



AWS - FinOps

Narendra ,  
Chief Architect





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FinOps Cloud terminology

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AWS Tools – Cloud Cost management

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FinOps – Executive Cost Summary

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Forecast next 3 months

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AWS – Pricing models

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Analyze EC2 Cost by purchase option

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RI/SP Coverage and Utilization

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Calculate Total RI/SP Coverage metric

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Interpret RI recommendations



# aws FinOps

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Purchase RI/Savings Plan

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Get EC2 Pricing data

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How RI/SP **discounts** vary with term length ,payment options and flexibility

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Compare RI vs SP

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Standard RI vs EC2 instance SP

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Convertible RI vs Compute SP

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AWS CUR

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10 Strategies to control cloud costs



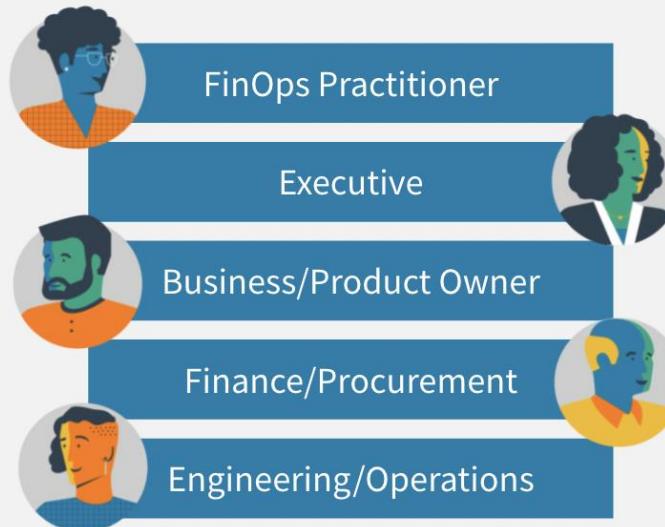
# FinOps Framework

FinOps is an evolving **cloud financial management discipline** and **cultural practice** that enables organizations to get **maximum business value** by helping engineering, finance & business teams to collaborate on data-driven spending decision

## Principles

- ▶ Teams need to collaborate
- ▶ Everyone takes ownership for their cloud usage
- ▶ A centralized team drives FinOps
- ▶ Reports should be accessible and timely
- ▶ Decisions are driven by business value of cloud
- ▶ Take advantage of the variable cost model of the cloud

## Personas



## Maturity



## Phases



## Domains

Understanding Cloud Usage and Cost

Performance Tracking & Benchmarking

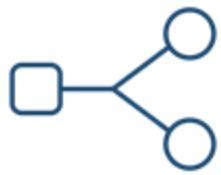
Real-Time Decision Making

Cloud Rate Optimization

Cloud Usage Optimization

Organizational Alignment

# Cloud is critical to every business but is a fundamentally different consumption model...



## Decentralized

Engineers siloed from Finance (and Procurement) are empowered to commit the company to spend



## Variable

Variable cloud spend replacing data center/fixed cost spend

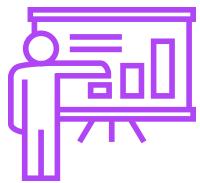


## Scalable

Instant access to resources enables innovation but often results in overprovisioning



# Cloud FinOps is an evolving cloud financial management discipline and cultural practice that:



enables organizations to get maximum business value



by helping engineering, finance and business teams

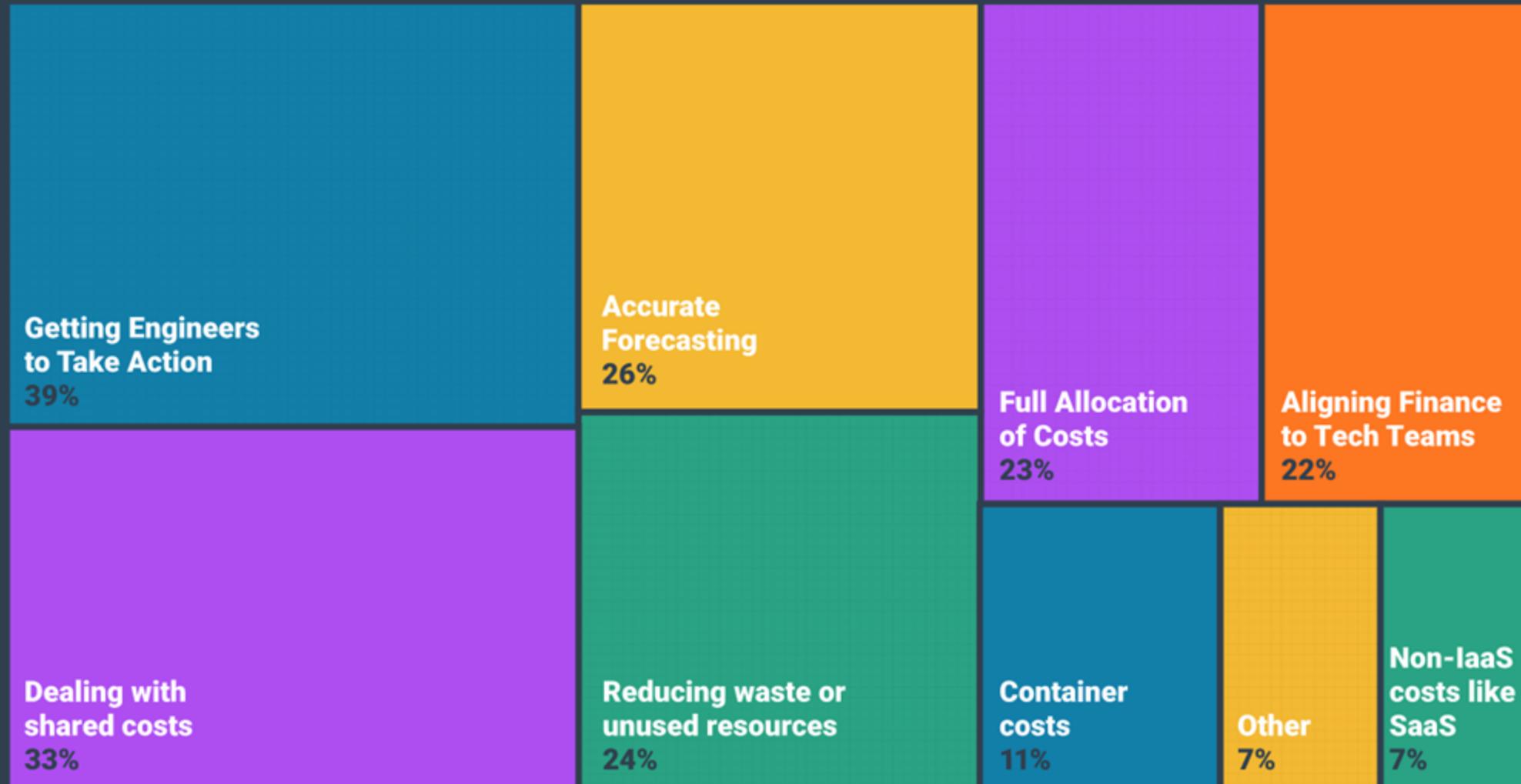


to collaborate on data-driven spending decisions

FinOps is not shorthand for “Financial Operations”. It is a portmanteau of “Finance” and “(Dev)Ops” stressing the communications and collaboration business and engineering teams.

## FinOps.org

# Data.FinOps.Org: what are your top challenges?



# Breaking the Challenge Into Addressable Parts



## CLOUD FORECASTING CHALLENGES (1/2)

Account and Project Structure

Tagging and Cost Allocation

Communication and Accountability

Forecast Frequency, Models, and Accuracy

Showback and Chargeback



# CLOUD FORECASTING CHALLENGES (1/2)

## Account and Project Structure

Tagging and Cost Allocation

Communication and Accountability

Forecast Frequency, Models, and Accuracy

Showback and Chargeback

- Use dedicated accounts or projects on the GCP side for each business unit, cost center, and major engineering team
- We need to anticipate ***organizational changes, acquisitions, and divestitures***



# CLOUD FORECASTING CHALLENGES (1/2)

Account and Project Structure

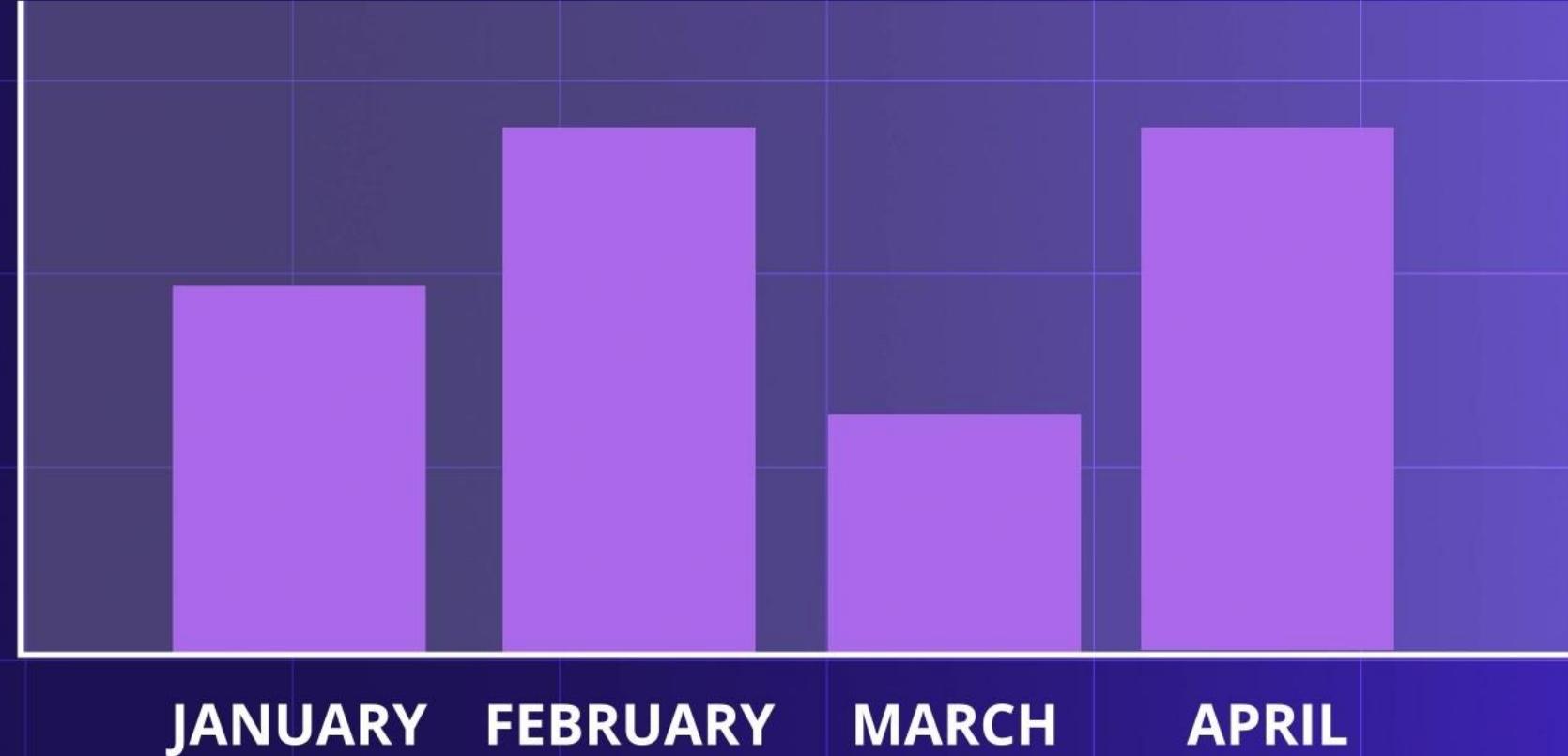
Tagging and Cost Allocation

Communication and Accountability

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Showback and Chargeback

WITHOUT TAGGING:



# CLOUD FORECASTING CHALLENGES (1/2)

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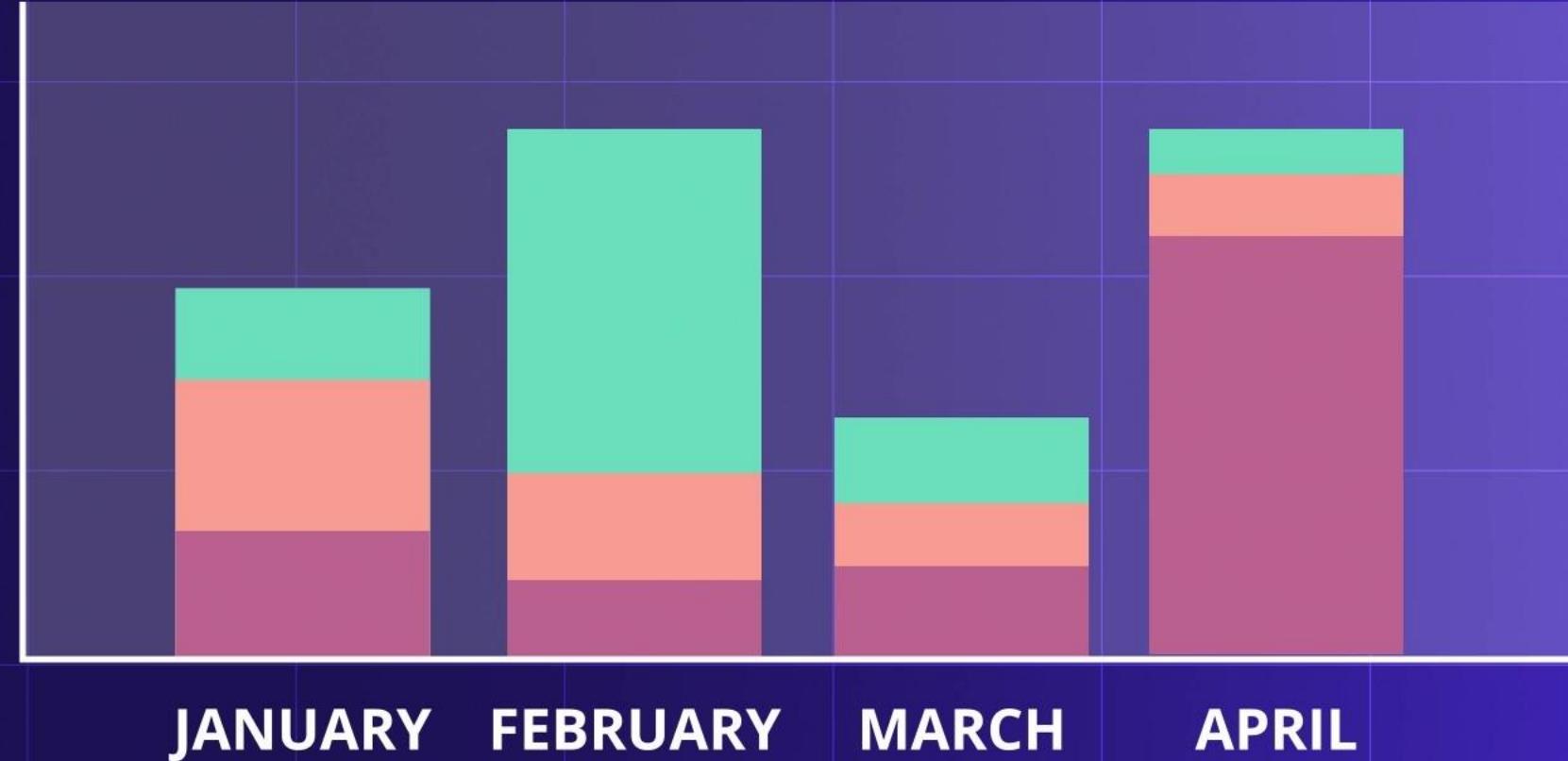
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## WITHOUT TAGGING:

User A User B User C



# CLOUD FORECASTING CHALLENGES (1/2)

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## EXPENSE REPORT:



# CLOUD FORECASTING CHALLENGES (1/2)

Account and Project  
Structure

Tagging and Cost  
Allocation

Communication and  
Accountability

Forecast Frequency,  
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Showback and  
Chargeback

## Untagable Costs:

- Cloud resources that do not support tagging (like network traffic) need to be apportioned to the workloads responsible for incurring their cost



# CLOUD FORECASTING CHALLENGES (1/2)

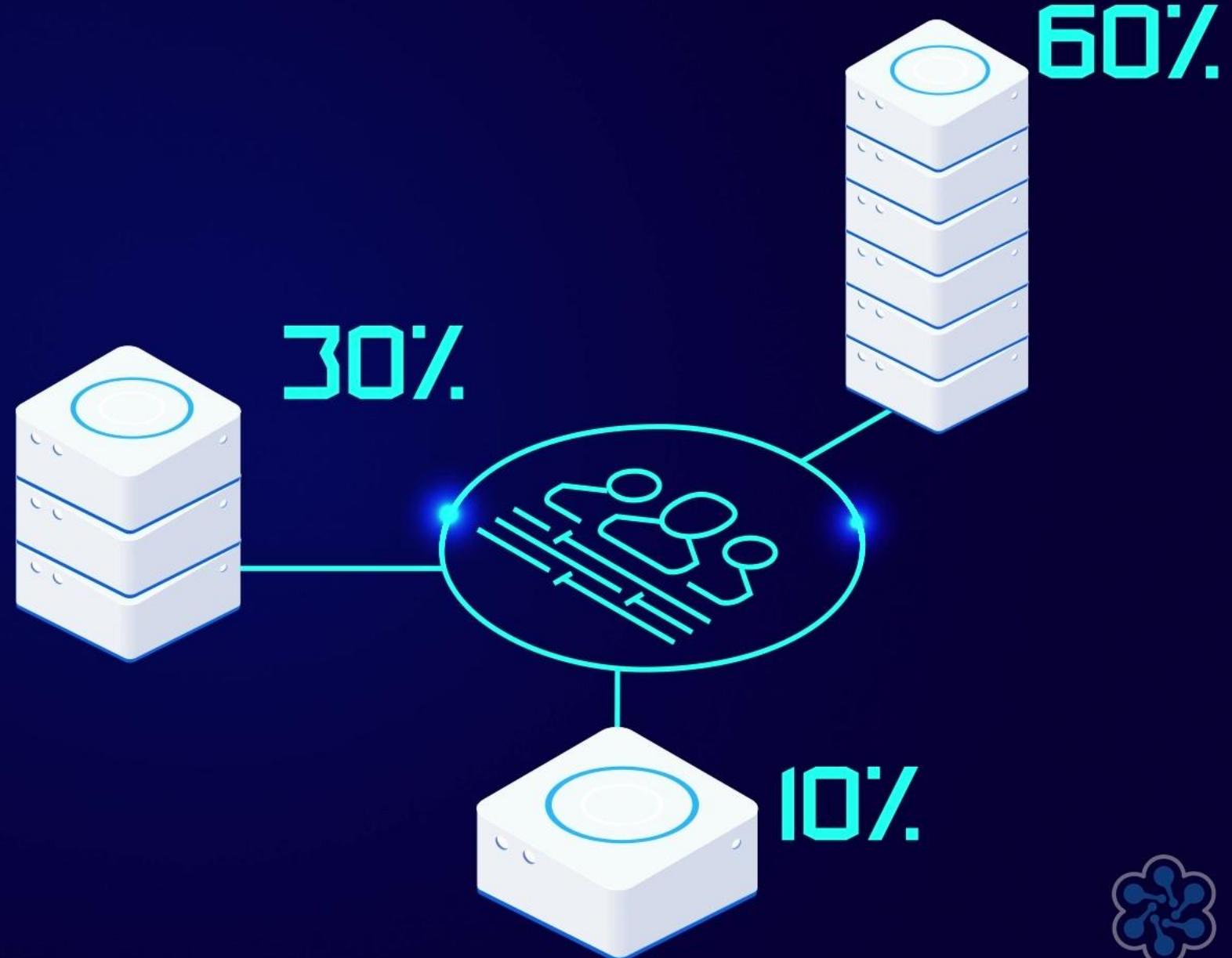
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## CLOUD FORECASTING CHALLENGES (1/2)

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# Logging System



## CLOUD FORECASTING CHALLENGES (1/2)

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### Notes on Tagging

- Tagging standards depend on requirements and organizational structure (to identify ownership and attribute cost back to teams)
- Cost tags need to be surfaced as cost allocation tags in AWS
- Tagging may be manual, use automated tag hygiene monitoring, or be part of a CI/CD pipeline with tag-or-terminate policies in place



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**Includes project scope changes that also affect cloud spend**



# CLOUD FORECASTING CHALLENGES (1/2)

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Showback and Chargeback

The engineer needs to understand that their budget will be impacted if they don't report



## CLOUD FORECASTING CHALLENGES (1/2)

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## Holding Accountability for Cloud Spend

- Regular communications regarding *actual spend* vs. *forecast spend*
- Identify substantial over and under spend
  - ***Under spend:*** Being short on staff
  - ***Over spend:*** Starting a project earlier than planned or experiments that engineers forgot to turn off
- Automation
  - **AWS:** Budget alerts
  - **Azure:** Spending quotas



# CLOUD FORECASTING CHALLENGES (1/2)

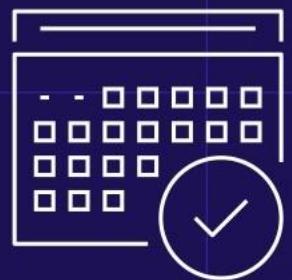
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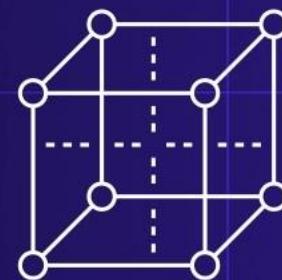
Communication and Accountability

Forecast Frequency, Models, and Accuracy

Showback and Chargeback



Frequency



Models



Accuracy



# CLOUD FORECASTING CHALLENGES (1/2)

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## Frequency

### Annual Forecast:

Due close to the end of the fiscal year

### Intermediate Forecast:

Can be done to update budgets based on business drivers



# CLOUD FORECASTING CHALLENGES (1/2)

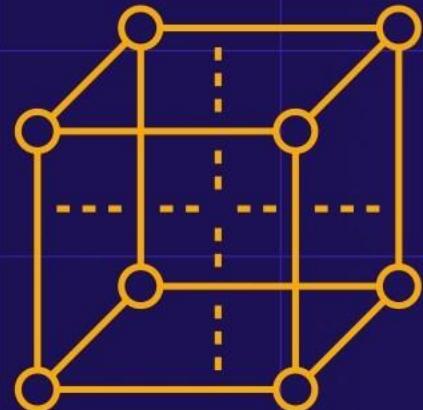
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**Models**



**Trend-Based Forecasting**



**Business Maturity**



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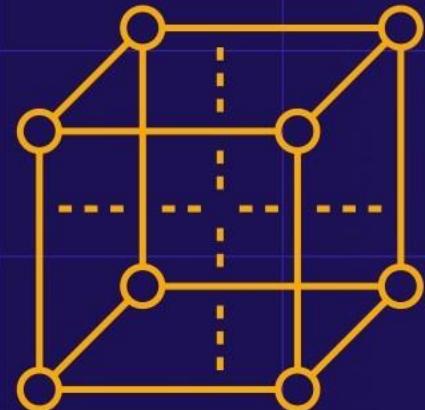
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Models

**Business Maturity**



**Driver-Based Forecasting**



# CLOUD FORECASTING CHALLENGES (1/2)

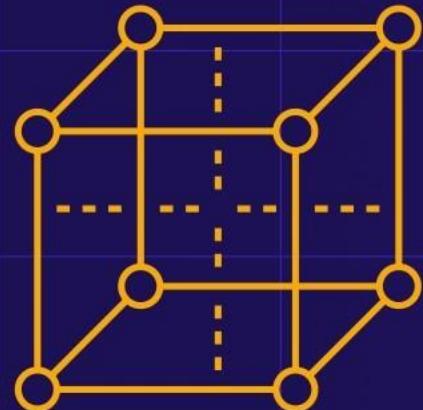
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**Models**

Finance will have requirements around forecast granularity that are driven by the fiscal reporting needs

- COGS
- COGS vs. OPEX
- Breakdown of specific business entities



# CLOUD FORECASTING CHALLENGES (1/2)

Account and Project Structure

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**Accuracy**



**Quality of data**



**Models**



# CLOUD FORECASTING CHALLENGES (1/2)

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**Accuracy**

Work with finance on the following:

- To learn which forecast variance is within the acceptable limits
- On requirements for layering in discounts, cost avoidance, and savings instruments



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# CLOUD FORECASTING CHALLENGES (1/2)

Account and Project Structure

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WORKLOAD A

 OVER



WORKLOAD B



WORKLOAD C



## CLOUD FORECASTING CHALLENGES (1/2)

Account and Project Structure

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Showback and Chargeback

WORKLOAD A



**CONTACT  
WORKLOAD  
OWNER**



## CLOUD FORECASTING CHALLENGES (1/2)

Account and Project  
Structure

Tagging and Cost  
Allocation

Communication and  
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Forecast Frequency,  
Models, and Accuracy

Showback and  
Chargeback

### Driver-Based Forecasting

- Workloads may scale differently from drivers
- The driver may not be a good match for the workload growth
- In cases of mismatch:  
Short term adjustments or building additional drivers that are a better match in the long term may be required



## CLOUD FORECASTING CHALLENGES (1/2)

Account and Project Structure

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A lack of accuracy may not be addressed until it becomes a larger problem +50%  
+\$10

Headcount



1.189460

1.182450

+

-

SELL ↵



30d

5 min

2 min

12:40

# CLOUD FORECASTING CHALLENGES (1/2)

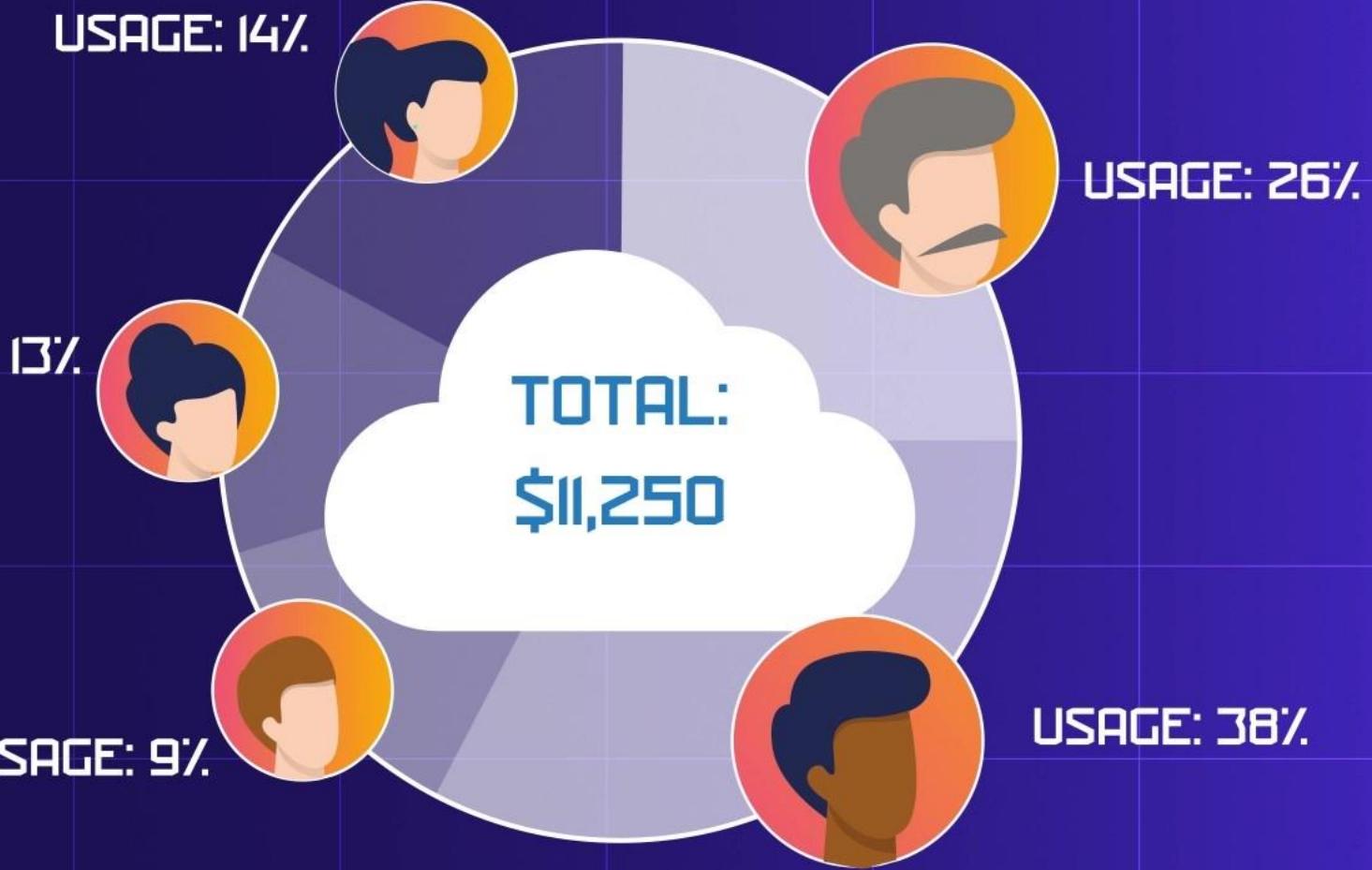
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## CLOUD FORECASTING CHALLENGES (1/2)

Account and Project Structure

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# BUSINESS COST: JAN 2025

ITEM	COST
<b>SHARED COSTS</b>	
Enterprise discounts	
Enterprise support	
3rd party licensing	
Shared services (logging and security)	
Shared resources (container orchestration and data transfer charges)	

Total:

\$\$\$\$\$\$



# CLOUD FORECASTING CHALLENGES (1/2)

Account and Project Structure

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## CLOUD FORECASTING CHALLENGES (2/2)

KPI-Driven Decisions

Estimating Cloud Cost for Workloads

Rate Reduction

Cost Avoidance

Training and Improving Maturity

### CLOUD PROVIDER



### WORKLOAD



## CLOUD FORECASTING CHALLENGES (2/2)

### KPI-Driven Decisions

Estimating Cloud Cost for Workloads

Rate Reduction

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## Total Cost of Ownership (TCO)

- Unit economics determines ***Total Cost of Ownership (TCO)***
- Engineers and leadership need insights to take ownership and make adjustments to cloud workloads
- Unit economics across providers needs to be available in an aggregate or rollup view for tracking, drill-downs, and troubleshooting



## CLOUD FORECASTING CHALLENGES (2/2)

KPI-Driven Decisions

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### BUDGET FORECAST: JAN 2025

#### Future Workloads



high availability



disaster recovery



persistence models



## CLOUD FORECASTING CHALLENGES (2/2)

KPI-Driven Decisions

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## COST CALCULATORS

### AWS

Old version (sharable link): <https://calculator.s3.amazonaws.com/index.html>  
New version (relies on export function): <https://calculator.aws/#/addService>

### GCP

<https://cloud.google.com/products/calculator>

### Azure

<https://azure.microsoft.com/en-us/pricing/calculator>

### Oracle

<https://www.oracle.com/cloud/cost-estimator.html>



## CLOUD FORECASTING CHALLENGES (2/2)

KPI-Driven Decisions

Estimating Cloud Cost for Workloads

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# CHALLENGES



## CLOUD FORECASTING CHALLENGES (2/2)

KPI-Driven Decisions

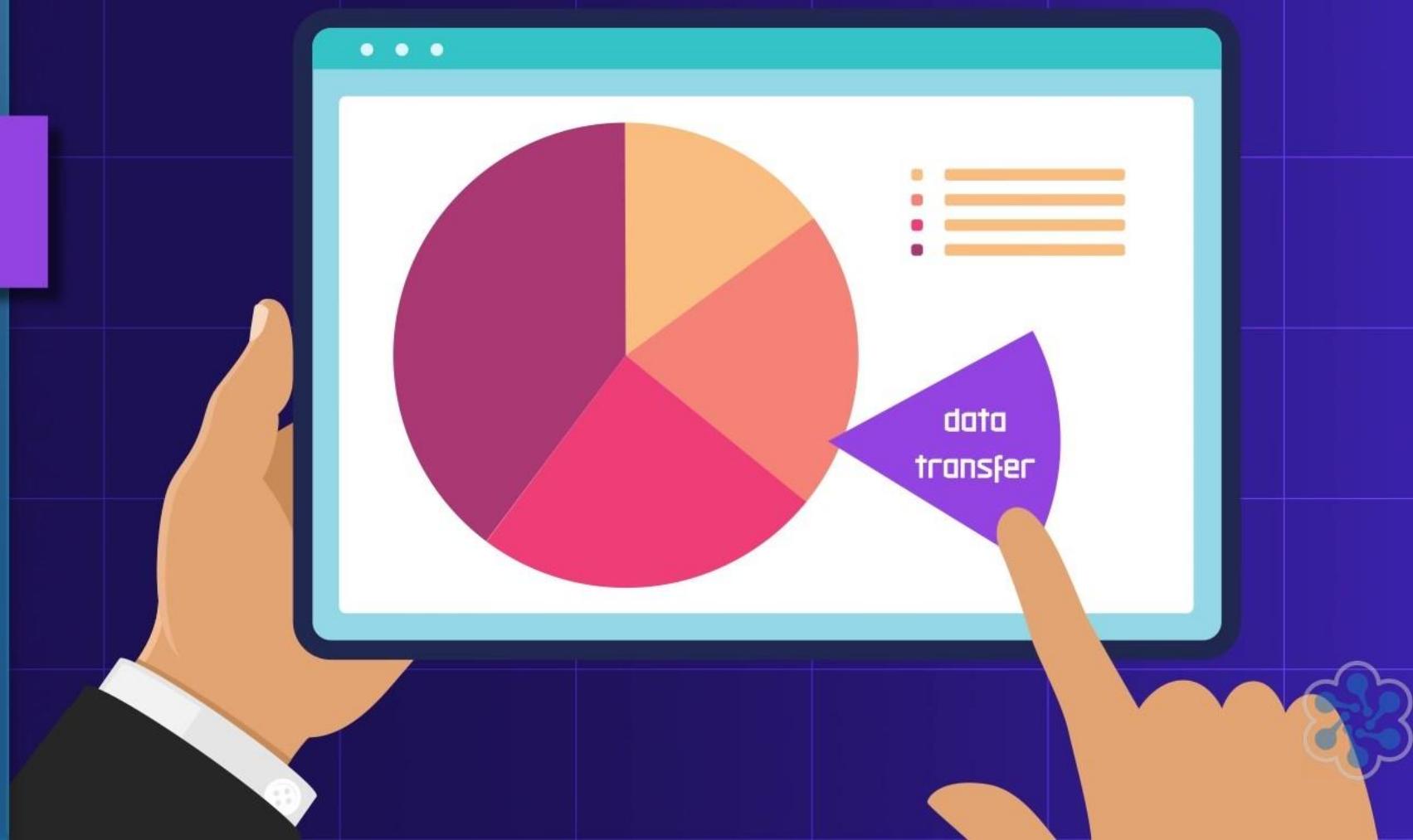
Estimating Cloud Cost for Workloads

Rate Reduction

Cost Avoidance

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To forget to model a specific aspect of the workload



## CLOUD FORECASTING CHALLENGES (2/2)

KPI-Driven Decisions

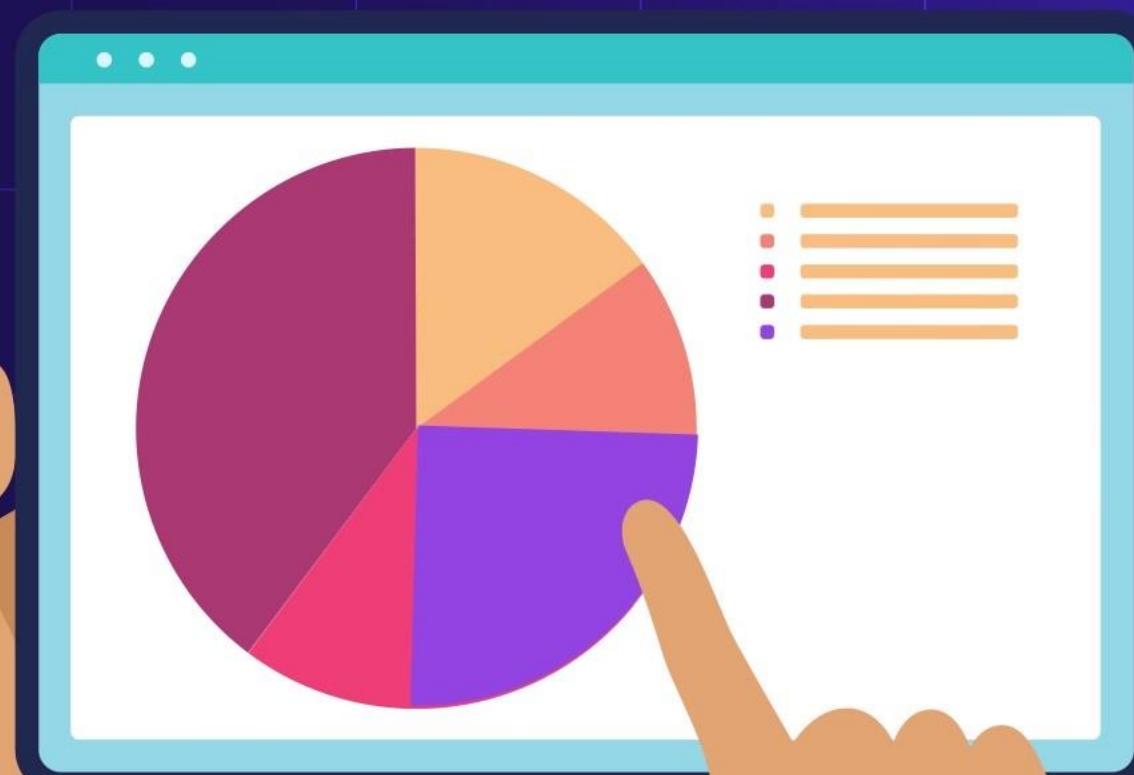
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### Overprovisioning



## CLOUD FORECASTING CHALLENGES (2/2)

KPI-Driven Decisions

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## ITERATIVE APPROACH

**STEP 1:** Engineer revises initial models

**STEP 2:** Engineer shares updated estimates with forecasting team

**STEP 3:** Forecasting team updates budget forecast



## CLOUD FORECASTING CHALLENGES (2/2)

KPI-Driven Decisions

Estimating Cloud Cost for Workloads

Rate Reduction

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$$\text{USAGE} \times \text{RATE} = \text{COST}$$

1. Duration of time  
2. Quantity of usage

Financial number in local currency



## CLOUD FORECASTING CHALLENGES (2/2)

KPI-Driven  
Decisions

Estimating Cloud  
Cost for Workloads

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X RATE = 0  
*Reduction*



## CLOUD FORECASTING CHALLENGES (2/2)

KPI-Driven Decisions

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**ENTERPRISE**  
AGREEMENT



**SAVINGS INSTRUMENTS**  
AGREEMENT



**PRIVATE PRICING**  
AGREEMENT



Flat discount on specific products or tiered discount based on usage



Must be renewed



Future agreements may have different discounts



## CLOUD FORECASTING CHALLENGES (2/2)

KPI-Driven Decisions

Estimating Cloud Cost for Workloads

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## SAVINGS INSTRUMENTS

	AWS	GCP	Azure
Reserved instances	Reserved instances	Sustained use discounts	Reservations
Savings plans	Savings plans	Committed use discounts	



