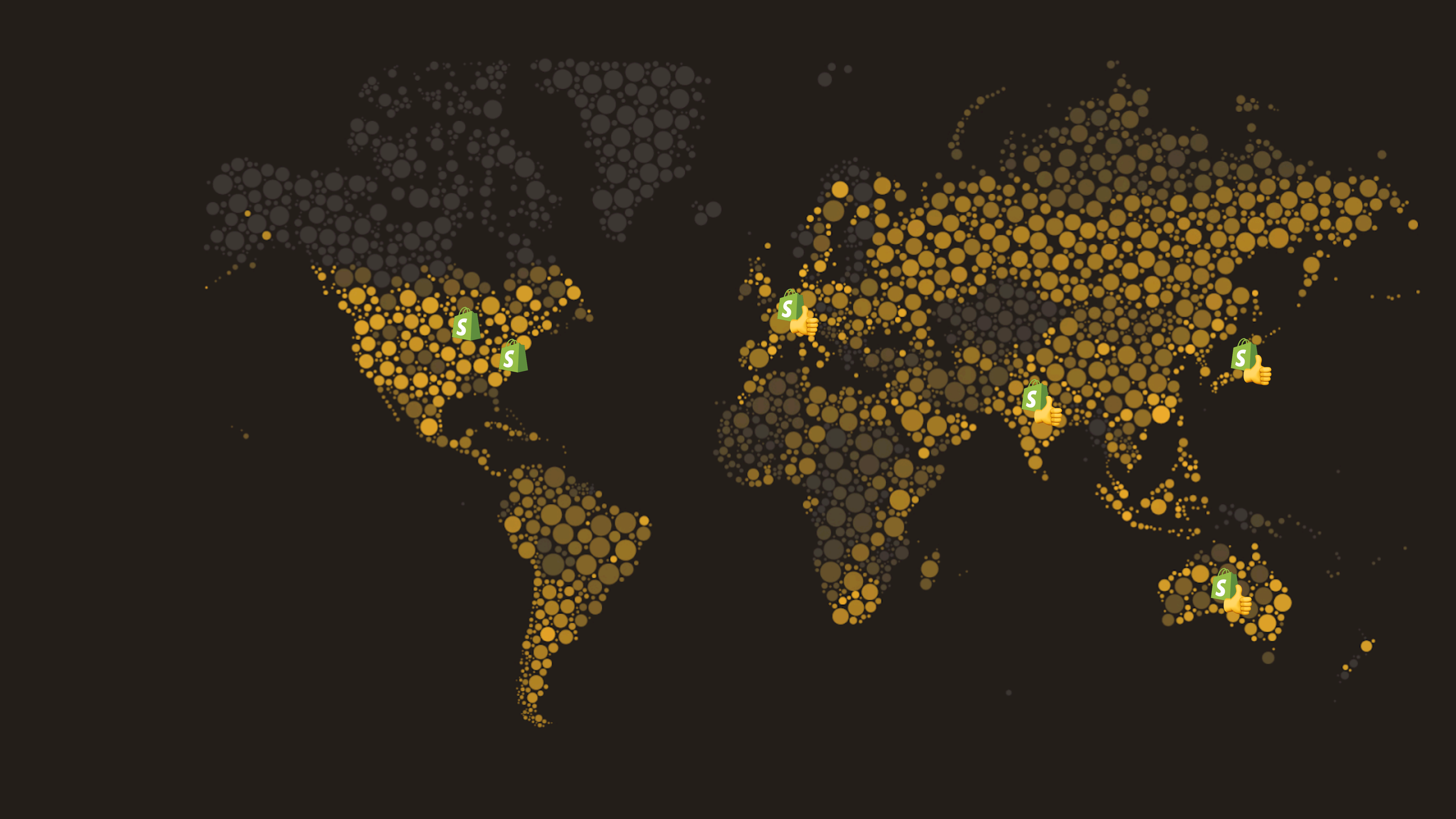
OCS
ONTARIO
CANNABIS
STORE

Performance

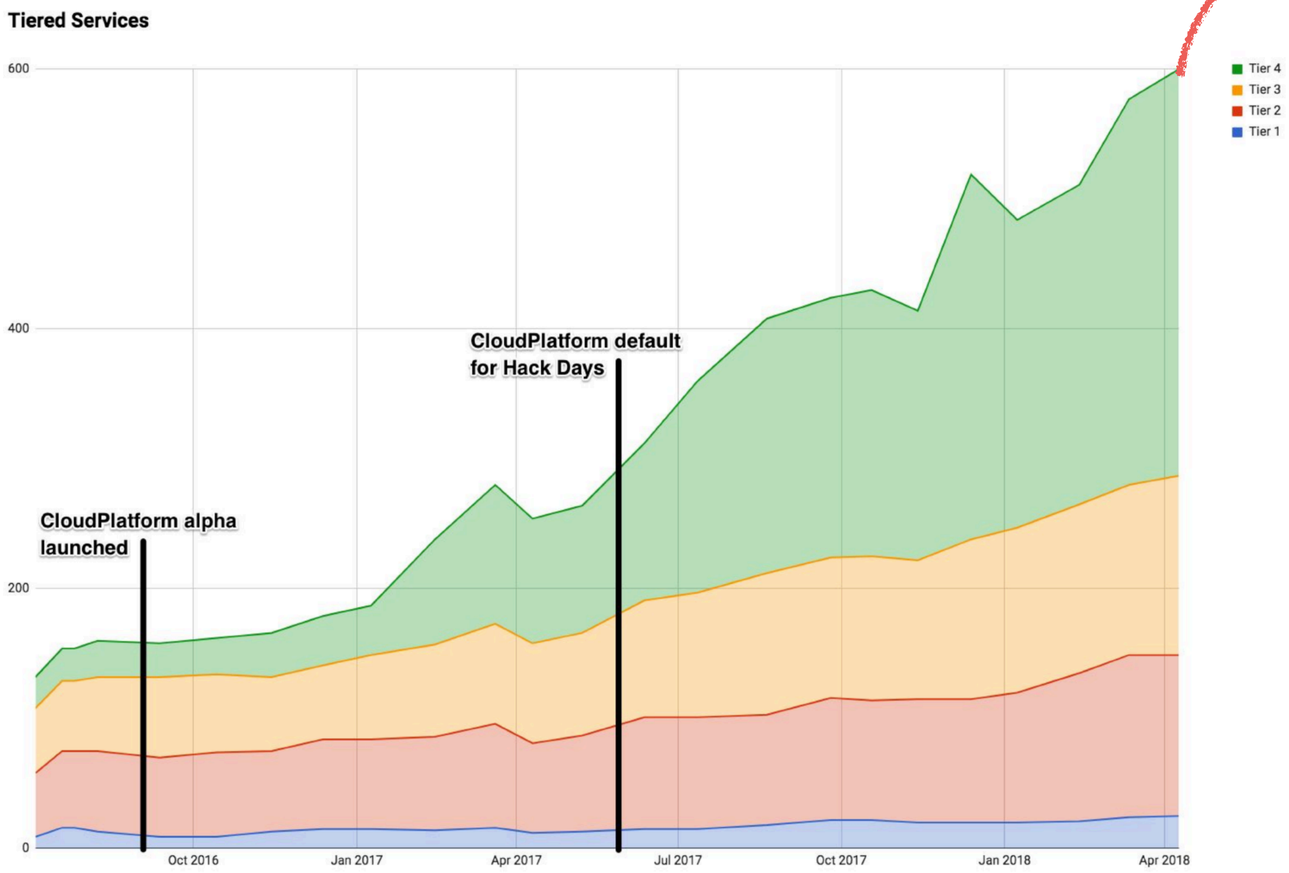


