KodeKloud

General Billing in AWS

Billing – Agenda for This Section

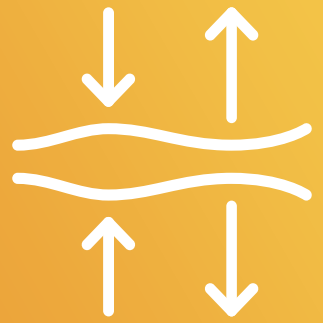
01

Fundamentals of Pricing

02

Cost Optimization

03



Use Elasticity

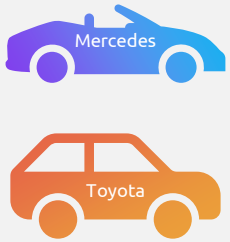
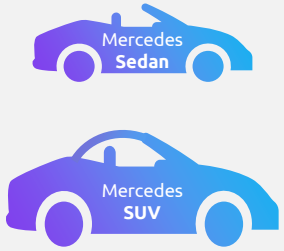
04

Pricing Models

05

Free Tier

Billing – Like Renting a Car?

How Fast is the Car?		$0.40 Per day for a fast vehicle
How Big is the Car?		$0.50 Per day for a large vehicle
How many miles did you put on it?	4000 km / 4 Days	$2 Per mile

Billing – Fundamentals of Pricing

Three general drivers of billing

Compute Used/Requested	I requested a 4-CPU virtual machine with 32 GB of RAM	$0.40 Per instance per hour
Storage Used/Requested	I requested 50 GB of fast disk storage	$0.50 for storage per hour
Network Used/Requested (out only)	I transferred 1000 GB of data out to my office	$2 for outbound data

I asked for an
R5.xlarge EC2 Instance

** These numbers are not real

Billing – Like Renting a Car?

How Fast is the Car?

How Big is the Car?

How many miles did you put on it?

Duration Pricing

Like a car lease or rental, you pay for as long as you have the car

Request Pricing

Like a rideshare, you pay each time you “ride” in the vehicle.

Billing – Fundamentals of Pricing

Three general drivers of billing

Compute

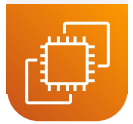
Used/Requested

Storage

Used/Requested

Network

Used/Requested (out only)



Duration Pricing

- **400,000** GB-seconds per month free, up to **3.2 million** seconds of compute time
- **$0.00001667** for every GB-second used thereafter

Request Pricing

- **Free Tier:** 1 million requests per month
- **$0.20** per **1 million** requests thereafter, or **$0.0000002** per request

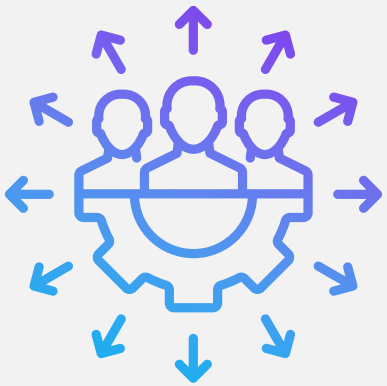
Billing – Start Early With Cost Optimization

01

Read the dimensions of pricing before you implement

02

Choose managed services over unmanaged when possible



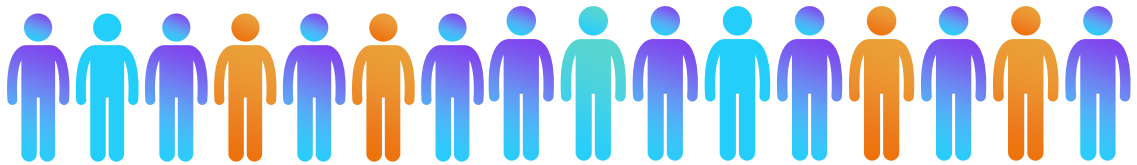
03

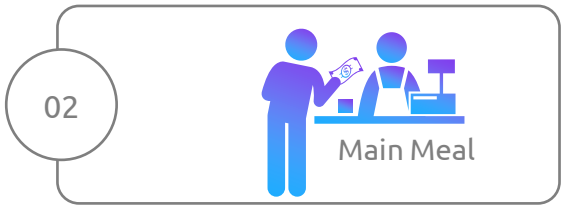
Correct expensive sizing

04

Use AWS's Optimize and Save Tools when possible

Billing – Maximize the Power of Elasticity





Billing – Maximize the Power of Elasticity

Billing – Maximize the Power of Elasticity

Remember to scale up only when needed

Don’t forget to scale down

Leverage repeatable scripts or programs as much as possible so you can delete services and recreate them

Use Automatic Scaling if available and suitable for your use case

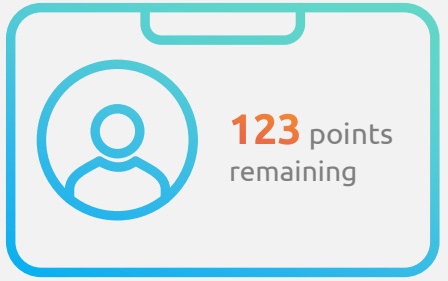
Billing – Think of Pricing Models in Ways of Eating

01 | Buffet

02 | Loyalty Program

03 | About to Expire or Extra food

04 | Membership



Billing – Use the Appropriate Pricing Model

Cloud Billing Models	AWS Has Several Pricing Models
On-Demand	Order the unlimited buffet; return access when you are done eating
Savings Plans	Pay $100, and they will give you credit for $150; you can then buy food with the $150
Spot	Pay for any excess food, but you can only eat it until a paying customer comes along.
Reservation	Become a loyalty member and pay for food whether you eat it or not (but let's eat it)

Billing – Use the Appropriate Pricing Model

Cloud Billing Models	AWS Has Several Pricing Models
On-Demand	No contract. Pay for what you use/request. Give back when done
Savings Plans	Pay $100, and they will give you credit for $150; you can then buy compute with the $150.
Spot	Pay for any excess compute, but you can use it until AWS needs it.
Reservation	Become a loyalty member and pay for food whether you eat it or not (but let's eat it)

Billing – Don’t Forget the “Free” Tier

Mainly for learning and testing

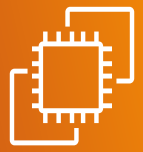
Free Trials	Free for 12 Months	Always Free
Short-term, starting from activation	For some services, starting from when the account was created	A certain level of usage is always free for certain services

General Billing - Summary

- Most services charge based on usage and capacity (always over time)
- Compute, Storage, and Requests/Network are the common dimensions
- Understand billing to optimize you spend
- Scale up and down as needed
- Use the appropriate billing model for your workload
- Use the Free tier when you can if learning

Specific Billing for EC2

Billing – Specifics of EC2 - Size

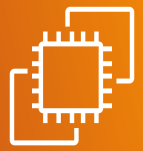


EC2 has several dimensions to pricing

- What is the size of machine you requested? Nano to micro to 32xlarge
- How is it charged - per second or per hour?
- What is your EC2 Licensing type?
- What features are turned on?
- Is the machine running? Has it stopped?

Instance	vCPU	CPU Credits/Hour	Mem (GiB)	Storage	Network Performance (GBps)
t3.nano	2	6	0.5	EBS - only	Up to 5
t3.micro	2	12	1	EBS - only	Up to 5
t3.small	2	24	2	EBS - only	Up to 5
t3.medium	2	24	4	EBS - only	Up to 5
t3.large	2	36	8	EBS - only	Up to 5

Billing – Specifics of EC2 - Size



There are so many Sizes!!!

Name	API Name	Instance Memory	vCPUs	Instance Storage
Filter...	Filter...	Min Mem: 0	Min vCPUs: 0	Min Storage: 0
T4G Nano	t4g.nano	0.5 GiB	2 vCPUs for a 1h 12m burst	EBS only
T3A Nano	t3a.nano	0.5 GiB	2 vCPUs for a 1h 12m burst	EBS only
T3 Nano	t3.nano	0.5 GiB	2 vCPUs for a 1h 12m burst	EBS only
T2 Nano	t2.nano	0.5 GiB	1 vCPUs for a 1h 12m burst	EBS only
T4G Micro	t4g.micro	1.0 GiB	2 vCPUs for a 2h 24m burst	EBS only
T3A Micro	t3a.micro	1.0 GiB	2 vCPUs for a 2h 24m burst	EBS only
T3 Micro	t3.micro	1.0 GiB	2 vCPUs for a 2h 24m burst	EBS only
T2 Micro	t2.micro	1.0 GiB	1 vCPUs for a 2h 24m burst	EBS only
T4G Small	t4g.small	2.0 GiB	2 vCPUs for a 4h 48m burst	EBS only
T3A Small	t3a.small	2.0 GiB	2 vCPUs for a 4h 48m burst	EBS only
T1 Micro	t1.micro	0.613 GiB	1 vCPUs	EBS only
T3 Small	t3.small	2.0 GiB	2 vCPUs for a 4h 48m burst	EBS only
T2 Small	t2.small	2.0 GiB	1 vCPUs for a 4h 48m burst	EBS only
A1 Medium	a1.medium	2.0 GiB	1 vCPUs	EBS only
T4G Medium	t4g.medium	4.0 GiB	2 vCPUs for a 4h 48m burst	EBS only
C6G Medium	c6g.medium	2.0 GiB	1 vCPUs	EBS only
C7G Medium	c7g.medium	2.0 GiB	1 vCPUs	EBS only
T3A Medium	t3a.medium	4.0 GiB	2 vCPUs for a 4h 48m burst	EBS only
C6GD Medium	c6gd.medium	2.0 GiB	1 vCPUs	59 GB NVMe SSD
M6G Medium	m6g.medium	4.0 GiB	1 vCPUs	EBS only
M7G Medium	m7g.medium	4.0 GiB	1 vCPUs	EBS only
T3 Medium	t3.medium	4.0 GiB	2 vCPUs for a 4h 48m burst	EBS only
C6GN Medium	c6gn.medium	2.0 GiB	1 vCPUs	EBS only
M1 General Purpose Small	m1.small	1.7 GiB	1 vCPUs	160 GB HDD
M6GD Medium	m6gd.medium	4.0 GiB	1 vCPUs	59 GB NVMe SSD
T2 Medium	t2.medium	4.0 GiB	2 vCPUs for a 4h 48m burst	EBS only
R6G Medium	r6g.medium	8.0 GiB	1 vCPUs	EBS only
A1 Large	a1.large	4.0 GiB	2 vCPUs	EBS only
R7G Medium	r7g.medium	8.0 GiB	1 vCPUs	EBS only

Billing – Specifics of EC2 - Size

Instances | EC2 | RDS | ElastiCache | Redshift | OpenSearch | OpenAI and ChatGPT API cost monitoring and forecasting now available → | Slack | Star

Region: US East (N. Virginia) | Pricing Unit: Instance | Cost: Hourly | Reserved: 1-year - No Upfront | Columns | Compare Selected | Clear Filters | Export | Search...

Name	API Name	Instance Memory	vCPUs	Instance Storage	Network Performance	Linux On Demand cost	Linux Reserved cost	Linux Spot Minimum cost	Windows On Demand cost	Windows Reserved cost
Filter...	Filter...	Min Mem: 0	Min vCPUs: 0	Min Storage: 0	Filter...	Filter...	Filter...	Filter...	Filter...	Filter...
T4G Nano	t4g.nano	0.5 GiB	2 vCPUs for a 1h 12m burst	EBS only	Up to 5 Gigabit	$0.0042 hourly	$0.0026 hourly	$0.0038 hourly	unavailable	unavailable
T3A Nano	t3a.nano	0.5 GiB	2 vCPUs for a 1h 12m burst	EBS only	Up to 5 Gigabit	$0.0047 hourly	$0.0029 hourly	$0.0041 hourly	$0.0093 hourly	$0.0075 hourly
T3 Nano	t3.nano	0.5 GiB	2 vCPUs for a 1h 12m burst	EBS only	Up to 5 Gigabit	$0.0052 hourly	$0.0033 hourly	$0.0035 hourly	$0.0098 hourly	$0.0079 hourly
T2 Nano	t2.nano	0.5 GiB	1 vCPUs for a 1h 12m burst	EBS only	Low to Moderate	$0.0058 hourly	$0.0036 hourly	unavailable	$0.0081 hourly	$0.0059 hourly
T4G Micro	t4g.micro	1.0 GiB	2 vCPUs for a 2h 24m burst	EBS only	Up to 5 Gigabit	$0.0084 hourly	$0.0053 hourly	$0.0062 hourly	unavailable	unavailable
T3A Micro	t3a.micro	1.0 GiB	2 vCPUs for a 2h 24m burst	EBS only	Up to 5 Gigabit	$0.0094 hourly	$0.0059 hourly	$0.0088 hourly	$0.0186 hourly	$0.0151 hourly
T3 Micro	t3.micro	1.0 GiB	2 vCPUs for a 2h 24m burst	EBS only	Up to 5 Gigabit	$0.0104 hourly	$0.0065 hourly	$0.0066 hourly	$0.0196 hourly	$0.0157 hourly
T2 Micro	t2.micro	1.0 GiB	1 vCPUs for a 2h 24m burst	EBS only	Low to Moderate	$0.0116 hourly	$0.0072 hourly	$0.0035 hourly	$0.0162 hourly	$0.0118 hourly
T4G Small	t4g.small	2.0 GiB	2 vCPUs for a 4h 48m burst	EBS only	Up to 5 Gigabit	$0.0168 hourly	$0.0105 hourly	$0.0129 hourly	unavailable	unavailable
T3A Small	t3a.small	2.0 GiB	2 vCPUs for a 4h 48m burst	EBS only	Up to 5 Gigabit	$0.0188 hourly	$0.0118 hourly	$0.0179 hourly	$0.0372 hourly	$0.0302 hourly
T1 Micro	t1.micro	0.613 GiB	1 vCPUs	EBS only	Very Low	$0.0200 hourly	$0.0140 hourly	$0.0031 hourly	$0.0200 hourly	$0.0150 hourly
T3 Small	t3.small	2.0 GiB	2 vCPUs for a 4h 48m burst	EBS only	Up to 5 Gigabit	$0.0208 hourly	$0.0130 hourly	$0.0169 hourly	$0.0392 hourly	$0.0314 hourly
T2 Small	t2.small	2.0 GiB	1 vCPUs for a 4h 48m burst	EBS only	Low to Moderate	$0.0230 hourly	$0.0144 hourly	$0.0173 hourly	$0.0320 hourly	$0.0236 hourly
A1 Medium	a1.medium	2.0 GiB	1 vCPUs	EBS only	Up to 10 Gigabit	$0.0255 hourly	$0.0161 hourly	$0.0250 hourly	unavailable	unavailable
T4G Medium	t4g.medium	4.0 GiB	2 vCPUs for a 4h 48m burst	EBS only	Up to 5 Gigabit	$0.0336 hourly	$0.0211 hourly	$0.0289 hourly	unavailable	unavailable
C6G Medium	c6g.medium	2.0 GiB	1 vCPUs	EBS only	Up to 10 Gigabit	$0.0340 hourly	$0.0214 hourly	$0.0338 hourly	unavailable	unavailable
C7G Medium	c7g.medium	2.0 GiB	1 vCPUs	EBS only	Up to 12.5 Gigabit	$0.0363 hourly	$0.0239 hourly	$0.0334 hourly	unavailable	unavailable
T3A Medium	t3a.medium	4.0 GiB	2 vCPUs for a 4h 48m burst	EBS only	Up to 5 Gigabit	$0.0376 hourly	$0.0236 hourly	$0.0362 hourly	$0.0560 hourly	$0.0420 hourly

Billing – Specifics of EC2

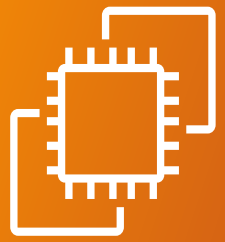
Pricing Model 1

EC2 Billing Models

On-Demand

Choose Your EC2 Pricing Model

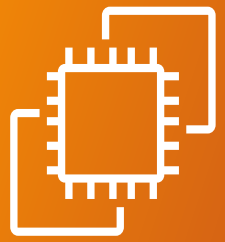
Order a machine; use it for seconds/minutes; then terminate it when you are done



Billing – Specifics of EC2

Pricing Model 2

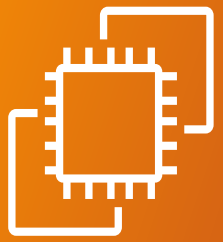
EC2 Billing Models	Choose Your EC2 Pricing Model
On-Demand	Order a machine; use it for seconds/minutes; then terminate it when you are done
Savings Plans	Pay $10,000 into a savings plan for EC2, and AWS will give you $12,000. Then you can pay from the $12,000 for 1-3 years



Billing – Specifics of EC2

Pricing Model 3

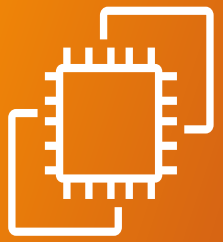
EC2 Billing Models	Choose Your EC2 Pricing Model
On-Demand	Order a machine; use it for seconds/minutes; then terminate it when you are done
Savings Plans	Pay $10,000 into a savings plan for EC2, and AWS will give you $12,000. Then you can pay from the $12,000 for 1-3 years
Spot	Place a bid on a Spot machine; win the bid; get the machine for minutes to days; get up to 90% discount



Billing – Specifics of EC2

Pricing Model 4

EC2 Billing Models	Choose Your EC2 Pricing Model
On-Demand	Order a machine; use it for seconds/minutes; then terminate it when you are done
Savings Plans	Pay $10,000 into a savings plan for EC2, and AWS will give you $12,000. Then you can pay from the $12,000 for 1-3 years
Spot	Place a bid on a Spot machine; win the bid; get the machine for minutes to days; get up to 90% discount
Reservations	Commit to 1-3 years and get up to 72% off on demand cost with Reserved Instances



Billing – Specifics of EC2

Pricing Model 5

EC2 Billing Models

On-Demand

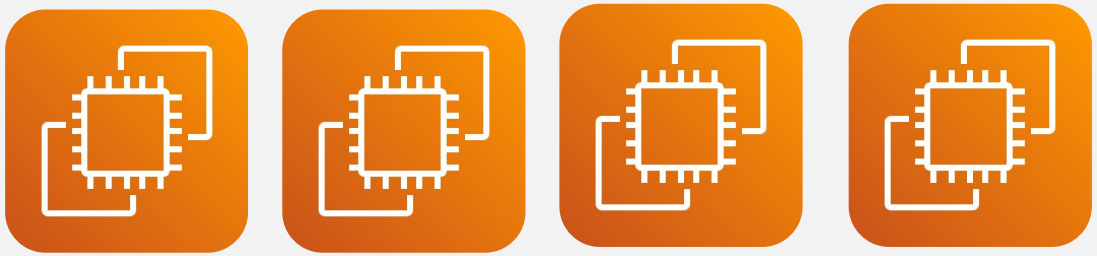
Savings Plans

Spot

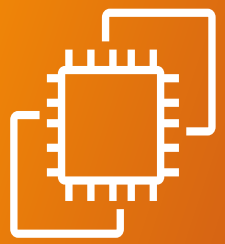
Reservations

Dedicated

Choose Your EC2 Pricing Model



Your private dedicated EC2 HOST



Billing – Fundamentals of Pricing - Remix

Three general drivers of billing

Compute Used/Requested	I requested a **4-CPU** virtual machine with **32 GB** of RAM	**$0.40** per hour
Storage Used/Requested	I requested **50 GB** of fast disk storage	**$0.50** for storage
Network Used/Requested (out only)	I transferred **1000 GB** of data out to my office	**$2** for outbound data

I asked for an
R5.xlarge EC2 Instance

** These numbers are not real

Billing – R5.xlarge Pricing

Three general drivers of billing

Compute Used/Requested	I requested a **4-CPU** virtual machine with **32 GB** of RAM	**$0.40** per hour
Storage Used/Requested	I requested **50 GB** of fast disk storage	**$0.50** for storage
Network Used/Requested (out only)	I transferred **1000 GB** of data out to my office	**$2** for outbound data
Licensing Model Used		

On-Demand

I asked for an **R5.xlarge** EC2 Instance

** These numbers are not real

Billing – R5.2xlarge Pricing

Three general drivers of billing

Compute Used/Requested	I requested a **4-CPU** virtual machine with **32 GB** of RAM	**$0.20** per hour
Storage Used/Requested	I requested **50 GB** of fast disk storage	**$0.50** for storage
Network Used/Requested (out only)	I transferred **1000 GB** of data out to my office	**$2** for outbound data
Licensing Model Used		

Reservation

I asked for an **R5.xlarge** EC2 Instance

** These numbers are not real

Billing – R5.4xlarge Pricing

Three general drivers of billing

Compute Used/Requested	I requested a **4-CPU** virtual machine with **32 GB** of RAM	**$.80** per hour
Storage Used/Requested	I requested **50 GB** of fast disk storage	**$0.50** for storage
Network Used/Requested (out only)	I transferred **1000 GB** of data out to my office	**$2** for outbound data
Licensing Model Used		

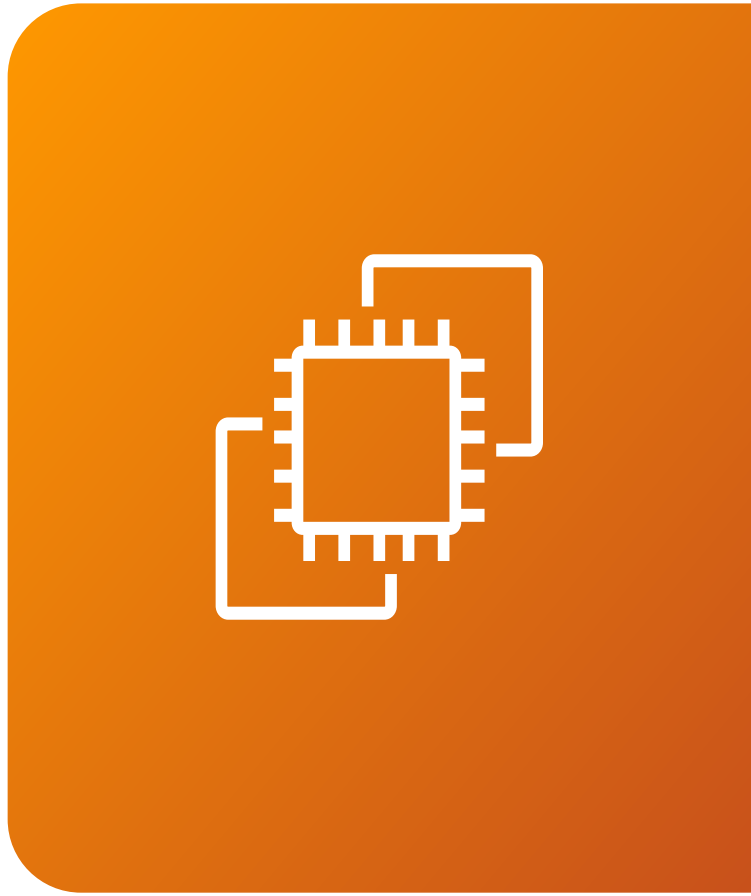
Dedicated

I asked for an **R5.xlarge** EC2 Instance

** These numbers are not real

Billing – What features did you turn on for EC2?

- Storage? >>> another service
- Elastic IP addresses? >>> cost only if unused
- Load balancers? >> >another service
- Hibernation? >>>slight cost
- Transferring data out to your office? >>> VPC outbound data charges
- Other features? >>> varies



EC2 Billing - Summary

- With EC2, you only pay when the machine is running
- Compute, Storage, Requests/Network are the common dimensions even with EC2
- Five models - On-demand, Reserved, Spot, Dedicated, and Savings Plans
- The Fifth Model - Dedicated to both instance and host
- Sizing is the biggest dimension
- Enabling Features or Service Integrations can increase costs

Specific Billing for RDS

Billing – Specifics of RDS - Overview

RDS has several dimensions to pricing

- Which service(s) are we talking about?
- What type of SQL engine is used?
- What is the Memory Size of the Database?
- What storage disk and type are used?
- What additional features like Multi-AZ or Backup Retention have you added?

Billing – RDS – What Service are we talking about?

RDS has three “sub” services

RDS “Main”

Includes the standard database engines (Oracle, Microsoft, MySQL, Maria, and PostgreSQL)

Aurora

Is a scalable clone of MySQL and PostgreSQL

Aurora Serverless

Has two versions, v1, and v2, both of which allow you to use Aurora but with no servers to manage

** Pricing is different for each of these!

Billing – RDS – What Type of SQL engine?

From an RDS perspective, AWS only supports the following:

- Which one of these are you using?
- These are more expensive due to licensing.

- You can bring your own license (BYOL) in many cases.
- Don't forget there are different versions of Oracle and MSSQL also.

Billing – RDS – What is the Database instance size?

- RDS uses DB instances and will charge you based on the DB size and number of DB instances.
- These "instances" are just like EC2, but made for Databases, and you can't log in to them normally.***
- DB are of different sizes like db.t3.small, db.t3.medium, db.t3.large, etc.
- Your CPU, memory, and network bandwidth will increase as you increase sizes, but so will your cost.
- Cost is per hour (shown next)

Billing – RDS – What is the Database instance size?

