

AWS re:Invent

NOV. 28 – DEC. 2, 2022 | LAS VEGAS, NV

SUP303-R

Intelligently automating cloud operations

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Principal Support Engineer
Amazon Web Services

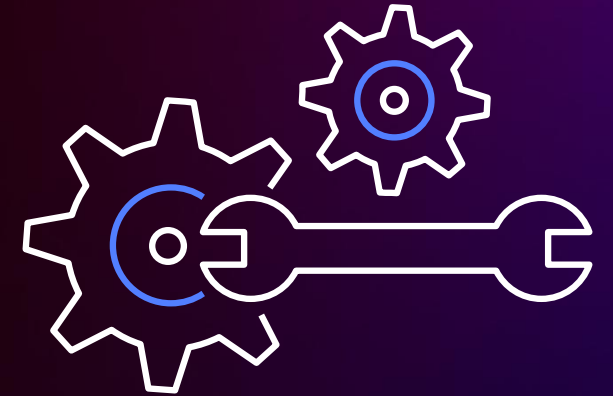
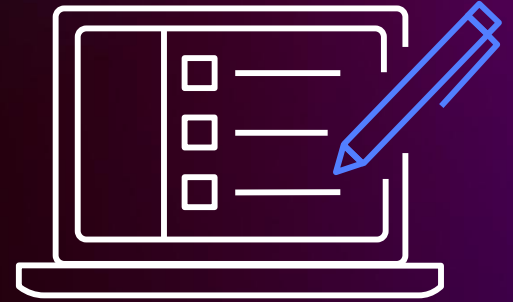
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Principal Support Engineer
Amazon Web Services



Agenda

- Workshop instructions
- Why we are here and what we will be using
 - Operations at scale
 - Intelligent data sources
 - Intelligence through machine learning
 - Automation tools
- Building intelligent automations



<https://s12d.com/SUP303>

or

**[https://catalog.workshops.aws/join
91f2-0125f1-80](https://catalog.workshops.aws/join/91f2-0125f1-80)**

Getting started with this workshop

- As a participant, you will have access to an AWS account with any optional pre-provisioned infrastructure and IAM policies needed to complete this workshop
- The AWS account will only be available for the duration of this workshop – you will lose access to the account thereafter
- The optional pre-provisioned infrastructure will be deployed to a specific Region – check your workshop content to determine whether other Regions will be used
- Be sure to review the terms and conditions of the event – do not upload any personal or confidential information to the account

Step 1: Sign in via your preferred method

<https://catalog.workshops.aws/join>



aws workshop studio

Workshop Studio > Sign in

Sign in

Choose a preferred sign-in method

Email one-time password (OTP)

Enter your personal or corporate email to receive a one-time password

Login with Amazon

Login with your Amazon.com retail account

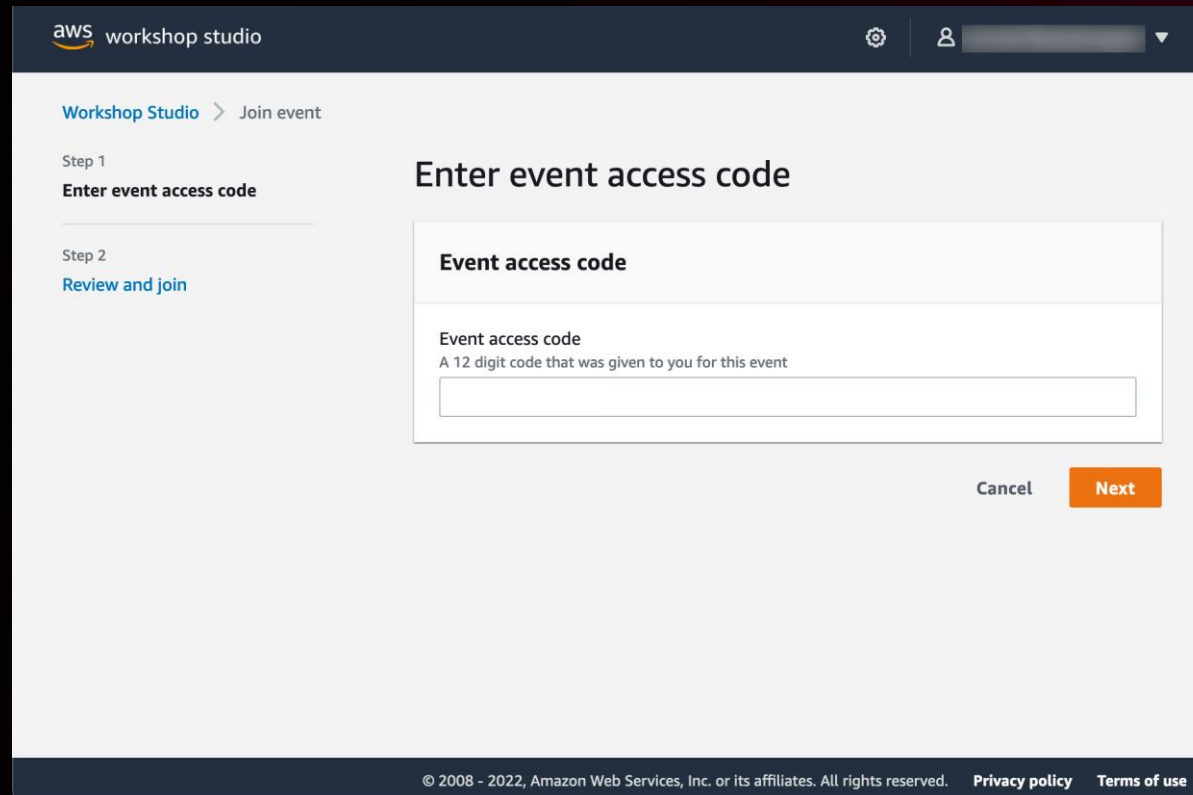
Amazon employee

Login with your Amazon Corporate account. Only for Amazon Employees.

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Step 2: Enter event access code

Enter the 12-digit event access code – if you were given a one-click join link, you can skip this step



The screenshot shows the AWS Workshop Studio interface. At the top, there's a header with the AWS logo and 'workshop studio' text. Below the header, a breadcrumb trail shows 'Workshop Studio > Join event'. The main content area is titled 'Enter event access code'. On the left side of this area, there's a sidebar with 'Step 1 Enter event access code' (highlighted) and 'Step 2 Review and join'. The main content area contains a form titled 'Event access code' with a subtitle 'Event access code' and a description 'A 12 digit code that was given to you for this event'. Below this is a text input field. At the bottom right of the form, there are two buttons: 'Cancel' and 'Next'.

aws workshop studio

Workshop Studio > Join event

Step 1
Enter event access code

Step 2
Review and join

Enter event access code

Event access code




Event access code
A 12 digit code that was given to you for this event

Cancel Next

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Step 3: Review terms and join event

aws workshop studio

Workshop Studio > Join event

Step 1

[Enter event access code](#)

Step 2

Review and join

Review and join

Event details

Name	Start time	Duration	Level
AWS General Immersion Day	9/23/2022 01:13 AM	12 hours	-

Description

AWS General Immersion Day

Terms and Conditions

Read and accept before joining the event

1. By using AWS Workshop Studio for the relevant event, you agree to the AWS Event Terms and Conditions and the AWS Acceptable Use Policy. You acknowledge and agree that are using an AWS-owned account that you can only access for the duration of the relevant event. If you find residual resources or materials in the AWS-owned account, you will make us aware and cease use of the account. AWS reserves the right to terminate the account and delete the contents at any time.

2. You will not: (a) process or run any operation on any data other than test data sets or lab-approved materials by AWS, and (b) copy, import, export or otherwise create derivate works of materials provided by AWS, including but not limited to, data sets.

3. AWS is under no obligation to enable the transmission of your materials through Event Engine and may, in its discretion, edit, block, refuse to post, or remove your materials at any time.

4. Your use of AWS Workshop Studio will comply with these terms and all applicable laws, and your access to AWS Workshop Studio will immediately and automatically terminate if you do not comply with any of these terms or conditions.

