
AWS
re:Invent
NOV. 28 – DEC. 2, 2022 | LAS VEGAS, NV

DOP205

Build it & run it: Streamline your DevOps capabilities with machine learning

Rafael Ramos (he/him)

Specialist Solutions Architect, DevAx
AWS

Shivansh Singh (he/him)

Principal Solutions Architect
AWS

Jared Reimer (he/him)

Founder, President & CTO
Cascadeo (a Globe Group company)

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Agenda

- Software delivery lifecycle today
- AI for DevOps
  - Writing code
  - Code quality and application performance
  - Application monitoring
- Demo
- Cascadeo journey

aws

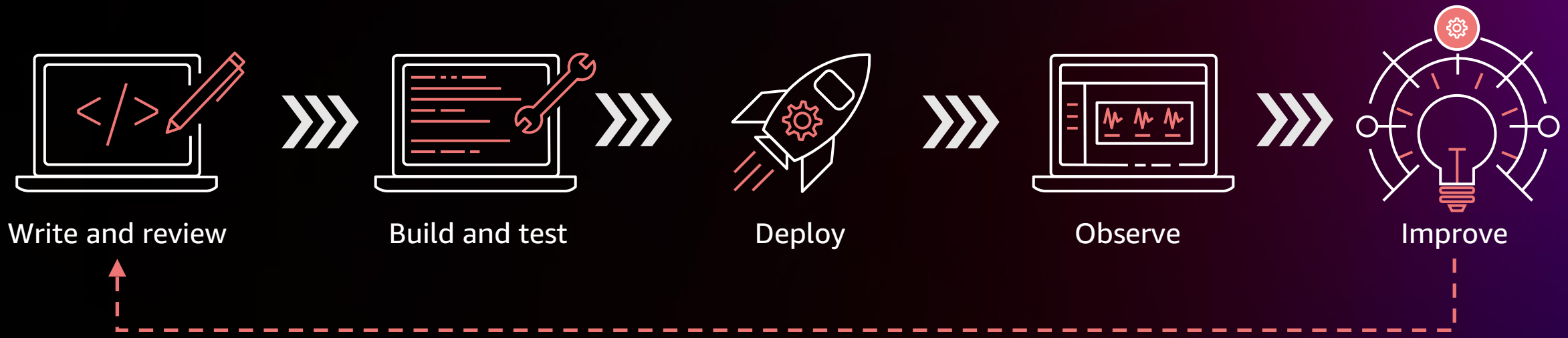
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A typical software delivery lifecycle



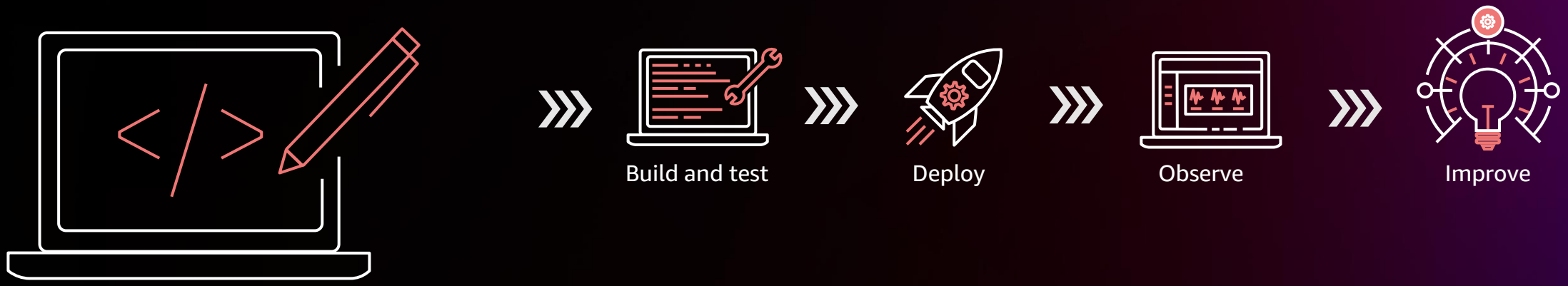
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A typical software delivery lifecycle



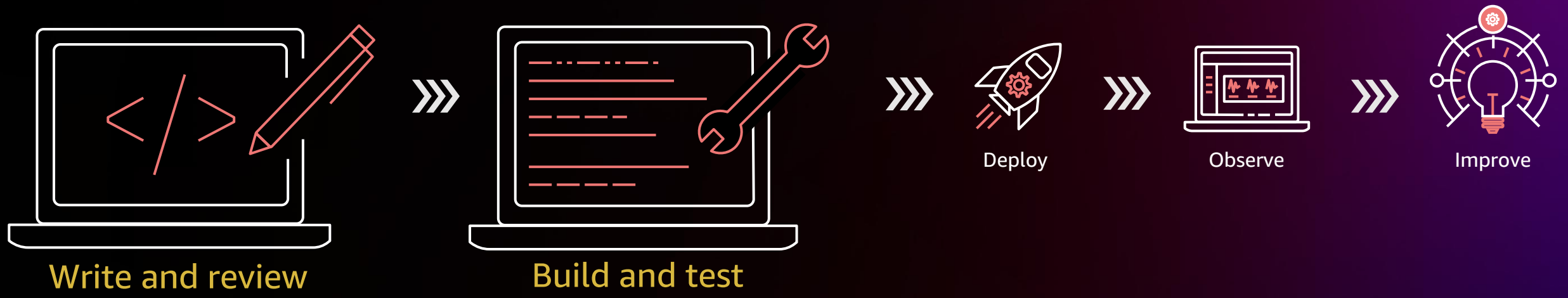
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Writing code



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Reviewing code



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Operating applications



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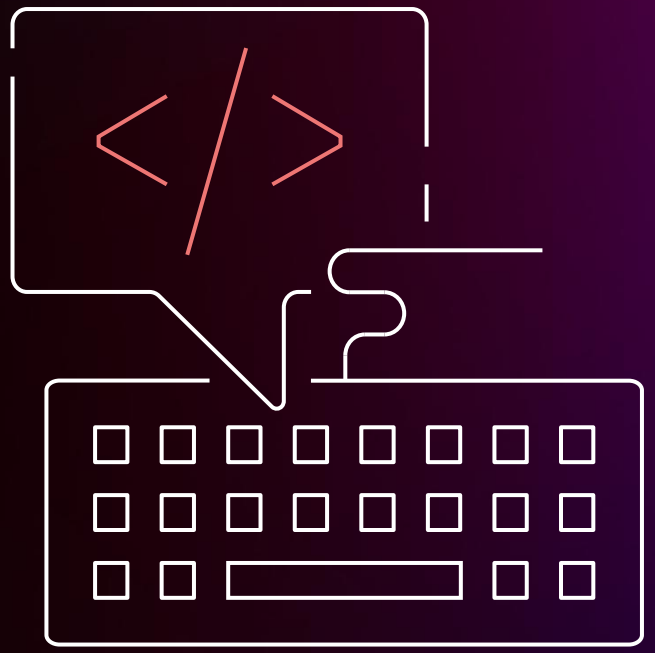
Writing code

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Writing code

Multiple programming languages

challenge



aws

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Writing code

Multiple programming languages

challenge

```java
public void handler() {
    List<String> list = Stream.of(...values: "a", "b", "c")
        .collect(Collectors.toList());
    List<String> newList = list.stream()
        .map(item -> item.toUpperCase())
        .collect(Collectors.toList());
```

```python
def handler():
    items = ['a', 'b', 'c']
    items = [item.upper() for item in items]

    items = list(map(do_something, items))

def do_something(item):
    return item.upper()
```

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Writing code

Multiple frameworks and libraries

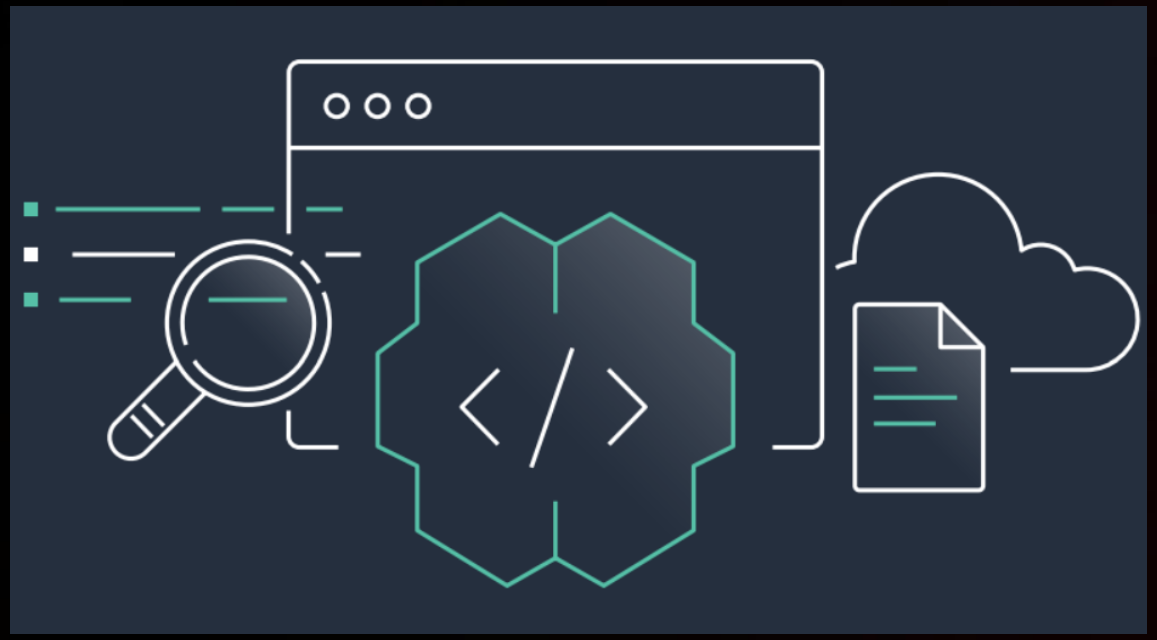
challenge



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Introducing Amazon CodeWhisperer

BUILD APPLICATIONS FASTER WITH ML-POWERED CODING COMPANION



- Machine learning (ML)–powered developer tool
- Provides code recommendations based on comments in natural language and prior code

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CodeWhisperer: ML-powered coding companion

Provides code recommendations in natural language based on contextual information such as prior code and comments

Generates

- Entirely new code based on context
- Code from plain English comments
- Complete functions

Available in all major integrated development environments (IDEs) as an extension

```
# Write a function to upload a file to S3.
def upload_file_to_s3(file_name, bucket_name, object_name):
    """
    Uploads a file to an S3 bucket

    :param file_name: File to upload
    :param bucket_name: Bucket to upload to
    :param object_name: S3 object name. If none then file_name is used
    :return: True if file was uploaded, else False
    """

    # Upload the file
    s3_client = boto3.client('s3',
                             aws_access_key_id=AWS_ACCESS_KEY_ID,
                             aws_secret_access_key=AWS_SECRET_ACCESS_KEY,
                             region_name=AWS_REGION_NAME)

    try:
        s3_client.upload_file(file_name, bucket_name, object_name)
        print(f'File {file_name} uploaded to S3 bucket {bucket_name} as {object_name}')
        return True
    except FileNotFoundError:
        print(f'File {file_name} not found')
```

aws

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CodeWhisperer: ML-powered coding companion

Natural language

```
# Write a function to upload a file to S3.
def upload_file_to_s3(file_name, bucket_name, object_name):
    """
    Uploads a file to an S3 bucket

    :param file_name: File to upload
    :param bucket_name: Bucket to upload to
    :param object_name: S3 object name. If none then file_name is used
    :return: True if file was uploaded, else False
    """

    # Upload the file
    s3_client = boto3.client('s3',
                             aws_access_key_id=AWS_ACCESS_KEY_ID,
                             aws_secret_access_key=AWS_SECRET_ACCESS_KEY,
                             region_name=AWS_REGION_NAME)

    try:
        s3_client.upload_file(file_name, bucket_name, object_name)
        print(f'File {file_name} uploaded to S3 bucket {bucket_name} as {object_name}')
        return True
    except FileNotFoundError:
        print(f'File {file_name} not found')
```

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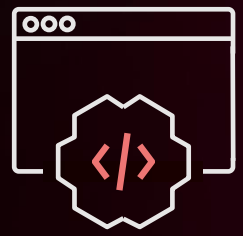
CodeWhisperer: How it works



Developers
Writing code in the IDE

IDE context automatically sent to CodeWhisperer

Receive code recommendations



CodeWhisperer
Uses ML to generate code recommendations based on prior code and comments in the IDE

- **Security scan**
- **Reference tracker**
- **Bias avoidance**

aws

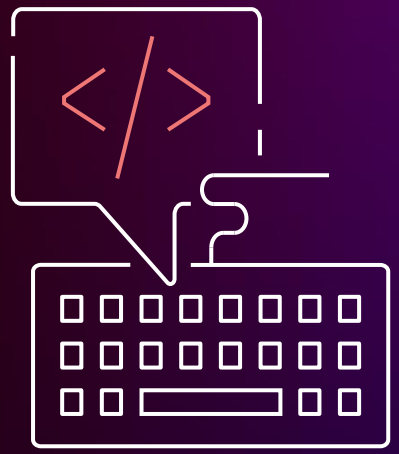
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CodeWhisperer features

Supported ecosystem

programming languages

- Java
- JavaScript
- Python
- C#
- TypeScript



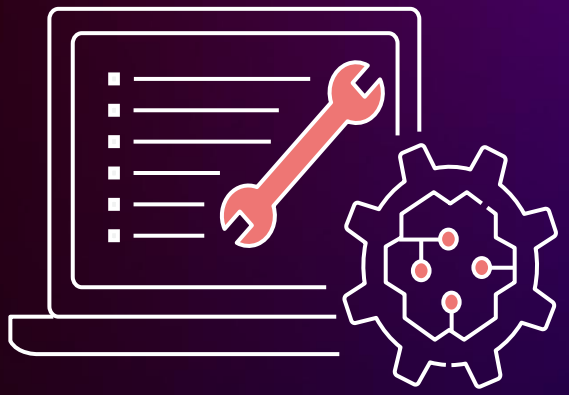
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CodeWhisperer features

Supported ecosystem

IDEs

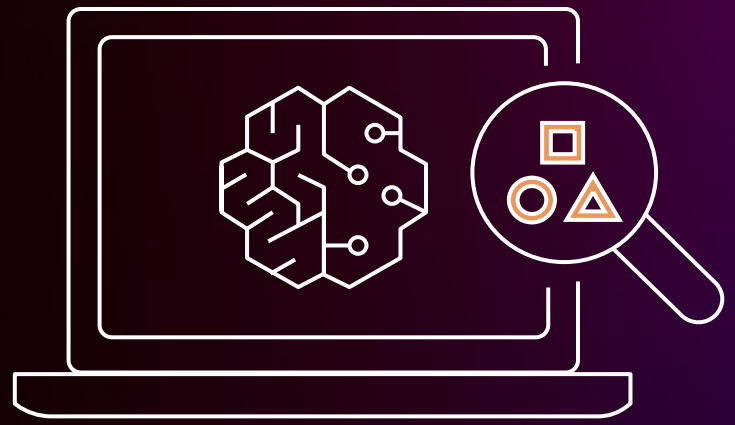
- **JetBrains** *(incl. PyCharm, IntelliJ IDEA, WebStorm)*
- **VS Code**
- **AWS Cloud9**
- **AWS Lambda console**



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CodeWhisperer features

Reference tracker



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CodeWhisperer features

Security scan



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AI for DevOps on AWS

CODEWHISPERER



CodeWhisperer



Code recommendations based on **existing code** and **natural language**

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Code quality and application performance

