

AWS Pricing Models

AWS SECURITY AND COST MANAGEMENT CONCEPTS



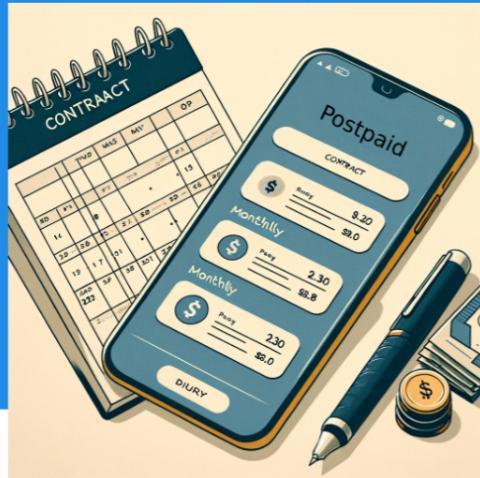
Dev Bhosale

Principal Data & Cloud Architect

Pricing models

| Feature | Pay-as-you-go | Save when you commit | Pay less by using more |
|-----------------------|--------------------|----------------------|------------------------|
| Flexibility | Very high | Low | Medium |
| Cost Savings | No upfront savings | High savings | Volume-based savings |
| Budget Predictability | Low | High | Medium |

Postpaid



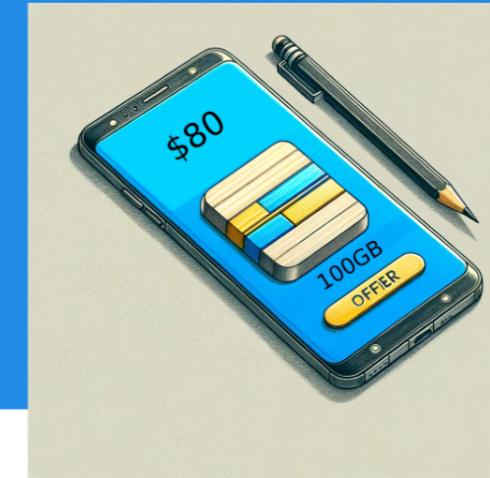
\$0.25/GB

6 month - 10GB



\$0.10/GB

Unlimited-1 month



\$0.01/GB

Pay-as-you-go

- Pay-as-you-go approach for the vast majority of our cloud services
- You pay only for the individual services you need, for as long as you use them



The screenshot shows the AWS CloudWatch Metrics console. At the top, there's a search bar and navigation links for 'Services' and 'DataCamp'. The main area displays a line chart titled 'Metrics (1/1)'. The chart shows a single metric named 'CPU Utilization' over a period from '1 hour ago' to '1 hour'. The utilization starts at approximately 10% and rises sharply to about 90% by the end of the hour. Below the chart, there's a table with columns for 'Metric Name', 'Unit', 'Value Type', 'Period', and 'Last Value'. The last value listed is '90.00%'. On the right side of the screen, there are several tabs and buttons for managing metrics, including 'Actions', 'Launch instances', and 'View alarms'.

Save when you commit

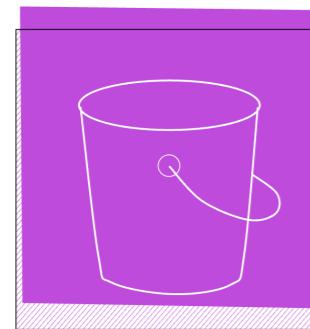
- Savings for a 1-year or 3-year commitment
- Increased savings with higher commitment
- Additional savings for upfront payment vs. monthly payments

| EC2 Commitment | Monthly cost | Discount |
|----------------------|--------------|----------|
| None (pay-as-you-go) | \$734.67 | 0% |
| 1-year commitment | \$487.07 | 33.07% |
| 3-year commitment | \$332.15 | 54.78% |

Pay less by using more

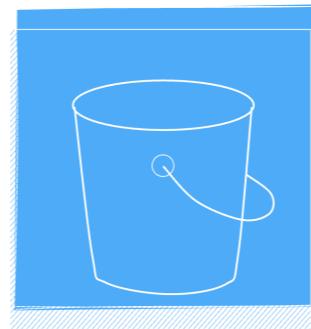
- Volume discounts decrease cost per GB with more use
- Economies of scale apply
- Similar to wholesale vs retail pricing

