GET STARTED

Eight Critical IT Practice Areas That Drive Multi-Cloud Use Maturity

A framework for assessing where you are today and developing a path toward mastery

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PREAMBLE

This eBook introduces a framework for assessing maturity related to multi-cloud use. As multi-cloud use is tightly coupled with application modernization strategies, the scope of the framework also includes practices for application development. It is intended for use by IT and line of business leaders who are responsible for determining an organization’s cloud strategy and by others who are stakeholders in that strategy, including application development, cloud operations, cloud platform, and cloud architecture teams.

Introduction

While IaaS was the initial value driver for the public cloud, public cloud providers have added hundreds of additional “as a Service” offerings. The growth of non-IaaS cloud services has fueled a massive second round of growth in the use of the public cloud.

The availability of non-IaaS cloud services has helped organizations dramatically improve the time it takes to deliver new applications. The use of these pre-made building blocks also allows app dev teams to focus on functionality that is unique to their business circumstances rather than building functionality that doesn’t differentiate or drive competitive advantage.

The growth in public cloud has also impacted the way organizations develop software. Agile and DevOps are now mainstream and today software development is using modern application principles such as 12 factor apps methodology, micro-services and containers, and Kubernetes as the foundation of a modern infrastructure.

According to Flexera’s 2021, State of the Cloud Report, 92 percent of organizations have a multi-cloud strategy. They are already using or expect to use two or more public clouds to meet their needs. While multi-cloud is the expectation at the enterprise level, today’s reality is that most teams responsible for building or running software in the cloud are primarily working in a single cloud environment.

However, as these teams become more strategic in their use of the public cloud, they are increasingly seeking to match the unique requirements of each app to the cloud that best meets those requirements. Increasingly, this results in a need to build, operate and manage apps across more than one cloud.

As more teams move from working on one cloud to intentionally operating on two or more, they are realizing that a model where each team member works on only one cloud is unsustainable. As a result, these teams are beginning to seek ways to leverage the skills and capabilities of both app dev and IT Ops professionals across multiple clouds.

Looking ahead, these teams see a world where successful operations will require competency across multiple cloud environments. They will also need to be highly competent at building modern apps and releasing those apps at high velocity.

So, what are the capabilities that will be required to be successful in this future state? To help organizations identify what’s needed, VMware created a framework that can help organizations assess their capabilities, or maturity, in the areas that we believe will be most critical to achieving successful operations in a multi-cloud world.

Assessing Maturity

There are many different approaches to assessing maturity related to multi-cloud use. The approach taken in this eBook will look at the level of adoption across an organization’s application development and cloud operation practices. These eight areas of focus are the practices most organizations will need to master in order to excel at multi-cloud use.

