# AWS re:Invent

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COP222

# Remove guesswork when launching new features with CloudWatch Evidently


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# Agenda

1. Why validate new features
2. **New launch!** Amazon CloudWatch Evidently
3. Learn how Amazon Alexa built their A/B testing feature
4. Deep dive and demo

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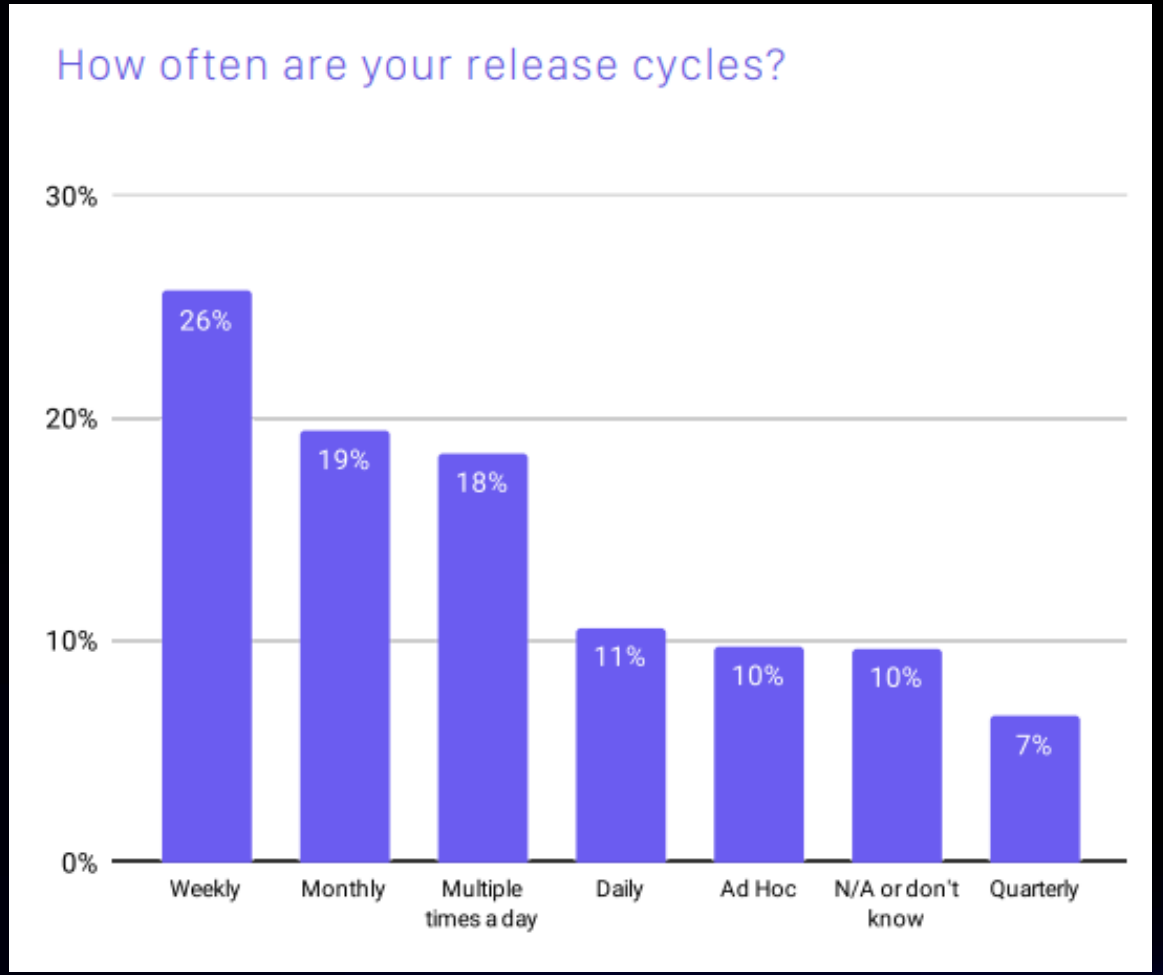
# Safely accelerate your business

IS THE FEATURE REALLY BETTER? IS IT SAFE TO LAUNCH?

Faster releases and feature innovation

Unintended consequences

- Unexpected user behavior
- Performance degradation




*Courtesy of CNCF Cloud Native Survey 2020*

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# Managing launch risks

- Set up traffic to new features
- Experimentation
- Monitor launches



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# Observability with Amazon CloudWatch

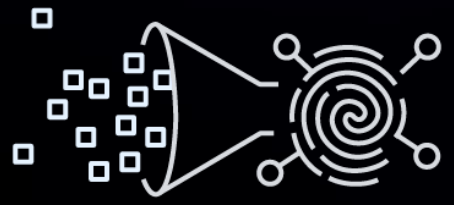
| | |
|---|---|
| **Digital experience** | Synthetics<br>**RUM—client-side performance insights—new release**<br>**Evidently—safe launches and experimentation—new release** |
| **Application** | ServiceLens<br>AWS X-Ray insights<br>Container insights, AWS Lambda insights, Logs insights, Contributor insights |
| **Infrastructure** | Alarms and dashboards<br>Metrics, logs, traces |

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NEW RELEASE

# What is CloudWatch Evidently?

For app developers to conduct experiments, reduce risk, and identify unintended consequences before launching features for general use.



