



VMware Multi-Cloud Adoption Framework

An outcome-focused approach

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Introduction

Successfully adopting a cloud strategy requires more than just great technology. It requires a thoughtful methodology—an approach that explores opportunities to extract value from any transformation journey, improves current capabilities and processes to drive down costs and respond faster to changing customer demands, and establishes a prescriptive path that allows organizations to fully leverage the potential that cloud technologies offer.

Based on experience with hundreds of customers and partners globally, VMware developed the [Multi-Cloud Adoption Framework](#) to help organizations accelerate their cloud journey and achieve their goals faster. The framework leverages an outcome-focused approach to clarify business and IT outcomes, assess the current state, determine a strategy to achieve the specific outcomes, and identify the steps required for the journey. It is also interconnected with the VMware Cloud Well-Architected Framework™ that provides technical guidance through the stages of the implementation using the plan, build, modernize, secure and operate pillars.

Audience

The intended audience for this white paper is technology executives (CTO, CIO) and cloud solution architects who are responsible for translating business requirements into technical capabilities to support their organization's digital transformation initiatives.

Business strategy leads the way

The starting point for any strategic initiative is determining the outcomes the business needs and a clear understanding of the gaps in current competencies, capabilities and culture. Business needs drive IT challenges, which require new or improved IT capabilities to achieve the requested business outcomes.



Figure 1: Turning business needs into business outcomes.

To have a real impact on the business, the conversations should span the full spectrum. Otherwise, it will be a struggle to explain how IT creates value for the business. It is important to have these discussions upfront and early. It is equally as important to have an architecture that looks out across this entire continuum and helps you make informed, long-term decisions that drive value for your business.

Multi-Cloud Adoption Framework

VMware developed the Multi-Cloud Adoption Framework to help simplify and streamline the journey to multi-cloud. Leveraging an outcome-focused approach, the framework provides a prescriptive set of organization-centric guidance and methods to facilitate conversations, and to develop a mid- to long-term strategy and roadmap. It can help you explore business needs, the desired state of the capabilities, and expected outcomes. It also helps to identify the best model and starting point, and to ensure proper tracking based on key success metrics.

The framework consists of five steps: maturity assessment, executive workshop, business strategy, well-architected framework, and implementation and metrics. Figure 2 provides an overview of each step.



Figure 2: The five steps of the Multi-Cloud Adoption Framework.

Let's take a deeper dive into each framework step.

Maturity assessment

The first step is to assess and determine the needs of your organization. This involves clarifying your desired business and IT outcomes. You also need to understand your current business situation, key challenges, and implications. Perform a comprehensive evaluation that addresses the following areas:

- Cloud vision and strategy – Understand the current cloud vision, strategy, and the desired level of support and culture within your organization to adopt technology as a means for digital transformation and innovation.
- Business outcomes and goals – Focus on the “why” aspects of change and the value expected from the transformation. This will help ensure your investments accelerate your transformation and overall ability to achieve your business outcomes.
- Leadership, governance and processes – Identify the leaders in governance, define the participant’s role in the projects, and have a good understanding of processes to proceed with the strategy.
- People, tools and enablement – Identify the people who perform various roles, responsibilities and relationships within an organization, as well as the current set of tools, vendor-specific products, and level of standardization and adoption, and the approach to enablement and training of IT teams.
- Infrastructure, data and platforms – Determine your current and desired infrastructure, data management, and platforms and level of standardization required to deliver services.
- Applications and development – Describe your current and desired strategies for designing, building, updating and maintaining applications.
- Security controls, operations and compliance – Describe your current and desired strategies for keeping the required security posture, the desired operating model, the reporting policies, and the approach to make everyone in the organization accountable for security.

To determine the maturity level, assign a self-evaluated score on a scale from one to five for both the current and desired states.

Table 1: Maturity assessment levels

Level	Description
1 – Low	Processes are unpredictable and reactive. There is no senior-level sponsorship, business unit alignment, or strategy.
2 – Medium low	Some key processes are documented, sponsorship from senior management exists, there is a vague strategy, but there is no business unit alignment.
3 – Medium	Teams are more proactive than reactive. There is a set of organization-wide standards to provide guidance across projects, programs and portfolios.
4 – Medium high	There is comprehensive C-level sponsorship with a shared strategy, a cloud roadmap, and a plan with reasonable alignment across business units.
5 – High	All teams have a formalized way of using clouds, defining and measuring outcomes, and sharing best practices. There is a continuous improvement cycle across the entire organization.