## CLOUD FORECASTING CHALLENGES (2/2)

KPI-Driven  
Decisions

Estimating Cloud  
Cost for Workloads

Rate Reduction

Cost Avoidance

Training and  
Improving Maturity

## RATE REDUCTION

**STEP 1:** Calculate historic rate reduction effects  
on cloud cost

**STEP 2:** Apply these ratios to the cloud forecast

**ADVANCED APPROACH:** Model individual rate  
reduction initiatives and their effects on cloud cost



## CLOUD FORECASTING CHALLENGES (2/2)

KPI-Driven Decisions

Estimating Cloud Cost for Workloads

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Cost Avoidance

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# COST AVOIDANCE MEASURES



Right-Sizing



Waste Reduction



Cloud Parking



Autoscaling



Re-Architecting Workloads



## CLOUD FORECASTING CHALLENGES (2/2)

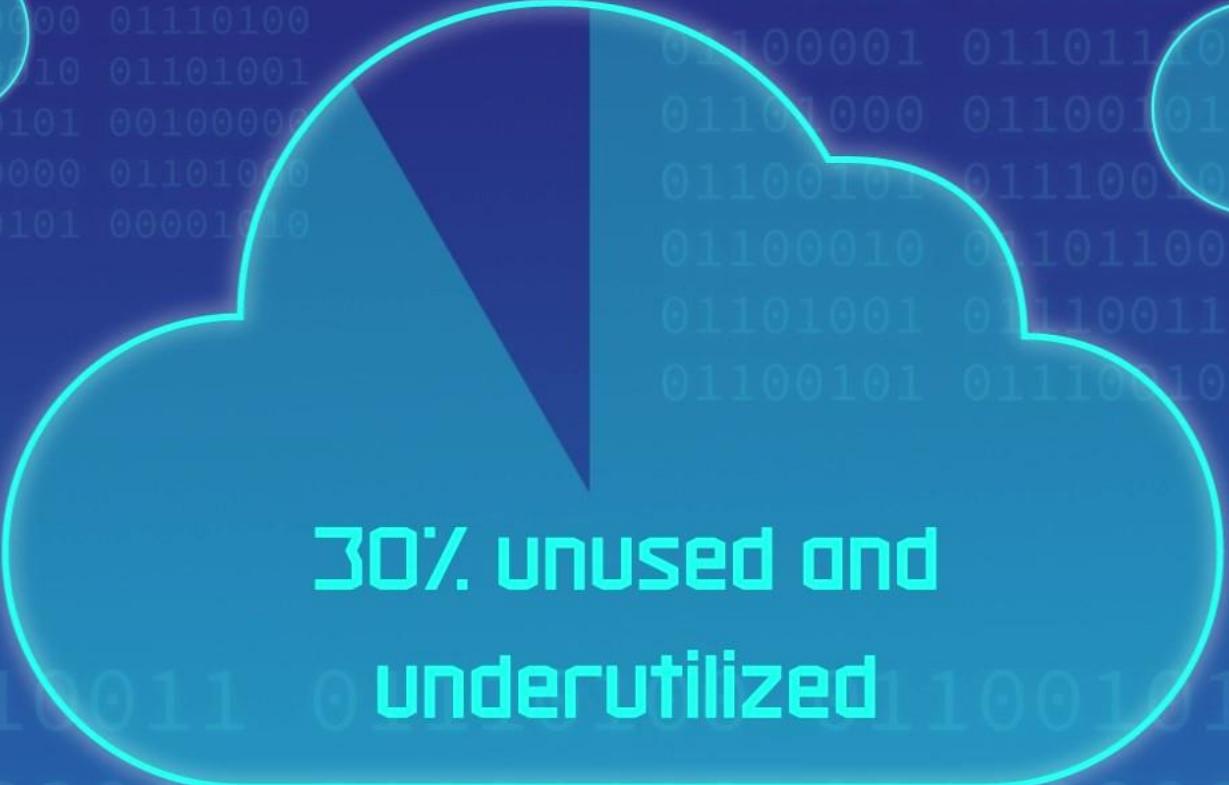
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**30% unused and underutilized**

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## COST AVOIDANCE

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**STEP 2:** Apply these ratios to the cloud forecast

**ADVANCED APPROACH:** Model individual rate  
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## CLOUD FORECASTING CHALLENGES (2/2)

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## IMPROVEMENTS

- Communicating ongoing improvements
- Workloads being re-architected to avoid technological debt
- Improvements in total cost of ownership over time



## CLOUD FORECASTING CHALLENGES (2/2)

KPI-Driven  
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## MIGRATIONS

- Have a ramp-up during which both old and new workloads run, with a ramp-down of the old workload after some observation time
- To layer these into our cloud forecasts, we need to reach out to the engineering teams to get a better picture of the behavior during these phases, as well as the duration of the migration



## **SUMMARY:** Breaking the Challenge Into Addressable Parts

- We use account and project structures as well as a tagging strategy to allocate cloud cost to owners
- We work with finance to get the requirements for our cloud forecasting frequency, models, and accuracy



# Relevant Terms and Concepts



## RELATED TERMS AND CONCEPTS (1/2)

Forecasting

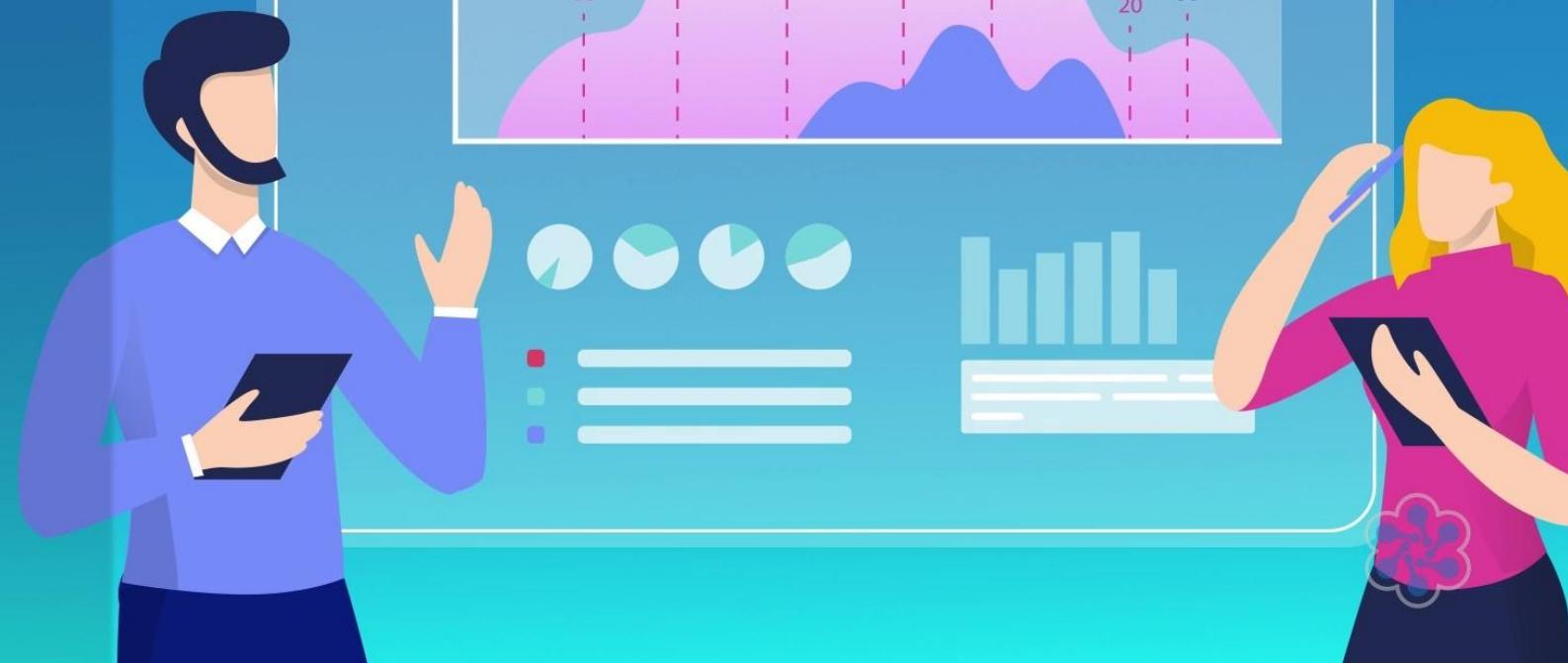
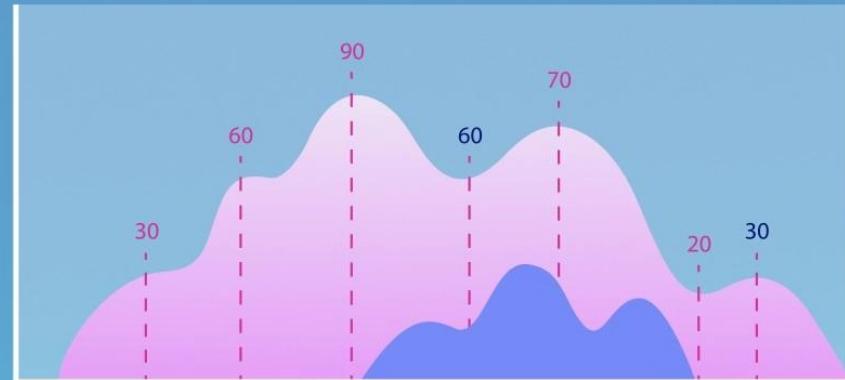
Budgeting

Cost Estimation

Cost of Goods Sold

CapEx vs. OpEx

## FORECAST



## RELATED TERMS AND CONCEPTS (1/2)

Forecasting

Budgeting

Cost Estimation

Cost of Goods Sold

CapEx vs. OpEx

**Budget:** An estimate of spending within a time period



## RELATED TERMS AND CONCEPTS (1/2)

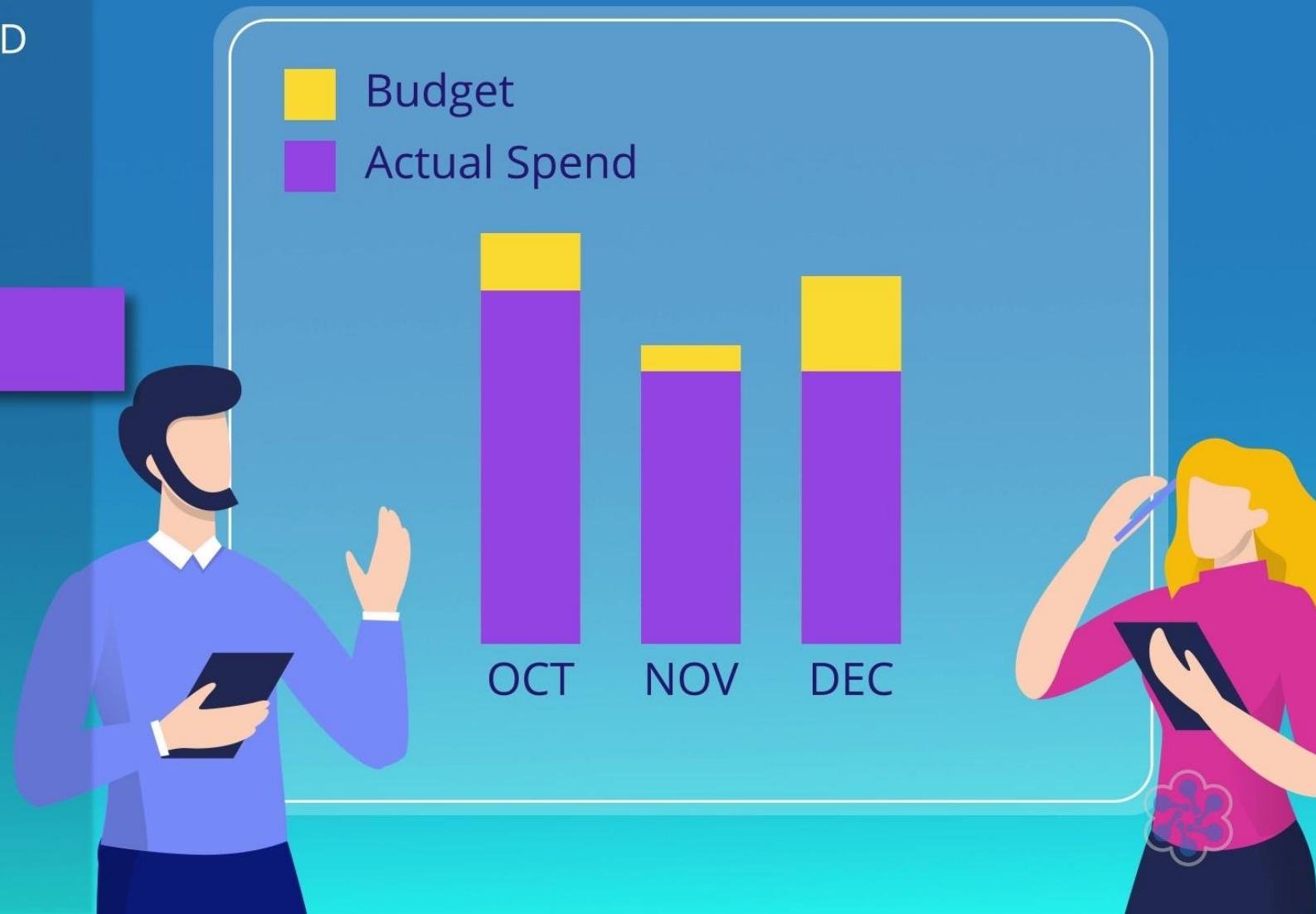
Forecasting

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Cost of Goods Sold

CapEx vs. OpEx



## RELATED TERMS AND CONCEPTS (1/2)

Forecasting

Budgeting

Cost Estimation

Cost of Goods Sold

CapEx vs. OpEx

**BUDGET:**

\$\$\$\$\$\$\$\$\$\$

**RESOURCES:**

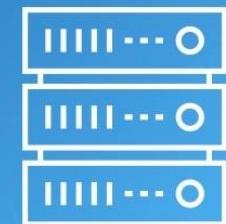
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<< CREATE PROJECT >>



## RELATED TERMS AND CONCEPTS (1/2)

Forecasting

Budgeting

Cost Estimation

**Cost of Goods Sold**

CapEx vs. OpEx

# COGS

Measures expenses directly responsible for revenue in the month they occurred



## RELATED TERMS AND CONCEPTS (1/2)

Forecasting

Budgeting

Cost Estimation

Cost of Goods Sold

CapEx vs. OpEx

# CapEx

When expenses are not directly responsible for revenue in the month they occurred



**EXPENSES**

**REVENUE**

## RELATED TERMS AND CONCEPTS (1/2)

Forecasting

Budgeting

Cost Estimation

Cost of Goods Sold

CapEx vs. OpEx

## SUMMARY

- Can become **CapEx** when the expenses are not directly responsible for revenue in the month they occurred
- Tagged as **COGS** when it contributes to revenue during the month of contribution

## RELATED TERMS AND CONCEPTS (1/2)

Forecasting

Budgeting

Cost Estimation

Cost of Goods Sold

CapEx vs. OpEx

## SUMMARY



***CapEx***  
There are future benefits that can be capitalized



***OpEx***  
When the payment has no future benefits



## RELATED TERMS AND CONCEPTS (2/2)

Unblended Rates

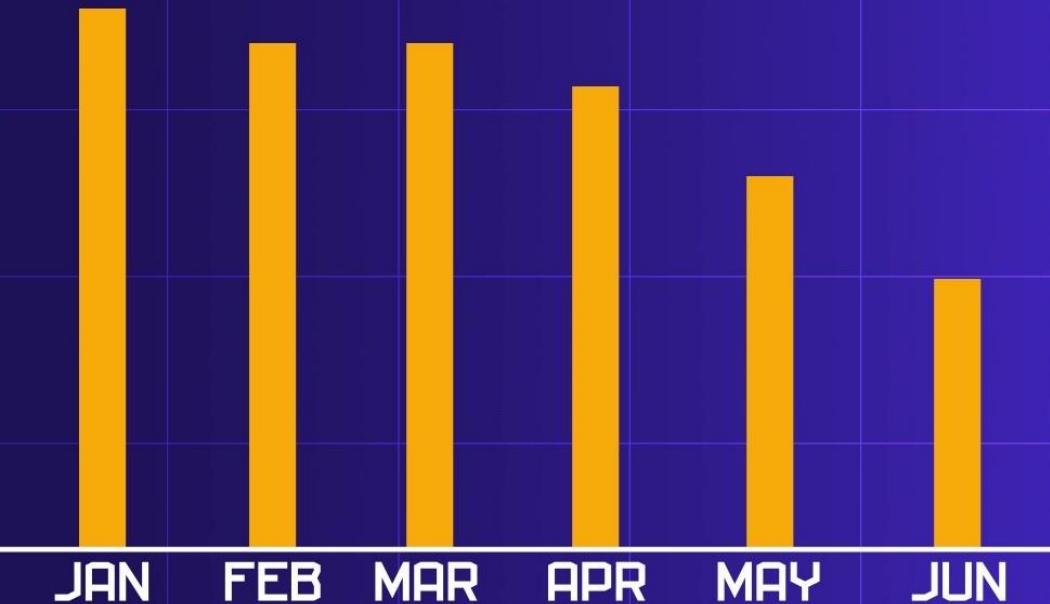
Amortized Costs

Fully Loaded Costs

Cost Allocation



**COST OF USE**



## RELATED TERMS AND CONCEPTS (2/2)

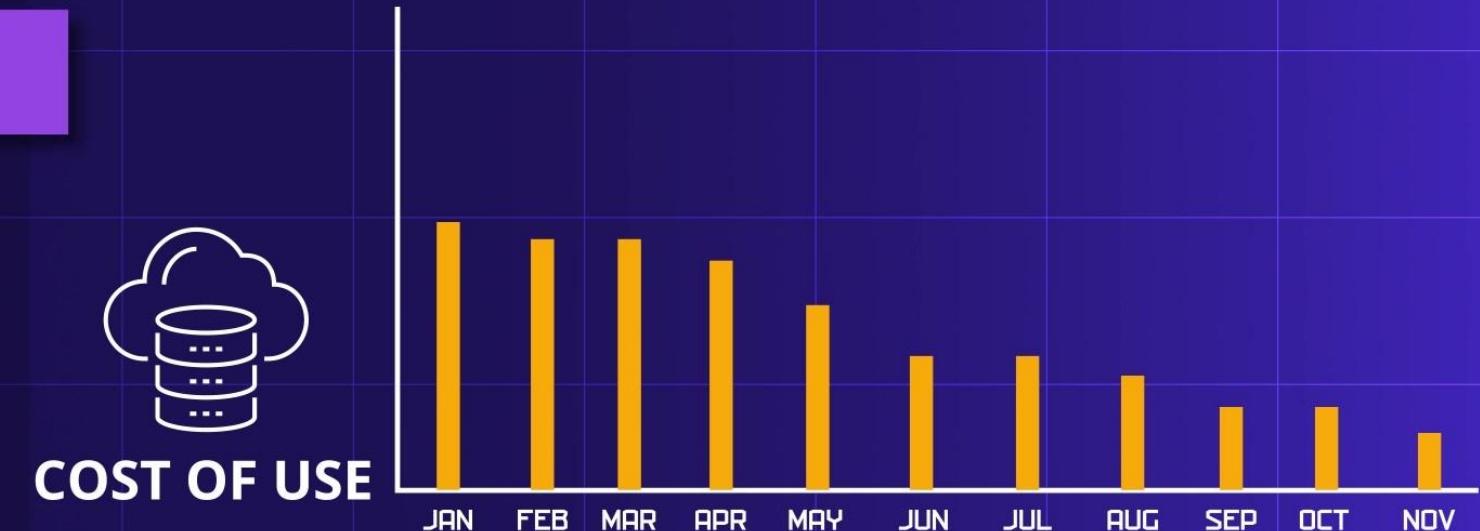
Unblended Rates

Amortized Costs

Fully Loaded Costs

Cost Allocation

Cost goes down the more you use the asset



## RELATED TERMS AND CONCEPTS (2/2)

Unblended Rates

Amortized Costs

Fully Loaded Costs

Cost Allocation



- There is an ***upfront cost***
- This cost is distributed based on usage



## RELATED TERMS AND CONCEPTS (2/2)

Unblended Rates

Amortized Costs

Fully Loaded Costs

Cost Allocation

## FULLY LOADED COSTS

- Amortized
- Reflect the actual discounted rates a company is paying for cloud resources
- Equitably factor in shared costs
- Mapped to the business' organizational structure



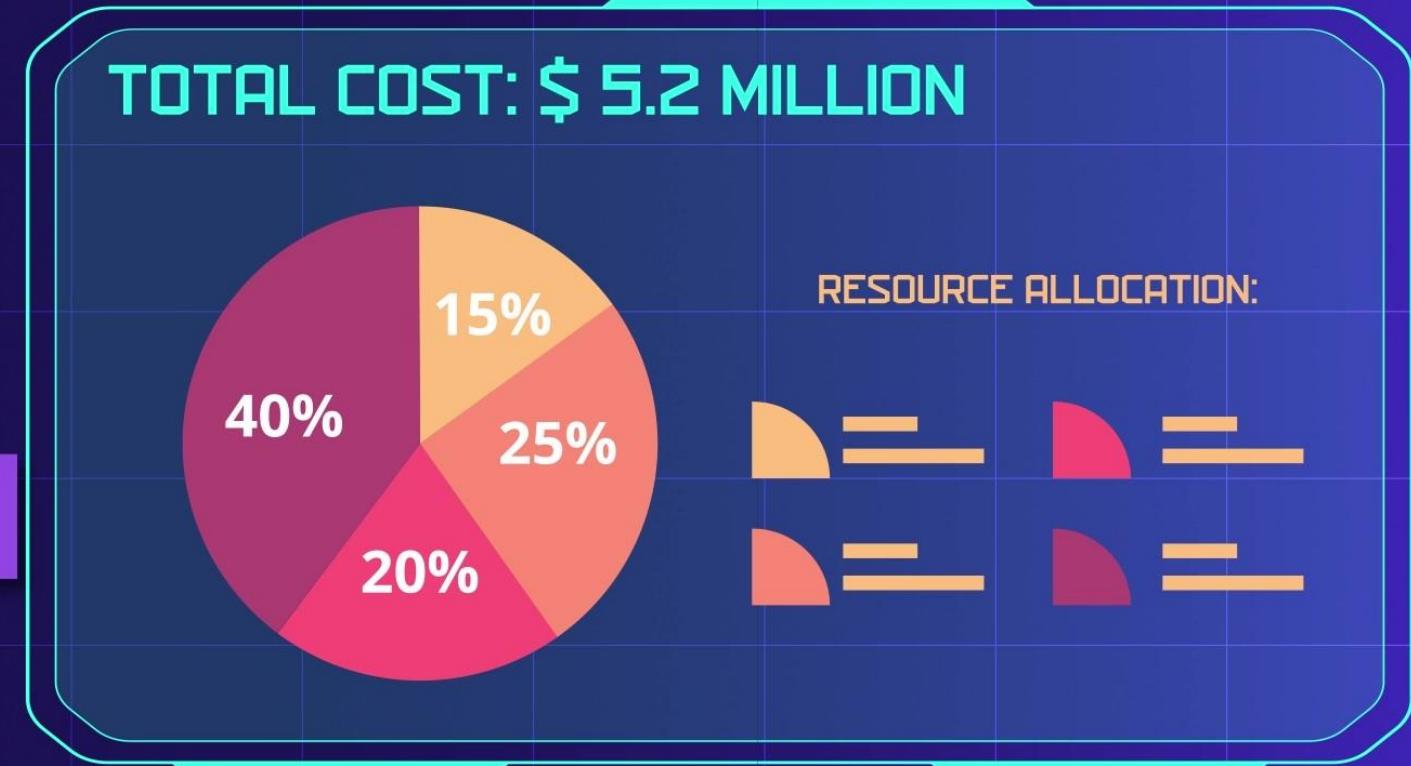
## RELATED TERMS AND CONCEPTS (2/2)

Unblended Rates

Amortized Costs

Fully Loaded Costs

Cost Allocation



## **SUMMARY:** Relevant Terms and Concepts

- Forecasting is a financial projection that can be assigned as a budget to a business owner
- Cloud costs can be expressed in different contexts such as unblended, amortized, and fully loaded costs
- Some costs may be capitalized under specific conditions



# How Tools Can Help in Cloud Forecasting



# TOOLS: AWS



AWS COST EXPLORER



AWS BUDGETS



AWS COST ANOMALY DETECTION



AMAZON QUICKSIGHT



AMAZON ATHENA



AWS COST AND USAGE REPORTS (CUR)



## TOOLS: AWS

AWS Cost Explorer

AWS Budgets

AWS Cost Anomaly  
Detection

Amazon QuickSight

Amazon Athena + CUR



A bill visualization tool



## TOOLS: AWS

AWS Cost Explorer



# AWS COST EXPLORER

AWS Budgets

AWS Cost Anomaly  
Detection

Amazon QuickSight

Amazon Athena + CUR

Cost of Hourly and Resource-Level Granularity:  
**1¢ per 1000 UsageRecords per month**

Cost when using the AWS Cost Explorer interface  
or API: **1¢ per request**



## TOOLS: AWS

AWS Cost Explorer

AWS Budgets

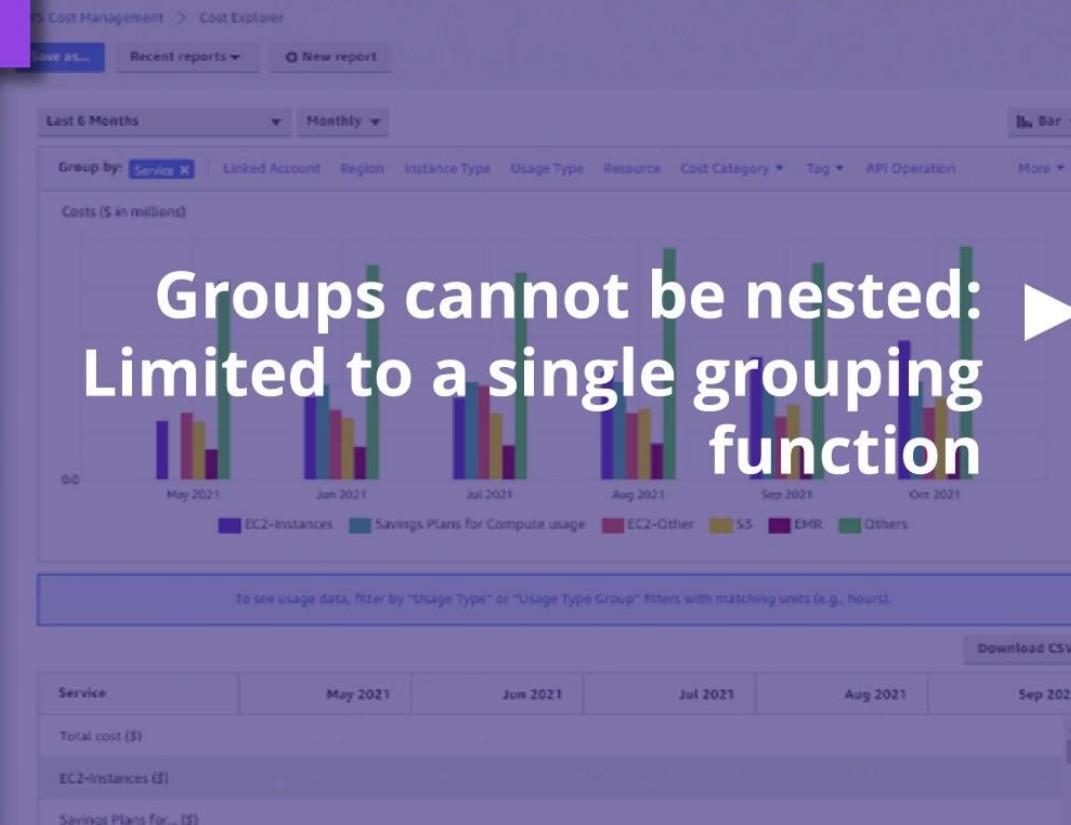
AWS Cost Anomaly  
Detection

Amazon QuickSight

Amazon Athena + CUR



# AWS COST EXPLORER



Groups cannot be nested:  
Limited to a single grouping  
function ➔

▲ FILTERS

Service  
CloudWatch ✕

Linked Account

Region

Instance Type

Usage Type

Usage Type Group

Resource ⓘ

Cost Category

Tag 

More filters

## TOOLS: AWS

AWS Cost Explorer

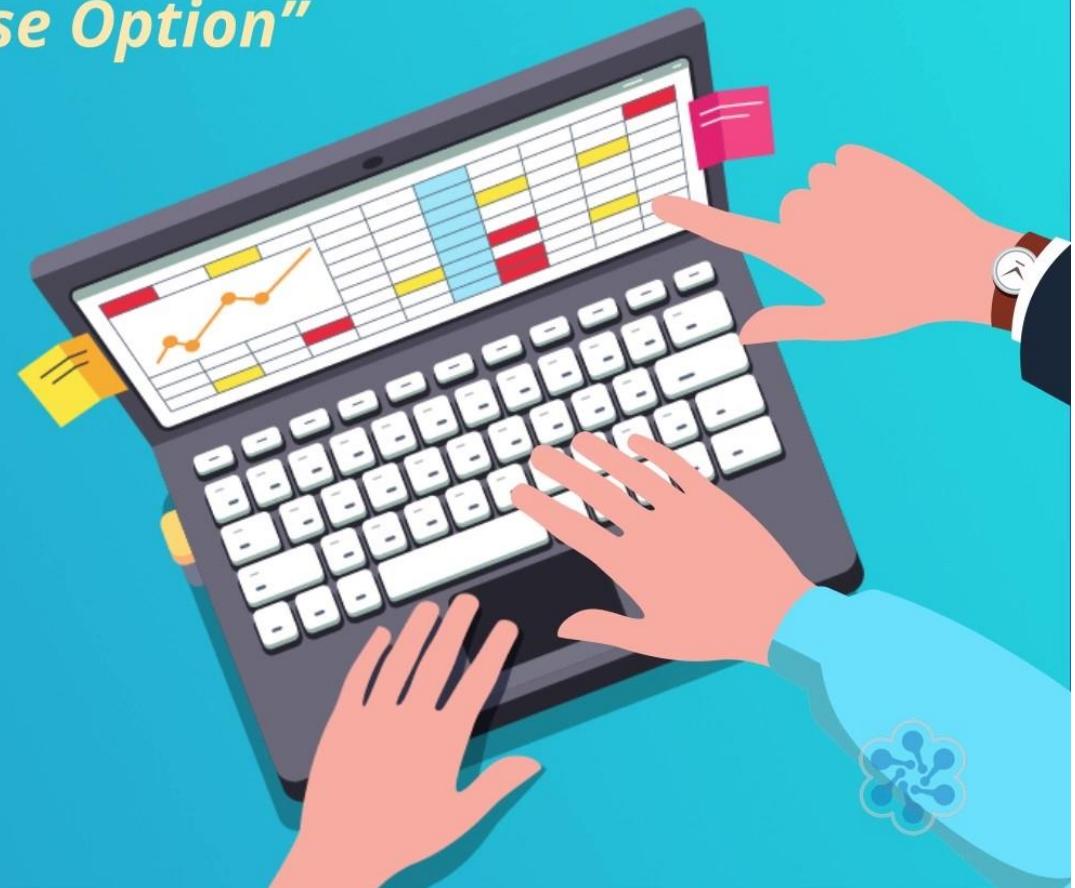
AWS Budgets

AWS Cost Anomaly  
Detection

Amazon QuickSight

Amazon Athena + CUR

*"Charge Type"*  
*"Purchase Option"*



## TOOLS: AWS

AWS Cost Explorer

**AWS Budgets**

AWS Cost Anomaly  
Detection

Amazon QuickSight

Amazon Athena + CUR



**BUDGETS**

**BUDGET REPORTS**



## TOOLS: AWS

AWS Cost Explorer

**AWS Budgets**

AWS Cost Anomaly  
Detection

Amazon QuickSight

Amazon Athena + CUR

## COST

### BUDGETS

- 10¢ (starts on 3rd action-enabled budget)
- First two are FREE

### BUDGET REPORTS

- 1¢ per report



## TOOLS: AWS

AWS Cost Explorer

**AWS Budgets**

AWS Cost Anomaly  
Detection

Amazon QuickSight

Amazon Athena + CUR

# FEATURES

## BUDGETS

- Can define a fixed or monthly budget
- Budgets can be recurring or expiring
- Percentage or absolute thresholds
- Can send notifications
- Can automate stopping some workloads without user intervention

## BUDGET REPORTS

- Notifications: daily, weekly, or monthly budget summaries via email



## TOOLS: AWS

AWS Cost Explorer

AWS Budgets

AWS Cost Anomaly  
Detection

Amazon QuickSight

Amazon Athena + CUR



# AWS COST ANOMALY DETECTION

Provides the ability to create cost monitors where thresholds, frequencies, and recipients for alerts are defined



## TOOLS: AWS

AWS Cost Explorer

AWS Budgets

AWS Cost Anomaly  
Detection

Amazon QuickSight

Amazon Athena + CUR

## MACHINE LEARNING

Detection date

Severity

Duration

Which AWS product  
experienced the  
anomaly



## TOOLS: AWS

AWS Cost Explorer

AWS Budgets

AWS Cost Anomaly  
Detection

Amazon QuickSight

Amazon Athena + CUR



# AWS COST ANOMALY DETECTION

Can detect very subtle cost variances

The detection algorithm cannot account for activities that have no record in the past

False positives are caused by new workloads being added or existing workloads being manually scaled



## TOOLS: AWS

AWS Cost Explorer

AWS Budgets

AWS Cost Anomaly  
Detection

Amazon QuickSight

Amazon Athena + CUR



# AMAZON QUICKSIGHT

Has a wide range of visualization capabilities

Offers data acceleration via SPICE (Super-fast,  
Parallel, In-memory Calculation Engine)

Allows the programmatic creation of dashboards  
via APIs

Offers machine learning insights



## TOOLS: AWS

AWS Cost Explorer

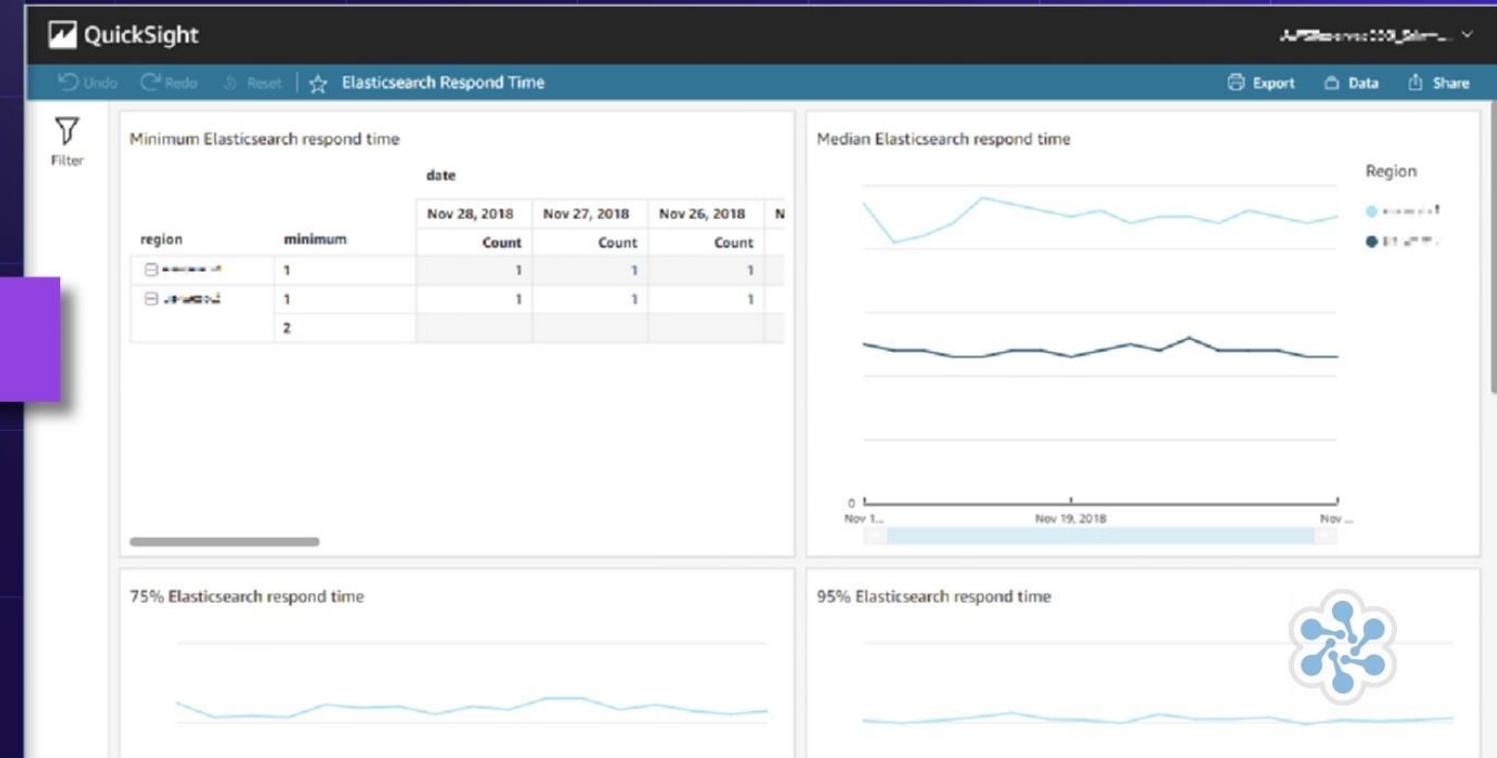
AWS Budgets

AWS Cost Anomaly  
Detection

Amazon QuickSight

Amazon Athena + CUR

- Has no default dashboards; start from scratch
- Graphs tend to look a little bland



## TOOLS: AWS

AWS Cost Explorer

AWS Budgets

AWS Cost Anomaly  
Detection

Amazon QuickSight

Amazon Athena + CUR



# AMAZON ATHENA

Charges for the number of bytes scanned, rounded up to the nearest megabyte

10 megabyte minimum per query

Standard S3 rates are charged for requests and data transfer

By default, query results are stored in an S3 bucket and are billed at standard S3 rates



## TOOLS: AWS

AWS Cost Explorer

AWS Budgets

AWS Cost Anomaly  
Detection

Amazon QuickSight

Amazon Athena + CUR



**AWS COST & USAGE REPORT  
(CUR)**



## TOOLS: AWS

AWS Cost Explorer

AWS Budgets

AWS Cost Anomaly  
Detection

Amazon QuickSight

Amazon Athena + CUR

Reports: 3x a day



## TOOLS: AWS

AWS Cost Explorer

AWS Budgets

AWS Cost Anomaly  
Detection

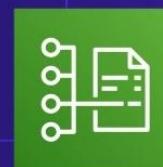
Amazon QuickSight

Amazon Athena + CUR



### ***Amazon Athena***

- Provides an SQL query editor that uses a modified Presto syntax



### ***AWS CUR***

- Available in a single table
- Size of the cloud footprint depends on the number of rows and columns
- Query results come in CSV format



## TOOLS: AWS

AWS Cost Explorer

AWS Budgets

AWS Cost Anomaly  
Detection

Amazon QuickSight

Amazon Athena + CUR

The screenshot shows the Amazon Athena Query Editor interface. The top navigation bar includes 'Services' (dropdown), 'Search for services, features, blogs, docs, and more' (input field), and 'Workgroup primary' (dropdown). The main area has tabs for 'Editor' (selected), 'Recent queries', 'Saved queries', and 'Settings'. The 'Data' section on the left shows 'Data Source' set to 'awslogs' and 'Database' set to 'awslogs'. Below these are 'Tables and views' (Create button) and a search bar ('Filter tables and views'). Under 'Tables (5)', there are entries for 'cost\_and\_usage\_data\_status', 'master\_historical\_2019\_rollup\_table', and 'master\_historical\_2019\_table'. Under 'Views (11)', there are entries for 'aws\_resource\_by\_account', 'aws\_resource\_to\_item\_id\_map', and 'cur\_breakdown\_2019'. The central pane displays a multi-line SQL query:

```
1 SELECT
2     "bill_payer_account_id"
3     , "bill_billing_period_start_date"
4     , "line_item_usage_account_id"
5     , "reservation_reservation_a_r_a"
6     , "line_item_product_code"
7     , "line_item_usage_type"
8     , "line_item_usage_amount"
9     , sum("line_item_usage_amount") as Usage
10    , "line_item_unblended_rate"
11    , sum("line_item_unblended_cost") as Cost
12    , "line_item_line_item_description"
13    , "pricing_public_on_demand_rate"
14    , sum("pricing_public_on_demand_cost") as PublicCost
15    from
16
17    WHERE
18        "line_item_line_item_type" like "%DiscountedUsage%"
```

Below the query are buttons for 'Run again', 'Cancel', 'Save as', 'Clear', and 'Create'. The status bar indicates 'SQL Ln 1, Col 1', 'Time in queue: 0.208 sec', 'Run time: 4.855 sec', and 'Data scanned: 2.77 GB'. The results section shows a table header with columns: 'bill\_payer\_account\_id', 'bill\_billing\_period\_start\_date', 'line\_item\_usage\_account\_id', and 'reservation\_reservation\_a\_r\_a'. A single row is shown with the value '2021-10-01 00:00:00.000'.



## TOOLS: AWS

AWS Cost Explorer

AWS Budgets

AWS Cost Anomaly  
Detection

Amazon QuickSight

Amazon Athena + CUR

The screenshot shows the Amazon Athena Query Editor interface. The top navigation bar includes 'AWS Services', a search bar, and account information ('N. Virginia' and 'Support'). The main area has tabs for 'Editor', 'Recent queries', and 'Saved'. A sidebar on the left lists 'Data', 'Data Source' (set to 'awslogs'), 'Database' (set to 'awslogs'), 'Tables and views' (with a 'Create' button), and 'Tables (5)' (including 'cost\_and\_usage\_data\_status', 'master\_historical\_2019\_rollup\_table', 'master\_historical\_2019\_table', 'Views (11)', 'aws\_resource\_by\_account', 'aws\_resource\_to\_item\_id\_map', and 'cur\_breakdown\_2019'). The central pane displays three highlighted query results:

- linelitem/UsageAccountId**:  
A SELECT query from the 'cost\_and\_usage\_data\_status' table. It filters for 'line\_item\_usage\_type' = 'LineItem' and 'line\_item\_usage\_amount' > 0. It also joins with 'aws\_resource\_to\_item\_id\_map' and 'aws\_resource\_by\_account' to get 'bill\_payer\_account\_id' and 'line\_item\_usage\_account\_id'. The results show a single row for the date 2021-10-01.
- linelitem/UsageType**:  
A SELECT query from the same table, filtering by 'line\_item\_usage\_type' = 'LineItem'. It joins with the same resource tables. The results show a single row for the date 2021-10-01.
- linelitem/UnblendedCost**:  
A SELECT query from the same table, filtering by 'line\_item\_usage\_type' = 'LineItem'. It joins with the same resource tables. The results show a single row for the date 2021-10-01.

