



Cloud Finance Onboarding (CFO)



CFO

Cloud Finance Onboarding by 

CLOUD FINANCE ONBOARDING (CFO): MODULE 2

Cloud Cost Optimization

AGENDA

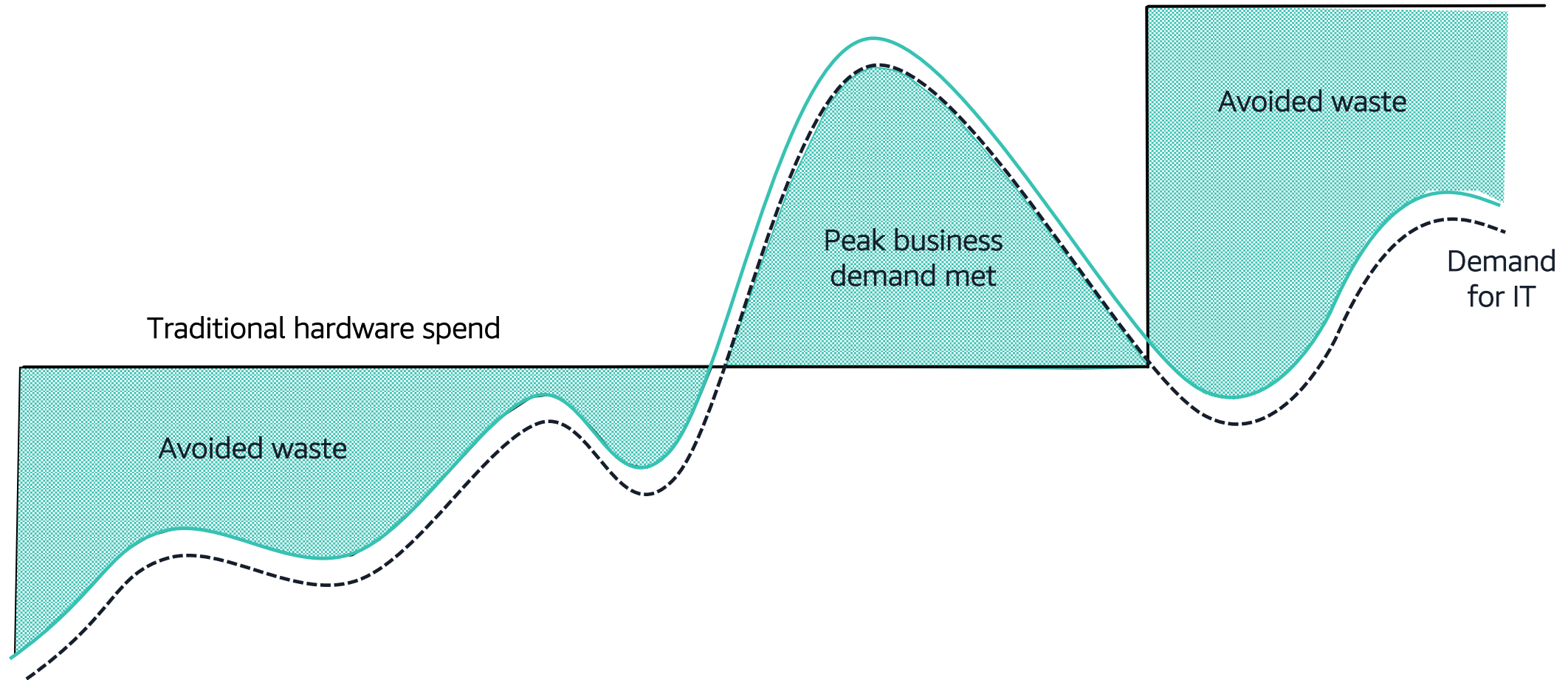
- 1 AWS Pricing
- 2 Optimize Cloud Rate
- 3 Optimize Cloud Usage
- 4 Implementing Optimizations



AWS Pricing



AWS allows you to reduce waste and manage resource supply to demand





What are the key drivers of your Cloud spend?

Usage

Total units describing
usage of each
underlying service



720 hours this month



550 GB stored this month



Rate

Amount paid per unit of
usage

\$0.0376 / hour

\$0.023 GB / month



Cloud Spend

Total amount to be paid
for usage of all services

\$27.07

*Amazon EC2 t4g.medium
On-Demand @ London Region*

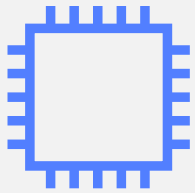
\$12.65

Amazon S3 Standard



Key Cost Drivers: Usage

Process

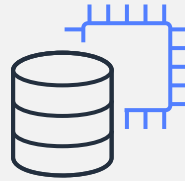


Charged per hour,
second or 1 ms

Charged from launch until
stoppage or termination

Amazon EC2 Linux (per second)
AWS Lambda (per nearest ms)

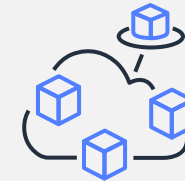
Store



Typically charged per GB

Amazon S3 (per GB)
Amazon EBS (per GB)

Move



Typically charged per GB

Data Egress (per GB)
Amazon CloudFront (per GB)



Key Cost Drivers: Rate

On-Demand

Pay only for what you use



Pay your resources utilization with complete flexibility

Commitment based

Pay less when you commit / reserve



Make a commitment and receive a significant discount (**between 12% to over 50% savings**)

Volume based

Pay less by using more



Realize volume-based discounts and realize important savings as your usage increases

Spot

Pay less by using spare capacity



Spare Amazon EC2 capacity at **savings of up to 90%** off On-Demand prices



AWS service pricing pages

Services Pricing



Compute



Storage



Database



Migration & Transfer



Networking & Content
Delivery



Developer Tools



Management and Governance



Media Services



Security, Identity &
Compliance



Analytics



Machine Learning



Mobile Services



AR & VR



Application Integration



Customer Engagement



Business Applications



End User Computing



Internet of Things



Game Development



Blockchain

Every AWS service has a pricing page



AWS Pricing Calculator

A web-based planning tool that you can use to create estimates for your AWS use cases

- View **transparent** pricing / calculations
- Use groups for **hierarchical estimates**
- Share your estimates (URL)
- Export your estimates (CSV, PDF)

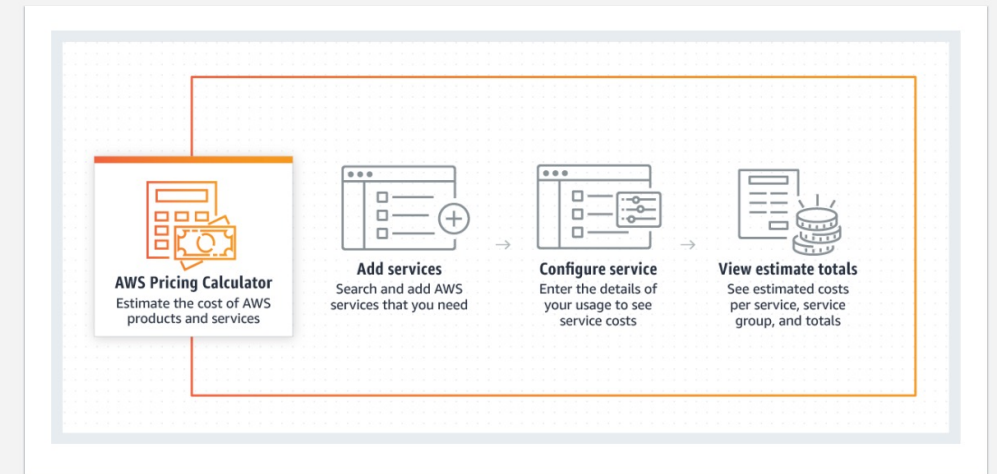
*As of April 24, 2022

AWS Pricing Calculator

Estimate the cost for your architecture solution.

