AWS re:Invent

NOV. 29 – DEC. 3, 2021 | LAS VEGAS, NV

ENT312

Intelligently automating cloud operations

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Agenda



Enterprise operations at scale



Prime Day 2021



Intelligent data sources



Automation services



Machine learning



Bringing it all together:
Intelligent automations in action

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Enterprise support

HELPING CUSTOMERS ACHIEVE OUTCOMES AND FIND SUCCESS IN THE CLOUD



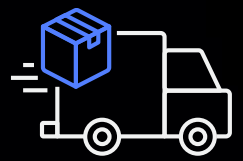
24/7 support

1



Business outcomes in the cloud

2



Supporting Amazon.com retail

3



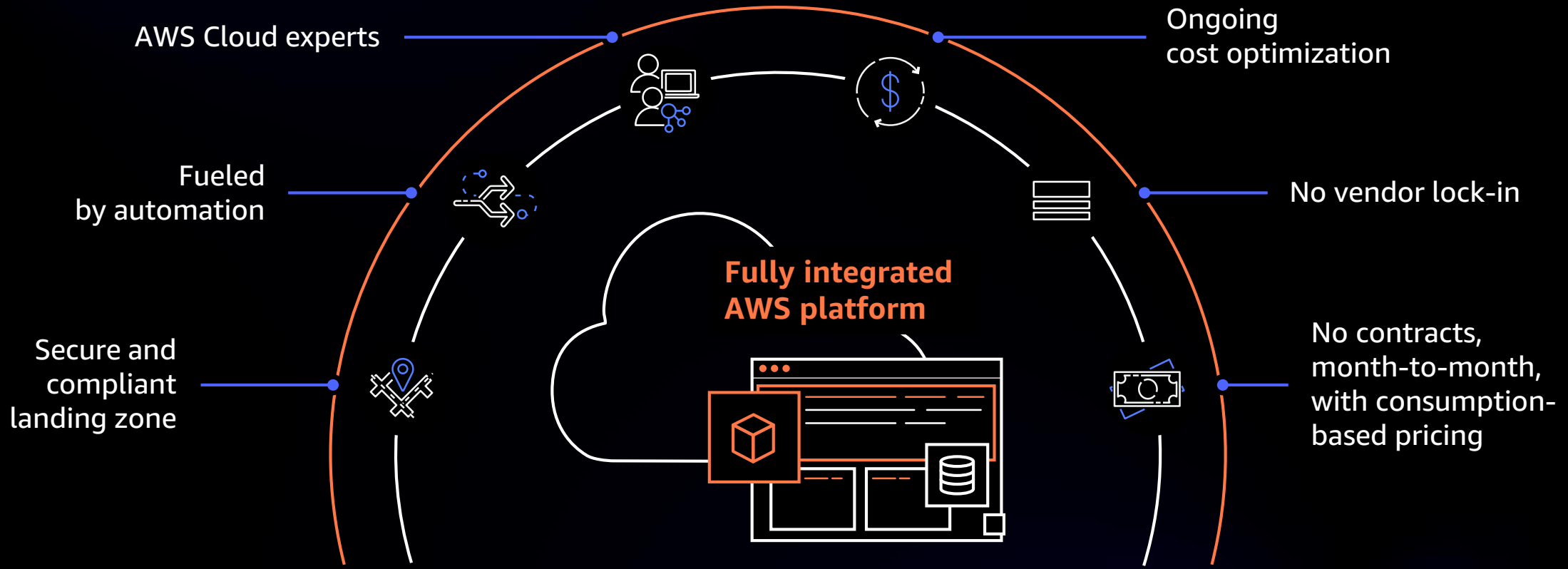
Efficient support tools to help engage with customers

4

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AWS Managed Services (AMS)

ENABLE, BUILD, AND OPERATE ON AWS



Built on standard AWS tools and customer-owned assets

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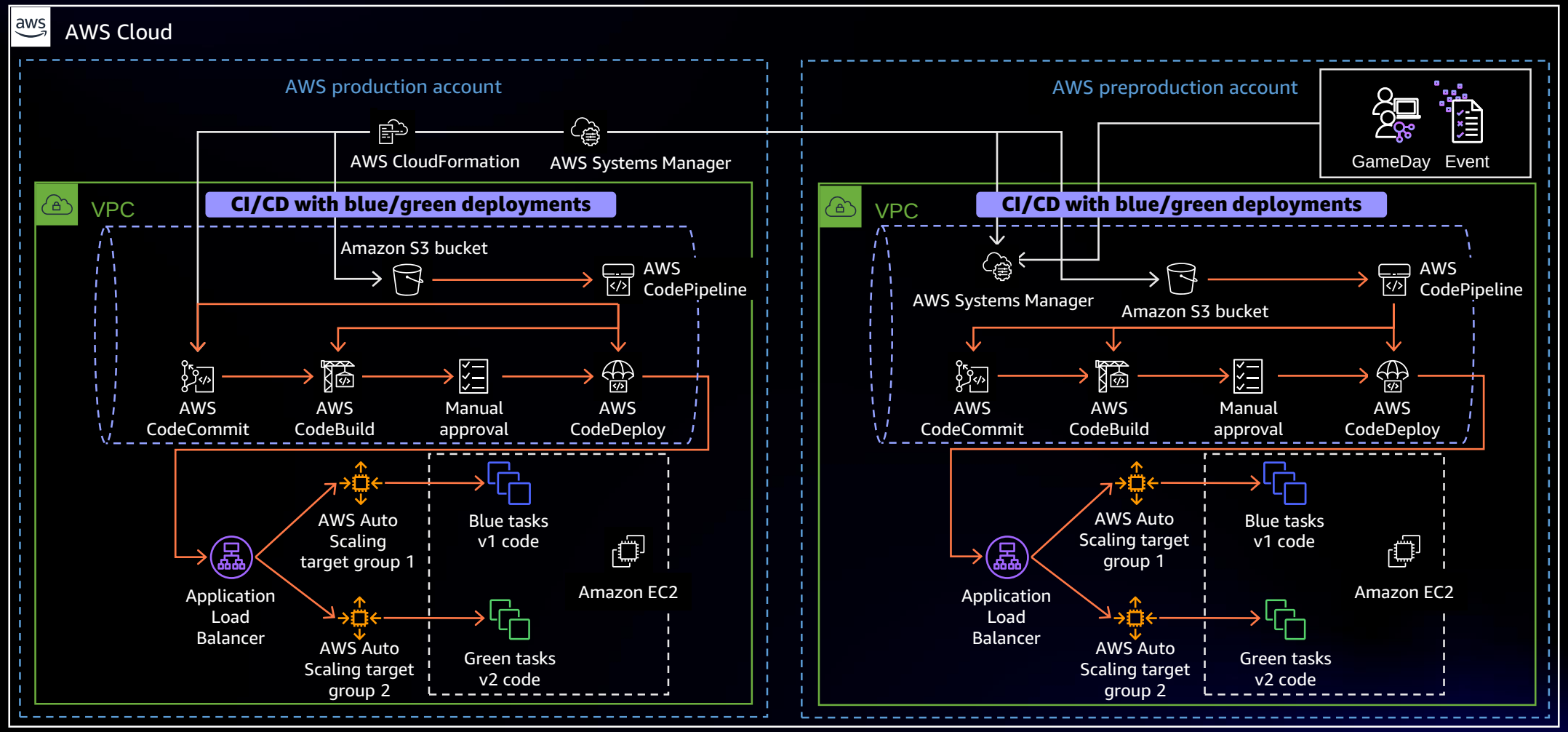
Operations at scale: What does that mean?



