

**AWS RE:INVENT**

**RE:CAP**

**AWS RE:INVENT**  
**RE:CAP**

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# AWS re:Invent re:Cap **The Technical Edition**

2022-01-25

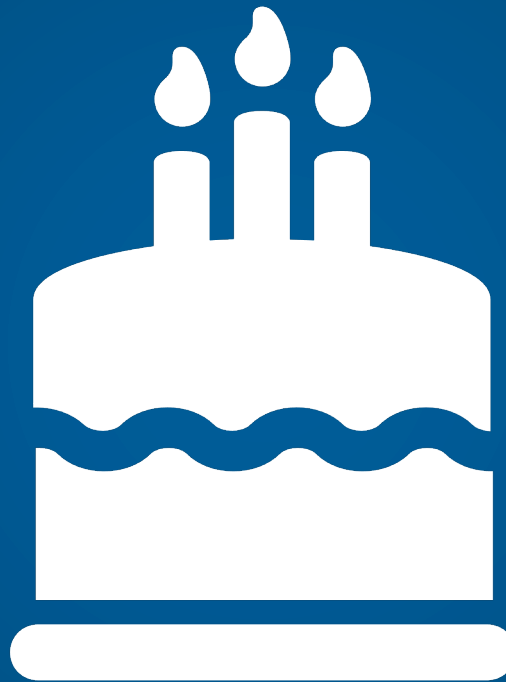
Yécine Allouache, Solutions Architect

Stephen Roux, Solutions Architect

Sébastien Stormacq, Developer Relations



# 10<sup>th</sup> AWS Customer Conference

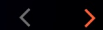


# 5 Keynotes

## Keynotes

Join our live keynotes and be the first to hear the latest from AWS. All the keynotes from re:Invent 2021 are available live for our registered virtual attendees, with repeat and on-demand viewing options available also.

RE:INVENT 2021



Missed any of the sessions?

Watch keynotes, leadership sessions, and hundreds of breakout sessions on demand. Register now to get free virtual access.

[Watch on demand content](#)

Adam Selipsky

Swami Sivasubramanian

Peter DeSantis

Werner Vogels

Global Partner Summit



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# 1200+ breakout sessions

## Breakout content

Join us in Las Vegas for the full re:Invent experience—learn new ways of working and practice live with AWS experts. Join us online, after the event, to view all the breakout sessions, free and on demand.

RE:INVENT 2021



Missed any of the sessions?

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[Watch on demand content](#)

Overview

Breakout sessions

Workshops

Chalk talks

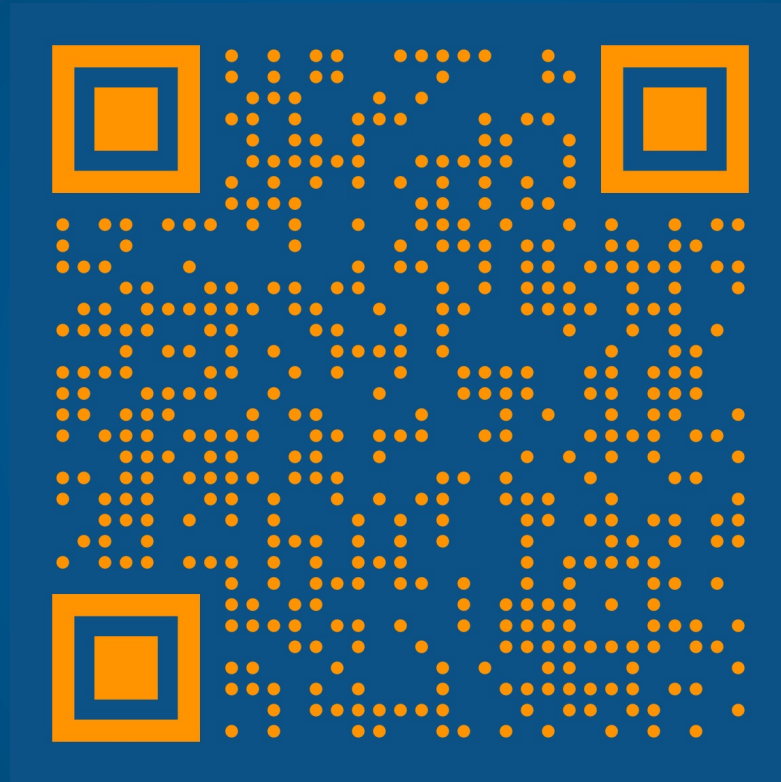
Builders' sessions

Content Hubs



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<https://www.youtube.com/AWSEventsChannel/playlists>



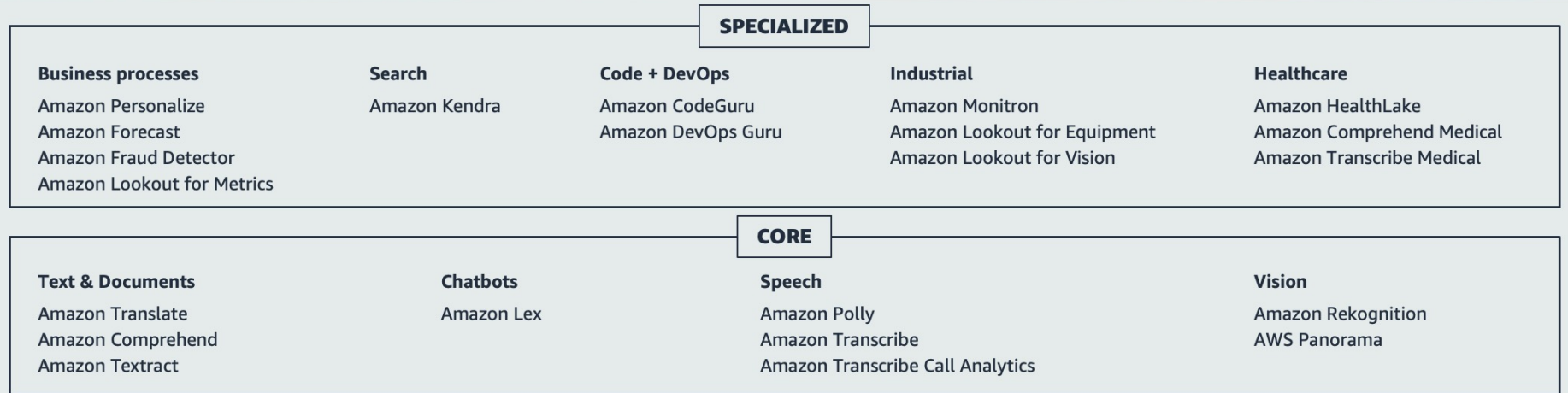
# AI/ML



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# The AWS ML Stack

## AI SERVICES



## ML SERVICES



## ML FRAMEWORKS & INFRASTRUCTURE

PyTorch, Apache MXNet, TensorFlow

Amazon EC2

CPUs

GPUs

AWS Inferentia

AWS Trainium

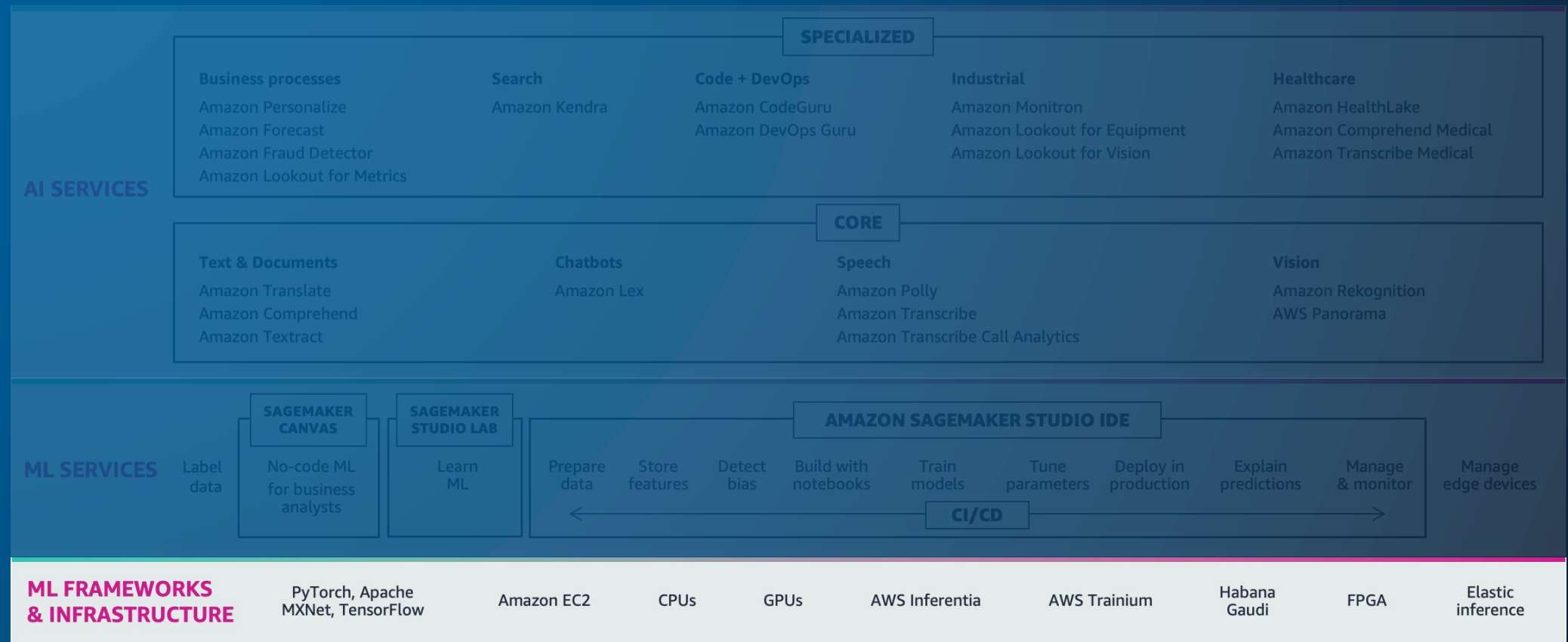
Habana Gaudi

FPGA

Elastic inference



# The AWS ML Stack



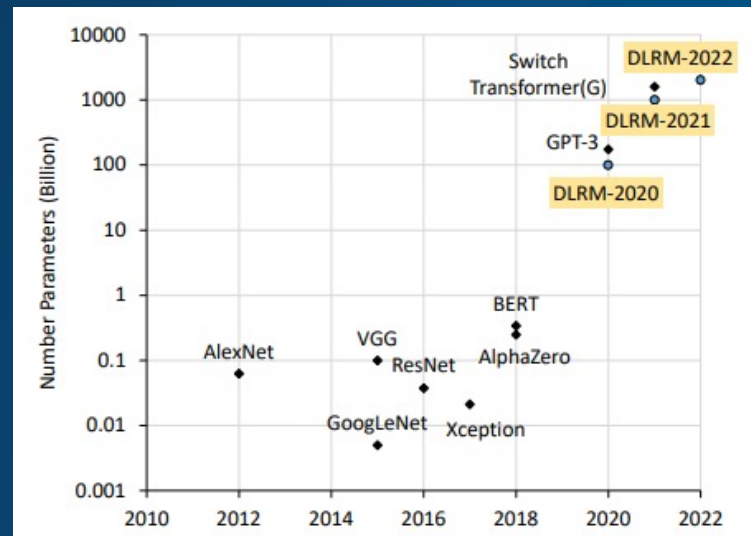
# Amazon EC2 Trn1 Instances for ML Training

## INCREASING ML COMPLEXITY

- Businesses need higher precision in their model predictions
- Larger and more complex models result in more frequent retraining

## INCREASING TRAINING COSTS

- Training larger models requires an increase in compute power, which also increases costs
- Increasing costs become a barrier to innovation and growth



# Amazon EC2 Trn1 Instances for ML Training



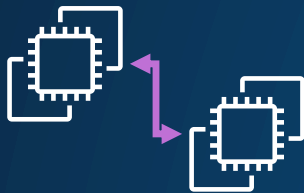
16 AWS Trainium chips, purpose-built for deep learning training



Most cost efficient for large-scale distributed training



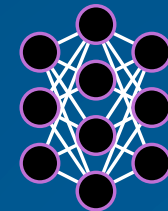
Fastest ML training in the cloud



800 Gbps networking and ultra-highspeed interconnect between accelerators



AWS Neuron SDK integrated with TensorFlow and PyTorch

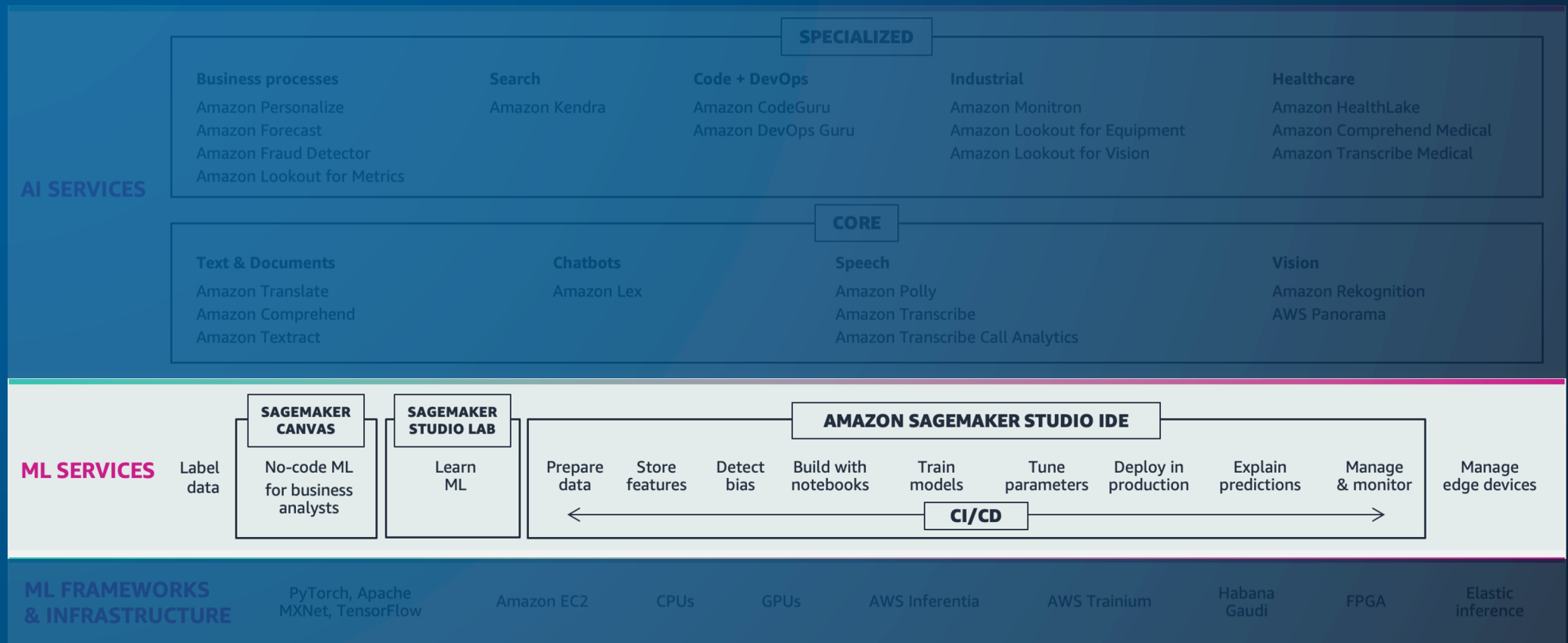


Deployed in Amazon EC2 UltraClusters with tens of thousands of Trainium chips and petabit-scale networking