☒ I agree with the Terms and Conditions

Cancel

Previous

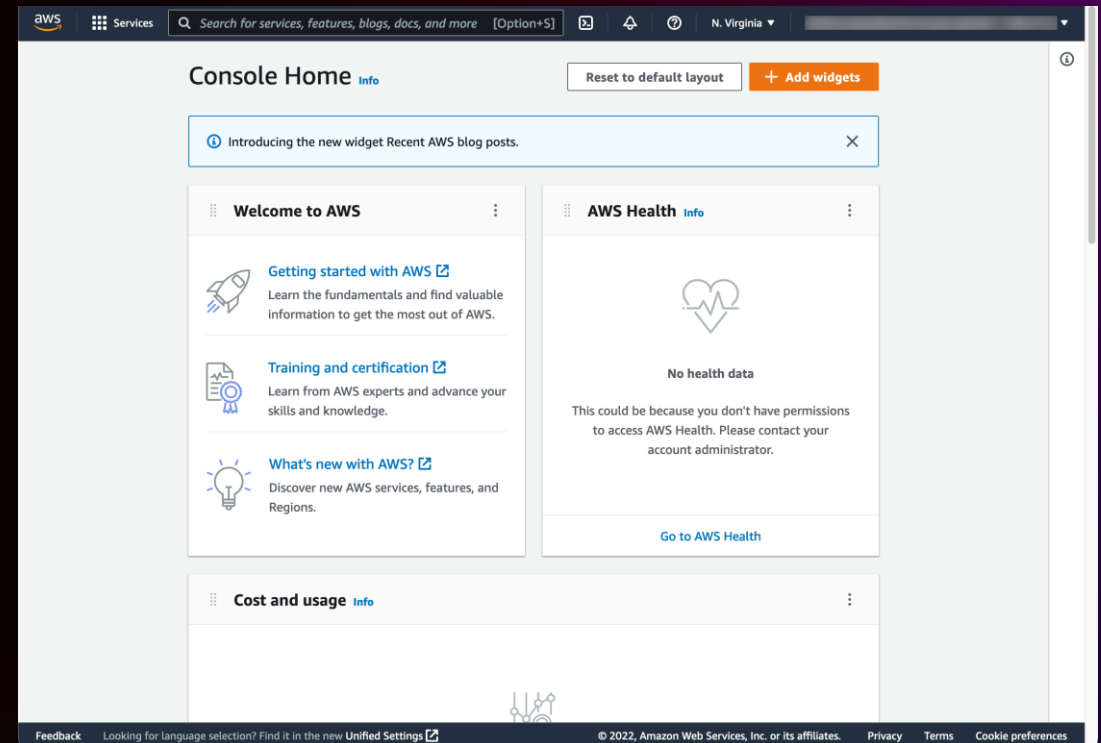
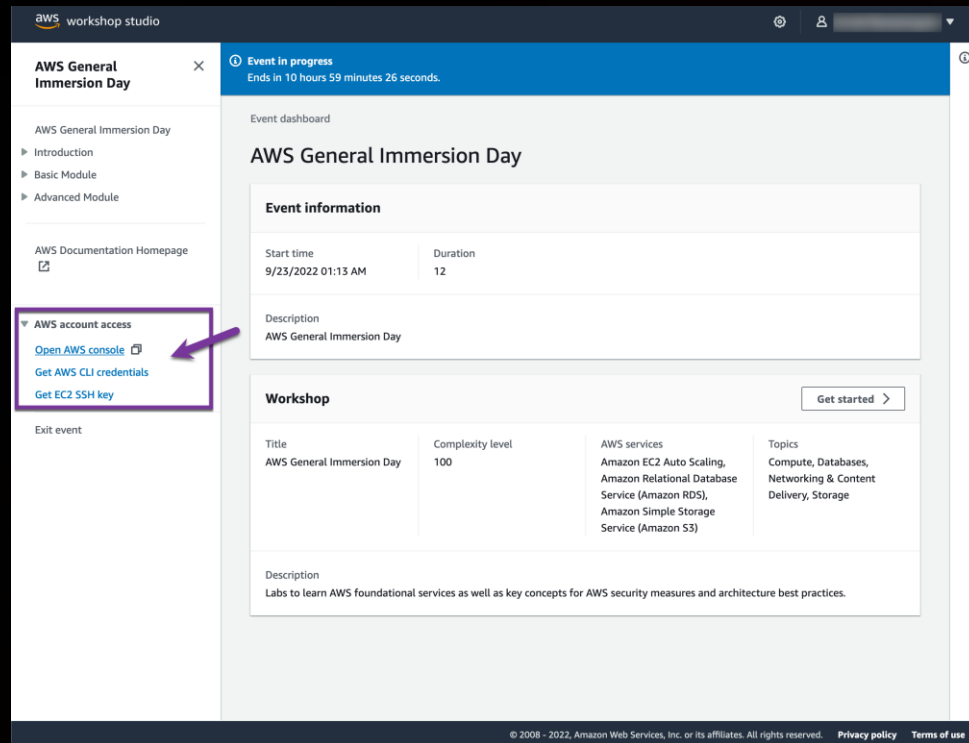
Join event

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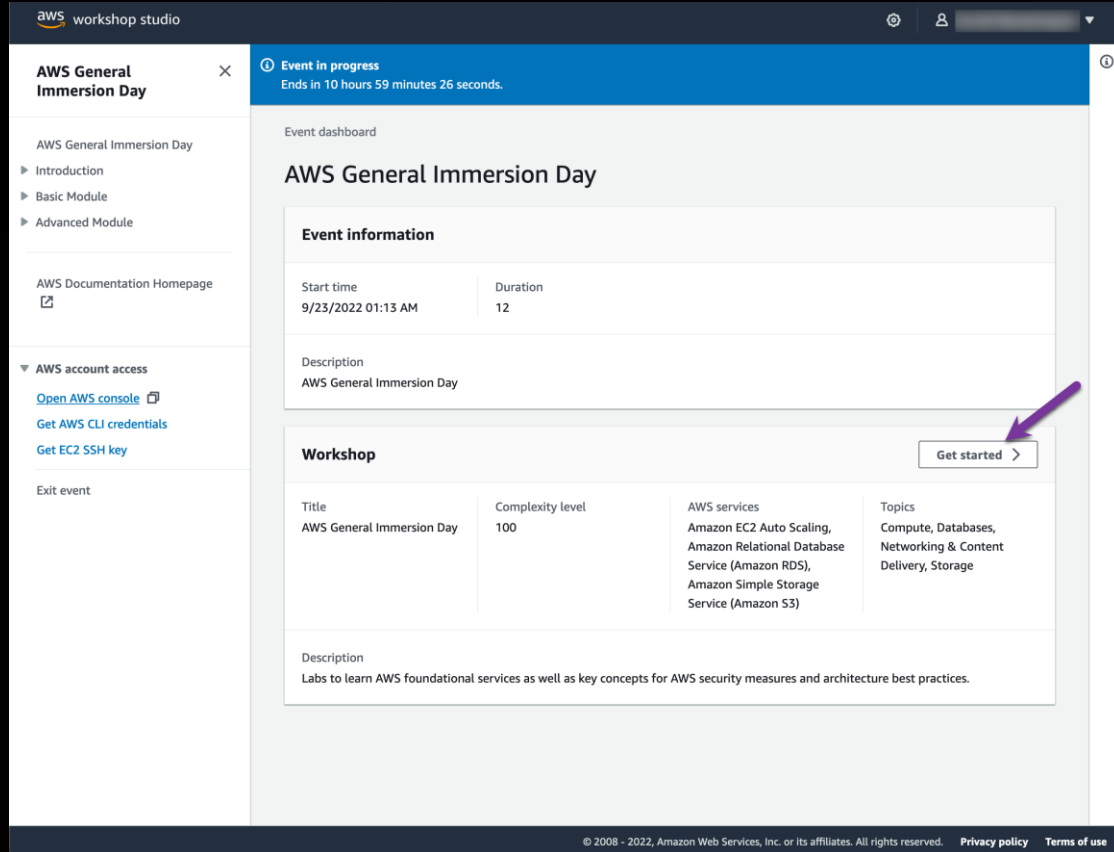
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Step 4: Access AWS account

Access the AWS console or generate AWS CLI credentials as needed



Step 5: Get started with the workshop



aws workshop studio

Event in progress
Ends in 10 hours 59 minutes 26 seconds.

Event dashboard

AWS General Immersion Day

Event information

Start time	Duration
9/23/2022 01:13 AM	12

Description
AWS General Immersion Day

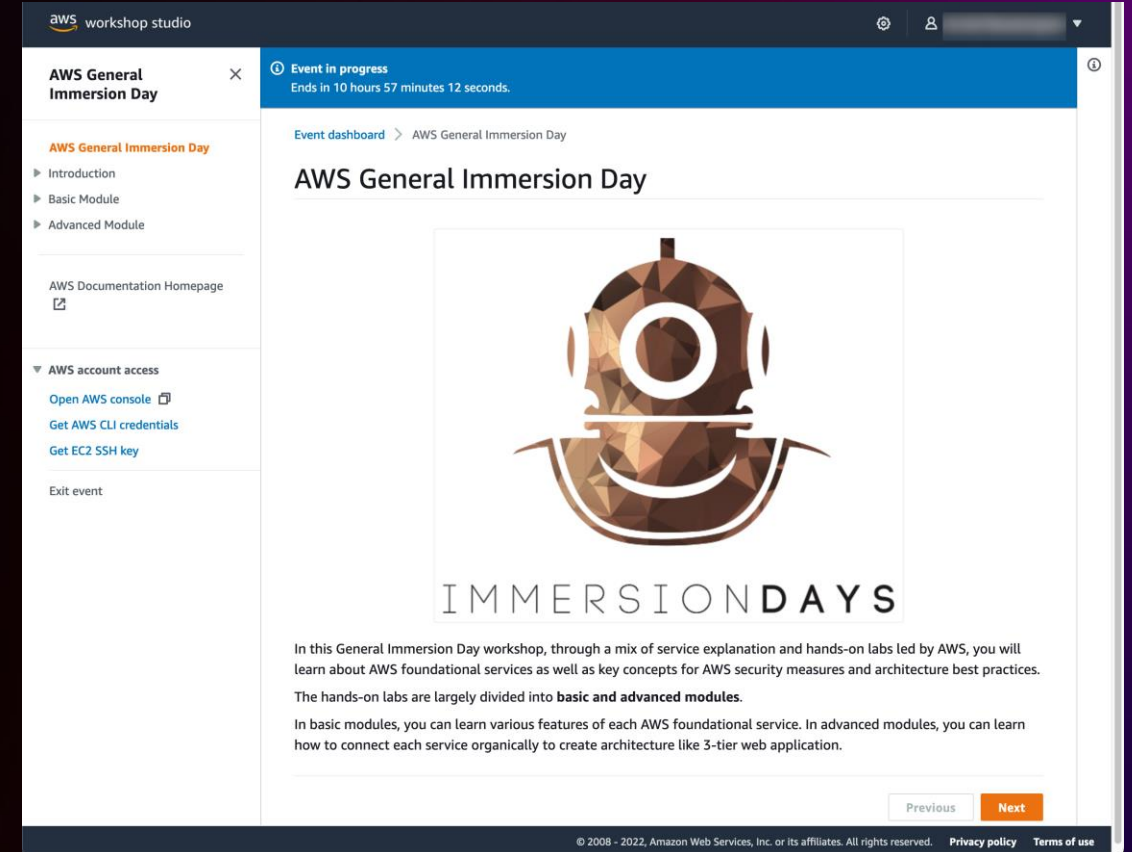
Workshop

Title	Complexity level	AWS services	Topics
AWS General Immersion Day	100	Amazon EC2 Auto Scaling, Amazon Relational Database Service (Amazon RDS), Amazon Simple Storage Service (Amazon S3)	Compute, Databases, Networking & Content Delivery, Storage

Description
Labs to learn AWS foundational services as well as key concepts for AWS security measures and architecture best practices.