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Example: Operational activities in perspective

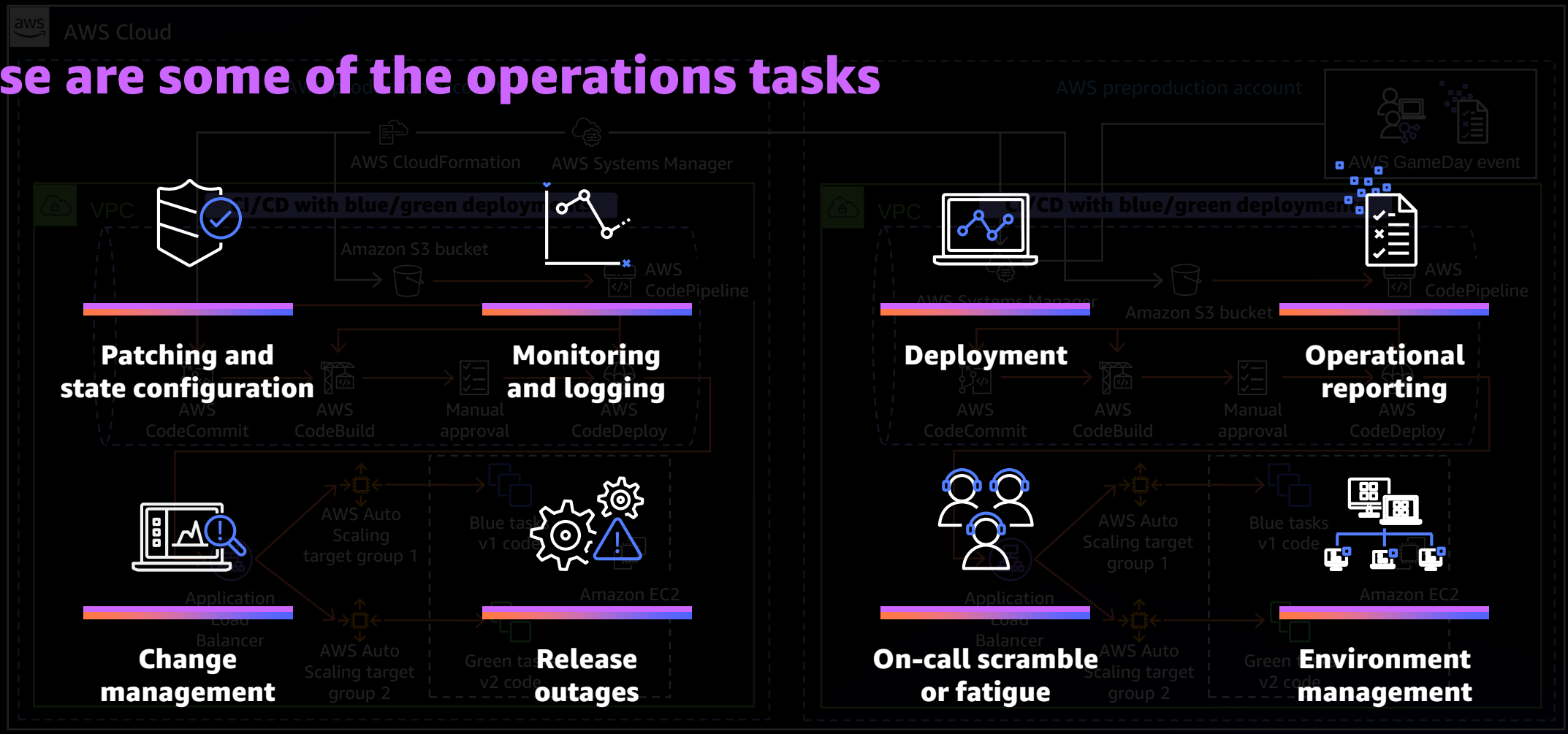
ACTIVITIES CAN VARY ACROSS ACCOUNTS AND BUSINESS FUNCTIONS



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Example: Operational activities in perspective

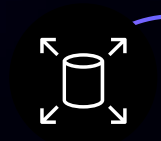
ACTIVITIES CAN VARY ACROSS ACCOUNTS AND BUSINESS FUNCTIONS



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amazon.com
HAPPY
prime day
amazon
amazon

Stats during Prime Day 2021



Added 159 petabytes –

11.1 trillion

requests per day



Peak load of more than

290 million

HTTP requests per minute



47.7 million

messages per second



Increased normalized instances by

12.5%



Amazon EC2 instance price-performance up

40%



Processed

233 billion

transactions



Peaking at

89.2 million

requests per second

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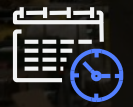
Scale brings challenges and opportunities



Unexpected bills and unused resources



Service disruption and impact reduction – fault tolerance



Managing events and scheduled changes



Performance opportunities

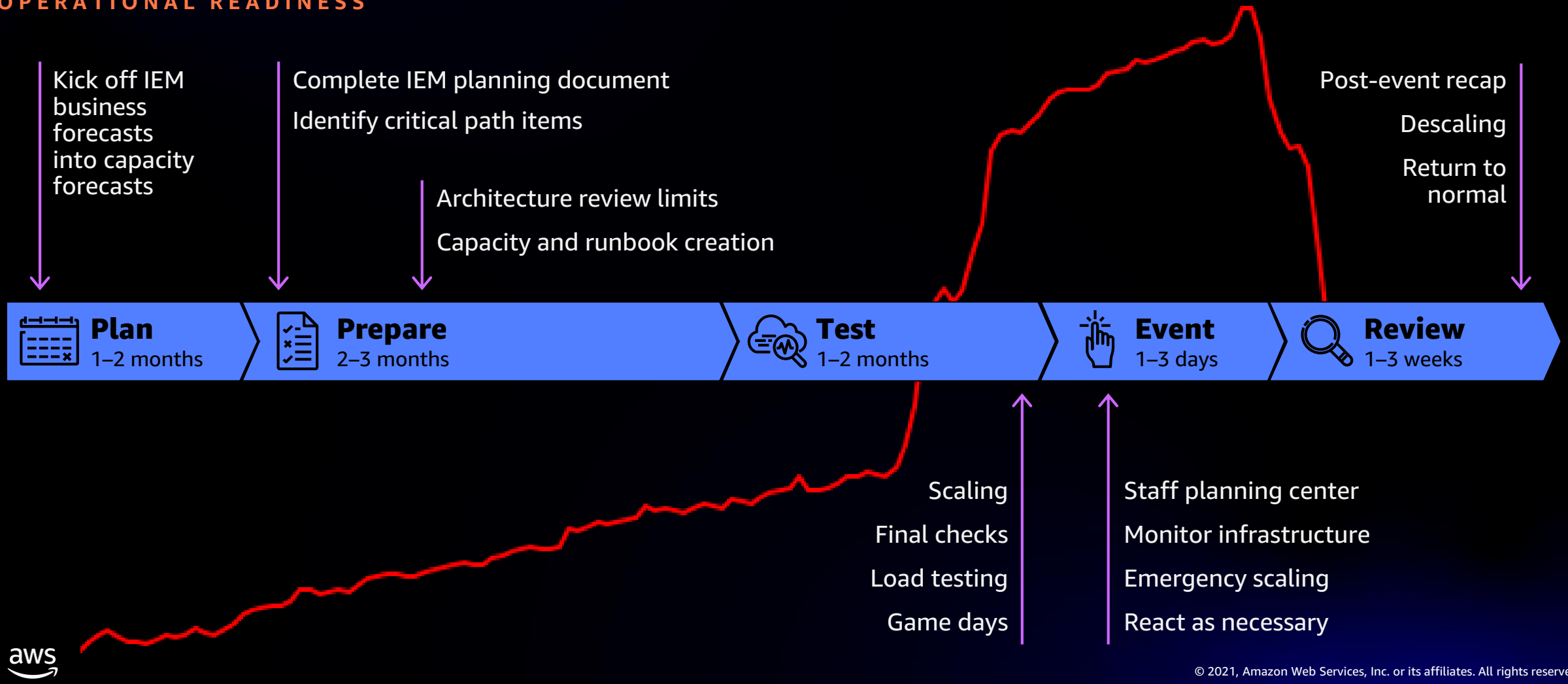


Monitoring governance



AWS Infrastructure Event Management (IEM) timeline

OPERATIONAL READINESS



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Intelligent data sources



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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

