

AWS re:Invent

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

Intelligently automating cloud operations

Francesco Penta (he/him)

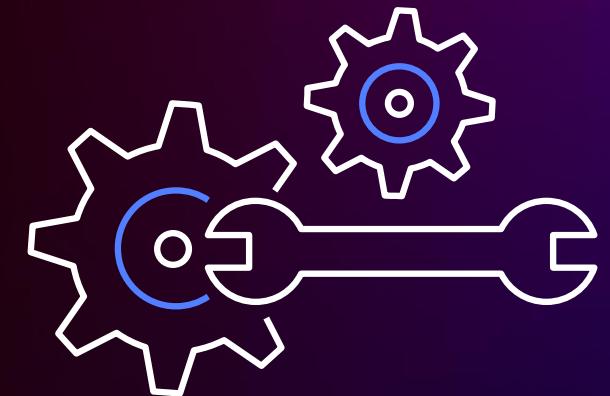
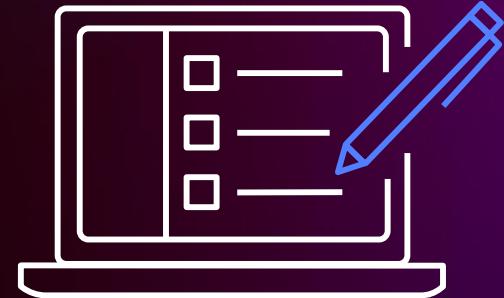
Principal Support Engineer
Amazon Web Services

Milan Karalic (he/him)

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

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

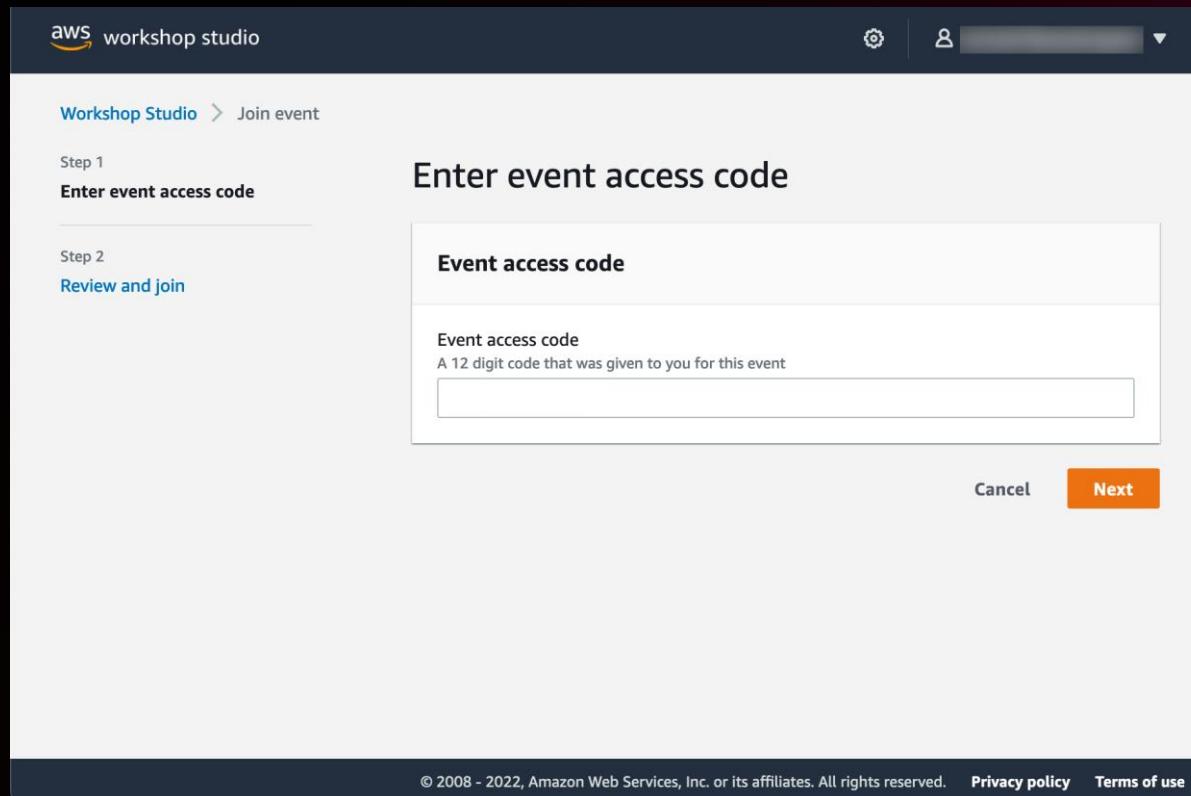
<https://catalog.workshops.aws/join>



A screenshot of the AWS Workshop Studio sign-in interface. The top navigation bar includes the AWS logo and the text "workshop studio". Below the navigation, the text "Workshop Studio > Sign in" is displayed. The main content area is titled "Sign in" and contains the sub-instruction "Choose a preferred sign-in method". Three sign-in options are listed in boxes: "Email one-time password (OTP)" (highlighted in orange), "Login with Amazon" (with a sub-instruction "Login with your Amazon.com retail account"), and "Amazon employee" (with a sub-instruction "Login with your Amazon Corporate account. Only for Amazon Employees"). The bottom of the page features a dark footer bar with the text "© 2008 - 2022, Amazon Web Services, Inc. or its affiliates. All rights reserved." and links for "Privacy policy" and "Terms of use".

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



Step 3: Review terms and join event

The screenshot shows the 'Review and join' step of the AWS Workshop Studio 'Join event' process. The page is titled 'Review and join' and displays 'Event details' and 'Terms and Conditions'.

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 derivative 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