Get started >

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aws workshop studio

Event in progress
Ends in 10 hours 57 minutes 12 seconds.

Event dashboard > AWS General Immersion Day

AWS General Immersion Day



IMMERSION DAYS

In this General Immersion Day workshop, through a mix of service explanation and hands-on labs led by AWS, you will learn about AWS foundational services as well as key concepts for AWS security measures and architecture best practices.

The hands-on labs are largely divided into **basic and advanced modules**.

In basic modules, you can learn various features of each AWS foundational service. In advanced modules, you can learn how to connect each service organically to create architecture like 3-tier web application.

Previous Next

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Have a question?



Francesco Penta
(he/him)



Milan Karalic
(he/him)



Edson Ferreira
(he/him)



Hugo Adao
(he/him)



Kien Tran
(he/him)



Shantanu Gupta
(he/him)



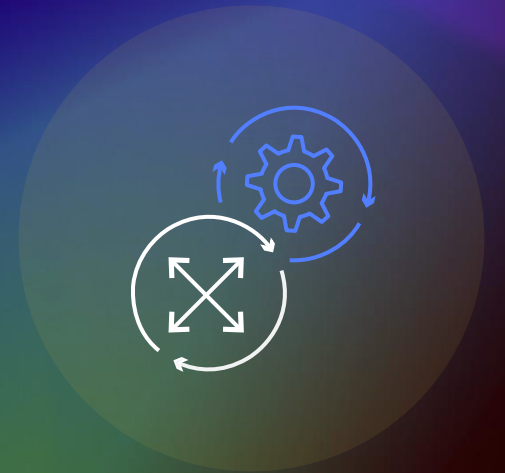
Flavio Risso
Sakakibara
(he/him)

<https://s12d.com/SUP303>

or

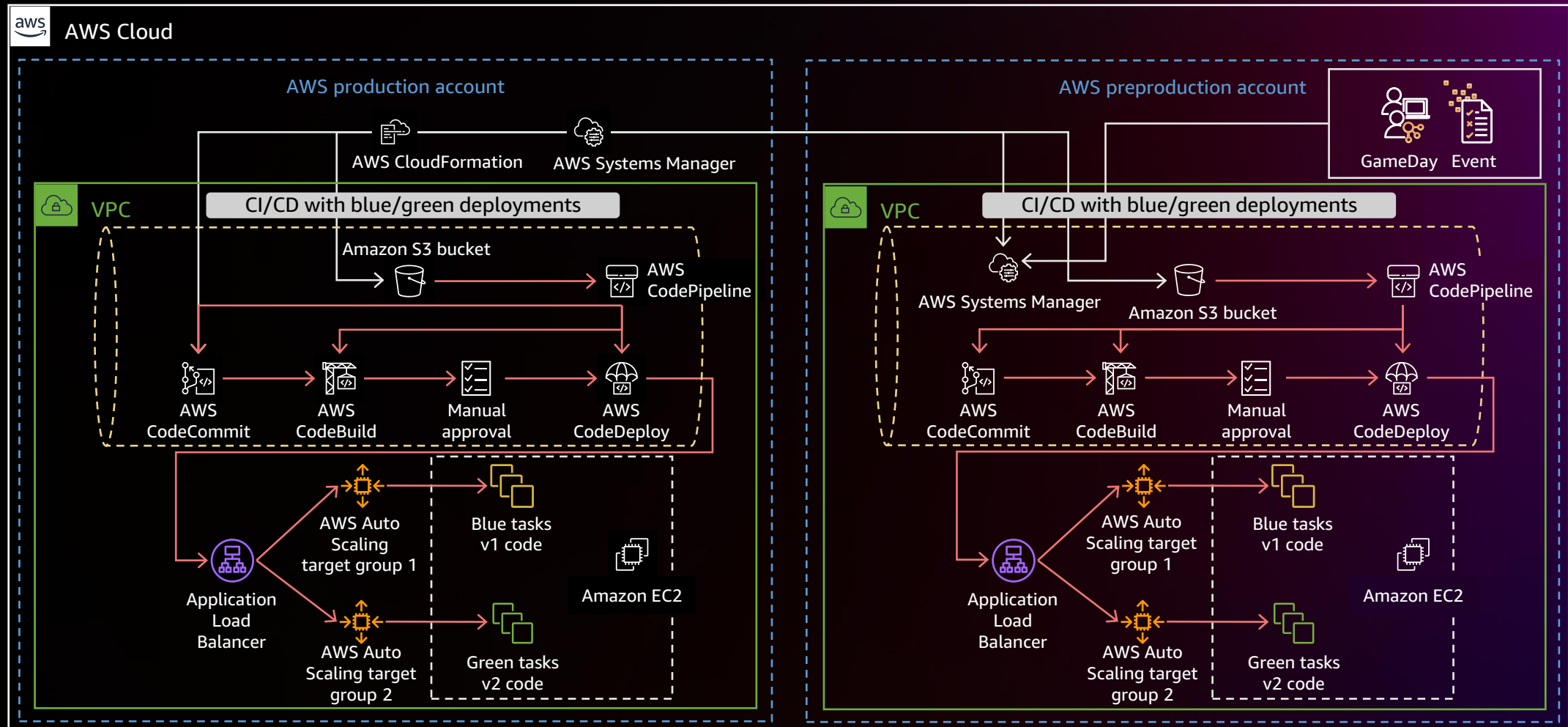
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Operations at scale: What does that mean?



Example: Operational activities in perspective

ACTIVITIES CAN VARY ACROSS ACCOUNTS AND BUSINESS FUNCTIONS



Example: Operational activities in perspective

ACTIVITIES CAN VARY ACROSS ACCOUNTS AND BUSINESS FUNCTIONS

These are some of the operations tasks



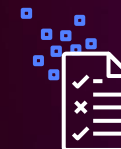
Patching and
state configuration



Monitoring
and logging



Deployment



Operational
reporting



Change management



Release
outages



On-call
operations



Environment
management



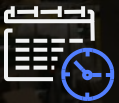
Scale brings challenges and opportunities