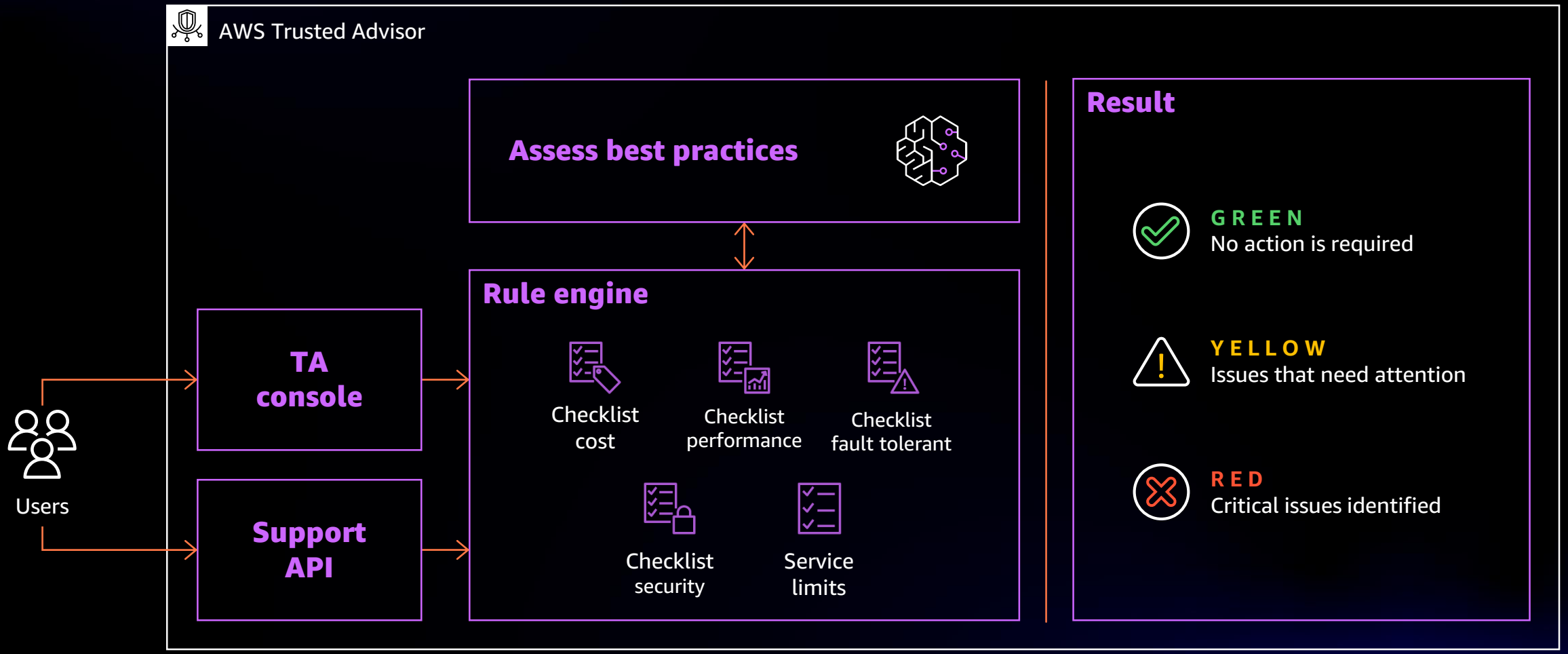


Amazon EC2 SQL Server

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AWS Trusted Advisor

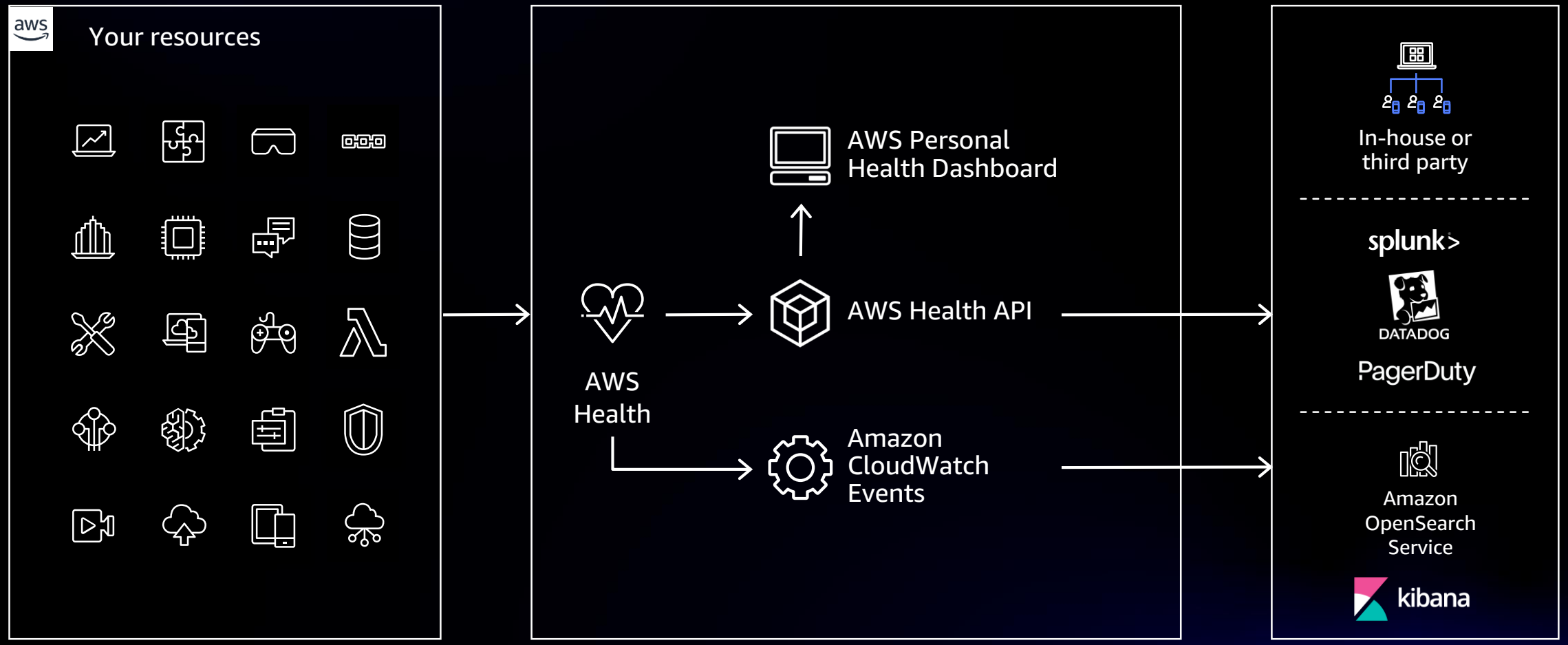
HOME OF AWS BEST PRACTICES



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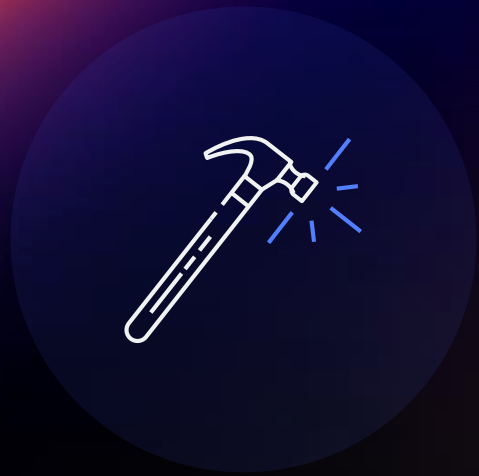
AWS Health

TRANSPARENT VISIBILITY INTO YOUR RESOURCE PERFORMANCE AND AVAILABILITY



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Automation tools

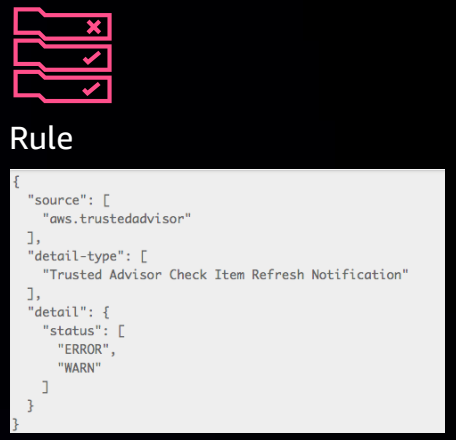


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Amazon EventBridge

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



Amazon Kinesis Data Firehose

AWS Step Functions

Amazon SQS

Amazon EC2

AWS Lambda

Amazon Inspector

AWS Systems Manager

AWS CodePipeline

AWS CodeBuild

Amazon SNS

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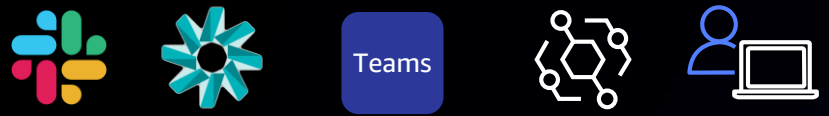
AWS Health Aware (AHA)

ENABLES YOU TO START USING AWS HEALTH IN UNDER 5 MINUTES

Real-time alerts on issues, changes, and notifications reported in your account's AWS Health dashboard

