Taking off with your cloud strategy

An Airtel perspective

Taking Off with Your Cloud Strategy

Over the past few decades, the world of business has fundamentally transformed. Gone are the days when you could plug in relevant data on a spread sheet and make a winning business decision. Now we need real time data from our customers, suppliers, stock markets, commodity markets and innumerable sources of information. Globally distributed workers constantly collaborate to come up with new technological and business innovations. Competitors and threat actors are constantly trying to penetrate your business and exploit your security vulnerabilities.

How should one navigate Enterprise IT under these circumstances?

The ideal answer is to be on a secure cloud.

Enterprises need a robust cloud strategy to drive innovation and growth in today's digital world. Across the world, cloud adoption is very high and increasing and Indian enterprises are also adopting cloud for business growth. Cloud is a critical enabler for emerging technologies like AI, IoT, and Big Data analytics. Data centre infrastructure to support these is on the rise, with Indian capacity expected to increase ten-fold by 2030. All of these are increasingly helpful in solving the needs created by growth of edge applications across different industries and data localization guidelines driven by government emphasis to store critical data within the country. So, what's the issue – let's adopt the cloud and all its capabilities?

Unfortunately, cloud migration is not that simple. There are multiple variants – private, public, sovereign and hybrid. It's an arduous task to choose the right solution to drive best value while minimizing complexity and cost.

Choice of the right cloud solution is driven by a conscious process of detailing requirements, assessing risks, creating an effective migration approach with repatriation capabilities, and navigating post migration to drive maximum benefits.

Airtel has navigated this cloud transformation journey – across multiple changes in cloud technologies and for organizations of all sizes, scale and industries.

Hence, we have devised a **SHIFT** method that enables a diligent approach to build the right strategy, which we share with you through this document.

Specify unique requirements

Highlight technical KPIs & success criteria

Inspect risks and manage change

Fuse hybrid cloud, activate migration

Tune for benefits beyond day 1

Figure 1: SHIFT Approach for Cloud Migration

Need for a Robust Cloud Strategy

As organizations compete in a deeply connected global supply chain, cloud investments are becoming critical components of IT spending. In fact, cloud investments are taking larger share of IT spends, with rising adoption across private and public cloud. India's annual cloud spend is expected to be $22 billion in 2024, growing at a CAGR of 17%, with the public cloud market expanding even faster at 35% CAGR.[1]

Enterprises are increasingly adopting hybrid and multi-cloud strategies to enhance agility, scalability, and compliance. Organizations are deriving business value riding on cloud transformation, by driving business acceleration, optimizing costs while enhancing security and scalability of their business models.

However, choosing the right cloud strategy is a complicated task. Multiple options exist to deploy cloud – and choosing the right mix is the challenge.

Options for Enterprise Cloud

Public Cloud
Public cloud services provided by big vendors deliver scalable, on-demand computing resources.

Private Cloud
Private clouds deliver dedicated computing resources operated solely for the organization, either on-premises or through managed private cloud providers.

Sovereign Cloud
Since hyperscaler clouds are incorporated in the United States and subject to U.S. laws, it can create conflicts when it comes to data protection. A sovereign cloud provider guarantees that all data, including metadata, remains in sovereign territory and, in all cases, forbids foreign access to data. Mature sovereign cloud providers can also offer all the other fundamental advantages of the cloud, including automation, security, and adaptability.

Hybrid Cloud
Networking connects private and public cloud environments. Secure connection strategies like virtual private networks (VPNs), direct peering arrangements, or dedicated connectivity services enable reliable, low latency.

Hybrid solutions, designed to use different cloud solutions for different workloads to balance speed and security are the most optimal ones and are being embraced by most advanced enterprises. With cloud solutions becoming the dominant way to run enterprises, one must look beyond cloud migration and drive optimal value capture with careful eyes on success metrics on an ongoing basis.

There is a need to take all these into account while designing the best-fit cloud strategy for your enterprise. We recommend a **SHIFT** approach to **S**pecify Unique Requirements, **H**ighlight Technical KPIs and Success Criteria, **I**nspect Risks and Manage Change, **F**use Hybrid Cloud, **T**une for Benefits Beyond Day 1.

Let's now delve deep into each of these steps, with the broad list of items to make each step deliver the best possible outcome for your cloud migration.

[1](Source: Gartner IT Spending Data, Gartner Public Cloud Services).

Step 1
Uncover Requirements for Cloud Selection

A structured approach to cloud adoption begins with deeply understanding your requirements across application performance, system availability, scalability, security and compliance, and cost model. Focused exploration of these aspects will uniquely outline your cloud journey. While every cloud migration is different, there are similarities and methods that are applicable all across.