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

How it works

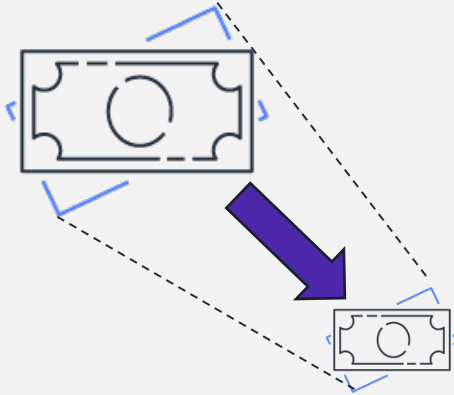


<https://calculator.aws/#/>



To reduce cost, there are ultimately two levers

To Reduce Cost



1

Optimize Usage

Use only what
you need



2

Optimize Rate

Pay less for
what you use

+





Optimize Cloud Rate

Pay less for what you use

Why are commitment-based purchase options important?

Commitment-based purchase options are a fundamental AWS pricing model construct

- A flexible pricing model that can help you reduce your bill by up to 72% compared to On-Demand prices, in exchange for a **one- or three-year hourly spend commitment**.
- Improve unit economics of **steady state** cloud workloads
- Reduce costs of compute, database, analytics, and media services
- Require **no changes** to deployed cloud resources



Commitment-based Purchases: RI & SP

Reserved Instances

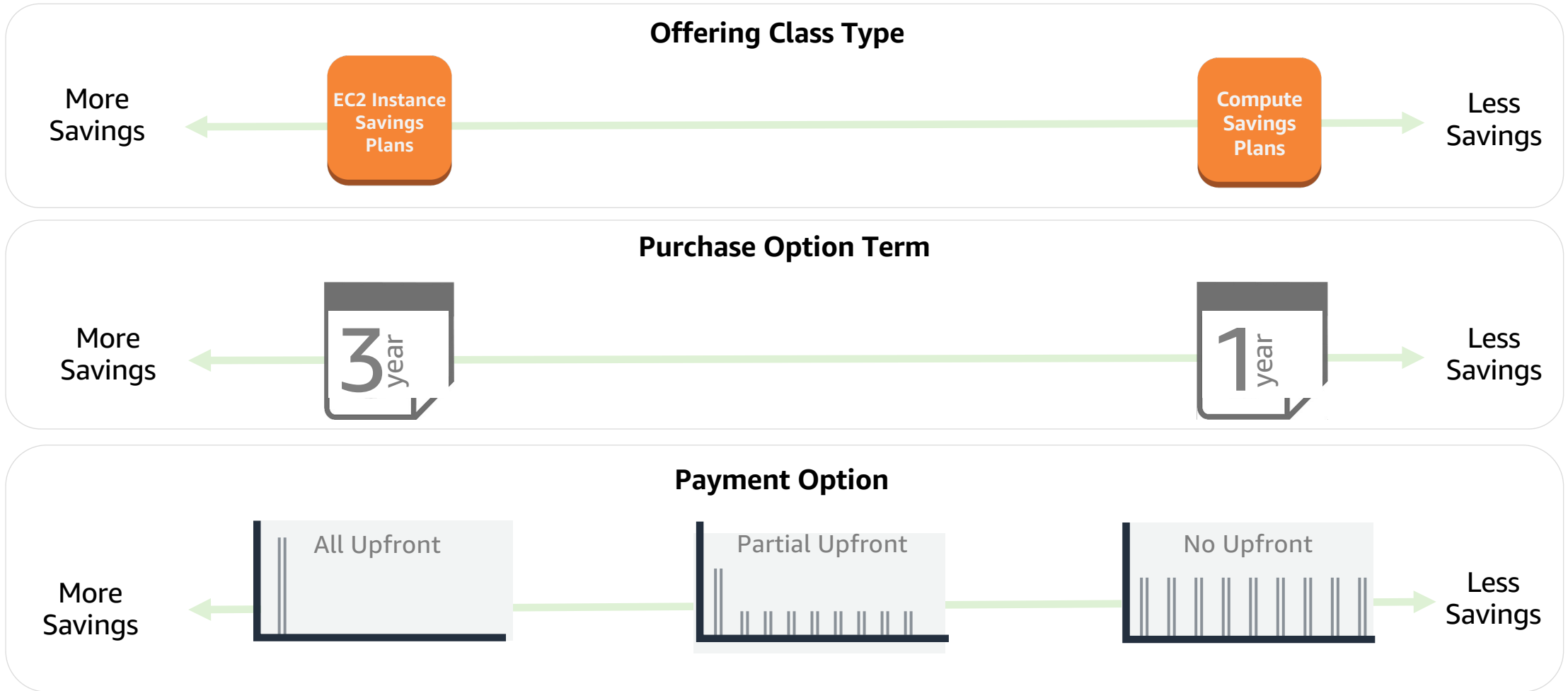
- ✓ Commit to consistent amount of usage in the form of **specific quantity and types of a resource**
 - *(15 instances of db.m4.2xlarge MySQL Amazon RDS per hour)*
- ✓ Standard' and 'Convertible' Reserved Instances
- ✓ Amazon RDS, Amazon Redshift, ElastiCache and OpenSearch

Savings Plans

- ✓ Commit to a consistent amount of usage in the form of an **hourly monetary spend**
 - *(\$10 per hour)*
- ✓ 'Compute' and 'EC2 Instance' Savings Plans
- ✓ Compute services like Amazon EC2, AWS Lambda, AWS Fargate, and even Amazon SageMaker



