Optimize Cost and Efficiency on AWS: Tips and Tools (Level 200)

Peter Shi, Commercial Architect

Today's Speaker

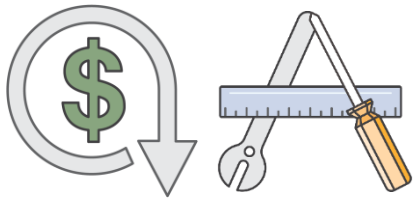
Peter Shi
Commercial Architect, APAC, AWS

Helps customers optimise spend, maximising business value

https://au.linkedin.com/in/petershiaws

Agenda

How AWS Helps You Realize Value and Save Cost



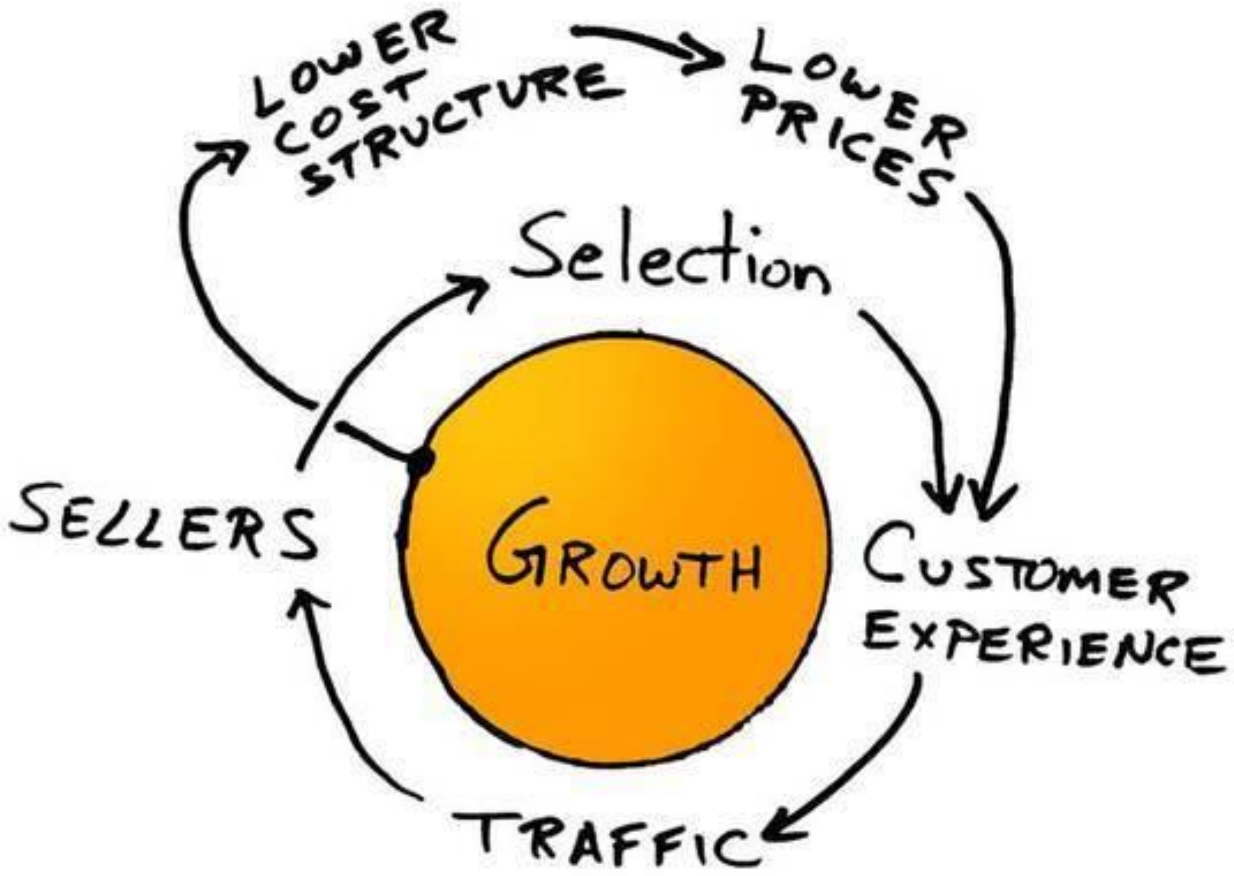
Cost Optimisation Levers and Tools

Cost Management and Optimisation Mechanisms

You can ask questions in the chat during the talk

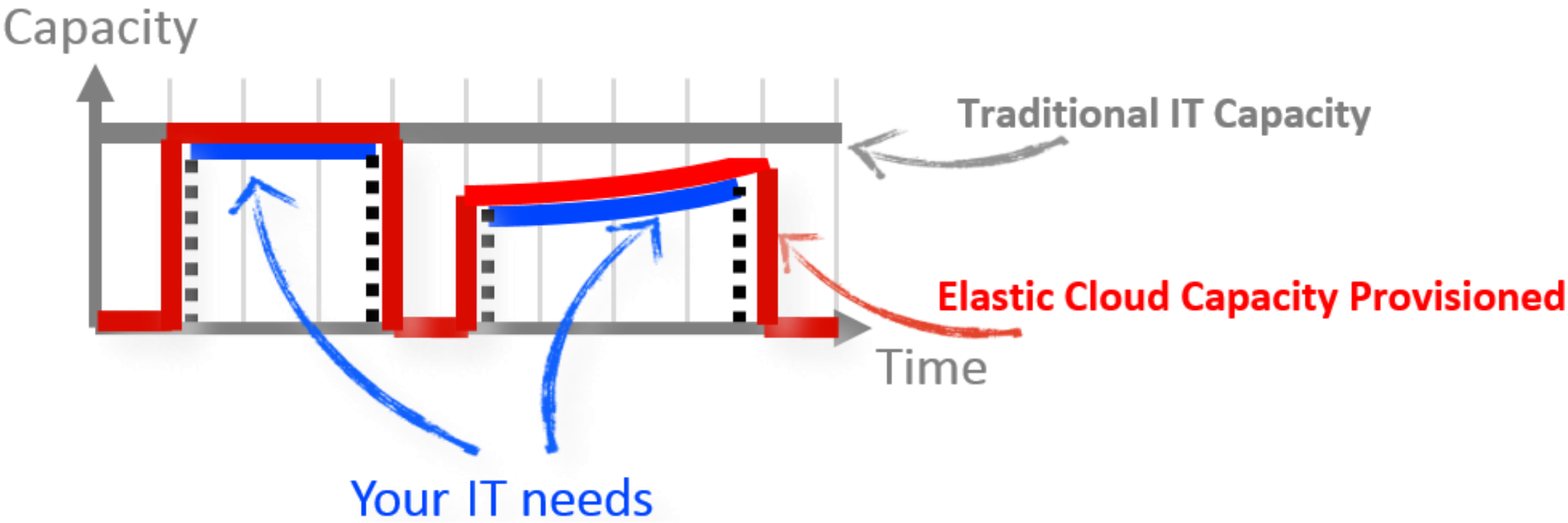
How AWS Helps You Realize Value and Save Cost

AWS lowers prices over time



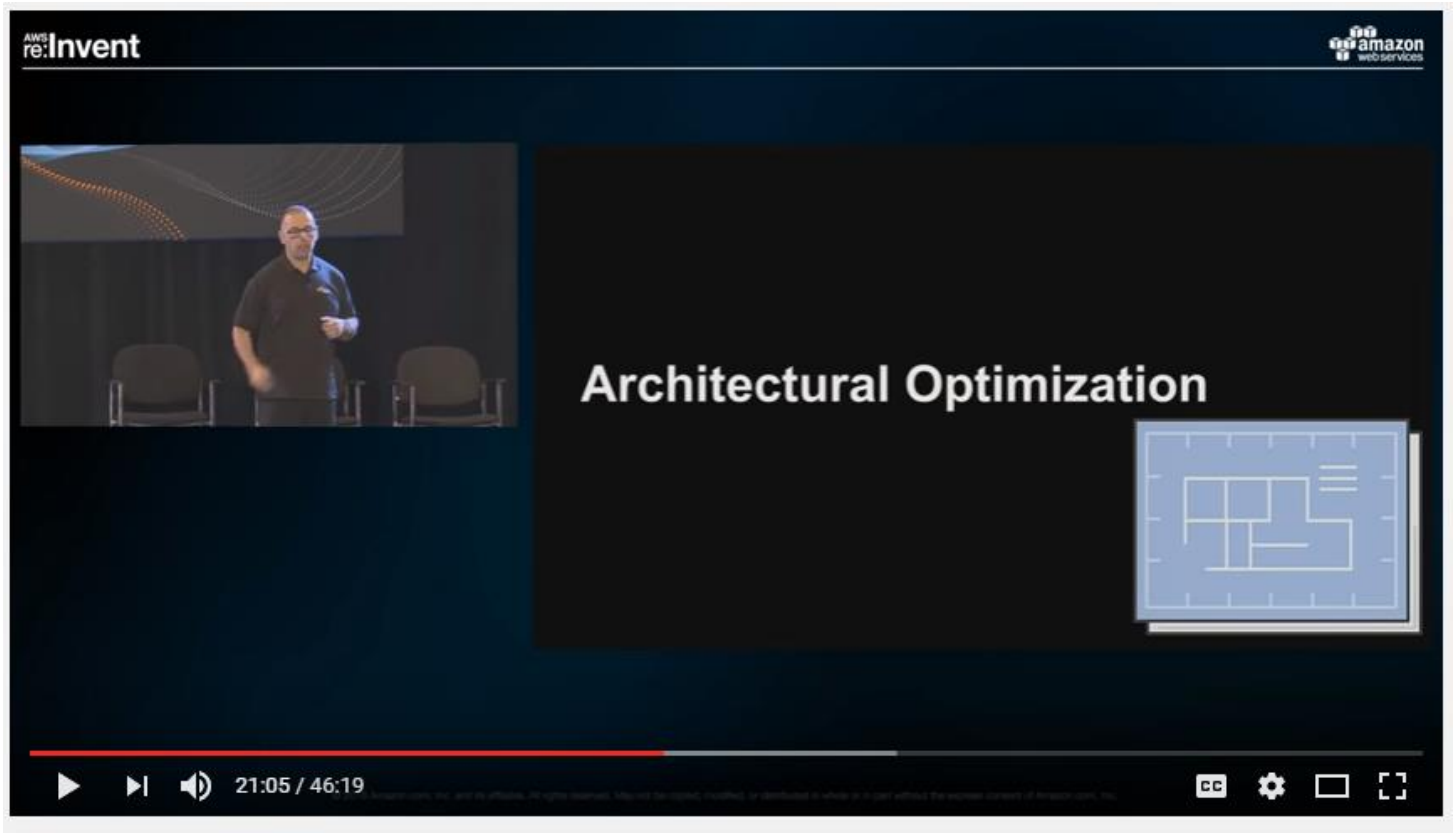
65 Price Reductions!

