



AWS Cloud Financial Management Guide

Adapt your financial processes to be cloud ready.

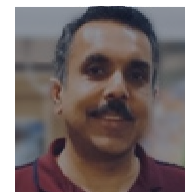
Bowen Wang
AWS Cloud Financial Management Strategist

Abstract

Businesses are in a digital transformation race to move faster, innovate more, and remain competitive. This guide shares Amazon Web Services (AWS) perspectives on why digital transformation requires a shift and evolution in financial management processes, how organizations can adapt, and what AWS solutions can help you succeed.

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Gopi Krishnan
Vice President,
AWS Finance

Foreword

As I talk to finance leaders, I'm increasingly aware of how the role of the Finance organization has evolved to support — and in some cases lead — large enterprise digital transformations. Finance teams are a critical player in helping organizations understand the value of cloud technology to protect the business and its customers from potential risks, to enable the evolution of financial practices, and, sometimes, to break down barriers in the organization to fully realize the value of adopting these technologies.

Finance leaders are strategic partners in this evolution and need to steward

the business. This means implementing the right financial practices and policies, helping the organization track and see the value of the cloud, understanding what is possible to achieve with new and emerging technologies, and maintaining a competitive advantage in the market. It's also about identifying optimization opportunities while scaling, and providing better customer experiences with more resilient business operations.

At AWS, we work closely with our customers around the world to understand their business goals and to ensure they realize the full value of AWS. Leaders are taking advantage of

our breadth and depth of technology offerings and consultative services to optimize and effectively manage their cloud spend.


We hope by reading this guide that you will find something relevant to the projects on which you and your teams are working. We'd love to hear your success stories and understand how we can improve our offerings to help you manage your IT finance, further differentiate your business, and drive positive business outcomes.

Thank you for considering and partnering with AWS as you grow your business.

1

Time to rethink the way you manage IT spend

If you are reading this paper, it's likely that your organization is already using cloud services or actively investigating how the cloud can help your business. Digital transformation and the push to innovate, sometimes even redefine entire industries, has made the cloud an attractive strategic investment for leaders looking to enable greater business agility, resiliency, and productivity without being burdened by the cost of failed experiments.



A recent Gartner research paper¹ noted that cloud spend is occupying a growing share of annual IT spend for organizations. Leaders must harness and deploy cloud service expense management capabilities that align with their overall cloud management strategy. That rising spend, which tends to be highly variable, is bringing new sets of challenges to Finance teams, requiring them to transform how they review, reconcile, and optimize their cloud expenditure.

Managing cloud spend is a different exercise than managing spend for traditional IT, such as physical servers (or other hardware), or on-premises software licenses. In a more traditional spend model, Finance teams approve budgets, Procurement teams purchase resources and manage vendors, and Supply Chain teams and Technology teams are responsible for the installation and provisioning of the new infrastructure. The cloud, however, has made it possible for any end user in any line of business to acquire technology resources independently and almost instantly.

When it comes to on-premises infrastructure, including customer-owned or co-location data centers, IT teams typically do not operate with real-time visibility on costs of their infrastructure. Those investments have already been approved (and purchased), so teams don't feel incentivized to better understand how to further optimize already procured resources until they start to face

capacity constraints. At the same time, most Technology teams do not have access to, or know what to do with, the tools to track and collect this information. In a cloud environment, you can access cost and usage data in near real-time through a cloud provider's native cost management tools and/or third-party solutions, which enable timely decision-making in order to maximize return on investment.

Cloud has also changed how we budget and plan for technology investments. In a physical data center, growing scale and capacity meant investing in new hardware — an event that was planned months, sometimes even years, in advance. But with cloud, on-demand pricing means employees across the organization may be scaling resources up and down on an ongoing basis, resulting in variability in spend month over month, sometimes week over week, or day over day. And while pay-as-you-go capacity is the easiest to buy, it is also the most expensive option. Are your teams taking advantage of the breadth of AWS cloud pricing models and a variety of saving practices to power cloud projects with much lower unit costs?

¹ Gartner, "How to identify solutions for management costs in public cloud IaaS," Brandon Medford, Craig Lowery, January 22, 2018. ID: G00347479.

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2

Adapting traditional processes to be cloud ready

Applying traditional, static waterfall planning and IT budgeting and cost assessment models to dynamic cloud usage can create risks, including inaccurate planning and less visibility. Ultimately, this results in a lost opportunity to effectively optimize and control costs and realize long-term business value. Gartner estimates that organizations that lack a defined plan for cloud cost management may be overspending by 70% (or more).² The following sections comprise areas where traditional financial management practices can lead organizations astray when it comes to managing cloud costs.

² Gartner, "Your 90-Day Plan to Control Public Cloud Spend," February 14, 2019. ID: G00382575.



Lack of traceability

As soon as an organization begins its cloud journey, it has an opportunity to establish a foundation, including policies and processes, for establishing cost visibility and accountability. However, since organizations typically manage multiple accounts, it can be challenging to keep an accurate inventory of cloud resources. AWS provides tagging policies to help teams link cloud resources to specific teams, projects, and business initiatives. Yet, often, team members may not spend the time to implement these measures when starting a new project. Over time, as adoption of cloud services grows, organizations will have a more difficult time tracking spend (or even measuring it at all), tracing spend back to approved initiatives, or allocating costs to the right business unit or project.

Unexpected or unexplainable billing

Cloud has democratized technology for everyone. However, without guardrails to control and govern cloud spending, that autonomy from buyers can result in disparate bills, unexpected or unexplainable costs, and can increase compliance and security risks. AWS offers tools to help teams consolidate their billing, understand their usage and spending habits, and set up permission controls. Often, cloud users might not be aware of, or actively take advantage of, these tools to process and understand their monthly bills and implement effective governance mechanisms.

Inaccurate forecasting

Traditional methods of budgeting and financial variance analysis do not translate well to the cloud. Technology and Finance teams may lack effective, centralized budgeting and monitoring mechanisms that allow them to accurately forecast usage, keep costs in check, and effectively align cloud investments with business objectives. Working across functions (technical, product, and business) without a centralized view into actual spend, regular forecasting and budgeting, it can be difficult to understand cost and usage trends, or, as you prepare for new business initiatives, to estimate future costs and create financial predictability.

Insufficient cost oversight

When Technology teams don't have a clear requirement to operate in a cost-conscious manner, they may prioritize cloud investments based solely on other IT priorities including performance, reliability, or security in their architecture designs. They may, for example, migrate to the cloud in a way that replicates their on-premises deployment. Or, they may not sufficiently consider the implications of different AWS services, Availability Zones, or pricing models that can improve unit costs compared to on-demand prices³. When cost is not part of the set of requirements in an architectural design, it leads teams to purchase resources that are not cost efficient (like only paying on-demand pricing or selecting oversized resources).