UP to 50TB Storage



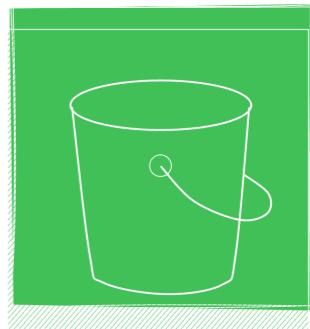
0.023 GB/month

51-100TB Storage



0.022 GB/month

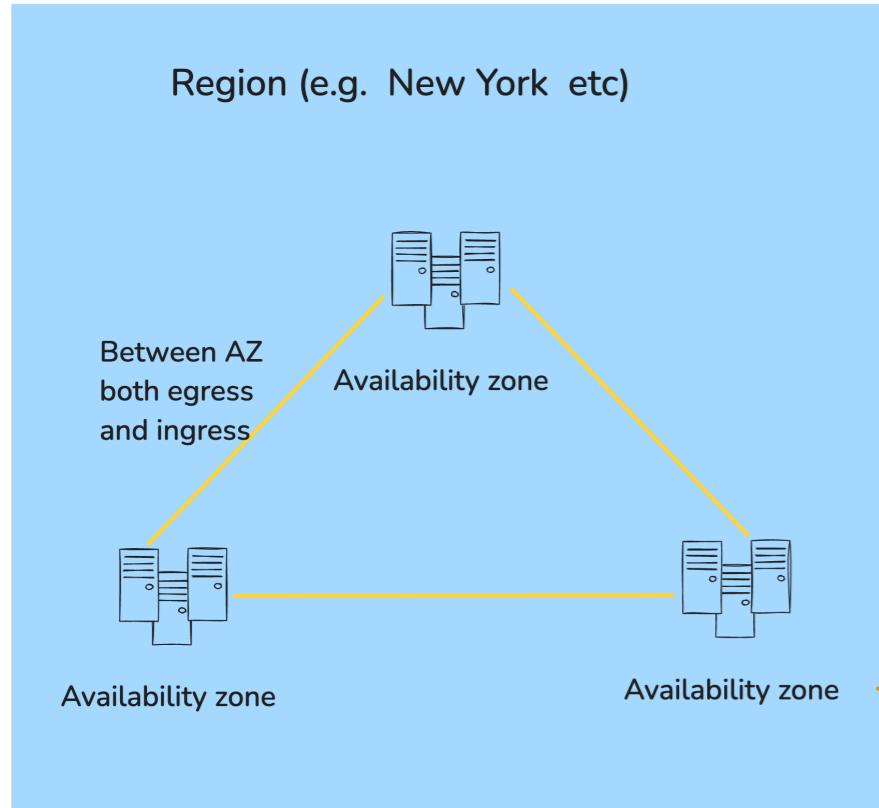
500TB+ Storage



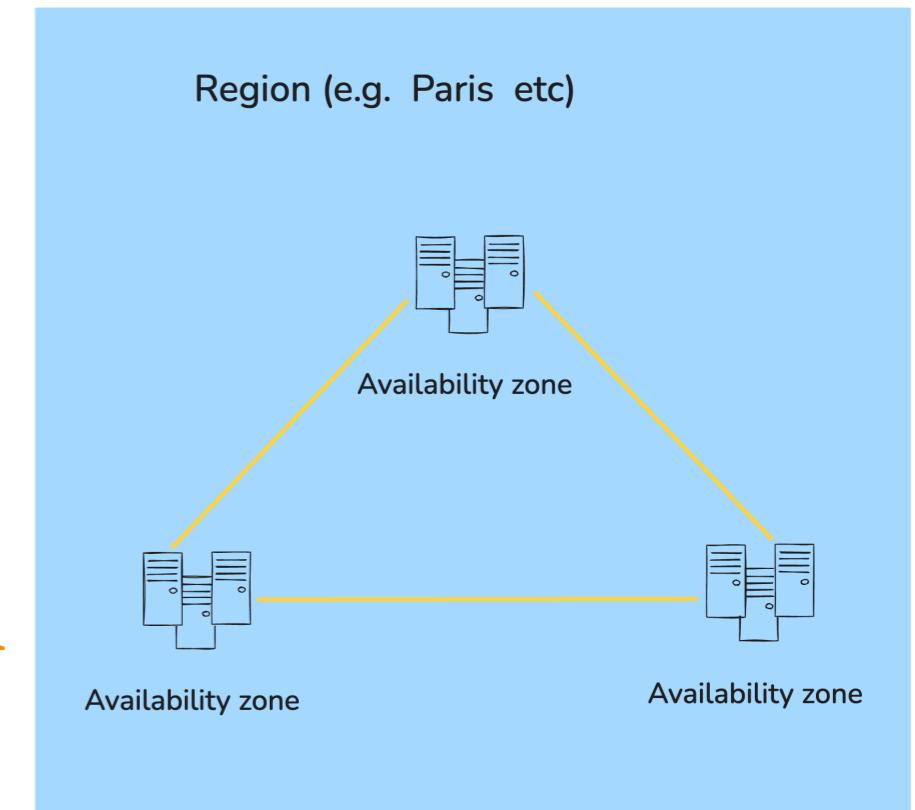
0.021 GB/month

Bandwidth costs

AWS Data Transfer Costs



Global network over Internet



Pricing calculator

Select the container and options to find your best price

Compute Savings Plans
One plan that automatically applies to all usage on EC2, Fargate, and Lambda. Up to 66% discount. [Learn more](#)

Reservation term
 1 year
 3 year

Payment Options
 No upfront
 Partial upfront
 All upfront

Upfront: 0.00
Monthly: 384.42/Month

EC2 Instance Savings Plans
Get deeper discount when you only need one instance family and region. Up to 72% discount. [Learn more](#)

Reservation term
 1 year
 3 year

Payment Options
 No upfront
 Partial upfront
 All upfront

Upfront: 0.00
Monthly: 334.27/Month

On-Demand
Maximize flexibility. [Learn more](#)

Expected utilization
Enter the expected usage of Amazon EC2 instances

Usage
100

Usage type
Utilization percent per month ▾

Instance: 0.928/Hour
Monthly: 677.44/Month

Spot Instances
Minimize cost by leveraging EC2's spare capacity. Recommended for fault tolerant and interruption tolerant applications. [Learn more](#)

The historical average discount for m4.4xlarge is 66%

Assume percentage discount for my estimate
66

Actual spot instance pricing varies
With spot instances, you pay the spot price that's in effect for the time period your instance is running

Instance: 0.928/Hour
Monthly: 230.33/Month

Amazon EC2 On-Demand instances cost (Monthly): 230.33

Total Upfront cost: 0.00 USD
Total Monthly cost: 230.33 USD

Show Details ▲

Cancel Update

<https://calculator.aws>

Let's practice!

AWS SECURITY AND COST MANAGEMENT CONCEPTS

Manage AWS Budgets and Costs

AWS SECURITY AND COST MANAGEMENT CONCEPTS



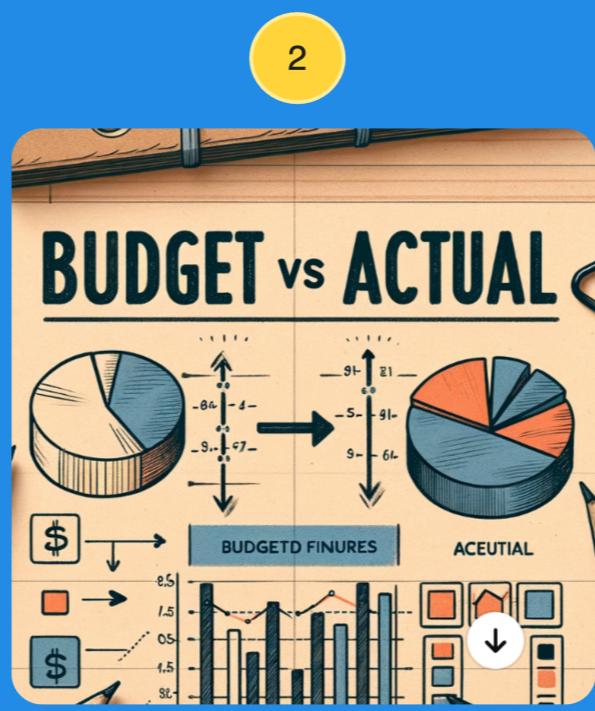
Dev Bhosale

Principal Data & Cloud Architect

How to manage AWS costs



Analyze costs



Set budgets



Respond with actions

1. Analyze costs
2. Set budgets
3. Respond with actions

Cost explorer

The screenshot shows the AWS Cost Explorer interface. On the left, a sidebar menu under "Billing and Cost Management" includes options like Home, Getting Started, Billing and Payments, Bills, Payments, Credits, Purchase Orders, Cost Analysis, Cost Explorer, Cost Organization, and Budgets and Planning. The main content area displays a "New cost and usage report" with a "Cost and usage graph". Key metrics shown are Total cost (\$2.81), Average daily cost (\$0.35), and Resource count (2). Below these are four bars representing different cost categories. To the right, a "Report parameters" panel is open, showing settings for Time (Date Range: 2024-02-22 — 2024-02-29, Granularity: Daily), Group by (Dimension: Resource), and Filters (Service, Linked account, Region, Instance type, Usage type).

Billing and Cost Management

Home New

Getting Started New

Billing and Payments

Bills

Payments

Credits

Purchase Orders

Cost Analysis

Cost Explorer New

Cost Explorer Saved Reports

Cost Anomaly Detection

Free Tier

Data Exports New

Cost Organization

Cost Categories

Cost Allocation Tags

Billing Conductor

Budgets and Planning

Budgets

Budgets Reports

Pricing Calculator

Billing and Cost Management > Cost Explorer > New cost and usage report

New cost and usage report

Recent reports ▾ Save to report library

Cost and usage graph Info

Total cost \$2.81

Average daily cost \$0.35

Resource count 2

Costs (\$)

0.6

0.45

0.3

0.15

Report parameters

Time

Date Range - New capability

2024-02-22 — 2024-02-29

Granularity

Daily

Group by

Dimension - New capability Clear

Resource

Filters - New capability Info

Applied filters (0) Clear all

Service

Choose services

Linked account

Choose linked accounts

Region

Choose regions

Instance type

Choose instance types

Usage type

Choose usage types

Budgets in action

The screenshot shows the AWS Billing and Cost Management console with the 'Create budget' wizard open. The left sidebar lists various cost management features like Home, Getting Started, Bills, Payments, Credits, Purchase Orders, Cost Explorer, Cost Anomaly Detection, Free Tier, Data Exports, Cost Categories, Cost Allocation Tags, Billing Conductor, Budgets, Budgets Reports, and Pricing Calculator. The main content area shows the 'Choose budget type' step with two options: 'Use a template (simplified)' and 'Customize (advanced)'. The 'Customize (advanced)' option is selected. Below it, the 'Templates - new' section lists four templates: 'Zero spend budget', 'Monthly cost budget', 'Daily Savings Plans coverage budget', and 'Daily reservation utilization budget'. The 'Monthly cost budget' template is selected. At the bottom, there's a 'Budget name' field containing 'My Monthly Cost Budget'.

Billing and Cost Management

Billing and Cost Management > Budgets > Create budget

Choose budget type Info

Budget setup

Use a template (simplified)
Use the recommended configurations. You can change some configuration options after the budget is created.

Customize (advanced)
Customize a budget to set parameters specific to your use case. You can customize the time period, the start month, and specific accounts.

Templates - new
Choose a template that best matches your use case.

Zero spend budget
Create a budget that notifies you once your spending exceeds \$0.01 which is above the AWS Free Tier limits.

Monthly cost budget
Create a monthly budget that notifies you if you exceed, or are forecasted to exceed, the budget amount.

Daily Savings Plans coverage budget
Create a coverage budget for your Savings Plans that notifies you when you fall below the defined target.