At the bottom of the editor, there are buttons for 'Run again', 'Context', 'Store as', 'Clear', and 'Create'. The results table shows columns: 'bill\_payer\_account\_id', 'bill\_billing\_period\_start\_date', 'line\_item\_usage\_account\_id', and 'reservation\_reservation\_k\_r\_d'. The results section indicates 20 rows, with the first row being 2021-10-01 00:00:00.000.

## TOOLS: AWS

AWS Cost Explorer

AWS Budgets

AWS Cost Anomaly  
Detection

Amazon QuickSight

Amazon Athena + CUR



# AMAZON ATHENA

REQUIREMENTS: Hands-on SQL skills and detailed knowledge of the CUR fields



# **CASE STUDY: EXECUTIVE COST SUMMARY**

## **Objective**

- Provide an executive summary of AWS cost to the company leadership team

## Considerations

- A chart showing last 12 month amortized cost
- Break down by services
- Exclude credit and refund (to reflect consumption)
- Stacked bar chart

AWS Services ▾

Search for services, features, marketplace products, and docs [Opt]

**AWS Cost Management** ×

What's new in AWS Cost Management.  
Cost Anomaly Detection (free service) is now generally available in AWS Cost Management. You can now detect anomalies in your costs and receive notifications when anomalies are detected. [Learn more](#)

AWS Cost Management > Cost Explorer

What's New: Cost Management is now available in the AWS Console Mobile Application. [Learn more](#)

Save as... Recent reports ▾ New report

Last 12 Months ▾ Monthly ▾ Bar ▾

Group by: Service ▾ Linked Account Region Instance Type Usage Type Resource Cost Category Tag More

Costs (\$ in thousands)

Dec 2019 Jan 2020 Feb 2020 Mar 2020 Apr 2020 May 2020 Jun 2020 Jul 2020 Aug 2020 Sep 2020 Oct 2020 Nov 2020

EC2-Other Refund CloudWatch EC2-ELB EC2-Instances Others

To see usage data, filter by "Usage Type" or "Usage Type Group" filters with matching units (e.g., hours).

**Considerations**

- A chart showing last 12 month amortized cost
- Break down by services
- Exclude credit and refund (to reflect consumption)
- Stacked bar chart

▲ FILTERS CLEAR ALL

Service Include all ▾

Linked Account Include all ▾

Region Include all ▾

Instance Type Include all ▾

Usage Type Include all ▾

Usage Type Group Include all ▾

Resource Include all ▾

Cost Category Include all

Tag Include all

More filters ▾

▲ ADVANCED OPTIONS

Show costs as ▾

AWS Services ▾

Search for services, features, marketplace products, and docs [Opt]

**AWS Cost Management** ×

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AWS Cost Management > Cost Explorer

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Save as... Recent reports ▾ New report

Last 12 Months ▾ Monthly ▾ Stack ▾

Group by: Service ▾ Linked Account Region Instance Type Usage Type Resource Cost Category Tag More

Costs (\$ in thousands)

May 2020  
EC2-Other: \$5,378.16  
Total Cost: \$10,699.75

Dec 2019 Jan 2020 Feb 2020 Mar 2020 Apr 2020 May 2020 Jun 2020 Jul 2020 Aug 2020 Sep 2020 Oct 2020 Nov 2020

EC2-Other Refund CloudWatch EC2-ELB EC2-Instances Others

FILTERS CLEAR ALL

Service Include all ▾  
Linked Account Include all ▾  
Region Include all ▾  
Instance Type Include all ▾  
Usage Type Include all ▾  
Usage Type Group Include all ▾  
Resource Include all ▾  
Cost Category Include all  
Tag Include all  
More filters ▾

ADVANCED OPTIONS ▾

Show costs as ▾

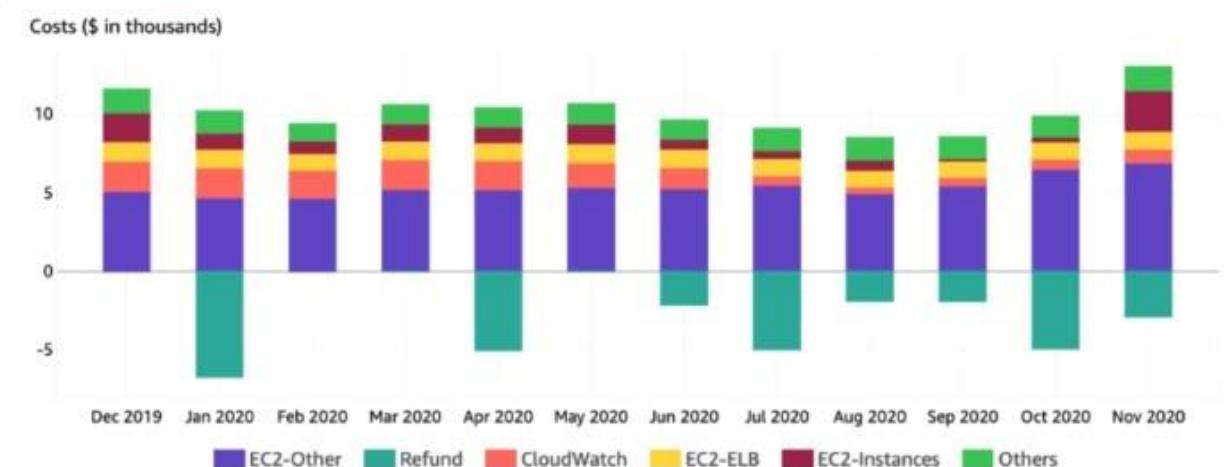
To see usage data, filter by "Usage Type" or "Usage Type Group" filters with matching units (e.g., hours).

## Considerations

- A chart showing last 12 month amortized cost
- Break down by services
- Exclude credit and refund (to reflect consumption)
- Stacked bar chart

**AWS Cost Management**[Home](#)  
[Cost Explorer](#)  
[Reports](#)  
[Budgets](#)  
[Cost Anomaly Detection](#)  
[Recommendations](#)**Savings Plans**[Overview](#)  
[Inventory](#)  
[Recommendations](#)  
[Purchase Savings Plans](#)  
[Utilization report](#)  
[Coverage report](#)[Cart 0](#)**Reservations**[Overview](#)  
[Recommendations](#)  
[Utilization report](#)  
[Coverage report](#)[Preferences](#)**What's new in AWS Cost Management.**

Cost Anomaly Detection (free service) is now generally available in AWS Cost Management. You can now receive automated alerts when unusual spend is detected. [Learn more](#)

[View Cost Anomaly Detection](#)

To see usage data, filter by "Usage Type" or "Usage Type Group" filters with matching units (e.g., hours).

[Download CSV](#)

Service	Dec 2019	Jan 2020	Feb 2020	Mar 2020
Total cost (\$)	11,613.44	3,517.82	9,422.84	10,608.52
EC2-Other (\$)	5,120.17	4,706.26	4,685.01	5,256.74
CloudWatch (\$)	1,914.10	1,927.19	1,798.24	1,899.03

- Linked Account [Include all ▾](#)
- Region [Include all ▾](#)
- Instance Type [Include all ▾](#)
- Usage Type [Include all ▾](#)
- Usage Type Group [Include all ▾](#)
- Resource [Include all ▾](#)
- Cost Category [Include all](#)
- Tag [Include all](#)
- API Operation [Include all ▾](#)
- Charge Type [Include all ▾](#)
- No filters currently added.
- Search for Charge Type
- Credit
- Recurring reservation fee
- Refund
- Reservation applied usage
- Savings Plan Covered Usage
- Savings Plan Negation
- Tax
- Upfront reservation fee
- Showing 9 of 9 results

AWS Services ▾

Search for services, features, marketplace products, and docs [Option+S]

x+d Global Support

## AWS Cost Management

**What's new in AWS Cost Management.**  
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[View Cost Anomaly Detection](#)

Home

**Cost Explorer**

- Reports
- Budgets
- Cost Anomaly Detection
- Recommendations

**Savings Plans**

- Overview
- Inventory
- Recommendations
- Purchase Savings Plans
- Utilization report
- Coverage report

Cart 0

**Reservations**

- Overview
- Recommendations
- Utilization report
- Coverage report

Preferences

Costs (\$ in thousands)

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Download CSV

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EC2-ELB (\$)	1,253.32	1,197.46	1,049.49	1,163.59

Linked Account [Include all](#)

Region [Include all](#)

Instance Type [Include all](#)

Usage Type [Include all](#)

Usage Type Group [Include all](#)

Resource [Include all](#)

Cost Category [Include all](#)

Tag [Include all](#)

API Operation [Include all](#)

Charge Type [Exclude only](#)

Credit  Refund [2](#)

Search for Charge Type

Credit  
 Recurring reservation fee  
 Refund  
 Reservation applied usage  
 Savings Plan Covered Usage  
 Savings Plan Negation  
 Tax  
 Upfront reservation fee

Showing 9 of 9 results

Download Apply Filters

## AWS Cost Management

- Home
- Cost Explorer**
- Reports
- Budgets
- Cost Anomaly Detection
- Recommendations

### Savings Plans

- Overview
- Inventory
- Recommendations
- Purchase Savings Plans
- Utilization report
- Coverage report

Cart 0

### Reservations

- Overview
- Recommendations
- Utilization report
- Coverage report

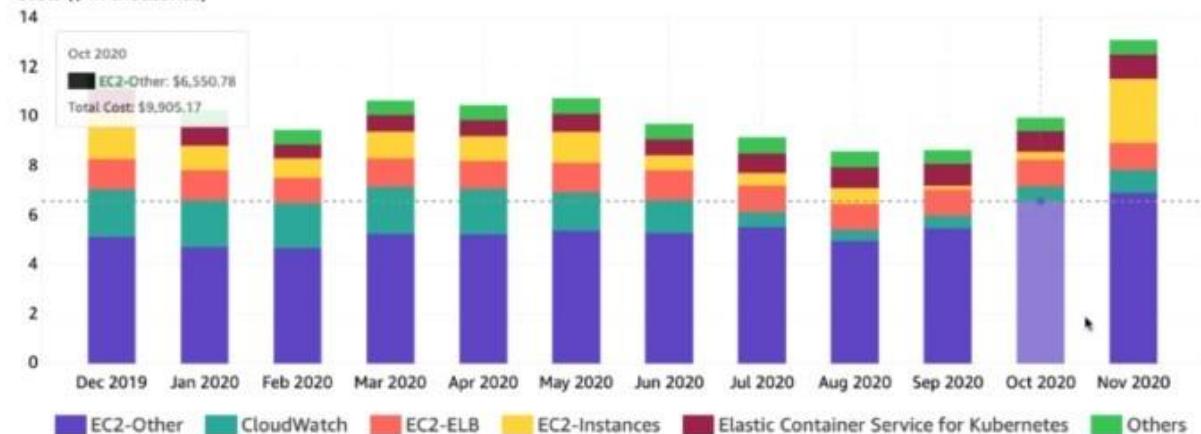
Preferences

### What's new in AWS Cost Management.

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[View Cost Anomaly Detection](#)

Costs (\$ in thousands)



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[Download CSV](#)

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- Linked Account Include all ▾
- Region Include all ▾
- Instance Type Include all ▾
- Usage Type Include all ▾
- Usage Type Group Include all ▾
- Resource Include all ▾
- Cost Category Include all
- Tag Include all
- API Operation Include all ▾
- Charge Type Exclude only ▾
  - Credit X
  - Refund X
  - 2
- Availability Zone Include all ▾
- Platform Include all ▾
- Purchase Option Include all ▾
- Tenancy Include all ▾
- Database Engine Include all ▾
- Legal Entity Include all ▾
- Billing Entity Include all ▾

AWS Services ▾

Search for services, features, marketplace products, and docs [Option+S]

View Cost Anomaly Detection

### AWS Cost Management

**What's new in AWS Cost Management.**  
Cost Anomaly Detection (free service) is now generally available in AWS Cost Management. You can now receive automated alerts when unusual spend is detected. [Learn more](#)

DEC 2019 JAN 2020 FEB 2020 MAR 2020 APR 2020 MAY 2020 JUN 2020 JUL 2020 AUG 2020 SEP 2020 OCT 2020 NOV 2020

EC2-Other CloudWatch EC2-ELB EC2-Instances Elastic Container Service for Kubernetes Others

To see usage data, filter by "Usage Type" or "Usage Type Group" filters with matching units (e.g., hours).

Download CSV

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EC2-ELB (\$)	1,253.32	1,197.46	1,049.49	1,163.59
EC2-Instances (\$)	1,841.47	1,004.68	787.08	1,080.46
Elastic Container... (\$)	981.74	864.96	556.84	670.68
GuardDuty (\$)	183.12	186.33	218.16	224.19

\*Charges for your current billing period shown on these reports are estimated charges. Estimated charges shown on this page, or shown on any notifications that we send to you, may differ from your actual charges for this statement period. This is because estimated charges presented on this page do not include usage charges accrued during this statement period after the date you view this page. (One-time fees and subscription charges are assessed separately from usage and recurring charges, on the date that they occur.)

\*\*Forecasted charges are estimated based on your historical charges and may differ from your actual charges for the forecast period. Forecasted charges are presented solely for your convenience and do not take into account changes to your use of services after the date on which you view this page.

All charges and prices are in US dollars.

Dates shown are based on Coordinated Universal Time (UTC).

All AWS Services are sold by Amazon Web Services, Inc.

API Operation Include all ▾

Charge Type Exclude only ▾

Credit Refund ▾ 2

Availability Zone Include all ▾

Platform Include all ▾

Purchase Option Include all ▾

Tenancy Include all ▾

Database Engine Include all ▾

Legal Entity Include all ▾

Billing Entity Include all ▾

Show less ▾

▲ ADVANCED OPTIONS ▾

Show costs as ▾

Unblended costs ▾

- Unblended costs
- Amortized costs
- Blended costs
- Net unblended costs
- Net amortized costs

# **CASE STUDY: FORECAST THE NEXT 3 MONTHS**

## **Objective**

- Provide a spend forecast of for the next 3 months

## Forecast w/ Cost Explorer

- Predict how much AWS services will cost over the forecast time period based on your past usage.
- Forecast will likely vary somewhat from actual
- Forecast at overall level (no break down by service)
- Cost Explorer forecasts have a prediction interval of 80%
- An 80% prediction interval might forecast your spend between 90 and 100, with a mean of 95.

AWS Services ▾

Search for services, features, marketplace products, and docs [Option+S]

Global ▾ Support ▾

**AWS Cost Management** X

What's new in AWS Cost Management.  
Cost Anomaly Detection (free service) is now generally available in AWS Cost Management. You can now receive automated alerts when unusual spend is detected. [Learn more](#)

View Cost Anomaly Detection X

Home

**Cost Explorer**

Reports

Budgets

Cost Anomaly Detection

Recommendations

Savings Plans

Overview

Inventory

Recommendations

Purchase Savings Plans

Utilization report

Coverage report

Cart 0

Reservations

Overview

Recommendations

Utilization report

Coverage report

Preferences

AWS Cost Management > Cost Explorer

What's New: Cost Management is now available in the AWS Console Mobile Application. [Learn more](#) X

Save as... Recent reports ▾ New report

Last 6 Months Monthly ▾

From 06/01/2020 To 11/30/2020 Clear Selections

Usage Type Resource Cost Category Tag More

Bar ▾

Filters Clear All

Service Include all ▾

Linked Account Include all ▾

Region Include all ▾

Instance Type Include all ▾

Usage Type Include all ▾

Usage Type Group Include all ▾

Resource 0 Include all ▾

Cost Category Include all

Tag Include all

More filters ▾

ADVANCED OPTIONS ⓘ

Cancel Apply

Auto-select: 1D 7D Current Month 3M 6M 1Y MTD YTD +3M +12M

EC2-Other Refund EC2-ELB Elastic Container Service for Kubernetes EC2-Instances Others

The screenshot shows the AWS Cost Explorer interface. On the left, there's a sidebar with links for Home, Cost Explorer (highlighted), Reports, Budgets, Cost Anomaly Detection, Recommendations, Savings Plans, Reservations, and Preferences. The main area has a banner about Cost Anomaly Detection. Below it, there's a 'What's New' message. The central part shows a monthly calendar for October 2020 and a bar chart for the same month. The bar chart has three main bars: one purple bar reaching the top, one red bar, and one green bar. The legend at the bottom identifies the colors: purple for EC2-Other, teal for Refund, red for EC2-ELB, yellow for ECS, dark red for EC2-Instances, and green for Others. The interface also includes filters for Service, Linked Account, Region, Instance Type, Usage Type, Usage Type Group, Resource, Cost Category, Tag, and Advanced Options.

AWS Services ▾

Search for services, features, marketplace products, and docs [Option+S]

Global ▾ Support ▾

**AWS Cost Management** X

What's new in AWS Cost Management.  
Cost Anomaly Detection (free service) is now generally available in AWS Cost Management. You can now receive automated alerts when unusual spend is detected. [Learn more](#)

View Cost Anomaly Detection X

Home

**Cost Explorer**

Reports

Budgets

Cost Anomaly Detection

Recommendations

Savings Plans

Overview

Inventory

Recommendations

Purchase Savings Plans

Utilization report

Coverage report

Cart 0

Reservations

Overview

Recommendations

Utilization report

Coverage report

Preferences

AWS Cost Management > Cost Explorer

What's New: Cost Management is now available in the AWS Console Mobile Application. [Learn more](#).

Save as... Recent reports ▾ New report

Last 12 Months Monthly ▾

From 12/01/2019 To 11/30/2020 Clear Selections

Usage Type Resource Cost Category Tag More

Bar ▾

Filters Clear All

Service Include all ▾

Linked Account Include all ▾

Region Include all ▾

Instance Type Include all ▾

Usage Type Include all ▾

Usage Type Group Include all ▾

Resource 0 Include all ▾

Cost Category Include all

Tag Include all

More filters ▾

ADVANCED OPTIONS ⓘ

Auto-select: 1D 7D Current Month 3M 6M 1Y MTD YTD +3M +12M

Cancel Apply Jan 2020 Jul 2020 Aug 2020 Sep 2020 Oct 2020 Nov 2020

EC2-Other Refund CloudWatch EC2-ELB EC2-Instances Others

The screenshot shows the AWS Cost Explorer interface. On the left, there's a sidebar with links for Home, Cost Explorer (which is currently selected), Reports, Budgets, Cost Anomaly Detection, Recommendations, Savings Plans, Reservations, and Preferences. The main content area has a banner at the top about Cost Anomaly Detection. Below that, it says "AWS Cost Management > Cost Explorer" and has a message about the mobile app. There are buttons for "Save as...", "Recent reports", and "New report". The main view shows a bar chart for the "Last 12 Months" from "12/01/2019" to "11/30/2020". The chart has two sections: October 2020 (from 1 to 31) and November 2020 (from 1 to 30). The x-axis shows months from Jan 2020 to Nov 2020. The y-axis represents cost or usage. The legend includes EC2-Other (blue), Refund (green), CloudWatch (red), EC2-ELB (yellow), EC2-Instances (purple), and Others (light green). A "Filters" section on the right allows users to refine results by Service, Linked Account, Region, Instance Type, Usage Type, Usage Type Group, Resource, Cost Category, and Tag. Advanced options and a "Show costs vs. " link are also present.

AWS Services ▾

Search for services, features, marketplace products, and docs [Option+S]

Global ▾ Support ▾

**AWS Cost Management** ×

What's new in AWS Cost Management.

Cost Anomaly Detection (free service) is now generally available in AWS Cost Management. You can now receive automated alerts when unusual spend is detected. [Learn more](#)

**View Cost Anomaly Detection** ×

Enable Forecasting?

Forecasting is not supported when there is a Group By selected. To enable forecasting and remove the current Group By selection, click OK.

Cancel OK

AWS Cost Management: > Cost Explorer

What's New: Cost Management

Save as... Recent reports ▾ New report

Last 12 Months + Next 3 Months ▾ Monthly ▾

Group by: Service ▾ Linked Account Region Instance Type Usage Type Resource Cost Category Tag More

Costs (\$ in thousands)

Dec 2019 Jan 2020 Feb 2020 Mar 2020 Apr 2020 May 2020 Jun 2020 Jul 2020 Aug 2020 Sep 2020 Oct 2020 Nov 2020

EC2-Other Refund CloudWatch EC2-ELB EC2-Instances Others

Filters ▾ CLEAR ALL

Service include all ▾

Linked Account include all ▾

Region include all ▾

Instance Type include all ▾

Usage Type include all ▾

Usage Type Group include all ▾

Resource include all ▾

Cost Category include all

Tag include all

More filters ▾

ADVANCED OPTIONS ▾

Show costs in ▾

Home

Cost Explorer

Reports

Budgets

Cost Anomaly Detection

Recommendations

Savings Plans

Overview

Inventory

Recommendations

Purchase Savings Plans

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Cart 0

## ▼ Reservations

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Coverage report

Preferences

## ⚠ What's new in AWS Cost Management.

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View Cost Anomaly Detection

Save as...

Recent reports ▾

New report

Last 12 Months + Next 3 Months ▾

Monthly ▾



Bar ▾

Group by: None

Service

Linked Account

Region

Instance Type

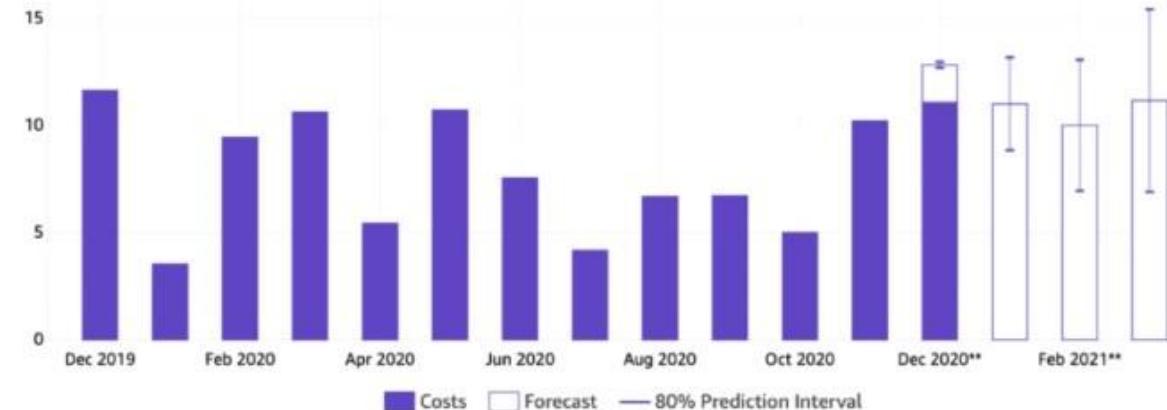
Usage Type

Resource

Cost Category ▾

More ▾

Costs (\$ in thousands)



To see usage data, filter by "Usage Type" or "Usage Type Group" filters with matching units (e.g., hours).

Download CSV

## ▲ FILTERS

CLEAR ALL

Service

Include all ▾

Linked Account

Include all ▾

Region

Include all ▾

Instance Type

Include all ▾

Usage Type

Include all ▾

Usage Type Group

Include all ▾

Resource

Include all ▾

Cost Category

Include all

Tag

Include all

More filters ▾

## ▲ ADVANCED OPTIONS



Show costs as

Unblended costs ▾

Unblended costs

Amortized costs

# CASE STUDY: IDENTIFY DAILY COST SPIKES

## **Objective**

- Identify daily cost trends within a particular month
- Quantify cost spikes due to a particular event  
(e.g. Thanksgiving)

AWS Services ▾

Search for services, features, marketplace products, and docs [Option+S]

Global ▾ Support ▾

View Cost Anomaly Detection X

### AWS Cost Management

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Coverage report

Preferences

Billing Console ↗

Documentation ↗

AWS Cost Management > Home

Current month costs \$11,085.23 ↑ 0% Over last month

Forecasted month end costs \$12,837.64 ↓ 2% Over last month

Daily unblended costs (\$)

Explore costs

December trends ⓘ

Service usage

AmazonCloudWatch costs are up \$389.15 (54%)

Amazon Elastic Container Service for Kubernetes costs are up \$99.84 (11%)

m3.large costs are up \$49.85 (9%)

Reservations

Since November 1st, you have saved ~\$3,184.77 as a result of your EC2 RI purchases.

Recently accessed reports View all reports

Report name	Report type	Time granularity	Last accessed
Monthly EC2 running hours costs and usage	Cost & Usage	Monthly	12 minutes ago
Monthly costs by service	Cost & Usage	Monthly	3 hours ago
AWS Marketplace	Cost & Usage	Monthly	a day ago
Daily costs	Cost & Usage	Daily	8 months ago
RI Utilization	Reservation Utilization	Daily	8 months ago
Monthly costs by linked account	Cost & Usage	Monthly	8 months ago

Viewing 6 of 9 total reports

Feedback: English (US) ▾

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AWS Services ▾

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AWS Cost Management > Cost Explorer

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Save as... Recent reports ▾ New report

Last 3 Months Daily

From 09/01/2020 To 11/10/2020 Clear Selections

October 2020 November 2020

Mo	Tu	We	Th	Fr	Sa	Su
1	2	3	4			1
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	30

Auto-select: 1D 7D Current Month 3M 6M 1Y MTD YTD +1M +3M

Cancel Apply

Aug-04 Aug-20 Sep-05 Sep-21 Oct-07 Oct-23 Nov-08 Nov-24

EC2-Other Refund EC2-ELB Elastic Container Service for Kubernetes EC2-Instances Others

To see usage data, filter by "Usage Type" or "Usage Type Group" filters with matching units (e.g., hour).

Download CSV

Service	Jun-01	Jun-02	Jun-03	Jun-04	Jun-05	Jun-06	Jun-07
Total cost (\$)	-1,773.04	325.21	318.04	315.77	321.52	332.04	328.54
EC2-Other (\$)	177.04	172.64	172.31	172.79	173.67	176.56	176.68
EC2-ELB (\$)	41.76	41.43	40.80	40.69	39.99	39.88	39.86
Elastic Container... (\$)	27.29	25.11	21.60	21.60	21.60	21.60	21.60
EC2-Instances (\$)	34.92	20.87	13.37	12.61	12.99	14.38	13.15
CloudWatch Log (\$)	50.11	48.69	48.80	48.80	53.85	50.73	52.15

FILTERS CLEAR ALL

Service Include all ▾

Linked Account Include all ▾

Region Include all ▾

Instance Type Include all ▾

Usage Type Include all ▾

Usage Type Group Include all ▾

Resource ⓘ Include all ▾

Cost Category Include all ▾

Tag Include all ▾

More filters ▾

ADVANCED OPTIONS ⓘ

Show costs as ⓘ Unblended costs ▾

Include costs related to

Show only untagged resources

Show only uncategorized resources

Show forecasted values

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View Cost Anomaly Detection [X](#)

AWS Cost Management [Home](#)

Cost Explorer [Recent reports](#) [New report](#)

Last 3 Months [Daily](#)

Group by: Service [Linked Account](#) [Region](#) [Instance Type](#) [Usage Type](#) [Resource](#) [Cost Category](#) [Tag](#) [API Operation](#) [Availability Zone](#) [Platform](#) [Purchase Option](#) [More](#)

Costs (\$)

Legend: EC2-Instances, EC2-Other, EC2-ELB, Elastic Container Service for Kubernetes, CloudWatch, Others

To see usage data, filter by "Usage Type" or "Usage Type Group" filters with matching units (e.g., hours).

Download CSV

Service	Sep-01	Sep-02	Sep-03	Sep-04	Sep-05	Sep-06	Sep-07
Total cost (\$)	614.23	613.55	614.08	624.61	625.39	621.30	618.11
EC2-Instances (\$)	336.54	336.94	338.43	341.42	339.70	339.35	339.64
EC2-Other (\$)	167.63	167.51	168.56	177.42	179.27	180.64	179.70
EC2-ELB (\$)	34.47	34.55	34.36	34.27	34.05	33.98	34.22
Elastic Container... (\$)	31.20	31.20	31.20	31.20	31.20	31.20	31.20
CloudWatch (\$)	19.91	20.28	19.92	19.92	19.92	15.17	13.48

FILTERS [CLEAR ALL](#)

Service [Include all](#)

Linked Account [Include all](#)

Region [Include all](#)

Instance Type [Include all](#)

Usage Type [Include all](#)

Usage Type Group [Include all](#)

Resource [Include all](#)

Cost Category [Include all](#)

Tag [Include all](#)

API Operation [Include all](#)

Charge Type [Exclude only](#)

Credit [Refund](#)

Availability Zone [Include all](#)

Platform [Include all](#)

Purchase Option [Include all](#)

Tenancy [Include all](#)

Database Engine [Include all](#)

Legal Entity [Include all](#)

Billing Entity [Include all](#)

Show less +

ADVANCED OPTIONS [I](#)

Feedback: English (US) ▾

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# **CASE STUDY:**

## ANALYZE EC2 COST AND USAGE BY INSTANCE TYPE

## **Objective**

- Understand EC2 cost and usage by instance type
- Show both \$ and hours

AWS Cost Management Services ▾

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AWS Cost Management > Cost Explorer

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Save as... Recent reports ▾ New report

Last 12 Months Monthly Usage: Hours Bar

Group by: Service ▾ Linked Account Region Instance Type Usage Type Resource Cost Category Tag API Operation Availability Zone Platform Purchase Option More

Costs (\$ in thousands)

Usage (Hrs in thousands)

Dec 2019 Jan 2020 Feb 2020 Mar 2020 Apr 2020 May 2020 Jun 2020 Jul 2020 Aug 2020 Sep 2020 Oct 2020 Nov 2020

EC2-Instances

Download CSV

FILTERS CLEAR ALL

Service Include all ▾

Linked Account Include all ▾

Region Include all ▾

Instance Type Include all ▾

Usage Type Include all ▾

Usage Type Group Include only ▾ EC2: Running Hours X

Resource Include all ▾

Cost Category Include all ▾

Tag Include all ▾

More filters ▾

ADVANCED OPTIONS

Show costs as Amortized costs ▾

Include costs related to

Show only untagged resources

Show only uncategorized resources

Show forecasted values

Feedback English (US) ▾ Global Support ▾

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The screenshot shows the AWS Cost Explorer dashboard. On the left, a sidebar navigation includes Home, Cost Explorer (which is selected), Reports, Budgets, Cost Anomaly Detection, Recommendations, Savings Plans, Reservations, Preferences, Billing Console, and Documentation. The main content area displays two stacked bar charts for the 'EC2-Instances' service from December 2019 to November 2020. The top chart shows 'Costs (\$ in thousands)' ranging from 0 to 15, with a total for Dec 2019 of \$12,013.01. The bottom chart shows 'Usage (Hrs in thousands)' ranging from 0 to 100, with a total for Dec 2019 of 125,736.90. To the right of the charts are various filtering options for Service, Linked Account, Region, Instance Type, Usage Type, Usage Type Group (set to 'EC2: Running Hours'), Resource, Cost Category, and Tag. Advanced options allow choosing between 'Amortized costs' and 'Forecasted values'. At the bottom, there are checkboxes for including untagged and uncategorized resources, and a note about showing forecasted values. The footer includes links for Feedback, English (US), Global, Support, Privacy Policy, and Terms of Use, along with the Udemy logo.

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[View Cost Anomaly Detection](#)

AWS Cost Management > Cost Explorer

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Save as... Recent reports ▾ New report

Last 12 Months Monthly Usage: Hours ▾ Stack ▾

Group by: Instance Type Service Linked Account Region Usage Type Resource Cost Category Tag API Operation Availability Zone Platform Purchase Option More ▾

Costs (\$ in thousands)

Usage (Hrs in thousands)

Download CSV

Instance Type	Dec 2019	Jan 2020	Feb 2020	Mar 2020	Apr 2020	May 2020	Jun 2020
Total cost (\$)	12,013.01	10,596.17	9,993.98	11,075.48	11,222.76	11,593.01	10,889.25
Total usage (Hrs)	125,736.90	113,926.96	110,433.37	121,987.45	121,650.98	125,418.38	118,516.72
m5.xlarge (\$)	3,228.74	2,377.87	2,132.56	2,351.03	2,612.88	2,829.98	3,207.55
m5.xlarge (Hrs)	38,623.66	36,945.00	34,650.00	36,030.40	39,369.40	44,930.63	36,630.00

FILTERS CLEAR ALL

Service Include all ▾

Linked Account Include all ▾

Region Include all ▾

Instance Type Include all ▾

Usage Type Include all ▾

Usage Type Group Include only ▾

EC2: Running Hours

Resource Include all ▾

Cost Category Include all ▾

Tag Include all ▾

More filters ▾

ADVANCED OPTIONS

Show costs as Amortized costs ▾

Include costs related to

Show only untagged resources

Show only uncategorized resources

Show forecasted values

Feedback English (US) ▾

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# CASE STUDY: BREAK DOWN “EC2-OTHER” COSTS

## **Objective**

- Analyze the drivers for rising “EC2-Other” costs

AWS Cost Management

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Last 12 Months    Monthly

Group by: Usage Type Service Linked Account Region Instance Type Resource Cost Category Tag API Operation Availability Zone Platform Purchase Option More

Service: EC2-Other (1)

Linked Account: Include all

Region: Include all

Instance Type: Include all

Usage Type: Include all

Usage Type Group: Include all

Resource: EBS (1)

Cost Category: Include all

Tag: Include all

API Operation: Include all

Charge Type: Credit (2)

Availability Zone: Include all

Platform: Include all

Purchase Option: Include all

Tenancy: Include all

Database Engine: Include all

Legal Entity: Include all

Billing Entity: Include all

Show less

To see usage data, filter by "Usage Type" or "Usage Type Group" filters with matching units (e.g., hours).

Download CSV

Usage Type	Dec 2019	Jan 2020	Feb 2020	Mar 2020	Apr 2020	May 2020	Jun 2020	Jul 2020	Aug 2020	Sep 2020	Oct 2020	Nov 2020
Total cost (\$)	5,133.85	4,706.26	4,685.01	5,256.74	5,225.44	5,378.16	5,300.11	5,257.57	5,255.69	5,355.18	5,556.11	5,556.11
USW2-EBS:VolumeUs... (\$)	2,563.27	2,266.28	2,320.83	2,527.57	2,525.69	2,535.18	2,556.11	2,527.57	2,525.69	2,535.18	2,556.11	2,556.11
USW2-EBS:Snapshot... (\$)	585.18	587.28	598.95	614.61	634.77	635.78	634.11	614.61	634.77	635.78	634.11	634.11
USW2-DataTransf... (\$)	661.28	567.90	530.38	718.20	627.50	725.25	649.11	718.20	627.50	725.25	649.11	649.11
USW2-NatGateway-H... (\$)	401.76	382.82	344.52	399.83	388.80	422.10	454.11	399.83	388.80	422.10	454.11	454.11
EBS:VolumeUsage(gp2) (\$)	244.11	243.73	243.68	253.42	283.68	283.82	283.11	253.42	283.68	283.82	283.11	283.11
EBS:SnapshotUsage (\$)	228.51	229.84	234.04	237.71	240.50	240.82	240.11	237.71	240.50	240.82	240.11	240.11

Changes for some common billings patterns shown in these reports are reflected. Estimated charges shown on this page, as shown for any notifications that we need to give, may differ from your actual charges for this statement period. This is because estimated charges presented on this page do not include usage charges incurred during this statement period after the date shown on this page. You will have full and accurate charges and account information to review once accounting charges on the date that they occur.

These reflect changes we've reflected based on your historical charges and may differ from your actual charges for this statement period. Estimated charges are presented using your consumption and do not take into account changes to your rate of service after the date on which you see this usage.

This category includes usage for non-hosted services that are not showing underneath in a specific usage type.

All charges and prices are in US Dollars.

Dates shown are based on Customer Invoicing Time (CIT).

All PCT Totals are used to calculate PCT Services.

Feedback English (US) ▾

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# CASE STUDY:

## Illustrate cost seasonality by region

## **Objective**

- Illustrate cost seasonality by various AWS regions

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Last 12 Months ▾ Monthly ▾ Stack ▾

Group by: Service ▾ Linked Account Region Instance Type Usage Type Resource Cost Category Tag API Operation Availability Zone Platform Purchase Option More ▾

Costs (\$ in thousands)

Dec 2019 Jan 2020 Feb 2020 Mar 2020 Apr 2020 May 2020 Jun 2020 Jul 2020 Aug 2020 Sep 2020 Oct 2020 Nov 2020

EC2-Instances EC2-Other CloudWatch EC2-ELB Elastic Container Service for Kubernetes Others

To see usage data, filter by "Usage Type" or "Usage Type Group" filters with matching units (e.g., hours).

Download CSV

Service	Dec 2019	Jan 2020	Feb 2020	Mar 2020	Apr 2020	May 2020	Jun 2020
Total cost (\$)	21,869.98	19,865.28	18,648.57	20,626.10	20,703.88	21,056.30	19,958.12
EC2-Instances (\$)	12,098.00	10,627.19	10,012.81	11,096.71	11,285.09	11,602.99	10,899.12
EC2-Other (\$)	5,120.17	4,706.26	4,685.01	5,256.74	5,225.44	5,378.16	5,300.12
CloudWatch (\$)	1,914.10	1,927.19	1,798.24	1,899.03	1,842.30	1,575.49	1,344.12
EC2-ELB (\$)	1,253.32	1,197.46	1,049.49	1,163.59	1,136.90	1,192.44	1,187.12
Elastic Container Service for Kubernetes (\$)	681.74	864.96	656.82	620.68	648.00	714.24	655.12

FILTERS CLEAR ALL

Service Include all ▾

Linked Account Include all ▾

Region Include all ▾

Instance Type Include all ▾

Usage Type Include all ▾

Usage Type Group Include all ▾

Resource Include all ▾

Cost Category Include all ▾

Tag Include all ▾

More filters ▾

ADVANCED OPTIONS

Show costs as Amortized costs ▾

Include costs related to

Show only untagged resources

Show only uncategorized resources

Show forecasted values

Feedback English (US) ▾

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Save as... Recent reports ▾ New report

Last 12 Months ▾ Monthly ▾

Group by: Region, Service, Linked Account, Instance Type, Usage Type, Resource, Cost Category, Tag, API Operation, Availability Zone, Platform, Purchase Option, More

Stack ▾

Costs (\$ in thousands)

The chart shows monthly costs in thousands of dollars. The total cost fluctuates between approximately \$15,000 and \$22,000. The segments represent different regions: US West (Oregon) in purple, US East (N. Virginia) in teal, Asia Pacific (Singapore) in red, South America (Sao Paulo) in yellow, Asia Pacific (Tokyo) in dark red, and Others in green. The legend at the bottom indicates the colors for each region.

To see usage data, filter by "Usage Type" or "Usage Type Group" filters with matching units (e.g., hours).

Download CSV

Region	Dec 2019	Jan 2020	Feb 2020	Mar 2020	Apr 2020	May 2020	Jun 2020	Jul 2020	Aug 2020	Sep 2020	Oct 2020	Nov 2020
Total cost (\$)	21,869.98	19,865.28	18,648.57	20,626.10	20,703.88	21,056.30	19,958.42	19,958.42	19,958.42	19,958.42	19,958.42	19,958.42
US West (Oregon) (\$)	17,706.22	16,112.56	15,235.93	16,774.58	16,668.21	16,965.39	16,283.11	16,283.11	16,283.11	16,283.11	16,283.11	16,283.11
US East (N. Virgi... (\$)	3,388.84	2,951.95	2,666.98	2,955.24	3,139.40	3,186.46	2,963.11	2,963.11	2,963.11	2,963.11	2,963.11	2,963.11
Asia Pacific (Sin... (\$)	173.71	174.98	162.98	176.84	173.26	176.33	149.11	149.11	149.11	149.11	149.11	149.11
South America (Sa... (\$)	157.40	162.61	120.57	176.80	174.31	178.27	121.11	121.11	121.11	121.11	121.11	121.11
Asia Pacific (Tokyo) (\$)	166.43	165.06	116.56	120.15	167.60	167.83	111.11	111.11	111.11	111.11	111.11	111.11

FILTERS CLEAR ALL

Service

Linked Account

Region

Instance Type

Usage Type

Usage Type Group

Resource

Cost Category

Tag

More filters ▾

ADVANCED OPTIONS

Show costs as ▾ Amortized costs

Include costs related to

Show only untagged resources

Show only uncategorized resources

Show forecasted values

Feedback English (US) ▾

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Services ▾

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### Preferences

Billing Console

Documentation

AWS Cost Management &gt; Cost Explorer

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Save as...

