Spot your system weaknesses with Azure Chaos Studio

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Session objectives

- Introduction to chaos engineering
- Introduction to Azure Chaos Studio
- How to design and run an experiment

Chaos Engineering

What is chaos engineering?

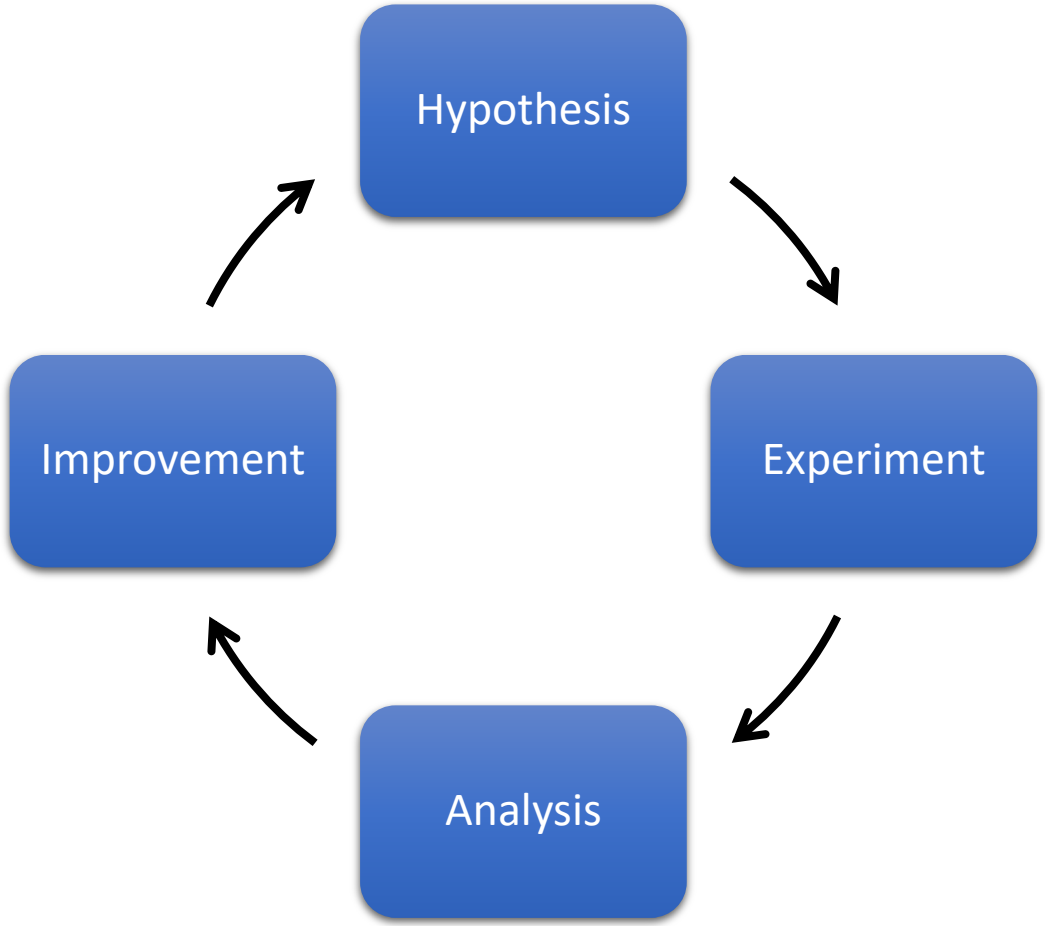
- *“Chaos Engineering is the discipline of experimenting on a system in order to build confidence in the system’s capability to withstand turbulent conditions in production.”* https://principlesofchaos.org/

- Chaos engineering does not only focus on the technical aspect

- Staging environment is good but not as good as production

What is chaos engineering?

- Hypothesis backlog
  - Past incident analysis
  - Asking questions like *"What could possibly go wrong?"* by using a detailed drawing of the system
- Hypothesis example:
  - *"The system will meet its SLOs if…"*

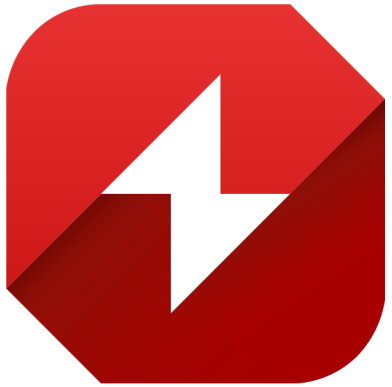


Azure Chaos Studio

Introduction – Azure Chaos Studio

- Managed service to execute chaos experiments against Azure

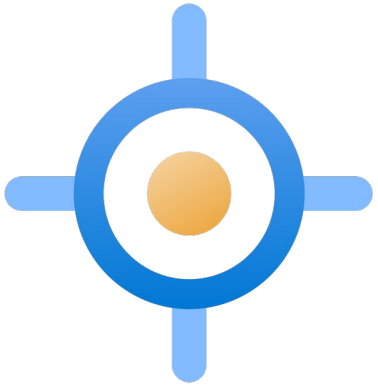
- Targets
  - Service-direct targets
  - Agent-based targets



- Experiments

Introduction – Azure Chaos Studio

- Service-direct targets
  - Faults run directly against Azure resources
  - No agent required



- Agent-based targets
  - Faults run in virtual machines or virtual machine scale sets
  - Agent required