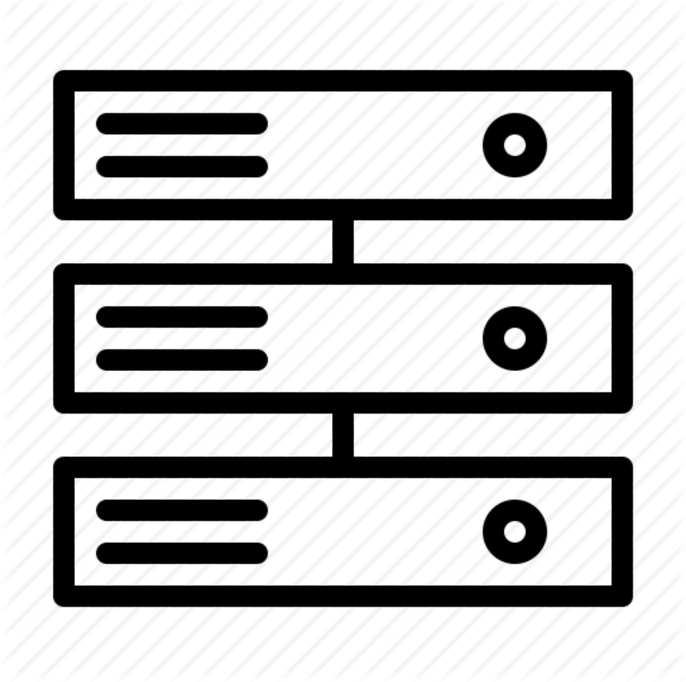
Google Cloud Network

https://peering.google.com
https://cloud.google.com/compute/docs/regions-zones/regions-zones