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Reviewing code

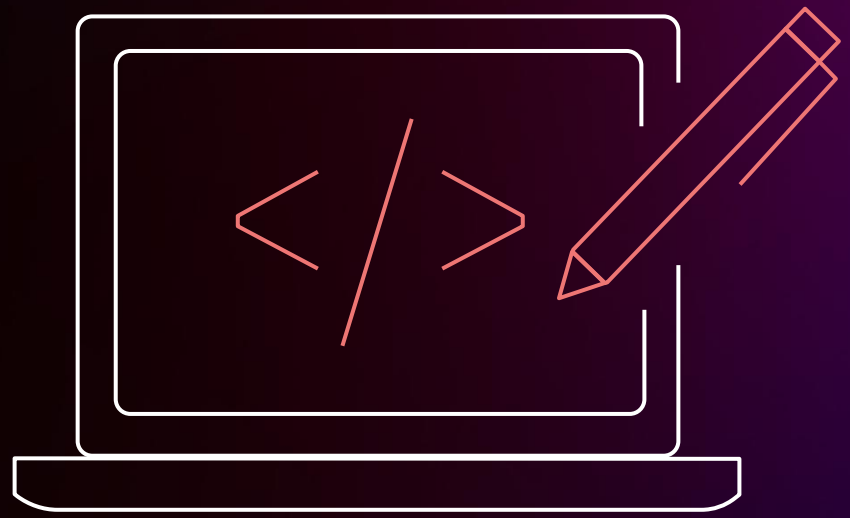


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Code reviews

Identify problematic code

challenge

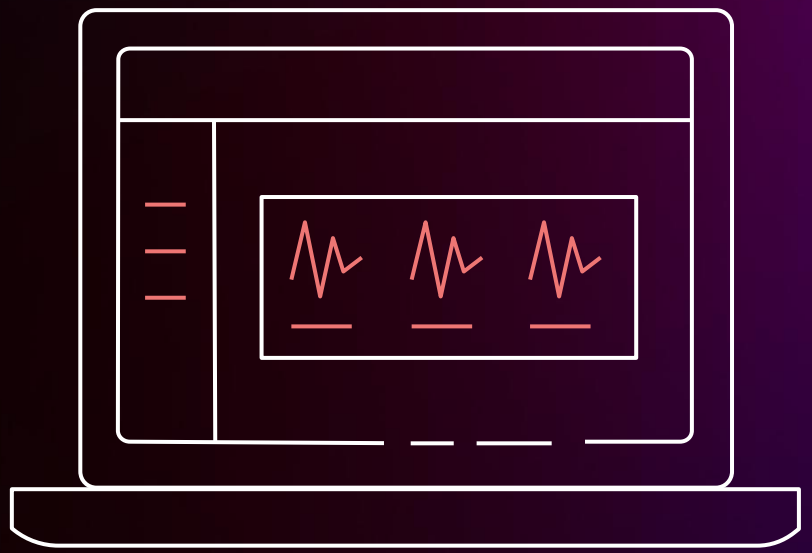


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Code reviews

Code efficiency

challenge



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Amazon CodeGuru

AUTOMATE CODE REVIEWS WITH ML-POWERED RECOMMENDATIONS

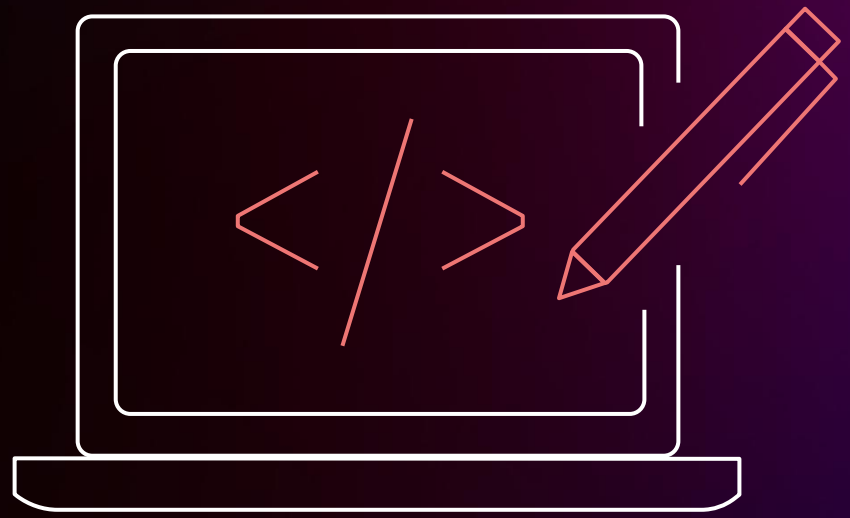


- ML-powered static code analysis tool
- Improves code quality by scanning for critical issues and hard-to-find bugs
- Provides recommendations

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CodeGuru Reviewer

Static code analysis



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CodeGuru Reviewer

Static code analysis

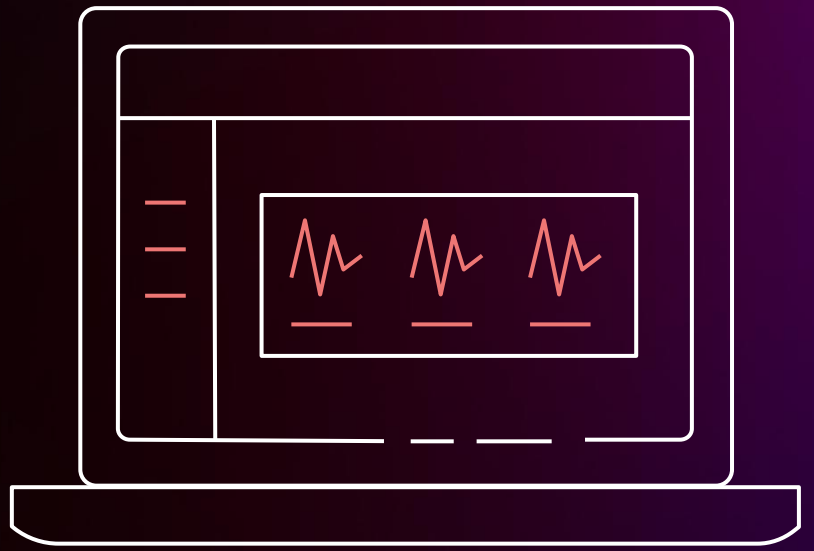
- AWS best practices
- Concurrency
- Resource leaks
- Security issues



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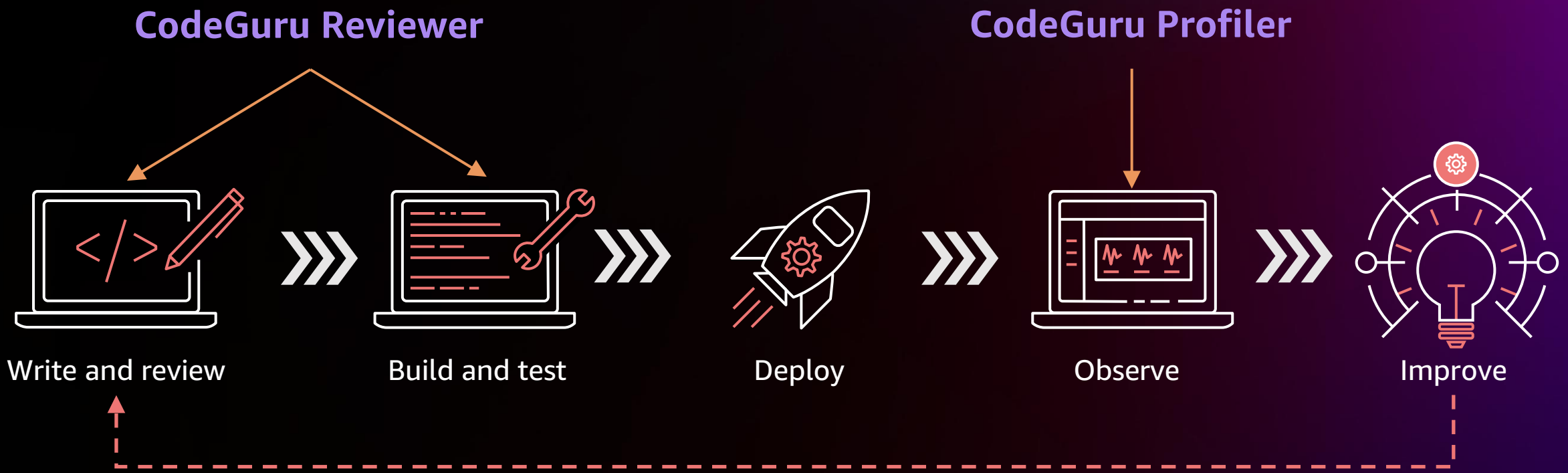
Amazon CodeGuru Profiler

Application performance analysis



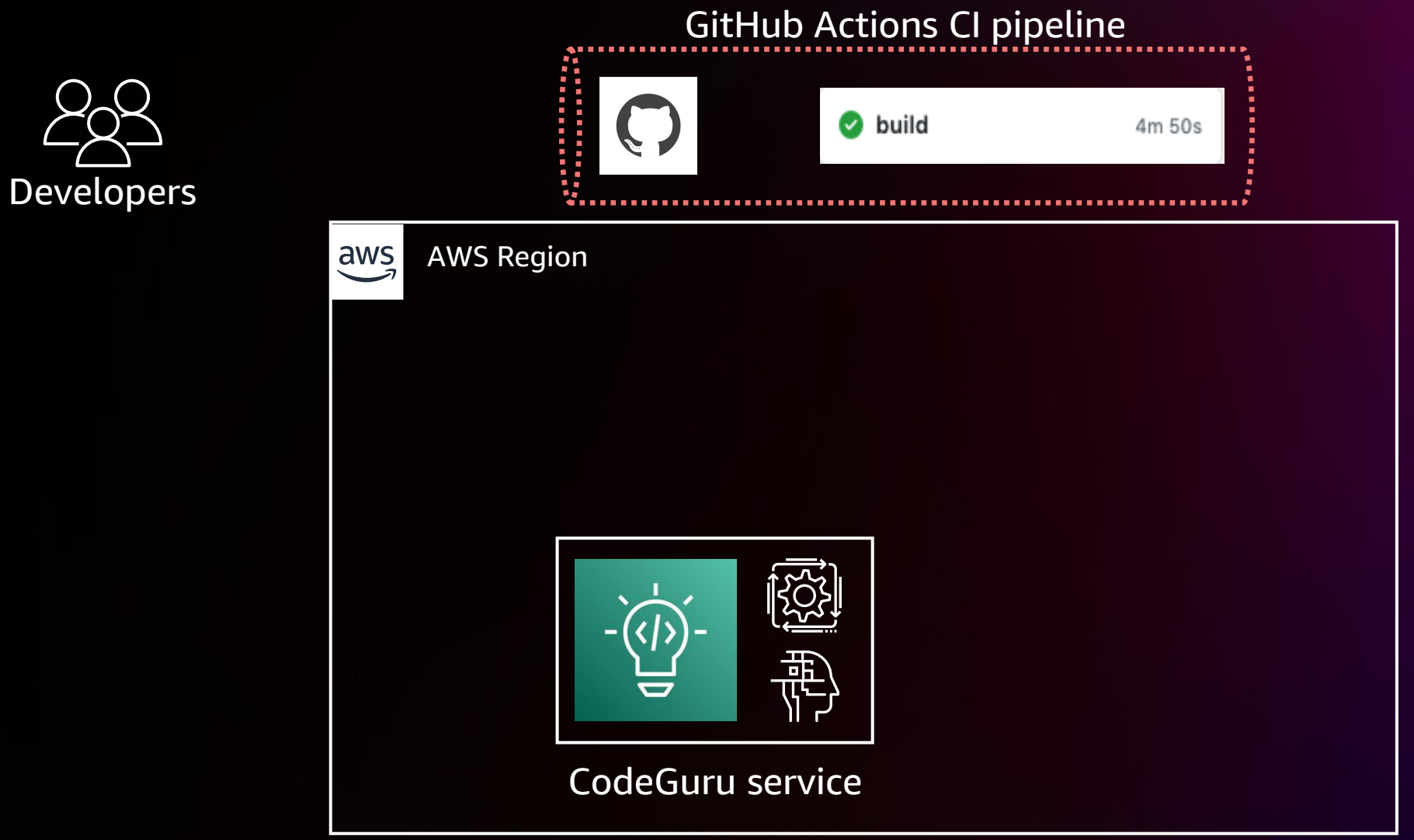
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Amazon CodeGuru in your software workflow



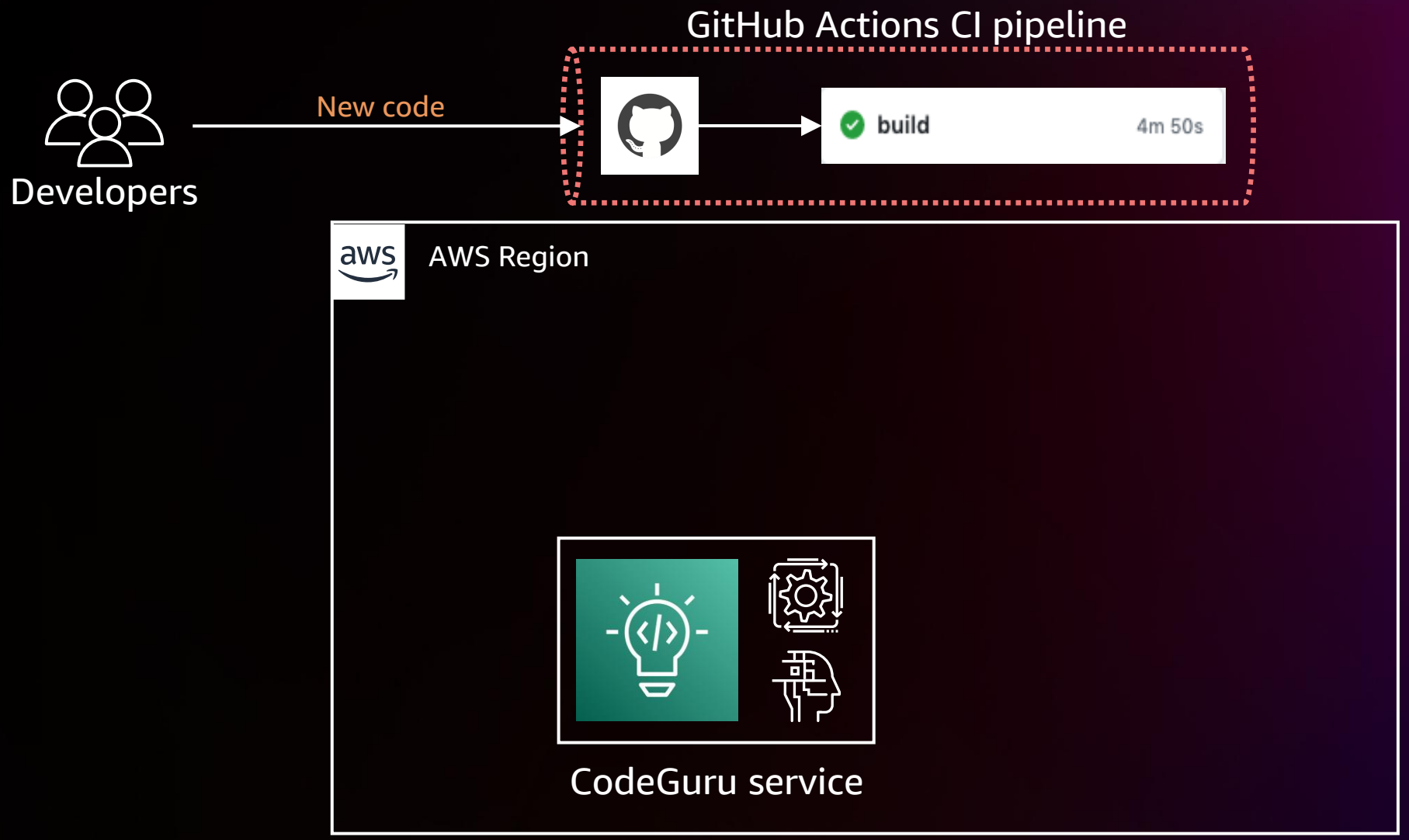
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Code review with CodeGuru Reviewer



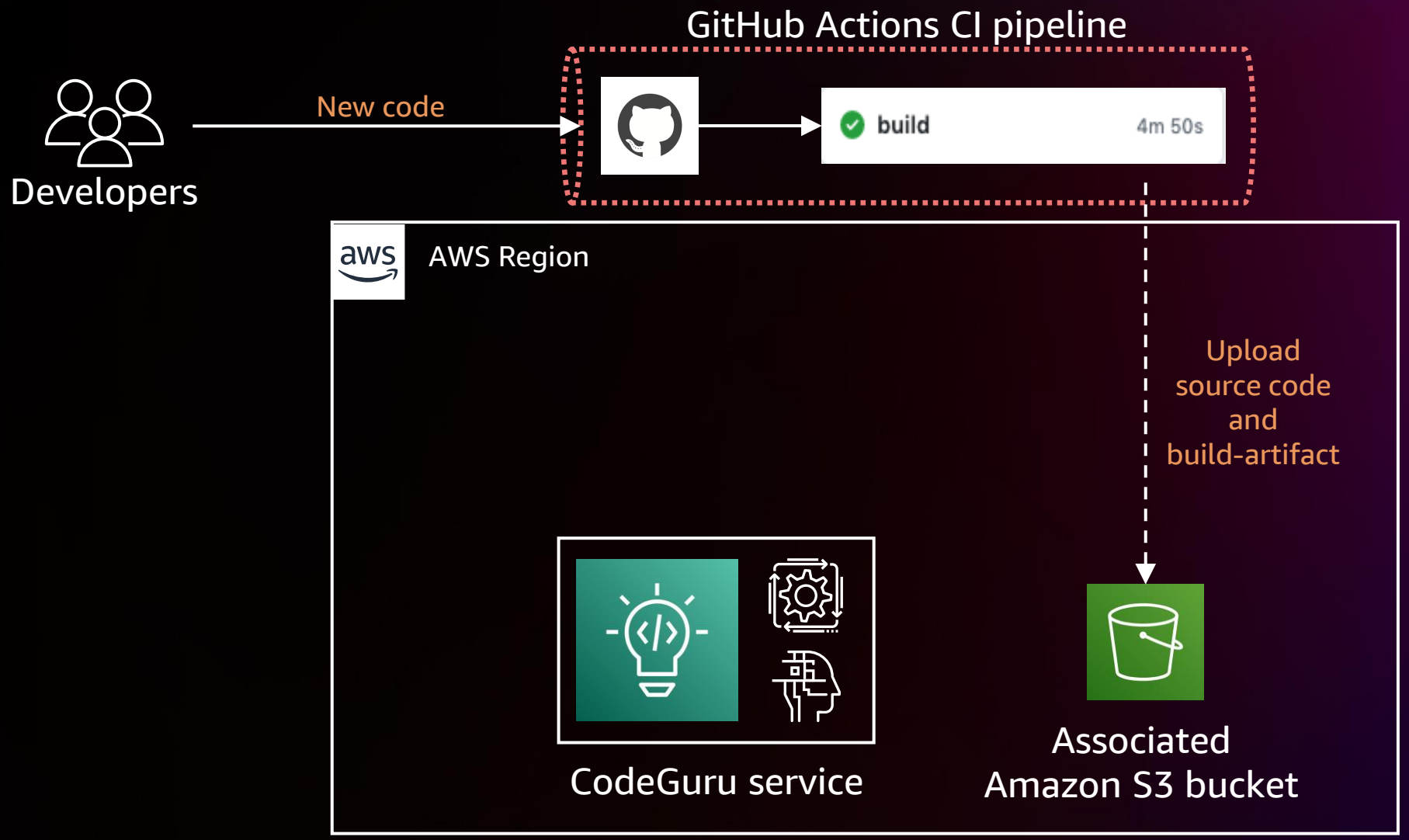
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Code review with CodeGuru Reviewer