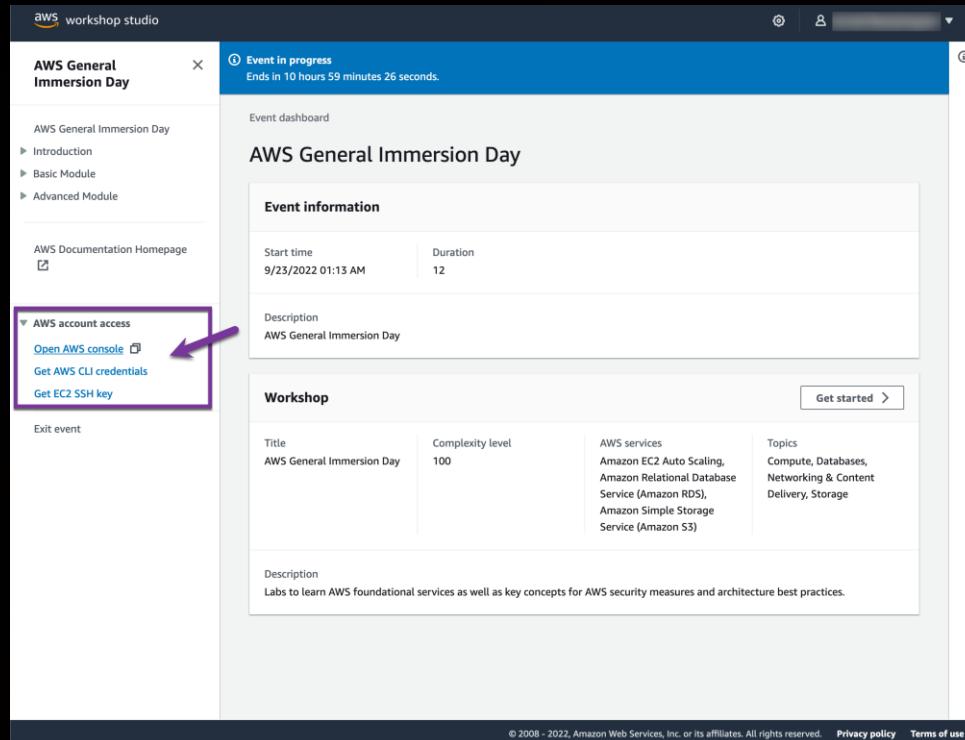
Cancel Previous **Join event**

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Step 4: Access AWS account

Access the AWS console or generate AWS CLI credentials as needed



AWS General Immersion Day

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

Event dashboard

AWS General Immersion Day

Event information

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

Description
AWS General Immersion Day

Workshop

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

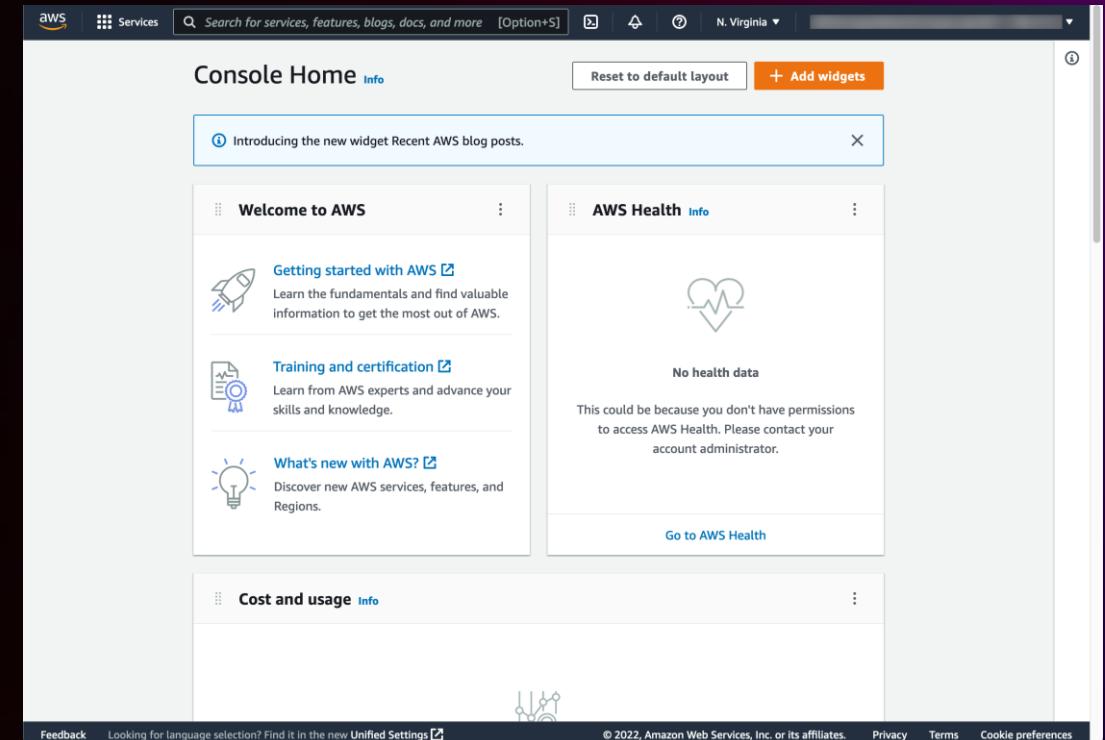
Description
Labs to learn AWS foundational services as well as key concepts for AWS security measures and architecture best practices.

AWS account access

- [Open AWS console](#)
- [Get AWS CLI credentials](#)
- [Get EC2 SSH key](#)

Exit event

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Console Home

Search for services, features, blogs, docs, and more [Option+S]

Console Home

Introducing the new widget Recent AWS blog posts.

Welcome to AWS

- [Getting started with AWS](#)
- [Training and certification](#)
- [What's new with AWS?](#)

AWS Health

No health data

This could be because you don't have permissions to access AWS Health. Please contact your account administrator.

Go to AWS Health

Cost and usage

Feedback Looking for language selection? Find it in the new Unified Settings

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Step 5: Get started with the workshop

AWS workshop studio

AWS General Immersion Day

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

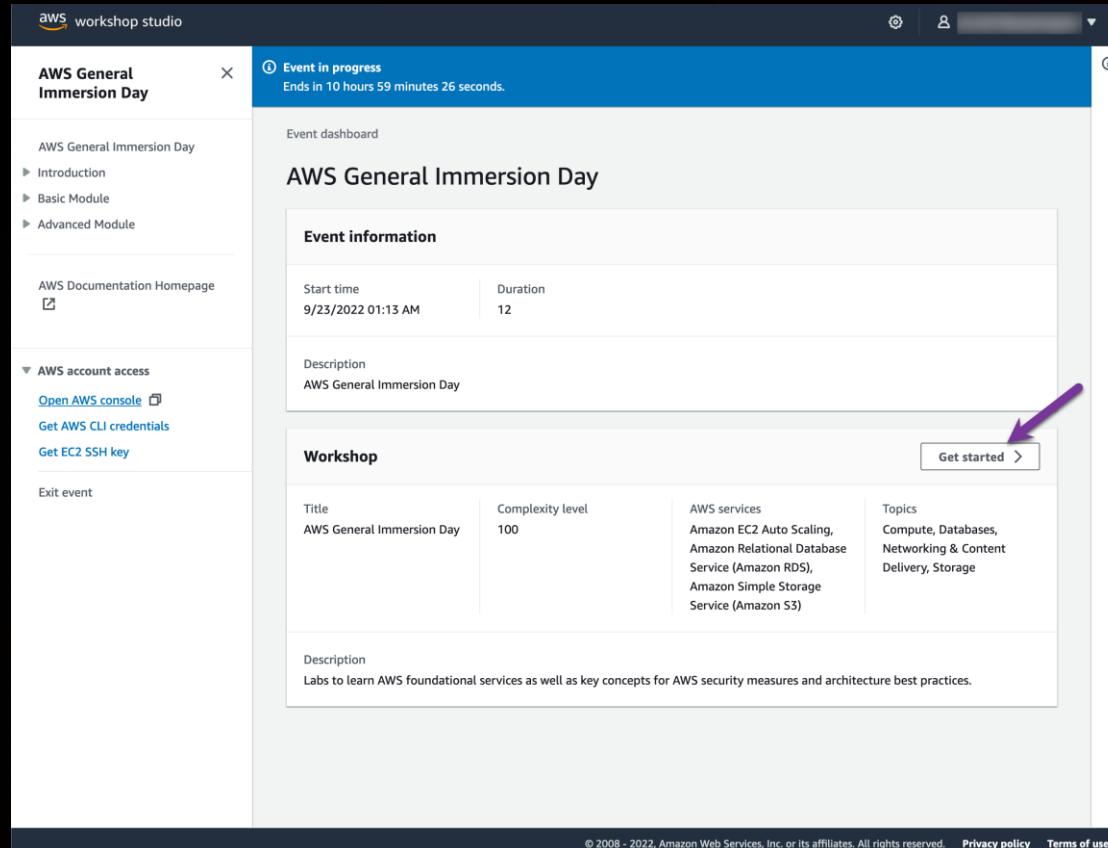
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Description
Labs to learn AWS foundational services as well as key concepts for AWS security measures and architecture best practices.

Get started >



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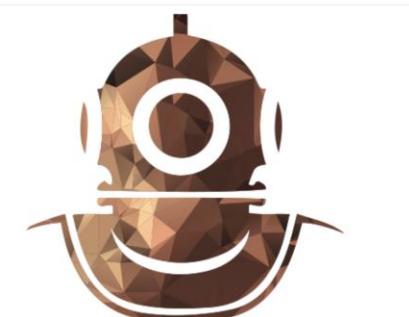
AWS workshop studio

AWS General Immersion Day

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?



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(he/him)



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Edson Ferreira
(he/him)



Hugo Adao
(he/him)



Kien Tran
(he/him)



Shantanu Gupta
(he/him)



Flavio Risso
Sakakibara
(he/him)

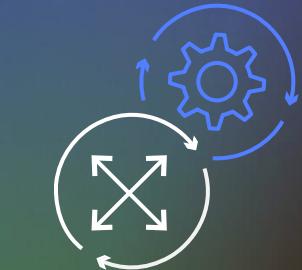
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<https://catalog.workshops.aws/join>

