

# Chaos Engineering with Containers

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Chaos Engineer at **Gremlin**

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SRE @ **Uber**, Also worked/  
interned @ **SFEFCU**, **Google**,  
**Quicken Loans**, **Stanford**  
**University** and **Miami Dade**  
**College**.

College dropout.  
Self taught engineer.



**How many of you have  
heard of Chaos  
Engineering?**

How many of you have run  
a Chaos Engineering  
experiment?

# Chaos Engineering

Thoughtful, planned  
experiments designed to reveal  
the weakness in our systems.

# Chaos Engineering

Inject something harmful to  
**build an immunity.**

-@KoltonAndrus  
*Gremlin Founder and CEO*



## Why?

- Microservices
- Systems are scaling fast
- Downtime is really expensive
- Our dependencies **will** fail
- Pager fatigue and burnout really hurts

# “Chaos Engineering Without Observability ... Is Just Chaos”

-@mipsytipsy  
Charity Majors  
CEO of honeycomb





## Prerequisite of Chaos Engineering

- Monitoring/Observability
- On-Call and Incident Management
- Cost of Downtime Per Hour

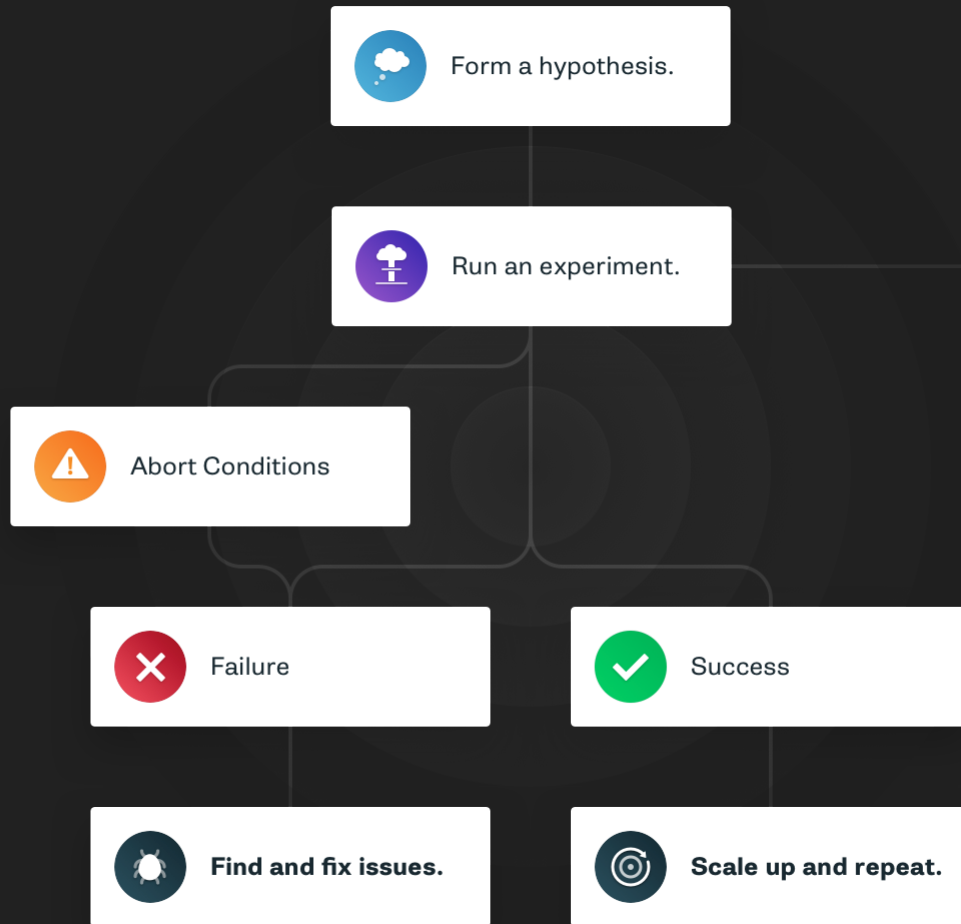
# Use Cases for Chaos Engineering

- Outage reproduction
- On-call training
- Strengthen new products
- Battle test new infrastructure and services

