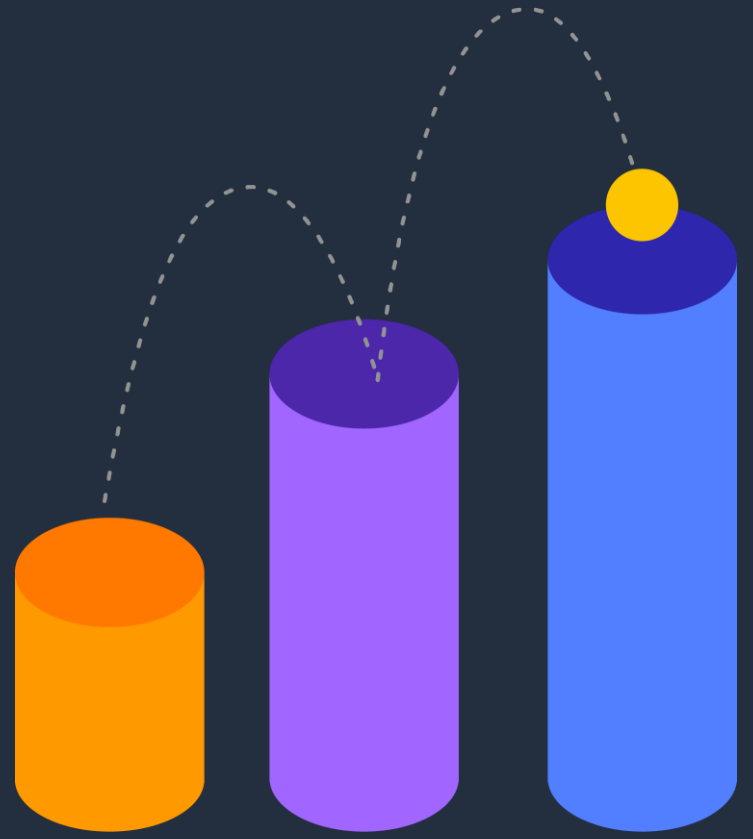
# AWS Builders Online Series

## Introductory guide to AWS cost management and efficiency

Peter Shi, Cloud Financial Management, Business Development

AWS



# Agenda

The economics of AWS

Using AWS in a cost efficient way

How to manage your spend on AWS

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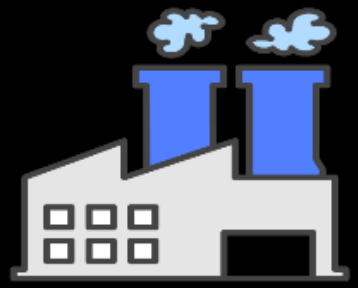
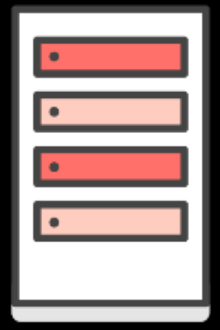
# Cloud is the new normal with fewer organisations asking “why” and more asking “how and how fast?”

**Industrial Revolution**



Shift to on-demand power

**Cloud Revolution**



Shift to on-demand computing



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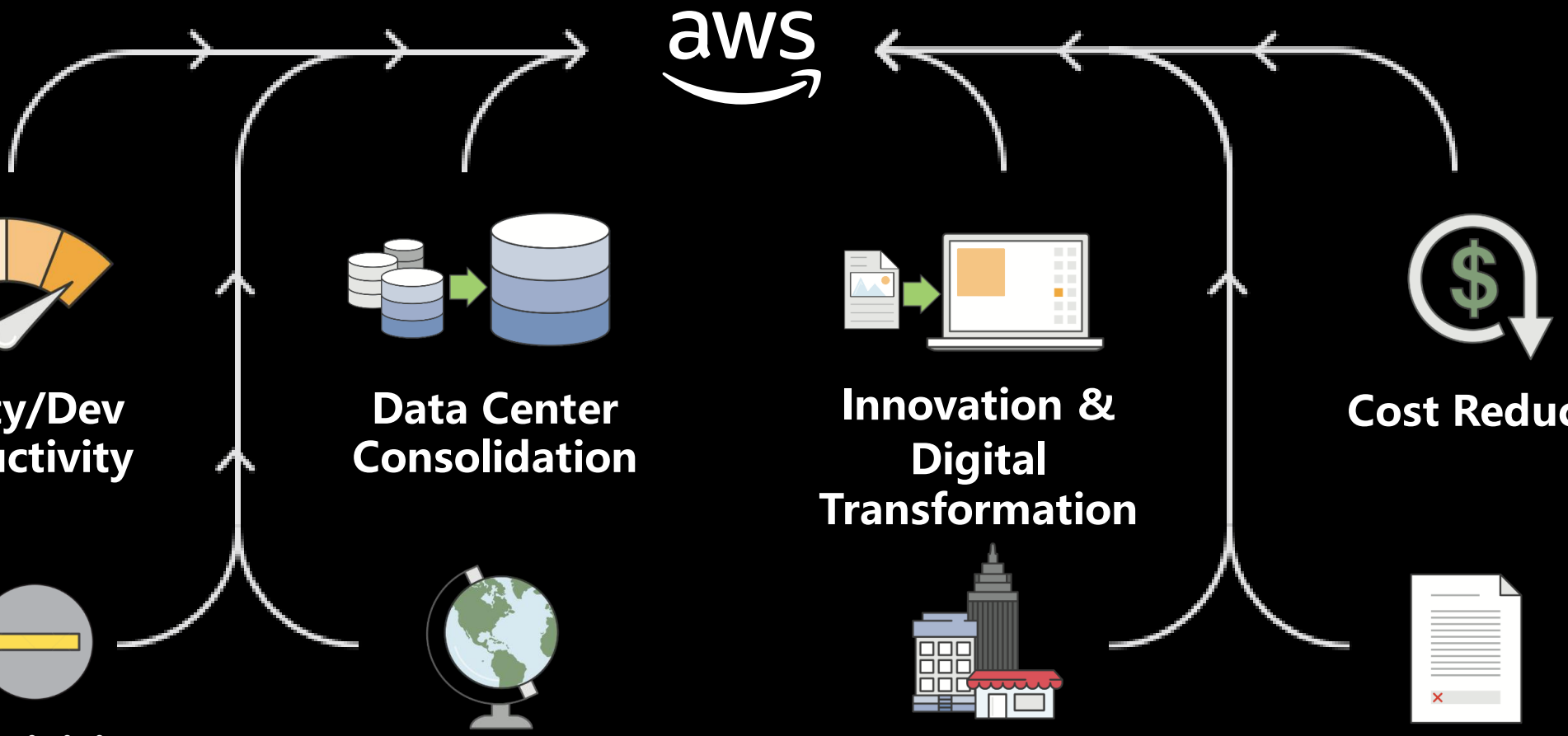
# Customers are adopting AWS at a rapid pace