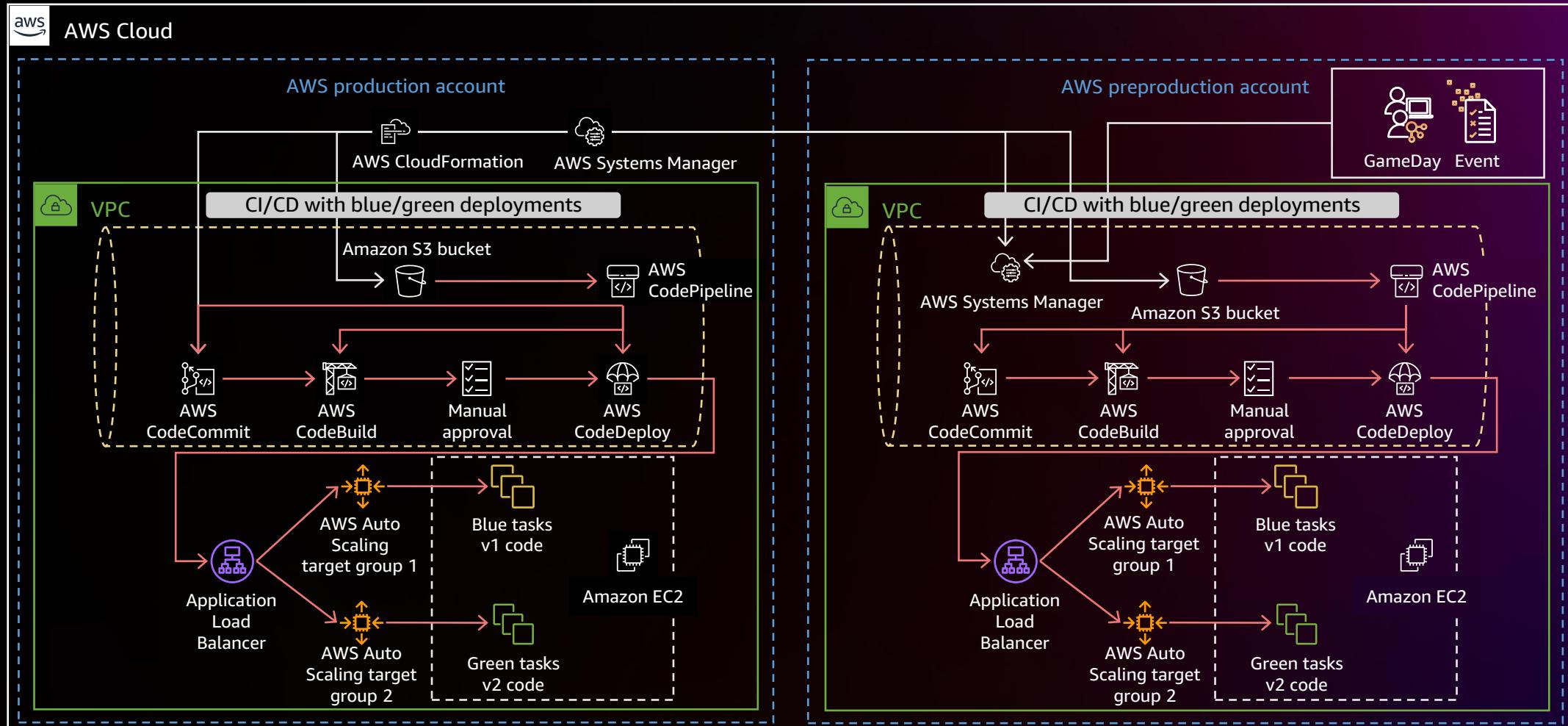
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Operations at scale: What does that mean?