Consistency


Tiered Services
600
400
200
0
Oct 2016
Jan 2017
Apr 2017
Jul 2017
Oct 2017
Jan 2018
Apr 2018
Tier 4
Tier 3
Tier 2
Tier 1
CloudPlatform alpha launched
CloudPlatform default for Hack Days



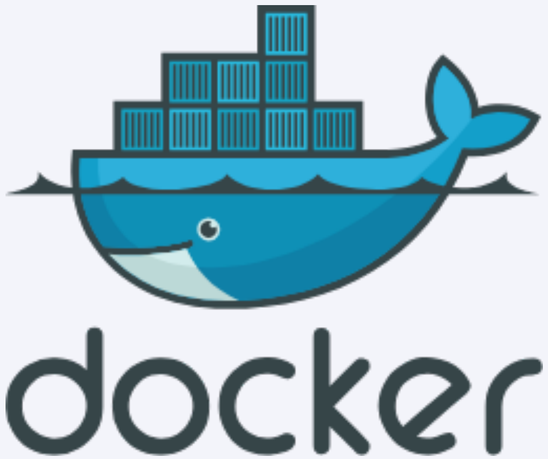
aws

heroku

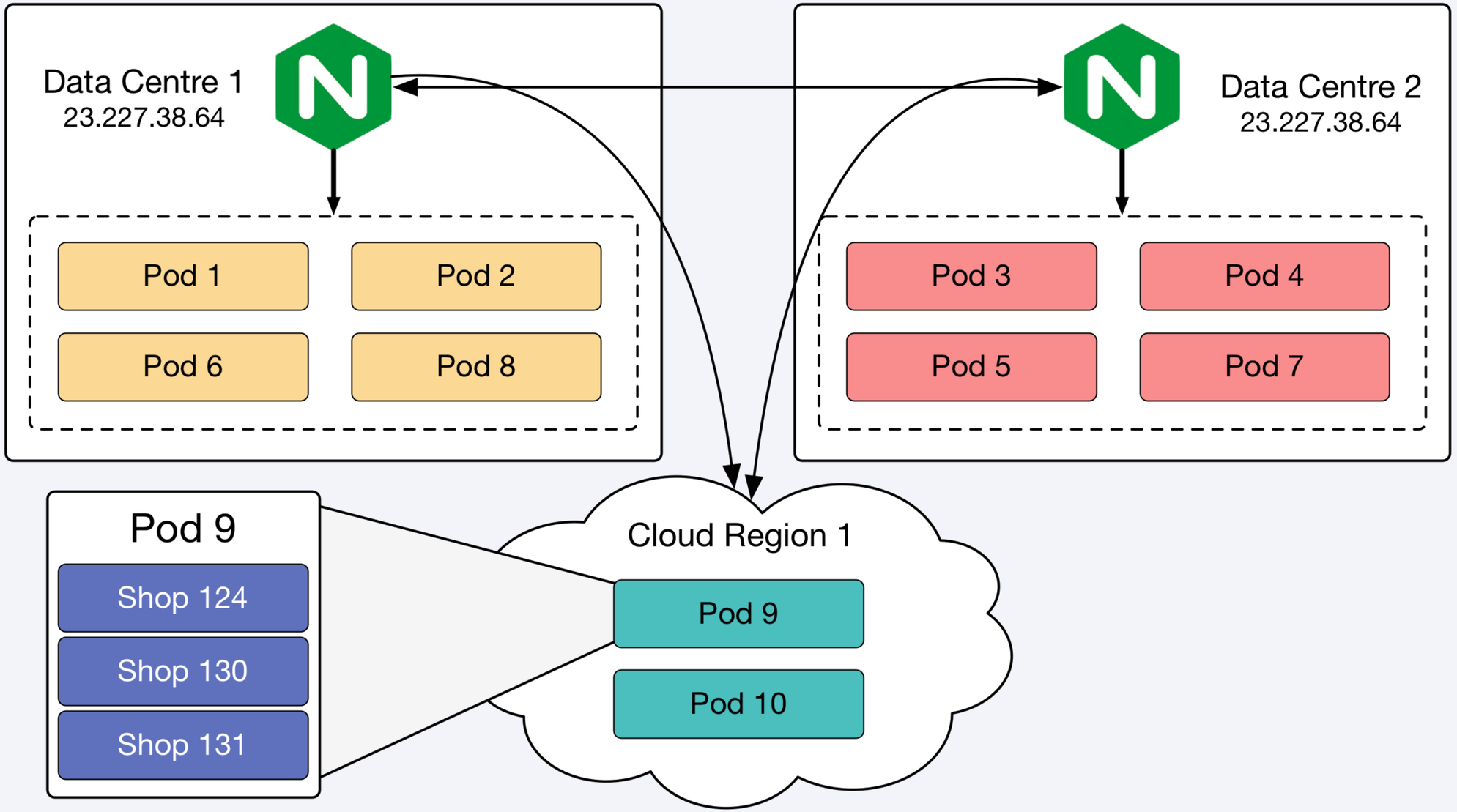
Simplicity

15
16
18
20
12
21B
21
21A
22A

Execution


docker

Pod Routing 2.0



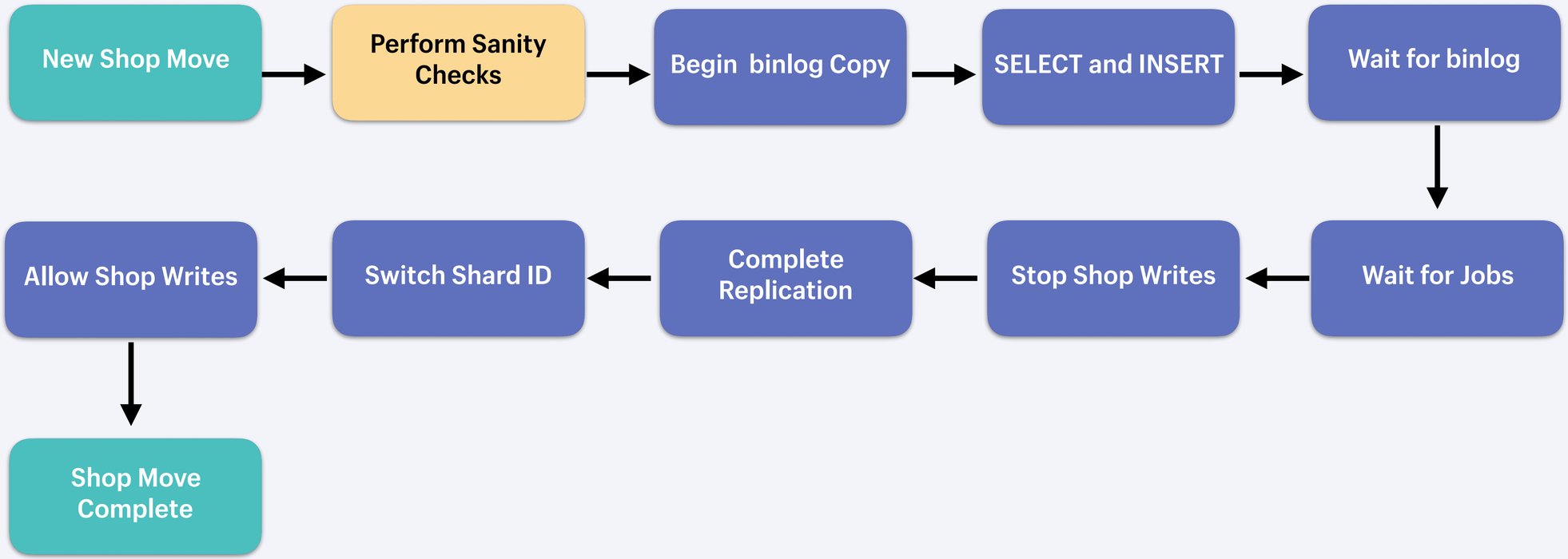
“We’re going to move to the cloud one shop at a time.”