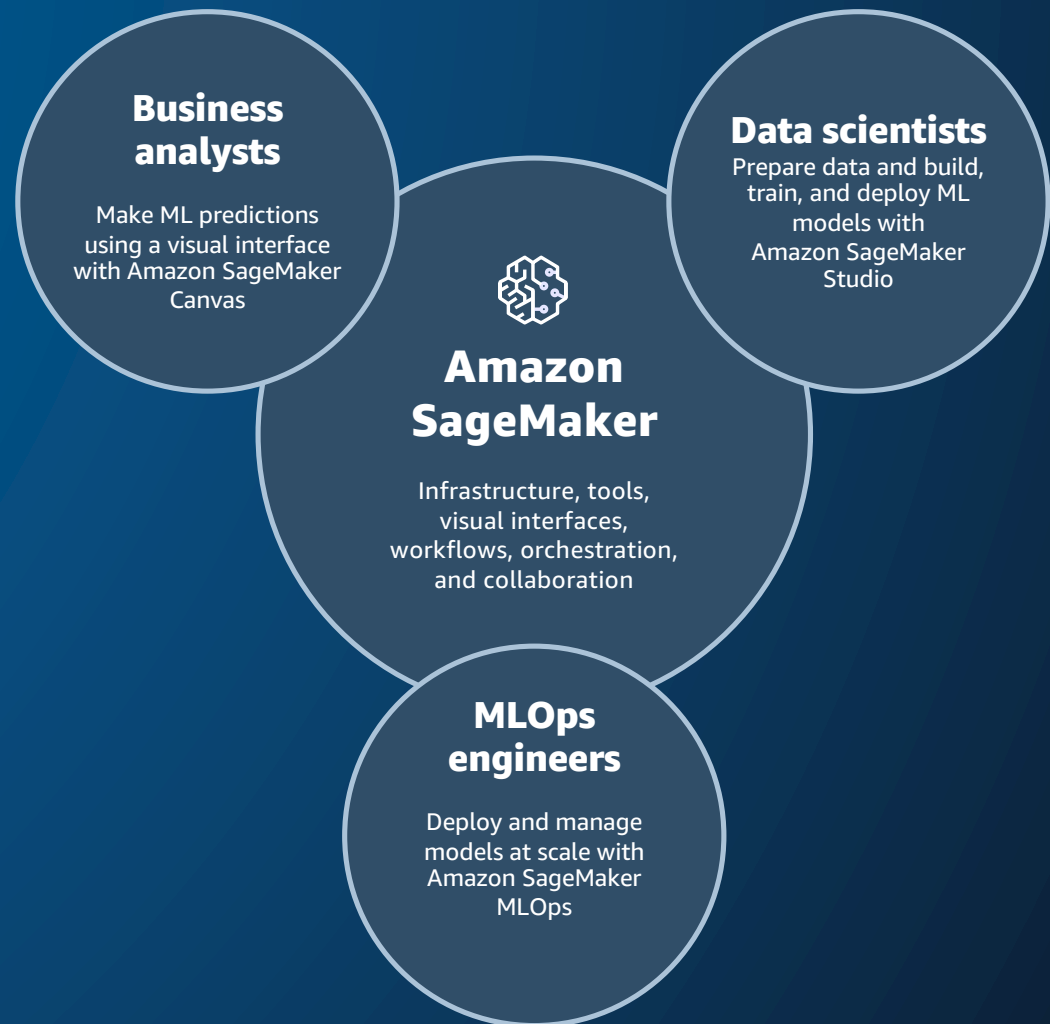


Preview

# The AWS ML Stack



# Amazon SageMaker helps organizations harness ML



# Amazon SageMaker Notebooks

PERFORM DATA ENGINEERING, ANALYTICS, AND ML WORKFLOWS IN ONE NOTEBOOK



Amazon SageMaker



Discover, manage, create, terminate, and connect to Amazon EMR clusters



Interactively access, transform, and analyze a wide range of data



Build, train, and deploy models using your preferred framework



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# Amazon SageMaker Training Compiler

ACCELERATE THE TRAINING OF DEEP LEARNING MODELS



Amazon SageMaker



## Training compiler

Accelerate training times by up to 50% through more efficient use of GPUs



## Reduce training costs

Save time and money associated with training



## Integrated with existing frameworks

Use familiar framework APIs with minimal code changes



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# Amazon SageMaker Inference Recommender

ACCELERATE THE DEPLOYMENT OF MODEL ENDPOINTS



Amazon SageMaker



Automatic deployment recommendations  
Optimal instance type/count and container parameters



Fully managed load testing  
Run and review fully managed load tests on a set of instance types to evaluate performance and trade-offs



**Reduce inference costs**  
Receive endpoint configuration recommends for best price performance



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# Amazon SageMaker Serverless Inference

DEPLOY ML MODELS FOR INFERENCE WITHOUT CONFIGURING OR MANAGING UNDERLYING INFRASTRUCTURE



Amazon SageMaker



Optimise for intermittent or unpredictable workloads  
Automatic and fast scaling when usage is required



Fully managed  
Underlying infrastructure, security, patching,  
monitoring and logging is all managed



**Pay per use**  
Pay only for the resources consumed, not idle time



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# Amazon SageMaker MLOps

TRACK, ASSESS, AND MONITOR YOUR ML MODELS



Amazon SageMaker



## Improved lineage management

Retrieve all ML lineage across accounts and in a single query, from data to endpoint



## Model quality and bias detection in workflows

SageMaker Model Monitor and SageMaker Clarify integrated into SageMaker Pipeline workflows



## Monitor endpoints from SageMaker Model Registry

Track endpoints, custom metadata, and model metrics



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# Amazon SageMaker Ground Truth Plus

DELIVER HIGH-QUALITY TRAINING DATASETS FAST AND REDUCE DATA LABELLING COSTS



**Increase data quality through ML-powered data labeling**



**Access expert data labelers**



**Reduce data labeling costs with assistive labeling features**



**Improve operational efficiency by reviewing project metrics**



**Make data labeling accessible to data operations and program managers**



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# Amazon SageMaker Canvas

GENERATE ML PREDICTIONS – NO CODE REQUIRED



Amazon SageMaker



Quickly access and prepare data sources for ML



AutoML built in to generate accurate predictions



Share ML models with data science teams



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# Amazon SageMaker Studio Lab

LEARN AND EXPERIMENT WITH MACHINE LEARNING

## Amazon SageMaker Studio Lab

**Free, no-configuration  
development environment**

All you need is an email address to get started

As many CPU and GPU sessions as needed

Automatically saves session data

Models ready for production



**Preview**

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# Developers & DevOps



# Amazon CodeGuru Reviewer

NOW DETECTS HARDCODED SECRETS IN JAVA AND PYTHON

**Recommendations (43)**

Found 1 match

Type = Secrets X

Clear filters

`.travis.yml` Line: 18 Security Secrets

It appears your code contains a hardcoded AWS Access Key ID. Hardcoded secrets or credentials can allow attackers to bypass authentication methods and perform malicious actions. We recommend revoking access to resources using this credential and storing future credentials in a management service such as [AWS Secrets Manager](#).

[Learn more about the use of hardcoded credentials](#)

Hardcoded credentials can be intercepted by malicious actors. Even after removing them from the code they may still pose a risk because an attacker might have recorded them to use them at a later point in time.

Protect your credential

Source  
CodeGuru

Was this helpful?  

👍

👎



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# Terraform Support for AWS Control Tower



- AWS Control Tower Account Factory for Terraform (AFT)
- AWS Control Tower governance benefits with Terraform-based account provisioning pipeline
- Supports Terraform Cloud, Terraform Enterprise, and Terraform Open Source
- Account creation and customization of new or existing accounts
- Customization to meet your procedures

# Amplify Studio



- Visually configure app backend
  - Model data
  - Set up auth and cloud storage
- Built on the AWS Amplify CLI
- Customize and integrate with your existing CI/CD using the AWS CDK
- Visually build a frontend UI with dozens of prebuilt components (such as buttons, forms, lists, and login)
- Import designs from Figma as React code

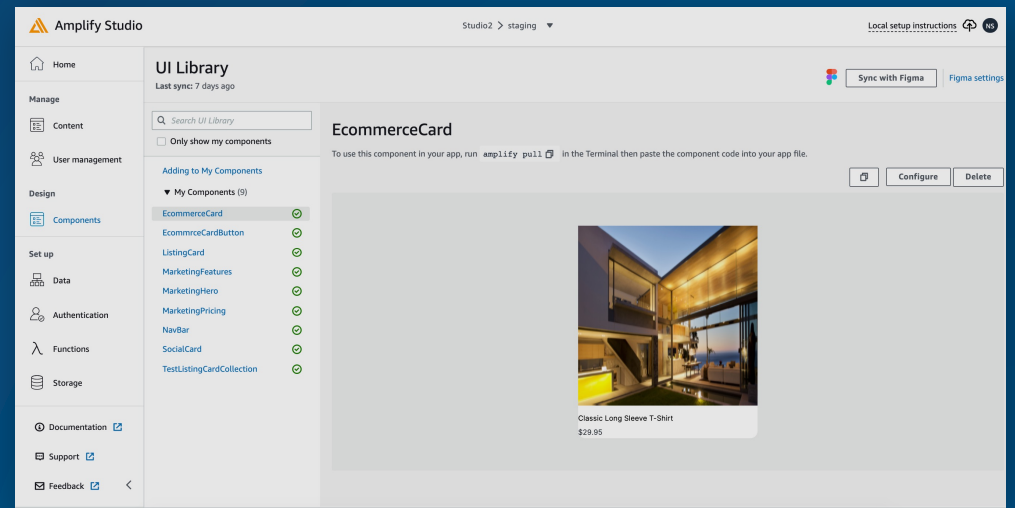


**Preview**

# AWS Amplify Studio

IMPORT FIGMA PROTOTYPES AS CLEAN REACT CODE

Visually build feature-rich apps in hours (not weeks), with full control over the application code.



Preview



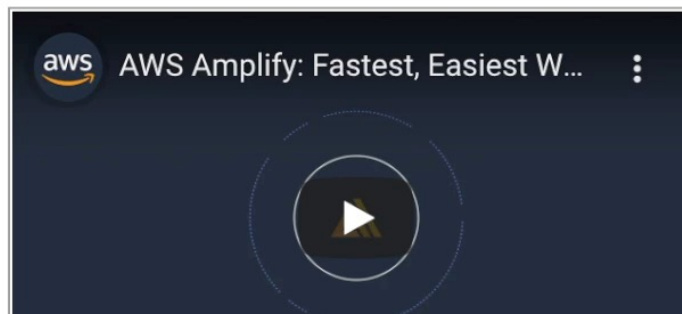
# AWS Amplify

Fastest, easiest way to develop mobile and web apps that scale.

GET STARTED



AWS Amplify is a set of products and tools that enable mobile and front-end web developers to build and deploy secure, scalable full-stack applications, powered by AWS.



# AWS Cloud Development Kit (CDK) v2

FOR JAVASCRIPT, TYPESCRIPT, JAVA, PYTHON, .NET AND GO

Consolidated construct library (aws-cdk-lib),  
experimental modules distributed separately.

New CDK Watch functionality.

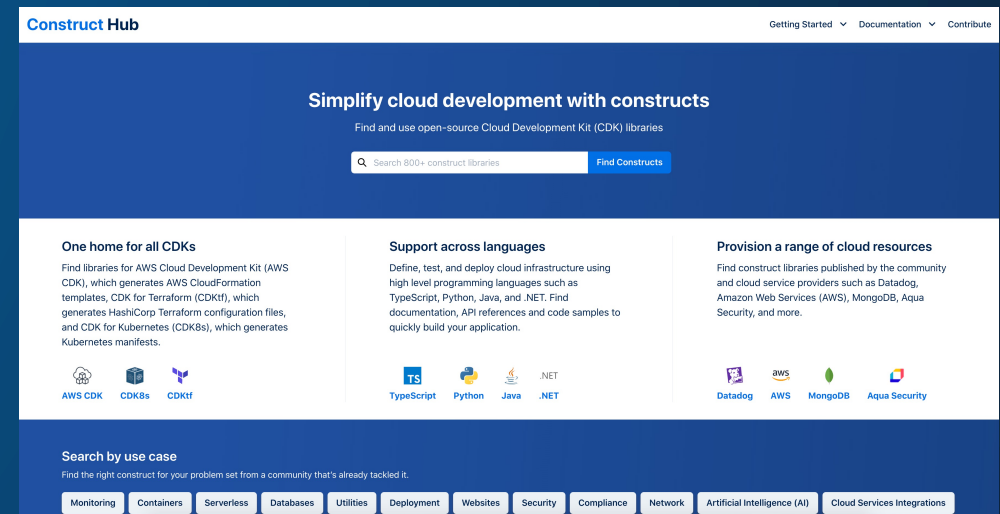


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# AWS CDK Construct Hub

Share open-source construct libraries with the wider cloud development community.