³ On-demand prices use a pay-as-you-go model, which allows you to easily adapt to changing business needs without overcommitting budgets and improving your responsiveness to changes. View the pricing page to learn more <https://aws.amazon.com/pricing>



3

Introducing AWS Cloud Financial Management

To avoid these pitfalls, organizations need to actively manage cloud costs throughout the cloud journey, whether you are building applications natively in the cloud, migrating your workloads to the cloud, or expanding your adoption of cloud services. AWS Cloud Financial Management (CFM) offers a set of capabilities to manage, optimize, and plan for cloud costs while maintaining business agility. Cloud Financial Management is paramount not only to effectively manage costs, but also to ensure that investments are driving expected business outcomes.

A recent study by 451 Research⁴ found that companies that consistently leveraged Cloud Financial Management tools and practices for at least 2-3 years experienced 51% cost savings — and those savings went up to 60% for companies that had been managing cloud finances for more than five years. Cost reduction was not the only benefit; the same study also found that 67% of companies that performed Cloud Financial Management also grew revenue as a result, and 64% increased profitability.

AWS provides you with Cloud Financial Management solutions to help transform your business through cost transparency, control, forecasting, and optimization. These solutions can also enable a cost-conscious culture that drives accountability across all teams and functions and drives expected business outcomes.

The AWS portfolio of services can help Finance teams see where costs are coming from, run operations with minimal unexpected expenses, plan for dynamic cloud usage, and save on cloud bills while teams scale their adoptions on AWS.

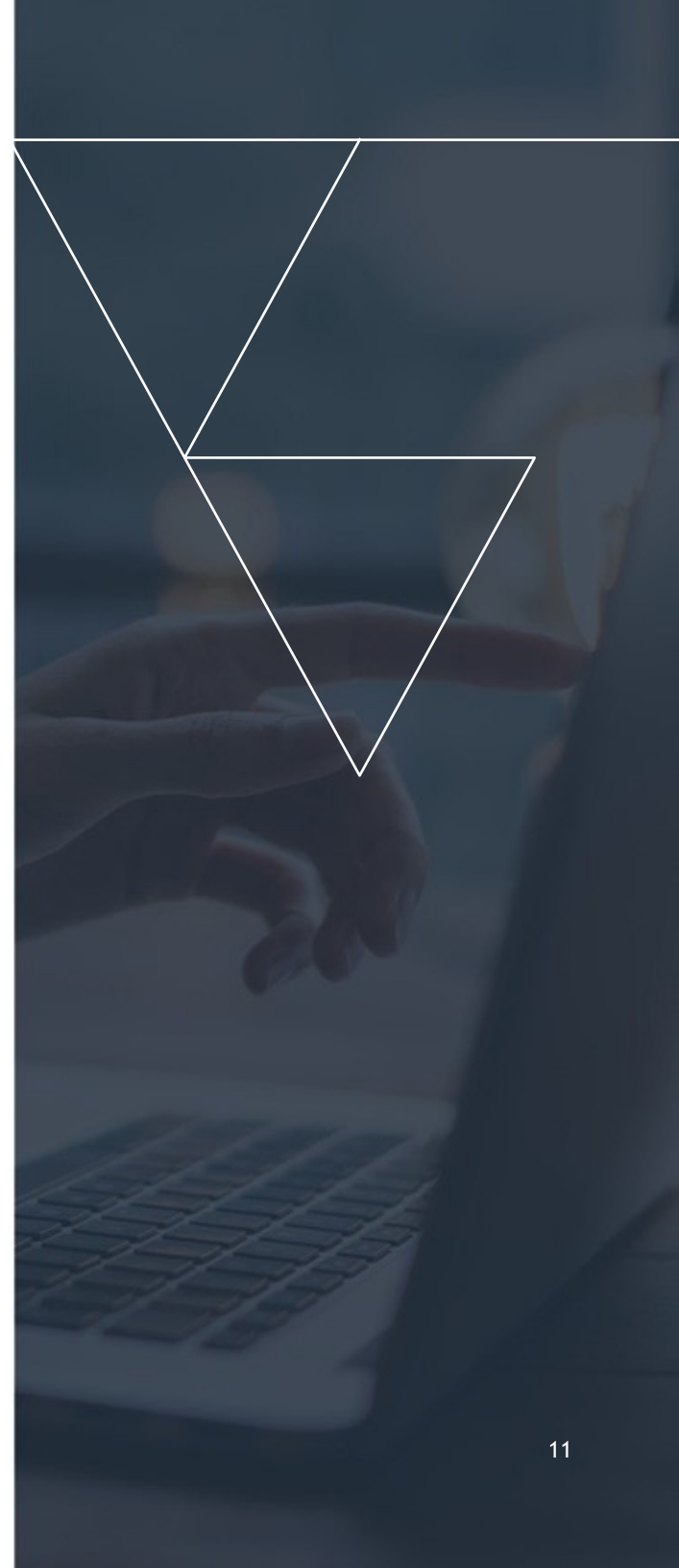
⁴ Cloud Financial Management, Small Changes Can Make Big Impacts, 451 Research and AWS, 2020, All Rights Reserved.

See — Organize and report with user-defined methods

To be able to understand your AWS costs and optimize spending, you need to know where those costs are coming from. This requires a deliberate structure for your accounts and resources, which enables Finance to track spending flows and ensure that teams are accountable for their portion of the bottom line.

The process starts by setting up a consolidated AWS Account structure that ensures cost traceability by taking these steps:

- Create a granular view of your organization's consumption patterns by using [cost allocations tags](#) and form a structured resource tagging strategy. For Cost Reporting, tag every AWS Service used with information, such as owner, stack type, and associated application. You can use [Tag policies](#) to maintain consistent tags, including the preferred case treatment of tag keys and key values. You can also use [AWS Resource Groups](#) to manage and organize your resources. To read about different strategies for creating tags, take a look at the [AWS Tagging Best Practices](#).



- Group cost and usage information into meaningful categories based on your needs, using [AWS Cost Categories](#). You can write rules and create custom groups of billing line items. There are a variety of grouping attributes available, such as account, tag, service, and charge types. [Read more](#) about how to create Cost Categories.

When you filter by tags and Cost Categories, you will be able to see and share IT costs by team and application, raising people's awareness of costs. This visibility enables your teams to be more cost-conscious about their AWS usage.

- Create and provision new AWS accounts with [AWS Control Tower](#) for preconfigured blueprints (e.g., AWS Single Sign-On for directory and access) and easily set up and govern a new secure, multi-account AWS environment.
- Create a holistic view of your organization's AWS accounts by using [AWS Organizations](#), reflecting your business needs, and simplifying billing via one single payment for all of your AWS accounts.



Once you create the required account structure for your business, you'll want to determine your internal cost allocation model. AWS advises appointing a dedicated person or team to develop, obtain stakeholder buy-in, monitor, and actively design and implement the cost allocation model to drive accountability and cost-conscious cloud consumption. Will you charge cloud and internal costs out to business function or product teams (internal chargeback)? Or, will you simply make the costs visible (showback model)? The former drives accountability, but can be perceived as a tax. The latter requires less overhead to administer but may not drive as much accountability for costs.

