vmware

aws

Azure

openstack

Multi-Cloud Adoption:
Challenges and Best Practices

Table of Contents

Executive Summary

Today, "multi-cloud environment" is not a new terminology for enterprises. When an organization takes the initiative to adopt infrastructure and services from different cloud vendors, we say that it is leveraging a multi-cloud environment. There are extremely convincing reasons that multi-cloud is providing huge agility and cost efficiency to enterprises with its flexibility to separate different workloads into different environments depending on their specific requirements.

As companies continue to progressively deploy services from multiple providers, business benefits such as increased agility, improved disaster recovery, faster time to market, cost optimization, improved power to negotiate, lower dependency on a single vendor, and product innovation are expected to increase. However, along with these advantages, the multi-cloud journey does introduce a few natural challenges such as difficulty in managing costs, reduced performance (in some instances), increased security risks, difficulty in controlling operation overheads, and management.

Working with leading enterprise customers and cloud vendors, we have identified key pain points, related best practices, and tools and frameworks that can help enterprises to begin or evaluate their multi-cloud journey.

How important is it for an enterprise to go the multi-cloud way?

We have stepped into a new era of cloud computing where enterprises are quickly adopting multi-cloud architectures. They are choosing more than one cloud service provider, empowering developers with a choice of the best components for their use cases. It is also helping organizations avoid situations such as a single point of failure, dependencies, and vendor lock-in. A survey by analyst firm Forrester found that 86% of cloud strategy and application management decision-makers in the US, EMEA and APAC regions characterized their organizations' cloud strategy as 'multi-cloud'.
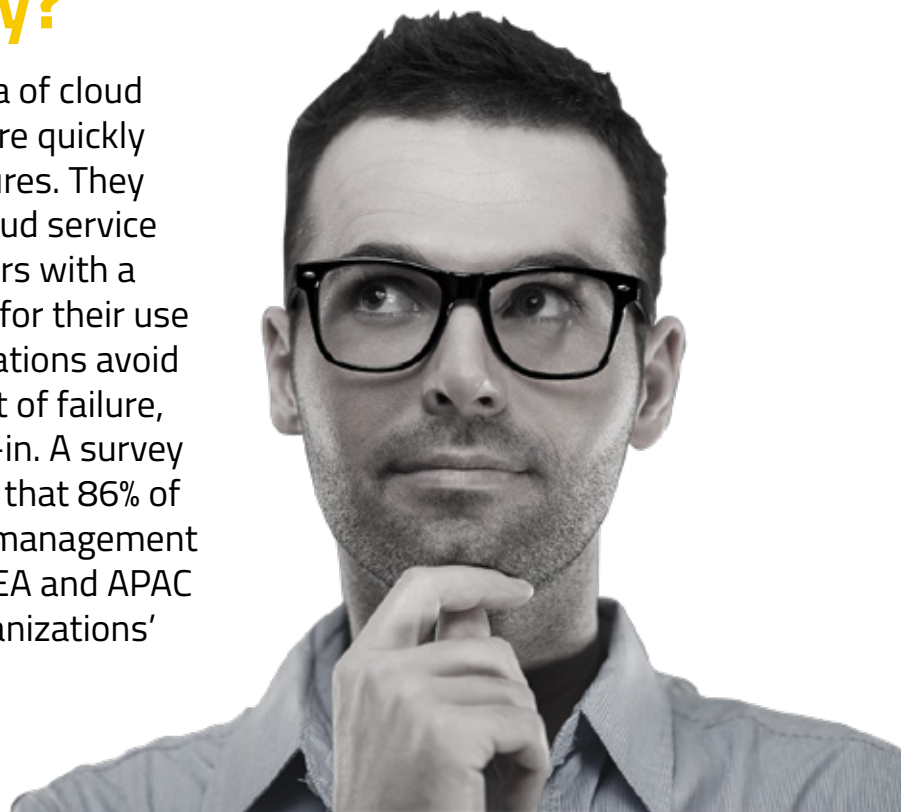
"Which of the following best describes your multicloud strategy?"

32% Using multiple public and private clouds for different application workloads

23% Using public cloud solutions in addition to taditional non-cloud on-premises infrastructure

14% Using public clouds simultaneously

12% Having an API-consistent public and private cloud infrastructure

10% Managing access to and use of any type of cloud resource from a single management portal

6% Using public cloud to extend our data center infrastructure (for elasticity, backup, DR, etc.)

