



CLOUD COST OPTIMIZATION: TOOLS, STRATEGY AND GOVERNANCE

Abstract

Banking and financial organizations are currently moving towards building new digital platforms, adopting microservices and re-engineering existing business processes for providing better services to customers while continuing to meet compliance and regulatory demands. The customer centric business transformation strategies with cloud as the foundation element bringing down the infrastructure cost while enabling the DevSecOps way of working.

In this whitepaper we are proposing a Cost Optimization Framework and a Cost Governance Model with focus into best practices, tools, strategy, and approach. This paper also presents a comparison of cloud-native and 3rd party commercial tools that can be adopted by organizations to achieve higher ROI, maximize benefits of cloud and invest their savings in business innovation without compromising customer experience.

Introduction

According to Gartner, end-user expenditure on public cloud services is forecast to grow 23.1% in 2021 to total \$332.3 billion, up from \$270 billion in 2020 and further expected to grow to \$832.1 billion by 2025¹. Cost saving is one of the major reasons why businesses move to public cloud, but issues start when customers migrate increasing workload without properly establishing and enabling a cloud cost governance model during the first phase of the cloud transformation journey. According to the Flexera State of the Cloud Report 2021,² Many organizations are spending 30% of their cloud consumption pricing going towards waste and 70% going towards efficient spend². So, it's essential to create a cost awareness session during the cloud adoption workshops and customers strategy discussions."

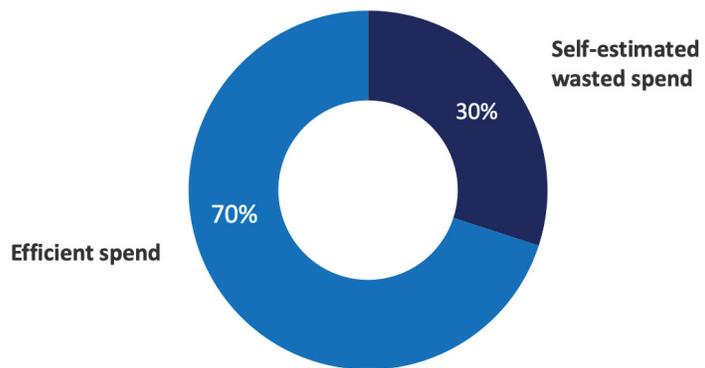
Today, cloud-based digital transformation initiatives are measured by how rapidly an enterprise can launch new applications and build new digital platforms capable of connecting global markets. The Cloud service delivery models namely infrastructure/platform/software as a service are designed to offer fault tolerance,

unlimited scalability, high availability and pay per use pricing i.e., charging only for the resources we utilize. However, cloud services are charged based on the allocated resources even if all services are not used. Customers can explore cost control techniques that can manage costs, standardize practices right from the cloud foundations, and can help organizations

save thousands of dollars in the long run. An efficient cloud cost optimization service offering ensures customers can get the maximum value out of cloud spends while avoiding expensive glitches in turn accelerating the customer's cloud adoption strategy. We need to find new ways to reduce cloud costs of handling budgeting, forecasting and capacity optimization.

Percentage of Cloud Spend Wasted

% waste of all respondents



N=750

Source: 2021 Flexera State of the Cloud Report

Figure 1: Cloud Spend percentage efficiently used vs wasted by organizations



Cloud Cost Optimization Challenges:

Public cloud service providers (CSPs) continue gaining popularity and top providers such as Google Cloud Platform, AWS and Azure offer competitive prices to attract enterprises and financial organizations. Adopting Multi-cloud strategies can hugely support larger enterprises to run their applications and workloads in a cloud environment that makes the most sense from a cost, performance, and functionality perspective. When different business units plan to start their cloud journey, they often land into a situation called as “cloud sprawl” i.e., unregulated creation and use of cloud resources because of missing enablement of a cost governance model.

Poor cost visibility: Poor cost visibility means deep billing analysis, chargebacks, showbacks, drill-down cloud spend and other forms of reporting. Lack of cost visibility of cloud service usage without a tagging system and monitoring, makes it difficult to discover cost reduction possibilities. Lack of detailed insights on cloud spend can also limit the ability of DevOps teams to accommodate public cloud costs and increasing operating costs.