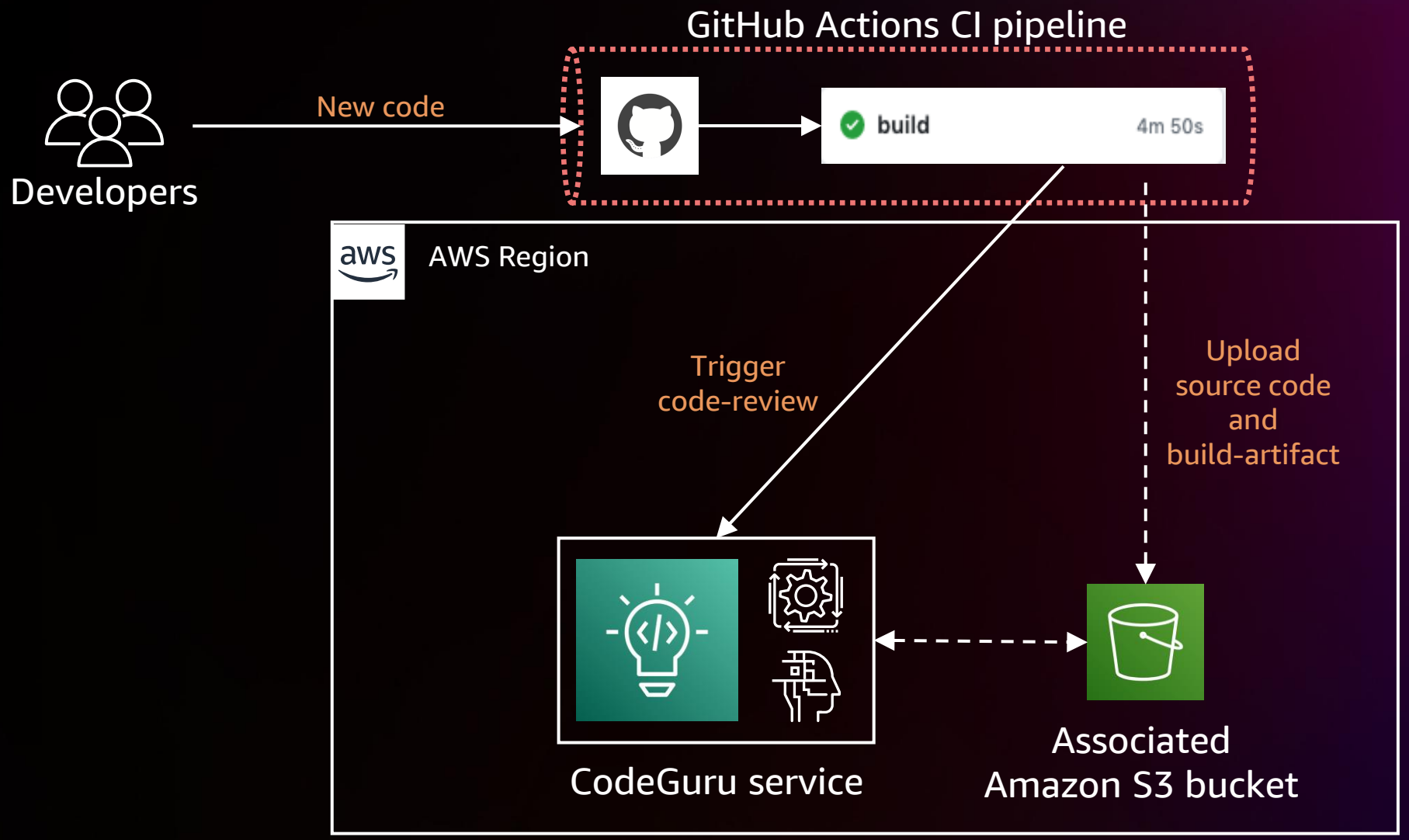
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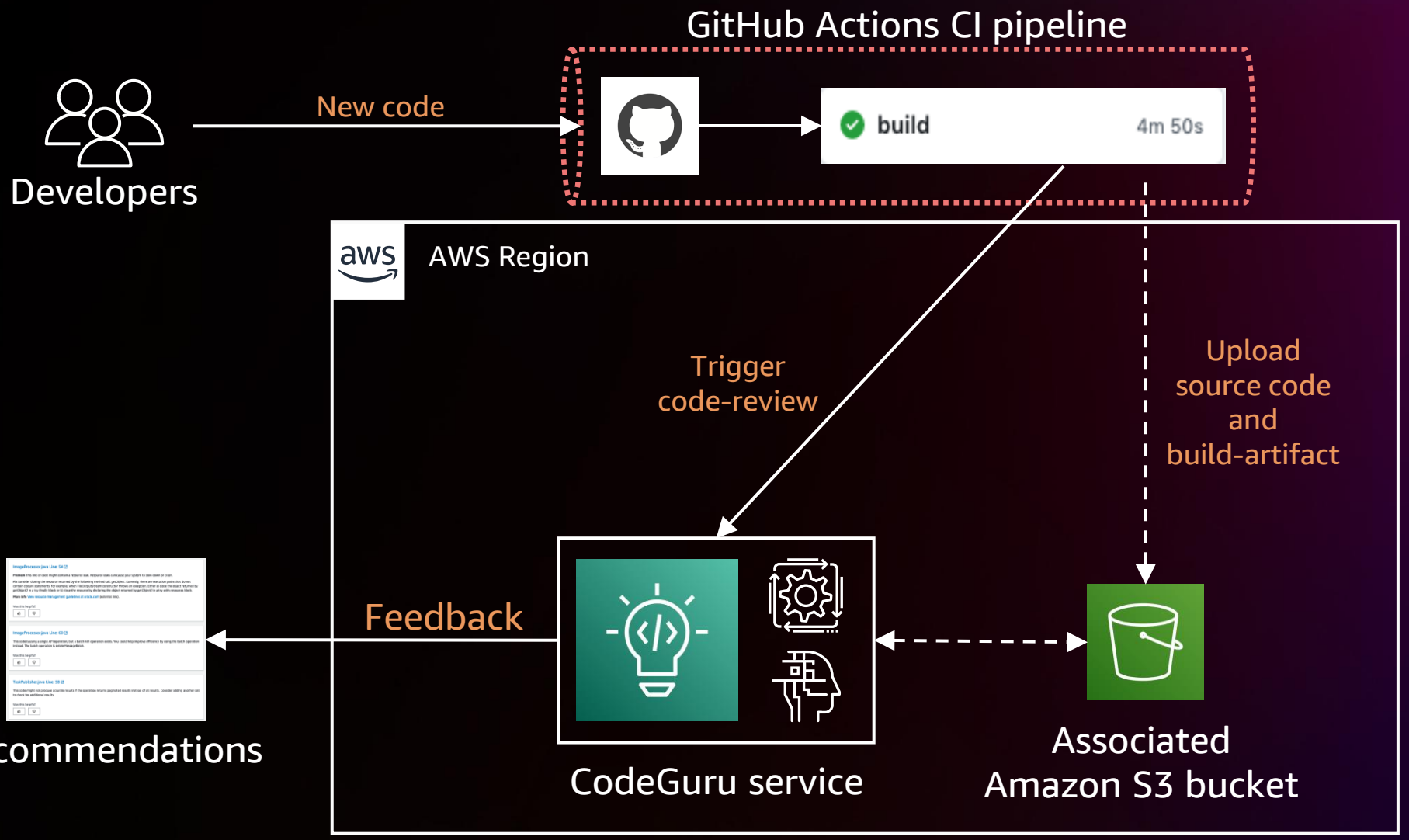
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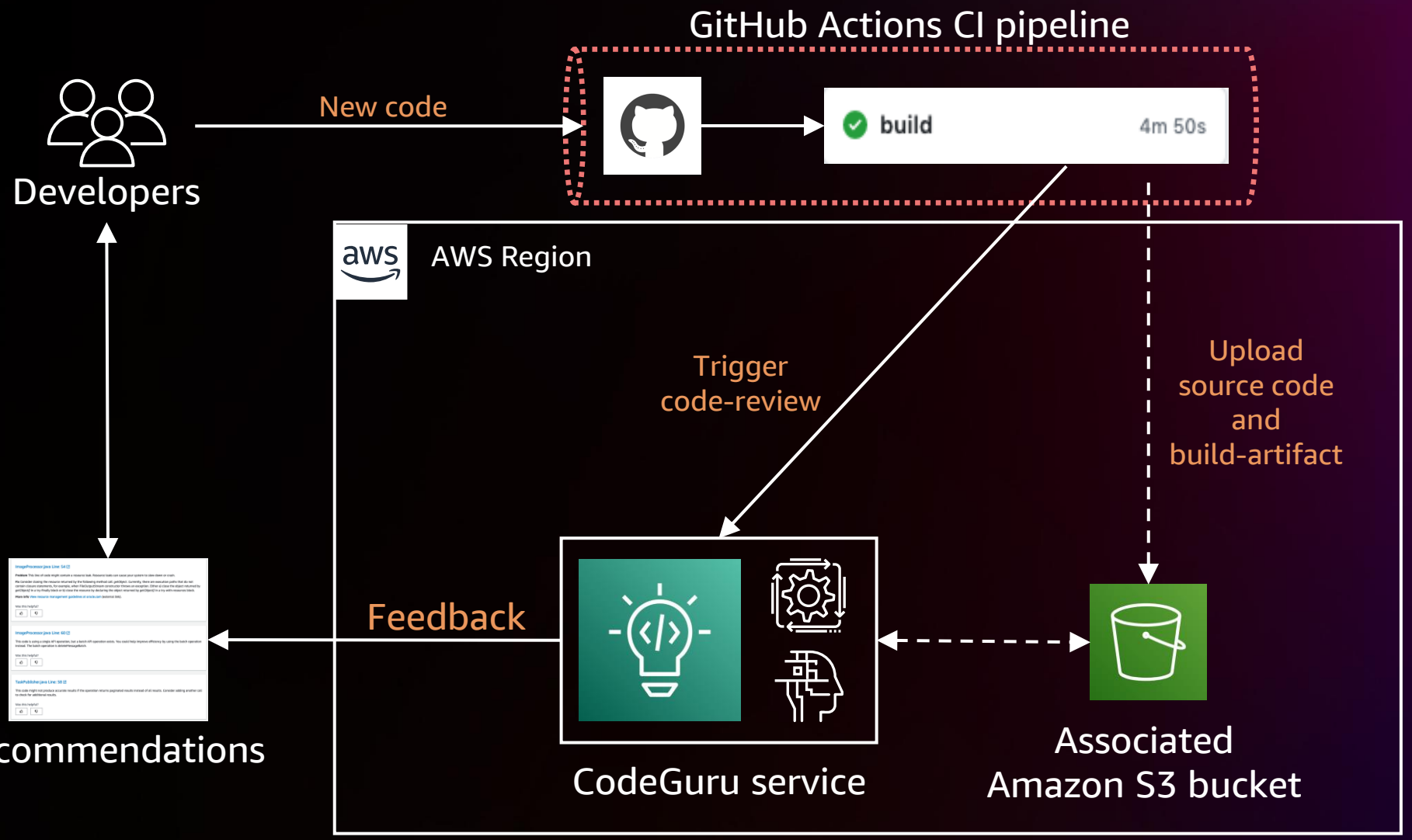
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Code review with CodeGuru Reviewer



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Code review with CodeGuru Reviewer



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AI for DevOps on AWS

CODEGURU



CodeGuru Reviewer

Built-in **code reviews** with actionable recommendations

CodeGuru Profiler

Detect and **optimize** the expensive lines of code

Easily identify **performance and cost improvements** in production environment

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Demo – Amazon CodeWhisperer

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Application monitoring

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A typical software delivery lifecycle



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Operational challenges

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Operational challenges

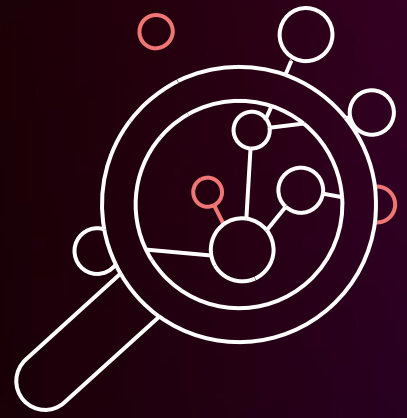
Large and disparate
Data volumes



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Operational challenges

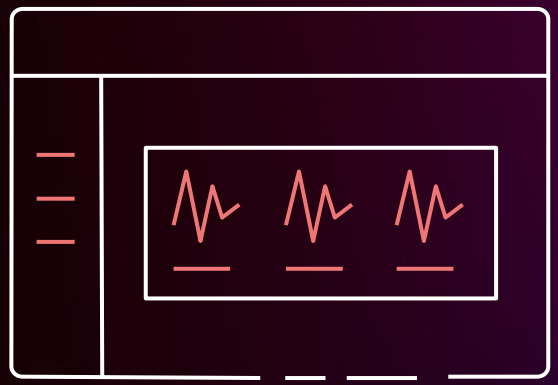
Data association



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Operational challenges

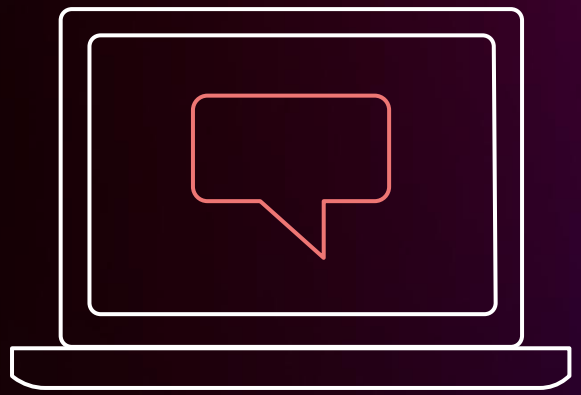
Keeping monitoring up to date



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Operational challenges

Overwhelming number of alarms

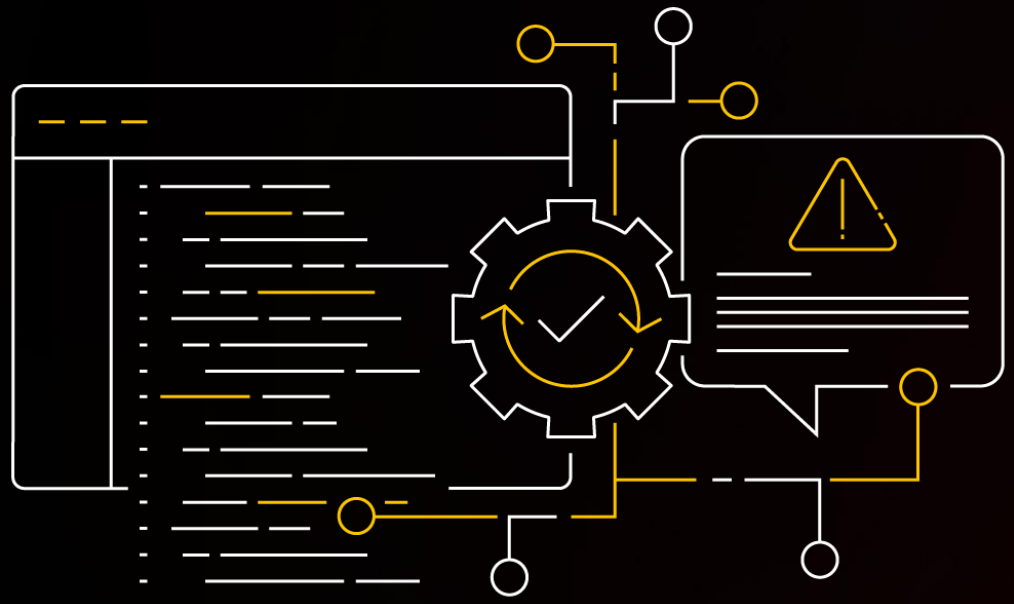


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Amazon DevOps Guru

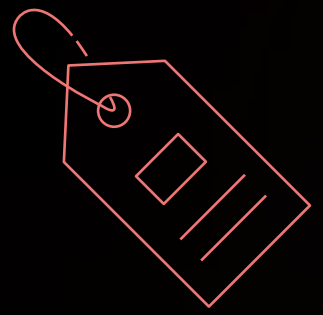
ML-POWERED CLOUD OPERATIONS SERVICE TO IMPROVE APPLICATION AVAILABILITY



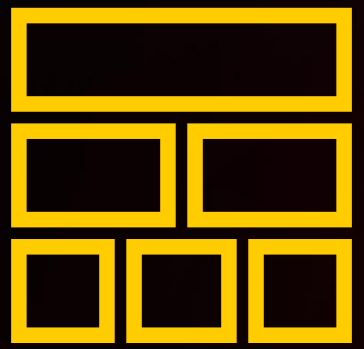
- ML-powered service for developers and operators
- Improves application availability
- Reduces downtime