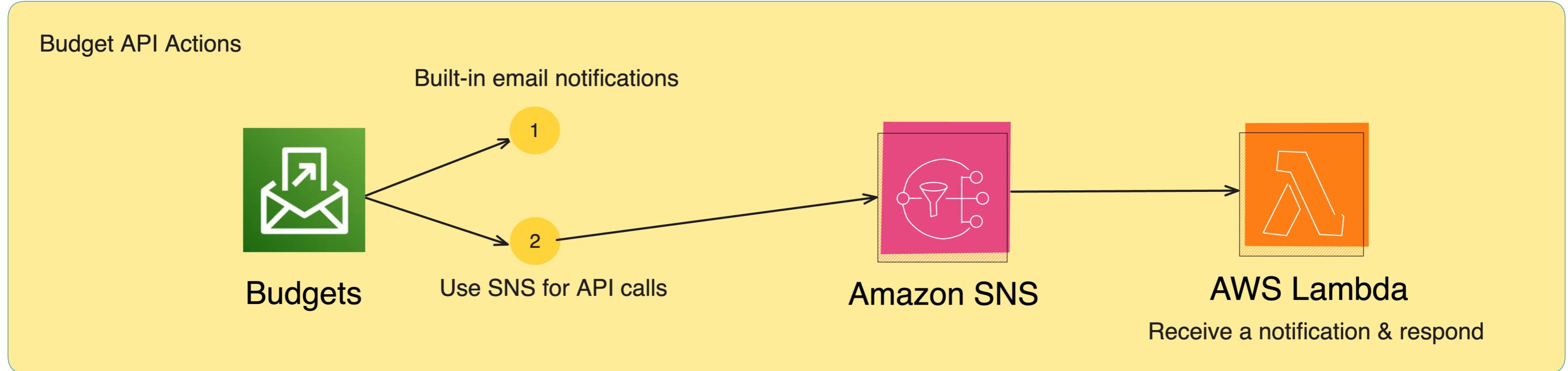
Daily reservation utilization budget
Create a utilization budget for your reservations that notifies you when you fall below the defined target.

Monthly cost budget - Template

Budget name
Provide a descriptive name for this budget.

My Monthly Cost Budget

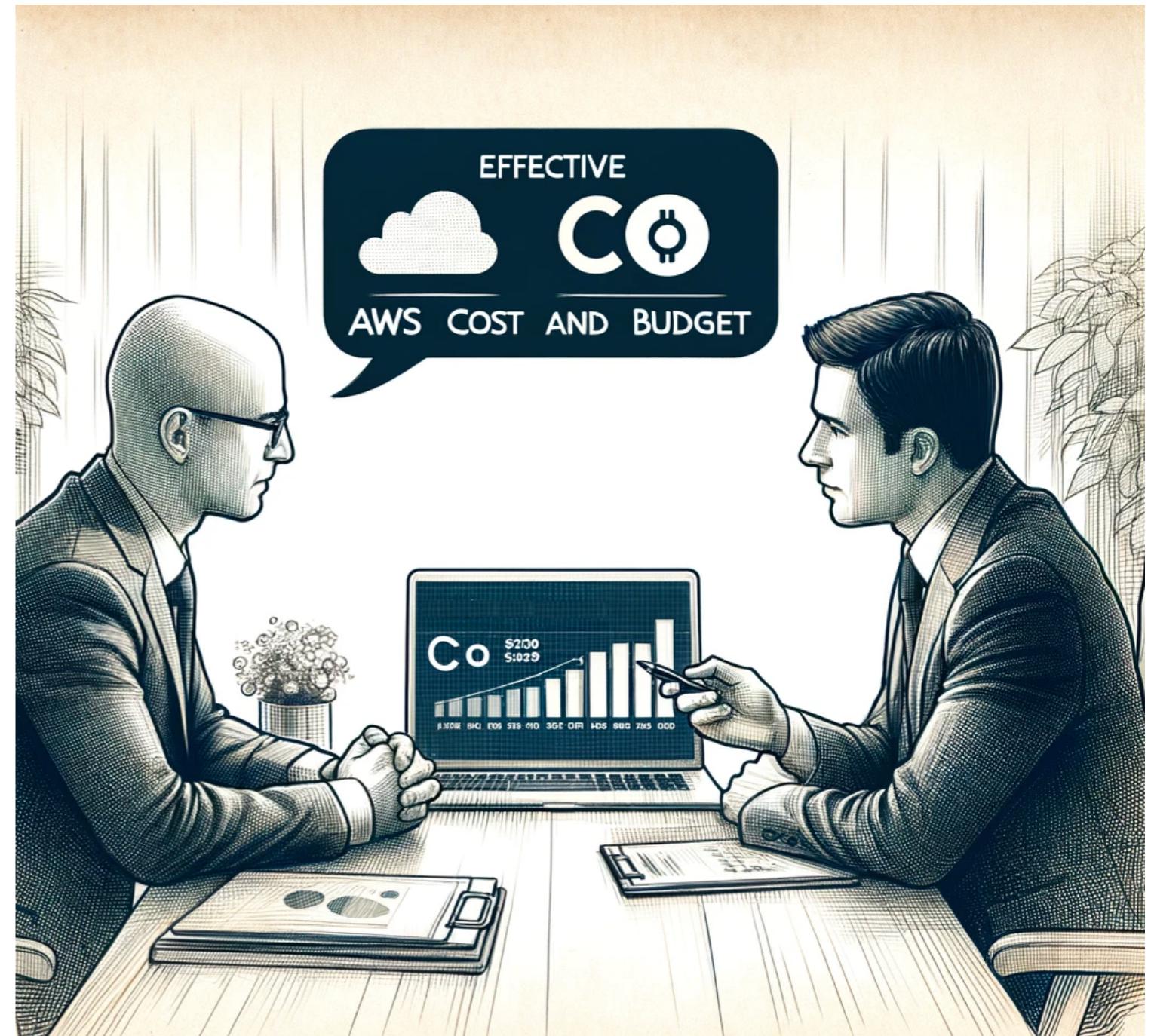
Respond with actions



- AWS Budgets has built-in email notifications
- Integrates with SNS for API notifications
- AWS Lambda reacts to SNS budget alerts
- Using Lambda, you can prevent creation of new resources when a budget threshold is reached

Guidelines for budgets

- Budgets doesn't guarantee financial control
- Budgets must be based on accurate, specific business needs
- Effective budgets consider all costs, are goal-oriented



Billing Conductor



- Organize cloud costs by project
- Track spending for different teams or users
- Create custom billing reports
- Improve budgeting and cost visibility

AWS Billing Conductor

Reserved instance flexibility

- Save money with Reserved Instances
- Flexibly adjust instance size
- Discounts apply within instance family
- Purchased capacity is calculated using normalization table

| Instance Size | Normalization Factor |
|---------------|----------------------|
| nano | 0.25 |
| micro | 0.5 |
| small | 1 |
| medium | 2 |
| large | 4 |
| xlarge | 8 |
| 2xlarge | 16 |
| 4xlarge | 32 |
| 8xlarge | 64 |
| 10xlarge | 80 |
| 16xlarge | 128 |
| 32xlarge | 256 |

Let's practice!