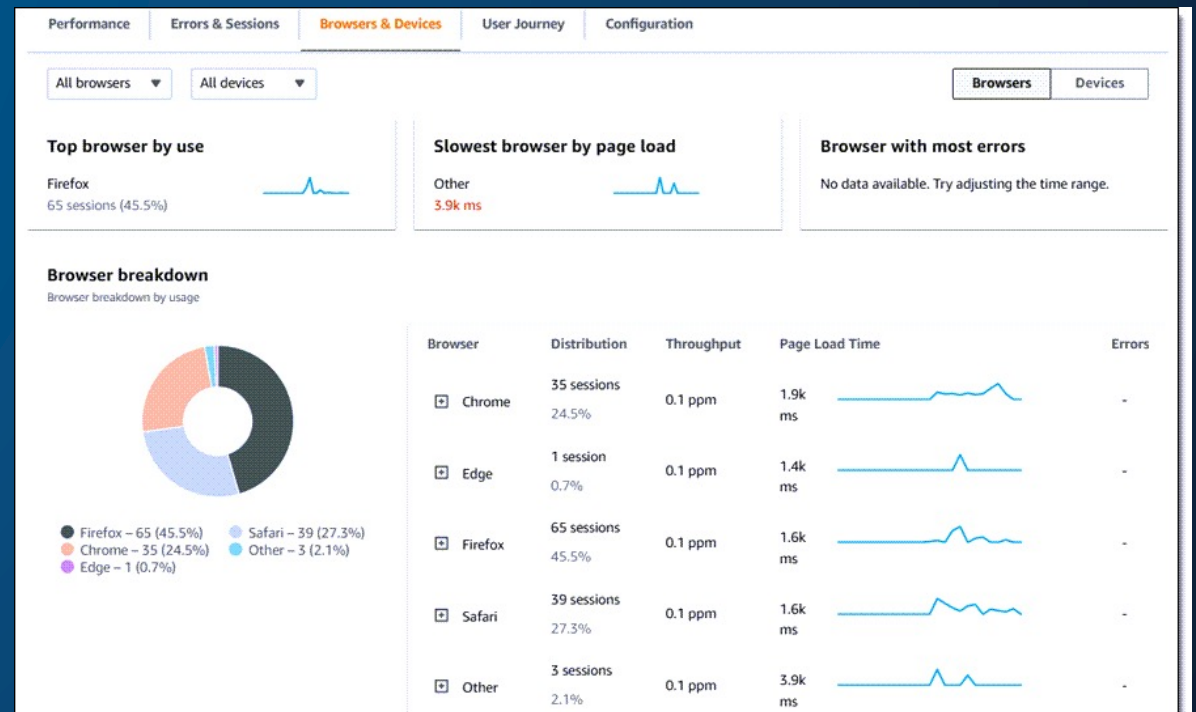


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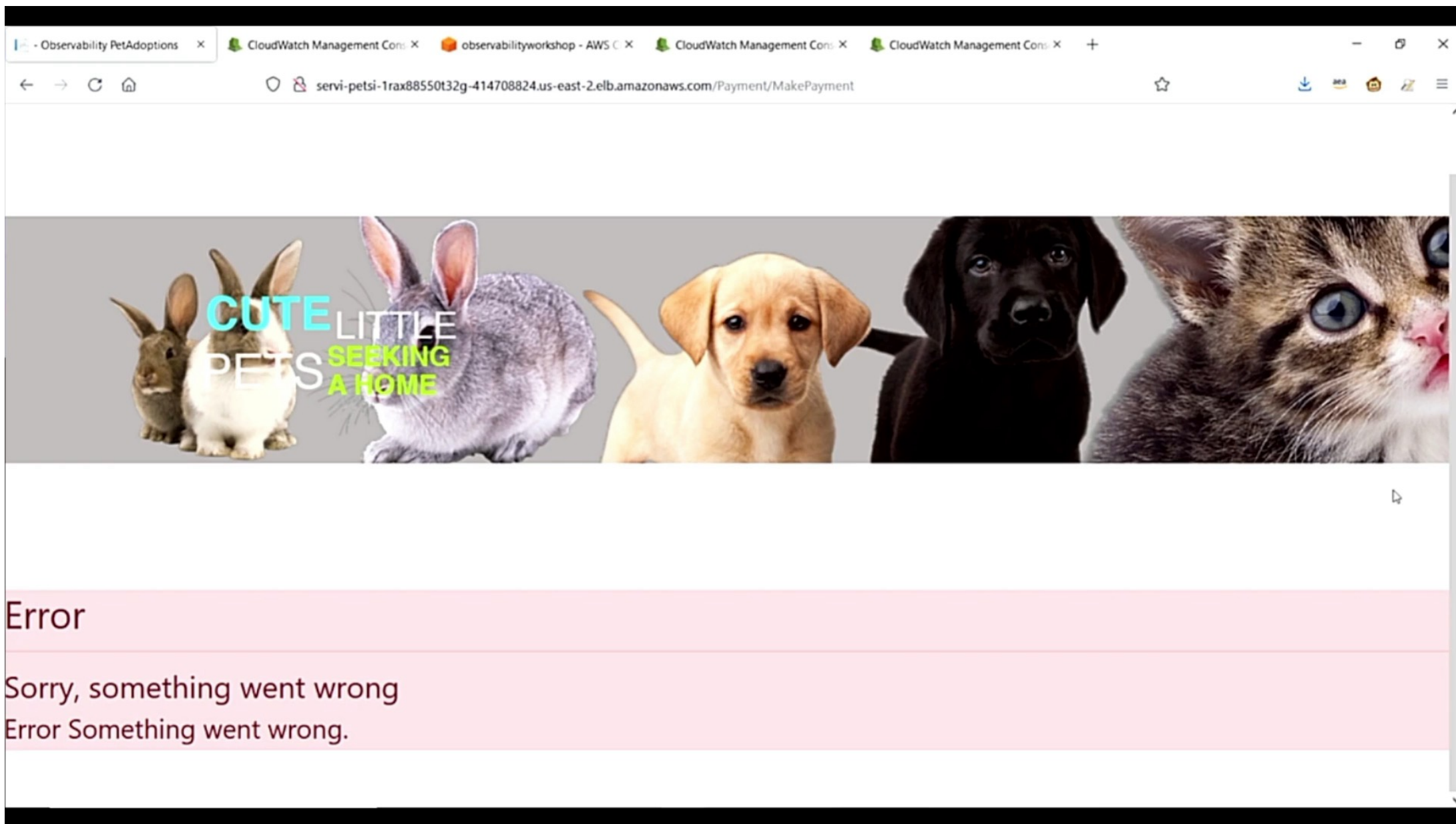
# CloudWatch Real User Monitoring (RUM)

Collect the metrics that give you the insights that will help you to identity, understand, and improve this experience.

Register your application by adding a code snippet of JavaScript to the header of each page

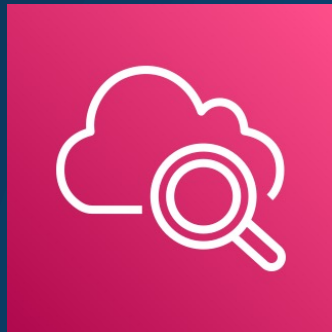


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# Amazon CloudWatch Evidently

INTRODUCE EXPERIMENTS AND FEATURE MANAGEMENT IN APPLICATION CODE

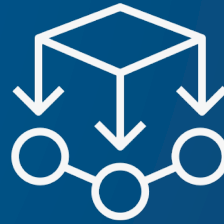


- Supports two primary use cases – Dark launches, aka feature flags and A/B testing
- AWS AppConfig and AWS Systems Manager also support feature flags, but CloudWatch Evidently includes templating and dashboards of your features
- Supports front end, back end, web or mobile and even ML applications
- 9 programming languages supported

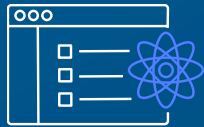


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# AWS Microservice Extractor for .NET



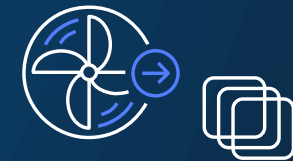
Assistive tool that reduces the effort to transform monolithic applications into microservices, which teams can develop and operate independently



Quickly identifies parts of the application to carve out as separate services



Facilitates refactoring planning based on domain-driven design



Assisted extraction of code into separate code projects



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# AWS SDKs

**New SDKs** for:



**Swift**



**Kotlin**



**Rust**

C++ Go Java JavaScript .NET Node.js PHP Python Ruby

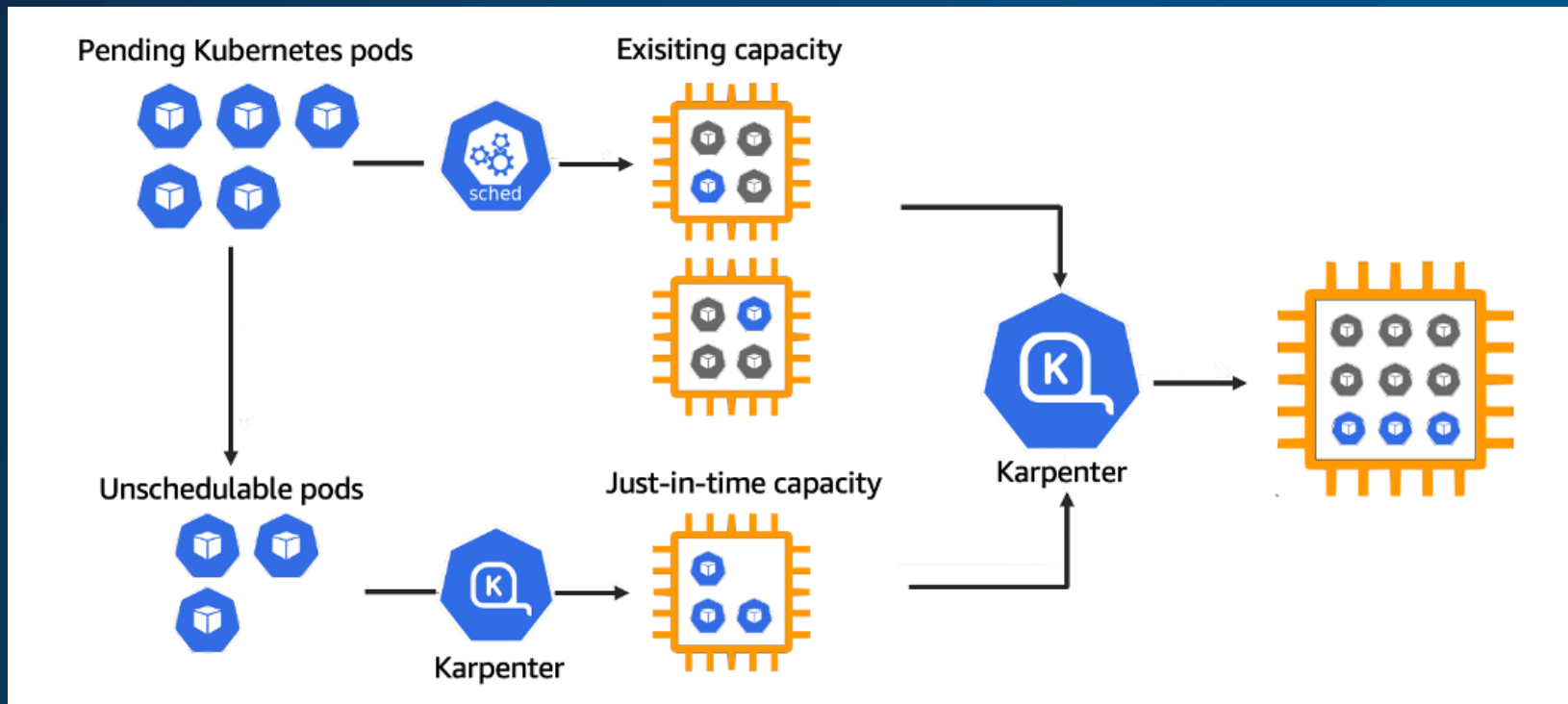


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# Karpenter

AWS BUILT KUBERNETES AUTOSCALER



# Amazon EKS – IPv6 support

- Pods are assigned only a globally routable IPv6 address
- Do not consume limited private IPv4 address space
- Communicate with IPv4 endpoints outside the cluster

# Amazon ECR – Pull Through Cache Repositories

ACCESS PUBLIC CONTAINER REGISTRIES THROUGH ECR

Public Repositories with no auth

Get the same improved performance, security and availability that ECR provides, but for public repositories

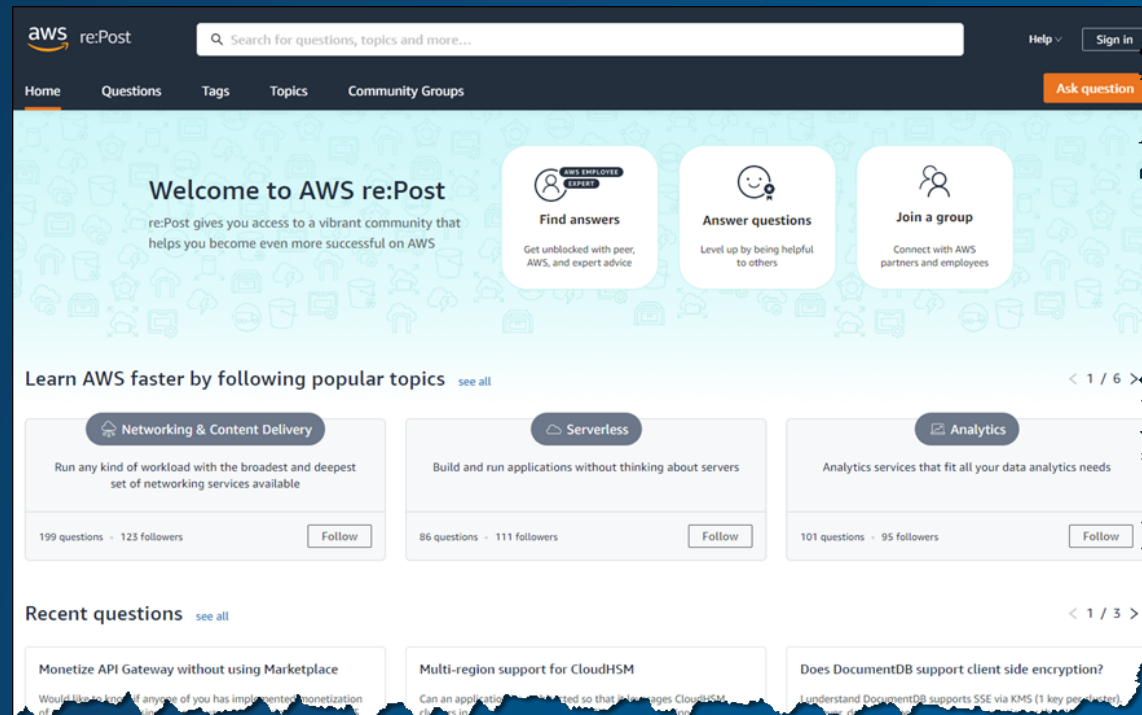


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# re:Post

- Community Q&A site
- Answers from AWS and customers
- Expert reviewed
- Free!



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# Serverless



# AWS Lambda: Event Filtering

- Filter incoming messages **before function invocation**
  - Same pattern matching rules as Amazon EventBridge
  - Define up to 5 patterns per event source mapping, up to 2048 characters each
  - Batching applied **after filtering**
- Reduce traffic to function, **reduce cost**
- Support for: Kinesis Data Streams, DynamoDB Streams, SQS

```
FleetTirePressureMapping:
  Type: AWS::Lambda::EventSourceMapping
  Properties:
    FunctionName: fleet-tire-pressure-evaluator
    BatchSize: 100
    StartingPosition: LATEST
    EventSourceArn:
      arn:aws:kinesis:...:stream/fleet-telemetry
  FilterCriteria:
    Filters:
      - Pattern: |
        {
          "data": {
            "tire_pressure": [{"numeric": ["<", 32]}]
          }
        }
```

# Amazon EventBridge: S3 Data Plane Notifications

Easily **build and deploy event-driven applications** without custom software

Act on new data in S3 **faster**, make changes to event-driven applications **without interruptions**, and **debug** by replaying past events

Only pay for **events that match a rule**



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### Define pattern

Build or customize an Event Pattern or set a Schedule to invoke Targets.