MULTI-CLOUD USE MATURITY ASSESSMENT AREAS OF FOCUS

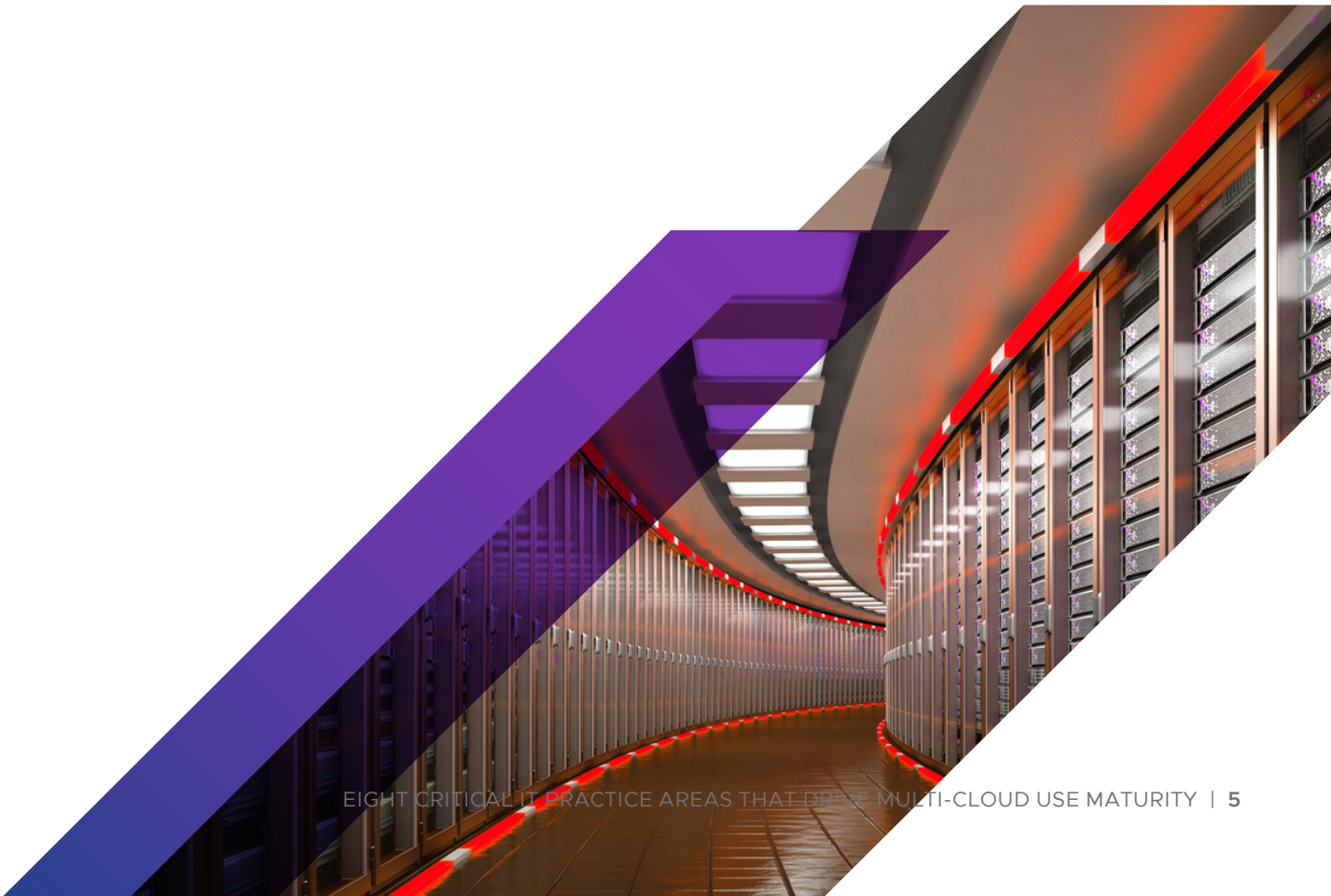
1. Cloud adoption routes
2. Leverage through cloud services
3. DevOps practices
4. Data center modernization strategies
5. Cloud financial management practices
6. Cloud governance practices (non-financial)
7. Tool and platform consolidation strategies
8. Cloud security practices

Developing maturity in any one of these areas is the same as developing capability in that area. The primary way a person or an organization develops capability is by first performing an activity and then repeating that activity until they have achieved a certain level of proficiency. For a given activity, the more an organization does it, the better they will become at it until some threshold is reached.

When considering organizational maturity, efforts must focus on building capabilities in practices that contribute to one or more strategic business or IT objectives. The organization must also focus on building the collective capabilities of teams rather than the capabilities of isolated individuals spread out broadly across a large organization.

The process of assessing maturity in any given organization involves taking an inventory to identify how widely adopted any practice is and, at the same time, assessing the level of competency within each team that is leveraging that specific practice. The more widely adopted a practice is, and the greater the competency that exists among teams using the practice, the more mature the organization is in that particular area.

In the balance of this eBook, we look at the eight areas we believe are the most critical for achieving multi-cloud use maturity. In exploring each of these areas, we look at why each area is important, the underlying activities or practices that make up the area, and some strategies for increasing maturity in each major area.



One: Cloud Adoption Routes

To succeed at multi-cloud you must first be good at a cloud, and to be good at a cloud you must be using a cloud. Cloud Adoption Routes looks at the paths used to instantiate a portfolio of applications on a public cloud. At the highest level there are three major strategies: 1) use the cloud to support applications in the data center, 2) migrate an application to the cloud or 3) build a new application in the cloud.

The practices below are related to these three major strategies. Every organization will have a different mix of these items but, in general, these are practices that the organization should assess to determine if they are building the competencies needed to establish a portfolio of applications running in the public cloud.

