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Validate the resilience of your workloads using chaos engineering

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What you will learn today?

- Chaos Engineering - Motivation
- Chaos Engineering - Process
- AWS Fault Injections Simulator
- Demo

Distributed systems are complex



Ref: <https://www.pexels.com/photo/black-and-white-electronic-devices-3469825/>

Traditional testing is not enough



Unit testing of components

Tested in isolation to ensure function meets expectations



Functional testing of integrations

Each execution path tested to assure expected results

TESTING = VERIFYING A KNOWN CONDITION

You don't know what you don't know



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Ref: <https://www.pexels.com/photo/brown-wooden-arrow-sign-66100/>

“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.”

Principles of Chaos Engineering
<http://principlesofchaos.org>



Verify resilience with chaos engineering



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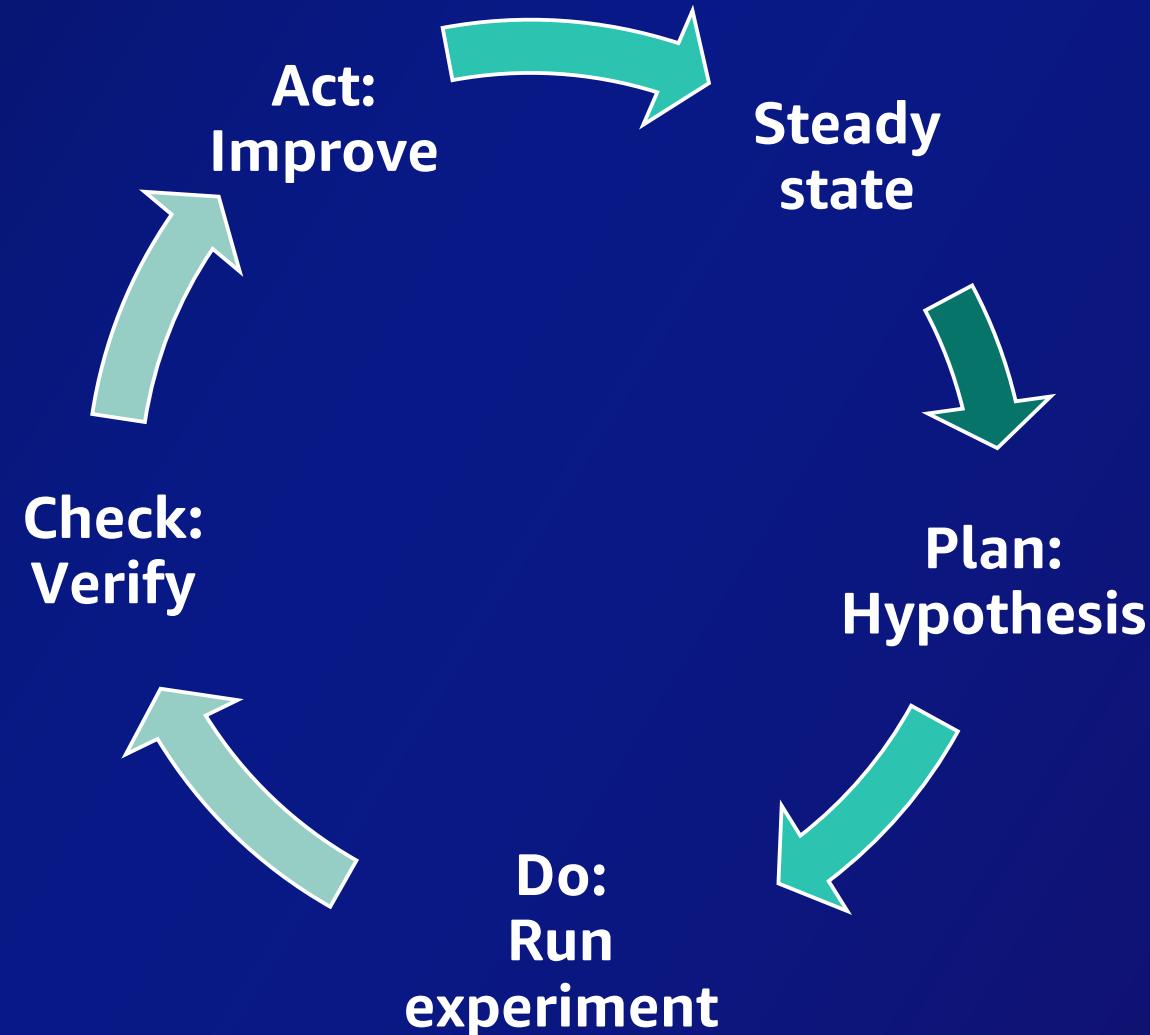
Ref: <https://www.pexels.com/photo/person-in-white-scrub-and-blue-latex-glove-holding-syringe-5998504/>



