aws SUMMIT

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Understanding and measuring application resilience

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Agenda

- What is application resilience?

- Resilience at AWS

- AWS Resilience Hub

- Demo

Definitions

Reliability

Ability of a workload to perform its required function correctly and consistently…

Resilience

Ability of a workload to recover from infrastructure or service disruptions…

– Reliability Pillar, AWS Well-Architected Framework
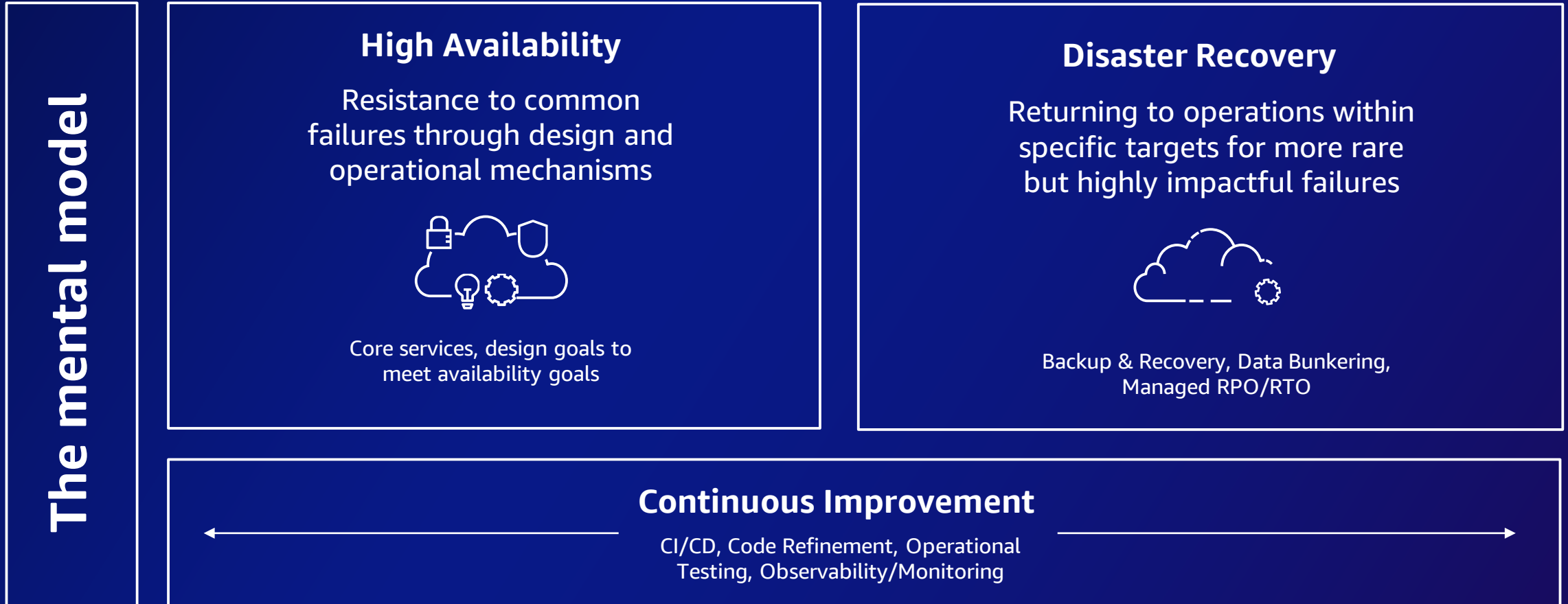
What is application resilience?

How much data can you afford to recreate or lose?