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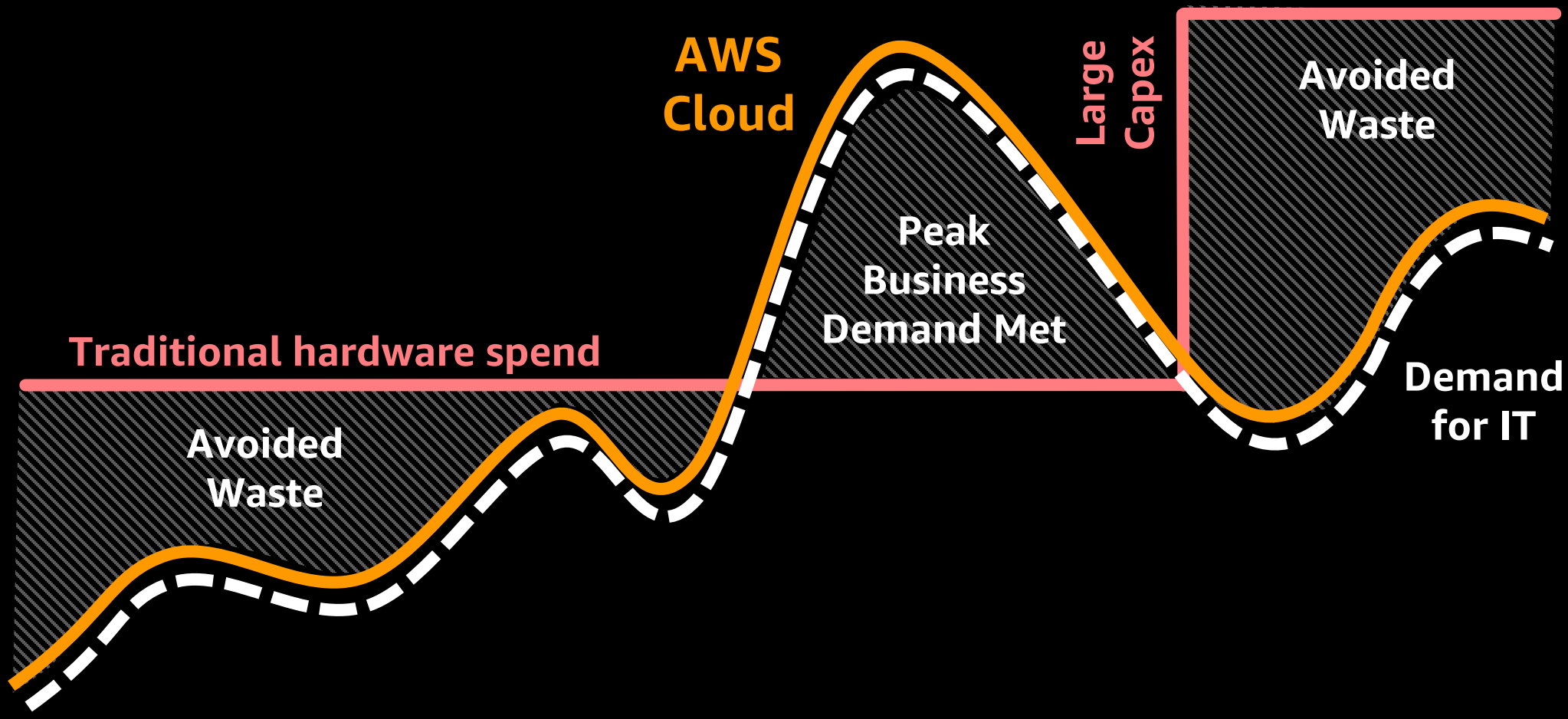
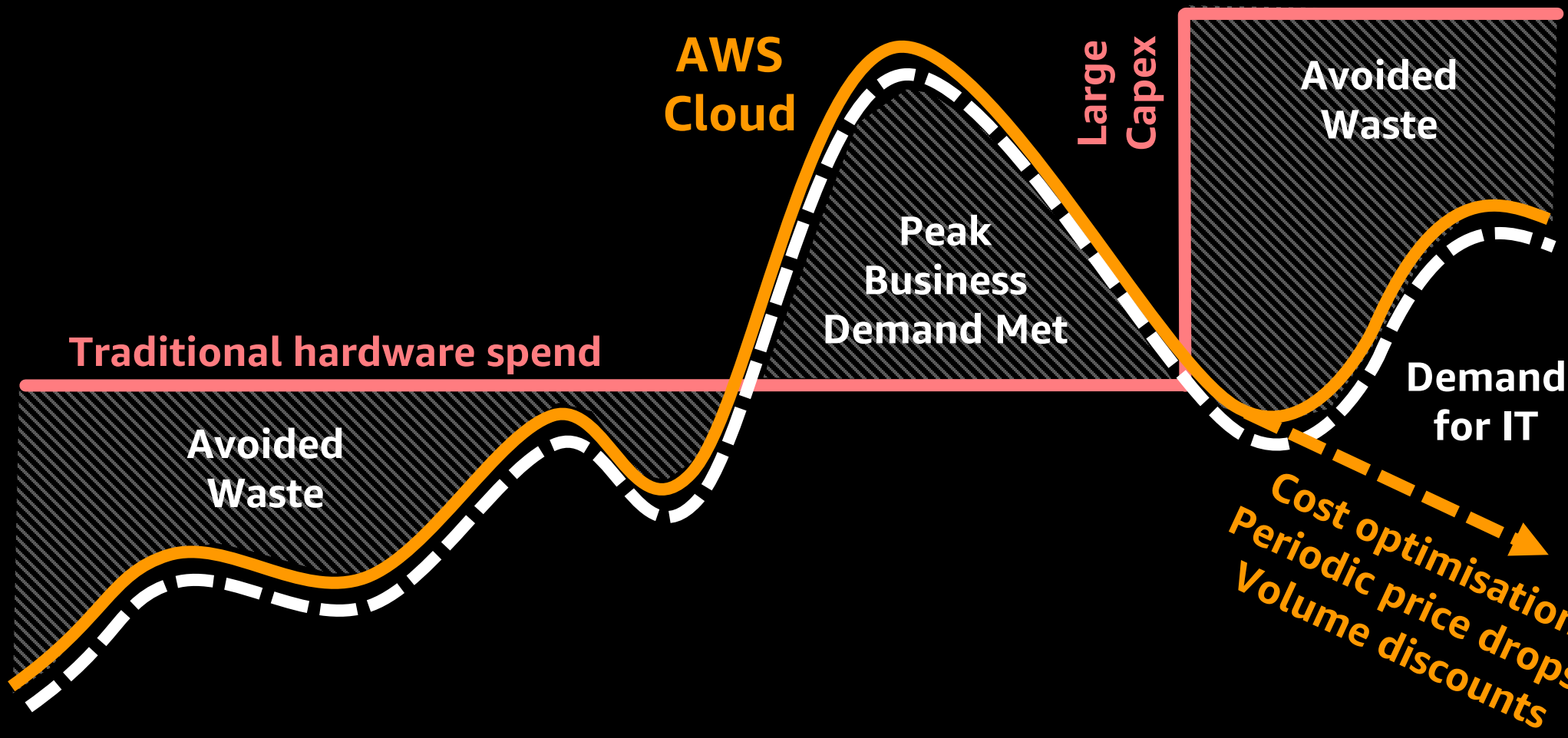
# AWS allows you to eliminate waste and meet peak business demand