The key benefits of a structured approach to cloud adoption are:

A. **Clarity of Business Requirements** of cloud adoption/migration project. E.g. faster product launches, enhanced customer experience, improved workforce productivity etc.

B. **Clear Roadmap for Security** measures and protocols to ensure cyber-resilience

C. **Understanding of Regulations and Compliance** requirements as a result of cloud transition

D. **Financial Allocation with Staged Capex Investment** and projected opex, for project TCO

Based on our experiences of developing comprehensive sets of requirements for cloud selection, we have outlined six broad areas to categorise them into and a checklist for them.

These include:

1. **Application Requirements** – This category includes application workload and performance requirements. Application workloads can be predictable, volatile, scheduled or even SaaS workload. Performance is dependent on bandwidth, latency and capabilities like cloud bursting.

2. **System Availability** – There can be shared or dedicated resources. There is also the question of high system availability and disaster recovery.

3. **Scalability** – Ability to scale in and out on demand can really drive the cost-effectiveness of your cloud expenses.

4. **Security Issues** – such as data localization and Control are really becoming important, especially due to increased cyber-crime and sovereign requirements.

5. **Compliance** – There is a requirement to be compliant with PCIDSS and TRAI.

6. **Cost Model** – One needs to choose between getting started soon and having their own controlled capital equipment. The choice of Capex and Opex impacts the cloud strategy and migration costs.

For selecting the most suitable cloud provider, it is important to benchmark the competencies of various cloud options against specific requirements needed to run the enterprise workloads. Figure 2 is a quick evaluation of cloud options against the most important requirements checklist.

Figure 2: Illustrative categorised list of requirements

Requirements - (Illustrative)	Public	Private	Hybrid / Multi
1. Application			
a. Application workloads			
Support legacy applications	~	✔	✔
Schedule workloads	✔	✖	✔
Data analysis / BI / AI / ML / DWH	✔	~	✔
b. Application performance			
Low latency	~	✔	✔
Application containerization (docker / kubernetes)	✔	✔	✔
Serverless compute (lambda, functions etc.)	✔	✔	✔
2. System Availability			
High performance and availability to meet demanding SLA	✔	✔	✔
High availability and disaster recovery	✔	✔	✔
Tiered SAN architecture, lifecycle policies, and versioning	✔	~	✔
Dedicated resources	~	✔	✔
Specialty hardware and configuration requirement	✖	✔	✔
Life cycle deployment (across clouds)	✖	✖	✔
Cloud bursting	✔	~	✔
3. Scalability			
Scale in and out on demand for all critical applications	✔	~	✔
Exit strategy / migrate data (egress)	~	✔	✔
4. Security			
Physical security of data	✖	✔	~
Centralized identity and access management across infrastructure, applications and services	✔	✔	~
Leverage third party security software on need basis	✔	~	~
Scan for vulnerabilities and security updates	✔	✔	✔
5. Compliance			
Auditing and reporting	✔	~	~
PCIDSS and TRAI compliance	✔	✔	✔
6. Cost Model			
High opex model	✔	✖	✔
High capex model	✖	✔	✔
Low migration cost	✔	✖	~

✔ - Recommended   ✖ - Not Recommended   ~ - Limited [2]

[2] Airtel Document

We have noticed that enterprises rarely find one cloud solution to be perfect for them. The ideal solution varies by the application that it supports – varying across workload type, scalability, availability and security needs. Hence, you will typically end up with a set of applications that match with a particular cloud solution.

Organizations utilize public clouds for workloads requiring rapid scaling, flexibility, and cost-efficiency. These clouds are typically used to host non-sensitive data, web applications, customer-facing services, and analytics systems. On the other hand, a private cloud delivers dedicated computing resources making it suitable for sensitive workloads requiring

high compliance, security, or performance. Typical use cases include data storage, mission-critical applications, and internal business systems that must adhere to strict governance rules. Then there is the sovereign cloud option for extreme data security bound to one specific jurisdiction. Networking allows the connection of these private and public cloud environments enabling the formation of a hybrid cloud suited for an enterprise's particular requirements.

The right approach is to build a mind map of the relevant criteria to arrive at your ideal cloud solution. A high-level schematic of a mind map typically looks like:

Figure 3: Illustrative mind map of choosing a Cloud Platform with requirements

The endgame is generally a hybrid cloud solution and requires a hybrid cloud migration with well-defined success metrics. Additionally, as requirements evolve, there may be a need to migrate workloads to another

cloud provider or repatriate them back to private cloud. Let's delve into the detailed KPIs and success metrics for cloud migrations.