4% Developing applications whose components are deployed to different cloud platforms
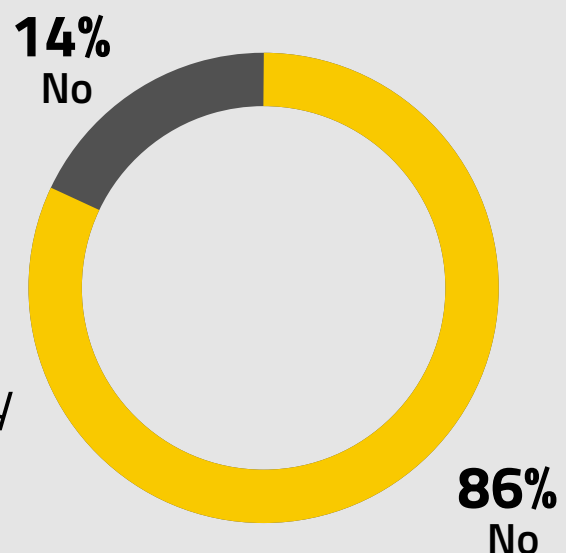
0% Don't know/Not applicable

Base: 623 cloud strategy and application management decision makers that are using multicloud in the US, EMEA, and AP

"Would you describe your cloud strategy as multicloud?"
(Select one)

The vast majority of firms lable their cloud strategy as muticloud today

14%
No

86%
No

Source: Forrester Research Inc

In a similar tone, Gartner says by 2022, 80% of companies leveraging the cloud, will have a multi-cloud approach. Avoiding a multi-cloud approach makes organizations fully dependent on one cloud service provider (CSP) for all their cloud-related services, and in such instances, there is a possibility that a few of the services may not offer the best value or service to address a specific situation. In most cases, either too much or too little is done to fit into the exact requirements of the user. As an example, if an organization is looking at using Azure Function for all client-facing event handling, and then, aims at taking the event data to a robust analytics platform for finding better insights out of the event logs, Azure might not be the best choice. It would be ideal to drain the data to GCP to get the task completed.

Below are a few key reasons that depict why adoption of multi-cloud architecture is becoming a mandate for progressive organizations:

Choice of Service

No single cloud vendor provides the best set of services for all of an organization's needs. However, a multi-cloud environment allows enterprises to choose the best service from multiple vendors for specific requirements. For example, MS Azure might be the ideal choice for fully managed (PaaS) runtimes while GCP or IBM Cloud could be the preferred choice for artificial intelligence (AI) and machine learning (ML) services.

Reduced Vendor Lock-in

A multi-cloud environment No single cloud vendor provides the best set of services for all of an organization's needs. However, a multi-cloud environment allows enterprises to choose the best service from multiple vendors for specific requirements. For example, MS Azure might be the ideal choice for fully managed (PaaS) runtimes while GCP or IBM Cloud could be the preferred choice for artificial intelligence (AI) and machine learning (ML) services.empowers rganizations to choose services from multiple vendors which eventually help them not only to distribute workloads across multiple providers but also to reduce vendor-specific dependency. Organizations have the necessary controls if they want to migrate to a different provider—when the quality of services degrades, prices go up, etc.

Low Latency

Latency plays a crucial role while making a decision involving cloud adoption. Choosing a service and infrastructure near to users can lead to better performance due to minimum server hops. When an organization plans for multi-region deployment of an application to provide a uniform and seamless customer experience, a multi-cloud strategy empowers them to choose the closest services and infra from multiple providers.

Increased Disaster Recovery

Multi-cloud environments help organizations to better manage their disaster recovery by adding the flexibility to choose redundant servers from different cloud providers. A multi-cloud arrangement allows replicas of applications in two or more clouds. In case of downtime in one cloud, all relevant requests can be redirected to the applications hosted in the other cloud. This arrangement can also be extended to multiple regions to achieve greater resiliency.

Key challenges in moving to a multi-cloud environment

As enterprises embark on a digital transformation journey, the adoption of a multi-cloud ecosystem is rising rapidly. Enterprises are moving their application and data to different cloud platforms to hyper-automate their operations, enabling bring-your-own-device (BYOD) systems as well as integrating technologies such as AI, Internet of things (IoT), Blockchain, and new cognitive tools to increase overall efficiency. While multi-cloud deployment becomes the new norm, there are some challenges that organizations are facing at the start of their journey.

