
AWS
re:Invent
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ARC324-R

Testing resiliency of AWS workloads using chaos engineering

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Agenda

- Chaos engineering
  - What it is
  - How to do it
  - When and where to use it
- Your questions

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“We needed to build systems that embrace failure as a natural occurrence”



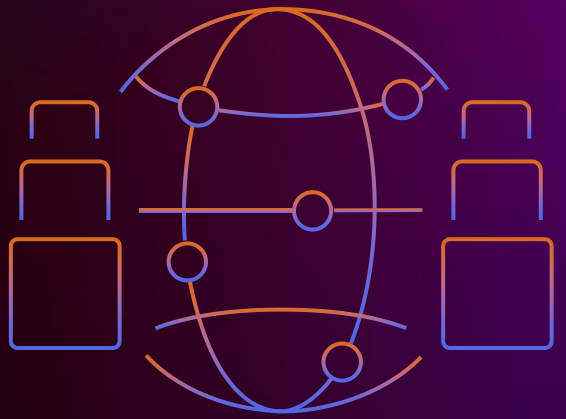
Werner Vogels

CTO
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Testing resilience

Resilience: The ability of a workload to recover from infrastructure or service disruptions



Design principles for reliability

- Automatically recover from failure
- Test recovery procedures

http://bit.ly/reliability-pillar

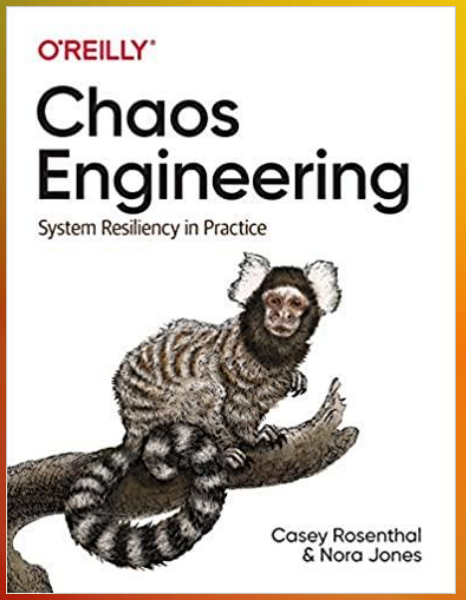
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What is chaos engineering?

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"Chaos Engineering is the discipline of experimenting on a system in order to build confidence in the system's capability to withstand turbulent conditions in production"