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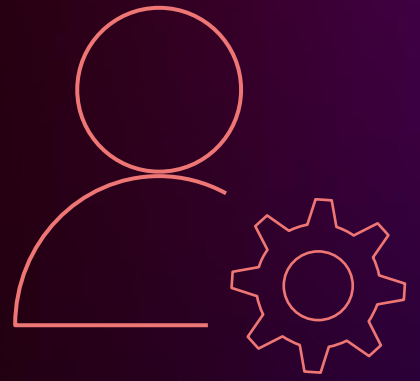
How to use DevOps Guru



Tags



AWS CloudFormation stack

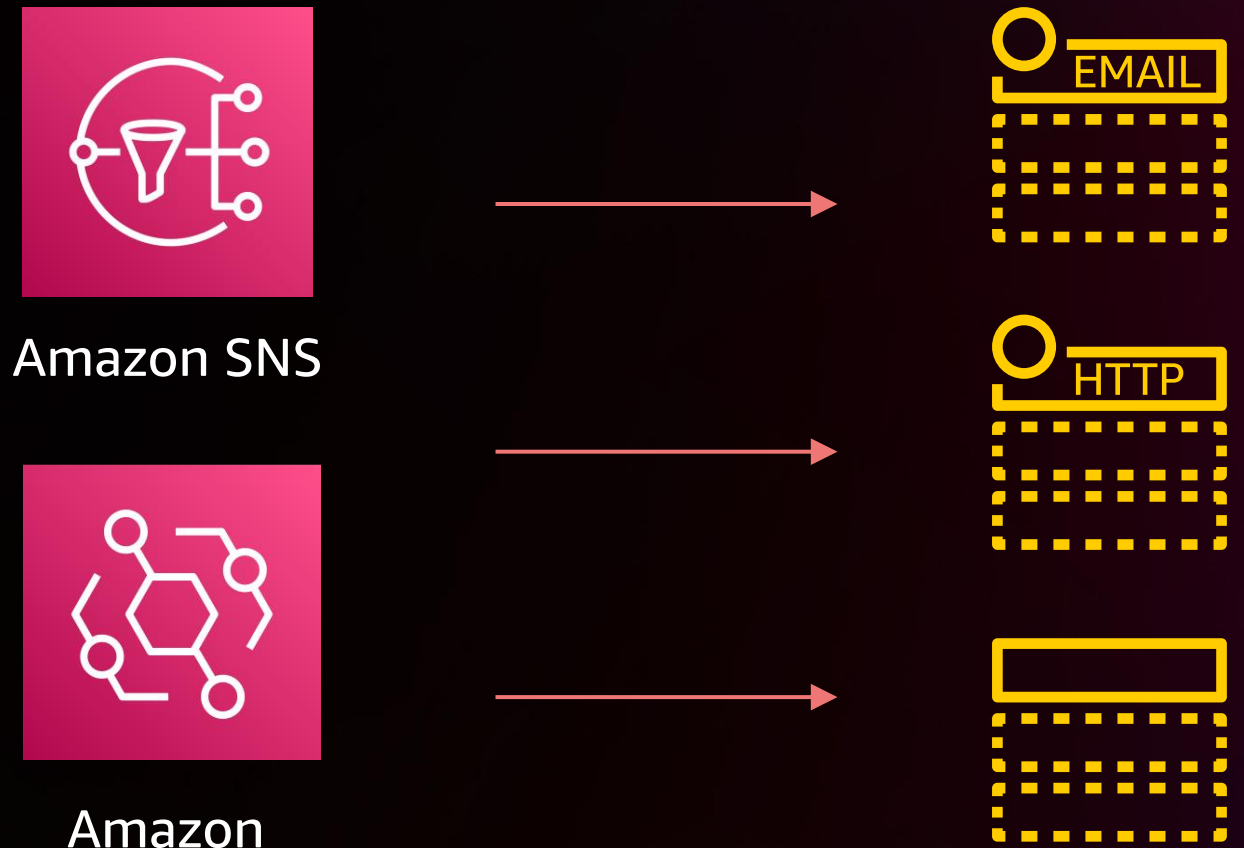


Account

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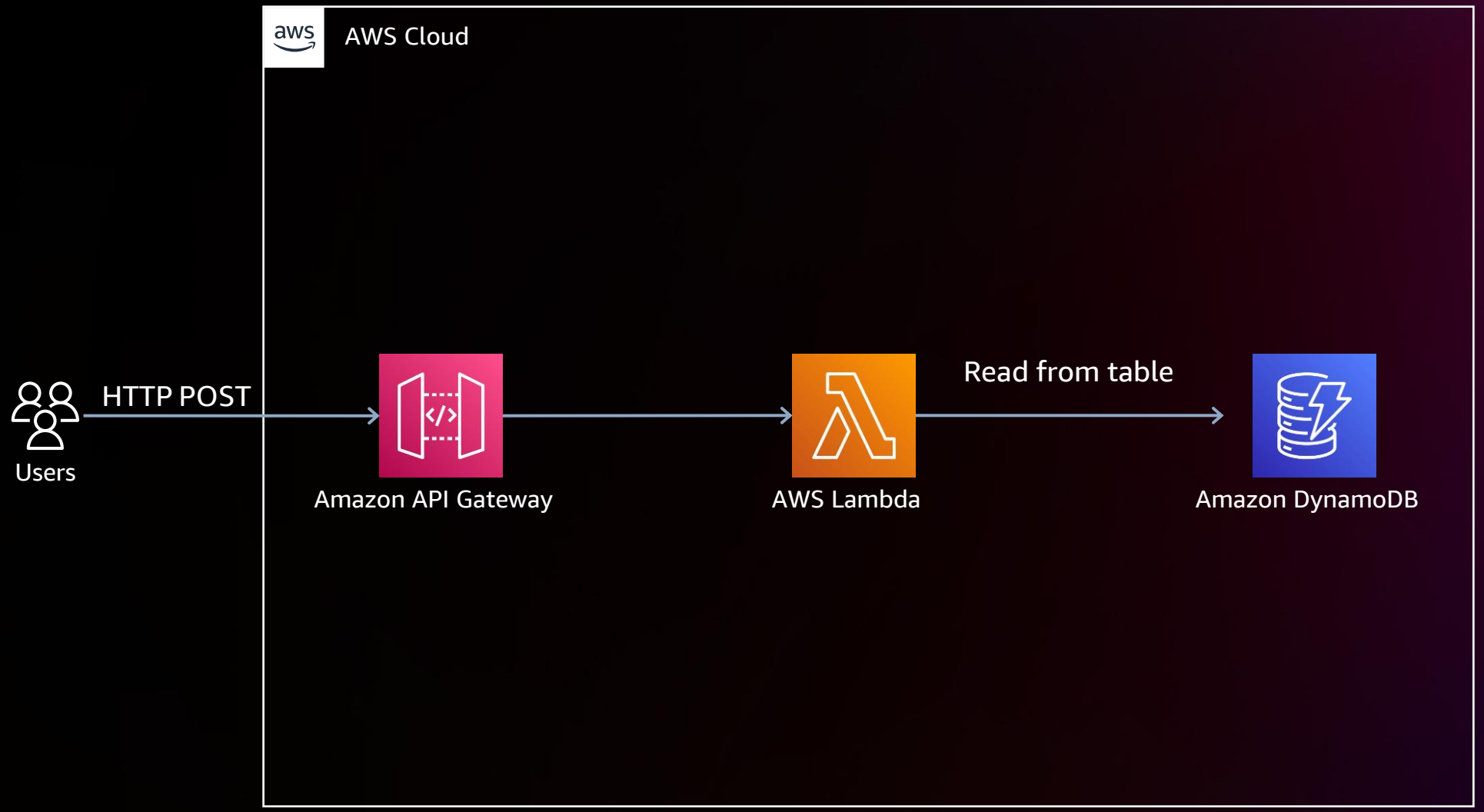
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How to use DevOps Guru



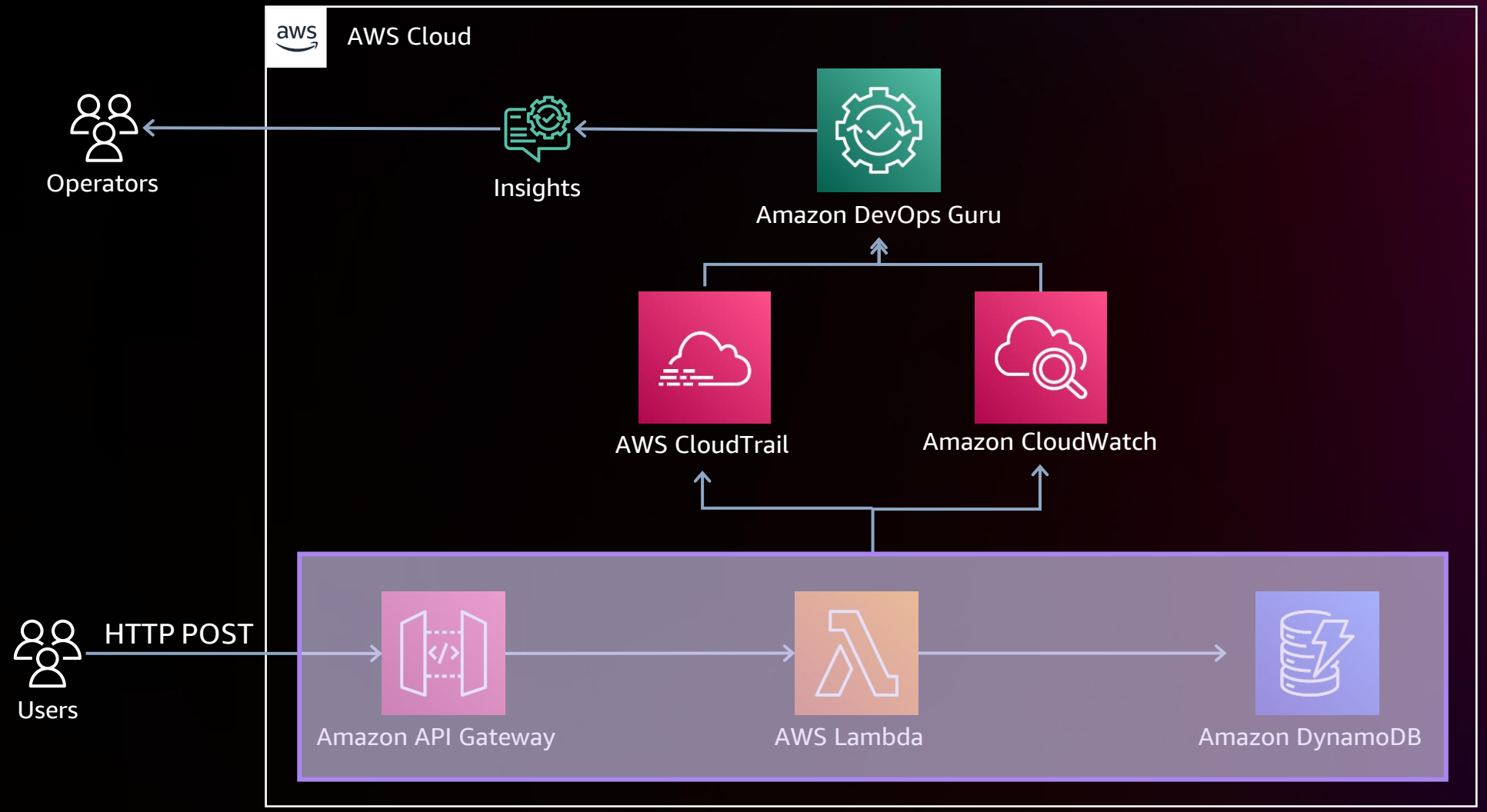
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How does DevOps Guru work?



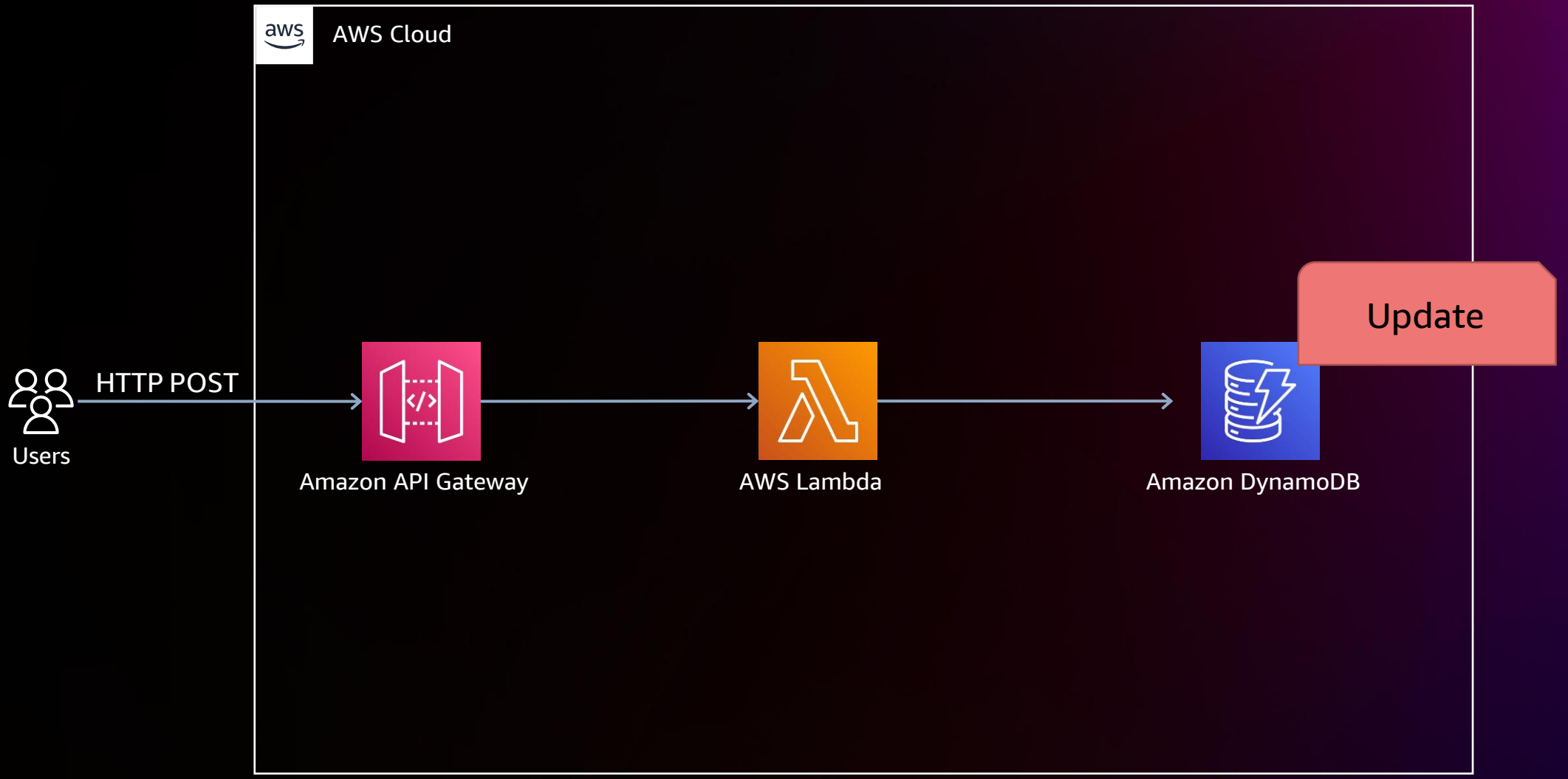
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How does DevOps Guru work?