Unexpected bills and unused resources



Service disruption and impact reduction – fault tolerance



Managing events and scheduled changes



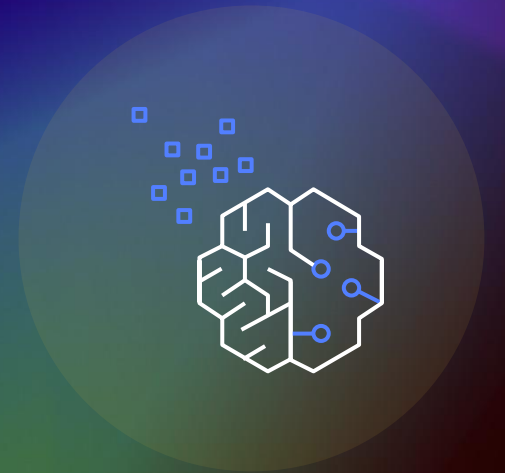
Performance opportunities



Monitoring governance



Intelligent data sources



AWS Trusted Advisor

HOME OF AWS BEST PRACTICES



Services with AWS Trusted Advisor best practices



Amazon EC2



Amazon
CloudFront



Amazon
Route 53



Amazon
OpenSearch
Service



AWS
Cost Explorer



Amazon S3



IAM



AWS
CloudFormation



AWS
Lambda



Amazon
VPC



Elastic Load
Balancing



Amazon
Redshift



Reserved
Instance (RI)
Reporting



Amazon EBS



Amazon RDS



AWS
CloudTrail



Amazon
Comprehend



AWS Well-
Architected



AWS
Security Hub



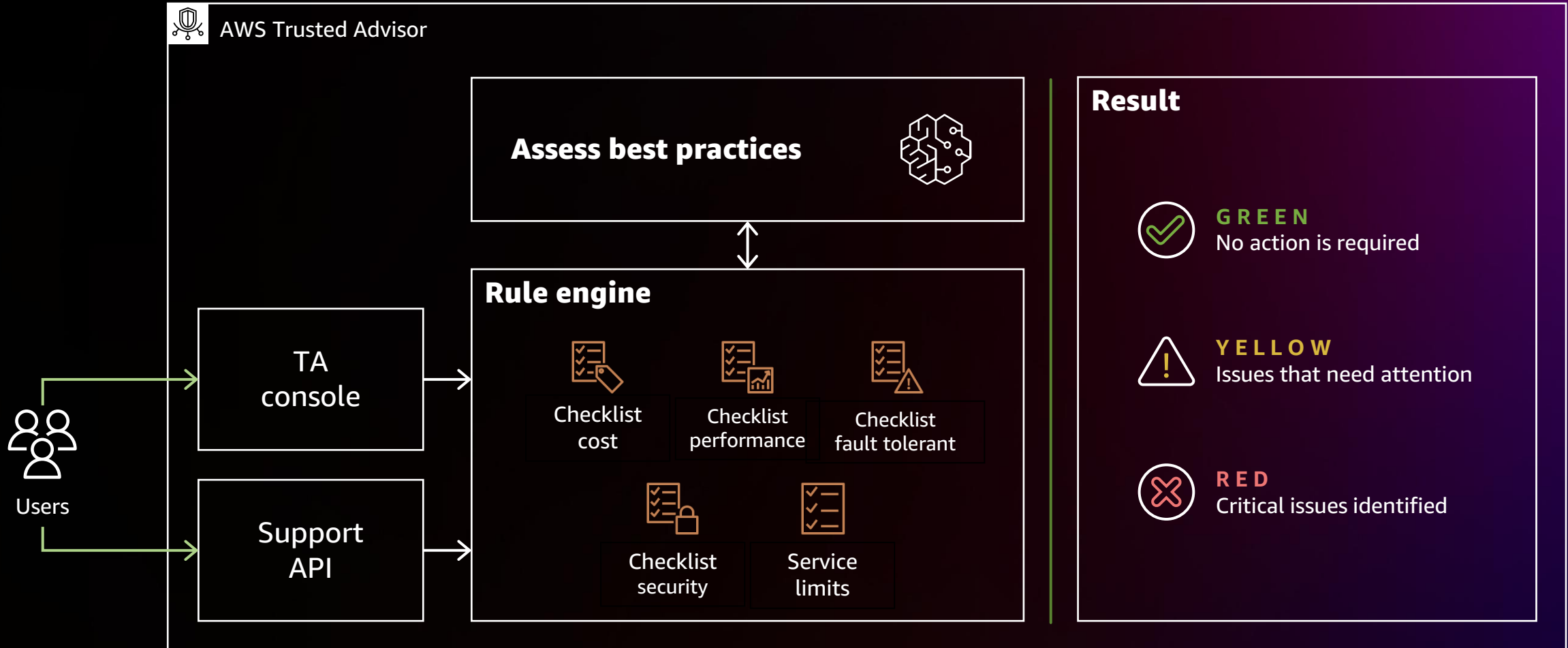
Amazon EC2
for SQL Server



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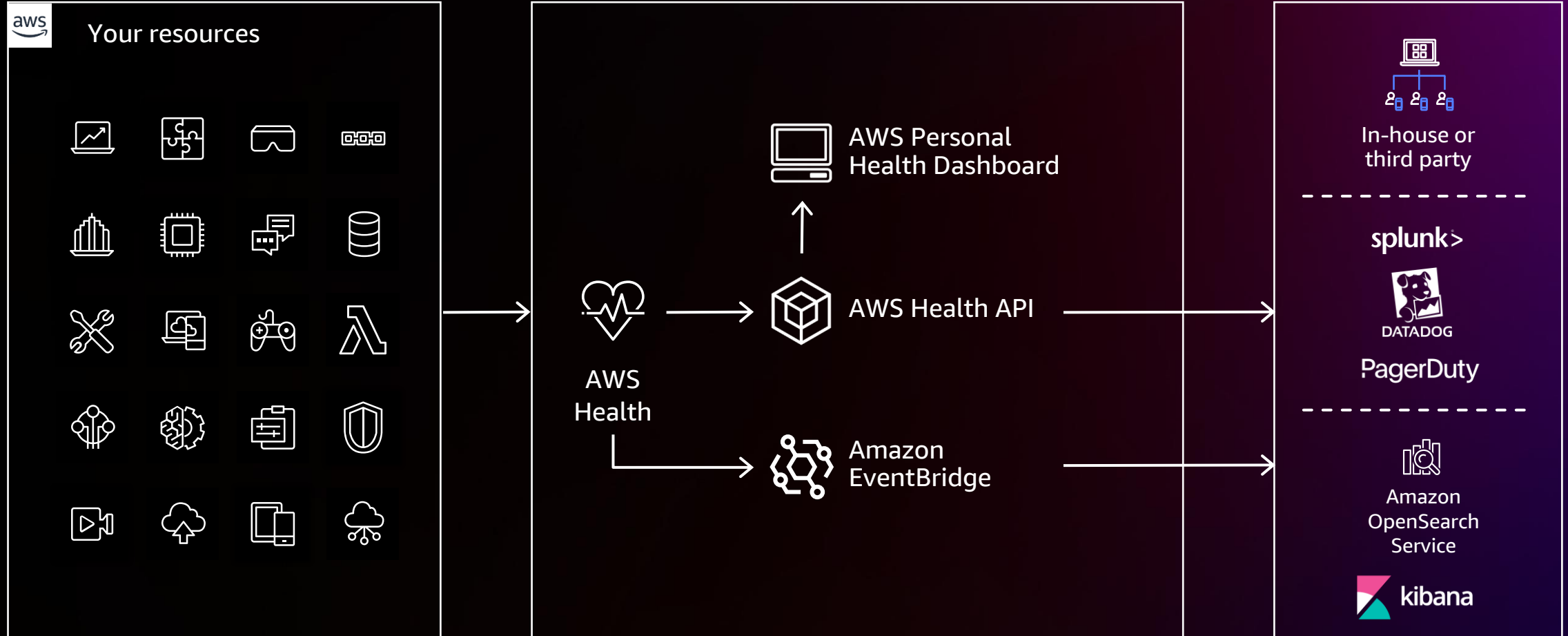
AWS Trusted Advisor