Casey Rosenthal and Nora Jones

Chaos Engineering: System Resiliency in Practice

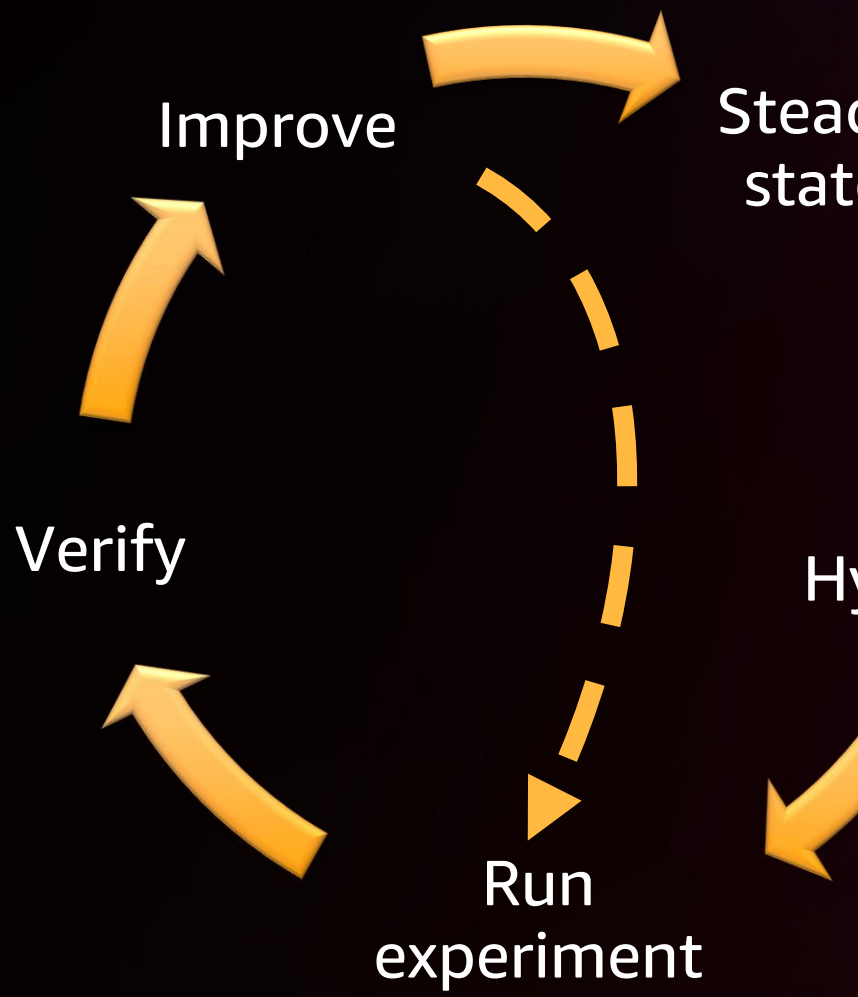
https://principlesofchaos.org

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Chaos engineering

A SCIENTIFIC METHOD

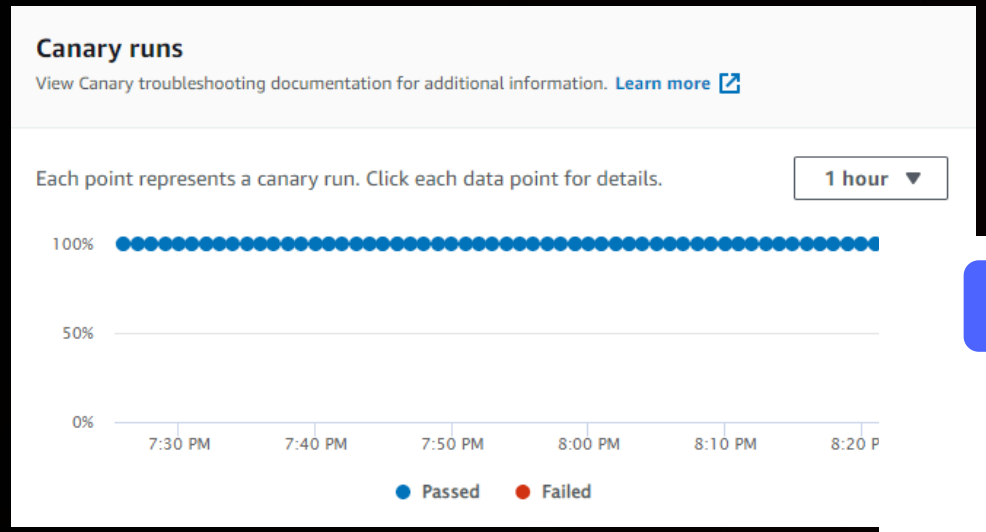


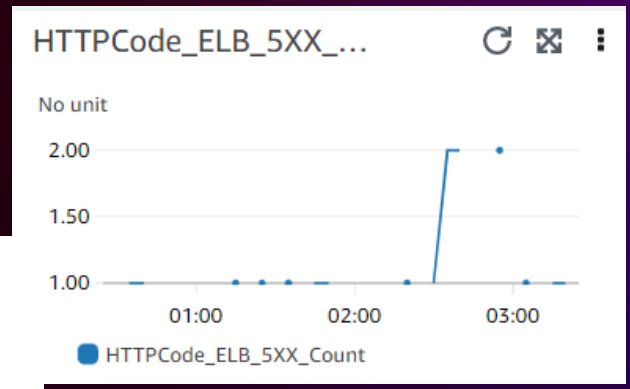
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Steady state

- Your workload exhibits steady state if it is operating reliably and as expected
- Not necessarily no impact – this may mean impact is within acceptable limits