☒ **Event pattern** Info  
Build a pattern to match events

☐ **Schedule** Info  
Invoke your targets on a schedule

#### Event matching pattern

You can use pre-defined pattern provided by a service or create a custom pattern

☒ **Pre-defined pattern by service**

☐ Custom pattern

#### Service provider

AWS services or custom/partner services

AWS

#### Service name

The name of partner service selected as the event source

Simple Storage Service (S3)

#### Event type

The type of events as the source of the matching pattern

Amazon S3 Event Notification

ⓘ S3 Event Notifications will only match your rules if you have configured your S3 bucket(s) to publish event notifications to EventBridge. [Learn more.](#)

☐ Any event

☒ Specific event(s)

Object Created X

Object Deleted X

☒ Any bucket

☐ Specific bucket(s) by name

#### Event pattern

Copy Edit

```
1 {
2   "source": ["aws.s3"],
3   "detail-type": ["Object Created", "Object Deleted"]
4 }
```

#### Sample event(s)

Copy

```
1 {
2   "version": "0",
3   "id": "17793124-05d4-b198-2fde-7ededc63b103",
4   "detail-type": "Object Created",
5   "source": "aws.s3",
6   "account": "123456789012",
7   "time": "2021-11-12T00:00:00Z",
8   "region": "ca-central-1",
9   "resources": ["arn:aws:s3:::example-bucket"],
10  "detail": {
11    "version": "0",
12    "bucket": {
13      "name": "example-bucket"
14    },
15    "object": {
16      "key": "example-key",
17      "size": 5,
18      "etag": "b1946ac92492d2347c6235b4d2611184"
19    }
20  }
21 }
```

# AWS Lambda: Ephemeral Storage

Provision between **512 MB to 10,240 MB** ephemeral storage (/tmp)

- Provision in **1 MB increments**
- Available for both zip and container packaging

Customers charged for storage provisioned beyond 512 MB

- Default of 512 MB remains same, no additional charge

Storage is encrypted with an AWS managed key



**PRE-ANNOUNCEMENT**

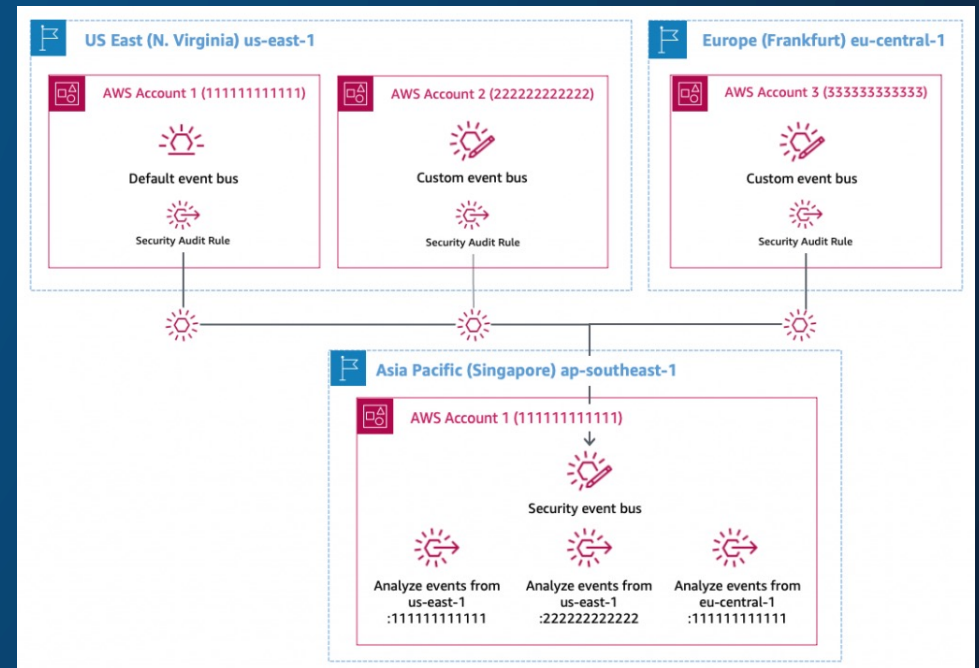
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# Amazon EventBridge cross-Region support

Amazon EventBridge expands support to all Regions, except for AWS GovCloud (US) and China

Consolidate events in one central Region from any Region

Centralize their events for **auditing** and **monitoring** purposes or replicate events from source to destinations Regions to help **synchronize data across Regions**



# AWS Step Functions: Integration with Athena Console

Manage Step Functions workflows from Athena console

View interactive diagrams of workflows that incorporate Athena

Launch sample projects

The screenshot displays the Amazon Athena console interface. On the left, a sidebar shows navigation options: 'Query editor', 'Workgroups', 'Data sources', and 'Related AWS resources'. Under 'Related AWS resources', 'Workflows' is highlighted with a 'New' tag, and it is noted as 'Powered by Step Functions'. Below this, there are two toggle switches: 'New Athena experience' (checked) and 'Enable compact mode' (unchecked).

The main content area is titled 'Amazon Athena > Workflows' and 'Jobs'. It features a section 'Create Athena jobs with Step Functions workflows' with an 'Info' link. Below this, a paragraph explains: 'AWS Step Functions helps you orchestrate your Amazon Athena queries using serverless workflows, called *state machines*. You can use Step Functions to handle errors, execute multiple queries, and query large datasets.'

Three workflow diagrams are presented, each with a 'Get started' button:

- Send query status:** Run a query, and send a notification on success or failure. The diagram shows a query icon branching into success and failure paths, each leading to a notification icon.
- Execute multiple queries:** Execute queries in sequence and parallel, with error handling and notifications. The diagram shows a query icon branching into three parallel query icons.
- Query large datasets:** Use a Glue Crawler to ingest data to S3, then submit a query with emailed status updates. The diagram shows a Glue Crawler icon, followed by an S3 bucket icon, then a query icon, and finally an email icon.

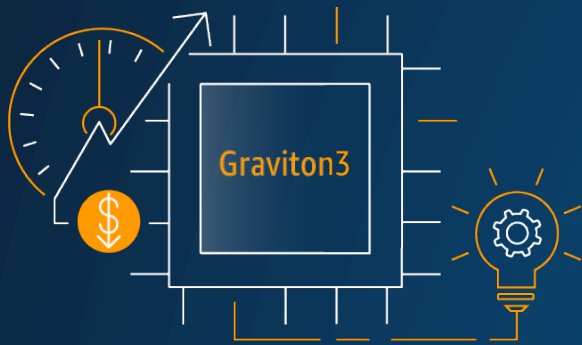
Below the workflow diagrams is a section for 'State machines'. It includes a 'Create state machine' button and a search bar labeled 'Find resources'. At the bottom, there is a table with columns: 'Name', 'Type', and 'Created'.

# Compute



# Announcing AWS Graviton3 and Amazon EC2 C7g instances

ENABLING THE BEST PRICE PERFORMANCE FOR WORKLOADS IN AMAZON EC2



Up to 25% better performance compared to Graviton2

Up to 2x higher floating-point performance, up to 2x faster cryptographic workload performance, and up to 3x better machine learning performance compared to Graviton2

First in the cloud to feature DDR5 memory

60% more energy efficient over comparable EC2 instances

C7g instances, available in preview, will provide the best price performance for compute-intensive workloads in Amazon EC2



**Preview**

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<https://aws.amazon.com/blogs/aws/join-the-preview-amazon-ec2-c7g-instances-powered-by-new-aws-graviton3-processors/>

# New: Amazon EC2 G5g instances powered by AWS Graviton2

THE FIRST GRAVITON-BASED INSTANCES TO FEATURE GPU ACCELERATION



Most cost-effective instances in Amazon EC2 for Android game streaming with up to 30% lower cost per stream per hour

Get significantly lower cost-per-inference for machine learning inference over x86-based GPU instances

Powered by AWS Graviton2 and featuring NVIDIA T4G Tensor Core GPUs



GA

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# Amazon EC2 Im4gn and Is4gen instances powered by AWS Graviton2

THE BEST PRICE PERFORMANCE FOR STORAGE-INTENSIVE WORKLOADS IN AMAZON EC2



Im4gn instances provide up to 40% better price performance compared to I3 instances

Is4gen instances offer the lowest cost per TB of SSD storage in Amazon EC2

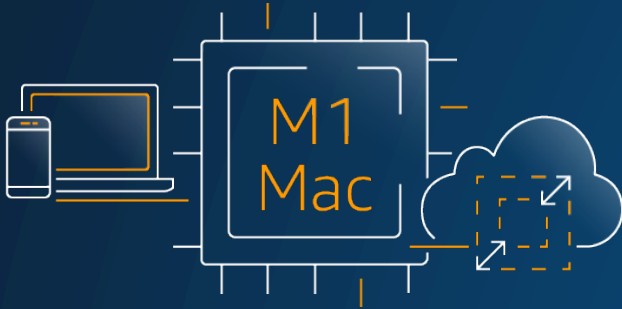
Both instances feature the new AWS Nitro SSDs, custom-designed by AWS to provide high I/O performance, low latency, and low latency variability for fast, predictable performance

# Local Zone Expansion



# Amazon EC2 M1 Mac instances

BETTER APPLICATION BUILD PERFORMANCE AND FASTER TESTS FOR MACOS



Enjoy up to 60% better price performance over x86-based Amazon EC2 Mac instances

Allows a native ARM64 macOS environment to develop, build, test, deploy, and run macOS applications within minutes

Experience the same elasticity, scalability, reliability, and security of AWS on-demand infrastructure



**Preview**

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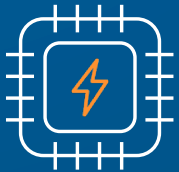
# Amazon EC2 M1 Mac instances



## Apple Silicon on AWS

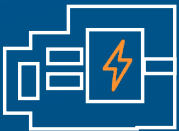
Apple M1 Mac mini

Built with AWS Nitro System



## Nitro Security Chip

Hardware root of trust



## Nitro Card

Network I/O and monitoring

**8**

4 performance cores  
4 efficiency cores

**16 GiB**

memory

**10 Gbps**

network  
throughput

**8 Gbps**

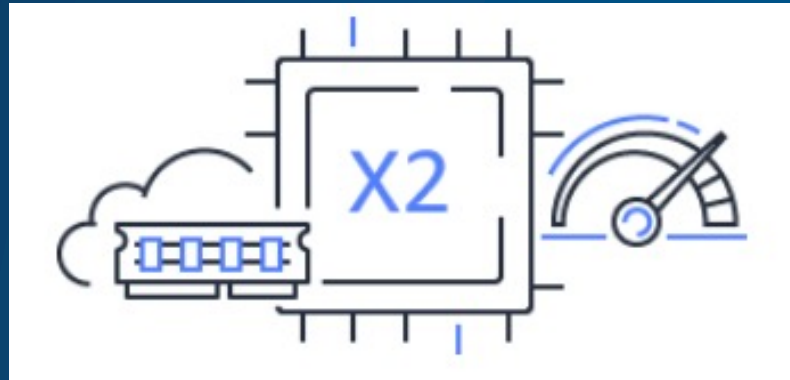
Amazon EBS  
bandwidth



**Preview**

# Amazon EC2 X2i instances – Coming Soon

- The new X2i instance family are the next generation of memory optimized instances designed for SAP HANA and other memory intensive workloads
- Up to **50%** higher compute price performance, 4x better network performance and 4x EBS throughput than the previous X1 instances
- X2iezn instances offers an all core turbo frequency of 4.5Ghz, the fastest in the cloud today



# AWS Compute Optimizer

RESOURCE EFFICIENCY METRICS TO ESTIMATE SAVINGS OPPORTUNITIES AND PERFORMANCE RISKS



Identify workload patterns

Recommend optimal AWS resources

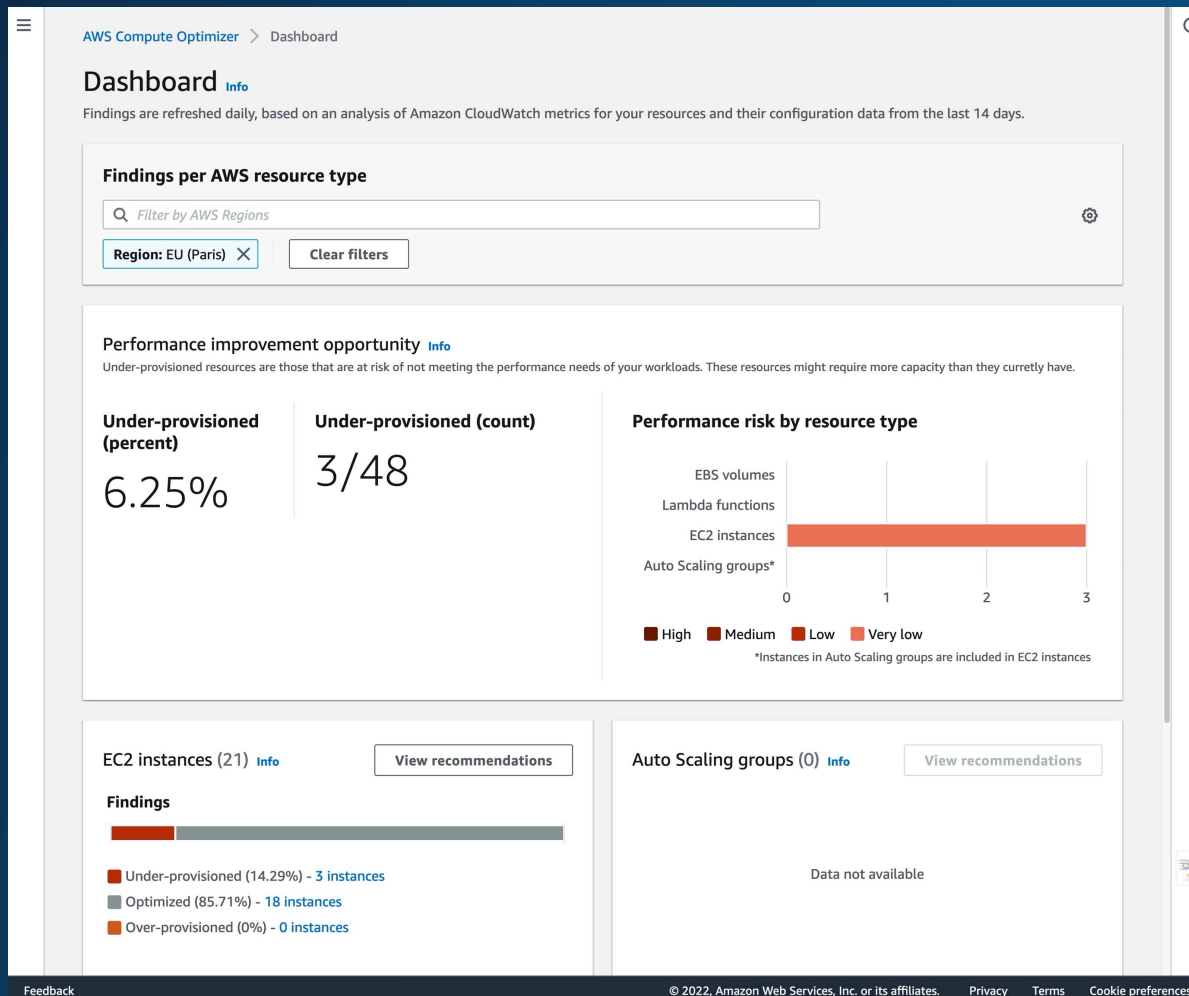
Rolls up to AWS Organizations

Outputs estimated savings



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# AWS Compute Optimizer



# Amazon CloudWatch Metrics Insights

IDENTIFY TRENDS AND PATTERNS ACROSS MILLIONS OF OPERATIONAL METRICS IN REAL TIME USING SQL

Gain better visibility on your infrastructure and large scale application

- Create powerful visualisations that auto-update
- On-the-fly metric aggregation
- SQL or visual query editor
- Use for EC2 or hybrid environments