Recent reports ▾

New report

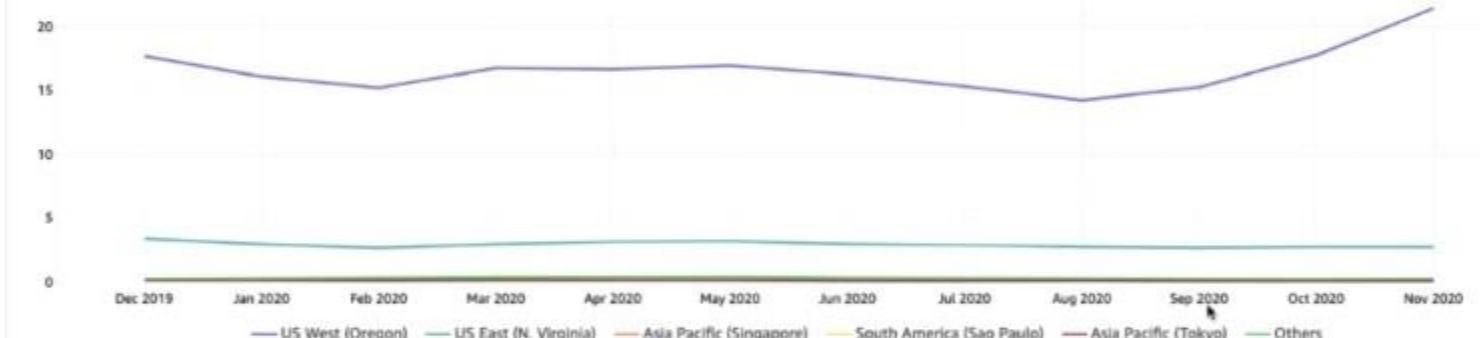
Last 12 Months

Monthly ▾

/ Line ▾

**Group by:** Region Service Linked Account Instance Type Usage Type Resource Cost Category Tag API Operation Availability Zone Platform Purchase Option More ▾

Costs (\$ in thousands)



▲ FILTERS

CLEAR ALL

Service

Include all

Linked Account

Include all

Region

Include all

Instance Type

Include all

Usage Type

Include all

Usage Type Group

Include all

Resource

Include all

Cost Category

Include all

Tag

Include all

More filters ▾

▲ ADVANCED OPTIONS



Show costs as

Amortized costs

Include costs related to

- Show only untagged resources
- Show only uncategorized resources
- Show forecasted values

To see usage data, filter by "Usage Type" or "Usage Type Group" filters with matching units (e.g., hours).

Download CSV

Region	Dec 2019	Jan 2020	Feb 2020	Mar 2020	Apr 2020	May 2020	Jun 2020
Total cost (\$)	21,869.98	19,865.28	18,648.57	20,626.10	20,703.88	21,056.30	19,958.4
US West (Oregon) (\$)	17,706.22	16,112.56	15,235.93	16,774.58	16,668.21	16,965.39	16,283.1
US East (N. Virgi... (\$)	3,388.84	2,951.95	2,666.98	2,955.24	3,139.40	3,186.46	2,963.1
Asia Pacific (Sin... (\$)	173.71	174.98	162.98	176.84	173.26	176.33	149.1
South America (Sa... (\$)	157.40	162.61	120.57	176.80	174.31	178.27	121.1
Asia Pacific (Tokyo) (J	166.43	165.06	135.55	170.18	167.60	167.81	111.1

# **CASE STUDY:**

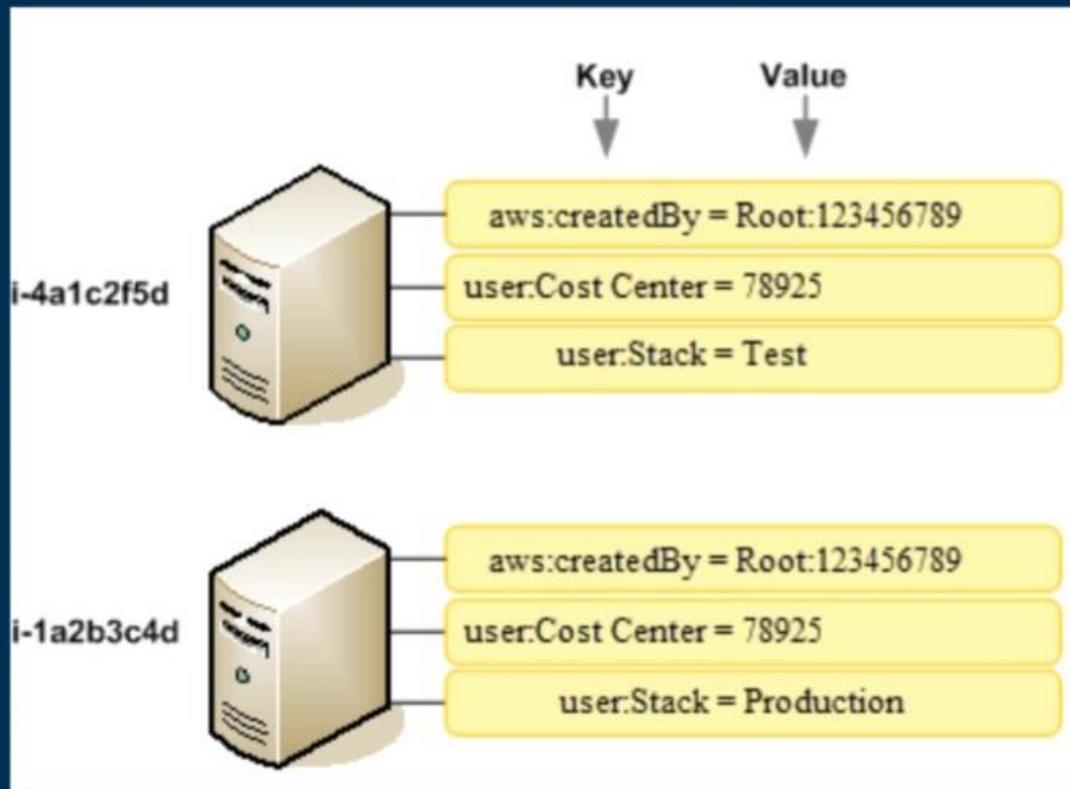
## Isolate cost of resources with certain tags

## **Objective**

- Calculate the cost of all resources with a particular tag  
(used for a particular project)

## What are tags?

- A tag is a label that you or AWS assigns to an AWS resource. Each tag consists of a key and a value.
- For each resource, each tag key must be unique, and each tag key can have only one value.



# Manage tags

Manage tags

**Selected resources (4)**  
View and edit the tags of selected resources.

Name	Service	Type	Region	ID	Tag: Name	Total tags
EC2 Instance i-0... 1	EC2	Instance	us-east-1	i-0...15	test-ubuntu-pi	2
EC2 Instance i-0... 1	EC2	Instance	us-east-1	i-0...13	jm-java-ec2-web-WebApp	3
S3 Bucket aws-codedstar-us-east-1-jm-ec2-web-pipe 1	S3	Bucket	us-east-1	aws-codedstar-us-east-1-jm-ec2-web-pipe	jm-ec2-web-S3Bucket	1
S3 Bucket jm-arg-cloudtrail-test-2018 1	S3	Bucket	us-west-2	jm-arg-cloudtrail-test-2018	-	1

**Edit tags of all selected resources**  
You can override the tags of all selected resources, or add new tags to them. [Learn more](#)

Tag key

Department

Environment

Key

Name

Stage

Value

awscodedstar:projectArn

Tag value - optional

Selected resources have different tag values  
Enter a new tag value or choose an existing value.

Remove tag

Selected resources have different tag values  
Enter a new tag value or choose an existing value.

Remove tag

Selected resources have different tag values  
Enter a new tag value or choose an existing value.

Remove tag

Selected resources have different tag values  
Enter a new tag value or choose an existing value.

Remove tag

Test

Selected resources have different tag values  
Enter a new tag value or choose an existing value.

Remove tag

Selected resources have different tag values  
Enter a new tag value or choose an existing value.

Remove tag

Add tag

Cancel Review and apply tag changes

# Tag we are looking for

The screenshot shows the AWS EC2 Dashboard. On the left, a navigation pane lists various services: Events, Tags, Limits, Instances (with 'Instances' selected), Instance Types, Launch Templates, Spot Requests, Savings Plans, Reserved Instances, Dedicated Hosts, Scheduled Instances, Capacity Reservations, Images, AMIs, Elastic Block Store (with 'Volumes' selected), Snapshots, Lifecycle Manager, Network & Security (with 'Security Groups' selected), and Elastic IPs.

The main content area displays the 'Instances (1/1) info' section. A welcome message states: "Welcome to the new instances experience! We're redesigning the EC2 console to make it easier to use. To switch between the old console and the new console, use the New EC2 Experience toggle above the navigation panel. We'll release updates continuously based on customer feedback." Below this, there's a table with one row, showing details for a running m5.xlarge instance named "Dev - Travel".

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS
Dev - Travel	i-03da4195d3d9f2d93	Running	m5.xlarge	2/2 checks ...	No alarms	-	-

Below the table, the "Instance: i-03da4195d3d9f2d93 (Dev - Travel)" details are shown. The "Tags" tab is selected. A single tag is listed: "Name" with the value "Dev - Travel".


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**Reservations**

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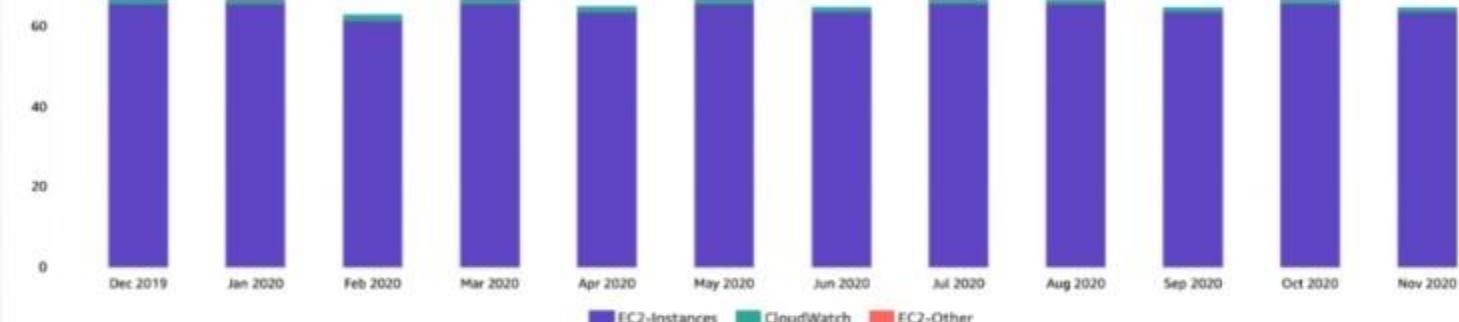
English (US) ▾

AWS Cost Management &gt; Cost Explorer

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[Group by:](#) [Service](#) [Linked Account](#) [Region](#) [Instance Type](#) [Usage Type](#) [Resource](#) [Cost Category](#) [Tag](#) [API Operation](#) [Availability Zone](#) [Platform](#) [Purchase Option](#) [More](#)

Costs (\$)


[FILTERS](#)
[CLEAR ALL](#)

Service

[Include all](#) ▾

Linked Account

[Include all](#) ▾

Region

[Include all](#) ▾

Instance Type

[Include all](#) ▾

Usage Type

[Include all](#) ▾

Usage Type Group

[Include all](#) ▾

Resource

[Include all](#) ▾

Cost Category

[Include all](#) ▾

Tag

Name

[Include only](#) ▾

Dev - Travel

1

API Operation

[Include all](#) ▾

Charge Type

[Exclude only](#) ▾

Credit

1

Refund

2

Availability Zone

[Include all](#) ▾

Platform

[Include all](#) ▾

Purchase Option

[Include all](#) ▾

Tenancy

[Include all](#) ▾

Database Engine

[Include all](#) ▾

Legal Entity

[Include all](#) ▾

Service	Dec 2019	Jan 2020	Feb 2020	Mar 2020	Apr 2020	May 2020	Jun 2020
Total cost (\$)	67.17	67.17	62.80	66.95	64.85	66.92	64.74
EC2-Instances (\$)	65.73	65.73	61.44	65.73	63.61	65.70	63.61
CloudWatch (\$)	1.44	1.44	1.36	1.23	1.24	1.23	1.13
EC2-Other (\$)			0.00				

An aerial photograph showing a row of sailboats docked at a wooden pier. The boats are covered with blue and white protective covers. One boat stands out with a red and white cover. The water is dark and reflects the boats.

# AWS Pricing Models

1	<b>ON DEMAND</b>
2	<b>SPOT INSTANCES</b>
3	<b>RESERVED INSTANCES (RI)</b>
4	<b>SAVINGS PLANS (SP)</b>

**1**

## **ON DEMAND**

- Default pricing model
- Pay-as-you-go
- Time / volume based
- Most flexible
- Most expensive

## 2

## SPOT INSTANCES

- Available for EC2 only
- Variable discounts (40-90%)
- Spare / unused EC2 capacity
- Can be interrupted and terminated in 2 minutes
- More complex to set up
- Not ideal for critical services

### 3

## RESERVED INSTANCES (RI)

- **For:** EC2, RDS, Redshift, ElastiCache, DynamoDB
- 30-70% Savings
- Commit to an instance configuration
- 1- or 3-year term
- Work like “coupons”

## 4

## SAVINGS PLANS (SP)

- New model since Nov 2019
- Work like RI, but more flexibility
- 30-70% Savings
- Covers EC2 and Fargate
- Commit to a dollar per hour

## Amazon Web Services – RIs vs. Savings Plans

- Reserved Instances (RIs)
  - What are they?
  - Benefits / Drawbacks
- Savings Plans
  - What are they?
  - Benefits / Drawbacks
  - No-brainer? 99% of the time, invest in Compute Savings Plans! – *but not so fast!*

## Reserved Instances

### ■ What are they?

- Discounted pricing (compared to On-Demand) in exchange for commitment to a utilization level for 1 or 3 year
- Two types: Standard & Convertible
  - 1-yr, No Upfront, Standard, t3.medium, Linux, regional scope, us-east-1, shared tenancy @ \$0.0261/hr (37% discount)
  - 3-yr, All Upfront, Convertible, m5.xlarge, Windows, zonal scope, us-east-1a, shared tenancy @ \$0.272/hr (28% discount)

Features	Limitations
<ul style="list-style-type: none"> <li>• Get up to 72% discount pricing from OnDemand</li> <li>• Reserve capacity with Zonal RIs (AZ)</li> <li>• Regional RIs (AZ) &amp; instance size flexibility for systems running Linux OS</li> <li>• Standard RIs can be sold in AWS marketplace</li> <li>• Convertible RIs offer more flexibility (Instance family, OS, tenancy)</li> </ul>	<ul style="list-style-type: none"> <li>• Pay for RIs even if they are underutilized</li> <li>• Restricted to AZ; no instance size flexibility</li> <li>• Constrained to reduce costs even if instances are oversized (e.g. wrong family, too much resource)</li> <li>• Governed by market prices; sold at less than purchase value</li> <li>• Not automated; manage exchange process &amp; interpret complex exchange rules</li> <li>• Minimize true up costs during exchange</li> </ul>



## Savings Plans

### I What are they?

- AWS Introduced Savings Plans in Fall 2019 to simplify long-term purchase commitments
- Discounted pricing (compared to On-Demand) in exchange for commitment to a dollar spend for 1 or 3 year
- Two types: EC2 Savings Plan & Compute Savings Plan
  - 1-yr, No Upfront, EC2 SP, us-east-1, t3 @ \$0.50/hr
  - 3-yr, All Upfront, Compute SP @ \$10/hr

## Comparing Reserved Instances & Savings Plans

### Standard RI

AZ, size (Linux), capacity reservation  
Discount up to 72%

### Convertible RI

AZ, size, family, OS, tenancy  
Discount up to 66%

### EC2 Savings Plan

AZ, size, OS, tenancy  
Discount up to 72%

### Compute Savings Plan

AZ, size, family, OS, tenancy, region, service  
Discount up to 66%

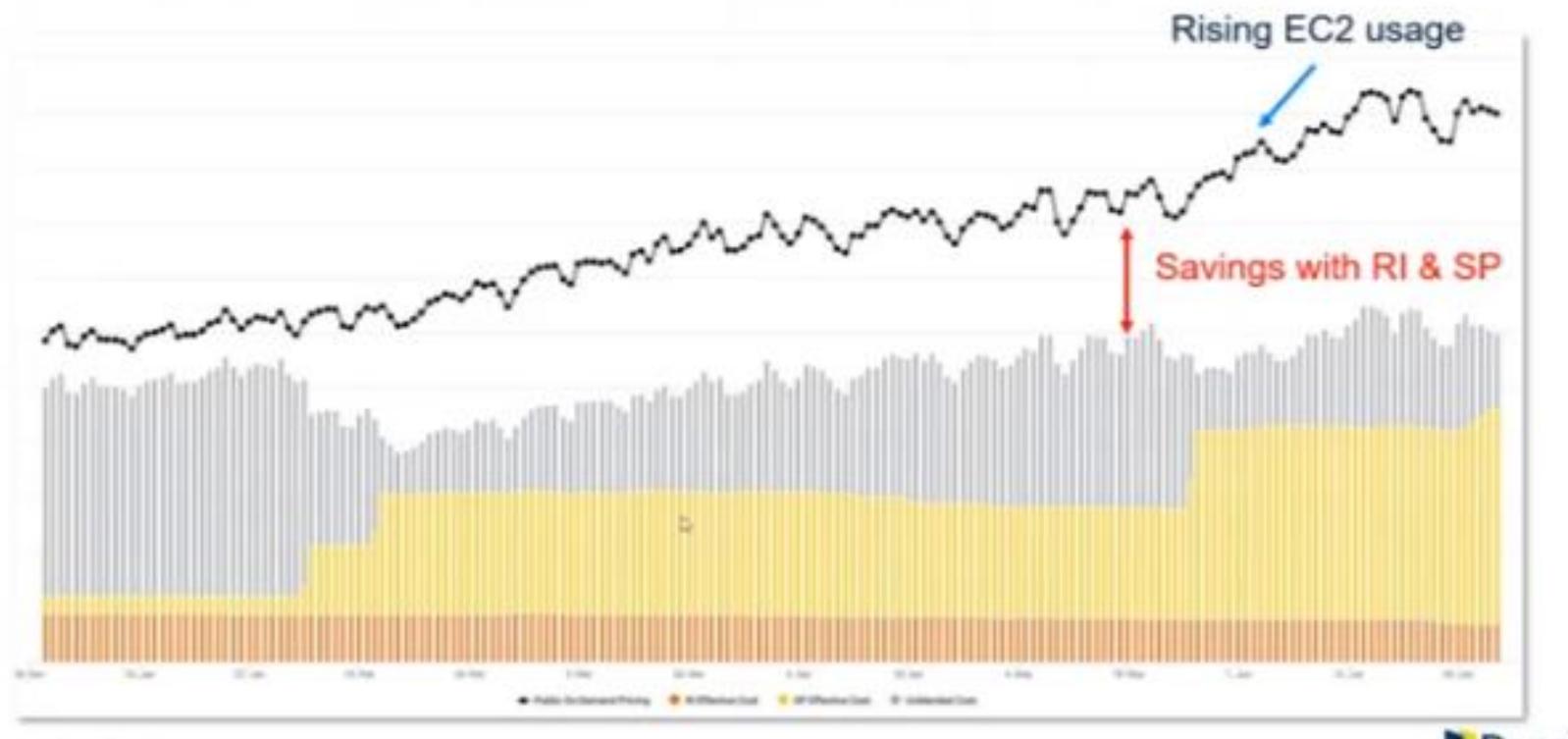
## Comparing Reserved Instances & Savings Plans

- Advantages of Savings Plans over Reserved Instances
  - Discounts are automatically applied. No management overhead
  - Regional Flexibility – Compute SPs can be applied to any region
  - Service Flexibility – Compute SPs can be shared amongst all compute services EC2, EKS, Fargate, Lambda etc...
- Advantages of Reserved Instances over Savings Plans
  - Standard RIs can be sold in marketplace
  - RIs can be purchased for RDS, Redshift, Elasticache
  - Capacity reservations can be made with Zonal RIs
  - For SUSE EC2 instances, much higher discounts are available via RIs vs. SPs
- It seems like a no-brainer to move to Compute Savings Plans for 99%, right? – *but not so fast!*

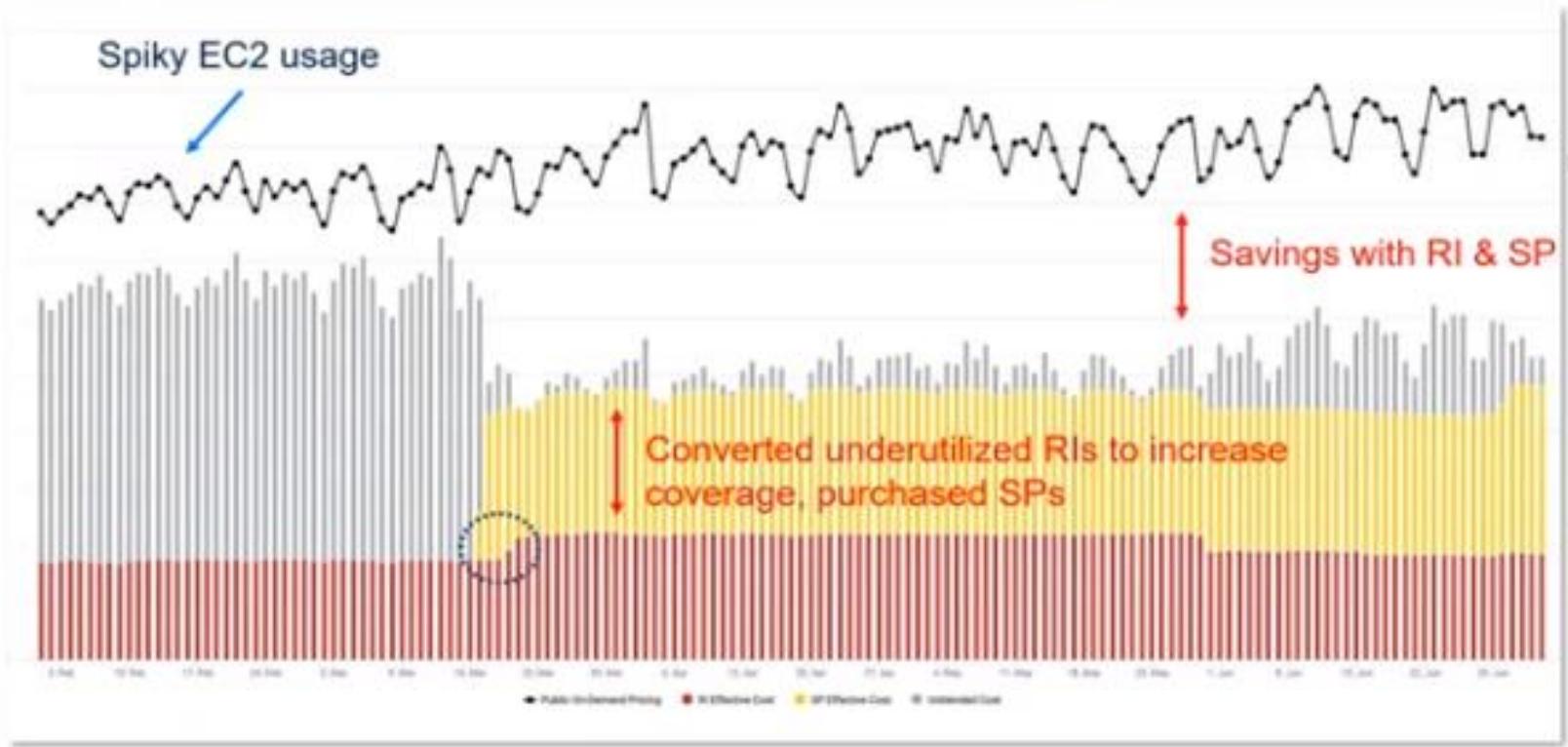
## **Key Considerations when purchasing Savings Plans**

- Centralized Purchasing vs. "Departmental" based decision making
- Are your instances and Auto Scaling Groups optimized / right-sized?
  - Purchase Savings Plans based on estimated "Right-sized" cost, not current state
- Do you have underutilized Convertible Reserved Instances?
  - If you have RIs that are convertible but are not fully utilized, you should convert to instances that provide better coverage
  - Purchase Savings Plans based on fully utilized RIs
- Cloud provider / bill reader recommendations – Beware!
  - "Buy this much" but are they optimized?
  - "Free tools / assessments" limitations

## Example 1 – Increasing Savings Plan Coverage



## Example 2 – Convertible Ris with Savings Plans



## Optimizing Purchases with Densify

- Constantly leverage the right RI portfolio
- Minimize true up costs
- Manage out of existing RI's where optimal
- Savings plan selection and optimal commits

The image displays three overlapping screenshots of the Densify software interface, specifically focusing on the 'Recommended Instances' tab. The interface is a web-based tool with a light blue header containing the Densify logo and navigation links for 'COST NAVIGATOR', 'RECOMMENDED INSTANCES', and 'REPORT LIBRARY'. The main content area is titled 'Recommended Instances' and shows a table of recommended savings plans. The table includes columns for 'Instance Type', 'Region', 'Provider', 'Subscription Type', 'Savings Plan', 'Estimated Monthly Cost', 'Actual Monthly Cost', 'Monthly Savings', 'Category', 'Detailed View', and 'Delete'. The table lists several recommendations, such as 'Amazon Lambda - Standard - 1000 hours per month' and 'Amazon Lambda - Standard - 10000 hours per month', with estimated monthly savings ranging from \$0.00 to \$20,000.00.

- Full monitoring of your RI Utilization & Coverage to maximize efficiency
- RI Aware Recommendations
  - Factor in existing standard RIs to ensure they are fully utilized
- Instance Optimization
  - Know your potential monthly savings through predictive rightsizing before oversubscribing
- Granular & fully transparent Convertible RI exchange process to minimize True Up Costs
- Savings Plans recommendations that are aware of your existing Reserved Instances
  - Exchange idle Convertible RIs before oversubscribing Savings Plans
- Managed Service
  - Optimization & Financial Visibility analysis from Densify Cloud Experts

# **CASE STUDY:**

## Analyze EC2 cost by purchase option

## **Objective**

- Illustrate EC2 cost and usage trends by AWS pricing model - on demand, reservations (RI), savings plan
- Calculate the % of on demand usage vs reservations
- Quantify potential on demand savings

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Last 6 Months

Group by: Monthly EC2 running hours costs and usage

Costs (\$)

AWS Marketplace

Daily costs

RI Utilization

Monthly costs by linked account

Jun 2020 Jul 2020 Aug 2020 Sep 2020 Oct 2020 Nov 2020

EC2-Other Refund EC2-ELB Elastic Container Service for Kubernetes EC2-Instances Others

To see usage data, filter by "Usage Type" or "Usage Type Group" filters with matching units (e.g., hour).

Download CSV

Service	Jun 2020	Jul 2020	Aug 2020	Sep 2020	Oct 2020	Nov 2020	Service Total
Total cost (\$)	7,538.19	4,162.04	6,664.55	6,706.60	5,000.33	10,189.83	40,261.55
EC2-Other (\$)	5,300.46	5,524.89	4,965.68	5,479.47	6,550.78	6,927.91	34,749.19
EC2-ELB (\$)	1,187.72	1,083.81	1,041.49	1,044.59	1,096.47	1,112.19	6,566.27
Elastic Container... (\$)	655.73	780.58	842.97	880.19	831.27	980.16	4,970.89

FILTERS

Service

Linked Account

Region

Instance Type

Usage Type

Usage Type Group

Resource

Cost Category

Tag

CLEAR ALL

More filters ↴

ADVANCED OPTIONS

Show costs as:

Unblended costs

Include costs related to

Show only untagged resources

Show only uncategorized resources

Show forecasted values

https://console.aws.amazon.com/cost-management/home?region=us-west-2

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Save as... Recent reports ▾ New report

Monthly EC2 running hours costs and usage

Last 6 Months Monthly Usage: Hours Bar

Group by: None Service Linked Account Region Instance Type Usage Type Resource Cost Category Tag API Operation Availability Zone Platform Purchase Option More

Costs (\$ in thousands)

Usage (Hrs in thousands)

Jun 2020 Jul 2020 Aug 2020 Sep 2020 Oct 2020 Nov 2020

Download CSV

Total cost (\$)

	Jun 2020	Jul 2020	Aug 2020	Sep 2020	Oct 2020	Nov 2020	Total
Total cost (\$)	596.55	489.76	636.65	152.34	300.77	2,577.59	4,753.26

FILTERS CLEAR ALL

Service Include all ▾

Linked Account Include all ▾

Region Include all ▾

Instance Type Include all ▾

Usage Type Include all ▾

Usage Type Group Include only ▾

EC2: Running Hours

Resource Include all ▾

Cost Category Include all ▾

Tag Include all ▾

More filters ▾

ADVANCED OPTIONS

Show costs as Unblended costs ▾

Include costs related to

Show only untagged resources

Show only uncategorized resources

Show forecasted values

Feedback English (US) ▾

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Save as... Recent reports ▾ New report

Monthly EC2 running hours costs and usage

Last 6 Months Monthly Usage: Hours Bar

From 06/01/2020 To 11/30/2020 Clear Selections

October 2020 November 2020

Usage Type	Resource	Cost Category	Tag	API Operation	Availability Zone	Platform	Purchase Option	More

Usage Type Group: EC2: Running Hours

Resource: Cost Category: Tag: More filters ▾

Advanced Options: Show costs as Amortized costs

Show only untagged resources Show only uncategorized resources Show forecasted values

Filters: Service: Linked Account: Region: Instance Type: Usage Type: Usage Type Group: Resource: Cost Category: Tag: More filters ▾

ADVANCED OPTIONS

Show costs as Amortized costs

Include costs related to:

Show only untagged resources

Show only uncategorized resources

Show forecasted values

Download CSV

Jun 2020 Jul 2020 Aug 2020 Sep 2020 Oct 2020 Nov 2020 Total

Total cost (\$)	Jun 2020	Jul 2020	Aug 2020	Sep 2020	Oct 2020	Nov 2020	Total
Total cost (\$)	10,889.25	10,267.92	9,807.85	10,044.19	11,434.63	14,319.55	66,763.38

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Save as... Recent reports ▾ New report

Monthly EC2 running hours costs and usage

Last 12 Months Monthly Usage: Hours Bar

Group by: None Service Linked Account Region Instance Type Usage Type Resource Cost Category Tag API Operation Availability Zone Platform Purchase Option More

Costs (\$ in thousands)

Usage (Hrs in thousands)

Download CSV

	Dec 2019	Jan 2020	Feb 2020	Mar 2020	Apr 2020	May 2020	Jun 2020	Jul 2020	Aug 2020	Sep 2020	Oct 2020	Nov 2020
Total cost (\$)	12,013.01	10,596.17	9,993.98	11,075.48	11,222.76	11,593.01	10,889.25					

FILTERS

CLEAR ALL

Service: Include all ▾

Linked Account: Include all ▾

Region: Include all ▾

Instance Type: Include all ▾

Usage Type: Include all ▾

Usage Type Group: **EC2: Running Hours** **Include only** **1**

Resource: Include all ▾

Cost Category: Include all ▾

Tag: Include all ▾

More filters ▾

ADVANCED OPTIONS

Show costs as: **Amortized costs**

Include costs related to:

Show only untagged resources

Show only uncategorized resources

Show forecasted values

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View Cost Anomaly Detection X

Last 12 Months Monthly Usage: Hours Stack

Group by: Purchase Option Service Linked Account Region Instance Type Usage Type Resource Cost Category Tag API Operation Availability Zone Platform More

Costs (\$ in thousands)

New 2020  
Reserved Cost: \$8,204.09 Usage: 108,750 Hrs Total Cost: \$14,319.55 Total Usage: 115,000 Hrs

Usage (Hrs in thousands)

Dec 2019 Jan 2020 Feb 2020 Mar 2020 Apr 2020 May 2020 Jun 2020 Jul 2020 Aug 2020 Sep 2020 Oct 2020 Nov 2020

Download CSV

Service Include all ▾

Linked Account Include all ▾

Region Include all ▾

Instance Type Include all ▾

Usage Type Include all ▾

Usage Type Group Include only ▾  
EC2: Running Hours

Resource Include all ▾

Cost Category Include all ▾

Tag Include all ▾

More filters ▾

ADVANCED OPTIONS

Show costs as ▾ Amortized costs

Include costs related to

Show only untagged resources

Show only uncategorized resources

Show forecasted values

Purchase Option Dec 2019 Jan 2020 Feb 2020 Mar 2020 Apr 2020 May 2020 Jun 2020

Purchase Option	Dec 2019	Jan 2020	Feb 2020	Mar 2020	Apr 2020	May 2020	Jun 2020
Total cost (\$)	12,015.01	10,596.17	9,993.98	11,075.48	11,222.76	11,593.01	10,889.25
Total usage (Hrs)	125,736.90	113,926.96	110,433.37	121,987.45	121,650.98	125,418.38	118,516.72
Reserved (\$)	9,542.72	8,533.62	8,052.41	8,437.70	8,403.22	8,526.31	8,166.91
Reserved (Hrs)	104,531.58	95,421.61	86,844.88	94,251.54	92,386.35	94,746.46	89,462.09
Savings Plans (\$)	646.19	1,073.88	1,171.52	1,575.62	1,828.02	1,827.57	2,125.99
Savings Plans (Hrs)	9,049.58	13,477.03	19,556.21	22,285.75	24,076.64	24,306.92	25,894.62
On Demand (\$)	1,824.09	988.68	770.05	1,062.17	991.52	1,239.55	596.55

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Cost Anomaly Detection (free service)

Save as... Recent reports

Monthly EC2 running costs

Last 12 Months

Group by: Purchase Option

Costs (\$ in thousands)

15

10

5

0

Usage (hrs in thousands)

100

50

0

Dec 2019

Purchase Option

Total cost (\$)

Total usage (Hrs)

Reserved (\$)

Sheet 1

EC2 purchase option

Purchase Option	Reserved (\$)	Savings Plans(\$)	On Demand(\$)	Total cost (\$)	Reserved(Hrs)	Savings Plans(Hrs)	On Demand(Hrs)	Total usage (Hrs)
2019-12-01	9,543	646	1,824	12,013	104,532	9,050	12,156	125,737
2020-01-01	8,534	1,074	989	10,596	95,422	13,477	5,028	113,927
2020-02-01	8,052	1,172	770	9,994	86,845	19,556	4,032	110,433
2020-03-01	8,438	1,576	1,062	11,075	94,252	22,286	5,450	121,987
2020-04-01	8,403	1,828	992	11,223	92,386	24,077	5,188	121,651
2020-05-01	8,526	1,827	1,239	11,593	94,746	24,307	6,365	125,418
2020-06-01	8,167	2,126	596	10,889	89,462	25,895	3,160	118,517
2020-07-01	7,842	1,937	490	10,268	85,670	23,203	2,465	111,338
2020-08-01	7,700	1,471	637	9,808	82,738	14,856	3,348	100,941
2020-09-01	8,153	1,739	152	10,044	87,154	16,967	649	104,771
2020-10-01	8,806	2,328	301	11,435	93,287	18,596	794	112,678
2020-11-01	9,204	2,538	2,577	14,320	109,730	19,284	6,847	135,860
<b>Total \$</b>	<b>101,368</b>	<b>20,261</b>	<b>11,629</b>	<b>133,258</b>	<b>1,116,223</b>	<b>231,553</b>	<b>55,482</b>	<b>1,403,258</b>
<b>Total %</b>	<b>76%</b>	<b>15%</b>	<b>9%</b>	<b>100%</b>	<b>80%</b>	<b>17%</b>	<b>4%</b>	<b>100%</b>

On demand cost 11,629

Potential savings % 30% 1 year EC2 savings plan

Potential savings \$ 3,489

Data Format Number

Thousands Separator

Fill: No Fill

Border: No Border

Conditional Highlighting...

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## **Objectives**

- Analyze historical Reserved Instances and Savings Plan coverage and utilization trends using AWS reports
- Develop a metric that shows % of on-demand, RI and savings plan

# CASE STUDY: RI/SP COVERAGE AND UTILIZATION

## Coverage vs Utilization

$$\text{Coverage \%} = \frac{\text{RI / SP Usage}}{\text{Total Usage}}$$

60%      RI / SP Usage      60 Hrs / \$60  
                Total Usage      100 Hrs / \$100

- How much of total instance usage is covered by RI/SP
- Inform how much incremental RI/SP commitment may be possible
- Identify opportunities savings and risks of over-committing
- Less established companies may aim coverage between 30-70%
- More mature companies may aim coverage between 70-90%
- Rule of thumb is: If there are savings, you should take advantage!

## Coverage vs Utilization

$$\text{Utilization \%} = \frac{\text{RI / SP Usage}}{\text{RI / SP Committed}}$$

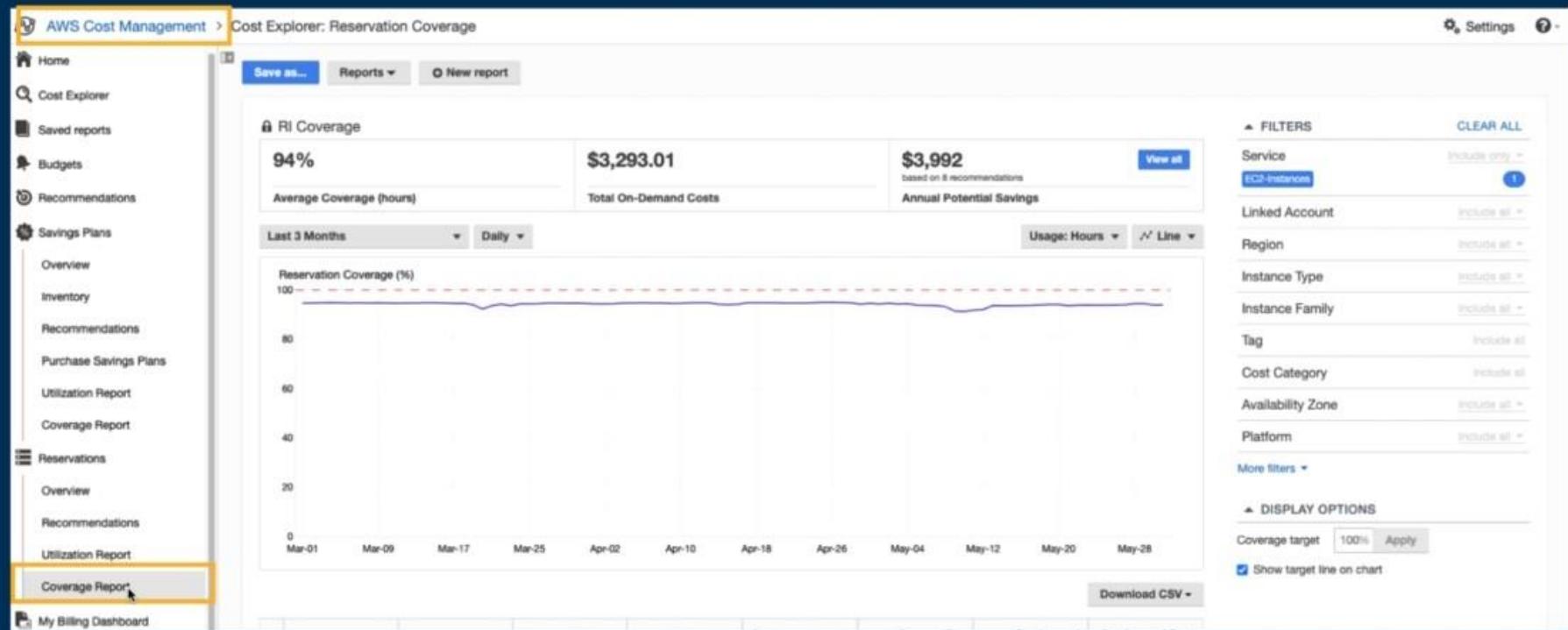
80%      RI / SP Usage      60 Hrs / \$60  
              RI / SP Committed      75 Hrs / \$75

- Measures efficiency of RI / SP commitment
- The higher the utilization, the better
- If utilization is 80%, that means 20% of RI/SP is wasted.
- If utilization is 100%, that means no waste!
- Generally speaking, should aim at utilization > 95%.