Highlight Technical KPIs and Success Criteria

Now that you have taken the appropriate steps to define your requirements, you can start defining the key performance indicators that will indicate that the cloud migration is successful. This is very important to define in the very beginning to ensure that migration is in the right direction towards fulfilling your requirements.

A broad keep-in-mind list when defining success metrics is:

1. **Focus on business value measurement,** not just technology metrics. The logic behind adopted KPIs should be easy to explain and understand.

2. **KPIs should be easily measurable** with well-defined data methods and not too "noisy".

3. **Clearly identify input and output KPIs.** While output KPIs measure the results achieved/ expected from cloud deployment, input KPIs track resources and progress, inducing stakeholders to take appropriate action.

Enterprises need to convert their requirements into Key Performance Indicators (KPIs) and metrics that help track their resource utilization (Input Metrics) and results (Output Metrics). A full metric sheet will cover all aspects in the following manner:

Cloud Migration Requirements	Input Metrics (examples)	Output Metrics (examples)
1 a. Application workload	New technologies enabled	Schedule adherence
1 b. Application performance	Containerized applications	Latency
2. System availability	% annual availability	Revenue loss due to outage
3. Scalability	Time to obtain new infrastructure	% scale up in a day
4. Security issues	Threat detection infrastructure	No of attacks averted
5. Compliance	PCIDSS compliance	No of compliance issues
6. Cost model	Workloads with cost tracking	Total cost per workload

Figure 4: Sample Input and Output Metrics

These convert into the following illustrative Success Metric Sheet that can be tracked daily. It is critical to have meaningful targets that are clearly enumerated in these metric sheets. You need to track and share these with all the stakeholders to drive better cloud migration benefits.

With a well-defined success sheet that covers all your requirements and provides input and output Metrics for determining success on them, you are all set for a migration to the hybrid cloud of your preference.

Goal	Metric	Example
Input Metrics and KPIs		
Cost transparency	Number of workloads with effective cost tracking	20
Access to new technologies	Number of new technologies	10
Improved application availability	% of annual availability	10%
Enhanced scalability	Time to obtain new infrastructure capacity	1 hour
Increased productivity	Committed lines of code per month	>200,000
Output Metrics and KPIs		
Faster time to market	Average months from idea to working prototype	2
Faster reactivity	Average application releases per month	2
Presence in new regions	Launched points of presence in new countries	5
Improved customer satisfaction	Customer Satisfaction Index	>7.5
Infrastructure cost savings	USD	22%

Figure 5: Illustrative Success Metric Sheet

But hold on. Are you aware of all the risks that will come up in this complex and potentially arduous journey? In the next section we detail the ones that we have encountered across the hundreds of migrations over the past two decades. Let's together look at the risks to mitigate and build your solid change management plan.
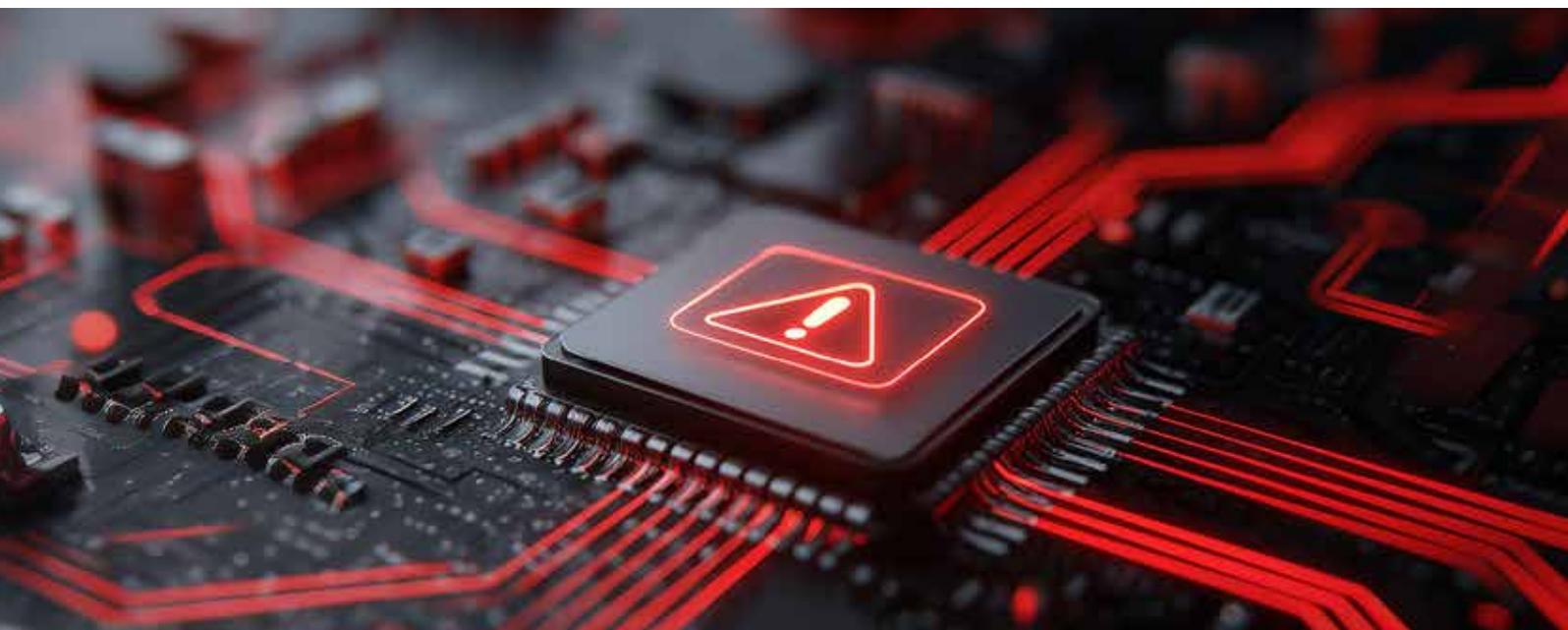
Assess Risks and Manage Change