Integrates with single AWS accounts as well as AWS Organizations

Integrates with common communication platforms



awsHEALTHaware



aws

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

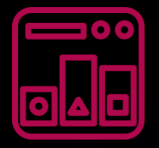

OpsCenter


Inventory


Maintenance Windows


Run Command


Parameter Store

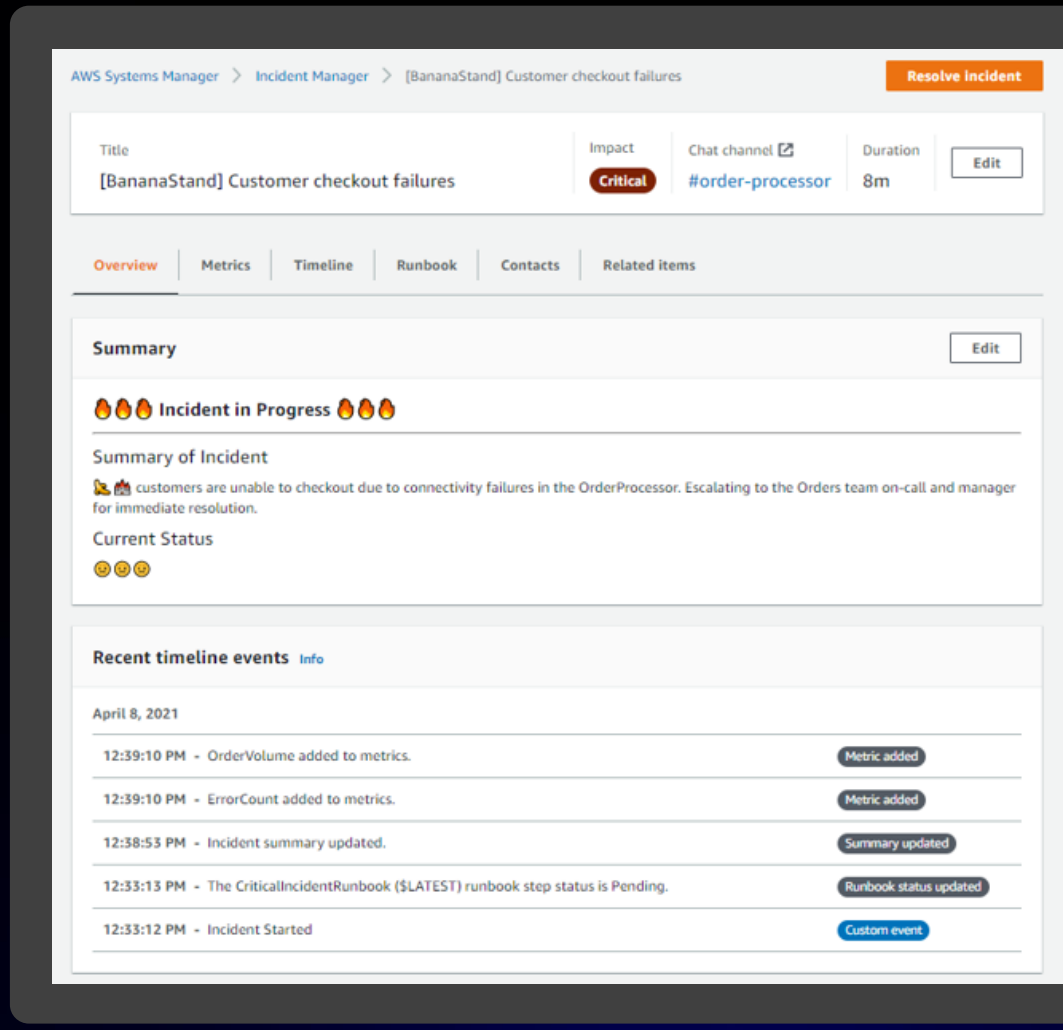

State Manager

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Incident Manager

RESOLVE APPLICATION ISSUES FASTER WITH AUTOMATED RESPONSE PLANS

- Response plan runbooks triggered by alarms
- Notify people via SMS, voice, and escalations
- Track incidents from detection to post-incident analysis
- Collaborate in Slack via AWS Chatbot
- Learn from issues via post-incident action items tracked in OpsCenter

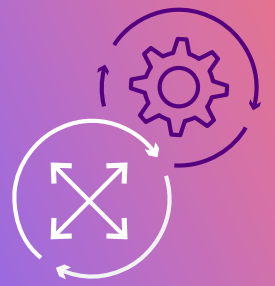


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Support Automation Workflows (SAW)

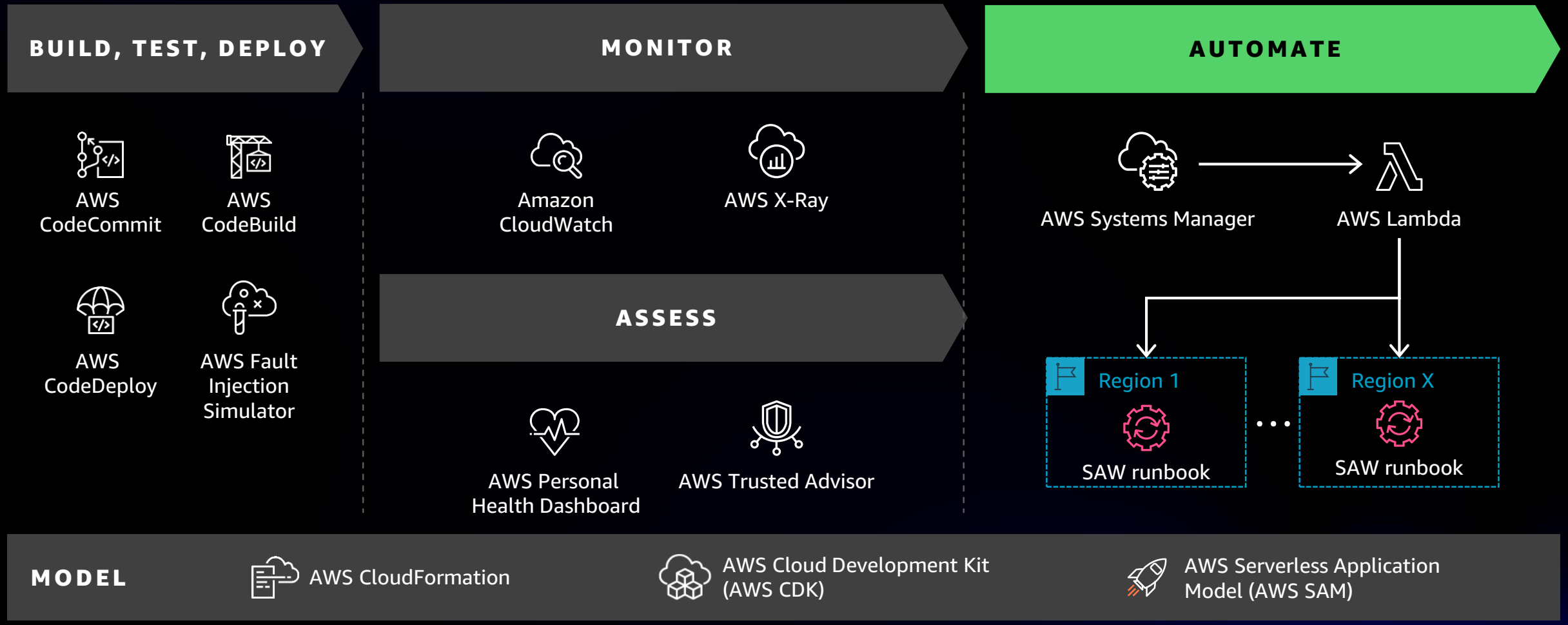
SAW runbooks help AWS customers troubleshoot and fix common issues with their AWS resources