Instances | EC2 | RDS | ElastiCache | Redshift | OpenSearch

OpenAI and ChatGPT API cost monitoring and forecasting now available →

Region: US East (N. Virginia) | Pricing Unit: Instance | Cost: Hourly | Reserved: 1 yr - No Upfront | Columns | Compare Selected | Clear Filters

Name	API Name	Memory	Storage	vCPUs	Network Performance	PostgreSQL On Demand cost	PostgreSQL Reserved cost	MySQL On Demand cost	MySQL Reserved cost	SQL Server Standard On Demand cost
Filter...	db	Min Me	Min Storage: 0	Min vC	Filter...	Filter...	Filter...	Filter...	Filter...	Filter...
T4G Micro	db.t4g.micro	1 GiB	0 GiB (EBS only)	2 vCPUs	Up to 5 Gigabit	$0.0160 hourly	$0.0116 hourly	$0.0160 hourly	$0.0116 hourly	unavailable
T3 Micro	db.t3.micro	1 GiB	0 GiB (EBS only)	2 vCPUs	Low to Moderate	$0.0180 hourly	$0.0129 hourly	$0.0170 hourly	$0.0120 hourly	unavailable
T2 General Purpose Micro	db.t2.micro	1 GiB	0 GiB (EBS only)	1 vCPUs	Low to Moderate	$0.0180 hourly	$0.0144 hourly	$0.0170 hourly	$0.0136 hourly	unavailable
T1 Micro	db.t1.micro	0.613 GiB	0 GiB (EBS only)	1 vCPUs	Very Low	$0.0260 hourly	unavailable	$0.0250 hourly	unavailable	unavailable
T4G Small	db.t4g.small	2 GiB	0 GiB (EBS only)	2 vCPUs	Up to 5 Gigabit	$0.0320 hourly	$0.0233 hourly	$0.0320 hourly	$0.0233 hourly	unavailable
T3 Small	db.t3.small	2 GiB	0 GiB (EBS only)	2 vCPUs	Low to Moderate	$0.0360 hourly	$0.0258 hourly	$0.0340 hourly	$0.0239 hourly	unavailable
T2 General Purpose Small	db.t2.small	2 GiB	0 GiB (EBS only)	1 vCPUs	Low to Moderate	$0.0360 hourly	$0.0288 hourly	$0.0340 hourly	$0.0270 hourly	unavailable
M1 General Purpose Small	db.m1.small	1.7 GiB	1 × 160	1 vCPUs	Low	$0.0600 hourly	unavailable	$0.0550 hourly	unavailable	unavailable
T4G Medium	db.t4g.medium	4 GiB	0 GiB (EBS only)	2 vCPUs	Up to 5 Gigabit	$0.0650 hourly	$0.0465 hourly	$0.0650 hourly	$0.0465 hourly	unavailable
T3 Medium	db.t3.medium	4 GiB	0 GiB (EBS only)	2 vCPUs	Low to Moderate	$0.0720 hourly	$0.0517 hourly	$0.0680 hourly	$0.0478 hourly	unavailable
T2 General Purpose Medium	db.t2.medium	4 GiB	0 GiB (EBS only)	2 vCPUs	Low to Moderate	$0.0730 hourly	$0.0580 hourly	$0.0680 hourly	$0.0544 hourly	unavailable
M3 General Purpose Medium	db.m3.medium	3.75 GiB	1 × 4 SSD	1 vCPUs	Moderate	$0.0950 hourly	unavailable	$0.0900 hourly	unavailable	$0.6550 hourly
M1 General Purpose Medium	db.m1.medium	3.75 GiB	1 × 410	1 vCPUs	Moderate	$0.1200 hourly	unavailable	$0.1150 hourly	unavailable	unavailable
T4G Large	db.t4g.large	8 GiB	0 GiB (EBS only)	2 vCPUs	Up to 5 Gigabit	$0.1290 hourly	$0.0930 hourly	$0.1290 hourly	$0.0930 hourly	unavailable
T3 Large	db.t3.large	8 GiB	0 GiB (EBS only)	2 vCPUs	Low to Moderate	$0.1450 hourly	$0.1034 hourly	$0.1360 hourly	$0.0957 hourly	unavailable
T2 General Purpose Large	db.t2.large	8 GiB	0 GiB (EBS only)	2 vCPUs	Low to Moderate	$0.1450 hourly	$0.1160 hourly	$0.1360 hourly	$0.1080 hourly	unavailable

Billing – RDS – Storage Disk and Storage Type?

General Purpose

Cheapest and used for many workloads, except for the most demanding databases

PIOPS

Most expensive and you can control how many I/O per second it can support up to 256K IOPS

Billing – RDS – **Features** that impact costs

Backup Retention

Deployment Models

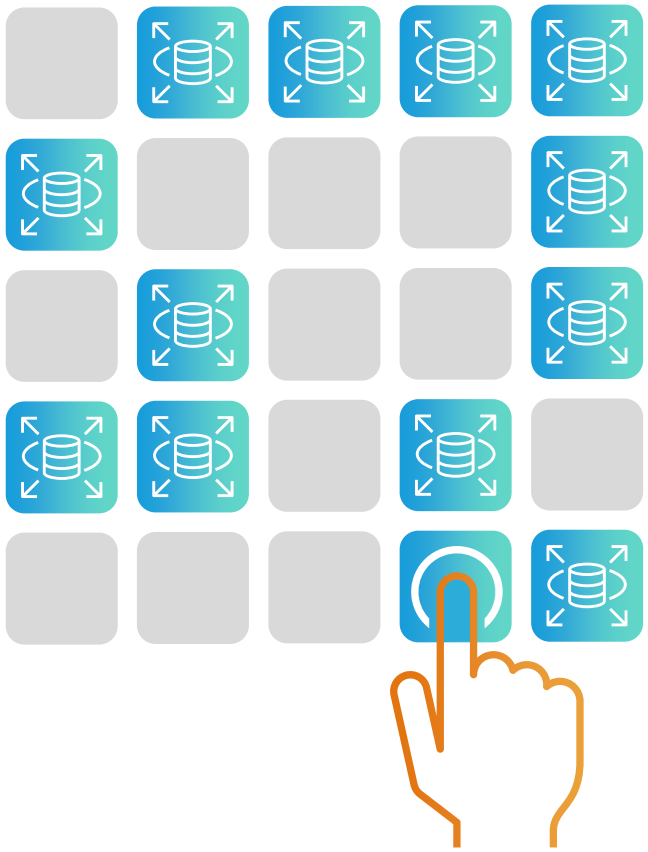
(Instance deployment versus cluster deployment)

Blue–Green

Caching Models

All are beyond the scope of Cloud Practitioner, but they add costs.

Billing – RDS – Side Note about Reservations



- Similar to EC2, RDS also has Reservations or Reserved Instances
- It does not have Spot, Dedicated, or a Savings Plan
- On-demand is common, but Reserved is recommended because of the discount
- Play with this in the RDS calculator exercise

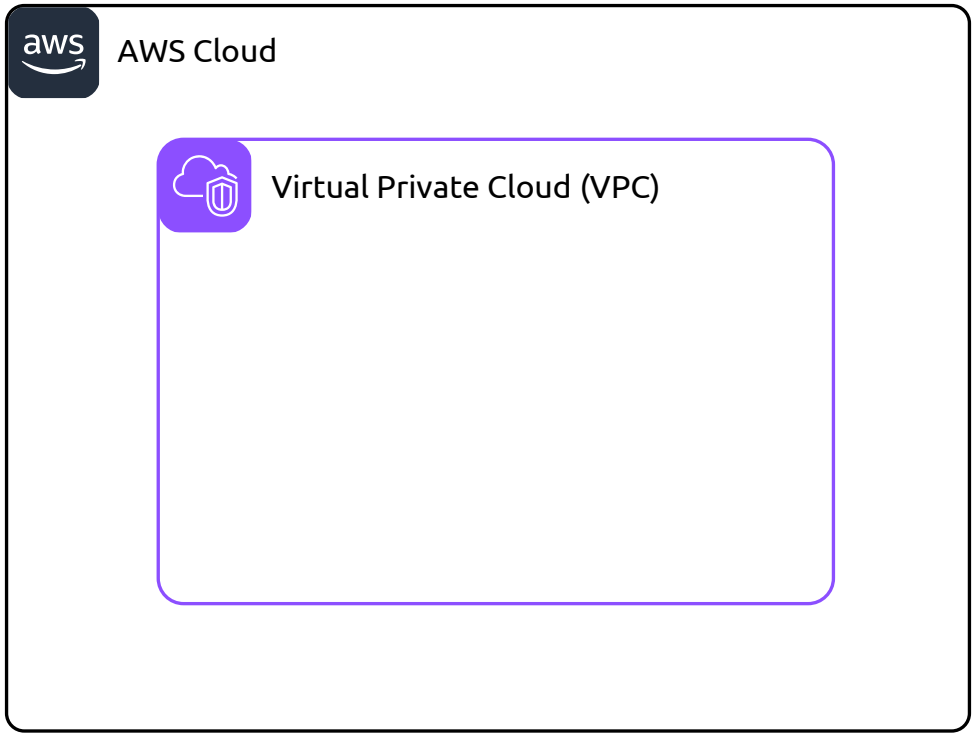
RDS Billing - Summary

- Which RDS service are you running - Aurora, “main” RDS, or Aurora Serverless?
- What Database engine are you using?
- What Size of DB engine are you using - DB.t3.large, DB.t3.xlarge, or others?
- How big and how fast are the disks?
- Are you using On-demand RDS/ you get Reservations for your RDS instances?
- Did you enable other features like Multi-AZ (failover) or long back-up retention?