It is critical to identify all key risks to build a cloud migration and change management plan. Change Management is often omitted from typical cloud adoption journey. Cloud adoption impacts several parts of business - infrastructure, applications, security, networking, identity, legal, and procurement. Ensuring cross-organizational alignment, thus, becomes key to successful transition.

Once cloud project is approved, detailed evaluation of risks related to change management should be done and a mitigation plan that includes preventive measures, incident response and business continuity methods should be outlined.

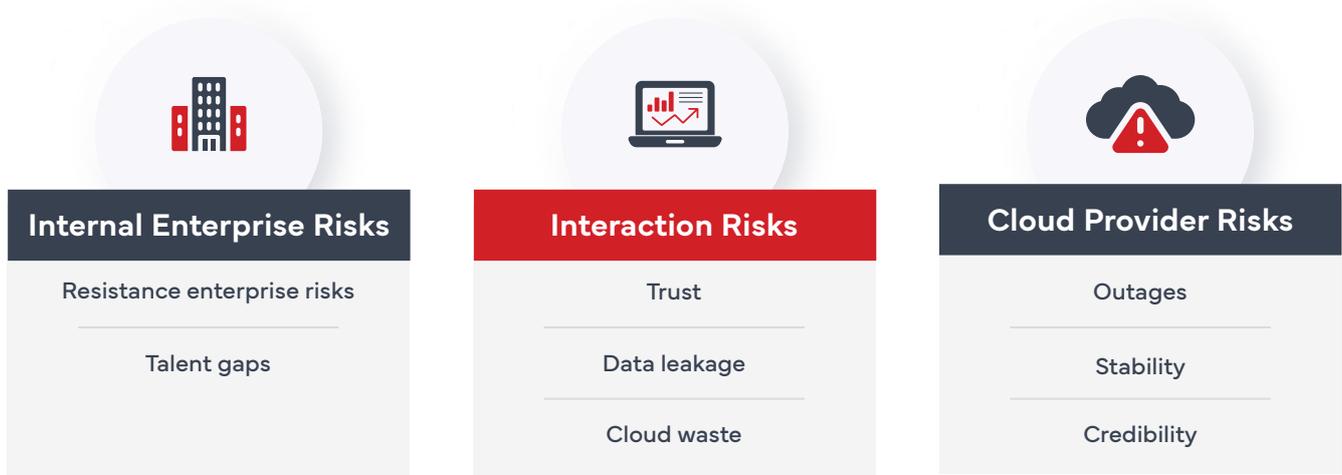Some of the frequent risks associated with cloud migration are listed below:

Internal Enterprise Risks	Interaction Risks	Cloud Provider Risks
Resistance enterprise risks	Trust	Outages
Talent gaps	Data leakage	Stability
	Cloud waste	Credibility

Figure 6: Major risks associated with cloud migration

Internal Enterprise Risks

1. **Resistance:** While there are many technical risks to cloud adoption, such as vendor lock in, security, compliance etc., cloud project stakeholders are often blindsided by another set of barriers that they don't expect: internal resistance.