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Hypothesis

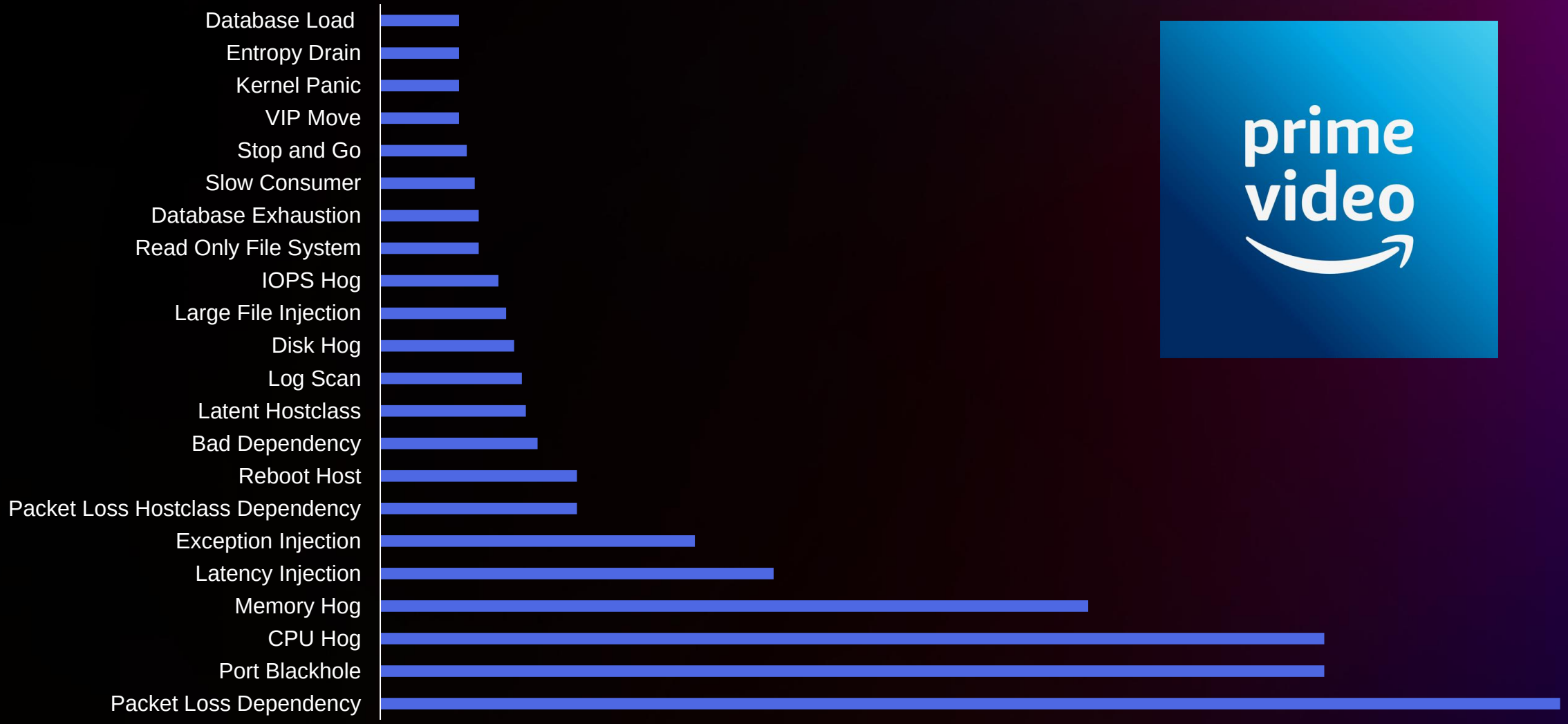
If [specific fault] occurs, the [workload name] workload will [describe mitigating controls] to maintain [business or technical metric]

If **a single Amazon EC2 instance failure** occurs, the **AnyCompany Order System** workload will **send traffic to only healthy instances and replace the unhealthy one**, to maintain a **less than 0.01% increase in server-side (5xx) errors**

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Failure injection tests used by Prime Video



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Run experiment



Logs
Stop conditions
Rollback



Script it yourself



AWS Fault Injection Simulator (FIS)



