Hands on with Chaos Engineering

Covering Today

Agenda

- Chaos Engineering + Honeycomb
- Overview of Gremlin and Reliability Managment
- Access tools
- Meet your team
- Hands-on experiments
- Q & A

Inject something harmful to build an immunity

Laying the Foundations

Observability + Chaos Engineering

3 Types of Data

- **Work metrics**
  - User experience/engagement
  - Latency
  - Service availability

3 Types of Data

- Work metrics
- **Resource metrics**
  - Dependency availability
  - CPU, Memory, Disk, I/O, etc.

3 Types of Data

- Work metrics
- Resource metrics
- **Events**
  - Code changes, deploys
  - Scaling
  - Chaos

3 Types of Data

- Work metrics (alert)
- Resource metrics (correlate)
- Events (investigate)

What is Chaos Engineering

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

What are the Principles of Chaos Engineering

- Plan an experiment
- Contain the Blast Radius
- Scale or Squash

Scientific Method

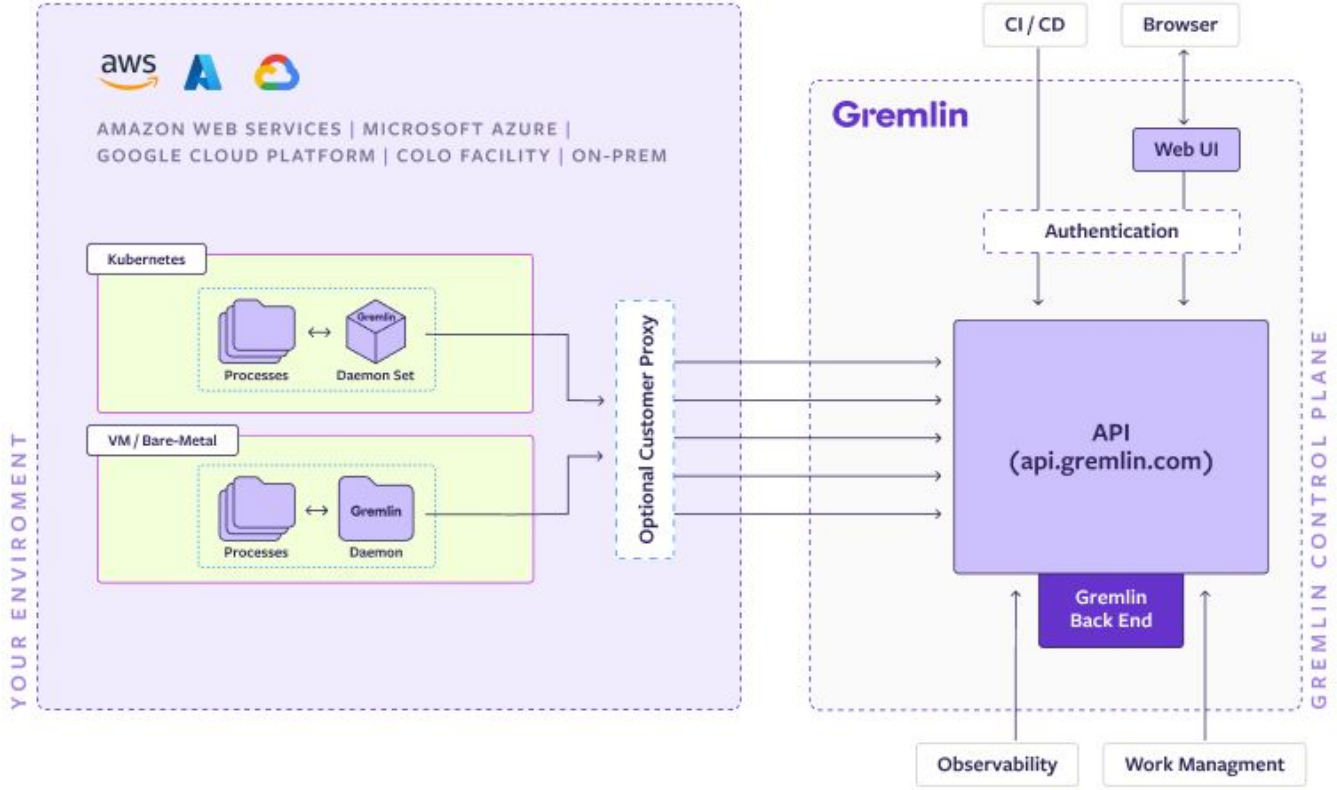
- Form a Hypothesis
- Experiment and Test It
- Analyze Results
- Share Results