Managing Cost

Multi-cloud economics is perhaps the biggest challenge before any organization planning for its adoption. Each provider comes with its own billing and metering systems, pricing models, sizing units, data egress fees, etc. As a consequence, managing cloud costs associated with multiple cloud providers can become a nightmare.

Managing Assets

As organizations subscribe to a growing variety of IT services from multiple cloud providers, managing assets can be very complicated. It is due to a lack of standards for integrating and managing the supplier ecosystem, including different sets of admin portals, dashboards and processes.

Managing Security

Security is another fundamental issue that can't be ignored. While cloud providers have appropriate protocols and tools to ensure their offerings are safe, the responsibility of securing application and data still lies with the enterprise.

Managing Compliance

When different clouds are deployed, it is important to ensure different industry standards such as PCI, PII, GDPR and HIPAA are met in order to avoid the high risks of data hacking and data loss.

Managing Performance

When an organization goes for multi-cloud adoption, application performance can be impacted heavily due to a poor choice of service and cloud.

Managing Users

When organizations adopt multi-cloud architecture and procure services from multiple vendors, they face challenges associated with managing access rights and entitlements of existing users on applications deployed on the vendor ecosystem. This is mainly due to a lack of standards for leveraging existing enterprise user management systems in multi-cloud environments.
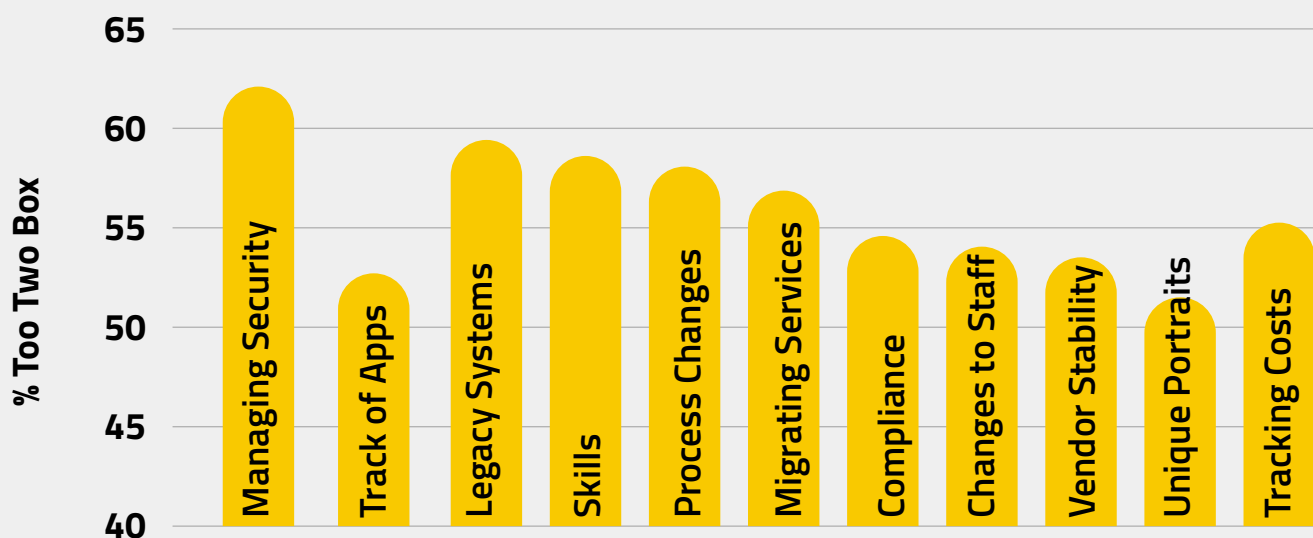
Managing Roles

Enterprises may face challenges in redefining roles and responsibilities of their IT organizations during the multi-cloud adoption journey. While many existing roles change automatically, IT may become merely a supply chain operator within the organization.

Managing Skills

When enterprises build their multi-cloud strategy on a public cloud, they must consider unique competencies concerning each provider to be included in the ecosystem.