   Internal Resistance can arise from a diverse set of stakeholders due to different reasons:

   - IT Staff may push back as they become representatives of others' technologies rather than operators of their own tangible IT assets

   - IT managers become uncomfortable as cloud migration may be perceived as reduction in their control and influence over enterprise stack

   - Shadow IT/power users existing in different business units may push back unless they are assured that they can get similar access and service once services and applications are moved to the cloud.

2. **Talent Gap:** Many IT staffs probably don't know a lot about the cloud, especially if this is their first migration. And finding cloud-savvy people can be challenging and expensive. Without that cloud knowledge, a migration can take longer than expected and run into more problems. And, possibly even worse, once the migration is over, IT might find they've simply moved their old on-premises mess to the cloud.

³ "https://www.linkedin.com/pulse/internal-resistance-cloud-adoption-might-your-biggest-bob-carver/
⁴ "https://www.computerworld.com/article/1674473/five-pitfalls-to-avoid-when-migrating-to-the-cloud-2.html

Interaction Risks

1. **Trust:** Lack of trust in the cloud providers' data security predominantly stems from lack of transparency around data security, privacy and control mechanisms put in place by them. Vendor assessment study should incorporate clear mechanisms in place for ensuring following aspects by the cloud provider - Data Isolation, Multi-tenancy, Availability, Reliability, Confidentiality, Identity management, Encryption, Cloud-Security and Disaster Recovery.[7]

2. **Data leakage:** Risk of data loss/data leak may increase as public cloud perimeter is outside client control. The cloud security model operates on shared responsibility, where the cloud provider secures the cloud infrastructure, but the customer is responsible for securing their data, code, and assets within the cloud. In contrast, self-hosted data centres require the organisation to handle most security aspects. Additionally, application security on the cloud requires a multi-layered approach combining testing, protection, and monitoring.[8]

3. **Cloud waste:** Risk of overspending exists due to lack of visibility and inefficient resource allocation. Avoidable cloud spend, also known as cloud waste, remains a challenge for 91% of respondents, as per a 2024 Forrester research survey. As adoption of hybrid and multi-cloud environments grow, cloud waste continues to be a key challenge for CIOs and IT managers. Lack of cloud management skills and overprovisioned/idle resources are leading reasons for inability to control cloud wastage.[9]

Cloud Provider Risks

1. **Outages:** Cloud providers may have outages that you don't control. While an outage can happen for any number of natural and unnatural reasons, having a redundancy strategy as part of cloud deployment is important. Based on criticality of service outage, organizations can consider multiple zonal deployments across different availability zones to meet high reliability requirements. The trade-off, of course, is associated costs of creating backups and system redundancy.[5]

2. **Stability:** Cloud providers may go out of business or raise prices. Consolidation is common in high-tech sectors, with small and niche cloud providers closing shop and exiting public cloud/colocation space. Thus, for every enterprise looking at cloud deployments, it is critical today to keep track of their cloud provider's financial health, business focus, and strategic priorities.[6]

3. **Credibility:** Cloud may not be able to guarantee performance. While this is a potential issue at first, a detailed outline of workloads and need wise KPIs can be driven into SLAs with your cloud provider. Checking credentials and past performance, and upcoming infrastructure roadmap will ameliorate your concerns. It is also essential to not overload all your risks onto one provider – derisk through a mixed cloud approach about which we talk in the next section.

[7] https://ijiet.com/wp-content/uploads/2018/03/72.pdf
[8] Zamun Cybersecurity paper
[9] https://www.datocms-assets.com/2885/1719373669-hashicorp-tlp.pdf

[5] https://learn.microsoft.com/en-us/azure/well-architected/reliability/regions-availability-zones
[6] https://www.infoworld.com/article/3847206/when-cloud-providers-go-out-of-business.html

The table below shows some recommended risk mitigation strategies.