There are a few scenarios, in which AWS recommends to achieve internal alignment with respect to cost allocation. For instance, organizations should align on the approach for allocating upfront and ongoing fees associated with [Reserved Instances](#) and [AWS Savings Plans](#), as costs can be allocated based on who purchased the services or

who benefits from them. Another scenario is around allocating shared costs, specifically, how to allocate the costs associated with AWS support, data transfer, or other costs that are shared by all end users. To ensure successful cost allocation,

AWS provides you with several solutions, with different levels of granularity, to help you understand your costs. These include:

- [AWS Cost Explorer](#) lets you visualize, understand, and manage your AWS cost and usage over a set period of time. You can quickly get started by exploring data at a high level (in chart and tabular formats), and then look for additional detail by creating more specific views through filters and groupings. For example, you can examine the top cost driver by service first, then further investigate to understand who used that service via the team tag or cost categories.



Figure 1: Example of AWS Cost Explorer Report UI – Grouping Feature

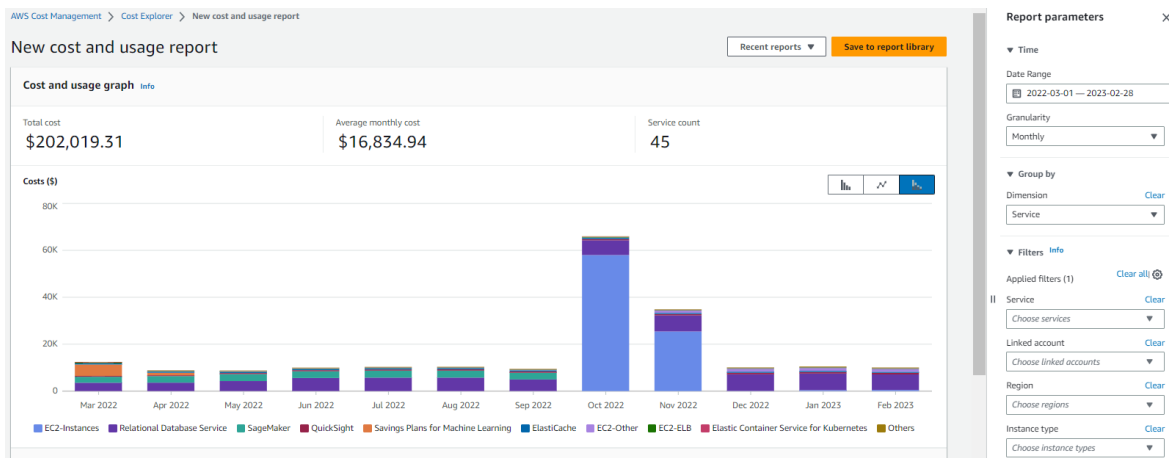
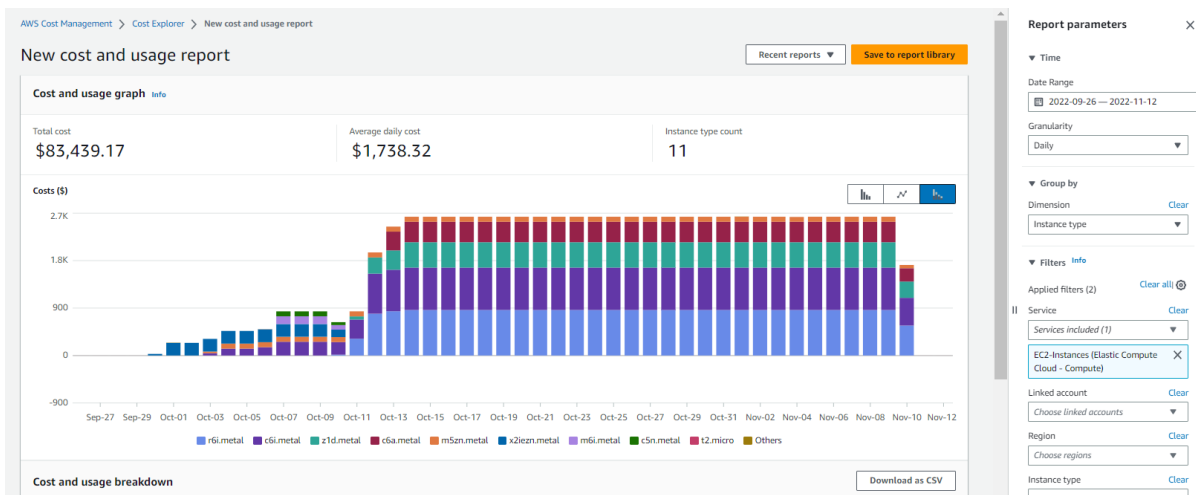


Figure 2: Example of AWS Cost Explorer Report UI – Grouping & Filtering Feature





- **AWS Cost and Usage Report (CUR)** provides the most comprehensive set of AWS cost and usage data. It includes additional metadata about AWS services, pricing, details around your pricing models (such as Reserved Instances, Savings Plans), and the tags and cost categories that you created. AWS delivers the CUR multiple times a day to the Amazon S3

bucket you specify; from there the report can be integrated with services such as Amazon Athena, Amazon Redshift, and Amazon QuickSight. You can also ingest the data into your own system for further analysis, such as by combining cost and usage data with your business operation data to generate business unit cost KPIs, e.g., cloud cost per unit sold.

