



AWS Partner: Well-Architected Best Practices (Technical)

Module 0

Course Introduction



Course overview

Course objectives



In this course, you will learn the following:

- Identify the AWS Well-Architected Framework features, design principles, design pillars, and common uses.
- Apply the design principles, key services, and best practices for each Well-Architected Framework pillar.
- Use the AWS Well-Architected Tool to conduct Well-Architected reviews.
- Understand the AWS Well-Architected Partner Program.

Course modules

Module 1: AWS Well-Architected Introduction

Module 2: Operational Excellence

Module 3: Reliability

Module 4: Security

Module 5: Performance Efficiency

Module 6: Cost Optimization

Module 7: Sustainability

Module 8: Course Summary



AWS Well-Architected Best Practices

Module 1

Well-Architected Introduction

Module goals and objectives



This module is an overview of the AWS Well-Architected Framework.

By the end of this module, you will be able to do the following:

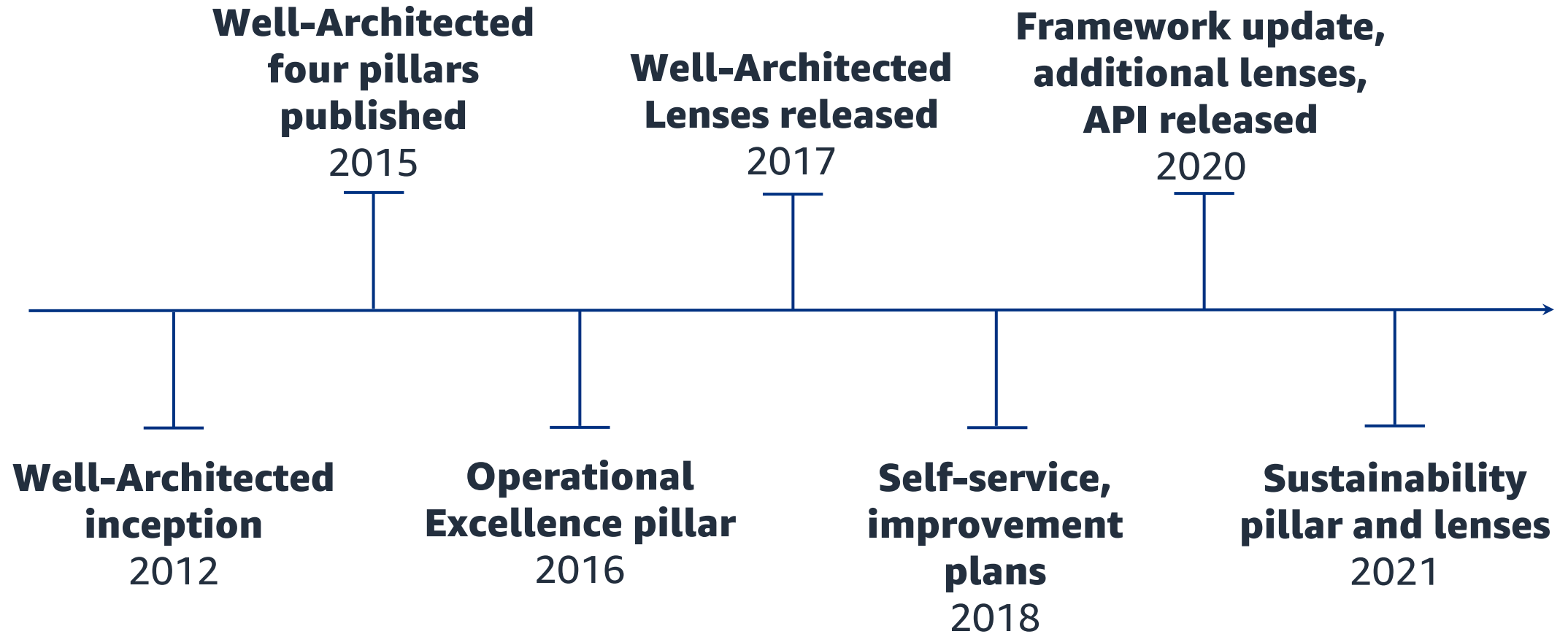
- Identify the key aspects of the Well-Architected Framework.
- Describe the added value of implementing the Well-Architected Framework.
- List the six Well-Architected Framework pillars.



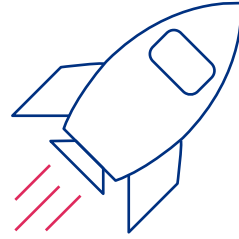
When you look at the systems or applications your team is building, can you answer the following question:

“Are your workloads Well-Architected”?

Brief history of AWS Well-Architected



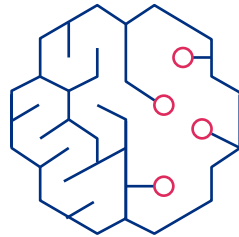
AWS Well-Architected benefits



Build and deploy faster.



Lower or mitigate risks.

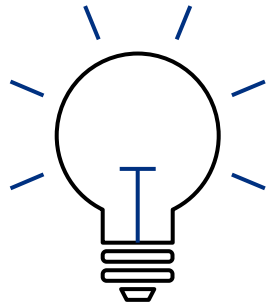


Make informed decisions.

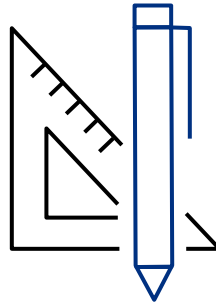


Learn AWS best practices.

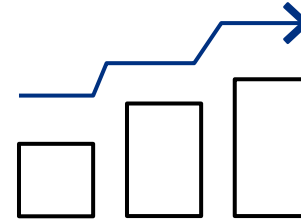
Mechanism for your cloud journey



Learn

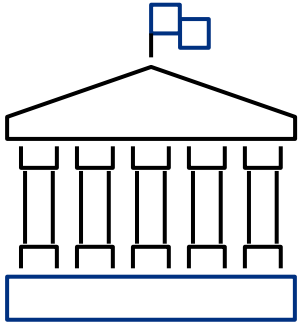


Measure

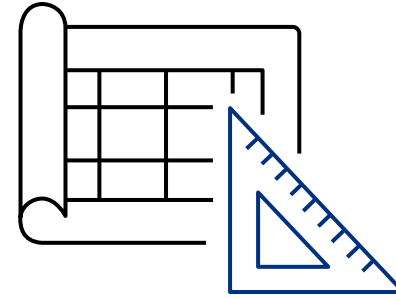


Improve

AWS Well-Architected Framework



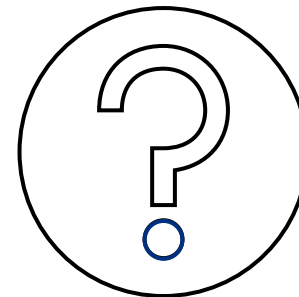
Pillars



**Design
principles**

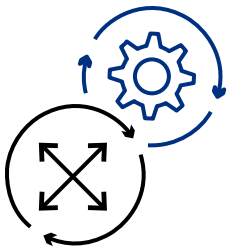


Lenses

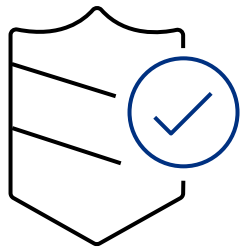


Questions

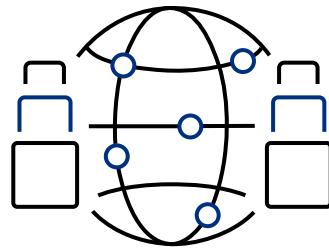
AWS Well-Architected Framework pillars



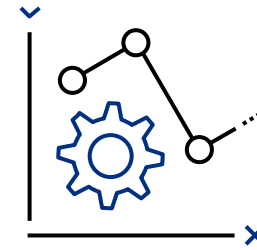
Operational
Excellence



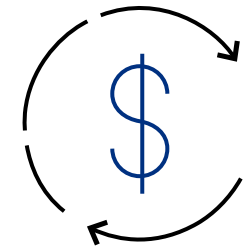
Security



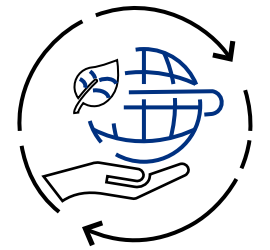
Reliability



Performance
Efficiency

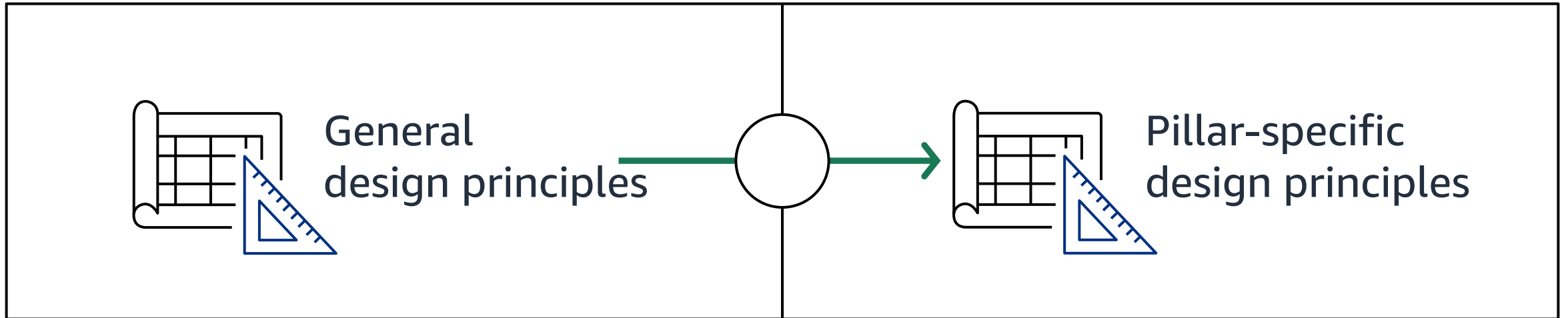


Cost
Optimization



Sustainability

Design principles

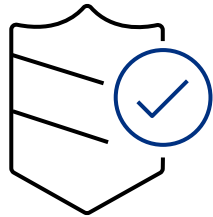


General design principles



- Stop guessing your capacity needs.
- Test systems at production scale.
- Automate to make architectural experimentation easier.
- Allow for evolutionary architectures.
- Drive architectures using data.
- Improve through game days.

Pillar-specific design principles



Example: Security

Automate responses to security events: Monitor and automatically launch responses to event-driven, or condition-driven, alerts.



Applying the AWS Well-Architected Framework

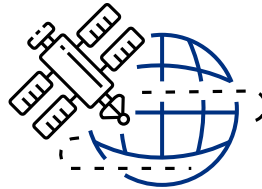
Intent of a Well-Architected Framework review

Not an audit.



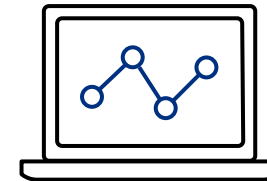
Work together
to improve
results.

**Not architecture
astronauts.**



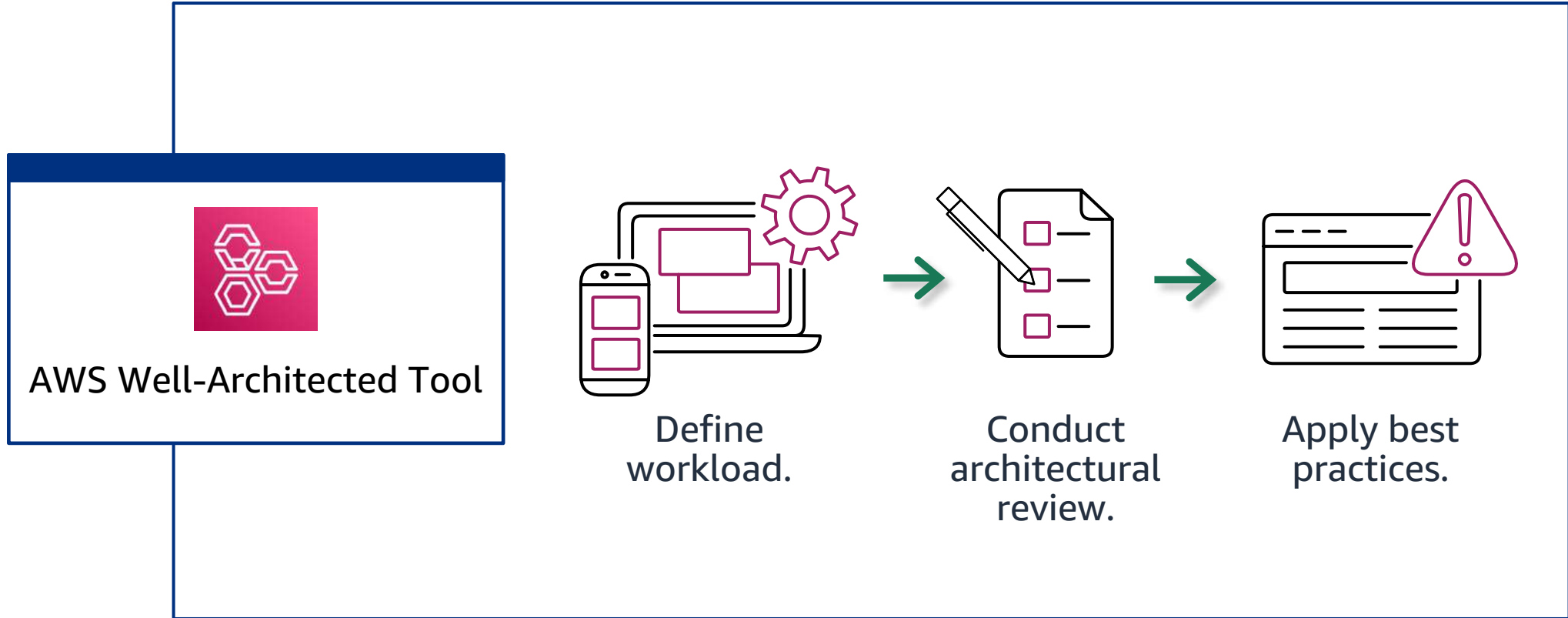
Use practical,
sensible, and
proven advice.

**Not a one-time
check.**



Examine
workloads
continuously.

AWS Well-Architected Tool



For more information, see “AWS Well-Architected Tool”
at <https://aws.amazon.com/well-architected-tool>.



Knowledge check

Knowledge check 1

Which of the following statements best describes the AWS Well-Architected Framework?

Choice	Response
A	An audit providing high-level advice.
B	A one-time AWS account review.
C	A set of three foundational design pillars: Security, Reliability, and Availability.
D	A set of design principles, lenses, and best practices.

Knowledge check 1 answer

Which of the following statements best describes the AWS Well-Architected Framework?

Choice	Response
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A	An audit providing high-level advice.
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B	A one-time AWS account review.
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C	A set of three foundational design pillars: Security, Reliability, and Availability.
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D	A set of design principles, lenses, and best practices.
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Correct



AWS Well-Architected Best Practices

Module 2 Operational Excellence

Module goals and objectives



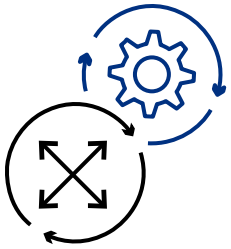
This module is an Operational Excellence pillar overview.

You will learn design principles and architectural best practices to achieve operational excellence.

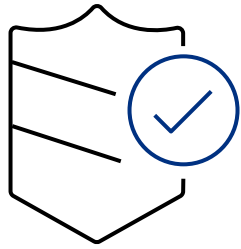
By the end of this module, you will be able to do the following:

- List the design principles of the Operational Excellence pillar.
- Describe architectural best practices for the Operational Excellence pillar.

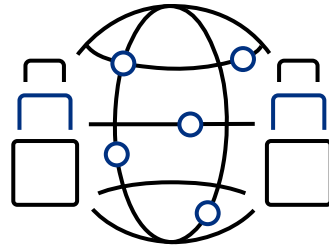
Operational Excellence



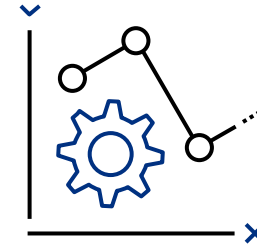
Operational
Excellence



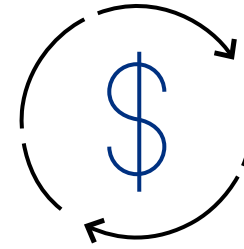
Security



Reliability



Performance
Efficiency



Cost
Optimization



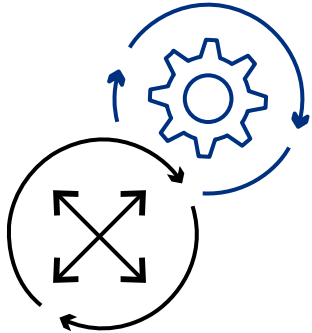
Sustainability



The **Operational Excellence pillar** covers how your organization supports business objectives.

This includes your organization's ability to run workloads effectively, gain insight into their operations, and continuously improve processes and procedures to deliver business value.

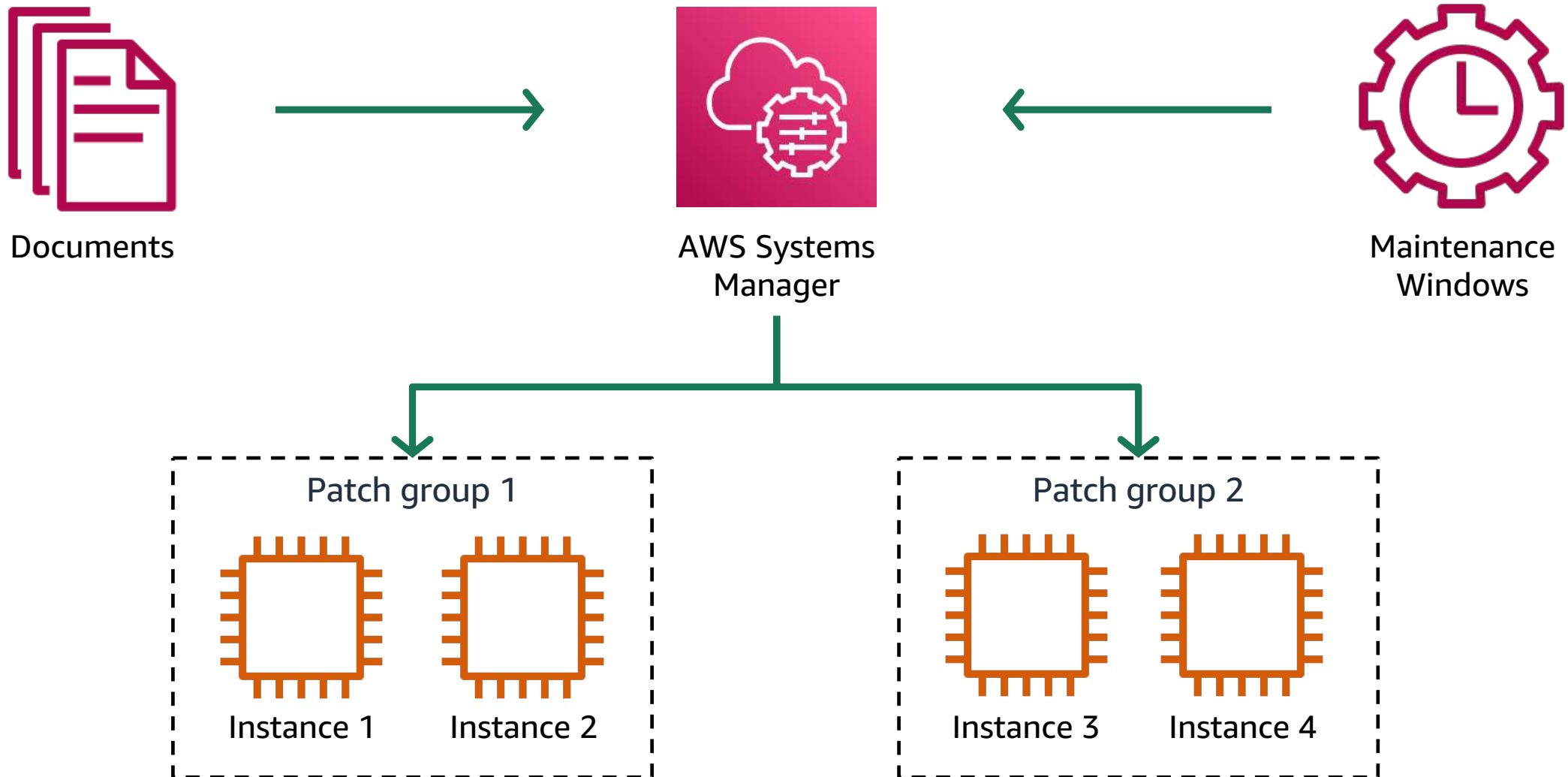
Operational excellence design principles