Abort Conditions

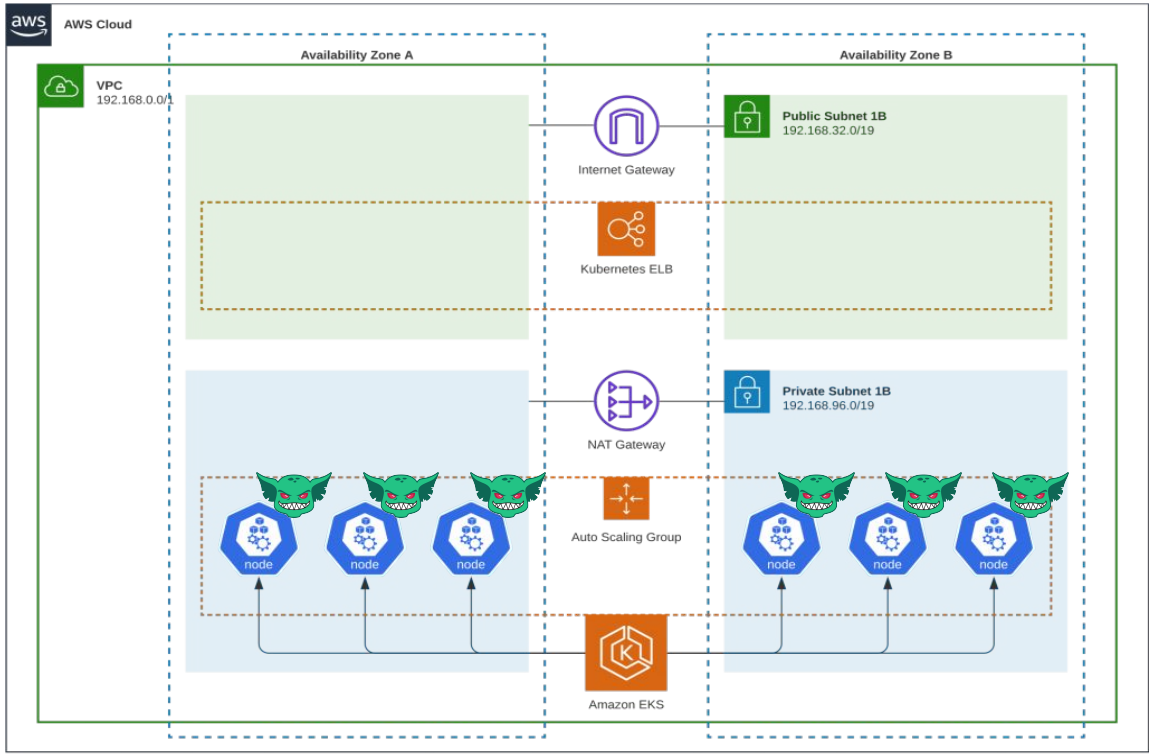
- What Conditions Would Cause You to Halt the Experiment?
- Examples: Error Rate, Latency
- Big Red Button