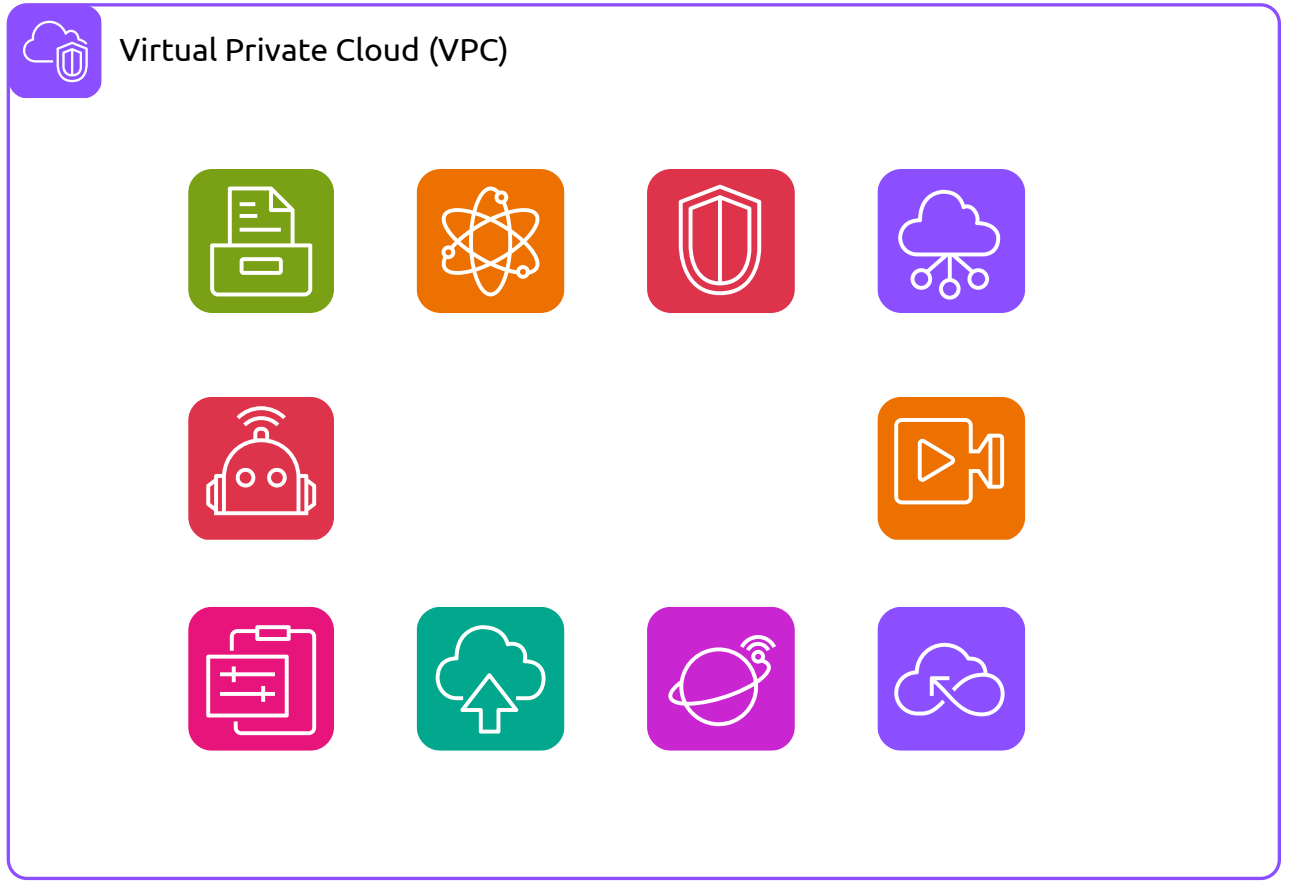
Specific Billing for VPC

VPC Pricing

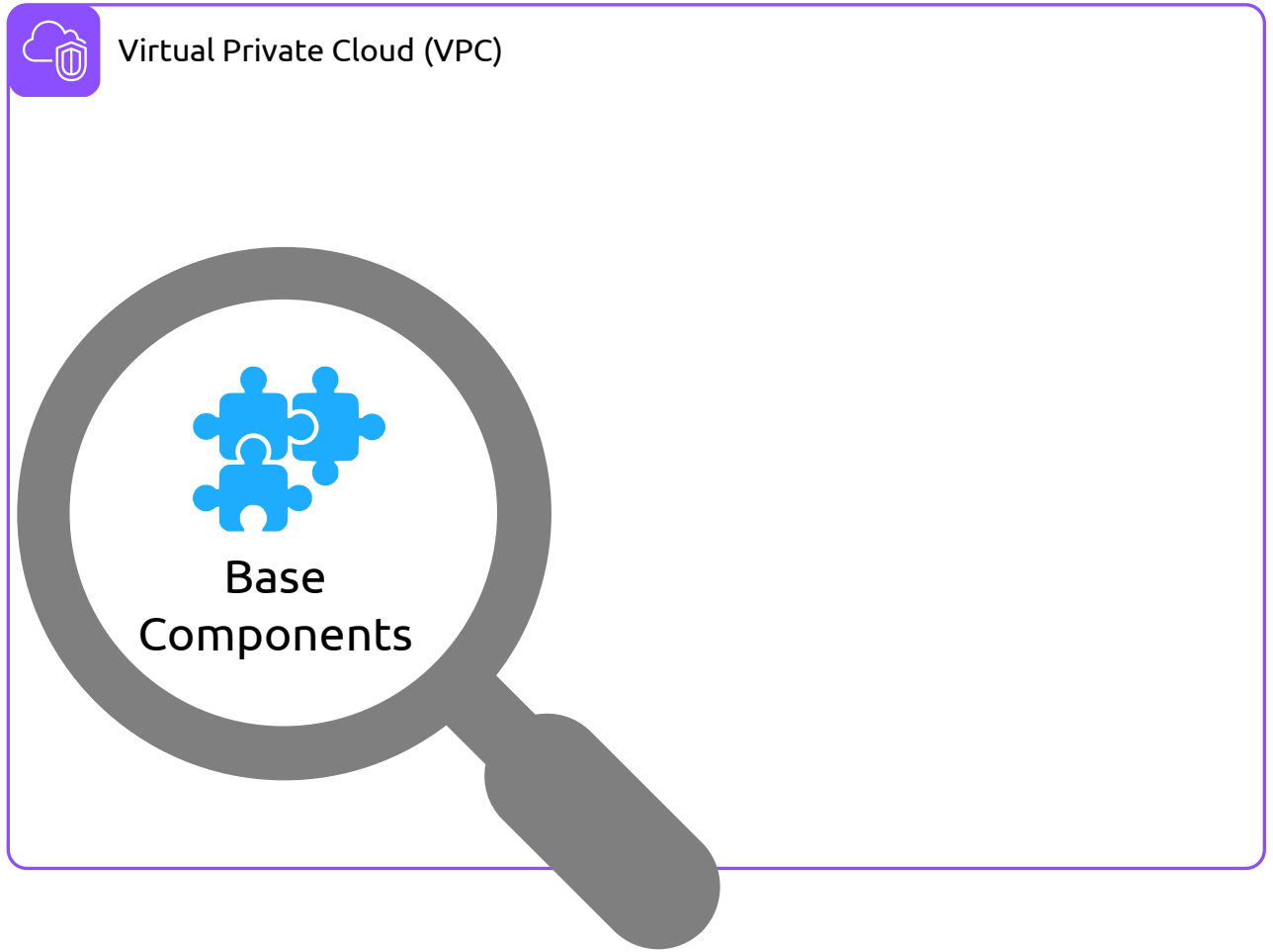
VPC Pricing



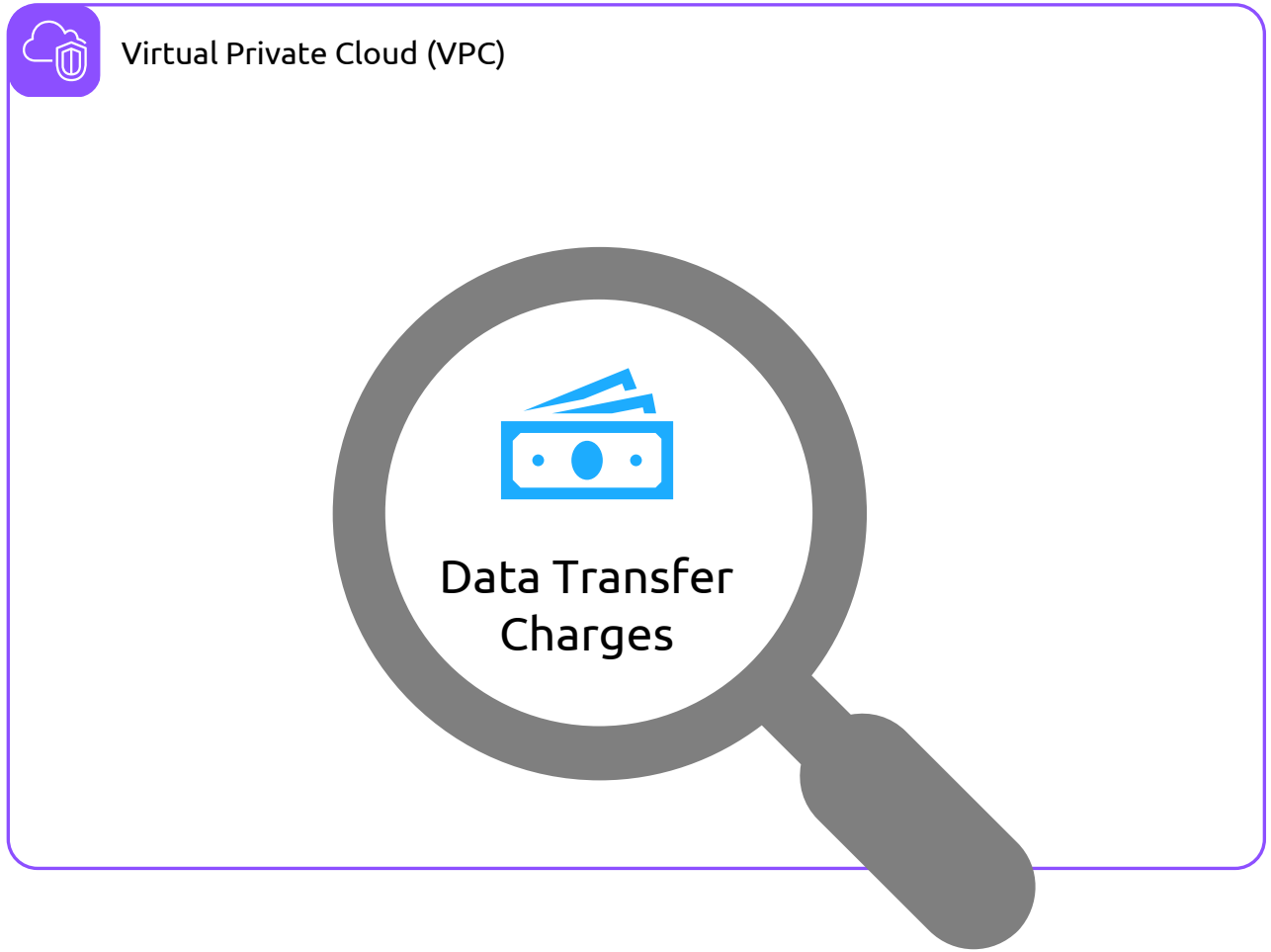
VPC Pricing



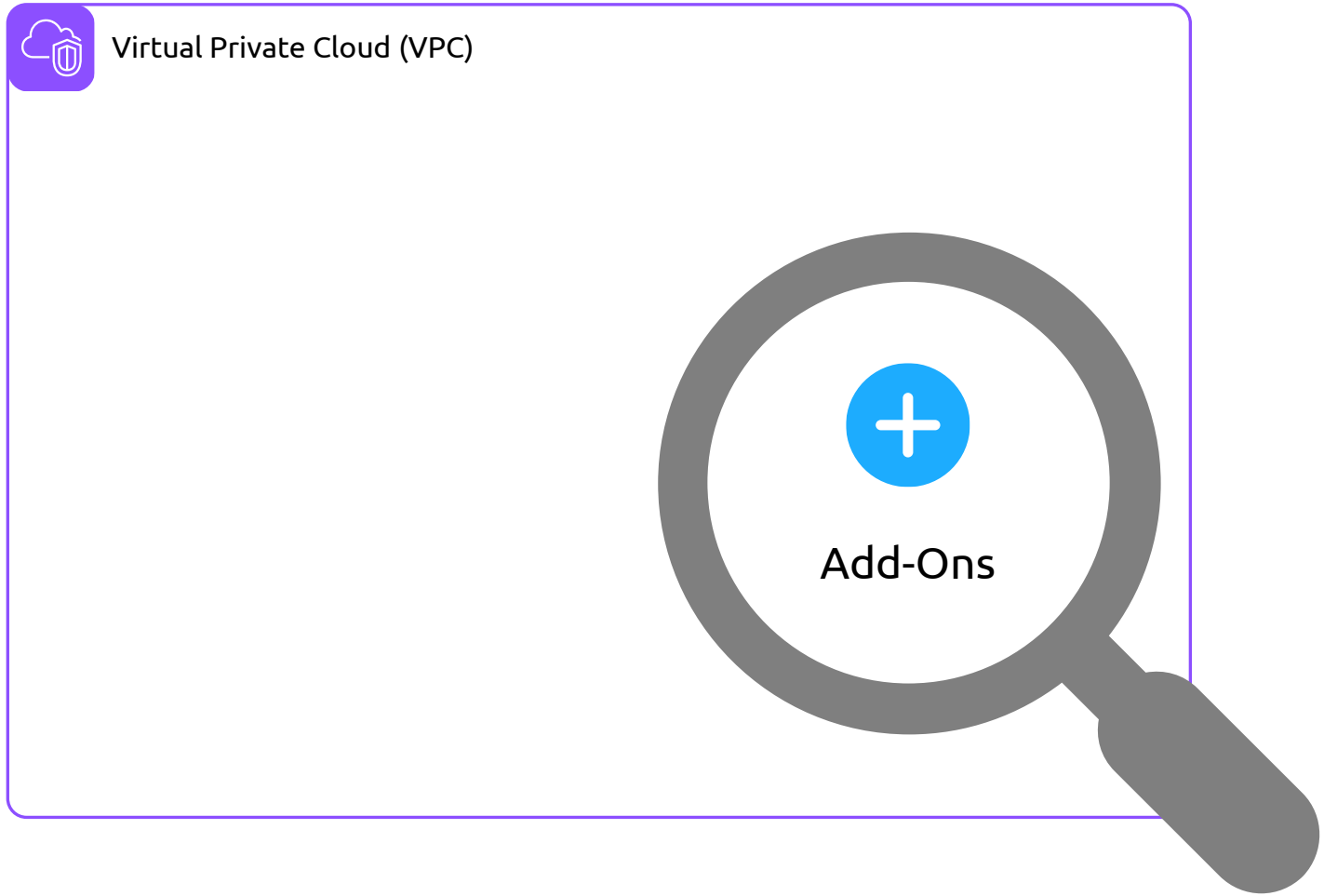
VPC Pricing



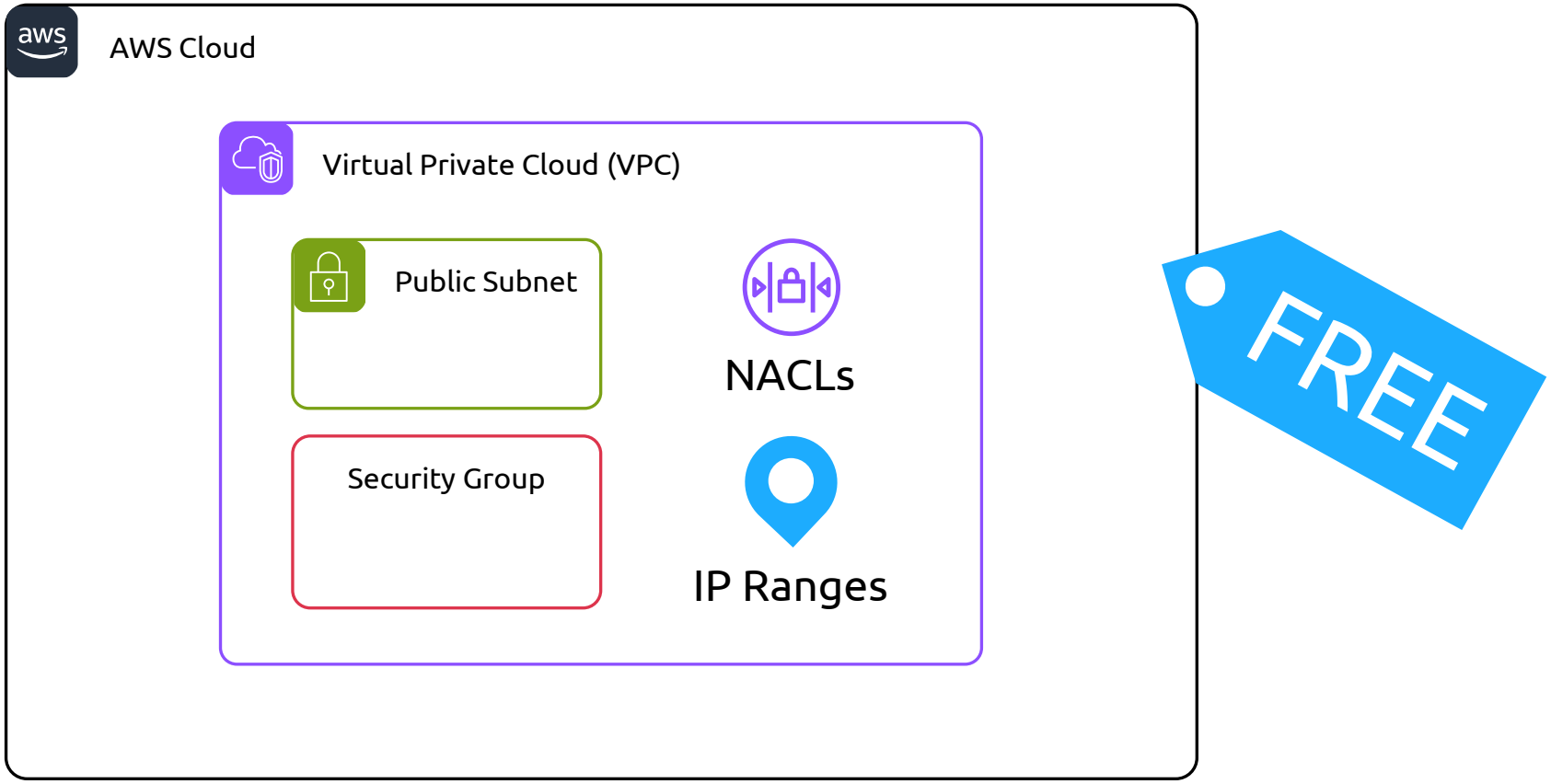
VPC Pricing



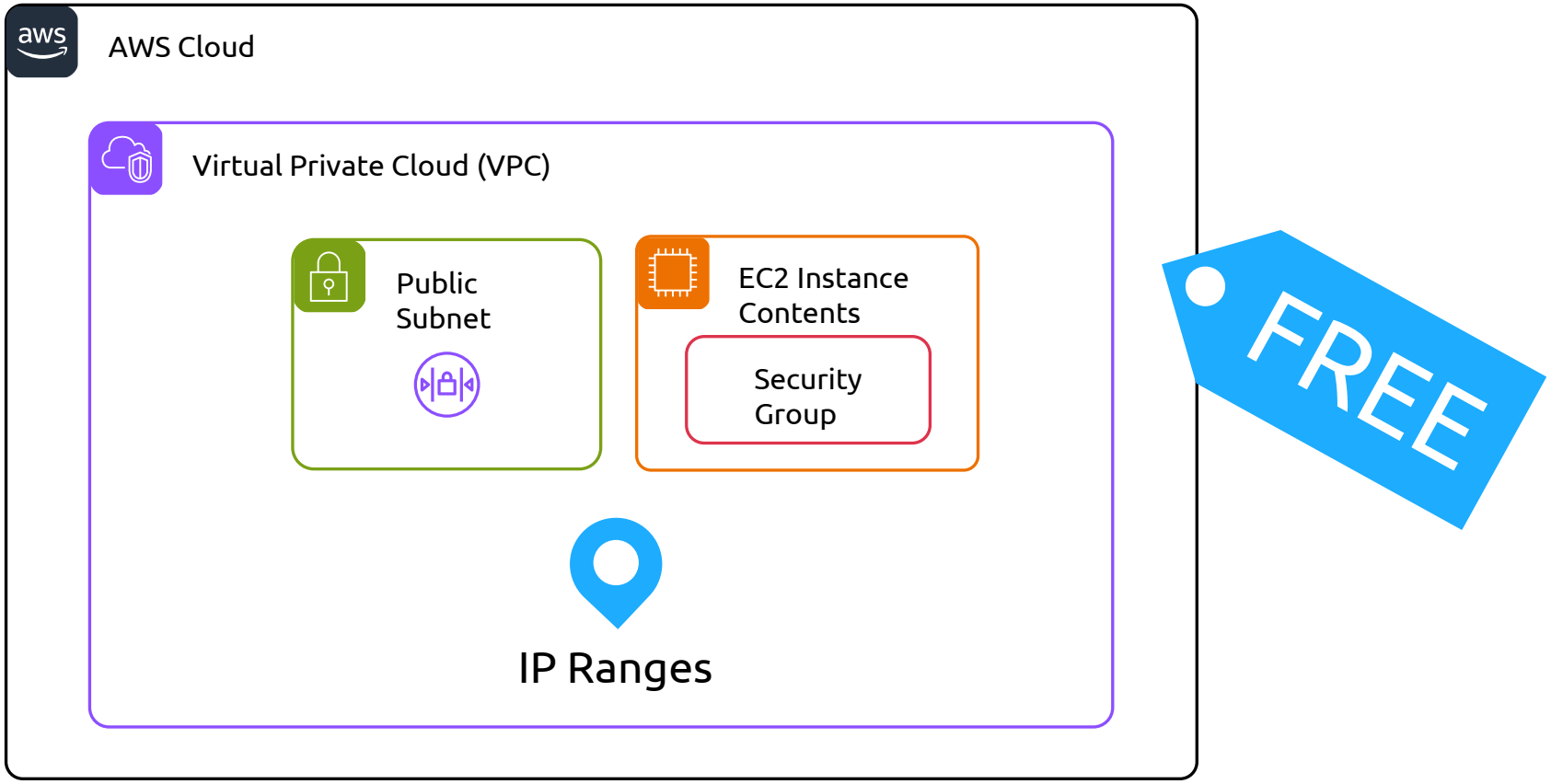
VPC Pricing



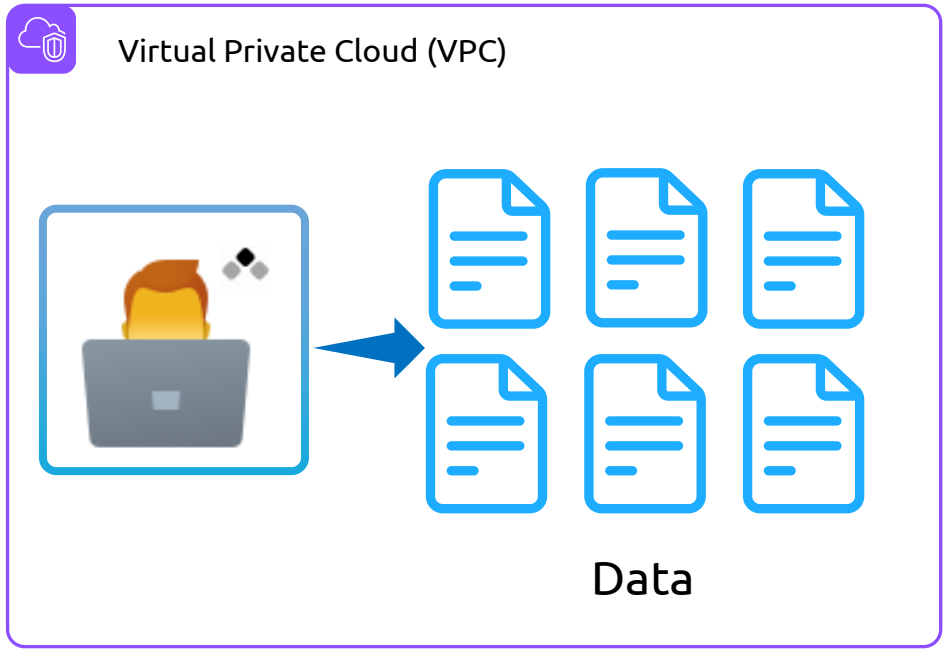
Billing for VPCs – Base Billing Charges



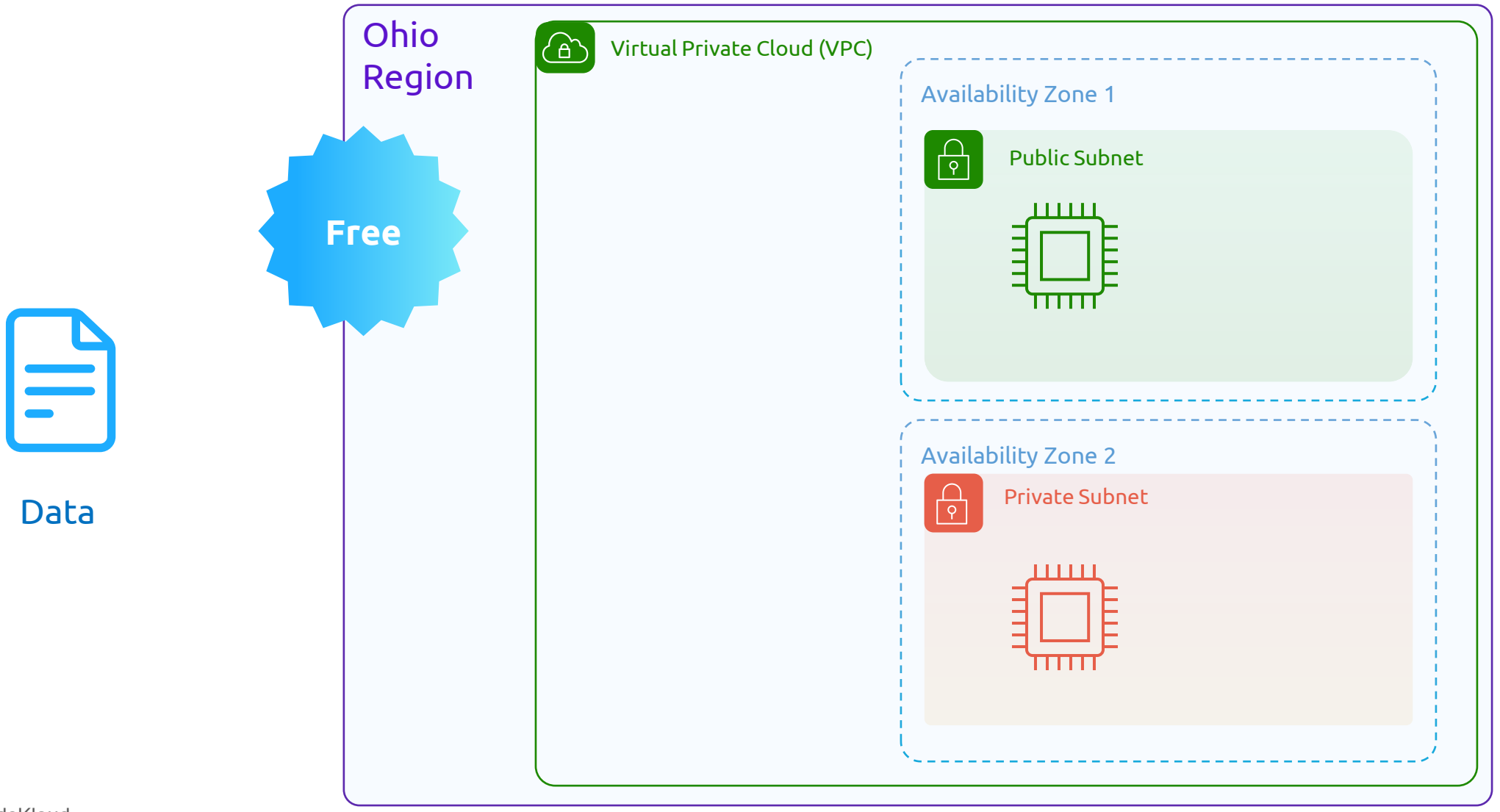
Billing for VPCs – Base Billing Charges



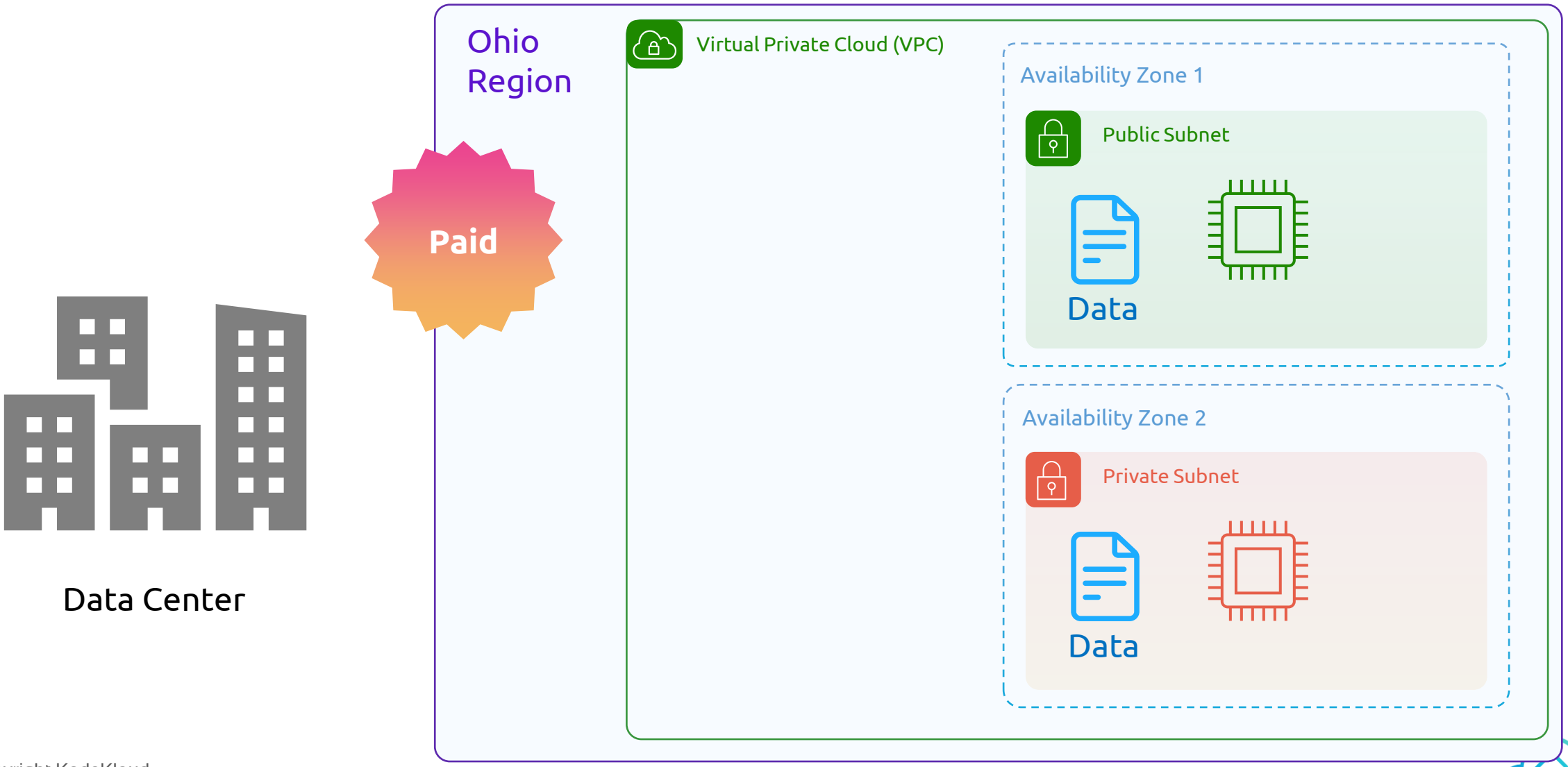
Billing for VPC – Data Transfer Charges



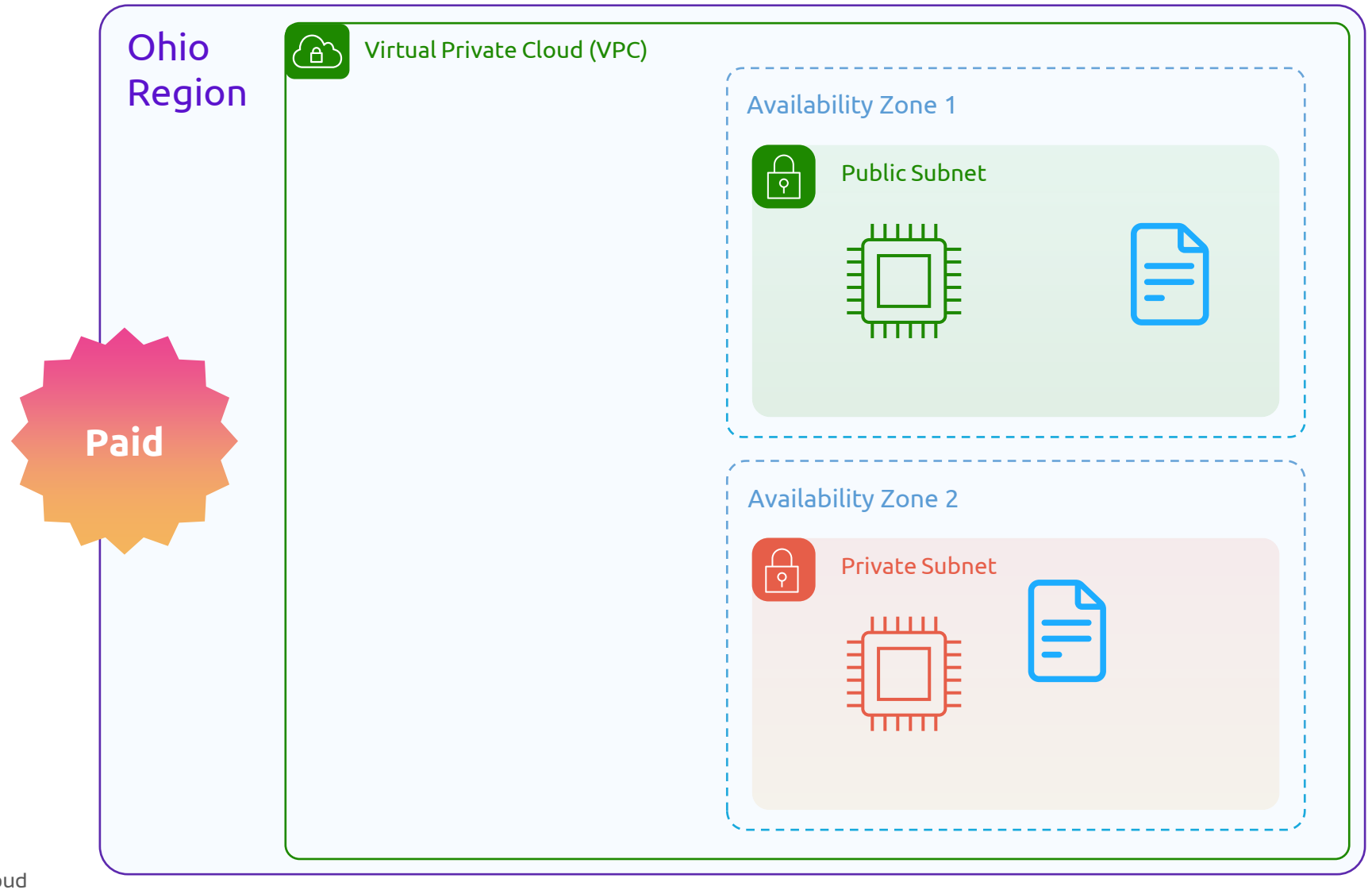
Billing for VPC – Data Inbound to a Region



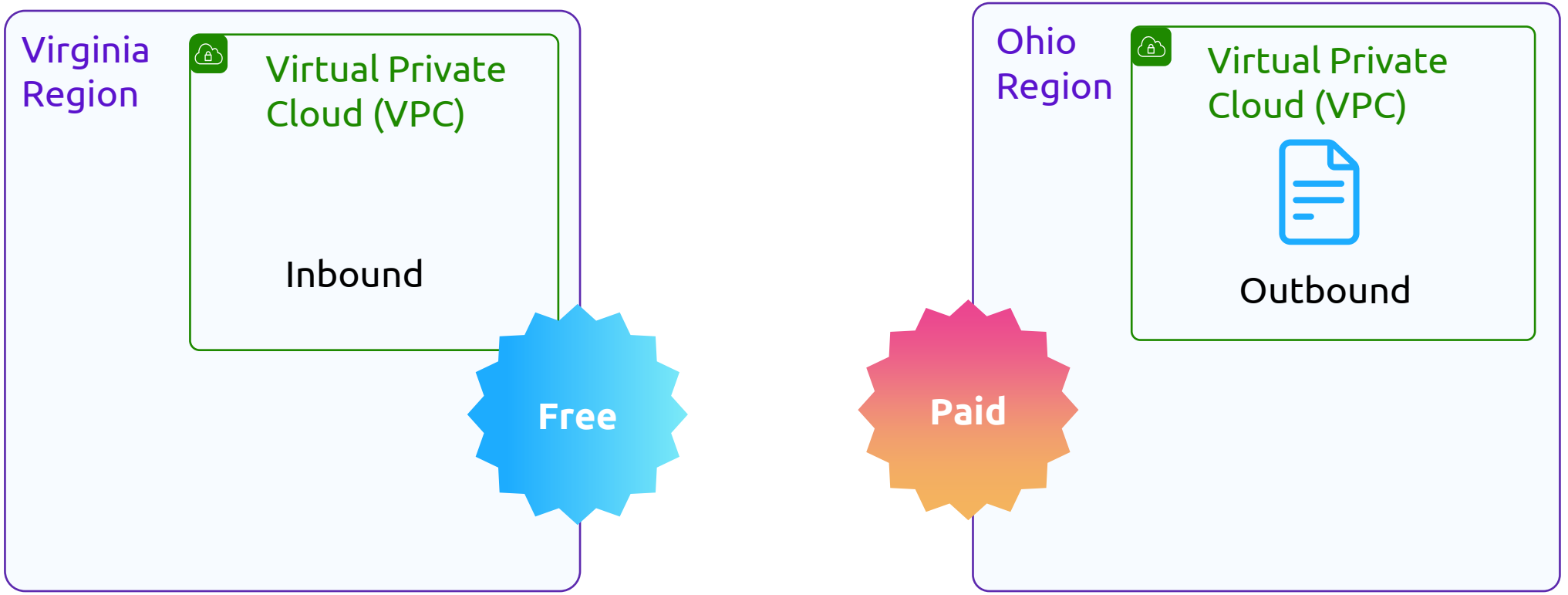
Billing for VPC – Data Outbound from a Region



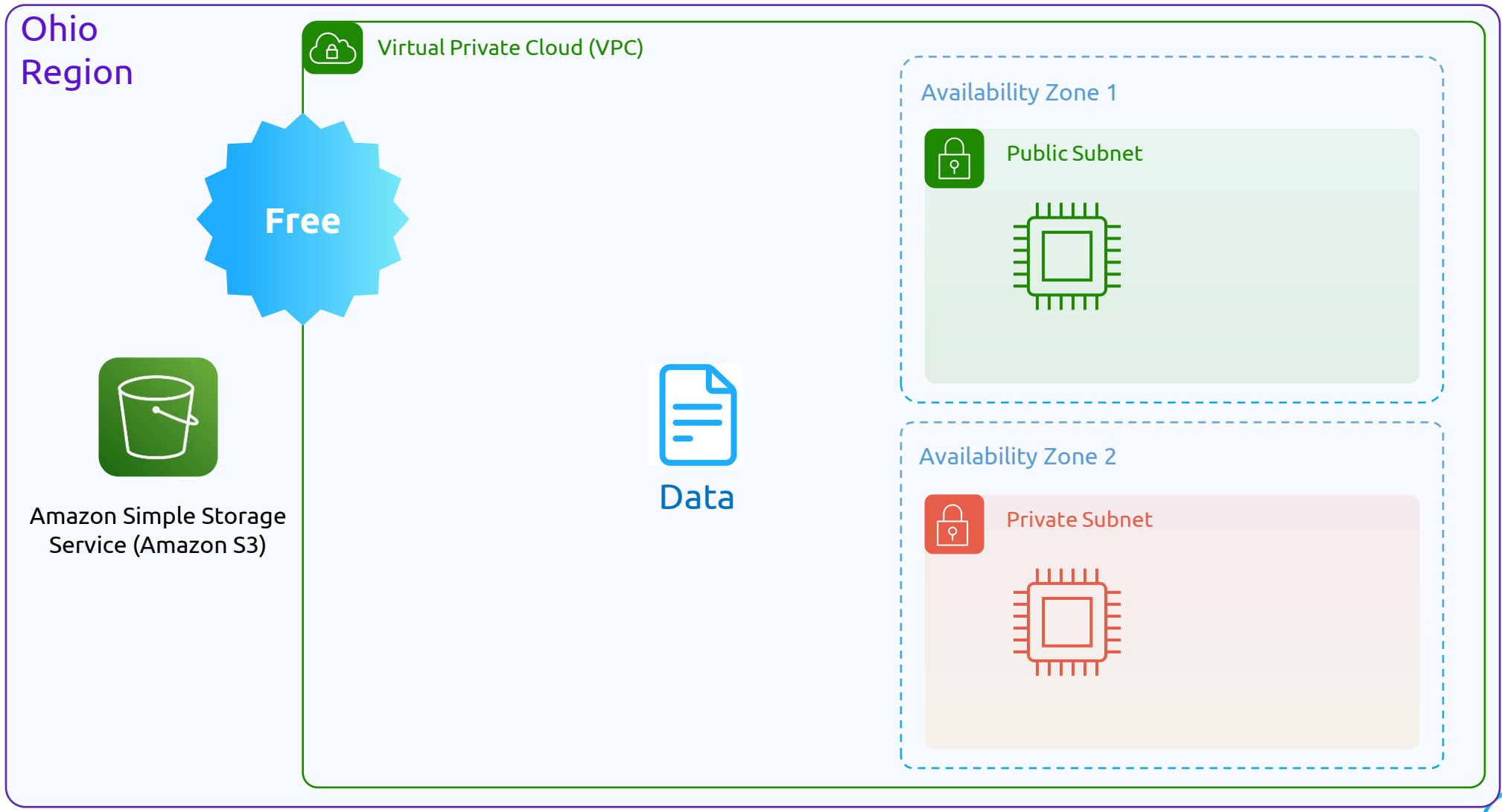
Billing for VPC – Availability Zone to Availability Zone