Forecasting challenges: Cloud cost budgeting and forecasting are the best ways to optimize cloud spend and increase the application performance. The fundamental challenge is to manage and optimize current cloud usage and being able to predict future usage to negotiate enterprise level annual commitments with cloud service providers (CSPs).

Overprovisioned resources: Many organizations waste close to 35% of the annual cloud spending, by over-provisioning i.e., picking the wrong instance size and forgetting to turn off the VMs (Virtual machines) namely Google machine type or Azure Virtual Machine when not in use which contributes to high costs.

Lack of automation: We need to leverage cloud cost optimization automation tools that can manage resource consumption and reduce cloud costs while adhering to governance & security standards. There are limited tools which has automation and integration compatibility that can be used for cost optimization as a code. These tools can help for both recommendation & implementing the recommendations using a change management ticket.

Underutilized saving/discount plans: Picking the Right Savings Plan like Reserved

Instances or committed use instances to ensure full utilization of the resource in case of Virtual machines or storage services. The Savings Plans offer customers a great deal of flexibility and one of their main use cases is for production workloads.

Idle resources: These are resources that were utilized at some point but are not currently in use. There are typically four types of resources that can consume customers cloud budget namely, On Demand Instances or VMs, Databases, Load Balancers and Containers. Switching dev/test instances 24/7 to a 12x5 model saves 67% of costs considering the business requirements.

Inconsistent stakeholder alignment: Identifying and creating a cost optimization team is an essential element for cost governance model. Without strong ownership, the participants and the cost assessment scope are inconsistent. Hence it is critical to identify the key stakeholders and work for a cost optimization roadmap, creating a training plan and support structure then work on the execution part of the scope and objective of the plan.

Sub-optimal architecture: A sub-optimal architecture can result in higher cloud costs that can result in lower efficiency.

Foundations of Cost Optimization:

There are seven cloud cost optimization pillars as illustrated in figure 2. The top three pillars are Right-sizing, Right Pricing Model, and Increased Scalability. The Right-sizing cloud service configuration is the process of upgrading, downgrading, or terminating cloud resources based on utilization metrics and automation. The pricing plan is powered by different types of pricing models that can be selected as per the type of workload. Identifying and eliminating cloud waste and choose the best purchase option is the key for cost optimization. We need to increase the scalability by enabling auto scaling features of the cloud service providers.



Figure 2: Cloud Cost Optimization Pillars and Focused Areas

Cost Optimization Strategy and Approach:

A comparison between Cloud and Traditional Data Center Application Deployment shows a paradigm shift of financial model from Capital expenditures (CapEX) to Operating Expense (OpEx) i.e., on-going monthly operating expense and cost structure according to the subscription plan. There are 3 phases of our proposed cloud cost optimization approach that is shown in the illustration below. This framework focuses on three phases to begin controlling cost with accurate recommendations and to reduce overall cloud consumption cost for any financial services customer.

Phase 1: Planning - This phase provides a complete visual of the customer's entire existing cloud application and

infrastructure landscape. This phase mainly involves data collection and understanding customers cloud environments with respect to cloud consumption reports and trends.

Phase 2: Scanning and Identify - This phase involves capturing top resource utilization by cost related to a particular application then analyzing and applying best practices to reduce the cost without impacting the performance. This phase also helps to understand the importance of cloud resources being used with respect to factors like idle resources and inactive resources.

Phase 3: Recommend and Implement: This phase involves submission of a list of recommendation and solutions for all

the applications with priority score of implementations. It also includes detailed steps for finding a perfect cloud service for the applications and integrating recommendations into the DevSecOps processes in terms of optimization as a code.

The cloud cost optimization approach has three layers namely data collection, data aggregation, data analysis and the sequence for applying the recommendations based on financial industry standard and best practices. This framework includes in-scope items and a list of activities & deliverables for each phase that helps customers to well advance planning and execution of the activities.