# AWS allows you to eliminate waste and meet peak business demand



# Customers have gained value beyond cost

| | Cost Savings (TCO) | Staff Productivity | Operational Resilience | Business Agility |
|---|---|---|---|---|
| **What is it?** | Savings on infrastructure, on licensing, and from managed services | Efficiency improvement, reduced wait times and downtime | Better SLAs, reduced outages and MTTR, and security | Faster application deployment, global reach, and lower cost of experimentation |
| **Examples** | 30% reduction in total cost of ownership (Globe) | Deploys SAP 93% faster (Visy) | 60% reduction in downtime (Trainline) | Scaled by 1000 percent in 1 year and reduced dev project time by months (iTrueMart) |

Typical Focus

Most Compelling Cloud Benefits



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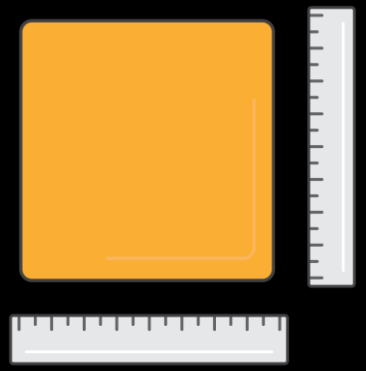
# Agenda

The economics of AWS

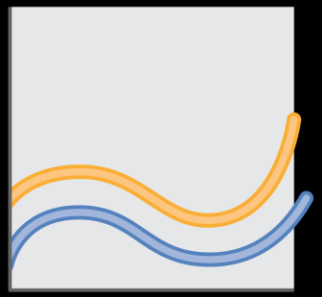
Using AWS in a cost efficient way

How to manage your spend on AWS

# The Technical Pillars of Optimisation



Right Size & Decommission unused Resources



Turn off resources outside of work hours

Use Savings Plans and Reserved Instances

Design for Cost



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# Right size by picking the right family from the start

| | |
|---|---|
| General Purpose | A1 T3 T3a T2 M5 M5a M4 |
| Compute Optimized | C5 C5n C4 |
| Memory Optimized | R5 R5a R4 X1e X1 High Memory z1d |
| Accelerated Computing | P3 P2 G3 F1 |
| Storage Optimized | I3 I3en D2 H1 |

For migrations, consider using a tool like TSO Logic, Risc Networks, or Atadata



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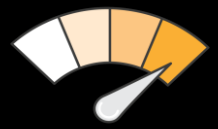
# Sizing resources to fit to usage example


1. Use Cost Explorer: Resource Optimization Recommendations to find underutilised EC2 resources and understand savings potential