Open-source and commercial products

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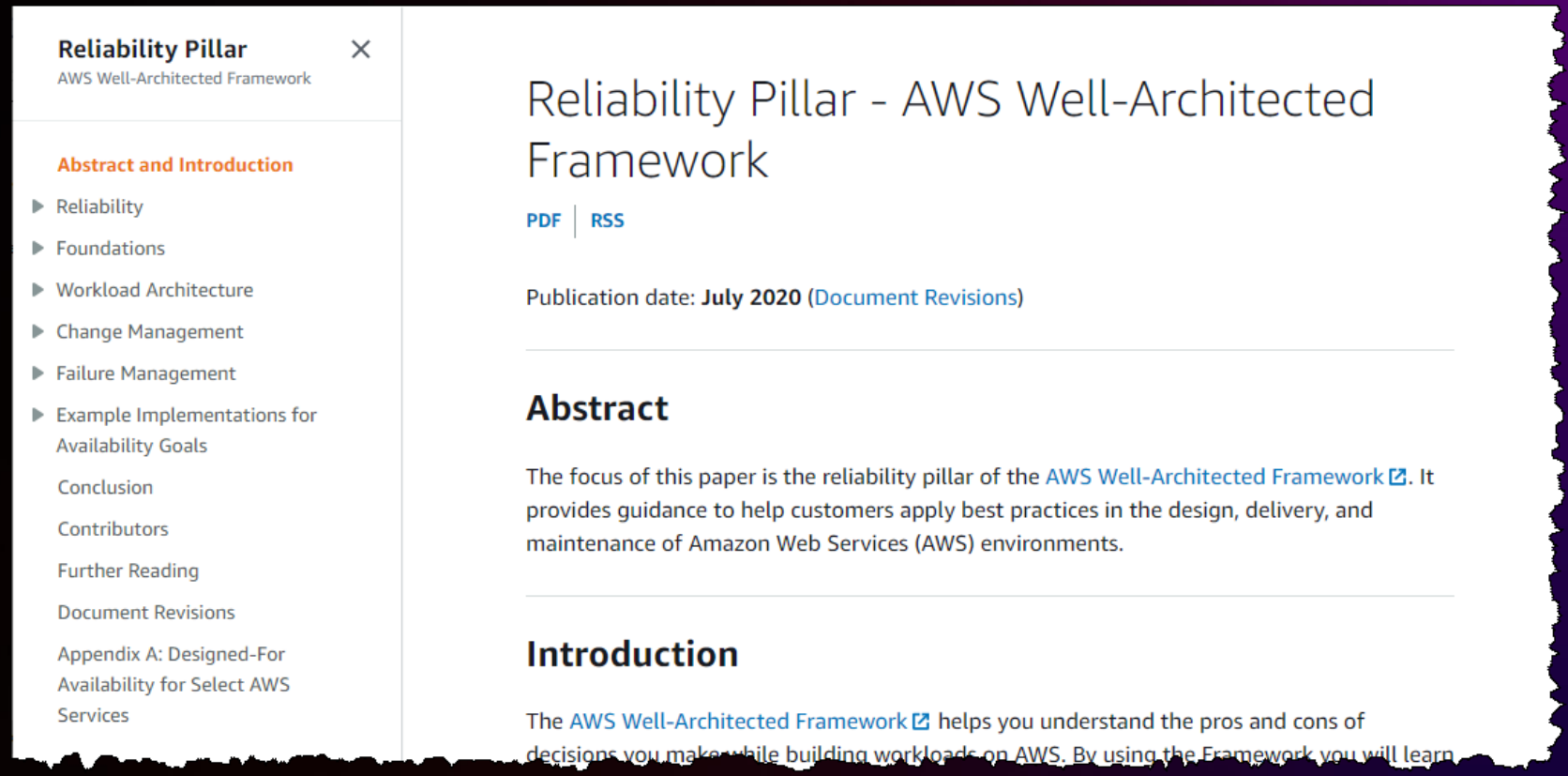
Verify and improve

Was hypothesis confirmed?

If not, why?