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



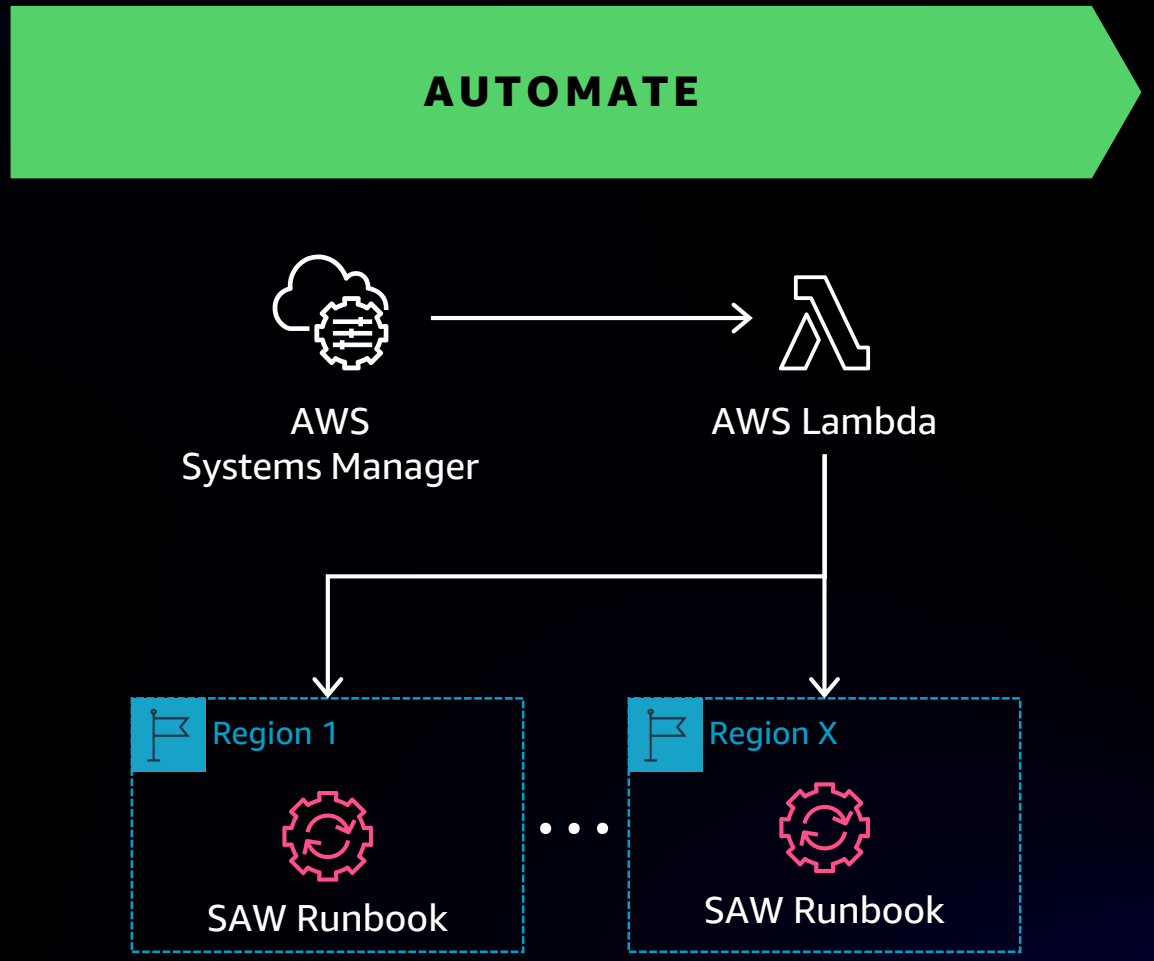
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Build, deploy, monitor, assess, and automate



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Build, deploy, monitor, assess, and automate



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Quick recap . . .



Operations at scale

Intelligent data sources

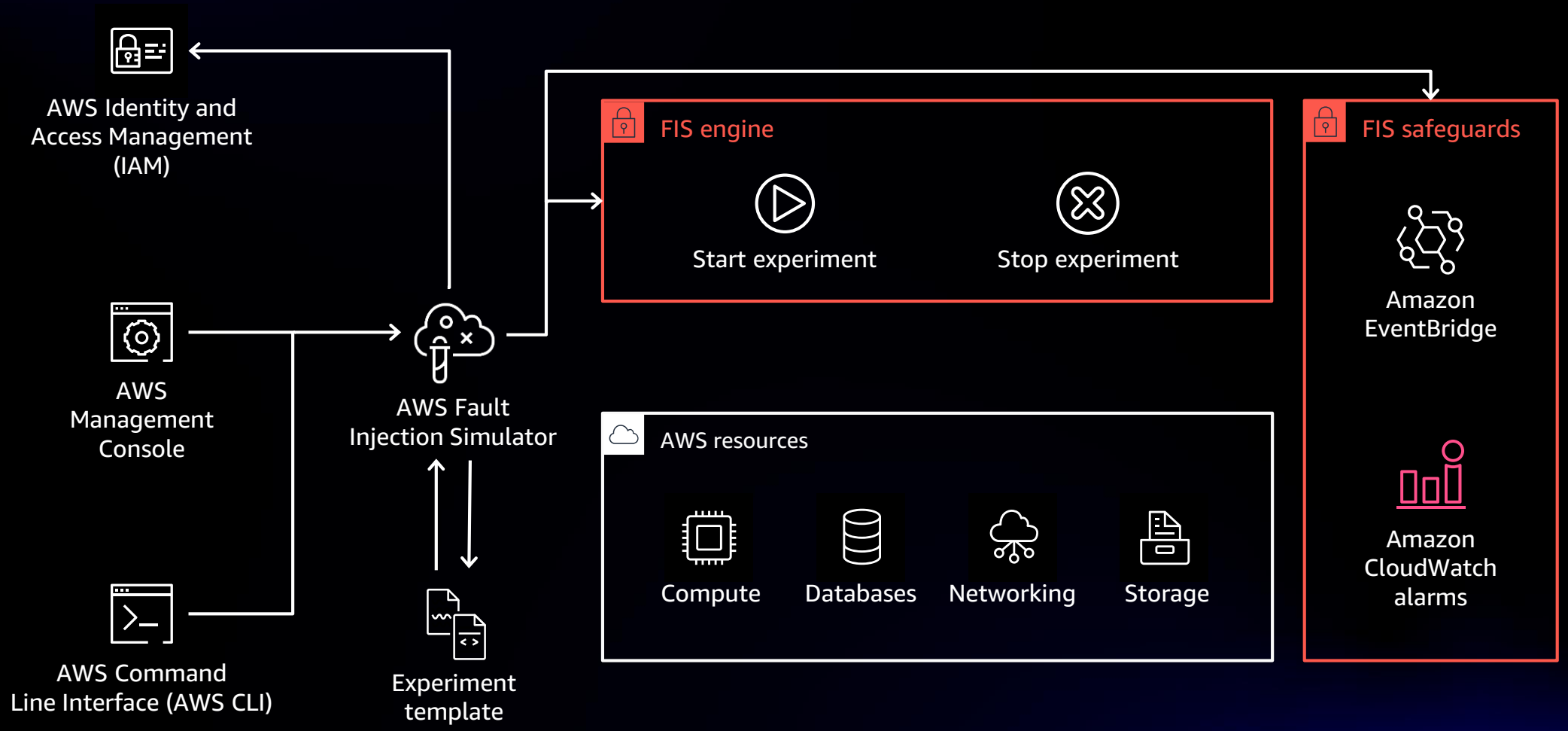
Automation tools

How to validate operational readiness?

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AWS Fault Injection Simulator

IMPROVE RESILIENCY AND PERFORMANCE WITH CONTROLLED EXPERIMENTS



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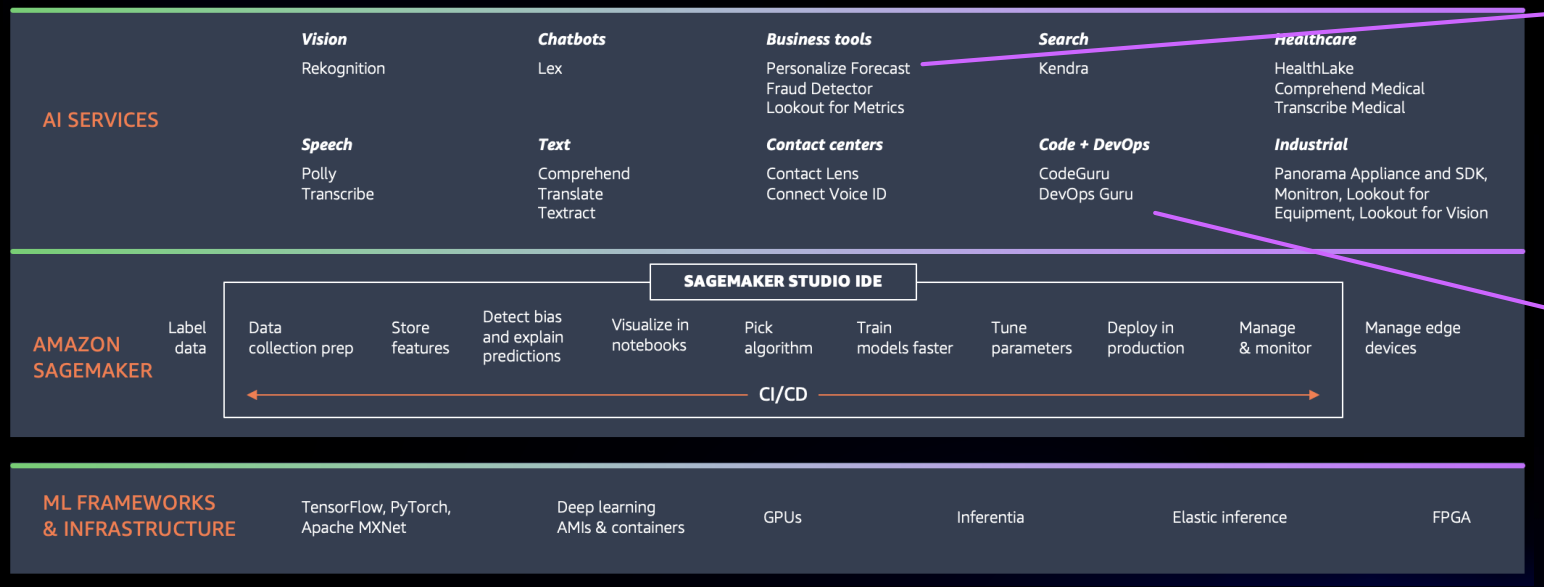
Intelligence through machine learning