Figure 3: Example of AWS Cost and Usage Report

ProductCode	ProductName	SellerOfRecord	UsageType	Operation	RateId	ItemDescription	UsageStartDate
ComputeSavingsPlans	Savings Plans for AWS CompulAmazon Web Services	Amazon Web Services	EC2SP:r5ad.1yrPartialUpfront		2E+09	1 year Partial Upf	7/27/2020 22:5i
ComputeSavingsPlans	Savings Plans for AWS CompulAmazon Web Services	Amazon Web Services	ComputeSP:1yrNoUpfront		8E+08	1 year No Upfron	7/1/2020 0:0
ComputeSavingsPlans	Savings Plans for AWS CompulAmazon Web Services	Amazon Web Services	ComputeSP:1yrNoUpfront		1.9E+09	1 year No Upfron	7/1/2020 0:0
ComputeSavingsPlans	Savings Plans for AWS CompulAmazon Web Services	Amazon Web Services	EC2SP:t3.1yrPartialUpfront		2E+09	1 year Partial Upf	7/9/2020 13:2
ComputeSavingsPlans	Savings Plans for AWS CompulAmazon Web Services	Amazon Web Services	ComputeSP:1yrAllUpfront		1.3E+09	1 year All Upfron	7/1/2020 0:0
ComputeSavingsPlans	Savings Plans for AWS CompulAmazon Web Services	Amazon Web Services	ComputeSP:1yrPartialUpfront		2E+09	1 year Partial Upf	7/1/2020 13:4
ComputeSavingsPlans	Savings Plans for AWS CompulAmazon Web Services	Amazon Web Services	EC2SP:c5d.1yrPartialUpfront		2E+09	1 year Partial Upf	7/9/2020 13:2
ComputeSavingsPlans	Savings Plans for AWS CompulAmazon Web Services	Amazon Web Services	ComputeSP:1yrPartialUpfront		2E+09	1 year Partial Upf	7/28/2020 22:4
ComputeSavingsPlans	Savings Plans for AWS CompulAmazon Web Services	Amazon Web Services	ComputeSP:1yrNoUpfront		2E+09	1 year No Upfron	7/13/2020 17:4
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ComputeSavingsPlans	Savings Plans for AWS CompulAmazon Web Services	Amazon Web Services	EC2SP:m5.1yrNoUpfront		2E+09	1 year No Upfron	7/1/2020 0:0
ComputeSavingsPlans	Savings Plans for AWS CompulAmazon Web Services	Amazon Web Services	ComputeSP:1yrNoUpfront		1.4E+09	1 year No Upfron	7/1/2020 0:0
AmazonEC2	Amazon Elastic Compute Clou	Amazon Web Services	BoxUsage:t2.nano	RunInstances	2.1E+08	Linux/UNIX (Ama	7/1/2020 0:0
AWSEvents	CloudWatch Events	Amazon Web Services	USE1-Event-64K-Chunks	PutEvents	1.7E+09	\$1.00 per million	7/1/2020 0:0
AWSDataTransfer	AWS Data Transfer	Amazon Web Services	USW1-EU1-AWS-In-Bytes		2.1E+09	USD 0.0 per GB fr	7/1/2020 0:0
AmazonSNS	Amazon Simple Notification S	Amazon Web Services	CAN1-Requests-Tier1		1.7E+09	First 1,000,000 Ar	7/1/2020 0:0
AWSDataTransfer	AWS Data Transfer	Amazon Web Services	EUW2-EU-AWS-Out-Bytes		2.1E+09	\$0.02 per GB - EL	7/1/2020 0:0
awskms	AWS Key Management Service	Amazon Web Services	ap-southeast-2-KMS-Requests		1.7E+09	\$0.00 per reques	7/1/2020 0:0
AmazonSNS	Amazon Simple Notification S	Amazon Web Services	USW2-Requests-Tier1		1.7E+09	First 1,000,000 Ar	7/1/2020 0:0
AWSCloudTrail	AWS CloudTrail	Amazon Web Services	USE1-FreeEventsRecorded		1.7E+09	0.0 per free even	7/1/2020 0:0
AmazonGuardDuty	Amazon GuardDuty	Amazon Web Services	EUW2-PaidEventsAnalyzed		2E+09	\$0.0000044 per C	7/1/2020 0:0
AWSDataTransfer	AWS Data Transfer	Amazon Web Services	USE1-EU-AWS-Out-Bytes		2.1E+09	\$0.02 per GB - UE	7/1/2020 0:0

AWS advises customers to start their cost and usage reporting journey with AWS Cost Explorer. You can always evolve to use CUR

in response to your business needs for more detailed data and analysis customization.



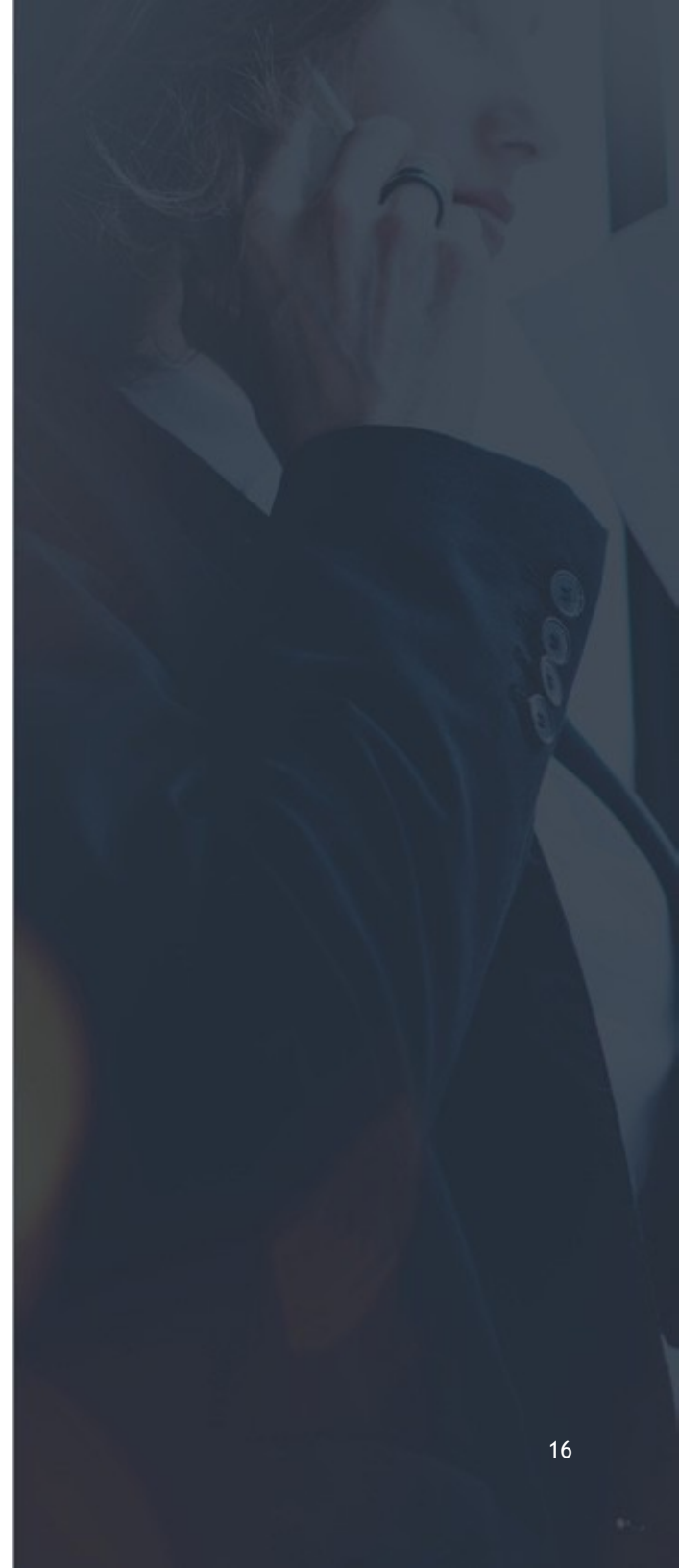
By tagging all instances in AWS, we are now able to look at specific costs from the application layer down to every resource associated with an application. This has allowed us to surface the hidden costs for operating applications.”