2. Agree when to resize, how many to resize, and understand any other constraints

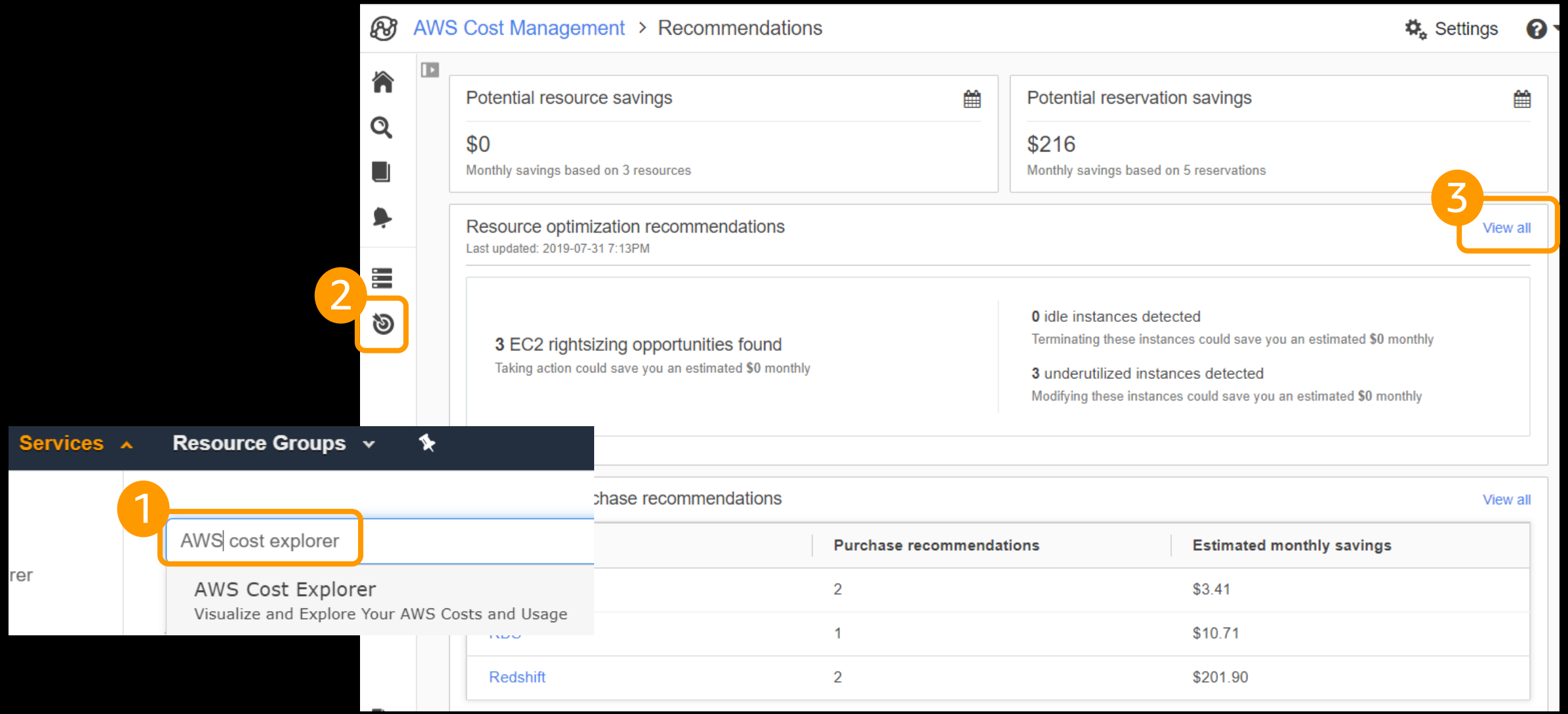

3. Size to what's needed (m4.4xlarge -> m4.xlarge saves 87%)



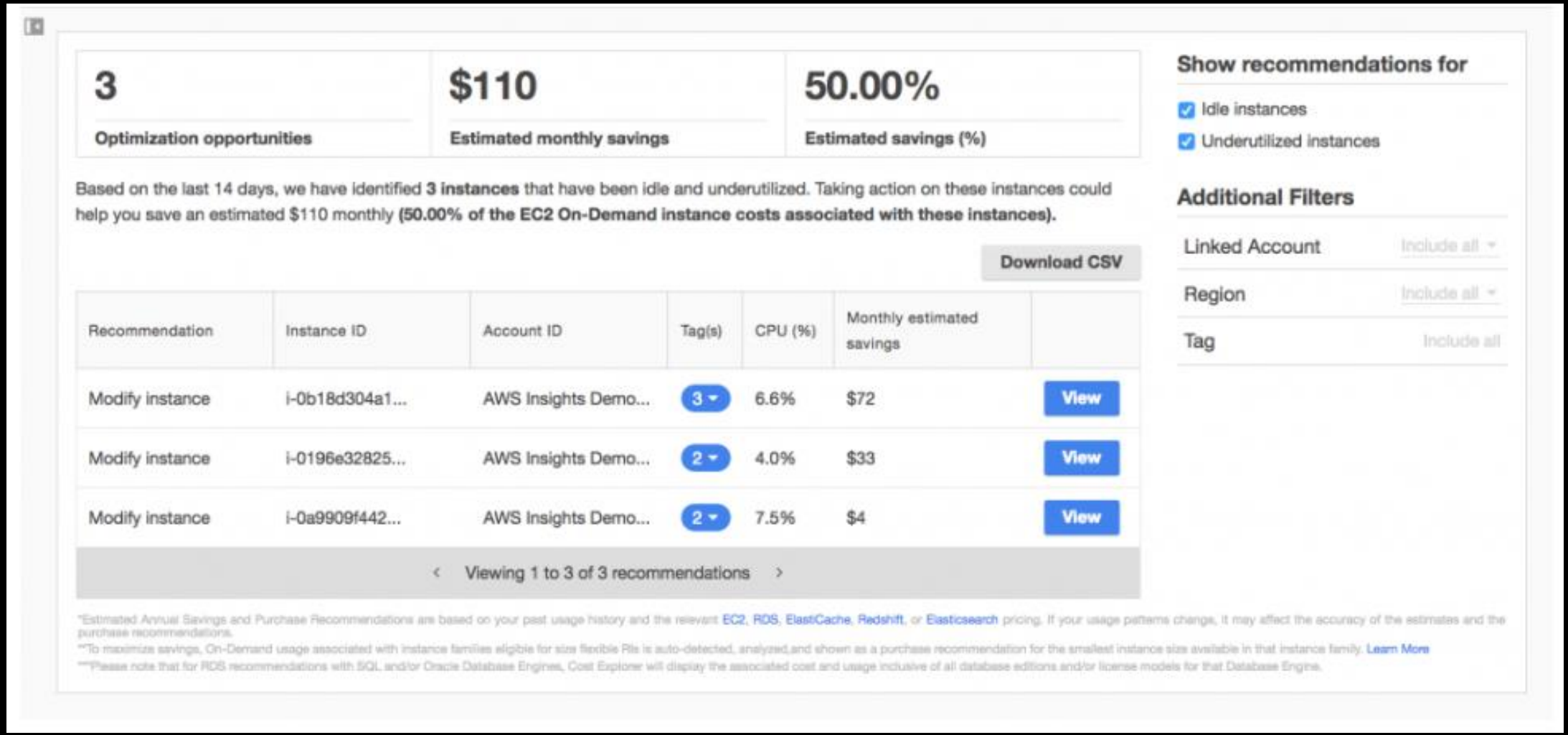
4. Review application Performance

5. Celebrate the savings win

# Cost Explorer: Resource optimization recommendations



# Cost Explorer: Resource optimization recommendations



| 3 | $110 | 50.00% |
|---|---|---|
| Optimization opportunities | Estimated monthly savings | Estimated savings (%) |

Based on the last 14 days, we have identified **3 instances** that have been idle and underutilized. Taking action on these instances could help you save an estimated $110 monthly **(50.00% of the EC2 On-Demand instance costs associated with these instances).**

Download CSV

| Recommendation | Instance ID | Account ID | Tag(s) | CPU (%) | Monthly estimated savings | |
|---|---|---|---|---|---|---|
| Modify instance | i-0b18d304a1... | AWS Insights Demo... | 3 | 6.6% | $72 | View |
| Modify instance | i-0196e32825... | AWS Insights Demo... | 2 | 4.0% | $33 | View |
| Modify instance | i-0a9909f442... | AWS Insights Demo... | 2 | 7.5% | $4 | View |

‹ Viewing 1 to 3 of 3 recommendations ›

Show recommendations for

- Idle instances
- Underutilized instances

Additional Filters

- Linked Account — Include all
- Region — Include all
- Tag — Include all

*Estimated Annual Savings and Purchase Recommendations are based on your past usage history and the relevant EC2, RDS, ElastiCache, Redshift, or Elasticsearch pricing. If your usage patterns change, it may affect the accuracy of the estimates and the purchase recommendations.
**To maximize savings, On-Demand usage associated with instance families eligible for size flexible RIs is auto-detected, analyzed,and shown as a purchase recommendation for the smallest instance size available in that instance family. Learn More
***Please note that for RDS recommendations with SQL and/or Oracle Database Engines, Cost Explorer will display the associated cost and usage inclusive of all database editions and/or license models for that Database Engine.