Experimentation

Remove guesswork



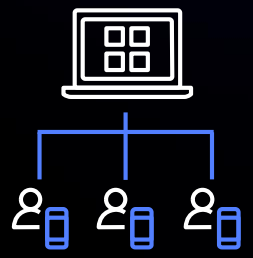
Safer launches

Reduce risk

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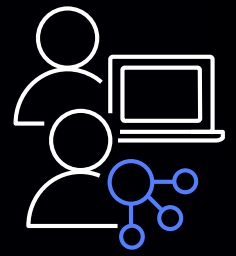
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# CloudWatch Evidently: Experiment use cases



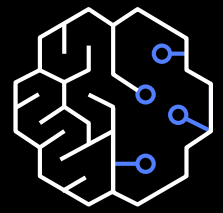
## System

Validate performance and reliability of code changes at different layers of the stack



## User experience

Test new product features, APIs, and UI to improve user experience



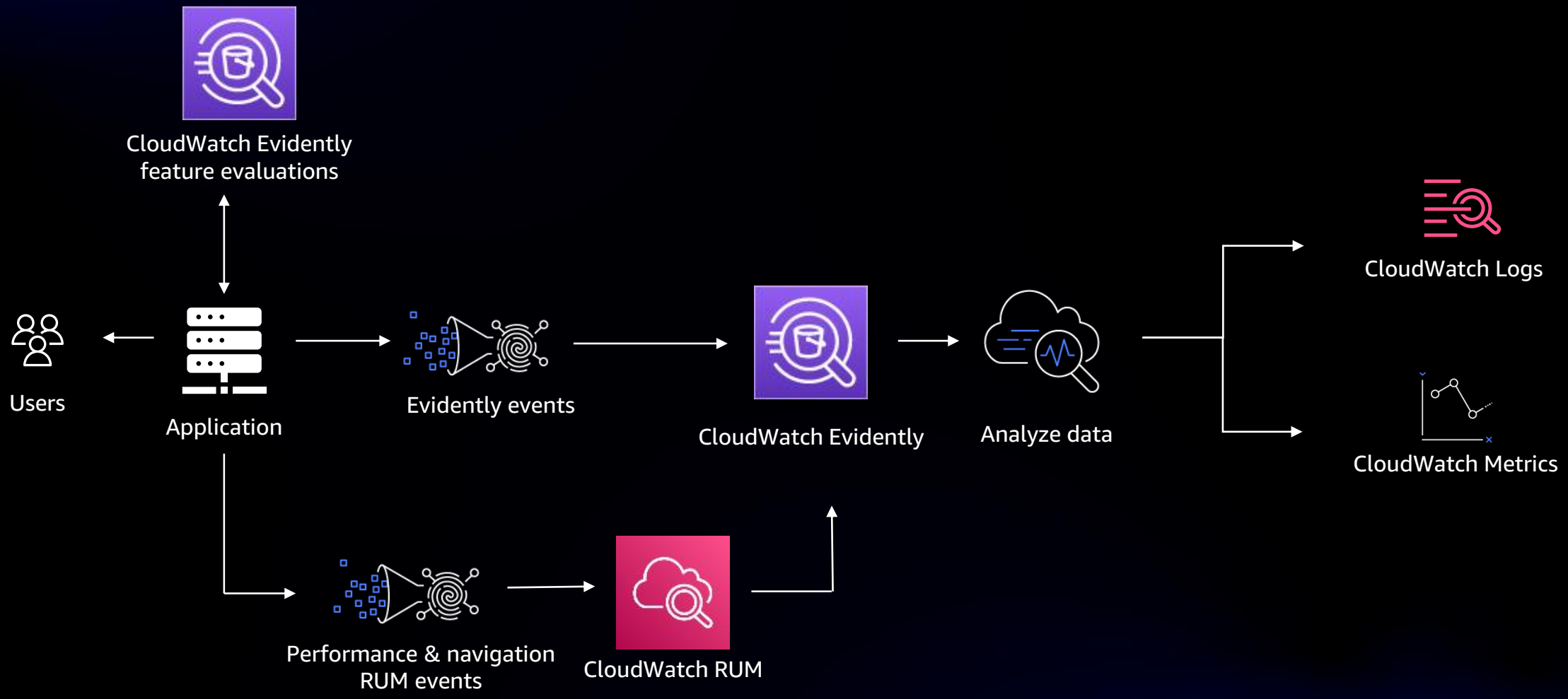
## Machine learning

Test different ML models

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# CloudWatch Evidently: How it works

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# User validation through experimentation with CloudWatch Evidently



