



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

Agenda

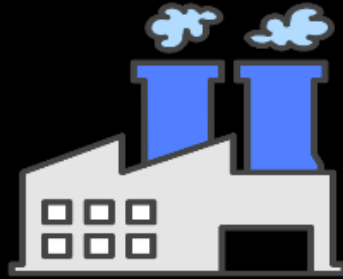
The economics of AWS

Using AWS in a cost efficient way

How to manage your spend on AWS

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

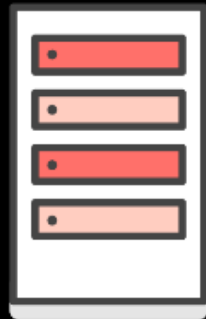
**Industrial
Revolution**



Shift to on-demand
power



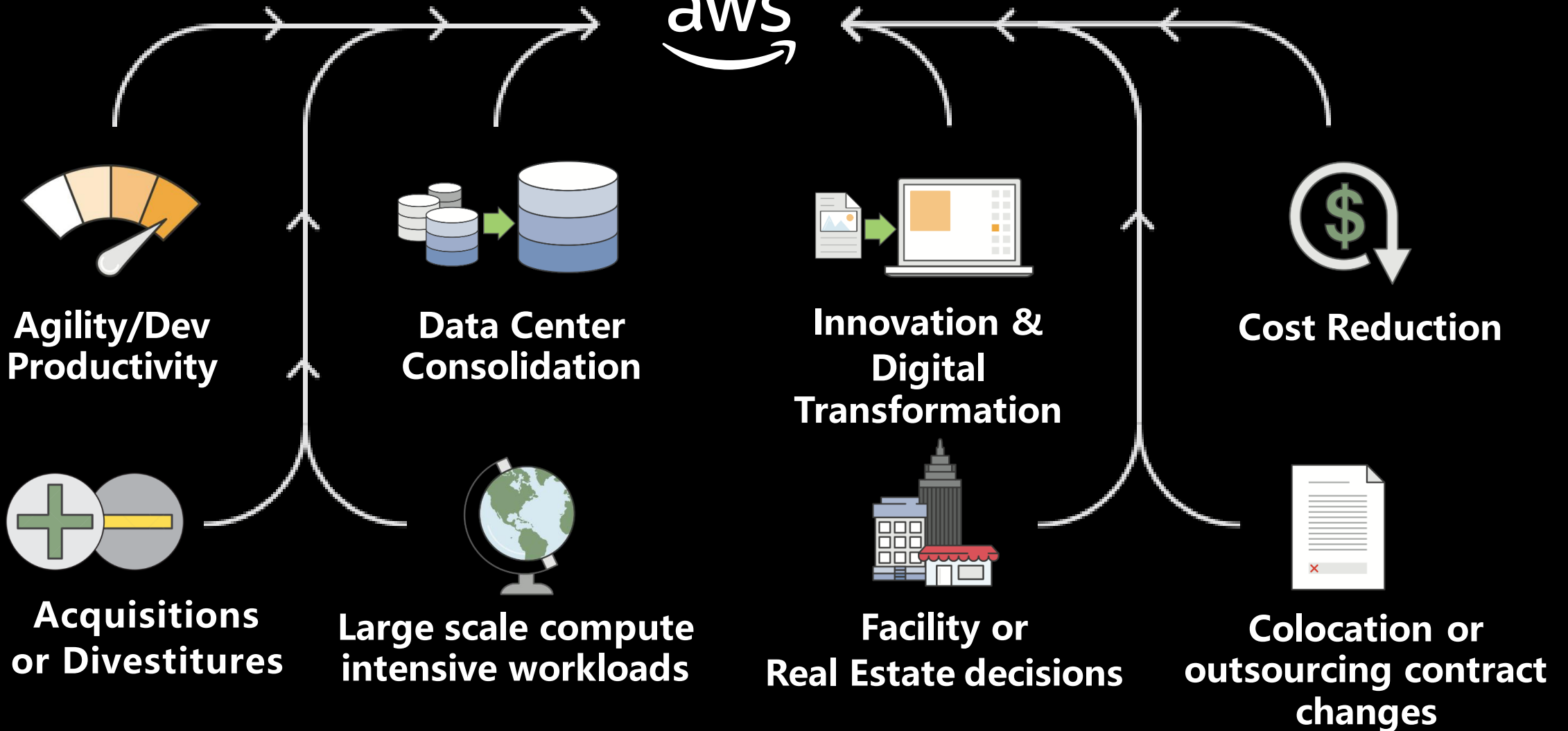
**Cloud
Revolution**



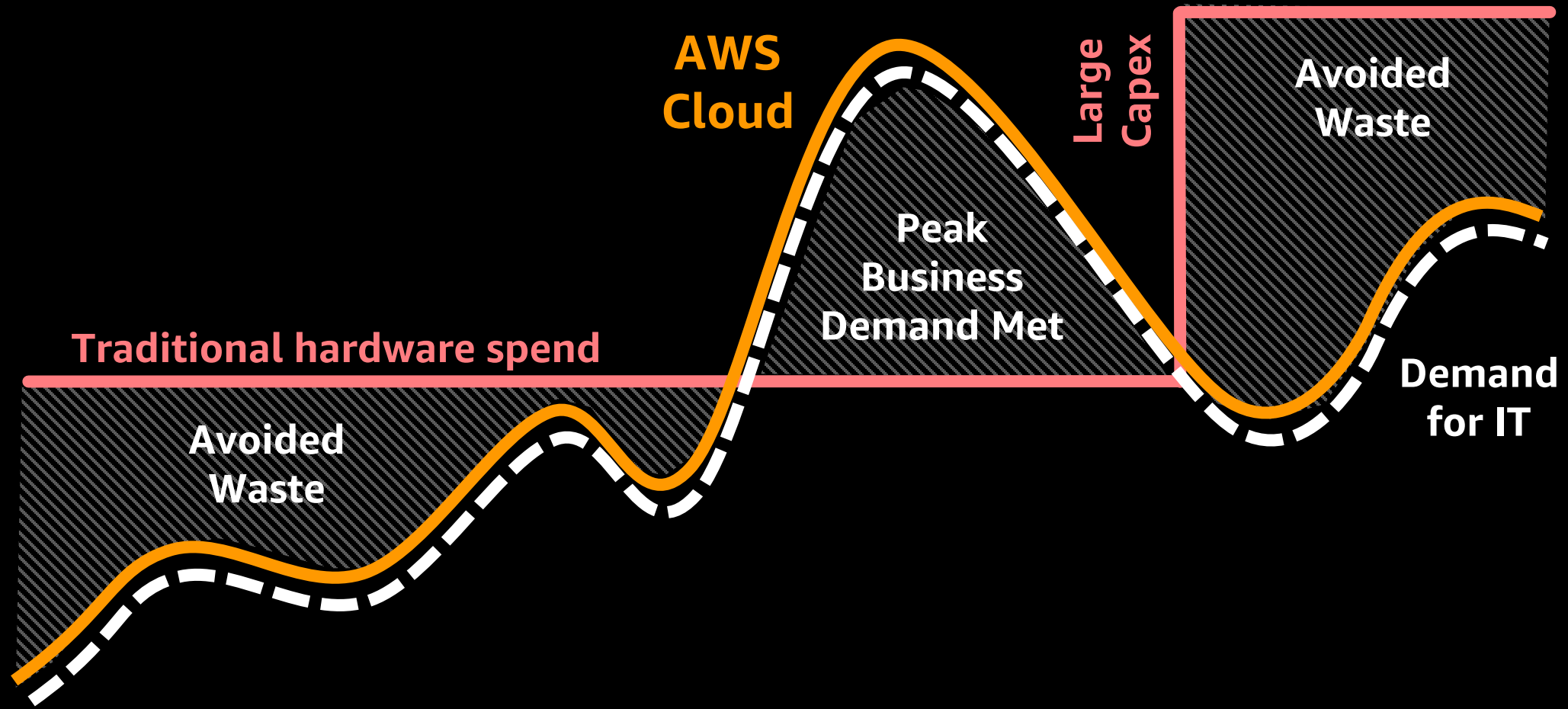
Shift to on-demand
computing



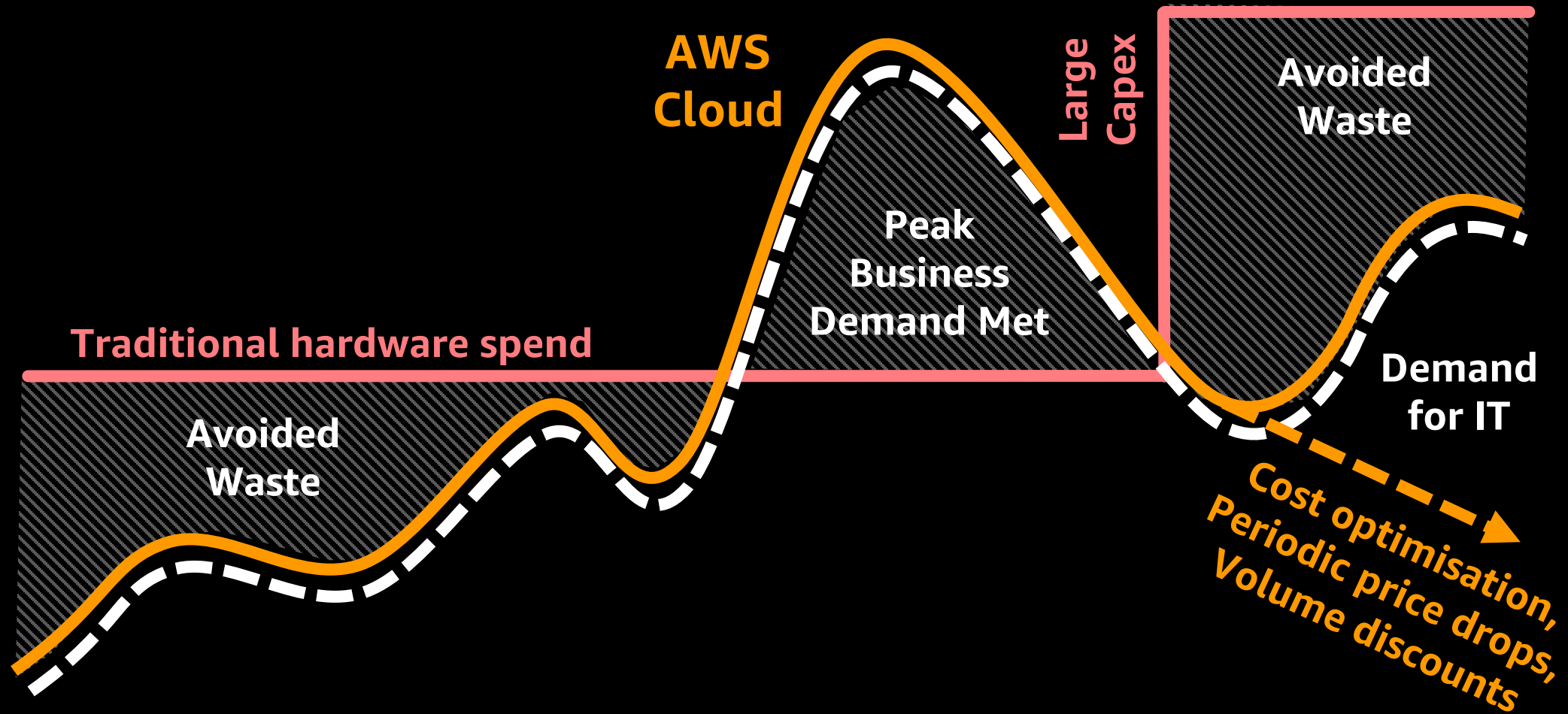
Customers are adopting AWS at a rapid pace



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)



Agenda

The economics of AWS

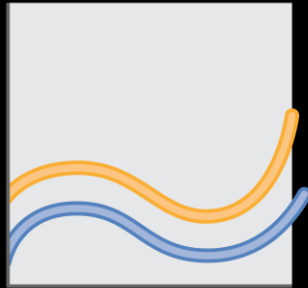
Using AWS in a cost efficient way

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

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

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

AWS Cost Management > Recommendations

Settings

Potential resource savings
\$0
Monthly savings based on 3 resources

Potential reservation savings
\$216
Monthly savings based on 5 reservations

Resource optimization recommendations
Last updated: 2019-07-31 7:13PM

3 EC2 rightsizing opportunities found
Taking action could save you an estimated \$0 monthly

0 idle instances detected
Terminating these instances could save you an estimated \$0 monthly

3 underutilized instances detected
Modifying these instances could save you an estimated \$0 monthly

View all

Services ^ **Resource Groups** v

1 AWS cost explorer

AWS Cost Explorer
Visualize and Explore Your AWS Costs and Usage

Purchase recommendations **View all**

| | Purchase recommendations | Estimated monthly savings |
|----------|--------------------------|---------------------------|
| | 2 | \$3.41 |
| | 1 | \$10.71 |
| Redshift | 2 | \$201.90 |

Cost Explorer: Resource optimization recommendations

3

Optimization opportunities

\$110

Estimated monthly savings

50.00%

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 >

*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 P1s 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.