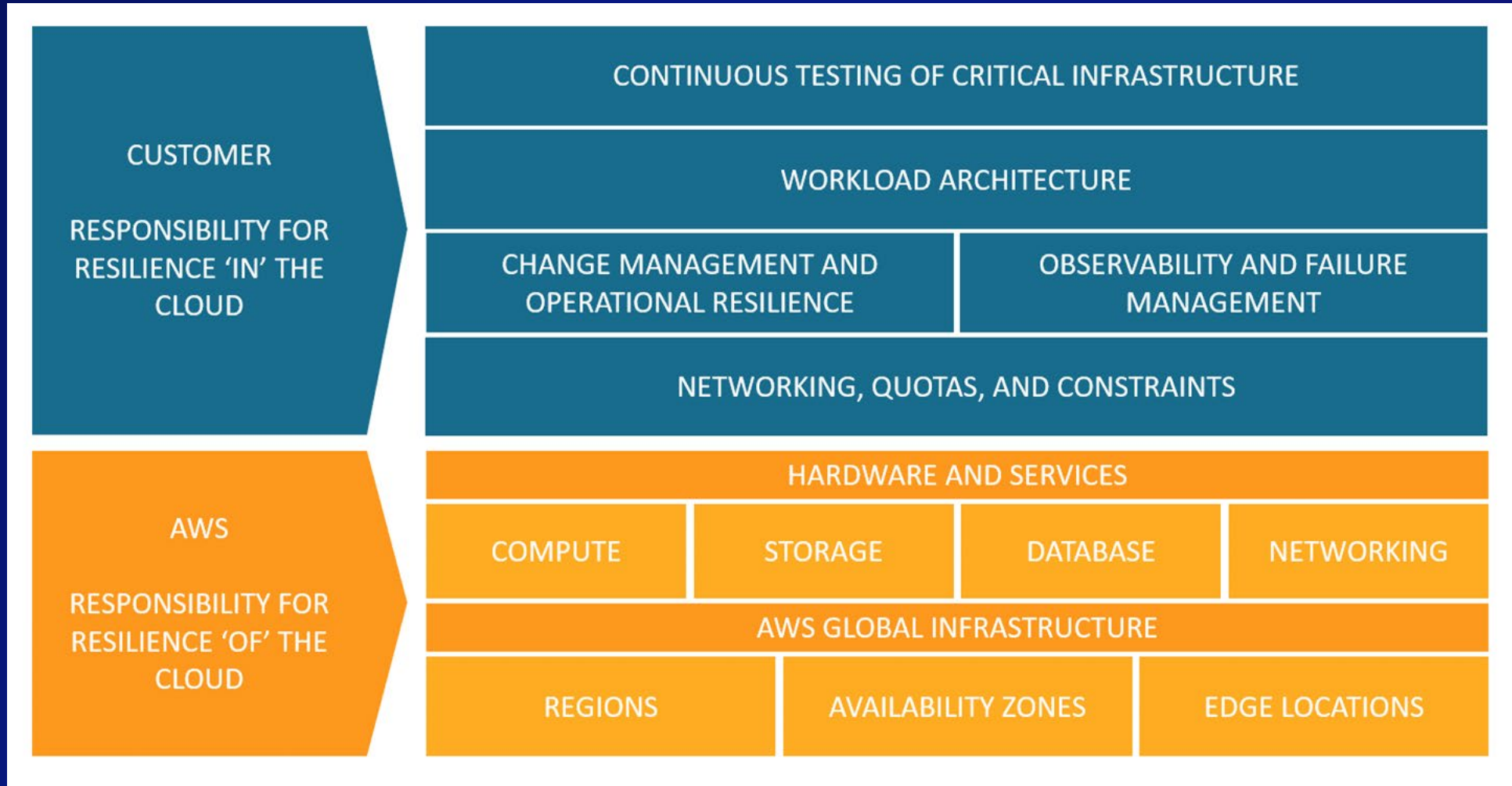How quickly must you recover? What is the cost of downtime?