CHALLENGES TO MANAGING MULTIPLE CLOUD

% Too Two Box

- Managing Security
- Track of Apps
- Legacy Systems
- Skills
- Process Changes
- Migrating Services
- Compliance
- Changes to Staff
- Vendor Stability
- Unique Portraits
- Tracking Costs

Source: MIT Technology and VMware study

Happiest Minds guidelines for a smooth journey toward multi-cloud adoption

The industry is definitely treading on the multi-cloud path. Working with enterprise clients and leading cloud vendors, we at Happiest Minds have identified the best practices that help organizations successfully navigate their multi-cloud transformations. Here, we have been rapidly building our capabilities and best practices to not only help our clients map out their strategies for the cloud, but also to help them manage, monitor and secure their applications and data once they are in these highly distributed multi-cloud ecosystems. Here are the three key pillars for multi-cloud adoption:

Building the Right Strategy

Building a right and actionable strategy is a key success factor for multi-cloud adoption. Happiest Minds' due diligence and consultancy-based look-ahead approach helps organizations prepare for the migration with realistic goals, selecting the right cloud partners, deciding the best-fit tools, choosing the right set of people and competencies to assist with the migration, and strengthening the structure to help manage performance, cost and security. The right strategy will help address the challenges mentioned earlier in this white paper.

> Selecting a suitable multi-cloud management platform/partner can bring resources under a single umbrella. This helps avoid problems with platform and process sprawl. Happiest Minds helps enterprises find the answer when they are looking for a third-party partner to manage their multi-cloud ecosystem. The assessment is done based on multiple factors such as ease of allocating resources to applications, uncertainty about security management of specific cloud resources, performance issues caused by a lack of cloud resources for certain applications, or the inability to chargeback cloud costs to appropriate departments and users.

> The right decision on investment vs partnership with a vendor will address skill-gap challenges.

Implementing the right security solutions can stop known and unknown threats in all multi-cloud deployments ensuring complete security. The right tool will offer visibility and control across all cloud applications and will ensure consistent security across the enterprise. It will help integrate automated security policies related to access control, network security, data security, application security, and audit trails.

It is important to select tools that will help maintain compliance consistently and efficiently across different platforms.

Happiest Minds appreciates and uses the slick framework introduced by Gartner to evaluate a specific cloud management platform. A template-based approach is used to rank and score capabilities under each category.

Evaluation Criteria Categories and Attributes

The Cloud Management Wheel
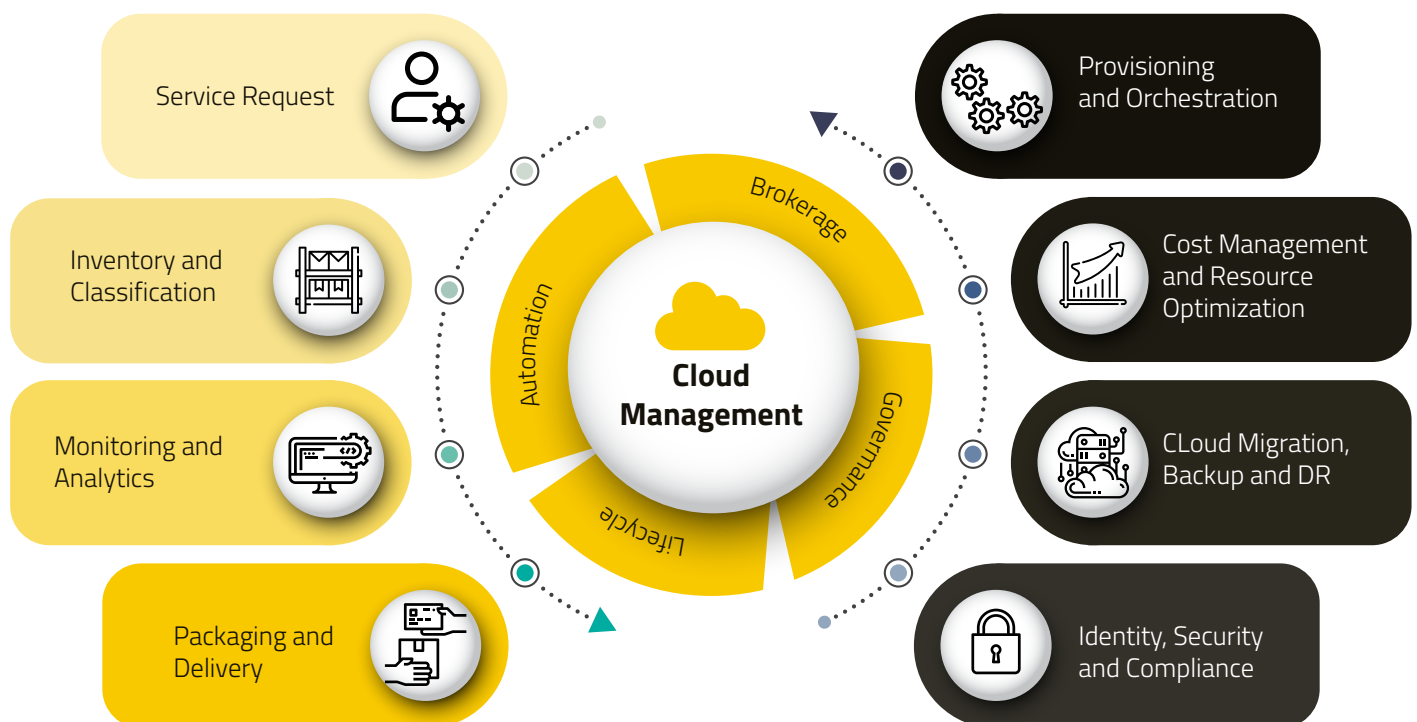
Source: Gartner