Perceived Risks	Mitigation Strategies		
Internal Enterprise Risks			
Resistance: Internal resistance to cloud adoption	Seek executive sponsorship	Trigger compelling event (such as deadline for data center exit)	Manage cloud community program to influence behavior and transform internal culture
Talent Gap: Lack of required skills	Build training program to develop the required skill set. Setup Cloud CoE.	Seek the guiding hand of an MSP/professional services organization	Seek research and advisory services
Cloud Provider Risks			
Outages: Cloud providers may have outages that you don't control	Build decision frameworks to select the cloud layer that gives you the required level of control	Implement IaaS high-availability architectural best practices that allow control of the application failover	Stipulate a cyber insurance contract
Stability: Cloud providers may go out of business or raise prices	Develop an exit strategy	Develop a multicloud strategy	Design for portability
Credibility: We need to change the provider	Develop a hybrid IT strategy	Purchase the appropriate configuration option and service level	Design for scalability
Interaction Risks			
Trust: Lack of trust in the cloud provider	Scrutinize compliance reports from third-party auditors	Build decision frameworks to select trustworthy cloud provider	Check past provider performance and availability metrics
Data Leakage: We may experience data loss as we don't control our perimeter	Implement cloud security best practices (such as micro-segmentation and security posture management)	Develop cloud data protection strategy (such as encryption and anonymization)	Build decision framework to select cloud provider with an appropriate data protection policy
Cloud Waste: We may overspend in the cloud as we don't have an upper capacity limit	Develop financial management processes for public clouds	Assign and enforce budget limits on a per-workload basis	Use cloud provider quotas to limit the number of resources that can be provisioned

Amalgamate Hybrid Cloud, Activate Migration

Once you look at your workloads and risks, it becomes clear that there is likely no single right cloud for you. You need to identify the right cloud solutions for your sub-needs and drive the right migration approach in totality.

Migrating to the cloud involves careful planning and execution to ensure a seamless transition while maximizing the benefits of the new environment. A well-defined migration strategy becomes paramount to effectively navigate this complex journey. Successful migration involves not just moving existing systems to the cloud, but also seeking to modernize applications by restructuring, optimizing, and sometimes even rewriting them to take full advantage of cloud services, architecture, and to fully leverage cloud-native capabilities.

Enterprises typically adopt one or a combination of the following seven migration strategies:

Retire: Decommissioning legacy applications with no business value.

Retain (Hybrid): Keeping certain workloads on-premise due to security or regulatory constraints.

Rehost (Lift & Shift): Moving applications as-is to the cloud with minimal changes.

Relocate: Migrating entire environments to cloud versions of existing platforms without modification.

Repurchase: Transitioning from traditional licensed software to SaaS models for cost efficiency.
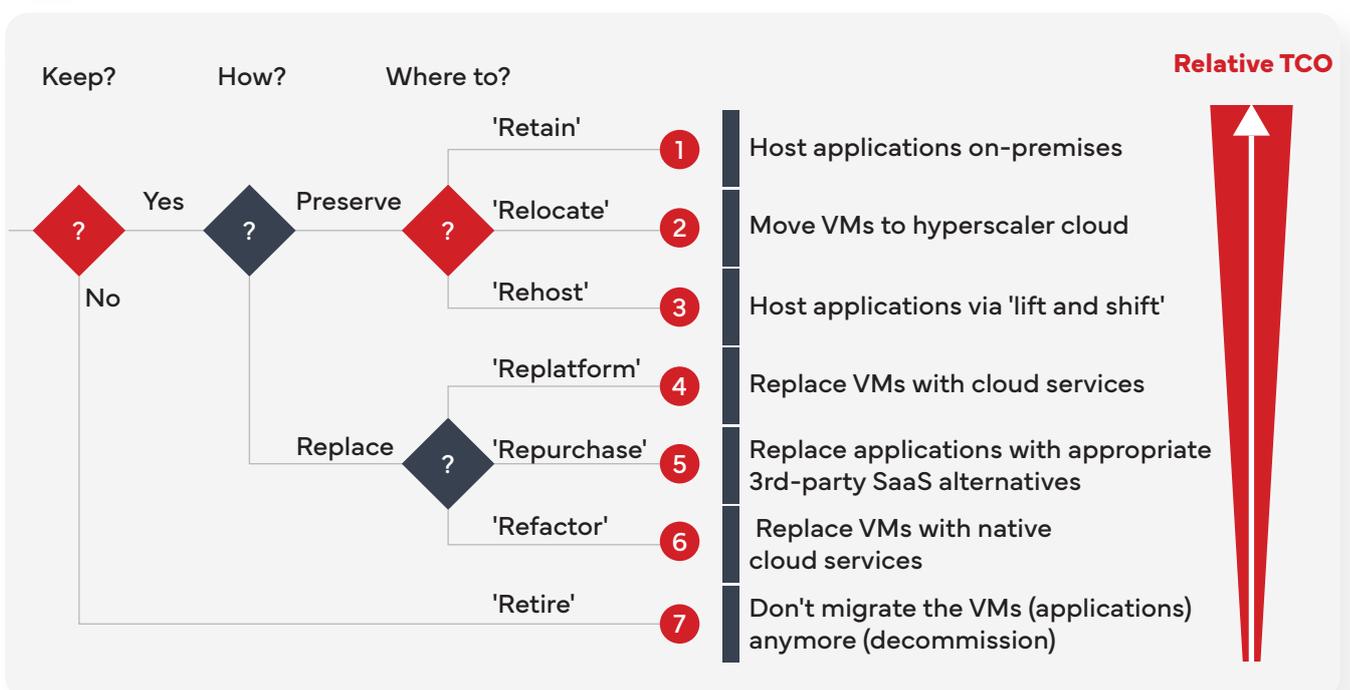
Replatform: Optimizing applications to better leverage cloud capabilities while maintaining core architecture.

