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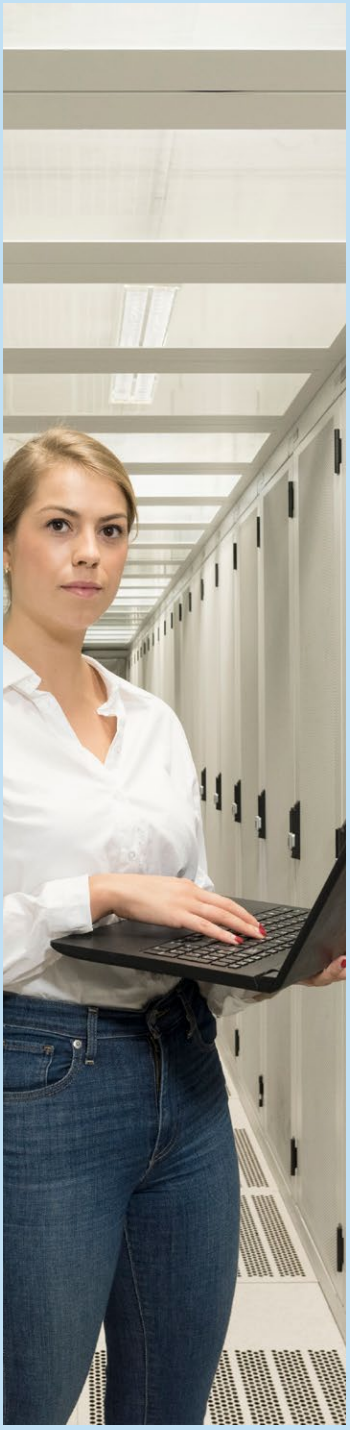

6 WAYS TO MANAGE CLOUD COSTS

Abstract

"Knowing your cloud cost", KYC is of prime importance for the success of digital enterprises. Not just being able to Know the cloud costs, but also, being able to efficiently manage, monitor, optimize, control, and predict costs is necessary for success in the digital transformation journey. Like enterprise security, the cloud cost should be everyone's responsibility. In this paper, we will discuss about on important aspects related to managing the cloud costs. The paper highlights the need of standards based, transparent, automated, and holistic approach for managing the cloud costs, where everyone from employees, partners, clients, customers, and stakeholders along with tools, frameworks and policies have a key role to play. The Workforce enablement and empowerment with right cloud skills and tools in the early stages of cloud adoption are very critical in the success of cloud cost management.

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Why has Cloud Cost become important?

Low CapEx along with huge infrastructure cost savings were the main drivers for cloud adoption. The benefits of cloud migration extend well beyond cost savings which include

- Rapid digitization with increased staff productivity
- Operational resiliency and scalability to meet changing demands, and
- Business agility that helps to innovate faster.

The Covid 2019 served as a catalyst for driving digital innovation to excel the cloud adoption across all domains. The rapid increase in cloud adoption has come with associated increase in cloud costs too. Today, a typical digital enterprise has been wasting around 35% of its cloud budgets as per Flexera 2021 report. By 2025, Gartner estimates 95% of new digital workloads will be deployed on cloud-native platforms, up from 30% in 2021. Thus, managing the increasing cloud costs and reducing the cloud wastages are on top priority list for CEOs.

Timely rollout of cost management program plays a key role in the success. Implementation of a well-designed cloud infrastructure cost optimization and rightsizing initiative across all levels in organization can help built the **Cloud Mindset** and **FinOps processes** that play pivotal role in cloud cost management.

The Cloud Migration planning is a very complex and implementing it at a very large scale is even more challenging. A mass migration of hundreds of applications from private data centers to public cloud is not realistic. A well planned and phased approach to cloud migration based on robust, automated and policy driven approach for cost optimization and rightsizing can help organizations to achieve their financial goal and business agility.

The cloud migration with focus on cost management

The cloud migration strategy and planning should factor in all hidden migration costs, challenges and risks related to many unknowns. Following points can help in addressing the unknowns.

1. Understanding the Cloud Economics

A deep understanding of concepts like CapEx, OpEx, developer productivity, agility, TCO – total cost of ownership, time to market, resiliency, outages, cloud SLAs, cost avoidance, ROI, data breach, and many more such terms help in making right decisions during the cloud migration which leads to cost savings.