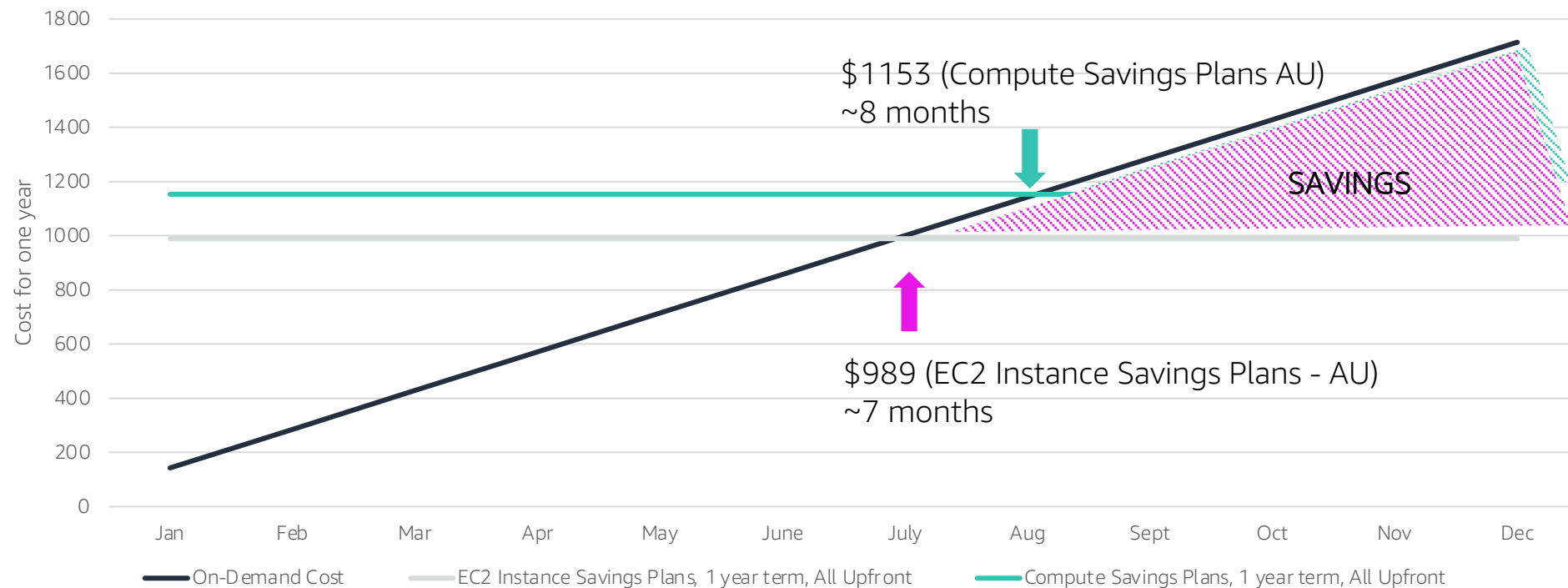
Commitment-based Purchases: Options





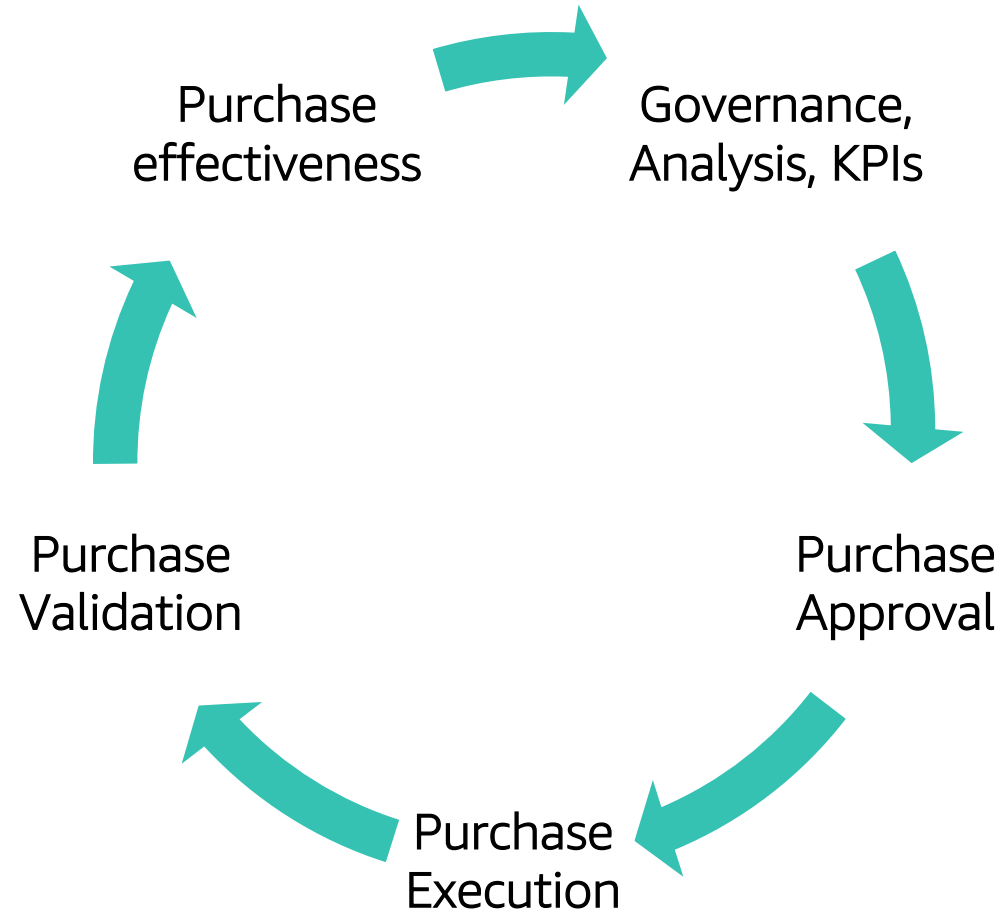
Commitment-based Purchases: Payback

m5.xlarge Savings Plans





Commitment-based Purchases: Management





Commitment-based Purchases: Strategy

Expand your Savings Plans footprint **progressively** as usage increases

One large SP creates a create risk of overcommitment

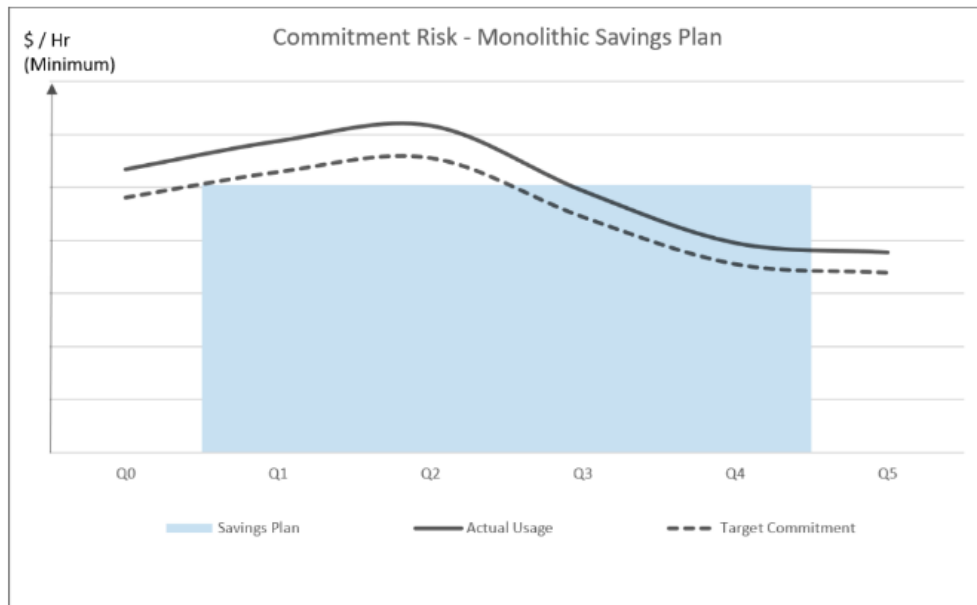


Figure 1: Unexpected and severe drop in actual usage goes below commitment level mid-term, resulting in waste due to over-commitment.