CLOUD ADOPTION COMPETENCIES

1. Using a public cloud to backup or support disaster recovery for production apps that currently run in the data center
2. Using a public cloud to provide extra capacity for production apps that run in the data center
3. Migrating production apps from the data center to a public cloud
4. Refactoring production apps that were first migrated to a public cloud
5. Building and deploying net new production apps on a public cloud
6. Running one or more production apps, where those apps have been architected to have components deployed on two or more public clouds (hybrid apps)
7. Leveraging two or more clouds to support the needs of a specific team (data center plus one or more public clouds —OR—two or more public clouds)

VMWARE GUIDANCE

VMware can help organizations increase maturity across the full spectrum of practices related to cloud adoption routes. *VMware Cloud™ Foundation* delivers a cloud stack that runs in the data center, on the edge, on the public cloud (AWS, Azure, Google, Oracle, IBM and Alibaba) and across thousands of managed service provider partners.

The availability of a common infrastructure stack on many clouds makes it easy to migrate applications to the cloud at a fraction of the time and effort that was previously required. This approach also makes it simple to adopt DR to the Cloud.

The *VMware Tanzu* portfolio allows organizations to build and run modern apps on any cloud, and the integration of Kubernetes into VMware vSphere means that teams can leverage existing skills to manage both traditional and modern apps side by side.

A great resource to help organizations further understand all the ways VMware can help public cloud adoption is the eBook, *The Counterintuitively Fastest Path to App Modernization*, by Kit Colbert, CTO for the Cloud Platform Business Unit.

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If you are still primarily using IaaS on the public cloud today, read, "*Moving to Multi-Cloud? Start with the Architecture*", a blog published in May of 2020 by VMware's CTO, Greg Lavendar. In it, Greg outlines a framework that organizations can use to develop clear strategies that go beyond using IaaS as a way to create business value.

Moving up the value ladder requires that organizations begin to leverage the extensive portfolio of cloud services delivered by hyper-scaler cloud providers. Using pre-built cloud services speeds up application development and reduces the scope of development that has to be assigned to "owned" resources

Two: Getting More From "aaS"

In order to assess the extent to which an organization is driving value through the consumption of non-IaaS services, an organization should look at how it is taking advantage of the massive amount of innovation being delivered by cloud providers and 3rd party ISVs in the form of cloud services. Below are categories of cloud services that an organization will want to consider.

CATEGORIES OF CLOUD SERVICES

1. Using Container- or Kubernetes-related Cloud Services
2. Using IDE or CI/CD Cloud Services
3. Using DaaS Cloud Services
4. Using DBaaS Cloud Services
5. Using AI, ML, and/or IOT Cloud Services
6. Using Function, Serverless or Similar Cloud Services

Three: DevOps

A major benefit of multi-cloud use is the ability to ensure that each application is matched to the cloud environment that best meets its requirements. Given this, for the concept of multi-cloud maturity use to make sense, the maturity of application development processes must also be assessed. Agile, DevOps, Containers and Microservices are now all mainstream concepts In the area of application development. For organizations to be successful in multi-cloud use they must also be successful developing high-quality software designed to run in a cloud environment. Maturity in this area can be assessed by taking a look at the state of the organization as it relates to broadly adopting the following practices.

APPLICATION DEVELOPMENT PRACTICES

1. Using containers and micro-services to build new software
2. Establishing an SRE function in order to move operation centric functions closer to development
3. Leveraging automated and continuous practices (development, testing, integration, delivery, deployment)
4. Treating infrastructure as code (version controlled, immutable, integrated into CI/CD pipelines)
5. Making sure developers can self-service their needs and get immediate access to resources
6. Adopting technologies and techniques that support observability for modern, cloud scale apps

VMWARE GUIDANCE

DevOps is a significant topic and there are many strategies an organization can adopt to build capability. While DevOps is primarily about practices, there are many VMware technologies that can directly support the adoption of DevOps practices.

The *VMware Tanzu* portfolio can help organizations master the development of micro-services-based applications and the integration of containers, micro-services and Kubernetes into fully automated CICD pipelines. VMware vRealize® technologies can help organizations in areas such as infrastructure as code and cross cloud resource provisioning and governance.

Mandy Storbakken, a VMware Technologist and Evangelist has authored a series of DevOps blogs that can be extremely helpful for organizations that are still early in their adoption of DevOps. The first blog in that series can be found *here*. At the end of Mandy's first blog in the series there is a table of contents that lists all of the related blogs that Mandy has written on DevOps adoption and use.