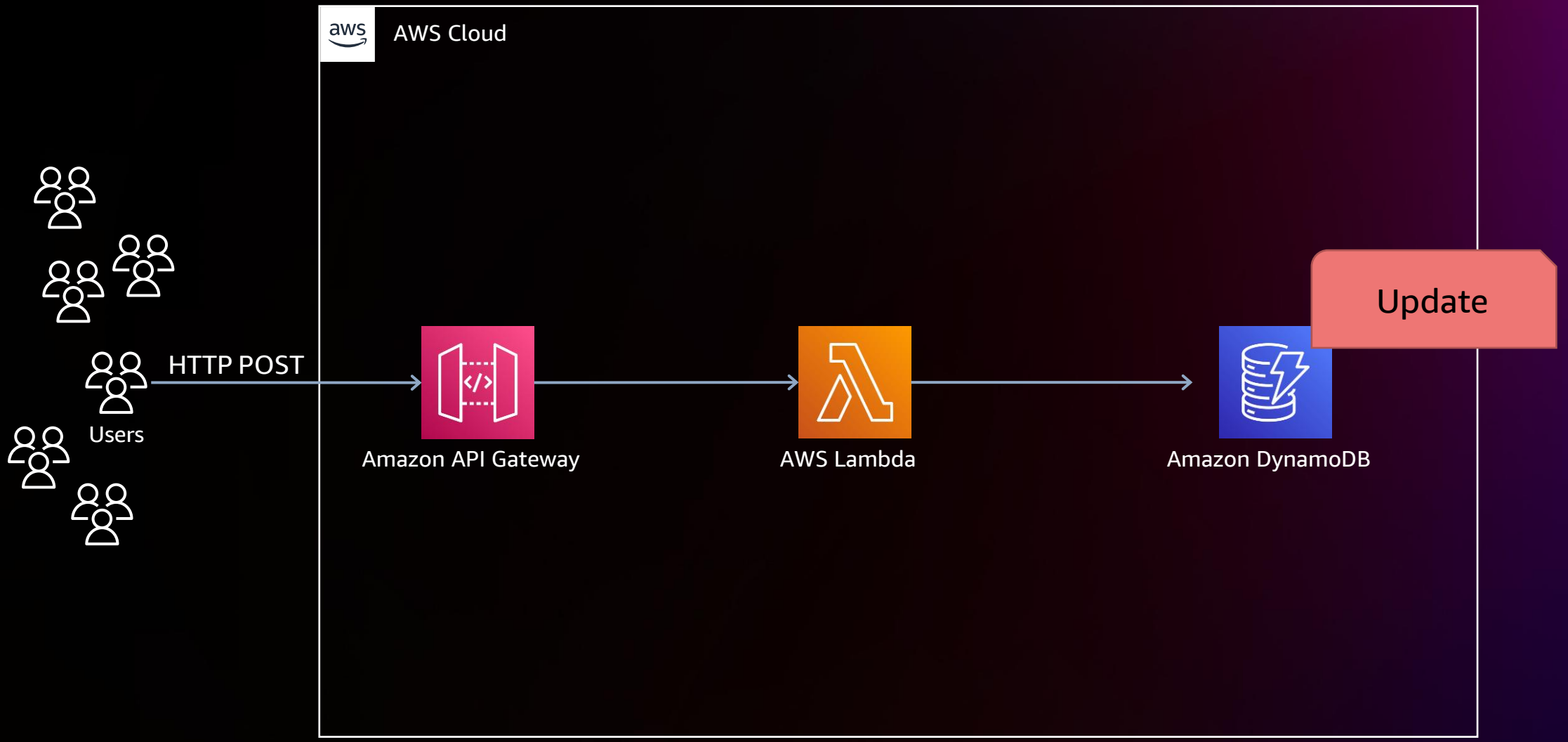
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How does DevOps Guru work?



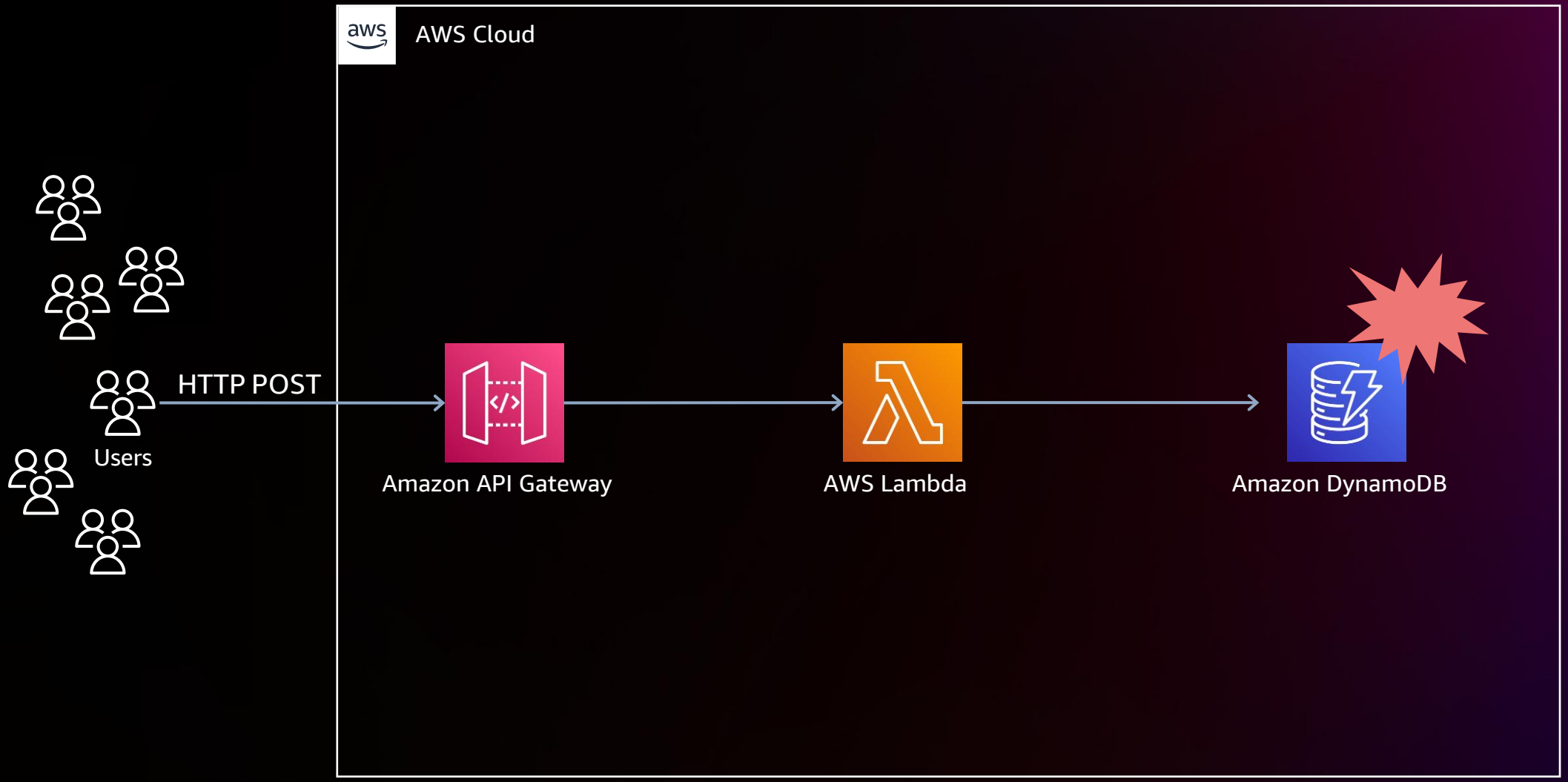
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How does DevOps Guru work?



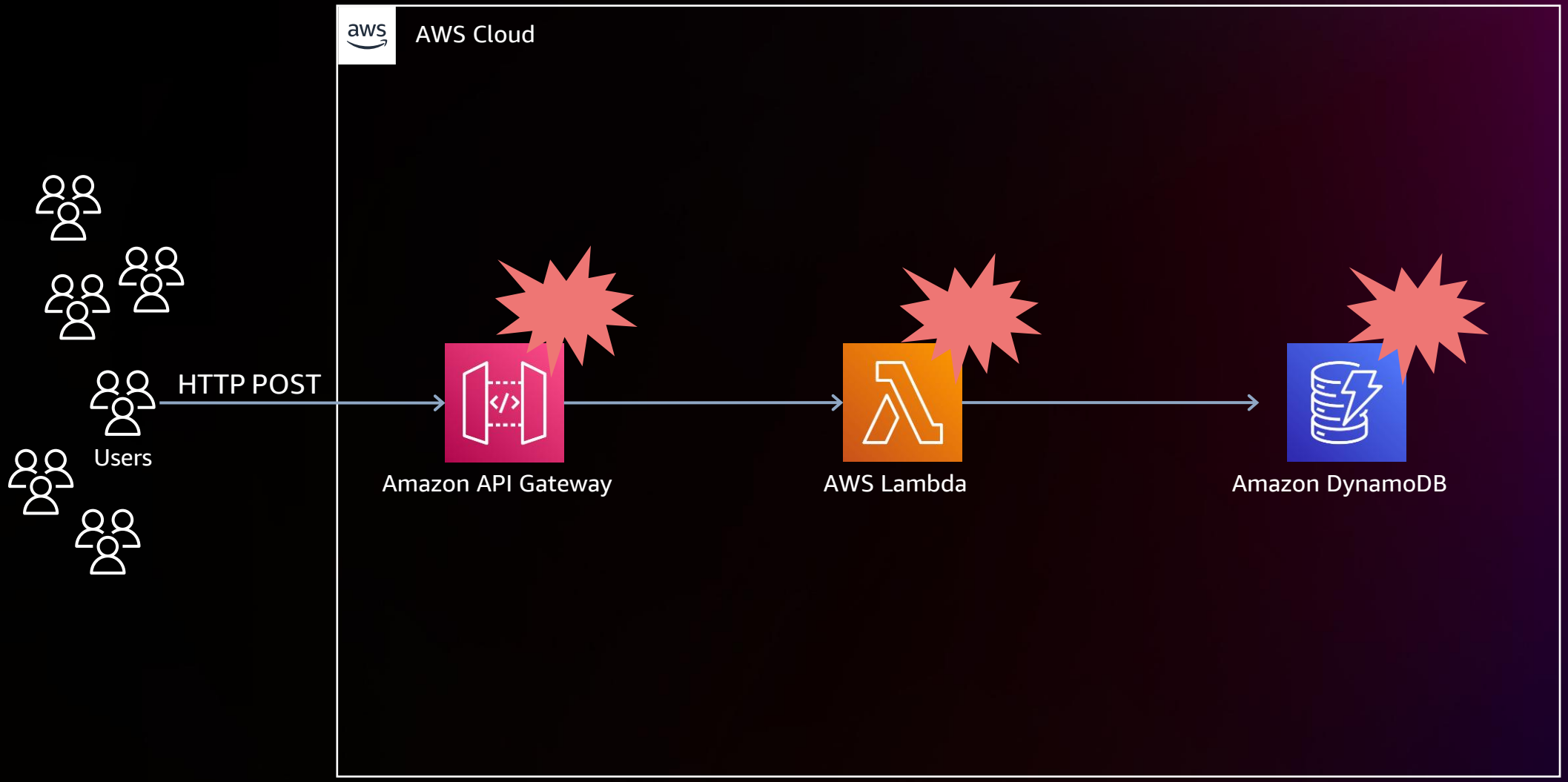
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How does DevOps Guru work?



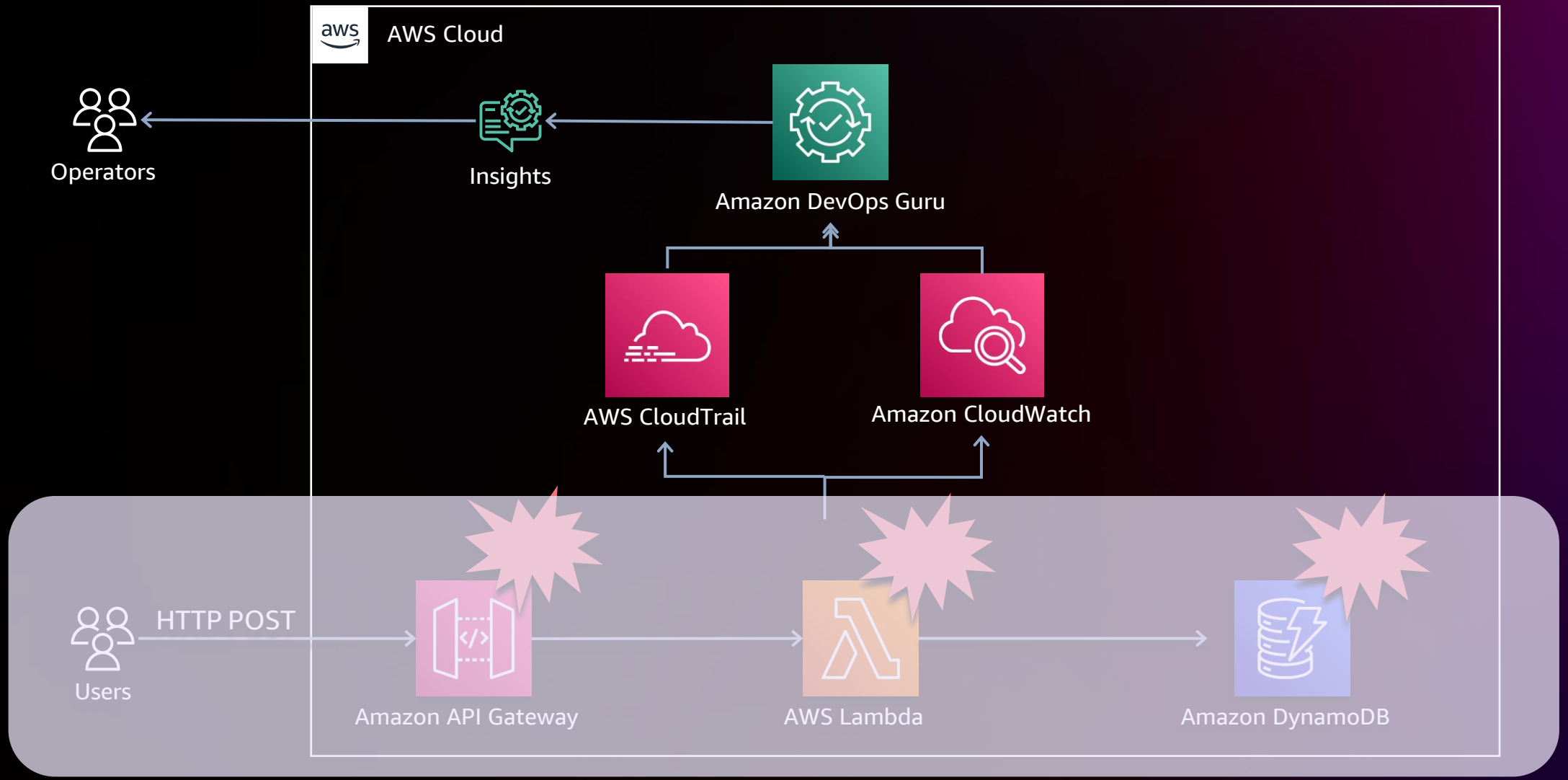
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How does DevOps Guru work?



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How does DevOps Guru work?



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AI for DevOps on AWS

AMAZON DEVOPS GURU

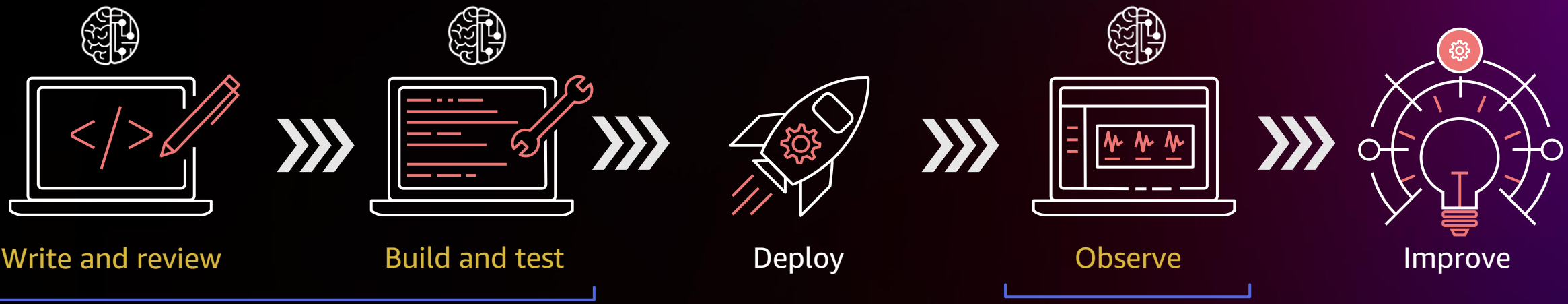


DevOps Guru

Continuously analyze streams of disparate data and **monitor relevant metrics** to **establish normal operating patterns**

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AI for DevOps on AWS



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Amazon DevOps Guru in practice: Critical cloud operations at scale

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“We stopped hiring IT Ops firefighters a long time ago. Inevitably, some will eventually become arsonists.”