2. Building cloud mindset and FinOps culture

In the local data centers, the infrastructure provisioning, support, and administration responsibilities were owned by central Ops team while in public cloud it gets distributed across multiple dev team. The dev team has been responsible for application security, performance, availability, etc. but the infrastructure cost has never been their concern, thus making cost management challenging. By default, developer mindset doesn't consider cloud cost management as the requirement. This should be addressed proactively through employee enablement programs with focus on FinOps and building cloud mindset.

3. Cost management with chargeback and showback

Like requirements traceability the cloud resource traceability should be targeted. Shadow IT is already an issue. The administration and traceability of self-provisioned cloud resources is very difficult, which leads to unaccounted cost escalation, wastages, and security gaps. Instead, automated resource provisioning with "Infrastructure as a Code" model should be adopted. The focus should be on making a cloud chargeback system acceptable and effective by using policies, resource tagging, access control and automation.

4. Avoid dual costs of on-premises and public cloud infrastructure

Rigid internal policies, resistance to change, manual processes, and slow adoption of standards impact the timelines of cloud migration programs. This leads to the dual Infrastructure costs for cloud and on-prem data centers. It can be avoided by active involvement of executive leadership, good dependencies planning, agility in decision making, strong collaboration between business units and knowledge sharing by setting up the cloud factory model for migration programs.

5. Upfront consideration of Data Privacy and Regional Laws

The data privacy laws and regulations like GDPR, Schrems II, etc., have potential to stall the cloud migration programs midway. These unaccounted delays lead to resource wastage and increased costs. Many applications are indirectly impacted due to inter-dependencies leading to scope creep and increased costs. An active involvement of experts, SMEs and stakeholders from all business functions including security, finance, legal, operations, and technology helps in better transformation strategy. The organization should account for the implications of regulations on the overall program cost.

6. Address the skill gap challenges

The skilled workforce availability is a big challenge today. The cloud experts and trained workforce is not readily availability in the market. The organizations should focus on employee enablement and reskilling programs proactively. Like the recurring security training programs, the cloud trainings along with FinOps aspects should be offered to the workforce on recurring basis.

Though there are so many unknowns and challenges, there are proven models for addressing the cloud costs. Early and effective implementations of cost management solutions is important. Many enterprises have successfully migrated to public cloud to achieve business agility using the cloud native and serverless architecture. In the next section we will discuss the path to successful cloud migration from cost management perspective.

Cloud cost optimization and rightsizing

As per Gartner, about 2/3rd **of enterprise public cloud bill** is spent on **compute resources.** By default, human behavior is to ask for more. The overprovisioned and unused cloud resources lead to wastages. These costs can be reduced by rightsizing first time followed by continuous monitoring and optimization. Major cloud cost savings can be achieved by avoiding the Idle and overprovisioned resources. Other wastages include orphaned volumes or disks or Ip, inefficient containerization, underutilized databases, usage of old or legacy resource types, unused reserved instances, and many more hidden costs. These issues can be easily detected and remediated by continuous monitoring, alerts, and rightsizing of resources using Infrastructure as a Code (IaaC) based automation.

The Gartner Guidance Framework for Cost Management should be adopted i.e. **Plan, Track, Reduce, Optimize and Evolve.**

1. Plan - Cloud Migration and Cost Management

- The Infosys 8-Rs framework* based on Gartner 5R's framework suggests paths to cloud migration that should be used for planning migration.

