



Testing Network Resilience in Amazon Elastic Container Service (ECS)

Fault Injection Experiments on AWS Fargate

Today's agenda

Amazon ECS & AWS Fargate Overview

Network Faults

AWS Fault Injection Service (FIS) Overview

FIS Reference Flow

Demo



Amazon ECS & AWS Fargate Overview

ECS is **fully managed container service** that:

- Provisions compute, network, storage for containers
- Manages container scheduling, autoscaling, self-healing
- Coordinates with common AWS services such as ELBs, ECR, Secrets Manager, ...

Fargate is **serverless compute for containers** that:

- Runs each task in its own kernel (VM)
- Manages lifecycle of container host
- Eliminates customer overhead to upgrade, patch, scale,... container hosts



ECS



Fargate



ECS Core Constructs

Cluster

- Logical grouping of services, tasks in a region
- IAM controls user permissions on a cluster

Service

- Run/maintain task replica count
- Replace unhealthy tasks
- Perform deployments
- Register to Load Balancers

Task

- One or more containers
- Specify compute, networking, IAM, config
- Tasks are created from TaskDefinition which specifies all the attributes

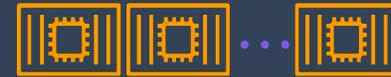
Cluster

Service

Task

Task

Task



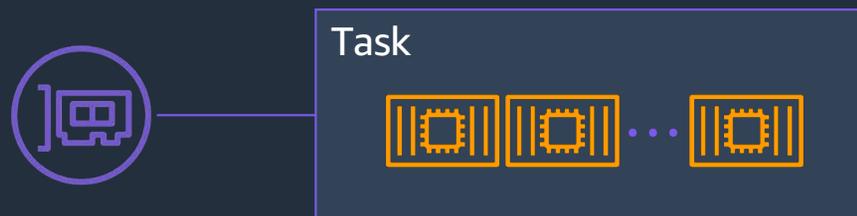
Fargate Task Networking

awsipc networking : Each Task gets its own network interface (ENI)

Apply security groups per task

Task ENI has IP from your subnets

Secondary CIDR blocks attached to VPCs can address IP exhaustion



Network Faults

Network Latency

- Delays in communication between services
- Network Congestion, Route Change, DNS Resolution Delays etc.

Network Blackhole

- Packets are silently dropped
- Loss of connectivity, TCP Connections Hang, No error responses returned

Network Packet Loss

- Network packets fail to reach destination
- Random or burst patterns, TCP retransmission attempts, Degraded performance



AWS Fault Injection Service

A fully managed service for running fault injection experiments.