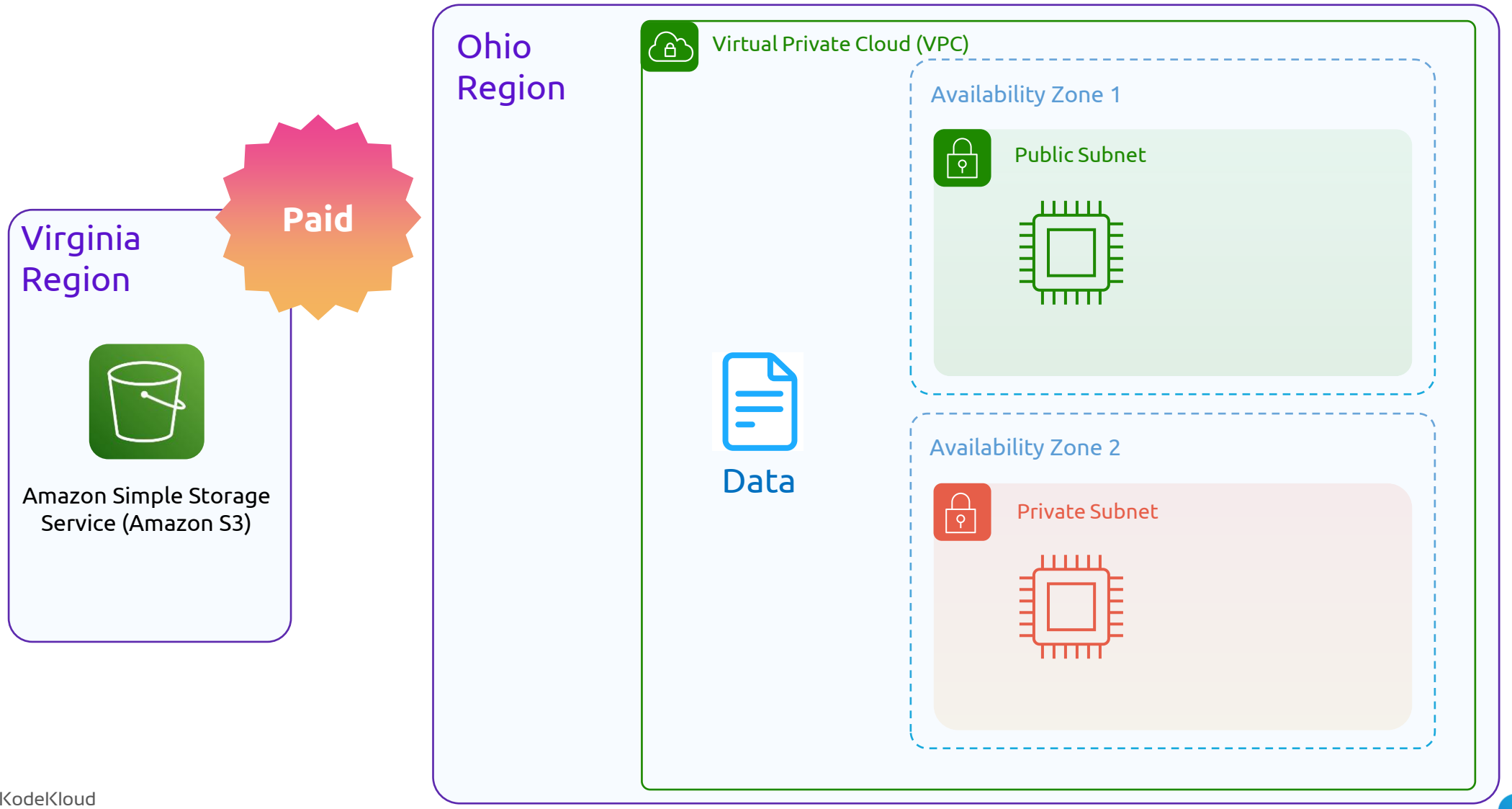
Billing for VPC – Region to Region



Billing for VPC – Same Region EC2 to Same Region S3



Billing for VPC – Region one - EC2 to Region two - S3



Billing for VPC – Data Transfer Charges

AWS Service	Data Transfer in	Data Transfer to Different AZ in Region	Data Transfer out to Other Regions	Data Transfer out to Public Internet	Data Transfer out to CloudFront
Amazon EC2, AWS Lambda, EKS (Includes EBS)					
Amazon S3 + Glacier					
Amazon CloudFront					
Amazon RDS					
Amazon Dynamo DB					
Amazon Aurora					
Amazon CloudSearch					
Amazon SNS + SQS					

Billing for VPC – Data Transfer Charges

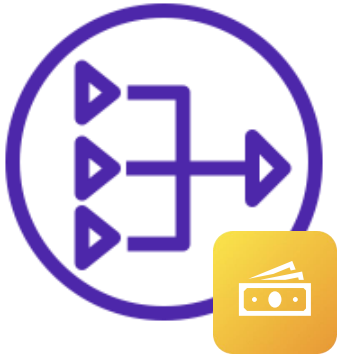
AWS Service	Data Transfer in	Data Transfer to Different AZ in Region	Data Transfer out to Other Regions	Data Transfer out to Public Internet	Data Transfer out to CloudFront
Amazon EC2, AWS Lambda, EKS (Includes EBS)		✓	✓	✓	
Amazon S3 + Glacier			✓	✓	
Amazon CloudFront		✓	✓	✓	
Amazon RDS			✓	✓	
Amazon Dynamo DB			✓	✓	
Amazon Aurora				✓	
Amazon CloudSearch				✓	
Amazon SNS + SQS				✓	

Billing for VPC – Pricing - Additional Components

Amazon Virtual Private Cloud
(Amazon VPC)

Billing for VPC – Pricing - Additional Components

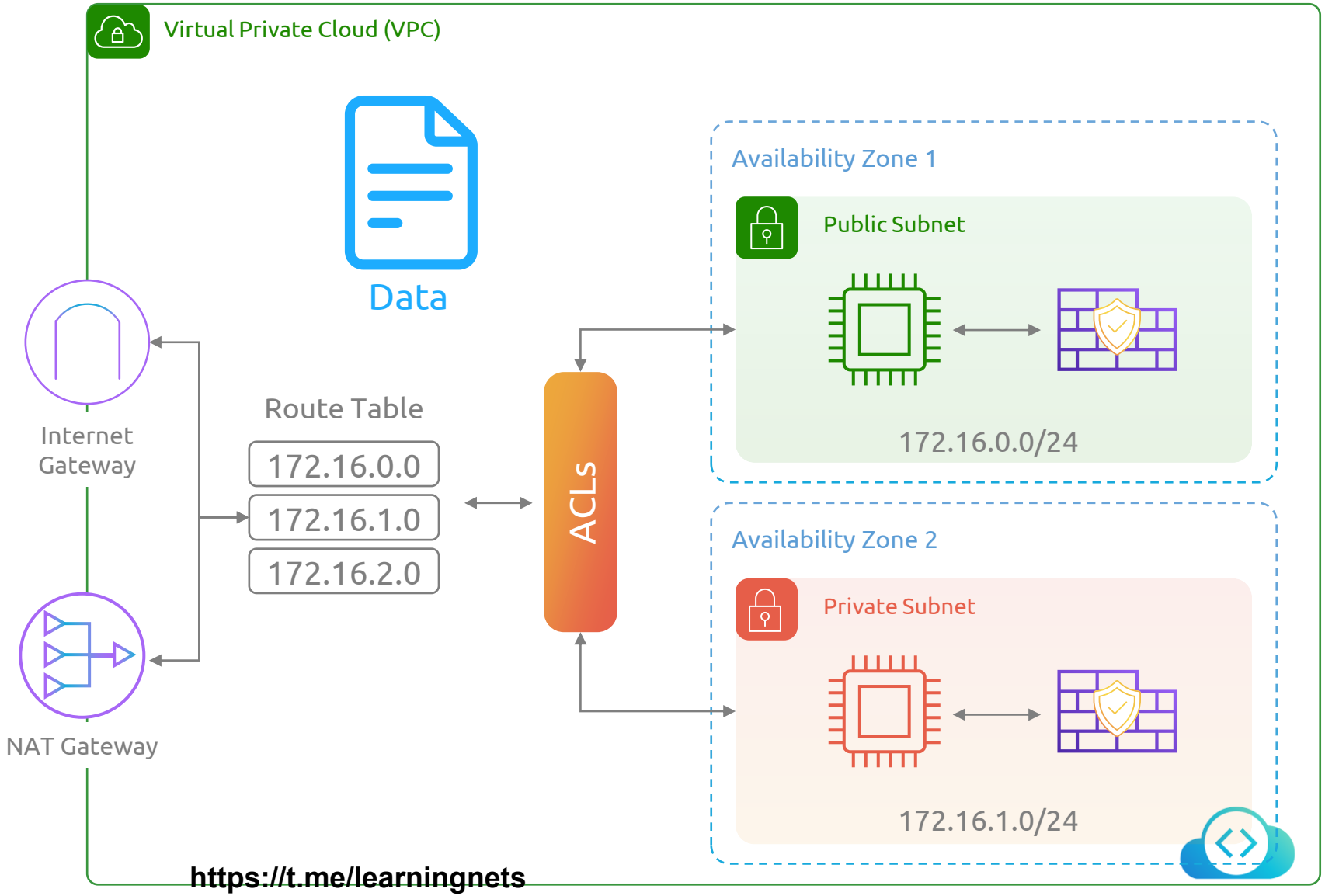
Amazon Virtual Private Cloud
(Amazon VPC)



NAT Gateway

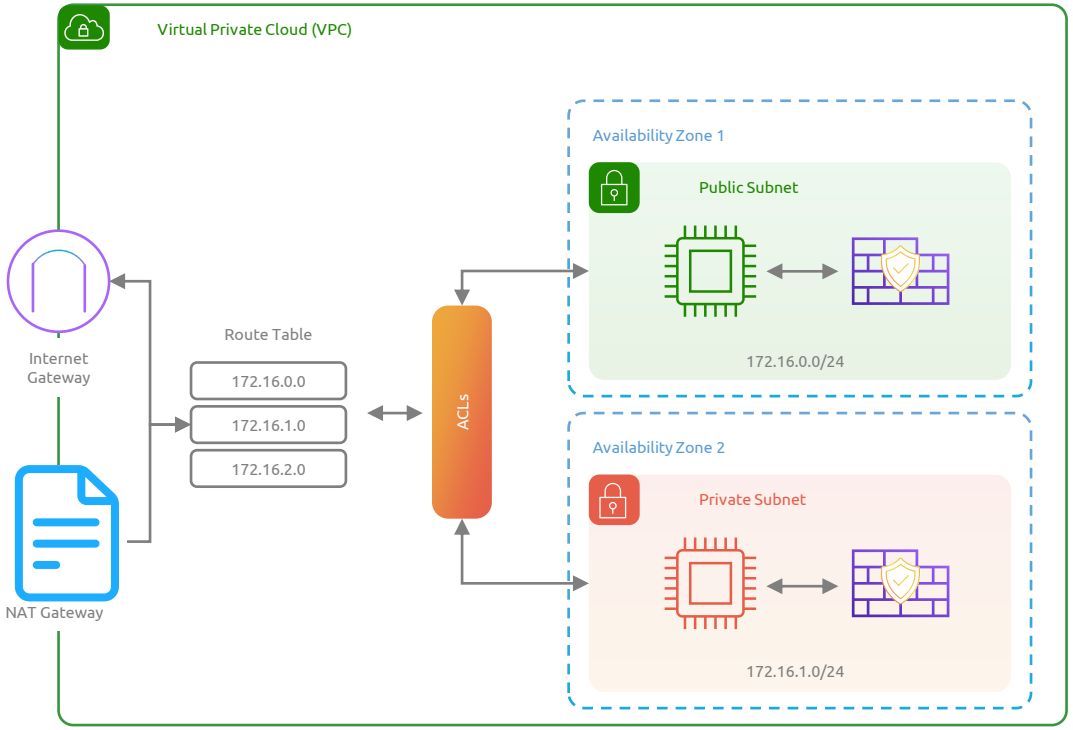
Outbound Data

Billing for VPC – Internet Gateway Charge - An Example



Billing for VPC – Internet Gateway Charge – An Example

First 10 TB/Month	$0.09 per GB
Next 40 TB/Month	$0.085 per GB
Next 100 TB/Month	$0.07 per GB
More than 150 TB/Month	$0.05 per GB



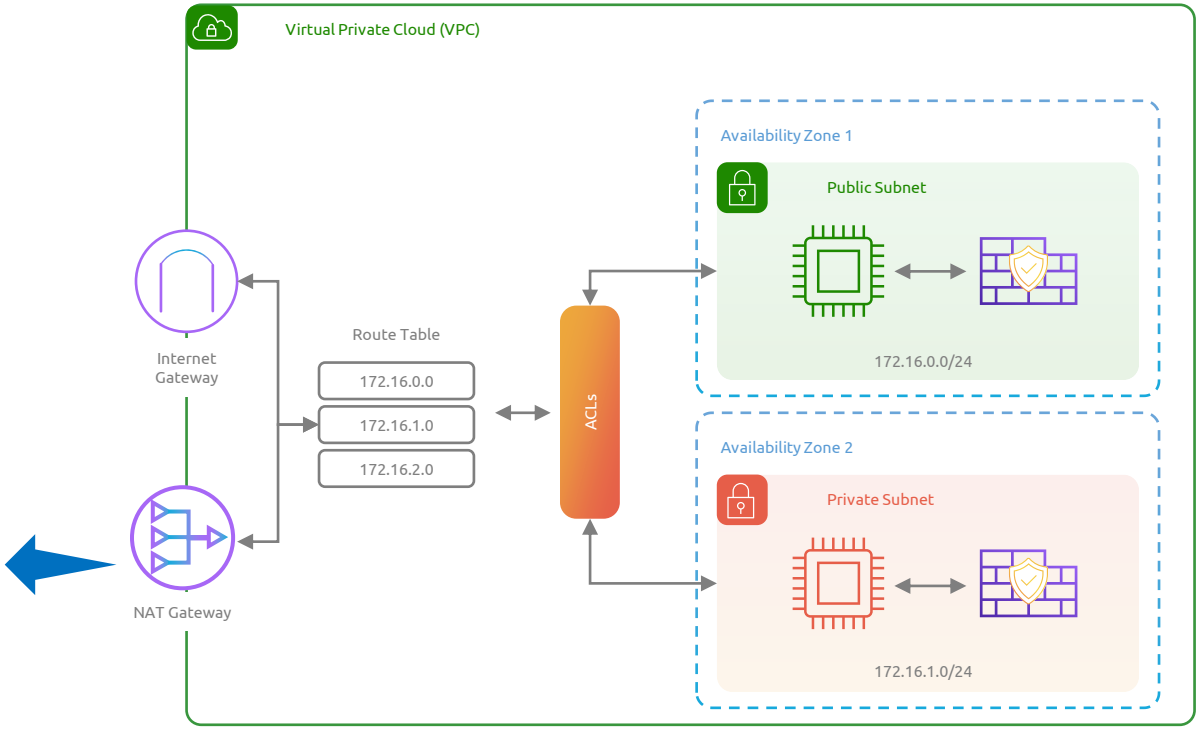
Billing for VPC – Internet Gateway Charge - An Example

NAT Gateway Hourly

$0. 045/hour

Data Processing Charge

$0. 045/GB

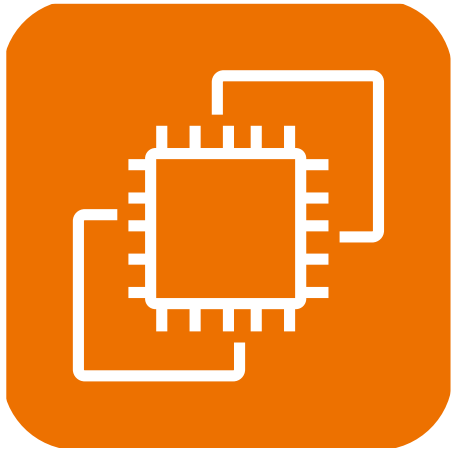


VPC Billing - Summary

- VPC components are mostly free
- Data, particularly outbound data = Not free
- Same region, same AZ, with private IP = Free
- Different region or AZ or public IP = Paid
- Add-on components add extra cost, particularly when data is run through them
- AWS does not test on specific numbers but does only general comparisons

Specific Billing for Lambda

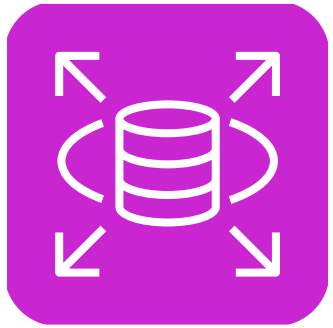
Billing – Lambda (Serverless) Pricing – Overview



Infrastructure Services

Billing – Lambda (Serverless) Pricing – Overview

Infrastructure Services



Platform-as-a-Service

Billing – Lambda (Serverless) Pricing – Overview

Infrastructure Services

Software-as-a-Service (SaaS)

Platform-as-a-Service (PaaS)

Billing – Lambda (Serverless) Pricing – Overview

Infrastructure Services

Software-as-a-Service (SaaS)

Platform-as-a-Service (PaaS)

Billing – Lambda (Serverless) Pricing – Sizing

Size

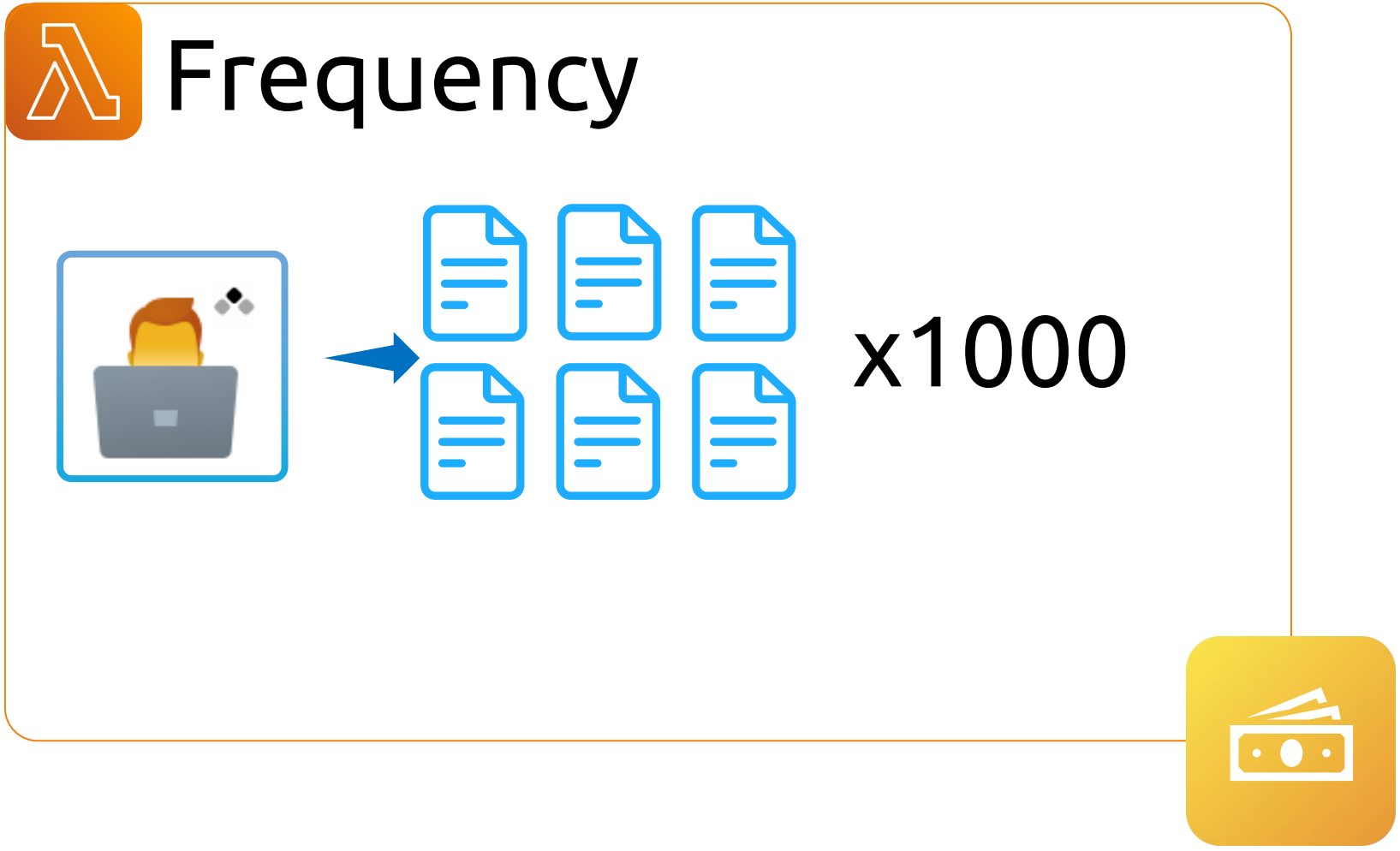
Billing – Lambda (Serverless) Pricing – Sizing

Size

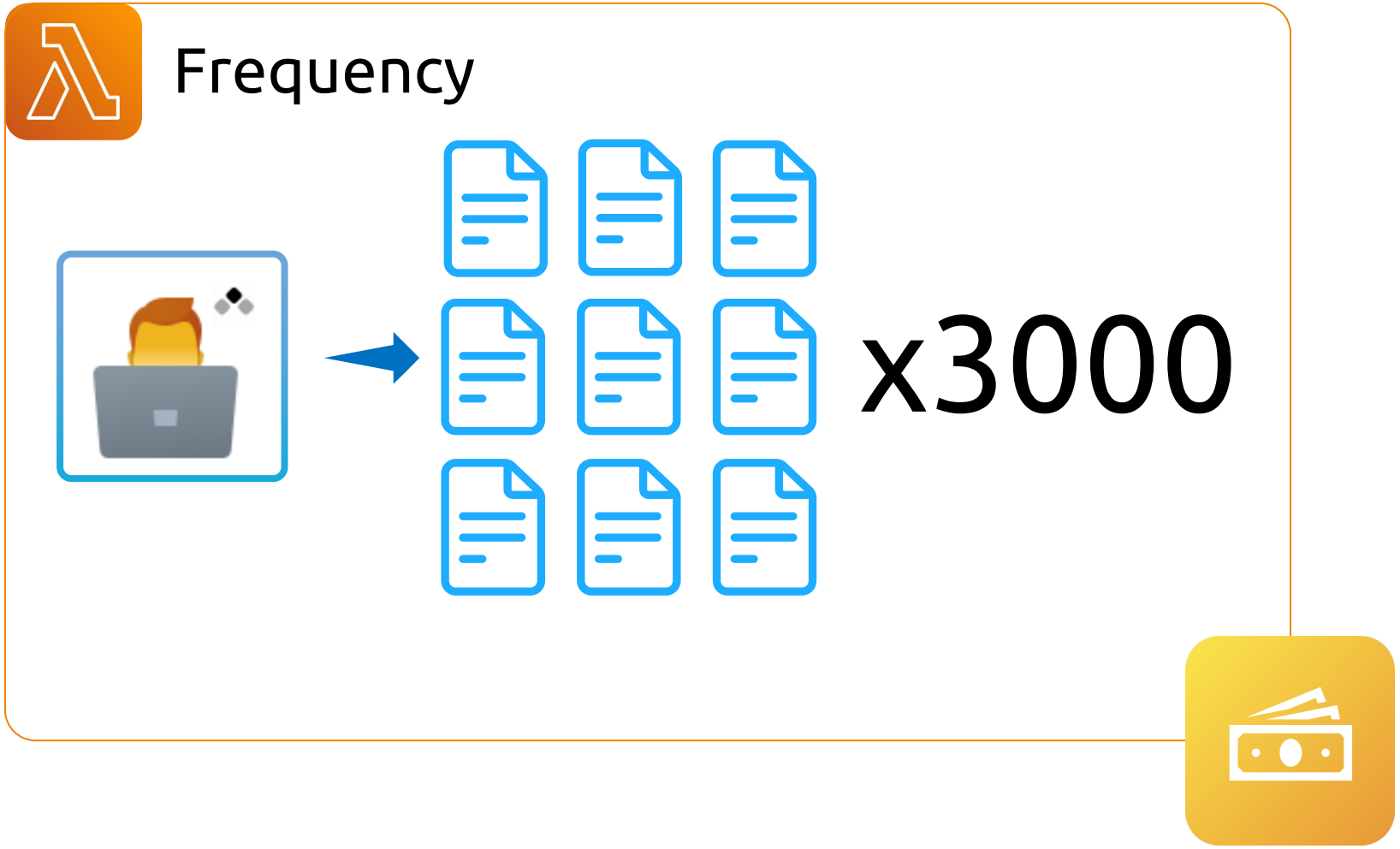
Billing – Lambda (Serverless) Pricing – Sizing