Each assessment area has specific aspects to consider. Assign a level of maturity for each of the focus topics within each area. The topics should be assessed at high and broad levels of context so you can identify and capture all the possible key elements to your business success.

Cloud vision and strategy

- Objective – Understand the multi-cloud vision, strategy, target outcomes, and level of execution against them.
- Target audience – Senior management
- Focus topics:
 - Level of support and culture within the organization to adopt technology as a means of transformation and innovation
 - Level of executive sponsorship, commitment, organizational alignment, and strategy for cloud
 - State of cloud adoption for cloud locations, platforms, and degree of adoption
 - State of cloud investment for providers, relationships, contracts and commitments
 - Approach to solving roadblocks and challenges in cloud adoption, including what these are today

Business outcomes and goals

- Objective – Focus on the “why” aspects of change and the value expected from the transformation. This will help to gain clarity on how the business progresses in the execution of organizational goals, and ensure investments to accelerate transformation and overall ability to achieve business outcomes.
- Target audience – Senior management
- Focus topics:
 - Organizational business plan or financial business case and budget for moving to the cloud
 - Cloud goals, key performance indicators (KPIs), level of achievement, and alignment with business goals
 - Perception of business units toward cloud
 - Projects, initiatives and constraints for cloud adoption/migration, and level of achievement or roadblocks

- Level of intentional cloud usage across the business in comparison to shadow IT

Leadership, governance and processes

- Objective – Determine how leadership, governance and processes either accelerate or hinder the success and execution of the application modernization and multi-cloud strategy.
- Target audience – Management
- Focus topics:
 - Approach to data sovereignty and data locality across cloud and edge locations
 - Drivers and compelling events that impact adoption of cloud services
 - Service-level agreement (SLA)/service-level objective (SLO) and degree of fulfilment to deliver services and resources to lines of business
 - Integration and alignment between application development, cloud service teams, cloud infrastructure operations, and/or other operations teams
 - Processes, policies and ownerships in place and documented that encompass multi-cloud services and the principles of service-based consumption

People, tools and enablement

- Objective – Identify the people who perform various roles, responsibilities and relationships within an organization, as well as the current set of tools, vendor-specific products, and level of standardization and adoption, and the approach to enablement and training of IT teams.
- Target audience – Management
- Focus topics:
 - Cloud team structure, roles and alignment with the business
 - Approach to enablement and training of cloud and IT teams
 - Relationship and collaboration with service partners to support the implementation and operation of cloud environments
 - Way to provision and manage cloud infrastructure, level of standardization, set of tools, and vendor solutions
 - Site reliability engineering (SRE) and software development and operations practice adoption and toolsets

Infrastructure, data and platforms

- Objective – Determine the current and desired infrastructure, data management, and platforms and level of standardization required to deliver services.
- Target audience – Operations
- Focus topics:
 - Your current and desired platforms in place and level of standardization on platforms to deliver applications
 - Degree of native cloud services adoption in comparison to infrastructure-as-a-service (IaaS) consumption and native services in use
 - Data management strategy, including data silos, governance and compliance
 - Approach to forecasting, delivering, optimizing and managing cloud resources

- Approach to designing, delivering, optimizing and managing networking and network security across clouds

Applications and development

- Objective – Describe the current and desired strategies for designing, building, updating and maintaining applications.
- Target audience – Operations
- Focus topics:
 - Way to rationalize and modernize the application portfolio for the cloud along the five R's (retain, retire, rehost/migrate, replatform, refactor)
 - Strategy to designing, building, updating and maintaining applications in accordance with cloud native principles
 - Level of involvement and buy-in from security stakeholders on the cloud platform adoption
 - Projects for application modernization and level of achievement
 - Development practice, degree and toolset of continuous integration/continuous deployment