Consider a mix of 1 and 3-year plans with multiple expiration dates



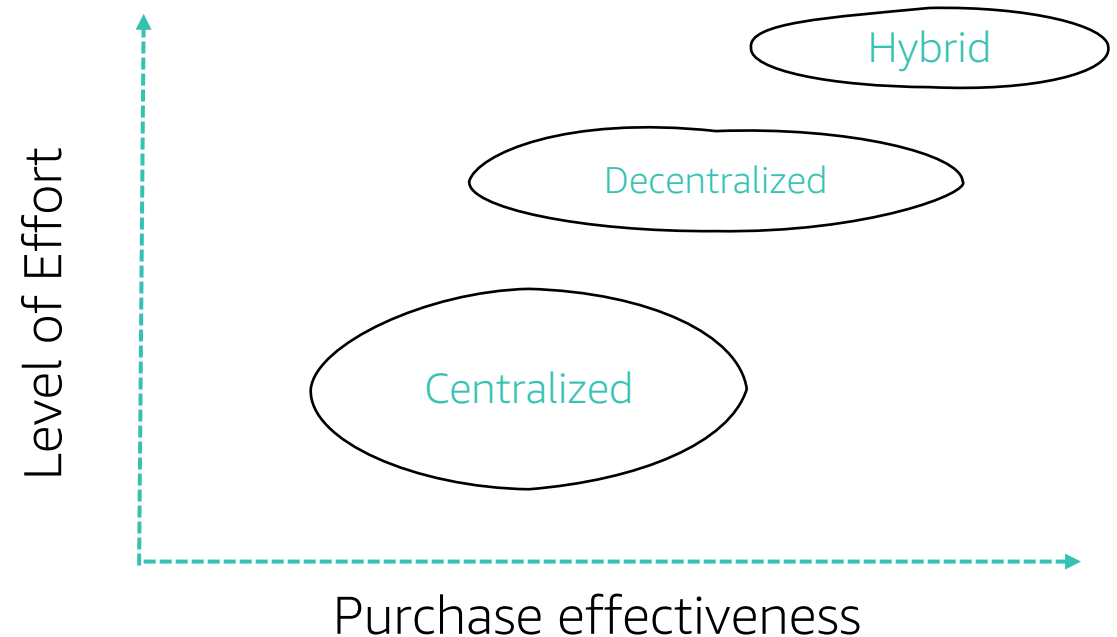
Figure 2: When Savings Plan 3 expires at the start of Q3, it is replaced with a much smaller Savings Plan 7, and when Savings Plan 4 expires at the start of Q4, no Savings Plan is purchased to replace it. As a result, over-commitment is reduced.



Commitment-based Purchases: Ownership

Ownership models

- **Centralized**
 - Single person/team
 - Independent teams
- **Decentralized**
 - Each team/product/business unit
- **Hybrid**
 - Centralized ownership, inputs from teams





Amazon EC2 Spot

Amazon EC2 Spot Instances let organizations take advantage of **spare** Amazon EC2 capacity in the AWS Cloud



Spot infrastructure

Same as On-Demand

Up to 90% off



Spot pricing

Smooth, infrequent changes
no spikes, more predictable



Interruptions

Only happens when Amazon EC2 needs capacity
(with 2 min window)