## AWS RI / SP Coverage / Utilization reports

- 4 reports available in AWS Cost Management/Cost Explorer Tools
  - RI Coverage (based on hours)
  - RI Utilization (based on hours)
  - SP Coverage (based on \$)
  - SP Utilization (based on \$)
- Limitations: No single interface showing combined RI/SP coverage
  - This can be calculated using “EC2 running hours cost and usage report”

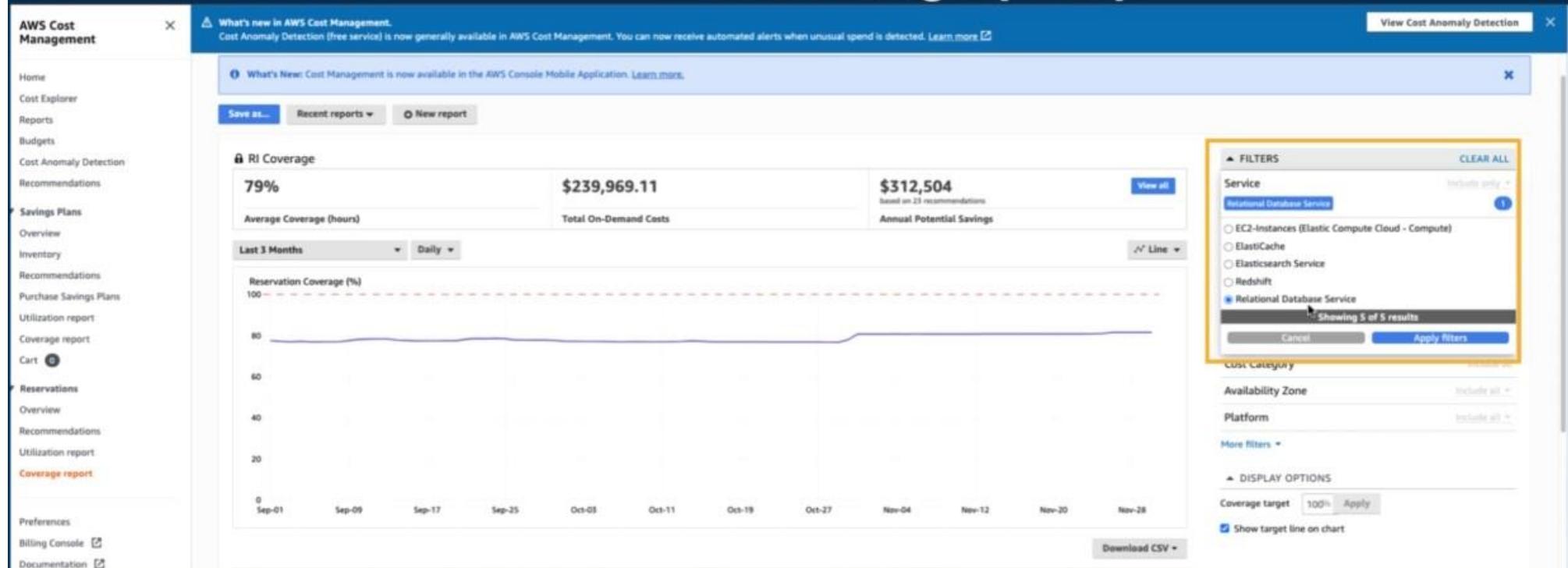
# RI Coverage (EC2)



$$\text{RI Coverage \%} = \frac{\text{RI Usage Hours}}{\text{RI + On-demand Hours}}$$

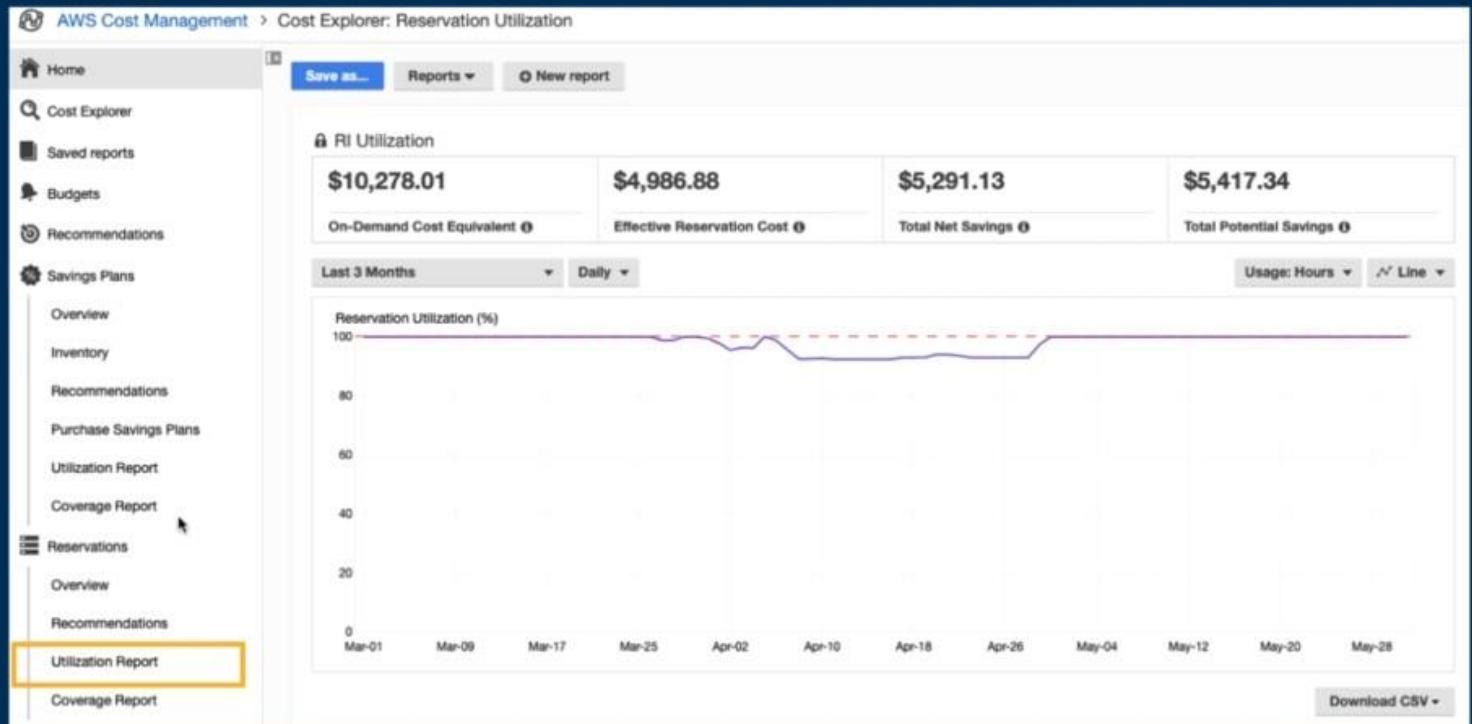
Limitation: Ignores Savings Plans

# RI Coverage (RDS)



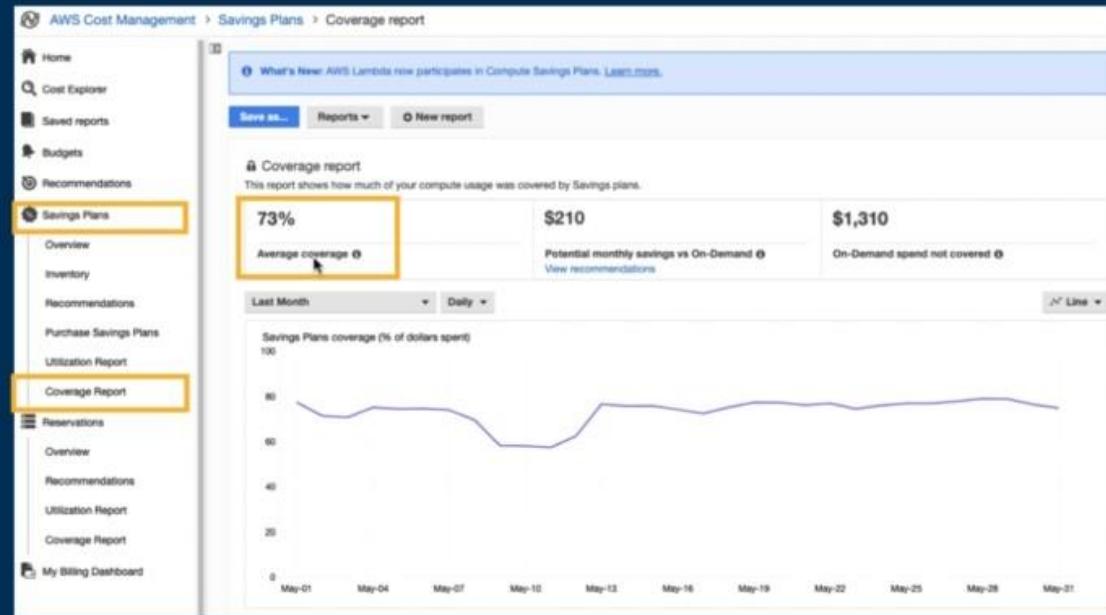
$$\text{RI Coverage \%} = \frac{\text{RI Usage Hours}}{\text{RI + On-demand Hours}}$$

# RI Utilization (EC2)



$$\text{RI Utilization \%} = \frac{\text{RI Usage Hours}}{\text{RI Committed Hours}}$$

## SP Coverage

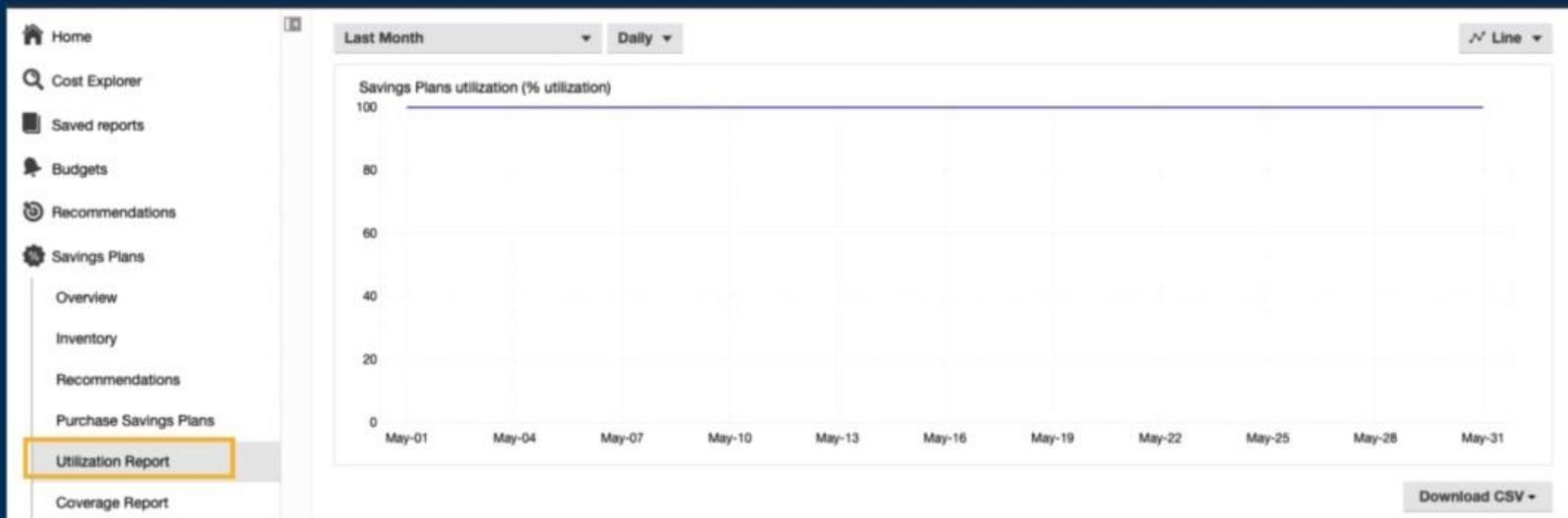


$$\text{SP Coverage \%} = \frac{\$ \text{ OD equivalent spend covered by SP}}{\$ \text{ OD equivalent spend covered} + \text{not covered by SP}}$$

### **Limitation: Ignores Reserved Instances**

$$\$100 = \$73 + \$27$$

# SP Utilization



**98%**  
SP Utilization % =

**\$ Used SP Commitment**  
\_\_\_\_\_

**\$ Total SP Commitment**

**\$9.8 / hr**

**\$10 / hr**

**Limitation: Ignores Reserved Instances**

# HOW TO CALCULATE A TOTAL RI/SP COVERAGE METRIC



Services ▾

Resource Groups ▾



AWS Cost Management

Cost Explorer: Cost &amp; Usage



Home



Cost Explorer



Saved reports



Budgets



Recommendations



Savings Plans

Overview

Inventory

Recommendations

Purchase Savings Plans

Utilization Report

Coverage Report



Reservations

Overview

Recommendations

Utilization Report

Coverage Report



Save as...

Reports ▾

New report

Cost and Usage Reports

Monthly costs by service

Monthly costs by linked account

Monthly EC2 running hours costs and usage

Daily costs

AWS Marketplace

Reservation Reports

RI Utilization

RI Coverage

Savings Plans Reports

Utilization report

Coverage report

User-defined Reports

Monthly

Last 6 Mon

Usage: Hours ▾

Stack ▾

Group by

Costs (\$)

12

10

8

6

4

2

0

Usage (Hrs in thousands)

100

50

0

Dec 2019

Jan 2020

Feb 2020

Mar 2020

Apr 2020

May 2020

Reserved Savings Plans On Demand Unused Reserved

[Home](#)[Cost Explorer](#)[Saved reports](#)[Budgets](#)[Recommendations](#)[Savings Plans](#)[Overview](#)[Inventory](#)[Recommendations](#)[Purchase Savings Plans](#)[Utilization Report](#)[Coverage Report](#)[Reservations](#)[Overview](#)[Recommendations](#)[Utilization Report](#)[Coverage Report](#)[My Billing Dashboard](#)[Save as...](#)[Reports](#)[New report](#)

### Monthly EC2 running hours costs and usage

Last 6 Months

Monthly

Usage: Hours

Stack

Group by: Purchase Option

Service

Linked Account

Region

Instance Type

Usage Type

Resource

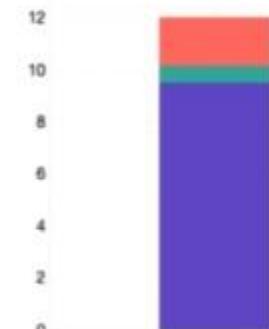
Cost Category

Tag

API Operation

More

Costs (\$ in thousands)



Usage (Hrs in thousands)



Legend: Reserved (purple), Savings Plans (teal), On Demand (red), Unused Reserved (yellow)

[Download CSV](#)

CSV

### FILTERS

[CLEAR ALL](#)

Service

[Include all](#)

Linked Account

[Include all](#)

Region

[Include all](#)

Instance Type

[Include all](#)

Usage Type

[Include all](#)

Usage Type Group

[Include only](#)

EG: Running Hours

1

Resource

[Include all](#)

Cost Category

[Include all](#)

Tag

[Include all](#)[More filters](#)

### ADVANCED OPTIONS

Show costs as

Amortized costs

Include costs related to

 Show only untagged resources Show only uncategorized resources Show forecasted values AWS Best Practice AWS Best Practice AWS Best Practice AWS Best Practice AWS Best Practice

Udemy

	Type	\$	Hours	% total hrs
1	Reserved	\$8,500	94,700	76%
2	Savings Plans	\$1,800	24,300	19%
3	On Demand	\$1,200	6,300	5%
<b>Total</b>		<b>\$11,500</b>	<b>125,400</b>	<b>100%</b>
1+2	<b>RI/SP Combined</b>	\$10,300	119,000	95%



# CASE STUDY: Interpret RI Recommendations



### ⚠ What's new in AWS Cost Management.

Cost Anomaly Detection (free service) is now generally available in AWS Cost Management. You can now receive automated alerts when unusual spend is detected. [Learn more](#)

[View Cost Anom](#)

AWS Cost Management > Reservations > Recommendations

**\$107,214.57**

Estimated Annual Savings\*

**8%**

Savings vs. On-Demand

**30**

Purchase Recommendations

Based on your past 60 days of EC2 usage, we have identified **30 one-year, all-upfront, standard RI purchase recommendations** to save an estimated **\$107,214.57** annually, representing a savings of **8% versus on-demand costs**. You can take action on these recommendations in the [EC2 Reservation Purchase Console](#).

Generate recommendations based on:

All accounts  Individual accounts

Sort by:

[Monthly Estimated Savings](#) [Download CSV](#)

Purchase Recommendations (30)

Details

#### Buy 97 m5.large reserved instances

EU (Ireland) | Windows (Amazon VPC) | Shared

*Based on your past 60 days of on-demand usage, we recommend purchasing 97 m5.large reserved instances.*

[View Associated EC2 Usage](#)

**\$1,770.80 monthly savings**

Upfront Cost: \$131,629.00

Recurring Monthly Cost: \$0.00

Expected RI Utilization: 90%

#### Buy 67 m5.large reserved instances

US West (N. California) | Windows (Amazon VPC) | Shared

*Based on your past 60 days of on-demand usage, we recommend purchasing 67 m5.large reserved instances.*

[View Associated EC2 Usage](#)

**\$1,384.54 monthly savings**

Upfront Cost: \$92,661.00

Recurring Monthly Cost: \$0.00

Expected RI Utilization: 91%

#### Buy 100 m5.large reserved instances

EU (London) | Windows (Amazon VPC) | Shared

*Based on your past 60 days of on-demand usage, we recommend purchasing 100 m5.large reserved instances.*

[View Associated EC2 Usage](#)

**\$1,307.06 monthly savings**

Upfront Cost: \$137,800.00

Recurring Monthly Cost: \$0.00

Expected RI Utilization: 86%

#### Buy 43 m5.large reserved instances

EU (Frankfurt) | Windows (Amazon VPC) | Shared

*Based on your past 60 days of on-demand usage, we recommend purchasing 43 m5.large reserved instances.*

[View Associated EC2 Usage](#)

**\$902.99 monthly savings**

Upfront Cost: \$60,114.00

Recurring Monthly Cost: \$0.00

Expected RI Utilization: 91%

#### Buy 82 m5.large reserved instances

**\$697.89 monthly savings**

### Select recommendation type

Elastic Compute Cloud (EC2)

Elastic Compute Cloud (EC2)

Relational Database Service (RDS)

ElastiCache

Redshift

Elasticsearch

Standard

Convertible

### Payment option

All upfront

Partial upfront

No upfront

### Based on the past

7 days

30 days

60 days

### Additional Filters

Linked Account



**What's new in AWS Cost Management.**

**View Cost Analyzer**

## EC2 COMMITMENT AVERAGE DISCOUNTS (LINUX)

**\$107,214.57** Estimated Annual Savings

Based on your past 60 days of on-demand usage, we recommend purchasing 97 m5.large reserved instances.

**Generate recommendations**

**Purchase Recommendation**

**Buy 97 m5.large reserved instances**

**Buy 67 m5.large reserved instances**

**Buy 100 m5.large reserved instances**

**Buy 43 m5.large reserved instances**

**Buy 82 m5.large reserved instances**

**8%** RI Type

Term	RI Type	All Upfront	Partial Upfront	No Upfront
1-year	<b>Standard RI / EC2 SP</b>	41%	40%	37%
1-year	<b>Conv. RI / Compute SP</b>	32%	31%	27%
3-year	<b>Standard RI / EC2 SP</b>	62%	60%	57%
3-year	<b>Conv. RI / Compute SP</b>	55%	54%	50%

Estimated Monthly Cost: \$107,214.57

Expected RI Utilization: 90%

**Discount Difference**

Partial upfront vs. All upfront	1-3%
No upfront vs. All upfront	4-6%
1-year vs. 3-year	20-25%
More Flexibility	7-10%

\$902.99 monthly savings

Upfront Cost: \$60,114.00

Recurring Monthly Cost: \$0.00

Expected RI Utilization: 81%

Select recommendation type

Elastic Compute Cloud (EC2)

RI Recommendation Parameters:

RI term

- 1-year
- 3-years

Offering Class

- Standard
- Convertible

Payment option

- All upfront
- Partial upfront
- No upfront

Based on the past

- 7 days
- 30 days
- 60 days

Additional Filters

Linked Account

Average



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Savings vs. On-Demand

**30**

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Generate recommendations based on:

All accounts  Individual accounts

Sort by:

[Monthly Estimated Savings](#) [Download CSV](#)

Purchase Recommendations (30)

Details

#### Buy 97 m5.large reserved instances

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*Based on your past 60 days of on-demand usage, we recommend purchasing 97 m5.large reserved instances.*

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#### Buy 43 m5.large reserved instances

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[View Associated EC2 Usage](#)

**\$902.99 monthly savings**

Upfront Cost: \$60,114.00

Recurring Monthly Cost: \$0.00

Expected RI Utilization: 91%

#### Buy 82 m5.large reserved instances

**\$697.89 monthly savings**

### Select recommendation type

Elastic Compute Cloud (EC2)

### RI Recommendation Parameter:

#### RI term

- 1 year  
 3 years

#### Offering Class

- Standard  
 Convertible

#### Payment option

- All upfront  
 Partial upfront  
 No upfront

#### Based on the past

- 7 days  
 30 days  
 60 days

### Additional Filters

Linked Account



**What's new in AWS Cost Management.**

Cost Anomaly Detection (free service) is now generally available in AWS Cost Management. You can now receive automated alerts when unusual spend is detected. [Learn more](#)

[View Cost Anom](#)

AWS Cost Management > Reservations > Recommendations

**\$82,271.96**

Estimated Annual Savings\*

**7%**

Savings vs. On-Demand

**26**

Purchase Recommendations

Based on your past 60 days of EC2 usage, we have identified **26 one-year, no-upfront, standard RI purchase recommendations** to save an estimated **\$82,271.96** annually, representing a savings of **7% versus on-demand costs**. You can take action on these recommendations in the [EC2 Reservation Purchase Console](#).

Generate recommendations based on:

All accounts    Individual accounts

Sort by:

[Monthly Estimated Savings](#) ▾ [Download CSV](#)

**Purchase Recommendations (26)**

**Details**

**Buy 96 m5.large reserved instances**

EU (Ireland) | Windows (Amazon VPC) | Shared

*Based on your past 60 days of on-demand usage, we recommend purchasing 96 m5.large reserved instances.*

[View Associated EC2 Usage](#)

**\$1,481.45 monthly savings**

Upfront Cost: \$0.00

Recurring Monthly Cost: \$11,142.72

Expected RI Utilization: 91%

**Buy 67 m5.large reserved instances**

US West (N. California) | Windows (Amazon VPC) | Shared

*Based on your past 60 days of on-demand usage, we recommend purchasing 67 m5.large reserved instances.*

[View Associated EC2 Usage](#)

**\$1,133.96 monthly savings**

Upfront Cost: \$0.00

Recurring Monthly Cost: \$7,972.33

Expected RI Utilization: 91%

**Buy 99 m5.large reserved instances**

EU (London) | Windows (Amazon VPC) | Shared

*Based on your past 60 days of on-demand usage, we recommend purchasing 99 m5.large reserved instances.*

[View Associated EC2 Usage](#)

**\$965.64 monthly savings**

Upfront Cost: \$0.00

Recurring Monthly Cost: \$11,707.74

Expected RI Utilization: 86%

**Buy 43 m5.large reserved instances**

EU (Frankfurt) | Windows (Amazon VPC) | Shared

*Based on your past 60 days of on-demand usage, we recommend purchasing 43 m5.large reserved instances.*

[View Associated EC2 Usage](#)

**\$764.53 monthly savings**

Upfront Cost: \$0.00

Recurring Monthly Cost: \$5,147.96

Expected RI Utilization: 91%

**Buy 81 m5.large reserved instances**

**\$483.67 monthly savings**

Select recommendation type

Elastic Compute Cloud (EC2)

**RI Recommendation Parameter:**

RI term

- 1 year  
 3 years

Offering Class

- Standard  
 Convertible

Payment option

- All upfront  
 Partial upfront  
 No upfront

Based on the past

- 7 days  
 30 days  
 60 days

**Additional Filters**

Linked Account





## What's new in AWS Cost Management.

Cost Anomaly Detection (free service) is now generally available in AWS Cost Management. You can now receive automated alerts when unusual spend is detected. Learn more

View Cost Anom

\$82,271.96

Estimated Annual Savings\*

7%

Savings vs. On-Demand

26

Purchase Recommendations

Based on your past 60 days of EC2 usage, we have identified **26 one-year, no-upfront, standard RI purchase recommendations** to save an estimated \$82,271.96 annually, representing a savings of **7% versus on-demand costs**. You can take action on these recommendations in the [EC2 Reservation Purchase Console](#).

## Generate recommendations based on:

 All accounts Individual accounts

## Sort by:

Monthly Estimated Savings

[Download CSV](#)

## Purchase Recommendations (26)

ASIA PACIFIC (Mumbai) | WINDOWS (AMAZON VPC) | Shared

Based on your past 60 days of on-demand usage, we recommend purchasing 37 m5.large reserved instances.

[View Associated EC2 Usage](#)

## Details

Upfront Cost: \$0.00

Recurring Monthly Cost: \$4,213.56

Expected RI Utilization: 85%

## Buy 5 m5a.xlarge reserved instances

EU (London) | Windows (Amazon VPC) | Shared

Based on your past 60 days of on-demand usage, we recommend purchasing 5 m5a.xlarge reserved instances.

[View Associated EC2 Usage](#)

## \$150.38 monthly savings

Upfront Cost: \$0.00

Recurring Monthly Cost: \$1,131.50

Expected RI Utilization: 91%

## Buy 8 m5.large reserved instances

Size flexible\*\*

US West (N. California) | Linux/UNIX | Shared

Based on your past 60 days of on-demand usage, we recommend purchasing 8 m5.large reserved instances to cover 32 normalized units per hour of m5 family usage to maximize savings.

[View Associated EC2 Usage](#)

## \$77.24 monthly savings

Upfront Cost: \$0.00

Recurring Monthly Cost: \$414.64

Expected RI Utilization: 75%

## Buy 1 m5.xlarge reserved instance

EU (London) | Windows (Amazon VPC) | Shared

Based on your past 60 days of on-demand usage, we recommend purchasing 1 m5.xlarge reserved instance.

[View Associated EC2 Usage](#)

## \$29.10 monthly savings

Upfront Cost: \$0.00

Recurring Monthly Cost: \$236.52

Expected RI Utilization: 90%

## Buy 2 m4.xlarge reserved instances

Asia Pacific (Sydney) | Windows (Amazon VPC) | Shared

Based on your past 60 days of on-demand usage, we recommend purchasing 2 m4.xlarge reserved instances.

## \$26.87 monthly savings

Upfront Cost: \$0.00

Recurring Monthly Cost: \$134.35

## Select recommendation type

 Elastic Compute Cloud (EC2)

## RI Recommendation Parameters

## RI term

- 
- 1 year
- 
- 
- 3 years

## Offering Class

- 
- Standard
- 
- 
- Convertible

## Payment option

- 
- All upfront
- 
- 
- Partial upfront
- 
- 
- No upfront

## Based on the past

- 
- 7 days
- 
- 
- 30 days
- 
- 
- 60 days

## Additional Filters

## Linked Account

# **CASE STUDY:**

## Purchase RI and Savings Plan

## **Objectives**

- Buy 1x EC2 Convertible RI (m5.large) in US-East Ohio
- Buy 1x RDS RI for r5.xlarge MySQL in US N.California
- Buy \$1 Compute Savings Plan





## AWS Cost Management

Home  
Cost Explorer  
Reports  
Budgets  
Cost Anomaly Detection  
Recommendations

### Savings Plans

Overview  
Inventory  
Recommendations  
Purchase Savings Plans  
Utilization report  
Coverage report  
Cart 0

### Reservations

Overview  
Recommendations  
Utilization report  
Coverage report

Preferences  
Billing Console ▾  
Documentation ▾

⚠ What's new in AWS Cost Management.  
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AWS Cost Management > Cost Explorer

What's New: Cost Management is now available in the AWS Console Mobile Application

Save as... Recent reports ▾ New report

Last 6 Months

Monthly ▾

Bar ▾

FILTERS

CLEAR ALL

Service Include all ▾

Linked Account Include all ▾

Region Include all ▾

Instance Type Include all ▾

Usage Type Include all ▾

Usage Type Group Include all ▾

Resource Include all ▾

Cost Category Include all

Tag Include all

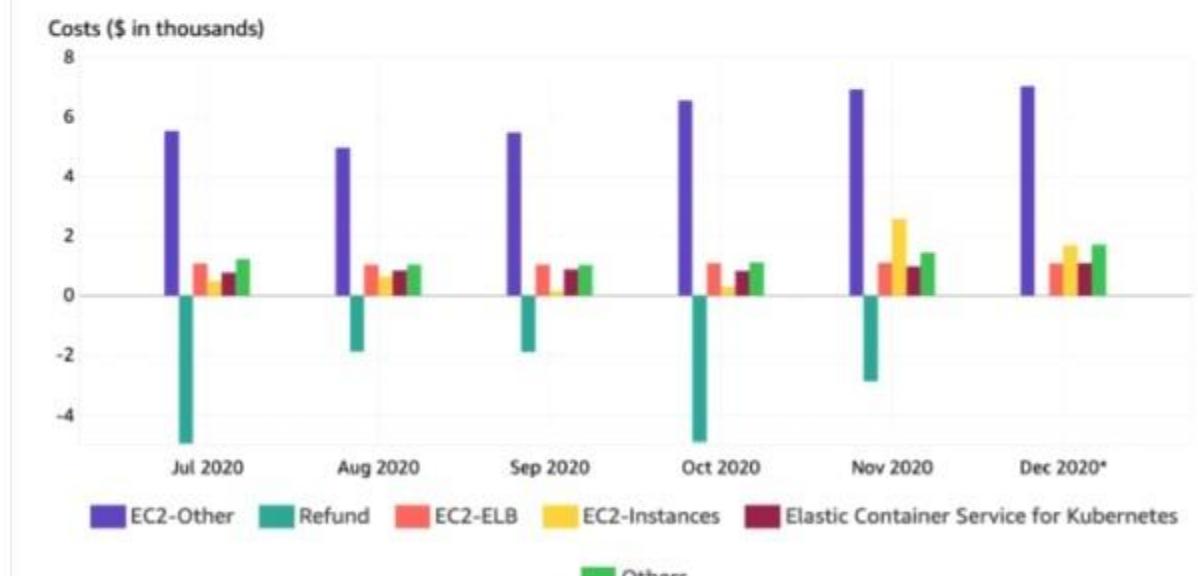
More filters ▾

ADVANCED OPTIONS ▾

Show costs as ▾

Unblended costs ▾

Include costs related to



To see usage data, filter by "Usage Type" or "Usage Type Group" filters with matching units (e.g., hours).



New EC2 Experience  
Tell us what you think X

EC2 Dashboard New

Events

Tags

Limits

▼ Instances

Instances New

Instance Types

Launch Templates

Spot Requests

Savings Plans

Reserved Instances

Dedicated Hosts New

Scheduled Instances

Capacity Reservations

▼ Images

AMIs

▼ Elastic Block Store

Volumes

Snapshots

Lifecycle Manager

▼ Network & Security

Security Groups New

Elastic IPs New

Placement Groups

Key Pairs

① Welcome to the new EC2 console!

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## Resources

You are using the following Amazon EC2 resources in the US East (N. Virginia) Region:

Instances (running)	20	Dedicated Hosts	0
Elastic IPs	6	Instances (all states)	20
Key pairs	11	Load balancers	7
Placement groups	0	Security groups	31
Snapshots	282	Volumes	23

i Easily size, configure, and deploy Microsoft SQL Server Always On availability groups on AWS using the AWS Launch Wizard for SQL Server. [Learn more](#) X

## Launch instance

To get started, launch an Amazon EC2 instance, which is a virtual server in the cloud.

[Launch instance](#) ▾

Note: Your instances will launch in the US East (N. Virginia) Region

## Service health

Service Health Dashboard [i]

Region

US East (N. Virginia)

Status

✓ This service is operating normally

## Zone status

## Objectives

- Buy 1x EC2 Convertible RI (m5.large) in US-East Ohio
- Buy 1x RDS RI for r5.xlarge MySQL in US N.California
- Buy \$1 Compute Savings Plan

## Supported platforms [i]

- EC2
- VPC

## Settings

[EBS encryption](#)

[Zones](#)

[Default credit specification](#)

[Console experiments](#)

## Explore AWS

### Faster Workload Deployment With MAP for Windows

Get prescriptive guidance, tooling, training, and services credits to modernize your applications. [Learn more](#) [i]

### Get Up to 40% Better Price Performance

T4g instances deliver the best price performance for burstable general purpose workloads in Amazon EC2. [Learn more](#) [i]

### Enable Best Price-Performance with



Services ▾

Q. Search for services, features, marketplace products, and docs

[Option+S]



x+d ▾ N. Virginia ▾

Support ▾

 New EC2 Experience  
Tell us what you think X[EC2 Dashboard](#) New

Events

Tags

Limits

## ▼ Instances

[Instances](#) New[Instance Types](#)[Launch Templates](#)[Spot Requests](#)[Savings Plans](#)[Reserved Instances](#)[Dedicated Hosts](#) New[Scheduled Instances](#)[Capacity Reservations](#)

## ▼ Images

[AMIs](#)

## ▼ Elastic Block Store

[Volumes](#)[Snapshots](#)[Lifecycle Manager](#)

## ▼ Network &amp; Security

[Security Groups](#) New[Elastic IPs](#) New[Placement Groups](#)[Key Pairs](#)

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Placement groups	0	Security groups	31
Snapshots	282	Volumes	23

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## Launch instance

## Service health

[Service Health Dashboard](#) ↗

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[Launch instance](#) ▼

Note: Your instances will launch in the US East (N. Virginia) Region

Region

US East (N. Virginia)

Status

✓ This service is operating normally

## Zone status

US East (N. Virginia) us-east-1

US East (Ohio) us-east-2

US West (N. California) us-west-1

US West (Oregon) us-west-2

Africa (Cape Town) af-south-1

Asia Pacific (Hong Kong) ap-east-1

Asia Pacific (Mumbai) ap-south-1

Asia Pacific (Seoul) ap-northeast-2

Asia Pacific (Singapore) ap-southeast-1

Asia Pacific (Sydney) ap-southeast-2

Asia Pacific (Tokyo) ap-northeast-1

Canada (Central) ca-central-1

Europe (Frankfurt) eu-central-1

Europe (Ireland) eu-west-1

Europe (London) eu-west-2

Europe (Milan) eu-south-1

Europe (Paris) eu-west-3

Europe (Stockholm) eu-north-1

Middle East (Bahrain) me-south-1

South America (São Paulo) sa-east-1

[Learn more](#) ↗

Enable Best Price-Performance with



New EC2 Experience  
Tell us what you think X

## EC2 Dashboard New

Events

Tags

Limits

### Instances

Instances New

Instance Types

Launch Templates

Spot Requests

Savings Plans

Reserved Instances New

Dedicated Hosts New

Capacity Reservations

### Images

AMIs

### Elastic Block Store

Volumes

Snapshots

Lifecycle Manager

### Network & Security

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## Resources



You are using the following Amazon EC2 resources in the US East (Ohio) Region:

Instances (running)	0	Dedicated Hosts	0
Elastic IPs	0	Instances (all states)	0
Key pairs	0	Load balancers	0
Placement groups	0	Security groups	0
Snapshots	0	Volumes	0

ⓘ Easily size, configure, and deploy Microsoft SQL Server Always On availability groups on AWS using the AWS Launch Wizard for SQL Server. Learn more X

## Account attributes



Supported platforms ↗

- VPC

Default VPC ↗

none

Settings

EBS encryption

Zones

Default credit specification

Console experiments

## Explore AWS



Faster Workload Deployment With MAP for Windows

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New EC2 Experience  
Tell us what you think X

EC2 Dashboard New

Events

Tags

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Dedicated Hosts New

Capacity Reservations

▼ Images

AMIs

▼ Elastic Block Store

Volumes

Snapshots

Lifecycle Manager

▼ Network & Security

Purchase Reserved Instances

Actions ▾

Filter by attributes or search by keyword



None found

You do not have any Reserved Instances.

To buy a Reserved Instance, click the Purchase Reserved Instances button.

Purchase Reserved Instances

0 Reserved Instances selected

Select a Reserved Instance above.





## Purchase Reserved Instances

 Only show offerings that reserve capacity

Platform Linux/UNIX ▾

Tenancy Default ▾

Offering Class Convertible ▾

Instance Type t2.micro ▾

Term Any ▾

Payment Option Any ▾

Search

To find a Reserved Instance

r5dn.large

following steps:

1. Specify the offering de

r5dn.xlarge

2. Select the Reserved In

r5dn.2xlarge

3. Click **View Cart** to view

r5dn.4xlarge

4. Click **Order** to complete

r5dn.8xlarge

the quantity that you want, and **Add** them to your cart.

Note: Additional taxes may a

r5dn.12xlarge

chasing the Reserved Instances.

Reserved Instances sold thro

r5dn.16xlarge

tance Marketplace are identical to those sold by Amazon Web Services, except they may have different prices and terms. For more information about th

Reserved Instance Marketplace

r5dn.24xlarge

e, see the [Amazon Reserved Instance Marketplace](#) web page.

m5.large

m5.2xlarge

m5.4xlarge

m5.8xlarge

m5.12xlarge

m5.16xlarge

m5.24xlarge

You currently have no items in your cart.

Cancel

View Cart

**Objectives**

- Buy 1x EC2 Convertible RI (m5.large) in US-East Ohio
- Buy 1x RDS RI for r5.xlarge MySQL in US N.California
- Buy \$1 Compute Savings Plan



Services ▾

Search for services, features, marketplace products, and docs

[Option+S]



x+d ▾

Ohio ▾

Support ▾

## Purchase Reserved Instances

 Only show offerings that reserve capacity

Platform Linux/UNIX ▾

Tenancy Default ▾

Offering Class Convertible ▾

Instance Type m5.large ▾

Term 1 months - 1...

Payment Option All Upfront ▾

Search

Seller	Term	Effective Rate	Upfront Price	Hourly Rate	Payment Option	Offering Class	Quantity Available	Desired Quantity	Normalized units per hour	
AWS	12 months	\$0.066	\$577.00	\$0.000	All Upfront	convertible	Unlimited	1	4	Add to Cart

You currently have no items in your cart.

Cancel

View Cart



## Purchase Reserved Instances

 Only show offerings that reserve capacity

Platform Linux/UNIX ▾

Tenancy Default ▾

Offering Class Convertible ▾

Instance Type m5.large ▾

Term 1 months - 1...

Payment Option All Upfront ▾

Search

Seller	Term	Effective Rate	Upfront Price	Hourly Rate	Payment Option	Offering Class	Quantity Available	Desired Quantity	Normalized units per hour	
AWS	12 months	\$0.066	\$577.00	\$0.000	All Upfront	convertible	Unlimited	1	4	<button>Add to Cart</button>

You currently have no items in your cart.

CancelView Cart



## Purchase Reserved Instances

## Shopping Cart

Items to order	Offering Class	Region	Upfront Price	Hourly Price	Order On	Quantity
All Upfront Linux/UNIX m5.large for 12 months Payment Terms: Upfront Sold By: Amazon <a href="#">Edit</a> <a href="#">Delete</a>	convertible	US East (Ohio)	\$577.00	\$0.000	Now	1

Your cart: 1 Reserved Instances, Total Due Now: \$577.00

Additional taxes may apply.

[Add More To Cart](#)[Order](#)

The screenshot shows the AWS EC2 console interface. On the left, a sidebar menu includes 'EC2 Dashboard', 'Events', 'Tags', 'Limits', 'Instances' (selected), 'Images', 'Elastic Block Store', 'Network & Security', and 'Feedback'. A modal window titled 'Welcome to the new EC2 console!' provides information about the redesign. The main content area features a section titled 'Objectives' with the following list:

- Buy 1x EC2 Convertible RI (m5.large) in US-East Ohio
- Buy 1x RDS RI for r5.xlarge MySQL in US N.California
- Buy \$1 Compute Savings Plan

Below the objectives, there's a 'Launch instance' button and a note: 'To get started, launch an Amazon EC2 instance, which is a virtual server in the cloud.' A sidebar on the right promotes 'Faster Workload Deployment With MAP for Windows'.

AWS Services ▾ Search for services, features, marketplace products, and docs [Option+S] x+d ▾ Ohio ▾ Support ▾ New EC2 Experience Tell us what you think EC2 i Welcome to the new EC2 console! We're redesigning the EC2 console to make it easier to use and improve performance. We'll release new screens periodically. We encourage you to provide feedback to help us make the new experience even better. EC2 i EC2 Dashboard Events Tags Limits Instances Instances New Instance Types Launch Templates Spot Requests Savings Plans Reserved Instances Dedicated Host Capacity Reservations Images AMIs Elastic Block Store Volumes Snapshots Lifecycle Manager Network & Security Feedback English (US) ▾ To get started, launch an Amazon EC2 instance, which is a virtual server in the cloud. © 2008 - 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved. Privacy Policy Terms of Use Udemy

**aws** Services ▾ Q rds X Ohio ▾ Support ▾

New EC2 Tell us what you need

EC2 Dashboard Services (3)

Events Features (22)

Tags Documentation (27,730)

Limits Marketplace (209)

Instances Instances

Instance Types

Launch Templates

Spot Requests

Savings Plans

Reserved Instances

Dedicated Instances

Capacity Reservations

Images AMIs

Elastic Block Volumes

Snapshots

Lifecycle Policies

Network & Security

To get started, launch an Amazon EC2 instance, which is a virtual server in the cloud.

Search results for 'rds'

**Services**

RDS Managed Relational Database Service

AWS Glue DataBrew Visual data preparation tool to clean and normalize data for analytics and machine learning

Kinesis Work with Real-Time Streaming Data

Features See all 22 results ▶

Dashboards CloudWatch feature

Security standards Security Hub feature

Redis ElastiCache feature

Objectives

- Buy 1x EC2 Convertible RI (m5.large) in US-East Ohio
- Buy 1x RDS RI for r5.xlarge MySQL in US N.California
- Buy \$1 Compute Savings Plan

Feedback English (US) ▾ © 2008 - 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved. Udemy



## Amazon RDS

[Dashboard](#)[Databases](#)[Query Editor](#)[Performance Insights](#)[Snapshots](#)[Automated backups](#)[Reserved instances](#)[Proxies](#)[Subnet groups](#)[Parameter groups](#)[Option groups](#)[Events](#)[Event subscriptions](#)[Recommendations](#)[Certificate update](#)

### Amazon Aurora

Amazon Aurora is a MySQL- and PostgreSQL-compatible enterprise-class database service. It offers up to 64TB of auto-scaling storage capacity, 6-way replication across three availability zones, and support for multiple engines.