SCAN ME

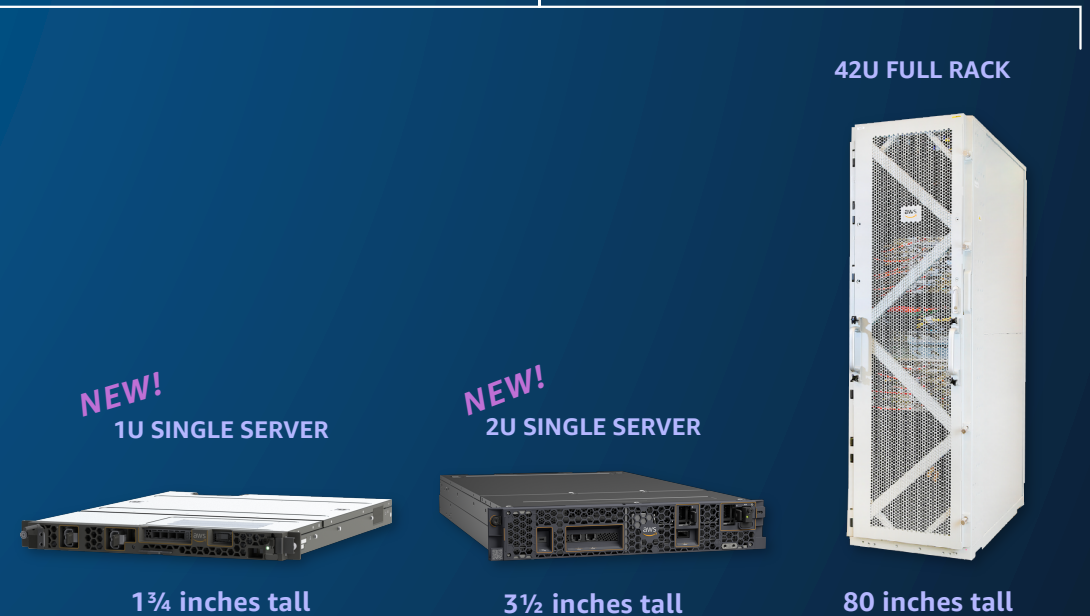


Preview

# Outposts Servers

- Use the the same AWS infrastructure, services, APIs, and tools on premises
- 1RU (AWS Graviton2 processor) or 2RU (Intel processor)
- Run AWS services locally, including Amazon EC2, Amazon ECS, and edge services like AWS IoT Greengrass
- Simple device installation by either your own personnel or a third-party vendor

## AWS OUTPOSTS FAMILY



# Outposts Region Expansion

- Costa Rica
- Ecuador
- Morocco
- Nigeria
- Vietnam



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# AWS Managed Microsoft AD Metrics

OPTIMISE DIRECTORY SCALING DECISION USING CLOUDWATCH

- Domain controller and directory utilization metrics in Amazon CloudWatch
- Analyze these utilization metrics to quantify your average and peak load times
- Use these to Define the number of domain controllers to meet your performance, resilience, and cost requirements.

Metrics (2) Info

Graph with SQL

Graph search

N. Virginia

All > Directory Service > AWS Managed Microsoft AD

Search for any metric, dimension or resource id

"Directory ID"="d-9067109236"

"Metric Category"="Processor"

<input type="checkbox"/>	Directory ID (2)	Domain Controller IP	Metric Category	Metric Name
<input type="checkbox"/>	d-9067109236	172.31.12.20	Processor	% Processor Time
<input type="checkbox"/>	d-9067109236	172.31.57.149	Processor	% Processor Time

# Workspaces Web

- Enable end-users to securely access web-based applications
- End devices only receive pixels and send keystrokes/mouse
- Corporate data stays within your control
- Each Workspace is created on demand
  - Then destroyed after the session is complete



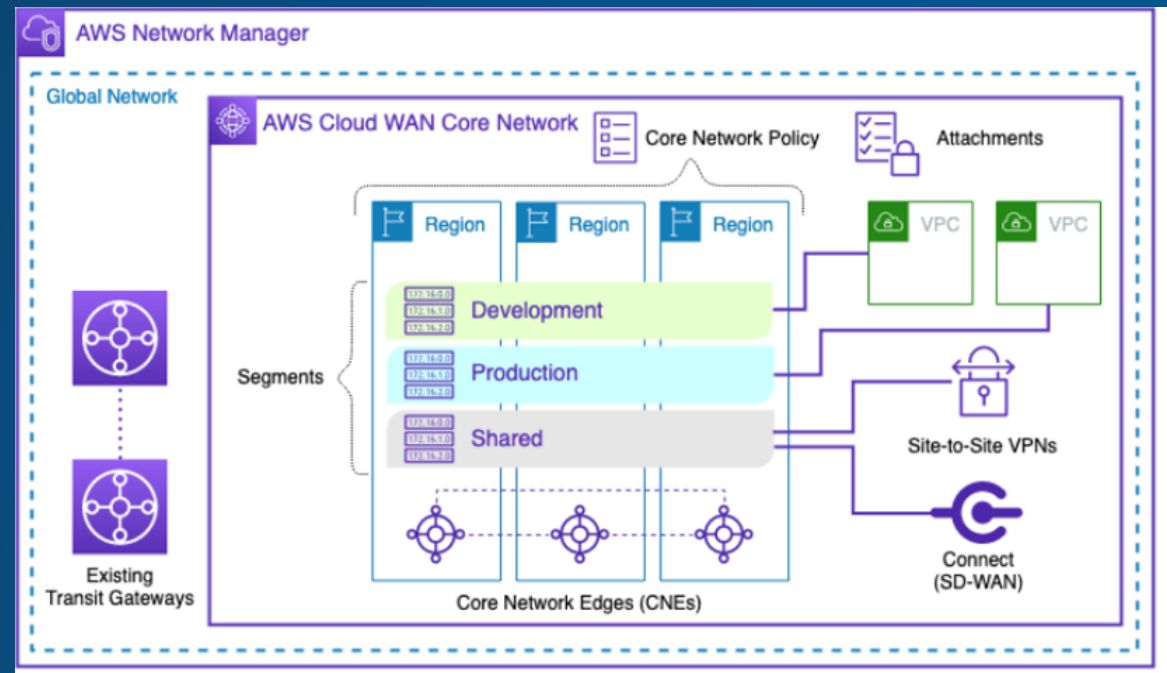
GA

# Networking



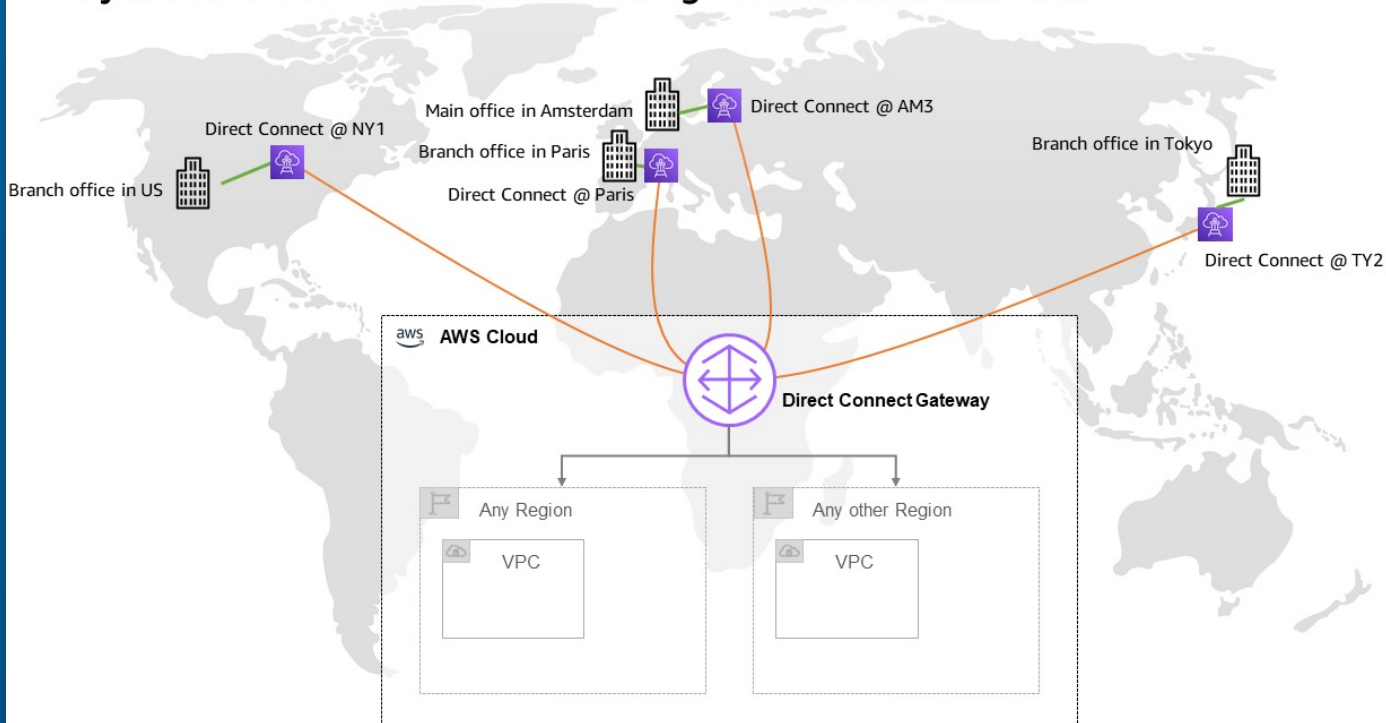
# Cloud WAN

- Single point of control
- Opinionated service
- Centralised dashboard and monitoring
- Built-in automation for new attachments
- Partner integration



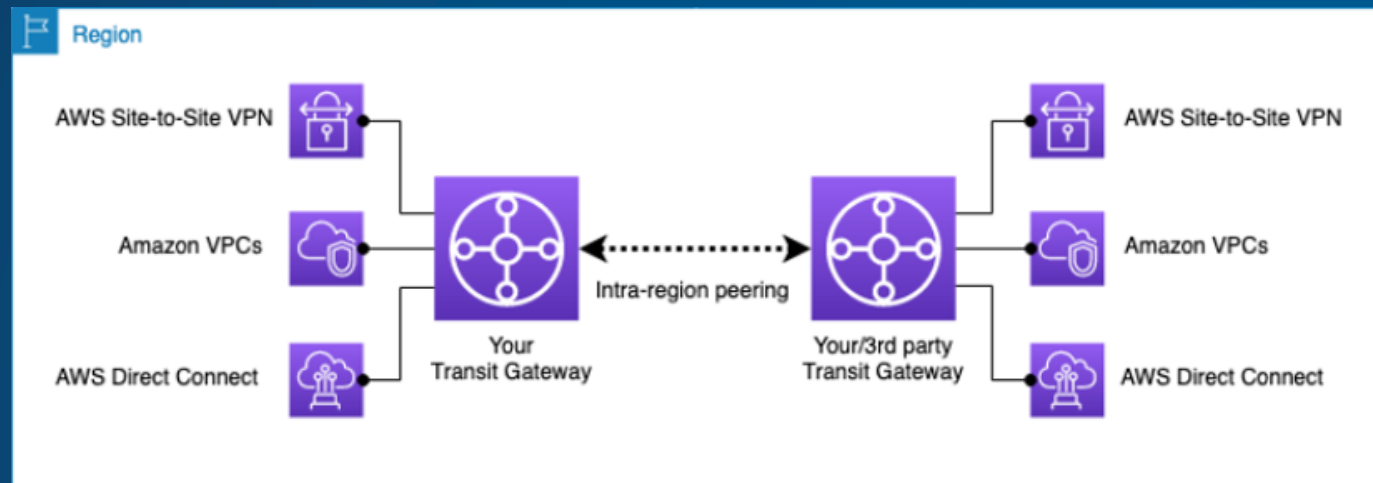
# Direct Connect SiteLink

Link your Direct Connect locations using the new **SiteLink** feature



# Transit Gateway Intra-Region Peering

- Transit Gateway launch: 2018
- Inter-region peering: 2020
- Intra-region peering: 2021



# IP Address Management

Networking & Content Delivery

## Amazon VPC IP Address Manager

### Managed IP address management service

Amazon VPC IP Address Manager (IPAM) makes it easier to manage and monitor IP addresses at scale across AWS resources

#### Get started

You can use IPAM to monitor IP space across your entire AWS Organization, or for a single account. Configure your settings to get started, and then create an IPAM.

Create IPAM

Settings

### How it works



### Benefits and features



Allocate IP addresses at scale

Automate IP address allocation across multiple accounts and VPCs based on



Troubleshoot your network

Quickly identify if connectivity issues are due to IP address configuration

Resources [↗](#)

[Pricing](#)



GA

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# VPC Network Access Analyzer

- Define network scope (access pattern)
- Evaluate network interface using scope
- Automated reasoning tool – no network scan required
- Use as part of a security review or CI/CD deployment pipeline



GA

VPC > Network Access Scopes > nis-070dc1d37ca315e86

nis-070dc1d37ca315e86 / AWS-VPC-Ingress (Amazon created)

Summary Info Actions Analyze

Network Access Scope ID  
nis-070dc1d37ca315e86

Name  
AWS-VPC-Ingress (Amazon created)

Description  
Identify ingress paths into your VPCs from Internet Gateways, Peering Connections, VPC Service Endpoints, VPN and Transit Gateways.

Network Access Scope definition

Latest analysis Past analyses Tags

Analysis details

Analysis ID  
nisa-02f2848b0a0a0e9ba

Last analysis date  
November 25, 2021, 10:43 (UTC-08:00)

Last analysis result  
Findings detected  
Limited findings are displayed info

Analysis status  
Complete

Network Interfaces analyzed  
28

Filter findings by category Info

This chart shows the number of occurrences of various resources in the findings. Select resource(s) to filter for findings containing the resource.