AWS allows you to fit spend to today's demand



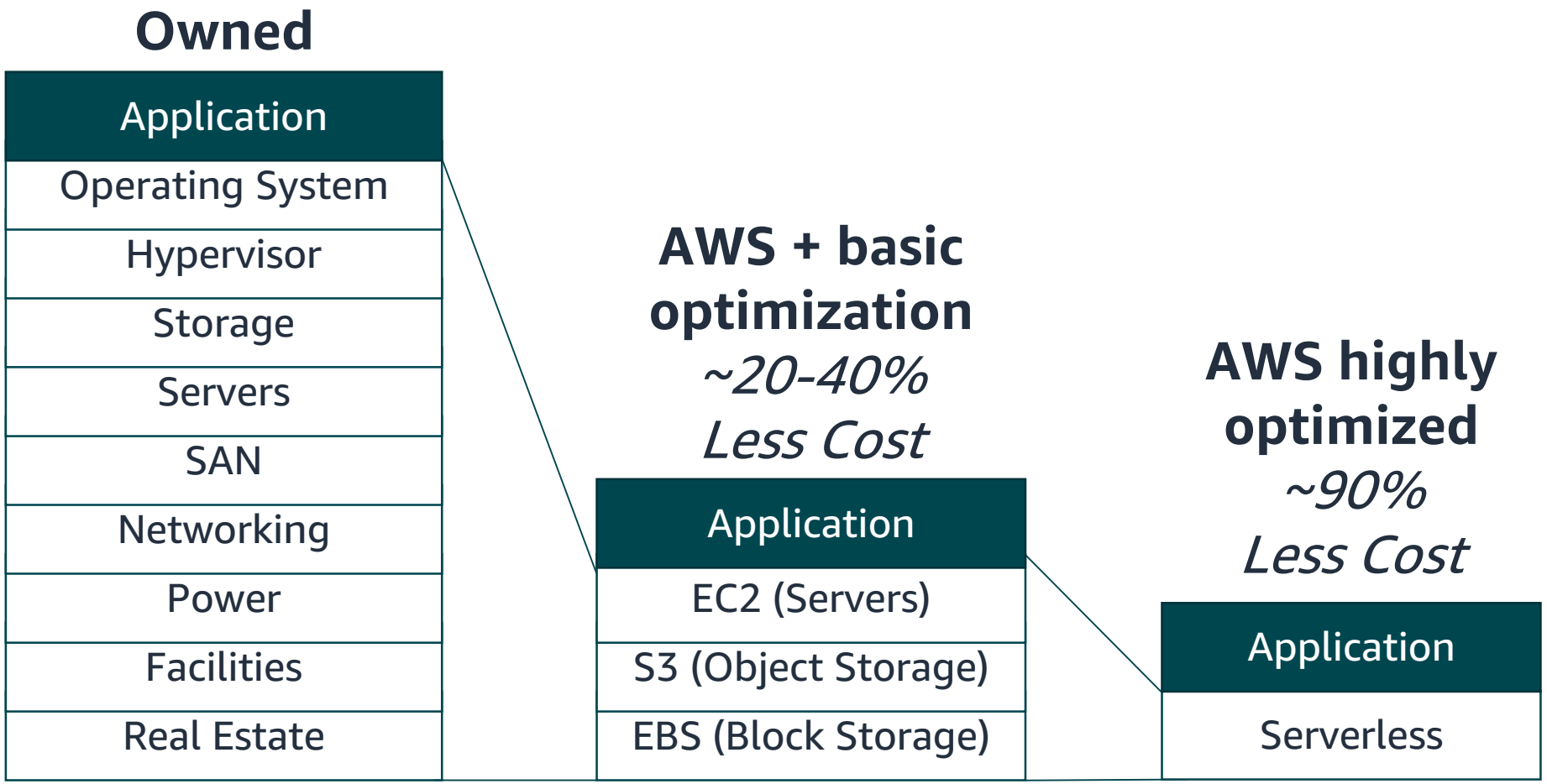
"Hug your workloads, not your servers!"

AWS shares how to save on your spend



AWS re:Invent 2016: Cost Optimizing Your Architecture: Practical Design Steps For Savings (ARC310)

Optimization levers drive down costs over time



You can significantly reduce your Total Cost of Ownership on AWS compared to on-premises infrastructure

*"Three years on, we've saved over **$100 million in avoided capital** and are about 65% in the cloud."*

Dominic Shine, CIO News Corp

News Corp

AdRoll

*Leveraging the AWS platform, we've been able to seamlessly scale our infrastructure, better serve our customers across the globe, and **reduce our fixed costs by 75% and operational costs by 83%.***

Valentino Volonghi, CIO AdRoll

*"We've realized a **52 percent reduction in TCO** … Ultimately these savings are a by-product of doing the right thing."*

Ben Cabanas, CTO, GE Transportation

aws | intel

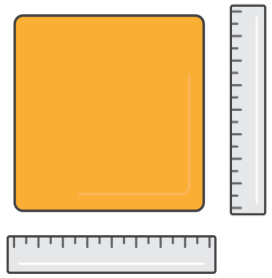
Cost savings are only the tip of the iceberg!

https://aws.amazon.com/solutions/case-studies/

Cost Optimization Levers and Tools

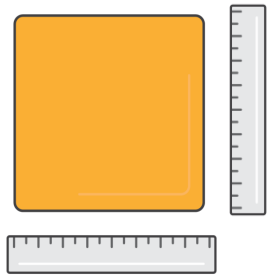
The Pillars of Cost Optimization

The Pillars of Cost Optimization

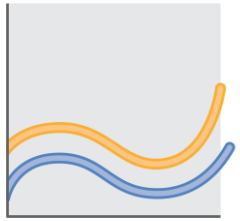


Right Size your Resources

The Pillars of Cost Optimization

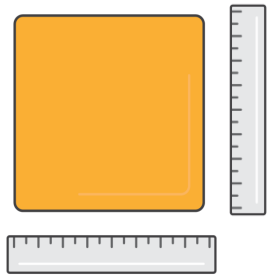


Right Size your Resources

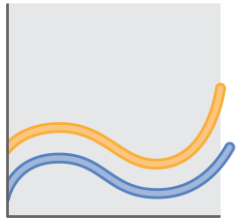


Increase Elasticity

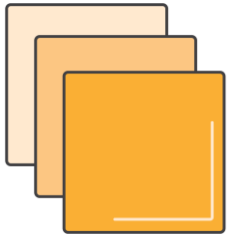
The Pillars of Cost Optimization



Right Size your Resources

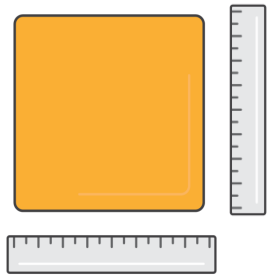


Increase Elasticity

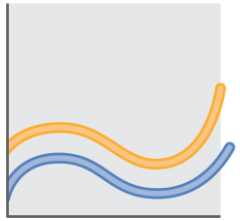


Use Reserved Instances

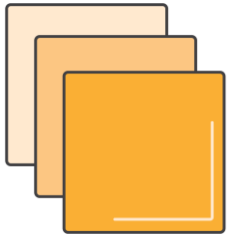
The Pillars of Cost Optimization



Right Size your Resources



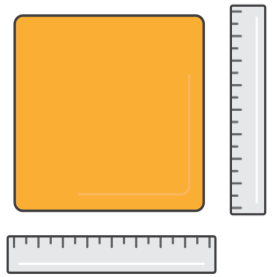
Increase Elasticity



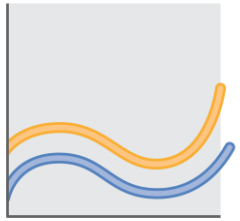
Use Reserved Instances

Match Storage to Need

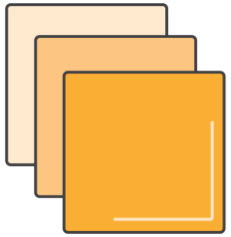
The Pillars of Cost Optimization



Right Size your Resources



Increase Elasticity

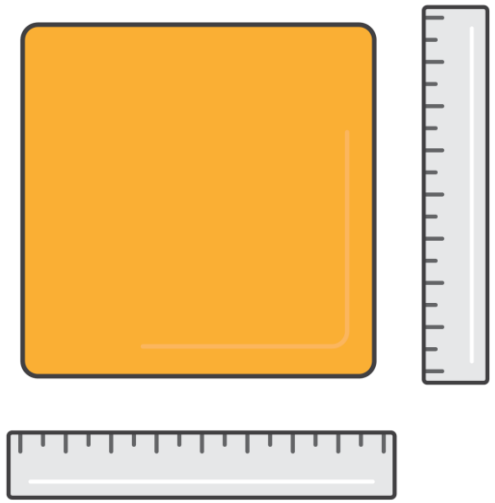


Use Reserved Instances

Match Storage to Need

Design for Cost

Pillar 1: Right Size your Resources



Right Sizing

- Selecting the cheapest instance (e.g. size, family) while meeting performance needs
- Most commonly based on CPU, RAM, storage, and network needs
- Doing this before/during migration via discovery tools reduces overall effort