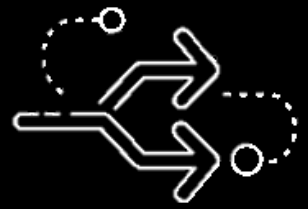
Easy to understand experiment results

Confidence intervals, p-values, and Bayesian inference



Real-time analysis

Anytime valid p-values, no need to wait a set period of time for analysis



Launch design of choice

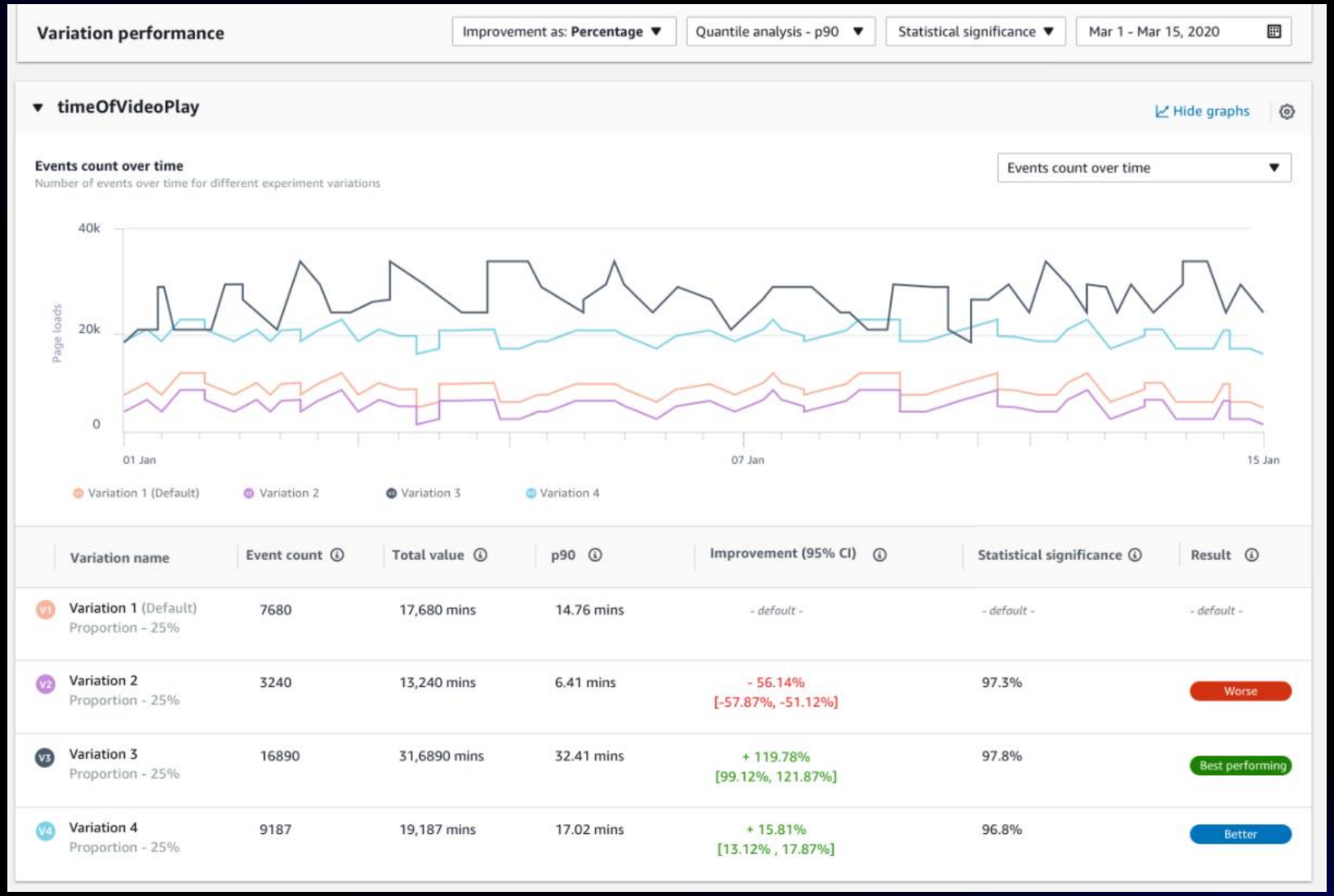
Use launches to automate traffic dial up

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# CloudWatch Evidently experiments

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| Variation name | Event count | Total value | p90 | Improvement (95% CI) | Statistical significance | Result |
|---|---|---|---|---|---|---|
| Variation 1 (Default) Proportion - 25% | 7680 | 17,680 mins | 14.76 mins | - default - | - default - | - default - |
| Variation 2 Proportion - 25% | 3240 | 13,240 mins | 6.41 mins | - 56.14% [-57.87%, -51.12%] | 97.3% | Worse |
| Variation 3 Proportion - 25% | 16890 | 31,6890 mins | 32.41 mins | + 119.78% [99.12%, 121.87%] | 97.8% | Best performing |
| Variation 4 Proportion - 25% | 9187 | 19,187 mins | 17.02 mins | + 15.81% [13.12% , 17.87%] | 96.8% | Better |

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# Safer launches with monitoring using CloudWatch Evidently