Security controls, operations and compliance

- Objective – Describe the current and desired strategies for keeping the required security posture, the desired operating model, the reporting policies, and the approach to DevSecOps.
- Target audience – Security and operations
- Focus topics:
 - Approach to designing and managing identity and access management, devices, users, network and data security controls to access, and consumption of the organization's information and process resources across clouds
 - Operating the organization's day-by-day activities; assessing the amount of risk to the organization; logging, auditing and developing countermeasures to protect against the threats
 - Validating security policies, standards, baselines, guidelines and procedures to help protect the organization's data and assets to assure compliance with regulatory and standards requirements
 - Reporting policies and lifecycle management for cloud services and applications to ensure suitability of technology to meet business needs
 - Approach to incorporating security practices that integrates security initiatives at every stage of the software development lifecycle to deliver robust and secure applications, from code to production (DevSecOps)

Executive workshop

The next step is brief and yet crucial: Engage with executives and stakeholders of your organization, and start to envision the journey needed based on the information discussed and evidence collected. This is done by reviewing and presenting your current strategy, capabilities and culture; creating and documenting a vision for the transformation; producing a high-level plan of action with the estimated effort to analyze your current and required competencies; and gaining consensus across your organization.

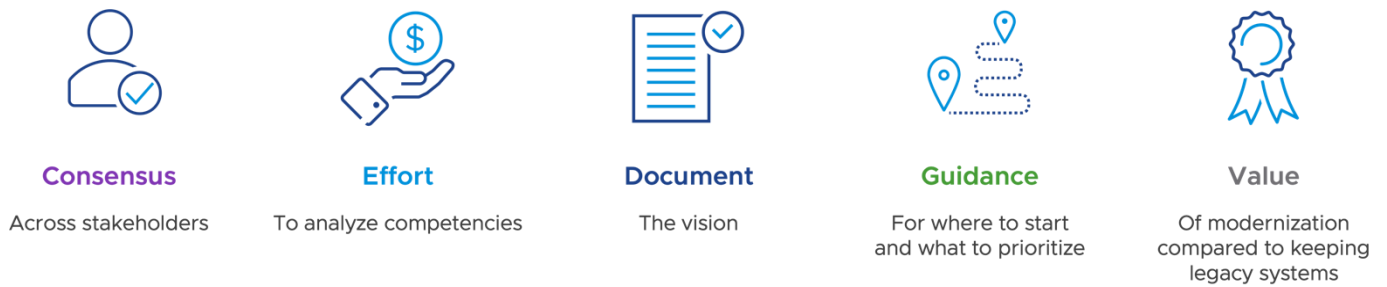


Figure 3: Benefits of the executive workshop.

The audience for this workshop is typically the CEO, CIO and/or executives of the organization. You want buy-in from your executives for the adoption of new technologies as well as for any changes that may be relevant to the organization's processes and people. You want to clearly estimate and share the value of those changes.

A business outcome is an achieved future state that can be verified through measurable results. Outcomes are typically tied to funded top-level initiatives and connected to specific time frames. Outcomes must be specific, measurable, achievable, realistic and time specific.

For each business outcome, it's important to identify the IT challenges that prevent you from achieving the desired outcome.

Define KPIs to measure success over time to make sure the changes introduced deliver the desired results. Some common KPIs include the reduction of overall costs, the speed of completing determined tasks, customer satisfaction (CSAT), employee satisfaction (ESAT), and minimizing carbon footprint emissions and reducing energy to achieve sustainability outcomes.

Develop an executive presentation to communicate the expected results, highlight the need to continue with the analysis involving the different business units, and identify capabilities to address the challenges and to help accelerate the realization of the business outcomes.

Business strategy

Your vision and strategy will lead to specific journeys required to meet your business goals. These journeys are defined as a series of capabilities needed to address your prioritized business challenges and to build the competencies your organization requires. Capabilities are a combination of people, processes and technology initiatives that break down into manageable, interactively delivered steps for fast but incremental value realization.



Figure 4: An example capability for unified cross-platform endpoint management showing the combination of people, processes and technology.

Based on your business and IT needs, you may need to follow a strategic and/or tactical or use case-driven journey. Strategic journeys address broad goals and transformative initiatives. Tactical or use case-driven journeys address short-term focused projects and initiatives such as workload migration or implementing disaster recovery.