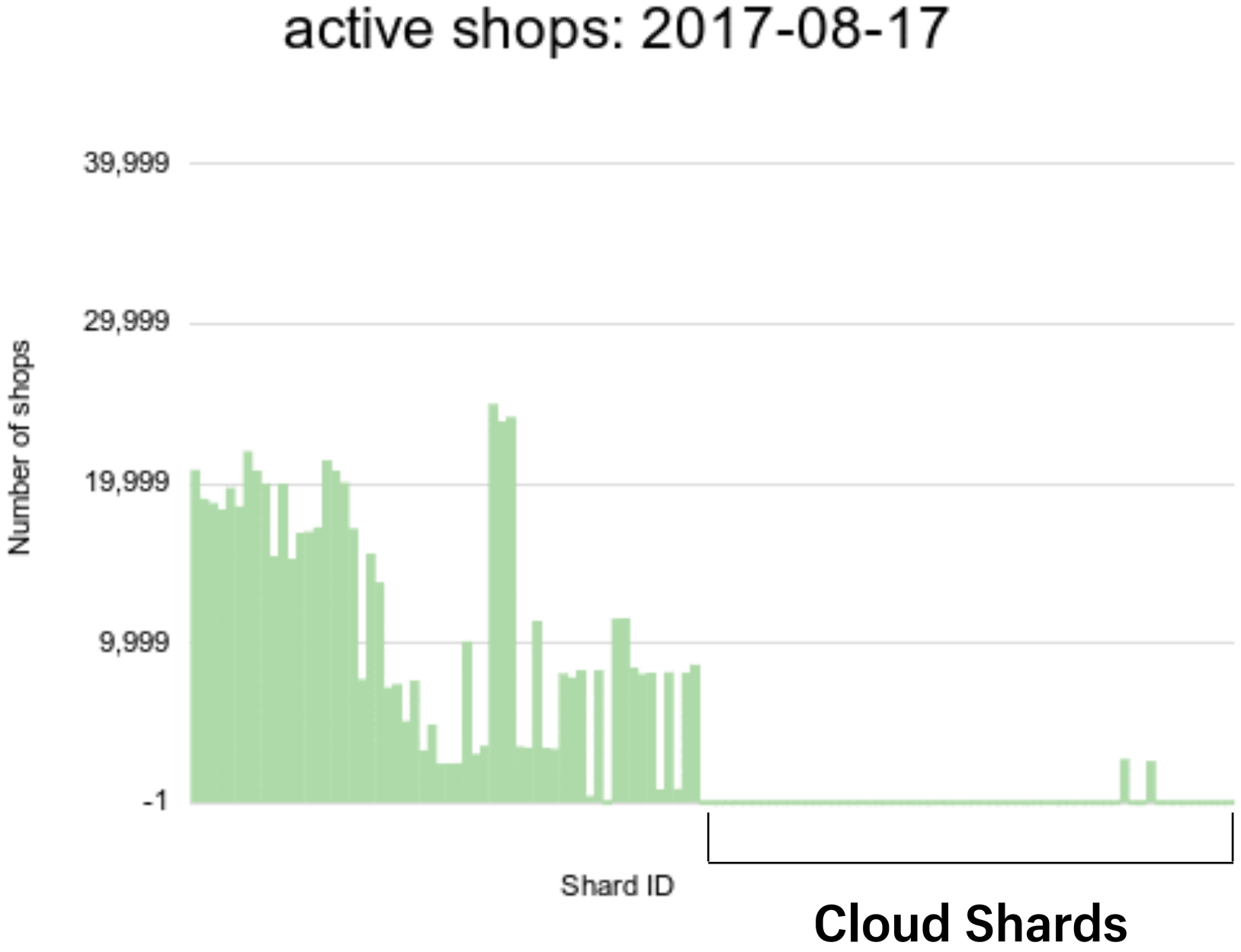
- Nameless Shopify Production Engineer

Shop Mover

- Moving a shop is NOT trivial
- Data migration uses Ghostferry
- Randomized shop selection

Shop Mover


New Shop Move
Perform Sanity Checks
Begin binlog Copy
SELECT and INSERT
Wait for binlog
Wait for Jobs
Stop Shop Writes
Complete Replication
Switch Shard ID
Allow Shop Writes
Shop Move Complete


active shops: 2017-08-17
39,999
29,999
19,999
9,999
-1
Number of shops
Shard ID
Cloud Shards

NASA
Jet Propulsion Laboratory
California Institute of Technology
Thermal
Propulsion

[redacted] 12:29 PM

spy failover shopify pod 1 to ash

spy APP 12:29 PM

[redacted]

Failing over pod **1** to ash.

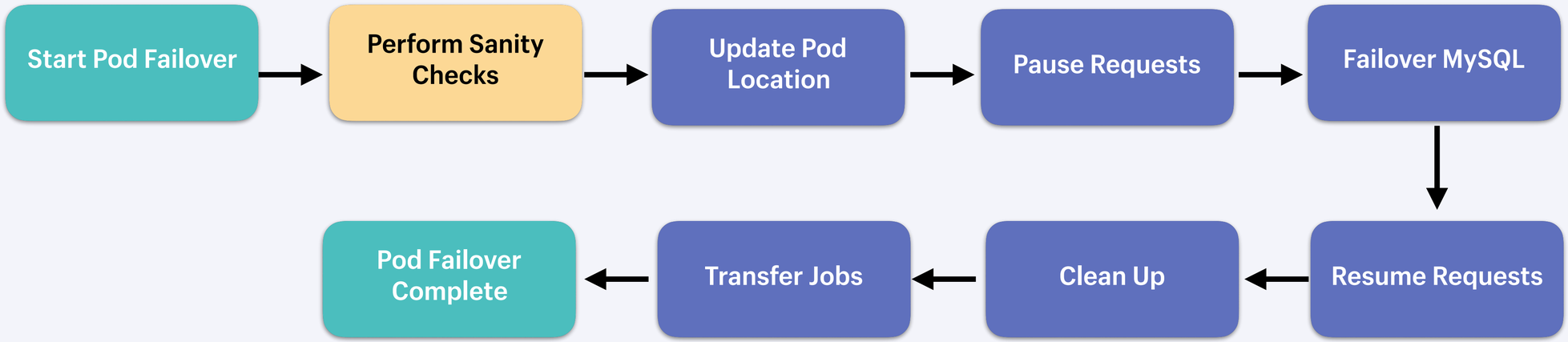
Please monitor the failover in #pod-failovers and datadog:

pod 1: [redacted]