[Create database](#)[Or, Restore Aurora DB cluster from S3](#)

### Resources

[Refresh](#)

You are using the following Amazon RDS resources in the US East (Ohio) region (used/quota)

#### DB Instances (0/40)

[Allocated storage \(0 TB/100 TB\)](#)[Click here to increase DB instances limit](#)

#### DB Clusters (0/40)

#### Reserved instances (0/40)

#### Snapshots (1)

[Manual \(0/100\)](#)[Automated \(0\)](#)

#### Recent events (0)

#### Event subscriptions (0/20)

#### Parameter groups (4)

[Default \(2\)](#)[Custom \(2/100\)](#)

#### Option groups (1)

[Default \(1\)](#)[Custom \(0/20\)](#)

#### Subnet groups (1/50)

#### Supported platforms VPC

[Default network none](#)

US East (N. Virginia) us-east-1

US East (Ohio) us-east-2

US West (N. California) us-west-1

US West (Oregon) us-west-2

Africa (Cape Town) af-south-1

Asia Pacific (Hong Kong) ap-east-1

Asia Pacific (Mumbai) ap-south-1

Asia Pacific (Seoul) ap-northeast-2

Asia Pacific (Singapore) ap-southeast-1

Asia Pacific (Sydney) ap-southeast-2

Asia Pacific (Tokyo) ap-northeast-1

Canada (Central) ca-central-1

### Objectives

- Buy 1x EC2 Convertible RI (m5.large) in US-East Ohio
- Buy 1x RDS RI for r5.xlarge MySQL in US N.California
- Buy \$1 Compute Savings Plan

[Create database](#)

**Amazon RDS**

RDS &gt; Reserved instances

[Dashboard](#)[Databases](#)[Query Editor](#)[Performance Insights](#)[Snapshots](#)[Automated backups](#)[Reserved instances](#)[Proxies](#)[Security groups](#)[Subnet groups](#)[Parameter groups](#)[Option groups](#)[Events](#)[Event subscriptions](#)[Recommendations](#)[Certificate update](#)**Reserved instances (0)**[Filter reserved instances](#)[Purchase Reserved DB Instance](#)**Reservation Id** ▲ **Product Desc** ▼ **Class** ▼ **Offering Type** ▼ **Status** ▼ **Multi AZ** ▼ **Remaining Days** ▼ **Quantity** ▼

No reserved instances found



## Amazon RDS



Dashboard

Databases

Query Editor

Performance Insights

Snapshots

Automated backups

## Reserved instances

Proxies

Security groups

Subnet groups

Parameter groups

Option groups

Events

Event subscriptions

Recommendations

Feedback

English (US) ▾

## Product description

mysql

## DB instance class

db.r5.xlarge — 4 vCPU, 32 GiB RAM

## Multi AZ deployment

- Yes  
 No

## Term

1 year

## Offering type

Choose an offering type

## Reserved Id (optional)

Optional tag to track your reservation

Reserved ID is case insensitive, but stored as all lower-case, as in "m-1234567890". It can contain lowercase letters, numbers, underscores, characters or hyphens. First character must be a letter. Cannot end with a hyphen.

## Number of DB instances

## Objectives

- Buy 1x EC2 Convertible RI (m5.large) in US-East Ohio
- Buy 1x RDS RI for r5.xlarge MySQL in US N.California
- Buy \$1 Compute Savings Plan



## Amazon RDS

[Dashboard](#)[Databases](#)[Query Editor](#)[Performance Insights](#)[Schemas](#)[Automated backups](#)[Reserved instances](#)[Proxies](#)[Security groups](#)[Subnet groups](#)[Parameter groups](#)[Option groups](#)[Events](#)[Event subscriptions](#)[Recommendations](#)[Feedback](#) English (US) ▾**Multi AZ deployment** Yes No**Term**

1 year

**Offering type**

All Upfront

**Reserved Id (optional)**

Optional tag to track your reservation

Reserved ID is case insensitive, but stored as all lower-case, as in "myreservedinstance". Must contain 1 to 63 alphanumeric characters or hyphens. First character must be a letter. Cannot end with a hyphen or contain two consecutive hyphens.

**Number of DB instances**

Specify the number of DB instances you wish to reserve with this order

1

## Pricing details

One-time payment (per instance)

### Objectives

- Buy 1x EC2 Convertible RI (m5.large) in US-East Ohio
- Buy 1x RDS RI for r5.xlarge MySQL in US N.California
- Buy \$1 Compute Savings Plan



## Amazon RDS

[Dashboard](#)[Databases](#)[Query Editor](#)[Performance Insights](#)[Snapshots](#)[Automated backups](#)

### Reserved instances

[Proxies](#)[Security groups](#)[Subnet groups](#)[Parameter groups](#)[Option groups](#)[Events](#)[Event subscriptions](#)[Recommendations](#)[Feedback](#)

English (US) ▾

[Privacy Policy](#)[Terms of Use](#)

Reserved ID is case insensitive, but stored as all lower-case, as in "myreservedinstance". Must contain 1 to 63 alphanumeric characters or hyphens. First character must be a letter. Cannot end with a hyphen or contain two consecutive hyphens.

### Number of DB instances

Specify the number of DB instances you wish to reserve with this order

### Pricing details

#### One-time payment (per instance)

2,912.00 USD

#### Total one-time payment\*

2,912.00 USD

\*Additional taxes may apply

#### Normalized units per hour

8

#### Usage charges\*

0.000 USD (hourly)

\*Additional taxes may apply

This hourly rate is charged for every hour for each instance in the Reserved Instance term you purchase, regardless of instance usage

Charges for your usage will appear on your monthly bill.

[Cancel](#)[Continue](#)



## Amazon RDS

[Dashboard](#)[Databases](#)[Query Editor](#)[Performance Insights](#)[Schemas](#)[Automated backups](#)[Reserved instances](#)[Proxies](#)[Security groups](#)[Subnet groups](#)[Parameter groups](#)[Option groups](#)[Events](#)[Event subscriptions](#)[Recommendations](#)

No

Term

1 year

Reserved DB Instance

default

Quantity

1

Price Per Instance

\$2,912.00

Total Payment Due Now

\$2,912.00

Purchasing this Reserved DB Instance will charge \$2,912.00 to the payment method associated with this Amazon Web Services account. Are you sure you would like to proceed?

[Cancel](#)[Back](#)[Order](#)



## Amazon RDS



instances limit

DB Clusters (0/40)

Default (1)

Custom (0/20)

With Aurora Serverless, you  
simply create an end-point  
to-

Dashboard

Databases

Query Editor

Performance

Snapshots

Automated

Reserved ins

Proxies

Security gro

Subnet gro

Parameter g

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Events

Event subsc

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Additional  
information

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English (US) ▾

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AWS Services Search results for 'ec2' N. California Support

Search results for 'ec2'

Services (6) See all 6 results ▶

EC2 Virtual Servers in the Cloud

EC2 Image Builder A managed service to automate build, customize and deploy OS images

AWS Compute Optimizer Recommend optimal AWS Compute resources for your workloads

AWS Firewall Manager Central management of firewall rules

Features (35) See all 35 results ▶

Export snapshots to EC2 Lightsail feature

Recommendations

Feedback English (US) ▾ Privacy Policy Terms of Use

Waiting for us-west-1.console.aws.amazon.com...

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Udemy



New EC2 Experience  
Tell us what you think X

EC2 Dashboard New

Events

Tags

Limits

▼ Instances

Instances New

Instance Types

Launch Templates

Spot Requests

**Savings Plans**

Reserved Instances

Dedicated Hosts New

Capacity Reservations

▼ Images

AMIs

▼ Elastic Block Store

Feedback English (US) ▾

# Savings Plans

Savings Plans are a flexible pricing model that offer low prices on EC2, Fargate and Lambda usage, in exchange for a commitment to a consistent amount of usage (measured in \$/hour) for a 1 or 3 year term. Savings Plans provide you the flexibility to use the compute option that best suits your needs and automatically save money, all without having to perform exchanges or modifications. When you sign up for a Savings Plan, you will be charged the discounted Savings Plans price for your usage up to your commitment.

Savings Plans allow you to easily reduce your bill by making a commitment to compute usage (e.g. \$10/hour) instead of making commitments to specific instance configurations or compute services. AWS offers two types of Savings Plans - Compute Savings Plans and EC2 Instance Savings Plans.

Purchase Savings Plans

## Flexible

**Compute Savings Plans** provide the most flexibility and help to reduce your costs by up to 66%. These plans automatically apply to:

- EC2 instance usage regardless of

## Significant Discounts

**EC2 Instance Savings Plans** provide the lowest prices, offering savings up to 72% in exchange for commitment to usage of individual instance families in a region (e.g. M5

## Get Started

Get started with Savings Plans by accessing your recommendations and customizing the plan type, payment option, and term. [Learn more](#)



## AWS Cost Management

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Recommendations

## ▼ Savings Plans

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[Purchase Savings Plans](#)

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Coverage report

Cart 0

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Recommendations

Utilization report

Coverage report

Preferences

Billing Console ↗Documentation ↗

## ⚠ What's new in AWS Cost Management.

Cost Anomaly Detection (free service) is now generally available in AWS Cost Management. You can now receive automated alerts when unusual spend is detected. [Learn more ↗](#)

View Cost Anomaly Detection



AWS Cost Management &gt; Savings Plans &gt; Overview

Overview Info[Manage alert subscriptions](#)[Purchase a Savings Plan](#)

## What are Savings Plans?

Savings Plans are a flexible pricing model that offer low prices on AWS usage, in exchange for a commitment to a consistent amount of usage (measured in \$/hour) for a 1- or 3-year term. Savings Plans provide you the flexibility to use the compute option that best suits your needs and automatically save money, all without having to perform exchanges or modifications. When you sign up for a Savings Plan, you will be charged at the Savings Plans price, which is inclusive of your savings rate, for usage up to your commitment.

Savings Plans allow you to easily reduce your bill by making a commitment to compute usage (e.g. \$10/hour) instead of making commitments to specific instance configurations. AWS offers two types of Savings Plans - Compute Savings Plans and EC2 Instance Savings Plans.

## Compute

Compute Savings Plans provide the most flexibility and help to reduce your costs by up to 66%. These plans automatically apply to EC2 instance usage, AWS Fargate, and AWS Lambda service usage regardless of instance family, size, AZ, region, OS, or tenancy.

## EC2 Instance

EC2 Instance Savings Plans provide the lowest prices, offering savings up to 72% in exchange for commitment to usage of individual instance families in a region (e.g. M5 usage in N. Virginia). This automatically reduces your cost on the selected instance family in that region regardless of AZ, size, OS or tenancy. EC2 Instance Savings Plans give you the flexibility to change your usage between instances within a family in that region.

Get started with Savings Plans by accessing your recommendations and customizing the plan type, payment option and term. [Learn more ↗](#)

**⚠ What's new in AWS Cost Management.**

Cost Anomaly Detection (free service) is now generally available in AWS Cost Management. You can now receive automated alerts when unusual spend is detected. [Learn more](#)

[View Cost Anomaly Detection](#)

## Purchase Savings Plans Info

Savings Plans are a flexible pricing model that offer low prices on AWS usage, in exchange for a commitment to a consistent amount of usage (measured in \$/hour) for a 1- or 3-year term.

### Purchase details Info

#### Savings Plan type

 **Compute Savings Plans**

Applies to EC2 instance usage, AWS Fargate, and AWS Lambda service usage, regardless of region, instance family, size, tenancy, and operating system.  
[Learn more](#)

 **EC2 Instance Savings Plans**

Applies to instance usage within the committed EC2 family and region, regardless of size, tenancy, and operating system.  
[Learn more](#)

#### Term

 **1-year** **3-year**

### Purchase commitment Info

#### Hourly commitment

Your hourly commitment at Savings Plan rates. To maximize your savings, see our [recommendations](#).

 Enter hourly commitment amount (USD)

#### Payment option

 **All Upfront** **Partial Upfront**

### Objectives

- Buy 1x EC2 Convertible RI (m5.large) in US-East Ohio
- Buy 1x RDS RI for r5.xlarge MySQL in US N.California
- **Buy \$1/Hour Compute Savings Plan**

**⚠ What's new in AWS Cost Management.**

Cost Anomaly Detection (free service) is now generally available in AWS Cost Management. You can now receive automated alerts when unusual spend is detected. [Learn more](#) 

[View Cost Anomaly Detection](#)  

Applies to EC2 instance usage, AWS Lambda, and AWS Lambda service usage, regardless of region, instance family, size, tenancy, and operating system.  
[Learn more](#) 

Applies to instance usage within the committed EC2 family and region, regardless of size, tenancy, and operating system.  
[Learn more](#) 

**Term**

- 1-year  
 3-year

**Purchase commitment** **Hourly commitment**

Your hourly commitment at Savings Plan rates. To maximize your savings, see our [recommendations](#).

**Payment option**

- All Upfront  
 Partial Upfront  
 No Upfront

**▶ Start date (optional)** **Purchase summary** **Upfront cost****\$8,760.00****Monthly payment****\$0.00****Total cost****\$8,760.00**

**What's new in AWS Cost Management.**

Cost Anomaly Detection (free service) is now generally available in AWS Cost Management. You can now receive automated alerts when unusual spend is detected. Learn more 

[View Cost Anomaly Detection](#)**Term**

- 1-year
- 3-year

**Purchase commitment** Info**Hourly commitment**

Your hourly commitment at Savings Plan rates. To maximize your savings, see our [recommendations](#).

\$1

**Payment option**

- All Upfront
- Partial Upfront
- No Upfront

**► Start date (optional)** Info**Purchase summary** Info

## Upfront cost

\$8,760.00

## Monthly payment

\$0.00

## Total cost

\$8,760.00

[Add to cart](#)



## AWS Cost Management

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## Cart



## Savings Plans (1)



Set start date

Remove from cart

Clear cart



Type

Term

Region

Instance Type

Purchase option

Start date

Commitment

Upfront payment

Monthly payment

Total cost



Compute

1-year

-

-

All Upfront

Now

\$1.000/hour

\$8,760.00

\$0.00

\$8,760.00

## Summary

Total commitment

\$8,760.00

Total commitment starting now

\$8,760.00

Total queued commitment

\$0.00

Total upfront payment due now

\$8,760.00

\*Additional taxes may apply.

Add another Savings Plan

Submit order

# GET EC2 PRICING DATA

# AWS EC2 Pricing Data Sources

<b>1</b>	<b>Savings Plan Pricing</b>	<a href="https://aws.amazon.com/savingsplans/pricing/">https://aws.amazon.com/savingsplans/pricing/</a>
<b>2</b>	<b>EC2 RI Pricing</b>	<a href="https://aws.amazon.com/ec2/pricing/reserved-instances/pricing/">https://aws.amazon.com/ec2/pricing/reserved-instances/pricing/</a>
<b>3</b>	<b>AWS Pricing Calculator</b>	<a href="https://calculator.aws/">https://calculator.aws/</a>
<b>4</b>	<b>AWS Mgmt Console (RI)</b>	AWS Management Console > EC2 > Reserved Instance
<b>5</b>	<b>AWS Mgmt Console (SP)</b>	AWS Management Console > Cost Explorer > Savings Plans

Every type of compute usage has a Savings Plan rate and On Demand rate. Below you can see the Savings Plan rates and On Demand rates for every type of offering. You will be charged the Savings Plans rates on the committed usage and any usage beyond the commitment will be charged at regular On Demand rates.

Compute Savings Plans for Amazon EC2

Compute Savings Plans for AWS Fargate

Compute Savings Plans for AWS Lambda

EC2 Instance Savings Plans

### Compute Savings Plans for Amazon EC2

Compute Savings Plans apply to EC2 Instance usage regardless of instance family, size, AZ, AWS Region, OS or tenancy.

#### Select terms for your Compute Savings Plans

Term length

Payment options

1 year

No Upfront

#### Select a region, operating system, and tenancy to view rates

Region

US East (Ohio)

Operating system

Linux

Tenancy

Shared

Viewing 237 of 71,183 available instances

Q

< 1 2 3 4 5 6 7 ... 12 >

Instance name	Savings Plans rate	Savings over On-Demand	On-Demand rate	Region	Operating system	Tenancy
a1.medium	\$0.0185	27%	\$0.0255	US East (Ohio)	Linux	Shared
a1.large	\$0.0369	28%	\$0.051	US East (Ohio)	Linux	Shared
a1.xlarge	\$0.0739	28%	\$0.102	US East (Ohio)	Linux	Shared
a1.2xlarge	\$0.1478	28%	\$0.204	US East (Ohio)	Linux	Shared
a1.4xlarge	\$0.2956	28%	\$0.408	US East (Ohio)	Linux	Shared
a1.metal	\$0.296	27%	\$0.408	US East (Ohio)	Linux	Shared

Every type of compute usage has a Savings Plan rate and On Demand rate. Below you can see the Savings Plan rates and On Demand rates for every type of offering. You will be charged the Savings Plans rates on the committed usage and any usage beyond the commitment will be charged at regular On Demand rates.

Compute Savings Plans for Amazon EC2 Compute Savings Plans for AWS Fargate Compute Savings Plans for AWS Lambda EC2 Instance Savings Plans

### Compute Savings Plans for Amazon EC2

Compute Savings Plans apply to EC2 Instance usage regardless of instance family, size, AZ, AWS Region, OS or tenancy.

#### Select terms for your Compute Savings Plans

Term length

3 years

Payment options

No Upfront

#### Select a region, operating system, and tenancy to view rates

Region

US East (Ohio)

Operating system

Linux

Tenancy

Shared

Viewing 237 of 71,183 available instances

m5.large

X

< 1 >

Instance name	Savings Plans rate	Savings over On-Demand	On-Demand rate	Region	Operating system	Tenancy
m5.large	\$0.049	49%	\$0.096	US East (Ohio)	Linux	Shared

Amazon EC2 Overview Features Pricing Instance Types FAQs Getting Started Resources

Products / Compute / Amazon EC2 / Amazon EC2 Pricing / ...

# Amazon EC2 Reserved Instances Pricing

PAGE CONTENT

Reserved Instances Purchase Options

Amazon EC2 Standard Reserved Instance Volume Discounts

Reserved Instances provide you with a significant discount (up to 72%) compared to On-Demand Instance pricing. In addition, when Reserved Instances are assigned to a specific Availability Zone, they provide a capacity reservation, giving you additional confidence in your ability to launch instances when you need them.

## Reserved Instances Purchase Options

### Standard and Convertible Reserved Instances Pricing

Standard Reserved Instances provide you with a significant discount (up to 72%) compared to On-Demand Instance pricing, and can be purchased for a 1-year or 3-year term. Customers have the flexibility to change the Availability Zone, the instance size, and networking type of their Standard Reserved Instances.

Purchase Convertible Reserved Instances if you need additional flexibility, such as the ability to use different instance families, operating systems, or tenancies over the Reserved Instance term. Convertible Reserved Instances provide you with a significant discount (up to 54%) compared to On-Demand Instances and can be purchased for a 1-year or 3-year term.

### Reserved Instances Payment Options

You can choose between three payment options when you purchase a Standard or Convertible Reserved Instance. With the All Upfront option, you pay for the entire Reserved Instance term with one upfront payment. This option provides you with the largest discount compared to On-Demand Instance pricing. With the Partial Upfront option, you make a low upfront payment and are then charged a discounted hourly rate for the instance for the duration of the Reserved Instance term. The No Upfront option does not require any upfront payment and provides a discounted hourly rate for the duration of the term.

Note: For T2 and T3 Unlimited instances, CPU Credits are charged at:

- \$0.05 per vCPU-Hour for Linux, RHEL and SLES, and
- \$0.096 per vCPU-Hour for Windows and Windows with SQL Web

The CPU Credit pricing is the same for all T2 and T3 instance sizes, for On-Demand and Reserved Instances, and across all T2 and T3

Amazon EC2

Overview

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**m5.large**

PAGE CONTENT

Reserved Instances Purchase Options

Amazon EC2 Standard Reserved Instance Volume Discounts

STANDARD 1-YEAR TERM						
	Payment Option	Upfront	Monthly*	Effective Hourly**	Savings over On-Demand	On-Demand Hourly
Amazon EC2 Standard Reserved Instance Volume Discounts	No Upfront	\$0	\$43.80	\$0.060	38%	\$0.0960
	Partial Upfront	\$252	\$21.17	\$0.058	40%	
	All Upfront	\$494	\$0.00	\$0.056	41%	

CONVERTIBLE 1-YEAR TERM

	Payment Option	Upfront	Monthly*	Effective Hourly**	Savings over On-Demand	On-Demand Hourly
Amazon EC2 Standard Reserved Instance Volume Discounts	No Upfront	\$0	\$51.83	\$0.071	26%	\$0.0960
	Partial Upfront	\$294	\$24.82	\$0.068	30%	
	All Upfront	\$577	\$0.00	\$0.066	31%	

STANDARD 3-YEAR TERM

	Payment Option	Upfront	Monthly*	Effective Hourly**	Savings over On-Demand	On-Demand Hourly
Amazon EC2 Standard Reserved Instance Volume Discounts	No Upfront	\$0	\$29.93	\$0.041	57%	\$0.0960
	Partial Upfront	\$505	\$13.87	\$0.038	60%	
	All Upfront	\$949	\$0.00	\$0.036	62%	

CONVERTIBLE 3-YEAR TERM

	Payment Option	Upfront	Monthly*	Effective Hourly**	Savings over On-Demand	On-Demand Hourly
Amazon EC2 Standard Reserved Instance Volume Discounts	No Upfront	\$0	\$51.83	\$0.071	26%	\$0.0960
	Partial Upfront	\$294	\$24.82	\$0.068	30%	
	All Upfront	\$577	\$0.00	\$0.066	31%	

EC2 Reserved Instance Pricing X AWS Pricing Calculator

calculator.aws/#/

AWS pricing calculator

Feedback English Contact Sales

# AWS Pricing Calculator

Estimate the cost for your architecture solution.

Configure a cost estimate that fits your unique business or personal needs with AWS products and services.

## How it works

The diagram illustrates the workflow of the AWS Pricing Calculator:

- AWS Pricing Calculator**: Estimate the cost of AWS products and services.
- Add services**: Search and add AWS services that you need.
- Configure service**: Enter the details of your usage to see service costs.
- View estimate totals**: See estimated costs per service, service group, and totals.

## Benefits and features

**Transparent pricing**  
See the math behind the price for your service configurations. View prices per service or per group of services to analyze your architecture costs.

**Multi-Region support**  
Configure services, or groups of services, in multiple AWS Regions. Prices and availability of AWS services vary per Region.

Create an estimate

Start your estimate with no commitment, and explore AWS services and pricing for your architecture needs.

Create estimate

Getting started

What is the AWS Pricing Calculator?

Getting started

Generating estimates

More resources

User guide

FAQs

Pricing assumptions and variations

Need help with estimation? Connect with AWS certified expert on AWS IQ

EC2 Reserved Instance Pricing X AWS Pricing Calculator

calculator.aws/#/addService

aws pricing calculator

Feedback English Contact Sales

AWS Pricing Calculator > My Estimate > Add service

Step 1 Select service

Step 2 Configure service

## Select service Info

**AWS services (44)**

Search

**Cancel**

**Amazon Athena**

Amazon Athena is an interactive query service that makes it easy to analyze data in Amazon S3 using standard SQL. Athena is serverless, so there is no infrastructure to manage, and you pay only for the queries that you run.

[Product page](#) [Configure](#)

**Amazon Aurora MySQL-Compatible**

Amazon Aurora MySQL Compatible relational database is built for the cloud, that combines performance and availability of traditional enterprise databases with the simplicity and cost-effectiveness of open source databases.

[Product page](#) [Configure](#)

**Amazon Aurora PostgreSQL-Compatible DB**

Amazon Aurora is a MySQL and PostgreSQL-compatible relational database built for the cloud, that combines the performance and availability of traditional enterprise databases with the simplicity and cost-effectiveness of open source databases.

[Product page](#) [Configure](#)

**Amazon Chime**

Amazon Chime lets you meet, chat, and collaborate with the security of AWS. You can work seamlessly on your devices, and meet from your desk or on the go - ensuring you always stay connected.

[Product page](#) [Configure](#)

**Amazon CloudWatch**

Amazon CloudWatch is a monitoring and management service that provides data and actionable insights for AWS, hybrid, and on-premises applications and infrastructure resources.

[Product page](#) [Configure](#)

**Amazon CodeGuru Reviewer**

Amazon CodeGuru Reviewer is a service that uses program analysis and machine learning to detect potential defects that are difficult for developers to find and recommends fixes in your Java code.

[Product page](#) [Configure](#)

**Amazon DocumentDB (with MongoDB compatibility)**

[Product page](#) [Configure](#)

**Amazon EC2**

[Product page](#) [Configure](#)

**Amazon Elastic Block Store (EBS)**

[Product page](#) [Configure](#)



EC2 Reserved Instance Pricing X AWS Pricing Calculator calculator.aws/#/createCalculator

**aws pricing calculator**

Feedback English Contact Sales

### Pricing strategy [Info](#)

Pricing model  EC2 Instance Savings Plans  Compute Savings Plans  Standard Reserved Instances  Convertible Reserved Instances  On-Demand Instances

Reservation term  1 Year  3 Year

Payment options  Partial Upfront  No Upfront  Full Upfront

**Show calculations**

Unit conversions:

EC2 Instance Savings Plans rate for m5.large in the US East (Ohio) for 1 Year term and Partial Upfront is 0.058 USD

Hours in the commitment: 365 days \* 24 hours \* 1 year = 8760.0000 hours

Total Commitment: 0.058 USD \* 8760 hours = 508.0800 USD

Upfront: Partial Upfront (50% of 508.08) = **254.0400 USD**

Hourly cost for EC2 Instance Savings Plans = (Total Commitment - Upfront cost)/Hours in the term:  $(508.08 - 254.0400)/8760 = 0.0290 \text{ USD}$

\*Please note that you will pay an hourly commitment for Savings Plans and your EC2 usage will be accrued at a discounted rate against this commitment.

Pricing calculations

1 Instances x 254.04 USD = 254.04 USD (upfront cost)

**Amazon EC2 instances (upfront): 254.04 USD**

1 Instances x 0.029 USD x 730 hours in month = 21.17 USD (monthly instance savings cost)

**Amazon EC2 Instance Savings Plans instances (monthly): 21.17 USD**

### Amazon Elastic Block Storage (EBS) [Info](#)

Attach persistent block storage volumes for your Amazon EC2 instances.

Storage per instance



# HOW RI/SP DISCOUNTS VARY WITH TERM LENGTH, PAYMENT OPTIONS AND FLEXIBILITY

## KEY FACTORS THAT AFFECT DISCOUNTS

- Term length (1 or 3 years)
- Payment term (All upfront, partial upfront, no upfront)
- Flexibility (Std RI / EC2 SP or Conv RI / Compute SP)

## NOTE

- Individual configurations have unique pricing and discount rates.
- Still, average rates would be helpful to understand order of magnitude.
- The rates in this lesson are average based on Linux (non-licensed OS)

## EC2 COMMITMENT AVERAGE DISCOUNTS

Term	RI Type	All Upfront	Partial Upfront	No Upfront
1-year	<b>Standard RI / EC2 SP</b>	41%	40%	37%
1-year	<b>Conv. RI / Compute SP</b>	32%	31%	27%
3-year	<b>Standard RI / EC2 SP</b>	62%	60%	57%
3-year	<b>Conv. RI / Compute SP</b>	55%	54%	50%

Discount Difference	
<b>Partial upfront vs. All upfront</b>	1-3%
<b>No upfront vs. All upfront</b>	4-6%
<b>1-year vs. 3-year</b>	20-25%
<b>More Flexibility</b>	7-10%

## EC2 COMMITMENT AVERAGE DISCOUNTS

Term	RI Type	All Upfront	Partial Upfront	No Upfront
1-year	<b>Standard RI / EC2 SP</b>	41%	40%	37%
1-year	<b>Conv. RI / Compute SP</b>	32%	31%	27%
3-year	<b>Standard RI / EC2 SP</b>	62%	60%	57%
3-year	<b>Conv. RI / Compute SP</b>	55%	54%	50%

Discount Difference	
Partial upfront vs. All upfront	1-3%
<b>No upfront vs. All upfront</b>	<b>4-6%</b>
1-year vs. 3-year	20-25%
More Flexibility	7-10%

# COMPARE RI VS SP

## 1. What's the same?

- Standard Reserved Instance (RI)
- EC2 Instance Savings Plan (SP)
- Convertible Reserved Instance (RI)
- Compute Savings Plan (SP)

## 2. What's the different?

- Standard RI vs EC2 Instance SP
- Convertible RI vs Compute SP
- Combined view

Model	Standard RI	EC2 Instance SP	Convertible RI	Compute SP
1- or 3- year term commitment	✓	✓	✓	✓
All, partial, or no upfront payment	✓	✓	✓	✓
Covers EC2 compute usage	✓	✓	✓	✓
Discount sharing <i>(across linked accounts)</i>	✓	✓	✓	✓

# How RI/SP sharing works

**Usage:** None

**RI/SP:** Available

**Wasted**

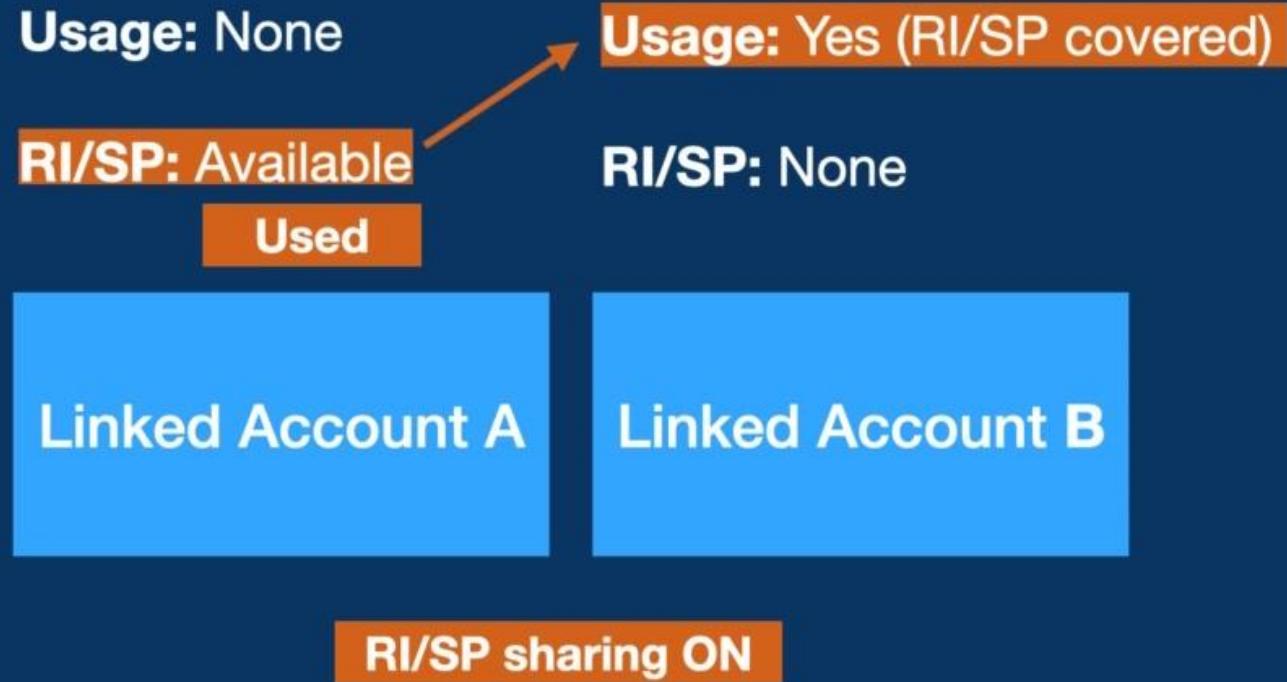
Linked Account A

**Usage:** Yes (On demand)

**RI/SP:** None

Linked Account B

# How RI/SP sharing works



# Standard RI vs EC2 Instance SP

Model	Standard RI	EC2 SP
Commitment	Instance	Dollar per hour
Savings / Discounts	up to 72%	up to 72%
Region Flexibility	✗	✗
Covers Fargate Usage	✗	✗
Instance Family Flexibility	✗	✗
Tenancy/OS Flexibility	✗	✓
Instance Size Flexibility	✓ (Linux only)	✓
Resellable on AWS Marketplace	✓	✗

## Region Flexibility

**us-east-2 (Ohio)**



**eu-west-2 (London)**

Model	Standard RI	EC2 SP
Commitment	Instance	Dollar per hour
Savings / Discounts	up to 72%	up to 72%
Region Flexibility	✗	✗
Covers Fargate Usage	✗	✗
Instance Family Flexibility	✗	✗
Tenancy/OS Flexibility	✗	✓
Instance Size Flexibility	✓ (Linux only)	✓
Resellable on AWS Marketplace	✓	✗

# Fargate

## Serverless compute for containers

Pricing is based on:

- vCPU per hour
- memory per hour

Model	Standard RI	EC2 SP
Commitment	Instance	Dollar per hour
Savings / Discounts	up to 72%	up to 72%
Region Flexibility	✗	✗
Covers Fargate Usage	✗	✗
Instance Family Flexibility	✗	✗
Tenancy/OS Flexibility	✗	✓
Instance Size Flexibility	✓ (Linux only)	✓
Resellable on AWS Marketplace	✓	✗

## Instance Family Flexibility

c5 ← → m5

Model	Standard RI	EC2 SP
Commitment	Instance	Dollar per hour
Savings / Discounts	up to 72%	up to 72%
Region Flexibility	✗	✗
Covers Fargate Usage	✗	✗
Instance Family Flexibility	✗	✗
Tenancy/OS Flexibility	✗	✓
Instance Size Flexibility	✓ (Linux only)	✓
Resellable on AWS Marketplace	✓	✗

## Tenancy

- Default (shared)
- Dedicated
- Host

## OS

- Linux
- Windows
- RHEL

Model	Standard RI	EC2 SP
Commitment	Instance	Dollar per hour
Savings / Discounts	up to <b>72%</b>	up to <b>72%</b>
Region Flexibility	✗	✗
Covers Fargate Usage	✗	✗
Instance Family Flexibility	✗	✗
Tenancy/OS Flexibility	✗	✓
Instance Size Flexibility	✓ <small>(Linux only)</small>	✓
Resellable on AWS Marketplace	✓	✗

## Instance Size Flexibility

**1x m5.2xlarge**



**2x m5.xlarge**

Model	Standard RI	EC2 SP
Commitment	Instance	Dollar per hour
Savings / Discounts	up to 72%	up to 72%
Region Flexibility	✗	✗
Covers Fargate Usage	✗	✗
Instance Family Flexibility	✗	✗
Tenancy/OS Flexibility	✗	✓
Instance Size Flexibility	✓ <small>(Linux only)</small>	✓
Resellable on AWS Marketplace	✓	✗

## Resell RI on AWS Marketplace

- AWS charges 12% fees
- Only Standard RI can be bought or sold

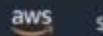
# WHAT'S DIFFERENT?

## Convertible RI vs Compute SP

Model	Convertible RI	Compute SP
Commitment	Instance	Dollar per hour
Savings / Discounts	up to <b>66%</b>	up to <b>66%</b>
Region Flexibility	✗	✓
Covers Fargate Usage	✗	✓
Instance Family Flexibility	✓ <small>(Exchanges required)</small>	✓ <small>(Automatic)</small>
Tenancy/OS Flexibility	✓ <small>(Exchanges required)</small>	✓ <small>(Automatic)</small>
Instance Size Flexibility	✓ <small>(Linux only)</small>	✓
Resellable on AWS Marketplace	✗	✗

EC2 Options		Less Flexible		More Flexible	
Model		Standard RI	EC2 SP	Convertible RI	Compute SP
Commitment		Instance	Dollar per hour	Instance	Dollar per hour
Savings / Discounts		up to <b>72%</b>	up to <b>72%</b>	up to <b>66%</b>	up to <b>66%</b>
Region Flexibility		✗	✗	✗	✓
Covers Fargate Usage		✗	✗	✗	✓
Instance Family Flexibility		✗	✗	✓ (Exchanges required)	✓ (Automatic)
Tenancy/OS Flexibility		✗	✓	✓ (Exchanges required)	✓ (Automatic)
Instance Size Flexibility		✓ (Linux only)	✓	✓ (Linux only)	✓
Resellable on AWS Marketplace		✓	✗	✗	✗

# Budget Overview



Services ▾

## AWS Cost Management



## ⚠ What's new in AWS Cost Management.

Cost Anomaly Detection (free service) is now generally available in AWS Cost Management. You can now receive automated alerts when unusual spend is detected. [Learn more](#)[View Cost Anomaly Detection](#)

## Home

[Cost Explorer](#)[Reports](#)[Budgets](#)[Cost Anomaly Detection](#)[Recommendations](#)

## ▼ Savings Plans

[Overview](#)[Inventory](#)[Recommendations](#)[Purchase Savings Plans](#)[Utilization report](#)[Coverage report](#)Cart 0

## ▼ Reservations

[Overview](#)[Recommendations](#)[Utilization report](#)[Coverage report](#)[Preferences](#)[Billing Console](#)[Documentation](#)[Feedback](#)

English (US) ▾

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[Privacy Policy](#)[Terms of Use](#)[AWS Cost Management](#) > Home

## Current month costs

\$12,087.36

Over last month  
↓ 4%

## Forecasted month end costs

\$12,779.98

Over last month  
↓ 2%

## Daily unblended costs (\$)

[Explore costs](#)

## December trends

## Service usage

AmazonCloudWatch costs are up \$330.53 (38%)

Amazon Elastic Container Service for Kubernetes costs are up \$96.84 (10%)

m3.large costs are up \$48.72 (8%)

## Reservations

Since November 1st, you have saved ~\$3,358.49 as a result of your EC2 RI purchases.

## Recently accessed reports

[View all reports](#)

Report name	Report type	Time granularity	Last accessed
Monthly EC2 running hours costs and usage	Cost & Usage	Monthly	2 days ago
Monthly costs by service	Cost & Usage	Monthly	3 days ago
AWS Marketplace	Cost & Usage	Monthly	4 days ago
Daily costs	Cost & Usage	Daily	8 months ago



Services ▾

Home

Cost Management

Cost Explorer

**Budgets**

Budgets Reports

Savings Plans

Cost &amp; Usage Reports

Cost Categories

Cost allocation tags

Billing

Bills

Orders and invoices

Credits

Purchase orders

Preferences

Billing preferences

Payment methods

Consolidated billing ▾

Tax settings

## AWS Budgets

You currently have no budgets. AWS Budgets lets you quickly create custom budgets that will automatically alert you when your AWS costs or usage exceed, or are forecasted to exceed, the thresholds you set.

[Create a budget](#)

### Create and Manage Budgets

Set custom cost and usage budgets to more easily manage your AWS spend. Monitor your budget status from the Budgets Dashboard.



### Refine your budget using filters

Track your cost or usage across multiple dimensions by adding filters related to Service, Linked Account(s), Availability Zone, and more.



### Add notifications to your budget

For more information, refer to the [Managing Your Costs With Budgets](#) section in the AWS Billing & Cost Management user guide.



Services ▾

Create a budget

## ⑦ Select budget type

Select which type of budget you would like to create.

### Cost budget

Monitor your costs against a specified amount and receive alerts when your user-defined thresholds are met.

### Usage budget

Monitor your usage of one or more specified usage types or usage type groups and receive alerts when your user-defined thresholds are met.

### Reservation budget

Track the RI Utilization or RI Coverage associated with your reservations. These budgets support Amazon EC2, RDS, Redshift, ElastiCache and Elasticsearch reservation models.

### Savings Plans budget

Track the utilization and coverage associated with your Savings Plans.

[Cancel](#)[Set your budget >](#)

## **CASE STUDY:**

### Set up a cost budget

## Objectives

- Set up a budget to keep account spend <\$24k  
(amortized cost basis)

Create a budget

## ⑦ Select budget type

Select which type of budget you would like to create.

 Cost budget

Monitor your costs against a specified amount and receive alerts when your user-defined thresholds are met.

 Usage budget

Monitor your usage of one or more specified usage types or usage type groups and receive alerts when your user-defined thresholds are met.

 Reservation budget

Track the RI Utilization or RI Coverage associated with your reservations. These budgets support Amazon EC2, RDS, Redshift, ElastiCache and Elasticsearch reservation models.

 Savings Plans budget

Track the utilization and coverage associated with your Savings Plans.

[Cancel](#)[Set your budget >](#)

Create a budget

## ⑦ Set your budget

Set your budget details, including your budgeted amount. From there, you can refine your budget using the optional budget parameters.

- Step 1 Select budget type
- Step 2 Set your budget
- Step 3 Configure thresholds
- Step 4 Confirm budget

### Define your budget name and timeframe

**Name**

total cost

**Period**

Monthly

**Budget effective dates**

Recurring budgets will renew on the first day of every monthly billing period. Expiring budgets will stop renewing on the last day of the expiration month.

- Recurring budget  
 Expiring budget

**Start month**

Dec 2020

### Specify your monthly budget

Monitor your costs against a specified amount and receive alerts when your user-defined thresholds are met.

 Fixed

Create a budget that tracks against a single monthly budgeted amount.

 Monthly Budget Planning

Specify your budgeted amount for each budget period.

**Budgeted amount**

\$1,000

Last month's cost \$13,063.86

### Set additional budget parameters - Optional

Use the filtering dimensions below to narrow the set of cost information tracked as part of this budget.

## Filtering

Unblended costs (\$ in Thousands)

View in AWS Cost Explorer

Region

Step 4

Confirm budget

Total cost:

Period

Monthly

**Budget effective dates**

Recurring budgets will renew on the first day of every monthly billing period. Expiring budgets will stop renewing on the last day of the expiration month.