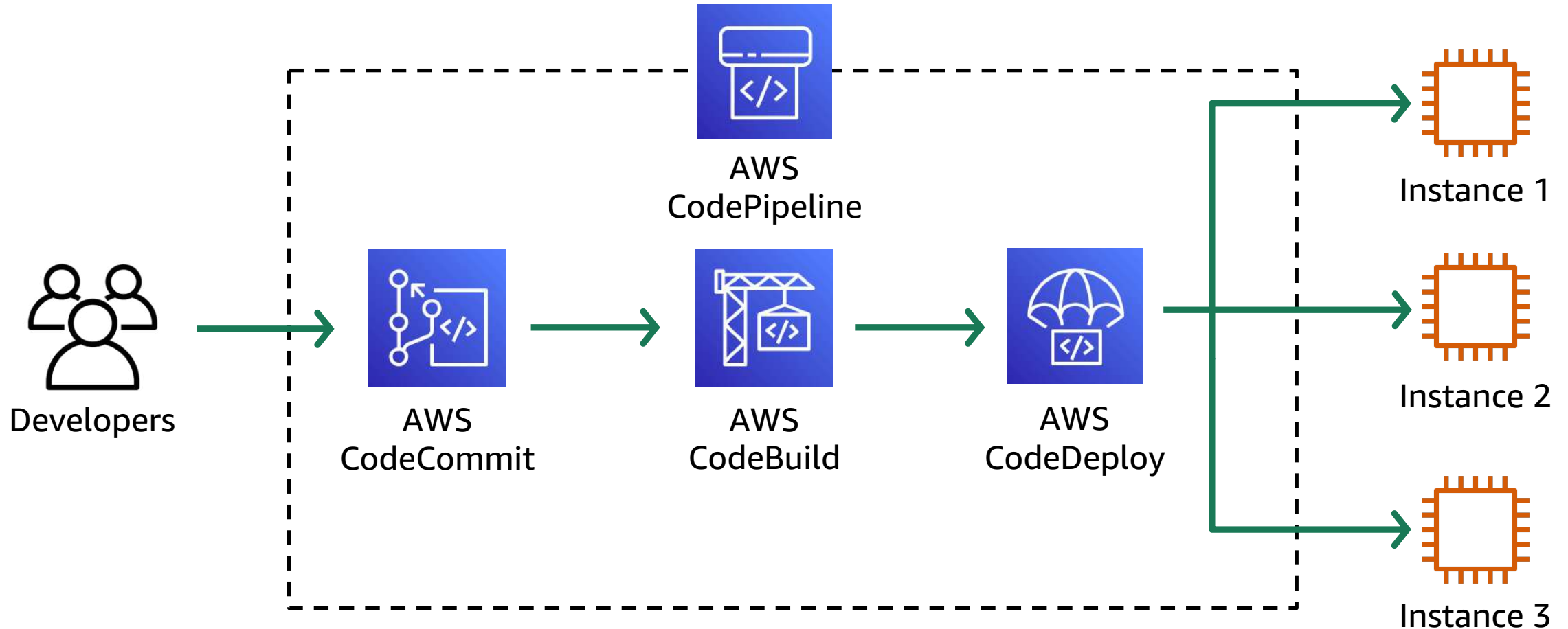
Operational
Excellence

- Perform operations as code.
- Make frequent, small, reversible changes.
- Refine operations procedures frequently.
- Anticipate failures.
- Learn from all operational failures.

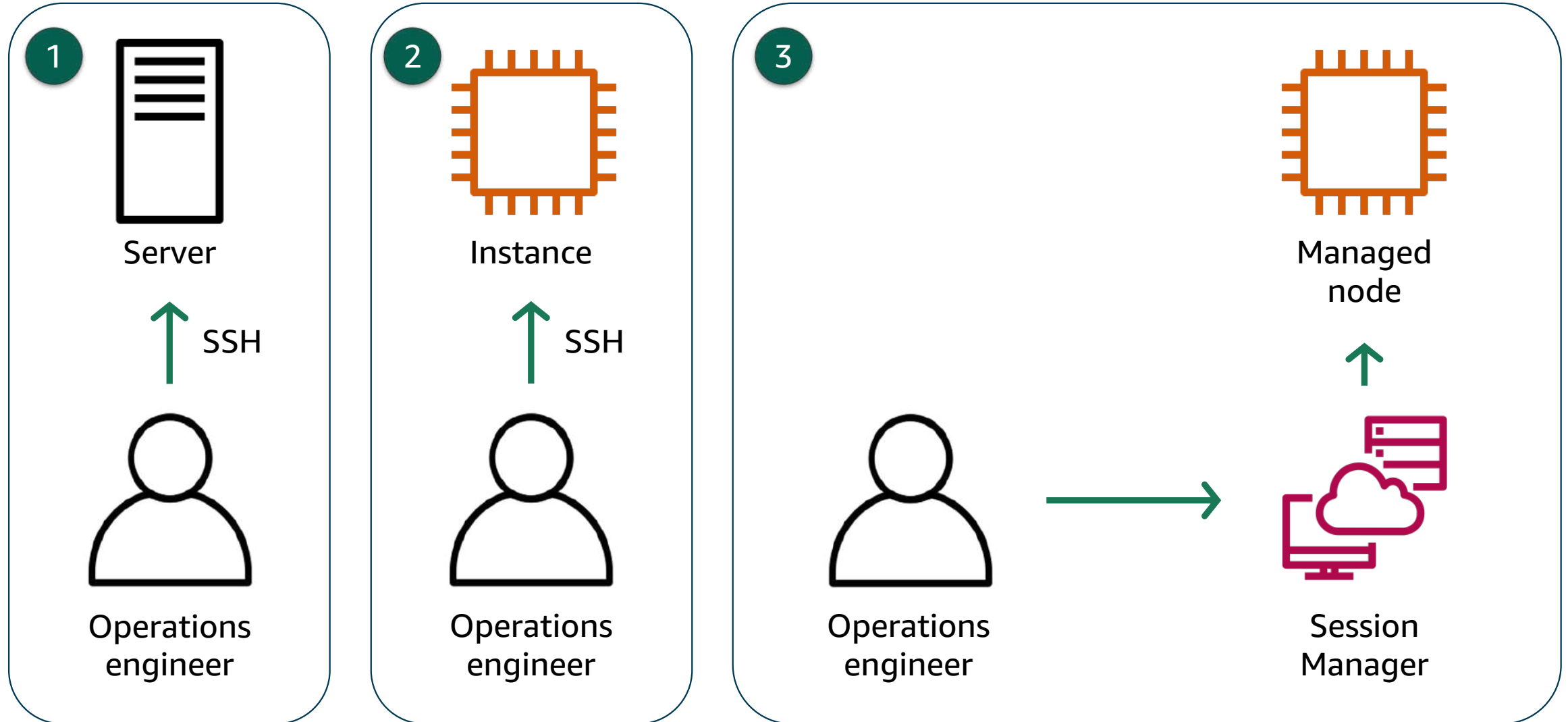
Perform operations as code



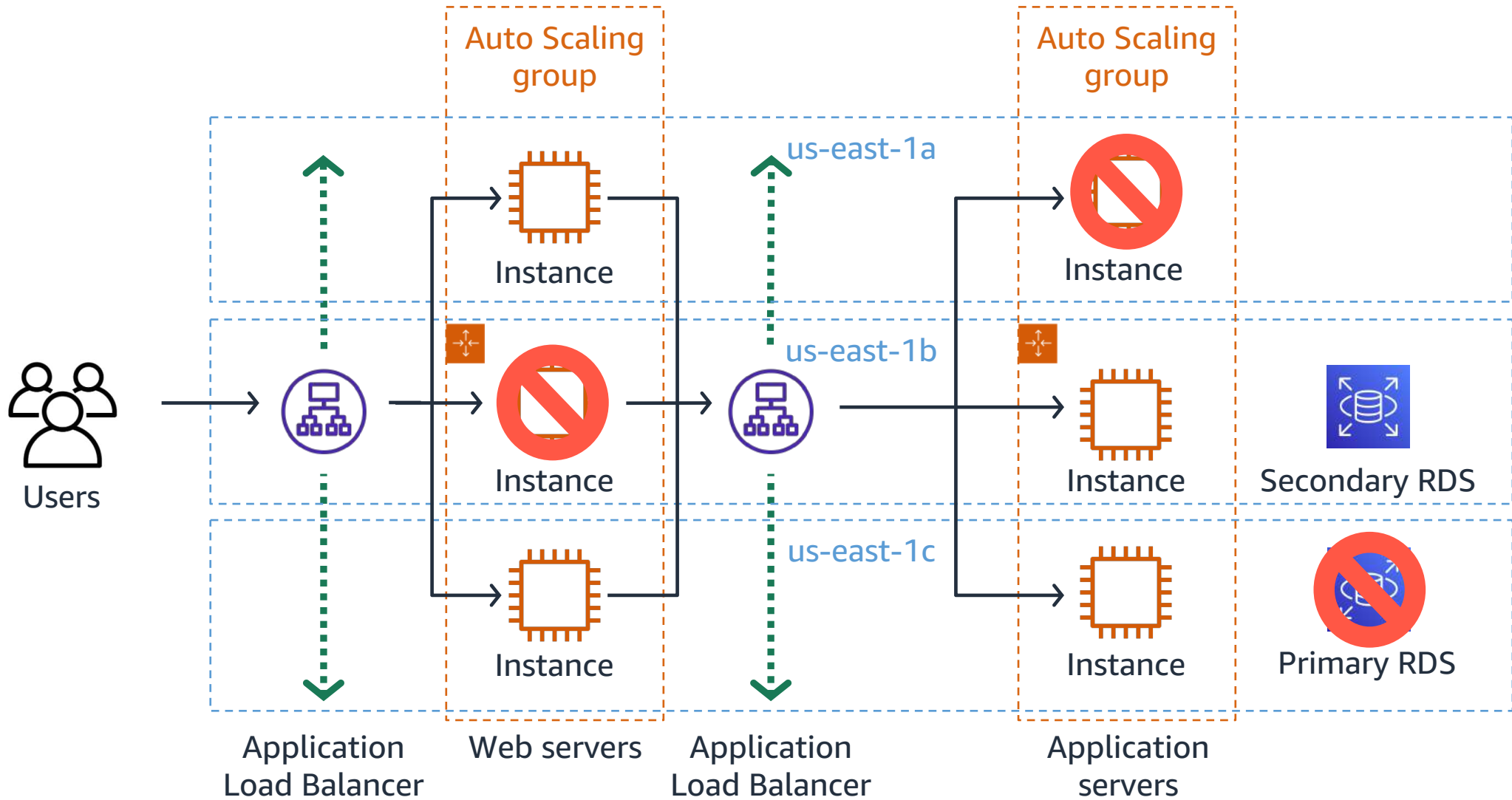
Make frequent, small, reversible changes



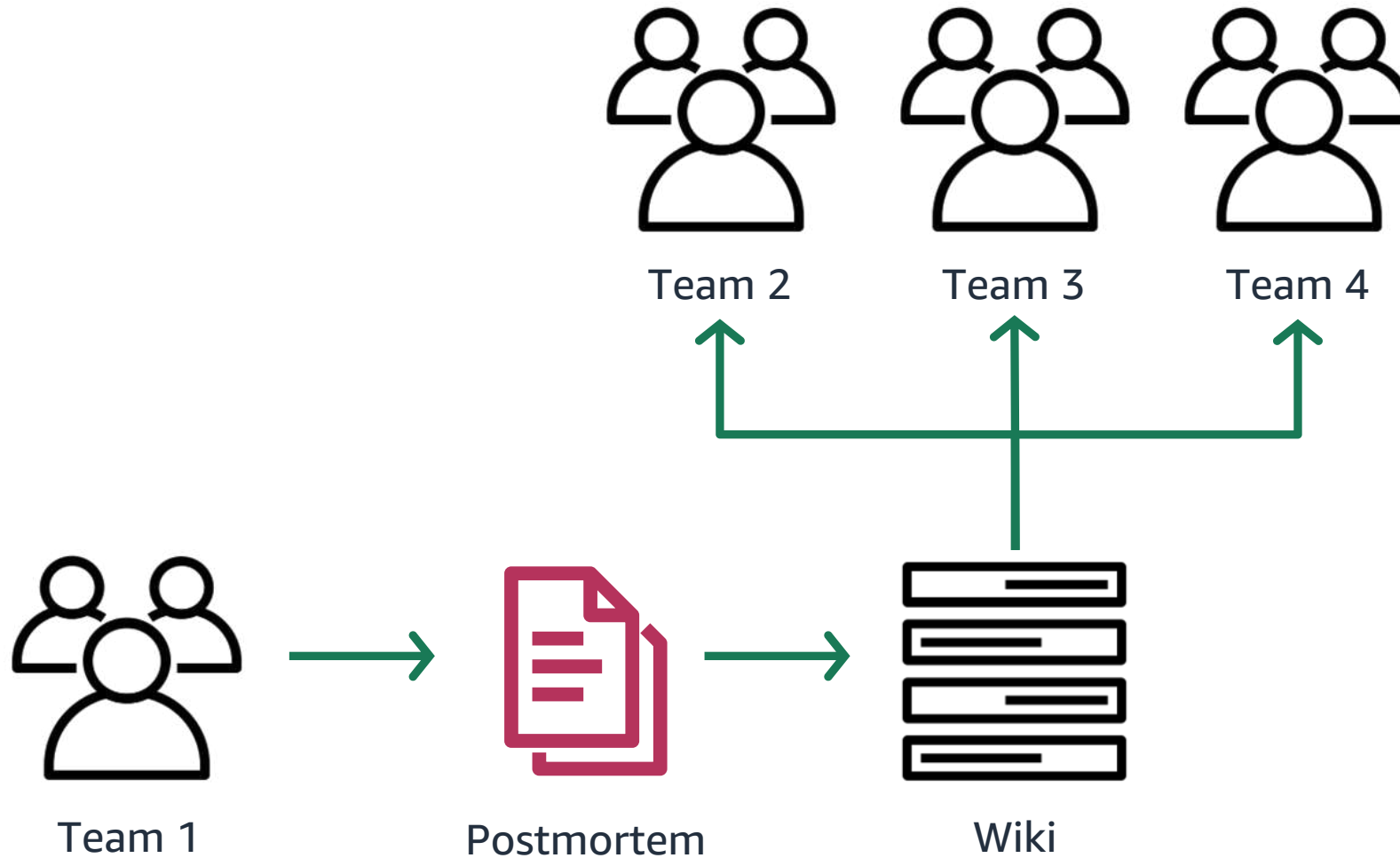
Refine operations procedures frequently



Anticipate failures



Learn from all operational failures





AWS Well-Architected Best Practices

Module 3 Reliability

Module goals and objectives



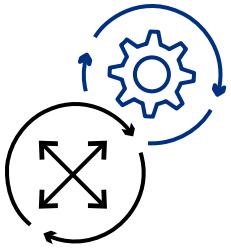
This module is a Reliability pillar overview.

You will learn design principles and architectural best practices to improve reliability.

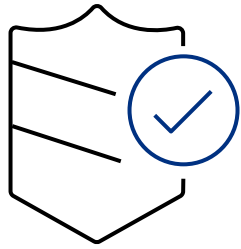
By the end of this module, you will be able to do the following:

- List the design principles of the Reliability pillar.
- Describe architectural best practices for the Reliability pillar.

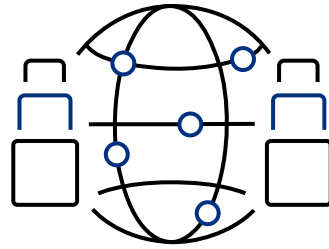
Reliability



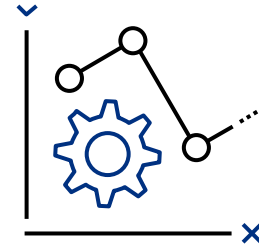
Operational
Excellence



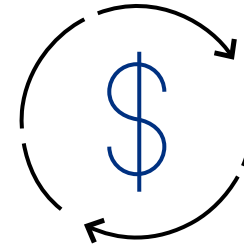
Security



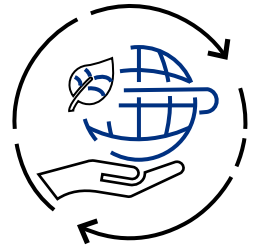
Reliability



Performance
Efficiency



Cost
Optimization

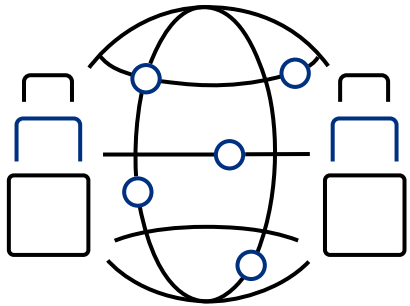


Sustainability



The **Reliability pillar** encompasses the ability of a system to recover from infrastructure or service disruptions, dynamically acquire computing resources to meet demand, and mitigate disruptions such as misconfigurations or transient network issues.

Reliability design principles



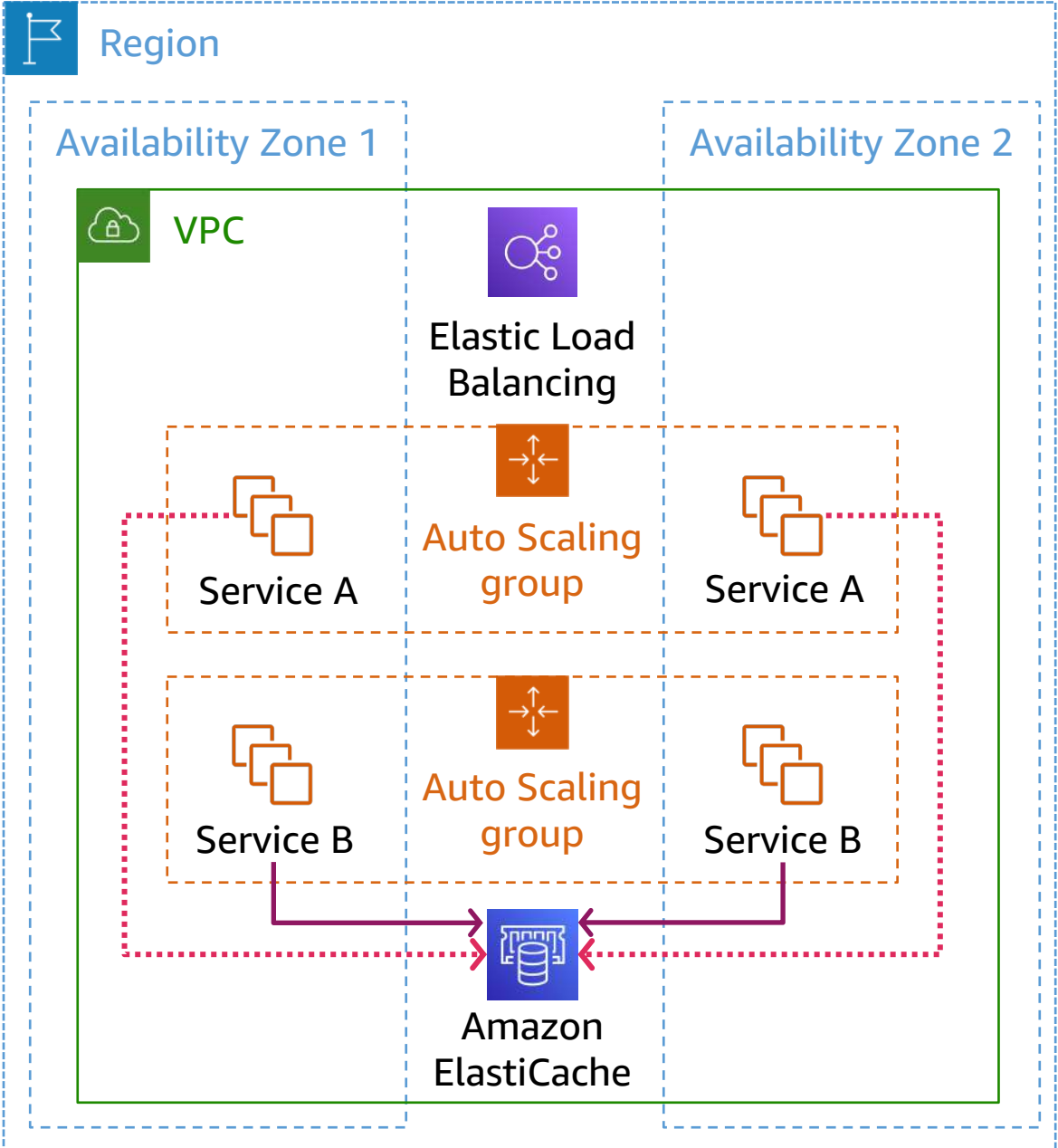
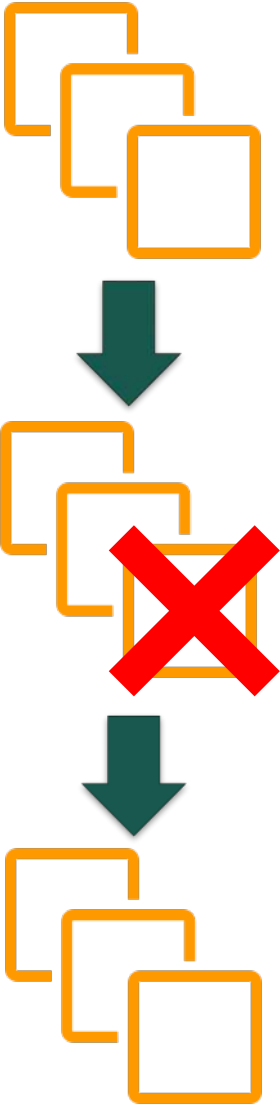
Reliability

- Automatically recover from failure.
- Test recovery procedures.
- Scale horizontally to increase aggregate workload availability.
- Stop guessing capacity.
- Manage change through automation.