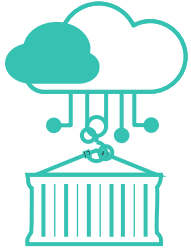


Diversify

Choose different instance types, size and Availability Zone in a single fleet



Spot is ideal for fault-tolerant workloads



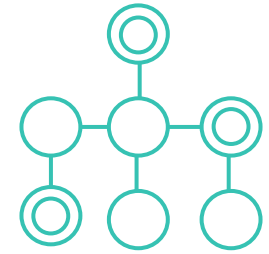
Containers



Big data



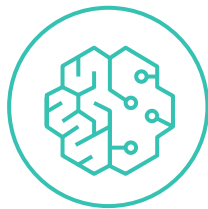
CI/CD



Batch



Web services



Machine Learning

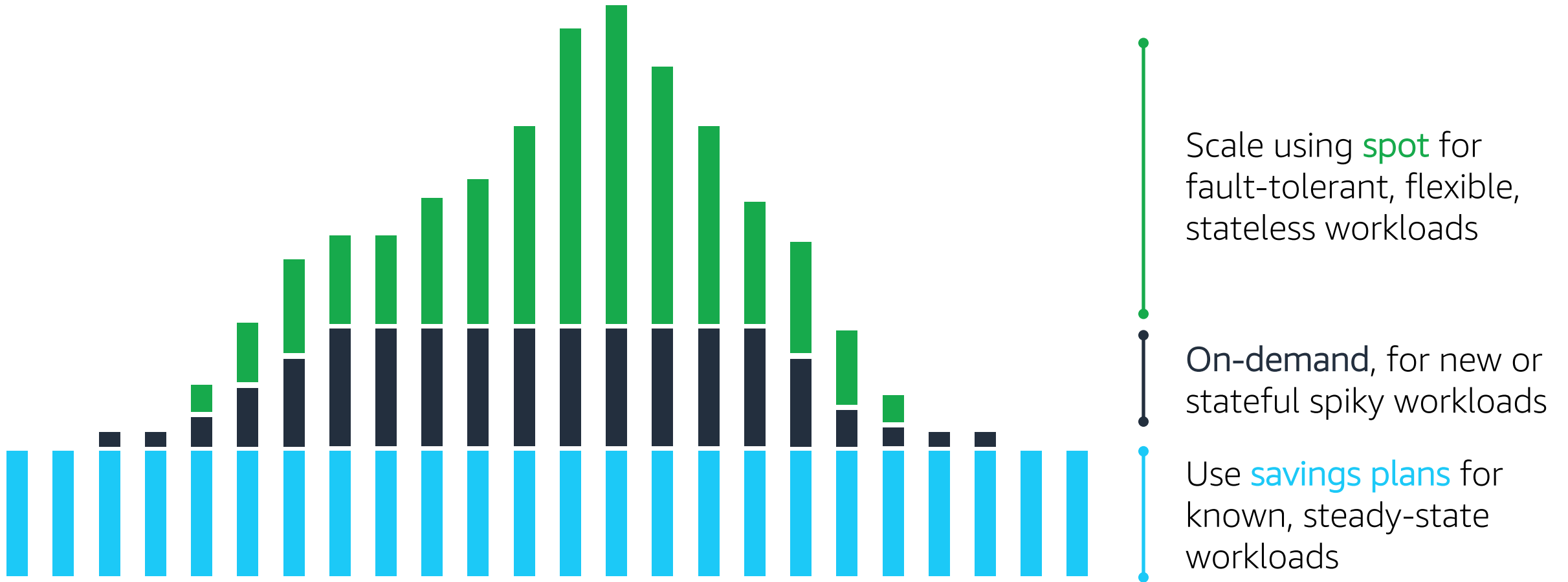


HPC

**Lean on
Spot
for these
workloads**



Combining Purchase Options





Optimize Cloud Usage

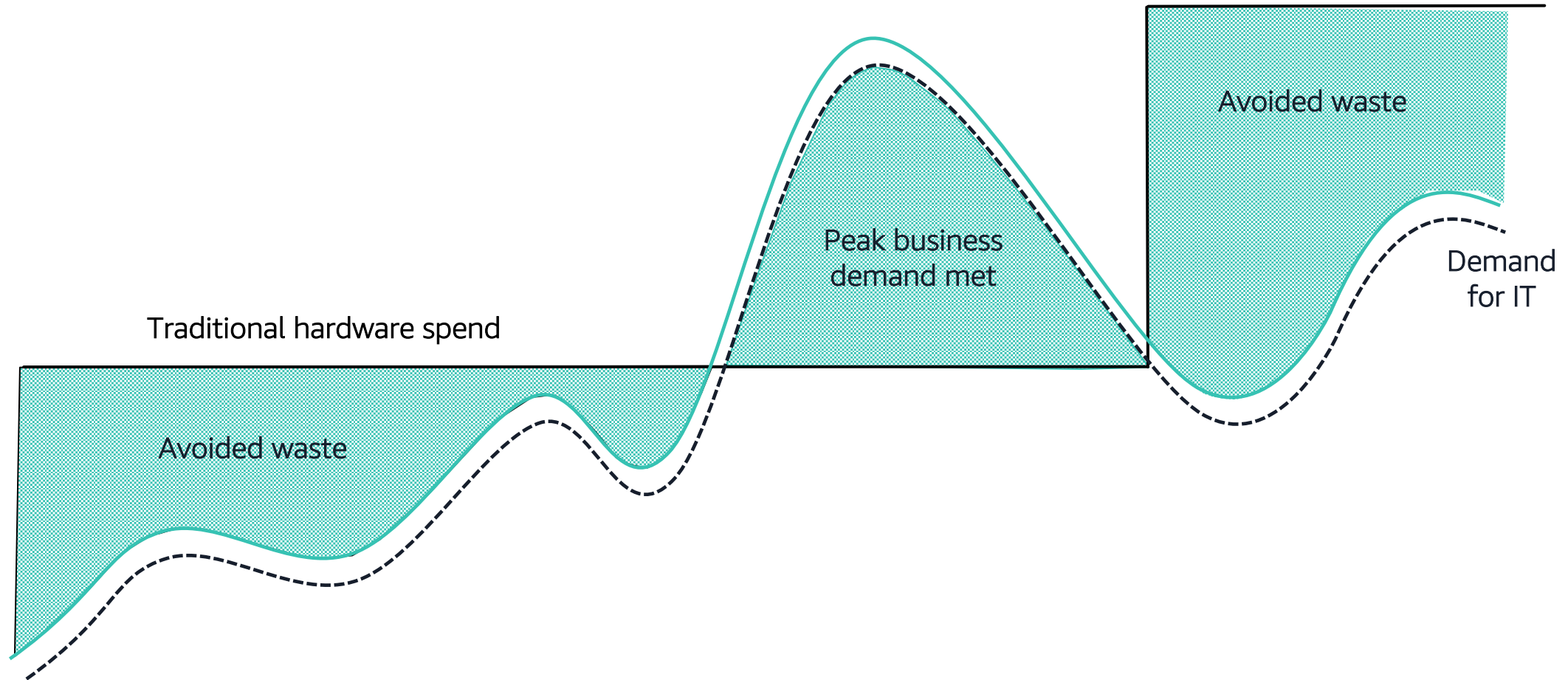
Use only what you need

Usage optimization activities where Finance is part of the mechanism

- Decommission resources
- Evaluate cost when selecting services and resources (rightsizing & modernization)
- Plan for data transfer
- Manage resource supply to meet demand (elasticity)



AWS allows you to reduce waste and manage resource supply to demand





Resource Decommissioning



AWS Trusted Advisor

Find unused resources with AWS Trusted Advisor

- Idle Amazon EC2 and Amazon Relational Database Service instances
- Underutilized Amazon Elastic Block Store volumes
- Idle load balancers
- Unassociated Elastic IP addresses
- Underutilized Amazon Redshift clusters

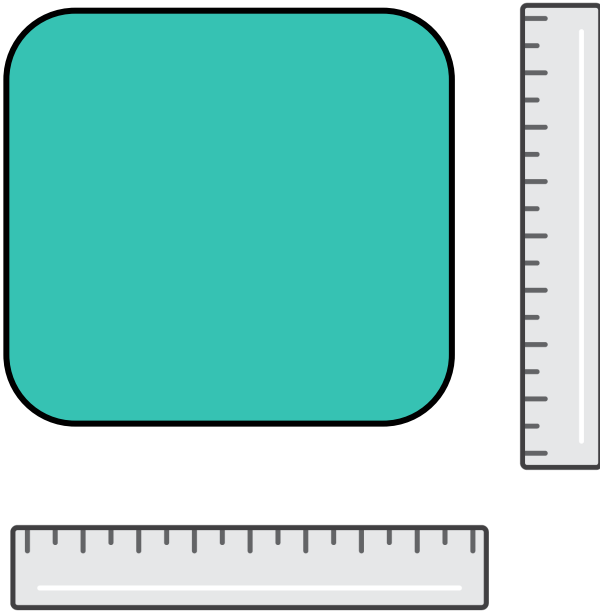


Resource Rightsizing (1/2)





Resource Rightsizing (2/2)



- Selecting the best fitted resource for your workload needs
- Most commonly based on CPU, RAM, storage, and network needs
- Doing this before/during migration or iteratively over a cloud-based workloads lifetime