AWS SECURITY AND COST MANAGEMENT CONCEPTS

Cost Allocation, Billing, and Support

AWS SECURITY AND COST MANAGEMENT CONCEPTS



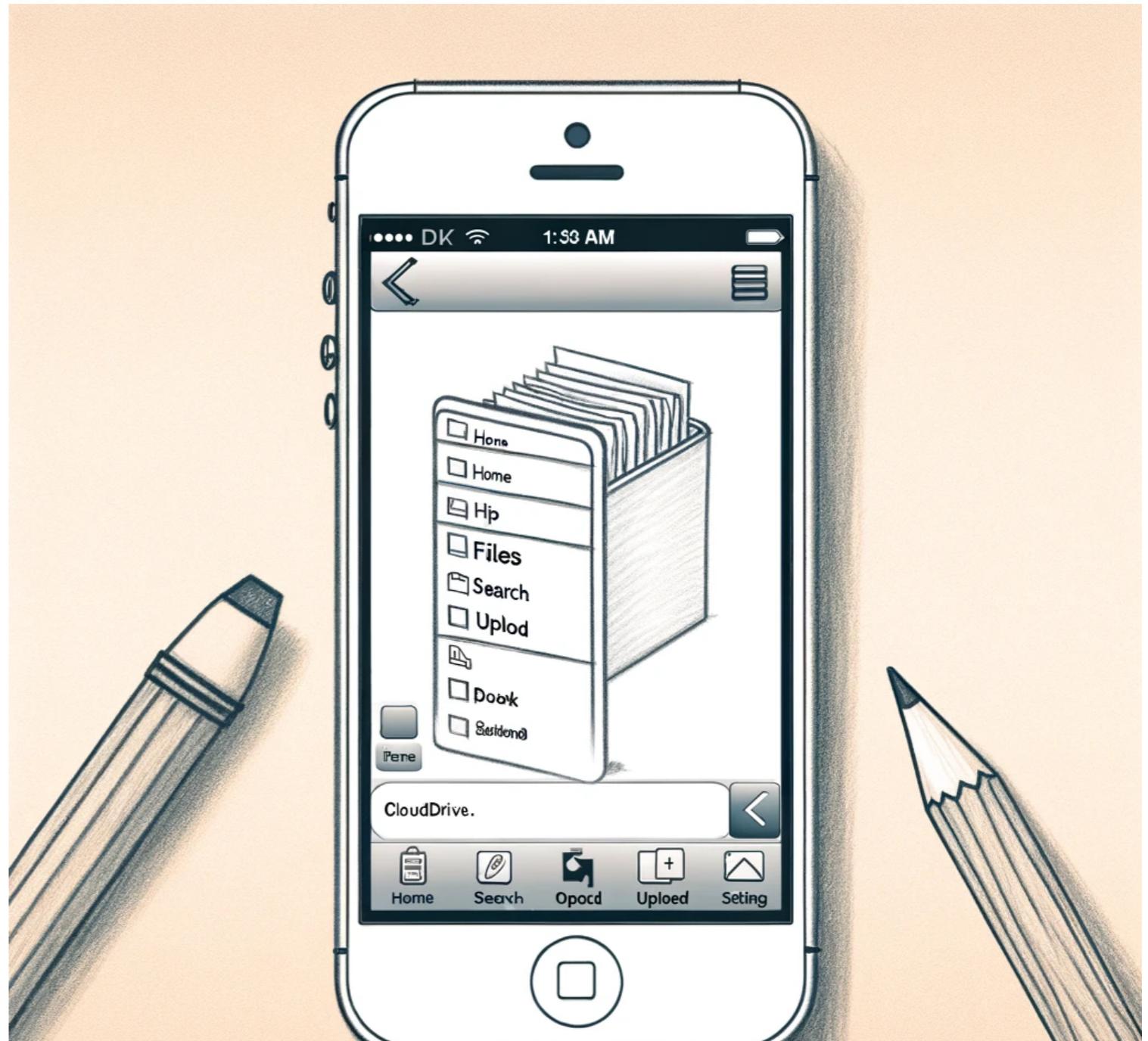
Dev Bhosale

Principal Data & Cloud Architect

How AWS billing works?

- AWS billing breakdown by services

| Service | Cost |
|------------------|----------|
| S3 Storage | \$2,000 |
| S3 Data Transfer | \$13 |
| AWS Cognito | \$400 |
| Web Servers | \$5,533 |
| Load Balancer | \$400 |
| Database | \$2,417 |
| Total | \$10,763 |



What are cost allocation tags?

Billing and Cost Management > Cost Allocation Tags

Cost allocation tags Info

Cost allocation tags activated: 3

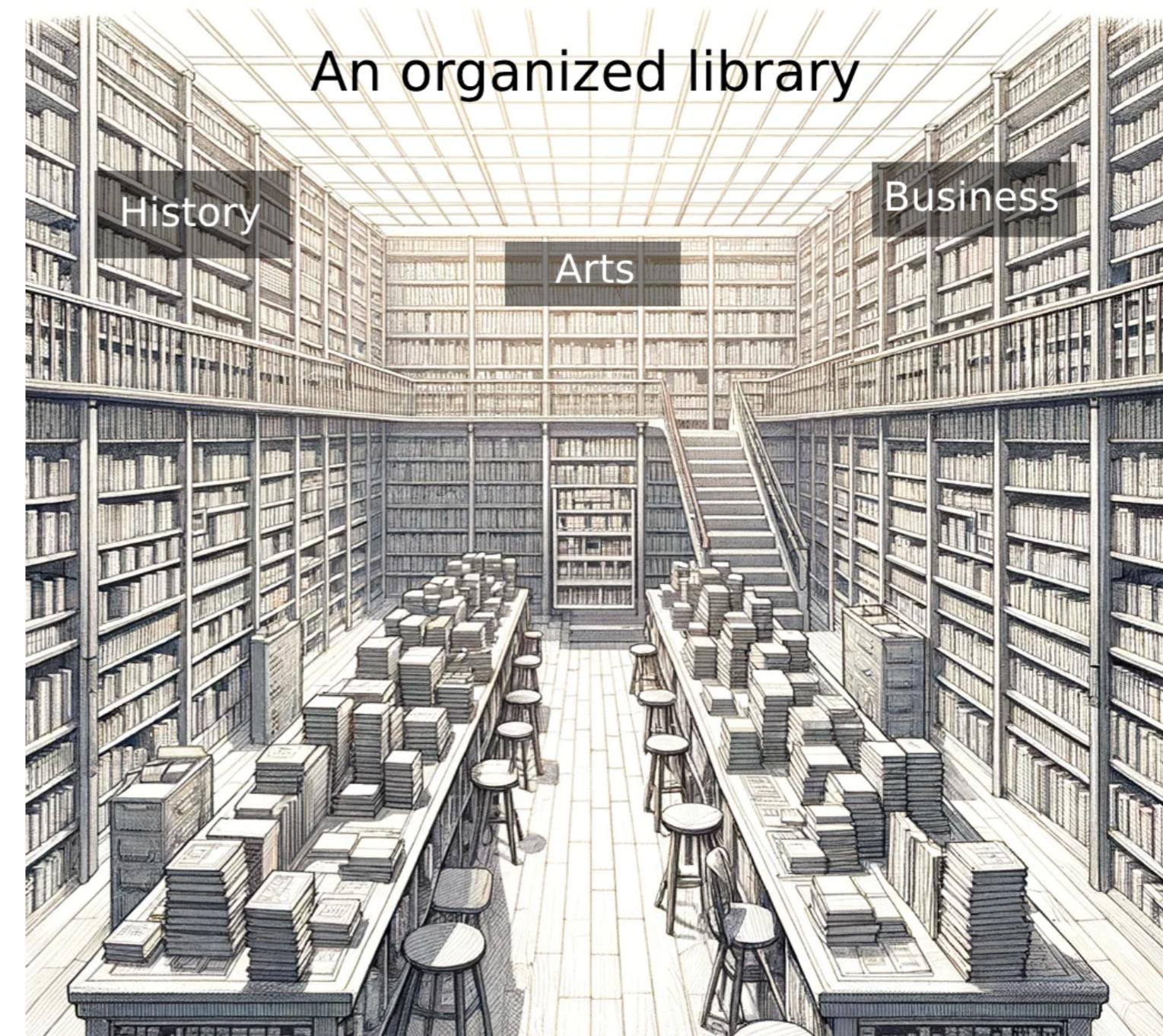
User-defined cost allocation tags AWS generated cost allocation tags