# Use Cases for Chaos Engineering - Containers

- Testing Provider Specific Reliability  
(eg: EKS vs AKS vs GKE)
- Auto Scaling
- Logs, Disk failure

# Minimize the Blast radius



# Monitoring / Observability

# What to measure and monitor?

- System Metrics: CPU, Disk, I/O
- Availability
- Service specific KPIs
- Customer complaints

# Demo

# #1 - Battle Test Cloud infrastructure

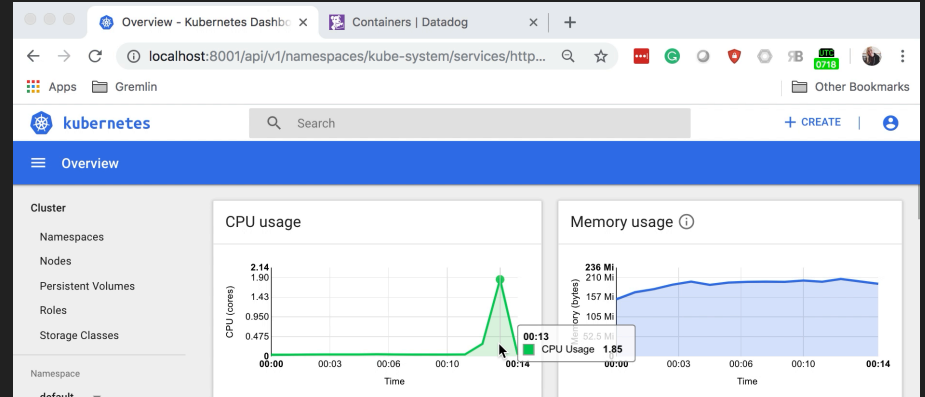
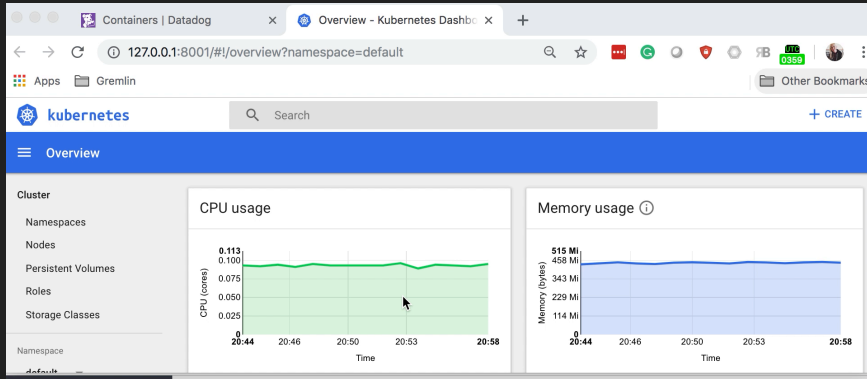
**Real World Scenario:** company / user is evaluating cloud provider managed kubernetes. which one is more reliable?