Resource Modernization

Previous Generation

AWS resource types that have modern versions available for consumption

Modern generation

Most recent AWS resource types

Reduced pricing

Better price to performance ratio



Data Transfer Management



HydroxyCoreyQuinn
@QuinnPig

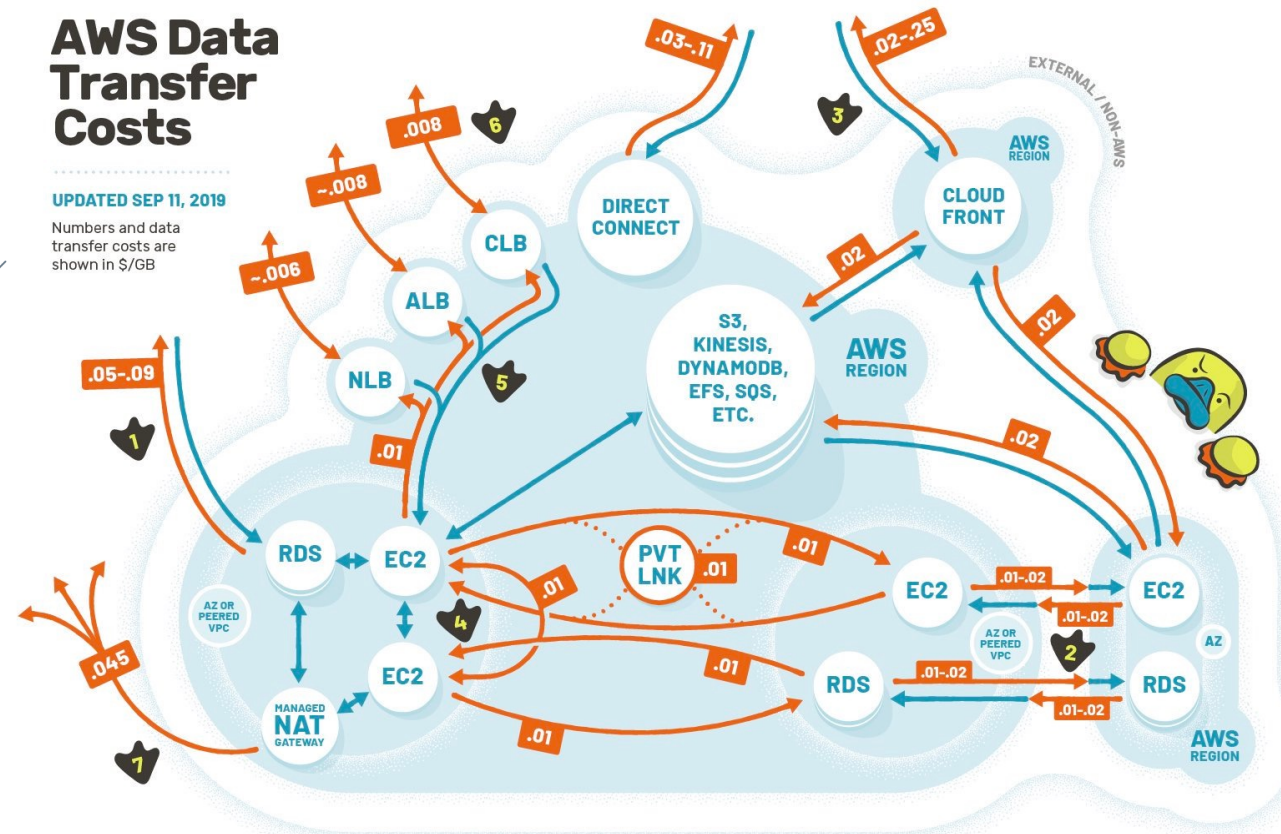
How @awscloud data transfer gets billed. Simple, right?

1:02 PM · Sep 12, 2019 · Tweetbot for Mac

AWS Data Transfer Costs

UPDATED SEP 11, 2019

Numbers and data transfer costs are shown in \$/GB



Still confused as hell? Get help at [duckbillgroup.com](https://github.com/open-guides/og-aws)



Inbound traffic is typically free – outbound is not. Some (but not all) internal traffic is **free**.

1

Direct outbound data starts at **\$.09/GB** for less than 10TB, and discounts with volume. **First 1GB is free**.

2

Region-to-region traffic is **\$.02/GB** when it exits a region for indicated services except between us-east-1 and us-east-2, where it's **\$.01/GB**. Even data wants to get out of Ohio.

3

Outbound CloudFront prices are highly variable by geography and regional edge cache and start at **\$.085/GB** in US/Canada.

4

Internal traffic via public or elastic IPs incurs **additional fees** in both directions.

5

Cross-AZ EC2 traffic within a region costs half as much as region-to-region! ELB-EC2 traffic is **free** except outbound crossing AZs.

6

Elastic Load Balancing: Classic and Network LB is priced per GB. Application LB costs are in LCUs, not \$/GB.

7

Traffic via Managed NAT Gateway – regardless of destination – costs an additional **\$.045/GB** on top of other transfer, including internal transfer (S3, Kinesis, etc.).

Inspired by Open Guide to AWS's data transfer diagram github.com/open-guides/og-aws