Introduction – Azure Chaos Studio

- Experiments
  - Steps
    - Run sequentially
  - Branches
    - Part of a step
    - Run in parallel
  - Faults
    - Part of a branch

Introduction – Azure Chaos Studio

- Azure Kubernetes Service
  - Chaos Mesh must be installed into *chaos-testing* namespace
  - AKS cluster must have *Kubernetes local accounts* enabled

- Azure Cache for Redis
  - Premium Tier support only
  - Clustering required

Demo – Azure Chaos Studio

Azure Load Testing

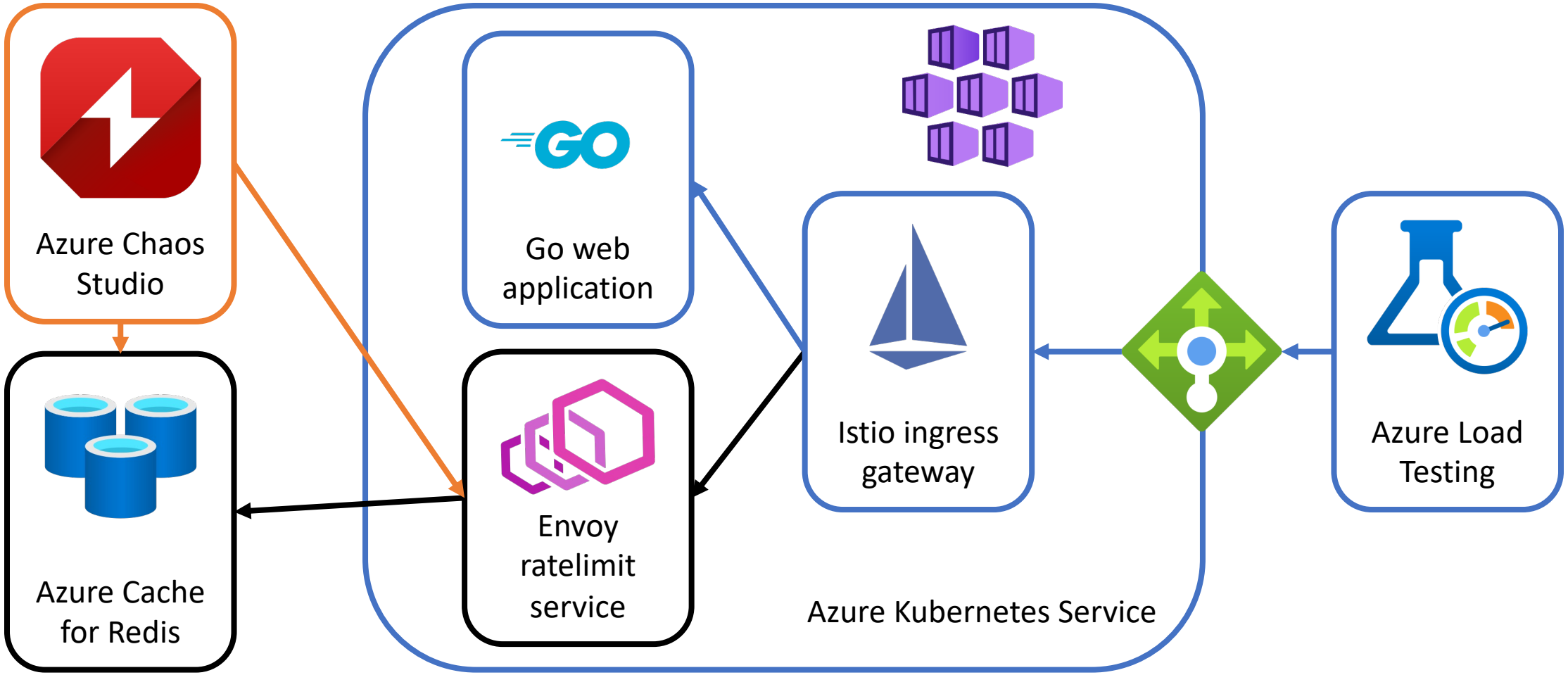
Introduction – Azure Load Testing

- Managed service for load testing
- Apache JMeter script support
- Test YAML configuration for CI/CD

Demo – Azure Load Testing

Chaos experiment

Scenario – Chaos experiment



Chaos experiment

- Hypothesis:
  - “An Azure Cache for Redis outage (forced reboot) will not affect the applications availability.”
  - “An Envoy ratelimit service outage will not affect the applications availability.”

- Experiment:
  - Step 1: Force reboot all Redis nodes
  - Step 2: Pod failure of all three Envoy ratelimit pods for 3 minutes

Demo – Chaos experiment

Summary

- Chaos engineering is an important building block for the system's reliability
- Azure Chaos Studio helps you to spot system weaknesses
- Azure Load Testing is a helpful companion for generating user traffic

Thank you!

Appendix

- Books:
  - https://www.oreilly.com/library/view/learning-chaos-engineering/9781492050995/
  - https://www.oreilly.com/library/view/chaos-engineering/9781492043850/
  - https://www.oreilly.com/library/view/security-chaos-engineering/9781098113810/

- Site Reliability Engineering
  - https://sre.google/books/

- KubeCon + CloudNativeCon Europe 2023
  - Archetypes for Reliable Systems https://www.youtube.com/watch?v=OdLnC8sjPCI