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Small traffic

Limit exposure



Monitor and act

Visualize anomalies, optional stop switch



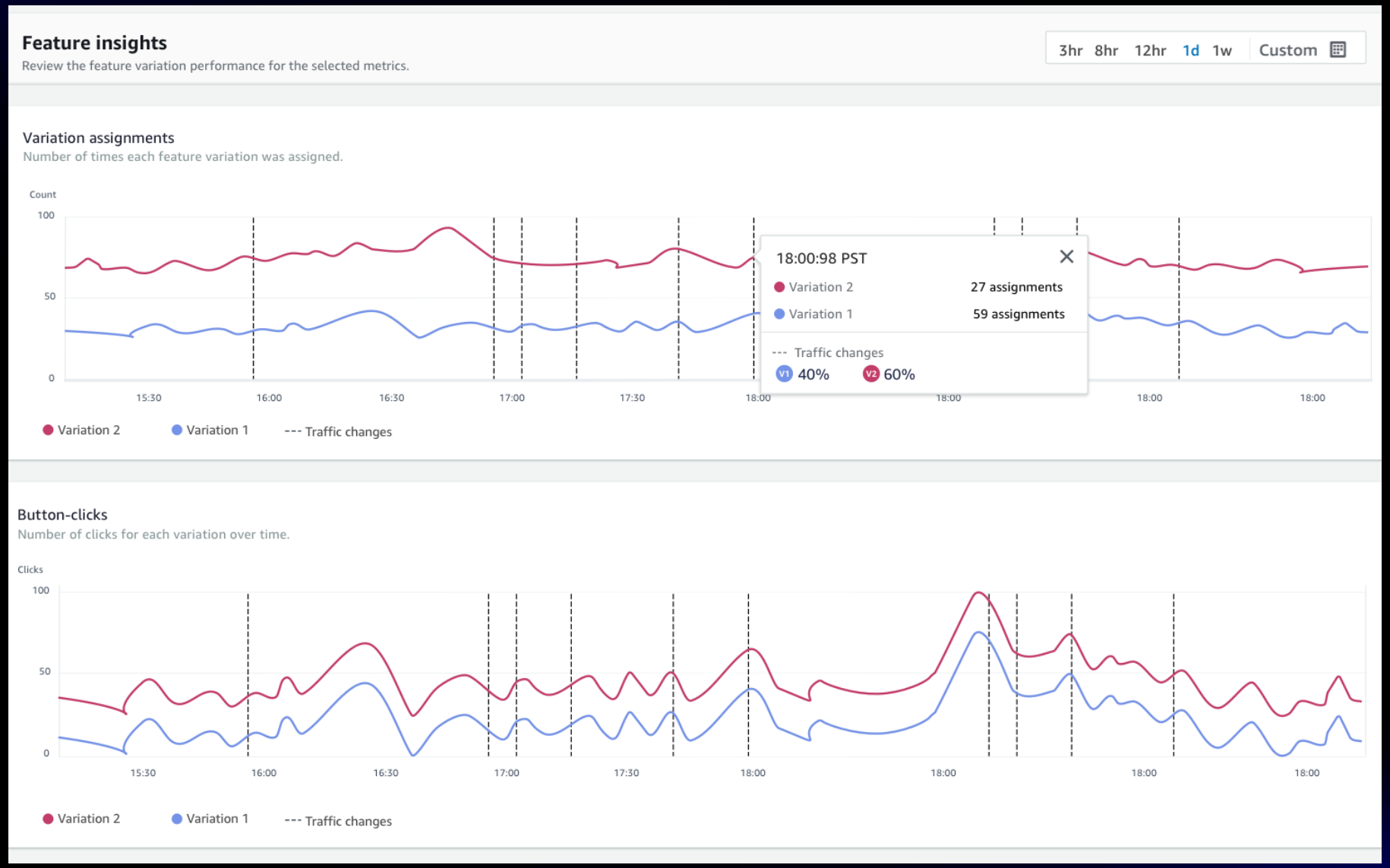
Dial up/down traffic

Include bake time and automate

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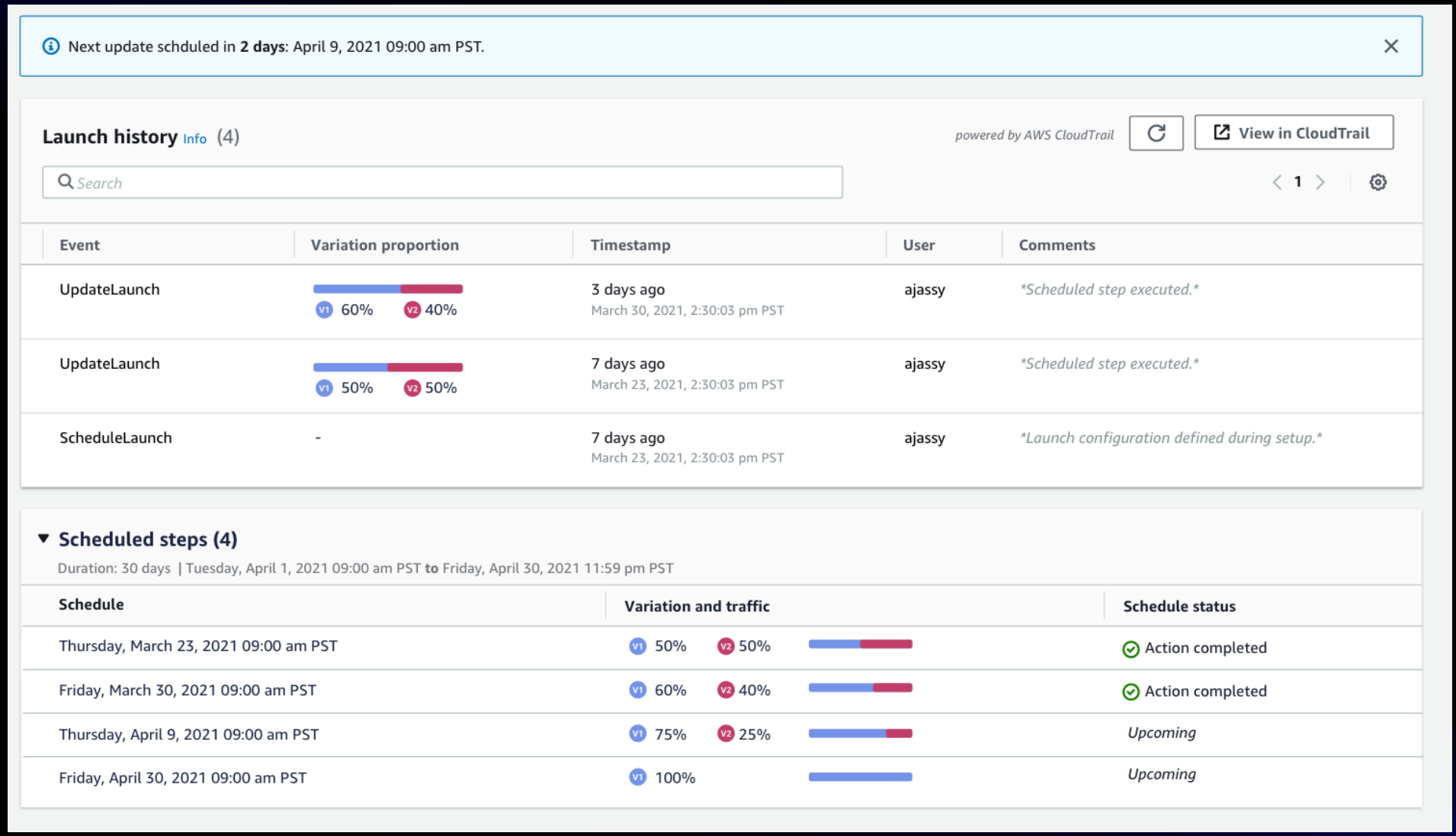
# CloudWatch Evidently: Launch monitoring




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# Safe launches: Automate dial up

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# A/B testing in Amazon Alexa using CloudWatch Evidently

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# Balamurugan Muthiah: Amazon Alexa



Senior Software Developer with Amazon Alexa

Been working on A/B testing for 4+ years

Previously worked on Amazon Kindle

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# What is an Alexa Skill?