 Recurring budget Expiring budget

Start month

Dec 2020 ▾

**Specify your monthly budget**

Monitor your costs against a specified amount and receive alerts when your user-defined thresholds are met.

 Fixed

Create a budget that tracks against a single monthly budgeted amount.

 Monthly Budget Planning

Specify your budgeted amount for each budget period.

**Budgeted amount**

\$24,000

Last month's cost \$13,063.86

**Set additional budget parameters - Optional**

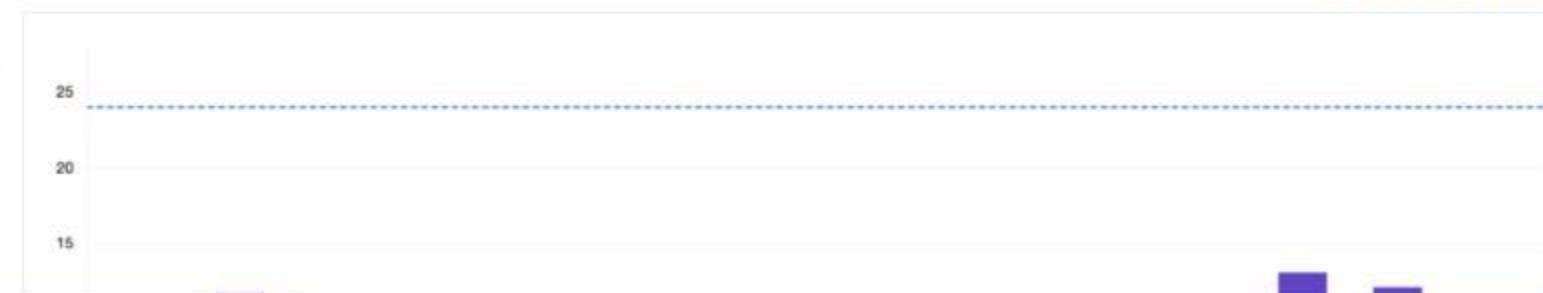
Use the filtering dimensions below to narrow the set of cost information tracked as part of this budget.

## ▼ Filtering

## Unblended costs (\$ in Thousands)

View in AWS Cost Explorer

Service	<input type="checkbox"/> Include all
Linked Account	<input type="checkbox"/> Include all
Region	<input type="checkbox"/> Include all
Instance Type	<input type="checkbox"/> Include all
Usage Type	<input type="checkbox"/> Include all
Usage Type Group	<input type="checkbox"/> Include all
Cost Category	<input type="checkbox"/> Include all



Step 4

Confirm budget

Total cost:

Period

Monthly

## Budget effective dates

Recurring budgets will renew on the first day of every monthly billing period. Expiring budgets will stop renewing on the last day of the expiration month.

 Recurring budget Expiring budget

Start month

Dec 2020 ▾

## Specify your monthly budget

Monitor your costs against a specified amount and receive alerts when your user-defined thresholds are met.

 Fixed

Create a budget that tracks against a single monthly budgeted amount.

 Monthly Budget Planning

Specify your budgeted amount for each budget period.

## Monthly Budget Planning

Last month's cost \$13,063.86

Auto-fill budgeted amounts

Dec 2020

\$24,000

Jan 2021

25000

Feb 2021

\$1,000.00

Mar 2021

\$1,000.00

Apr 2021

\$1,000.00

May 2021

\$1,000.00

Jun 2021

\$1,000.00

Jul 2021

\$1,000.00

Aug 2021

\$1,000.00

Sep 2021

\$1,000.00

Oct 2021

\$1,000.00

Nov 2021

\$1,000.00

Please note that the last budgeted amount you input will automatically be used for future budget periods. You can adjust your budgeted amounts at any time.

## Set additional budget parameters - Optional

Use the filtering dimensions below to narrow the set of cost information tracked as part of this budget.

▼ Filtering

Unblended costs (\$ in Thousands)

View in AWS Cost Explorer

Service

Include all

Linked Account

Include all

25

## Auto-fill budgeted amounts



Specify your initial budgeted amount and, if desired, input your expected growth rate for the next 12 months

Last month's cost \$13,063.86

Starting Budget

\$24,000

Budget growth %

5 %

**Auto-fill**

Dec 2020	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021
\$24,000	\$25,200	\$26,460	\$27,783	\$29,172.15	\$30,630.76
Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021
\$32,162.30	\$33,770.41	\$35,458.93	\$37,231.88	\$39,093.47	\$41,048.14

Cancel

**Apply**

## Monthly Budget Planning

Last month's cost \$13,063.86

Auto-fill budgeted amounts

Dec 2020	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021
\$24,000	\$25,000	\$1,000.00	\$1,000.00	\$1,000.00	\$1,000.00
Jun 2021	Jul 2021	Aug 2021	Sep 2021	Oct 2021	Nov 2021
\$1,000.00	\$1,000.00	\$1,000.00	\$1,000.00	\$1,000.00	\$1,000.00

Please note that the last budgeted amount you input will automatically be used for future budget periods. You can adjust your budgeted amounts at any time.

## Set additional budget parameters - Optional

Use the filtering dimensions below to narrow the set of cost information tracked as part of this budget.

▼ Filtering

Unblended costs (\$ in Thousands)

View in AWS Cost Explorer

Service

Include all

Linked Account

Include all

25



Services ▾

Search for services, features, marketplace products, and docs

[Option+5]



Global ▾ Support ▾

## Set additional budget parameters - Optional

Use the filtering dimensions below to narrow the set of cost information tracked as part of this budget.

### Filtering

Service	Include all
Linked Account	Include all
Region	Include all
Instance Type	Include all
Usage Type	Include all
Usage Type Group	Include all
Cost Category	Include all
Tag	Include all
API Operation	Include all
More filters ▾	

### Advanced Options

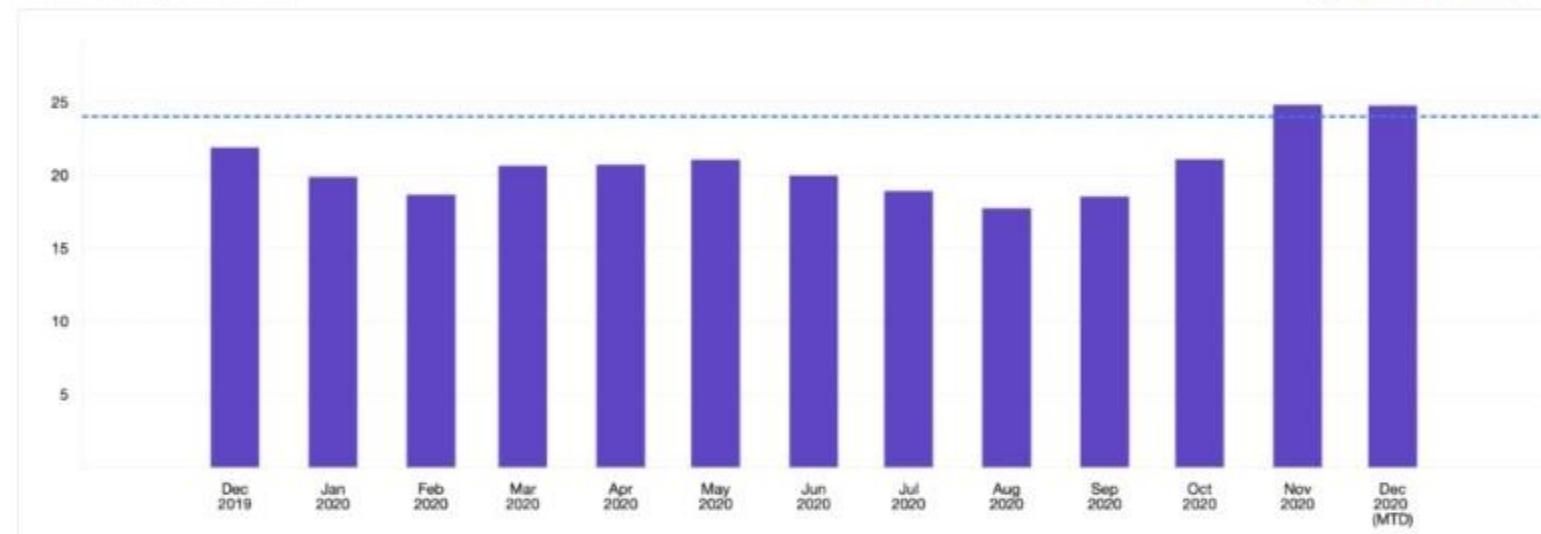
Aggregate costs by

Amortized costs

Include costs related to

- Refunds
- Credits
- Upfront reservation fees
- Recurring reservation charges
- Other subscription costs
- Taxes
- Support charges
- Discounts

Amortized costs (\$ in Thousands)



[View in AWS Cost Explorer](#)

Create a budget

## ⑦ Configure thresholds

Define your threshold then select whether you would like to send alerts to recipient(s) or setup budget actions. You can send budget alerts via email and Amazon Simple Notification Service (Amazon SNS) topic.

Budgeted Amount: \$24,000.00 [Edit](#)

Thresholds: 1

[+ New threshold](#)

### Define your budget threshold

Set threshold based on:

- Actual cost  
 Forecasted Cost

Alert threshold

80

% of budgeted amount ▾

### Set up your notifications

You can send budget alerts via email, Amazon Simple Notification Service (Amazon SNS) topic or with AWS Chatbot Alerts. When a threshold includes a budget action, it is required to input an email recipient or setup an Amazon SNS.

Email recipients (Maximum:10)

Please separate email addresses with commas

▶ Amazon Simple Notification Service (Amazon SNS) (Optional)

▶ AWS Chatbot Alerts (Optional)

[+ Add a budget action](#)

Cancel

[◀ Set your budget](#)[Confirm budget ▶](#)

Create a budget

## ⑦ Configure thresholds

Define your threshold then select whether you would like to send alerts to recipient(s) or setup budget actions. You can send budget alerts via email and Amazon Simple Notification Service (Amazon SNS) topic.  
Budgeted Amount: \$24,000.00 [Edit](#)

Thresholds: 1

[+ New threshold](#)

### Define your budget threshold

Set threshold based on:

- Actual cost  
 Forecasted Cost

Alert threshold

100

% of budgeted amount ▾

Summary: This threshold is set based on **Forecasted cost** when it is **greater than 100% (\$24,000.00)**.

### Set up your notifications

You can send budget alerts via email, Amazon Simple Notification Service (Amazon SNS) topic or with AWS Chatbot Alerts. When a threshold includes a budget action, it is required to input an email recipient or setup an Amazon SNS.

#### Email recipients (Maximum:10)

Please separate email addresses with commas

▶ [Amazon Simple Notification Service \(Amazon SNS\) \(Optional\)](#)

▶ [AWS Chatbot Alerts \(Optional\)](#)

[+ Add a budget action](#)

[Cancel](#)[◀ Set your budget](#)[Confirm budget ➤](#)

Budgeted Amount: \$24,000.00 [Edit](#)

Thresholds: 1

[+ New threshold](#)

Step 2

Set your budget

Step 3

Configure thresholds

Step 4

Confirm budget

## Define your budget threshold

Set threshold based on:

- 
- Actual cost
- 
- 
- Forecasted Cost

Alert threshold

100

% of budgeted amount ▾

Summary: This threshold is set based on **Forecasted cost** when it is **greater than 100% (\$24,000.00)**.

## Set up your notifications

You can send budget alerts via email, Amazon Simple Notification Service (Amazon SNS) topic or with AWS Chatbot Alerts. When a threshold includes a budget action, it is required to input an email recipient or setup an Amazon SNS.

Email recipients (Maximum:10)

demo@demo.com

## ▼ Amazon Simple Notification Service (Amazon SNS) (Optional)

Amazon SNS allows you to send budget alerts to stakeholders across your organization by configuring an Amazon SNS topic. To enable Amazon SNS alerts for this budget, please input your Amazon SNS topic ARN below:

arn:aws:sns:us-east-1:444455556666:MyTopic

 Create or manage existing SNS topics | View the AWS Budgets SNS topic policy statement

## ▼ AWS Chatbot Alerts (Optional)

AWS Chatbot lets you send budget alerts to the Amazon Chime or Slack chat rooms of your choice. To receive alerts via AWS Chatbot, you need to configure an Amazon SNS topic in the proper region (please see above), authorize Slack and Amazon Chime to publish to this topic, and specify the chat room to which budget alerts should be sent. To manage your AWS Chatbot configuration, go [here](#).[+ Add a budget action](#)[Cancel](#)[◀ Set your budget](#)[Confirm budget ➤](#)

▼ Amazon Simple Notification Service (Amazon SNS) (Optional)

Amazon SNS allows you to send budget alerts to stakeholders across your organization by configuring an Amazon SNS topic. To enable Amazon SNS alerts for this budget, please input your Amazon SNS topic ARN below:

arn:aws:sns:us-east-1:444455556666:MyTopic

[Create or manage existing SNS topics](#) | View the AWS Budgets SNS topic policy statement

▼ AWS Chatbot Alerts (Optional)

AWS Chatbot lets you send budget alerts to the Amazon Chime or Slack chat rooms of your choice. To receive alerts via AWS Chatbot, you need to configure an [Amazon SNS topic](#) in the proper region (please see above), authorize Slack and Amazon Chime to publish to this topic, and specify the chat room to which budget alerts should be sent. To manage your AWS Chatbot configuration, go [here](#).

## Budget action

Remove

Budget actions allow you to trigger specific events when your budget threshold is reached, such as stopping Amazon EC2 instances or triggering Service Control Policies. If your threshold has an associated action, you must specify an email recipient or a valid Amazon SNS topic.

### Notification settings

Use the same notification settings created in "Set up your notifications."

### Choose your budget action

**i** AWS Budgets requires specific IAM permissions to execute an action on your behalf. Selecting an IAM role with incorrect permissions will prevent AWS Budgets from executing actions. For the specific permissions needed, reference [here](#) X

#### IAM Policy

Attach a policy to IAM identities (users, groups to which users belong, or roles). These policies control which actions an entity can perform, on which resources, and under what conditions.

#### Automate instances to stop for EC2 or RDS

Use this automation to stop instances for EC2 or RDS when your budget exceeds your budget threshold.

None selected

Automate instances to stop for EC2 or RDS

**+ Add a budget action**

[Create a budget](#)

## 7 Confirm budget

Please review your budget details and alerts settings. Then select Create to finish creating your budget.

- Step 1 Select budget type
- Step 2 Set your budget
- Step 3 Configure thresholds
- Step 4 Confirm budget

### Budget type

[Edit](#)

#### Cost budget

Monitor your costs against a specified amount and receive alerts when your user-defined thresholds are met.

### Budget details

[Edit](#)

Name

total cost

Period

Monthly

Start Date

Nov 30, 2020

End Date

-

Budgeted amount

\$24,000

Advanced Options

Aggregate costs by: Amortized costs

Include costs related to: Taxes, Support charges, Other subscription costs, Recurring reservation charges, Upfront reservation fees, Discounts

Exclude costs related to: Credits, Refunds

### Thresholds

[Edit](#)

Threshold 1 - Forecasted cost is greater than 100% (\$24,000.00) | 1 email recipients

[Cancel](#)[Configure thresholds](#)[Create](#)

[Home](#)

## AWS Budgets

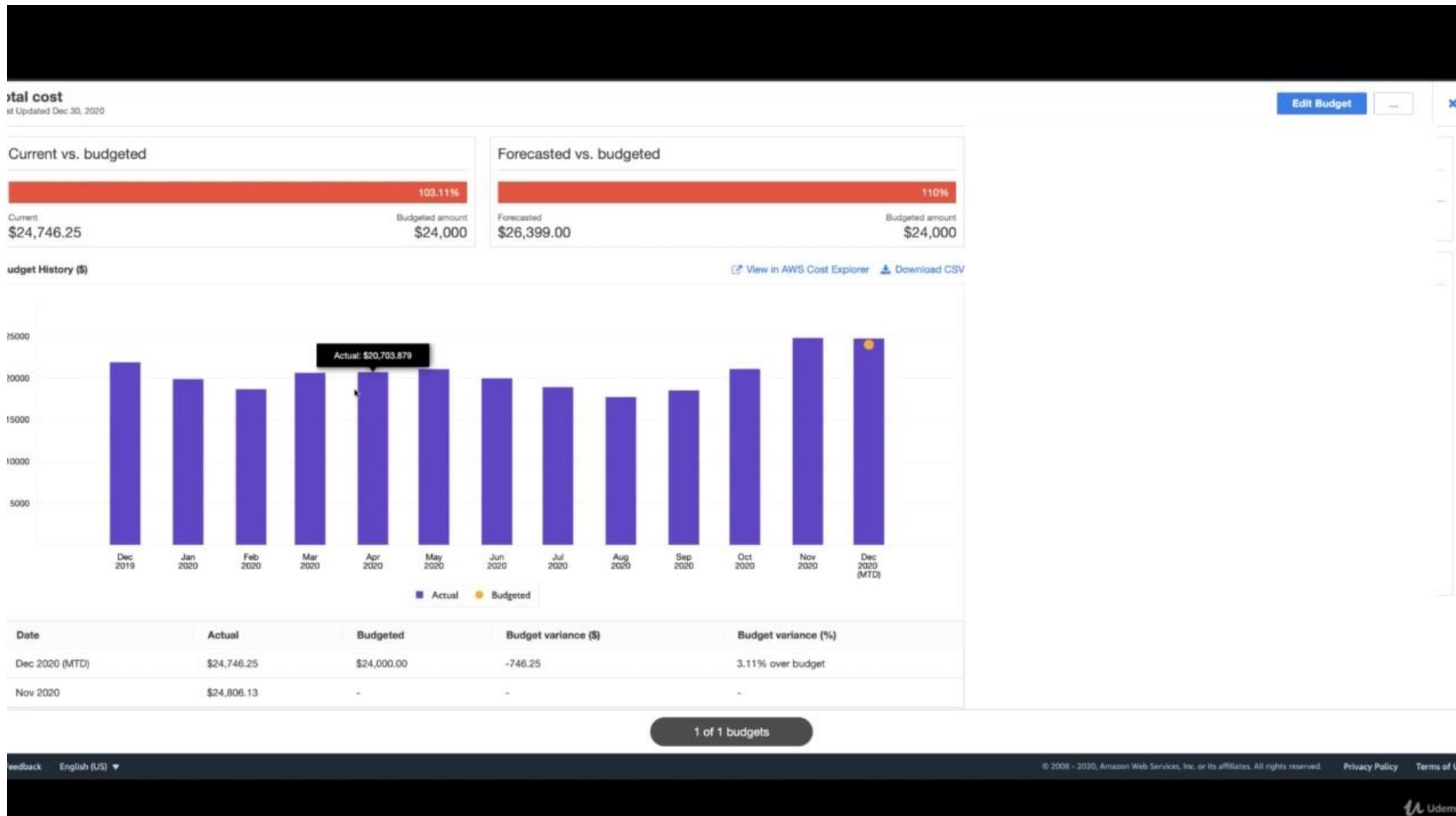
[Cost Management](#)[Cost Explorer](#)[Budgets](#)[Budgets Reports](#)[Savings Plans](#)[Cost & Usage Reports](#)[Cost Categories](#)[Cost allocation tags](#)[Billing](#)[Bills](#)[Orders and invoices](#)[Credits](#)[Transactions \(beta\)](#)[Purchase orders](#)[Preferences](#)[Billing preferences](#)[Payment methods](#)[Consolidated billing](#)[Tax settings](#)

**What's new in AWS Budgets** You have the option to attach actions that execute whenever your alert threshold has been exceeded, such as stopping an EC2 instance from incurring any further costs.

 total cost [Download CSV](#)[Create budget](#)

All budgets (1)	Cost budgets (1)	Usage budgets (0)	Reservation budgets (0)	Savings Plans budgets (0)
-----------------	------------------	-------------------	-------------------------	---------------------------

Budget name	Type	Actions	Current	Budgeted	Forecasted	Current vs. budgeted	Forecasted vs. budgeted
total cost	Cost	-	\$24,746.25	\$24,000.00	\$26,399.00	<div style="width: 103.11%;">103.11%</div>	<div style="width: 110%;">110%</div>





# Subscribe to summary budget reports

[Home](#)

## AWS Budgets Reports

[Cost Management](#)[Cost Explorer](#)[Budgets](#)[Budgets Reports](#)[Savings Plans](#)[Cost & Usage Reports](#)[Cost Categories](#)[Cost allocation tags](#)[Billing](#)[Bills](#)[Orders and invoices](#)[Credits](#)[Transactions \(beta\)](#)[Purchase orders](#)[Preferences](#)[Billing preferences](#)[Payment methods](#)[Consolidated billing](#)[Tax settings](#) Filter by report name[Create budget report](#)

Report name	Frequency	Budget(s) monitored	Recipient(s)	...
My account budget summary	Daily	3	1	...



## Set up budget report

Give your report a descriptive name and select the budgets you would like to include.

## Report name

## Select budget(s) 0 Selected

Please choose the budgets that you would like to include in your report (maximum 50):

<input type="checkbox"/>	Budget name	Type	Filters	Current	Budgeted	Current vs. budgeted
<input type="checkbox"/>	total cost	Cost	Linked Account:  1	\$24,746.25	\$24,000.00	103.11%
<input type="checkbox"/>	total cost-copy	Cost	Linked Account:  1	\$24,746.25	\$24,000.00	103.11%
<input type="checkbox"/>	AWS Marketplace \$15k	Cost	Billing Entity:  1	\$13,352.43	\$13,000.00	102.71%
<input type="checkbox"/>	InterAZ GB 80TB Data Transfer	Usage	Usage Type Group:  1 Linked Account:  1	81,095.91 GB	80,000 GB	101.37%
<input type="checkbox"/>	InterAZ GB 80TB Data Transfer-copy	Usage	Usage Type Group:  1 Linked Account:  1	81,095.91 GB	80,000 GB	101.37%
<input type="checkbox"/>	Savings Plan Coverage	Savings Plans Coverage	No filters applied	100%	100%	100%



## Set up budget report

Give your report a descriptive name and select the budgets you would like to include.

## Report name

My account summary | 

## Select budget(s) 3 Selected

Please choose the budgets that you would like to include in your report (maximum 50):

<input type="checkbox"/>	Budget name	Type	Filters	Current	Budgeted	Current vs. budgeted
<input checked="" type="checkbox"/>	total cost	Cost	Linked Account:	\$24,746.25	\$24,000.00	103.11%
<input type="checkbox"/>	total cost-copy	Cost	Linked Account:	\$24,746.25	\$24,000.00	103.11%
<input checked="" type="checkbox"/>	AWS Marketplace \$15k	Cost	Billing Entity:	\$13,352.43	\$13,000.00	102.71%
<input type="checkbox"/>	InterAZ GB 80TB Data Transfer	Usage	Usage Type Group:  Linked Account:	81,095.91 GB	80,000 GB	101.37%
<input checked="" type="checkbox"/>	InterAZ GB 80TB Data Transfer-copy	Usage	Usage Type Group:  Linked Account:	81,095.91 GB	80,000 GB	101.37%
<input type="checkbox"/>	Savings Plan Coverage	Savings Plans Coverage	No filters applied	100%	100%	100%



## Configure delivery settings

Please select your report delivery frequency and desired email recipients.

## Report frequency

Daily ▾

Daily 0/50

Weekly main.com, example1@domain.com

Monthly



No email recipients

Please enter at least one email recipients

Cancel

< Set up budget report

Confirm budget report >



## Configure delivery settings

Please select your report delivery frequency and desired email recipients.

## Report frequency

Weekly ▾

## Day of week

Sunday ▾

Sunday 0/50

Monday

Tuesday

Wednesday

Thursday

Friday

Saturday



no email recipients

Please enter at least one email recipients

Cancel

&lt; Set up budget report

Confirm budget report &gt;



## Configure delivery settings

Please select your report delivery frequency and desired email recipients.

### Report frequency

Monthly ▾

### Day of month

1 ▾

### Email recipients 1/50

demo@demo.com

[Cancel](#) [Set up budget report](#)[\*\*Confirm budget report\*\*](#)

## Email notifications

AWS Budgets Report December

AWS Account

Dear AWS Customer,

You requested that we provide a daily update on the status of the following budgets.

Budget Name	Budget Type	Current	Budgeted	Forecasted	Current vs. Budgeted	Forecasted vs. Budgeted
AWS Marketplace \$15k	Cost	\$13,352.43	\$13,000.00	\$14,013.97	102.71%	107.80%
total cost	Cost	\$24,746.25	\$24,000.00	\$26,399.00	103.11%	110.00%
InterAZ GB 80TB Data Transfer	Usage	81,095.91 GB	80,000.00 GB	86,395.84 GB	101.37%	107.99%

[Go to AWS Budgets Report Dashboard](#)

# **CASE STUDY:**

## Automatic Alerts for Low Savings Plan Utilization

## **Objectives**

- Set up automated alerts when Savings Plan SP utilization goes below 100%

Note: This method is applicable for tracking RI coverage, RI utilization, SP coverage as well.



## Select budget type

Select which type of budget you would like to create.

### Cost budget

Monitor your costs against a specified amount and receive alerts when your user-defined thresholds are met.

### Usage budget

Monitor your usage of one or more specified usage types or usage type groups and receive alerts when your user-defined thresholds are met.

### Reservation budget

Track the RI Utilization or RI Coverage associated with your reservations. These budgets support Amazon EC2, RDS, Redshift, ElastiCache and Elasticsearch reservation models.

### Savings Plans budget

Track the utilization and coverage associated with your Savings Plans.

[Cancel](#)[Set your budget >](#)

Select budget type

Set your budget details, including your budgeted amount. From there, you can refine your budget using the optional budget parameters.

- Step 2 Set your budget
- Step 3 Configure alerts
- Step 4 Confirm budget

## Define your budget name and timeframe

### Name

### Period

## Specify your Savings Plans budget

Track the utilization or coverage associated with your Savings Plans.

### Savings Plans budget type

- Savings Plans Utilization
- Savings Plans Coverage

### Utilization threshold

%

Last month's utilization 100.00%

## Set additional budget parameters - Optional

### Filtering

### Savings Plans Utilization (%)

[View in AWS Cost Explorer](#)

Savings Plans Type

Include all

100



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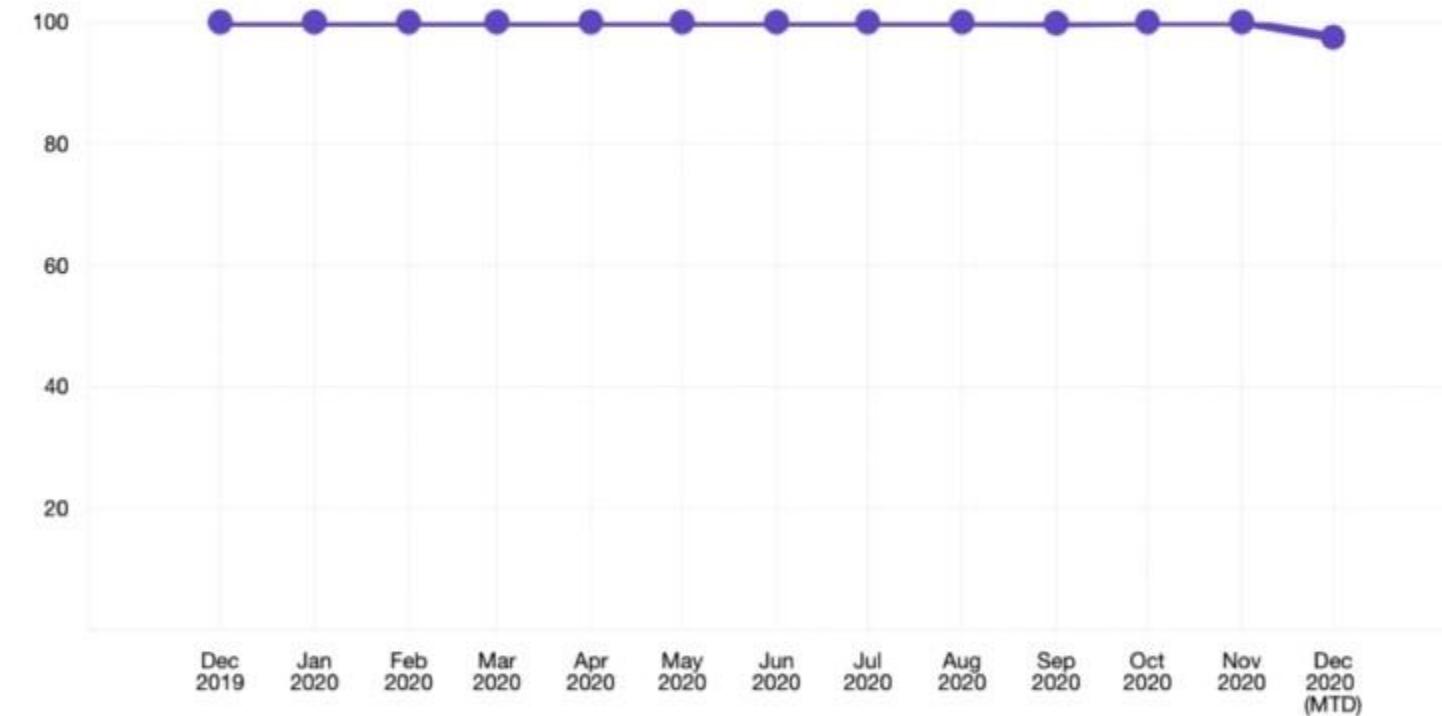
English (US) ▾

**Utilization threshold**

100

%

Last month's utilization 100.00%

**Set additional budget parameters - Optional****▼ Filtering**Savings Plans Type [Include all](#)Linked Account [Include all](#)Region [Include all](#)Instance Family [Include all](#)[More filters ▼](#)**Savings Plans Utilization (%)** [View in AWS Cost Explorer](#)[Cancel](#)[\*\*< Select budget type\*\*](#)[Configure alerts >](#)



## Configure alerts

You can send budget alerts via email and/or Amazon Simple Notification Service (Amazon SNS) topic. To send a budget alert, you must provide at least one email contact or valid SNS topic ARN.

Utilization threshold [Edit](#)

100%

### Alert 1

Notify the following contacts when utilization falls [below 100%](#).

#### Email contacts

demo@demo.com

[Add email contact](#)

Notify via Amazon Simple Notification Service (SNS) topic [Learn more](#)

#### AWS Chatbot Notifications - Optional [Learn more](#)

AWS customers can send notifications to Chime or Slack by simply mapping an AWS SNS topic to a chat room. To receive alerts via the AWS Chatbot, you will need to create and configure an Amazon SNS topic (instructions above). To manage your AWS Chatbot configuration, please click [here](#).

[Cancel](#)

[◀ Set your budget](#)

[Confirm budget ▶](#)

Cost Management

Cost Explorer

**Budgets**

Budgets Reports

Savings Plans

Cost &amp; Usage Reports

Cost Categories

Cost allocation tags

Billing

Bills

Orders and invoices

Credits

Transactions (beta)

Purchase orders

Preferences

Billing preferences

Payment methods

Consolidated billing

Tax settings

**What's new in AWS Budgets** You have the option to attach actions that execute whenever your alert threshold has been exceeded, such as stopping an EC2 instance from incurring any further costs. [Learn more](#) X

 savings plan utili XDownload CSVCreate budget

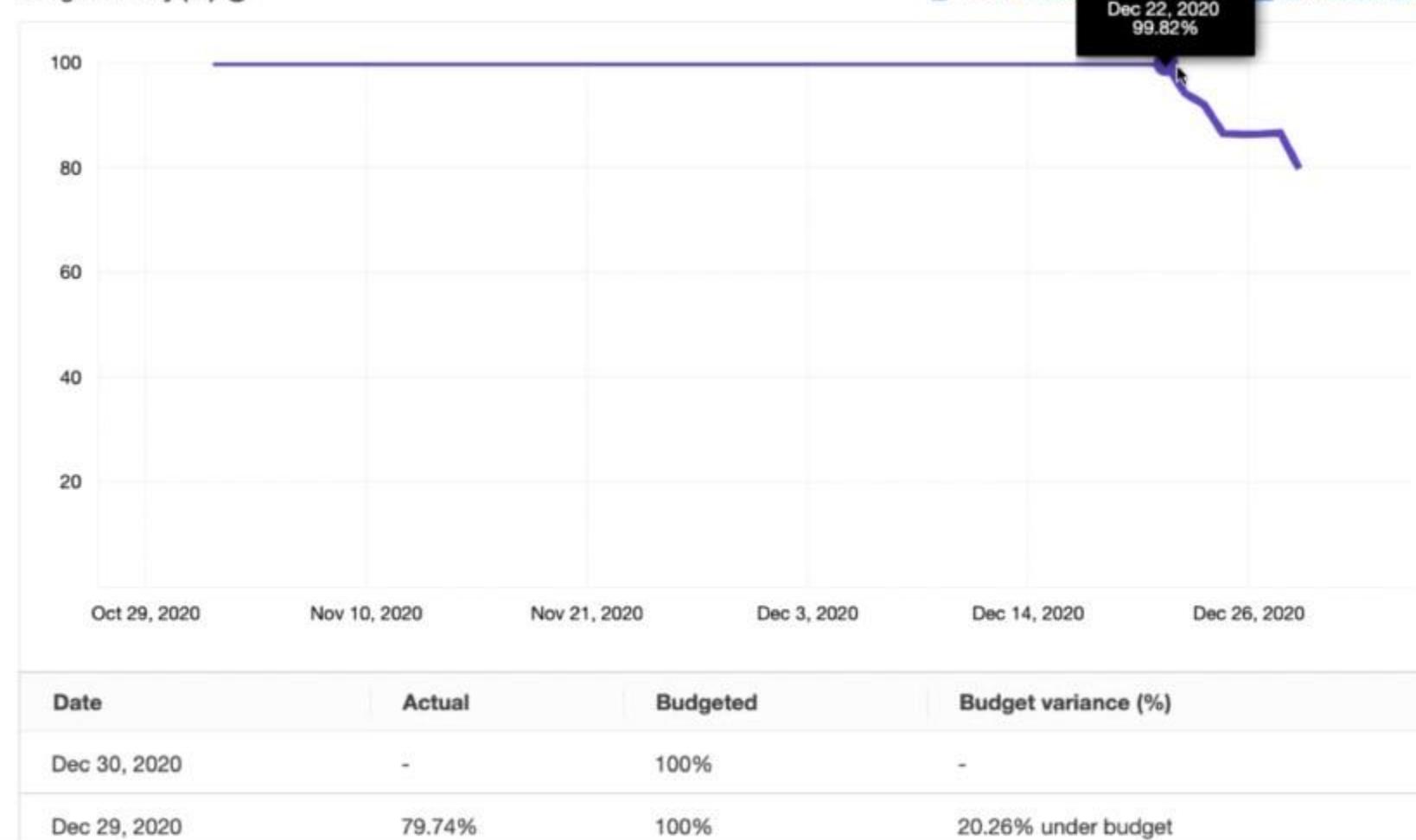
All budgets (1)	Cost budgets (0)	Usage budgets (0)	Reservation budgets (0)	Savings Plans budgets (1)	
Budget name	Type	Actions	Current	Budgeted	Forecasted
Savings Plan Utilization 100pt	Savings Plans Utilization	-	86.4%	100%	<div style="width: 86.4%; background-color: #0070C0; height: 10px; margin-bottom: 5px;"></div> 86.4% -

# Savings Plan Utilization 100pt

Last Updated Dec 30, 2020

[Edit Budget](#)[...](#)[X](#)

## Budget History (%) [i](#)



1 of 1 budgets

[View in AWS](#)[Download CSV](#)

Dec 22, 2020  
99.82%

## Current vs. budgeted

	86.4%	Budgeted amount
Current	86.4%	100%

## Alerts

<b>Alert 1</b>
Savings Plans utilization drops below 99%
▶ 1 contact

## Budget details

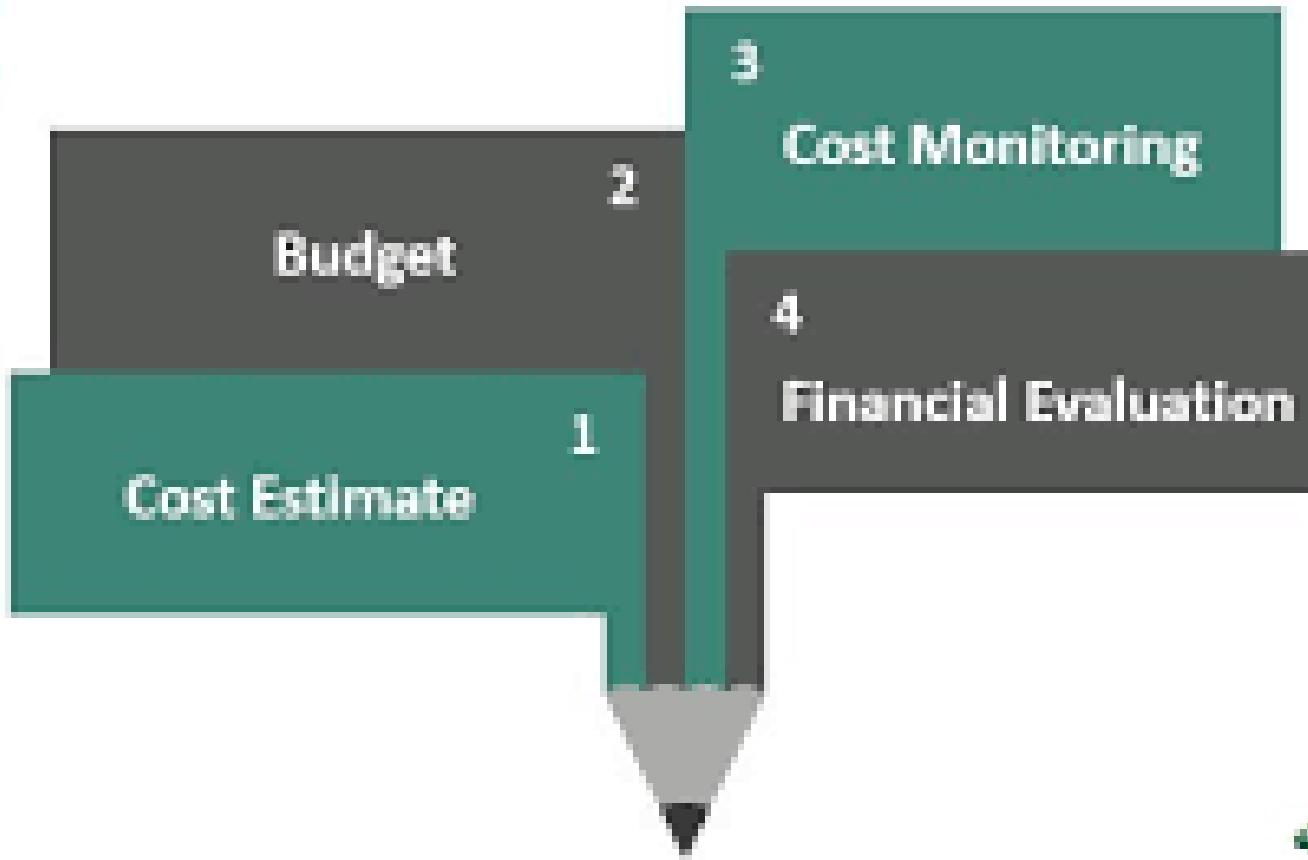
Budget period  
Daily

Budget type  
Savings Plans

Savings Plans Type  
Savings Plans Utilization

# Cost Control

## Tools





## Agenda

- Examining your AWS Cost and Usage Reports
  - Hidden costs in your CUR files affects your bottom line without you even knowing
- Top 10 Strategies to Controlling your Cloud Costs
- New Cloud Operating Model & Need for Cost Governance (FinOps)
  - What is FinOps?
  - Building a culture of cost awareness across your organization

# Examining your AWS Cost and Usage Report

- AWS provides detailed list of items that are attributing to your Costs
  - *LineItems, BillingPeriod, Costs/Rate, Amortized Costs, ProductCode etc..*
  - Too overwhelming and free tools may not be enough
- Densify – Cloud Cost Intelligence makes it simpler to read your Cloud Bill
  - Understand what is making up the “cost” of your service
  - Cloud Experts provide expert guidance



## 1. Select the correct cloud instance type

- Typically EC2 represents a significant portion of cloud bills
- Wide selection of instance families & types targeting different workloads
  - Compute, Memory, General purpose, High Performance Computing, Storage Optimized
  - Chipsets: Intel or AMD or Gravitron
- Example: OnDemand Monthly Prices listed for various instance types in US-East (Ohio) for Linux AMIs

t3.large	m5.large	c5.large	r5.large	i3.large	z1d.large
\$60.74	\$70.08	\$62.05	\$91.98	\$113.88	\$135.78

- Procurement Options: OnDemand, Reserved Instances or Savings Plans

## Densify – Continuous Compute Optimization

- Hidden items that you are getting charged for: Oversized EC2 instances
  - Challenge: Engineers/Developers unaware of ideal resource selection
- Continuous Rightsizing – effort to align workloads to the optimal EC2 instance
  - Identify CPU/Memory/Disk/Network performance & match them to best EC2 instance
  - Do not compromise performance for cost savings, via Policy



## 2 & 3. Selecting lower cost AMI and chip sets

### ■ Hidden items that you are getting charged for:

- Utilize Free/Open Source AMIs where applicable to lower compute costs
  - Example: *c5.xlarge instance in US-East Ohio (OnDemand)*

Linux	Windows	RHEL	SUSE	Windows SQL Standard	Linux SQL Server Standard	Windows SQL Server Enterprise
\$124.10	\$258.42	\$167.90	\$197.10	\$608.82	\$474.50	\$1,353.42

- Switch to AMD instance types, if you haven't done so already
  - Consider geographic region
  - Example: *r5.2xlarge instance with Linux OS (OnDemand)*

	US-East1 (Ohio)	US-West (N. California)	AP (Mumbai)	AP (Tokyo)	EU (London)	EU (Stockholm)	ME (Bahrain)	South America (Sau Paulo)
r5.2xlarge	\$367.92	\$408.80	\$379.60	\$443.84	\$432.16	\$391.28	\$452.60	\$586.92
r5a.2xlarge	\$329.96	\$367.92	\$208.78	\$400.04	\$388.36	n/a	n/a	\$528.52

## 4. Make better RIs & Savings Plans commitments

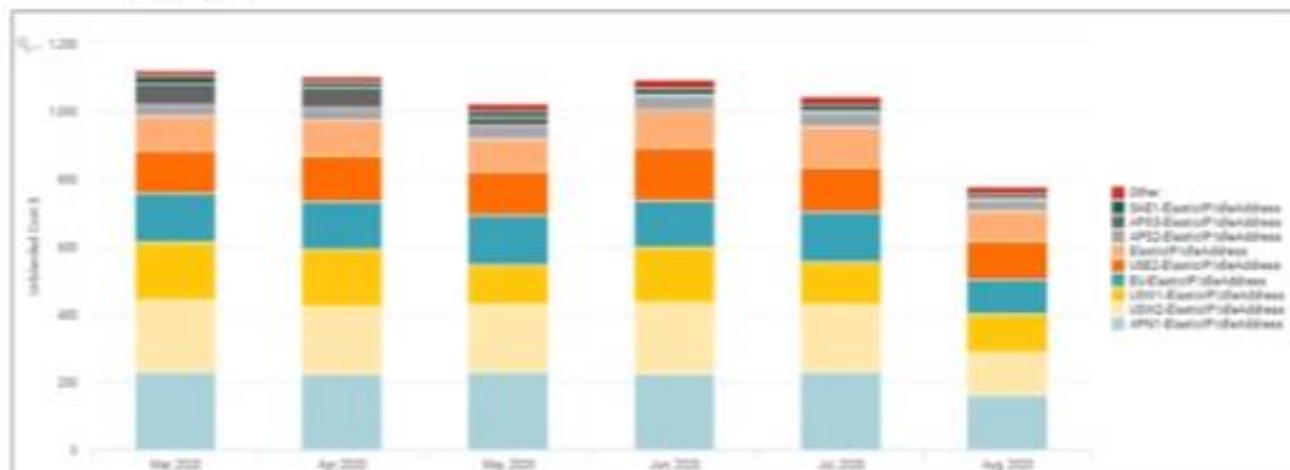
- Understand your current RI/SP utilization & coverage
- Hidden Costs:
  - True up costs for Convertible RIs
  - Manage out of existing RI's where optimal
  - Savings plan selection and optimal commits

The image displays three overlapping screenshots of the Densify software interface, illustrating the tools available for managing Reserved Instances (RIs) and Savings Plans.