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To achieve the objective of making the data center more cloud-like, organizations are investing heavily in automating the delivery of IT services. *Driving IT and Business Innovation Through Data Center Modernization*, a whitepaper co-sponsored by VMware and TechTarget, provides an overview of what organizations should look for in any solutions focused on modernizing the data center.

A strong foundation for data center automation starts with the deployment of a modern, fully virtualized cloud stack that includes compute, storage, networking and management. *VMware Cloud Foundation* delivers these capabilities across the data center, edge, hyper-scaler clouds and thousands of managed service provider partners.

Four: Bringing Cloud to the Data Center

While workloads in the public cloud continue to grow at double digit rates, workloads in the data center are also growing, though at a slower pace. Most analysts now predict that the data center will continue on for many years to come, and surveys of IT and App Dev professionals indicate the same. As organizations have come to terms with the idea that data centers are here to stay, they have turned their attention towards strategies designed to dramatically increase their functionality. As a result, organizations are making significant investments in data centers to make them more cloud-like. The list below represents a set of practices that organizations should be assessing to improve maturity.

DATA CENTER AUTOMATION STRATEGIES

1. Virtualizing all layers of the infrastructure stack (compute, storage, network) to support increased automation
2. Automating service delivery processes to dramatically improve efficiency and responsiveness to user requests
3. Providing developers with self-service, on-demand access to data center resources
4. Upgrading IT Ops tools and practices in order to rapidly resolve any issues that could potentially impact service availability
5. Adopting the use of on-premises, managed service offerings (such as *VMware Cloud on Dell EMC* or AWS Outpost) to bring cloud financial and operational models on-premises

VMWARE GUIDANCE

Organizations that want to improve how they execute against cloud financial management and other governance objects can benefit from a whitepaper created by the *CloudHealth by VMware* team. The whitepaper *"Benchmark Your Cloud Maturity: A Framework for Best Practices"* lays out a four-level model that can be used to assess maturity across Financial, Operational and Security practices in the cloud. An interactive online model based on this framework is also available and can be found *here*.

Five: Managing Cloud Spend

When applications were primarily built on premises in an organization's own data center, most app dev teams operated in a shared service environment where central IT was responsible for providing all of the infrastructure needed to support app dev initiatives. These costs were rarely broken out by the organization consuming the resources.

As organizations embraced the cloud, everything changed. Pay as you go, while enticing at the start of cloud adoption, has introduced new challenges. As organizations have ramped up their efforts in the cloud, many have experienced runaway cloud costs and most organizations have poor visibility into how much they are spending, who is spending it, and whether the resources are being used. The activities below represent a set of cloud financial practices and competencies that most organizations will have to develop if they are to excel at the use of multiple clouds.

CLOUD FINANICAL COMPETENCIES

1. Using an automated and repeatable process to provide teams with visibility into resource usage and costs (what is being used, who is using it, how much they are using)
2. Using an automated and repeatable process to identify and rightsize under-utilized or zombie resources
3. Using an automated and repeatable process to identify opportunities to save money through the use of reservations

VMWARE GUIDANCE

For organizations looking to better understand the role of policy in managing multi-cloud and the best way to automate the implementation of those policies, a blog written by the *CloudHealth by VMware* team, *"A Guide to Automated Cloud Policy Management"* can help.

The blog provides an overview of cloud policy management and a link to a whitepaper that goes deeper into the concepts the blog introduces. Concrete examples around how you can implement automated governance in your multi-cloud environment are provided. It also explores the important role that a Cloud Center of Excellence plays in helping your organization accelerate the adoption of cloud governance practices.

Six: Governance Beyond Financial Management

While most organizations are keenly aware that they need to implement strong governance practices related to the financial management of cloud spend, there are other governance related practices that organizations must also become proficient in if they are to achieve a high degree of multi-cloud maturity. Multi-cloud use necessitates establishing and maintaining governance practices and policies across a range of domains. The three primary domains beyond financial management are 1) general operations, 2) security and compliance, and 3) data management. Adoption of these practices at scale will require the use of third party solutions to provide high levels of automation. Below is a set of practices that organizations should consider when assessing their maturity as it relates to governance.