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Leverage AIOps from the AWS ML stack

AWS ML stack



Business tools

Amazon Personalize
Amazon Forecast
Amazon Fraud Detector
Amazon Lookout for Metrics

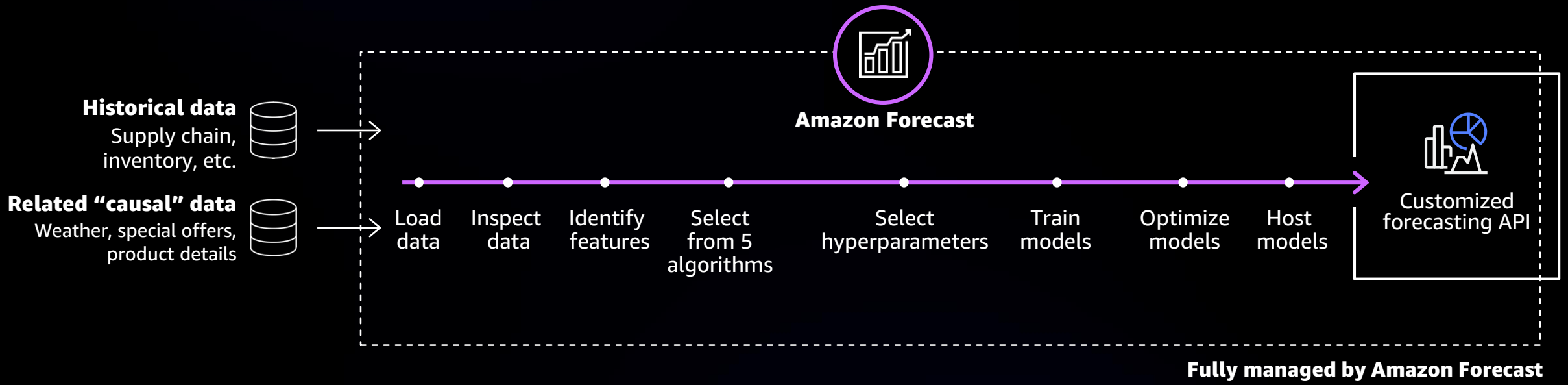
Code + DevOps

Amazon CodeGuru
Amazon DevOps Guru

Broadest and most complete set of machine learning capabilities

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Amazon Forecast: Machine learning time-series forecasting



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Predictive scaling in Amazon EC2 Auto Scaling

MACHINE LEARNING TECHNOLOGY BEHIND THE SCENES

Machine learning model
Billions of data points from Amazon.com

Loads metric and forecasts
Next 2 days based on the pretrained model

Performs regression analysis
between load metric and scaling metric

Schedules scaling actions
for the next 2 days, hourly

Repeats every day



Capacity provisioning on premises



Capacity provisioning with dynamic scaling



Capacity provisioning with predictive scaling and dynamic scaling

Provisioned capacity **Actual capacity demand**

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Amazon CloudWatch anomaly detection



Self-learning metric behavior

1



Awareness of seasonality

2



Dynamic alarming

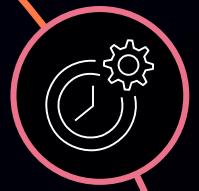
3

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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



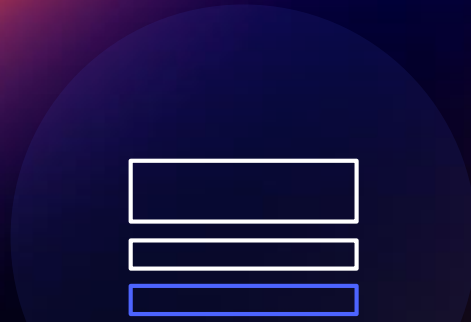
Reduce noise

Helps overcome alarm fatigue by automatically correlating and grouping related anomalies

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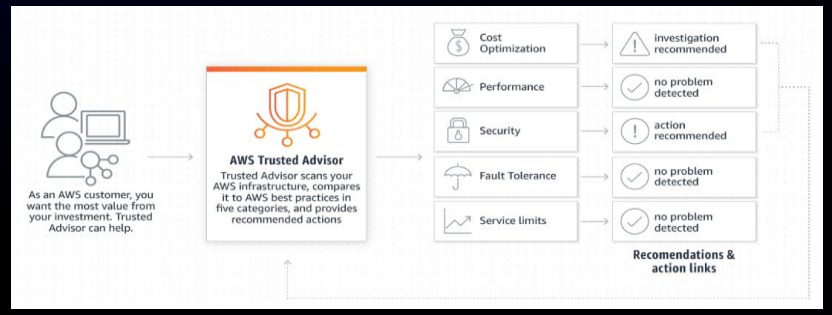
Bringing it all together: Intelligent automations in action



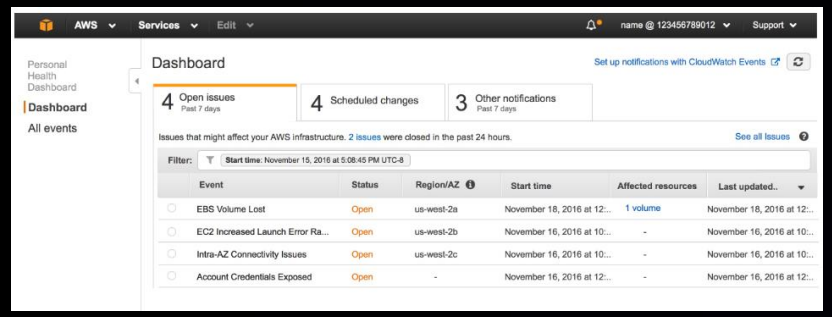
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Minimizing manual operations for scalability