Automatically recover from failure

Stateless services for automatic recovery





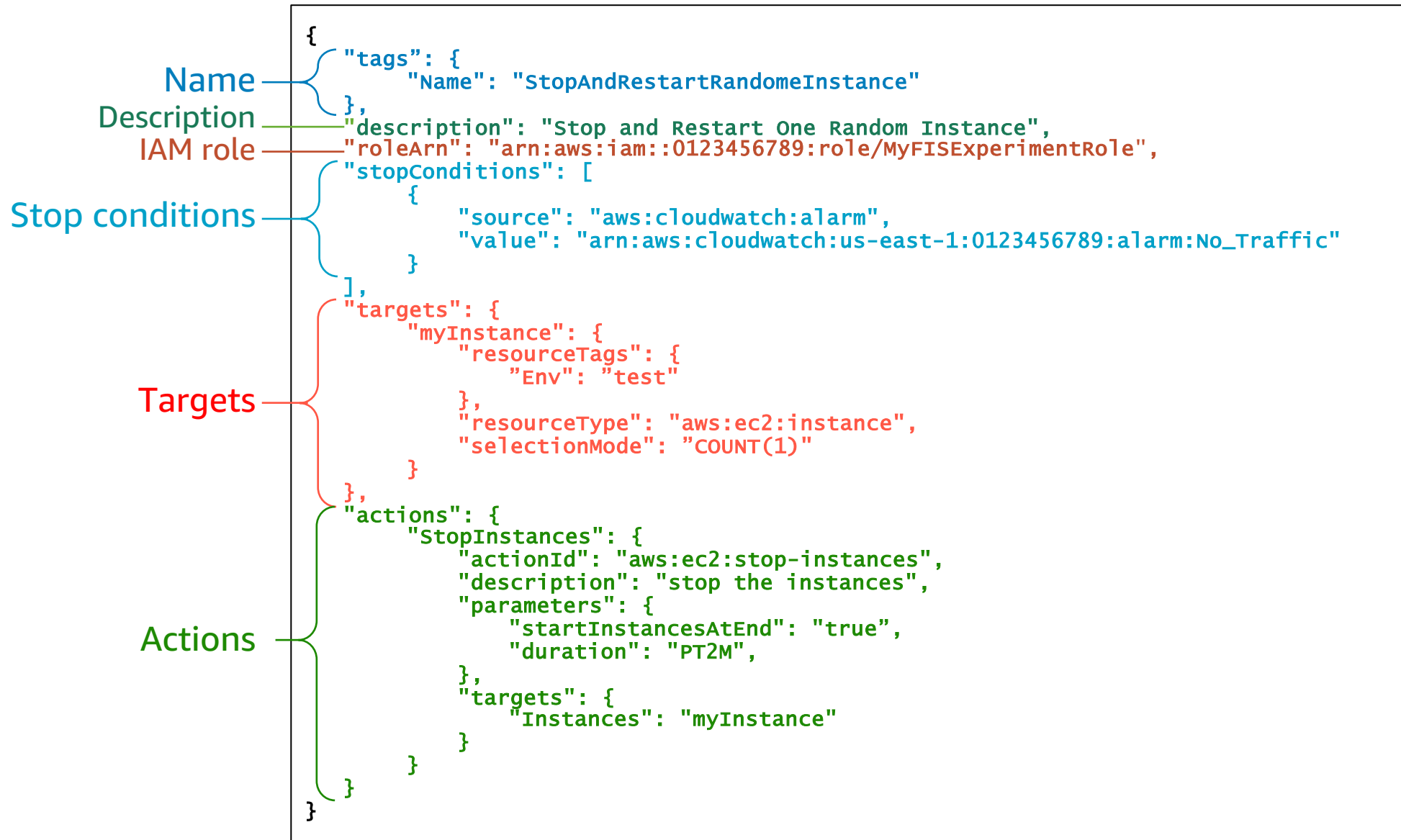
Test recovery procedures

AWS Fault Injection Simulator experiments

- Find performance bottlenecks or other unknown weaknesses.
- Define conditions to stop an experiment or to roll back to a pre-experiment state.
- Use prebuilt templates to run high-quality tests in minutes.
- Generate real-world failure conditions in a safe environment.



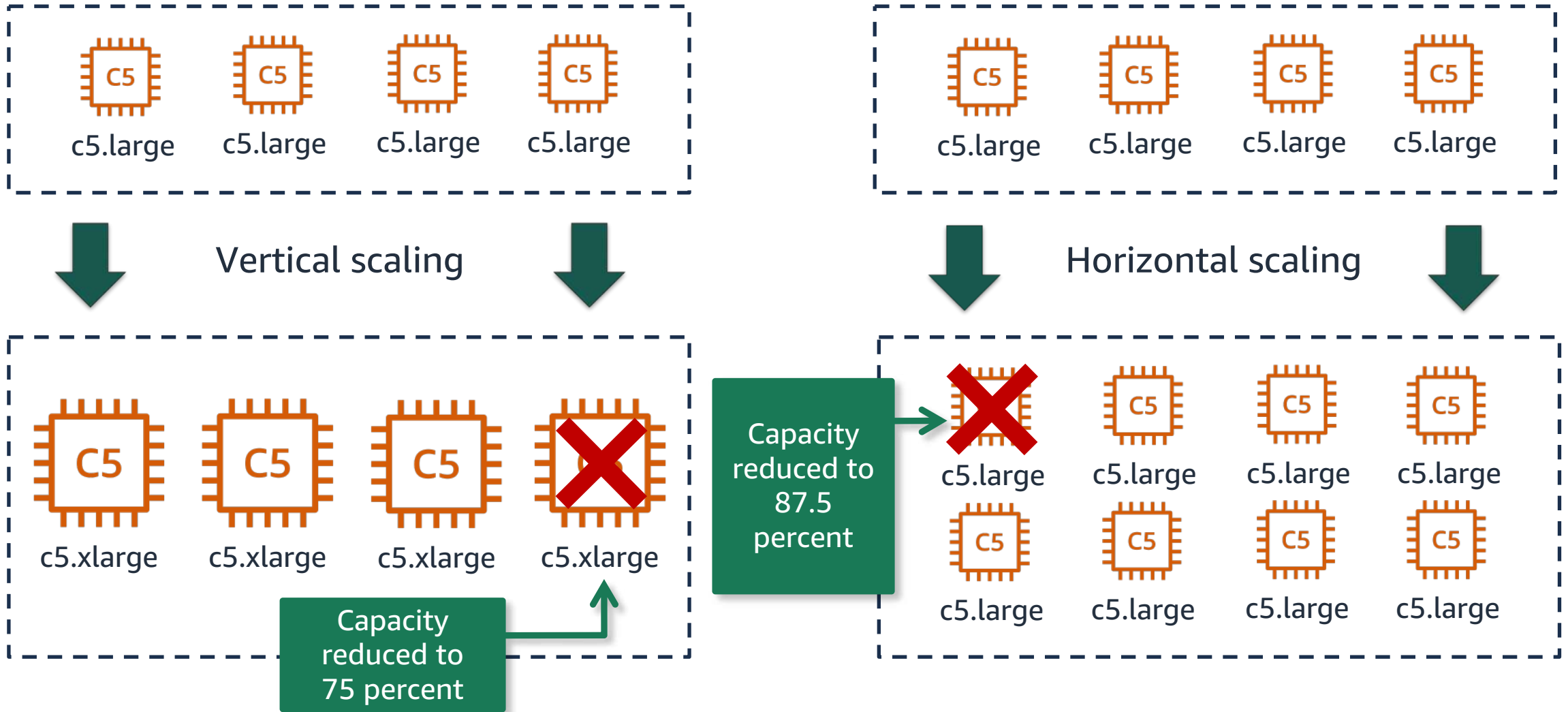
AWS Fault Injection Simulator experiment templates



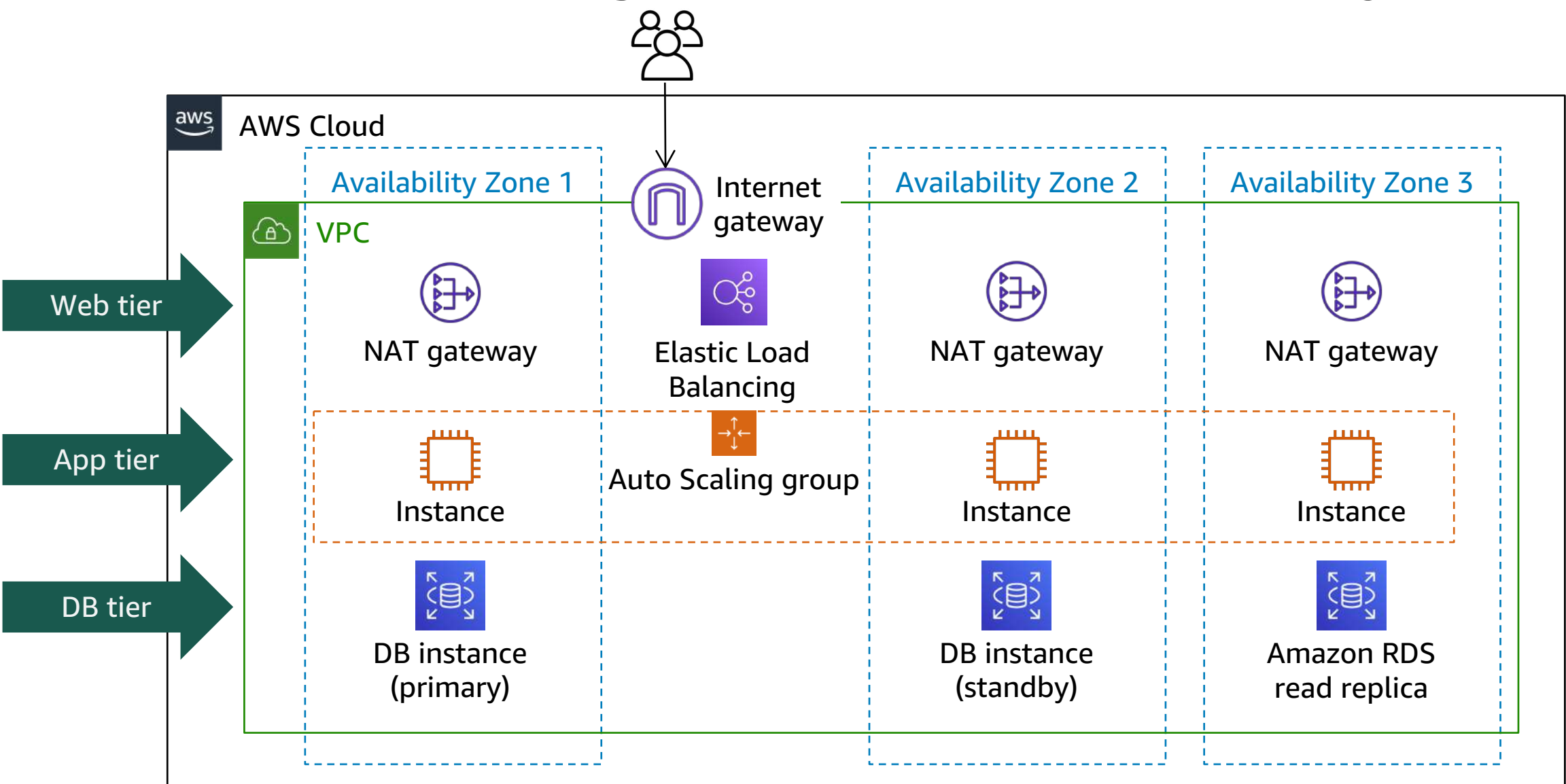


**Scale horizontally to increase
aggregate workload availability**

Vertical scaling and horizontal scaling



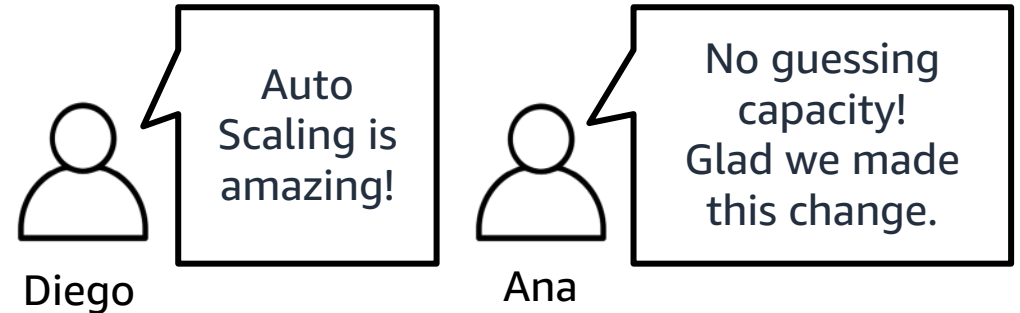
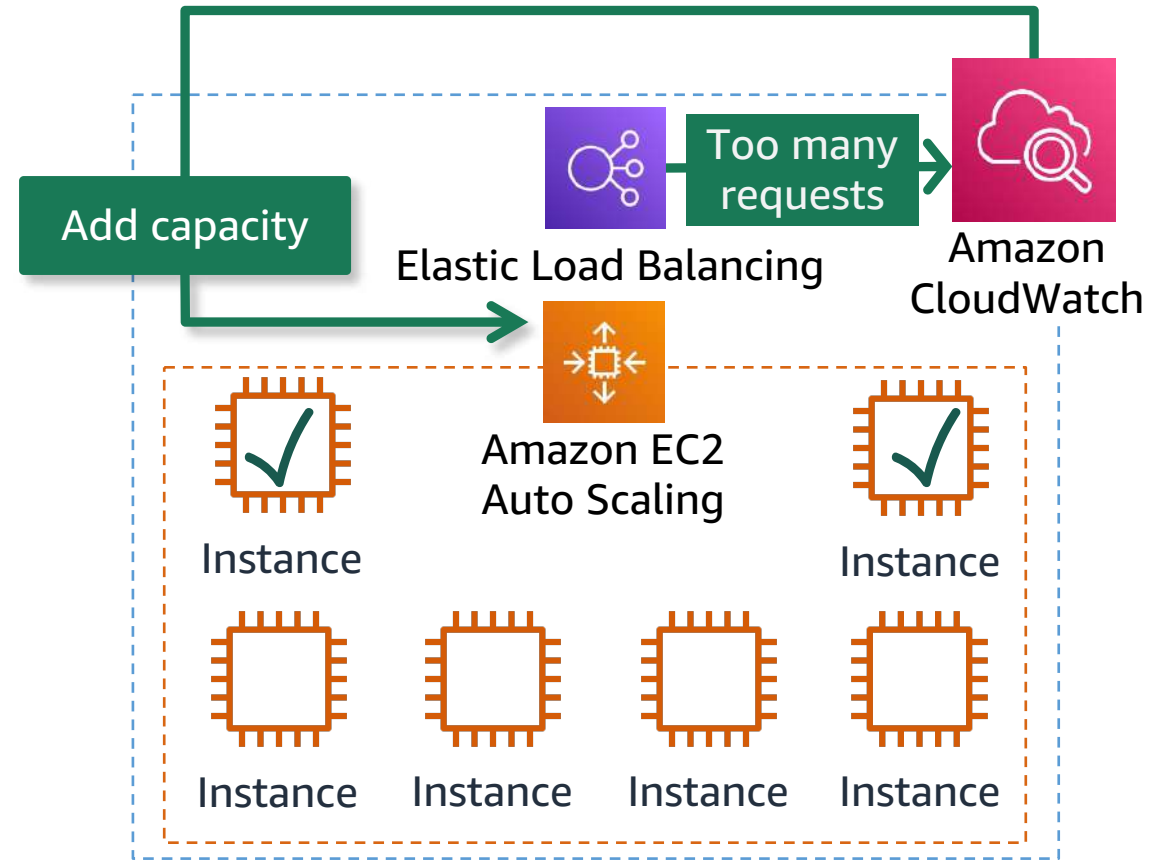
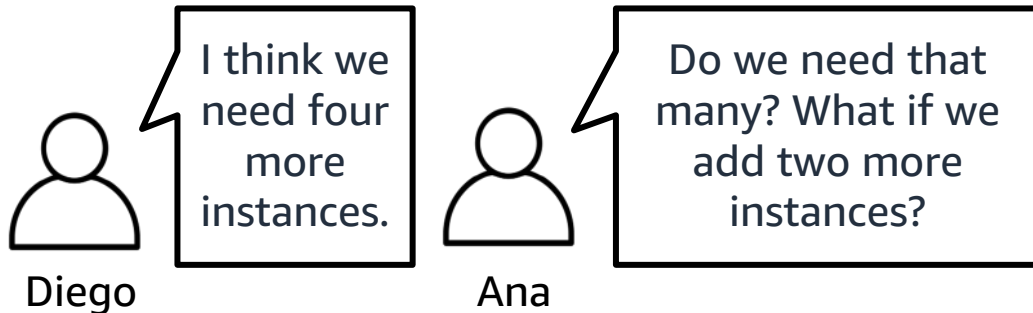
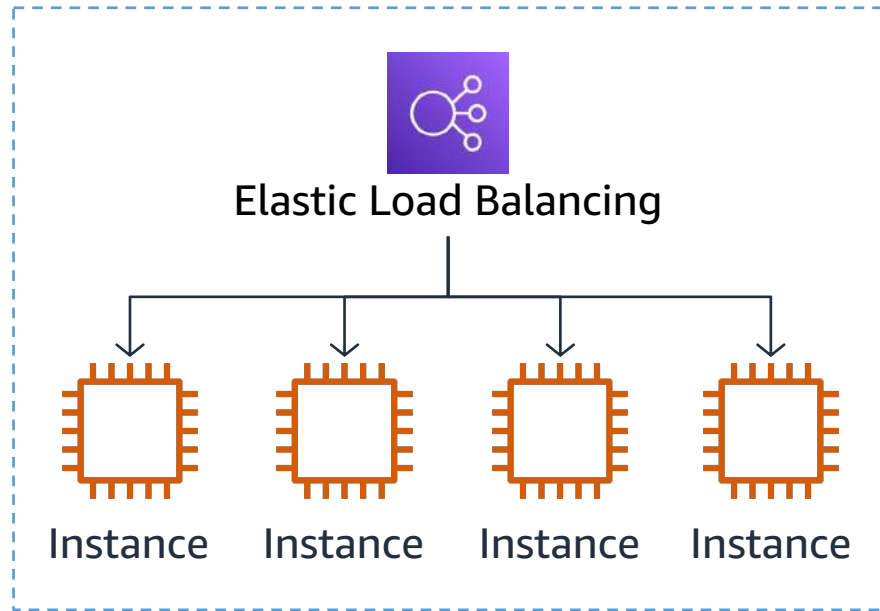
Horizontal scaling in multiple Availability Zones