Skills are apps for Alexa, where

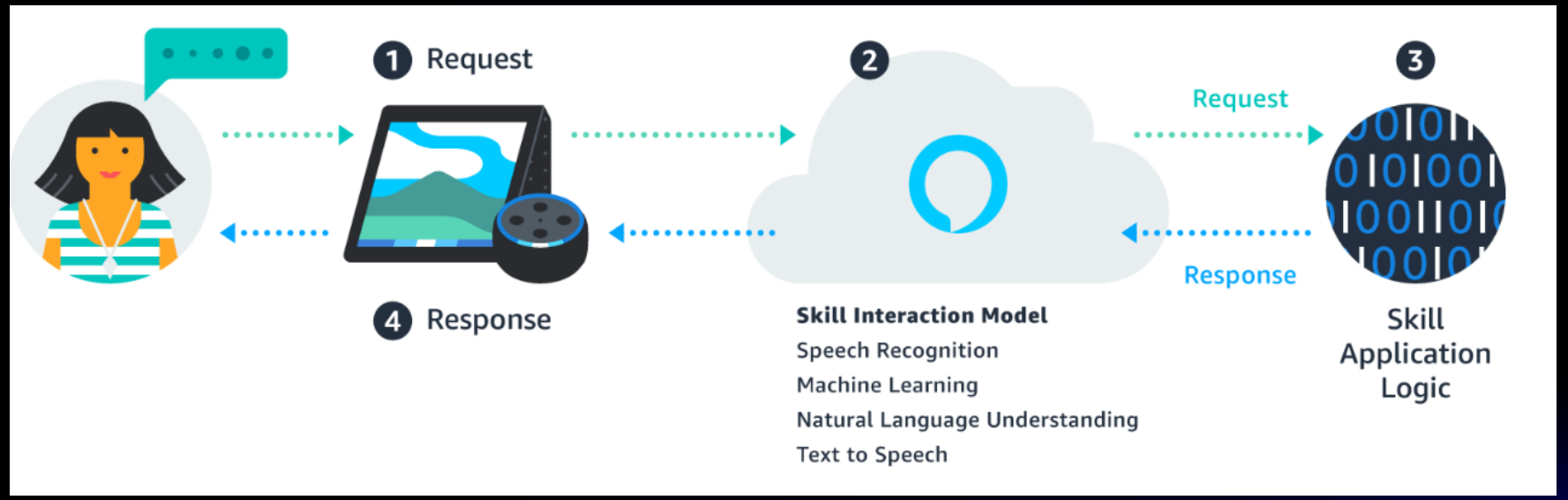
- Customers use their voice to perform everyday tasks
- Organizations and individuals can publish skills in Alexa Skills Store

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# How do Alexa Skills work?

Alexa Skills enable developers to . . .

- Handle customer requests made to Alexa, through the development of an **interaction model**
- Deliver responses rendered by a skill's **application logic**



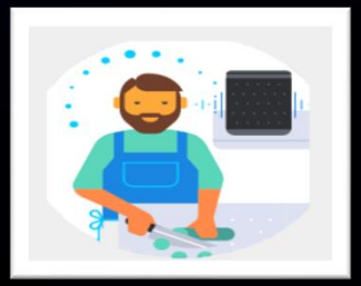

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# Why is A/B testing needed?

## Interaction model experiments

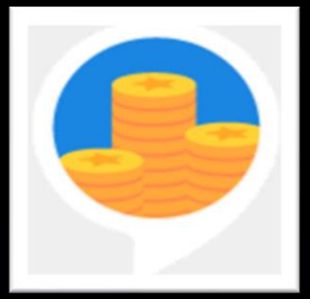


Add new utterances to reduce customer friction

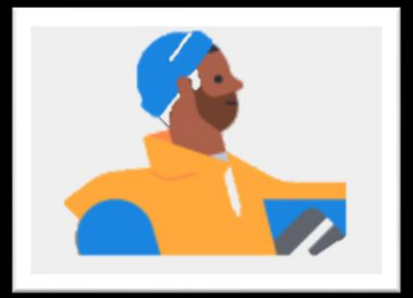


Add a new intent to your skill to improve customer engagement

## Application logic experiments



Change upsell messaging to optimize in-skill purchasing sales



Change response messages to improve customer retention

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# A/B testing for Alexa Skills

With A/B testing, third-party skill developers can . . .