Right Sizing example

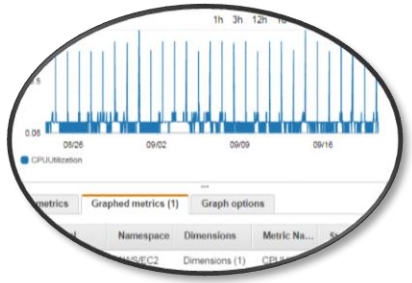
m4.4xlarge
$1.72 per hr.

1. Migrate/provision & Run

2. Check (CPU, RAM, network, disc)

m4.large
$0.215 per hr.

3. Right Size



4. Review Performance

87% Saving

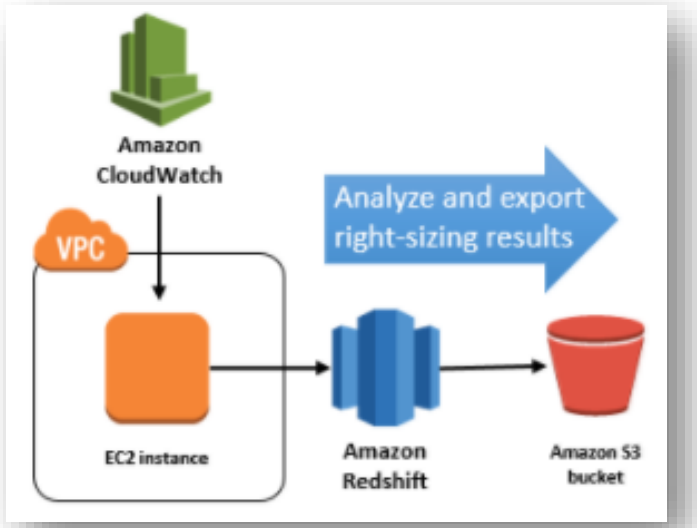
5. Save!

https://docs.aws.amazon.com/AWSEC2/latest/UserGuide/ec2-instance-resize.html

Right Sizing tools

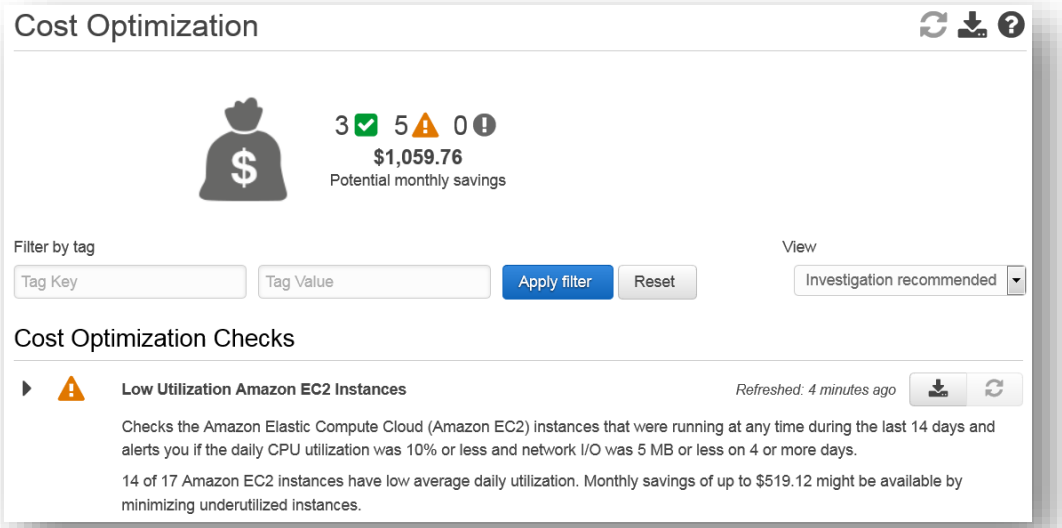
AWS EC2 Right Sizing Tool

https://aws.amazon.com/answers/account-management/cost-optimization-ec2-right-sizing/



AWS Trusted Advisor

Business and Enterprise support



Right Sizing demo

AWS Answers

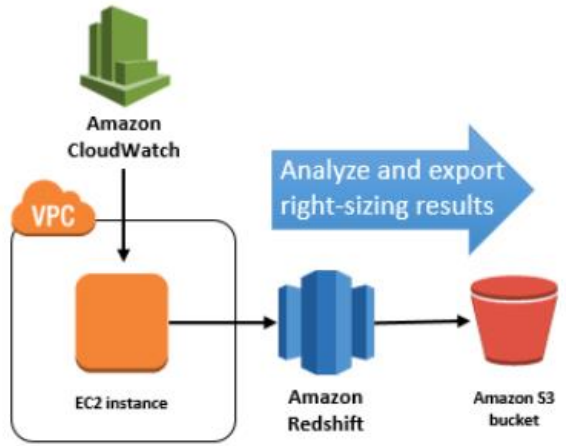
Cost Optimization: EC2 Right Sizing

Am I using the most cost-effective instances for my workloads?

Amazon Web Services (AWS) customers can access information in the AWS Management Console, Amazon CloudWatch, and AWS Trusted Advisor to gain insight into their service usage and estimated costs. This information can help organizations better understand how to leverage the elasticity and flexibility of the AWS Cloud to optimize their costs yet still meet their performance and capacity requirements.

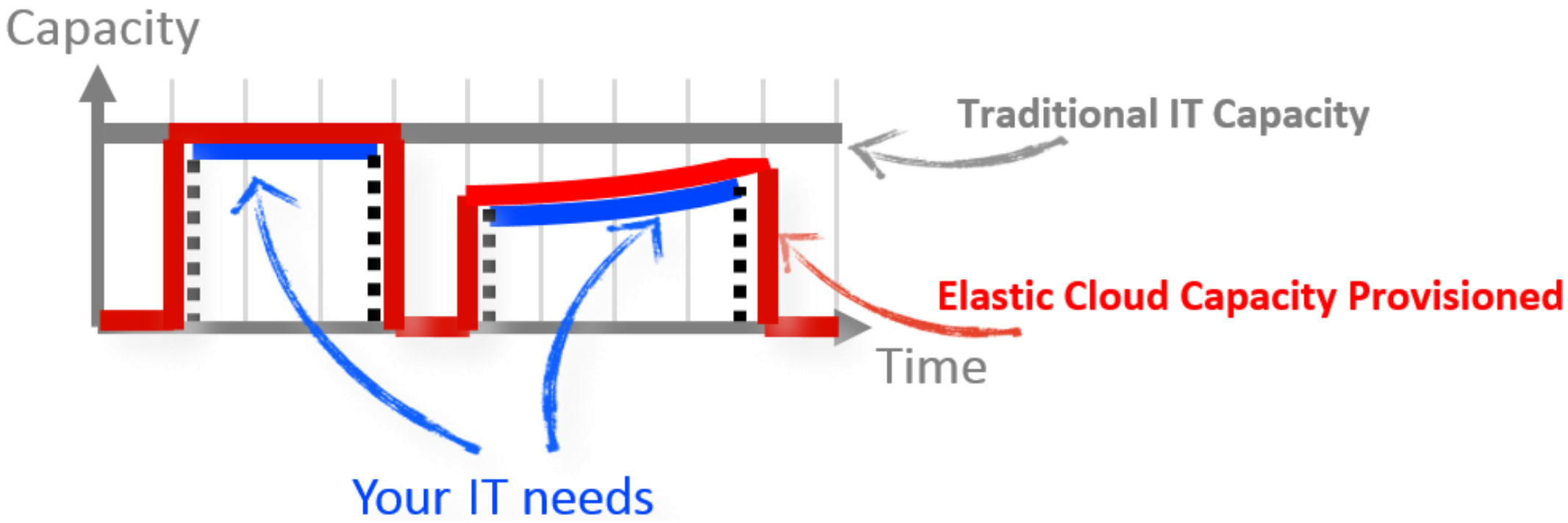
Amazon Elastic Compute Cloud (Amazon EC2) provides a wide selection of instance types and sizes, giving customers the flexibility to *right size* compute resources to meet their capacity needs at the lowest cost. Amazon EC2 also generates detailed usage data to help determine how to better right size instances to meet the technical requirements of a given workload.

AWS offers the Cost Optimization: EC2 Right Sizing (EC2 Right Sizing) solution, which uses managed services to perform a right-sizing analysis and offer detailed recommendations for more cost-effective instances. The following sections provide an overview of the solution as well as high-level best practices for optimizing your Amazon EC2 costs.