CLOUD GOVERNANCE PRACTICES

1. Policies and practices to manage privileges and access rights on all clouds in use
2. Policies and practices to operationalize best practices to ensure that applications perform as expected
3. Policies and practices to ensure that all applications are secure and compliant
4. Policies and practices to ensure that application data (in transit or at rest) is well understood, properly classified and properly managed for security,compliance and privacy requirements across all clouds
5. Implementation of a Cloud Center of Excellence (or similar type of group) responsible for standardizing processes, developing best practices and putting cloud use guidelines in place for the full organization.
6. Implementation of a central platform team with responsibility for cloud operations for most or all cloud delivered applications

VMWARE GUIDANCE

Kit Colbert, CTO for VMware's Cloud Platform Business Unit, recently wrote a blog, *"Multi-Cloud: Strategy or Inevitable Outcome? (Or Both?)"*, that talks about the different approaches an organization can take to achieve a multi-cloud environment. In this blog Kit highlights four choice points all organizations face as they think about creating a foundation for a multi-cloud environment. They can choose to have a) consistent operations, b) consistent infrastructure, c) consistent applications or d) nothing consistent across these three areas.

The first three choices (a, b, and c) can be mixed and matched to some extent while the last (d) is, of course, mutually exclusive of the first three. Kit's blog is a good jumping off point for understanding the benefits of tool and platform consolidation and how VMware can help organizations achieve their objectives in these areas.

Seven: Tool and Platform Standardization

Earlier in this eBook we noted that while most teams that are responsible for app dev and IT operations are primarily working on one cloud, increasingly these teams are beginning to look at building and running applications across more than one cloud. In the early days of cloud, the agility that public cloud brought to the organization was enough to accept significant operational inefficiency. Not anymore. Today, organizational leaders are looking to add efficient operations to the list of benefits they associate with the cloud. The three areas below represent areas that organizations should consider in order to achieve significantly more skill leverage from both app dev and IT Ops teams.

PLATFORM STANDARDIZATION OPPORTUNITIES

1. Using a set of management tools and practices that can work across multiple clouds/environments
2. Using a common infrastructure that can be deployed on multiple clouds/environments
3. Using a common set of cloud services that that can work across multiple clouds/environment

VMWARE GUIDANCE

To help organizations build capability and maturity in the area of cloud security, the VMware Secure State team authored, *“Seven Best Practices for Cloud Security Management.”* This eBook examines a broad range of security topics, including the impact of the shared responsibility model where both cloud provider and cloud consumer are responsible for security, how security is “shifting left” as part of the movement towards DevSecOps, and the role that a Cloud Center of Excellence can play in making security best practices ubiquitous across an organization. In each of the seven areas explored, the team provides actionable guidance that can help any organization improve its capabilities in the critical area of cloud security.

Eight: Securing the Cloud

The ability to secure the applications you run in a multi-cloud environment is a critical area of capability. Managing security in a multi-cloud environment presents scale and complexity challenges beyond anything organizations have faced in the past. Below is a set of capabilities related to DevSecOps that should be considered when assessing maturity.

DEVSECOPS CAPABILITIES

1. The ability to get real time visibility into the security and compliance posture of apps based on best practices and/or industry standards
2. The ability to receive real-time alerts for security events, changes, and risks related to the application portfolio
3. The ability to prioritize security violations based on quantifiable risks
4. The ability to automatically remediate potential risks based on access, app, infrastructure, or other misconfigurations

VMware Can Help Your Organization Increase Its Multi-Cloud Use Maturity

Building capability and maturity around multi-cloud use involves practices and activities in multiple areas. Creating competencies in areas related to building and running applications in a multi-cloud environment is not easy but the right partners can make it easier. No matter where you are starting, VMware and its ecosystem of partners can help.

About VMware Cloud

Redefine the foundation of IT with cloud capabilities, modern architectures, and consistent operations in the data center, any cloud, and edge for all applications. VMware Cloud transforms private data centers, hyper-scalers, and remote sites into a unified and elastic multi-cloud platform with integrated compute, network, storage, security, Kubernetes, and cloud management optimized to securely and reliably deliver any application, everywhere.

About VMware Cloud Universal

VMware Cloud Universal is a flexible subscription that delivers enterprise-class multi-cloud infrastructure and operations combining compute, storage, networking, management, and modern app services with customer entitlements to flexibly deploy VMware Cloud across a customer-managed private cloud, a fully managed local cloud, or fully managed public cloud.

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