Chad Marino
Executive Director of
Technology Services, Kaplan



- **[AWS Billing Conductor \(ABC\)](#)** simplifies your billing and reporting process for chargeback purposes. To help customize the output of your billing details according to your financial reporting structure and chargeback logic, ABC gives you the capabilities to organize accounts

into mutually exclusive [billing groups](#), adjust AWS and Marketplace billing rates with a [pricing plan](#) built with [pricing rules](#), and share additional costs and credits through [custom line items](#).





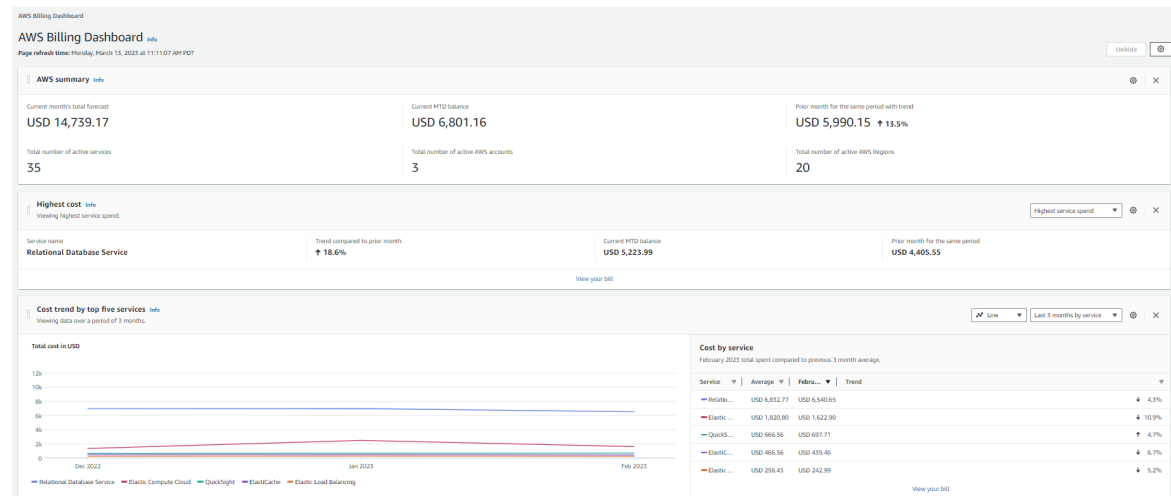
Run — Manage billing and control costs

You can establish guardrails and set governance to ensure expenses stay in line with budgets. AWS provides several tools to help you get started.

[The AWS Billing console](#) provides you with high level KPIs focused on your overall spend, spend by service, and free tier usage for the current month. It also provides links for getting started with AWS Billing & Cost Management, as well as the ability to navigate to Cost Management services, Billing details, and Preferences.

This can help you quickly evaluate whether your monthly spend is in line with your prior month and projected run rate. The Billing console also provides a month-to-date breakdown by top services, so you can determine if these costs are as expected. If they are not, you may want to investigate and take corrective actions. You can also get billing details for the current month — for example, costs by service, account, or region — as well as for previous months, for the life of the account.

Figure 4: Example of AWS Billing dashboard





For more details, see the [Getting Started with AWS Billing Console blog](#).

While cost control is a shared responsibility, it is critical to establish basic governance policies to guide permissions and accessibility. Customers who are successful doing this have centralized ownership through designated teams, such as a Cloud Center of Excellence (CCoE), or a Cloud Business Office (CBO). These teams help design and implement governance mechanisms and drive best practices company-wide.

AWS provides you tools to set up guardrails that define and enforce limits to cloud usage and spending. You can use [AWS Identity & Access Management \(IAM\)](#) to create and manage users and groups and to use permissions allowing access to AWS resources. You can also use [Service Control Policies \(SCPs\)](#) to centrally manage permissions for all accounts in your organization.

AWS offers a single set of permissions that control access to Billing and Cost Management services via console and programmatic interfaces, so you can authorize the user access to specific console pages, including AWS Cost Explorer, AWS Budgets, consolidated billing, billing preferences, credits, tax

settings, payment methods, purchase orders, and cost allocation tags. Refer to the [billing console](#) and [cost management user guides](#) to understand these fine-grained IAM actions for each of billing and cost management services.

If your teams prefer an operation model, where you centrally provision and share services approved for use and end users can quickly search and deploy these IT services, you can use the [AWS Service Catalog](#). With the AWS Service Catalog, you can create and manage catalogs of IT services. The Service Catalog is also integrated with AWS Budgets, so you can create and associate budgets with products and portfolios and track your teams' spend.

As mentioned in the last section, the [AWS Control Tower](#) provides a streamlined way to set up a multi-account AWS environment. It is also an important governance tool that automates policy management for new accounts and provides an integrated dashboard view of account permissions and compliance status with your guardrails.



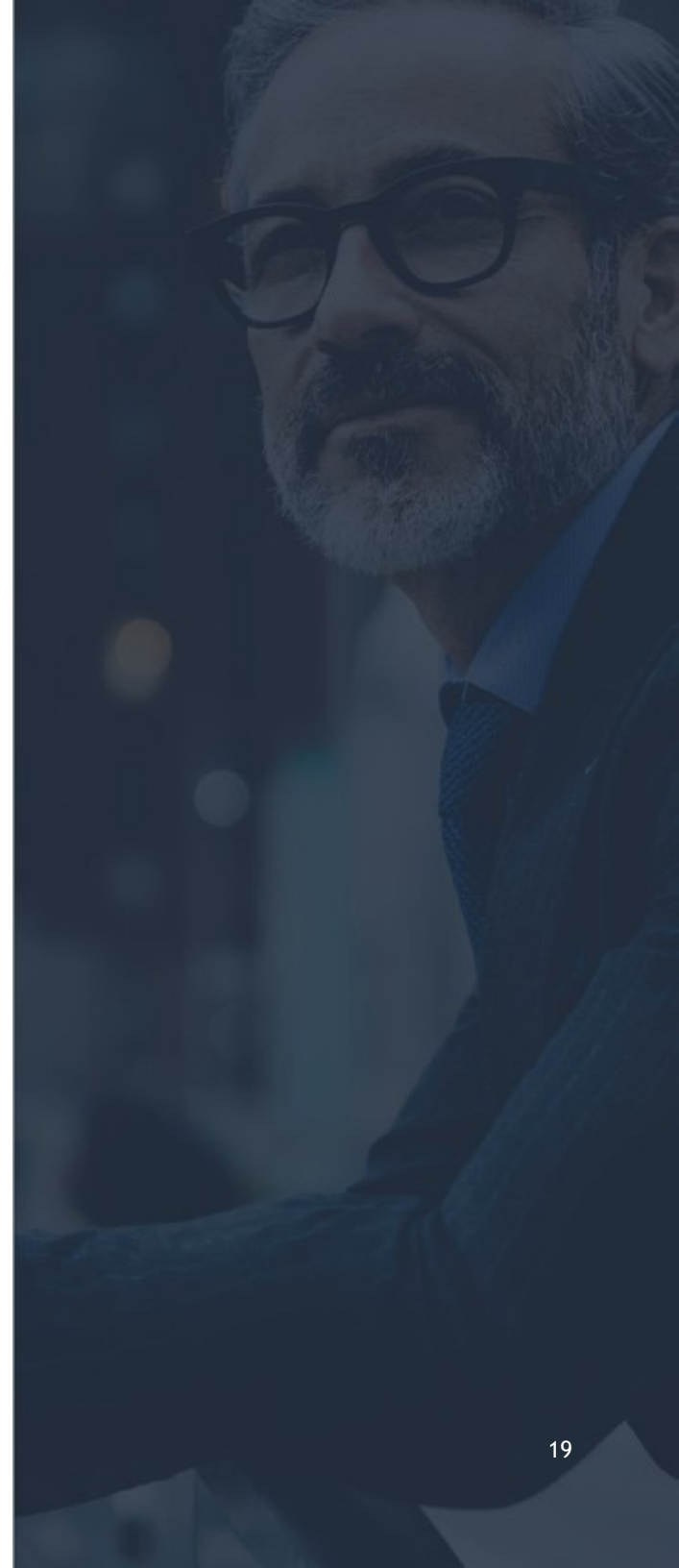
Securing executive sponsorship and establishing a three-way partnership between Finance, Technology Groups, and IT was critical to our cost management efforts.”