Show recommendations for

☒ Idle instances

☒ Underutilized instances

Additional Filters

Linked Account [Include all ▾](#)

Region [Include all ▾](#)

Tag [Include all](#)

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

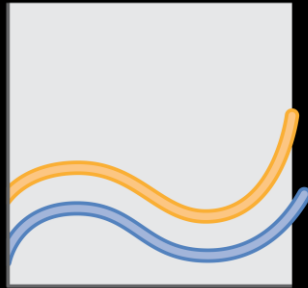


Idle or unattached
load balancers

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

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



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)



GorillaStack

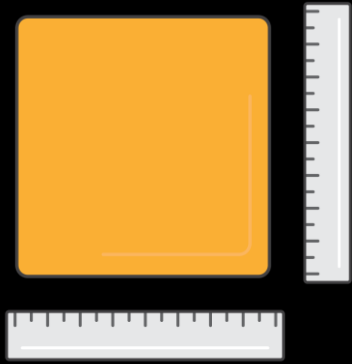


skeddly

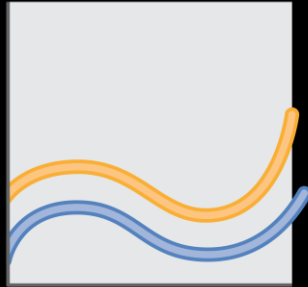


ParkMyCloud

The Technical Pillars of Optimisation



Right Size &
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unused Resources



Turn off resources
outside of work
hours



**Use Savings Plans
and Reserved
Instances**



Design for
Cost

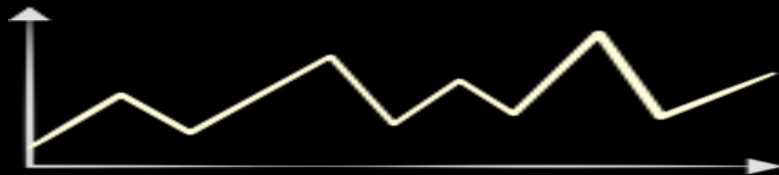
Use Savings Plans and Reserved Instances

On-Demand

Capacity with no commitment.

For workloads that are temporary, spiky, or for defining workload needs.

E.g. non-production

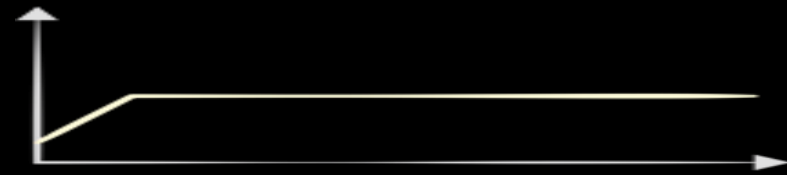


Reserved Instances (RIs) (EC2, RDS, Redshift, ElastiCache, Elasticsearch)