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

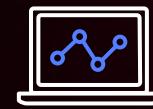
These are some of the operations tasks



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



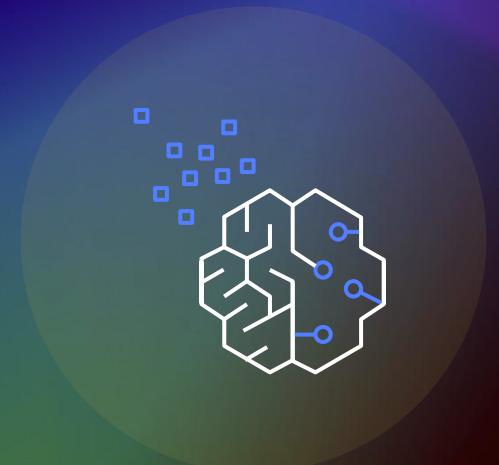
Performance opportunities



Monitoring governance



Intelligent data sources



AWS Trusted Advisor

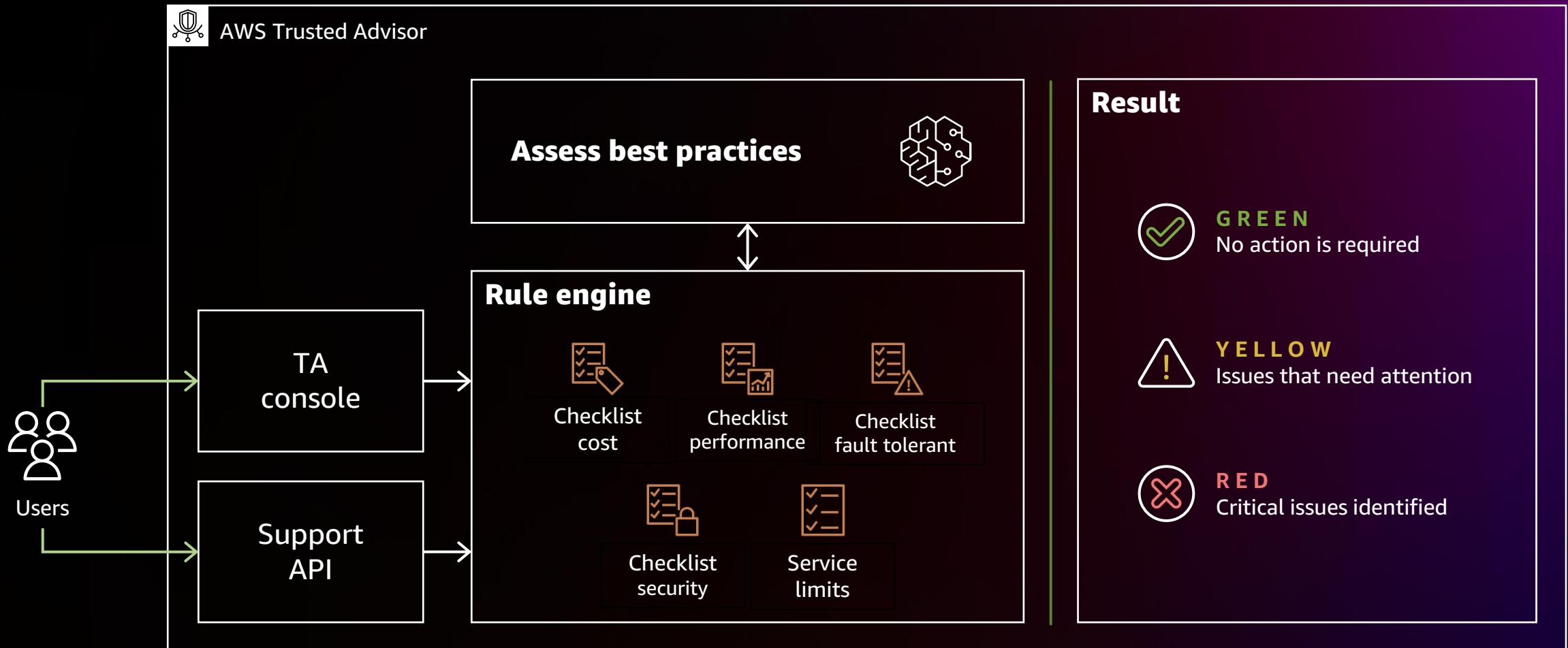
HOME OF AWS BEST PRACTICES

aws 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				

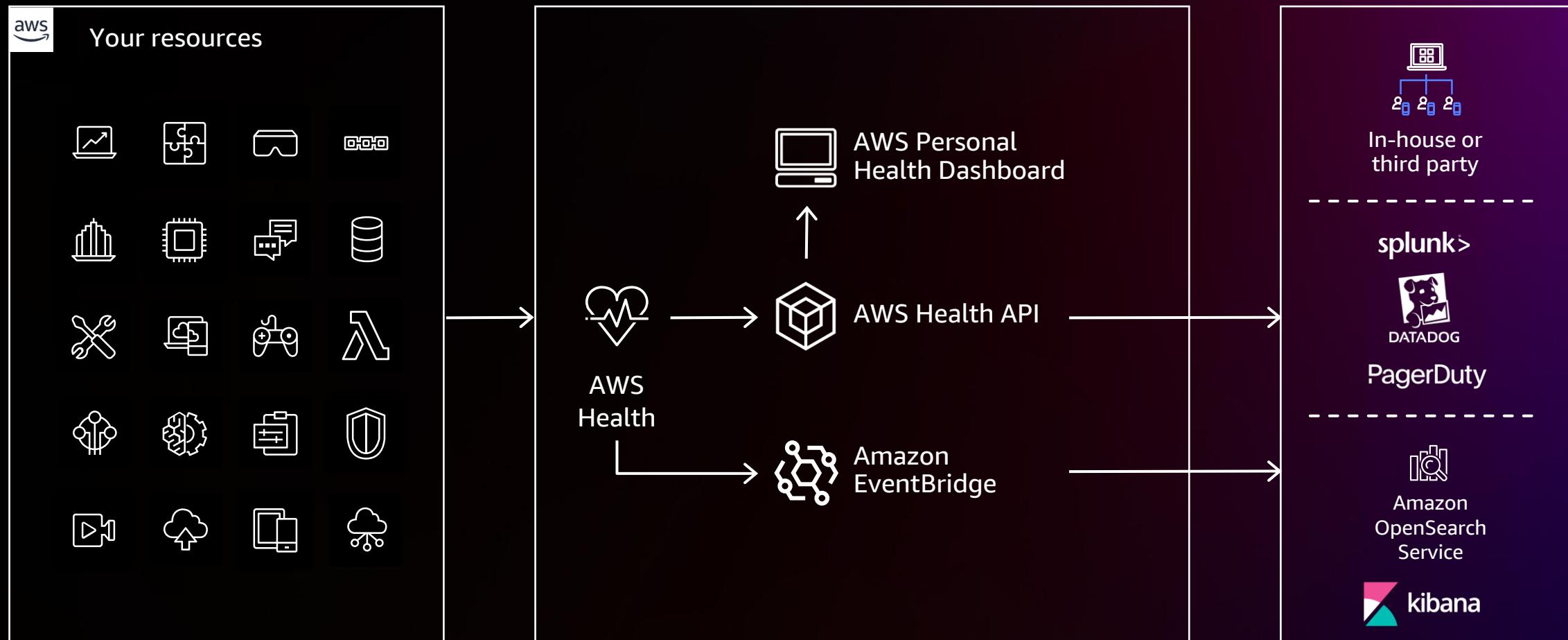
AWS Trusted Advisor

HOME OF AWS BEST PRACTICES

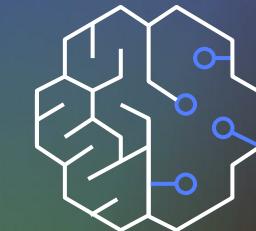


AWS Health

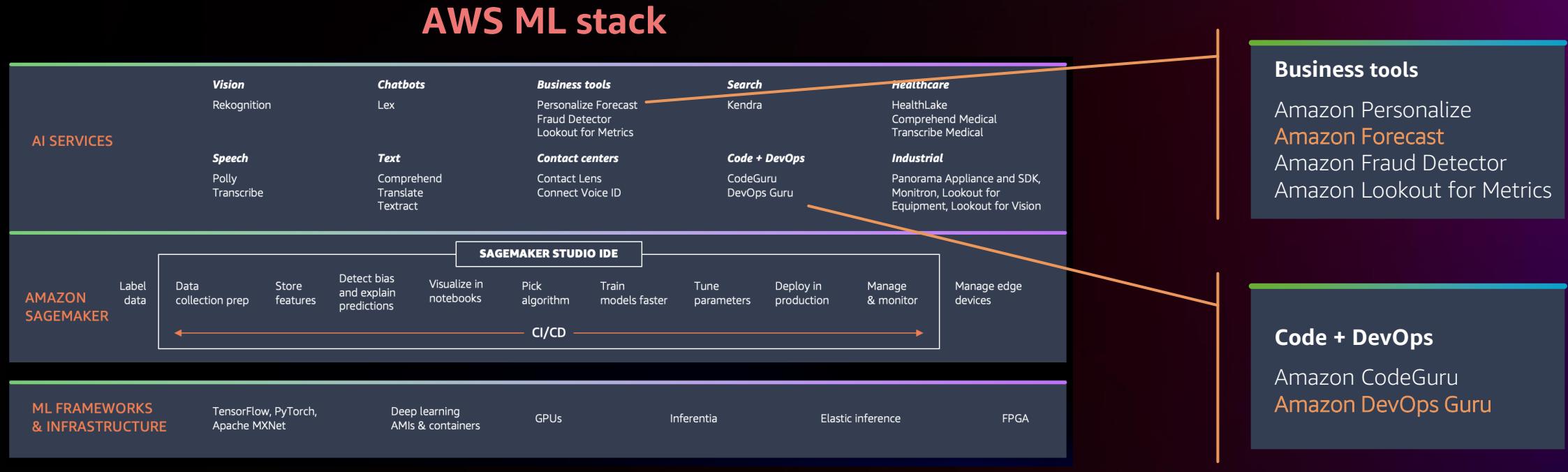
TRANSPARENT VISIBILITY INTO YOUR RESOURCE PERFORMANCE AND AVAILABILITY



Intelligence through machine learning

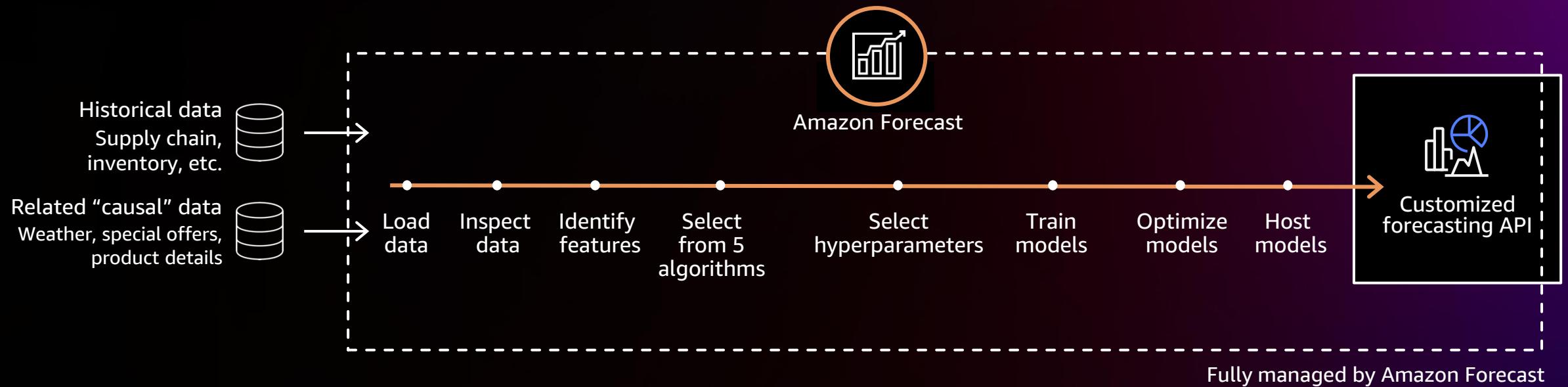


Leverage AIOps from the AWS ML stack



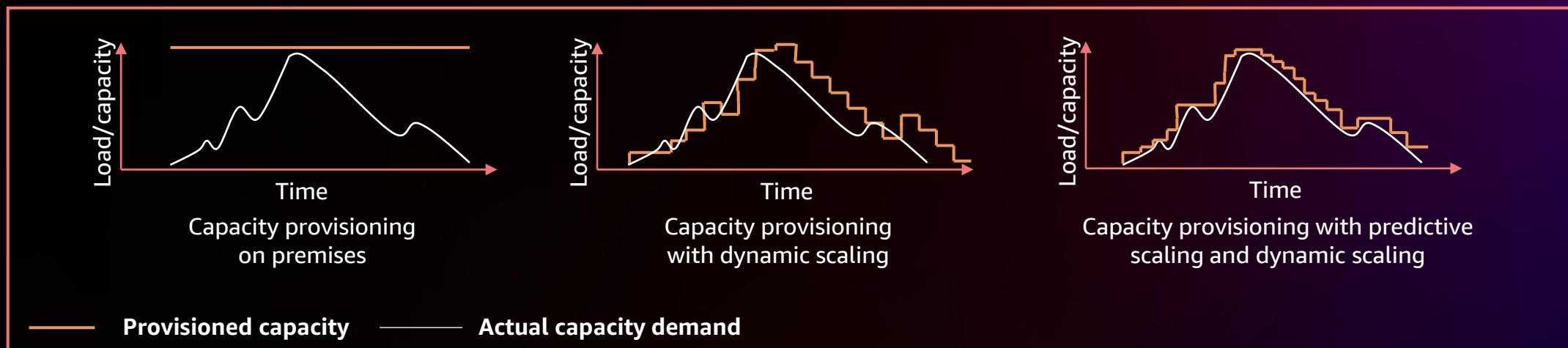
**Broadest and most complete
set of machine learning capabilities**