Sveta Shandilya
Head of IT Planning,
Rubrik



It is important to detect and catch activities that cause cost overruns early. With [AWS Cost Anomaly Detection](#), we will investigate your spend trend, compare what you spend versus what was expected, and send you anomalous alerts with root cause analysis, so you can evaluate specific accounts, service, regions, etc.

When your cost and usage go above the budget limit, you can pre-configure [AWS Budget Actions](#) that can enforce specific IAM or SCP policies, or stop target EC2 or RDS running instances in your account, and prevent unintentional spend. These actions can either be executed automatically or require workflow approval.



Plan — Improved planning with flexible budgeting and forecasting

Once you've established visibility and cost controls, you will likely want to plan and set expectations for spending on cloud projects. AWS gives you the flexibility to build dynamic forecasting and budgeting processes so you can stay informed on whether costs adhere to, or exceed, budgetary limits.

You can use AWS Cost Explorer to forecast costs in a defined, future time range based on your past spend. AWS Cost Explorer's forecasting engine segments your historical data based on charge types (e.g., Reserved

Instances) and uses a combination of machine learning and rule-based models to predict spend across all charge types individually. This multiple time series-based approach helps you get a higher degree of forecasting accuracy through AWS Cost Explorer, irrespective of the AWS services you used.

For more information on creating custom usage forecasts using AWS Cost Explorer, see the [Usage-Based Forecasting](#) now Available in AWS Cost Explorer on the AWS Cost Management Blog.

Figure 5: Example of AWS Cost Explorer UI — Forecasting Feature





You can also use [AWS Budgets](#) to set custom budgets at a granular level by specifying the time period, recurrence, or amount (fixed or variable), and adding filters such as service, AWS Region, and tags.

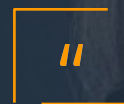
To stay informed on the performance of your existing budgets, you can create and schedule [AWS Budget Reports](#) to be emailed to you and your stakeholders on a regular cadence.

You can also create [budget alerts](#) based on actual costs, which is reactive in nature, or on forecasted costs, which provides time to implement mitigations against potential cost overruns. You

will be alerted when your cost or usage exceed, or are forecasted to exceed, your budgeted amount. If you have purchased Reserved Instances or Savings Plans, you can also use AWS Budgets to set utilization or coverage targets for your Reserved Instances and Savings Plans: You will receive alerts when your utilization or coverage drops below the thresholds you define. Alert notifications can be delivered via email, Amazon SNS topic, Slack message, or Amazon Chime message (leveraging the AWS Chatbot service). These features allow you to act quickly in response to negative variances in forecasted spend, and to mitigate risks of overspending and failing to meet the return-on-investment target.

Figure 6: Example of AWS Budgets UI

Budget name	Budget type	Current	Budgeted	Forecasted	Current vs. budgeted	Forecasted vs. budgeted
Project Hero Cost Budget	Cost	\$43.30	\$45.00	\$55.30	97.33%	125.11%
Eastern US Regional Budget	Cost	\$85.21	\$100.00	\$125.28	85.21%	125.28%
Total Monthly Cost Budget	Cost	\$141.30	\$175.00	\$187.00	80.86%	106.86%
Total EC2 Cost Budget	Cost	\$108.30	\$200.00	\$188.21	54.15%	94.11%
EC2 Usage Budget	Usage	3,811 Requests	5,200 Requests	4,875.75 Requests	65.47%	65.07%
Monthly DataTransfer Usage Budget	Usage	2.28 GB	4 GB	3.07 GB	57.00%	76.75%
Quarterly Budget	Cost	\$133.10	\$400.00	\$216.10	33.28%	54.03%



For us, the ability to forecast our expenditure without worrying about unexpected bills is a huge relief. The AWS Cost Explorer tells us exactly where our money is going and what we can do to reduce costs further.”

Dean Jezard
CTO and Cofounder,
Tigerspike

Save — Optimize costs with pricing and resource recommendations

Optimizing costs begins with having a well-defined strategy for your new cloud operating model. Ideally, this should start as early as possible in your cloud journey, setting the stage for a cost-conscious culture reinforced by the right processes and behaviors.

There are many different ways you can optimize cloud costs. AWS recommends that customers focus on the following:

Select the right purchase models

AWS services can be procured through multiple pricing models. You can purchase cloud resources with on-demand, pay-as-you-go prices or receive discounts when you select one- or three-year term-based commitments. You can even purchase spare compute capacity at a much lower price.