Disaster
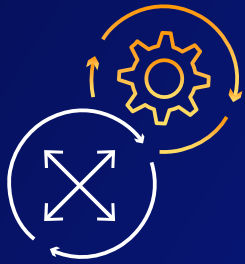
Recovery Point (RPO)

Recovery Time (RTO)

Time

Data Loss

Downtime

Resilience

Ability of a workload to recover from infrastructure or service disruptions

The mental model

High Availability

Resistance to common failures through design and operational mechanisms

Core services, design goals to meet availability goals

Disaster Recovery

Returning to operations within specific targets for more rare but highly impactful failures

Backup & Recovery, Data Bunkering, Managed RPO/RTO

Continuous Improvement

CI/CD, Code Refinement, Operational Testing, Observability/Monitoring

Shared responsibility model for resilience

CUSTOMER

RESPONSIBILITY FOR RESILIENCE 'IN' THE CLOUD

CONTINUOUS TESTING OF CRITICAL INFRASTRUCTURE

WORKLOAD ARCHITECTURE

CHANGE MANAGEMENT AND OPERATIONAL RESILIENCE

OBSERVABILITY AND FAILURE MANAGEMENT

NETWORKING, QUOTAS, AND CONSTRAINTS

AWS

RESPONSIBILITY FOR RESILIENCE 'OF' THE CLOUD

HARDWARE AND SERVICES

COMPUTE

STORAGE

DATABASE

NETWORKING

AWS GLOBAL INFRASTRUCTURE

REGIONS
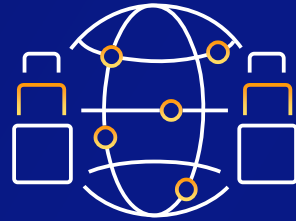
AVAILABILITY ZONES

EDGE LOCATIONS

AWS Well-Architected

Operational Excellence

Security

Reliability

Performance Efficiency

Cost Optimization

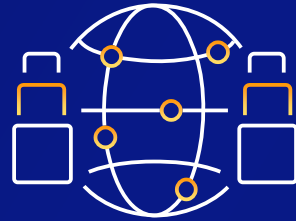Sustainability

Well-Architected is a set of best practices

Design principles

Questions

Best Practices

Whitepaper

Labs

REL 12. How do you test reliability? Info

After you have designed your workload to be resilient to the stresses of production, testing is the only way to ensure that it will operate as designed, and deliver the resiliency you expect.

◯ Question does not apply to this workload   Info

Select from the following

☑ Use playbooks to investigate failures   Info

☑ Perform post-incident analysis   Info

☑ Test functional requirements   Info

☑ Test scaling and performance requirements   Info

☑ Test resiliency using chaos engineering   Info

☑ Conduct game days regularly   Info

Well-Architected Tool

AWS Well-Architected

Operational Excellence

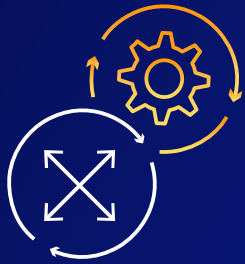Security

Reliability

Performance Efficiency

Cost Optimization

Sustainability

10

AWS Well-Architected

Operational Excellence

Reliability

REL 11. How do you design your workload to withstand component failures? Info

Workloads with a requirement for high availability and low mean time to recovery (MTTR) must be architected for resiliency.

⬤ Question does not apply to this workload   Info

Select from the following

☑ Monitor all components of the workload to detect failures   Info

☑ Fail over to healthy resources   Info

☑ Automate healing on all layers   Info

☑ Use static stability to prevent bimodal behavior   Info

☑ Send notifications when events impact availability   Info

How AWS helps you design resilient workloads

AWS Resilience Hub

Protect
- AWS Backup
- AWS Elastic Disaster Recovery
- CloudEndure Disaster Recovery
- AWS Systems Manager

↓ Protect data and applications

Define
- AWS CloudFormation
- AWS Service Catalog AppRegistry

↓ Define resilience of applications

Test
- AWS Fault Injection Simulator

↓ Test to improve resilience

Monitor and Manage
- Amazon DevOps Guru
- AWS CloudTrail
- Amazon CloudWatch
- Amazon Route 53 Application Recovery Controller