Stop guessing capacity

Auto Scaling at work

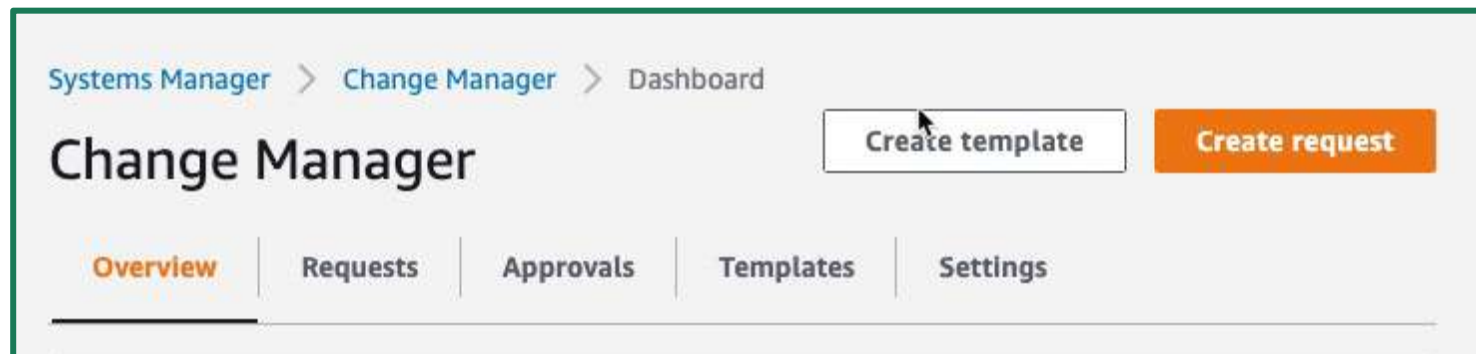
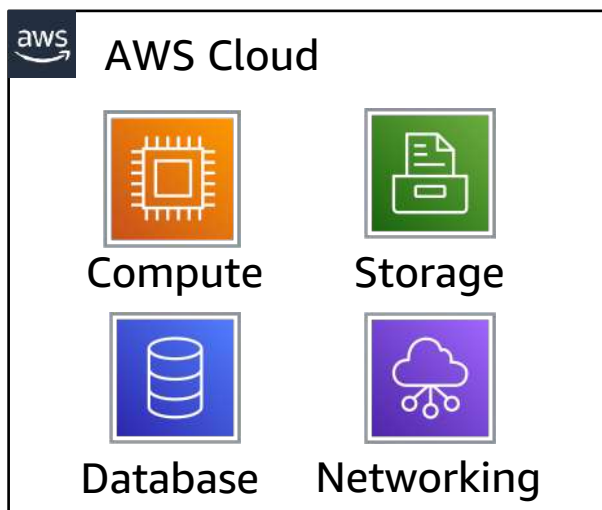




Manage change through automation

Reporting and auditing changes

AWS Systems Manager Change Manager



Li made some changes before going on vacation.

What did she change?

Change requests (7)

Filter change requests by property or value

Create date range 1h 4h 1d 4d 1w 4w < 1 >

	Name	Request ID	Create time	Status	Last updated
<input type="radio"/>	TestCR6	oi-d1e5103f78e1	Sun, 13 Dec 2020 12:26:36 UTC	Success	Sun, 13 Dec 2020 12:31:59 UTC
<input type="radio"/>	TestCR5	oi-2b693029c45c	Sun, 13 Dec 2020 12:23:17 UTC	Cancelled	Sun, 13 Dec 2020 12:25:21 UTC
<input type="radio"/>	TestCR4	oi-1de9fd7e382e	Sun, 13 Dec 2020 12:10:06 UTC	Completed with errors	Sun, 13 Dec 2020 12:15:40 UTC



Ana



Diego



AWS Well-Architected Best Practices

Module 4 Security

Module goals and objectives



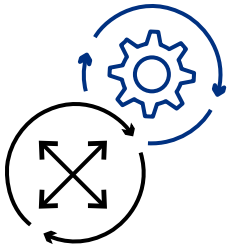
This is an overview of the Security pillar.

You will learn design principles and architectural best practices to achieve security.

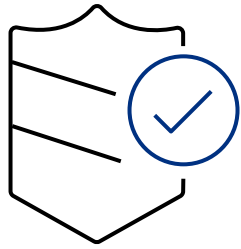
By the end of this module, you will be able to do the following:

- List the design principles for the Security pillar.
- Describe what's needed when implementing best practices for the Security pillar.

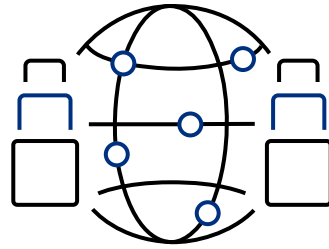
Security



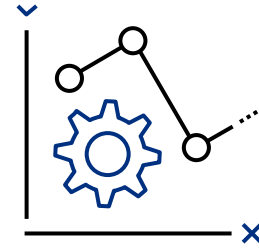
Operational
Excellence



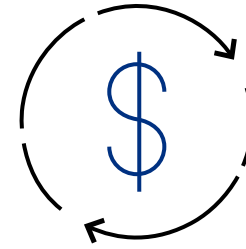
Security



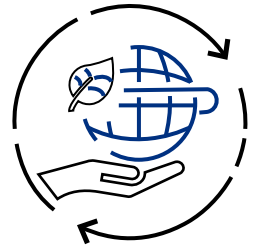
Reliability



Performance
Efficiency



Cost
Optimization

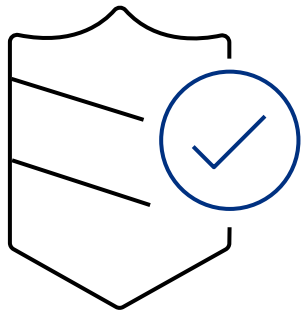


Sustainability



The **Security pillar** considers how you use cloud technologies to protect data systems and assets and improve your security posture.

Security design principles



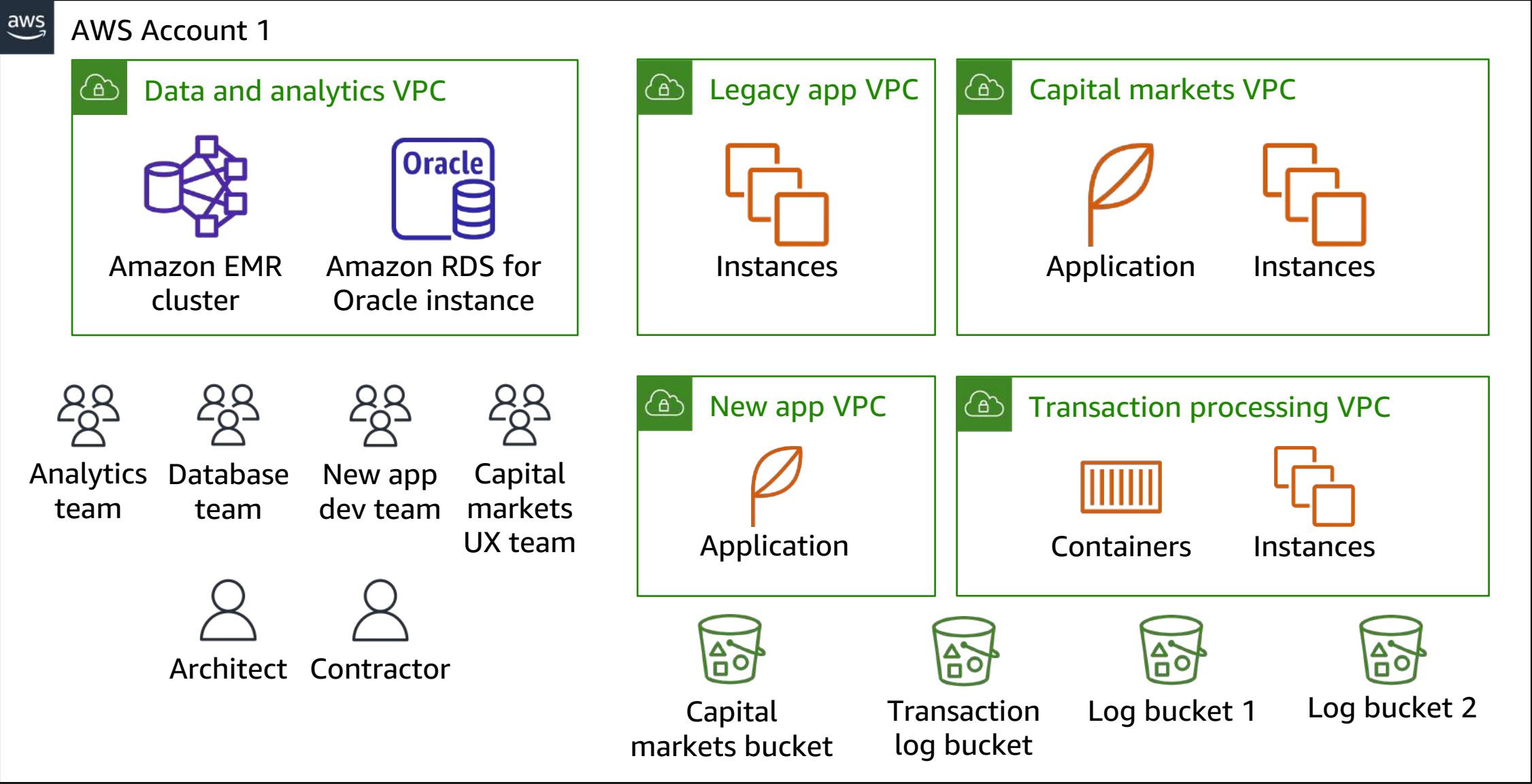
Security

- Implement a strong identity foundation.
- Enable traceability.
- Apply security at all layers.
- Automate security best practices.
- Protect data in transit and at rest.
- Keep people away from data.
- Prepare for security events.

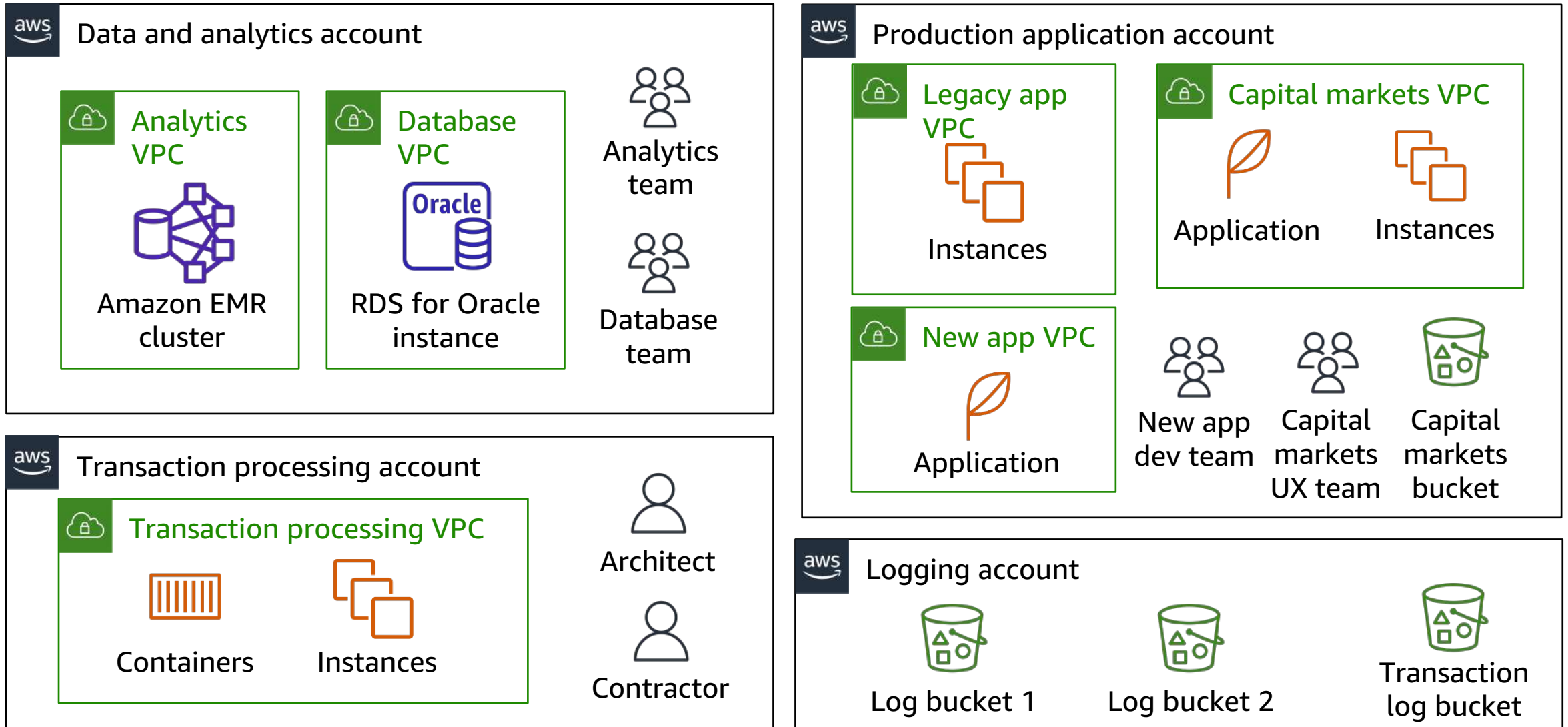


Implement a strong identity foundation

Example: AWS account overcrowding and ambiguous security boundaries



AWS account strategy: AWS account per function





Enable traceability

Detective controls



Gain the visibility you need to spot issues before they impact the business, improve your security posture, and reduce the risk profile of your environment.



AWS Security Hub



Amazon GuardDuty



Amazon Inspector



Amazon CloudWatch



AWS Config



AWS CloudTrail

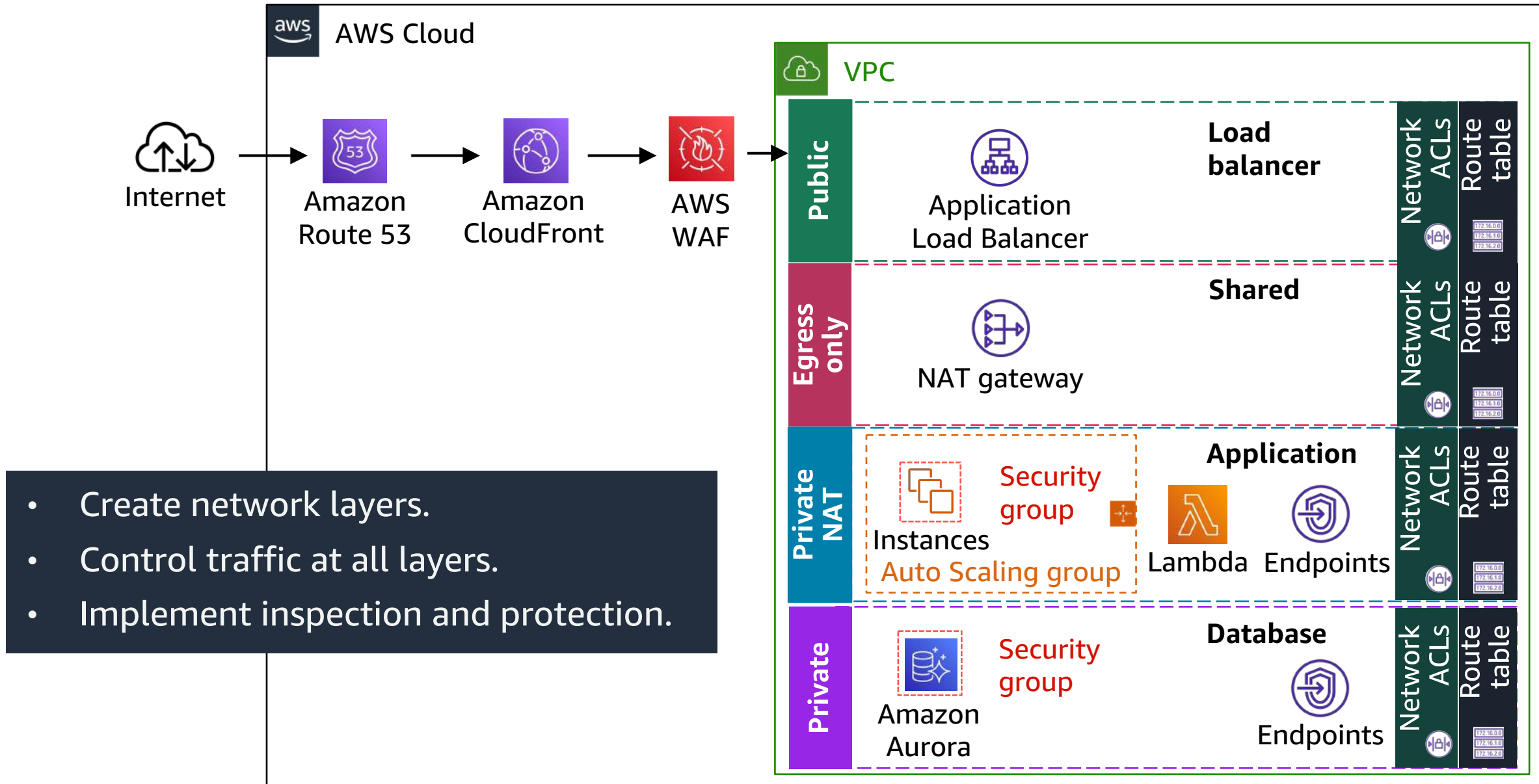


VPC Flow Logs



Apply security at all layers

Best practices – Infrastructure protection

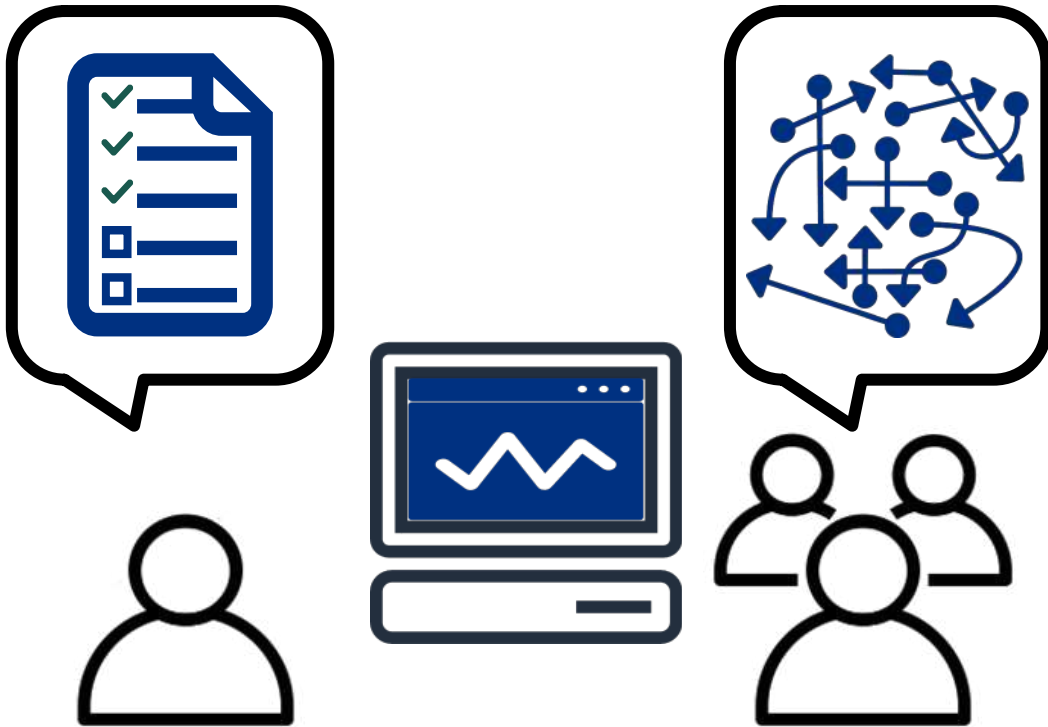


- Create network layers.
- Control traffic at all layers.
- Implement inspection and protection.