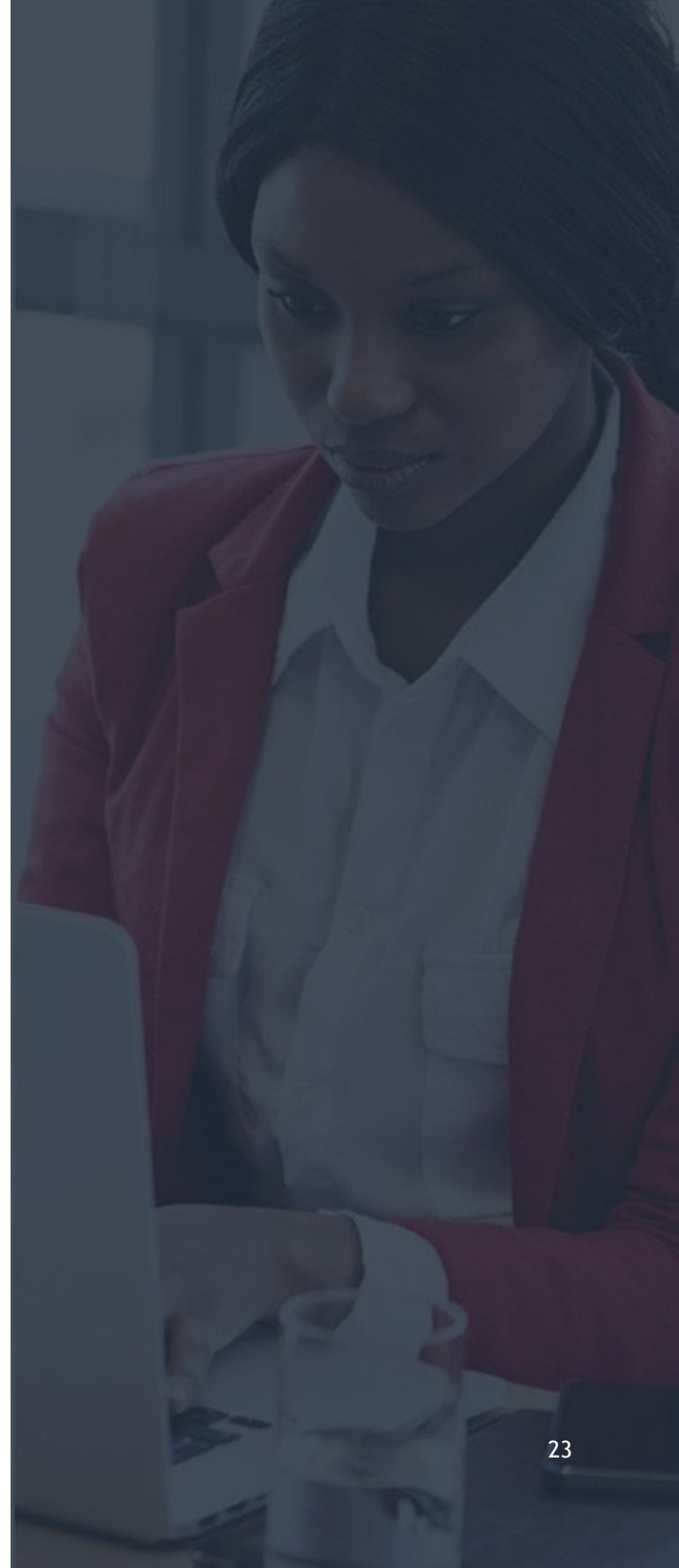
A few strategies to consider:

- If your financial situation allows you to make a longer-term commitment, and you have predictable workloads for instances like Amazon EC2 or Amazon RDS (to name a couple), [Reserved Instances](#) (RIs) enable you to reduce costs (up to 72% off On-Demand pricing). You have the flexibility to choose among three payment options: All, Partial, or No Upfront. Instance discounts can also be applied to other accounts in your organization's consolidated billing family by enabling Reserved Instances Sharing in your billing console.

- If you want to commit to a dollar amount per hour rather than to a specific instance, [Savings Plans](#) is another commitment-based purchase option and offers up to 72% off On-Demand pricing. With a Compute Savings Plan, discounts are applied automatically, even when you move your workloads between instance families or AWS Regions, or migrate your workloads, such as, moving from Amazon EC2 to Amazon ECS, using AWS Fargate. With EC2 Instance Savings Plans, discounts are automatically applied, regardless of instance size, operating system, and tenancy, as long as they are within the specific family in a chosen AWS Region.
- If you have stateless, fault-tolerant, or flexible workloads, such as big data, containerized workloads, continuous integration / continuous delivery (CI/CD), web servers, high-performance computing (HPC), or other test and development

workloads, Amazon [EC2 Spot Instances](#) allows you to take advantage of unused EC2 capacity at steep discounts (up to 90% discount off On-Demand pricing).

See [EC2 Auto Scaling Groups](#) with Multiple Instance Types & Purchase Options on the AWS News Blog to learn more about how you can combine [Spot Instances](#) with other purchase models in a single Auto Scaling group to lower your compute costs. As Spot Instances are spare capacity, EC2 can reclaim that capacity whenever it needs it, with a two-minute notification. Spot Instances are integrated with AWS managed services like Amazon EC2 Auto Scaling, Amazon EMR, AWS Batch, Amazon ECS, and Amazon EKS, to help you seamlessly handle interruptions. [See Best practices for handling EC2 Spot Instance interruptions](#) on the AWS Compute Blog to learn how you can take advantage of the interruption notice.



Match capacity with demand

It's important that the size and the type of resource of what you provision matches what you actually need. Within the architectural design, your teams will want to consider the most appropriate destination for specific data types and select the right storage tier for your data. All of the choices below can further reduce your costs.

- [AWS Compute Optimizer](#) delivers AWS compute resource recommendations to help you quickly identify the optimal AWS compute resources. It uses machine learning to analyze your historical utilization metrics and deliver recommendations that can reduce your costs by up to 25%.
- [AWS Cost Explorer Resource Recommendations](#) use a machine learning-based recommendation engine to analyze the configuration and resource utilization of a workload. It also takes into consideration the customer-specific cost and savings information (e.g., billing, available credits, RI, and Savings Plans) to help you identify underutilized EC2 instances that may be downsized on an instance-by-instance basis within, as well as across, EC2 instance families.
- [AWS Trusted Advisor](#) is an online tool that provides you with real-time guidance for provisioning resources according to AWS best practices, including cost optimization, performance, security, fault tolerance, and service limits.

To optimize storage and database provisioning:

- [Amazon S3 Intelligent Tiering](#) helps you optimize costs by automatically moving data to the most cost-effective access tier. It works by storing objects in two access tiers, one that is optimized for frequent access, and the other for infrequent access. You are charged a small monthly monitoring and automation fee per object.
- [Amazon S3 analytics](#) - Storage Class Analysis observes data access patterns to help you determine when to transition less frequently accessed STANDARD storage to the STANDARD_IA (IA, for infrequent access) storage class.
- When you use [Amazon DynamoDB](#), you are charged for reading, writing, and storing your data in your DynamoDB tables. With [DynamoDB On-Demand Capacity mode](#) you don't need to specify how much read and write throughput your application will perform, since DynamoDB accommodates your workloads as they ramp up or down. This is particularly useful if you have unpredictable application traffic, or you need to create new tables for unknown workloads. You don't need to factor capacity planning — you pay as you go only for the reads and writes performed by your workload. However, you need to be aware that DynamoDB On-demand capacity mode is a more expensive option than the [provisioned capacity mode](#).

To optimize EC2 capacity with:

- [Amazon EC2 Auto Scaling](#) allows you to add or remove compute capacity to meet changes in demand. For example, you can monitor the health of your EC2 instances and replace unhealthy ones automatically. You can schedule scaling ahead of time to align with known traffic patterns for your web application. Or, you might use predictive scaling, which relies on machine learning to forecast future traffic, including regularly occurring spikes, to provide EC2 instances in advance.
- [AWS Instance Scheduler](#) allows you to configure custom start and stop schedules for EC2 and RDS instances so you can reduce running costs for your environment. Customers using this solution to run instances during business hours have saved up to 70% from when they ran those instances 24/7.
- You can stay up to date with all Amazon EC2 instance types and features by using the EC2 Instance Types, which is offered both in the EC2 Console and via its APIs. This offering provides a single source of truth for all EC2 instance types, enabling you to compare options and easily access the latest information.