Vice President of Operations

A Cascadeo Global 2000 enterprise customer

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About Cascadeo and the Globe Group



AWS Premier Partner + re:Stack SCA

AWS Managed Services Provider (MSP)

Gartner Magic Quadrant for PCITS 2022

Seattle roots + elite Manila CS delivery org

Serving clients in US, Canada, and ASEAN

Excellence-in-engineering + cloud-native

We bring the latest AWS magic to our customers.



The Philippines leading telco @ ~90M subs with diverse subsidiaries: VC, cloud, health, fintech, video production, data center, and beyond.

The largest AWS customer in .ph – by a mile

Massive scale. Broad mix of AWS services.

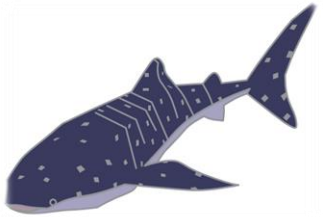
Originally a Cascadeo client, Globe became Cascadeo's majority investor November 2020.

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cascadeo

Public Cloud IT Transformation Services Global Strategy



Cloud Neutral
Cloud First
Data Future

Public Cloud + Data-Centric

Cascadeo builds and manages cloud & data infrastructure for critical environments.

cascadeo.io
Platform

Cloud-First Digital Transformation

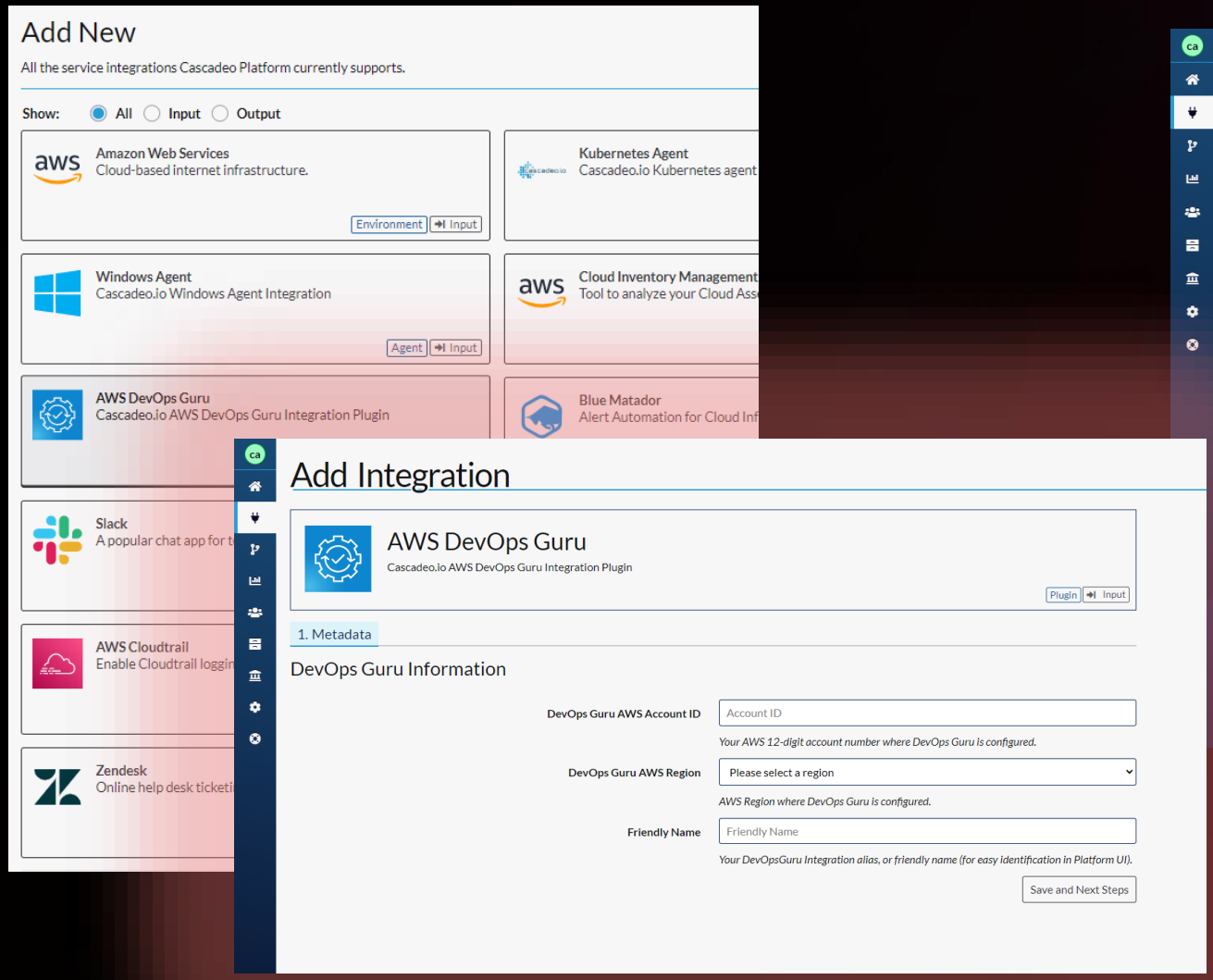
Taking an individual approach with each client to rethink applications and IT and put data at the center of all.

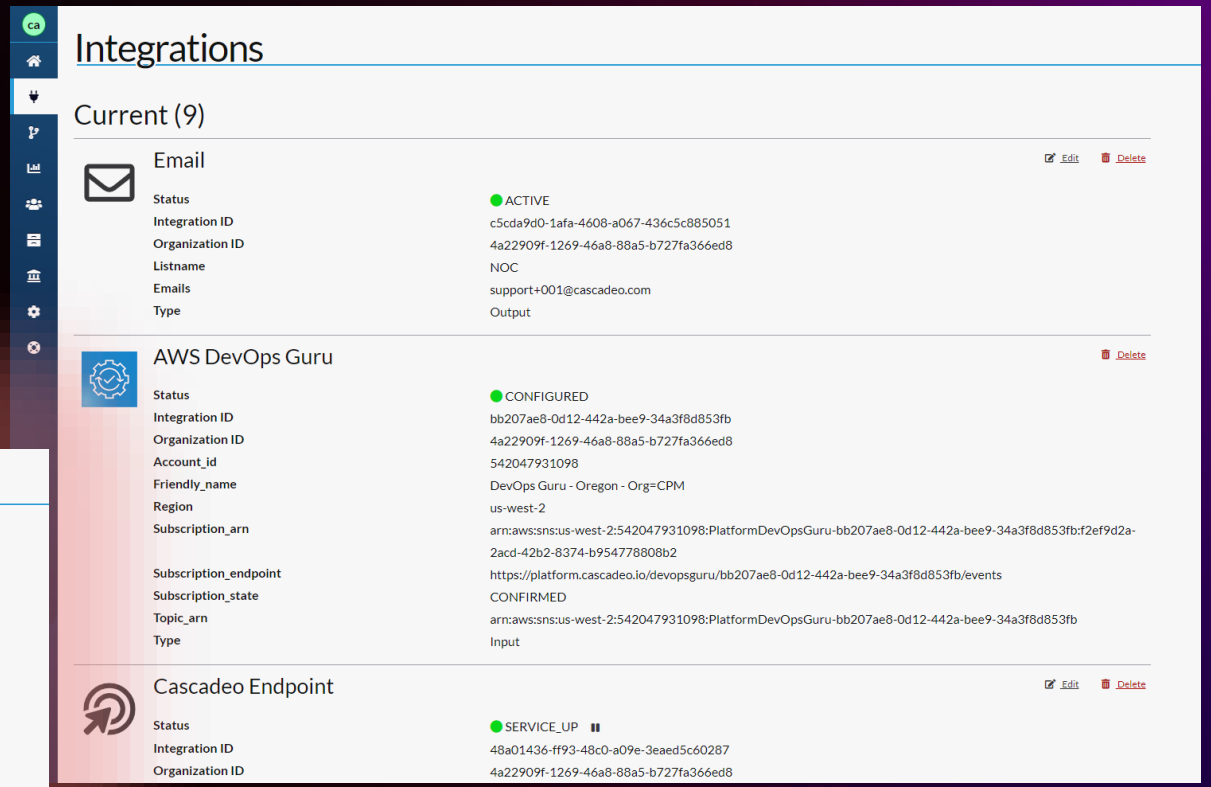
Cloud
Transformation for
Business Agility

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Onboard new MSP customers in <1 day

CASCADEO.IO AND AMAZON DEVOPS GURU NATIVE INTEGRATION





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Diverse AWS scenarios benefit from AIOps







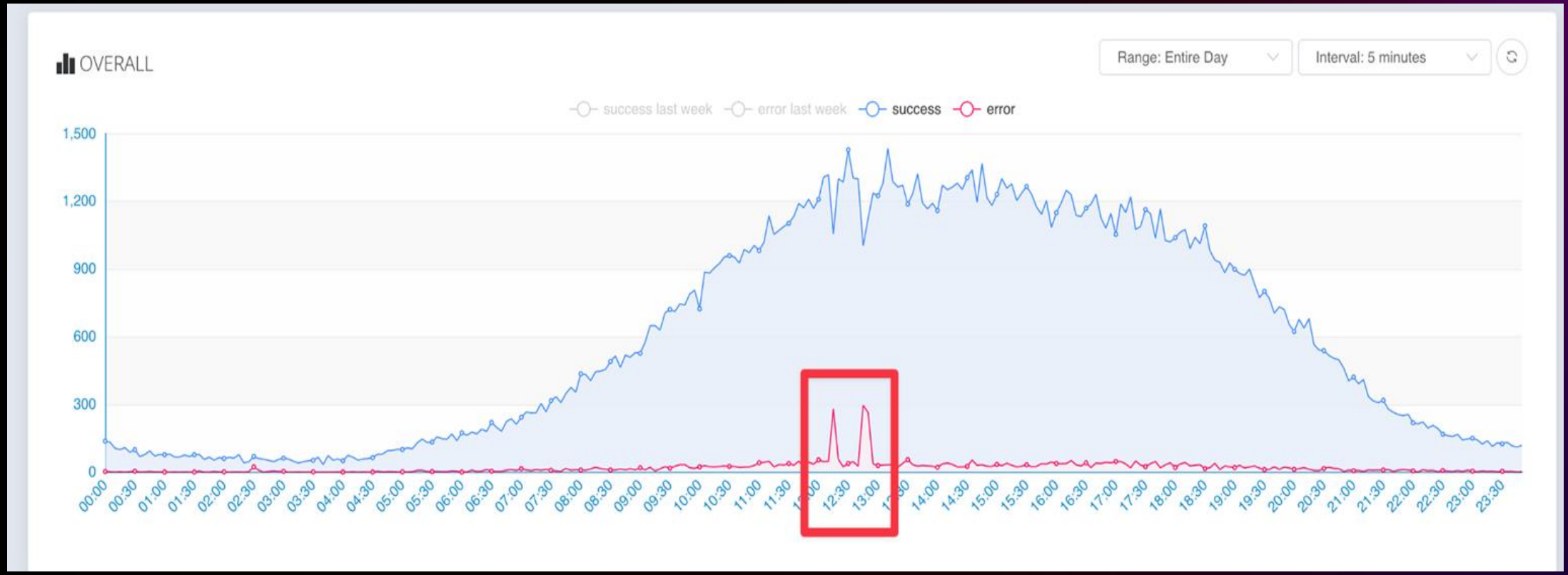


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cascadeo

Critical infrastructure enterprise production service operations with Amazon DevOps Guru

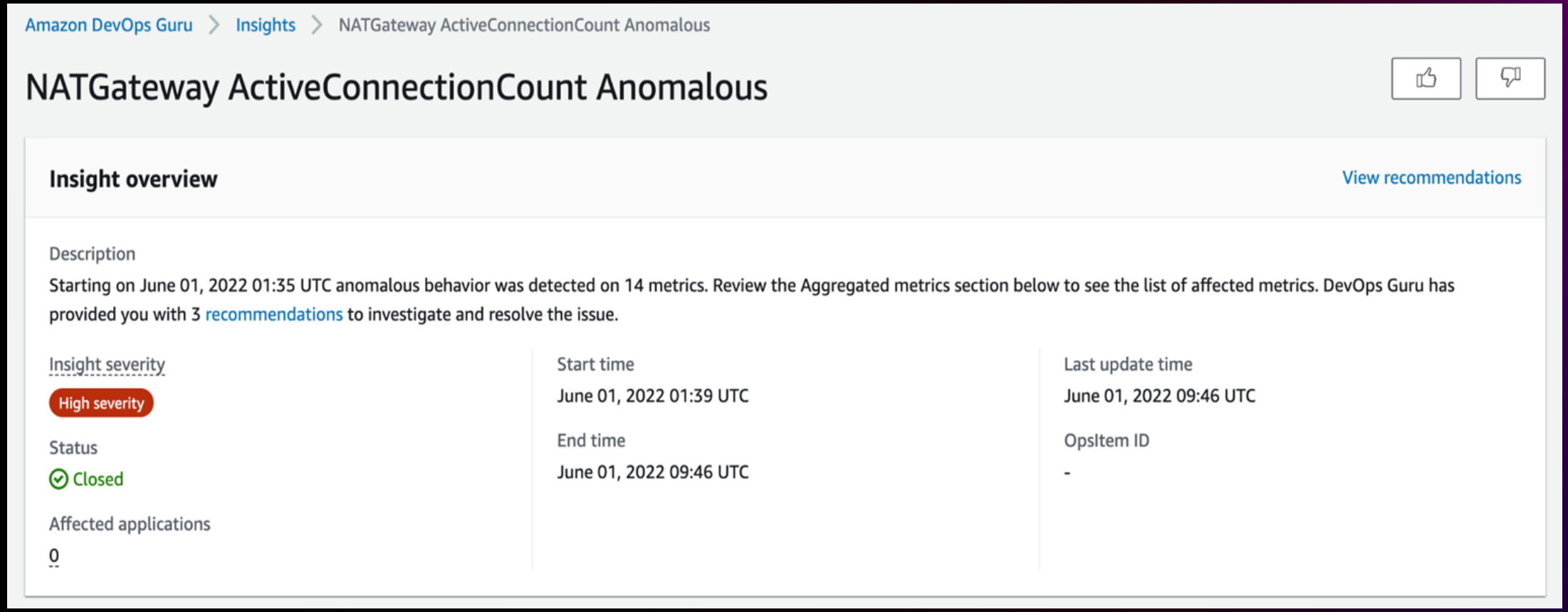
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Critical AAA application impacted



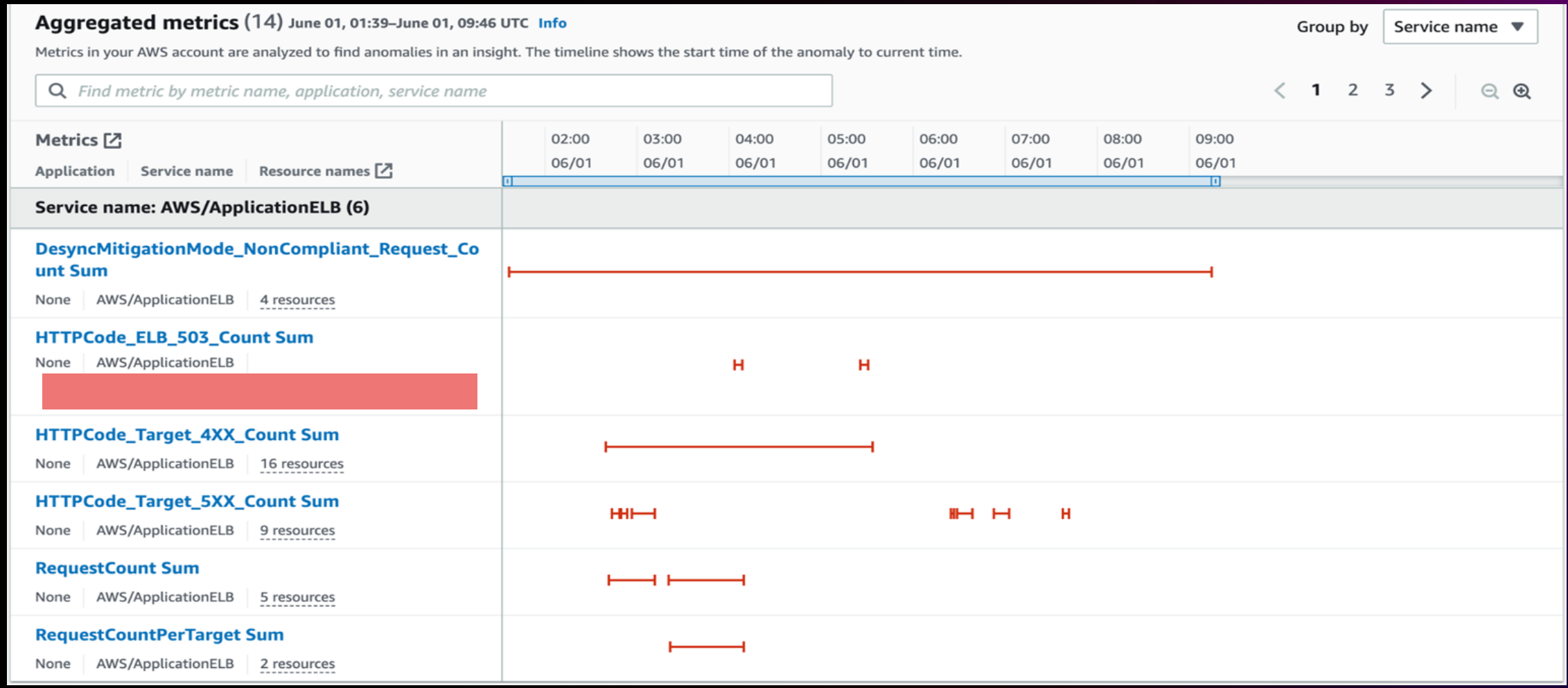
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Anomaly detection – Almost psychic