Amazon Forecast: Machine learning time-series forecasting



Predictive scaling in Amazon EC2 Auto Scaling

MACHINE LEARNING TECHNOLOGY BEHIND THE SCENES



Amazon CloudWatch anomaly detection



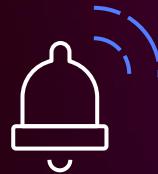
Self-learning
metric behavior

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

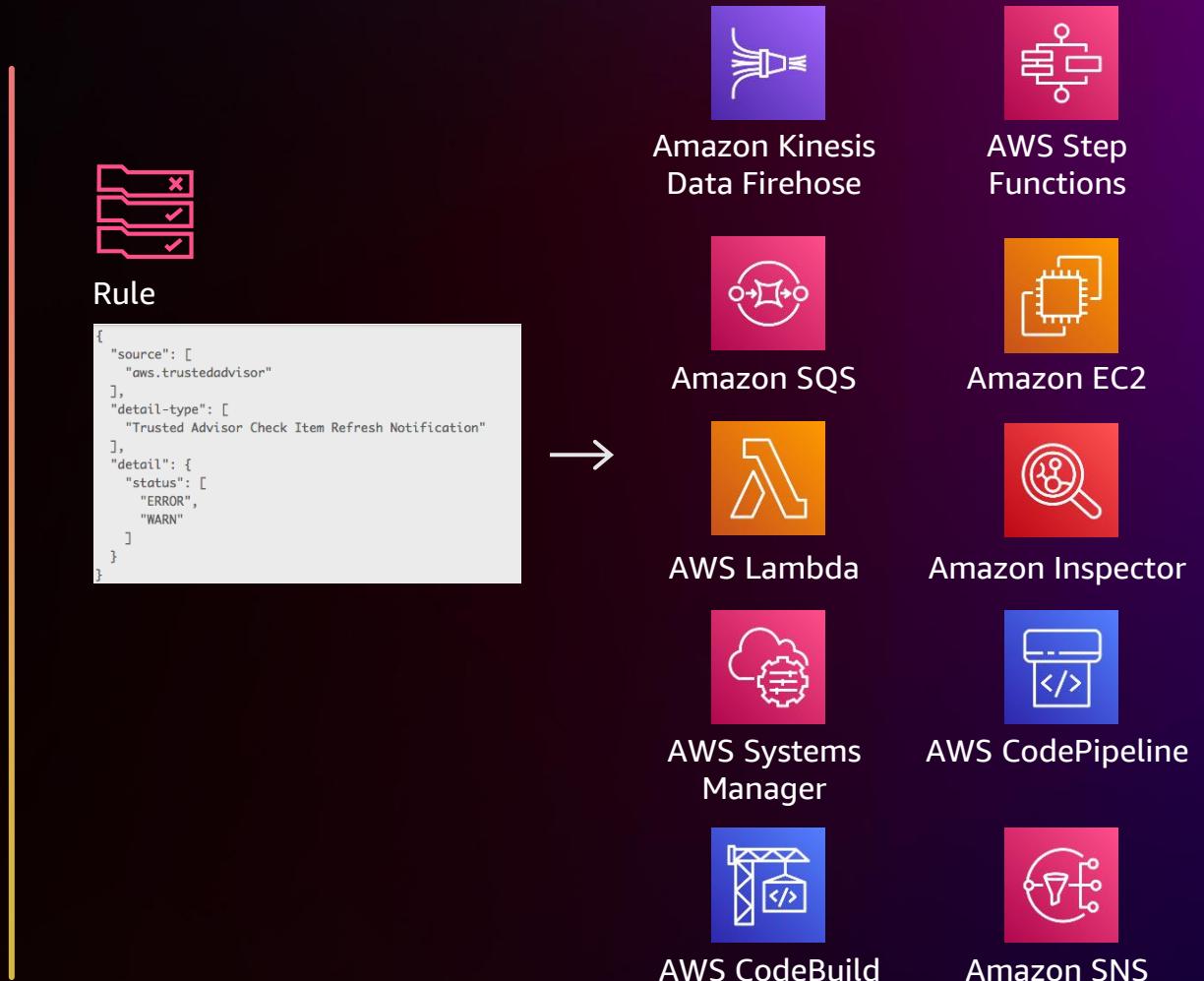


Amazon EventBridge

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

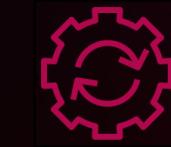


AWS Systems Manager

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



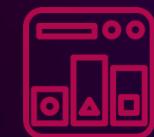
Maintenance
windows



Run
command



Parameter
store

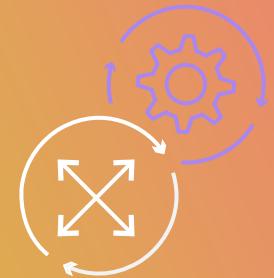


State
manager

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

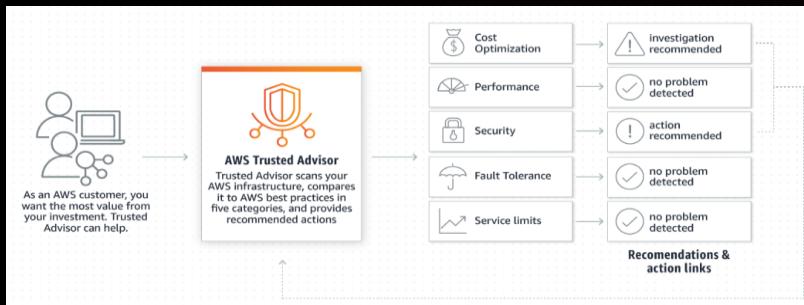


Bringing it all together: Intelligent automations in action

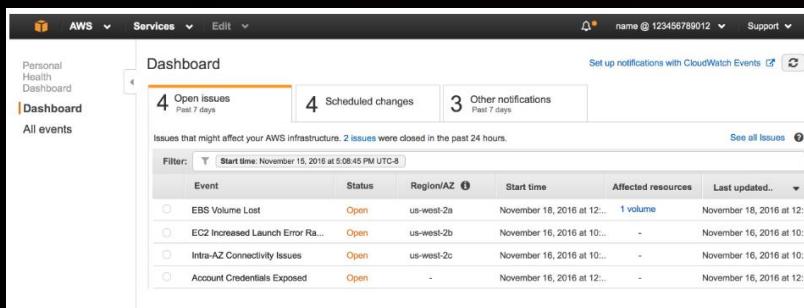
Minimizing manual operations for scalability