Achieve better price performance with modernization and AWS-designed silicon

Scale reliably and flexibly by designing and building modern, microservice architectures with serverless products, such as, [AWS Lambda](#), [AWS Fargate](#), and [Amazon Aurora serverless](#) to increase agility and lower cost.

Accelerate innovation with custom silicon optimized for the cloud. [AWS Graviton-powered instances](#) deliver up to 40% better price performance over comparable x86-based processors. Purpose-built ML chips, [AWS Inferentia](#) and [AWS Trainium](#), are designed to provide the best price performance for deep learning applications.



After going live, we started monitoring the utilization of our resources and fine-tuned the infrastructure sizing. This resulted in an additional 20% reduction in our initially provisioned infrastructure versus what we forecasted. This was simply not possible in our on-premises environment.”

Paddy Raghavan
Cofounder,
CMPUTE.IO

4

Cloud Financial Management improves more than just costs

The benefits of CFM extend beyond cost avoidance and reduction. Implementing CFM and achieving success requires collaboration across Finance, Technology, and Business teams, and a shift in how cloud spend is communicated and evaluated across the organization. Once you have adopted and gained confidence in the main CFM strategies and tactics listed above, you can also focus on better communicating the value of CFM.



Business value of the cloud

Finance needs to partner with Technology teams to create and socialize an IT value story, helping Business understand how technology spend is linked to business outcomes. This way, technology expenditures are viewed not as costs, but rather as investments.

To tell the IT value story, you need to identify whether the technology investments are growth- or run-the-business-oriented, and define and approve a set of metrics that can quantify their business impact. It's relatively easy to demonstrate the value of technology investments that are growth driven and that can be associated with revenue-generating activities, such as number of new sales orders or reduced time to market for new products. Run-the-business technology investments may appear harder to quantify, yet there are also effective ways for leaders to see value, such as the improved availability (e.g., shorter unplanned downtime) and performance (e.g., faster transaction processing time) of systems, applications, and business activities the technology resources are supporting.

⁵ AWS "Cloud Value Benchmarking Study Quantifies the Benefits of Cloud Adoption," June, 2020.

⁶ See "Amazon's Invention Machine: one-way door decisions vs. two-way door decisions" in Amazon's 2015 Shareholder Letter.

AWS recently conducted a cloud value benchmarking study⁵, in which the business impact of cloud was measured against four value areas: cost savings, staff productivity, operational resilience, and business agility.

[For more information, see Cloud Value Benchmarking Study Quantifies the Benefits of Cloud Adoption.](#)

Reduce business risk

Risk control and mitigation is another key point for Business leaders. Finance should partner with Technology teams in educating Business on how the agility of AWS can reduce the cost of failure through experimentation and by enabling reversible decisions. At Amazon, we call this a "[two-way door](#)" decision model. When preparing for future applications, teams should assess the relative costs, technical capabilities, time to deploy, and risks.

The agility provided by AWS means enabling technical teams to innovate, without being restrained by large upfront capital costs. With enhanced transparency into your business — and without the constraints of sunk costs and hardware — your organization can minimize the risks associated with failed experiments by quickly identifying, deprecating, and relocating resources to other high impact areas. AWS can help you improve business agility, ensure IT budgets align to broader business objectives, and benchmark value KPIs for existing and future workloads.

27.4% reduction in cost per user

56.7% decrease in application downtime

37.1% reduction in the time-to-market for new products and services



Customer case study



Zynga's first big AWS migration project was its analytics platform, which is critical for a player-centric, data-driven company. With assistance from AWS, Zynga conducted proofs of concept (PoCs) to test the analytics platform infrastructure against modern Amazon EC2 instance classes. The result was an analytics management solution that initially reduced a 230-node zCloud cluster to a 115-node cluster running in AWS. Additional PoC work increased efficiency and performance even further by enabling the solution to run on 70-node clusters.



Having the freedom to explore and experiment — we can do so much more today running on AWS as we execute against our mission to connect the world through games. Using AWS allows Zynga to focus on developing great games, investing in product innovation, and improving player experiences.”

Dorion Carroll
Chief Information Officer,
Zynga



Customer case study



At MedStar Health, the cost of operating and maintaining the website declined by more than 40% per month. At the same time, downtime decreased from 120 minutes per month to less than 5 minutes, and page download times decreased from an average of 1,500 milliseconds to 120 milliseconds. As a result, patients spend more time on the website, with fewer people abandoning their searches.



By understanding the value provided by the AWS Cloud, combined with the reduced risk associated with failure, you can objectively evaluate the performance of your cloud investments, ensure the proper level of funding, and prioritize resources effectively across your portfolio of projects.



Running our website on AWS has dramatically improved the user experience. Our bounce rate on the website has gone way down, our time on the page has gone way up, and our most recent numbers show that the number of page views is increasing.”

Christine M. Swearingen
Executive VP, Planning,
Marketing, and
Community Relations,
MedStar Health

Conclusion

Managing cloud finance requires evolving your existing finance processes to be cloud ready in order to establish and operate with cost transparency, control, planning, and optimization.

Cloud Financial Management is about more than just reining in costs. It is about how to embrace the agility, innovation, and scale of AWS to maximize the value that the cloud provides to your business.

Managing cloud technology and its finances can no longer be a siloed endeavor. Finance and Technology teams need to ensure that IT costs are fundamentally aligned with the goals of the business; they must also understand the associated risks, mitigation, implementation, and value targets. AWS provides a set of solutions to help you adopt CFM best practices, yet the organizational transformation doesn't need to be large and overnight. As analyst

studies⁷ have shown, small, measured improvements can lead to big impacts over time: When organizations consistently adopt Cloud Financial Management practices, those behaviors become ingrained in the way of working and decision-making. The result is a culture that is more cost-aware, from developers architecting a new born-in-the-cloud application, to finance managers analyzing the ROI on these new cloud investments.

The resources and tools included in this reference guide are essential to your organization's Cloud Financial Management journey and will help accelerate business value realization. You can learn more from our [customer success stories](#) and read about additional strategies at our [Cloud Financial Management web portal](#) and solution launches and best practices on our [blog channel](#).

"

Cloud computing is not just technology. It is a tight coupling of technology and a business model. Having a good understanding of both will allow customers to make choices that enable their organizations to better serve customers while also making effective use of their IT budget."

Jeff Barr
Vice President and
Chief Evangelist,
AWS

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More on this topic

- [Business Value on AWS Whitepaper](#)
- [Realizing Business Value with AWS Infographic](#)
- [How Live Nation Realized Business Value with AWS Infographic](#)
- [Cloud Financial Management Small Changes Can Make Big Impacts – 451 Research Paper](#)