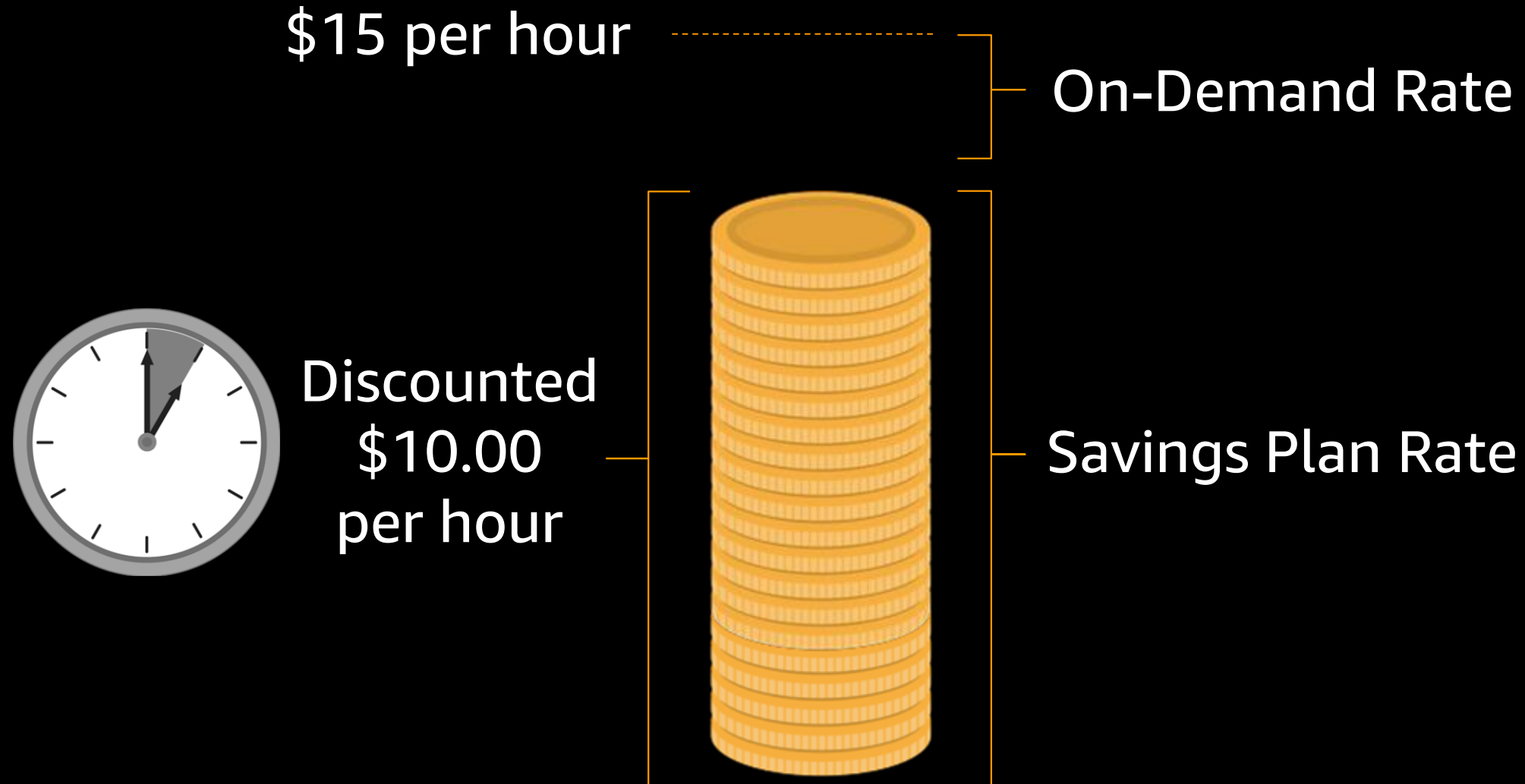
1-3 year commitment for a discount. Up to 72% off vs. on-demand, average 20-50%.

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

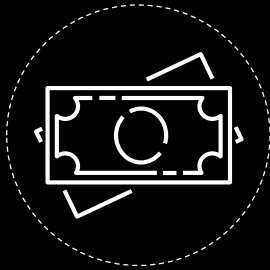
Savings Plans are like RIs 2.0 (Compute only)



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

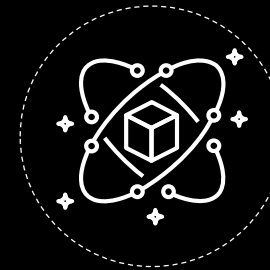


Reserved Instances provide significant savings but requires planning and management



Significant Savings

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

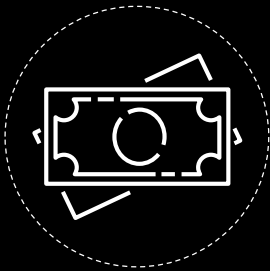


Requires planning and management

- **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

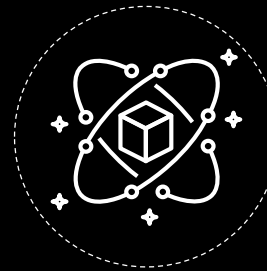
EC2 Savings Plans has the same commercial benefits but significantly less planning and management overhead