Refactor: Rebuilding applications with cloud-native architectures to maximize scalability and agility.

Enterprises should align their migration strategy with business goals, cost implications, and operational requirements. Additionally, selecting the right cloud partner ensures a seamless, secure, and efficient migration process.[10]

Keep?	How?	Where to?			Relative TCO
		'Retain'	1	Host applications on-premises	
Yes	Preserve	'Relocate'	2	Move VMs to hyperscaler cloud	
		'Rehost'	3	Host applications via 'lift and shift'	
		'Replatform'	4	Replace VMs with cloud services	
No	Replace	'Repurchase'	5	Replace applications with appropriate 3rd-party SaaS alternatives	
		'Refactor'	6	Replace VMs with native cloud services	
		'Retire'	7	Don't migrate the VMs (applications) anymore (decommission)	

[10] https://community.aws/content/2cKbgI3WsAYTiDM0J48uEMVqOVW/understanding-the-7-rs?lang=en

Navigate Benefits by Optimizing Beyond Day 1

In Step 2, you detailed the KPIs for each of your objectives and workloads. Subsequently, you made your choices and activated migration. Now is the time to see if the migration really worked on driving value to those requirements. You now need to create a plan to monitor & optimize your cloud deployment to maximize benefits. This is the step to scale up and scale out your cloud deployments based on lessons learned during deployment and post deployment optimization. Successful cloud adoption extends beyond migration. To fully leverage cloud benefits, enterprises must focus on continuous monitoring, cost management, and skill development through:

FinOps & observability tools
Optimize cloud costs and track resource utilization.

Managed cloud services
Automate monitoring, incident management, and security compliance.

Cloud upskilling & governance
Train internal teams on cloud best practices to drive efficiency.

Periodic strategy review
Adapt to evolving technologies and business needs to stay competitive.

A proactive approach ensures that cloud investments continue delivering value beyond the initial adoption phase. And if you keep exploring the right cloud solutions for each workload, a small set of approaches can help drive enhancing of cloud benefits, especially if a hybrid cloud solution is already available. You could move applications back to your private cloud, move to a different cloud provider and keep pruning away the Shadow IT infrastructure. It might sound like a lot of moving parts, but it essentially is switching between your preset parts. And if the cloud migration approach and hybrid solution are in place – it can be done with high application effectiveness and cost efficiency.

In Conclusion

Cloud migrations are essential for business growth in today's hyper-connected digital world. However, they are intricate and complicated. The solution is a structured approach such as SHIFT to drive cloud adoption, enabling enterprises to make informed decisions on strategy, risk management, platform selection, and long-term optimization. With such a detailed and proactive cloud approach your enterprise will surely achieve your requirements and unlock transformative benefits such as:

Faster go-to-market – Accelerate innovation with seamless scalability.

IT cost optimization – Leverage a pay-as-you-go model for maximum efficiency.

Higher system availability & resilience – Ensure reliability with elastic cloud infrastructure.