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# Find unused resources using tools like AWS Trusted Advisor (available via business support)

AWS Trusted Advisor

Old snapshots

Unattached Elastic IPs

Idle EC2, RDS instances

Unattached EBS

Idle or unattached load balancers



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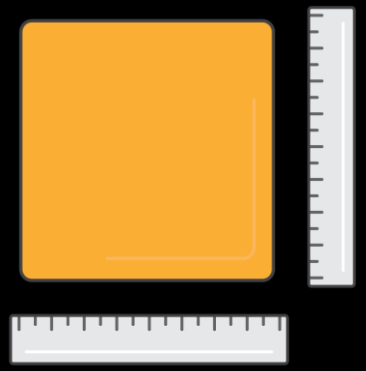
# The Technical Pillars of Optimisation



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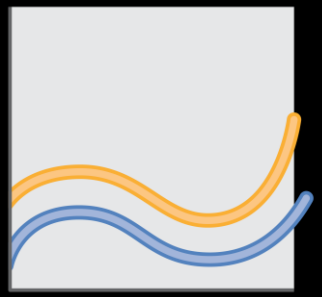

**Turn off resources outside of work hours**

Use Savings Plans and Reserved Instances

Design for Cost



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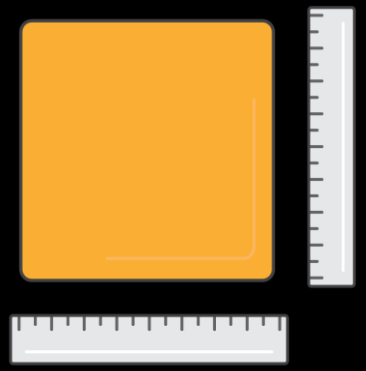
# Turning off non-production resources outside of work hours saved $800 per day on weekends and $400 per day on weekdays for this customer = $15,600 per month saving


RDS can be turned off too

# Tools for turning off resources outside of work hours

- AWS Instance Scheduler https://aws.amazon.com/answers/infrastructure-management/instance-scheduler/
- 3rd party paid tools (including but not limited to)

# The Technical Pillars of Optimisation



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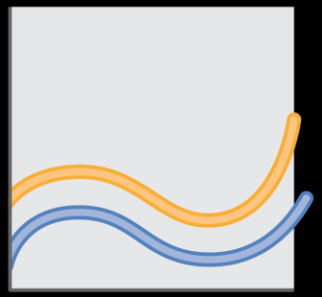

Turn off resources outside of work hours

**Use Savings Plans and Reserved Instances**

Design for Cost



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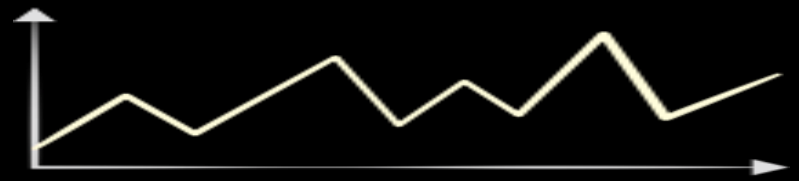
# Use Savings Plans and Reserved Instances

## On-Demand

Capacity with no commitment.

For workloads that are temporary, spiky, or for defining workload needs.
E.g. non-production

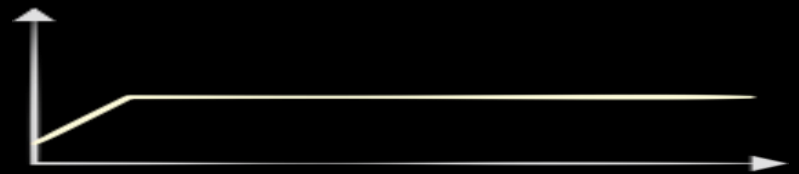


## Reserved Instances (RIs) (EC2, RDS, Redshift, ElastiCache, Elasticsearch)

1-3 year commitment for a discount. Up to 72% off vs. on-demand, average 20-50%.

For committed use and for applications that cannot scale horizontally (more or less quantity).

**Savings Plans are like RIs 2.0 (Compute only)**





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# Savings Plans is a $/hour commitment for a discount

$15 per hour

On-Demand Rate

Discounted
$10.00
per hour

Savings Plan Rate



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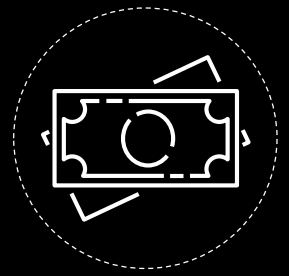
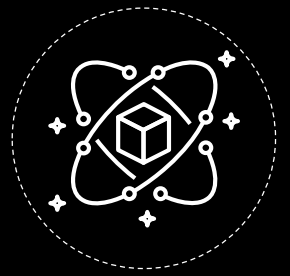
# Reserved Instances provide significant savings but requires planning and management



## Significant Savings

- Standard RI:
  up to 72% discount vs. on-demand
- Convertible RI:
  up to 66% discount vs. on-demand



## Requires planning and management

- **Instance family:** m4 or c5
- **Size:** .nano or .8xlarge
- **Operating System:** Windows or Linux
- **Region:** ap-southeast-2 (Sydney)
  - **Availability zone:** ap-southeast-2a
- **Tenancy:** Shared or Dedicated



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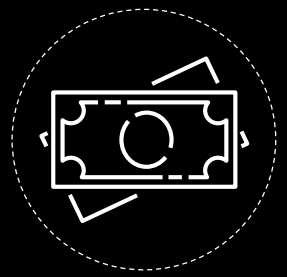
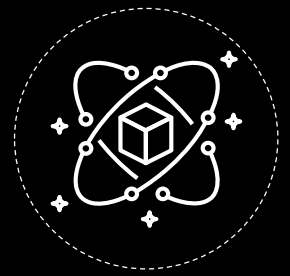
# EC2 Savings Plans has the same commercial benefits but significantly less planning and management overhead

$ commitment to an EC2 instance Family (m5) + Region (Sydney). E.g. $5 per hour of c5 in Sydney



## Significant Savings

- Same discount as Standard RIs, up to 72% vs. on-demand
- Applies to EC2, ECS, EKS, EMR



## Requires less planning and management

- **Instance family:** m4 or c5
- ~~**Size:** .nano or .8xlarge~~
- ~~**Operating System:** Windows or Linux~~
- **Region:** ap-southeast-2 (Sydney)
  - ~~**Availability zone:** ap-southeast-2a~~
- ~~**Tenancy:** Shared or Dedicated~~



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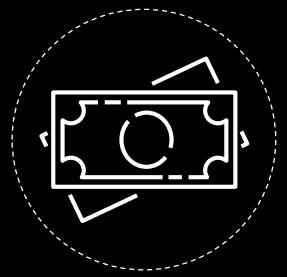
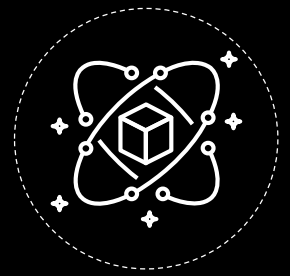
# Compute Savings Plans requires even less planning and management