1. Retain 2. Retire 3. Remediate 4. Rehost 5. Refactor 6. Replace 7. Re-platform 8. Re-Architect

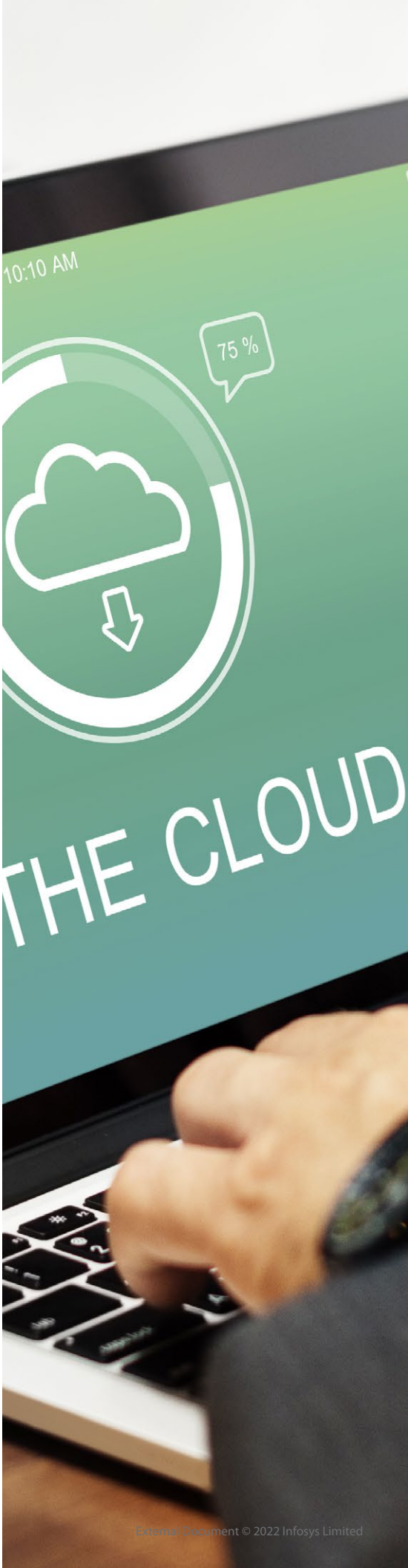
- Define requirements and Identify dependencies
- Design architecture with cost as important aspect
- Choose appropriate pricing models that aligns with budget
- Define cost budgets and build ability to forecast consumption
- Do pilot migration to get confidence

2. Track – Focus on what it matters most

- Establish daily / weekly cadence for review of spends
- Ensure clear communication of cost control policies and goals
- Executive level support and consistent communication motivates teams to actionize plans.
- Build granular costs dashboards that could highlighting cost deviations
- Implement resource tagging.
- Prioritize, identify, and optimize the cloud resources that incur the maximum cost and define metrices to track.
- Evolve capabilities to keep a check on cost meters and optimize by implementing chargeback and showback policy. The BAU teams should be responsible for the cloud costs.
- Mostly, around **60-70%, of cloud costs** are incurred from few services like compute, storage, disk, data licensing costs, etc.
- Trigger alerts on anomalies and focusing on optimizing key services that offer major cost savings.

3. Reduce - Cost Savings by Right Sizing

- Define the short term, medium term, and long-term cost saving goals.
- Automated and continuous **"Always-On" strategy for rightsizing** should be implemented.
- Establish DevOps feedback loop
- Enforce rightsizing based-on CPU, RAM, storage, and network needs driven by usage history
- Explore and adopt the tools offered by major hyper scalars and by 3rd party products like Cloudability, Turbonomic, Densify, CloudCheckr etc.
- Leverage CSP discounts.
- Different cost saving measures are available for Dev-test stage vs production environments.
- Continuous rightsizing of the on-premises infra during and post migration is necessary.



4. Optimize - Use cloud native services to innovate and save cost

- Look for **AIOps based** solutions for selecting the cheapest instance (size and family) while meeting performance needs
- Explore possibilities to implement serverless solutions, for certain use cases this can save costs
- Design cloud provider agnostic solutions to reap the benefits of Hybrid and Polycloud Architecture.
- Establish a **Factory model for cloud migration** to promote cloud patterns co-creation with teams.
- Automate and manage data effectively with lifecycle policies.
- Effective usage of tools, frameworks, and cloud native features for automation.
- Re-Architect the monolithic applications using cloud native and serverless services. It can offer huge cost savings.