Strategic journeys

For strategic journeys, leverage a comprehensive competency model to identify the required capabilities. VMware Professional Services has developed two competency models: one for app and cloud modernization, and one for transforming to an anywhere workspace. These models can help you identify the mandatory and supplemental set of capabilities needed, assess your current capabilities, and identify gaps between your current capabilities and required capabilities.

App and Cloud Competency Model

App and cloud modernization must be done simultaneously to achieve success. Using the App and Cloud Competency Model, you can assess your current competencies across three areas:

- Modern infrastructure addresses your cloud infrastructure and operating model across public, private and multi-cloud environments.
- Modern platforms addresses your ability to reduce application complexity through abstraction interfaces, accelerate application deployment, and enable apps to operate on diverse data sets.
- Digital enterprise addresses how well your IT and development teams can support modern software development and modernization methodologies, as well as their ability to deliver and manage any app, on any cloud, on any device.

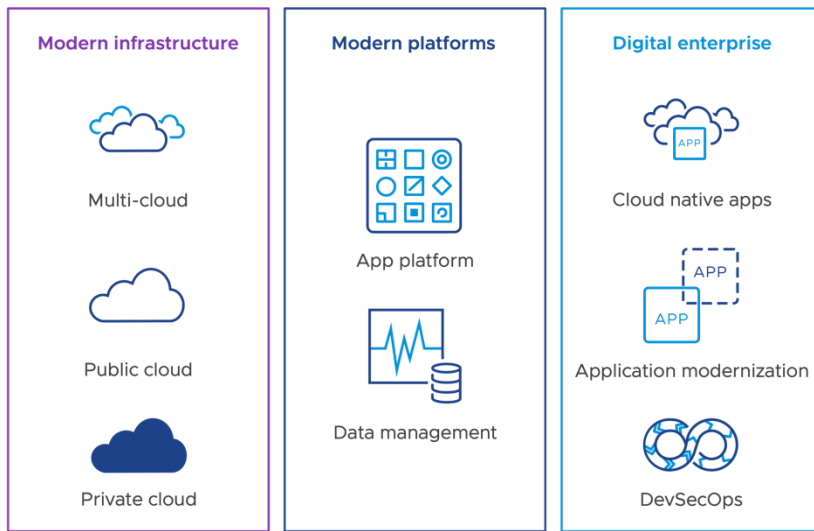


Figure 5: The App and Cloud Competency Model.

Each competency has a set of aligned capabilities. After identifying your required competencies (e.g., public cloud to be able to provide services and infrastructure managed by a third-party provider), identify the required capabilities (e.g., automate workload provisioning, provide a self-service portal for IT users, provide resiliency for business applications). Assess your current state and target state for each capability, and identify the gaps. Determine the specific activities needed to deliver the required capabilities, and develop a high-level plan with workstreams and timelines aligned with business milestones.

Anywhere Workspace Competency Model

Designed to help accelerate your anywhere workspace and digital business objectives, this model identifies the competencies and capabilities needed for your end-user, infrastructure and security teams to modernize current processes and systems, helping you more easily support employees across devices, regardless of location.

Using this model, you can assess your current competencies across three areas:

- Workspace management addresses IT capabilities for delivering apps and workspaces, and automating administrative workflows.
- Employee experience addresses capabilities to ensure employees are productive and engaged from prehire to retire.
- Workspace security addresses how well you provide employees with secure access to the applications and data they need.