↓ Receive alerts and conduct readiness checks

Recover
- AWS Backup
- AWS Elastic Disaster Recovery
- CloudEndure Disaster Recovery
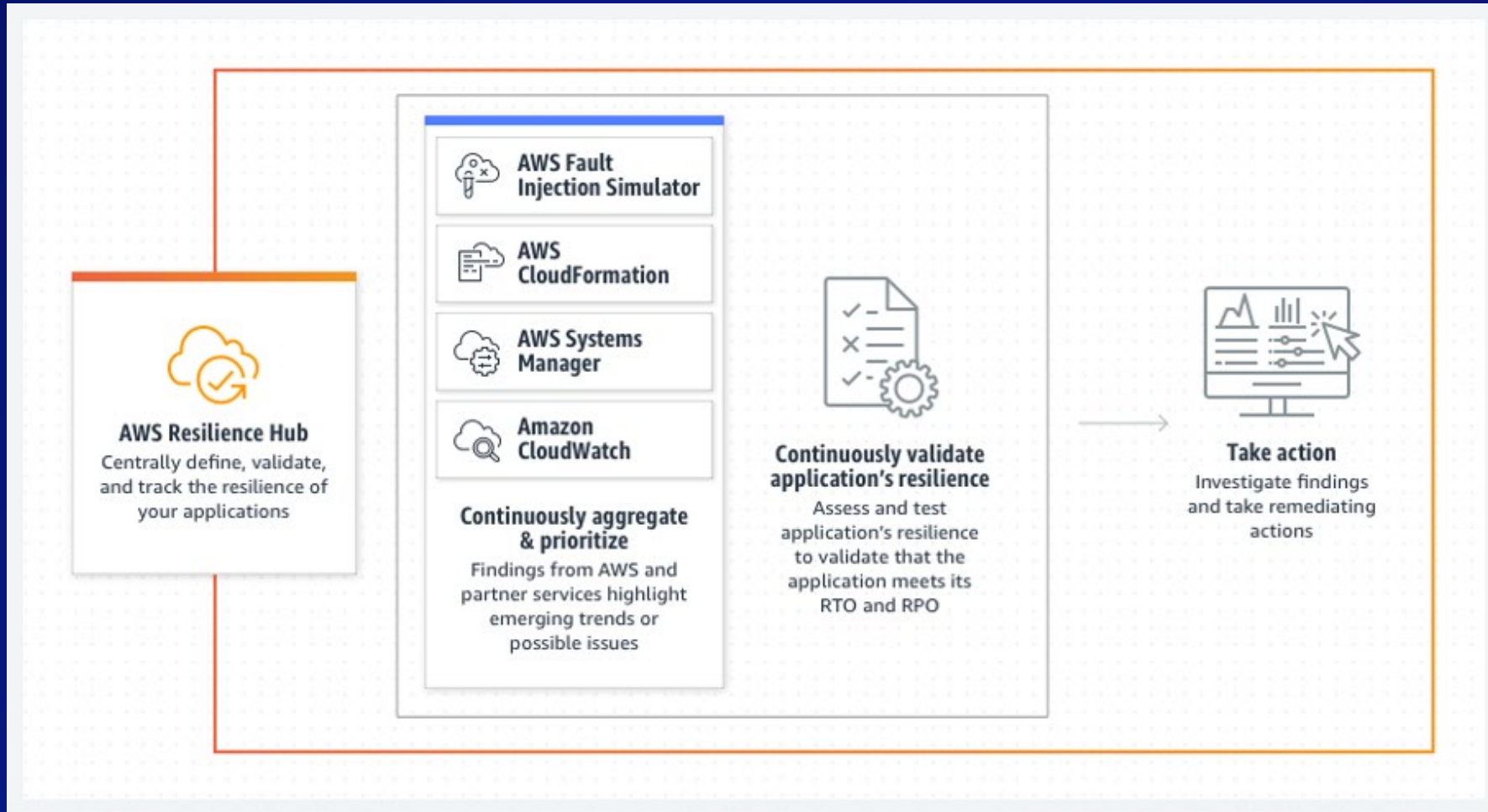- AWS Systems Manager

↓ Restore data and applications

AWS Resilience Hub

AWS Resilience Hub

Provides a central place to define, validate, and track the resilience of your applications on AWS.