[redacted] is running **Failover a pod** for activefailover/production `TARGET=ash POD_ID=1` (logs)

Failover a pod for activefailover/production **succeeded** in `2m38s`

Activefailover



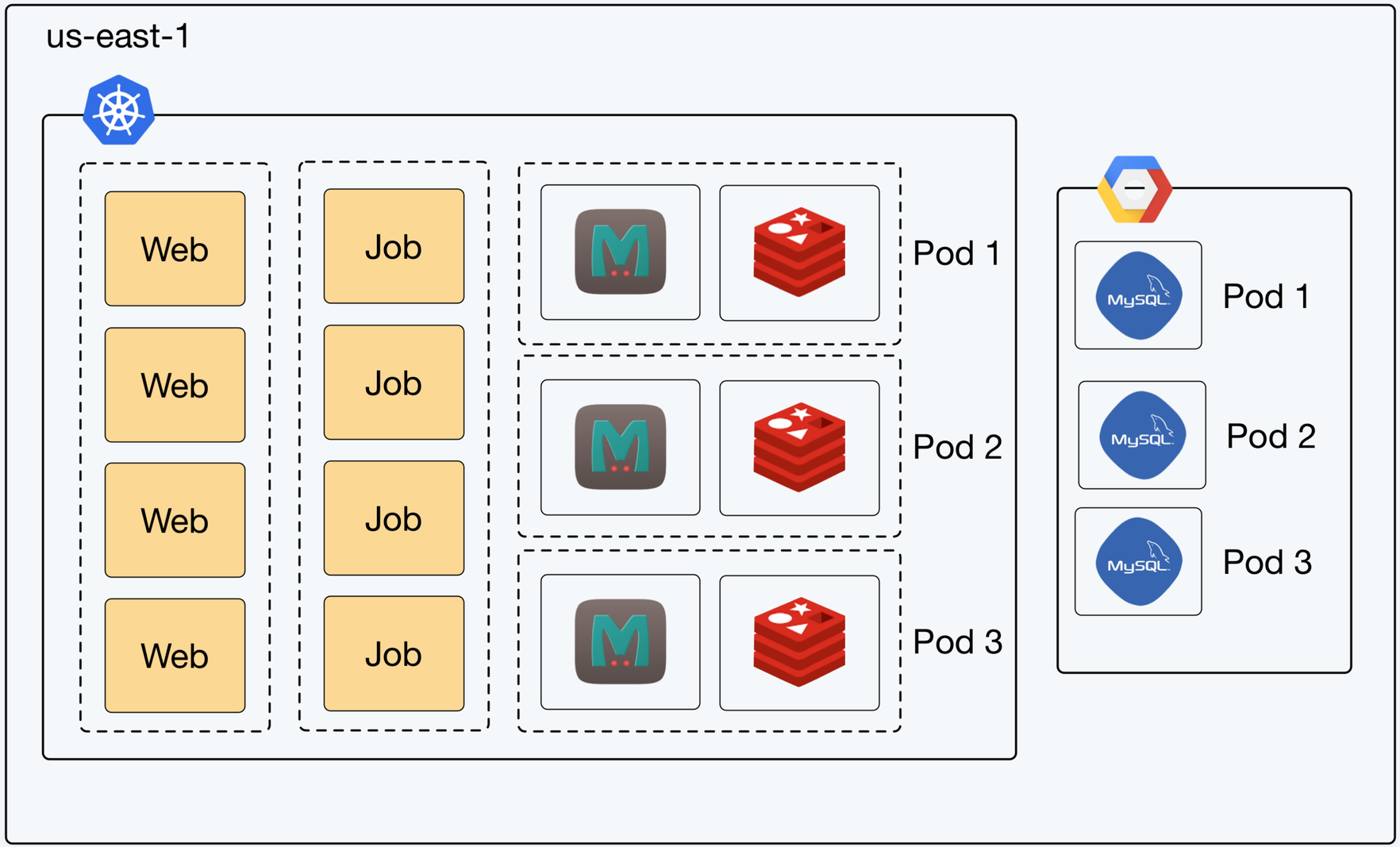
Problems

😱 Fear, Uncertainty, Doubt 😱