HOME OF AWS BEST PRACTICES



AWS Health

TRANSPARENT VISIBILITY INTO YOUR RESOURCE PERFORMANCE AND AVAILABILITY

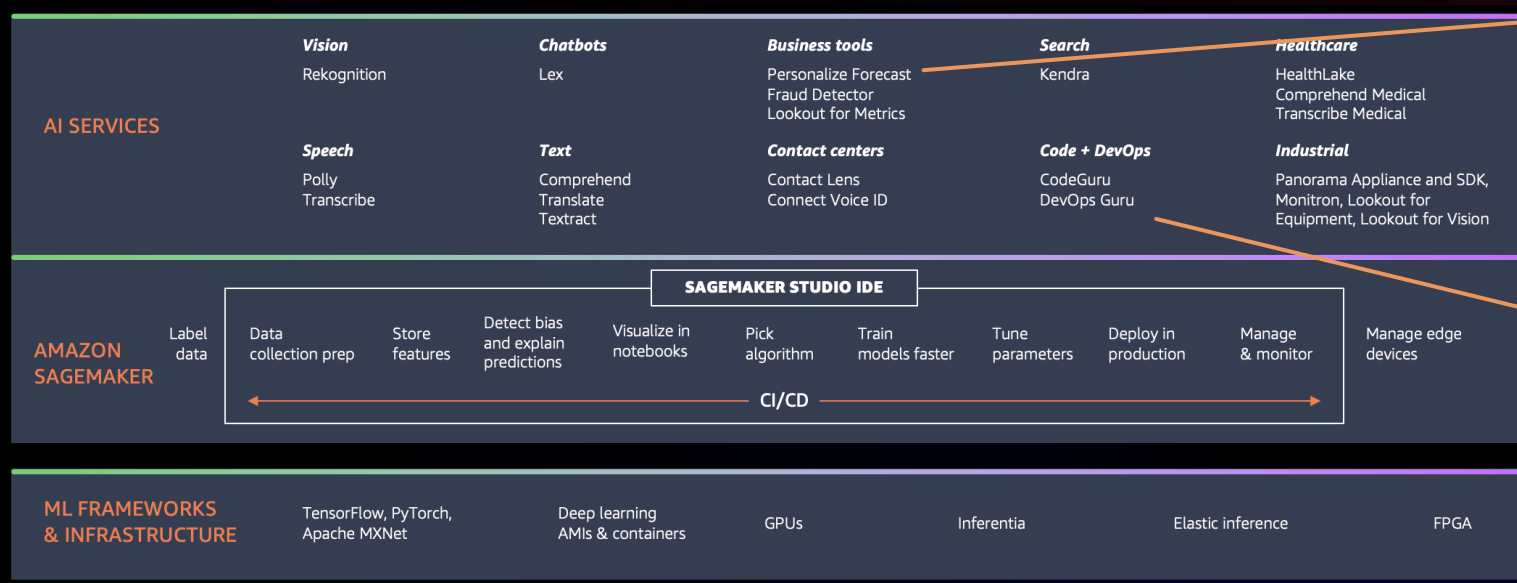


Intelligence through machine learning



Leverage AIOps from the **AWS ML stack**

AWS ML stack



Business tools

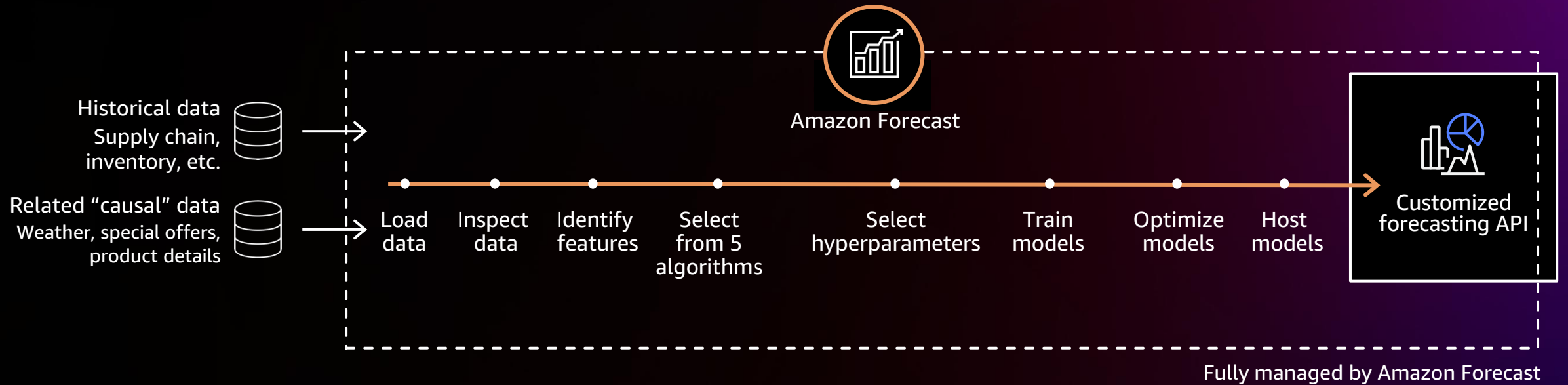
Amazon Personalize
Amazon Forecast
Amazon Fraud Detector
Amazon Lookout for Metrics

Code + DevOps

Amazon CodeGuru
Amazon DevOps Guru

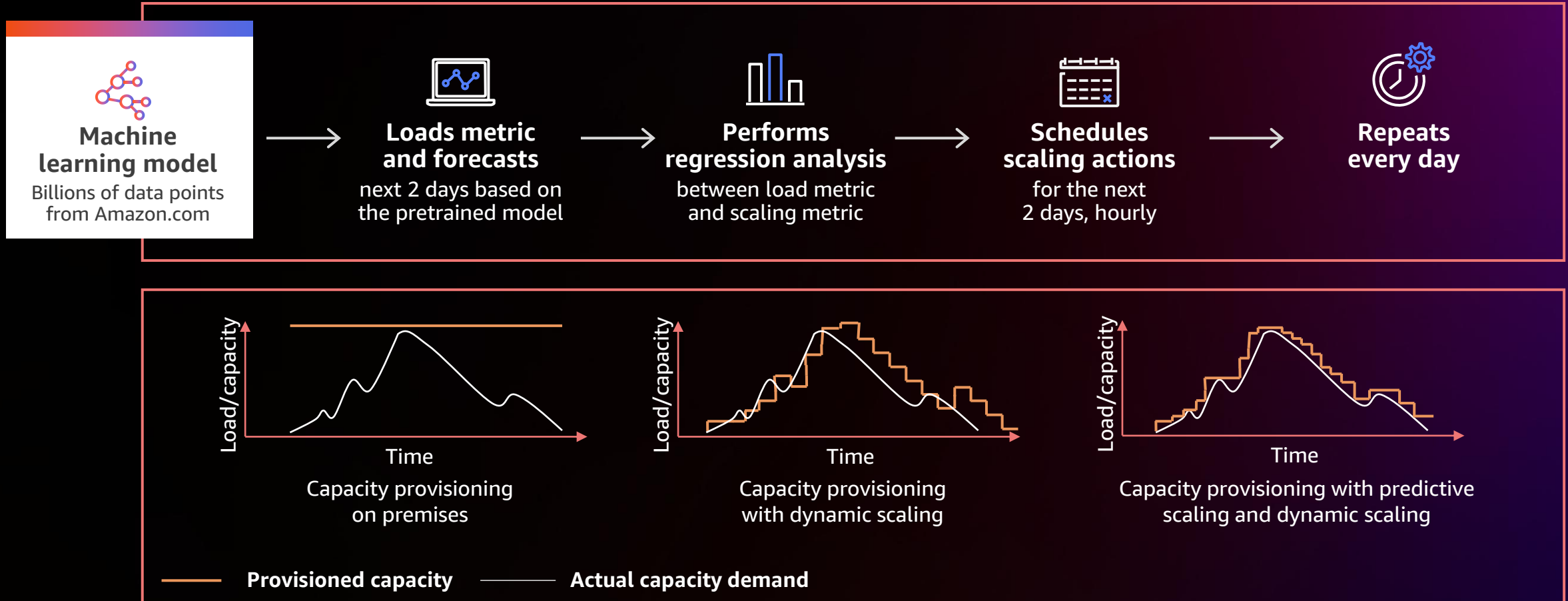
**Broadest and most complete
set of machine learning capabilities**

Amazon Forecast: Machine learning time-series forecasting



Predictive scaling in Amazon EC2 Auto Scaling

MACHINE LEARNING TECHNOLOGY BEHIND THE SCENES



Amazon CloudWatch anomaly detection



Self-learning
metric behavior

1



Awareness
of seasonality

2



Dynamic
alarming

3



Amazon DevOps Guru

ML-powered cloud operations service to improve application availability



Easy to use

No configuration or ML experience required



Auto-detect operational issues

DevOps Guru continuously analyzes streams of disparate data and metrics to determine application behavior



Quick resolution

Helps to resolve issues quickly with ML-powered insights and recommendations



Scalable

Easily scales and maintains availability as new AWS workloads are added



Reduce noise

Helps overcome alarm fatigue by automatically correlating and grouping related anomalies



Automation tools



Amazon EventBridge

BUILD EVENT-DRIVEN AUTOMATIONS AT SCALE

- Formerly known as Amazon CloudWatch Events
- Near-real time stream of system events of changes in AWS resources
- Integration with multiple AWS services as source and targets



Rule

```
{
  "source": [
    "aws.trustedadvisor"
  ],
  "detail-type": [
    "Trusted Advisor Check Item Refresh Notification"
  ],
  "detail": {
    "status": [
      "ERROR",
      "WARN"
    ]
  }
}
```



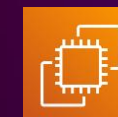
Amazon Kinesis
Data Firehose



AWS Step
Functions



Amazon SQS



Amazon EC2



AWS Lambda



Amazon Inspector



AWS Systems
Manager



AWS CodePipeline



AWS CodeBuild



Amazon SNS



AWS Systems Manager

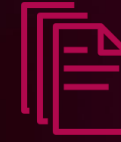
GAIN OPERATIONAL INSIGHT AND TAKE ACTION ON AWS RESOURCES



- Provides visibility and control of your infrastructure on AWS in a unified user interface
- Performs multiple operational tasks across multiple AWS resources
- Provides multiple capabilities for infrastructure automation



Automation



Documents



Patch manager



OpsCenter



Inventory



Maintenance windows



Run command



Parameter store

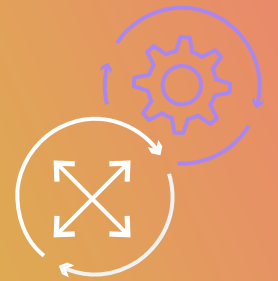


State manager

Support Automation Workflows (SAW)

SAW runbooks help AWS customers troubleshoot and fix common issues with their AWS resources

- Written and maintained by AWS Support
- Available to all customers
- Can perform actions on almost any AWS resource
- Support on-premises executions

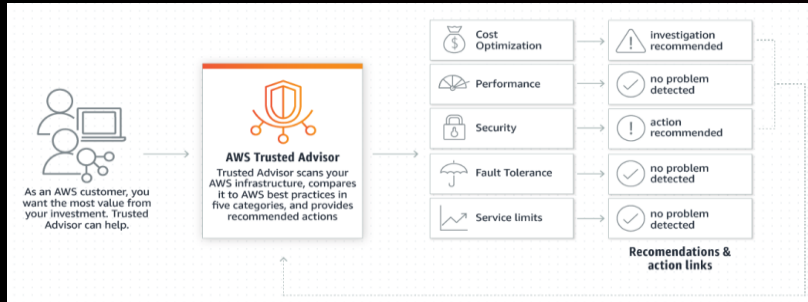


Bringing it all together: Intelligent automations in action

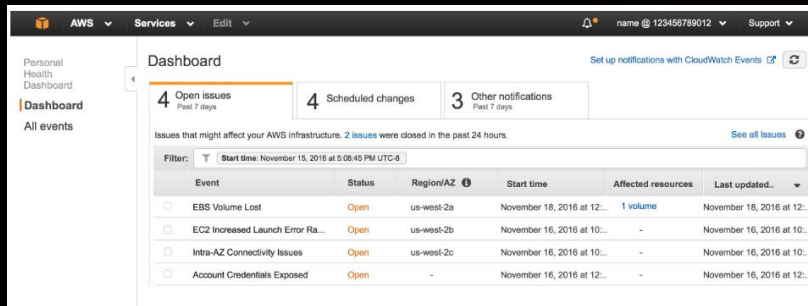
Minimizing manual operations for scalability