Update design for resilience

bit.ly/reliability-pillar

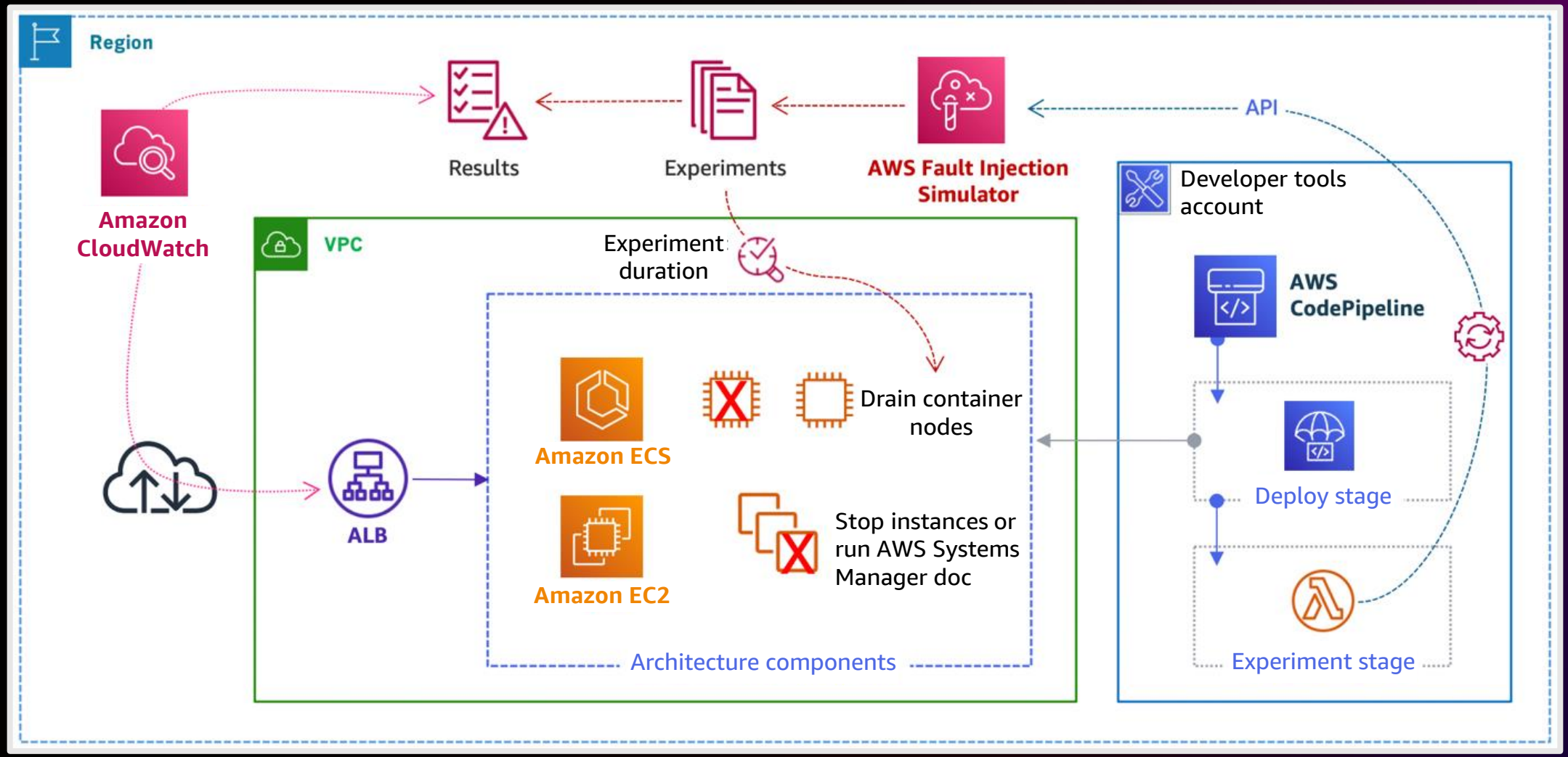


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When and where to run chaos experiments

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Run these experiments regularly



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Game days

SIMULATE FAILURE OR EVENT TO TEST SYSTEMS' RESILIENCY, PROCESSES, AND TEAM RESPONSES



Planning

Hypothesis



Execution

Run experiment



Analysis

Verify

Improve

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Game days

SIMULATE FAILURE OR EVENT TO TEST SYSTEMS' RESILIENCY, PROCESSES, AND TEAM RESPONSES



People

Cross-discipline team

Processes



Briefing

Overview

Roles



Planning

Preparation

Hypothesis



Execution

Run experiment



Analysis

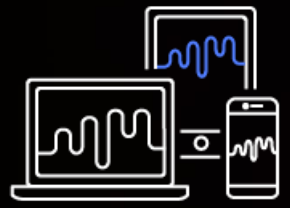
Verify

Improve

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Get close to production

- Your recovery design is based on *assumptions*
- Reality may differ
- Test close to production



Traffic patterns

Record/replay

Shadow testing

Test in production



Environment

Cloud-deployed

Test in production



Events

Are simulations

Learn from production

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Resources



AWS Fault Injection Simulator
aws.amazon.com/fis



Lab: Testing resilience of EC2, RDS, and AZ using Chaos Engineering
bit.ly/wa-chaos



Lab: Chaos Engineering on AWS [includes serverless]
chaos-engineering.workshop.aws



Public Chaos Engineering Stories/Implementations
github.com/ldomb/ChaosEngineeringPublicStories

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Thank you!

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