User-defined cost allocation tags (8) Info

Undo Deactivate Activate

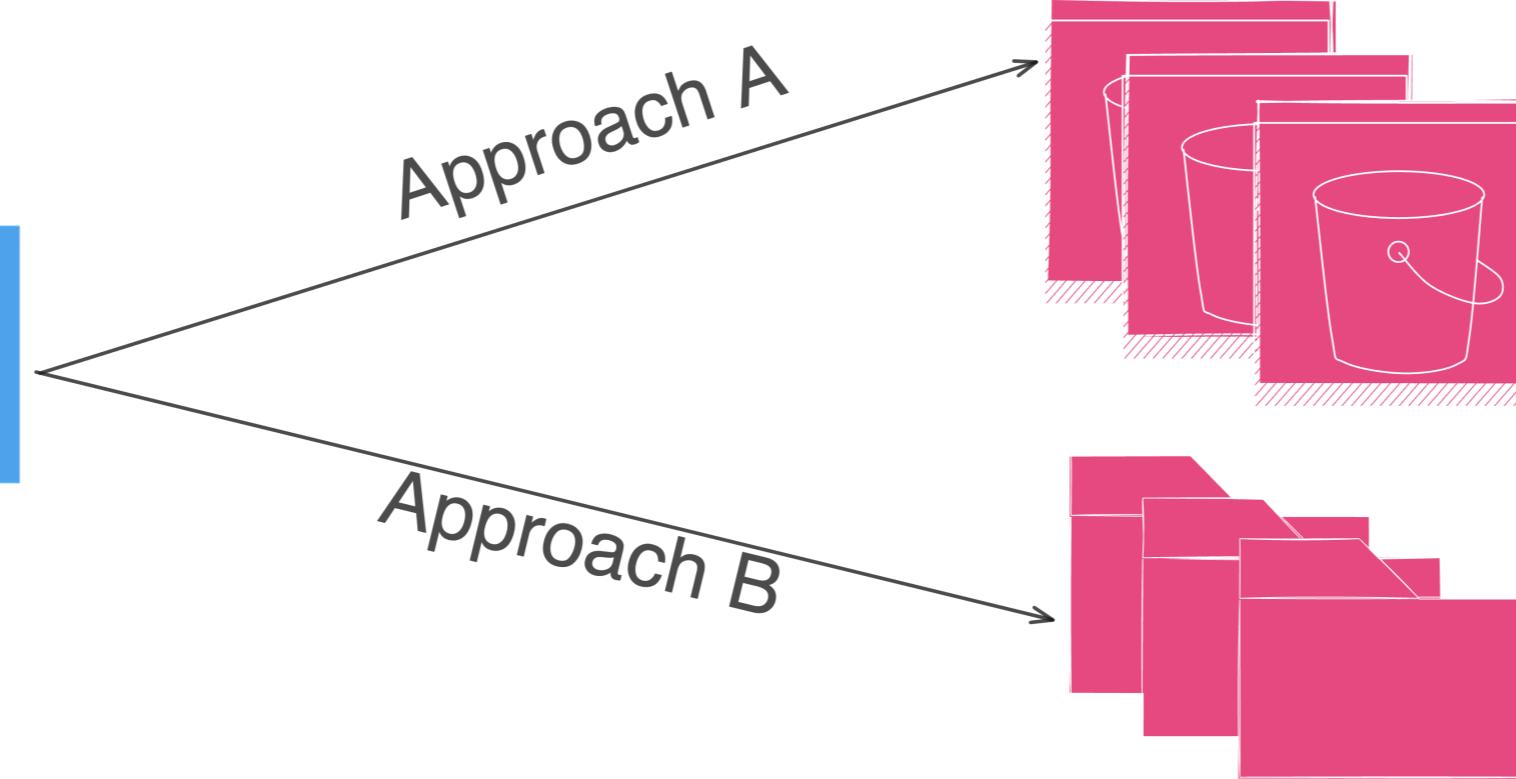
Find cost allocation tags

| Tag key | Status | Last updated date |
|----------------------------------|----------|-----------------------------------|
| app-username | Active | March 10, 2024, 16:55 (UTC-04:00) |
| bucketname | Active | March 08, 2024, 10:45 (UTC-05:00) |
| ManagedByAmazonSageMakerResource | Inactive | - |
| Name | Inactive | - |



Adding tags to files

CloudDrive
Application Code



Create one bucket per user
Add tags to bucket

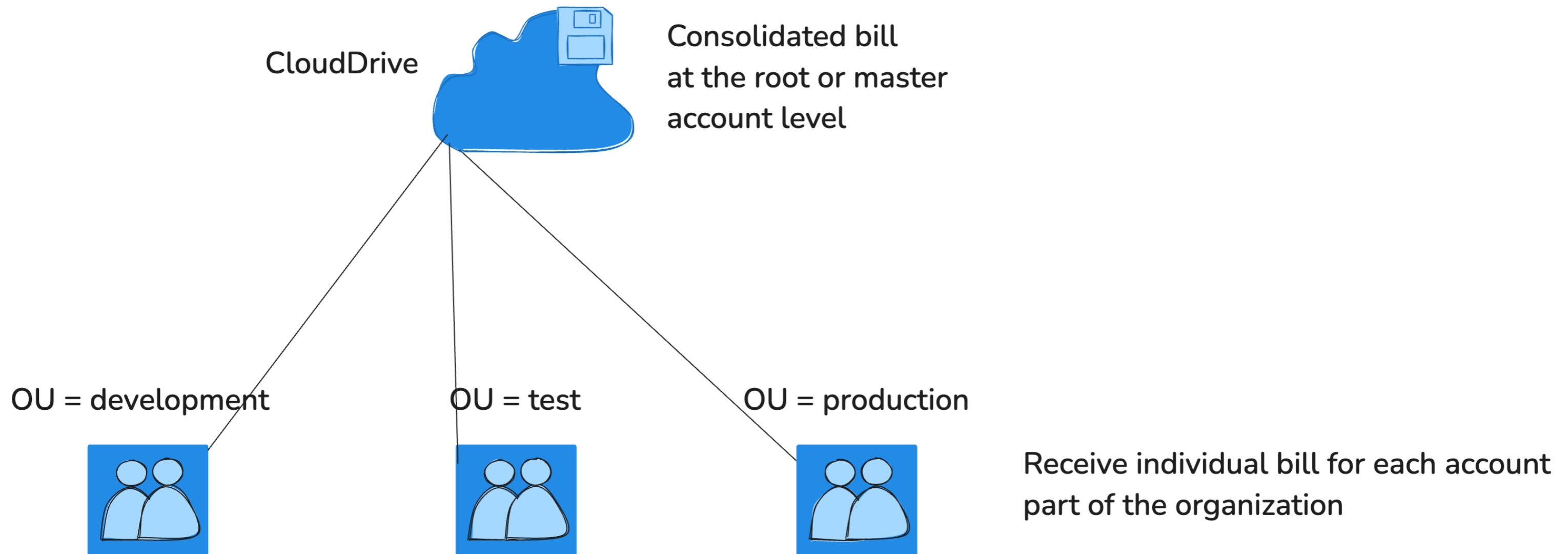
Keep files in one bucket
Add tags to each file

Tag values appear on object property

A screenshot of the AWS Lambda Tags interface. It shows a table with one row of data. The table has two columns: "Key" and "Value". The "Key" column contains the value "app-username" and the "Value" column contains the value "awesome-datacamp-user". In the top right corner of the table, there is a small "Edit" button.

| Tags (1) | Value |
|--|-----------------------|
| Track storage cost of other criteria by tagging your objects. Learn more | |
| Key | Value |
| app-username | awesome-datacamp-user |

AWS Organization



AWS Health

AWS Health Dashboard

Service health

Open and recent issues

Service history

Your account health

Open and recent issues

Scheduled changes

Other notifications

Event log

Your organization health

Health Integrations

Amazon EventBridge

AWS Health Aware

Time zone settings

AWS Health Dashboard

Updated less than 1 min ago



Your account health

Stay informed of important events affecting your AWS resources.

Amazon EventBridge rule

Get notifications for events that might affect your services and resources.

Configure

Learn more

Open and recent issues (0)

Scheduled changes (0)

Other notifications (0)

Event log

Event log

Add filter

< 1 >

| Event | Status | Event category | Region / Zone | Start time | Last update time | Affected resources |
|--|--------|----------------|---------------|-------------------------------------|--------------------------------------|--------------------|
| Operational issue - IAM (Global) | Closed | Issue | - | August 29, 2024 at 5:31:00 AM UTC-4 | August 29, 2024 at 12:41:14 PM UTC-4 | - |
| | | | | August 15, 2024 | August 15, 2024 | |

AWS support options

| Feature | Basic | Developer | Business | Enterprise |
|------------------------------------|--------------|----------------------|--------------------|--------------------|
| Pricing | Free | Pay-per-use | Monthly fee | Monthly fee |
| Direct Access to Support Engineers | - | Yes (business hours) | Yes (24/7) | Yes (24/7) |
| 24/7 Support | - | - | Yes | Yes |
| API Access | - | - | Yes | Yes |
| Support Channels | Forums | Email | Email, Chat, Phone | Email, Chat, Phone |
| Response Times | - | < 24 hours | < 1 hour | < 15 minutes |
| Training & Programs | Basic guides | - | Yes | Yes |
| Technical Account Manager (TAM) | - | - | - | Yes |

Let's practice!