$ commitment to AWS Compute globally. E.g. $10 per hour on AWS Compute



## Significant Savings

- Same discount as Convertible RIs, up to 66% vs. on-demand
- Applies to EC2, ECS, EKS, EMR, and Fargate



## Requires even less planning and management

- ~~**Instance family:** m4 or c5~~
- ~~**Size:** .nano or .8xlarge~~
- ~~**Operating System:** Windows or Linux~~
- ~~**Region:** ap-southeast-2 (Sydney)~~
  - ~~**Availability zone:** ap-southeast-2a~~
- ~~**Tenancy:** Shared or Dedicated~~



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# Savings Plans vs. RI scenario comparison

| | Compute Savings Plans | EC2 Instance Savings Plans | Convertible RIs | Standard RIs |
|---|---|---|---|---|
| I may need to change instance family (e.g. m4 to m5) | ☺ | X | ☺+work | X |
| I may need to change instance size (e.g. large to 2xlarge) | ☺ | ☺ | ☺+work | ☺+linux |
| I may need to change OS (e.g. Windows to Linux) | ☺ | ☺ | ☺+work | X |
| I want to share my commit across tenancies (e.g. Shared - Dedicated) | ☺ | ☺ | ☺+work | X |
| I may use Fargate and want to leverage existing commits | ☺ | X | X | X |
| I may need to move region | ☺ | X | X | X |



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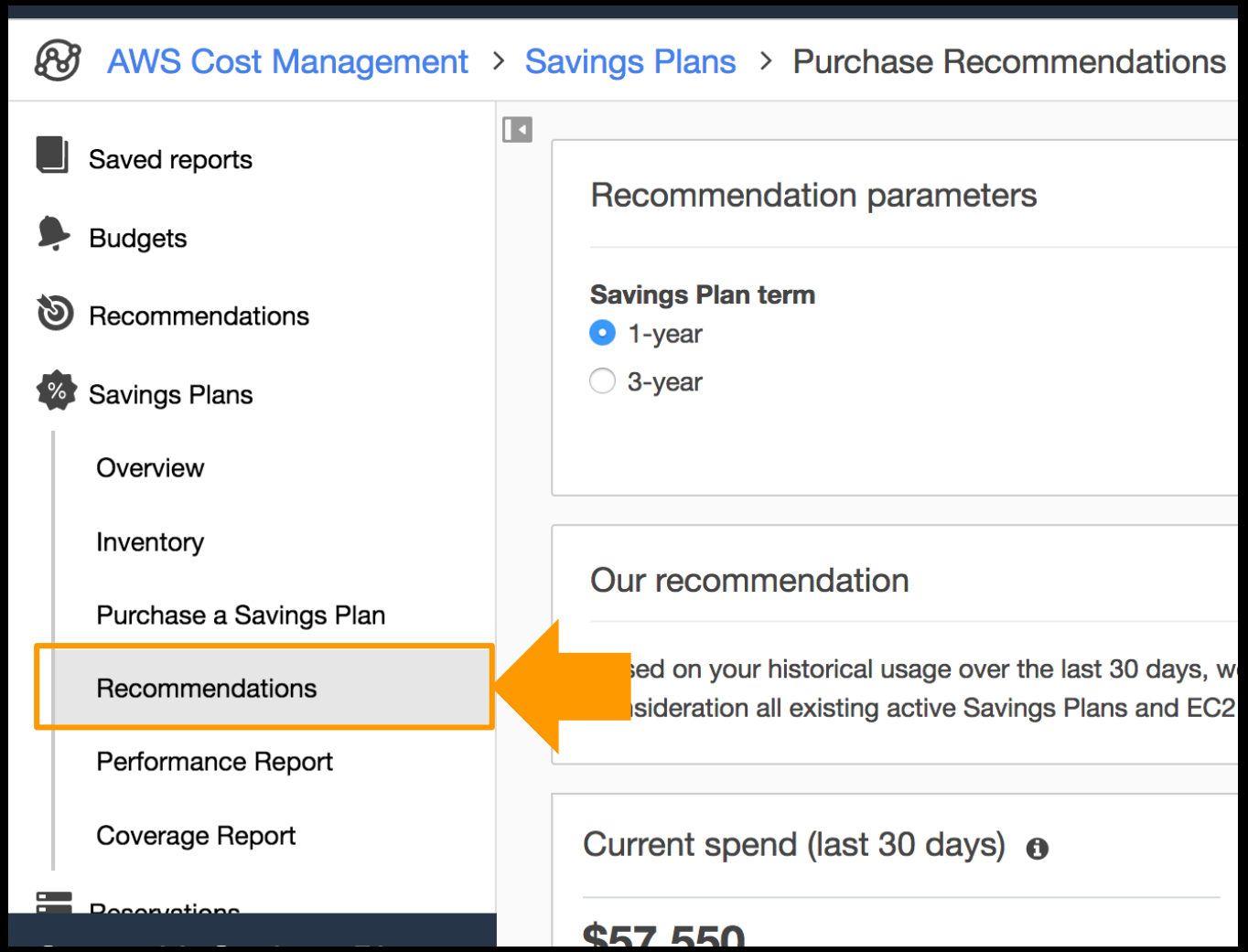
# Purchase Savings Plans via AWS Cost Explorer



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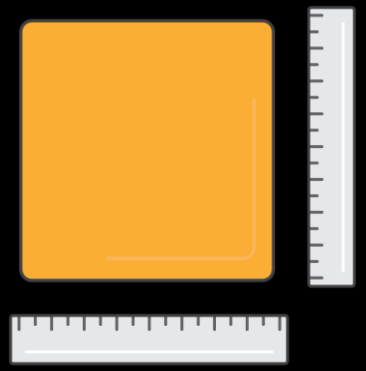

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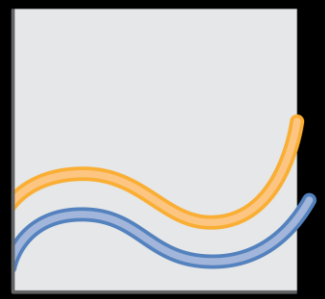
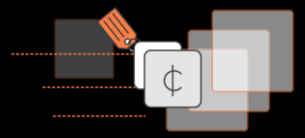


Turn off resources outside of work hours

Use Savings Plans and Reserved Instances

**Design for Cost**

# Designing for Cost



Amazon EC2 Spot

Static Web Hosting on S3 and using S3 Select

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

AWS CloudFormation (developer time saving)