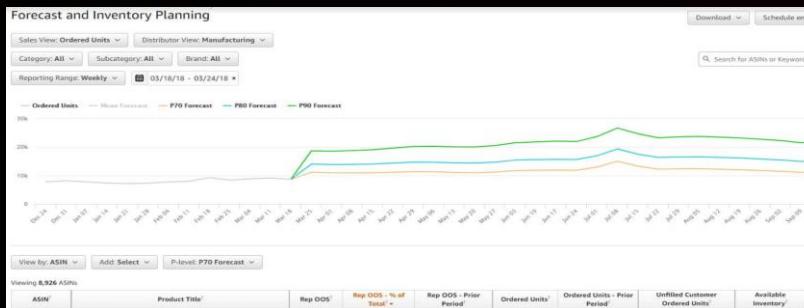
AWS Trusted Advisor



AWS Personal Health Dashboard



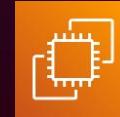
Amazon Forecast



Amazon EventBridge



Amazon SNS



Amazon EC2



AWS Systems Manager



AWS Batch



AWS Lambda



Amazon Kinesis



AWS CodePipeline



Amazon ECS



AWS Step Functions



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

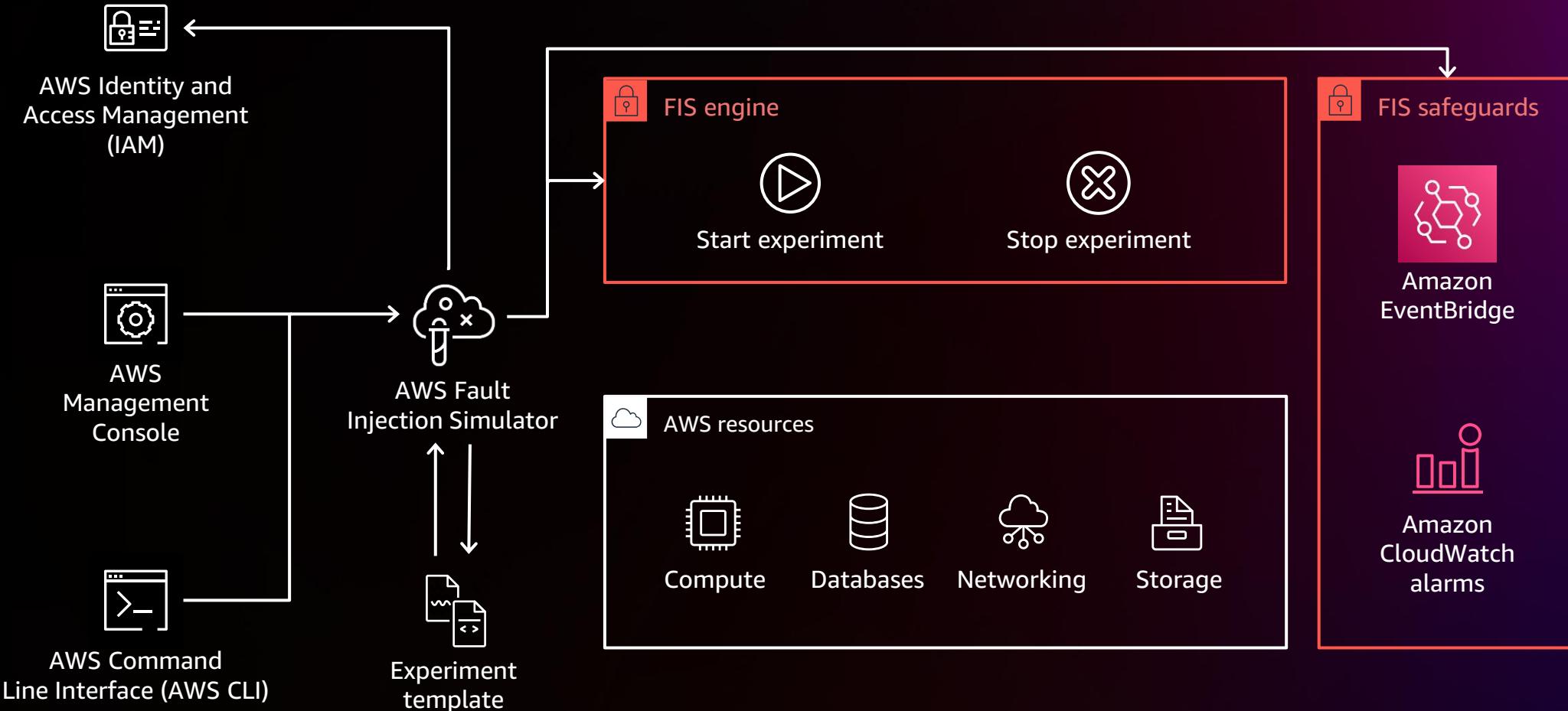
Quick recap



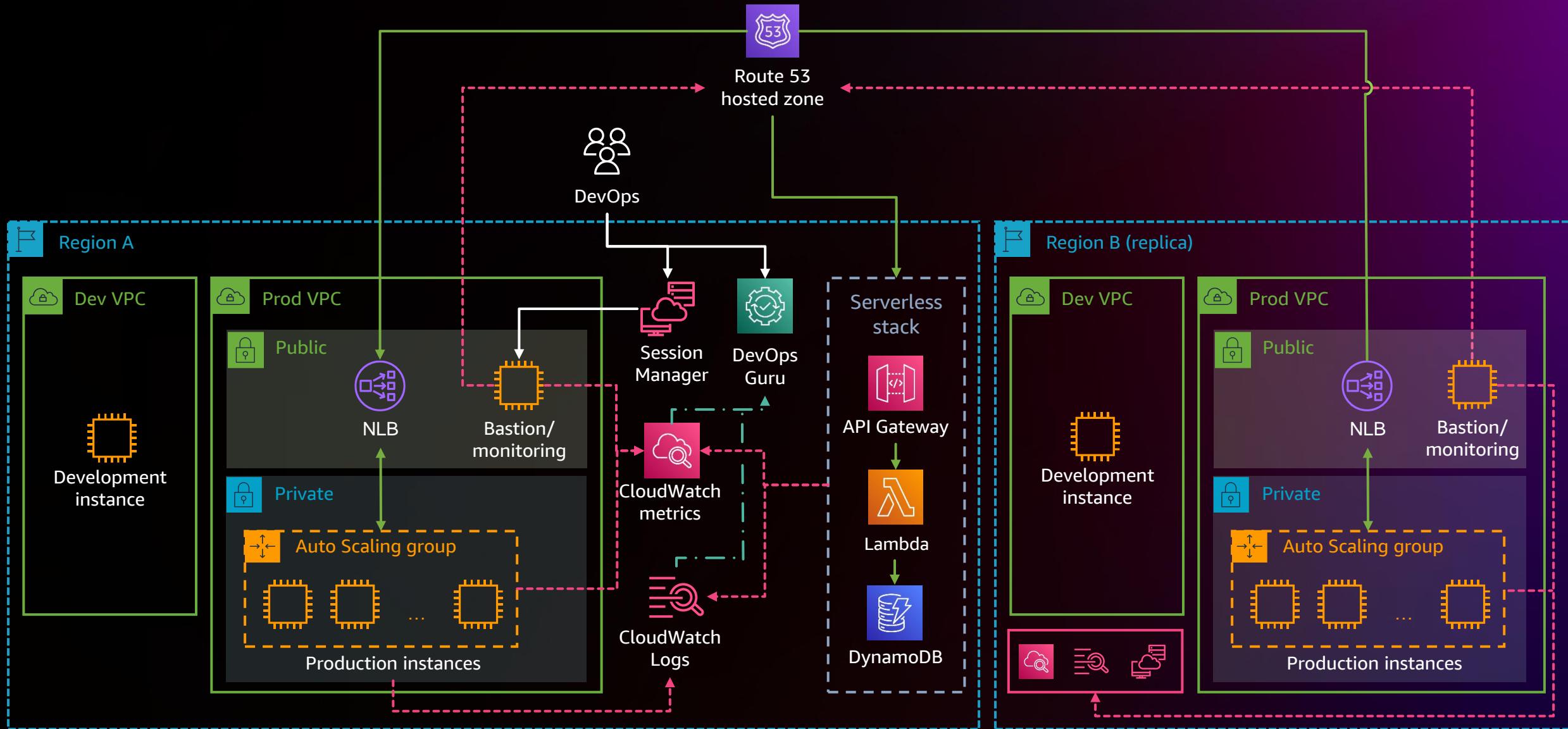
How do you validate operational readiness?

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 shows the AWS Health Dashboard on the left and a detailed view of an abuse report on the right. The dashboard displays 1 Open issue (Past 7 days), 0 Scheduled changes, and 0 Other notifications (Past 7 days). The abuse report details an 'Abuse copyright dmca ...' event from August 27, 2018, at 1:00 AM UTC, affecting 1 entity. The report includes instructions for acknowledging the receipt of the report and removing infringing content, as well as a list of steps for providing a counter-notice to the agent for notice of claims of copyright infringement.

Dashboard

Personal Health Dashboard

1 Open issues Past 7 days

0 Scheduled changes

0 Other notifications Past 7 days

Issues that might affect your AWS infrastructure. 3 issues were resolved in the past 24 hours. [See all issues](#)

Start time: August 20, 2018 at 2:08:16 PM UTC-7 [Add filter](#)

Event	Region...	Start time	Last update time	Affected resources
Abuse copyright dmca ...	-	August 27, 2018 at 1:00 AM UTC	August 27, 2018 at 1:00 AM UTC	1 entity

Abuse copyright dmca report

Aug 27, 08:57 PM UTC [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.

Please acknowledge the receipt of this report and/or remove the allegedly infringing content within 24 hours. If you do not remove the content, we will take the necessary steps to disable access to the content, up to and including suspension of your account. You would have also received an email notification from ec2-abuse@amazon.com with this same report. Please reply directly to that email.