Duration

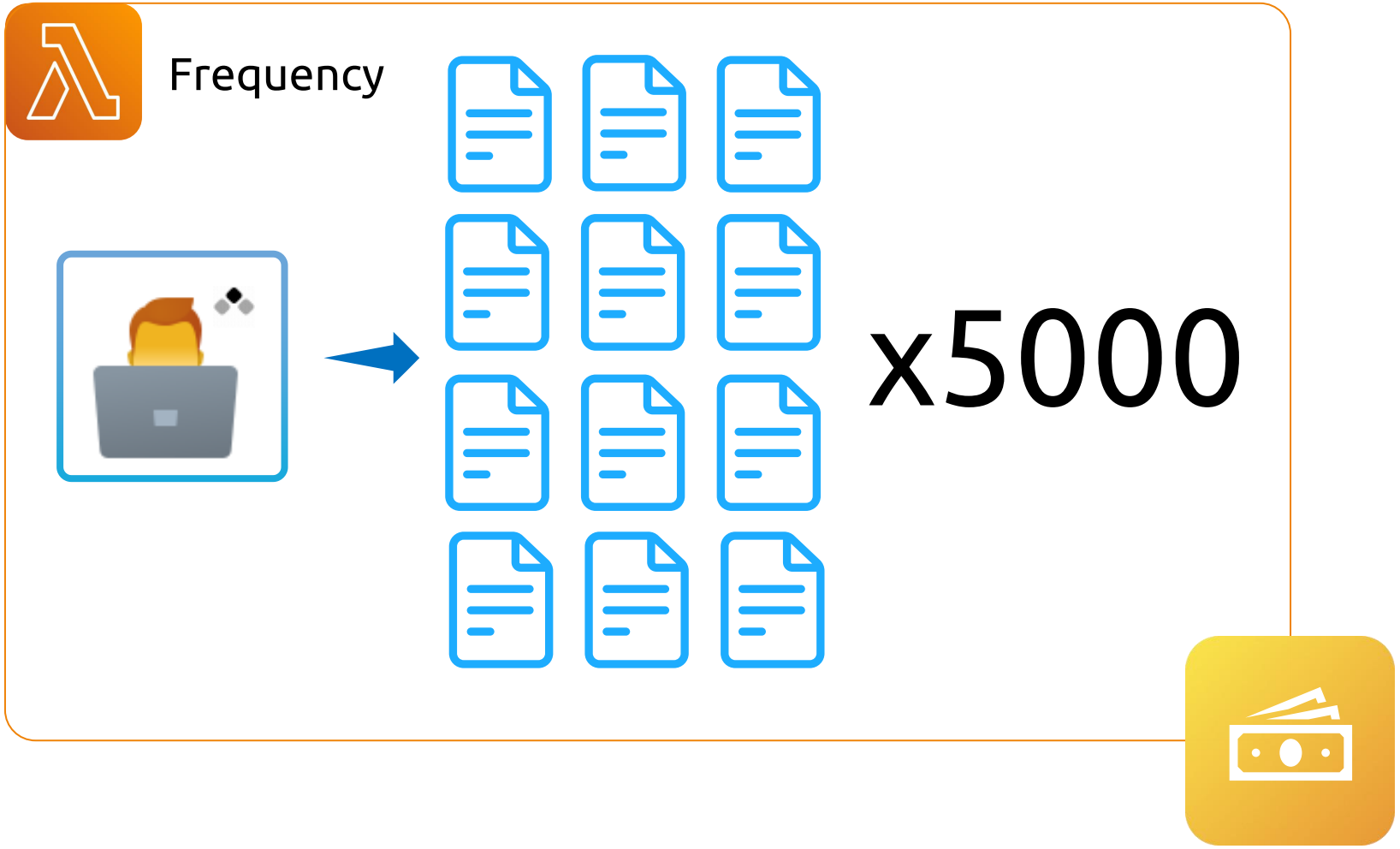
Billing – Lambda (Serverless) Pricing – Frequency



Billing – Lambda (Serverless) Pricing – Frequency



Billing – Lambda (Serverless) Pricing – Frequency



Billing – Lambda (Serverless) Pricing – Example

Request Pricing

- Free Tier: 1 million requests per month
- $0.20 per 1 million requests thereafter, or $0.0000002 per request

Duration Pricing

- 400,000 GB-seconds per month free, up to 3.2 million seconds of compute time
- $0.00001667 for every GB-second used thereafter

Billing – Fundamentals of Pricing

Three general drivers of billing

Compute

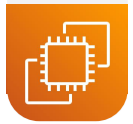
Used/Requested

Storage

Used/Requested

Network

Used/Requested (out only)



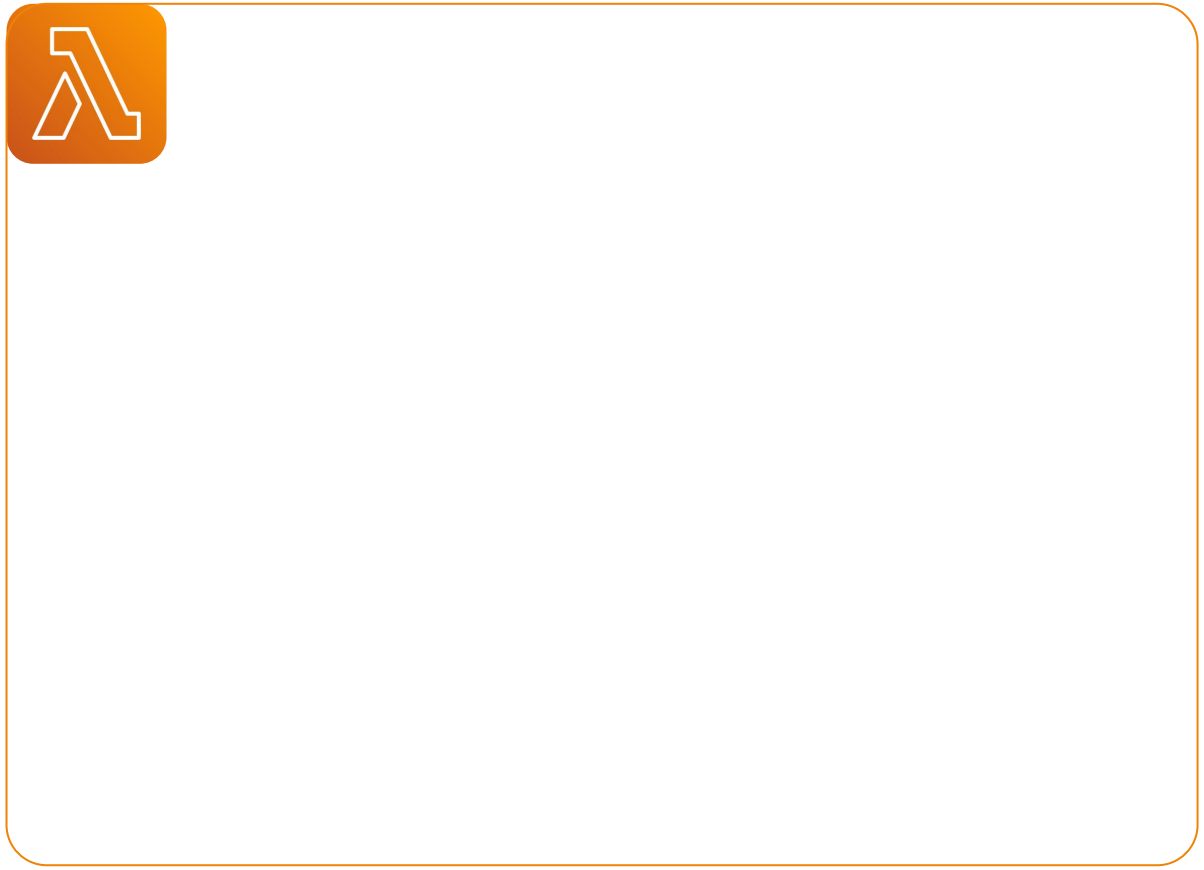
Request Pricing

- **Free Tier:** 1 million requests per month
- **$0.20** per **1 million** requests thereafter, or **$0.0000002** per request

Duration Pricing

- **400,000** GB-seconds per month free, up to **3.2 million** seconds of compute time
- **$0.00001667** for every GB-second used thereafter

Billing – Lambda (Serverless) Pricing – Calculations



Billing – Lambda (Serverless) Pricing – Calculations

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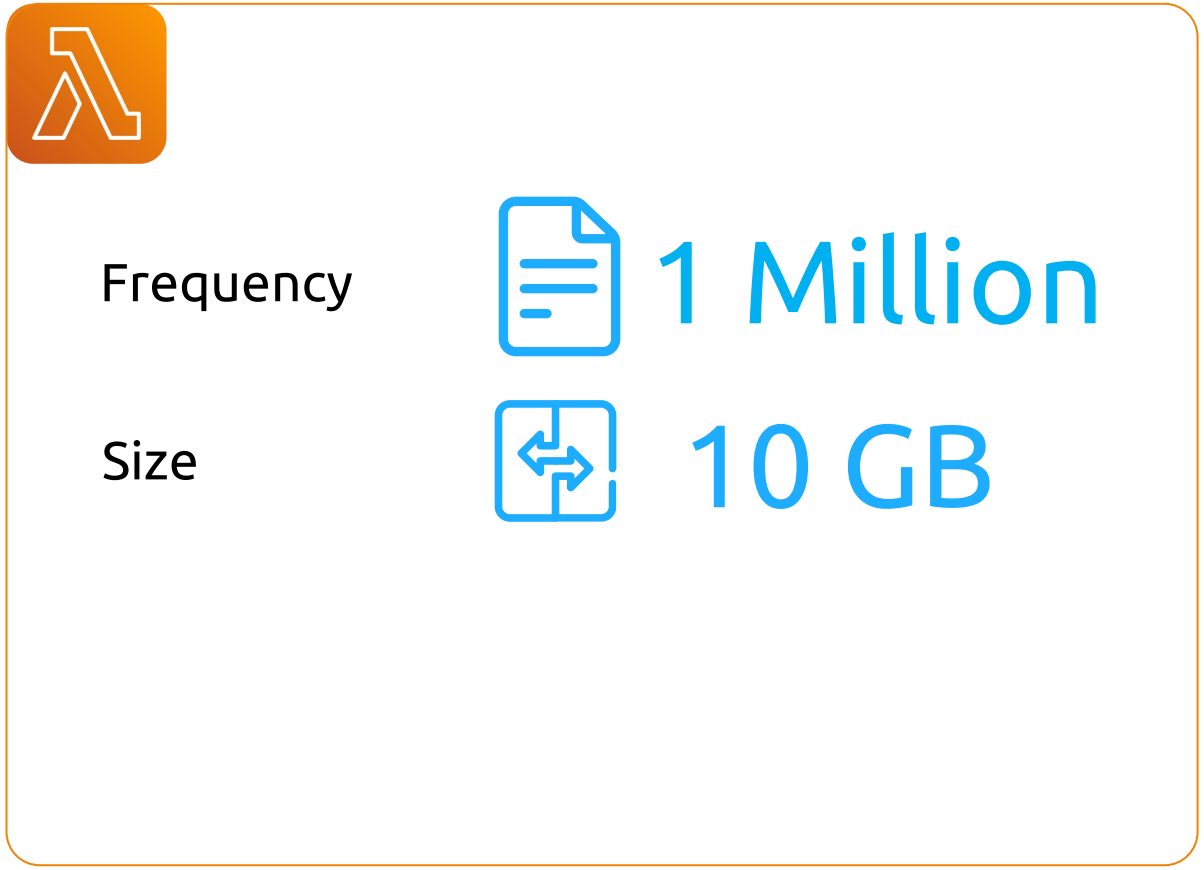


100 Sec

Billing – Lambda (Serverless) Pricing – Calculations

Frequency	1 Million
Size	10 GB
Duration	100 Sec

$16,660.03

Us-east-2 (Ohio)

Billing – Lambda (Serverless) Pricing – Features

Other Features

Billing – Lambda (Serverless) Pricing – Features

Other Features

Billing – Lambda (Serverless) Pricing – Features

Other Features

Ephemeral Function Storage (default 512 MB)

Provision Concurrency

Lambda@edge

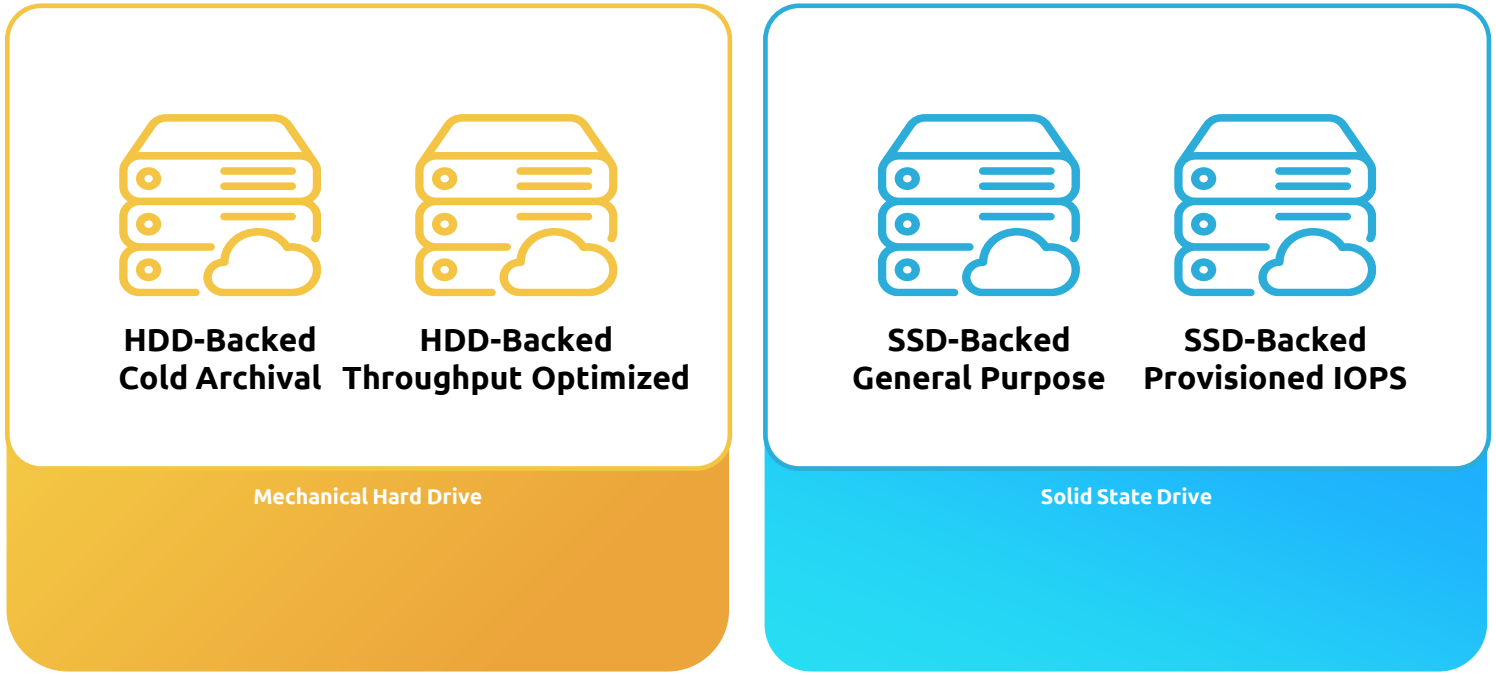
Response Streaming

Lambda Billing - Summary

- Lambda pricing is based on size, duration, and frequency
- The more often you run it, the more you pay (frequency)
- The larger the memory and the longer it runs, the more you pay
- Lambda functions have a maximum memory limit up to 10 GB and/or execution time up to 15 minutes
- Additional features can be added but not required for Cloud Practitioner level
- AWS does not test on specific numbers and does only general comparisons. Did we say this already?

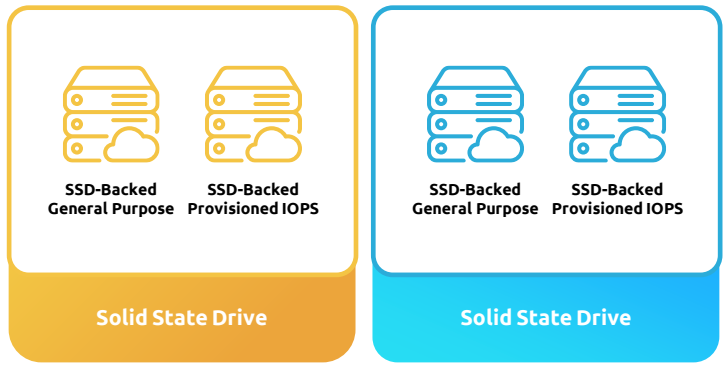
General Billing for Other Services

Billing – A Sample for Other Services



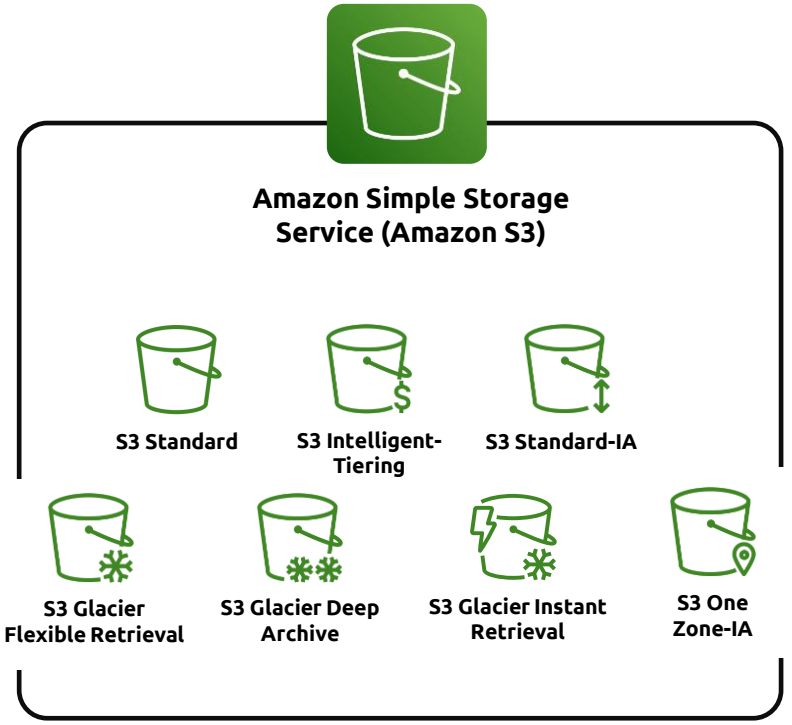
Billing – A Sample for Other Services

Billing – Elastic Block Store – Overview



- Volumes – Size and type over time
- Snapshots – Size over time
- EBS Fast Snapshot Restore
- EBS Direct APIs for Snapshots

Billing – Simple Storage Service (S3) – Overview



Billing – Simple Storage Service (S3) – Overview

- Which class of S3 storage (type and time)?
- What number and size of objects are you storing?
- How many and what kind of requests are you making against S3?
- Are you pulling data out of S3 (outbound)?
- Did you enable any other management or backup features?