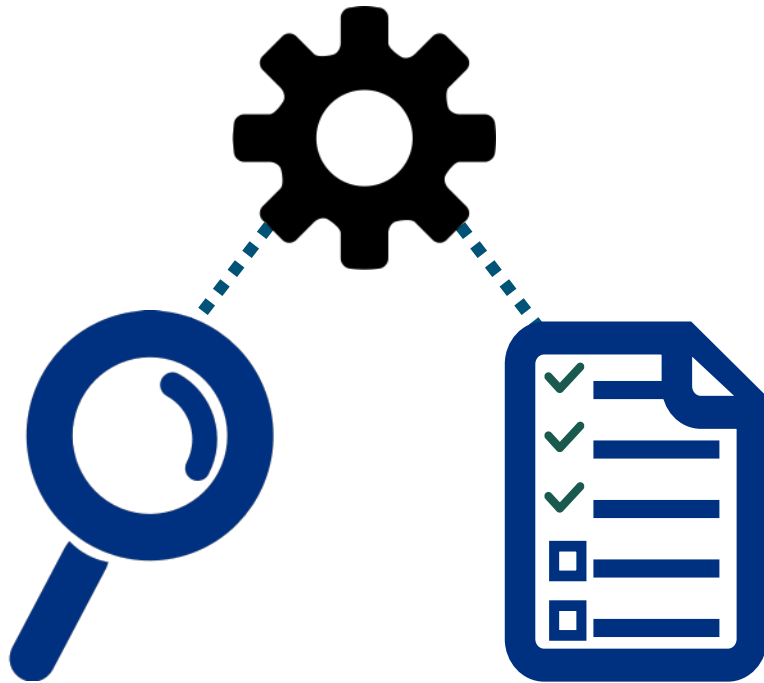
Automate security best practices

Anti-pattern: Manual technical auditing



- Inefficient
- Error prone
- Not highly scalable
- Inconsistent
- Often reactive

Best practice: Continuous automated auditing



DevSecOps: Security as code

- Proactive controls enforced by code.
- Continuous evidence-based auditing.

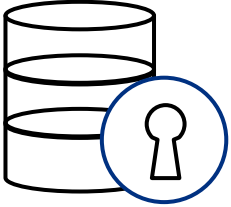
Continuous detective controls

- Amazon Inspector for Amazon EC2
- Amazon Macie for Amazon S3
- AWS Trusted Advisor
- AWS Config rules
- GuardDuty



Protect data in transit and at rest

Data protection



In addition to using automatic data encryption and management services, employ more features for data protection.

(This includes data management, data security, and encryption key storage.)



Amazon Macie



AWS Key Management Service (AWS KMS)



AWS CloudHSM



AWS Certificate Manager (ACM)

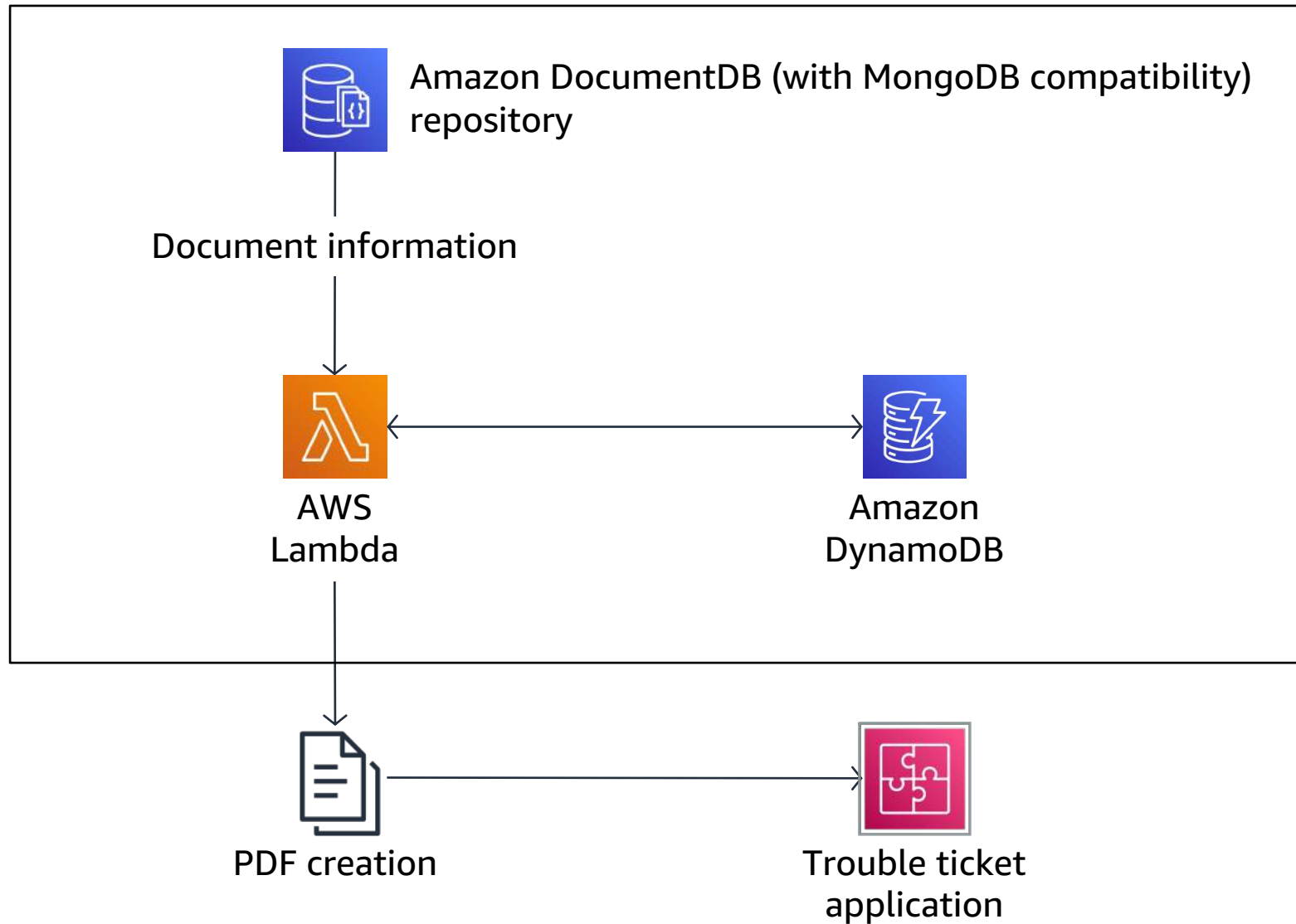


Server-side encryption (SSE)



Keep people away from data

Example: Securing technical documents





Prepare for security events

Incident response



During an incident, containing the event and returning to a known good state are important elements of a response plan.

Automate best practices with these tools.



Amazon Detective



AWS Config rules



AWS Lambda



AWS Well-Architected Best Practices

Module 5 Performance Efficiency

Module goals and objectives



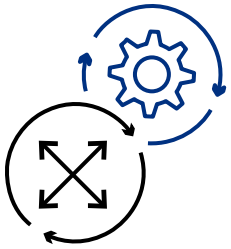
This is an overview of the Performance Efficiency pillar.

You will learn design principles and architectural best practices to achieve performance efficiency.

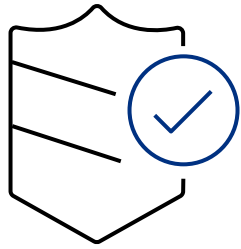
By the end of this module, you will be able to do the following:

- List the design principles for the Performance Efficiency pillar.
- Describe what's needed when implementing best practices for the Performance Efficiency pillar.

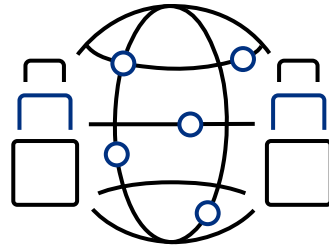
Performance Efficiency



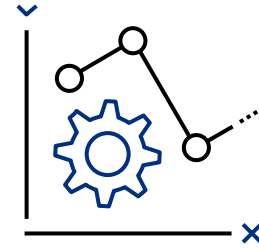
Operational
Excellence



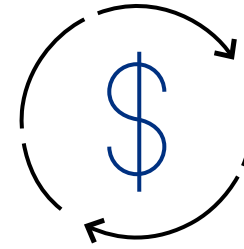
Security



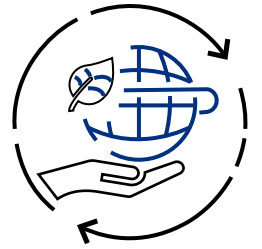
Reliability



Performance
Efficiency



Cost
Optimization

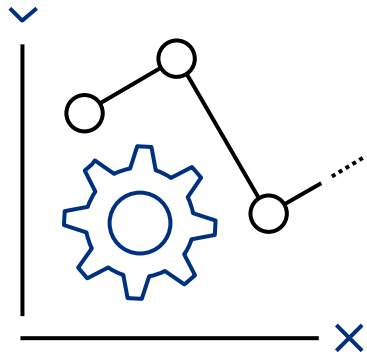


Sustainability



The **Performance Efficiency pillar** encompasses the efficient use of computing resources to meet requirements and maintain efficiency as demand changes and technologies evolve.

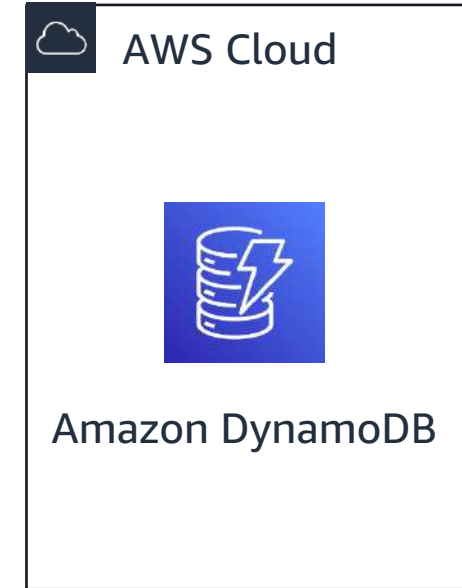
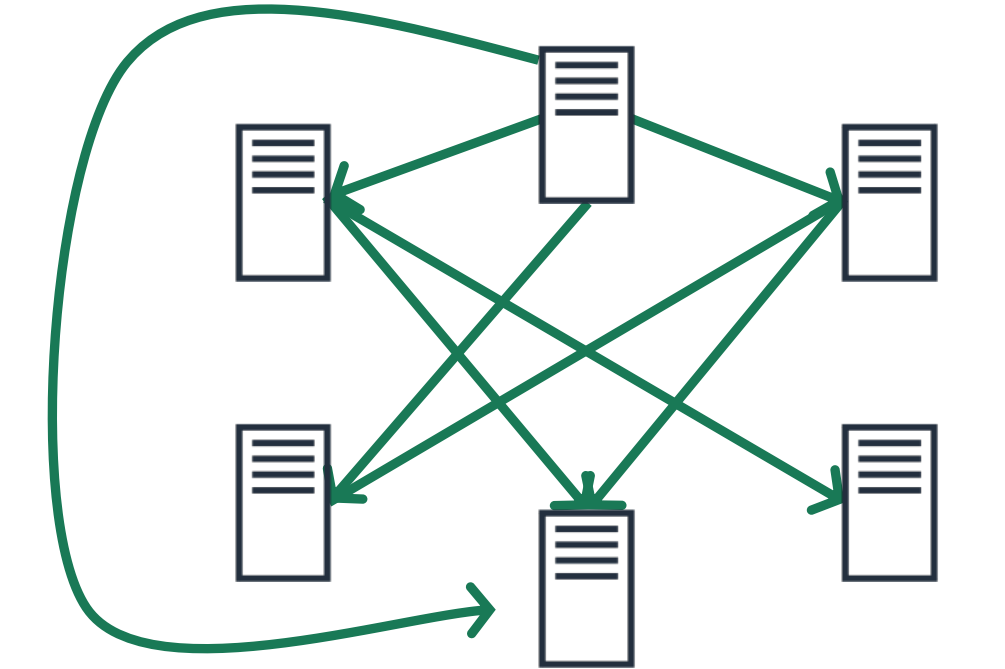
Performance efficiency design principles



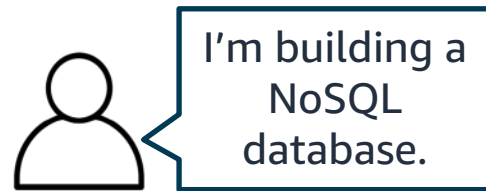
Performance
Efficiency

- Democratize advanced technologies.
- Go global in minutes.
- Use serverless architectures.
- Experiment more often.
- Consider mechanical sympathy.

Democratize advanced technologies



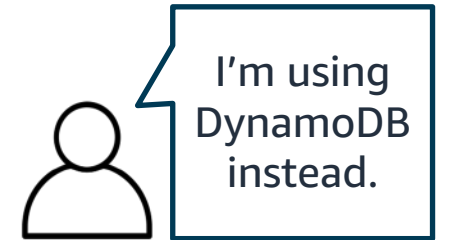
Ana



Diego

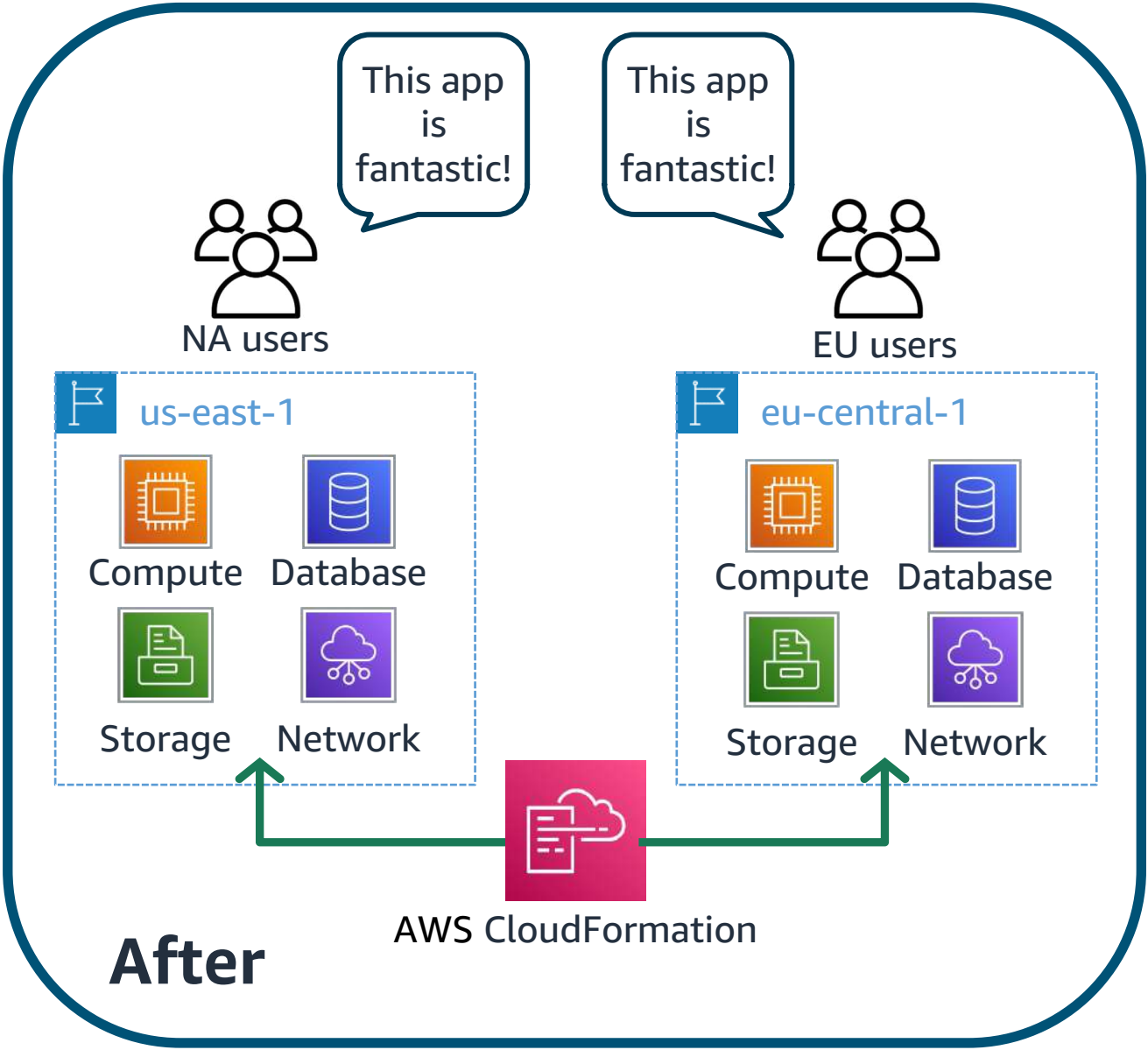
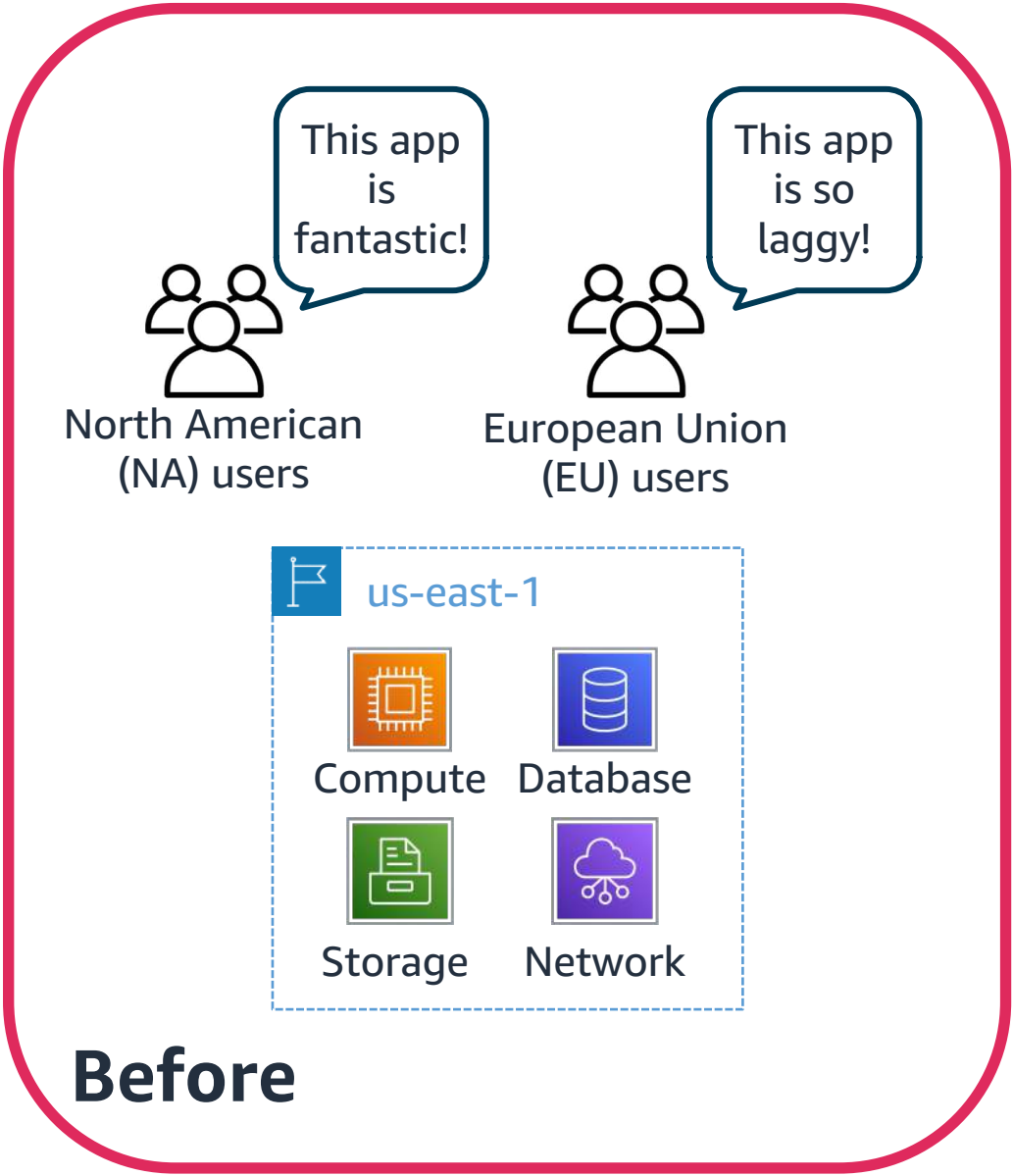