- Database Performance
- Kubernetes
- Cloud Infrastructure

Scaling Kubernetes Clusters

Shopify Core k8s v1



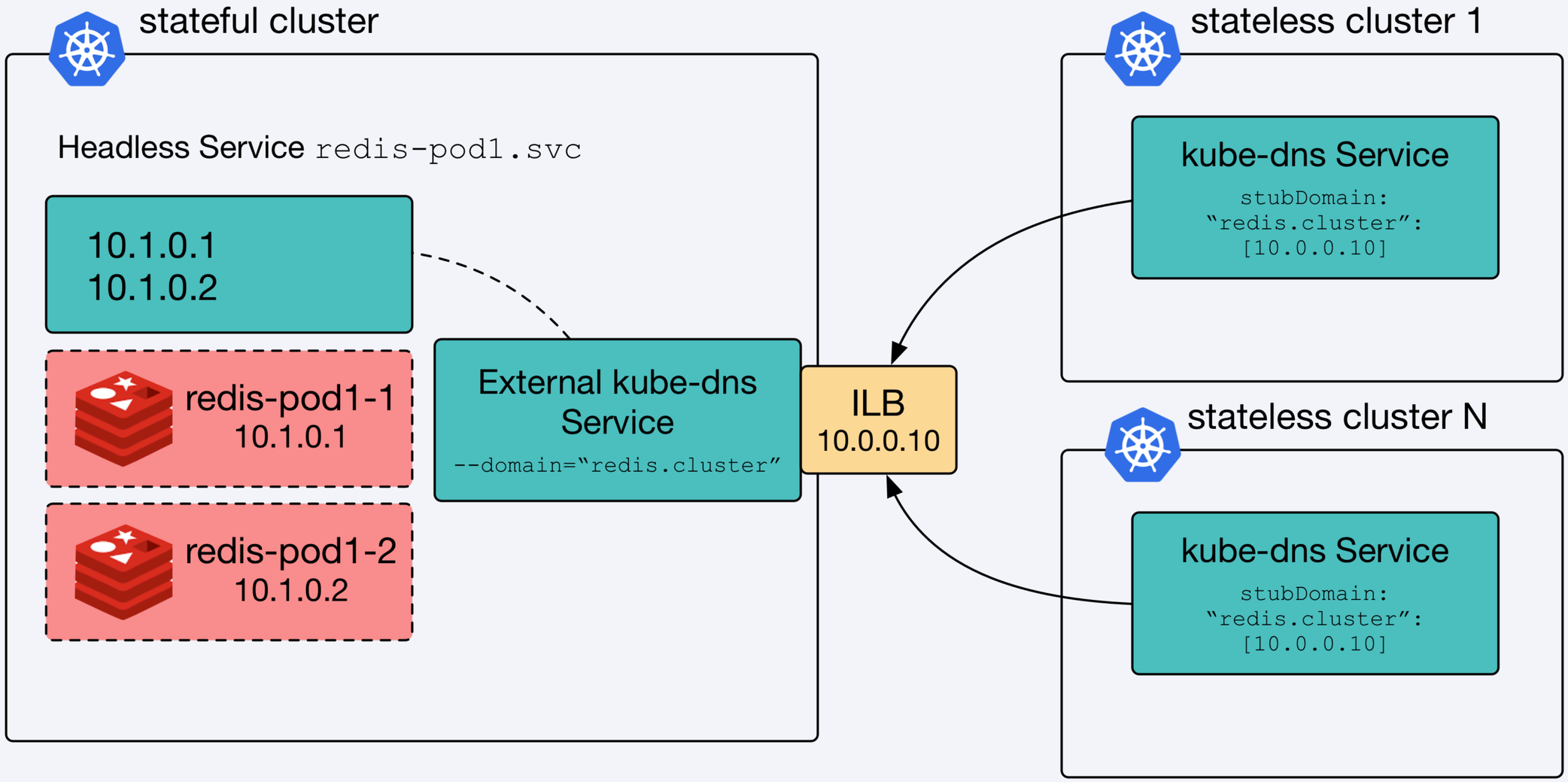
k8s Scaling Problems

- How to communicate across clusters?? 🤔
- Running out of routes??
- Cross-cluster service discovery??