Running resources in a cheaper region

Serverless & AWS Lambda

ELB to Application Load Balancer

Containerisation (staff productivity and compute utilisation)


Open source platforms & databases (reduced licensing cost)

Auto Scaling up and down to match peak demand



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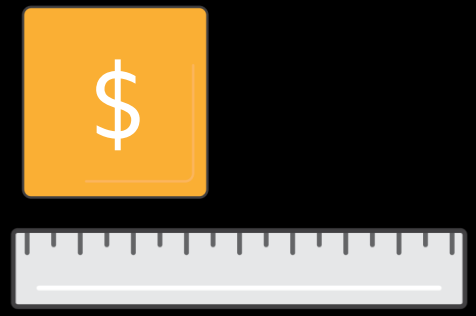
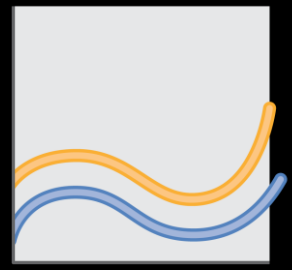
Estimating spend




Measuring & monitoring spend



Metrics to know how efficient your spend is

# Consider optimisation when estimating spend

## Tips for new workloads

- Design for cost upfront
- Include turn-off time
- Include reserved instances

## Tips for migrating workloads

- Understand peak utilisation (i.e. peak CPU and RAM) via tools like hypervisor monitoring or TSO Logic
- Understand usage pattern (e.g. % of time off)

## Self-serve tools

1) Simple Monthly Calculator

2) AWS pricing calculator


## Supported options

3) Migration Acceleration Program (MAP)


4) Contact AWS Sales (incl. for TSO Logic)

# Cost Savings: Modeling On-Premises Cost

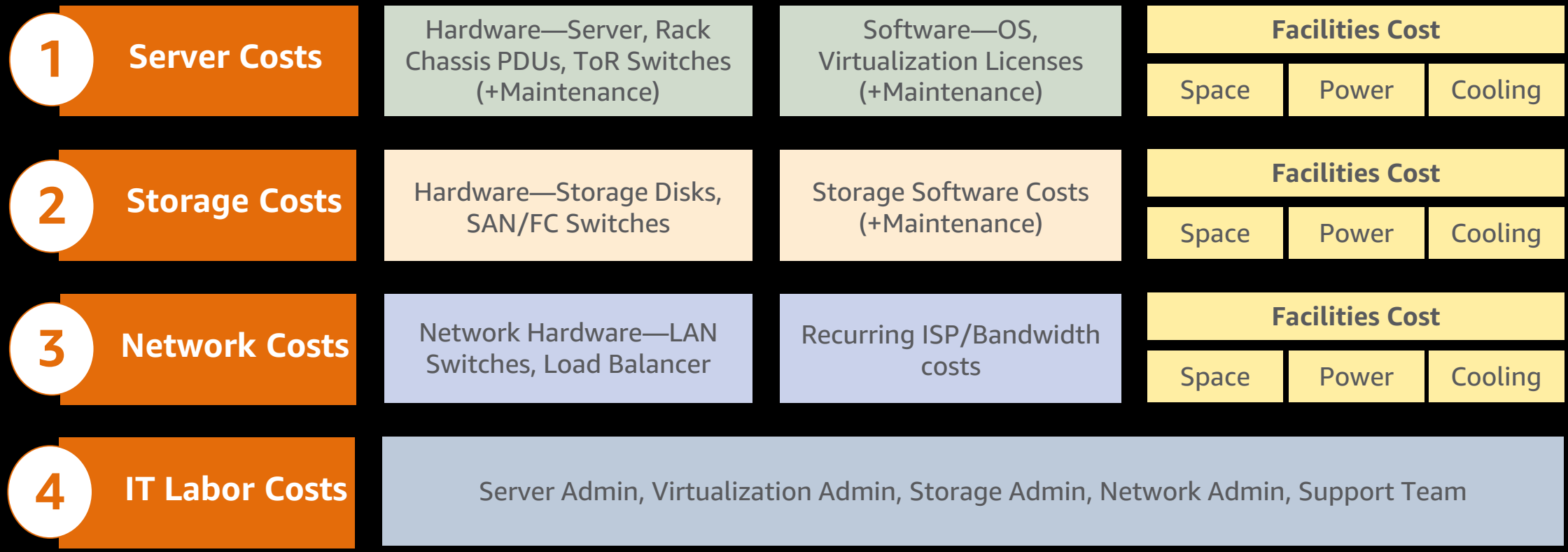



Diagram doesn't include every cost item. (E.g. software costs can include database, management, middle tier software costs.) Facilities cost can include costs associated with upgrades, maintenance, building security, taxes, and others.



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# To measure your spend, use AWS Cost Explorer

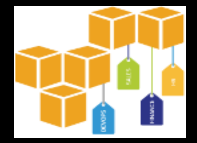

Monthly
AWS invoice

Move towards tools with greater speed to insight

1. AWS Cost Explorer


2. AWS budgets

3. Use Tags





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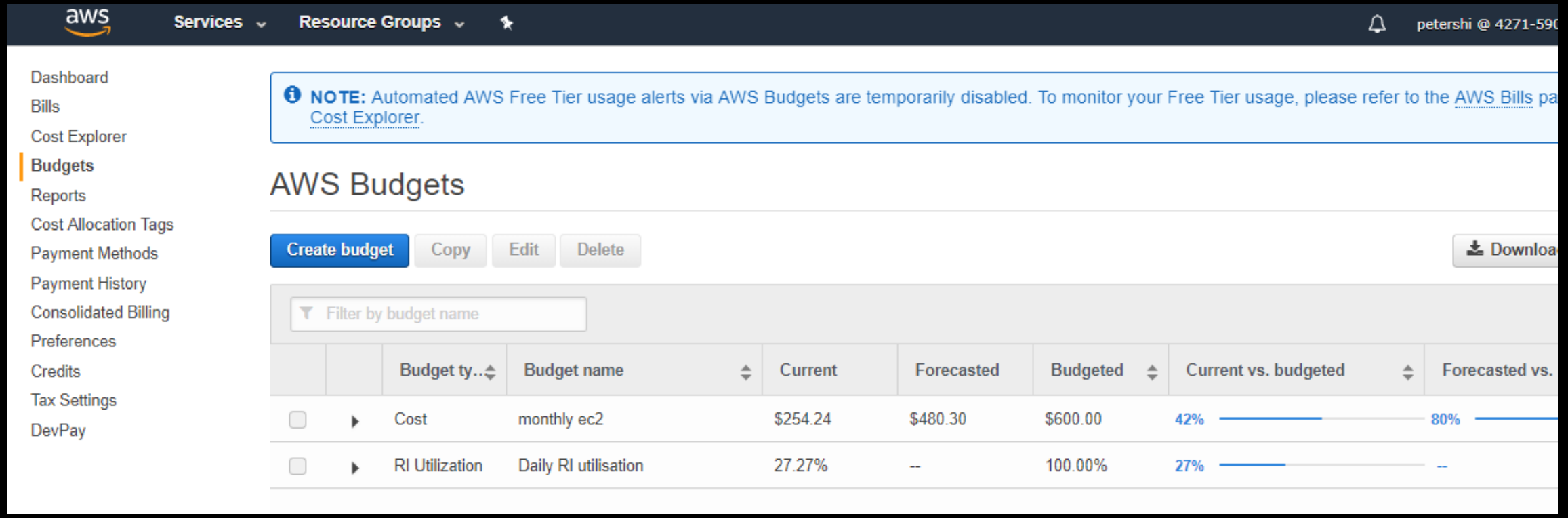
# AWS Budgets send you email or SNS notifications when spend thresholds are reached