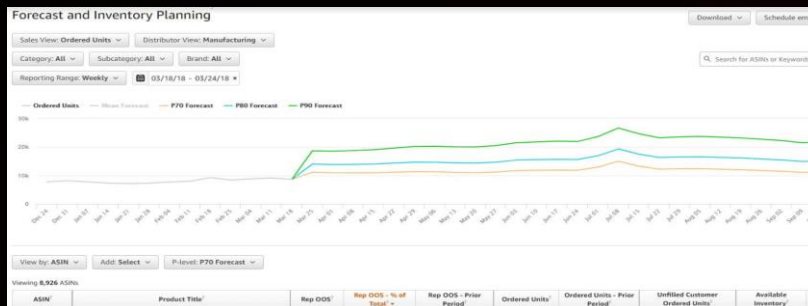
AWS Trusted Advisor



AWS Personal Health Dashboard



Amazon Forecast



Amazon EventBridge



Amazon SNS



Amazon EC2



AWS Lambda



Amazon ECS



AWS Systems Manager



Amazon Kinesis



AWS Step Functions



AWS Batch



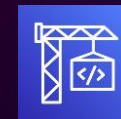
AWS CodePipeline



Amazon SNS



Amazon SQS

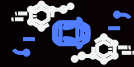


AWS CodeBuild



Automation best practices

Define context



Reference resource using tagging/naming convention/AWS CloudFormation

Think event-driven



Detect change with use of existing service; AWS Config/Amazon EventBridge

Principle of least privilege



Allow access to necessary API for automation

Think serverless



No infrastructure to maintain, runs on demand

Implement circuit breakers



Reduce bulk or unexpected changes

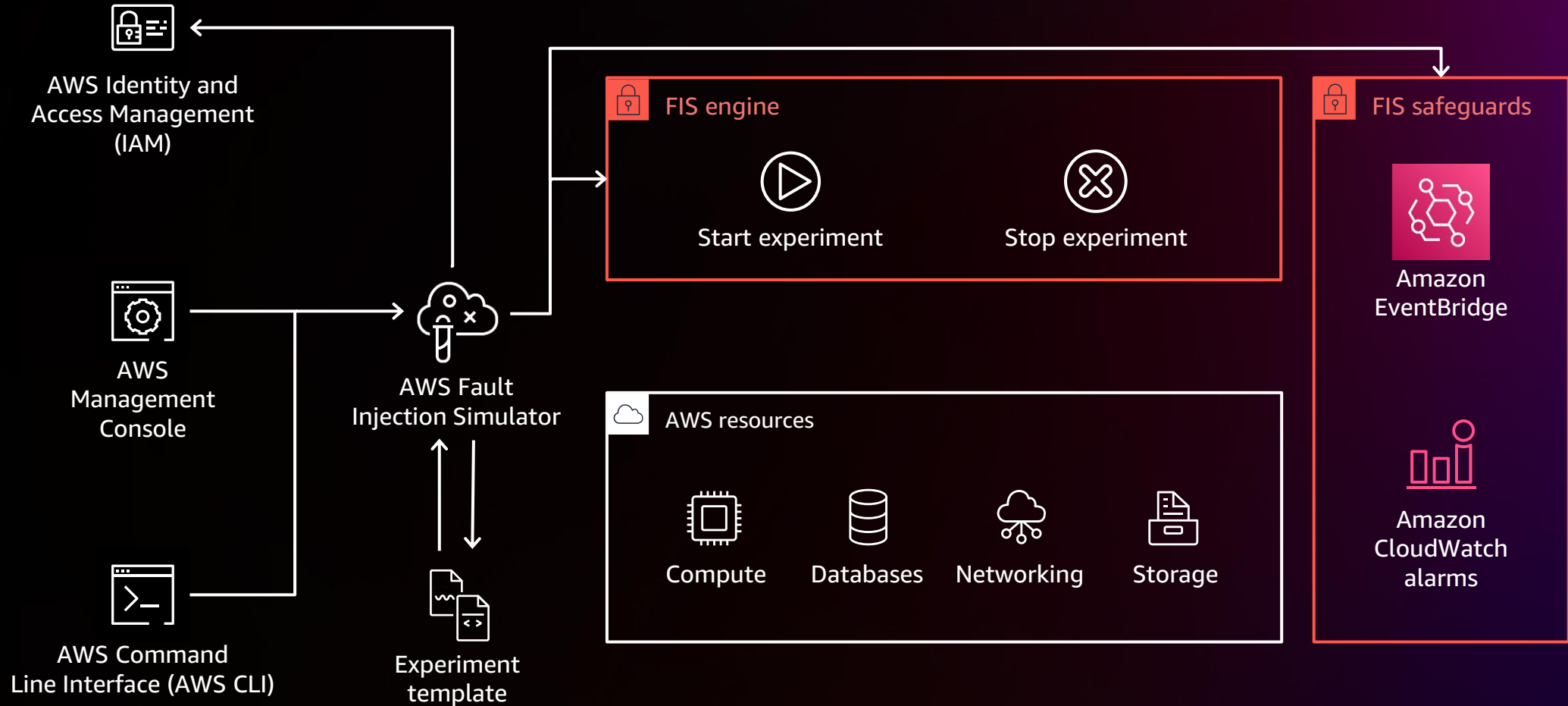
Quick recap



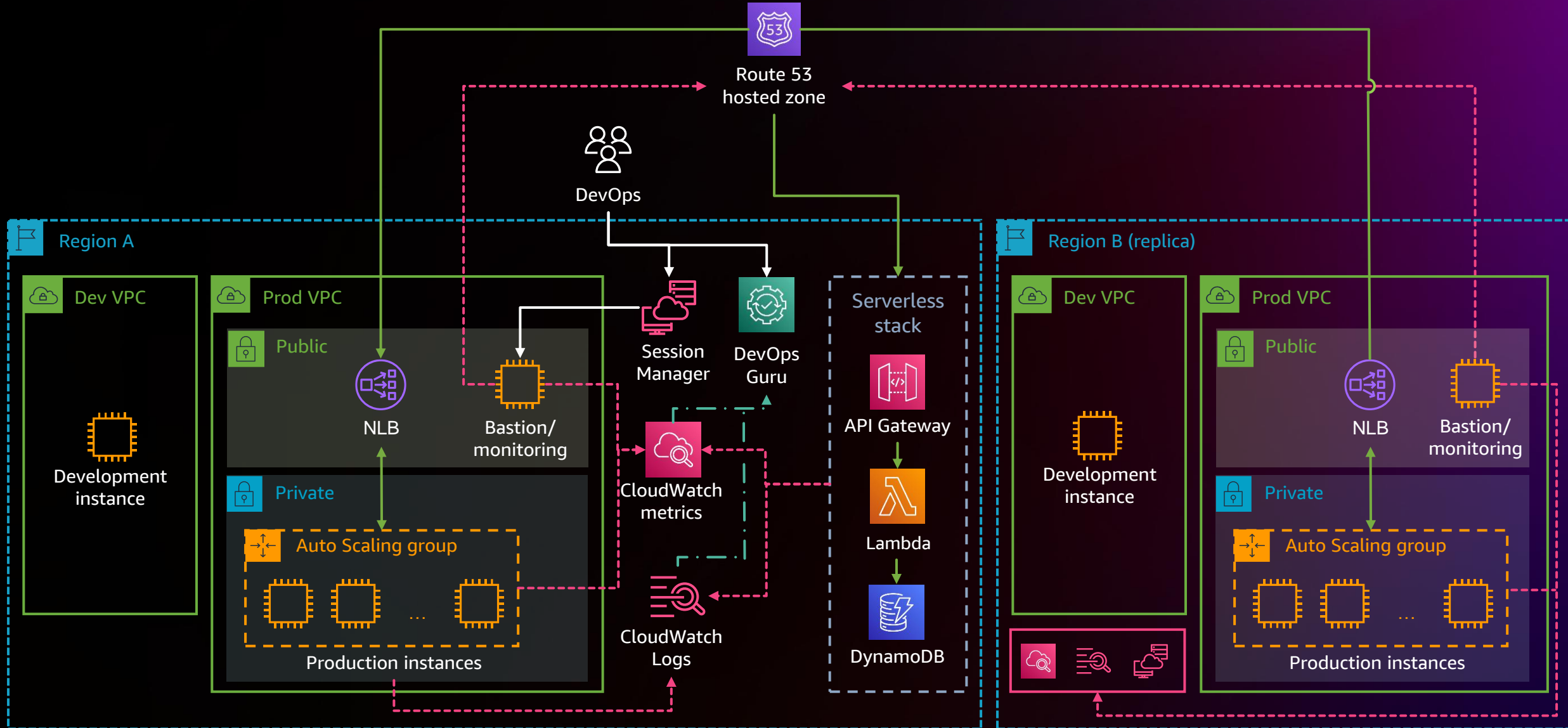
How do you validate operational readiness?

AWS Fault Injection Simulator

IMPROVE RESILIENCY AND PERFORMANCE WITH CONTROLLED EXPERIMENTS



Architecture overview



Responding to AWS Health events



Responding to AWS Health events

“One of our developers deployed a new software version on our development instance that accidentally allows users to send unsolicited traffic to other destinations on the internet, becoming an actor in a denial of service attack.”