\$ 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

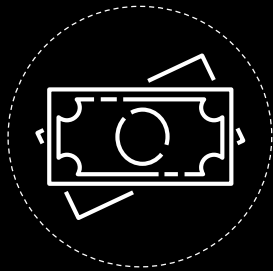


Requires less planning and management

- **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~~

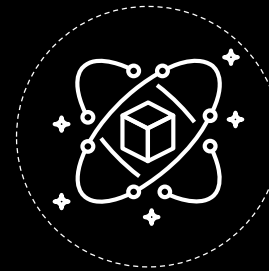
Compute Savings Plans requires even less planning and management

\$ 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~~

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 |

Purchase Savings Plans via AWS Cost Explorer

AWS Cost Management > **Savings Plans** > Purchase Recommendations

Savings Plans

- Overview
- Inventory
- Purchase a Savings Plan
- Recommendations**
- Performance Report
- Coverage Report
- Reservations

Recommendation parameters

Savings Plan term

- ☒ 1-year
- ☐ 3-year

Our recommendation

Based on your historical usage over the last 30 days, with consideration all existing active Savings Plans and EC2

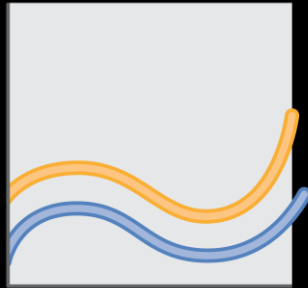
Current spend (last 30 days) ⓘ

\$57,550

The Technical Pillars of Optimisation



Right Size &
Decommission
unused Resources



Turn off resources
outside of work
hours

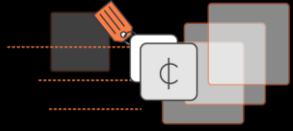


Use Savings Plans
and Reserved
Instances



**Design for
Cost**

Designing for Cost



Amazon EC2 Spot



Serverless &
AWS Lambda



Static Web Hosting on S3
and using S3 Select



ELB to Application Load
Balancer



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



Containerisation (staff productivity
and compute utilisation)



AWS CloudFormation
(developer time saving)



Open source platforms &
databases (reduced licensing cost)



Running resources in a
cheaper region



Auto Scaling up and down to
match peak demand

Agenda

The economics of AWS

Using AWS in a cost efficient way

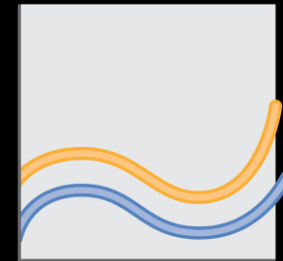
How to manage your spend on AWS



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

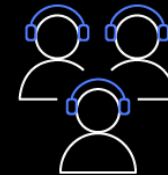


Supported options

3) Migration Acceleration Program (MAP)



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



Cost Savings: Modeling On-Premises Cost

| | | | | | | | |
|---|----------------|--|---|-----------------|-------|---------|--|
| 1 | Server Costs | Hardware—Server, Rack Chassis PDUs, ToR Switches (+Maintenance) | Software—OS, Virtualization Licenses (+Maintenance) | Facilities Cost | | | |
| | | | | Space | Power | Cooling | |
| 2 | Storage Costs | Hardware—Storage Disks, SAN/FC Switches | Storage Software Costs (+Maintenance) | Facilities Cost | | | |
| | | | | Space | Power | Cooling | |
| 3 | Network Costs | Network Hardware—LAN Switches, Load Balancer | Recurring ISP/Bandwidth costs | Facilities Cost | | | |
| | | | | Space | Power | Cooling | |
| 4 | IT Labor Costs | Server Admin, Virtualization Admin, Storage Admin, Network Admin, Support Team | | | | | |

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.