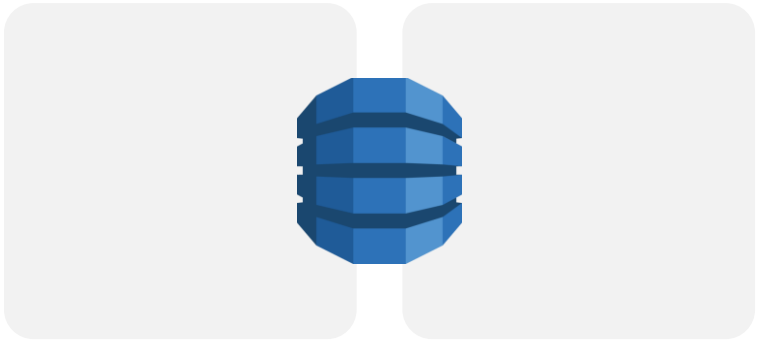
Billing – DynamoDB – Overview

Billing – DynamoDB – Overview

$ Reading/Writing/Storing data

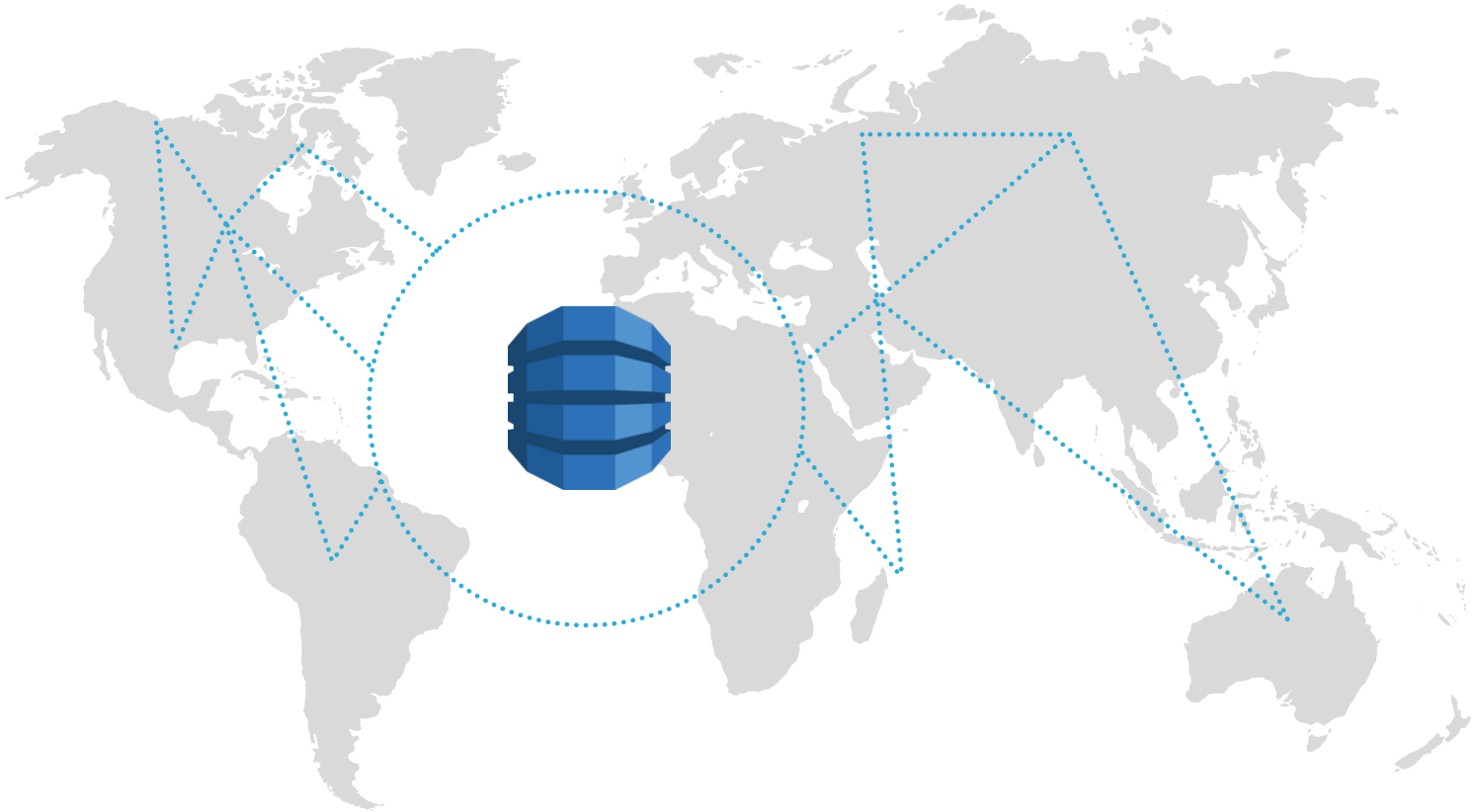
Works off Read/Write request

Billing – DynamoDB – Overview

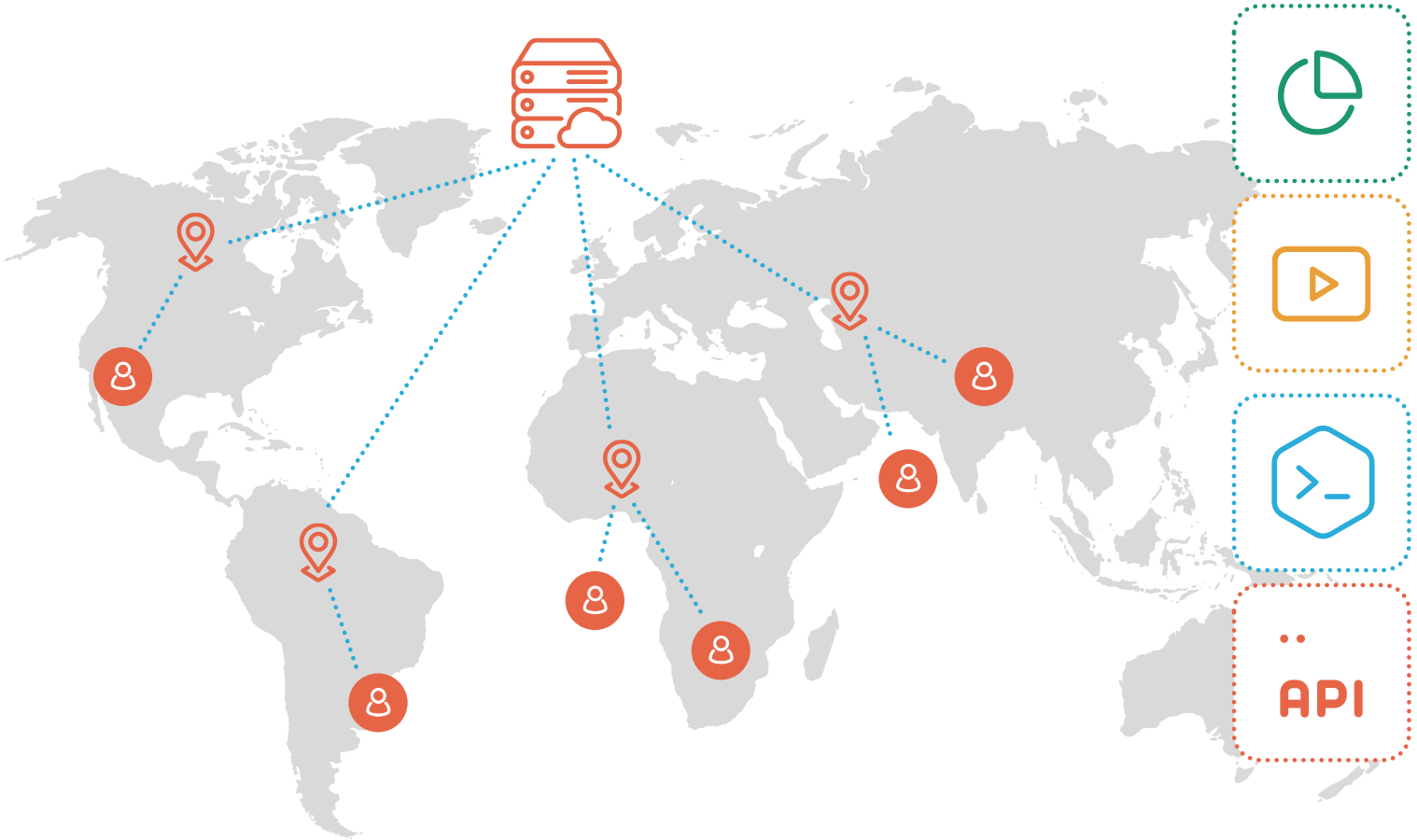


RRU WRU

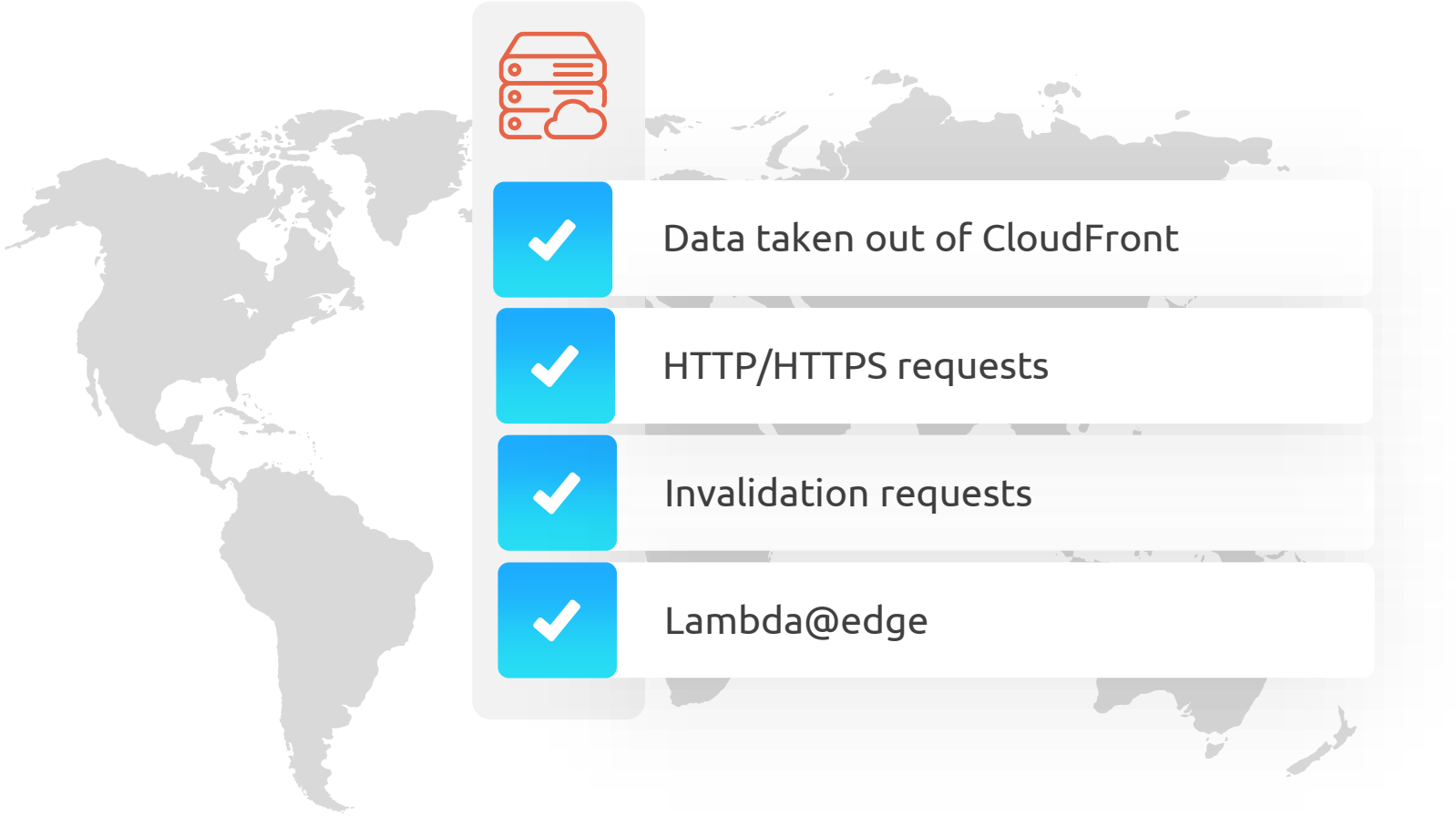
Billing – CloudFront – Overview



Billing – CloudFront – Overview

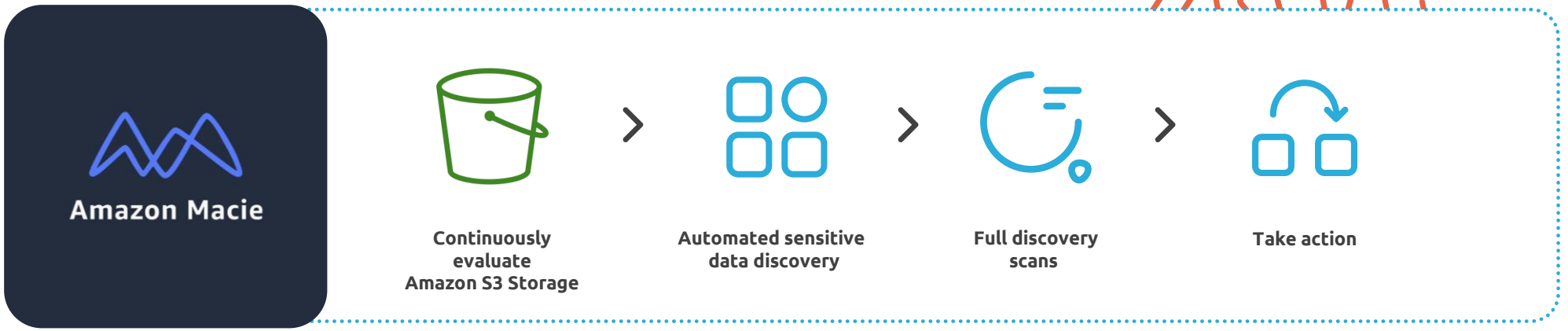


Billing – CloudFront – Overview



- Data taken out of CloudFront
- HTTP/HTTPS requests
- Invalidation requests
- Lambda@edge

Billing – Macie – Overview



Billing – Macie – Overview

$

Amount of data you ask it to scan

Other Services and their Billing - Summary

- Not required to know the specifics of billing for every service
- EBS charges based on the type, size, and storage duration of the virtual hard drive
- S3 charges based on number of objects, number of requests, storage class, and outbound pull
- DynamoDB charges based on table type, number of data, and read/write capacity units
- CloudFront charges based on data pulled/actions against “cached” objects
- Macie charges based on data scanned (number of objects)

Impact of Account Structures on Billing

Billing – Account Structures – A Few Scenarios

One account
all by itself

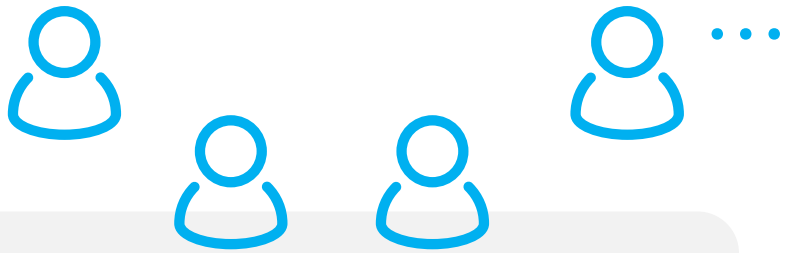
Billing – Account Structures – A Few Scenarios

Two/More accounts with
Consolidated Billing turned on

Billing – Account Structures – A Few Scenarios

Two/More accounts inside an AWS Organization

Billing – Account Structures – A Few Scenarios



Two/More accounts inside AWS Control Tower

Billing – Account Structures – One Account

One account
all by itself

Billing – Account Structures – One Account

Reservations Plan

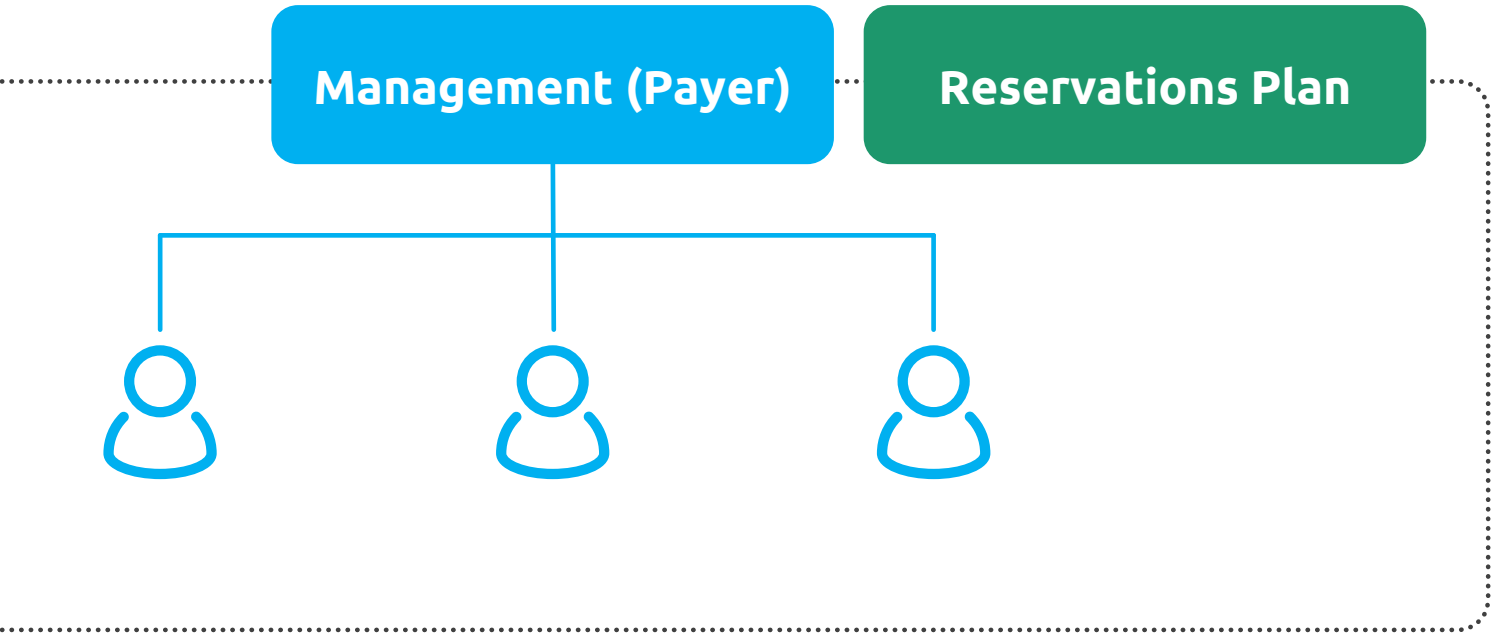
Savings Plan

Billing – Account Structures – One Account

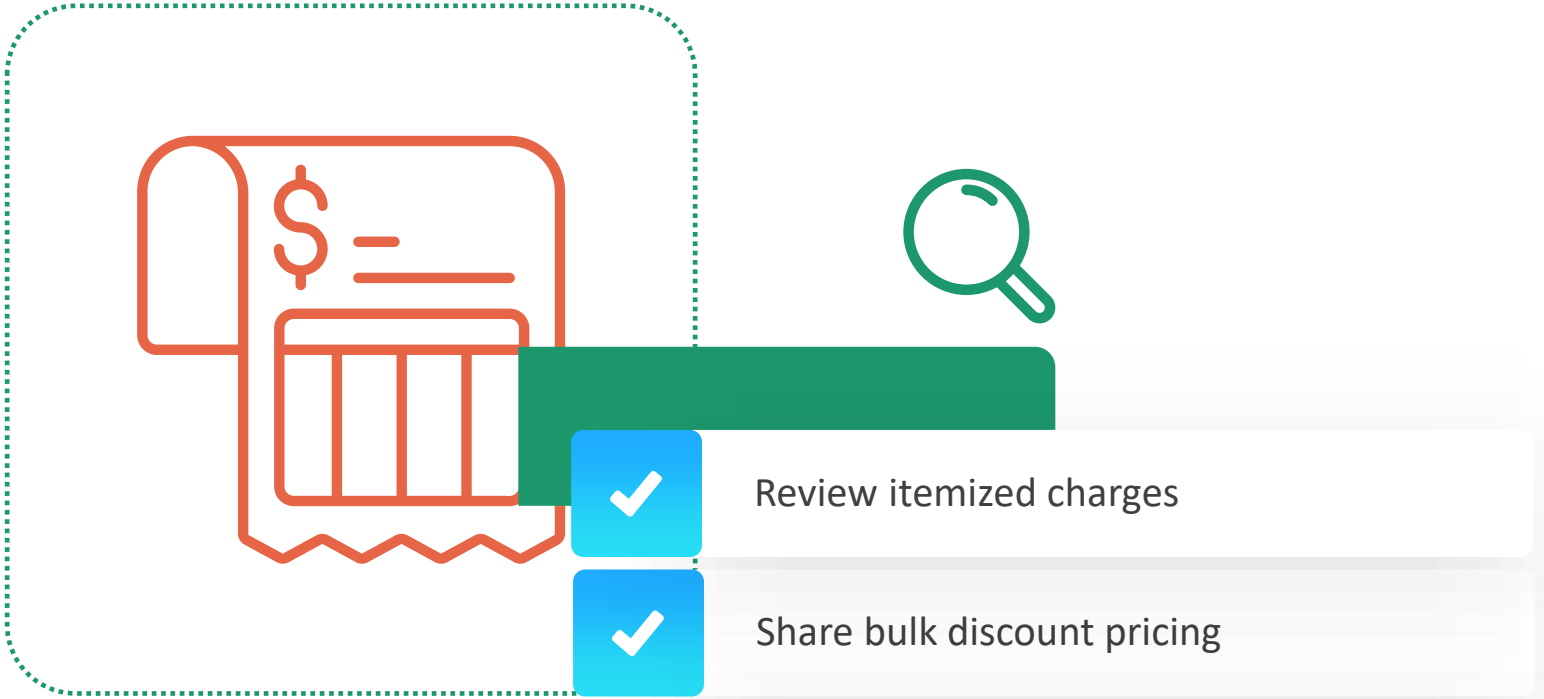
Billing – Account Structures – Consolidated Billing

Two/More accounts with Consolidated Billing on

Billing – Account Structures – Consolidated Billing



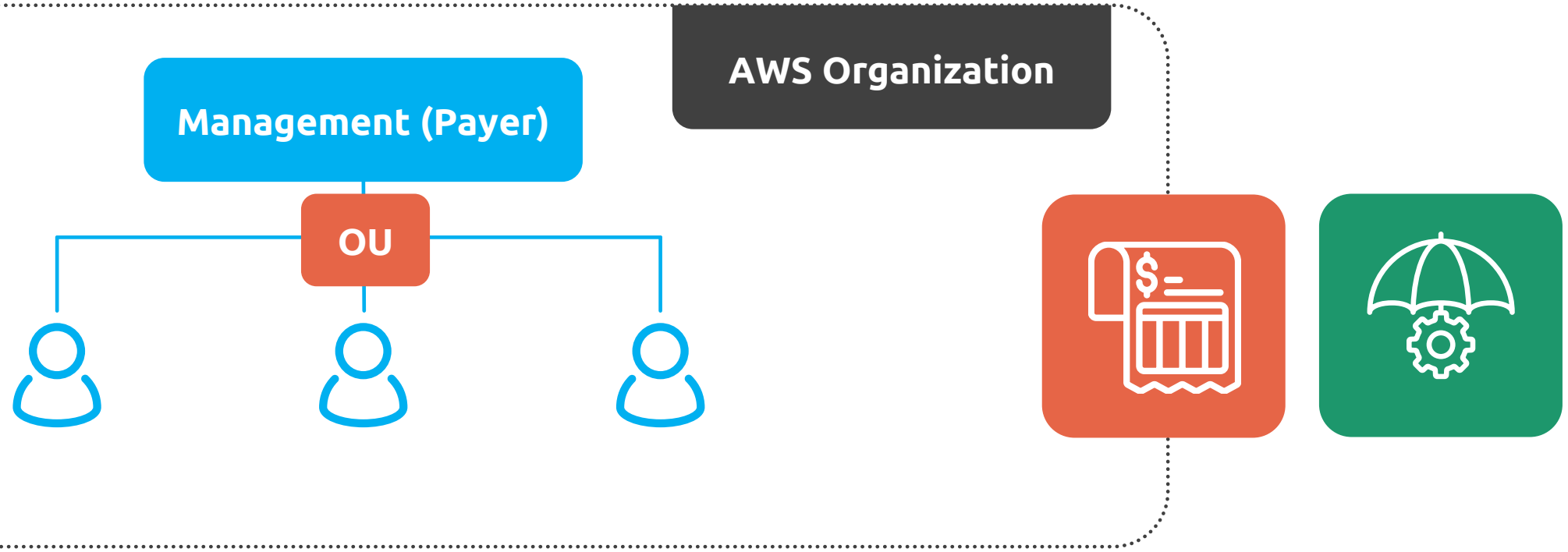
Billing – Account Structures – Consolidated Billing



Billing – Account Structures – Two or more accounts in an Org

Two/More accounts inside an AWS Organization

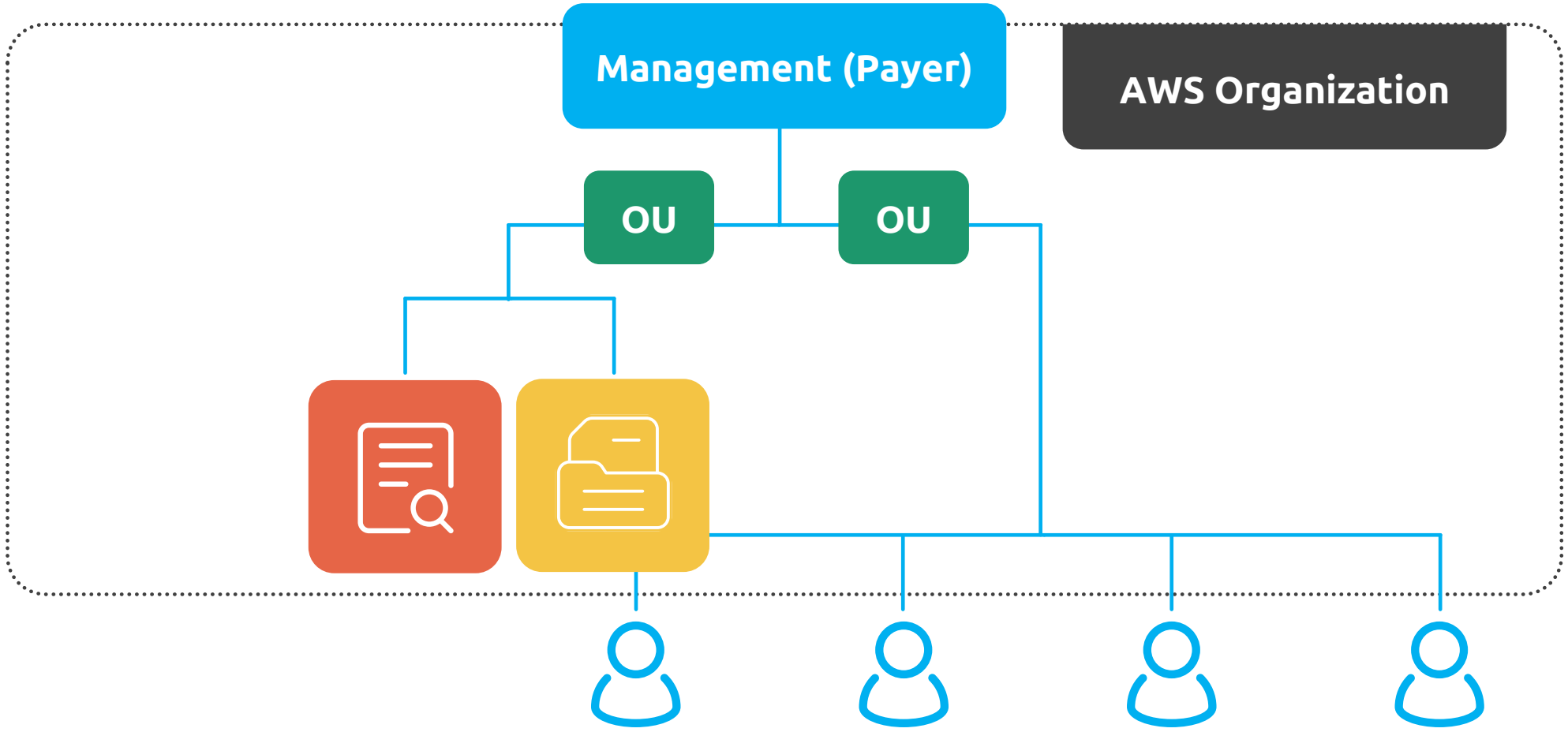
Billing – Account Structures – AWS Organizations



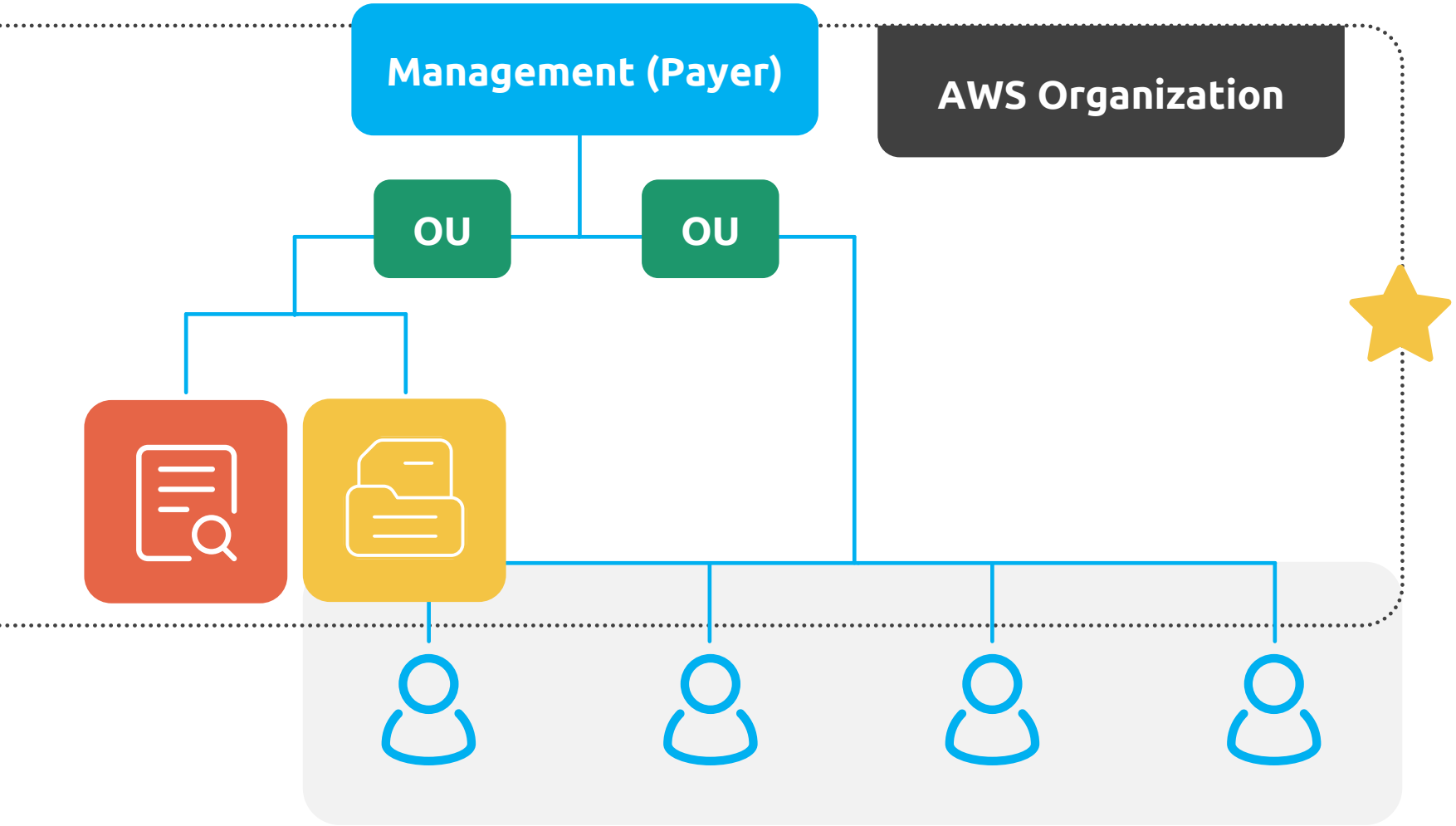
Billing – Account Structures – AWS Control Tower

Two/More accounts inside AWS Control Tower

Billing – Account Structures – AWS Control Tower



Billing – Account Structures – AWS Control Tower



Billing – Account Structures – AWS Control Tower

Account Structures on Billing - Summary

- Solo AWS accounts have their own bills, details, and savings
- Two/More accounts can designate a payer account with Consolidated Billing
- Biller account ready if it is part of an AWS Organization
- Control Tower is a practiced way to deploy a multi-account “Meta” account
- All three Consolidated Billing options allow for billing by account

Tools for Billing

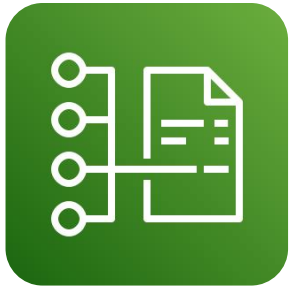
Tools for Billing – Agenda

1. 

AWS Billing Dashboard

2. 