Chaos Engineering

- Improve resilience and performance
- Uncover hidden issues
- Expose blind spots
Monitoring, observability, and alarm
- Fix failures before they become outages

Phases of chaos engineering





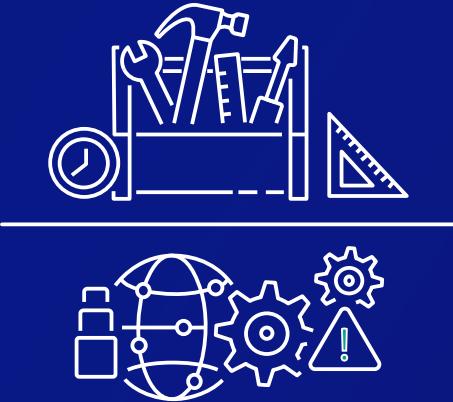
AWS Fault Injection Simulator

Fully managed chaos engineering service

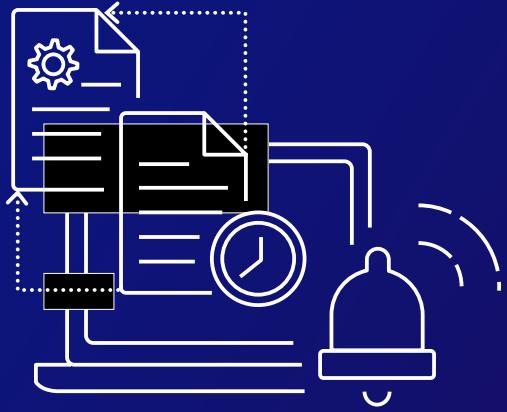
Fully managed chaos engineering service



Easy to
get started



Real-world
conditions



Safeguards

Components



Actions



Targets



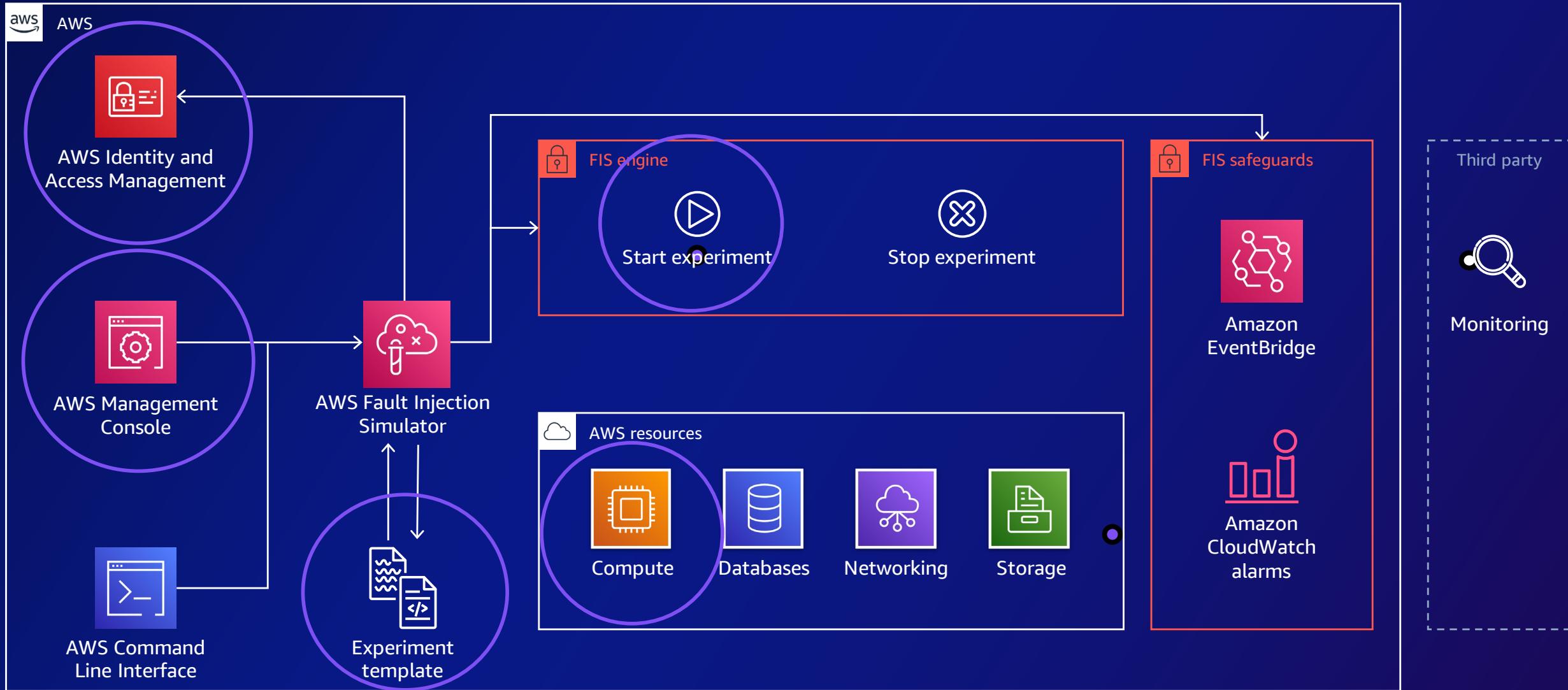
Experiment
templates



Experiments

AWS Fault Injection Simulator

OVERVIEW



Supported fault injections



Amazon Elastic Compute
Cloud (Amazon EC2)

`aws:ec2:reboot-instances`

`aws:ec2:send-spot-instance-interruptions`

`aws:ec2:stop-instances`

`aws:ec2:terminate-instances`



Amazon Elastic Block Store
(Amazon EBS)

`aws:ebs:pause-volume-io`



Amazon Virtual Private Cloud
(Amazon VPC)

`aws:network:disrupt-connectivity`



Amazon Relational Database
Service (Amazon RDS)

`aws:rds:failover-db-cluster`

`aws:rds:reboot-db-instances`

Supported fault injections



Amazon Elastic Container
Service (Amazon ECS)

`aws:ecs:drain-container-instances`
`aws:ecs:stop-task`



AWS Fault Injection
Simulator

`aws:fis:inject-api-internal-error`
`aws:fis:inject-api-throttle-error`
`aws:fis:inject-api-unavailable-error`
`aws:fis:wait`



Amazon Elastic Kubernetes
Service (Amazon EKS)

`aws:eks:inject-kubernetes-custom-resource`
`aws:eks:terminate-nodegroup-instances`