Ana

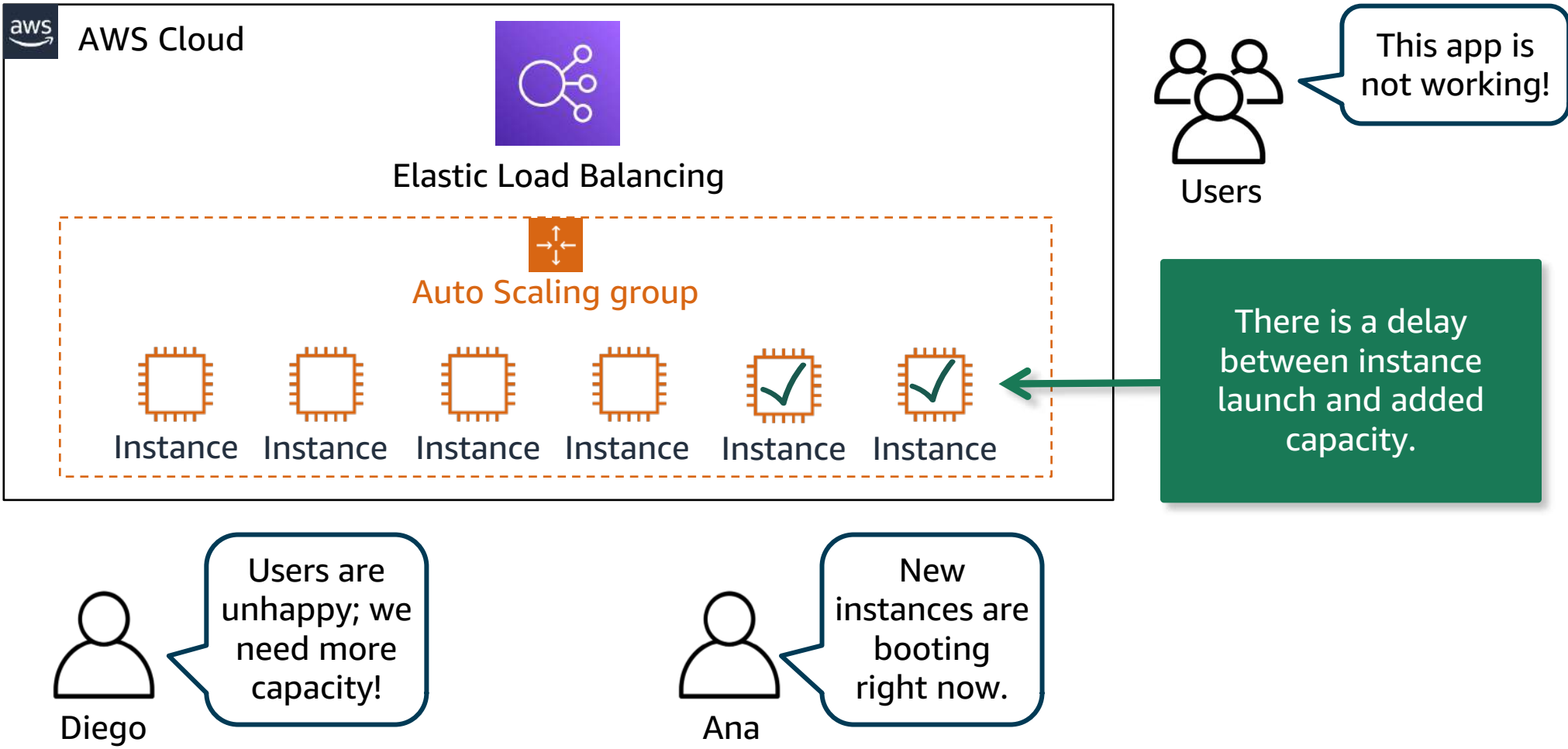


Diego

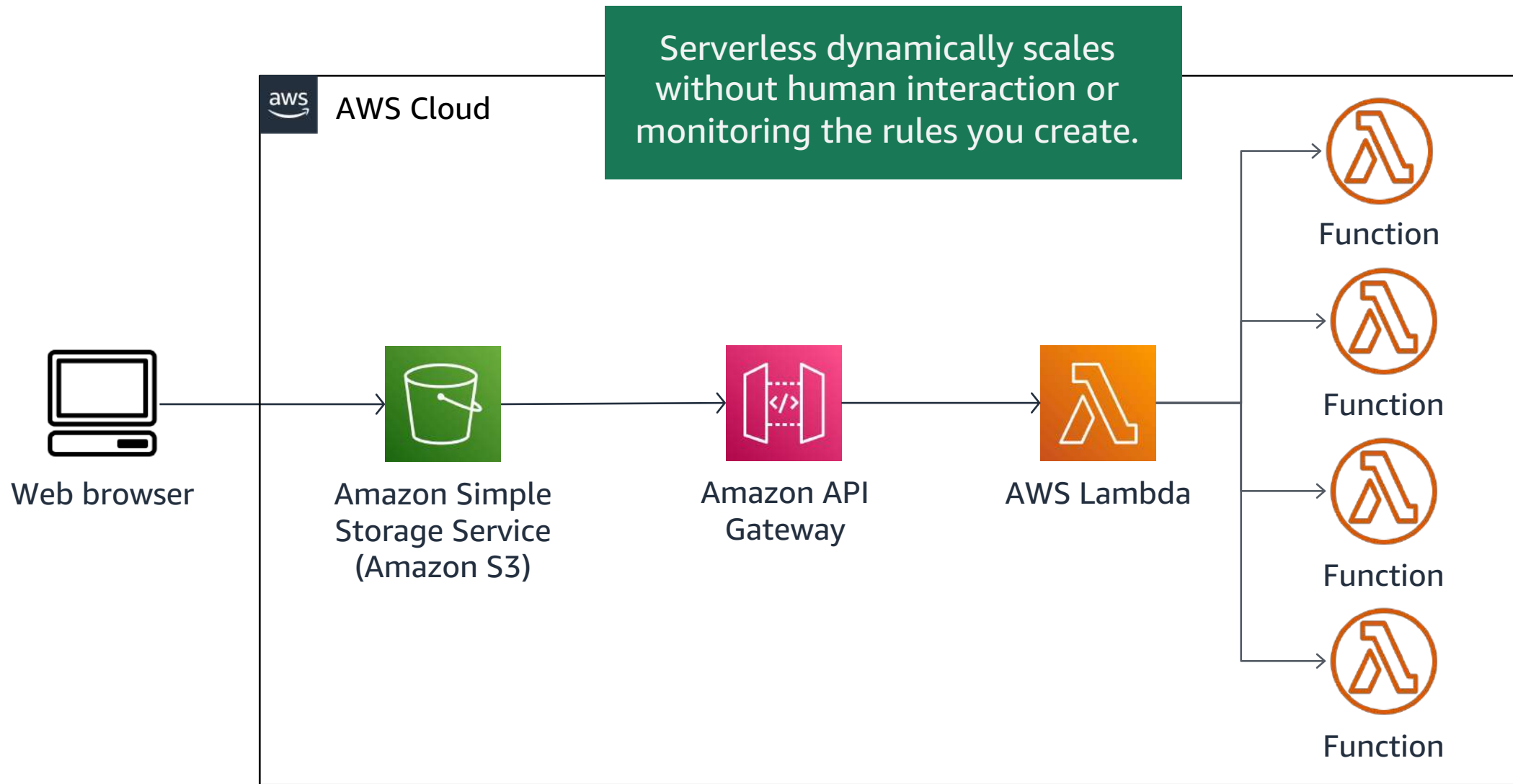
Go global in minutes



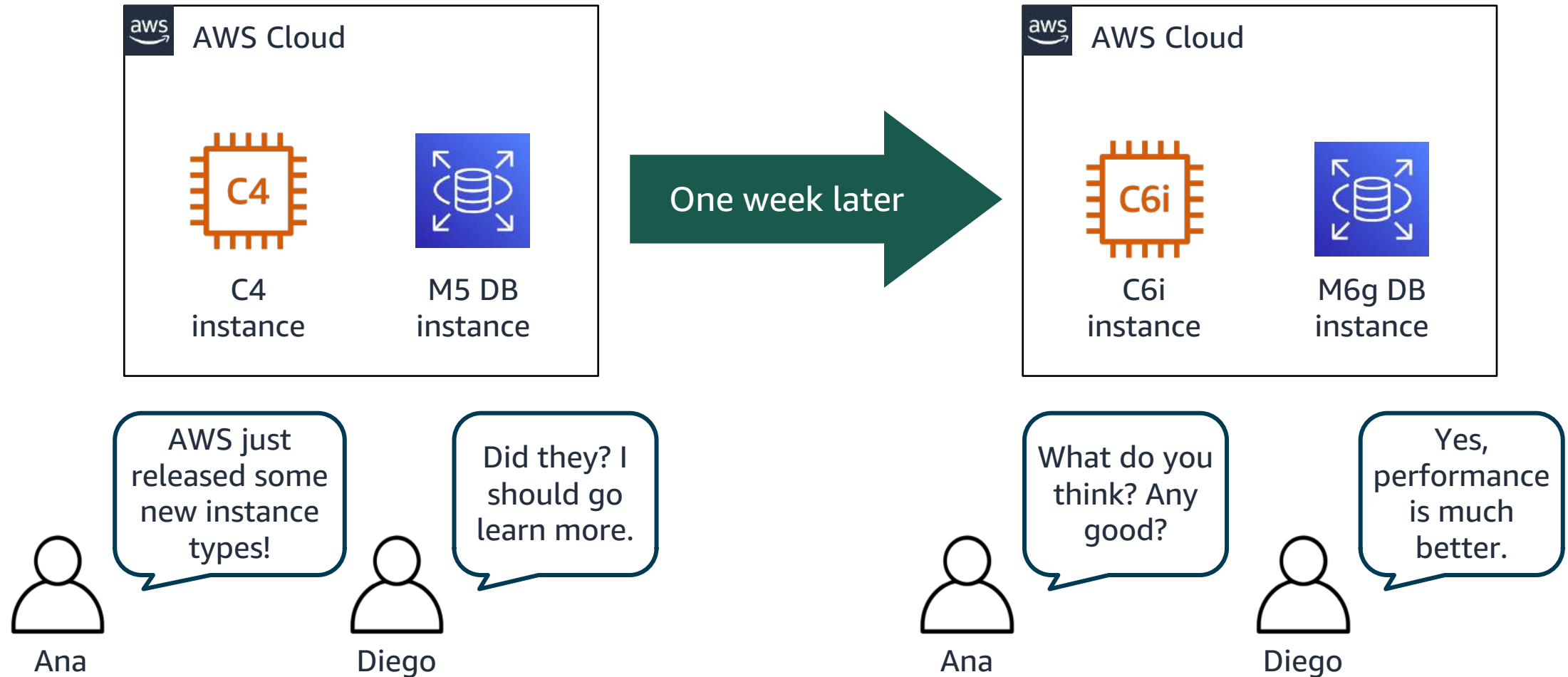
Use serverless architectures (1 of 2)



Use serverless architectures (2 of 2)



Experiment more often



Consider mechanical sympathy



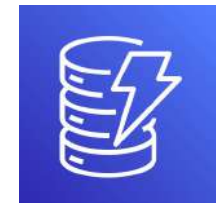
Amazon Relational Database Service (Amazon RDS) DB instance



RDS DB instance



RDS DB instance



Amazon DynamoDB

We need single-digit latency!



Network engineer

We don't want to spend much time taking care of DBs!



Operations engineer

We need infinite scaling!



Database admin

Did anyone say infinite scaling?



Solutions architect



AWS Well-Architected Best Practices

Module 6 Cost Optimization

Module goals and objectives



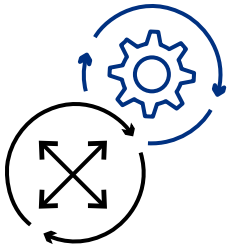
This is an overview of the Cost Optimization pillar.

You will learn design principles and architectural best practices to achieve cost optimization.

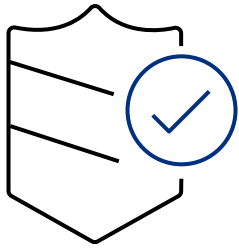
By the end of this module, you will be able to do the following:

- List the design principles for the Cost Optimization pillar.
- Describe what's needed when implementing best practices for the Cost Optimization pillar.

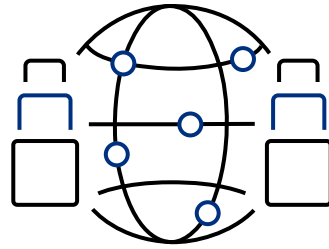
Cost Optimization



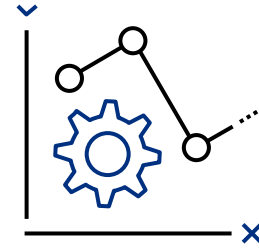
Operational
Excellence



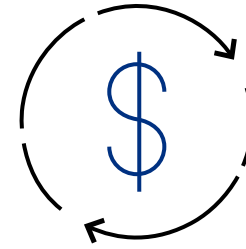
Security



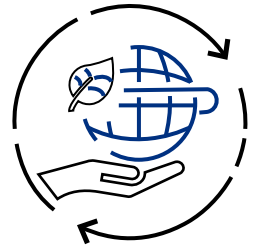
Reliability



Performance
Efficiency



Cost
Optimization

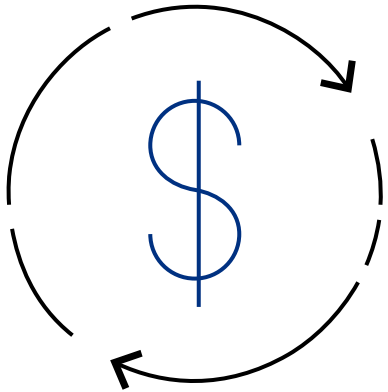


Sustainability



The **Cost Optimization pillar** encourages the ability to run systems that deliver business value at the lowest price point.

Cost optimization design principles



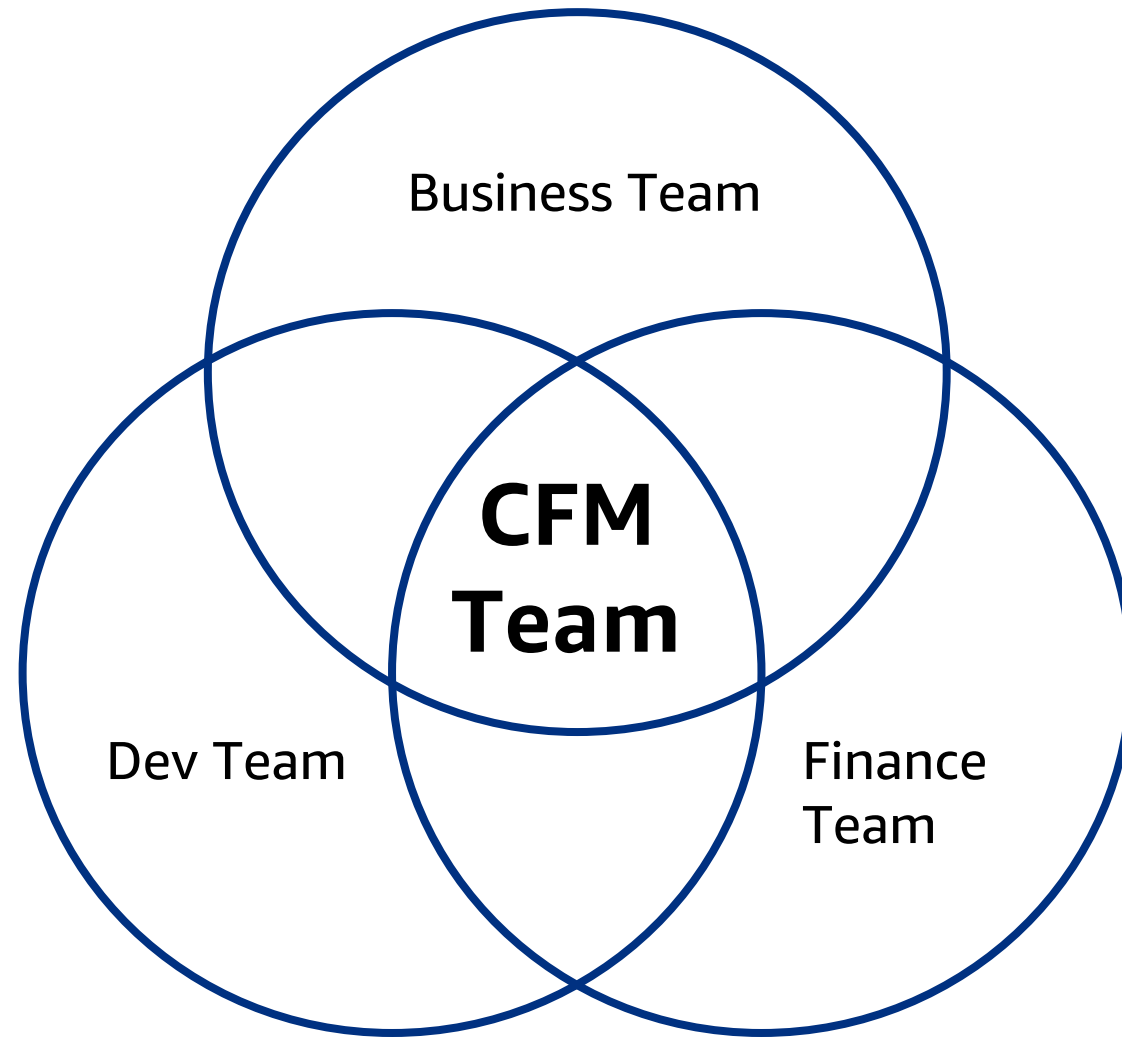
Cost Optimization

- Implement cloud financial management (CFM).
- Adopt a consumption model.
- Measure overall efficiency.
- Stop spending money on undifferentiated heavy lifting.
- Analyze and attribute expenditure.