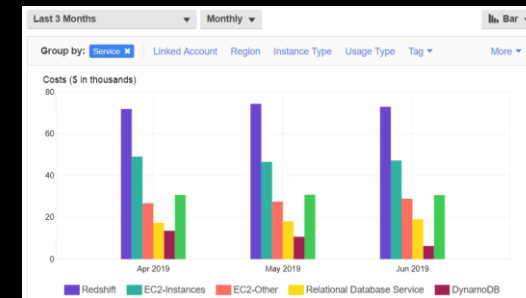
To measure your spend, use AWS Cost Explorer



Monthly
AWS invoice

Move towards
tools with greater
speed to insight

1. AWS Cost Explorer



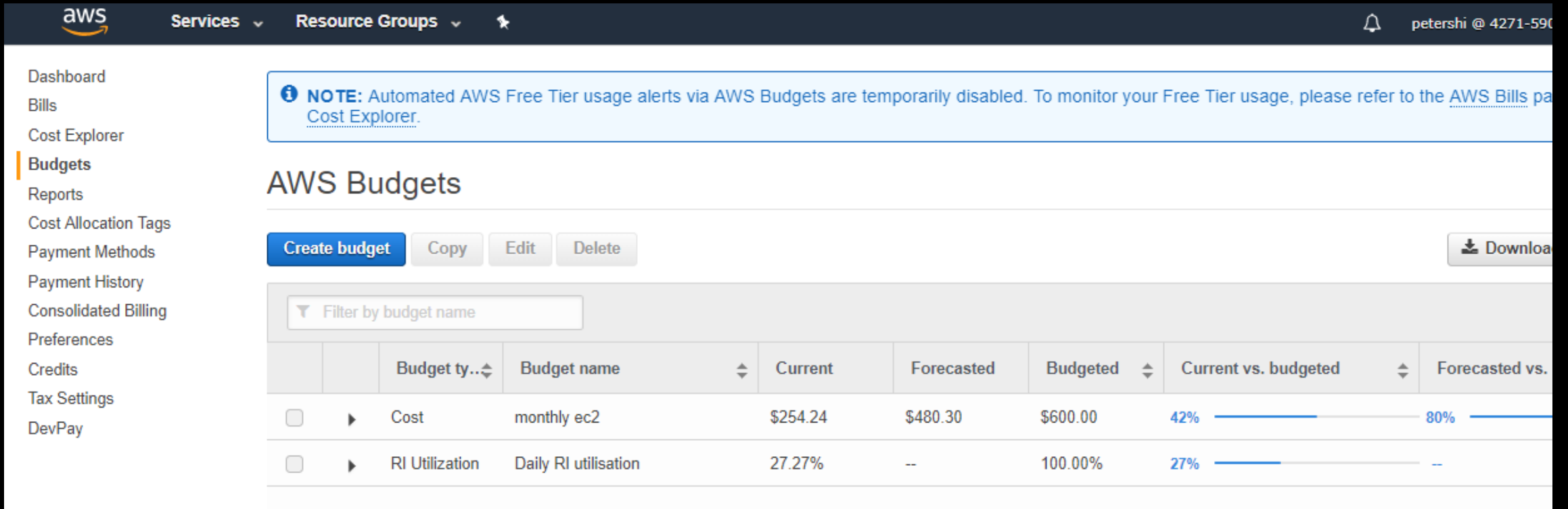
2. AWS budgets



3. Use Tags



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



The screenshot shows the AWS Budgets console interface. At the top, there's a navigation bar with the AWS logo, 'Services', 'Resource Groups', and a user profile 'petershi @ 4271-590'. A left-hand sidebar lists various AWS services and tools. The main content area is titled 'AWS Budgets' and includes a 'NOTE' about Free Tier usage alerts. Below the title are buttons for 'Create budget', 'Copy', 'Edit', 'Delete', and 'Download'. A search bar 'Filter by budget name' is present. A table lists two budgets: 'monthly ec2' (Cost type) and 'Daily RI utilisation' (RI Utilization type). The table columns include Budget type, Budget name, Current, Forecasted, Budgeted, and Current vs. budgeted. The 'monthly ec2' budget shows a current spend of \$254.24, a forecast of \$480.30, and a budgeted amount of \$600.00, with a progress bar indicating 42% of the budget is used. The 'Daily RI utilisation' budget shows a current utilization of 27.27%, a forecast of --, and a budgeted amount of 100.00%, with a progress bar indicating 27% of the budget is used.

NOTE: Automated AWS Free Tier usage alerts via AWS Budgets are temporarily disabled. To monitor your Free Tier usage, please refer to the [AWS Bills page](#) or [Cost Explorer](#).