AWS SECURITY AND COST MANAGEMENT CONCEPTS

Cost Optimization Strategies

AWS SECURITY AND COST MANAGEMENT CONCEPTS

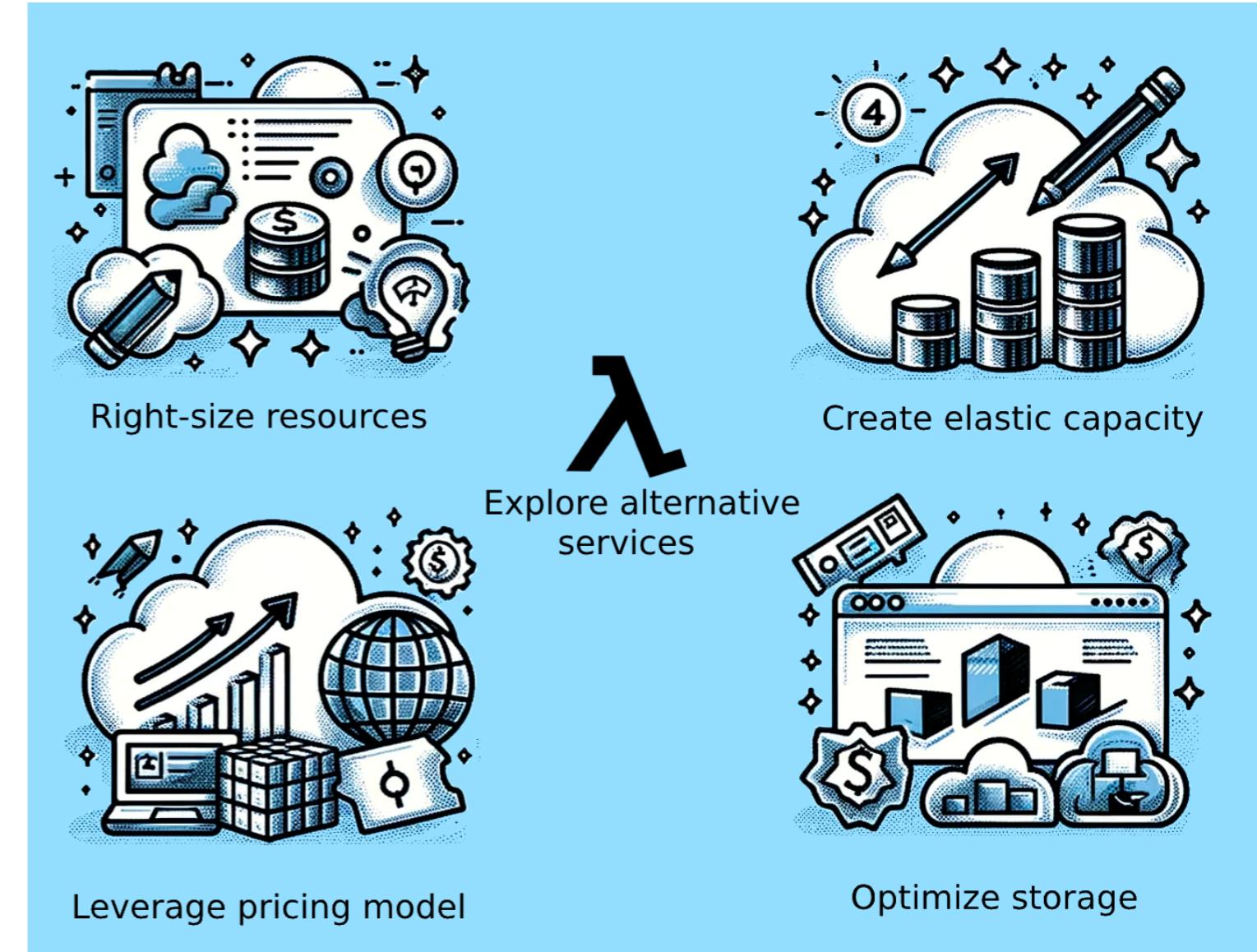


Dev Bhosale

Principal Data & Cloud Architect

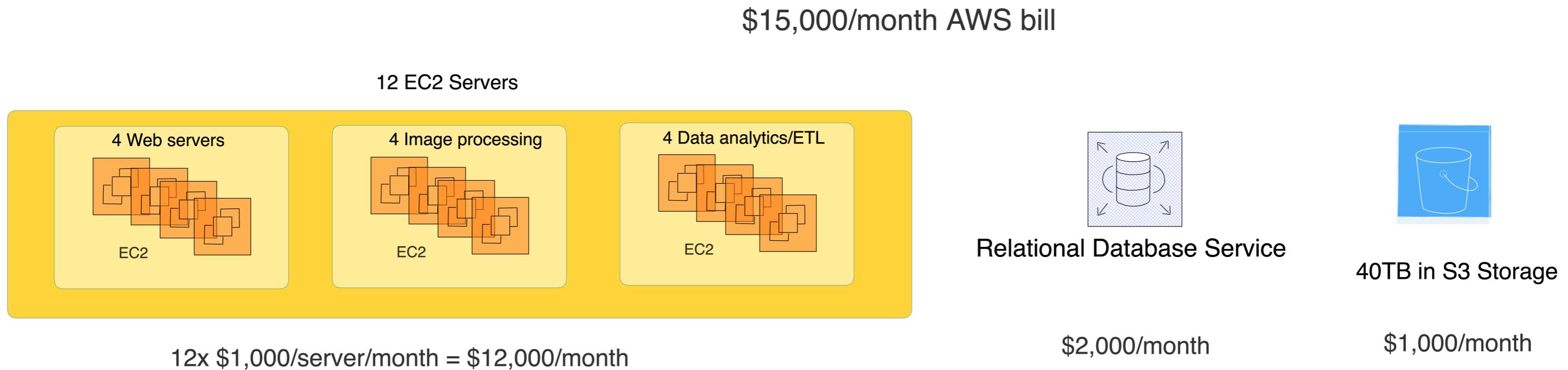
Cost optimization framework

1. Right-size resources
2. Create elastic capacity
3. Leverage pricing model
4. Explore alternative services
5. Optimize storage



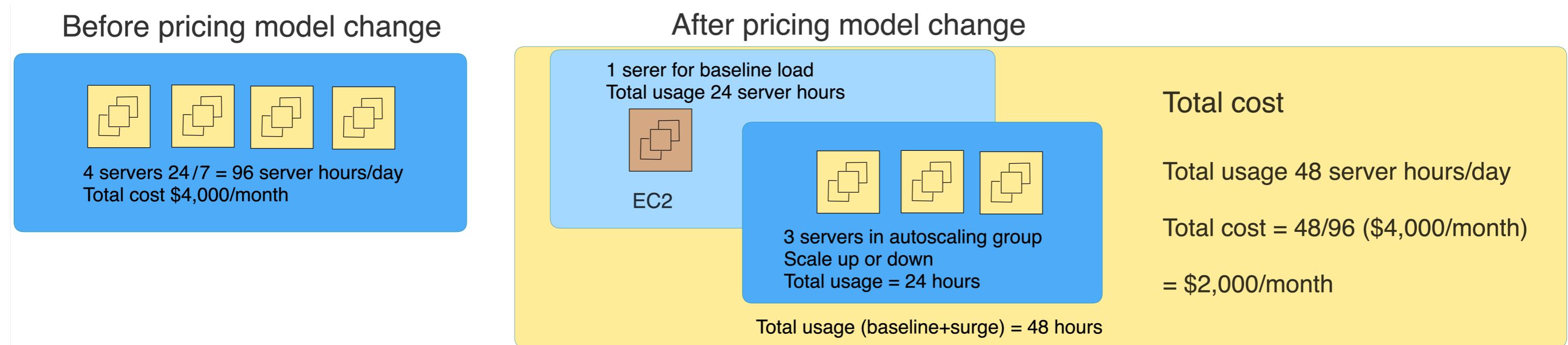
Optimization example

The company's pays AWS \$15,000/month total. \$12,000 for 12 EC2 servers and \$2,000 for a database service and \$1,000 for S3 storage. On-demand rate paid is \$1.36/server-hour.