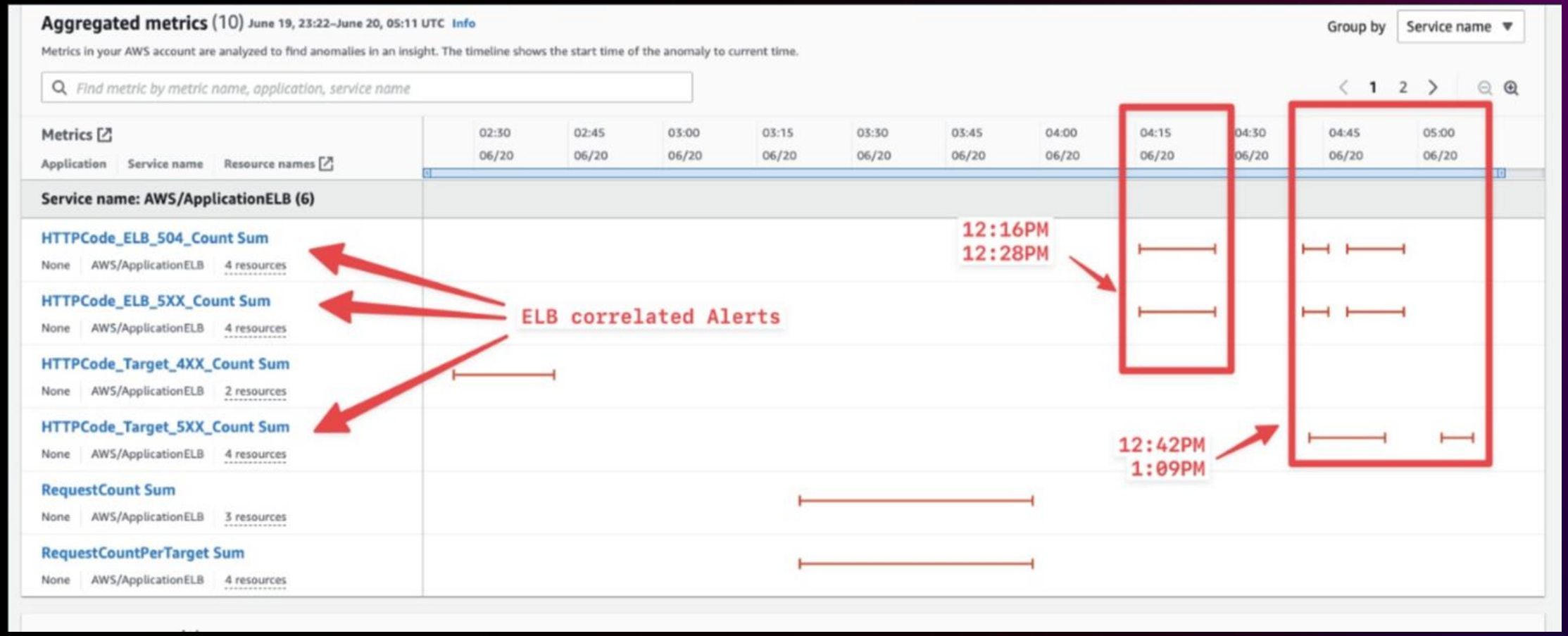
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Dive deep . . . and do it fast!



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Aggregated and correlated alerts FTW



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DevOps Guru recommendations

Recommendations (3) Info

View updates we recommend you implement to address the anomalies in this insight.

Configure desync mitigation mode for AWS Application Elastic Load Balancer (ELB)

The requests made to your load balancer do not comply with RFC 7230. To learn more on how to make your load balancer compliant with RFC 7230, see Configure desync mitigation mode for AWS Application Elastic Load Balancer (ELB) .

Why is DevOps Guru recommending this?

The DesyncMitigationMode_NonCompliant_Request_Count metric in ApplicationELB breached a high threshold.

Related metric (1)

DesyncMitigationMode_NonCompliant_Request_Count

ApplicationELB app/GMovies-OTT-LB-PROD-INT/df570d5baaf54882

Troubleshoot errors in AWS Application Elastic Load Balancer (ELB)

Your load balancer is throwing errors. To learn more and troubleshoot load balancer errors, see Troubleshoot errors in AWS Application Elastic Load Balancer (ELB) .

Why is DevOps Guru recommending this?

The HTTPCode_Target_5XX_Count metric in ApplicationELB breached a high threshold.

Related metric (1)

HTTPCode_Target_5XX_Count

ApplicationELB app/wifi-rearch-alb-st/97b4aed35b50dfc0

Troubleshoot latency issues in AWS Application Elastic Load Balancer (ELB)

There is an increase in response time from your load balancer. To learn more or troubleshoot the latency issues, see Troubleshoot latency issues in AWS Application Elastic Load Balancer (ELB) .

Why is DevOps Guru recommending this?

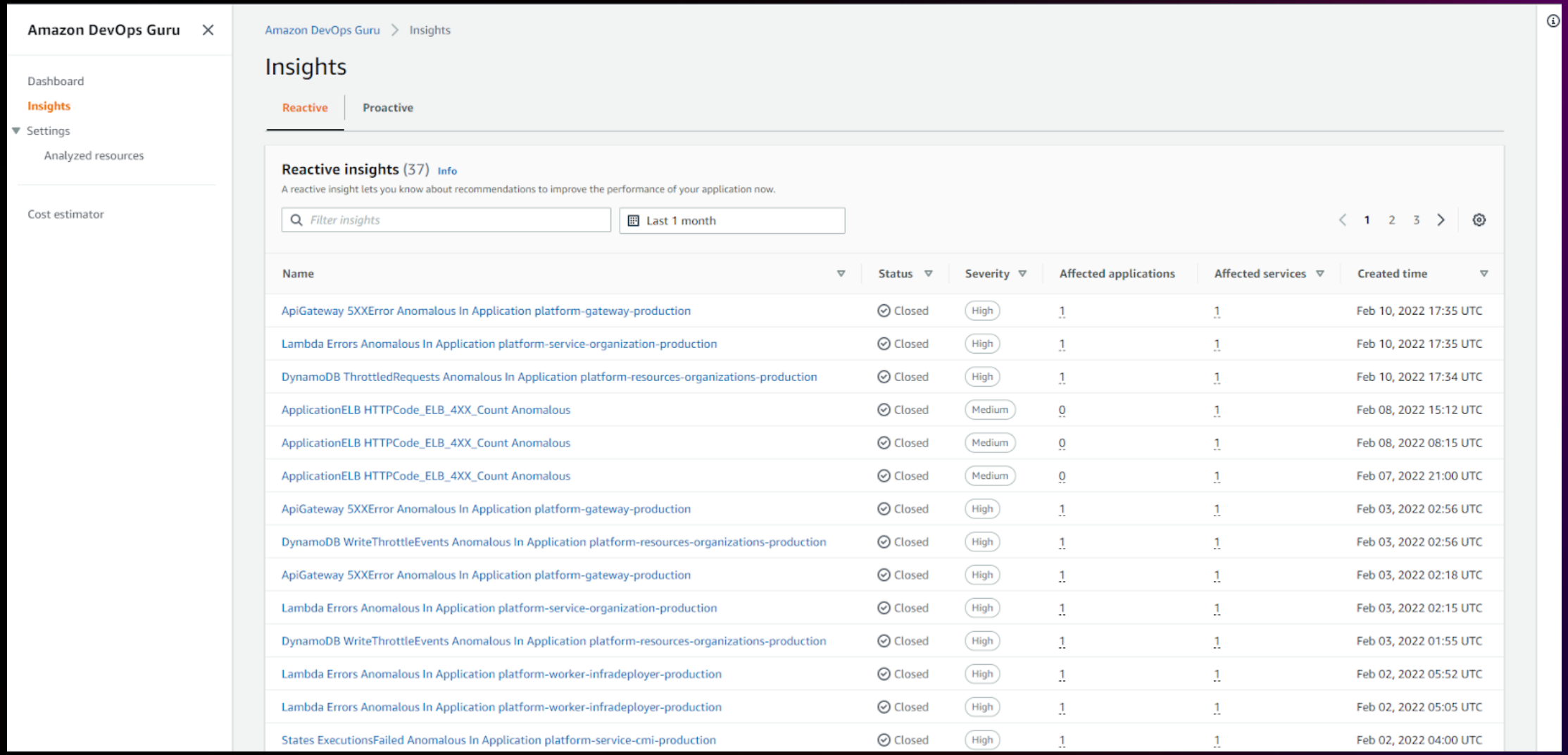
Related metric (1)

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The cascadeo.io SaaS platform: AIOps at Service Provider Scale

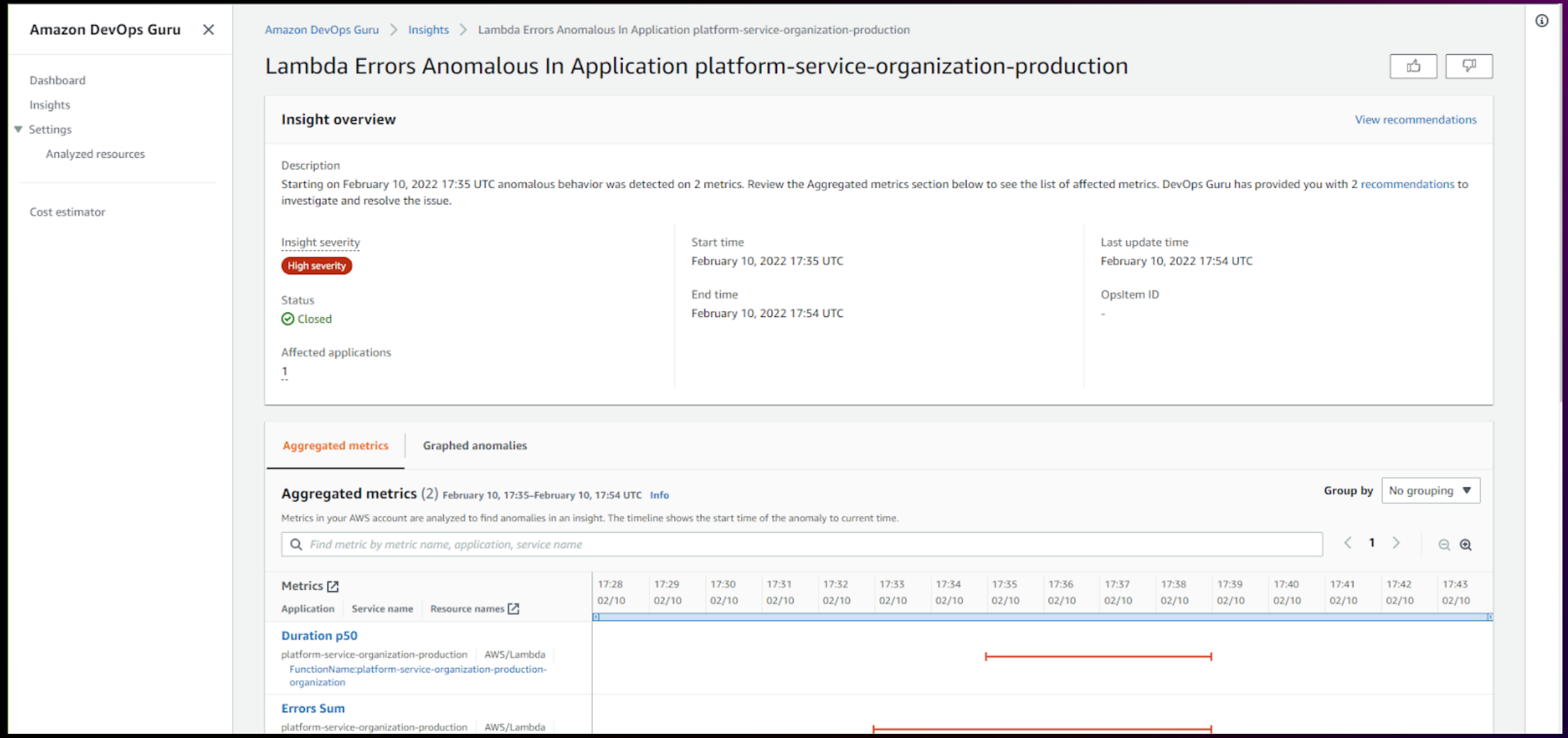
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Insights from DevOps Guru in production env



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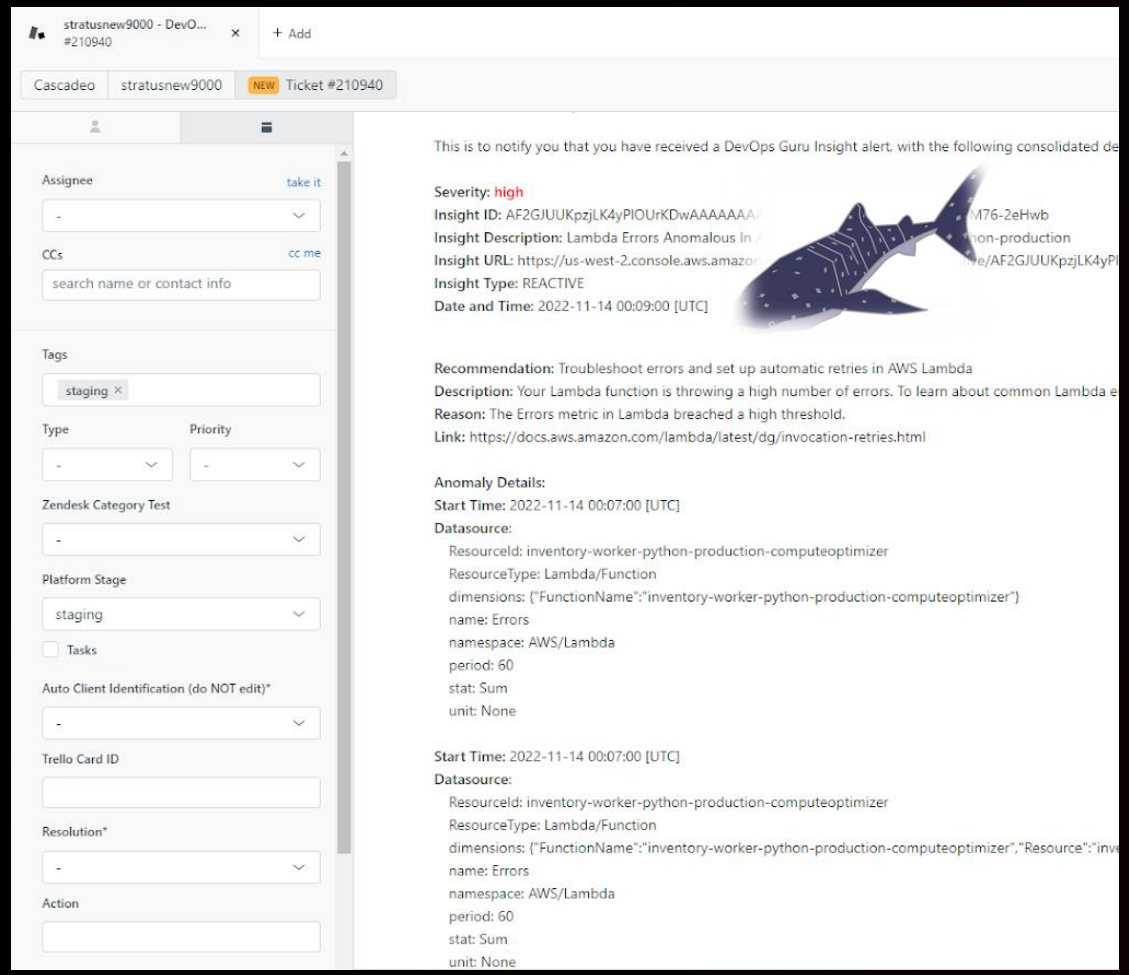
AWS Lambda errors anomalous in prod SaaS ops