Gremlin Platform Overview

Gremlin Architecture



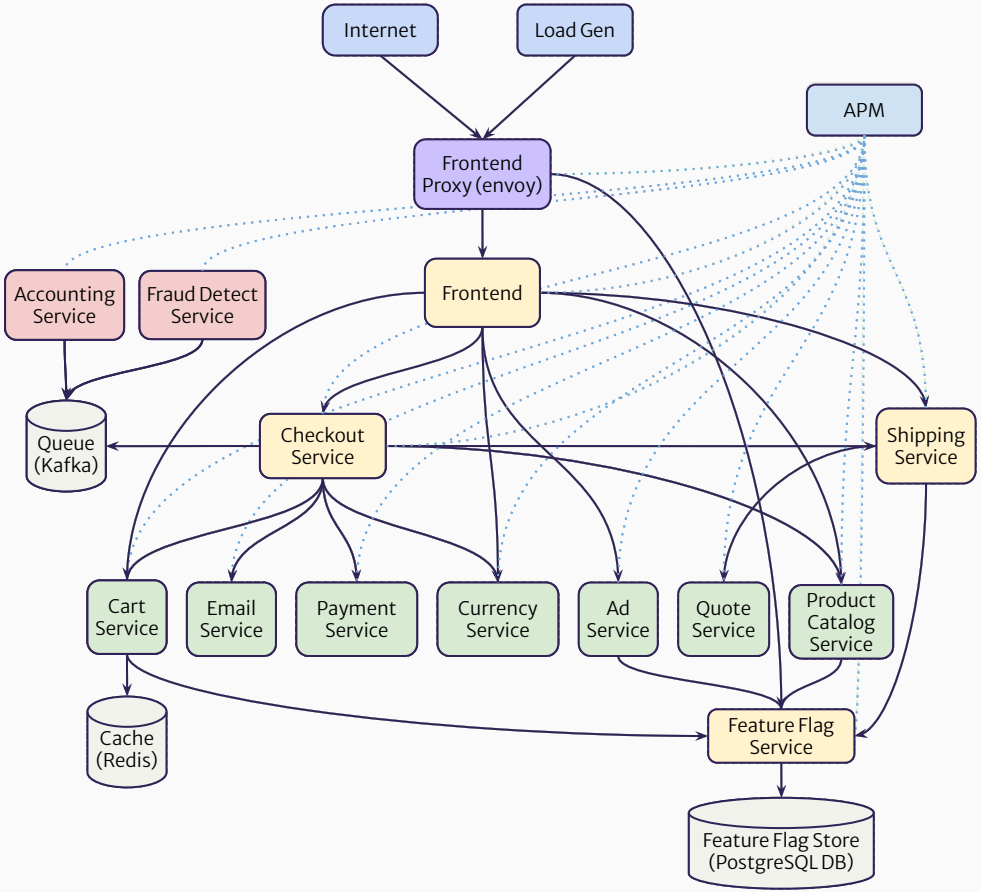
Gremlin on Kubernetes



Automate Reliability

with Gremlin Reliability Management

Service	State	Score
Cart service	✓	100%
Checkout service	✓	100%
Currency service	✓	100%
Email service	✓	90%
Frontend service	✓	88%
PostgreSQL DB	✓	88%
Payment service	✓	76%
Redis Cache	✓	74%



1. CONTAINER Latency Experiment

Hypothesis:

When this failure happens, we expect our system will handle it in the following way

APPLICATION NAME Opentelemetry Store	MONITORING TOOL Honeycomb
EXPERIMENT NAME Experiment #1	HYPOTHESIS
FAILURE TO INJECT Latency Test	ABORT CONDITION
IMPACT OF FAILURE Nodes	RESULTS
SCOPE OF FAILURE 2/4 nodes	
DURATION OF FAILURE 120 Seconds	ACTION ITEMS

Gremlin:Bootcamp

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Create a Latency test to create a delay in all of the frontend transactions. This will impact everything running including monitoring systems.

Activity: Meet your team

1. Identify your group number
2. Meet your team
3. Choose your role
4. Rename yourself with your group and role

CHAOS

General

This person is the decision maker. They call the experiment schedule, decide when abort conditions are met, and otherwise own the exercise.

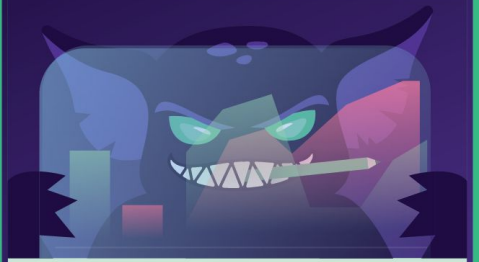
CHAOS

Commander

This person is responsible for implementing and executing experiments using the Gremlin application.

CHAOS

Scribe



This person is responsible for recording the experiments and results on the Notes & Observation section of the Gremlin application.

CHAOS

Observer

This person will work with the scribe to gather data and correlate effects of the experimentsusing monitoring, observability, alerting tools and verifying the user experience.

Activity: Logging in

1. Identify your role and group number
2. Log in to the tools your role requires

http://bootcampXX.gremlinpoc.com:8080

Logins

Honeycomb (https://https://ui.honeycomb.io/):