Cloud Cost Optimization Framework :

A One-Stop Solution for All type of Cloud Cost Optimization Needs

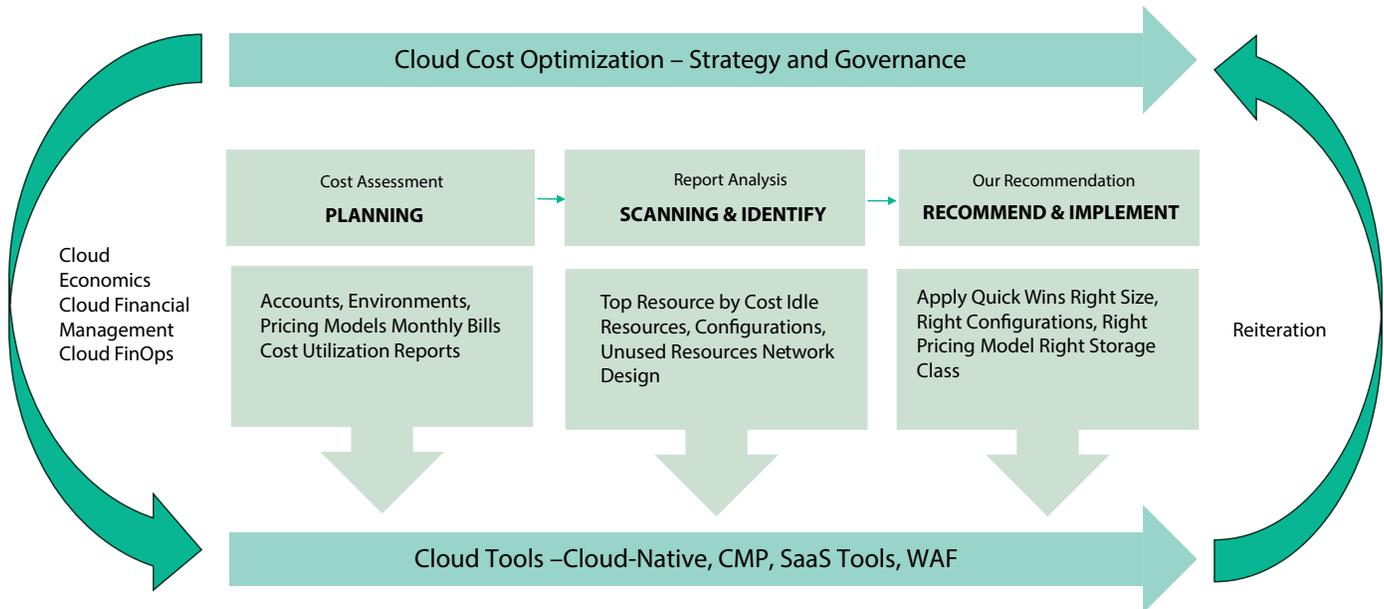


Figure 3: Proposed Cloud Cost Optimization Approach

Cost Optimization Best Practices:

We need to apply industry best practices that include all types of cloud cost management strategies, mainly selecting the right configuration and reducing wasteful spend. These have been described below:

Best Practices	Description
Apply Power Scheduling	<p>Tools for schedule to establish start and stop times</p> <ul style="list-style-type: none"> • AWS – Instance Scheduler • Azure - Azure Automation • GCP - Cloud Scheduler
Use Savings Plans	<p>Reserved Capacity Drastically Reduce Costs</p> <ul style="list-style-type: none"> • AWS Instances (RI - Reserved, SI - Spot, BI – Burstable) • Azure VMs (Reserved VMs, Spot VMs, Hybrid benefits) • GCP Machine Type (Committed Use discounts, Preemptible instances)
Pick Right Sizing Services	<p>Right Sizing is the process of analyzing computing services and modifying them to the most efficient size. Cost management tools evaluate whether a given configuration is the most economical approach for a particular workload.</p>
Control Data Transfer Costs:	<p>Data Transfer is Free in the same region (S3, Elastic compute cloud - EC2 same region or replicate, Use CDN, Use Private IP for Data Transfer, Data transfer IN to S3 from the internet is free. Data transfer OUT to CloudFront is also free).</p>

Table 1: Cloud Cost Optimization Best Practices



Cost Optimization Cloud-Native Tools

In the tables below we have given a comparison between cloud-native, and industry adopted enterprise grade cost optimization tools.