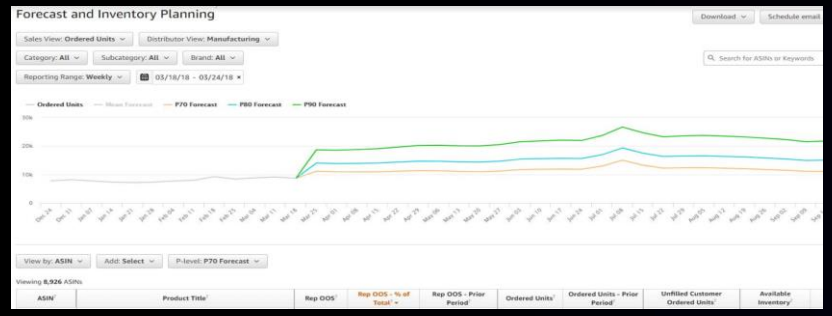
AWS Trusted Advisor



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

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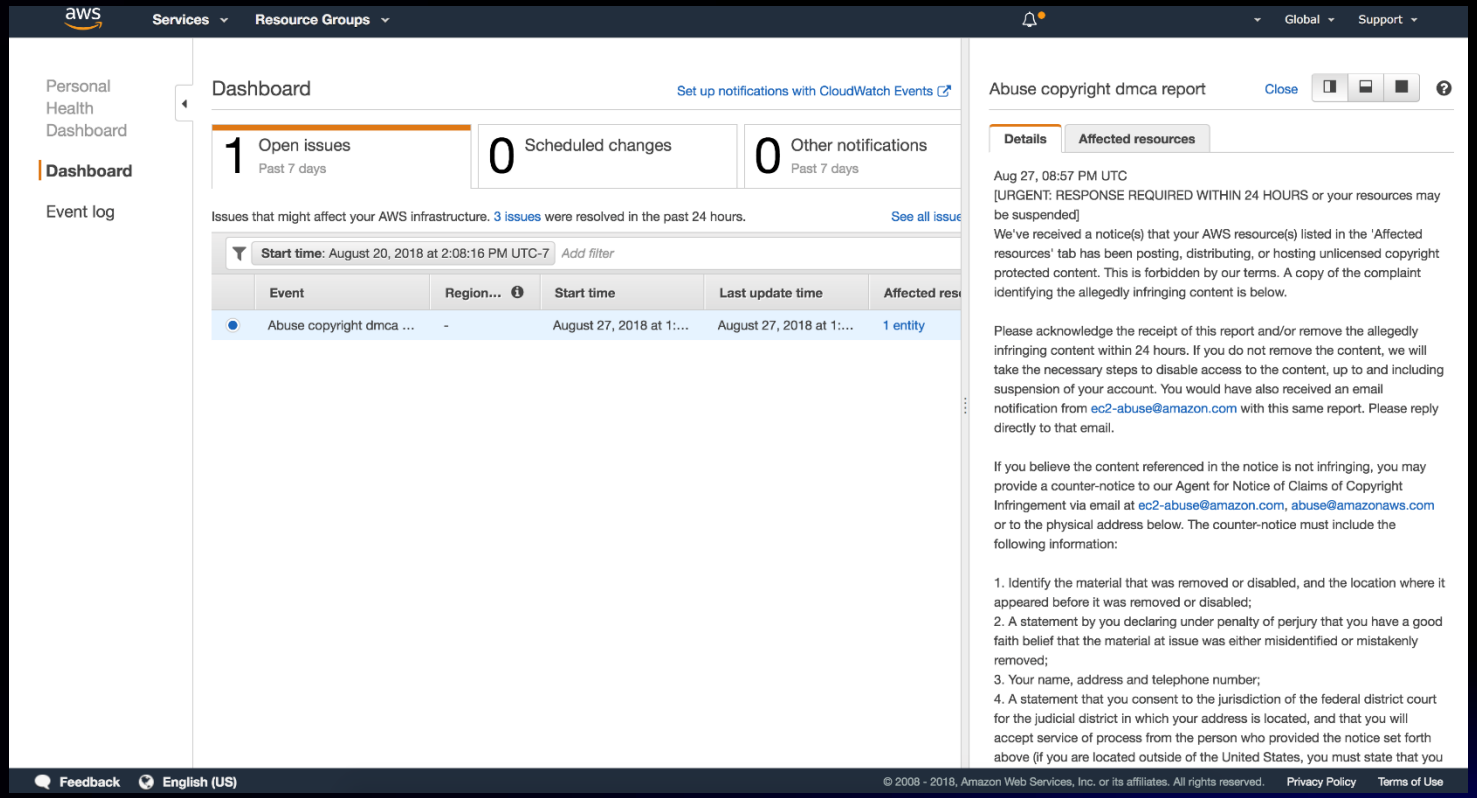
AWS Health

AUTOMATION PROCESS FOR HANDLING AND REMEDIATION OF ABUSE ALERTS

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

https://go.aws/3BfaOQp

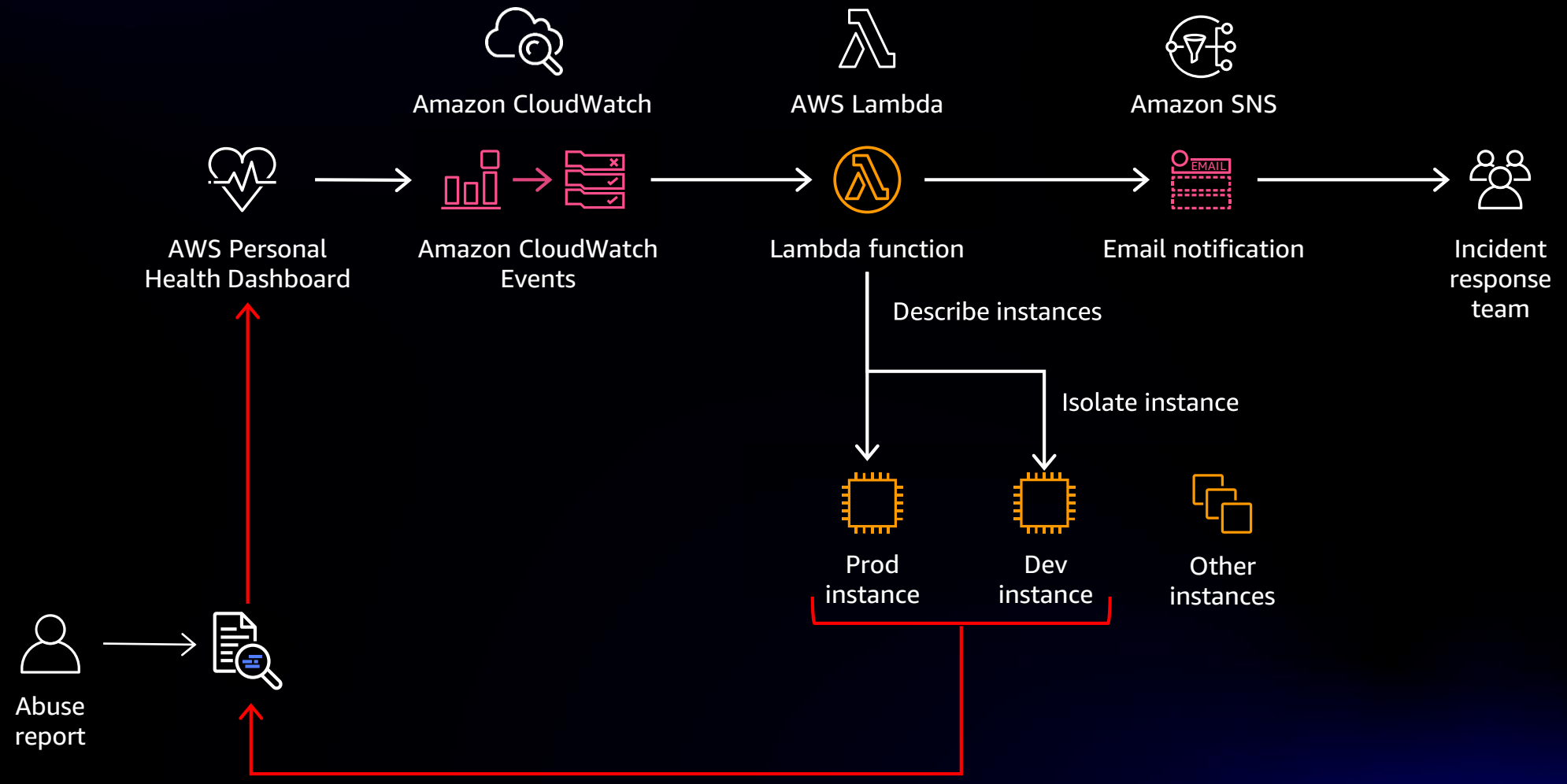
- Sending email spam
- Excessive web crawling
- Open proxy