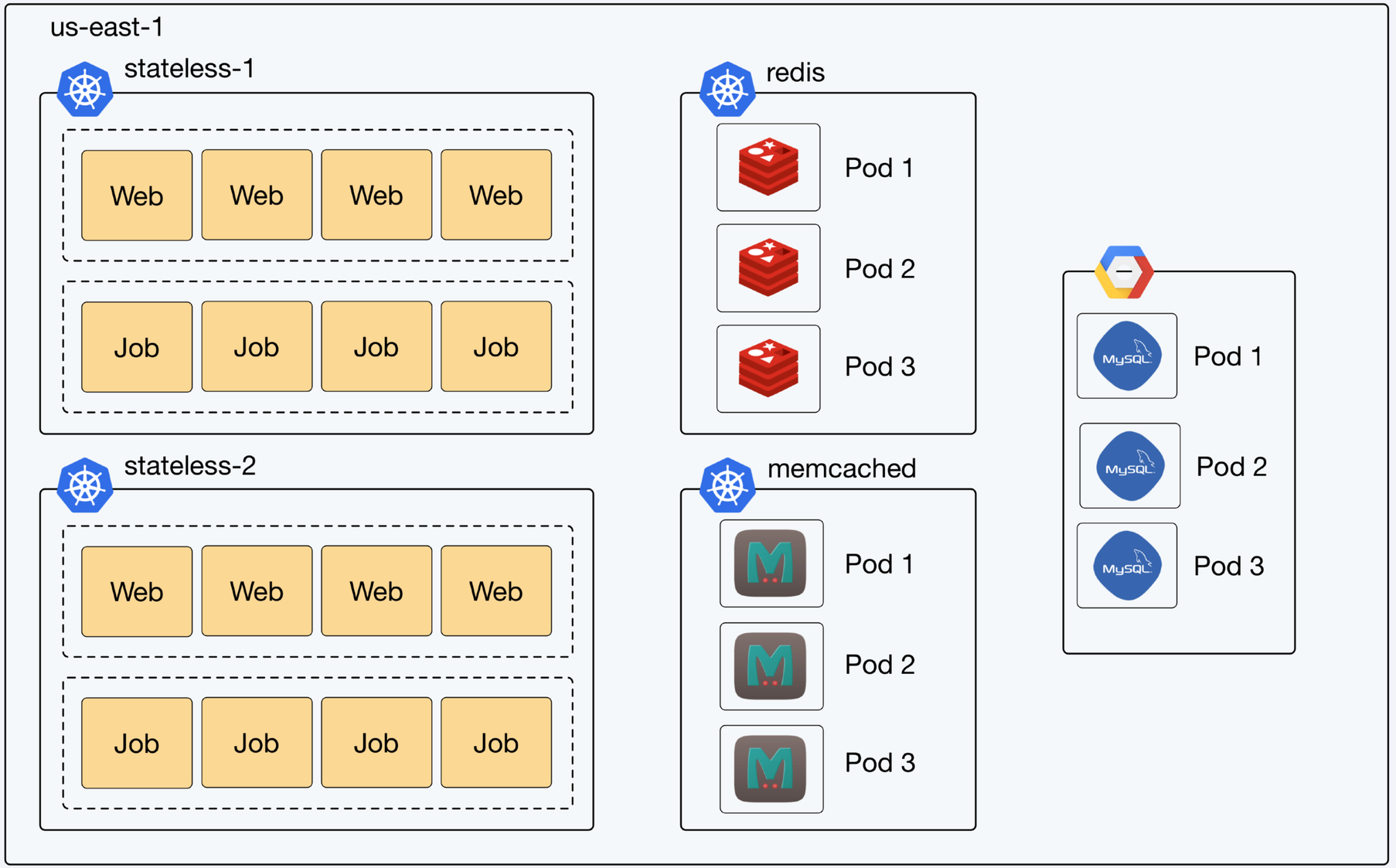
k8s Scaling Solutions

- Running out of routes??
  - IP Aliasing
- Cross-cluster service discovery??
  - External kube-dns ILB

External kube-dns ILB



Shopify Core k8s v2



`kubectl` is a really big

kubernetes-deploy

- Watches changes to make sure they’re successful
- Pre-deploys dependent resources
- Runs tasks at the beginning of the deploy

```
KnVerey at Emory in ~/Github/kubernetes-deploy/demo on ±master ✗
⋄ tree                                                    ⎈ minikube/hello-cloud
.
├── configmap-data.yml
├── redis.yml
├── secrets.ejson
├── unmanaged-pod.yml.erb
└── web.yml.erb

0 directories, 5 files

KnVerey at Emory in ~/Github/kubernetes-deploy/demo on ±master ✗
⋄                                                         ⎈ minikube/hello-cloud
```

Lessons Learned

Maintaining two separate infrastructures is really hard.

Lift and Shift, or: don’t do too much at the same time

Iterate

Automate

Thanks!

p.s. we're hiring

shopify

Links

- **Ghostferry:** https://github.com/Shopify/ghostferry
- **kubernetes-deploy:** https://github.com/Shopify/kubernetes-deploy
- **Shipit:** https://github.com/Shopify/shipit-engine
- **Chat Ops at Shopify:** https://engineering.shopify.com/blogs/engineering/implementing-chatops-into-our-incident-management-procedure

Image Credits

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