Cost Optimization Pillars			
Right Sizing Services	Trusted Advisor EC2 Right Sizing	Azure Advisor	NA
Right Pricing Model	S3 Calculator TCO Calculator	Azure Calculator TCO Calculator	GCP Calculator TCO Calculator
Right Storage Class	S3 Analytics	Azure Cost Management	GCP Calculator
Increase Elasticity	Autoscaling	Scale-set	Autoscaling
Monitor and Improve	CloudWatch Metrics Cost Optimization Monitor	Azure Monitor Metrics	GCP Operations Suite
Periodic Review	AWS Cost Explorer Cost Usage & Report	Azure Cost Management	GCP Billing Reports
Budgeting and Alerting	AWS Budget AWS Cost Explorer AWS Billing Dashboard	Azure Cost Management Azure Budgets	GCP Billing Reports Budget Alerts

Table 2: Cloud Cost Optimization Pillars and Cloud-native Tools

Cost Optimization 3rd Party Tools:

Third Party Tools and Capabilities				
Hybrid Multi-Cloud	AWS, Azure, IBM Cloud	AWS, Azure, GCP	AWS, Azure, GCP	AWS, Azure, GCP
AKS, EKS, GKE, OpenShift	FULL SUPPORT	NO SUPPORT	NO SUPPORT	FULL SUPPORT
Optimization as Code	NO	NO	NO	FULL SUPPORT
Real time Visibility	YES	YES	YES	FULL SUPPORT
Budget Forecasting	YES	YES	YES	FULL SUPPORT
Platform Integration	YES	YES	YES	FULL SUPPORT
Bill Analysis & Better Reporting	YES	YES	YES	FULL SUPPORT

Table 3: Cloud Cost Optimization 3rd Party Tools and Capabilities

Cloud Cost Governance Model:

Establishing the Cloud Cost Governance helps financial organizations to decrease cloud cost and increase efficient utilization of resources by forecast budget requirements, enforcing the global tagging policies, and building FinOps practice team shown in figure no 3. In addition to reducing cost, it provides

detailed visibility & insights of cloud consumption ensuring better performance of applications. The proposed governance model evaluates and monitors costs, limits IT spend, scales to meet needs, and creates cost accountability. The Cloud Business office generally drives the cloud cost and resource optimization across business

units. It consists of multiple teams namely CCOE, FinOps, Partner tools team and all the cloud projects. The third-party tools like Densify having capabilities like an automation workflow that can be integrated with the customer's ITSM tools like ServiceNow for implementing cost optimization recommendations.

Cloud Cost Governance Model :