Username: jason.heller+bcX@gremlin.com

Password: Infra-training24

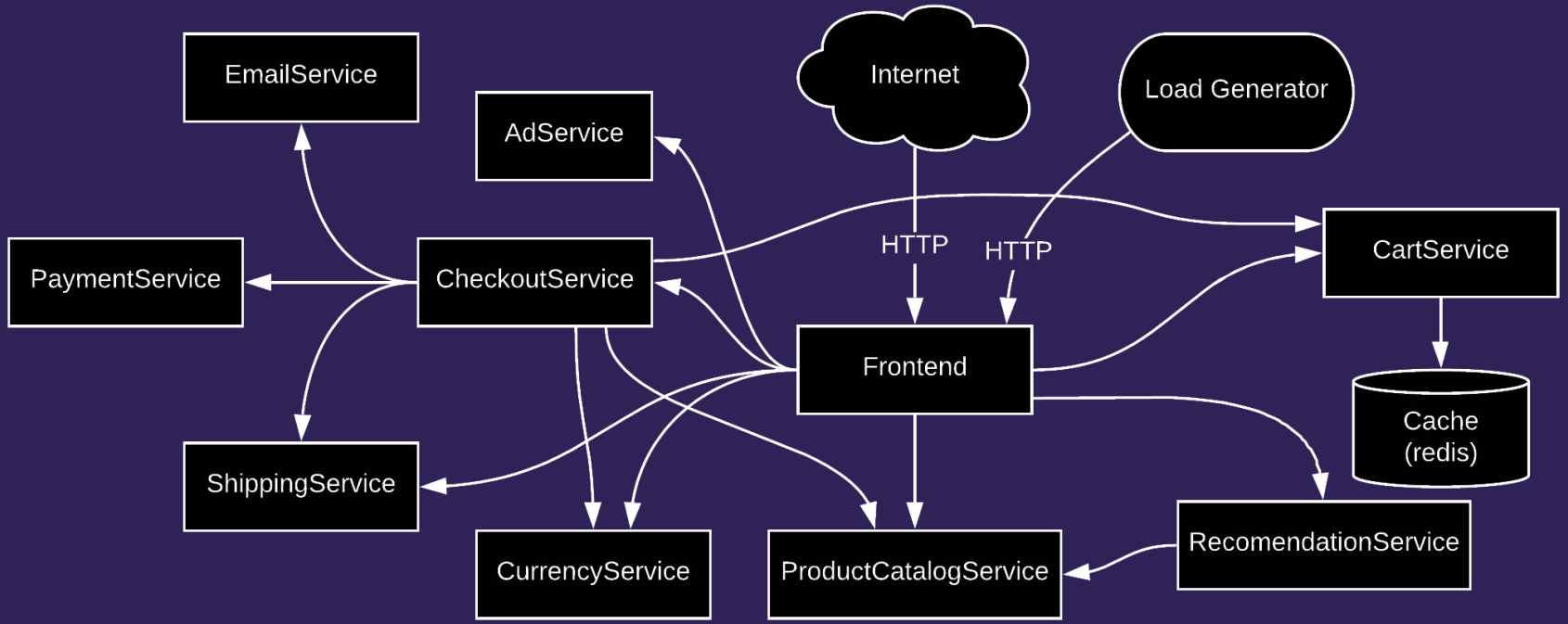
Login for Gremlin (https://app.gremlin.com/)