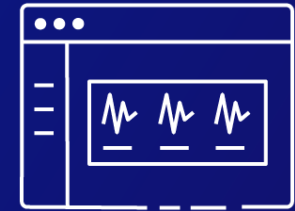# AWS Resilience Hub – key capabilities

Assess

Assess whether or not the current configuration of the underlying services can meet the application's RTO/RPO… and recommend improvements
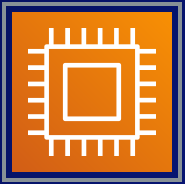
Validate

Continuously validate that the application meets its RTO/RPO

Track

Track the resilience of the application over time using 'Resilience Score'

AWS Resilience Hub | Supported resources

Compute

EC2,
API Gateway,
Lambda,
ECS, EKS,
Fargate,
AutoScaling

Networking

NAT Gateway,
Route 53,
ELB

Database

RDS,
Aurora,
DynamoDB,
DocumentDB

Storage

EBS Volumes,
S3 buckets,
EFS FileSystem,
AWS Backup
Elastic Disaster
Recovery Service

Queues

SQS,
SNS

AWS Resilience Hub | Define targets

- Define resilience targets (RTO and RPO) per application
- Define targets per failure type (Application, Infrastructure, Availability Zone, Region)
- Use build-in resilience targets templates

Resilience Hub Users

↓

Define resilience targets

AWS Resilience Hub | Add application

- Import Infra-as-code files – CloudFormation stacks / Terraform scripts

- Select from AWS Service Catalog App Registry

- Select AWS Resource Groups

- Supports multi-region applications

- Supports cross accounts

Resilience Hub Users

↓

| Define resilience targets | → | Add application |
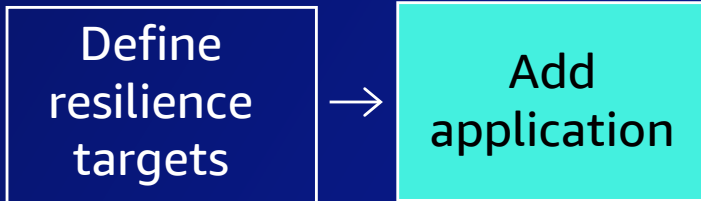
AWS Resilience Hub | Assess resilience

• Assess the resilience of the application and uncover resilience weaknesses

• Compare application to resilience targets

Resilience Hub Users

↓

| Define resilience targets | → | Add application | → | Assess app resilience |

AWS Resilience Hub | Recommendations

- Recommendations are of two types:
  - Resiliency recommendations
  - Operational recommendations
- Update the application
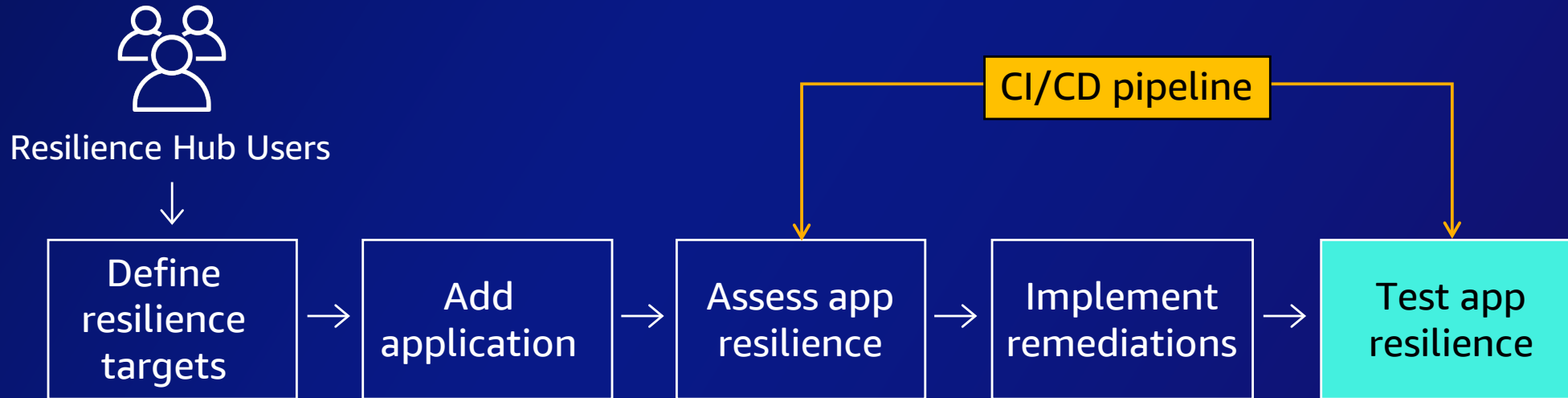- Implement alarms, SOPs, fault injection tests