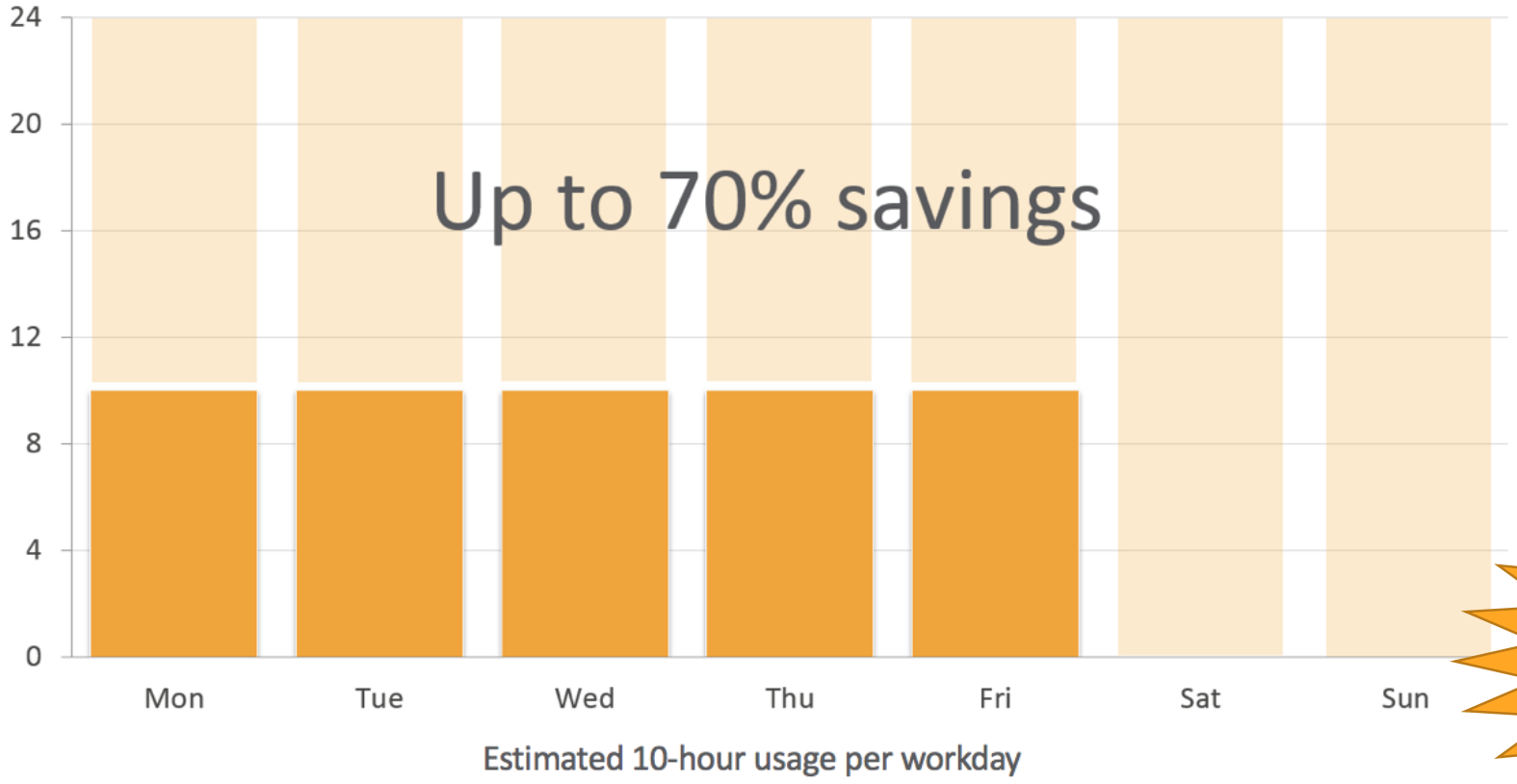


https://aws.amazon.com/answers/account-management/cost-optimization-ec2-right-sizing/

Pillar 2: Increase Elasticity

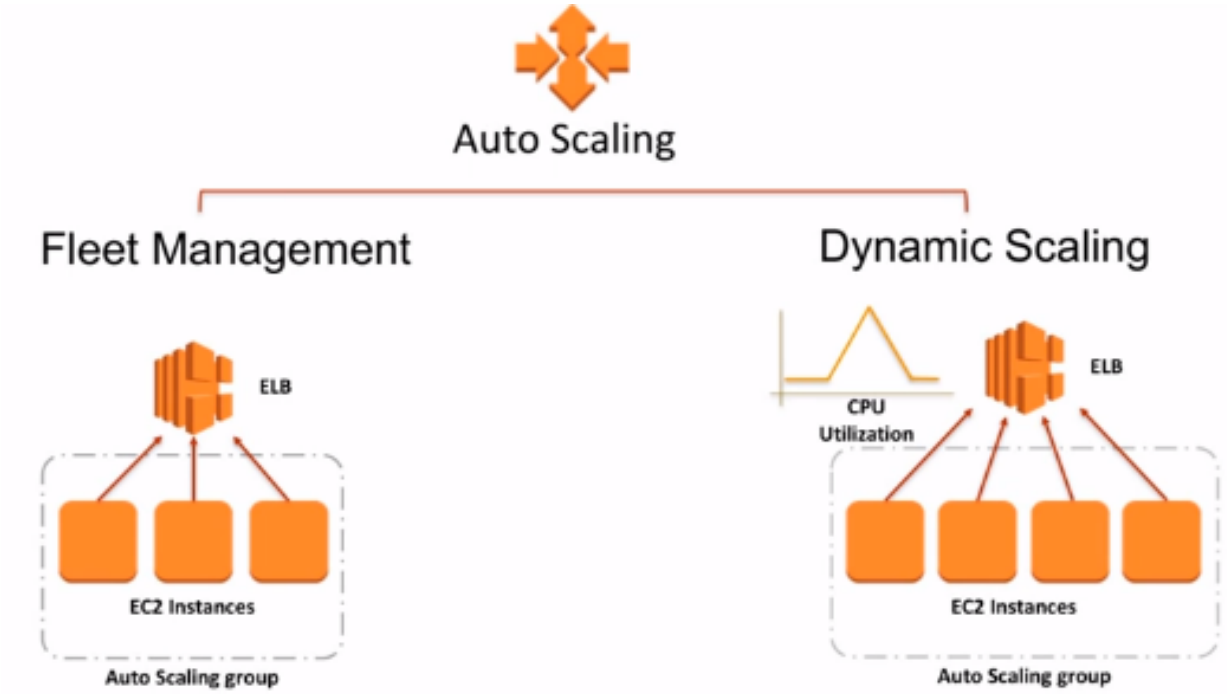


Reduce instance spend by 70% though scheduling



Fun fact: RDS can be turned off too

AWS Auto Scaling helps you match resources to demand



Elasticity Guides and Tools

AWS Auto Scaling

https://aws.amazon.com/autoscaling/

AWS Instance Scheduler

https://aws.amazon.com/answers/infrastructure-management/instance-scheduler/

3rd party options (including but not limited to)

AWS Instance Scheduler demo

AWS Answers

AWS Instance Scheduler

How do I automatically start and stop my Amazon EC2 and Amazon RDS instances?

Amazon Web Services (AWS) offers infrastructure on demand so that customers can control their resource capacity and pay only for what they consume. One simple method to reduce costs is to stop resources that are not in use, and then start those resources again when their capacity is needed.

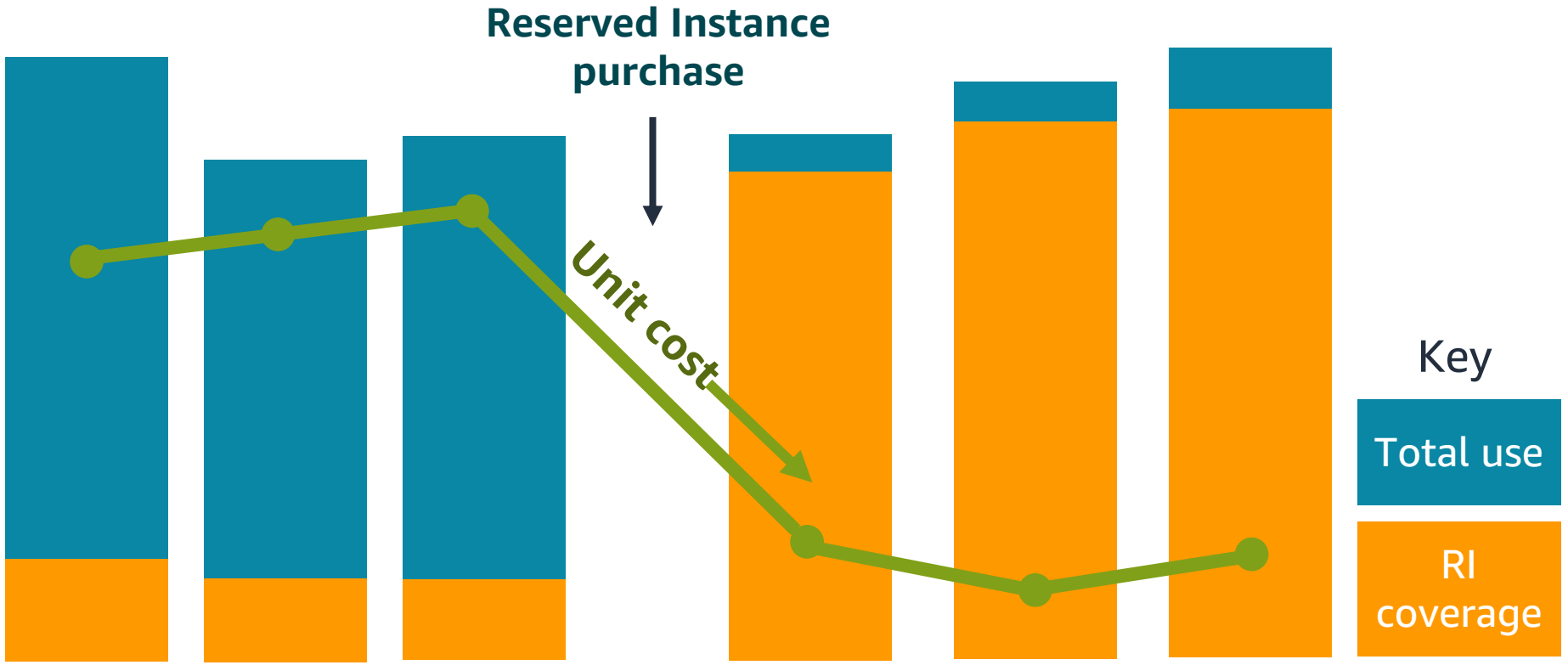
The AWS Instance Scheduler is a simple AWS-provided solution that enables customers to easily configure custom start and stop schedules for their Amazon Elastic Compute Cloud (Amazon EC2) and Amazon Relational Database Service (Amazon RDS) instances. The solution is easy to deploy and can help reduce operational costs for both development and production environments. Customers who use this solution to run instances during regular business hours can save up to 70% compared to running those instances 24 hours a day.