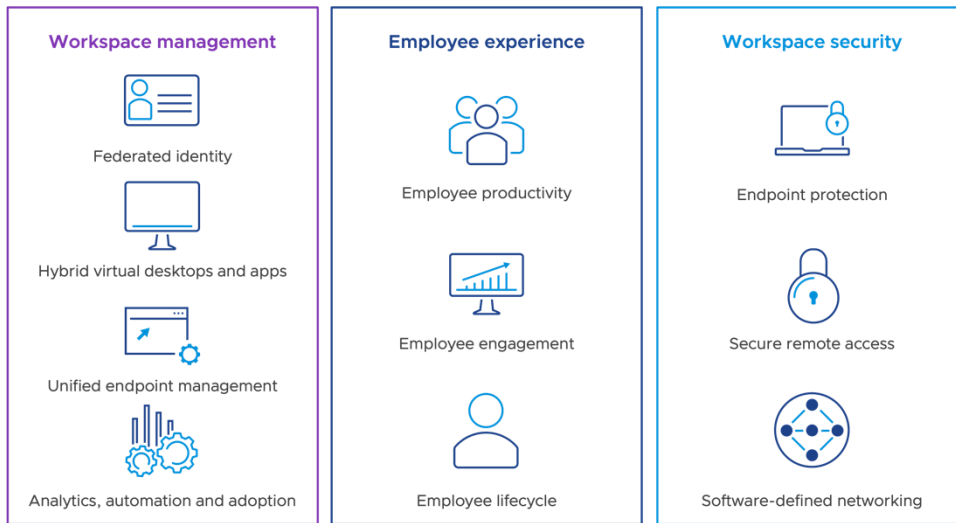


Figure 6: The Anywhere Workspace Competency Model.

As with the App and Cloud Competency Model, each competency in this model has a set of aligned capabilities that allow you to identify your required competencies and required capabilities. You can then assess your current state and target state for each capability, identify the gaps, determine the specific activities needed to deliver the required capabilities, and develop a high-level plan.

Use case–driven journeys

Tactical or use case–driven journeys are focused projects and initiatives generally requiring a year or less to achieve from a timeline perspective. The following are some of the most common use cases for multi-cloud adoption:

- App modernization – Build modernized applications and automate the path to production. Establish a unified operating model for virtual machines and containers within your private cloud. Extend a consistent operating model across clouds, and take full advantage of containers with a multi-cloud Kubernetes platform.
- Disaster recovery as a service – Protect workloads to the cloud with comprehensive disaster recovery (DR) and ransomware mitigation solutions. The target DR site in the cloud can be flexible in size and be created or expanded only when/if a real disaster occurs, saving money and facilitating the testing procedures for an optimized recovery strategy.
- Cloud migration – Activate, integrate and configure a mobility platform across traditional data centers and clouds. Allow a more flexible workload placement. Realize value faster for new VMware private and public cloud environments while driving down operational costs.
- Cloud virtual desktop infrastructure (VDI) – Deliver remote desktops and applications to employees from VMware private and public cloud environments while optimizing IT resources, reducing operational costs, and driving greater utilization of infrastructure assets.
- Data center extension – Extend your on-premises data center to a public cloud for quick access to additional capacity, on-demand scaling of apps, flexible development and test environments, or rapid regional expansion.

Whatever your journey is, identify the capabilities needed, assess your current capabilities, and identify gaps between your current and required capabilities. Then determine the specific activities needed to deliver the required capabilities, and develop a high-level plan with workstreams and timelines.

A well-architected cloud framework

There are several well-architected frameworks that exist in the market today; however, they primarily focus on individual public cloud providers with an emphasis on cloud-only deployments. In contrast, VMware environments span across different deployment models, such as private cloud (on-premises), public cloud, and hybrid cloud. As organizations increasingly adopt multiple cloud providers to support their business interests, a need has emerged to offer prescriptive guidance and best practices supporting multi-cloud deployments.

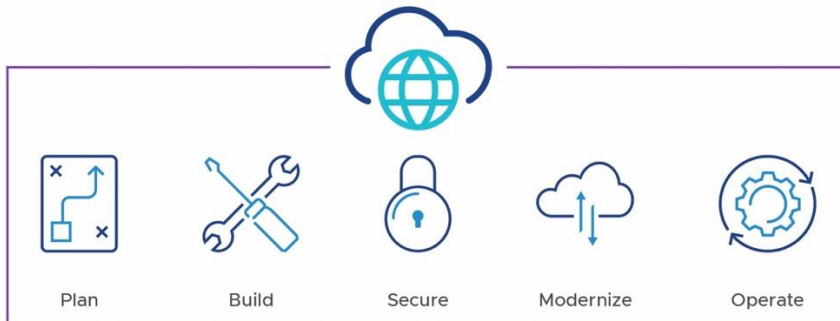


Figure 7: The pillars of the VMware Cloud Well-Architected Framework.