Resilience Hub Users

↓

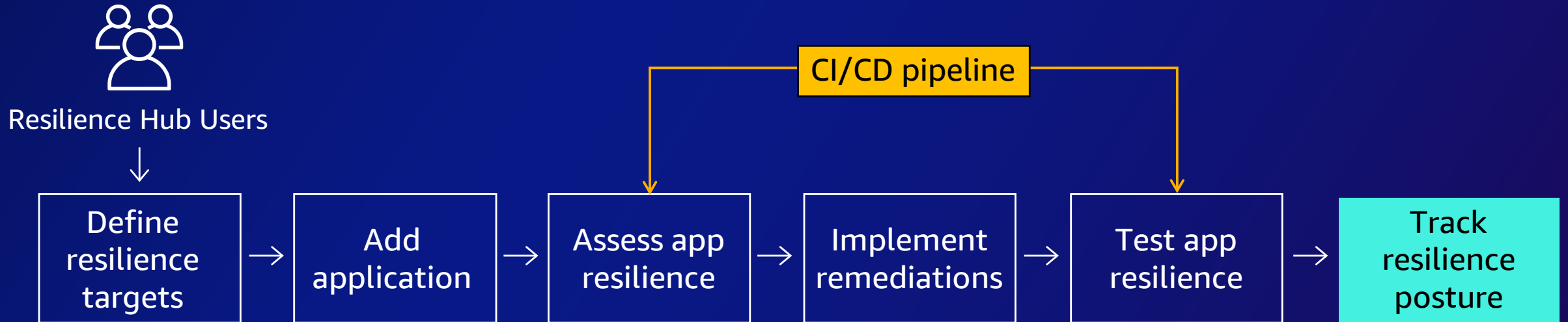| Define resilience targets | → | Add application | → | Assess app resilience | → | Implement remediations |
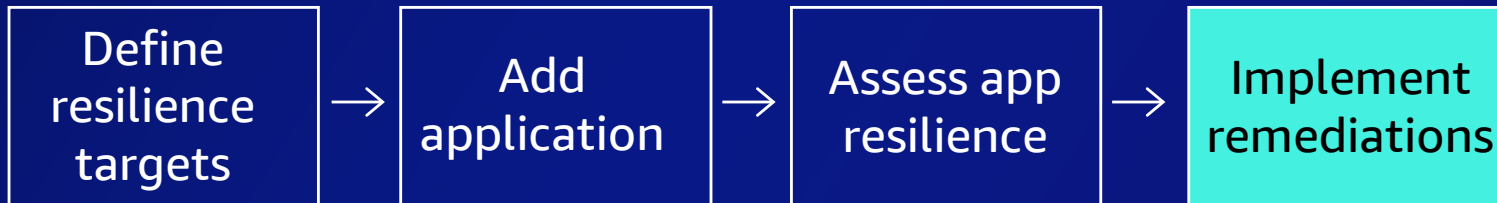
AWS Resilience Hub | Test resilience

- Simulate a wide range of failures
- Validate that monitors and alarms identify the correct outage
- Validate that SOP recovered the application within its resilience targets
- Integrate into CI/CD pipelines for continuous assessment and testing

Resilience Hub Users

CI/CD pipeline

| Define resilience targets | → | Add application | → | Assess app resilience | → | Implement remediations | → | Test app resilience |