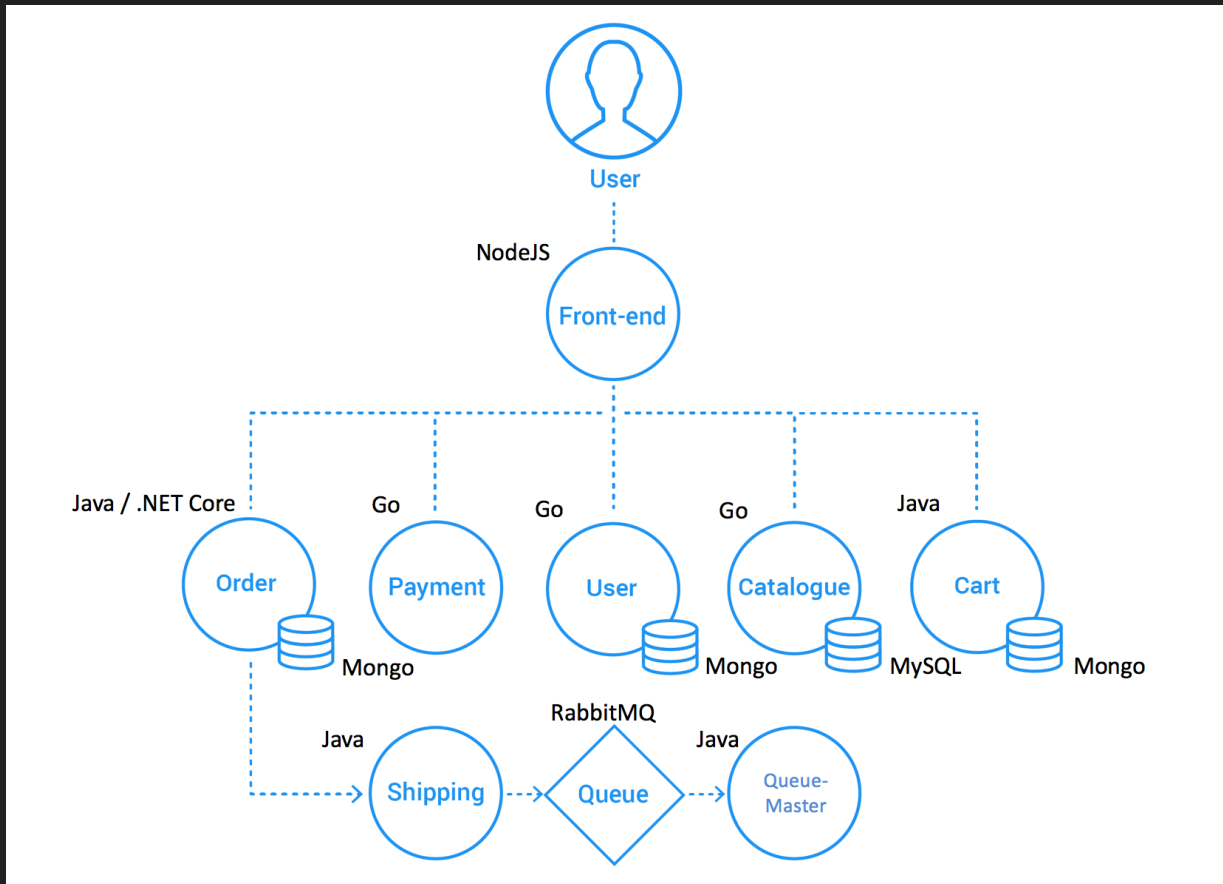
**The Hypothesis:** shutting down a container (1/1) should only give a small delay before app is reachable again