VMware can deliver comprehensive guidance to support you throughout your multi-cloud journey. The [VMware Cloud Well-Architected Framework](#) provides technical implementation guidelines and recommendations to help you plan and build reliable, scalable, secure and operationally efficient cloud environments.

Implementation and metrics

The final step in the Multi-Cloud Adoption Framework is to implement the solution and measure your success. This involves architecting, deploying, integrating and operationalizing your VMware Cloud™ environment; iteratively measuring adoption and consumption; and validating outcomes.

Why measure?

How do you know how well your organization is doing? You must track metrics and KPIs, such as cost, performance, systems utilization, return on investment, and so on, to help understand how well your solution is performing and make decisions about what actions to take.

Simply put, metrics are numbers of things. Ideally, you should collect metrics in an automated way from systems, monitors, validated data entry, and the like. Examples from our digital world might be the number of virtual desktop users and the number of virtual machines. Choosing the right metrics based on reliable sources is key to their value.

KPIs are the averages or percentages of things. They are calculated from a combination of metrics that can be from multiple systems. Continuing along with the above metrics examples, the KPI counterparts would be the percentage of users using virtual desktops and the percentage of servers that are virtualized.

KPIs should be meaningful, actionable, calculated from operational metrics, and tiered according to the interests of your audience. In the business world, we have the hierarchy of executives, management and line managers, as well as each group's partner and vendor counterparts.

Executives are typically concerned with the overall status and health. Clear indications of red/yellow/green, up/down arrows, speedometers, and the link answer these concerns.

Managers need to know the overall health and understand what actions might be necessary. Trended over time, granular KPIs are needed to ensure SLAs and service direction.

Line managers and operations focus on their specific products and processes, and need more detailed metrics to fine-tune and run their services.

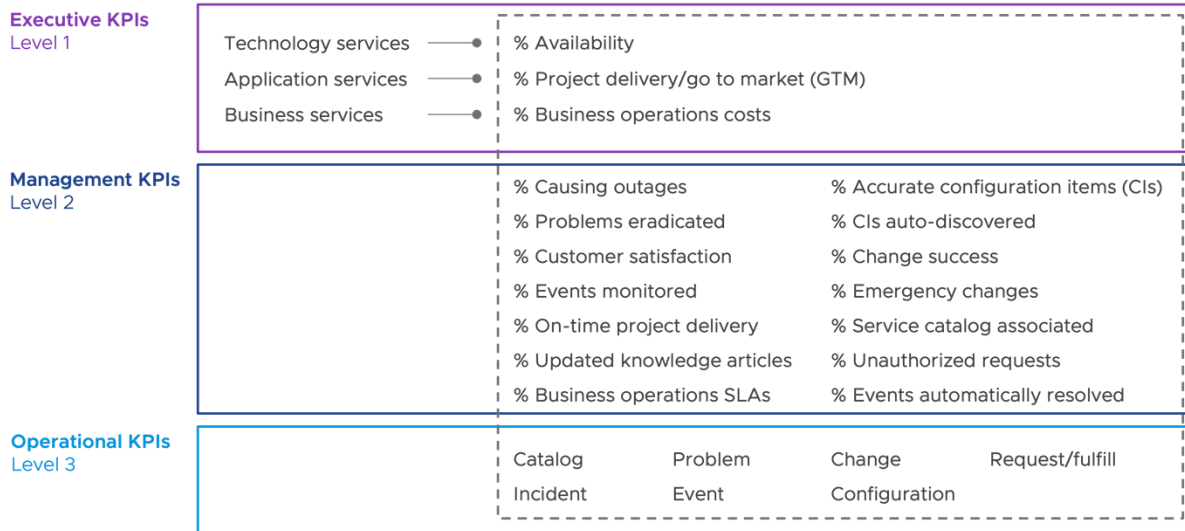


Figure 8: Examples of executive, management and operational KPIs.

What to measure?

As this framework focuses on multi-cloud adoption, consider the most relevant metrics to measure in your organization to make sure you move in the right direction. Every organization is unique, so while not all these suggestions will work for everyone, we've identified several common metrics and KPIs across different areas of excellence.