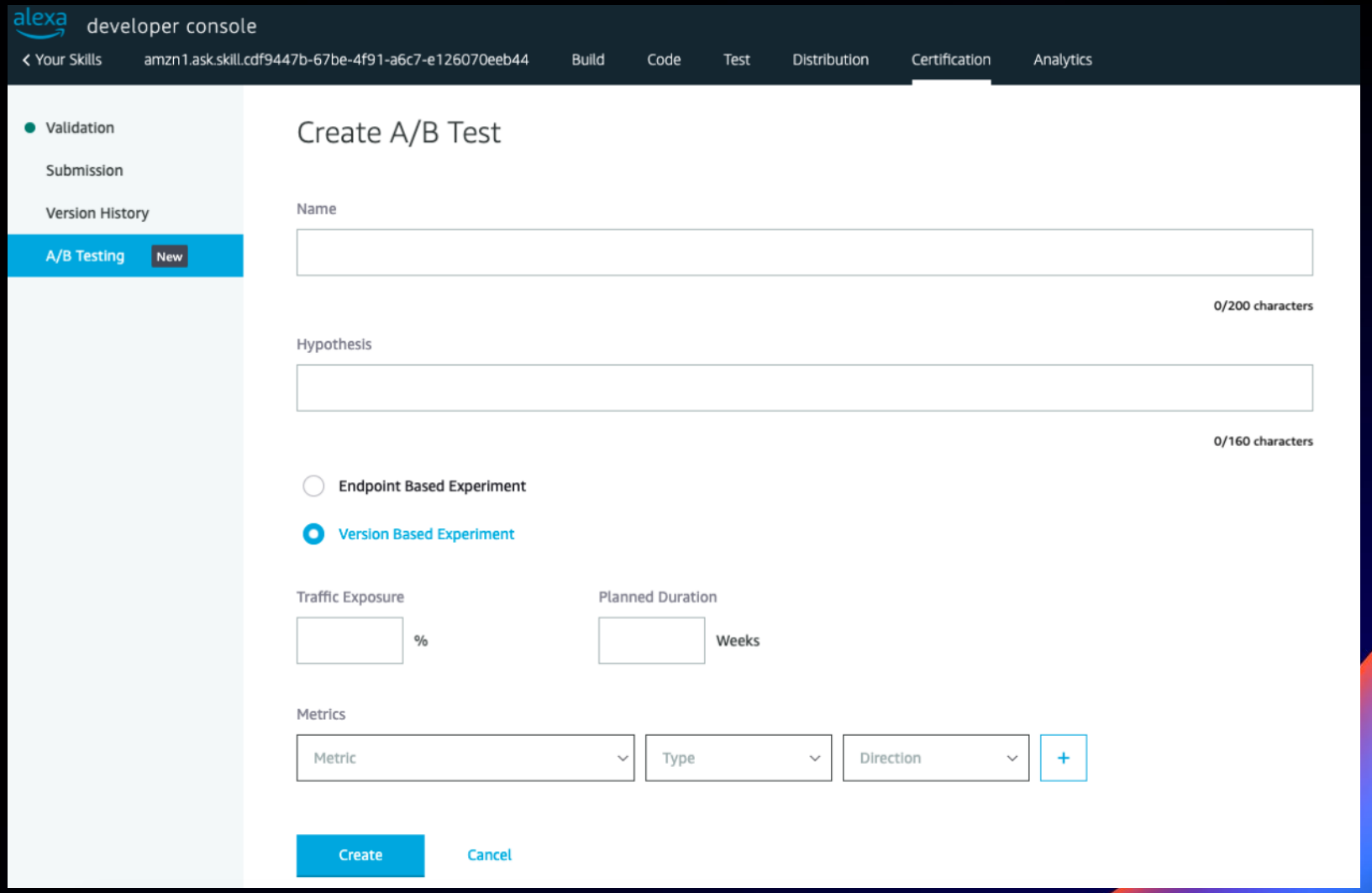
- Deliver two different skill experiences at the same time
- Make launch decisions based on metrics and statistics
- Learn from past A/B tests to inform new ideas

**Skill A/B testing available in beta, powered by CloudWatch Evidently!**

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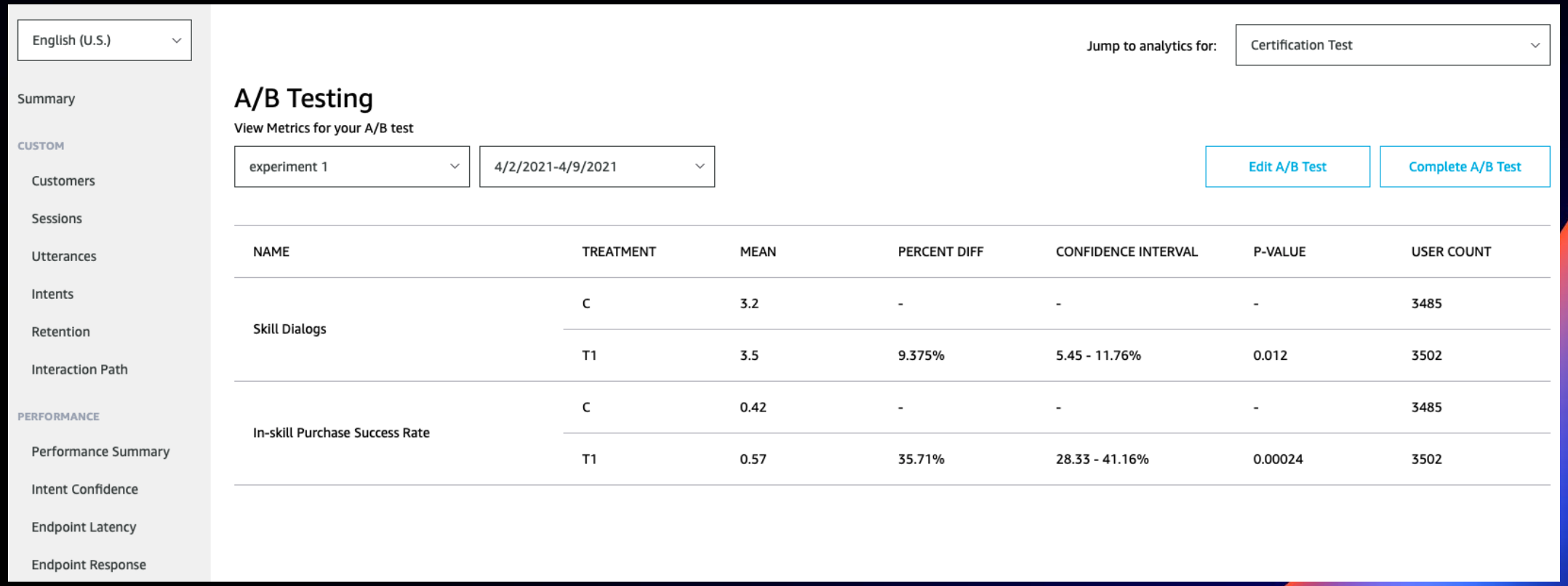
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# Alexa Skills A/B testing feature