Easy to
get started



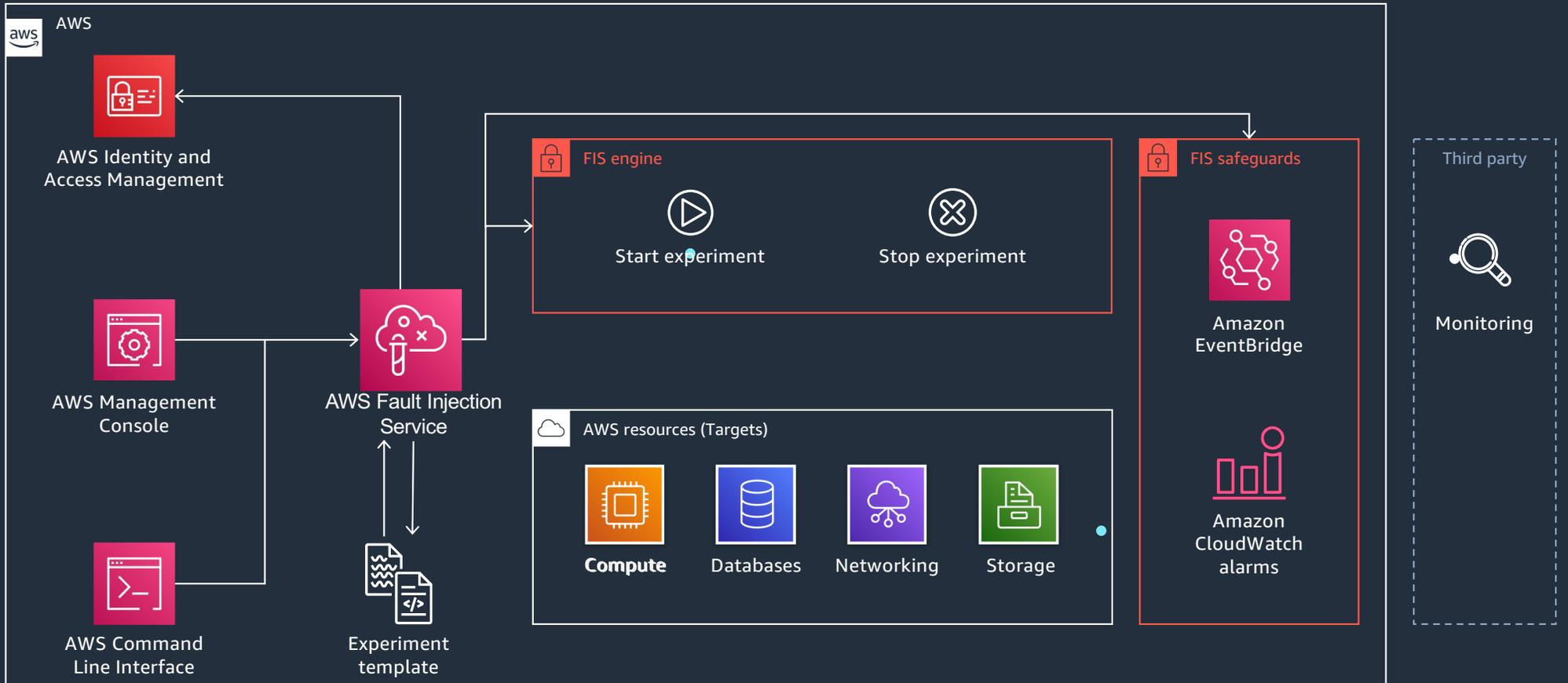
Real-world
conditions



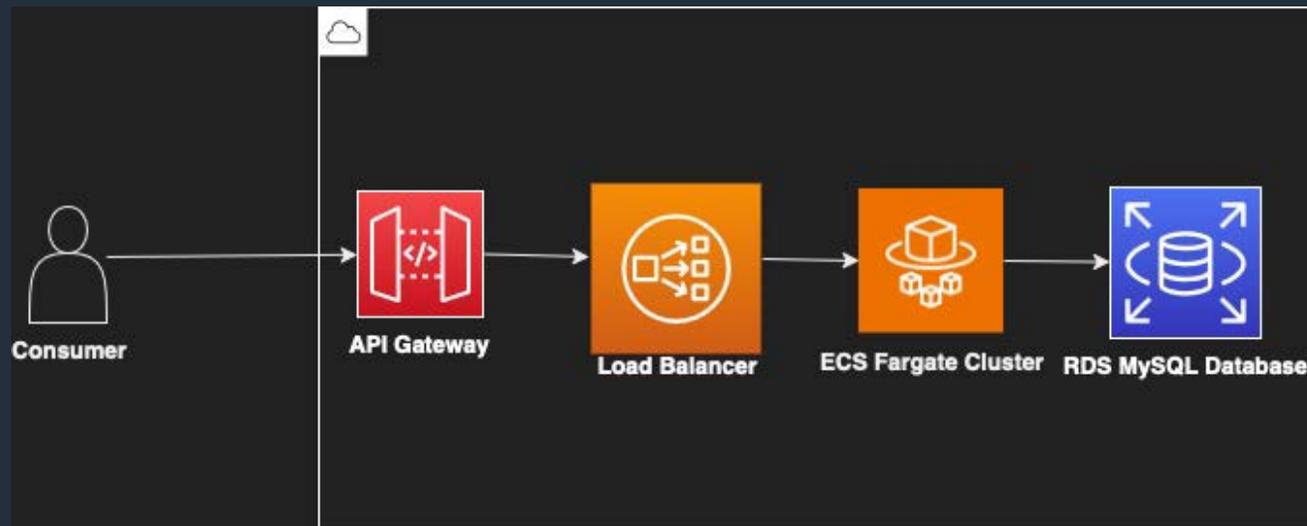
Safeguards



AWS Fault Injection Service – Reference Flow



Demo – Sample App



Thank you!