If you believe the content referenced in the notice is not infringing, you may provide a counter-notice to our Agent for Notice of Claims of Copyright Infringement via email at ec2-abuse@amazon.com, abuse@amazonaws.com or to the physical address below. The counter-notice must include the following information:

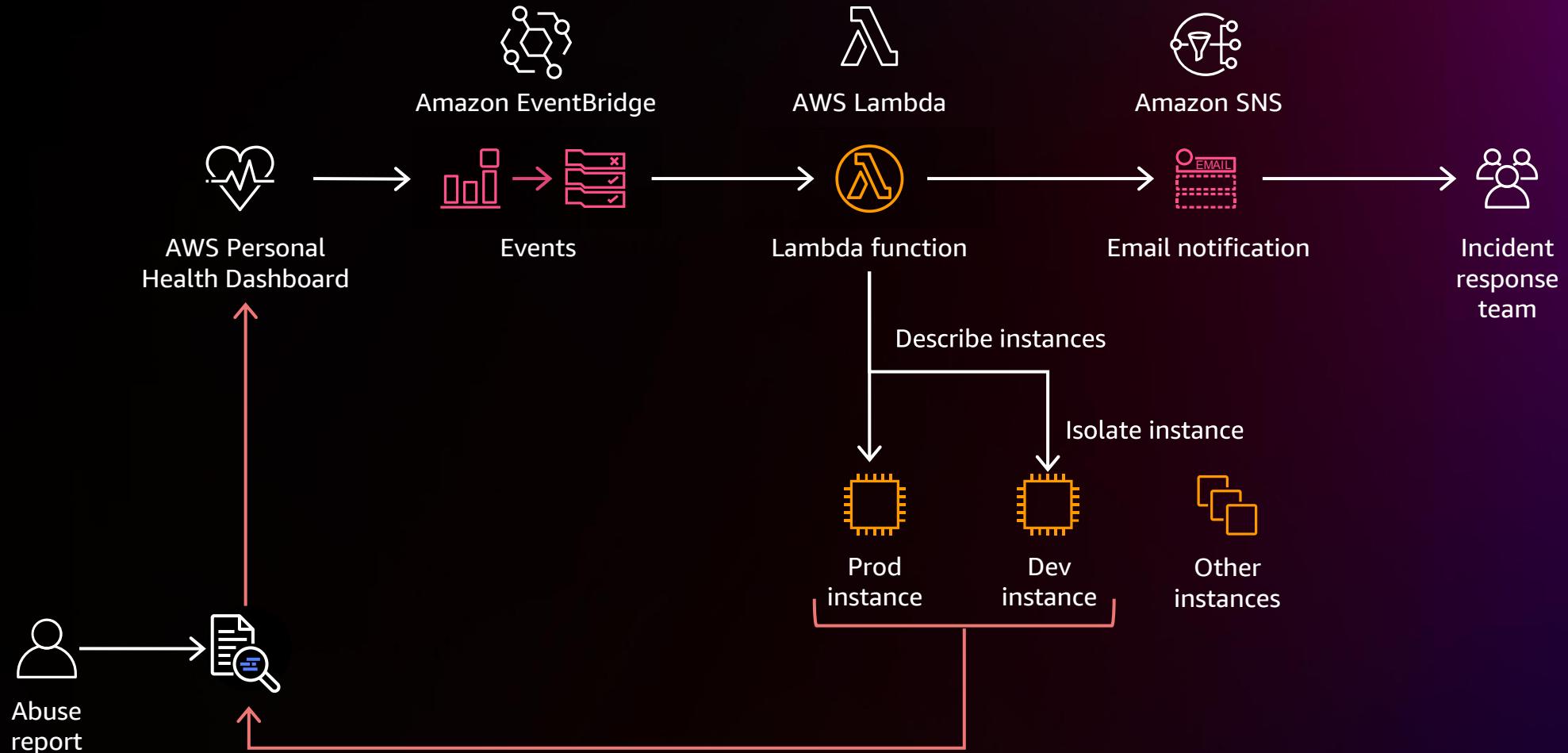
- Identify the material that was removed or disabled, and the location where it appeared before it was removed or disabled;
- A statement by you declaring under penalty of perjury that you have a good faith belief that the material at issue was either misidentified or mistakenly removed;
- Your name, address and telephone number;
- 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