Cost Explorer

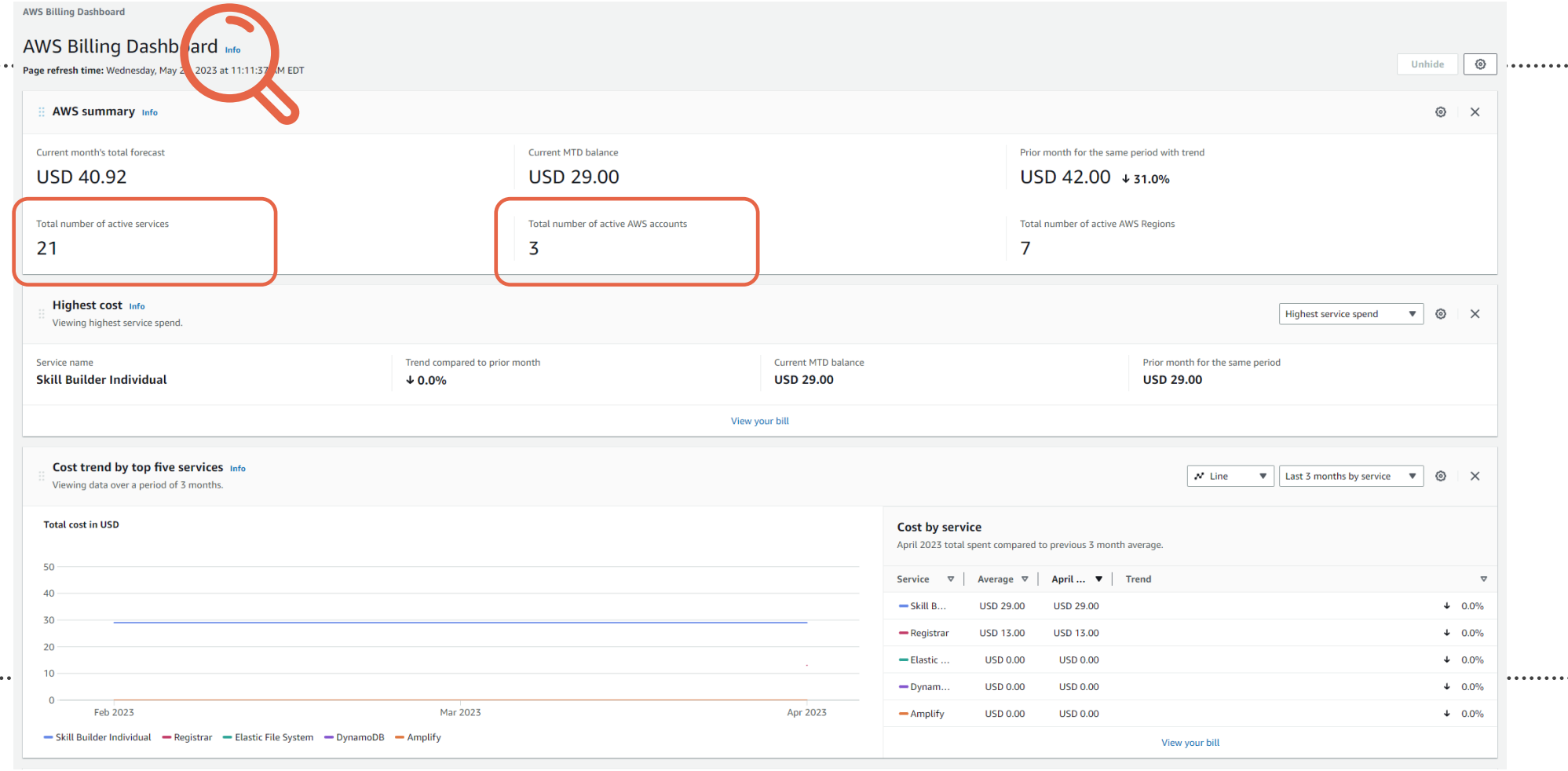
3. 

Cost and Usage Report

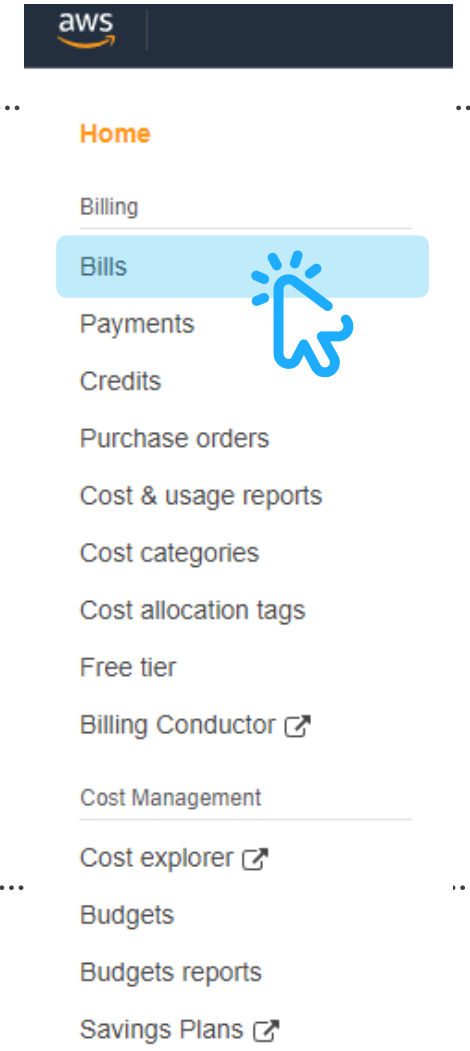
4. 

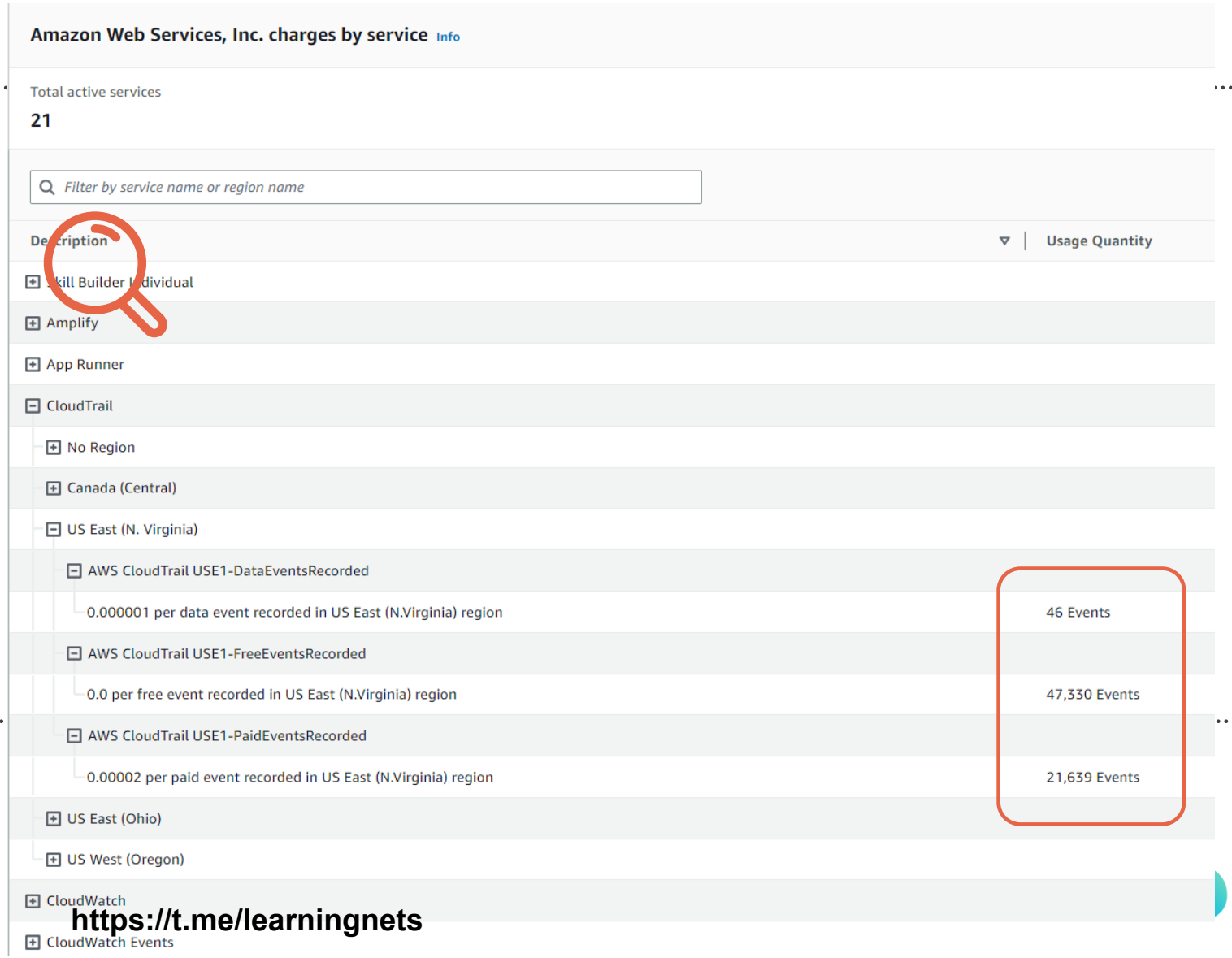
AWS Budgets

Tools for Billing – The AWS Billing Dashboard

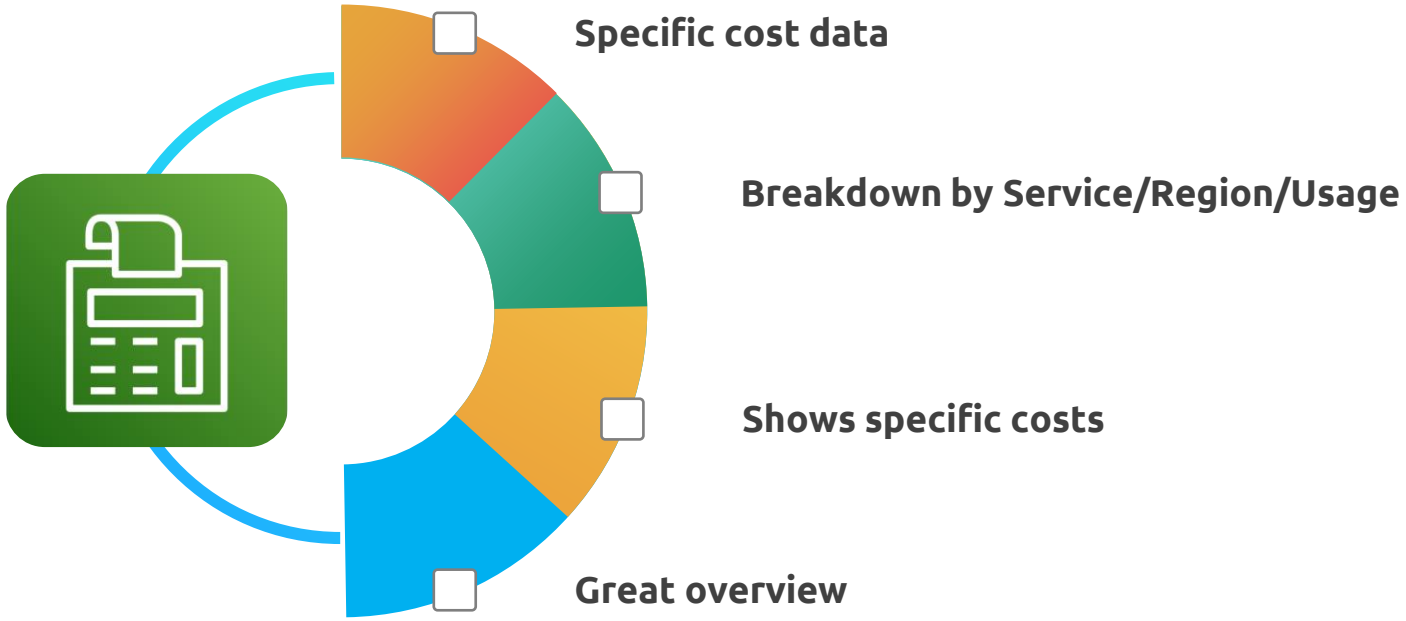


Tools for Billing – The AWS Billing Dashboard

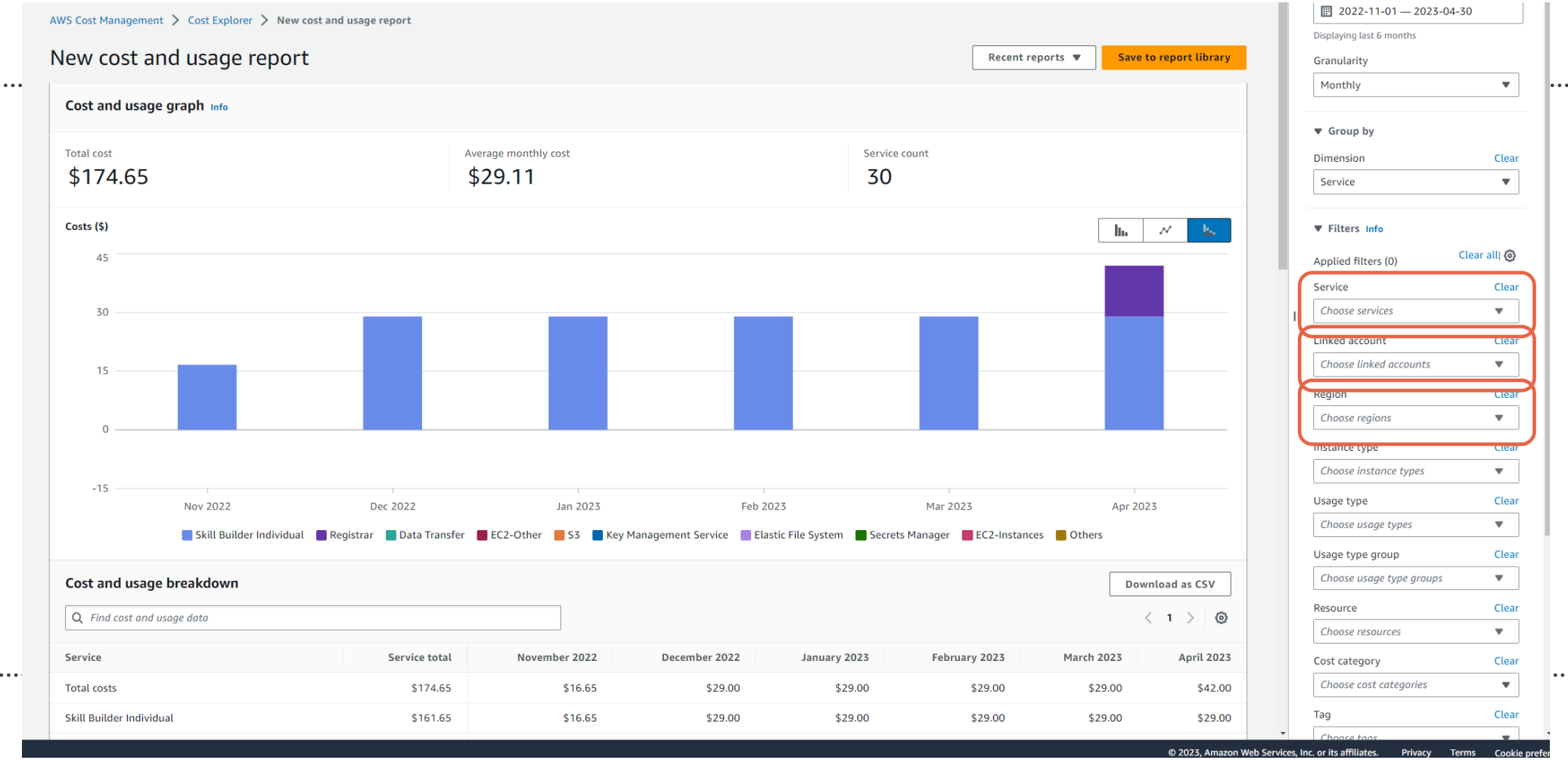




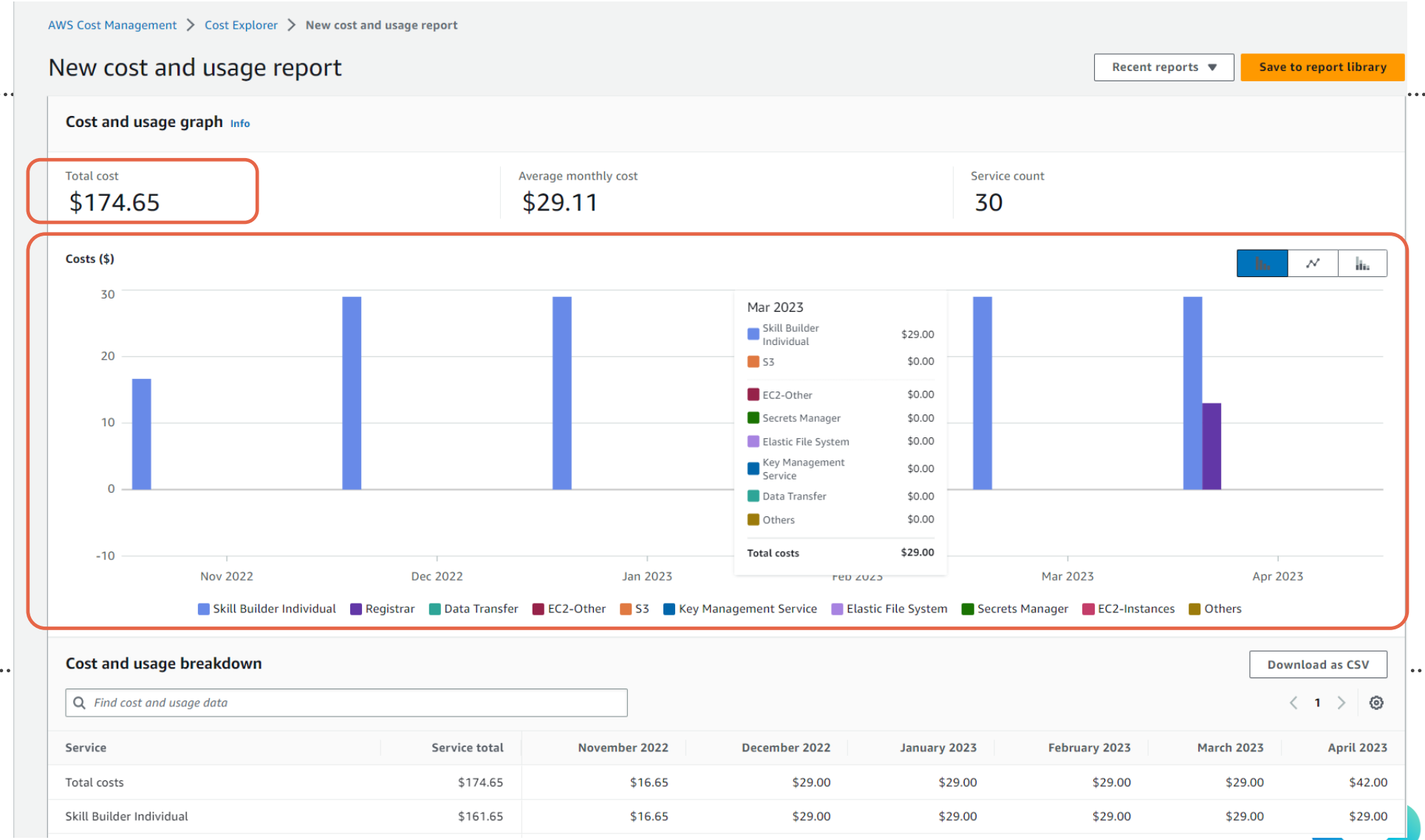
Tools for Billing – Why the Bill?



Tools for Billing – Cost Explorer – A Visual



Tools for Billing – Cost Explorer – A Visual



Tools for Billing – Cost Explorer – A Visual

Cost and usage breakdown

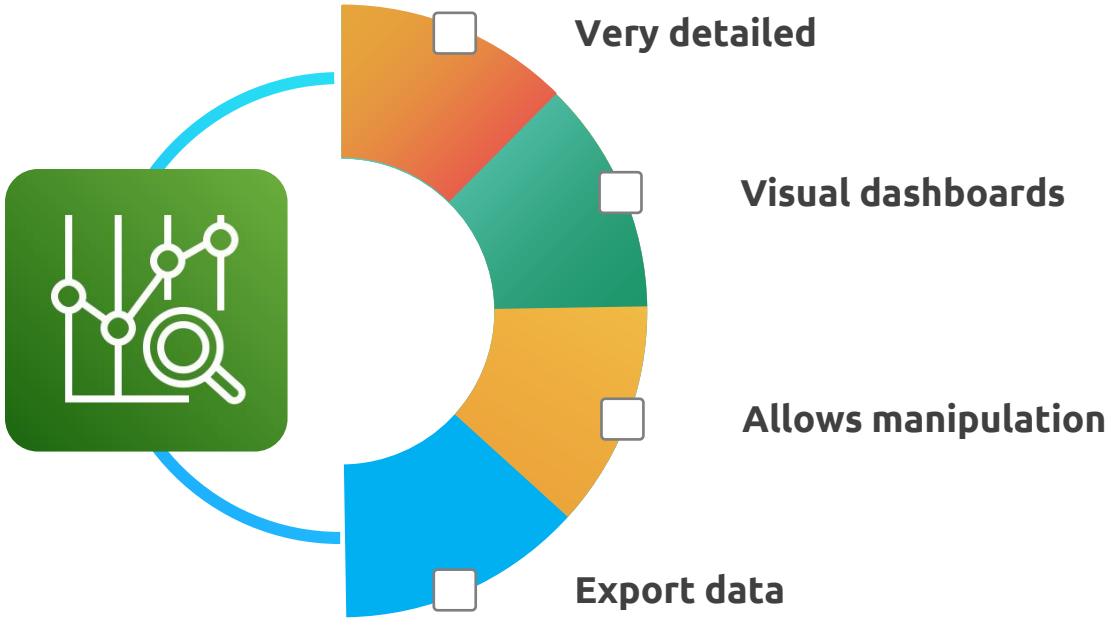
Download as CSV

Find cost and usage data

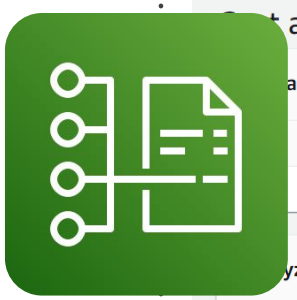
1

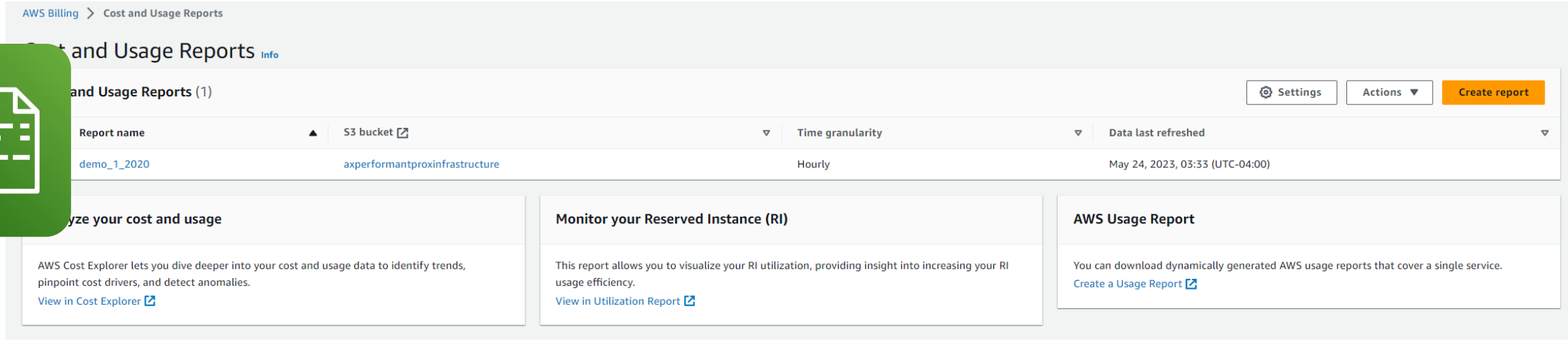
Service	Service total	November 2022	December 2022	January 2023	February 2023	March 2023	April 2023
Total costs	$174.65	$16.65	$29.00	$29.00	$29.00	$29.00	$42.00
Skill Builder Individual	$161.65	$16.65	$29.00	$29.00	$29.00	$29.00	$29.00
Registrar	$13.00	-	-	-	-	-	$13.00
EC2-Other	$0.00	-$0.00	$0.00	-$0.00	$0.00	-$0.00	$0.00
S3	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
EC2-Instances	$0.00	$0.00	$0.00	$0.00	$0.00	-	-$0.00
CloudWatch	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
EC2-ELB	$0.00	-$0.00	$0.00	-$0.00	$0.00	-	-
Elastic Container Service	$0.00	-	-	-	$0.00	-	-
EC2 Container Registry (ECR)	$0.00	-	-	-	$0.00	-	-$0.00
CloudTrail	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	-$0.00
Config	$0.00	-$0.00	$0.00	$0.00	$0.00	$0.00	-$0.00
Glue	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Lambda	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00