- RI Navigator:** Shows a list of RI types including Standard, Convertible, and Dedicated. It highlights "Convertible" RIs and provides a link to "True up costs for Convertible RIs".
- Reserved Instances:** Shows a summary of RI usage. It indicates "Available coverage 99% commitment \$200,000 (2.00x Pw)" and "Unused coverage \$200,000 (2.00x)". Below this, it lists RI details such as Region, Type, and Status, along with metrics like Monthly Usage and Monthly Remaining.
- Report Library:** Shows a list of reports including "Cost Navigator", "Reserved Instances", and "Report Library". It highlights "Report Library" and provides a link to "Savings plan selection and optimal commits".

## 5. Release idle Elastic IP addresses

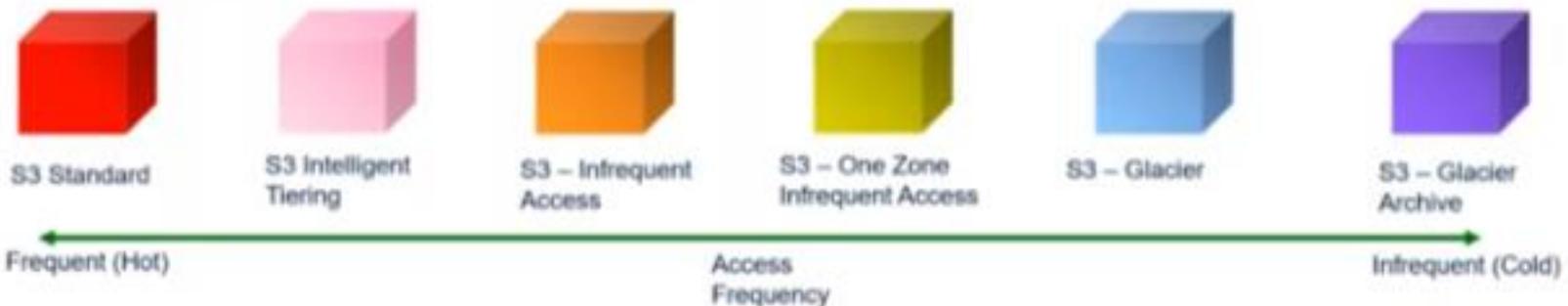
- Elastic IP address is a static IPv4 address associated with an AWS Account
    - Attached to a Network interface
  - Hidden items that you are getting charged for:
    - Idle Elastic IP addresses
      - AWS imposes a small hourly charge if an Elastic IP address is not associated with a running instance



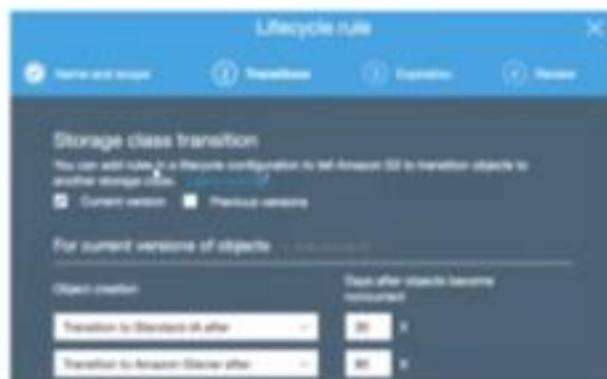
## 6. Identify Cost Anomalies & Outliers

- Closely inspect your AWS Cost and Usage Reports regularly to identify any spend anomalies (Outliers)
    - For example: Cloudwatch Log Delivery

## 7. Select optimal S3 storage



- | Factors attributing to S3 costs:
  - Storage costs varies by Class
  - Data Access/APIs costs varies by Class
  - Data Transfer costs varies by Region
- | Use LifeCycle Manager to manage objects storage based on customizable policies



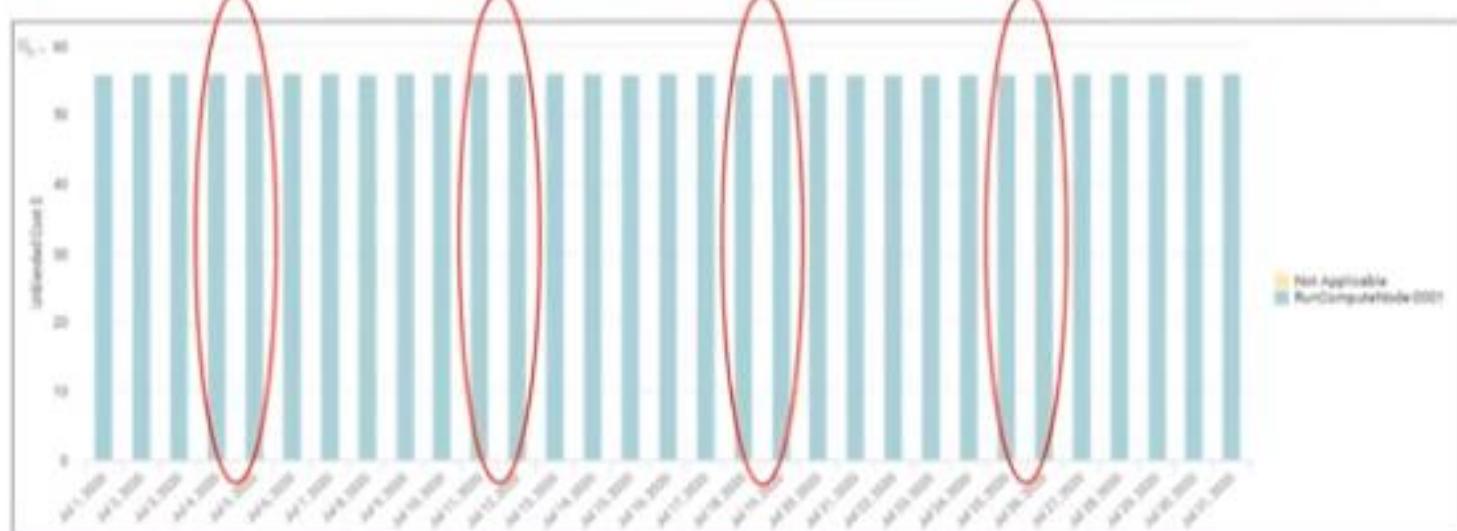
## Strategies for S3

- Hidden items that you are getting charged for:
  - Incorrect Storage Class Selection
  - Data API costs
  - Data Transfer
- Example: 500TB of storage in N. Virginia
  - 250TB of that is infrequent access\*
  - 50M PUT, 100M GET requests
  - 2000 TB Data Transfer to Internet

	S3 standard	S3 Intelligent Tiering	S3 Standard – IA	S3 One Zone – IA	S3 Glacier	S3 – Glacier Archive
orage cost (FA)	\$11,050	\$11,050	\$6,250	\$5,000	\$2,000	\$495
orage cost (IA)*	\$11,050	\$8,675	\$6,250	\$5,000	\$2,000	\$495
ata API costs (N.Virginia)	\$290	\$290	\$600	\$600	\$2,540	\$2,540
ata API costs (S.Paulo)	\$406	\$406	\$600	\$600	\$3,556	\$5,056
ata Transfer (Internet)	\$92,500	\$92,500	\$92,500	\$92,500	\$92,500	\$92,500
ata Transfer (S.Paulo)	\$40,000	\$40,000	\$40,000	\$40,000	\$40,000	\$40,000

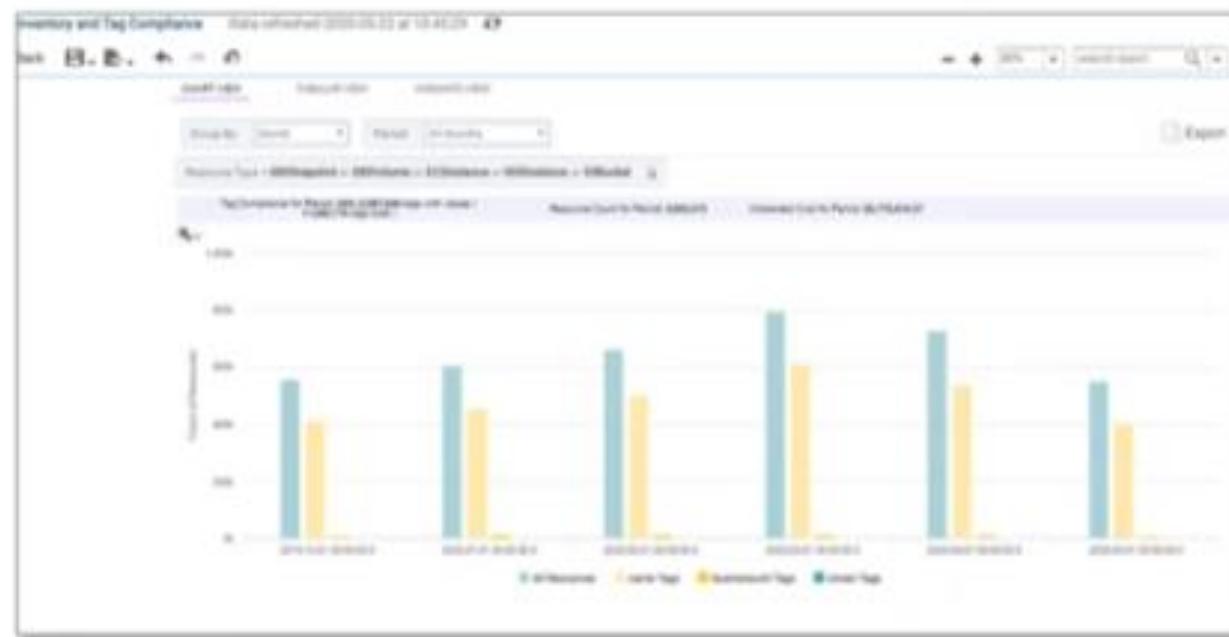
## 9. Pause idle RedShift Clusters

- Redshift Clusters consist of specialized Compute Nodes used for Massively Parallel Processing
- Hidden items that you are getting charged for:
  - Running Redshift cluster nodes during offhours (i.e. weekends)
  - Utilize new "Pause & Resume" feature on Redshift Cluster nodes when not in use

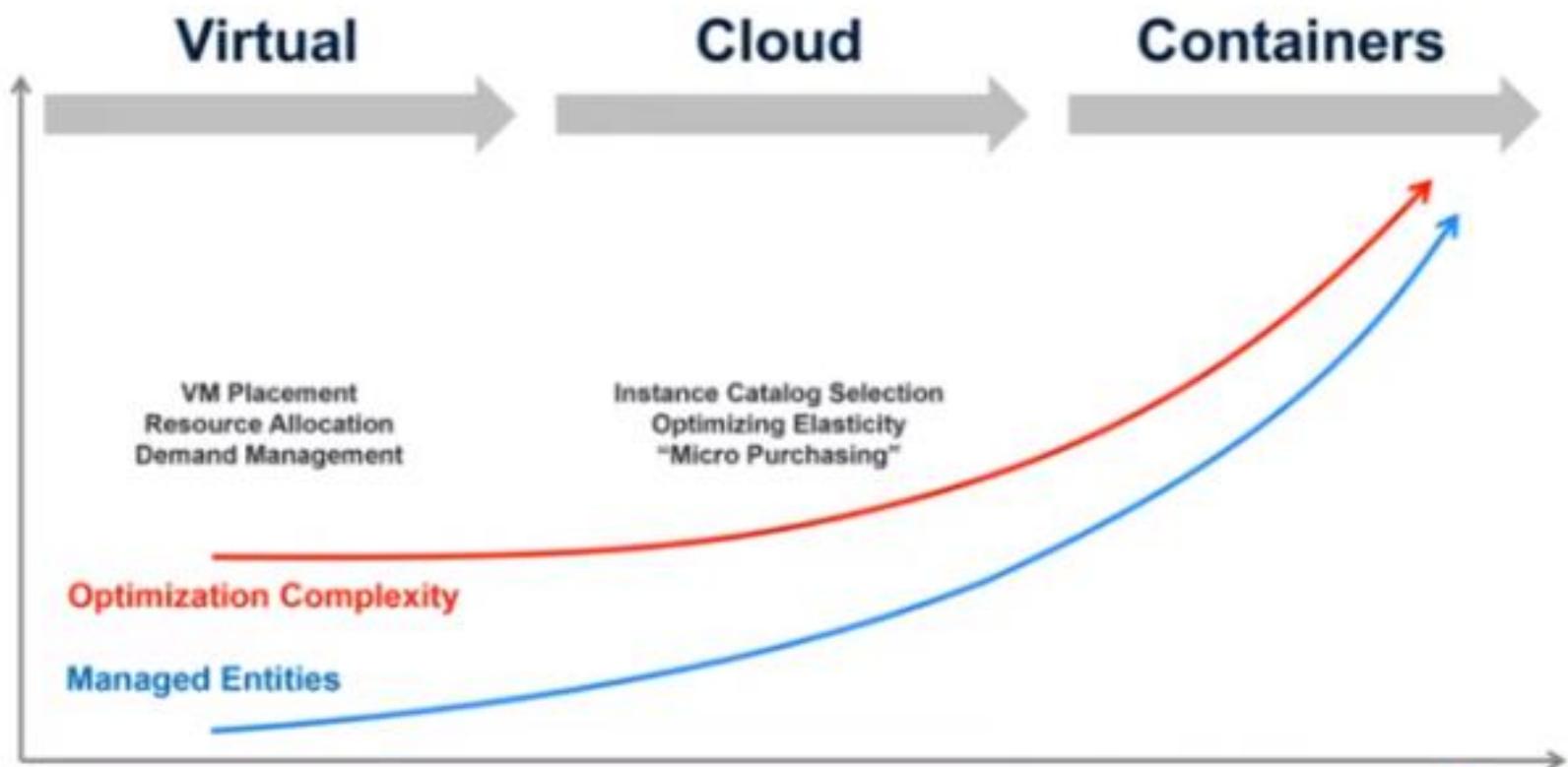


## 10. Automate Infrastructure selection & tagging

- Automate rightsizing as part of infrastructure provisioning
  - Integrate into the CI/CD framework
- Automate tagging best enforcement



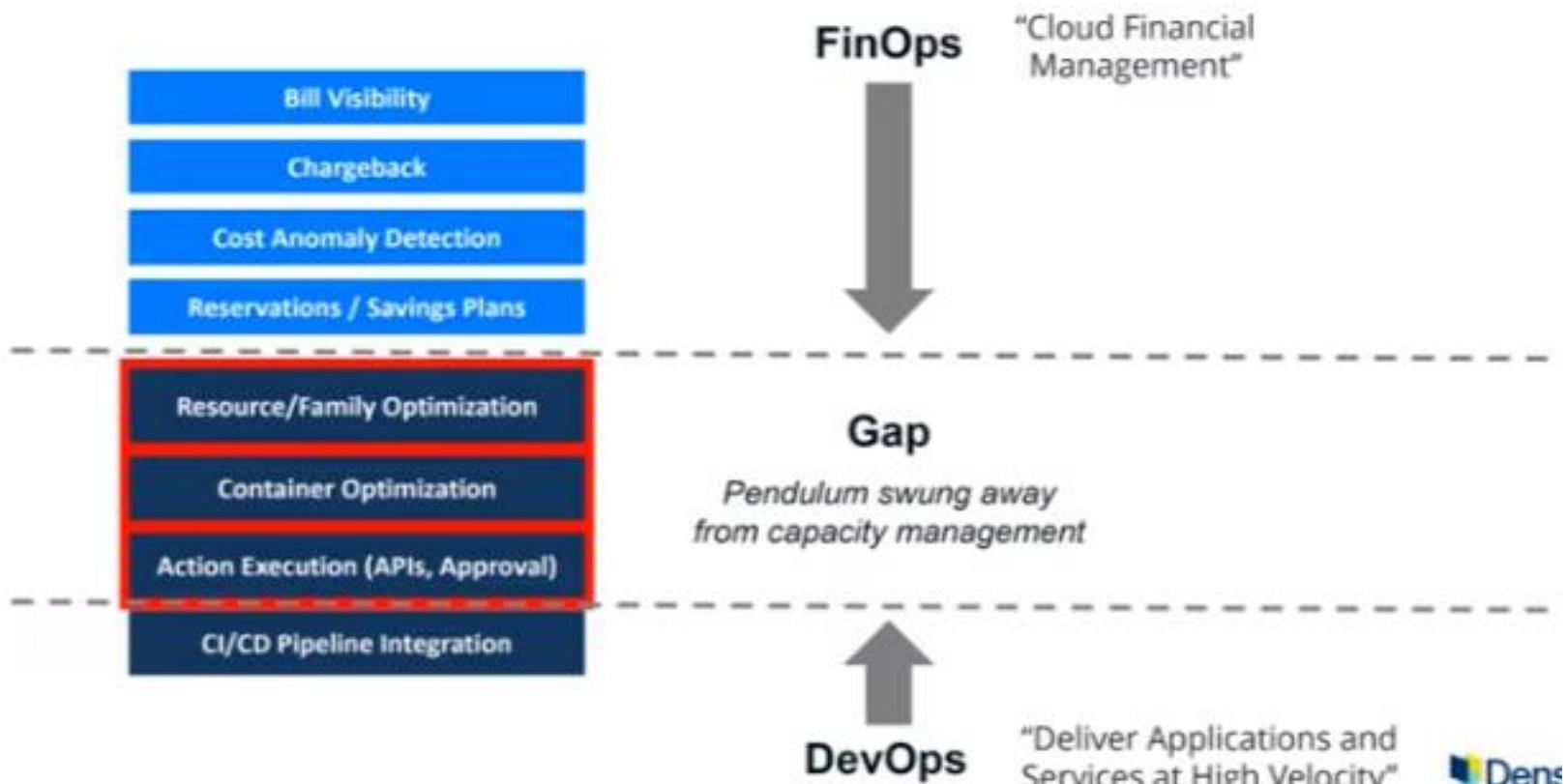
## Resource Optimization



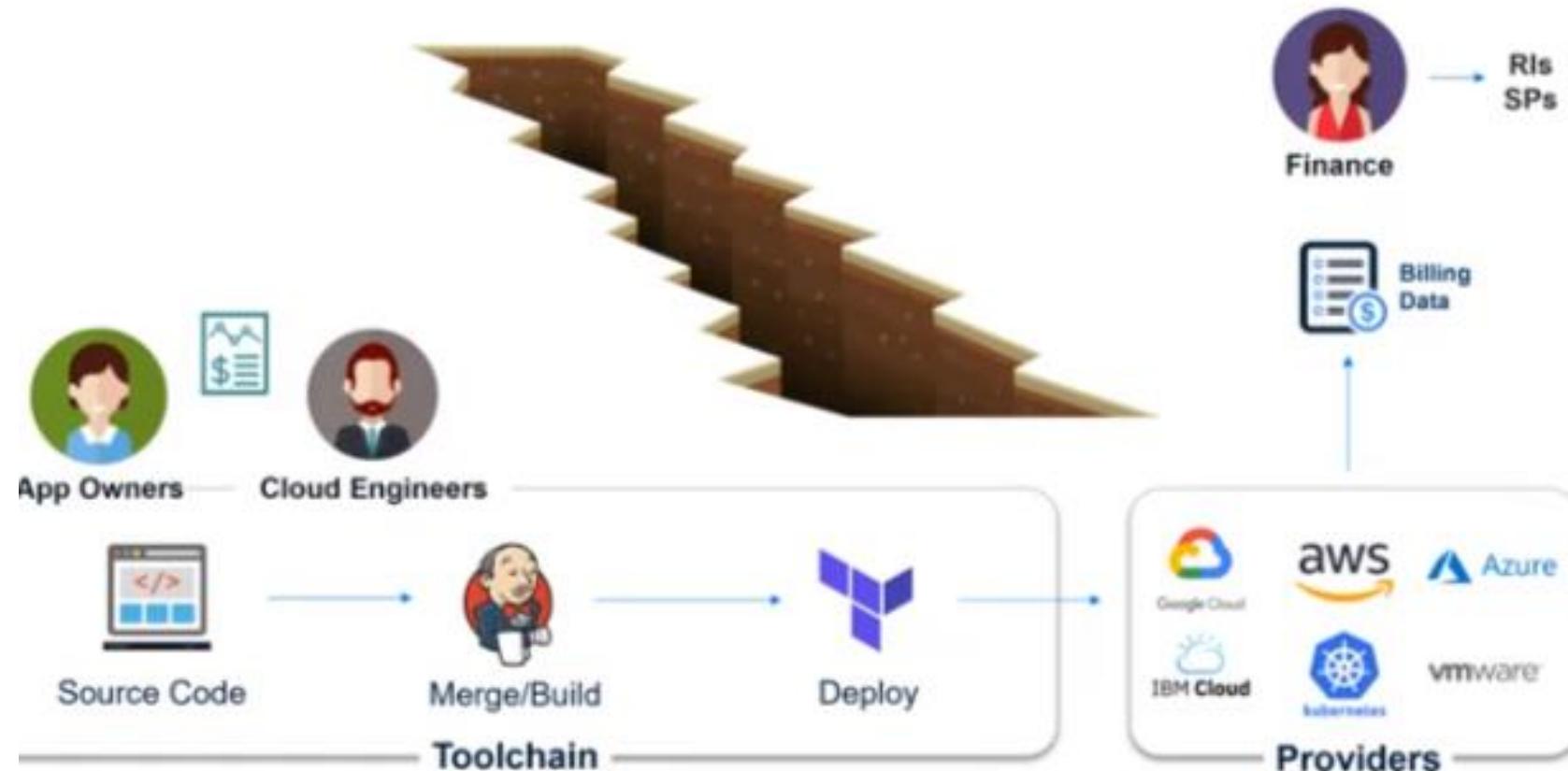
# Cloud & Container Resource Optimization



# Cloud & Container Resource Optimization



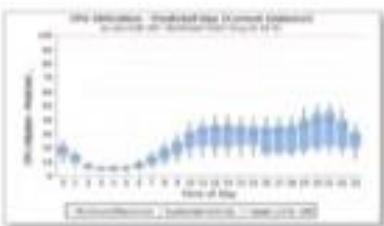
## What this Looks Like in Practice



# Why Don't Engineers take Action?

- The real question: why don't engineers take these actions
- In order to act on a recommendation there are several things that are required:

## Precision



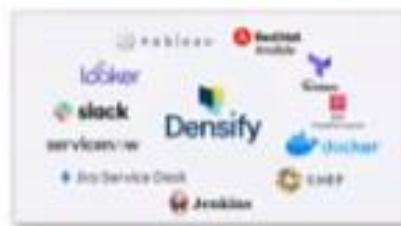
Actions need to be correct

## Transparency



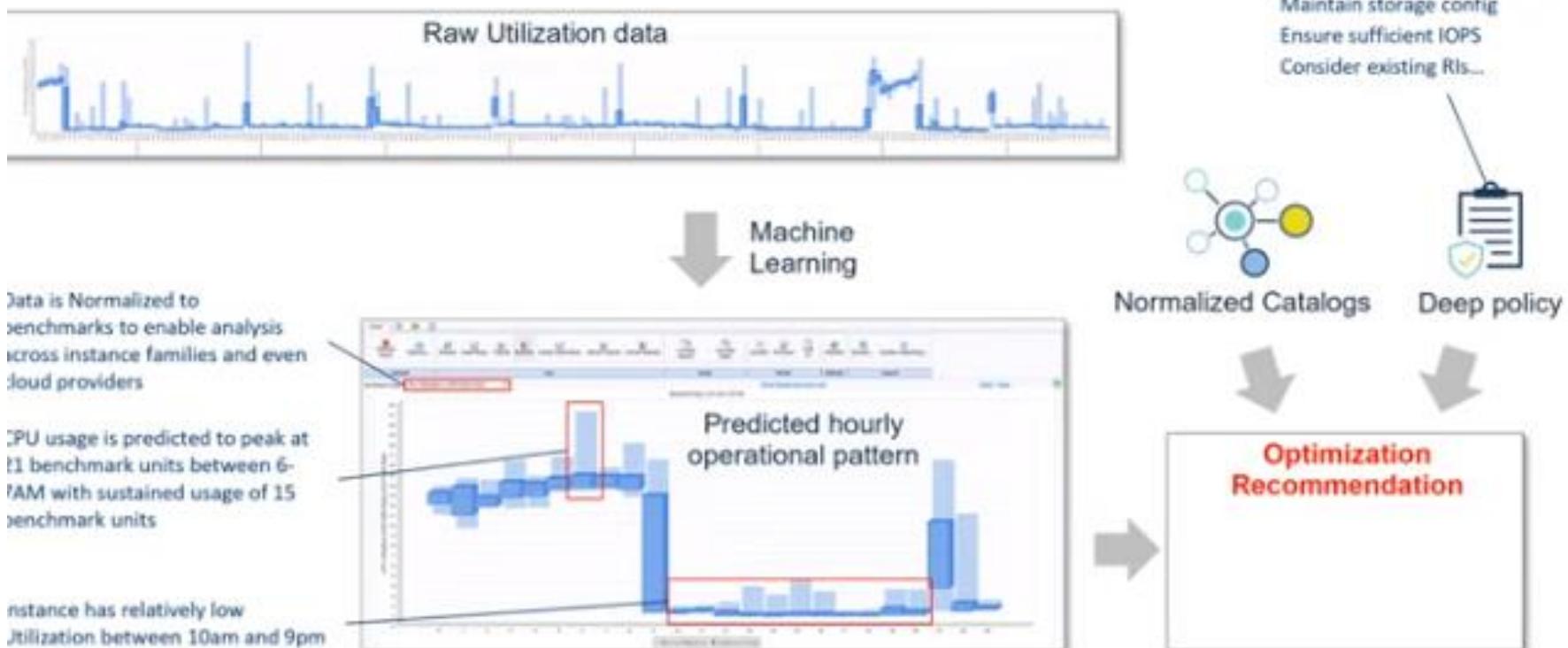
Stakeholders need to be able to understand and approve them

## Integration



They need to go to the right tools and pipelines

# Optimizing Cloud Resources



## Precision = Correct & Actionable



Engineering &  
App Owners



IT Finance



Instance / Database  
Resource Optimization



Scale Group  
Optimization



Container Resource  
Optimization



- Uptime
- Modernize
- Cross-Family
- Downsize
- Terminate

- Node Uptime
- Node Downsize
- Modernize
- Cross-Family
- Scaling Min/Max

- Requests
- Limits
- Pods & Deployments
- Clusters & Namespaces
- Initial Resource Values

## Cloud Resource Optimization Example

General Services  
(223) 900-1940)

922390019409  
(Mobile\_Inv)

卷-003-10

SC-010-empD-1220

i-00b<37973411bcf18

#### Identified Risk

Lionize - One

### Selectivity 1

## Resource Utilization Metrics: Cloud

## System Information

### Effort Details

### Predicted Uptime Details

### Approvals

### Edit System Attributes

#### **Resource Utilization Metrics: Cloud**

Système influencé

[View Details](#)

### Predicted Update Details

## Appendix Edit System Attributes

Wort: Moderate

Description	Inspection Effort	Property	Instance Property Value	
			Current	Recommended
Migration from Gen 5 (Nitro Hypervisor) to Gen 3 or Older Instance	Medium (10%)	Catalog Model - Instance Generation	1	5
Local Disk with I/O under 1000 IOPS	Medium (10%)	Catalog Model - Recommended Disk Allocation	180,000	30,000
Ignoring processor architecture from Intel to AMD	Small (5%)	Catalog Model - Processor Features	Intel AVX, Intel Turbo	AVX, AVX2, AMD Turbo
Migrating into Same Instance Family and Newer Generation	Small (2%)	Catalog Model - Instance Generation	1	5
I/O Operations Detected Under 1,000 IOPS	Info (2%)	Disk I/O (Open)	3.87	8.333
Instance Family	Info (2%)	Catalog Model - Instance Family	Memory optimized r	Memory optimized r

# Communicating with App Owners – Plainly & Clearly

The image displays four screenshots of a mobile application interface, each highlighting a different aspect of app performance monitoring:

- Policy Reminder:** A red box highlights a section titled "Policy Reminder" which includes a summary of utilization metrics and a list of communication benefits.
- Business Cycle Utilization (Busiest Day):** A red box highlights a chart showing CPU utilization over time, specifically focusing on the busiest day of the business cycle.
- Prediction of Utilization with Recommendation Applied:** A red box highlights a chart showing predicted utilization after applying a recommendation, comparing current usage against recommended levels.
- Financial impact of proposed change (factoring in RIs):** A red box highlights a section detailing the financial impact of proposed changes, including utilization metrics and a "Density" logo.

# Automating via Infrastructure as Code

## Educated Estimation of Resources



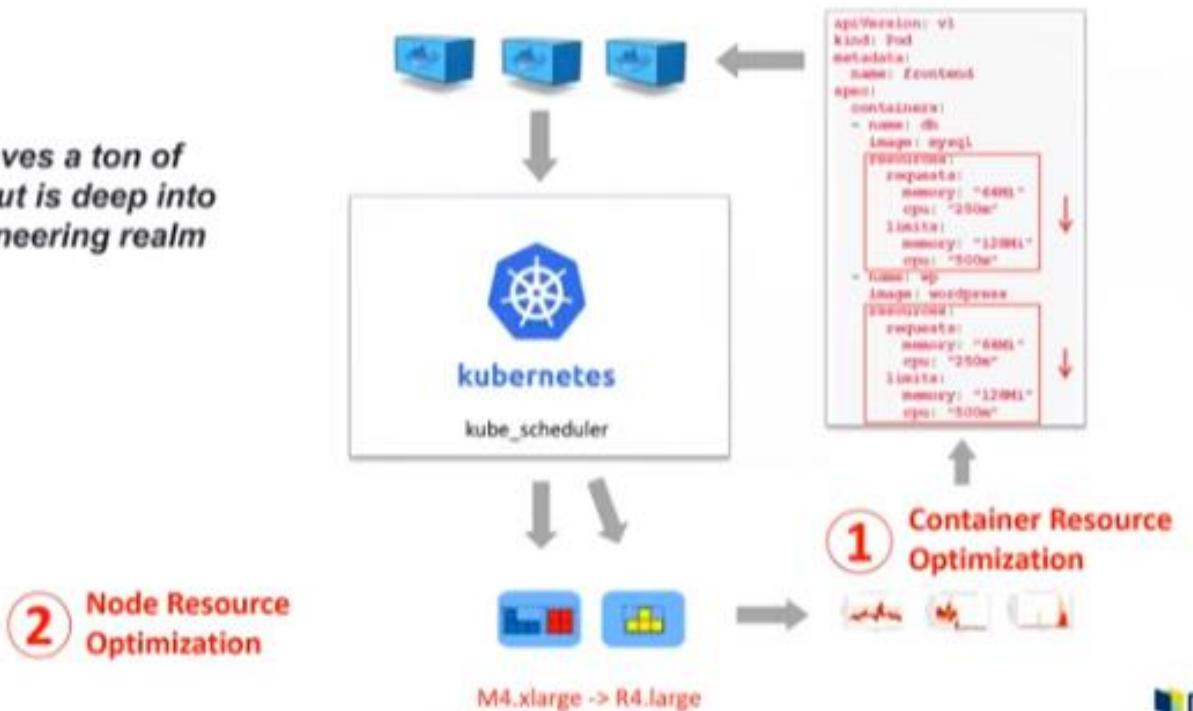
```
1 provider "aws" {
2   region = "${var.aws_region}"
3 }
4
5 resource "aws_instance" "web" {
6   name     = "Web Server"
7
8   instance_type = "m4.large"
9
10  ami      = "${lookup(var.aws_amis, var.aws_region)}"
11 }
```



- Hard-Coded
- Rough Estimate
- Huge problem in scale

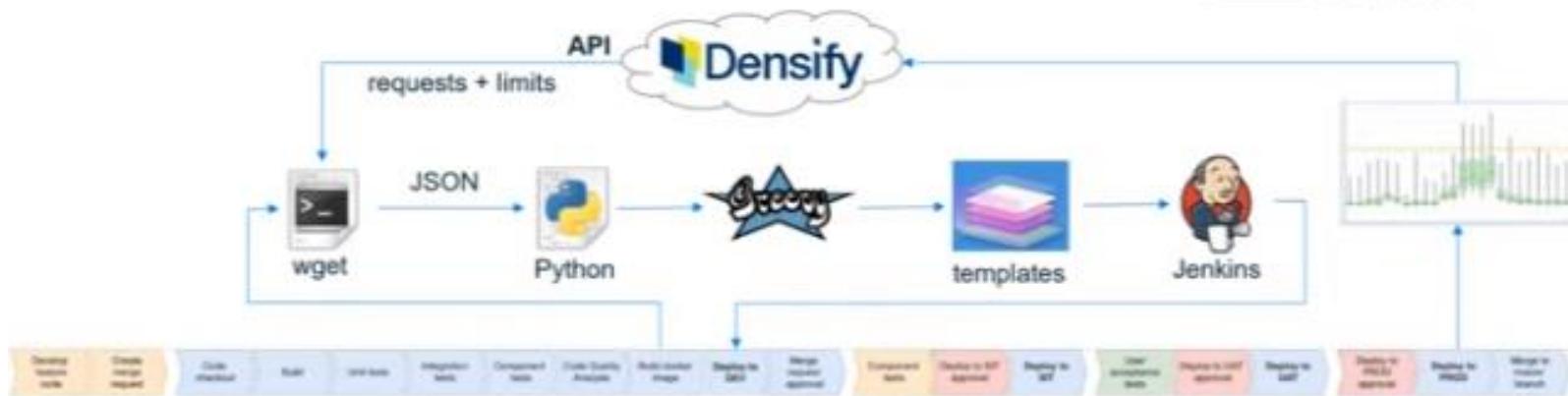
## Container Optimization – Multi-Step Process

*This saves a ton of  
money, but is deep into  
the Engineering realm*



Densify

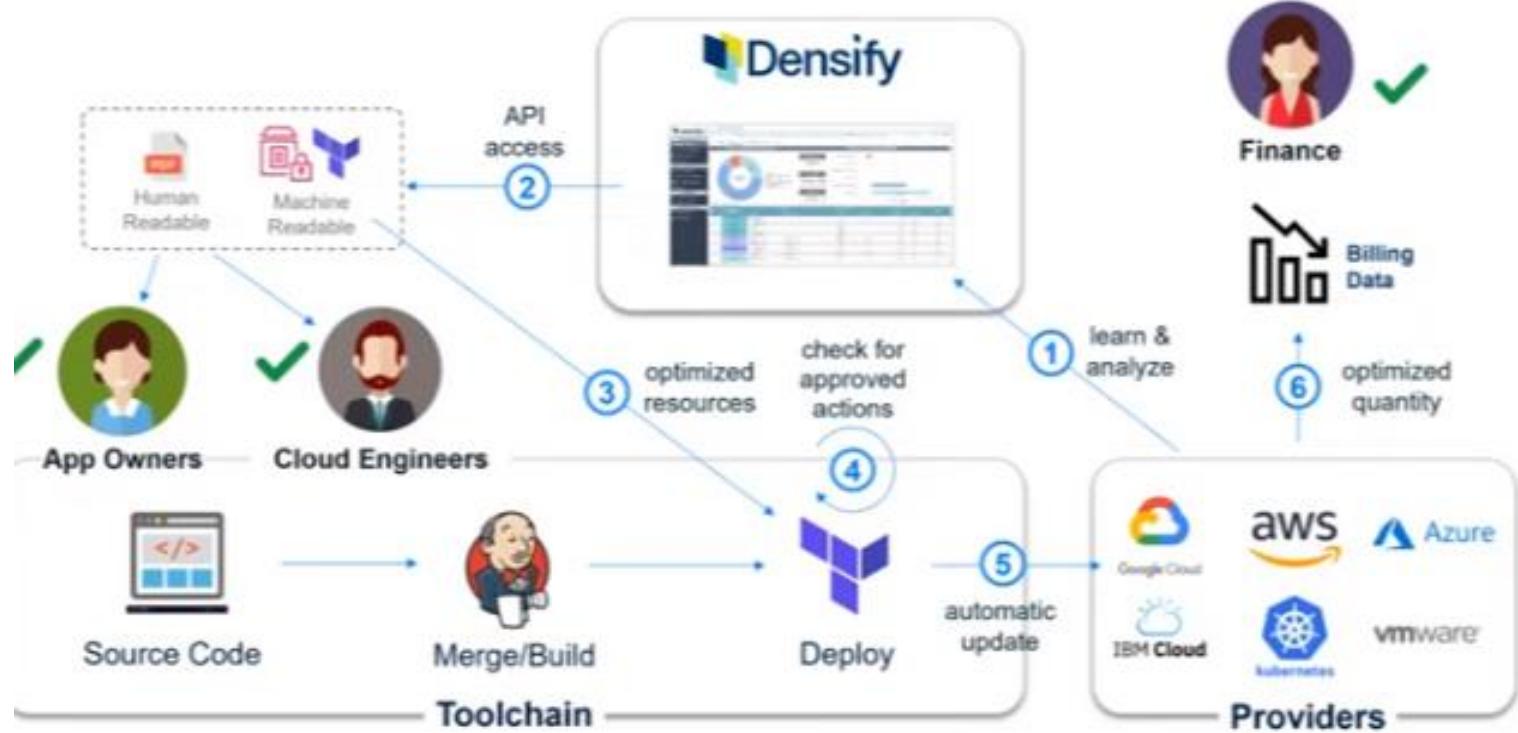
## Container Automation Example



1. Shell script uses wget to call the Densify Recommendation API
2. Densify returns optimized container request and limit settings in JSON format
3. JSON is parsed Python
4. Groovy used to inject new values into container template
5. Jenkins pipeline redeploys container with optimized settings

<https://www.densify.com/resources/optimizing-openshift-resources>

## The Complete Picture – “Capacity Operations”





CKA - DAY 2

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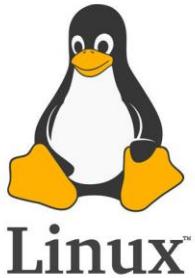
---

---

K.I.S.S.

Keep It Simple, Stupid!

# FSF , GNU/Linux , Linux Foundation



- <https://www.fsf.org/>
- <https://www.kernel.org/>
- <https://kernelnewbies.org/>
- <https://lwn.net/> - linux kernel news
- <https://www.linuxfoundation.org/>