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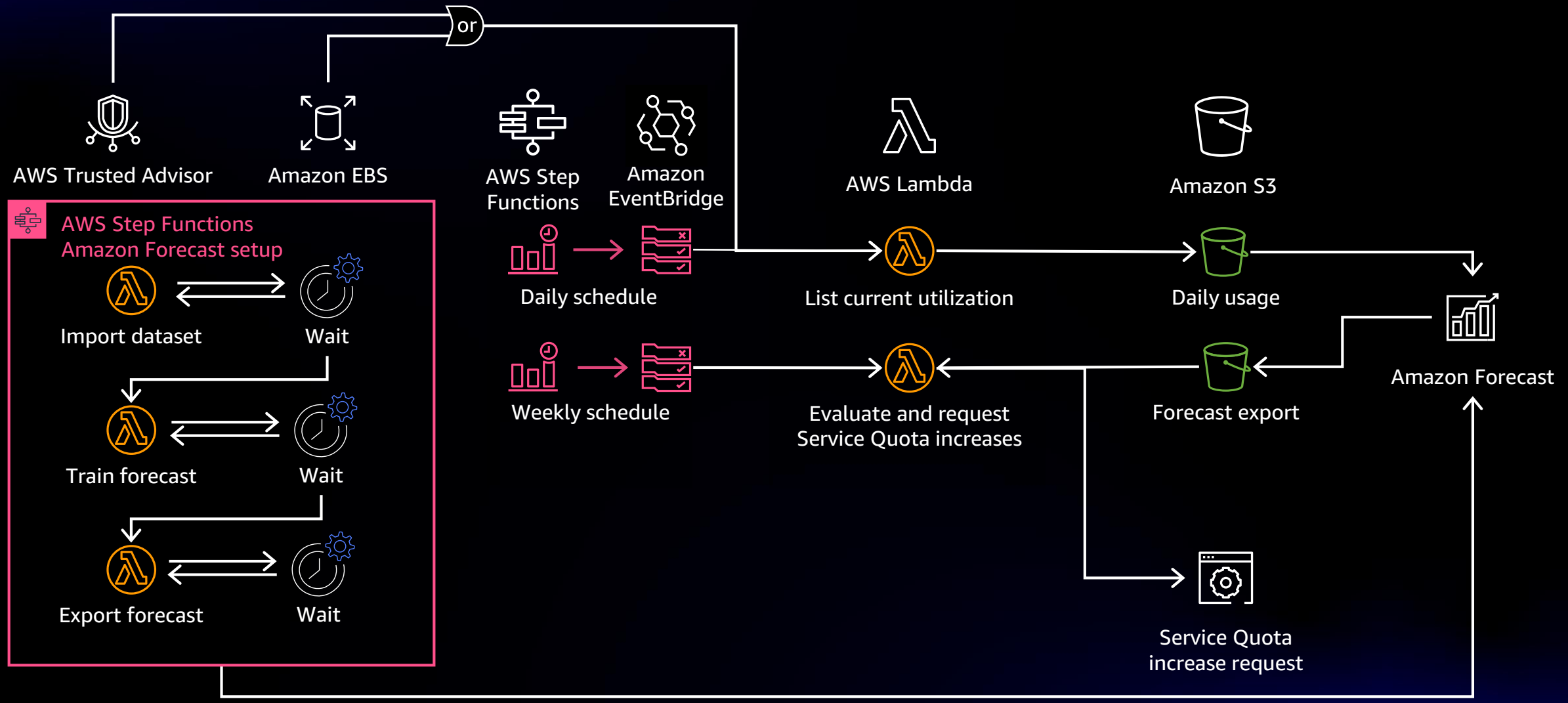
AWS Health

DOS ABUSE REPORT AUTOMATION



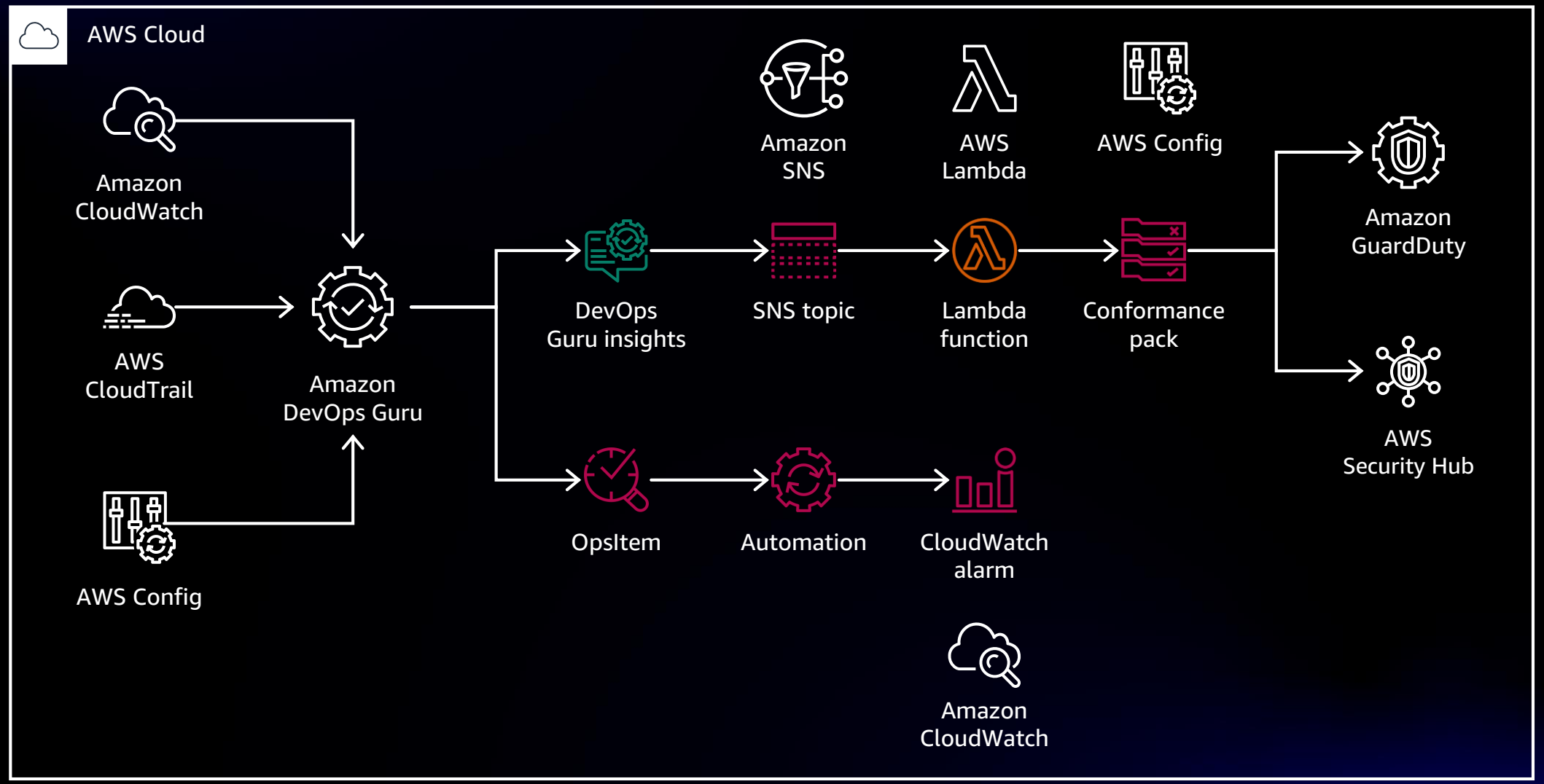
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Service Quota forecast and increase



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Establish alert governance



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Key takeaways for your enterprise



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Enterprise support proactive reviews



Infrastructure Event Management (IEM)

1



Well-Architected review

2



Proactive services

Workload diagnostics and reviews

Operational workshops and deep dives

3

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Proactive programs to minimize downstream issues

Specialized onboarding



The technical account manager (TAM) coordinates new customer/team division setups

Technology and tool setup (e.g., AWS Trusted Advisor)

Plan out quarterly business reviews (QBRs) and strategic programs

Continuous education



500 QwikLabs training credits per year

Help to upskill knowledge of AWS services

AWS-led GameDays, Hackathons, Immersion Days, etc.

Promote innovation internally

Proactive services



AWS Support experts lead workload reviews, best practices workshops, and deep dives to achieve operational excellence

Architecture guidance



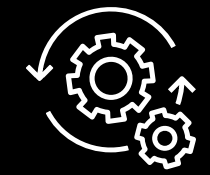
Well-Architected reviews conducted by AWS Solutions Architects and TAMs

Guidance for designing reliable, secure, efficient, and cost-effective systems

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AWS Managed Services (AMS)



Augments your teams with additional cloud operations capacity and skills to achieve operational excellence in AWS faster

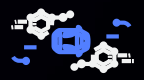
- Robust library of automations
- Ongoing AWS Control Tower operations
- Incident management with recovery SLAs
- Proactive monitoring and governance
- Security
- Patch and disaster recovery
- Financial and capacity management

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Automation best practices

Define context



Reference resource using tagging/naming convention/AWS CloudFormation

Principle of least privilege



Allow access to necessary API for automation

Think event-driven



Detect change leveraging existing service; AWS Config/Amazon CloudWatch Events

Think serverless



Use AWS serverless

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Key takeaways

1

Automating operations at scale

Automation goes beyond solving repetitive tasks by supporting business goals at scale with emphasis on continuous improvement

2

ML-powered capabilities

Services like Amazon DevOps Guru, Amazon Forecast, and Amazon CloudWatch anomaly detection ease the operations burden by being proactive

3

Get expert guidance

Leverage Enterprise Support, operations reviews, training, and Well-Architected reviews

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Thank you!

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ragarvin @amazon.com

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