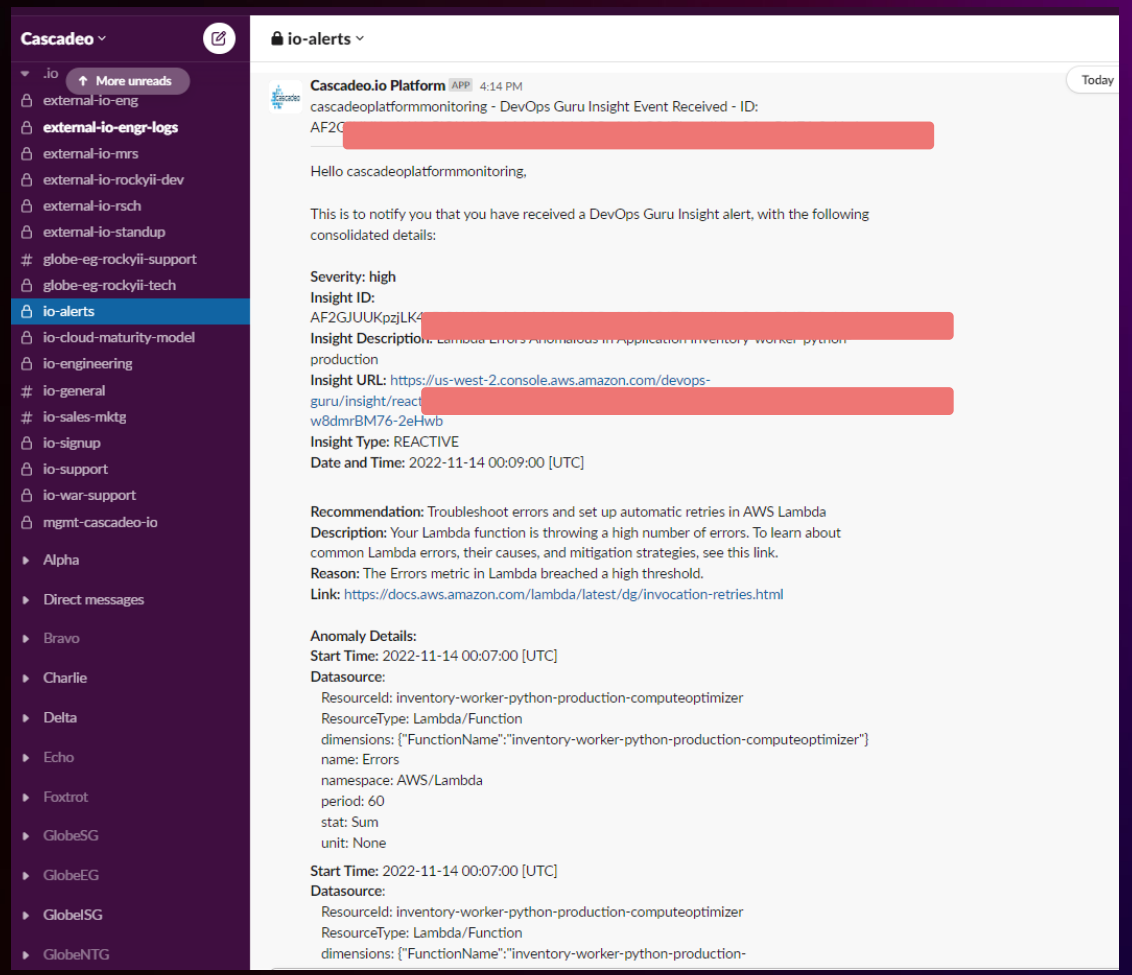


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cascadeo.io default customer notification & ops

SLACK AND ZENDESK AS PRIMARY PLATFORMS; TEAMS AND O365 FOR FAILOVER SCENARIOS

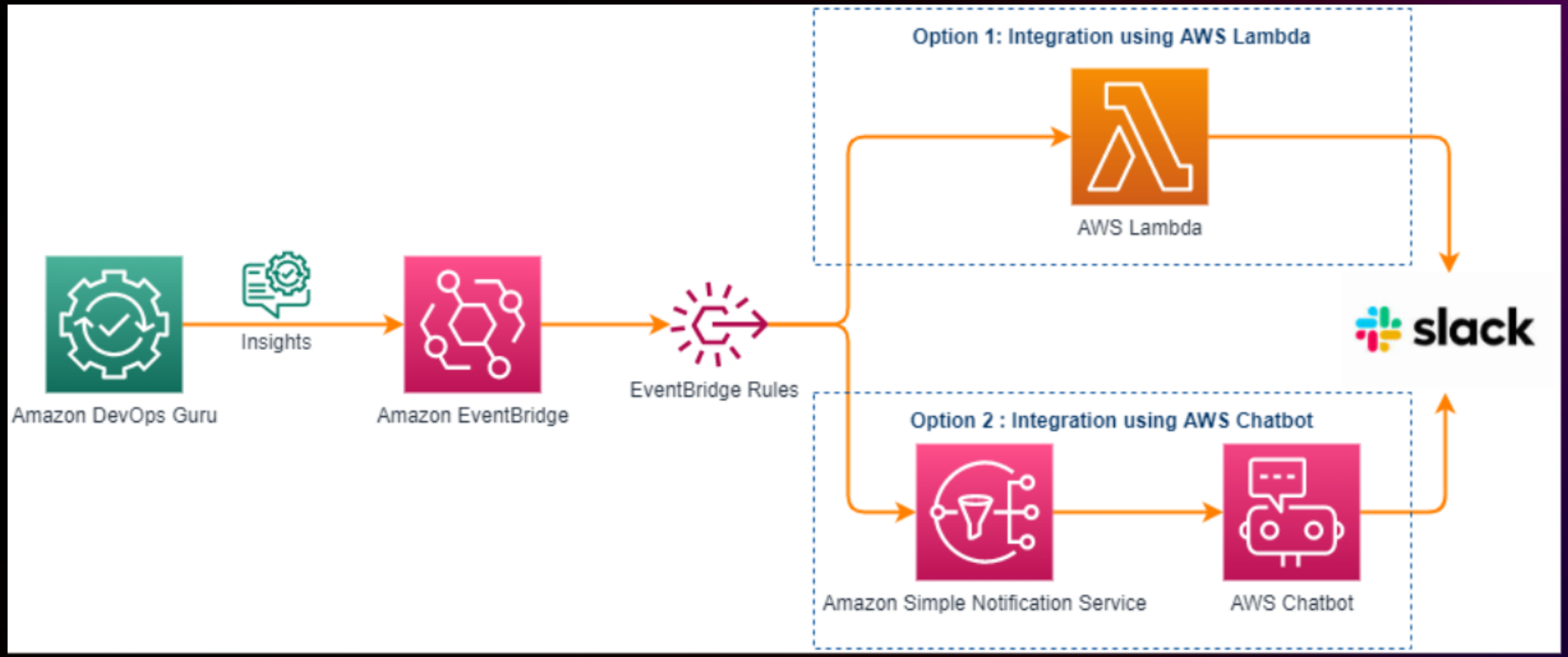




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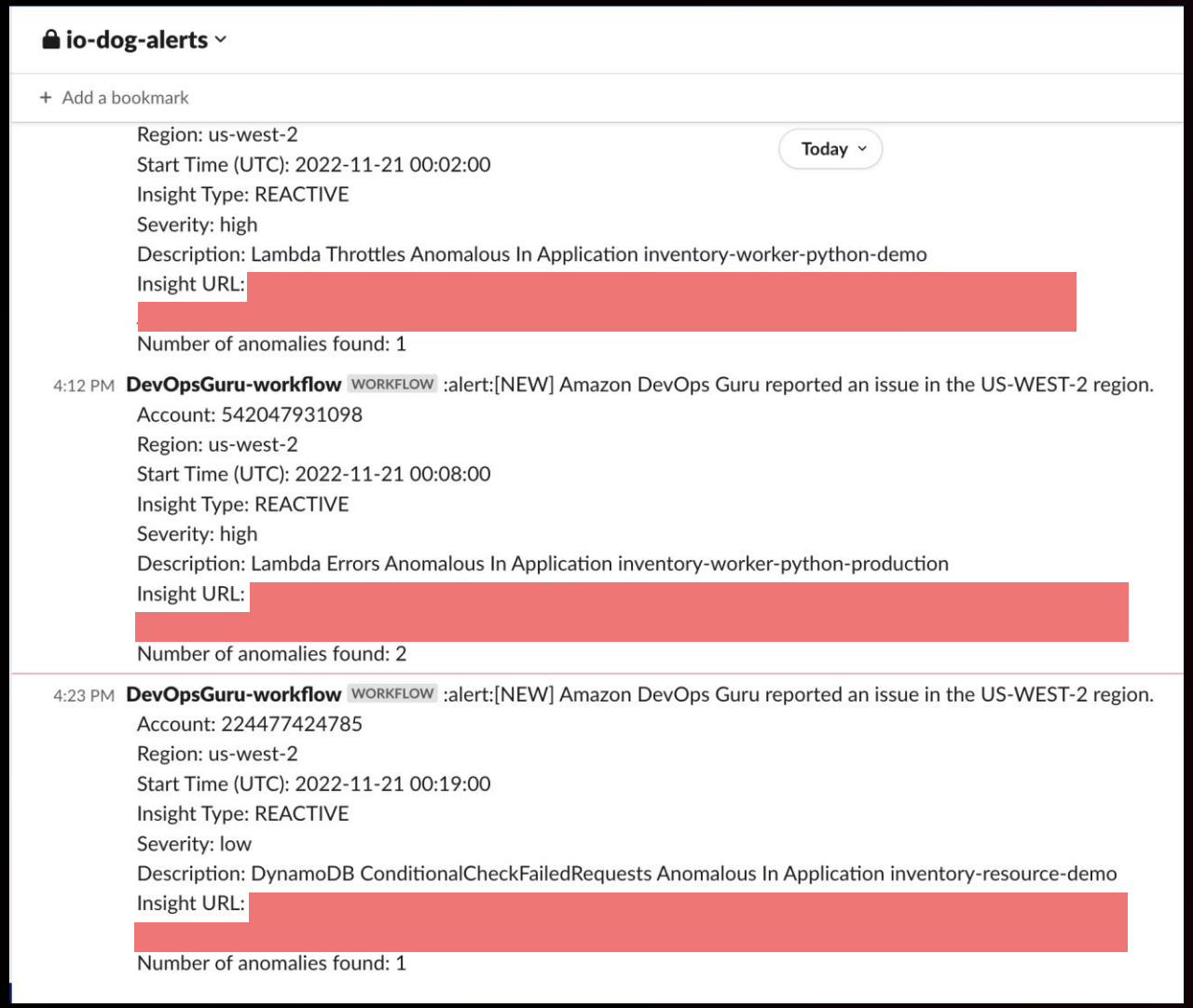
NEW: Amazon EventBridge for out-of-band alerting

PRO TIP: YOUR MONITORING SYSTEM MONITORING ITSELF IS A BAD STRATEGY; WATCH THE WATCHER



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OOB insights and alerts from DevOps Guru

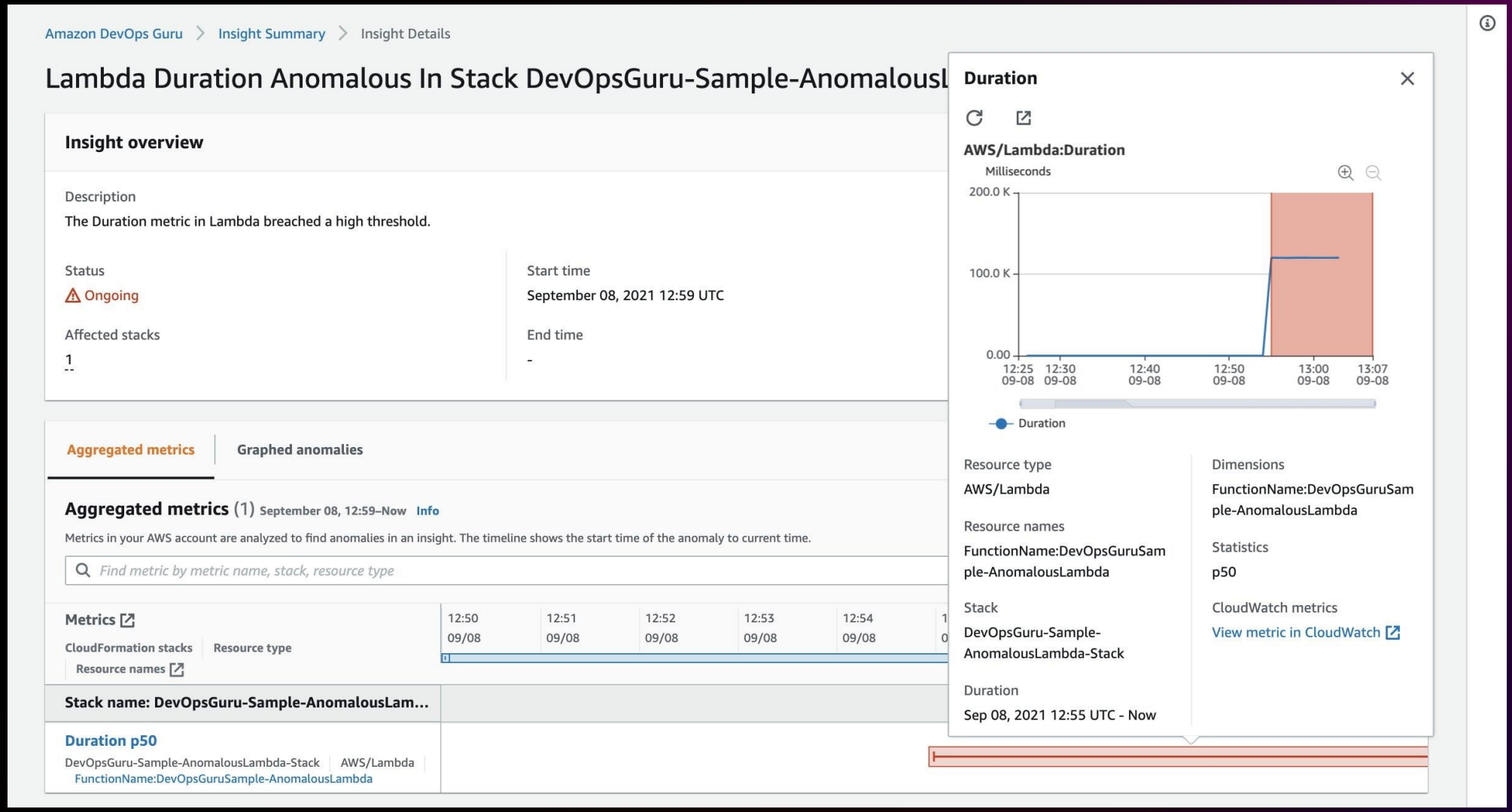


DevOps Guru is the primary source of OOB monitoring, alerting, correlation, and improvement for cascadeo.io SaaS in production.

Inband monitoring and alerting is not inherently worrying, but unsatisfactory things can and will happen if there is not a neutral watcher watching the watcher.

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Building the serverless future with DevOps Guru



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Summary and conclusions

Amazon DevOps Guru has revolutionized the way Cascadeo delivers for our clients.

Now recommended to (nearly) every client

Anomaly detection & correlation for MSP

Recommendations & optimization for PS

OOB monitoring & alerting for our SaaS

Amazon DevOps Guru is an incredible value – costs very little, helps and saves a lot.



DevOps Guru supports key AWS services + PaaS



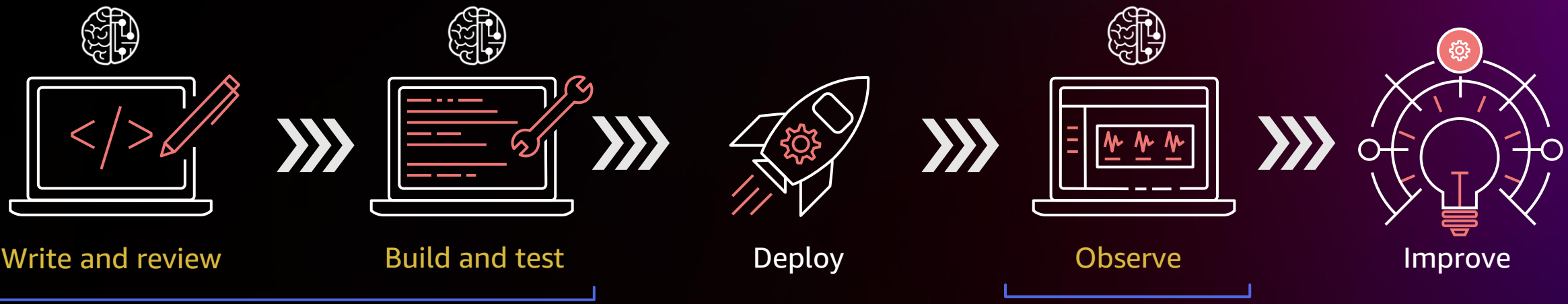
AWS AIOps reduces toil, frees you to create value



Global AWS Partners like Cascadeo are here to help

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AI for DevOps on AWS



Amazon CodeWhisperer

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Amazon DevOps Guru

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AI for DevOps on AWS

- Context-based code recommendations
- Automate code reviews
- Detect hard-to-find bugs
- Code optimization
- Anomaly detection
- Intelligent recommendations



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7,200 AWS resource hours per group per month for 3 months



Get started with Amazon CodeGuru
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Thank you!

Rafael Ramos
@rafaelgsr

Shivansh Singh
sshvans@amazon.com
@shivansh_singh

Jared Reimer
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