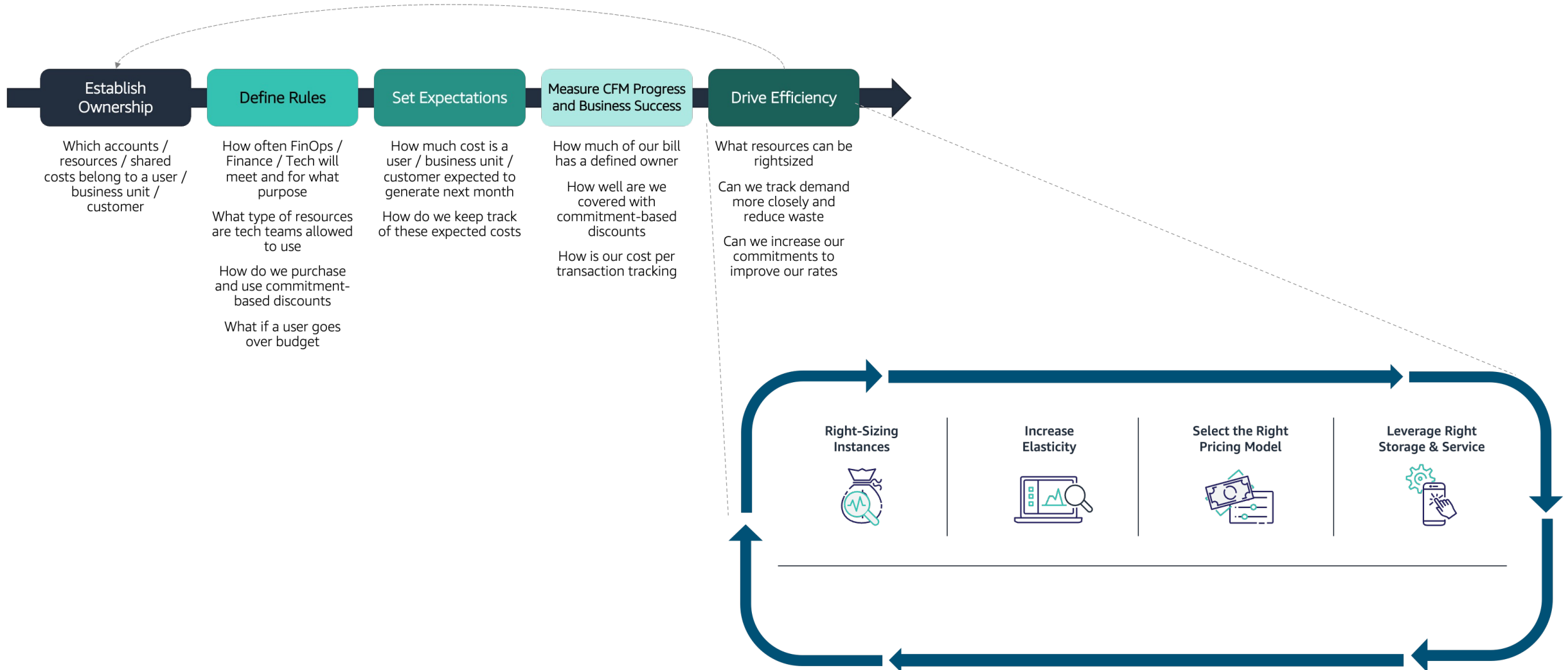
<https://twitter.com/quinnpig/status/1>



Implementing Optimizations

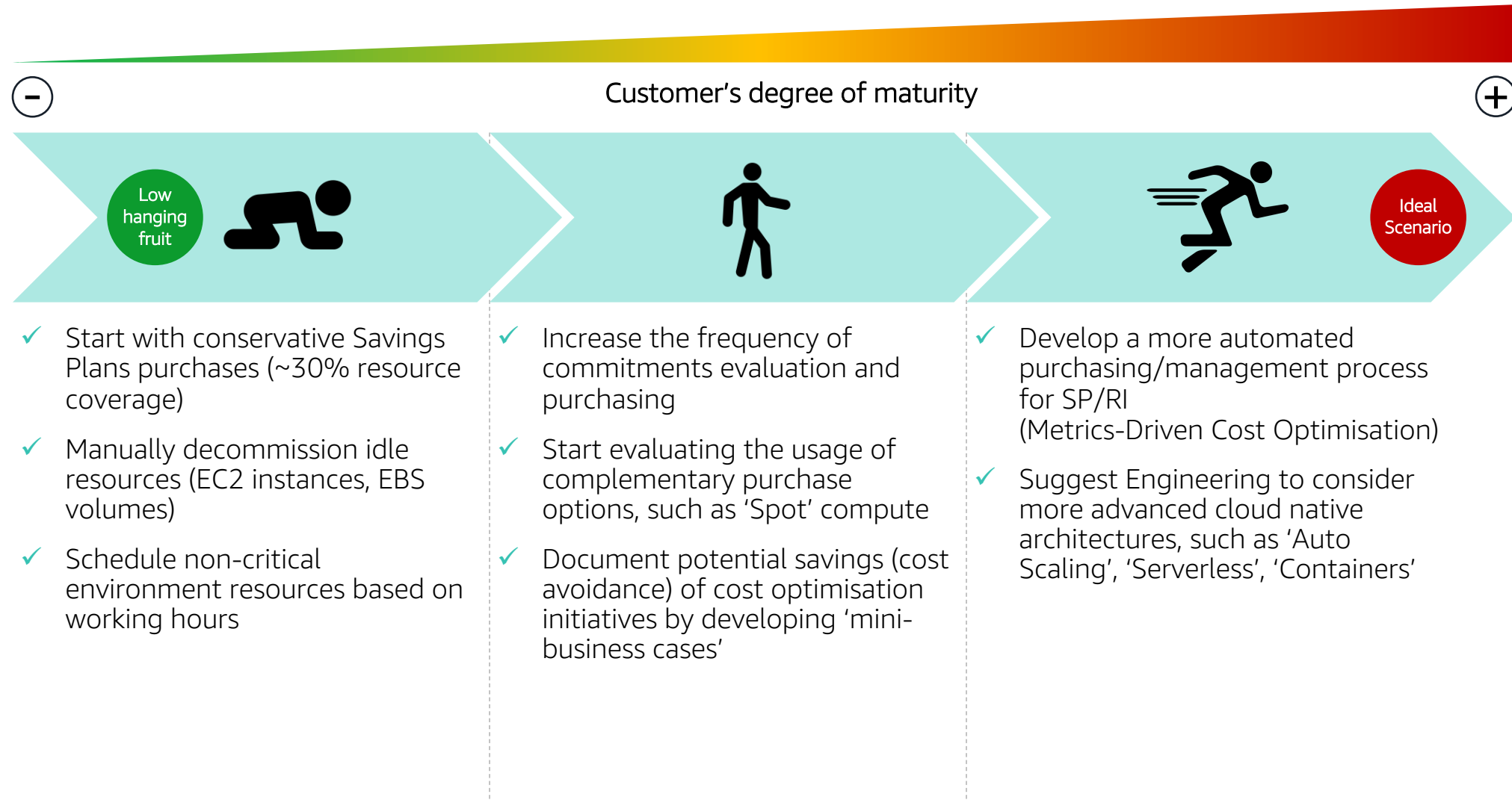


An iterative combination of tactical and strategic



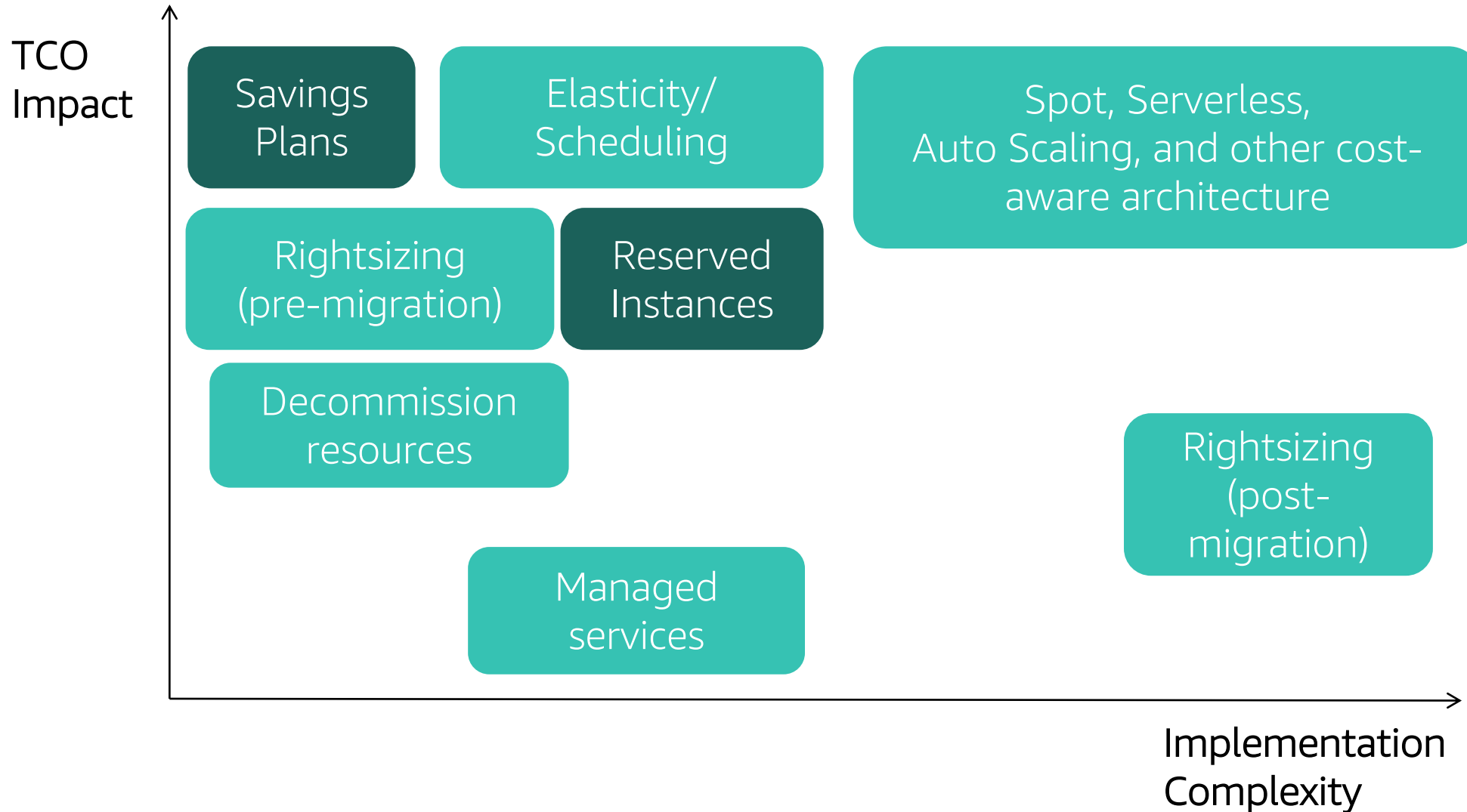


Where to start





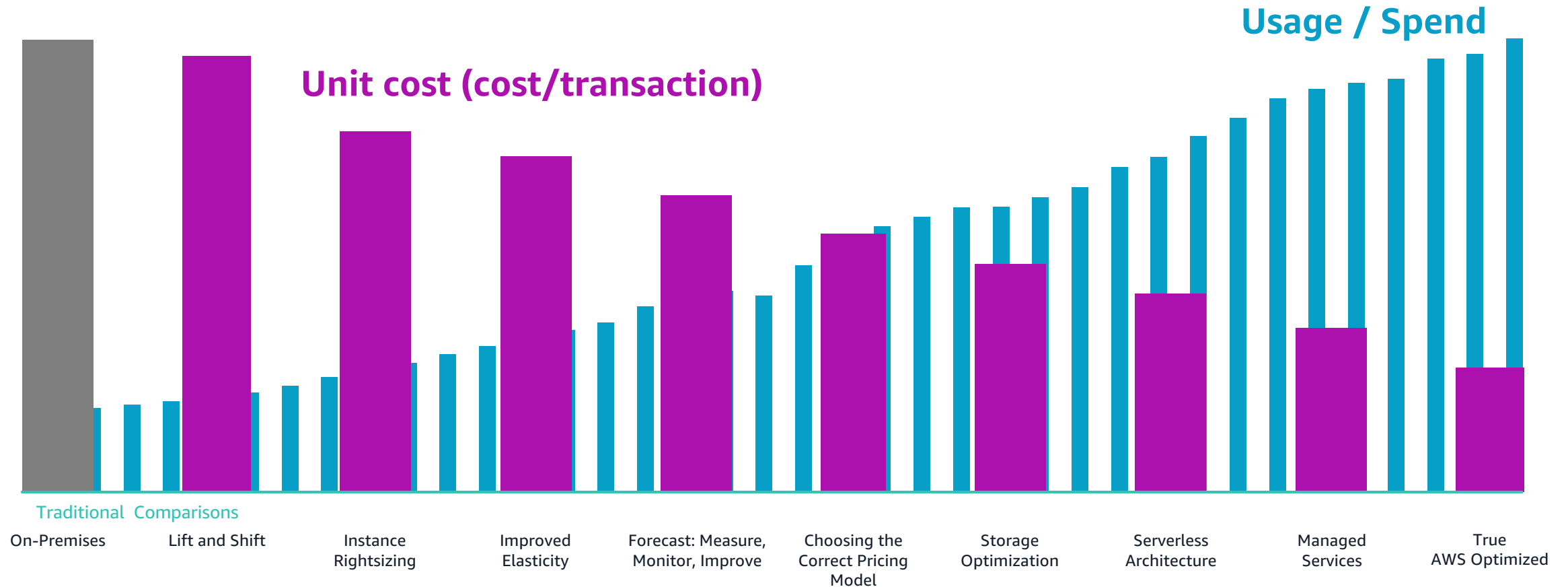
Considering TCO Impact vs. Complexity





What great looks like

Leveraging **efficiency** to meet business agility needs








To be a bit more pragmatic ...

9

The nine ways

Knowledge level

-  Beginner
-  Intermediate
-  Advanced

Use only what you need



- 1 Stop paying for underutilized Amazon EC2 and Amazon RDS instances
- 2 Stop paying for underutilized Network and Storage resources
- 3 Finetune your Amazon Redshift clusters
- 4 Finetune your serverless resources: AWS Lambda and Amazon DynamoDB

Pay less for what you use



- 5 Enable Amazon S3 Intelligent-Tiering
- 6 Enable Amazon EC2 Spot Instances
- 7 Modernize your resources: Amazon EC2, Amazon RDS, and Amazon EBS
- 8 Use Compute Savings Plans
- 9 Use Reserved Instances



Who is responsible for what (personas)



Finance Persona

- ✓ Define optimization **targets**
- ✓ Approve/endorse **commitment based purchases**



FinOps Persona

- ✓ **Deliver and centralise reports** in a timely manner and **identify** optimization opportunities
- ✓ Set a **cadence/meetings** with Tech and Finance together to discuss optimisation opportunities
- ✓ **Lead the prioritization** and agree on delivery with the teams
- ✓ Ensure that Finance/Procurement is aware of commitments and that internal process/policies are followed
- ✓ **Challenge Tech / IT**



Tech Persona

- ✓ Assess **technical feasibility** of optimisation recommendations
- ✓ **Implement** prioritized technical optimisations
- ✓ Advise on **expected minimum volumes** when discussing commitment based purchases
- ✓ **Document** all optimization activities (e.g. what has been assessed and the reason for non implementation if any)
- ✓ Consider **cost-aware architectures** when designing solutions (e.g. spot, serverless, auto scaling, latest generation EC2, RDS, EBS)



Thank you