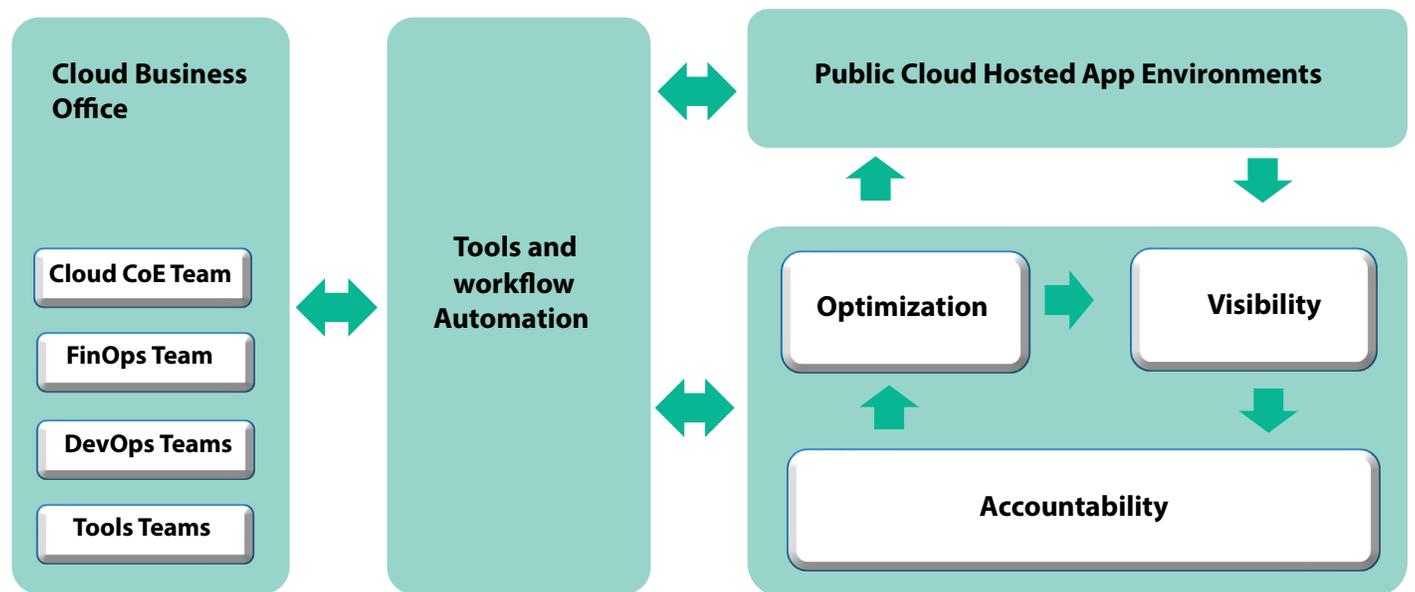


Figure 4: Proposed Cloud Cost Governance Model

There are three fundamental components of Cloud Governance model namely Cost Visibility, Cost Accountability and Cost Optimization Process. To build a cost governance model we need to focus on the below parameters.

Enforcing tagging: Tagging is one of the most foundational steps that you need to take to establish a meaningful cost governance model. It is simply a key/value label for cloud infrastructure resources that enables users to manage, search resources

including cost tracking, reporting, and allocating resources to various business units.

Budgeting: Defining and allocating Cloud budgets for business units, departments, cost centers, projects and ensuring approval mechanisms, to avoid cloud cost overrun. This is done by sending out alerts when thresholds are breached which in turn helps customers limit the Cloud cost and usage of cloud resources. The cloud cost governance

team works as a peer of the cloud strategy team to plan cloud-adoption budgets.

Cloud FINOPS: It is a framework for managing operating expenditures (OpEx) in the cloud defined by FinOps Foundation. The FinOps process has three phases (Inform/Optimize/Operate) and it's a collection of cloud financial management best practices and tools that allow organizations to understand and take control of their cloud spend.

Conclusion

Cloud Cost Optimization is a cost management solution that enables FS enterprises to cut cloud costs while ensuring efficient use of cloud resources across customers, business units, cloud accounts and applications. It is an essential and continuous improvement process of

reducing overall public cloud spend by identifying idle resources, eliminating waste, reserving capacity for higher discounts, right sizing computing services to scale that discover cost saving opportunities. Adopting the cost optimization process during the

entire lifecycle of DevOps Processes including cost optimization trainings to the CloudOps and DevOps teams can benefit the organizations for a cultural shift i.e., we need to build a culture of cloud financial awareness and accountability.

About the Author



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Senior Industry Principal

Rabi has rich experience in Enterprise IT, Hybrid Multi-Cloud and Business Transformation in the space of Advisory, Consulting, Presales and Service Delivery. At Infosys he is part of the FSDGTL Team and working as a Sr. Industry Principal. His Industry experience makes him a Cloud Business Leader who has carried experience from world's most innovation companies like Philips, IBM, Oracle and Dell. He has played various Tech leadership roles and built Cloud Practices, Created Cloud Service Offerings, Digital Solutions and demonstrated thought leadership. He is a certified Cloud Solution Architect for all top three cloud service providers and Togaf 9.2 Enterprise Architect.

Reference

- 1) Gartner Forecasts Worldwide Public Cloud End-User Spending to Grow 23% in 2021, April 21, 2021, [gartner.com](https://www.gartner.com)
- 2) State of the Cloud Report, 2021, [flexera.com](https://www.flexera.com)
- 3) Cost Optimization Pillar, July 2020, [amazon.com](https://aws.amazon.com)
- 4) Cloud cost optimization: principles for lasting success, 2021, cloud.google.com
- 5) Cost optimization on Google Cloud for developers and operators, 2021, cloud.google.com
- 6) AWS Cloud Financial Management, 2021, aws.amazon.com
- 7) Optimize your Azure costs, 2021, [Azure.com](https://azure.com)
- 8) Cloud Cost Optimization: 10 Best Practices for FinOps, 2021, densify.com
- 9) Apptio Cloudability, 2021, apptio.com
- 10) What is FinOps, 2021, finops.org

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