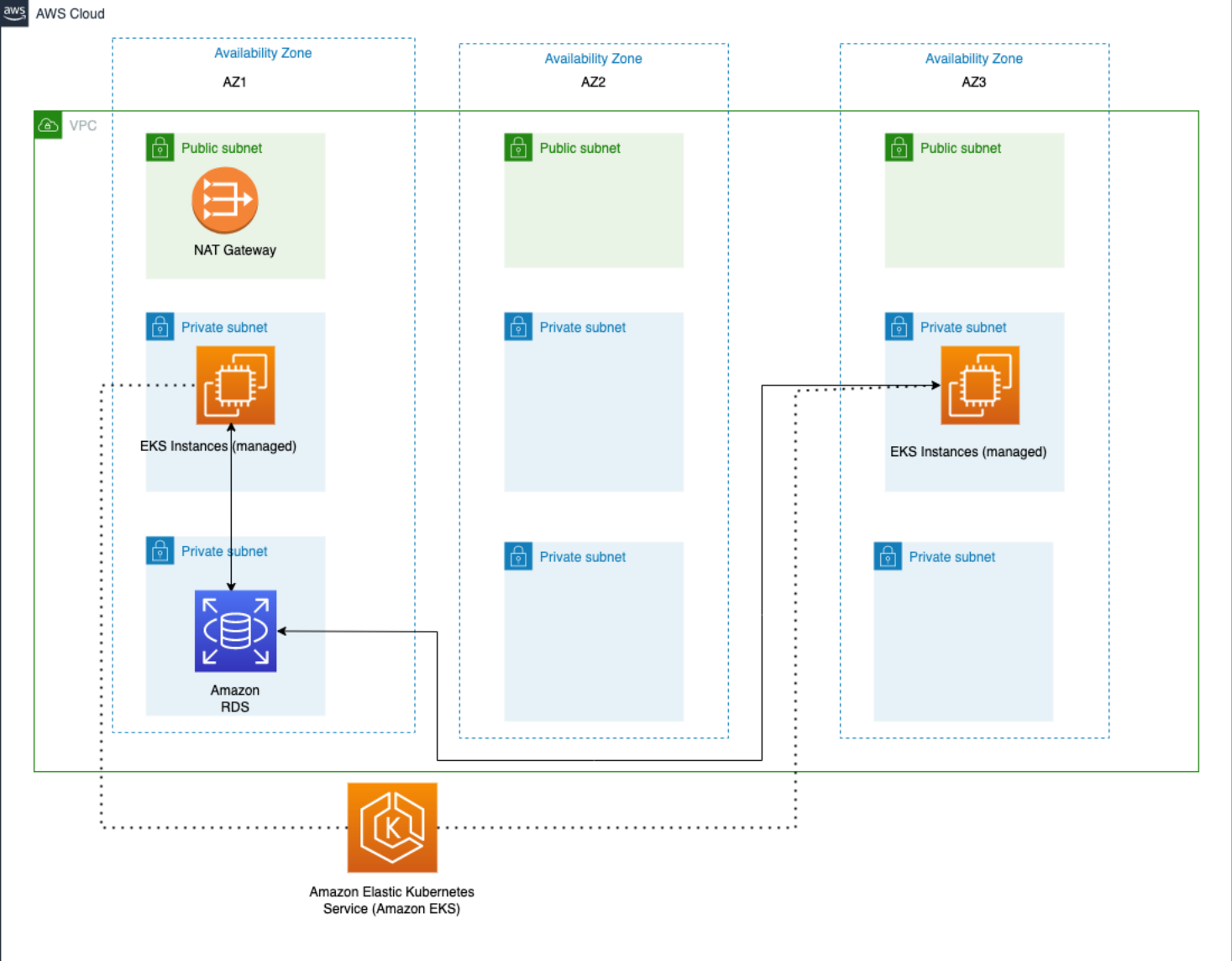# AWS Resilience Hub | Track resilience

- Track the resilience posture of your applications
- Alert operator if resilience posture is compromised
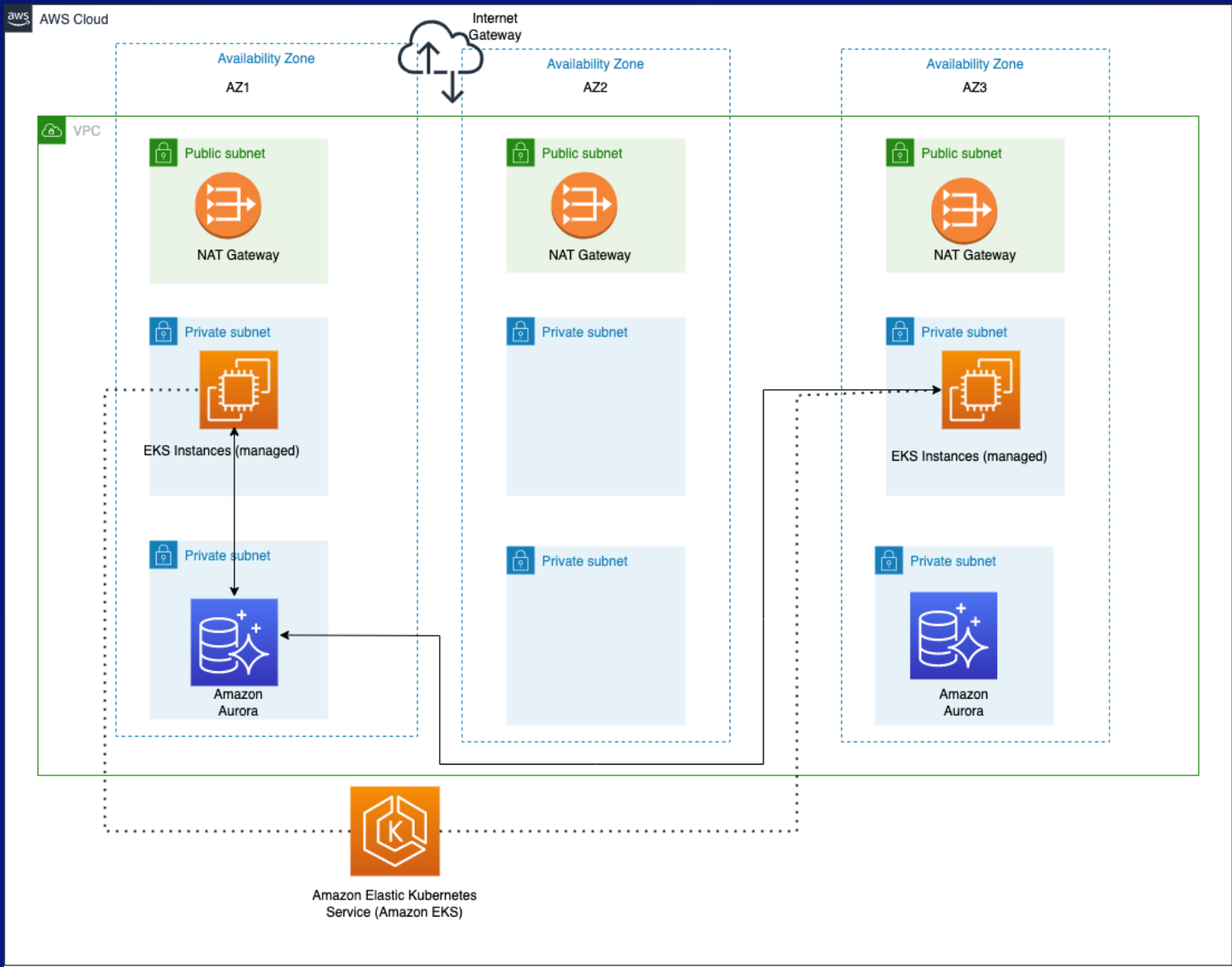- Track the resilience readiness with 'Resilience Score'

Resilience Hub Users

CI/CD pipeline

| Define resilience targets | → | Add application | → | Assess app resilience | → | Implement remediations | → | Test app resilience | → | Track resilience posture |

Demo time...

Workload Architecture

Rectified Architecture

Get started

AWS Resilience Hub

Visit the AWS Resilience Hub
[product page](#)

ARH Documents

Review the AWS Resilience Hub
[Technical Documentation](#)

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