Legend:

- Security Groups (234)
- Transit Gateway Attachments (111)
- Network Interfaces (100)
- Application Load Balancers (42)
- Transit Gateway RouteTables (30)
- VPC Peering Connections (28)
- Classic Load Balancers (25)
- Internet Gateways (12)
- Network ACLs (171)
- Route Tables (76)

Findings (100) Info

Filter findings by resource type or specific resource

Source	Destination	Path details
igw-0db9e5e51caa59ba...	eni-0096ad03d76e70c75...	igw-SG-eni
igw-0db9e5e51caa59ba...	eni-01972fa63f872a4a0...	igw-SG-eni
igw-0db9e5e51caa59ba...	eni-00e6fe2e80e5db629...	igw-SG-eni
tgw-attach-01241698f82...	eni-00e6fe2e80e5db629...	tgw-SG-eni
tgw-attach-01241698f82...	eni-00e6fe2e80e5db629...	tgw-SG-eni
tgw-attach-0a3e70f3d92...	eni-00e6fe2e80e5db629...	tgw-SG-eni
tgw-attach-0a3e70f3d92...	eni-0096ad03d76e70c75...	tgw-SG-eni
tgw-attach-0a3e70f3d92...	eni-00e6fe2e80e5db629...	tgw-SG-eni
tgw-attach-0a3e70f3d92...	eni-030294b88ef014fab...	tgw-SG-eni
tgw-attach-01241698f82...	eni-030294b88ef014fab...	tgw-SG-eni

Select a path from the findings table.

# Private 5G

- Thousands of devices
  - Low latency
  - High bandwidth
- AWS provides:
  - Cell radio units
  - Servers
  - 5G core and Radio Access Network (RAN) software
  - SIM toolkit



**Preview**

# Data Out Transfer Price Reduction

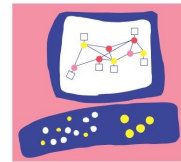
- CloudFront
  - 1TB of data transfer out
  - 10M HTTP/HTTPS requests
  - 2M CloudFront Functions invocations
- EC2, S3, Load balancers, etc. (non-CloudFront)
  - 100GB of data transfer out
- Per month
- Perpetual



GA

# Partner-Managed Firewall Offering

- Powered by Gateway Load Balancer
- Coming in 2022



**Check Point**<sup>®</sup>  
SOFTWARE TECHNOLOGIES LTD.



**TREND**<sup>™</sup>  
**M I C R O**



**Preview**

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# Storage



# S3 Intelligent-Tiering: Archive Instant Access tier

AUTOMATICALLY SAVE UP TO 68% ON STORAGE COSTS, WITH MILLISECONDS ACCESS



Milliseconds access

# Amazon S3 Price Reduction

REDUCED STORAGE PRICES BY UP TO 31% IN THREE S3 STORAGE CLASSES



S3 Standard-IA



S3 One Zone-IA

---

**Up to 31% Storage Price Reduction  
(SYD -27%)**



S3 Glacier Flexible Retrieval  
(former S3 Glacier)

---

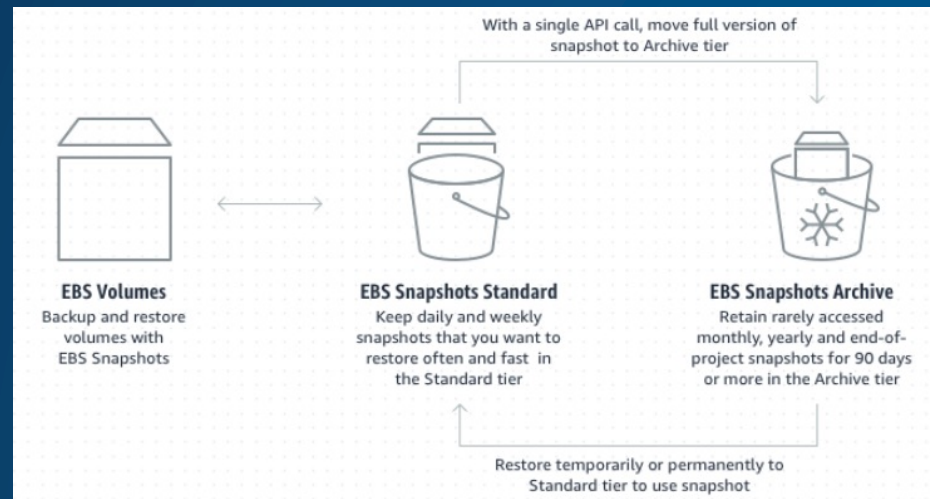
**Free Bulk Retrieval  
10% Storage Price Reduction**



GA

# EBS Snapshot Archive

- New storage tier for long term retention of EBS Snapshots
- Archive full point in time snapshots, perfect for snapshots that need to be stored for compliance or regulatory needs
- Up to 75% savings over storage in the standard tier



# Recycle Bin for EBS Snapshots

QUICK RECOVERY OF DELETED SNAPSHOTS



REDUCE THE RISK OF  
DATA LOSS FROM  
ACCIDENTAL  
DELETIONS

Automatically keep deleted snapshots for a retention period that you specify

---

Predefined rules specify retention periods for all snapshots or specific "tagged" snapshots

---

Recover deleted snapshots before your retention period expires

---

Restrict access to Recycle Bin Rules and resources using AWS Identity and Access Management (IAM) roles



GA

# AWS Snowball with Tape Gateway

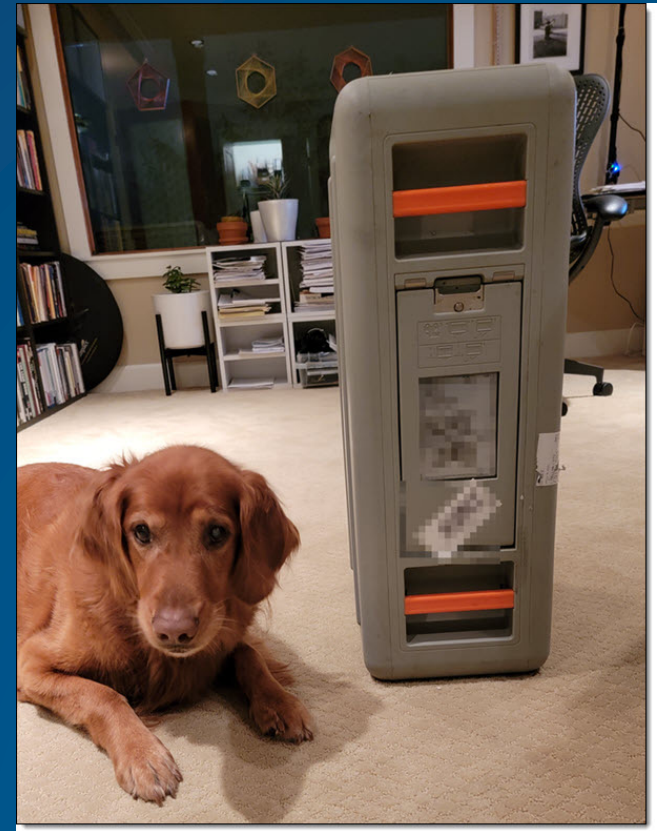
MOVE PETABYTES OF PHYSICAL TAPE DATA TO THE CLOUD

Secure, offline tape data migration capability running on AWS edge computing devices \*\*\*

Migrate petabytes of data stored on physical tapes to AWS without changing your existing tape-based backup workflows.



GA



\*\*\* dog for scale

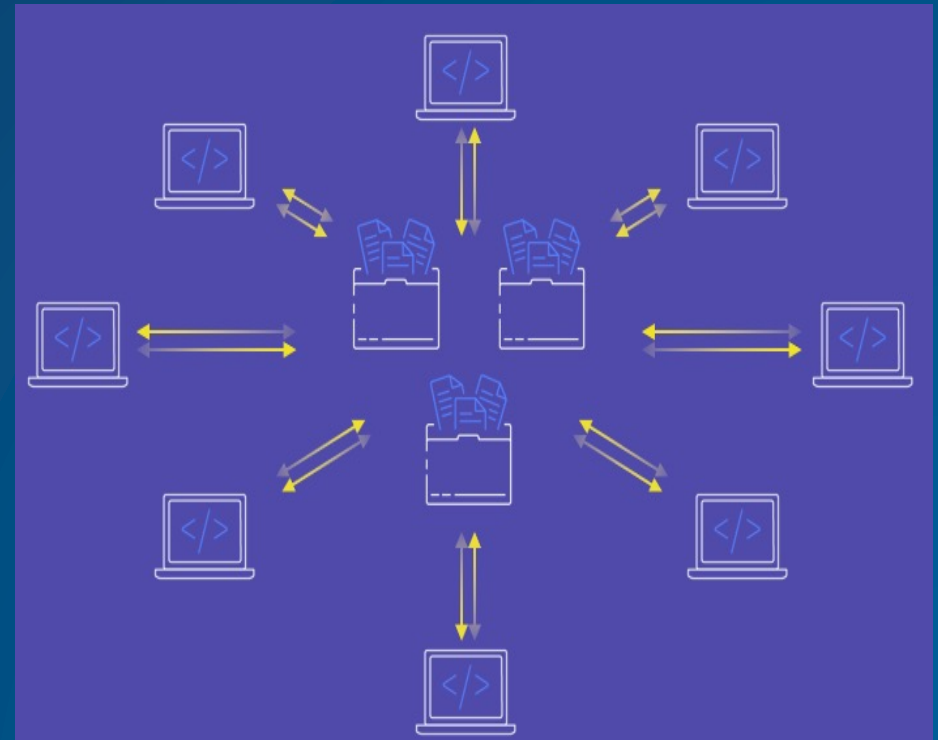
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# Next generation Amazon FSx for Lustre file system

PERFORMANCE, PRICE, FEATURES

## Service Improvements for 2021

- 1GB per second per terabyte
- Drive upto 400 Gbps on EC2 instances
- 60% cost/throughput reduction
- Automatic Amazon S3 integration
- Compression and Backups



# Amazon FSx for OpenZFS

FULLY MANAGED HIGH-PERFORMANCE FILE STORAGE POWERED BY OPENZFS

Launch, run, and scale fully managed file systems on AWS that replace the ZFS or other Linux-based file servers.



GA

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# AWS Backup support for Amazon S3 and VMware workloads



**Amazon S3 (Preview)**

**vmware®**

Centralize data protection across 12 stateful AWS compute, storage, and database services alongside hybrid workloads like VMware

---

Automate backup and restore with policy-driven protection across Regions and accounts

---

Govern data protection compliance in real time with auditor-ready reports

---

Use immutable backup vaults for protection against accidental and ransomware deletions



**Preview**

# Security



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# Introducing the new Amazon Inspector

Amazon Inspector is an automated vulnerability management service that continually scans workloads for software vulnerabilities and unintended network exposure



# Amazon Inspector benefits



## Scale with simplified management

One-click activation for all accounts within the AWS Organization

SSM Agent integration



## Gain centralized visibility

AWS Organizations integration

Environment coverage details

Consolidated findings across accounts and resources



## Automate discovery and continual scanning

Automated discovery of resources

Continual vulnerability and network reachability scanning

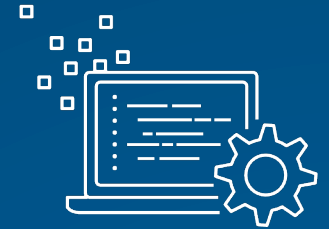


## Prioritize with contextualized scoring

Contextualized Amazon Inspector risk score

Prioritized findings

Automated triage and analysis



## Automate workflows and take actions

Management APIs

Detailed findings in Amazon EventBridge

AWS Security Hub integration



GA

# AWS Control Tower capabilities



**Centrally provision  
resources in a multi-  
account environment**



**Share resources and  
control access to  
accounts, regions,  
and services**

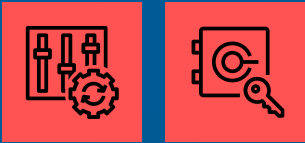


**Optimize costs and  
identify cost-saving  
measures**



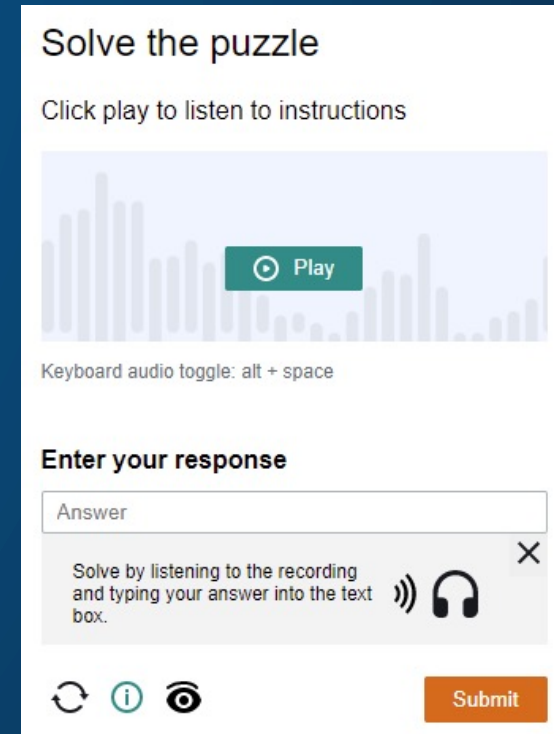
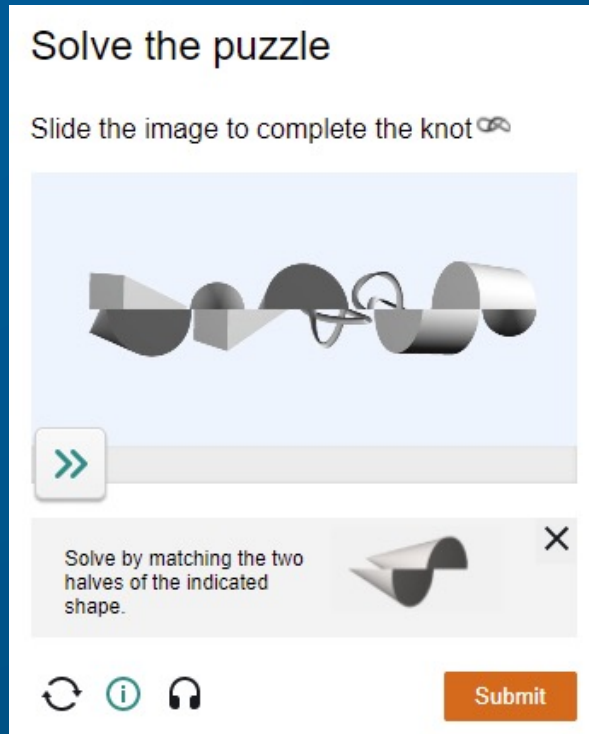
**Seamlessly  
integrate with AWS  
security services**

# AWS Control Tower Data Residency Controls



- Limit customer data within geographic locations
- Reduce complexity
- Keep your customer data compliant
- Use purpose-built guardrails
- Set up in minutes

# AWS WAF adds support for Captcha



# AWS WAF adds support for Captcha

WAF & Shield

▼ AWS WAF

Getting started

Web ACLs

Bot Control

IP sets

Regex pattern sets

Rule groups

AWS Marketplace

Switch to AWS WAF Classic

► AWS Shield

► AWS Firewall Manager

Security, Identity, and Compliance

## AWS WAF

### Protect your web applications from common web exploits

AWS WAF is a web application firewall service that lets you monitor web requests that are forwarded to an Amazon API Gateway API, an Amazon CloudFront distribution, or an Application Load Balancer. You can protect those resources based on conditions that you specify, such as the IP addresses that the requests originate from.