This webpage provides best practices for implementing automated actions on resources, as well as an overview of the Instance Scheduler design and functionality.

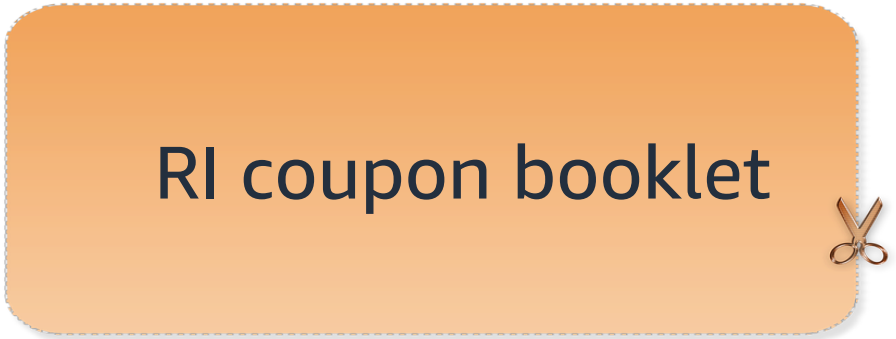
https://aws.amazon.com/answers/infrastructure-management/instance-scheduler/

Pillar 3: Use Reserved Instances (RIs)

Reserved Instances for one financial services customer resulted in a 39% decrease in unit cost



What are Reserved Instances (RIs)?



- RIs are a commitment in exchange for discount
- They behave like discount coupon booklets
- Each hourly coupon is matched to a running instance and used or expires at the end of each hour
- RIs are a financial construct/layer on top of your AWS infrastructure

RIs are best used for always-on instances (can still be used to save for non-always on)

Up to 75% savings

Approx. 20-40% savings for 1 year RIs

Commitment level

- 1 year (approx. payback 7-10 months)
- 3 year (approx. payback 10-20 months)

AWS services offering RIs

- Amazon EC2 & EC2 Hosts
- Amazon RDS
- Amazon Redshift
- Amazon ElastiCache
- Amazon Elasticsearch (new)
- Amazon DynamoDB*
- Amazon CloudFront*

*Discount for commitment, but not an RI

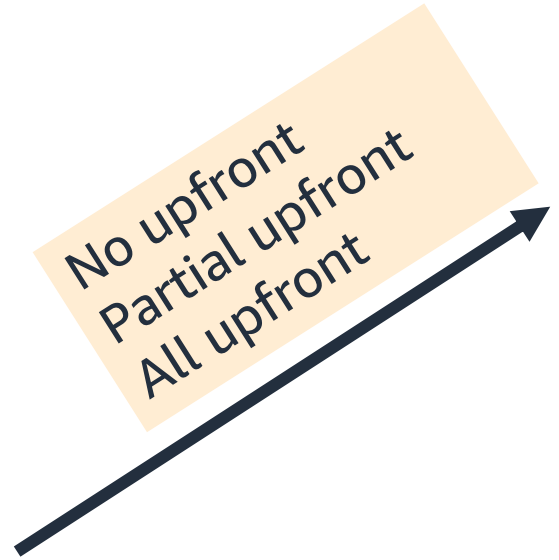
EC2 RI types cater to a range of customer needs

	1 year	3 years
Standard	Regional (e.g. ap-southeast-2) (with Linux/Unix Size Flex)	Regional
	Zonal (e.g. ap-southeast-2a) (with capacity reservation)	Zonal
Convertible	Regional	Regional
	Zonal	Zonal

Note: you can easily switch between Regional and Zonal at no cost

EC2 RI types cater to a range of customer needs

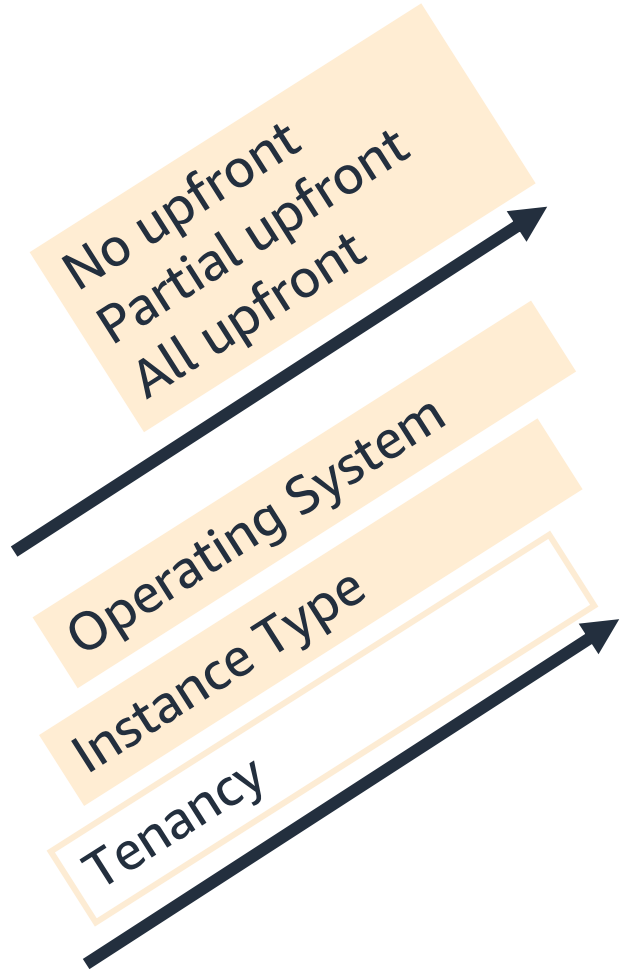
	1 year	3 years
Standard	Regional (e.g. ap-southeast-2) (with Linux/Unix Size Flex)	Regional
	Zonal (e.g. ap-southeast-2a) (with capacity reservation)	Zonal
Convertible	Regional	Regional
	Zonal	Zonal



Note: you can easily switch between Regional and Zonal at no cost

EC2 RI types cater to a range of customer needs

	1 year	3 years
Standard	Regional (e.g. ap-southeast-2) (with Linux/Unix Size Flex)	Regional
	Zonal (e.g. ap-southeast-2a) (with capacity reservation)	Zonal
Convertible	Regional	Regional
	Zonal	Zonal



Note: you can easily switch between Regional and Zonal at no cost

Which EC2 RIs give greater discount?

Less discount

Greater discount

Which EC2 RIs give greater discount?

	Less discount		Greater discount
Payment option	No upfront	Partial upfront	All upfront

Which EC2 RIs give greater discount?

	Less discount		Greater discount
Payment option	No upfront	Partial upfront	All upfront
Duration	1 year		3 year

Which EC2 RIs give greater discount?

	Less discount		Greater discount
Payment option	No upfront	Partial upfront	All upfront
Duration	1 year		3 year
Operating System	Others (typically)		Linux/Unix

Which EC2 RIs give greater discount?

	Less discount		Greater discount
Payment option	No upfront	Partial upfront	All upfront
Duration	1 year		3 year
Operating System	Others (typically)		Linux/Unix
Instance type	Older generations (typically)		Newer gen.

Which EC2 RIs give greater discount?