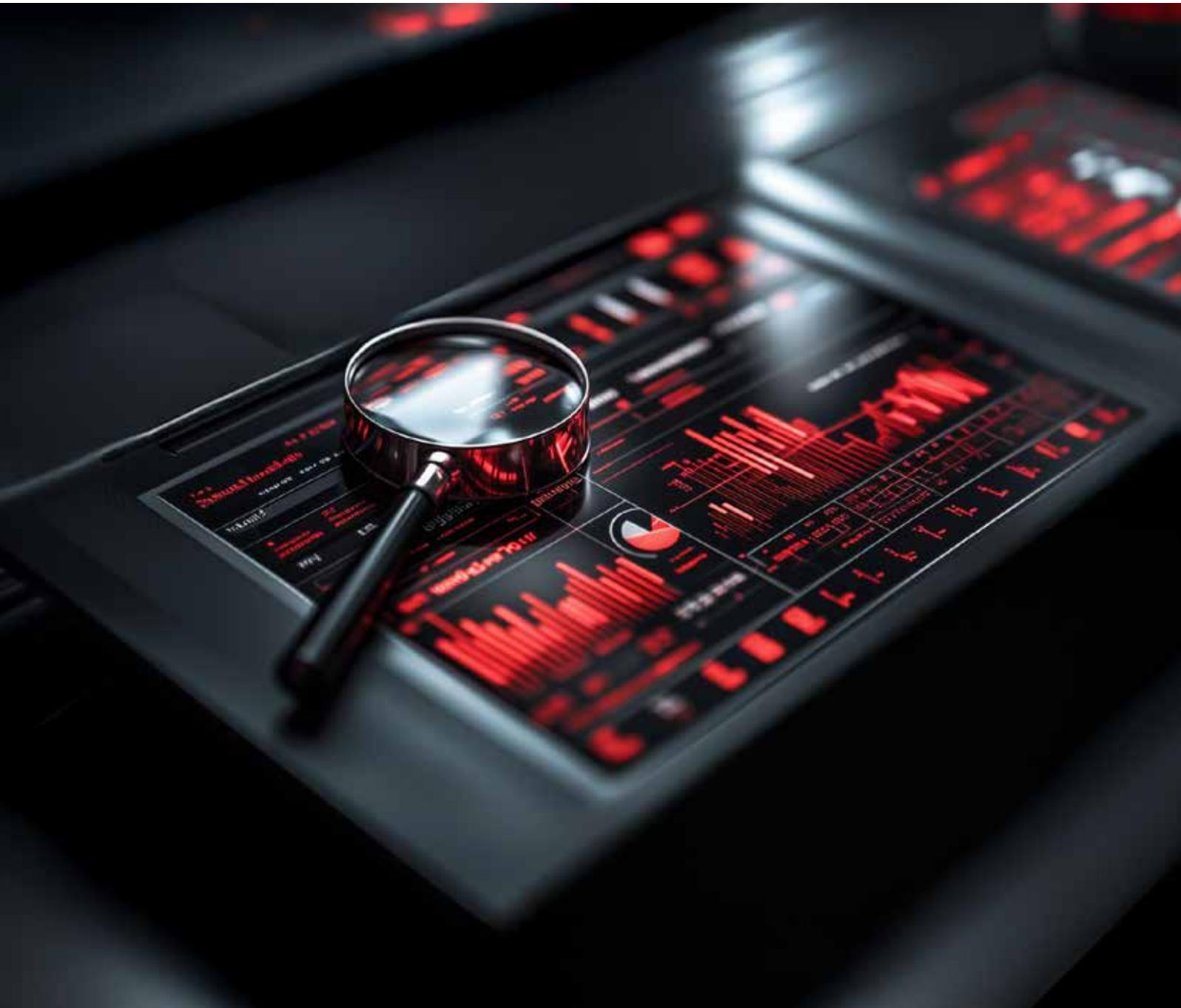**Access to the latest technologies –** Stay ahead with AI, analytics, and automation.

Simplified resource provisioning – Deploy and manage workloads with ease.

As the enterprises across the world are taking leaps in cloud transformation, the benefits from this are clear. Needless to say, a trusted cloud partner and an experienced set of specialists and engineers can help fully realize these benefits and make this navigation smooth and rewarding.

Sources

1. Source: Gartner IT Spending Data, Gartner Public Cloud Services.
2. **Airtel Document**
3. https://www.linkedin.com/pulse/internal-resistance-cloud-adoption-might-your-biggest-bob-carver/
4. https://www.computerworld.com/article/1674473/five-pitfalls-to-avoid-when-migrating-to-the-cloud-2.html
5. https://learn.microsoft.com/en-us/azure/well-architected/reliability/regions-availability-zones
6. https://www.infoworld.com/article/3847206/when-cloud-providers-go-out-of-business.html
7. https://ijiet.com/wp-content/uploads/2018/03/72.pdf
8. **Zamun Cybersecurity paper**
9. https://www.datocms-assets.com/2885/1719373669-hashicorp-tlp.pdf
10. **Airtel Document, Section 6**
11. https://community.aws/content/2cKbgI3WsAYTiDM0J48uEMVqOVW/understanding-the-7-rs?lang=en
12. **Airtel Document, Section 7**

Take the next step towards building a smarter, future-ready cloud strategy.

You can reach out to your Airtel account manager or reach out to us on

🖥️ https://www.airtel.in/b2b/

📞 1800 103 8325

✉️ enterprise@in.airtel.com

📱 +91 74118 05208