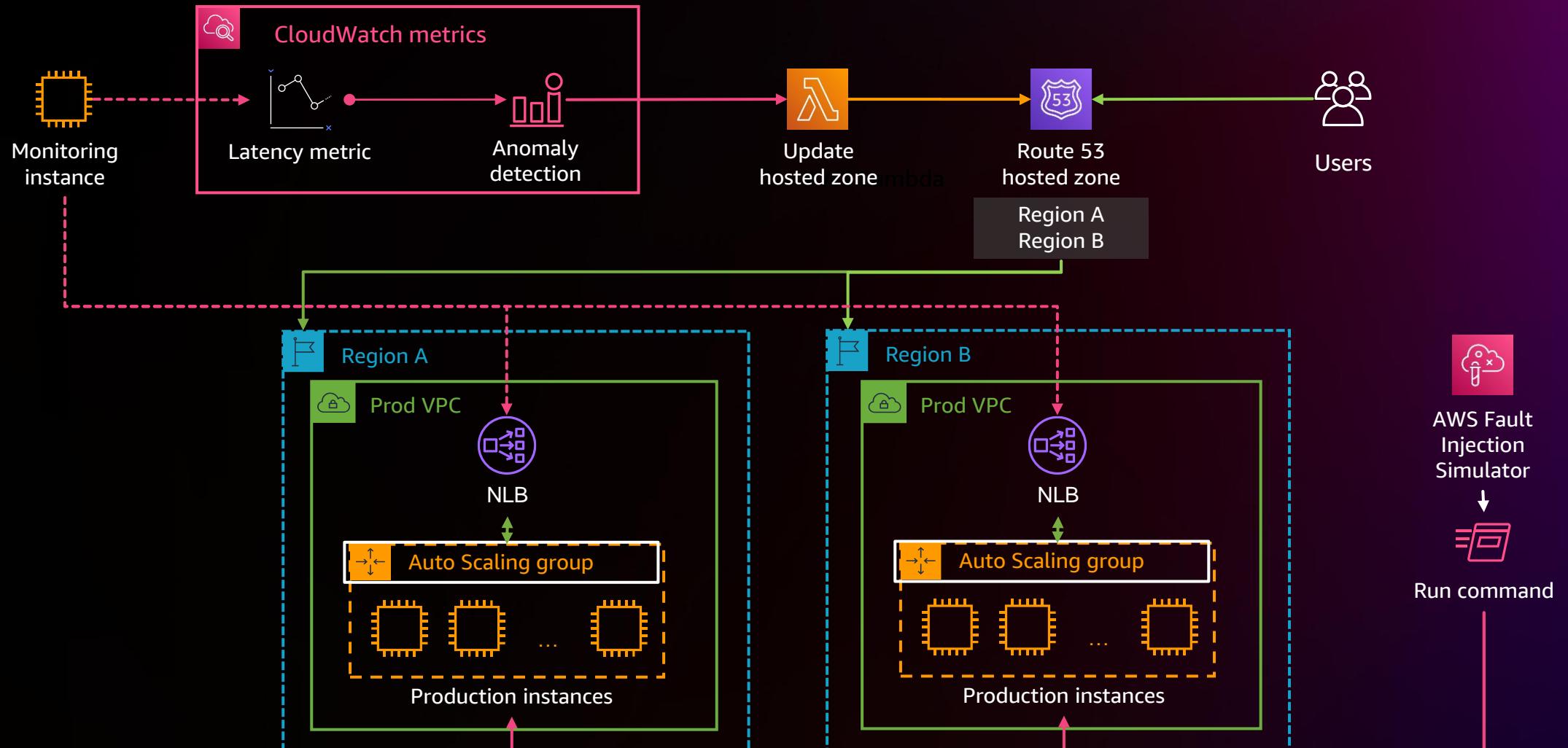
Automatic Region failover

"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

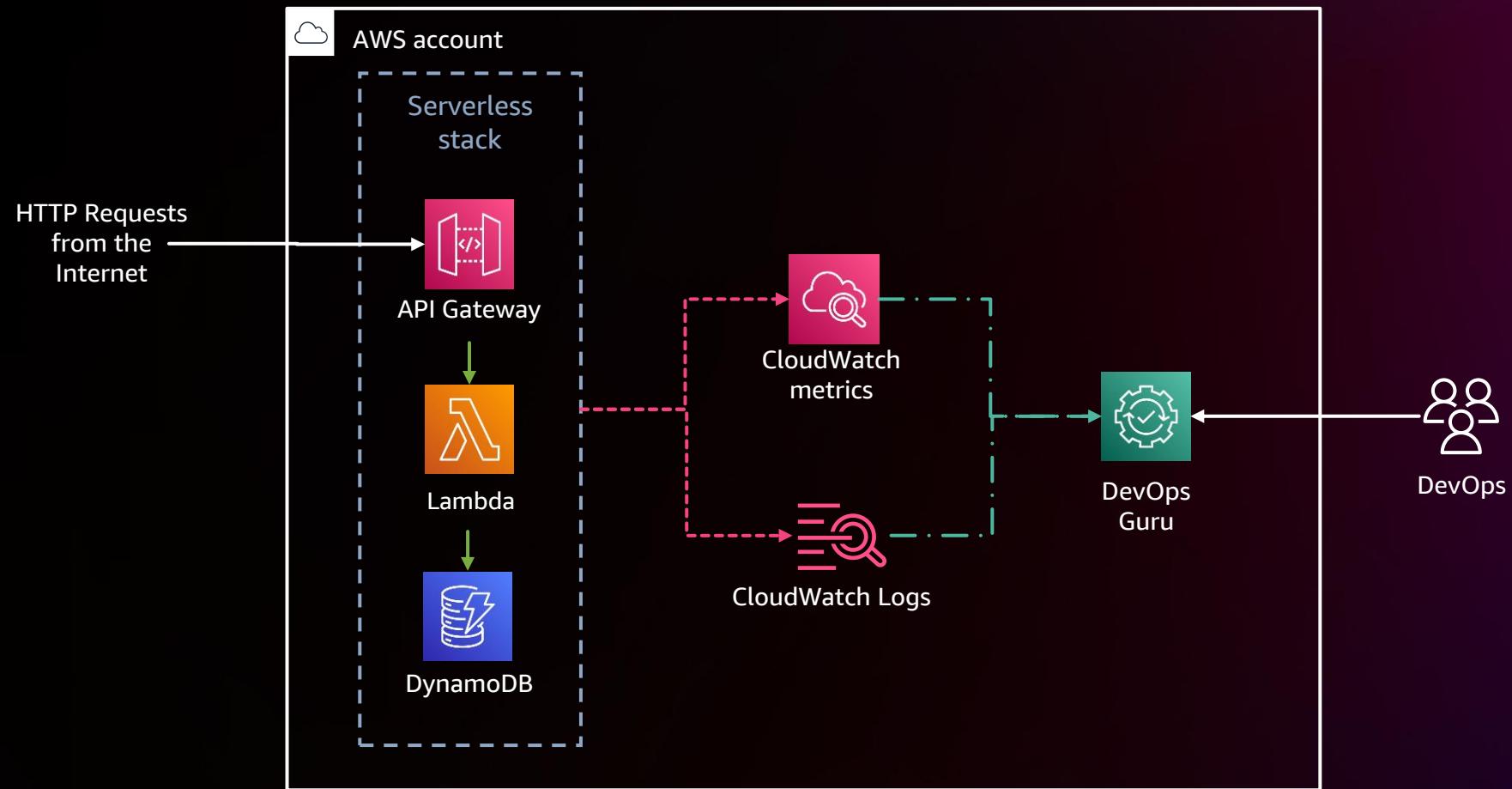


Leverage ML tools to identify operational issues

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

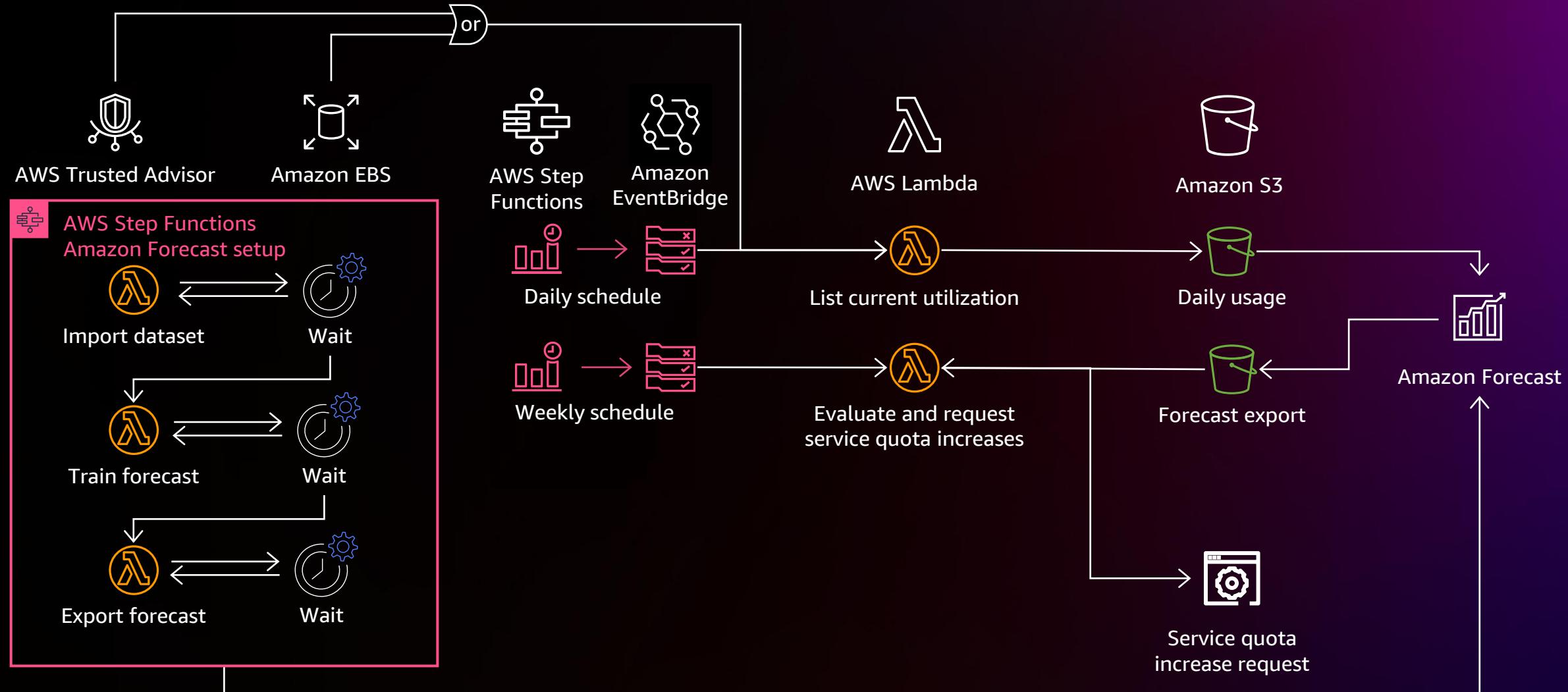
- Familiarize yourself with Amazon DevOps Guru
- Simulate failure and issues in your serverless stack
- Review DevOps Guru reactive insights

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

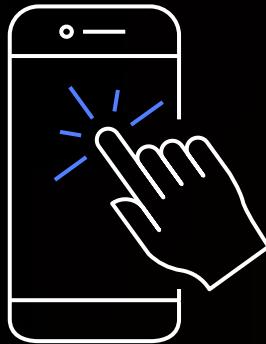
Service Quotas forecast and increase



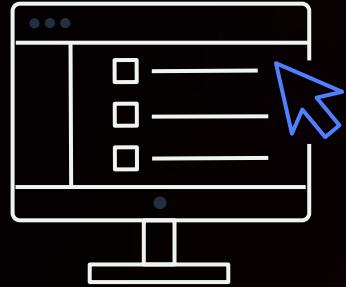
AWS re:Post

Community-driven knowledge sharing site for your AWS questions

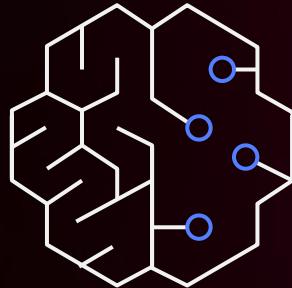
Visit <https://repost.aws/>



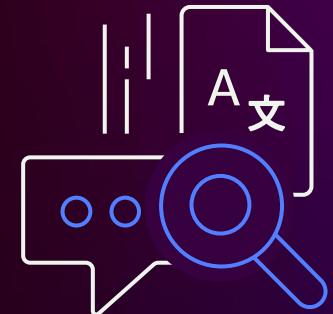
Login is not required to browse content



Content is organized by topics and tags



Machine learning drives smart content recommendations



Follow specific questions, topics, and community experts

Thank you!

Francesco Penta
penta@amazon.com

Milan Karalic
karalicm@amazon.com



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