Username: bootcamps@gremlin.com

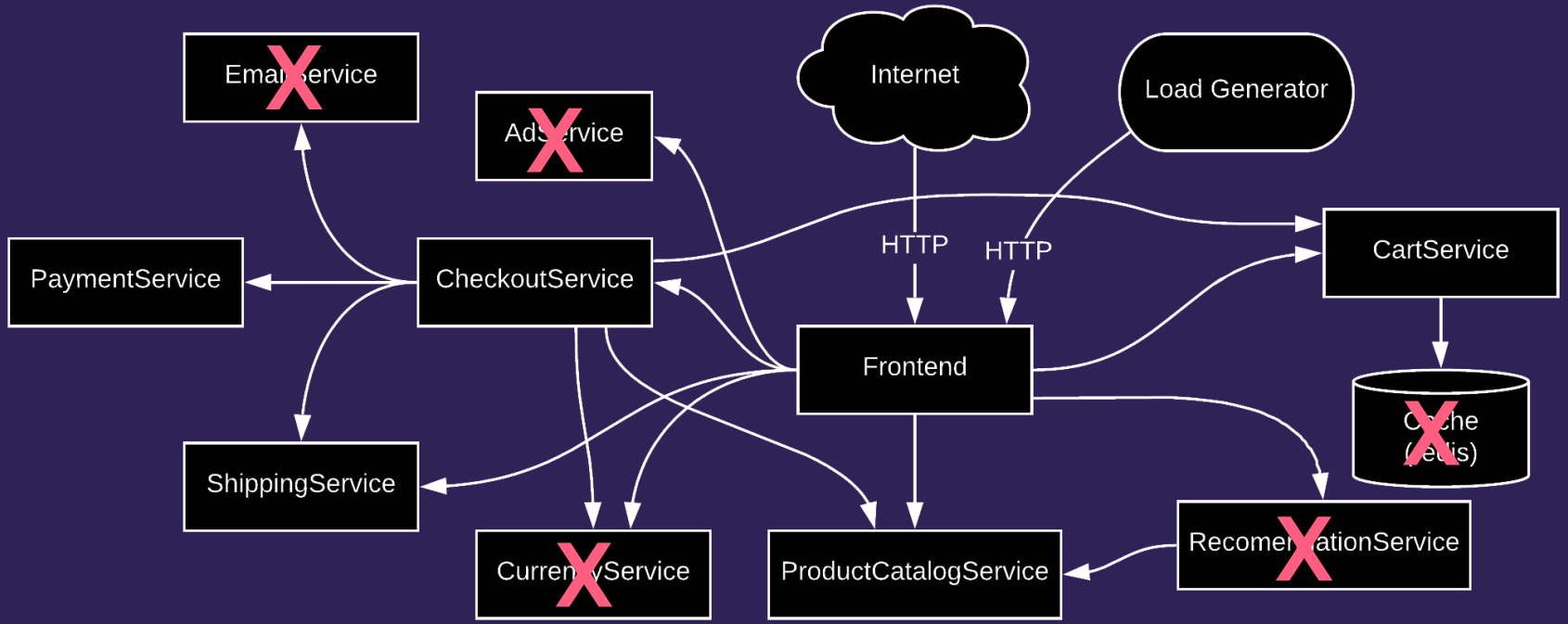
Password: Infra-training24

Activity:
Validate non-critical services

Identify critical vs non-critical dependencies



Identify critical vs non-critical dependencies



2. Deployment Memory Attack

Hypothesis:

When this failure happens, we expect our system will handle it in the following way

APPLICATION NAME OpenTelemetry Store	MONITORING TOOL Honeycomb
EXPERIMENT NAME Experiment #2	HYPOTHESIS
FAILURE TO INJECT Memory Attack	ABORT CONDITION
IMPACT OF FAILURE 80%, 100%	RESULTS
SCOPE OF FAILURE 1 instance	
DURATION OF FAILURE 120 Seconds	ACTION ITEMS

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Test exhausting memory on a deployment set. Observe what happens as the test reaches 100% of memory capacity.

3. Blackhole network Attack

Hypothesis:

When this failure happens, we expect our system will handle it in the following way

APPLICATION NAME OpenTelemetry Store	MONITORING TOOL Honeycomb
EXPERIMENT NAME Experiment #3	HYPOTHESIS
FAILURE TO INJECT Blackhole Test	ABORT CONDITION
IMPACT OF FAILURE Traffic into service	RESULTS
SCOPE OF FAILURE 1 instance	
DURATION OF FAILURE 120 Seconds	ACTION ITEMS

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Blackhole test against a deployment set should block either a critical service which will bring down the store or a dependency. Observe what traffic you are blocking and what happens to pods.

4. Network Latency Test

Hypothesis:

When this failure happens, we expect our system will handle it in the following way

APPLICATION NAME	MONITORING TOOL
OpenTelemetry Store	Honeycomb

EXPERIMENT NAME	HYPOTHESIS
Experiment #4	
FAILURE TO INJECT	**ABORT CONDITION**
Latency Test	
IMPACT OF FAILURE	**RESULTS**
Traffic into service	
SCOPE OF FAILURE	
1 instance	
DURATION OF FAILURE	**ACTION ITEMS**
120 Seconds	

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Latency test against a deployment set should block either a critical service which will bring down the store or a dependency. Try adjusting the latency to observe different results. Try the Frontend deployment which will allow user experience testing to your group store.

5. Packet Loss Test

Hypothesis:

When this failure happens, we expect our system will handle it in the following way

APPLICATION NAME OpenTelemetry Store	MONITORING TOOL Honeycomb
EXPERIMENT NAME Experiment #5	HYPOTHESIS
FAILURE TO INJECT Packet Loss Test	ABORT CONDITION
IMPACT OF FAILURE Traffic between services	RESULTS
SCOPE OF FAILURE multiple instance	
DURATION OF FAILURE 120 Seconds	ACTION ITEMS

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Packet loss in the network simulating failed connections. This can manifest many different issues between pods.

http://bootcampXX.gremlinpoc.com:8080

Logins

Honeycomb (https://https://ui.honeycomb.io/):

Username: jason.heller+bcX@gremlin.com

Password: Infra-training24

Login for Gremlin (https://app.gremlin.com/)

Username: bootcamps@gremlin.com

Password: Infra-training24