AWS Health

AUTOMATION PROCESS FOR HANDLING AND REMEDIATION OF ABUSE ALERTS

Programmatically capture abuse events to notify relevant parties and take automation action



Sending email spam



Excessive web crawling



Open proxy

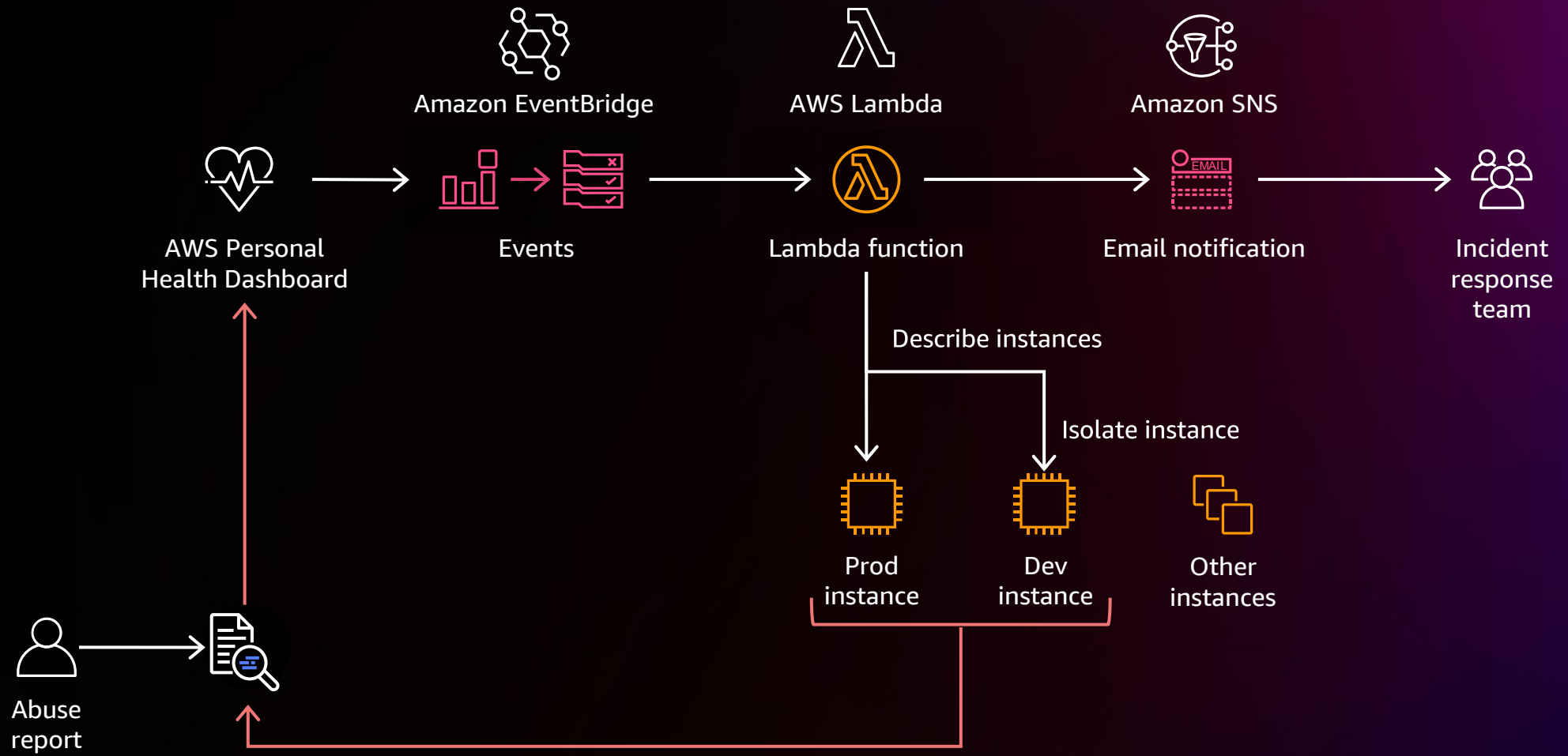
The screenshot displays the AWS Health console interface. On the left, a sidebar shows navigation options: Personal Health, Dashboard, and Event log. The main content area is titled 'Dashboard' and features three summary cards: '1 Open issues' (Past 7 days), '0 Scheduled changes', and '0 Other notifications' (Past 7 days). Below these, a message states: 'Issues that might affect your AWS infrastructure. 3 issues were resolved in the past 24 hours.' A table lists the issues, with one entry highlighted: 'Abuse copyright dmca ...' in the 'Event' column, with columns for 'Region...', 'Start time' (August 27, 2018 at 1:00:00 PM UTC-7), 'Last update time' (August 27, 2018 at 1:00:00 PM UTC-7), and 'Affected resources' (1 entity). To the right, a detailed view of the 'Abuse copyright dmca report' is shown, including a 'Details' tab and a 'Affected resources' tab. The 'Details' tab contains a timestamp 'Aug 27, 08:57 PM UTC' and a message: '[URGENT: RESPONSE REQUIRED WITHIN 24 HOURS or your resources may be suspended] We've received a notice(s) that your AWS resource(s) listed in the 'Affected resources' tab has been posting, distributing, or hosting unlicensed copyright protected content. This is forbidden by our terms. A copy of the complaint identifying the allegedly infringing content is below.' It also includes instructions for acknowledging the report and removing infringing content within 24 hours, and a list of four required items for a counter-notice: 1. Identify the material that was removed or disabled, and the location where it appeared before it was removed or disabled; 2. A statement by you declaring under penalty of perjury that you have a good faith belief that the material at issue was either misidentified or mistakenly removed; 3. Your name, address and telephone number; 4. A statement that you consent to the jurisdiction of the federal district court for the judicial district in which your address is located, and that you will accept service of process from the person who provided the notice set forth above (if you are located outside of the United States, you must state that you



Our goals

- Monitor for specific AWS Health events
- Identify the resources involved in the event
- Differentiate between production and development resources
- Isolate development resources from sending/receiving traffic
- Send a notification to a team responsible for investigating the event
- Validate that our solution works

DoS abuse report automation



Automatic Region failover



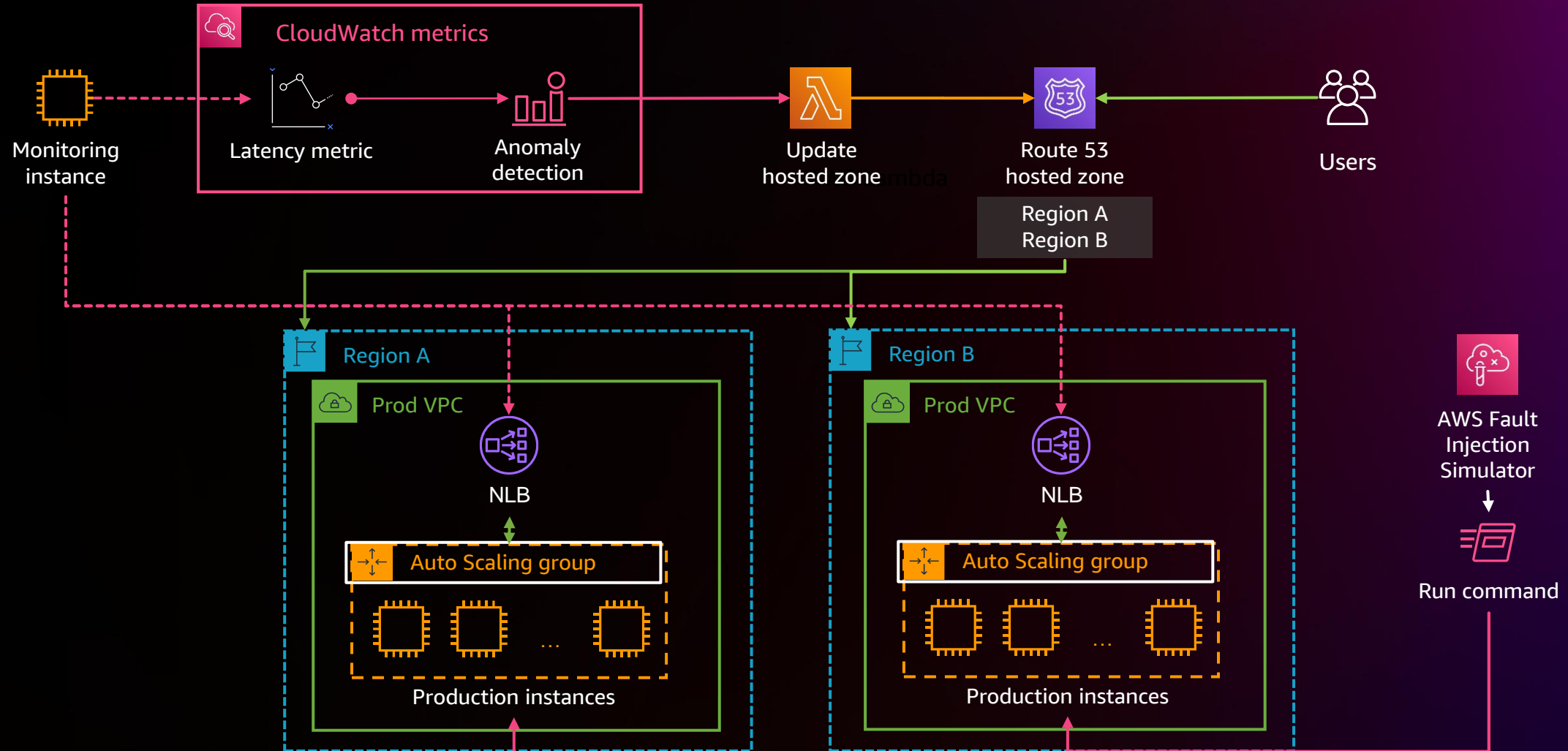
Automatic Region failover

"Last week's software release had an issue that resulted in elevated latencies and poor customer experience. This went undetected until customers started complaining on social media sites. We issued a rollback, but that took a lot of manual effort."