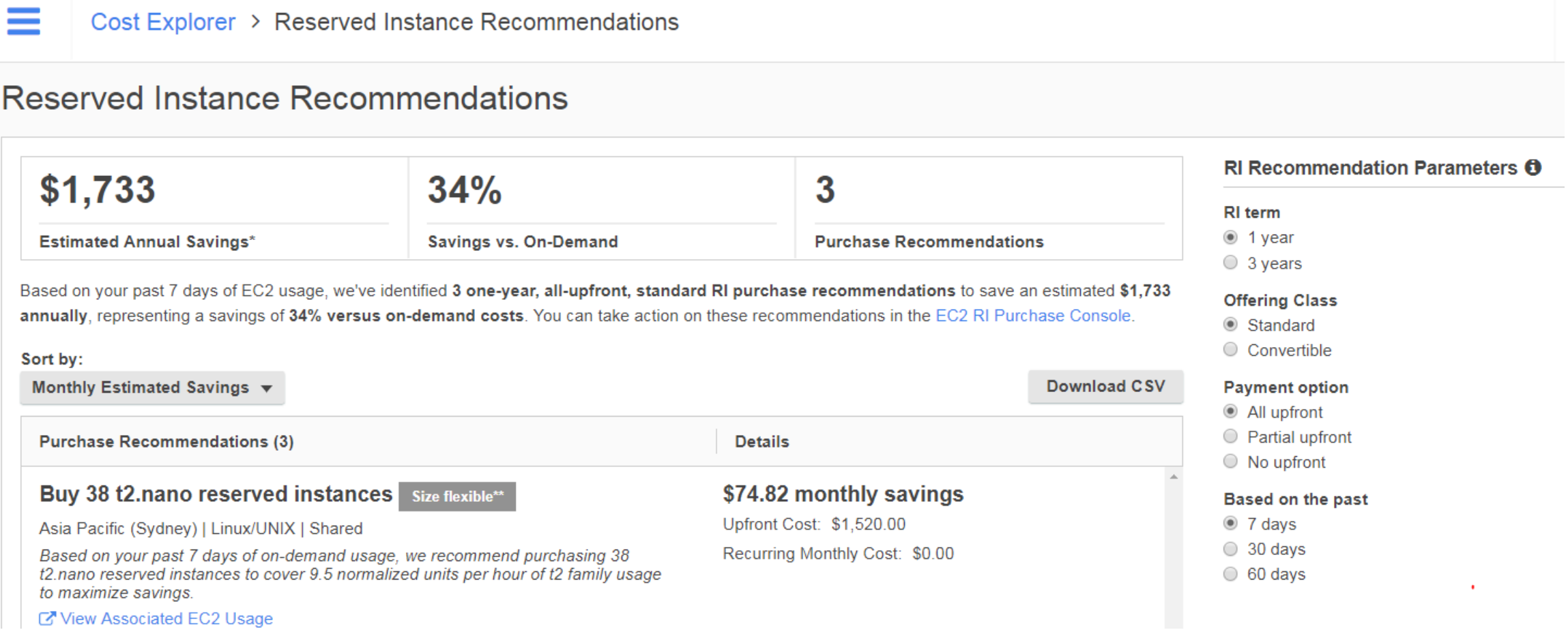
	Less discount		Greater discount
Payment option	No upfront	Partial upfront	All upfront
Duration	1 year		3 year
Operating System	Others (typically)		Linux/Unix
Instance type	Older generations (typically)		Newer gen.
Class	Convertible		Standard

Understanding Convertible Reserved Instances

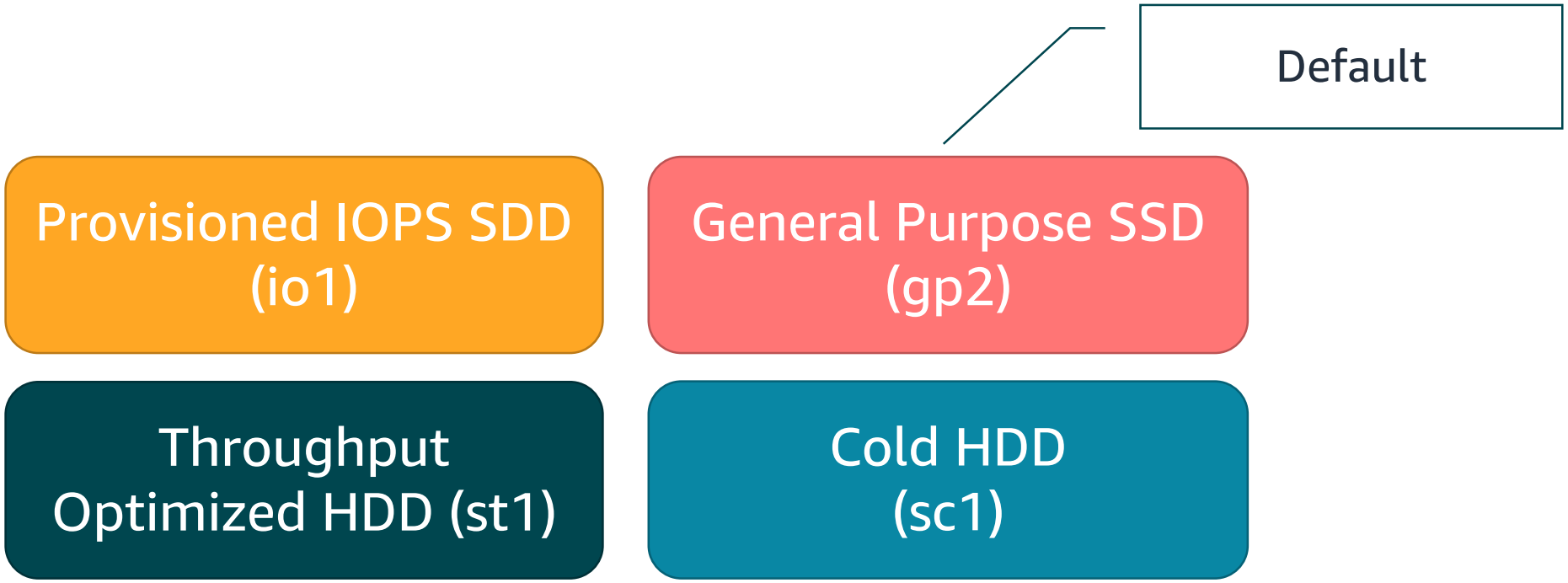
With a Convertible Reserved Instance, you can modify your existing reservation across:

- ✓ Instance families
- ✓ Instance sizes
- ✓ Operating Systems
- ✓ Tenancy

AWS Cost Explorer and AWS Budgets RI Demo

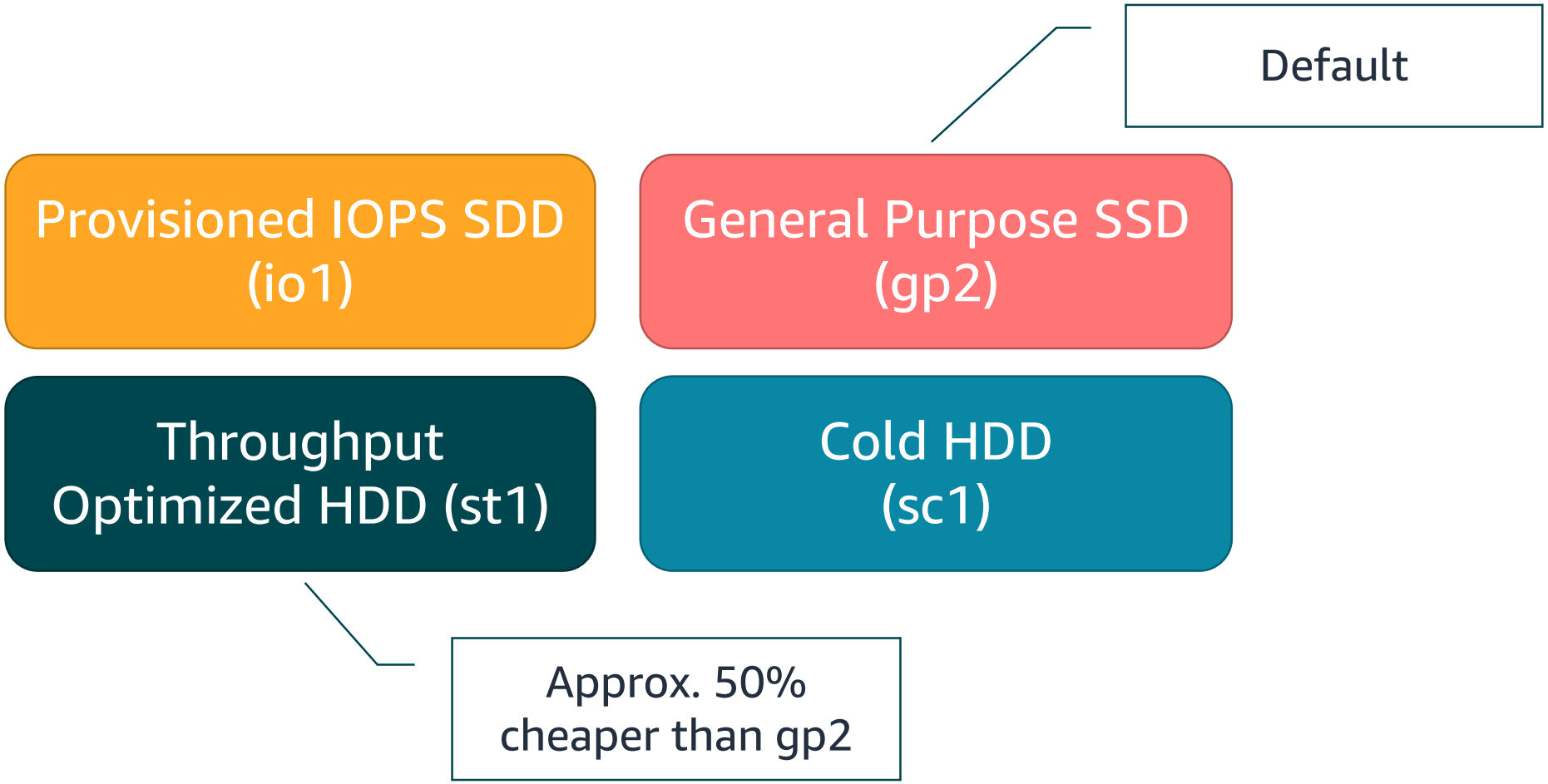


Pillar 4: Match Storage to Need



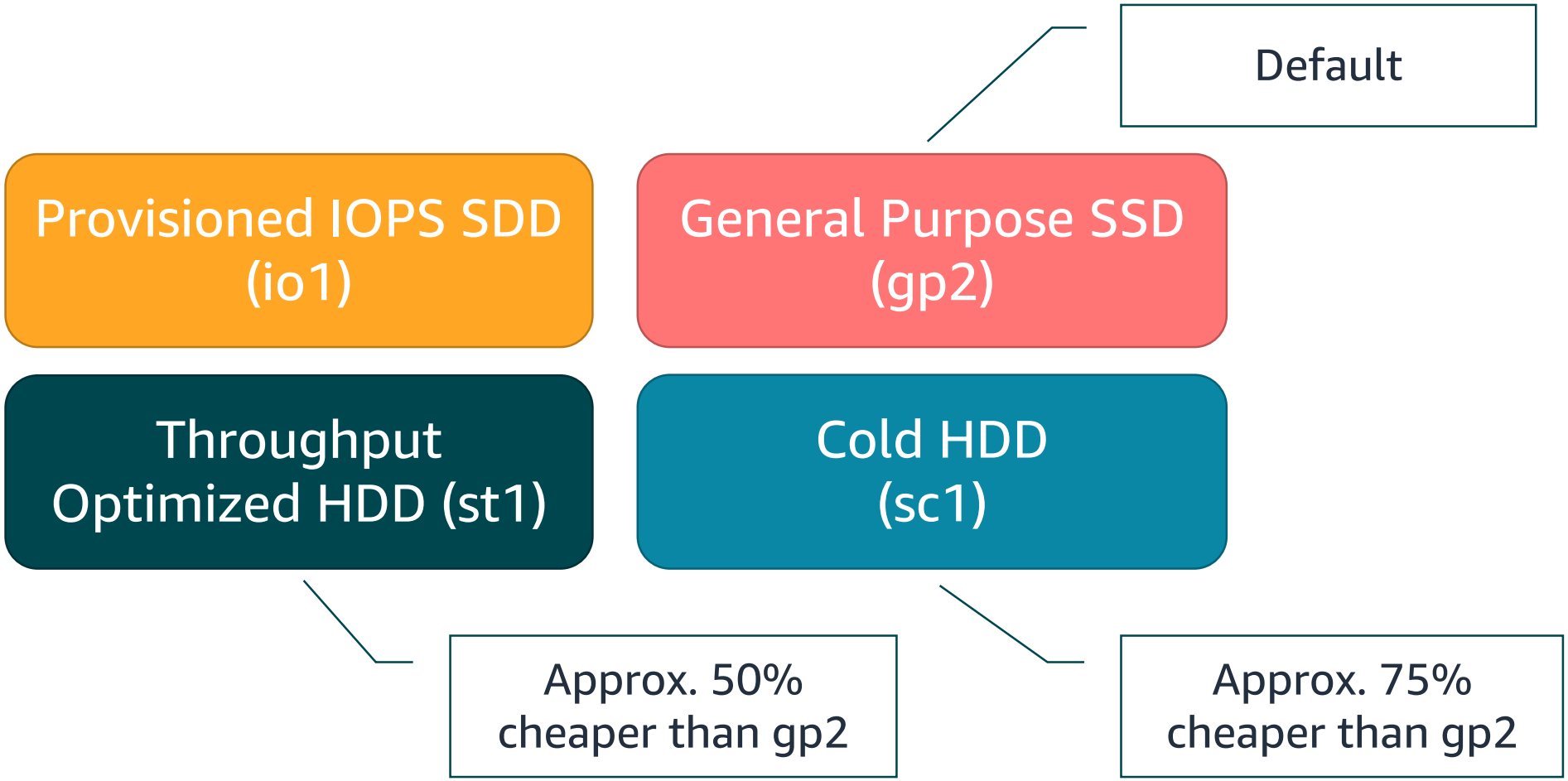
https://aws.amazon.com/ebs/details/

Pillar 4: Match Storage to Need



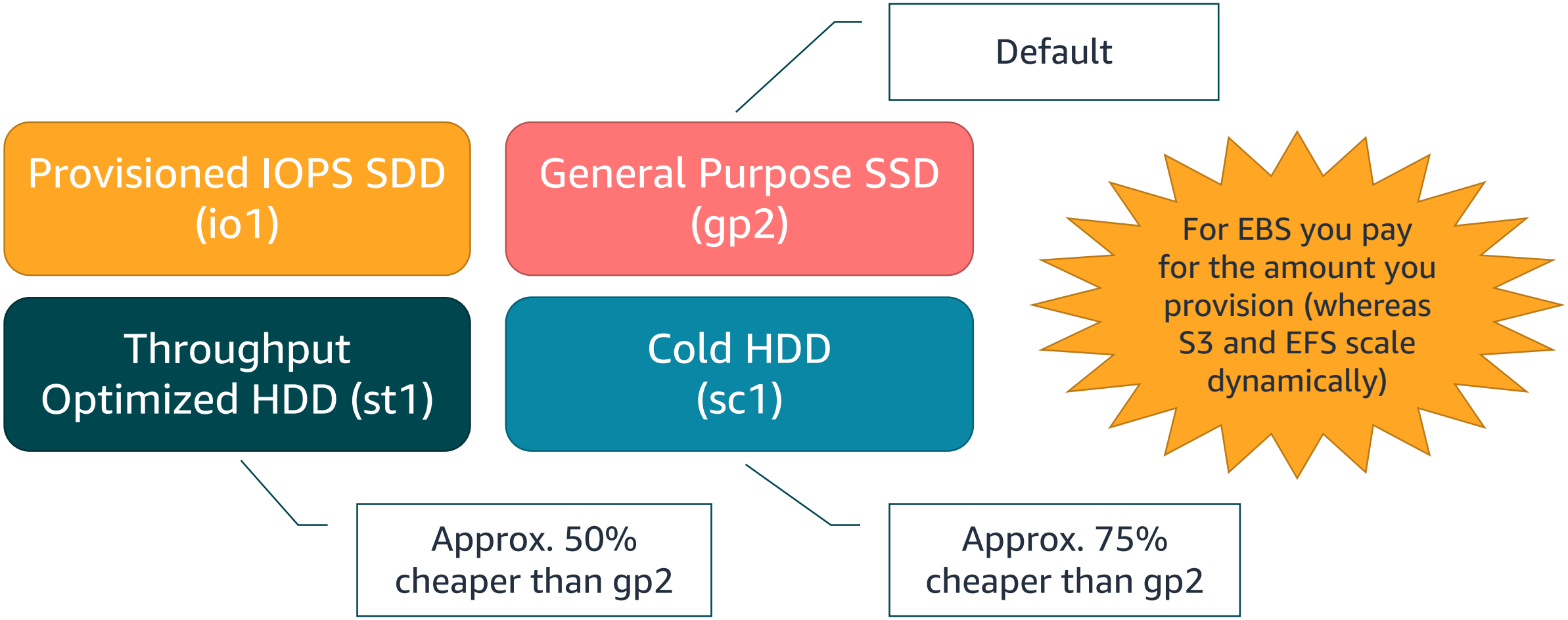
https://aws.amazon.com/ebs/details/

Pillar 4: Match Storage to Need



https://aws.amazon.com/ebs/details/

Pillar 4: Match Storage to Need



https://aws.amazon.com/ebs/details/

Storage Classes on Simple Storage Service (S3)

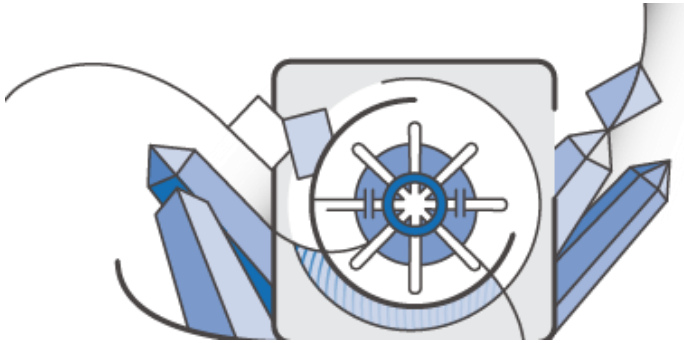
Hot

Standard (default)