Amazon CloudWatch

`aws:cloudwatch:assert-alarm-state`

Supported fault injections



AWS Systems Manager

aws:ssm:send-command

aws:ssm:start-automation-execution

AWSFIS-Run-CPU-Stress

AWSFIS-Run-IO-Stress

AWSFIS-Run-Kill-Process

AWSFIS-Run-Memory-Stress

AWSFIS-Run-Network-Blackhole-Port

AWSFIS-Run-Network-Latency

AWSFIS-Run-Network-Latency-Sources

AWSFIS-Run-Network-Packet-Loss

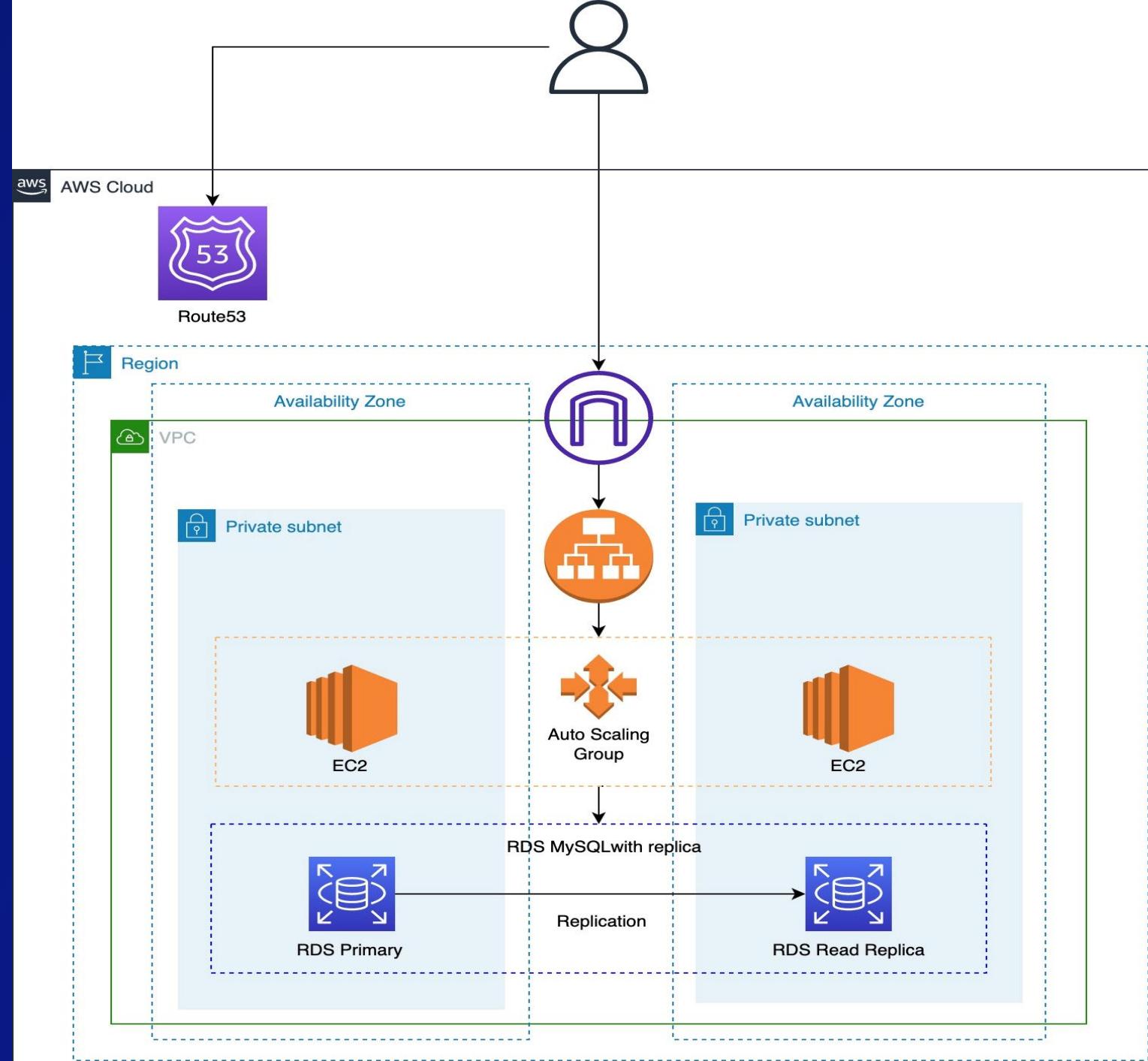
AWSFIS-Run-Network-Packet-Loss-Sources

Chaos Engineering - FIS

Given: We have a managed RDS database with a replica and automatic failover enabled.

Hypothesis: Failure of a single database instance / replica may slow down a few requests but will not adversely affect our application.

Demo Architecture



How to get started and what's next?



Identify the easiest thing to experiment with

Determine where you can get quick results

Implement and verify results

Iterate over time

Fault Injection Simulator Lab



<https://tiny.amazon.com/9o24jzhp>

skillbuilder.aws



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Thank you!

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