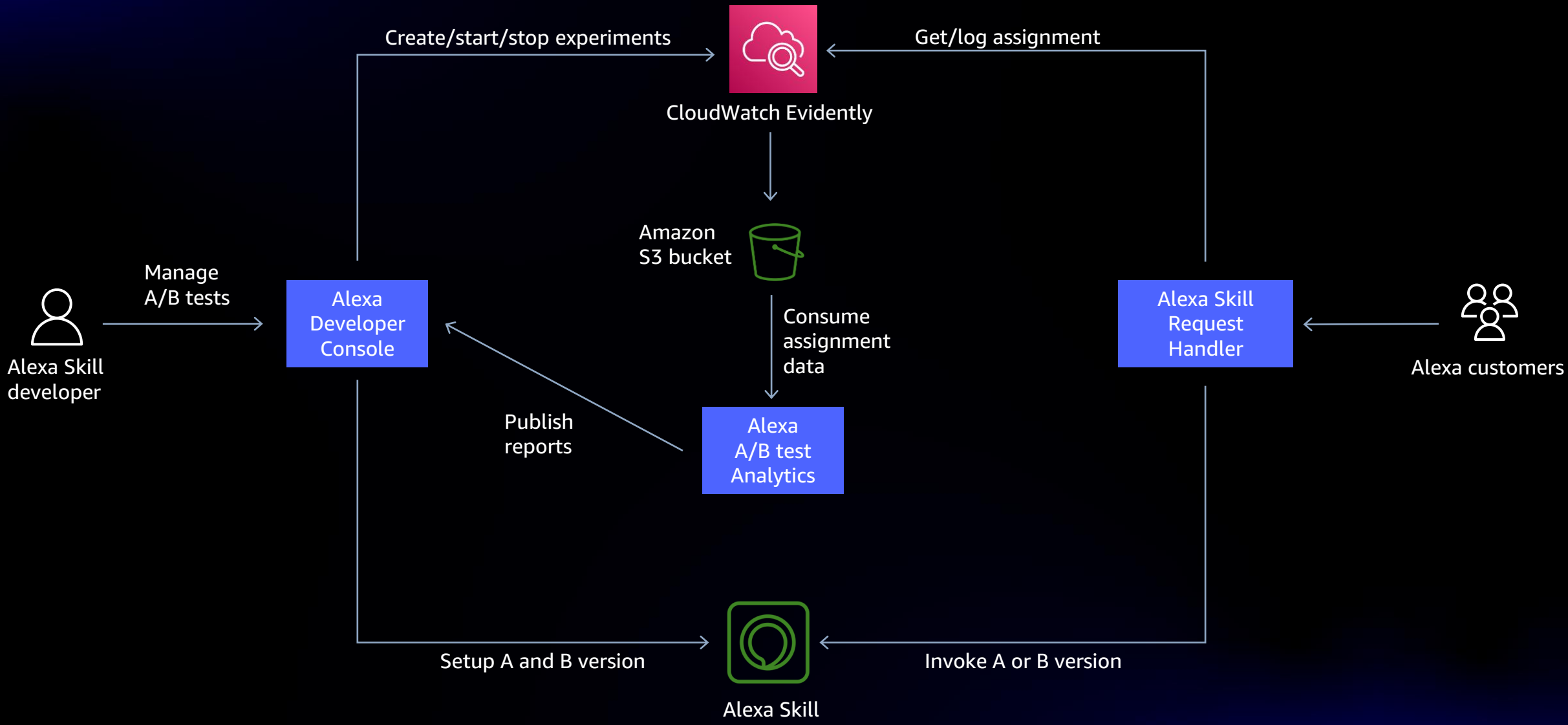

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# Alexa Skills A/B testing feature




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# Architecture




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# Why CloudWatch Evidently?

- Offers APIs to build our own experience in Alexa Developer Console; create, start, stop, dial up traffic, add overrides
- Assignment data available within a few minutes
- Scale to millions of customers
- Expand to internal Alexa use cases for improving CX

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# Deep dive

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# Speaker intro: Adel Lahlou