Cloud visibility

Without visibility across all your clouds broken down by business groups, applications or users, it's almost impossible to take the next steps to improve governance and start automating processes. Because cloud visibility spans cost, usage, performance, configuration, security and availability, there are varied measurements your organization should be tracking:

- Cost of all untagged resources
- Percent of environment with proper tagging in place
- Percent of total bill charged back
- Variance of budget compared against actual by application or team
- Forecast accuracy
- Security incident per month by team
- Security vulnerabilities identified per month per team
- Mean time for vulnerability announced to all systems patched

Tags enable you to categorize your resources in different ways, for example, by purpose, owner or environment. This is useful when you have many resources of the same type; you can quickly identify a specific resource based on the tags you've assigned to it.

Cloud optimization

Optimization is the process of finding opportunities to be more efficient and reduce spend or save time, without sacrificing functionality or required resources needed to meet your broader business objectives. While mature organizations might already have robust cloud cost optimization practices (e.g., rightsizing, elimination of zombie infrastructure, and reservation management), optimization isn't just about cost. Operational optimization involves finding opportunities to be faster and more efficient at day-to-day tasks. Security optimization is the process of proactively monitoring and suggesting remediation of security and compliance risks.

Your organization should be monitoring KPIs such as the following to measure optimization across teams and functional areas:

- Percentage of infrastructure running on demand (compared to covered by reservation)
- Rightsizing savings
- Effective cost per resource (e.g., cost/compute hour)
- Production incidents by application/team
- Reverted deploys
- Mean time to repair or mean time between failures
- Number of security lapses (open ports, identity and access management failures, etc.)
- Number of assets that don't meet configuration standards (e.g., wrong virtual machine type, location, image, OS, tagging)

The key to optimization success is to motivate and incentivize teams to follow provided optimization guidance.

Cloud governance and automation

Governance is the process of defining best practices and then getting notified (or taking action) when infrastructure is out of compliance or has drifted. Cloud governance policies can be implemented the following ways:

- In-band – An in-band policy is evaluated before a user takes an action that would potentially violate best practices.
- Out-of-band – An out-of-band policy is evaluated after a best practice violation is detected.
- Guidelines – These are policies that will communicate a risk boundary via an alert that informs the user of the best practice but will not take action to prevent or correct the action.
- Guardrails – These are policies that will both communicate and take action to correct a violated best practice.

Table 2: Example of cloud governance policies		
	In-band	Out-of-band
Guideline	Before deploying, the user is notified they are violating a best practice and is provided with instructions on how to properly deploy the resource. The user can ignore the notification and proceed with deployment.	After deploying, the user is notified their recent deployment violated a best practice. The notification includes instructions on how to fix the request and conform to the practice.
Guardrail	Before deploying, the user is notified they will not be able to deploy until they fix the violation, or the violation is automatically corrected.	After deploying, the user is notified their recent deployment violated a best practice and that it has been automatically fixed.

The following are examples of governance and automation metrics and KPIs:

- Percent of policies in compliant state
- Cost optimized over time
- Cost optimized per policy over time
- Time saved as a result of policies
- Number of reservations automated
- Time to remediate security violations
- Service availability
- Time to deployment

Business integration

Integrate your cloud process into business processes so everyone works toward a common goal. Ensure your cloud strategy and business strategy are aligned with metrics and KPIs such as the following:

- Cost per customer
- Cloud spend as a percentage of revenue
- Reduction in cost of goods sold (COGS) over time
- Cost of revenue over time
- Time to bring new services to market
- Compliance issues open
- Mean time to detect
- CSAT and ESAT

Conclusion

As technological innovation continues to accelerate, the need for continuous digital transformation will become even more pressing. Leveraging our experience and best practices, VMware Professional Services developed the Multi-Cloud Adoption Framework to help accelerate your multi-cloud journey and realize business outcomes faster.

Resources

- [VMware Multi-Cloud Adoption Framework webpage](#)
- [VMware Professional Services webpage](#)
- [VMware Cloud Well-Architected Framework tech zone](#)
- [VMware multi-cloud solutions webpage](#)