Implement cloud financial management

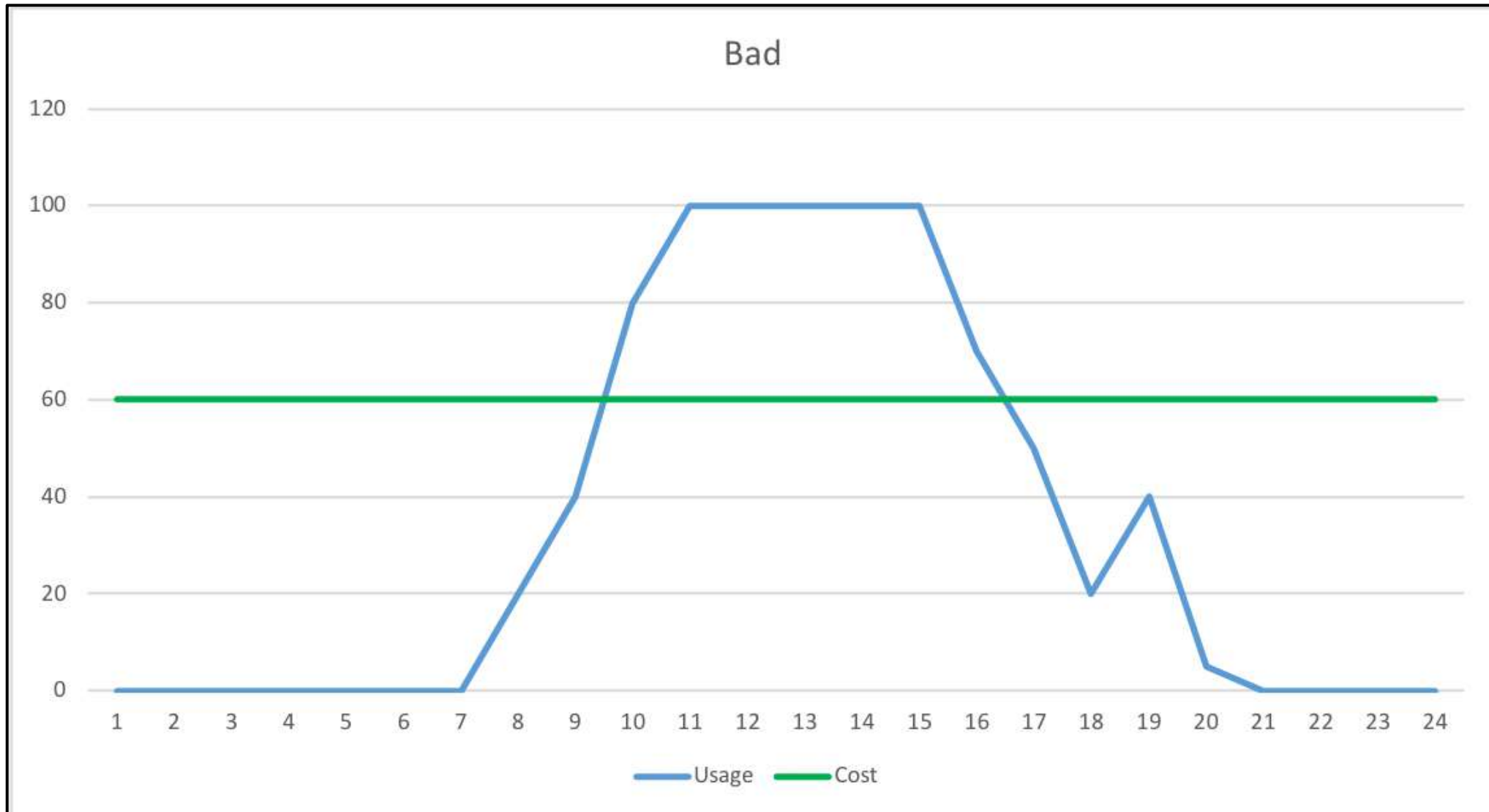
Build CFM capabilities



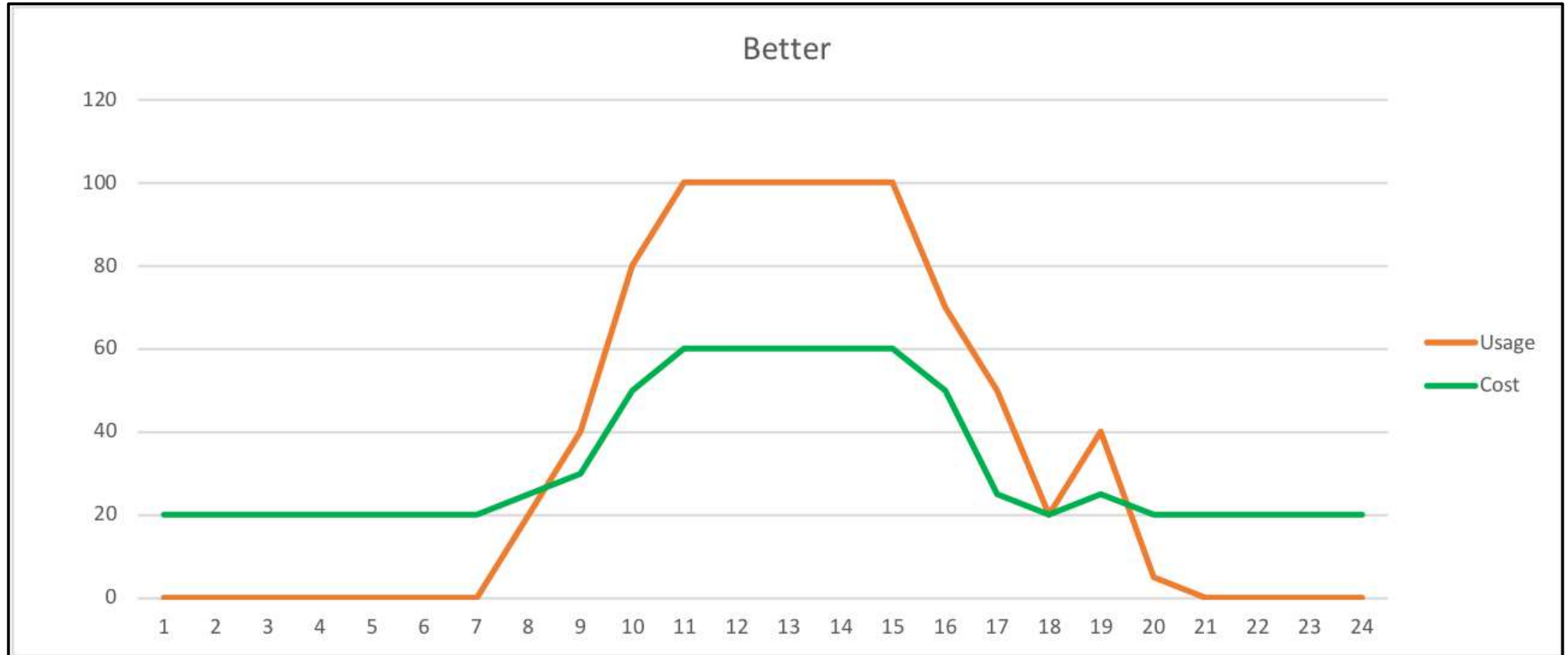


Adopt a consumption model

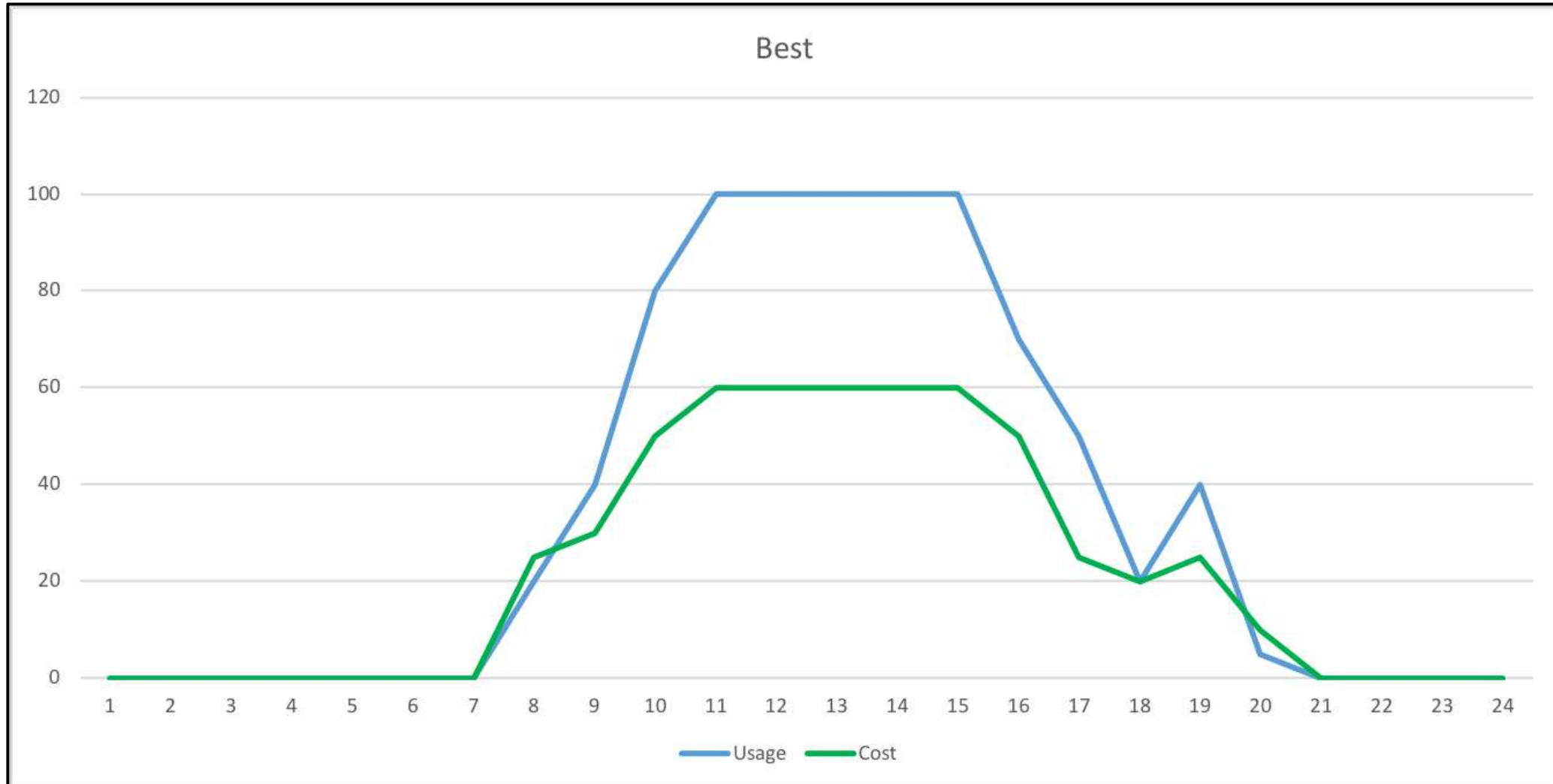
Costs and usage: Bad example



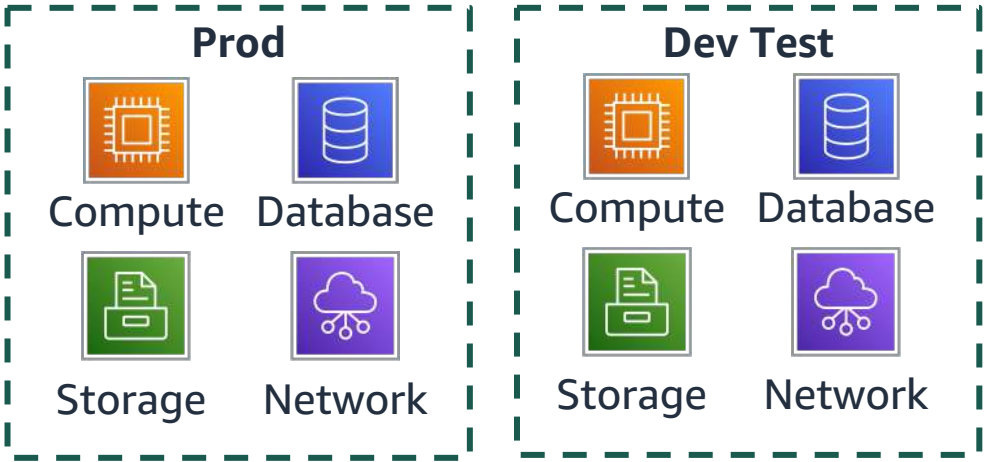
Costs and usage: Better example



Costs and usage: Best example



Pay for what you use

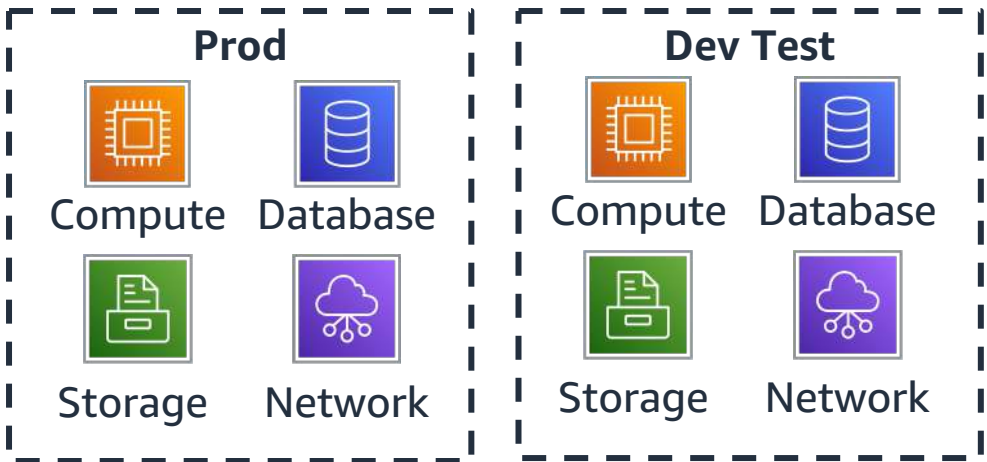


24 x 365

24 x 365

Approximately
\$17,520

\$1 per hour



24 x 365

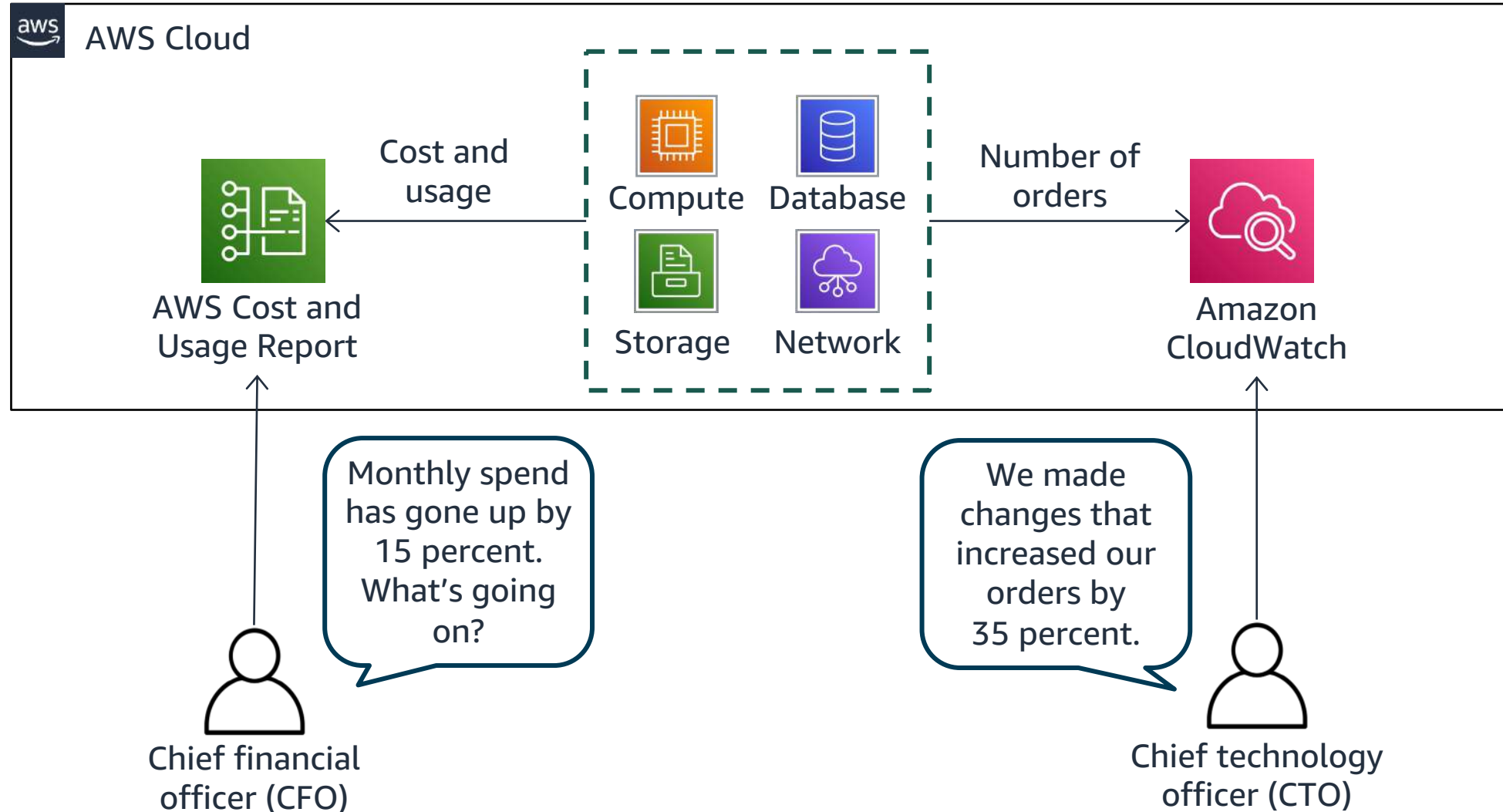
8 x 261

Approximately
\$10,848

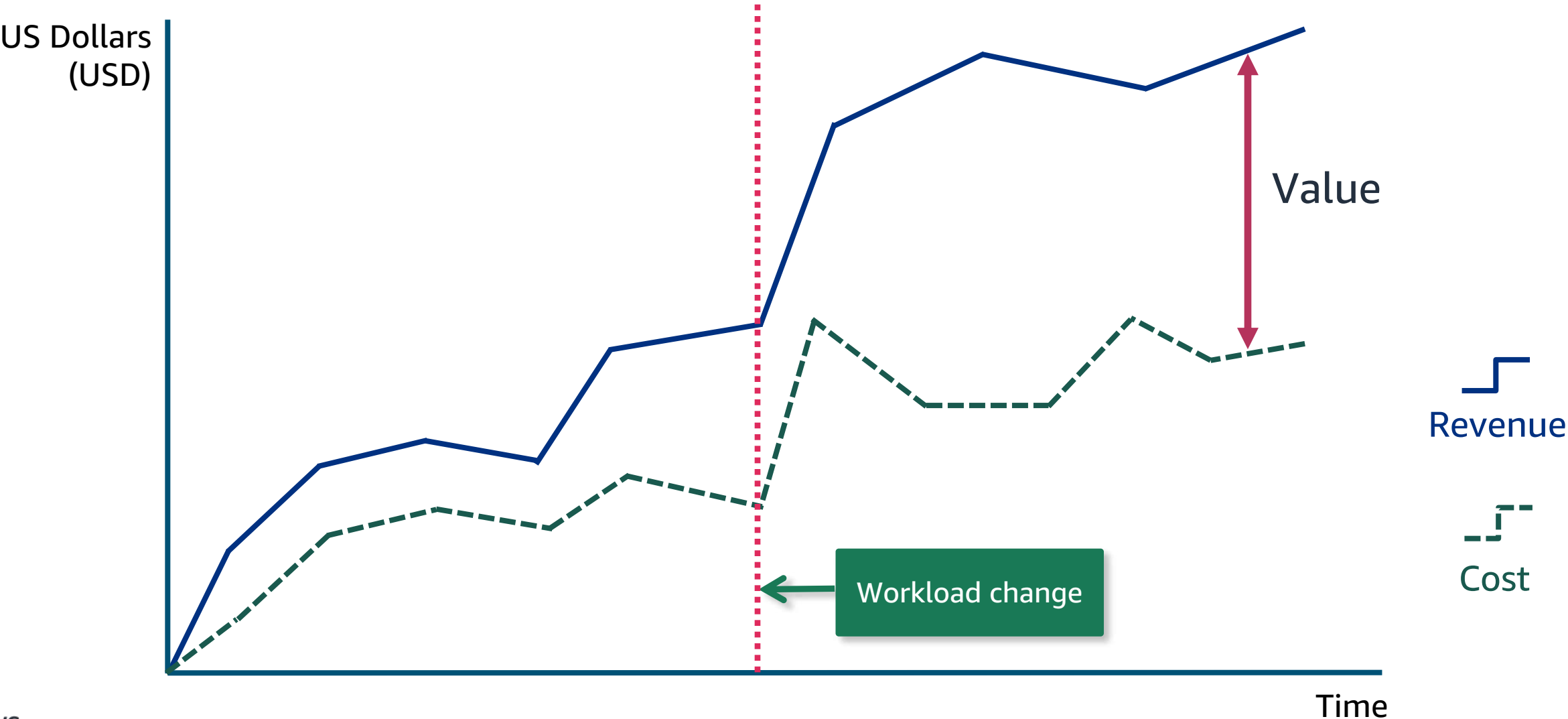


Measure overall efficiency

Look at cost compared to investment



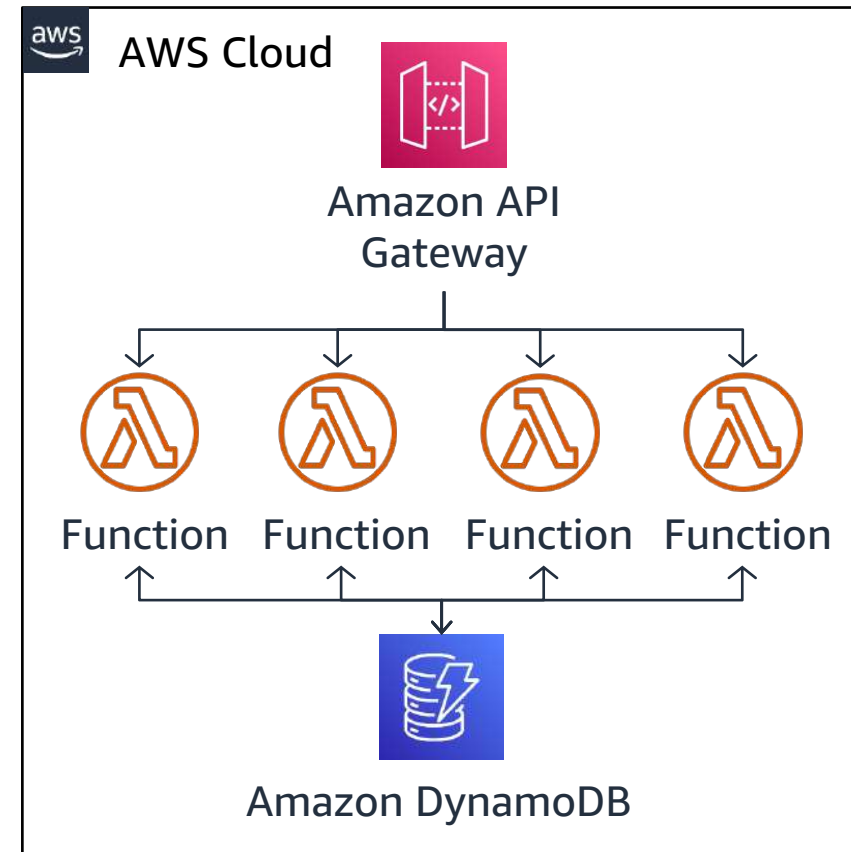
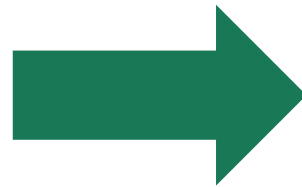
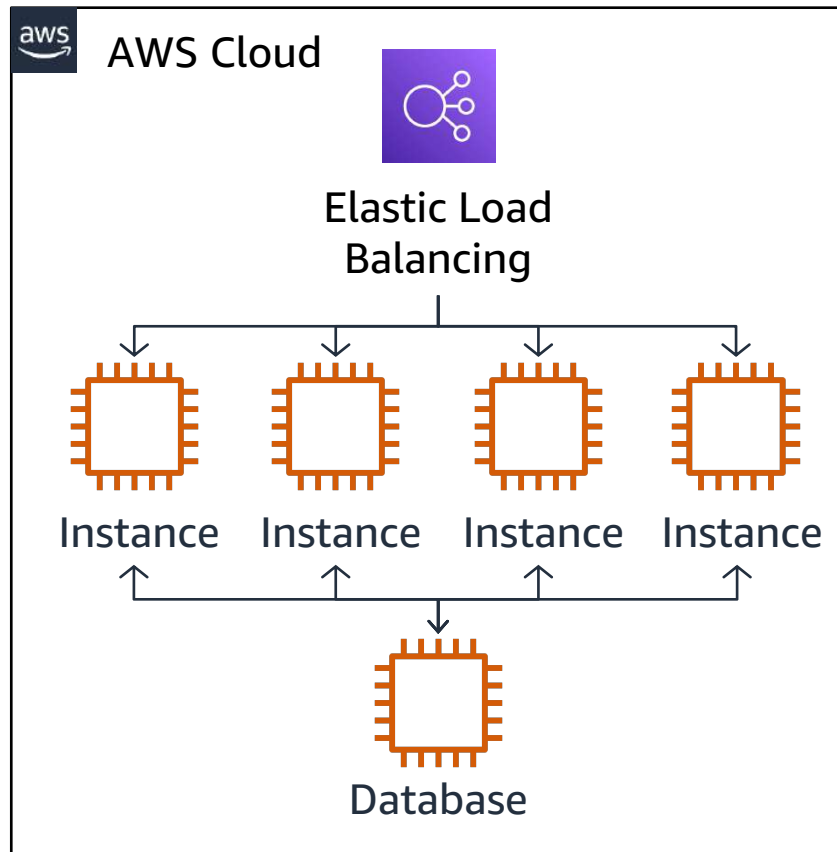
Graph: Cost compared to investment





**Stop spending money on
undifferentiated heavy lifting**

Transition to serverless architectures



Can you look into how we can improve deployments?



Diego



Ana

Sorry, I can't. I need to patch these instances.

Can you look into how we can improve deployments?



Diego



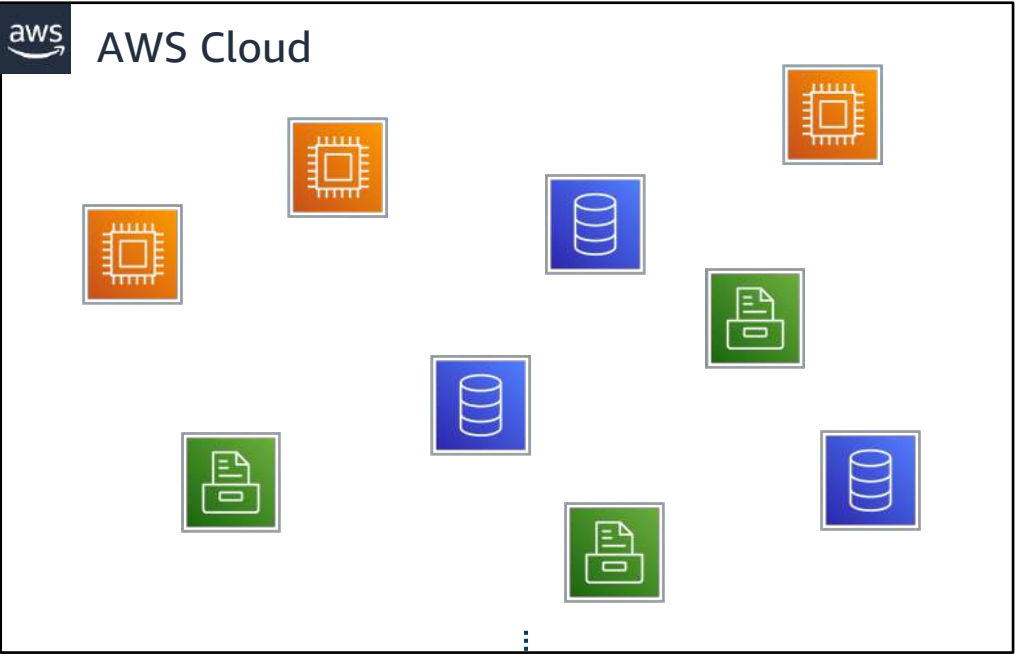
Ana

I'm already on it!



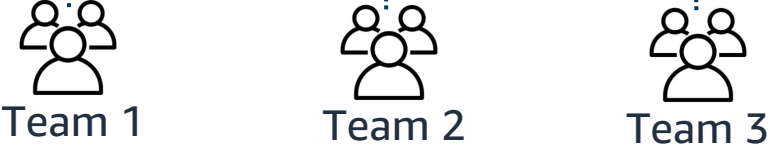
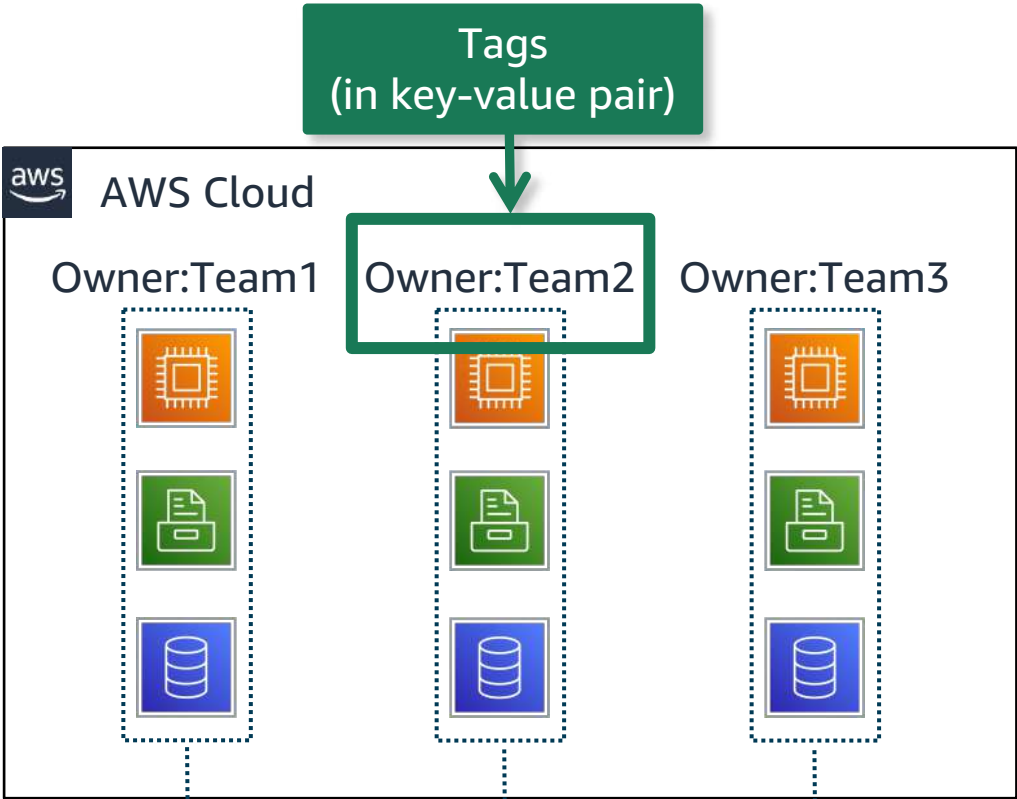
Analyze and attribute expenditure

Identify usage and cost



CFO

Our monthly bill just dropped.
What happened?



CFO

Team 2 just purchased
savings plans.



AWS Well-Architected Best Practices

Module 7 Sustainability

Module goals and objectives



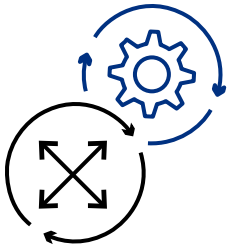
This module is an overview of the Sustainability pillar.

You will learn design principles and architectural best practices to achieve Sustainability.

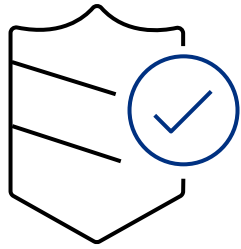
By the end of this module, you will be able to do the following:

- List the design principles for the Sustainability pillar.
- Describe what's needed when implementing best practices for the Sustainability pillar.

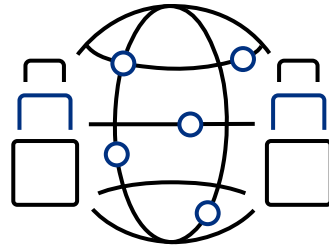
Sustainability



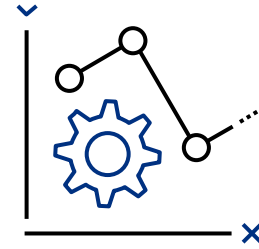
Operational
Excellence



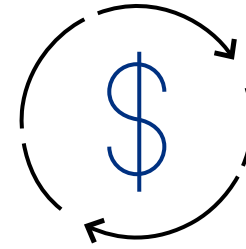
Security



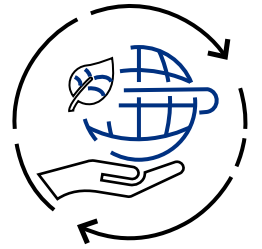
Reliability



Performance
Efficiency

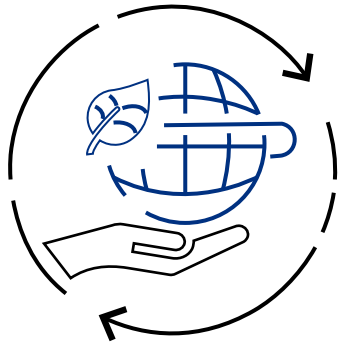


Cost
Optimization



Sustainability

Sustainability design principles



Sustainability

- Understand your impact.
- Establish sustainability goals.
- Maximize utilization.
- Anticipate and adopt new, more efficient hardware and software offerings.
- Use managed services.
- Reduce the downstream impact of your cloud workloads.

Sustainability best practices



- AWS Region selection
- User behavior patterns
- Software and architecture patterns