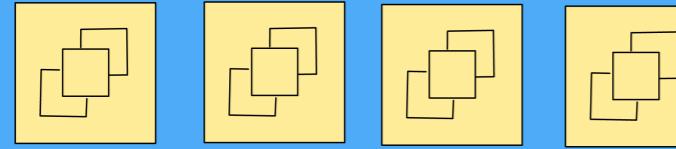
Optimize size and capacity

- Servers are adequately sized in terms of CPU/memory
- Instead of running four servers 24/7 we can optimize usage
- We can dynamically scale-up and scale-down servers based on traffic surges using auto-scaling group and save at least **50% total server costs**



Leverage pricing model

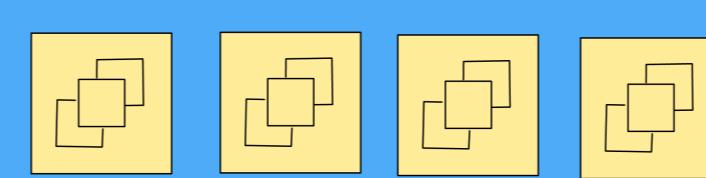
Before pricing model change



4 servers 24/7 = 96 server hours

4 servers x \$1,000/month = \$4,000

After pricing model change



4 spot-instance servers
for 4 hours every night
= 16 server hours

Total cost
16/96 (usage factor)
* 4 server
* \$1000/month/server
* 0.334 66% avg spot discount

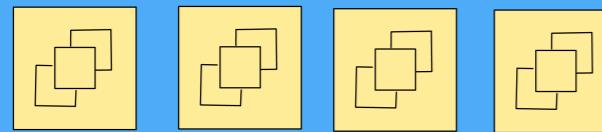
= \$222.66/month

- Spot instances offer average savings of 66%
- Analytics workload needs to run for only four out of 24 hours
- Opportunity to **save 94%** of the analytics server costs

Explore alternatives

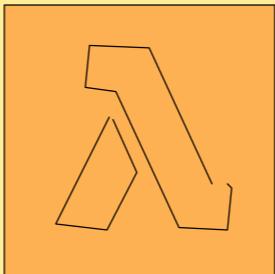
- Lambda is a serverless compute service for running code without having to manage servers
- Lambda is ideal for short-term tasks such as image uploads and processing
- One million free requests per month and 400,000 GB-seconds of compute time per month
- Replacing four EC2 servers with Lambda will result in savings of \$4,000/month or **100%** of the image processing server costs

Before using lambda serverless



4 servers 24/7 = 96 server hours/day
Total cost \$4,000/month

After using Lambda

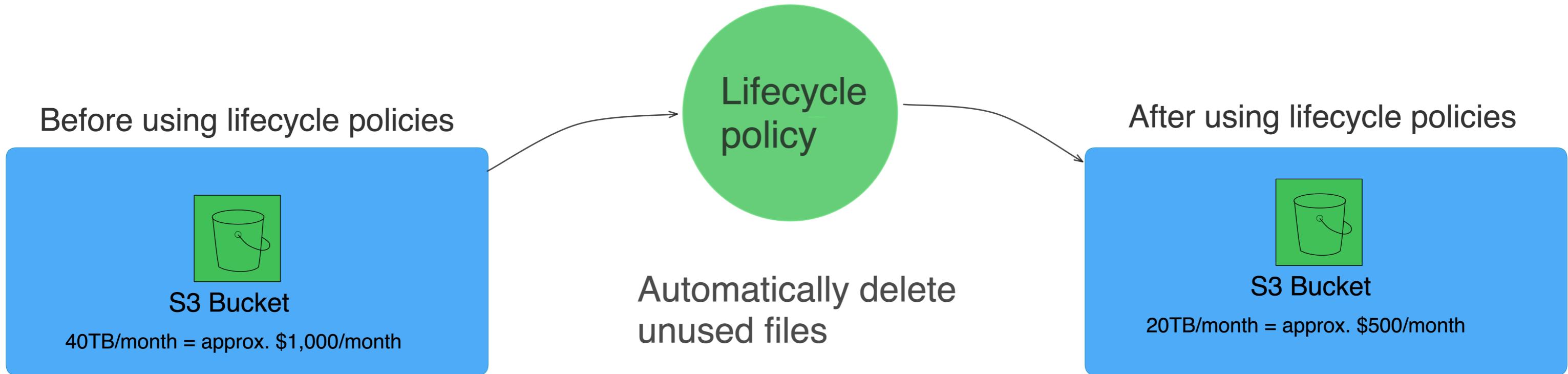


Lambda

Total cost = 0 (zero)

one million free requests per month and
400,000 GB-seconds
of compute time per month

Optimize storage



- S3 can grow in size and add to storage costs
- Lifecycle policies can create rules which automatically purge files
- This will save \$500/month or 50% of the storage costs

Savings summary

- We've saved a whopping 68.52% from the original AWS costs
- Elastic-sizing EC2 servers and using alternative compute such as Lambda
- Actual savings will depend on workload characteristics and the business need

| Use cases | Cost/month before optimization | Cost/month After optimization |
|--------------------------|--------------------------------|-------------------------------|
| Web server | \$4,000 | \$2,000 |
| Analytics servers | \$4,000 | \$222 |
| Image processing servers | \$4,000 | 0 |
| S3 storage costs | \$1,000 | \$500 |
| RDS database | \$2,000 | \$2,000 |
| Total | \$15,000 | \$4,722 |

Let's practice!

AWS SECURITY AND COST MANAGEMENT CONCEPTS

Wrap-up

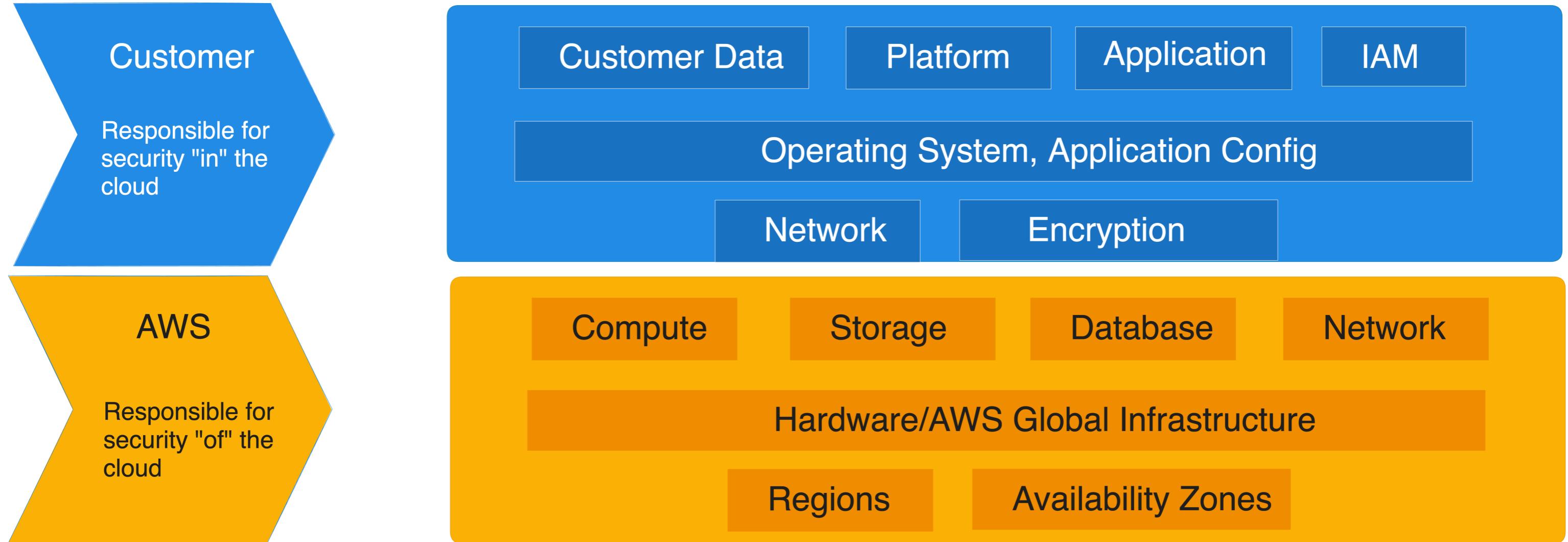
AWS SECURITY AND COST MANAGEMENT CONCEPTS