Goals

- Detect abnormal behavior in our production stack
- Fail over to our secondary region
- Test the solution by simulating failures and increases in latency

Region failover automation and test

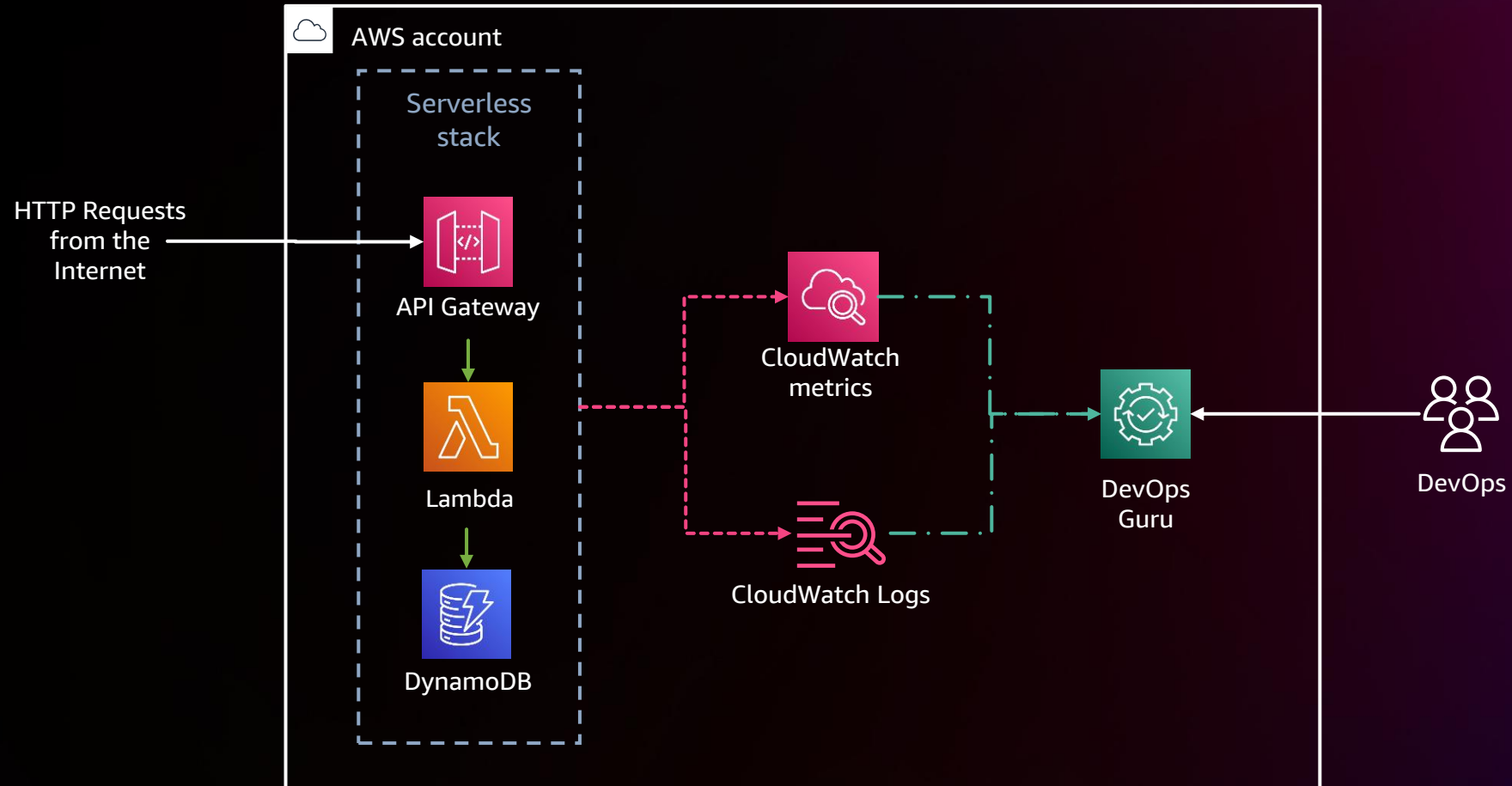


Leverage ML tools to identify operational issues

Improving monitoring for our serverless stack

"We recently acquired a serverless stack that will analyze data about businesses. Unfortunately, we don't have a lot of expertise in any of the products involved in this stack and we want to improve the monitoring and incident response times in case something goes wrong."

Serverless stack



Goals

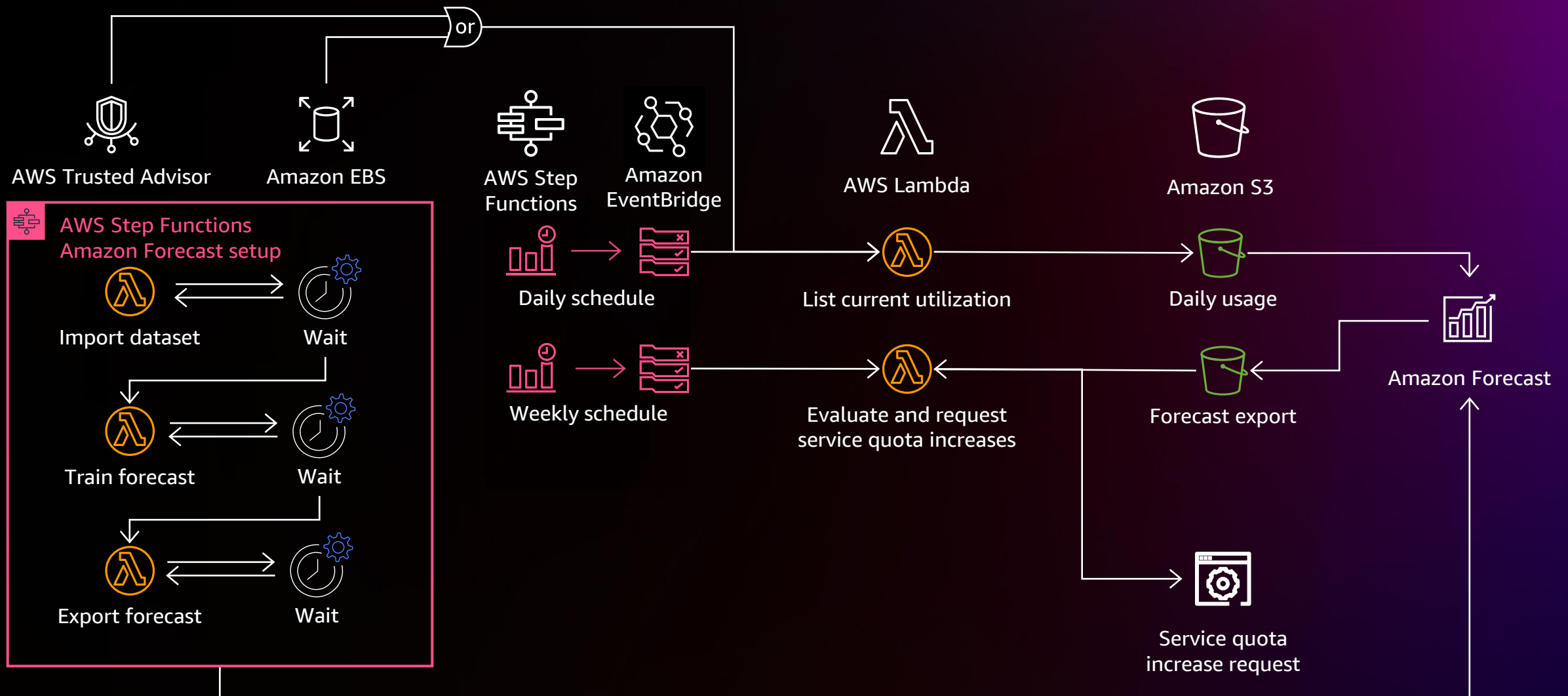
- Familiarize yourself with Amazon DevOps Guru
- Simulate failure and issues in your serverless stack
- Review DevOps Guru reactive insights

Bonus scenario: limit Forecast and increase

Goals

- Explore Amazon Forecast components and their automation
- Evaluate Trusted Advisor vs EBS API to retrieve service quotas
- Use Amazon Forecast results to automate quota increase requests

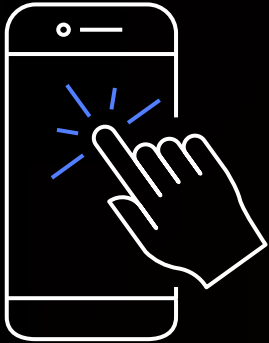
Service Quotas forecast and increase



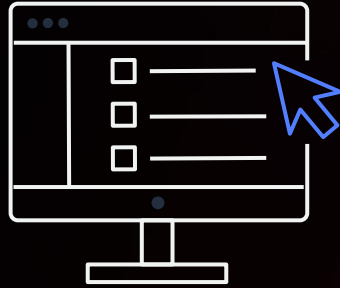
AWS re:Post

Community-driven knowledge sharing site for your AWS questions

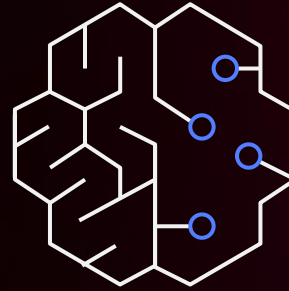
Visit <https://repost.aws/>



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browse content



Content is
organized by
topics and tags



Machine learning
drives smart content
recommendations



Follow specific
questions, topics, and
community experts

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Milan Karalic
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Please complete the session
survey in the **mobile app**



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