Get started with AWS WAF

Set up protection for your Amazon CloudFront distributions, Application Load Balancers, and/or Amazon API Gateway stages in just under 5 minutes.

Create web ACL

Pricing (US)

\$5.00 per web ACL per month (prorated hourly)

\$1.00 per rule per month (prorated hourly)

\$0.60 per million requests processed

View pricing

More resources

AWS WAF Developer Guide

AWS WAF Security Automations

FAQ

Forum

What's new

Feature	New AWS WAF	AWS WAF Classic
AWS managed rule groups	☑	-
AWS Marketplace seller managed rule groups	☑	☑
Number of rules per web ACL	Up to the web ACL capacity limit	10
Number of rule groups per web ACL	Up to the web ACL capacity limit	2

A web ACL has a capacity of 1,500. You can add hundreds of rules and

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Feedback

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# AWS WAF automatic application layer DDoS mitigation

Reduce time to mitigation and respond to application availability threats immediately

- ✓ AWS WAF rules are automatically created to mitigate detected DDoS events
- ✓ AWS WAF rules are tested against normal traffic to minimize false positives
- ✓ AWS WAF rules can be created in Count mode to observe effectiveness before deploying in Block mode
- ✓ AWS WAF rules are automatically removed after an event subsides
- ✓ No manual intervention required



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# Migration



# AWS Mainframe Modernization

AWS Mainframe Modernization is an elastic mainframe service, run time environment, and set of development tools for migrating and modernizing mainframe and legacy workloads.



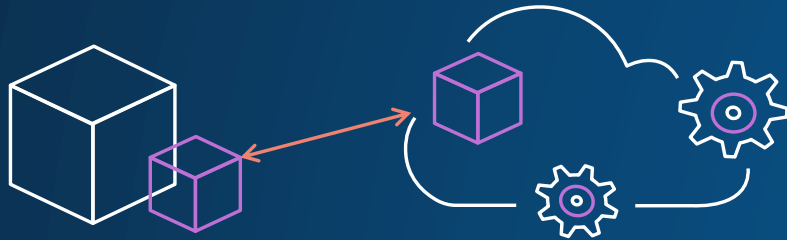
## Preview

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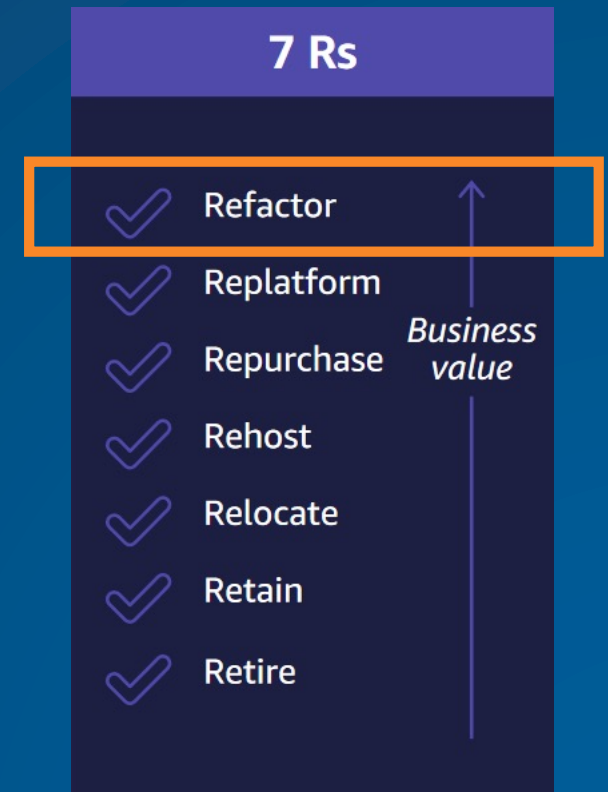
# AWS Migration Hub Refactor Spaces

THE ONE DESTINATION FOR MIGRATION AND MODERNIZATION

The new starting point for incremental app refactor that makes it easy to manage the refactor process while operating in production.



Preview



# Architecture



# The Pillars of AWS Well-Architected



Operational  
excellence



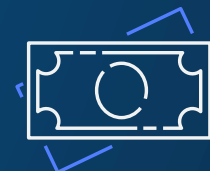
Security



Reliability



Performance  
efficiency



Cost  
optimization



Sustainability



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# Well Architected Lenses

EXTEND THE GUIDANCE OFFERED BY AWS WELL-ARCHITECTED TO SPECIFIC INDUSTRY AND TECHNOLOGY DOMAINS

WHITEPAPER

**Management and Governance Lens – AWS Well-Architected**

Provides prescriptive guidance on how to manage your AWS workloads so that you have environments that are migration-ready, scale-ready, and cost-efficient.

[HTML | Kindle](#)

November 2021

WHITEPAPER

**Hybrid Networking Lens – AWS Well-Architected**

Learn how to design, deploy, and architect hybrid networking for workloads in the AWS Cloud.

[HTML | Kindle](#)

Networking & Content Delivery | Well-Architected Framework

November 2021

WHITEPAPER

**Games Industry Lens – AWS Well-Architected**

Learn best practices for designing, architecting, and deploying your games workloads on AWS.

[HTML | Kindle](#)

Networking & Content Delivery | Games Tech | Well-Architected Framework

November 2021

WHITEPAPER

**Data Analytics Lens – AWS Well-Architected**

This paper describes the AWS Well-Architected Data Analytics Lens, a collection of customer-proven best practices for designing well-architected analytics workloads.

[HTML | Kindle](#)

Analytics | Well-Architected Framework

October 2021

WHITEPAPER

**SAP Lens – AWS Well-Architected**

This paper is a collection of customer-proven design principles and best practices for ensuring SAP workloads on AWS are well-architected.

[HTML | Kindle](#)

Application Integration | Well-Architected Framework

October 2021

WHITEPAPER

**Machine Learning Lens – AWS Well-Architected**

Best practices for architecting your machine learning (ML) workloads on AWS.

[HTML | Kindle](#)

Machine Learning & AI | Well-Architected Framework

October 2021

1

2

3

>

<https://aws.amazon.com/architecture/well-architected>



GA

# Analytics



# Data Exchange for APIs



RESTful or GraphQL API calls directly to AWS Data Exchange

Use the AWS SDK in the programming language of your choice.

Manage API access centrally with AWS Identity and Access Management (IAM)

# AWS Lake Formation Governed Tables

A **new storage API** to simplify how data is ingested, stored, and managed, together with row-level security to protect your data



## Granular access control

Define row- and cell-level access policies on both governed and traditional Amazon S3 tables. Manage and consistently enforce policies in a single place.



## Governed tables

A new type of Amazon S3 table that allows you to ingest and manage data at scale, easily and reliably.



## Storage optimization

Automatically optimize how data is stored to improve query performance as data volume increases.

# New storage API that solves for those key challenges

## Fine-grained access controls



Define column-, **row-**, and **cell-level permissions** in a single place and enforce them consistently across AWS native and third-party tools

## Simple to ingest and manage data



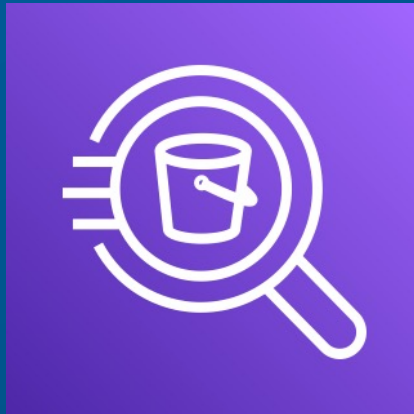
Ingest streaming and batch data with **ACID transactions**  
Automatic small file compaction and data management

## Integration APIs



**Unified data access APIs** make it easy to securely integrate your applications and tools with data in the data lake

# Amazon Athena ACID transactions



Write, delete, update, and time travel operations

Enables concurrent users to make row-level modifications to Amazon S3 data

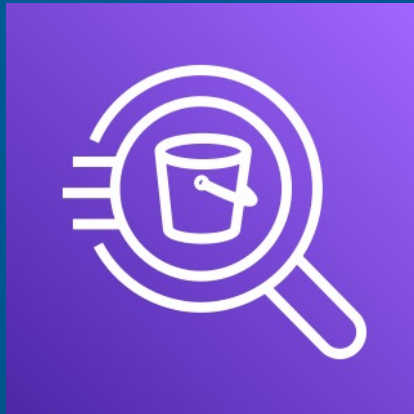
Use Athena's console, API, and ODBC and JDBC drivers

Use ACID transactions either on Lake Formation Governed tables, or using the Apache Iceberg table format



**Preview**

# Amazon Athena Engine Upgrade



Queries up to 3x faster

Up to 70% cost savings



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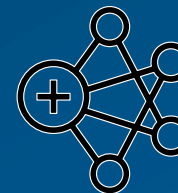
NEW

# Serverless and on-demand analytics

PREVIEW AVAILABLE TODAY



AMAZON REDSHIFT  
SERVERLESS



AMAZON EMR  
SERVERLESS



AMAZON MSK  
SERVERLESS



AMAZON KINESIS  
ON-DEMAND

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# Amazon Redshift Serverless – Easy Start Experience



**No compromises**

SQL features

Performance at scale

Scalability

Analyze all your data

Security

**Easy to get started**



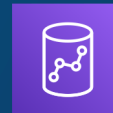
## Developer and business analyst

Activate Amazon Redshift Serverless for your AWS account



## BI tool

Connect from your favorite BI tool or Amazon Redshift Query Editor



## Amazon Redshift

Load data seamlessly and Amazon Redshift executes queries by automatically provisioning capacity



## Pay

Pay for compute and storage used during analysis



**Preview**

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# Amazon EMR Serverless



## Simple to use

Easily run petabyte-scale data analytics in the cloud without managing, tuning, optimizing, securing, and operating clusters



## Fast and highly available

Quickly run large-scale applications that use open-source frameworks of your choice, including Spark, Hive, and Presto



## Highly scalable

Automatically scale resources up and down as needed based on the changing requirements of your application



## Cost effective

Pay only for the resources you use for data analytics at scale

# Redshift Materialized views auto refresh & query rewrite

SPEED UP QUERY PERFORMANCE BY ORDERS OF MAGNITUDE WITH PRECOMPUTED RESULTS

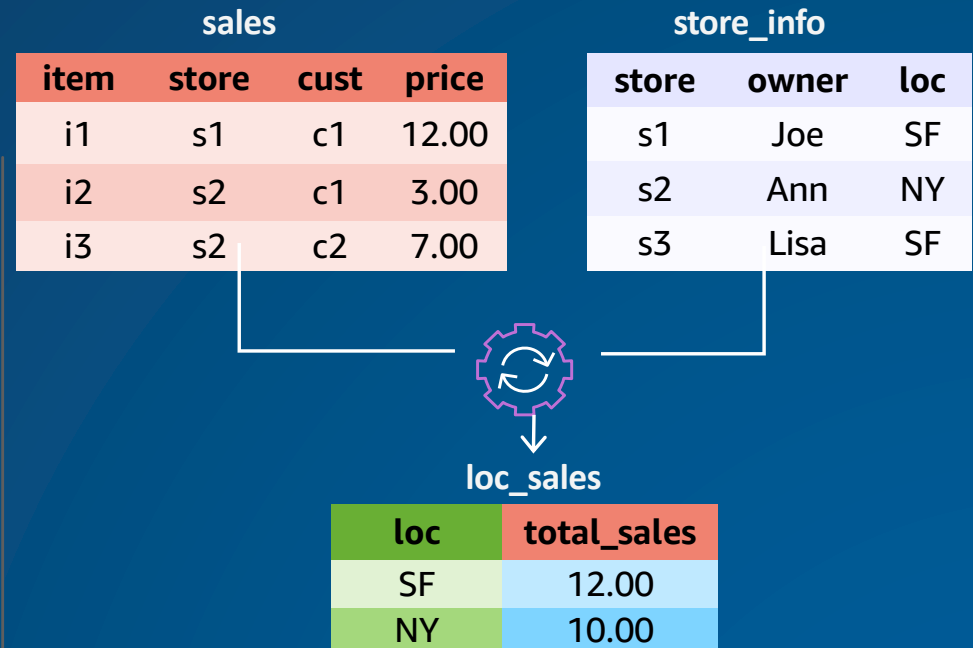
Simplify and accelerate iterative and predictable workloads, such as ETL, BI/dashboarding queries

MVs can be based on one or more Amazon Redshift tables or external tables (Spectrum, Federated)

Efficient incremental maintenance

Scheduled, automatic, or manually timed refresh

Amazon Redshift auto query rewrite optimizes queries by replacing native tables with materialized views



"The Amazon Redshift materialized view auto query rewrite feature reduced dashboard load times from 8 minutes to just 500 ms. The best part is that this is completely transparent for Tableau and the business user."