Dev Bhosale

Principal Data & Cloud Architect

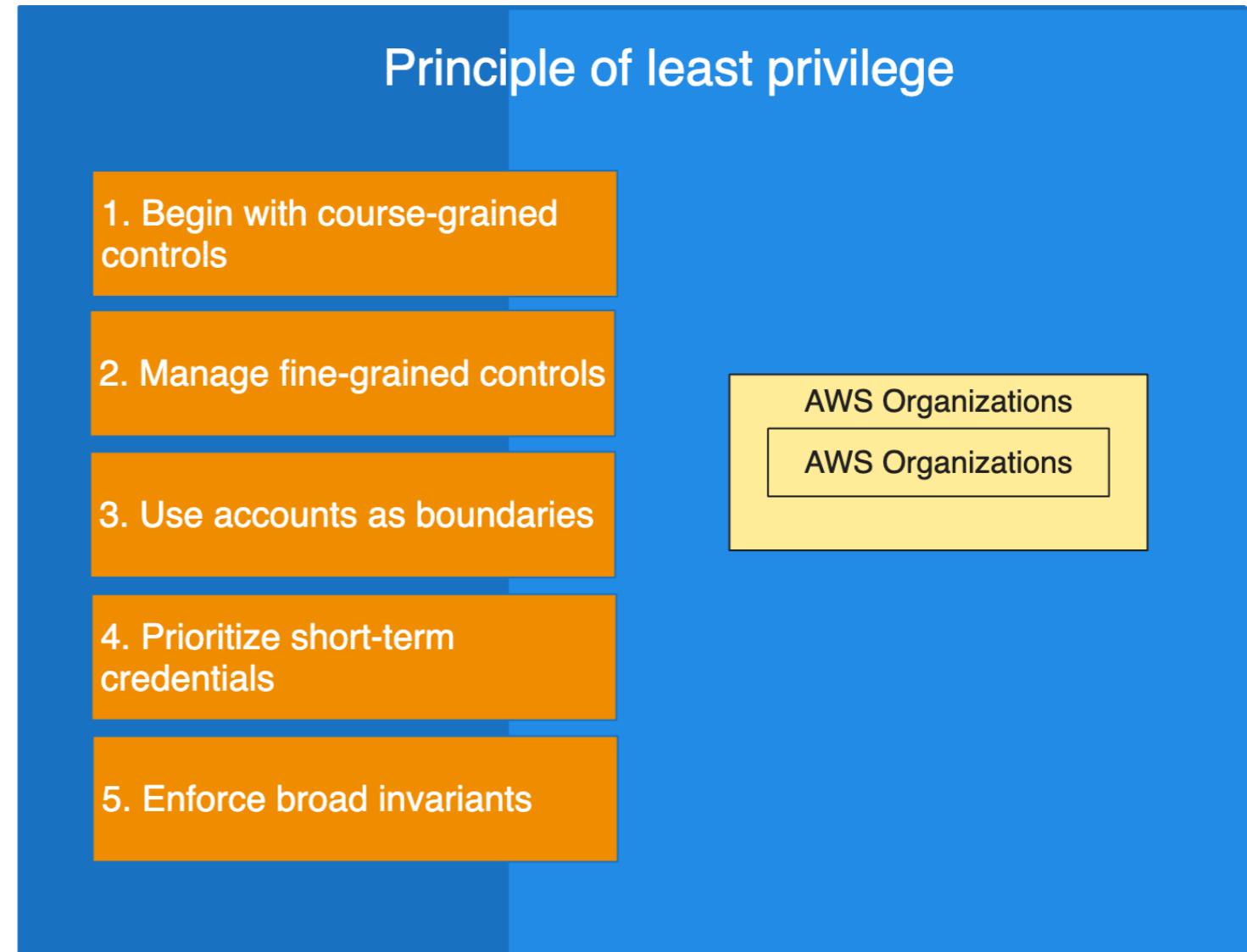
Introduction to AWS Security



- Security concepts and shared responsibilities
- Why end-to-end security is important

Deep dives into Compliance, Governance, and IAM

- Principle of least privilege
- Identity and Access Management (IAM)



Network and Compute Security

Network Security

Subnet design

NACL

Firewall

- Network security
- Compute security

Compute Security



Keep credentials secure



Update Operating System



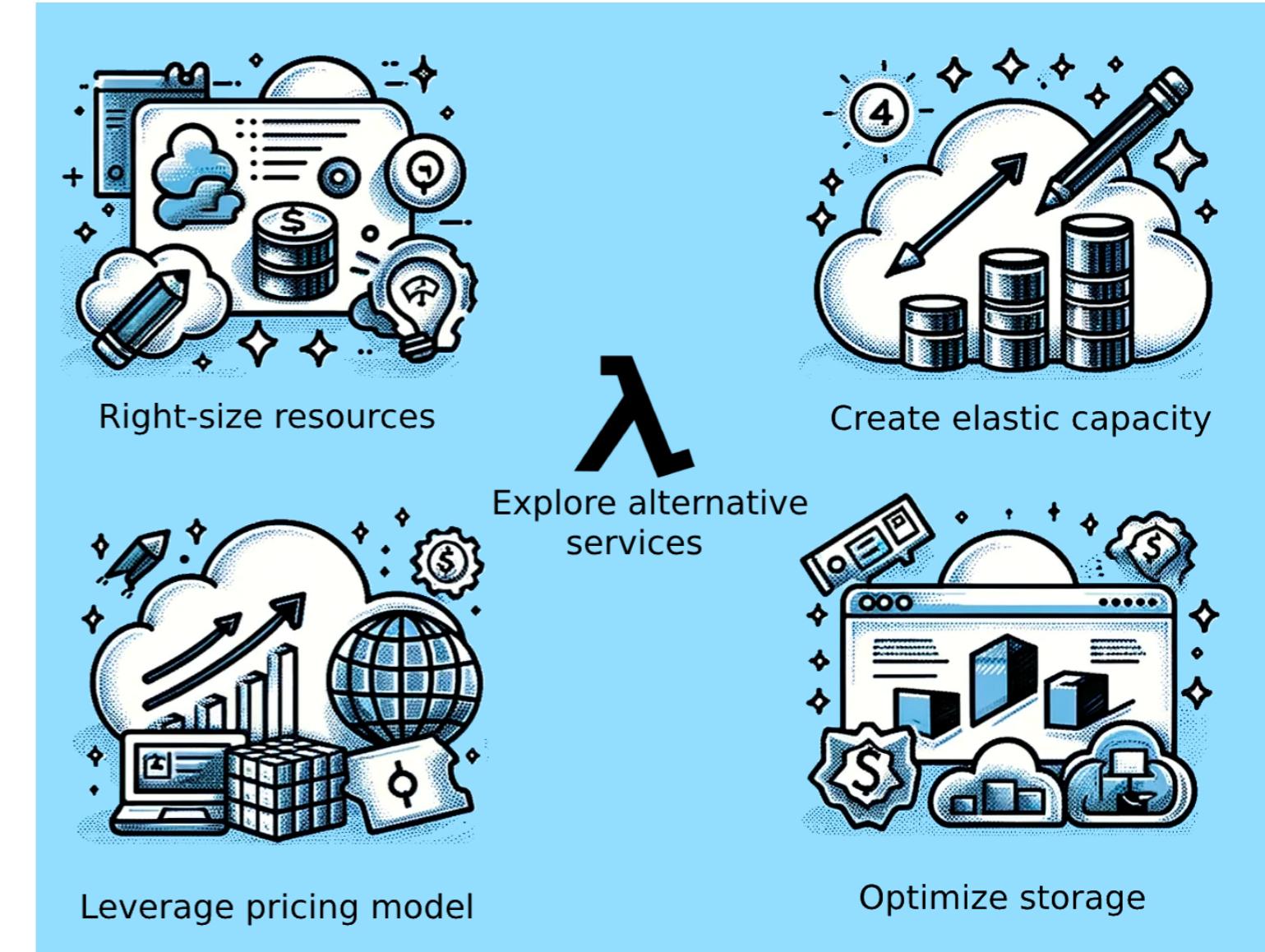
Manage access
using security groups



Use IAM Roles

Mastering AWS Cost Management

- Pricing calculator
- Cost allocation tags
- Cost optimization framework



What's Next?



Congratulations!

AWS SECURITY AND COST MANAGEMENT CONCEPTS