5. Evolve – Build tooling, automate, and Incentivize teams

- Enable your partners and employees. Incentivize them to implement measures, controls, and guidelines that help to save costs.
- Apply external cost pressure to drives savings with cost budgets and detailed planning.
- Strive to build cloud mindset and establish **FinOps** culture to prioritizing the cost along with NFRs like performance, availability etc.
- Formalize the chargeback models that allow the business flexibility and cost reductions
- Gamify cost savings dashboard by creating leader boards for cost differentiators.
- Focus on team enablement and business agility
- Provide trainings / tools to increase the migration velocity, quality, and make actions measurable.
- Time given to engineers to optimize infrastructure should be a separate from BAU work items in the backlog.
- Setup central team to drive the cost optimization goals and run enablement programs.
- Management support to evolve, change or suspend rigid policies and controls that impact business agility along with costs.

Holistic approach to right sizing leads to cost saving

Holistic view of cost management should encompass following

1. A well-designed cloud re-skilling and enablement program to create cloud awareness and embraces the adopting the cloud native features.
2. Design solutions to be cloud provider agnostic to reap the benefits of hybrid and poly-cloud architecture along with more flexibility and choices that could result in cost savings.
3. Make timely decisions to decommission the legacy applications and on-premises infrastructure
4. Well-designed cloud cost and dependencies management dashboard, that helps prioritize application migration, highlight cost overrun and publish key cost metrices to all stakeholders.
5. Ability to rightsizing of the cloud infrastructure by implementation of cost optimizations pillar.
6. Ability to automatically scale in and out the cloud infra
7. Quickly provision/ deallocate resources using configuration, controls, and well-defined policies through DevSecOps pipelines using IaaC. Strictly avoid manual interventions.

An example of Azure cloud cost optimization techniques categorized as basic, intermediate, and advanced levers.

Basic Technique/ Low Hanging fruits	Intermediate Technique	Advanced Technique
1. Azure Hybrid Benefits (Now for Linux with windows & SQL) 2. Consider VM Reservations 3. Rightsizing- Compute, memory, capacity using tools like Cloudability, Densify, Turbonomic, CloudCheckr 4. Azure Advisor – Free tool 5. Delete Orphaned Resources- IP address, disks, snapshots etc. 6. Deallocate VMs during the off hours 7. Setup Budgets and Cost Alerts 8. PAYG Vs Enterprise Agreement Discounts 9. Use Azure Cost Management	1. VM Scale sets 2. Burstable VMs (B series) 3. Dev/Test Labs 4. Azure Dev Test Pricing 5. Shared Services / Elastic Pools 6. VM size standardization for Reserved Instances 7. Storage reservations – Can reserve Azure Blog Storage, SQL database, managed disk 8. Explore Location cost benefit 9. Governance – Policies, Tagging, Locks, Chargeback, Showback	1. Planning network costs – Egress 2. Custom Autoscaling logic 3. Suspend options – save compute costs 4. Software licensing 5. Using Ephemeral OS disk 6. Planning for disk bursting 7. Effective usage of temporary drives 8. Usage of Azure container instances (AKS) 9. Azure Automation (500 free /month) & Azure DevOps (1500 / month) 10. Leverage Windows virtual desktop to support multiple users. 11. Optimize costs by automating azure blog storage access tiers

Table 1 – Cost Optimization Techniques

Summary

- The executive sponsorship and support in cloud cost optimization and rightsizing initiative is the first step in the success of cloud cost management.
- Both, top-down and bottom-up approach should be used to involve employees, clients, partners, vendors, customers, and all stakeholders from early stage of cloud migration planning.
- Organizations should strive hard to achieve the "Always-On" and continuous cost optimization process using various tools, products, and frameworks offered by hyper-scalars and 3rd party vendors.
- The cloud cost optimization levers should be co-created by central factory team along with dev partners. Build pluggable, Injectable, and reusable components that could be easily reused and integrated in DevOps pipelines.
- For successful cost management, the **Cloud Mindset** should find strong roots in organization, where everyone understands FinOps, the cloud economics, and is empowered to manage the cloud costs while meeting the financial goals of organization.
- Finally, the 6 ways to manage cloud cost are
    - Understanding the cloud economics
    - Build the cloud mindset and FinOps culture
    - Manage costs with chargeback and showback policies
    - Avoid dual costs of on-premises and public cloud infrastructure
    - Have upfront consideration of data privacy and regional laws from cost perspective
    - Promptly address the skill gap challenges

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