—Arman Nasrollahi, Home24



Preview

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# Amazon MSK Serverless



Easily run Apache Kafka clusters without rightsizing cluster capacity

Instantly scale I/O without worrying about scaling capacity up and down or reassigning partitions

Pay for the data volume you stream and retain



**Preview**

# Amazon Kinesis Data Streams on demand



## Simple to use

Simplify streaming data processing by eliminating capacity management

## Flexible scaling

Automatically scale capacity in response to changing data volumes

## Automated high availability

Provide built-in availability and fault tolerance by default

## Lower your costs

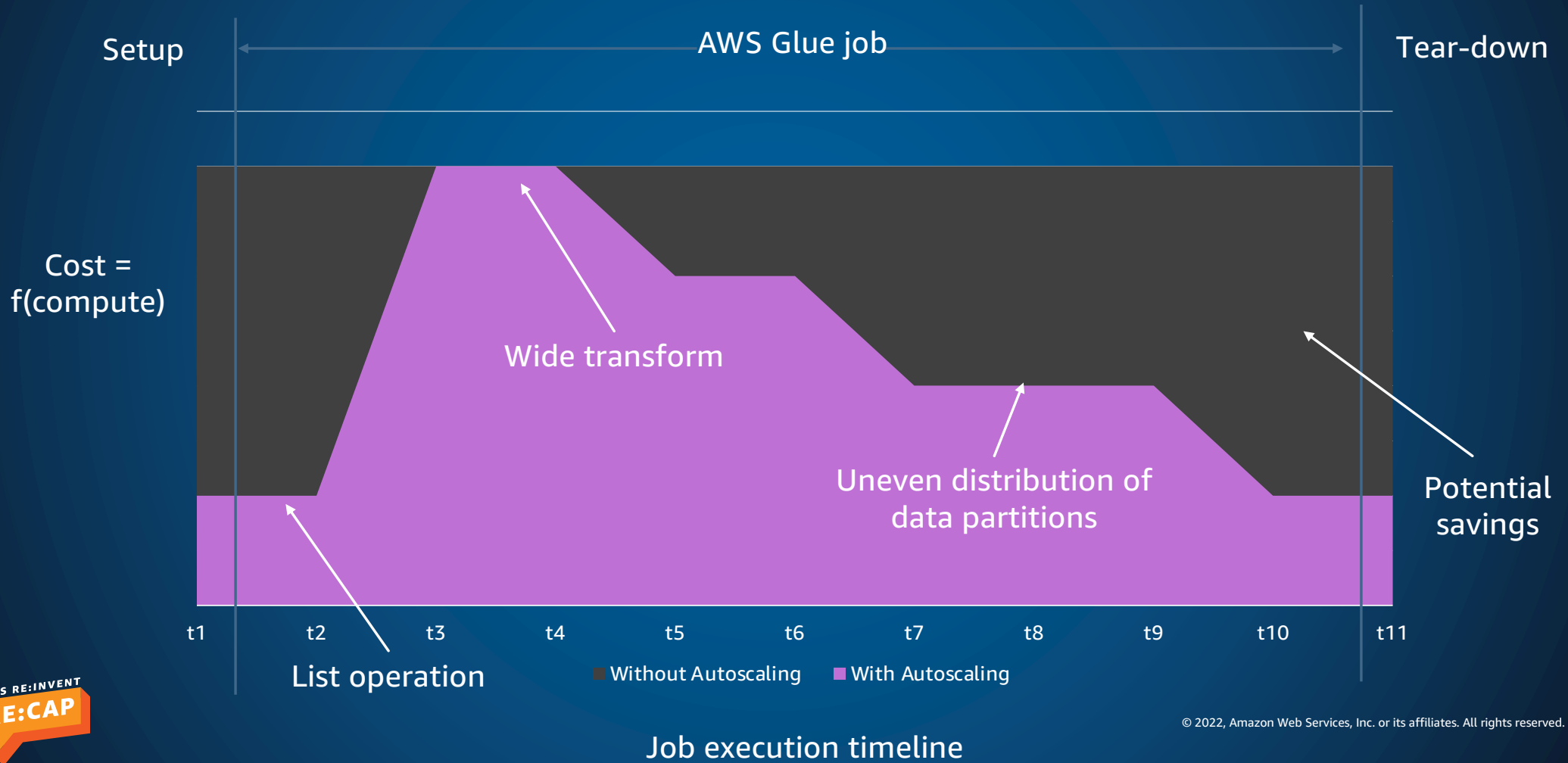
Pay per gigabyte of data written, read, and stored



GA

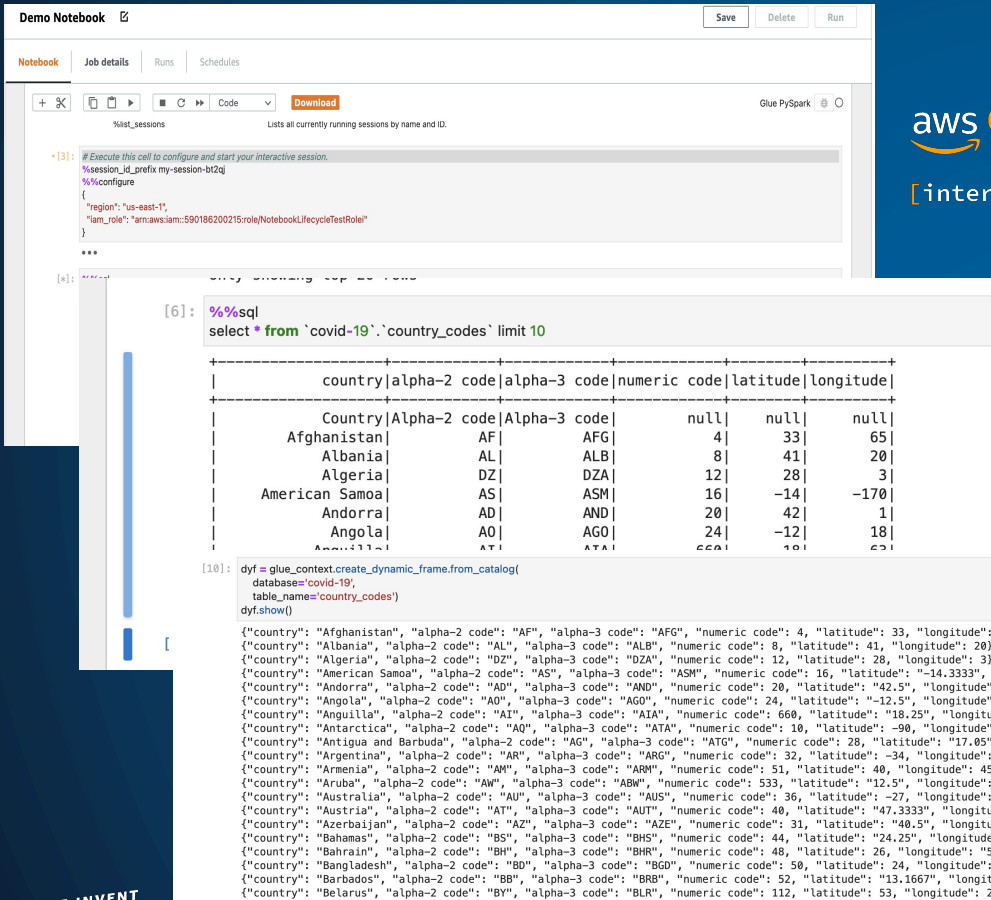
# AWS Glue Autoscaling

Preview



# AWS Glue Studio Notebook (Preview)

Preview



The screenshot shows the AWS Glue Studio Notebook interface. At the top, there's a 'Demo Notebook' header with 'Save', 'Delete', and 'Run' buttons. Below the header, there are tabs for 'Notebook', 'Job details', 'Runs', and 'Schedules'. The main area displays a notebook with a code cell containing a SQL query and a PySpark cell. The SQL query is:

```
[6]: %%sql
select * from 'covid-19'.country_codes limit 10
```

The results of the SQL query are displayed in a table format:

country	alpha-2 code	alpha-3 code	numeric code	latitude	longitude
Afghanistan	AF	AFG	4	33	65
Albania	AL	ALB	8	41	20
Algeria	DZ	DZA	12	28	3
American Samoa	AS	ASM	16	-14	-170
Andorra	AD	AND	20	42	1
Angola	AO	AGO	24	-12	18

Below the table, the PySpark cell shows the results of the query as a JSON array:

```
[10]: dyf = glue_context.create_dynamic_frame.from_catalog(
        databases='covid-19',
        table_name='country_codes')
dyf.show()
```

The output of the PySpark cell is a JSON array of country information, including country name, alpha-2 code, alpha-3 code, numeric code, latitude, and longitude.

aws Glue

[interactive\_sessions: ↓]:



Interactive AWS Glue  
jobs development

Submit AWS Glue jobs from the  
AWS Glue Studio notebook

Use notebook magic to define  
transforms in SQL and control cost

Built-in monitoring support

AWS RE:INVENT  
RE:CAP

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# AWS Glue Interactive Sessions

Preview



Development  
tool of your  
choice



Rapid  
development



Built-in cost  
control

A dedicated cluster created in seconds for developers to interactively build data pipelines with choice of IDE...



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# ... and advanced transforms like PII detection for advanced cleansing

1

Scan Data



Full Scan

Sample Scan

2

Detect Entities



Built-in Entities  
(e.g. SSN, passport)

Custom Entities

3

Remediate



Store results

Redact/mask  
results

# Databases



# Amazon RDS Custom

Amazon RDS Custom is a managed database service for legacy, custom, and packaged applications that require access to the underlying operating system and database environment

Amazon RDS Custom is available for RDS for Oracle and for SQL Server



GA



# Amazon DevOps Guru for RDS

**ML-powered database advisor for Amazon RDS**  
**First released for Amazon Aurora**

Automatically detects and diagnoses hard-to-find performance bottlenecks and operational issues

---

Delivers insights and recommendations to help resolve issues in minutes

---

Uses ML models informed by years of operating thousands of databases for Amazon.com

---

No ML experience required

---

Continuously monitors database workloads at scale



GA

# Amazon DynamoDB Standard-Infrequent Access (Standard-IA) table class



## Lower storage costs

The Standard-IA table class offers 60% lower storage costs than DynamoDB Standard tables.



## No performance trade-offs

Standard-IA tables offer the same performance, durability, data availability, and massive scalability as existing DynamoDB Standard tables.



## No developer overhead

Switch between table classes with a single click in the DynamoDB console, or using the AWS CLI or AWS SDK. Also, use the same DynamoDB APIs and service endpoints.



GA

# AWS DMS Fleet Advisor

ACCELERATE DATABASE AND ANALYTICS MIGRATIONS WITH AUTOMATED INVENTORY AND MIGRATION RECOMMENDATIONS



Automatically  
gathers  
database fleet  
information



Generates a list of  
possible migration  
targets



Results in hours  
instead of weeks  
and months



**Preview**

# Database Migration Service – Time Travel

Store and encrypt AWS DMS logs using Amazon S3, and view, download and obfuscate the logs within a certain time frame

---

Log and debug replication tasks

---

Time Travel can be used in all AWS Regions with DMS-supported PostgreSQL source endpoints and DMS-supported PostgreSQL and MySQL target endpoints



GA

# IoT



# AWS IoT Announcements

## New services:

- AWS IoT **ExpressLink**
- AWS IoT **TwinMaker**
- AWS IoT **FleetWise**
- AWS IoT **RoboRunner**
- **FreeRTOS** out-of-the-box

## Other:

- AWS IoT **Greengrass** & Systems Manager
- AWS IoT **Greengrass** Software Catalog
- AWS IoT **SiteWise** Hot/Cold Storage Tiers
- AWS IoT **Fleet Indexing** enhancements
- **FreeRTOS** extended maintenance



# AWS IoT TwinMaker

EASILY CREATE DIGITAL TWINS OF REAL-WORLD SYSTEMS TO OPTIMIZE OPERATIONS



Easily access data no matter where it lives



Accurately model your built environment



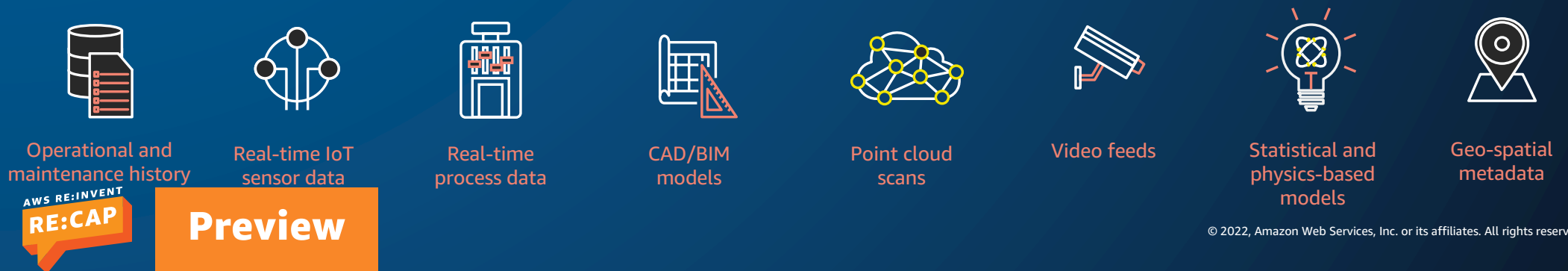
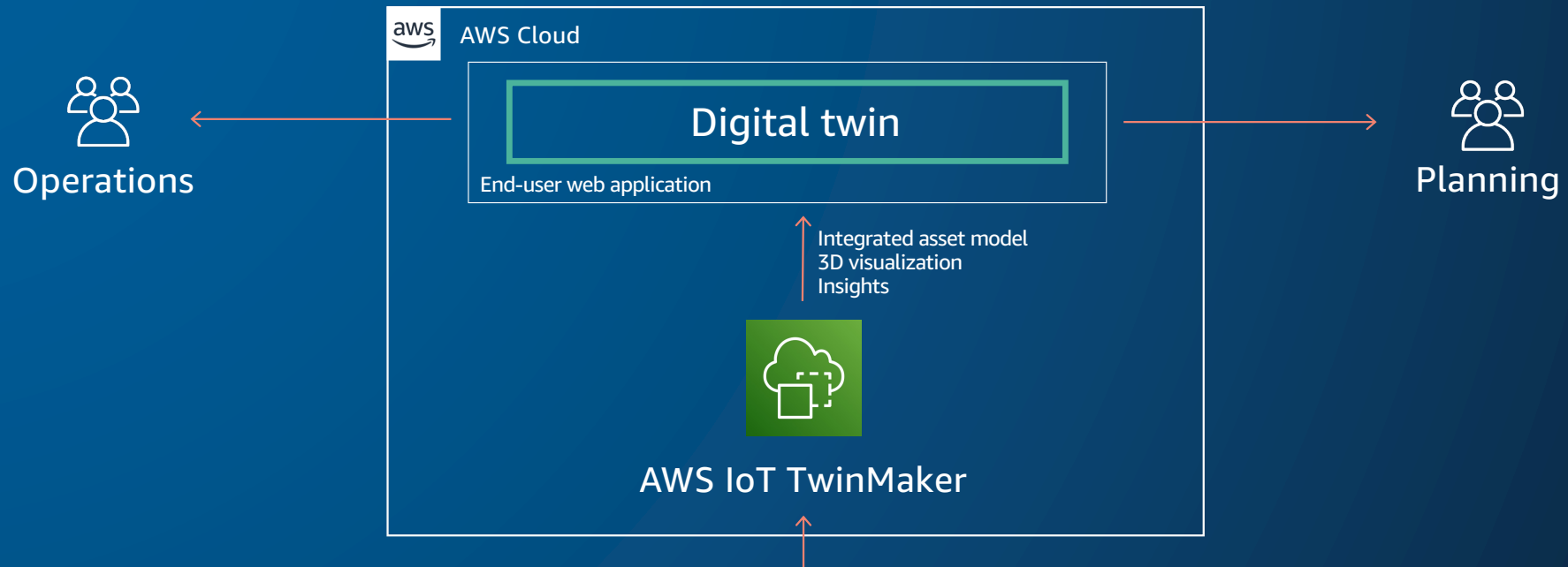
Create immersive 3D views



**Preview**

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# AWS IoT TwinMaker – How it works



# Thank you!



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