Senior Software Developer with Amazon CloudWatch Evidently

Worked with customers in voice assistants, payments, ecommerce

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# Deep dive overview

Introduce application and experiment goals

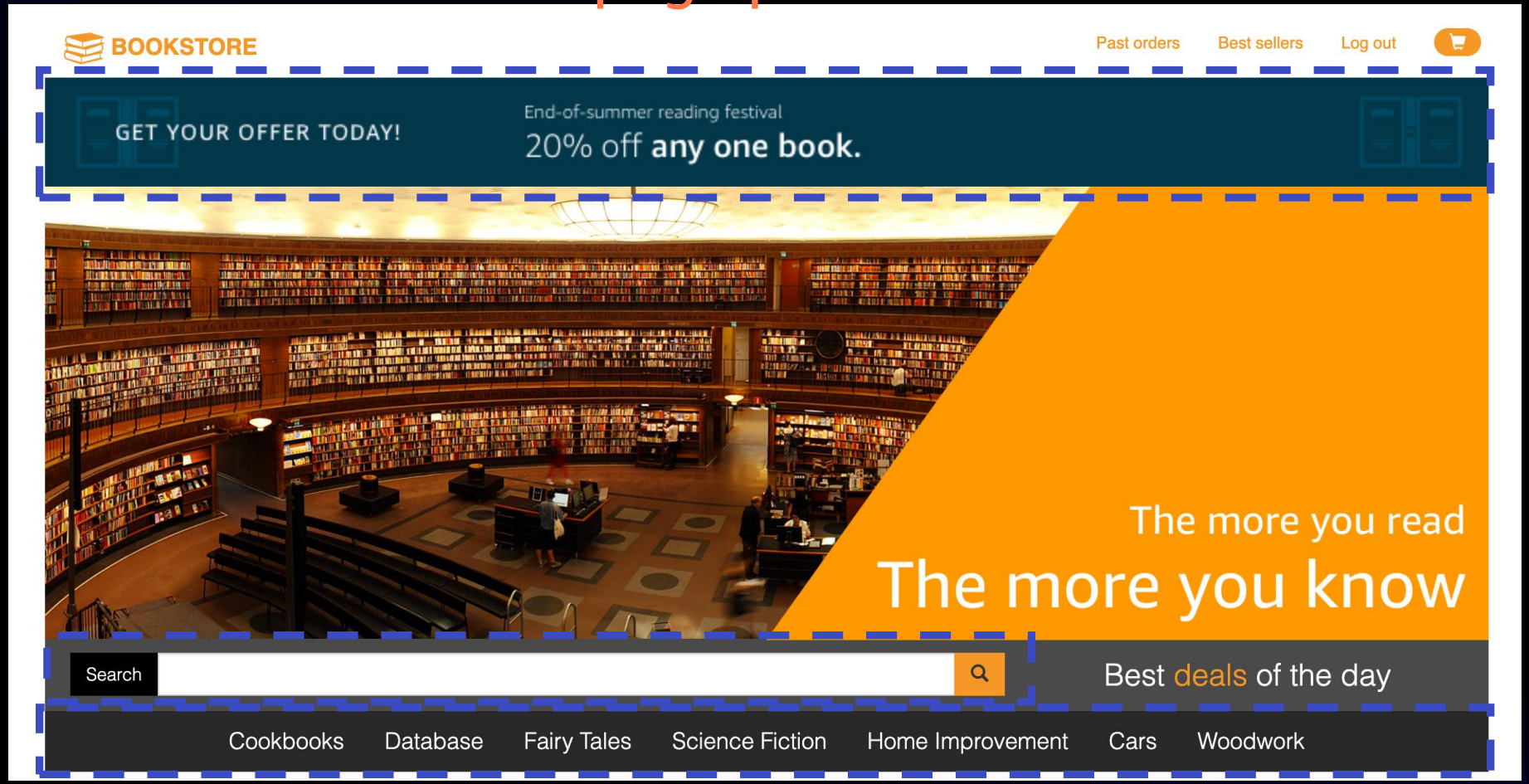
Overview of A/B experiments in console

Set up experiment in CloudWatch Evidently

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# Application introduction

Homepage promotion




Search ranking

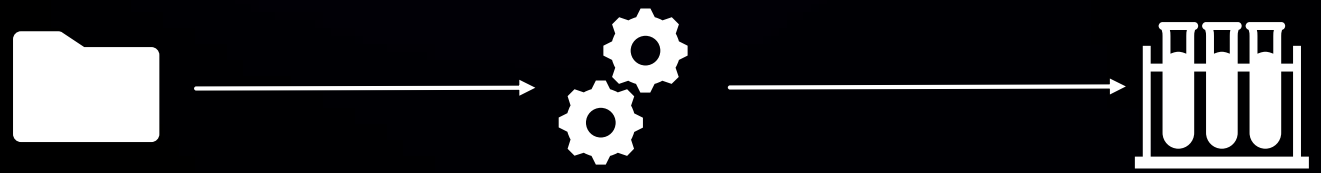
Highlighted categories

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# Walkthrough

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# Review: Model homepage promotion



- Setup variations
- Previewed with overrides
- Evaluation logs
- Results

Bookstore project

Promotion feature

Promotion experiment

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# Recap

- Challenges with releasing new features and updates
- Amazon CloudWatch Evidently for safer launches and experimentation
- Amazon Alexa’s A/B feature for skill developers
- How to use CloudWatch Evidently through demo

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# Observability sessions this week

BREAKOUT SESSIONS

COP201 – Gain enterprise visibility with AWS Cloud operation dashboards

COP223 – Optimize applications through end user insights with Amazon CloudWatch RUM

COP206 – Observability the open-source way

CHALK TALKS

COP315 – Observability on a single platform on AWS

DOP202 – Increasing availability with AWS observability solutions

WORKSHOPS AND BUILDER SESSIONS

COP307 – Observability best practices for modern & traditional applications

COP316 – Open-source observability

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# Resources

- Visit https://aws.amazon.com/blogs/aws/cloudwatch-evidently/ to read more about CloudWatch Evidently
- Visit https://observability.workshop.aws/ to get a hands-on experience of all AWS observability features
- Visit https://aws.amazon.com/cloudwatch/pricing/ to learn more about CloudWatch pricing

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# Thank you!

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