AWS Budgets

[Create budget](#) [Copy](#) [Edit](#) [Delete](#) [Download](#)

Filter by budget name

| | | Budget type | Budget name | Current | Forecasted | Budgeted | Current vs. budgeted | Forecasted vs. |
|--------------------------|---|----------------|----------------------|----------|------------|----------|----------------------|-----------------|
| <input type="checkbox"/> | ▶ | Cost | monthly ec2 | \$254.24 | \$480.30 | \$600.00 | 42% <div></div> | 80% <div></div> |
| <input type="checkbox"/> | ▶ | RI Utilization | Daily RI utilisation | 27.27% | -- | 100.00% | 27% <div></div> | -- <div></div> |

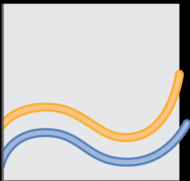
“Email me if my EC2 spend is expected to reach 105% of forecast”

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?



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?



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

Are my resources fit to need?



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?

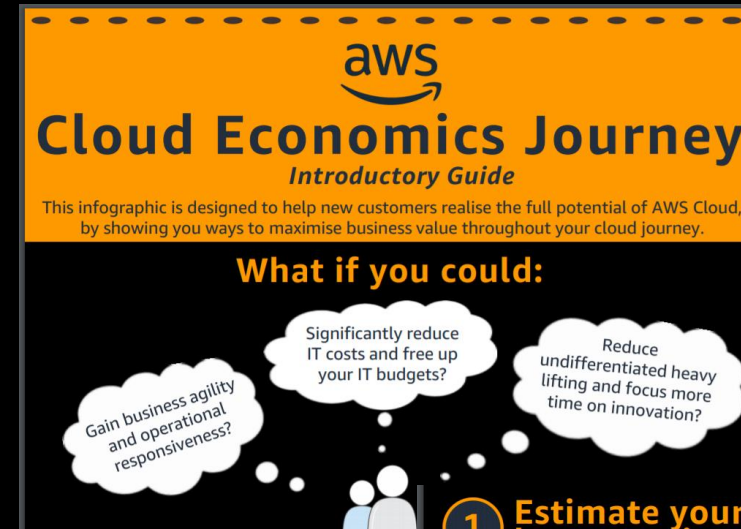
Summary of this session

The economics of AWS

Using AWS in a cost efficient way

How to manage your spend on AWS

<http://bit.ly/cloudeconintro2020>



1 Estimate your cost based on the best practices you plan to apply
Consider the following cost efficiency levers when forming your price estimate.

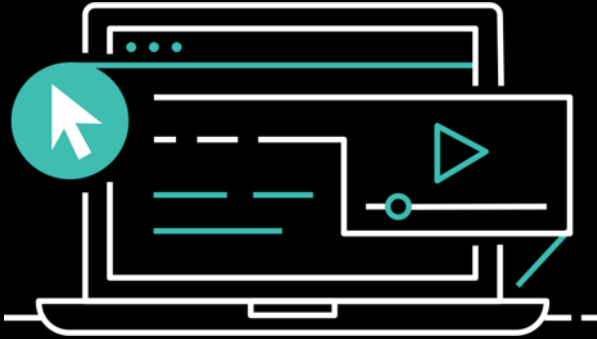
i) Match supply with demand
With AWS you can align your cost to demand for IT, avoiding waste and meeting peak business demand.

The graph shows two lines: a solid red line for 'Traditional hardware spend' and a dashed orange line for 'AWS Cloud'. The red line is a flat horizontal line. The orange line follows the 'Demand for IT' (a fluctuating line) but stays below it, with the area between them labeled 'Avoided Waste'. The orange line peaks at 'Peak Business Demand Met'. A vertical dashed line marks 'Large Capex'. The area under the red line but above the orange line is also labeled 'Avoided Waste'.

ii) Pick the right pricing model
Pick from one of the three pricing models (on-demand, Reserved Instances, Amazon EC2 Spot) in your cost estimation. Learn more on pages 5 and 6 of this document.

iii) Fit storage to your needs
Storage type can have a big impact on pricing and cost. For example, long-term archival storage (Amazon Glacier) can be 20x cheaper than persistent local storage (Amazon EBS-GP2).

AWS Digital Training



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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

Thank you for attending AWS Builders Online Series

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.



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