- Data patterns
- Hardware patterns
- Development and deployment process

Knowledge check 1

Which of the following options is a Sustainability pillar design principle? (Select TWO.)

Choice	Response
A	Maximize utilization.
B	Test systems at production scale.
C	Improve through game days.
D	Reduce the downstream impact of your cloud workloads.
E	Anticipate failures.

Knowledge check 1 answer

Which of the following options is a Sustainability pillar design principle? (Select TWO.)

Choice	Response
A Correct	Maximize utilization.
B	Test systems at production scale.
C	Improve through game days.
D Correct	Reduce the downstream impact of your cloud workloads.
E	Anticipate failures.



AWS Well-Architected Best Practices

Module 8

Course Summary



Recap

Summary

- AWS Well-Architected introduction
 - AWS Well-Architected Framework
 - AWS Well-Architected Tool
 - AWS Well-Architected reviews
- Pillar-specific design principles and best practices
 - Operational excellence
 - Reliability
 - Security
 - Performance efficiency
 - Cost optimization
 - Sustainability



Resources

AWS Well-Architected resources

- AWS Well-Architected Framework website
- AWS Well-Architected Framework resources in AWS Documentation
- AWS Well-Architected Labs
- AWS Solutions Library
- The AWS Builders' Library

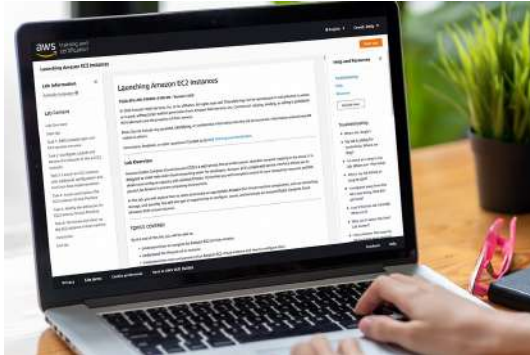


Continue your learning

AWS Skill Builder online learning center



Game-based learning



Self-paced labs



Use case challenges



Exam preparation

Continue to deepen the skills you need, your way, with 500+ courses and interactive training developed by the experts at AWS.



Get started

<https://aws.amazon.com/training/digital>

Don't miss these learning opportunities



Free Digital Training

Learn with hundreds of free, self-paced digital courses on AWS fundamentals.



Classroom Training

Deepen your technical skills and learn from an accredited AWS instructor.

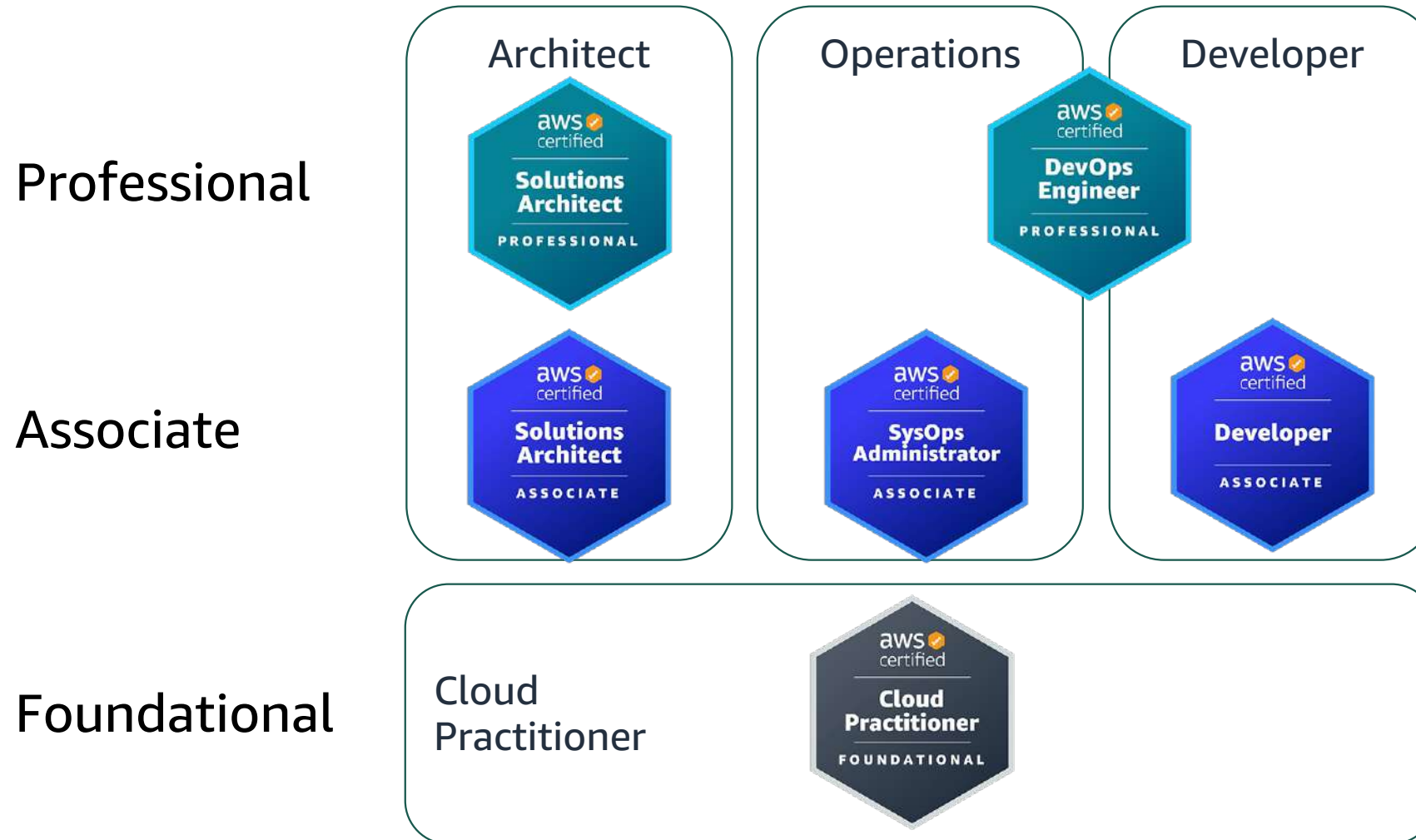


AWS Certification

Validate your expertise with an industry-recognized credential.

AWS certification

Role-based certifications align to the following roles and levels:



Specialty certifications align to domain expertise in the following areas:

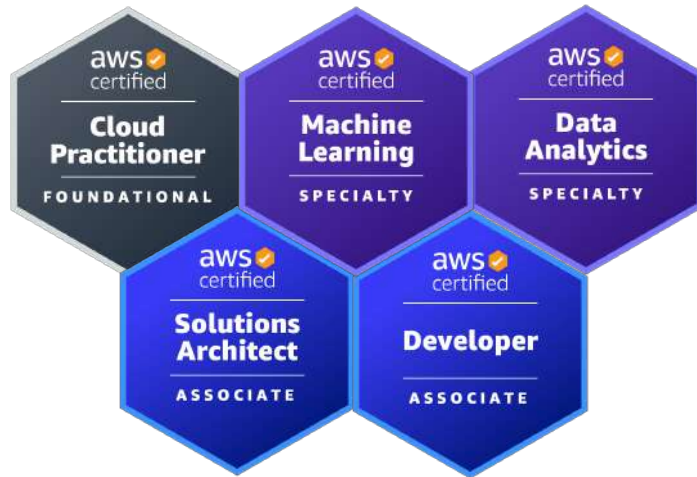


Thank you!



ANDY KROLL

Senior AWS Partner Trainer – Waco, TX



Thanks for attending today's course!

- Look out for 2 emails
- Complete the course evaluation
- Feel free to connect with me on LinkedIn

<https://www.linkedin.com/in/andykrolltx/>



End of Module 8

Corrections, feedback, or other questions?
Contact us at <https://support.aws.amazon.com/#/contacts/aws-training>.
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