Tools for Billing – Cost Explorer

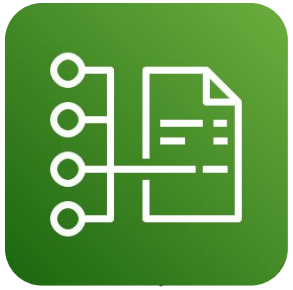


Tools for Billing – CUR – A Visual





Tools for Billing – CUR – A Visual



PayerAccountId	LinkedAccountId	RecordType	RecordID	BillingPeriodStart	BillingPeriodEndDate	InvoiceDate	ProductCode
67670530788		PayerLineItem	-36	5/1/2023 0:00	5/31/2023 23:59	5/24/2023 8:03	AWSCloudTrail
67670530788		PayerLineItem	-34	5/1/2023 0:00	5/31/2023 23:59	5/24/2023 8:03	AWSCloudTrail
67670530788		PayerLineItem	-33	5/1/2023 0:00	5/31/2023 23:59	5/24/2023 8:03	awskms
67670530788		PayerLineItem	-31	5/1/2023 0:00	5/31/2023 23:59	5/24/2023 8:03	AmazonS3
67670530788		PayerLineItem	-28	5/1/2023 0:00	5/31/2023 23:59	5/24/2023 8:03	AmazonSNS
67670530788		PayerLineItem	-27	5/1/2023 0:00	5/31/2023 23:59	5/24/2023 8:03	AWSConfig
67670530788		PayerLineItem	-26	5/1/2023 0:00	5/31/2023 23:59	5/24/2023 8:03	AWSDataTransfer
67670530788		PayerLineItem	-24	5/1/2023 0:00	5/31/2023 23:59	5/24/2023 8:03	awskms
67670530788		PayerLineItem	-23	5/1/2023 0:00	5/31/2023 23:59	5/24/2023 8:03	AWSConfig
67670530788		PayerLineItem	-22	5/1/2023 0:00	5/31/2023 23:59	5/24/2023 8:03	AmazonS3
67670530788		PayerLineItem	-21	5/1/2023 0:00	5/31/2023 23:59	5/24/2023 8:03	AmazonSNS
67670530788		PayerLineItem	-20	5/1/2023 0:00	5/31/2023 23:59	5/24/2023 8:03	AWSQueueServic
67670530788		PayerLineItem	-19	5/1/2023 0:00	5/31/2023 23:59	5/24/2023 8:03	awskms
67670530788		PayerLineItem	-18	5/1/2023 0:00	5/31/2023 23:59	5/24/2023 8:03	AmazonS3
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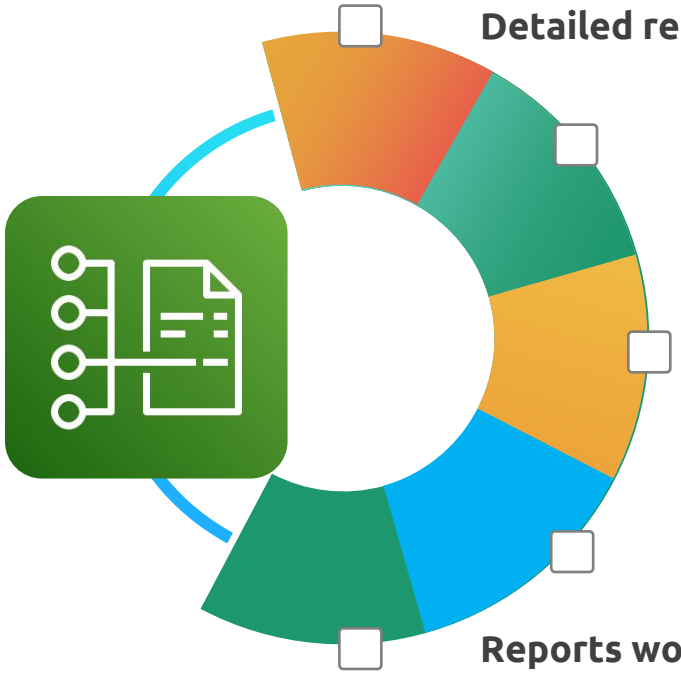
67670530788		PayerLineItem	-14	5/1/2023 0:00	5/31/2023 23:59	5/24/2023 8:03	AmazonSNS
67670530788		PayerLineItem	-13	5/1/2023 0:00	5/31/2023 23:59	5/24/2023 8:03	AWSConfig
67670530788		PayerLineItem	-11	5/1/2023 0:00	5/31/2023 23:59	5/24/2023 8:03	AmazonCloudWa

ProductName	SellerOfRecord	UsageType	Operation	RateId	ItemDescription	UsageStartDate	UsageEndDate	UsageQuantity
AWS CloudTrail	Amazon Web Services,	USE1-FreeEventsRecorded		14321586440	0.0 per free event recorded in U	5/1/2023 0:00	##########	47330
AWS CloudTrail	Amazon Web Services,	USE2-FreeEventsRecorded		14321586637	0.0 per free event recorded in U	5/1/2023 0:00	##########	131696
AWS Key Manage	Amazon Web Services,	us-east-1-KMS-Requests		17793264566	$0.00 per request - Monthly Glc	5/1/2023 0:00	##########	138
Amazon Simple S	Amazon Web Services,	Requests-Tier1		15694243495	$0.005 per 1,000 PUT, COPY, PC	5/1/2023 0:00	##########	33235
Amazon Simple N	Amazon Web Services,	USE2-Requests-Tier1		19306472423	First 1,000,000 Amazon SNS AP	5/1/2023 0:00	##########	34190
AWS Config	Amazon Web Services,	USW2-ConfigurationItemRecorded		15694674624	$0.003 per Configuration Item r	5/1/2023 0:00	##########	8
AWS Data Transfe	Amazon Web Services,	USE1-USW2-AWS-Out-Bytes		19366110777	$0.02 per GB - US East (Norther	5/1/2023 0:00	##########	0.00059199
AWS Key Manage	Amazon Web Services,	us-west-2-KMS-Requests		17793264569	$0.00 per request - Monthly Glc	5/1/2023 0:00	##########	138
AWS Config	Amazon Web Services,	ConfigurationItemRecorded		15694674573	$0.003 per Configuration Item r	5/1/2023 0:00	##########	10
Amazon Simple S	Amazon Web Services,	Requests-Tier2		15694241104	$0.004 per 10,000 GET and all c	5/1/2023 0:00	##########	21793
Amazon Simple N	Amazon Web Services,	USW2-Requests-Tier1		19306455405	First 1,000,000 Amazon SNS AP	5/1/2023 0:00	##########	332
Amazon Simple C	Amazon Web Services,	Requests-RBP		14074883304	First 1,000,000 Amazon SQS Re	5/1/2023 0:00	##########	46
AWS Key Manage	Amazon Web Services,	us-east-2-KMS-Requests		17793264567	$0.00 per request - Monthly Glc	5/1/2023 0:00	##########	1817

Tools for Billing – Cost and Usage Report



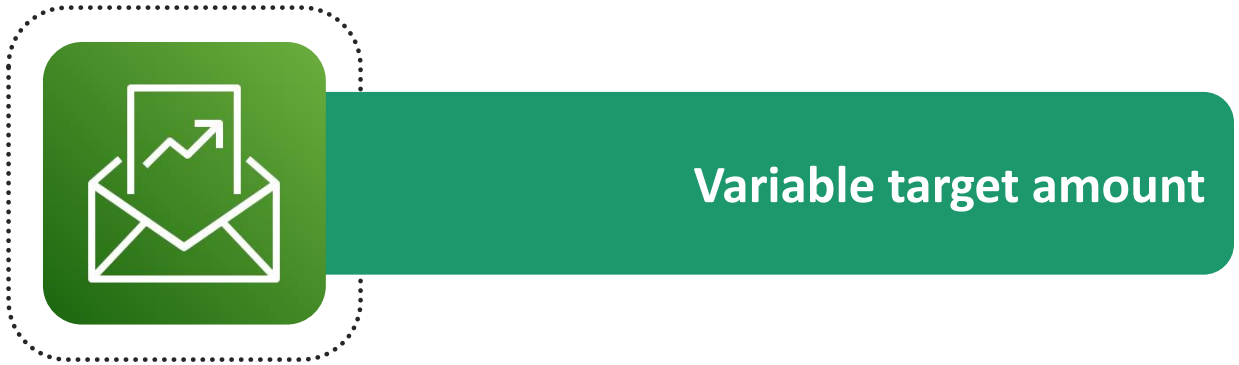
- Detailed report
- Publishes to an S3 bucket
- Breaks down costs by dimensions
- Reports in CSV format
- Reports work with other AWS services

Tools for Billing – AWS Budgets

Tools for Billing – AWS Budgets

Tools for Billing – AWS Budgets

Tools for Billing – AWS Budgets



Tools for Billing – AWS Budgets

Tools for Billing – AWS Budgets

Tools for Billing – AWS Budgets – A Visual

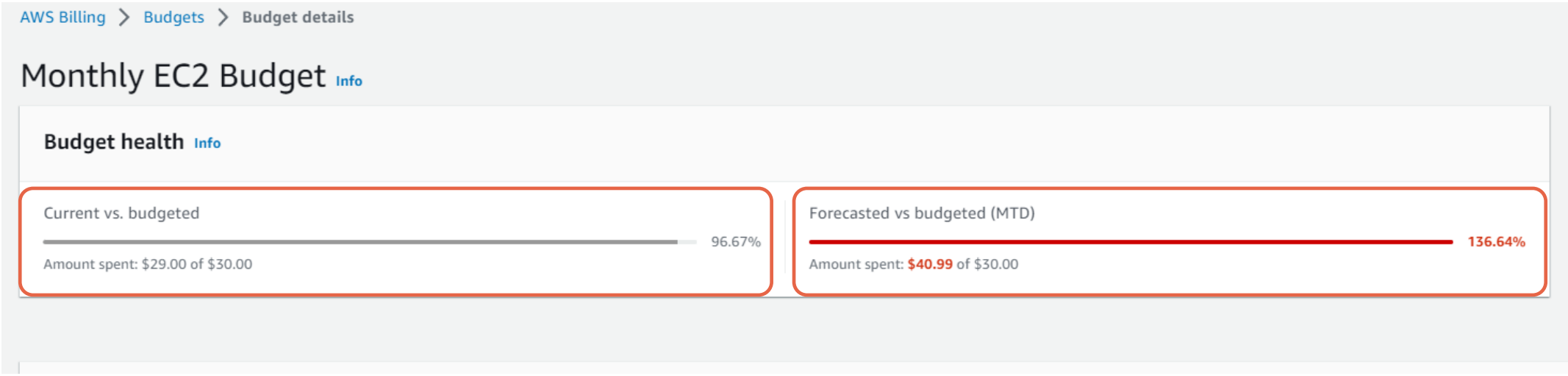
Budgets (8) Info

Download CSV | Actions | Create budget

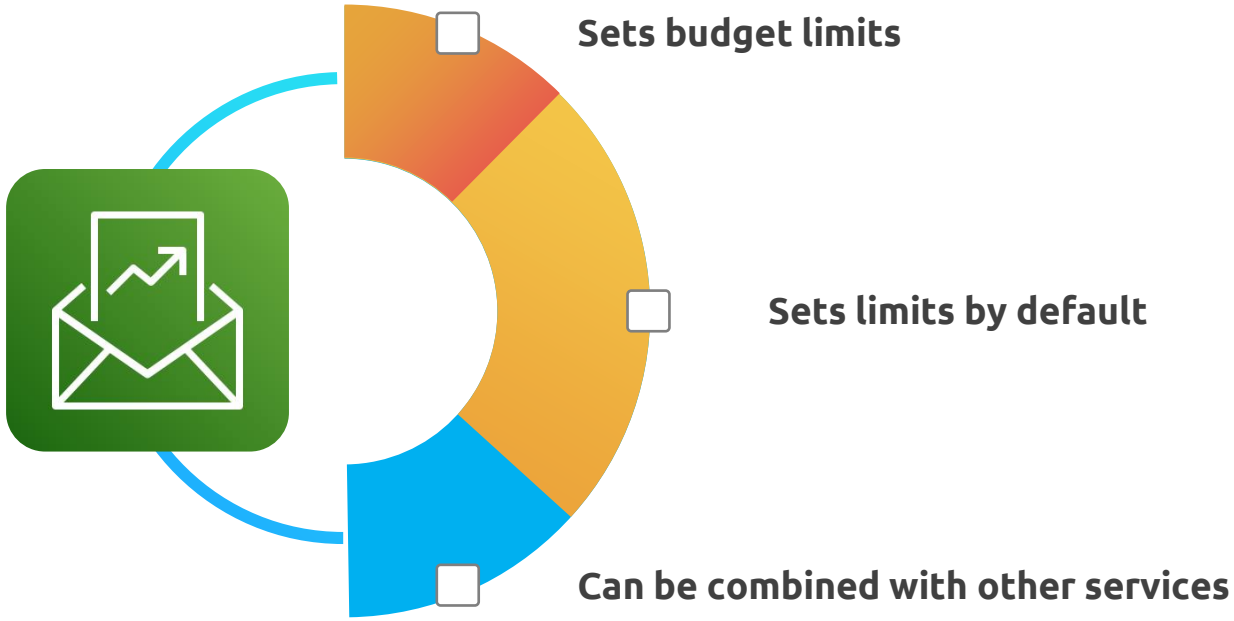
Find a budget | Show all budgets | 1

Name	Thresholds	Budget	Amount used	Forecasted amount	Current vs. budgeted	Forecasted vs. budgeted
Container Anything	OK	$12.00	$0.00	$0.00	0.00%	-
Datastores (both)	OK	$15.00	$0.00	-	0.00%	-
DNS charges	OK	$15.00	$2.00	$2.00	13.34%	13.34%
Monitoring Budget	OK	$12.00	$2.02	$2.73	16.85%	22.73%
Monthly EC2 Budget	Exceeded (1)	$30.00	$29.00	$40.99	96.67%	136.64%
Monthly Network	OK	$10.00	$0.00	-	0.00%	
Monthly S3 Budget	OK	$10.00	$0.00	$0.38	0.00%	3.82%
Overall Budget	OK	$100.00	$65.99	$77.96	65.99%	77.96%

Tools for Billing – AWS Budgets – A Visual



Tools for Billing – Budgets



Billing Tools - Summary

- Billing, Cost Explorer, and CUR are tools for Billing Analysis
- AWS Budgets is focused on soft and hard limits and notifications for billing
- The “bill” or billing dashboard is great for skimming
- Cost Explorer is more about visualization of billing data
- CUR is the most detailed in terms of usage report
- Modify budgets to “restricts” service launch based on thresholds/alarms

AWS - Support Options

AWS Support – What Are the Options Available?

< SUPPORT

AWS Support – Basic Support

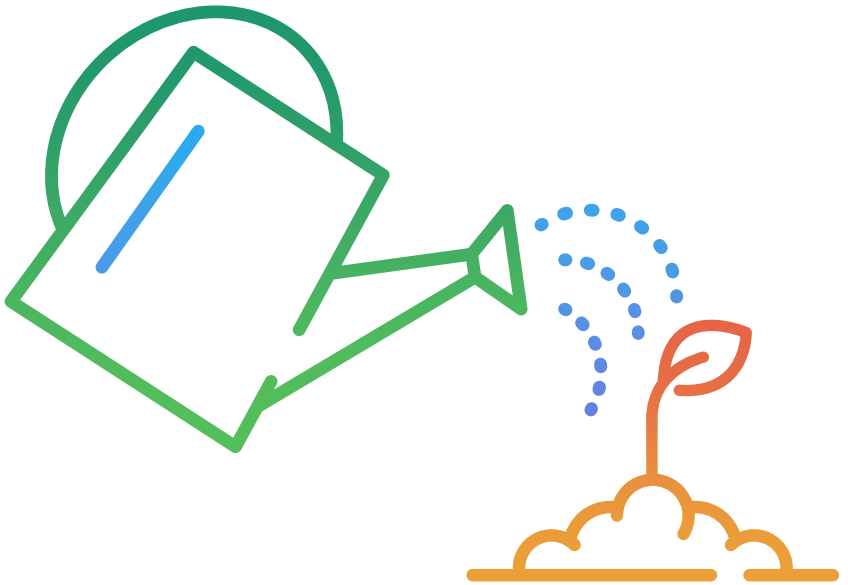
Basic

AWS Support – Basic Support

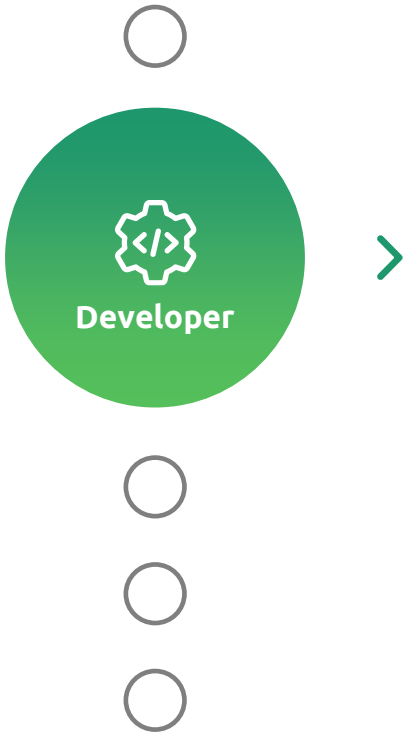
- This support is free for all customers. No case limits via web.
- Web support for cases
- Limited access to AWS Trusted Advisor checks
- Access to Personal Health Dashboard
- No phone support
- No SLA for response or remediation
- No Technical Account Manager
- Cheapest option (free)

AWS Support – Developer

Developer



AWS Support – Developer



- Includes everything in Basic Support
- Recommended for experimenting and testing on AWS
- Slight increase in Trusted Advisor checks
- Prioritized responses on AWS repost with primary contact
- No phone support; web support only
- Response times of 24 hours for general questions and 12 hours for system impaired
- No Technical Account Manager or Support Team
- Second cheapest at either $29 or 3% of total AWS spend

AWS Support – Business

Business

AWS Support – Business

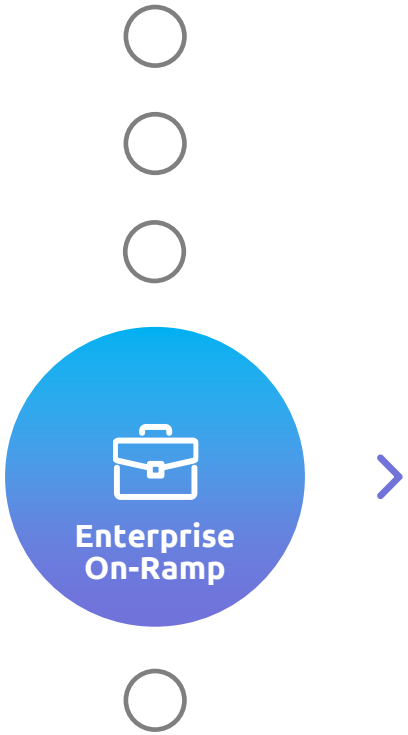
- Includes everything in Developer
- Minimum if you have production workloads on AWS
- Lowest tier that has **ALL** Trusted Advisor checks
- Access to AWS Support App in Slack; AWS Support API access
- Support available 24/7 on phone and web, and chat access to AWS Cloud support
- Same as Developer SLAs plus Production impaired <4 hours vs Production down <1 hour
- No Technical Account Manager or Support Team
- Third cheapest at either $100 or Tier % of spend***

Note that you can add additional services like AWS managed services to Business.

AWS Support – Enterprise On-Ramp

Enterprise On-Ramp

AWS Support – Enterprise On-Ramp



- Includes everything in Business
- Recommended if you have mission-critical workloads in AWS
- **ALL** Trusted Advisor checks (from Business)
- No new electronic support access, but….
- Infrastructure Event Incident Management
- Same as Business SLAs, but Business-critical system down <30 minutes
- A pool of Technical Account Managers is available with a Concierge Support Team
- Second most expensive at either $5,500 or 10% of spend***

Note that you can add additional services like AWS managed services to Enterprise On-Ramp.

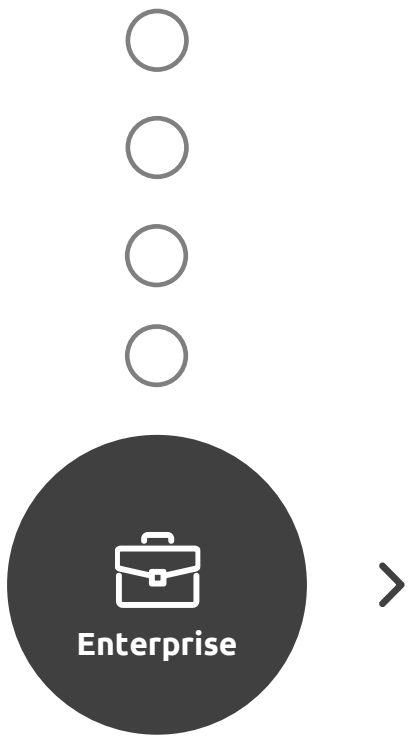
AWS Support – Role of a Technical Account Manager (TAM)

- Primary point of contact
- Educates and empowers the client and evolves with them along the Cloud journey
- Provides architectural guidance
- Facilitates issues and requests
- Can bring in other Subject Matter Experts as needed

AWS Support – Enterprise

Enterprise

AWS Support – Enterprise

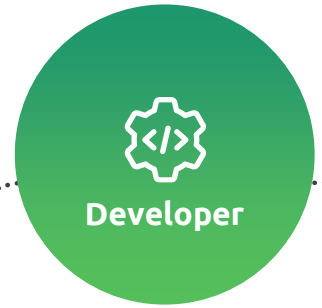


- Includes everything in Enterprise On-Ramp plus……
- Recommended if you have business-critical workloads in AWS
- **ALL** Trusted Advisor checks (from Business)
- No new electronic support access
- Proactive reviews, training, architecture reviews, workshops, deep dives
- Same as Business SLAs, but mission-critical system down <15 minutes
- Private dedicated Technical Account Manager
- Most expensive at either $5,500 or Tier % of spend***

Note that you can add additional services like AWS managed services to Enterprise.

AWS Support Plans – Summary

AWS Support Plans – Summary



- Best-practice guidance
- Client-side diagnostic tools
- Building-block architecture support

AWS Support Plans – Summary

- Application architecture guidance
- Infrastructure event management
- Full Trusted Advisor Checks

AWS Support Plans – Summary

- Application architecture guidance
- Infrastructure event management
- A pool of Technical Account Managers (TAM)

AWS Support Plans – Summary

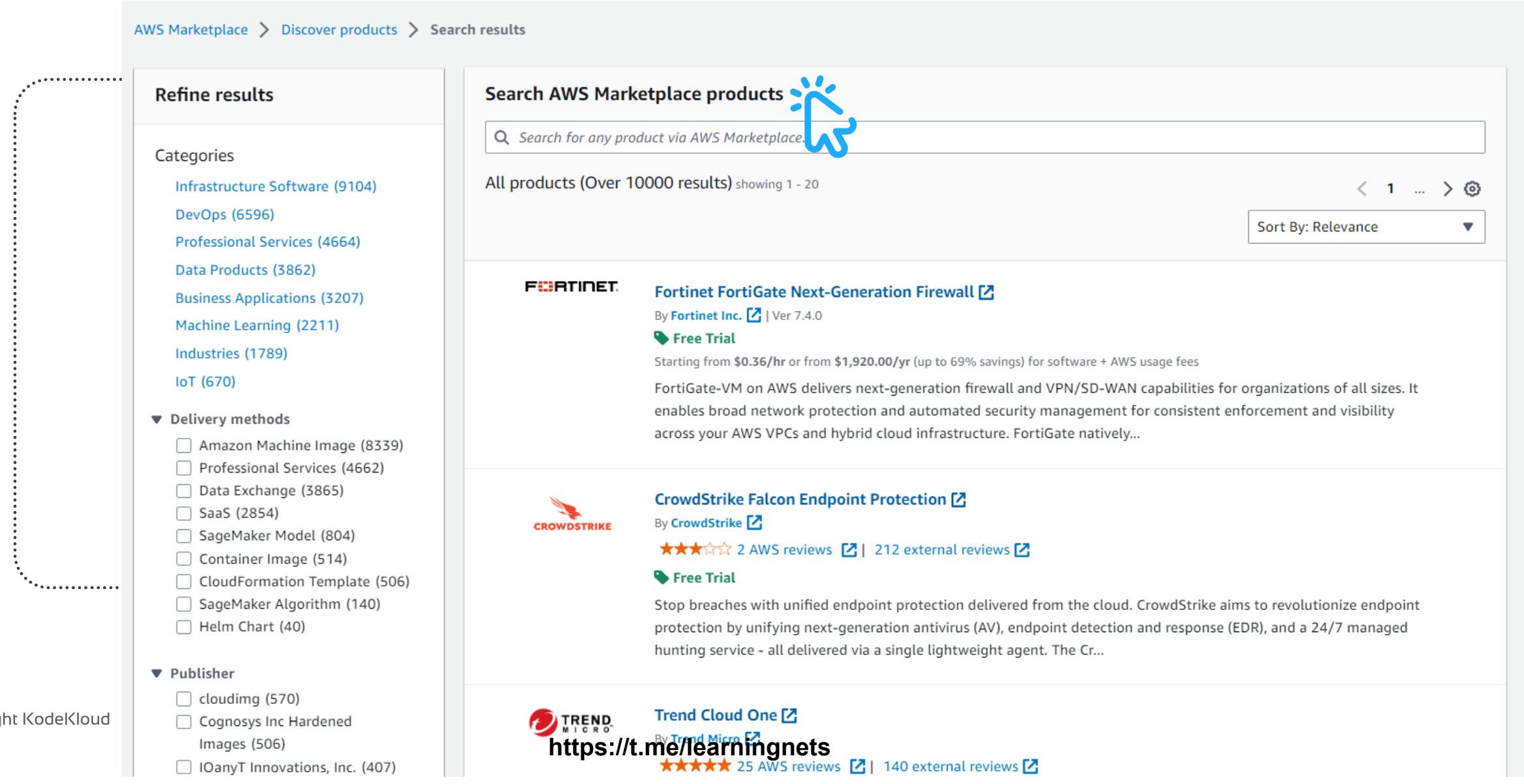
- Application architecture guidance
- Infrastructure event management
- A designated TAM

AWS Support – Third-Party Software

What if I need 3rd party software installed in my AWS account, but I want it pre-configured?

AWS Support – Third-Party Software

AWS Marketplace – A Visual



Support Plans - Summary

- Five support levels in AWS
- Basic is free, but with web access only
- Developer level includes some SLAs, but still with web access only
- Business level is the minimum requirement for Production and includes Trusted Advisor/SLAs
- Enterprise On-Ramp includes Business plus a pool of TAMs/reduced SLA times
- Enterprise includes Enterprise On-Ramp/TAM/ <15 mission-critical SLAs
- All support plans beyond Basic have flat fees or a % of spend (higher of the two)

KodeKloud