"Email me if my EC2 spend is expected to reach 105% of forecast"

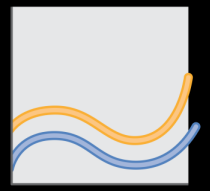
# Cost Explorer provides metrics that tell you if you're running efficiently

1) **Spend** against budgets (split by BU, account, service, etc.), and % valid tagging

*In which areas am I spending the expected amount?*

2) **Rightsizing**: ratio of right sizing savings vs. EC2 total spend via AWS Cost Explorer

*Are my resources fit to need?*



3) **On-off scheduling**: ratio of weekday vs. weekend average spend for EC2 and RDS instances via AWS Cost Explorer

*Are non-production costs turning on-off as expected outside of work hours?*

4) **Savings Plan / RI Efficiency**: % Savings Plan/RI coverage, % Savings Plan/RI utilisation, monthly $ saved vs. savings potential

*Am I paying less for the same capacity & am I using that capacity I paid for?*



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# Summary of this session

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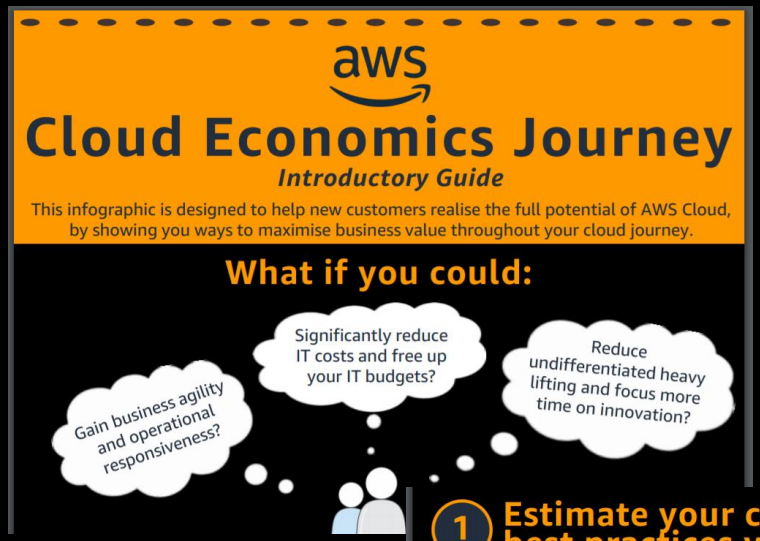
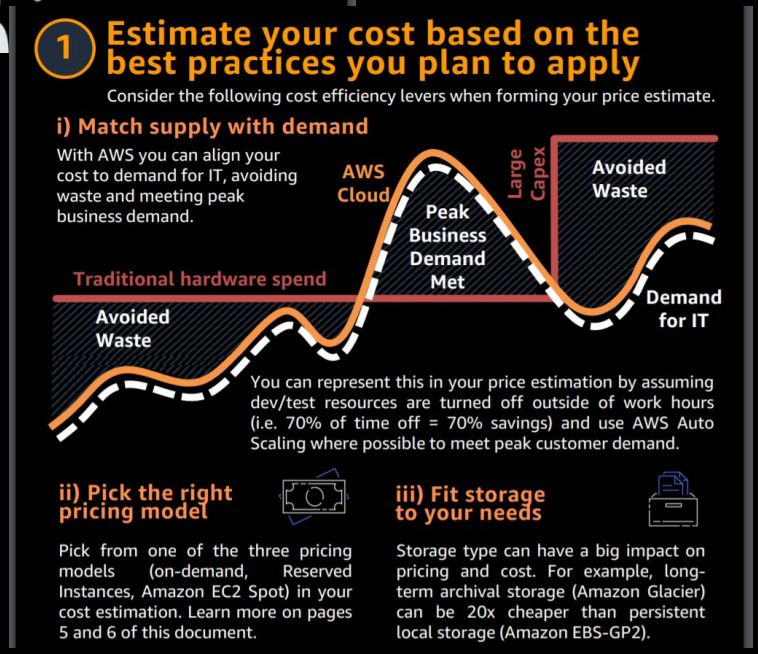
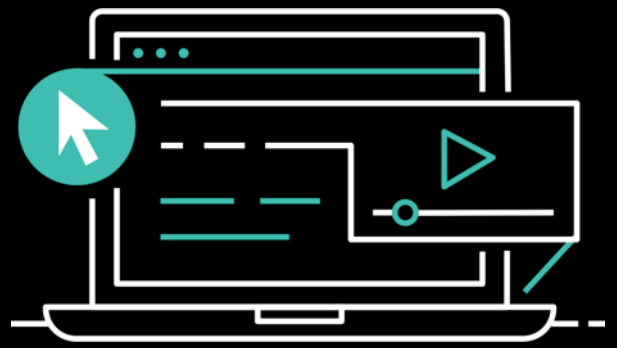



http://bit.ly/cloudeconintro2020

# AWS Digital Training



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## Featured Courses

- AWS Cloud Practitioner Essentials (Second Edition)
  Learn the fundamentals of the AWS Cloud and prepare for the AWS Certified Cloud Practitioner exam.
- Amazon DynamoDB for Serverless Architectures
  An introduction to Amazon DynamoDB and how it's leveraged in building a serverless architecture
- AWS Security Fundamentals
  Learn fundamental cloud computing and AWS security concepts, including AWS access control and management, governance, logging, and encryption methods.
- Getting Started with Amazon Simple Storage Service (Amazon S3)
  Learn the knowledge to determine when to use Amazon S3 by reviewing typical use cases and understanding how the service provides object storage for your applications

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# Thank you for attending AWS Builders Online Series

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