**The Experiment:** shut down kubernetes dashboard container

**Abort Conditions:** app is unreachable after 60 seconds







```
root@host01:~# docker ps
```

CONTAINER ID	IMAGE	COMMAND	CREATED	STATUS	PORTS
e3e29b9dadd1	weaveworksdemos/load-test	"/usr/local/bin/ru..."	7 hours ago	Up 24 minutes	
8d7f37725c8d	weaveworksdemos/load-test	"/usr/local/bin/ru..."	7 hours ago	Up 24 minutes	
92433036dc75	weaveworksdemos/catalogue:0.3.5	"/app -port=80"	7 hours ago	Up 24 minutes	80/tcp
d45716a9e11b	weaveworksdemos/shipping:0.4.8	"/usr/local/bin/ja..."	7 hours ago	Up 7 hours	
d743a11c04be	mongo:3.4	"docker-entrypoin..."	7 hours ago	Up 26 minutes	27017/tcp
4961ffd36106	weaveworksdemos/queue-master:0.3.1	"/usr/local/bin/ja..."	7 hours ago	Up 7 hours	
8b54b80c16be	weaveworksdemos/carts:0.4.8	"/usr/local/bin/ja..."	7 hours ago	Up 7 hours	
3c3007031351	weaveworksdemos/front-end:0.3.12	"/usr/local/bin/np..."	7 hours ago	Up About a minute	8079/tcp
9cd53aa56f72	weaveworksdemos/orders:0.4.7	"/usr/local/bin/ja..."	7 hours ago	Up 7 hours	
afc1e45b1012	weaveworksdemos/catalogue-db:0.3.0	"docker-entrypoin..."	7 hours ago	Up 6 hours	3306/tcp
c2c8fa5a3560	weaveworksdemos/user:0.4.4	"/user -port=80"	7 hours ago	Up 7 hours	80/tcp
4f1811c716ca	weaveworksdemos/edge-router:0.1.1	"traefik"	7 hours ago	Up 7 hours	0.0.0.0:80->80/tcp, 0
bed80be34256	weaveworksdemos/payment:0.4.3	"/app -port=80"	7 hours ago	Up 7 hours	80/tcp
a5efaf89b2e7	rabbitmq:3.6.8	"docker-entrypoin..."	7 hours ago	Up 7 hours	4369/tcp, 5671-5672/t
ac4861abb19c	weaveworksdemos/user-db:0.4.0	"/entrypoint.sh mo..."	7 hours ago	Up 7 hours	27017/tcp
02e080e31b69	mongo:3.4	"docker-entrypoin..."	7 hours ago	Up 7 hours	27017/tcp

```
root@host01:~#
```

#Q

ina

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

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HOME CATALOGUE ▾

0 items in cart



### WE LOVE SOCKS!

Fun fact: Socks were invented by woolly mammoths to keep warm. They died out because stupid humans had to cut their legs off to get their socks.

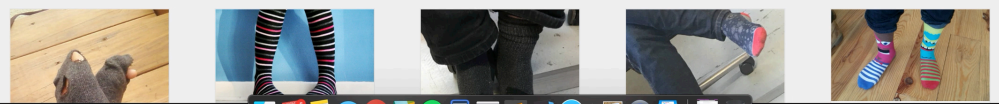
### BEST PRICES

We price check our socks with trained monkeys back at the office.

### 100% SATISFACTION GUARANTEED

Free returns on most items. Hamsters are non-returnable once spoken to.

## HOT THIS WEEK



## #2 - Shutdown of a Container

**Real World Scenario:** company / user is evaluating containers. Are they as reliable as promised?

**The Hypothesis:** yes, they will come back up

**The Experiment:** shutdown container and wait a few seconds and check if it's up

**Abort Conditions:** app is unreachable after 60 seconds

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HOME

CATALOGUE

2 item(s) in cart



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## #3 - Blackholing traffic to Catalog

**Real World Scenario:** company / user is working with their UI team to provide a good user experience when there API/DB issues

**The Hypothesis:** images will not load, but product listing will

**The Experiment:** blackhole all traffic from the front end to REST API and DB ports

**Abort Conditions:** app is unreachable after 60 seconds

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HOME CATALOGUE

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# Case Study

# Companies doing Chaos Engineering

NETFLIX

 twilio

  
UNDER ARMOUR

 **Dropbox**

 Expedia<sup>®</sup>

Uber

jet

amazon  


Gremlin

# Tools you Can Use

[Gremlin](#)

[Chaos Toolkit](#)

[Litmus](#)

[PowerfulSeal](#)

# Break Things Together



**[bit.ly/chaos-eng-slack](https://bit.ly/chaos-eng-slack)**

2,000+ members across the world

# THANKS!



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