Warm

Standard - Infrequent Access

Cold



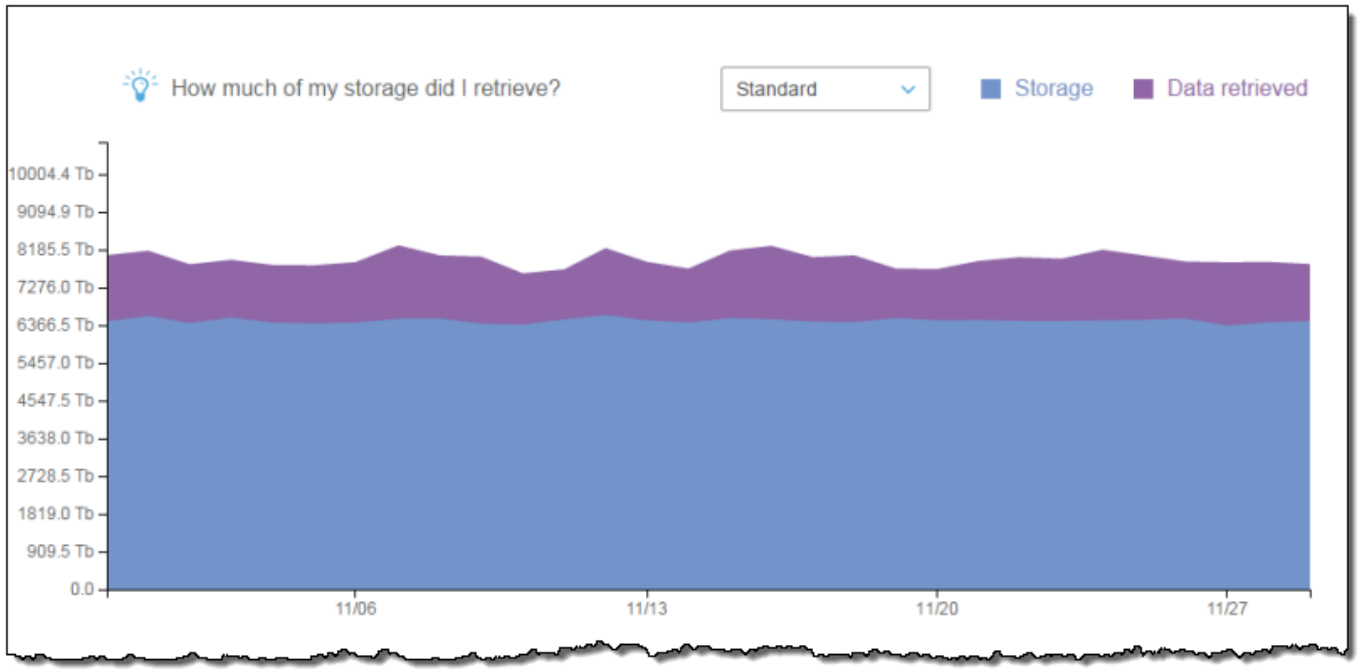
Amazon Glacier

Active data → Infrequently accessed data → Archive data

Automatically transition infrequently accessed objects to S3-Infrequent Access via S3 Analytics

How Much of My Storage did I Retrieve?

The Amazon S3 console graphs how much of the storage in the filtered data set has been retrieved for the observation period as shown in the following example.



S3 Analytics Lifecycle policies also clean up incomplete multi-part uploads to S3, potentially saving thousands of dollars.

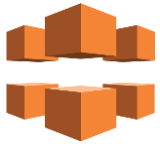
https://docs.aws.amazon.com/AmazonS3/latest/dev/analytics-storage-class.html

Pillar 5: Designing for cost – there are many methods

Static Web Hosting on S3
and using S3 Select

Consolidated billing (RI and
volume discount benefits)

Eliminated unused resources
(e.g. unused Elastic IPs)



Deliver content with AWS CloudFront
(lower compute and data transfer)

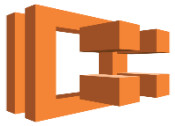
AWS CloudFormation
(Dev time saving)

Running resources in a cheaper
region

AWS EC2 Spot and
EC2 Fleet

Serverless &
AWS Lambda

Elastic Load Balancer (ELB) to
Application Load Balancer (ALB)



Containerisation
(higher productivity and utilisation)

Open source platforms &
databases (reduced licensing cost)

Low cost security monitoring
via AWS GuardDuty

AWS Trusted Advisor Demo

Trusted Advisor Dashboard

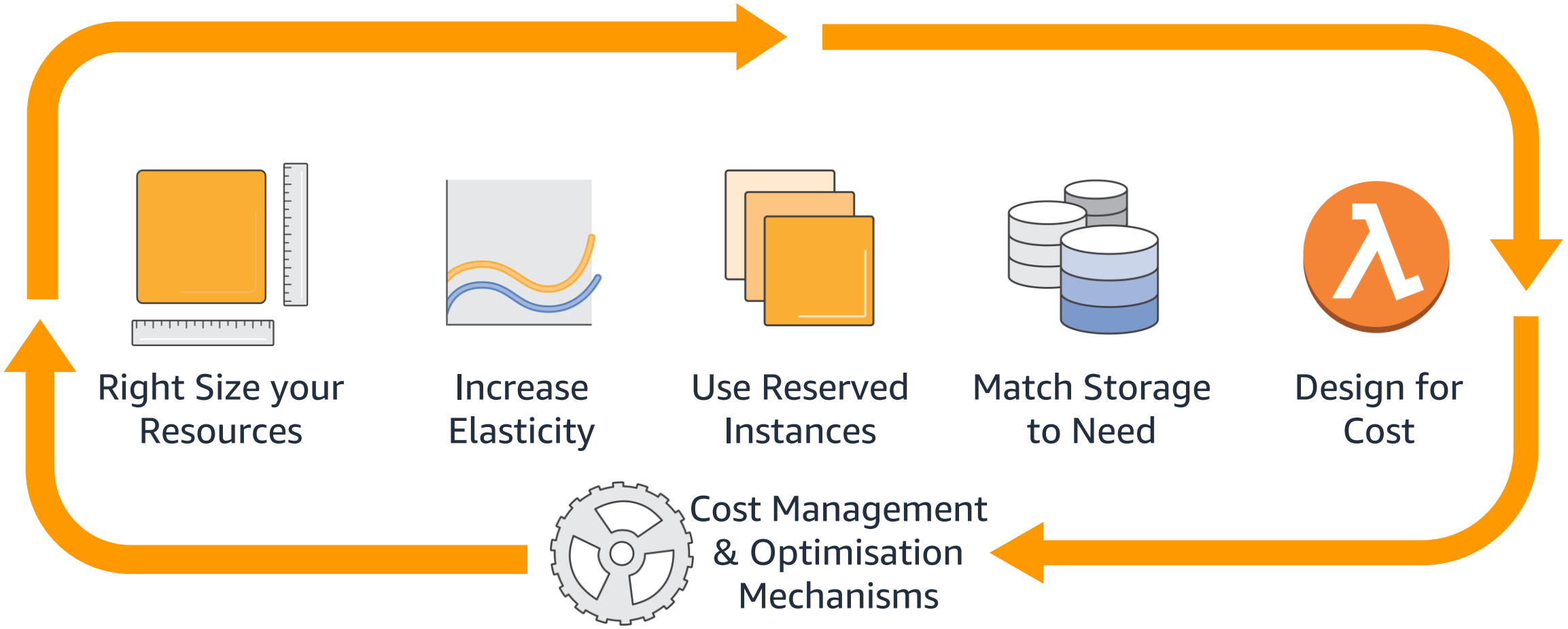
Cost Optimization	Performance	Security	Fault Tolerance	Service Limits
				
3 ✓ 6 ⚠	10 ✓ 0 ⚠	11 ✓ 3 ⚠	12 ✓ 3 ⚠	0 ✓ 0 ⚠
0 ❗	0 ❗	3 ❗	2 ❗	0 ❗
$1,934.10 Potential monthly savings				

Cost Management and Optimisation Mechanisms

“Good intentions never work, you need good mechanisms to make anything happen"

- Jeff Bezos

Cost Management & Optimisation Mechanisms drives action



Cost Management & Optimisation Mechanisms that makes saving money quicker and easier

Cost visibility, optimisation metrics, and targets

Cost Management & Optimisation Mechanisms that makes saving money quicker and easier

Cost visibility, optimisation metrics, and targets

Defined & validated cost allocation tags

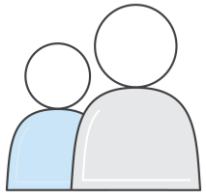
Cost Management & Optimisation Mechanisms that makes saving money quicker and easier

Cost visibility, optimisation metrics, and targets

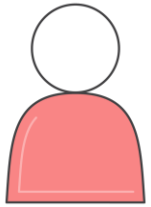
Defined & validated cost allocation tags

Cost Management & Optimisation tools

AWS Enterprise Support, AWS Professional Services, and AWS Partners can guide your Cost Management and Optimisation journey and initiatives, contact your AWS Account Manager for more info.



AWS Enterprise Support
https://aws.amazon.com/premiumsupport/enterprise-support/



AWS Professional Services
https://aws.amazon.com/professional-services/

aws partner network

AWS Partner Network
https://aws.amazon.com/partners/

Learn from AWS experts. Advance your skills and knowledge. Build your future in the AWS Cloud.

Digital Training

Free, self-paced online courses built by AWS experts

Classroom Training

Classes taught by accredited AWS instructors

AWS Certification

Exams to validate expertise with an industry-recognized credential

Ready to begin building your cloud skills?
Get started at: https://www.aws.training/

With deep expertise on AWS, APN Partners can help your organization at any stage of your Cloud Adoption Journey.

AWS Managed Service Providers

APN Consulting Partners who are skilled at cloud infrastructure and application migration, and offer proactive management of their customer's environment.

AWS Competency Partners

APN Partners who have demonstrated technical proficiency and proven customer success in specialized solution areas.

AWS Marketplace

A digital catalog with thousands of software listings from independent software vendors that make it easy to find, test, buy, and deploy software that runs on AWS.

AWS Service Delivery Partners

APN Partners with a track record of delivering specific AWS services to customers.

Ready to get started with an APN Partner?
Find a partner: https://aws.amazon.com/partners/find/
Learn more at the AWS Partner Network Booth

Thank You for Attending AWS Innovate

We hope you found it interesting! A kind reminder to **complete the survey.**

Let us know what you thought of today's event and how we can improve the event experience for you in the future.


aws-apac-marketing@amazon.com


twitter.com/AWSCloud


facebook.com/AmazonWebServices


youtube.com/user/AmazonWebServices


slideshare.net/AmazonWebServices


twitch.tv/aws