Build/Deployment/Migration Approach

When an organization plans to build a new capability, or, migrate or re-engineer existing capabilities, by leveraging best practices, Happiest Minds can help them with the following to streamline the process, delivering faster results and predictable outcomes:

- Select the right cloud provider and the right service.

- Analyze the total cost of ownership (TCO) to ensure proper control over costs.

- Calculate the cost of deployment or migration

- Analyze cost vs performance while distributing workloads across various clouds. For example, we recommend avoiding the use of multiple clouds when an organization has a huge volume of data stored in one cloud but processes the data from another cloud. Though users are tempted to use storage or computing services of a specific cloud provider due to cheaper costs, it may create a huge performance bottleneck due to network latency.

- Design the solution optimally. For example, data portability allows compressing data when it leaves one cloud and enters another. The scheme can enhance performance.

- Analyze reliability vs performance. For example, while distributing workloads across clouds for increased reliability, there may be a need to take special care to sync both the workloads in a timely fashion, failing which the solution may suffer from performance issues.

- Apply the correct strategy for automation of various tasks that reduce human effort and error, allowing you to stay agile. The strategy should address automation from a DevSecOps perspective.

- Apply an autoscaling strategy across multiple clouds.

Visibility and Measurement

The level of visibility plays an important role in deciding the success or failure of a multi-cloud adoption initiative. Cloud services (SaaS, PaaS, IaaS), and Microservice-based applications act as the backbone of any business, and Happiest Minds recommends careful evaluation and performance monitoring of every deployed service on a regular basis—to streamline multi-cloud operations and deliver uninterrupted and superior digital experiences. Happiest Minds helps enterprises choose the best cloud monitoring tool. We help organizations establish the three basic pillars during adoption

One Platform: Visibility into all services, infrastructure network paths and related dependencies across multiple cloud providers

Detailed Insights: Visual view of workloads, cost, usage and performance, leading to accurate forecasting, planning and budgeting

Simplified Reporting and Notifications: Reports and notifications to provide quick answers to questions on usage, performance, security and cost, alerting users and enabling them to effectively address potential problems

Detailed Insights: Visual view of workloads, cost, usage and performance, leading to accurate forecasting, planning and budgeting

References

1. https://blogs.cisco.com/
2. https://www.ibm.com/in-en/cloud/redhat
3. https://azure.microsoft.com

About the Author

Ramkrishna Chatterjee is a Senior Architect in Happiest Minds having 16 years of experience in Enterprise Architecture,Cloud,Digital Transformation, Multitenant SaaS Platform Development, Microservices , API, Hybrid Integration, SOA, Design Thinking, Technology Maturity, Technology Future Proofing and Architecture Governance activities for large enterprise scale initiatives

Business Contact **business@happiestminds.com**

happiest minds
The Mindful IT Company
Born Digital . Born Agile

www.happiestminds.com

About Happiest Minds Technologies

Happiest Minds, the Mindful IT Company, applies agile methodologies to enable digital transfor-mation for enterprises and technology providers by delivering seamless customer experience, business efficiency and actionable insights. We leverage a spectrum of disruptive technologies such as: Big Data Analytics, AI & Cognitive Computing, Internet of Things, Cloud, Security, SDN-NFV, RPA, Blockchain, etc. Positioned as "Born Digital . Born Agile", our capabilities spans across product engineering, digital business solutions, infrastructure manage-ment and security services. We deliver these services across industry sectors such as retail, consumer packaged goods, edutech, e-commerce, banking, insurance, hi-tech, engineering R&D, manufacturing, automotive and travel/transportation/hospitality.

Headquartered in Bangalore, India; Happiest Minds has operations in the U.S., UK, The Netherlands, Australia and Middle East.

*All logos are proprietary to respective companies