

App Modernization in a Multi-Cloud World

2020 VMware Market Insights Report





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Executive Summary

As the cloud market continues to mature, global organizations are forming an ever clearer and more concrete view of cloud strategies and the link between cloud, application priorities and business outcomes.

The market is at an inflection point. Long-standing app architectures are giving way to new cloud native models. The worlds of datacenter, cloud and edge, once divided as proprietary silos, are now converging. And the diversity of multi-cloud, once viewed as chaotic and challenging, is emerging as the most powerful source of innovation. By studying in detail more than 1,200 organizations around the globe, we've developed a strong picture of how market priorities are emerging, how businesses are building for the future, and the major challenges they are experiencing and overcoming along the way.

At the intersection of business priorities and cloud adoption strategies are the needs of a growing and ever more complex set of business applications. For every organization, this application estate remains the top priority, driving business growth, operational efficiency and market differentiation. But supporting this set of applications becomes more challenging as organizations struggle with exponential growth in app volume, diversity in application styles and architectures, and the complexity of today's multi-cloud reality.

This study helps to identify the ideal environment customers are striving to achieve in order to drive business strategies through app modernization efforts. Stated simply, organizations want the flexibility to rapidly build applications for any environment – any cloud, in the data center, at the edge – the ability to operate this entire landscape in a unified way while keeping all applications secure and

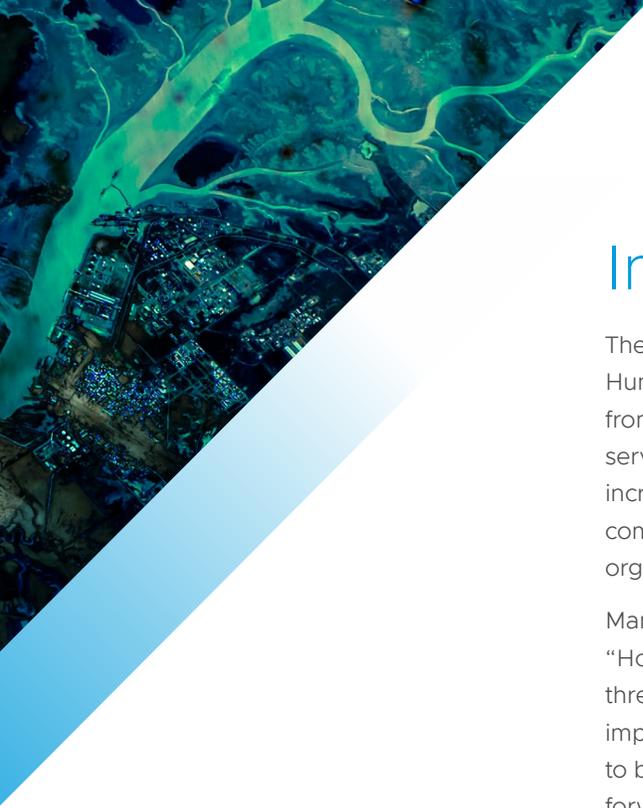
protected, and the freedom to migrate and evolve in the future without penalty.

While defining the ideal landscape is simple, achieving it is proving to be challenging. App modernization strategies, cloud migration efforts and plans to adopt containers and Kubernetes, while underway, present major challenges and obstacles. Across the board there exists a persistent gap between expectations and reality. And closing this gap will require a concerted effort that combines technology, skills development and organizational change.

At the same time, leading organizations have found a model of turning the complexity of multi-cloud into an advantage, to harness the innovation delivered from cloud providers while succeeding at making developers more agile and productive. Interestingly, driving this is the goal not of cost savings, but of being more responsive and valuable to the business.

As this study reveals, building an app modernization strategy that accesses the innovation of multi-cloud holds incredible potential. Those organizations that have navigated the complexity of multi-cloud have emerged as more agile than ever, able to deliver applications that are more powerful than ever, contributing greater value back to the business while accessing the best, most innovative services from any cloud.





Introduction

The pace of change in the enterprise application market is staggering. Hundreds of millions of applications in production, new innovations from vibrant open source communities, hundreds of new cloud services and a diverse set of options for where and how to run an increasingly set of demanding apps. With all this diversity comes complexity. And this complexity can be incredibly chaotic for organizations.

Many organizations are grappling with fundamental issues like, “How do I make my developers productive and innovative without threatening security or operations?” “Can I extend the value and impact of my existing enterprise apps?” “Do I have the skills I need to build the next generation of applications to drive my business forward?” “How do I take advantage of all the incredible innovation in the market without adding new skills, new tools, new teams?”

VMware recently spoke with leaders and experts from more than 1,200 organizations worldwide to better understand their goals and challenges around modern applications and cloud, and their strategies for moving to a multi-cloud world.

The results are summarized in this report.

Research Methodology

VMware spent more than three months studying leading global organizations. The company commissioned Management Insight Technologies to conduct custom research in North America (US & Canada), Western Europe (UK, Germany, & France) and APAC (Australia, New Zealand, Japan, India, & China) using a combination of web and telephone interviews.

Responses were collected from 1,206 IT leaders, IT decision makers, and developers who are knowledgeable about and involved in decision making for cloud platforms. The sample targeted 10% SMB (2-999 employees), 30% Commercial (1000-4999 employees), and 60% Enterprise (5000+ employees).

The study ran from November to December 2019.

Diversity Rules

Organizations have never had more choice when it comes to applications, operating environments, infrastructure, and more. Does all this choice present an opportunity, or does it bring chaos? Is diversity a challenge or an opportunity?

What's most interesting is that diversity is much more than an IT reality, it's a business imperative. Managing and rationalizing diversity is only the beginning. VMware's study revealed that leading organizations want to use the incredible diversity generated by the multi-cloud market to drive innovation and be more responsive to the needs of business leaders and customers.

An organization's success at deriving innovation from diversity depends on its ability to unify and optimize its cloud environment, simplifying operations and unlocking new capabilities.

Toward an Ideal Cloud Environment

All of this is driving a preferred model today and in the future that combines a modernized data center, multiple public clouds and edge environments, built on a modern, cloud-native architecture, giving IT maximum flexibility of where and how to run apps.

Most organizations already use multiple public clouds in addition to their on-premises environment. However, each of these environments exists in distinct and often proprietary silos. Without a single operating model, seamless portability, security, and Dev/IT collaboration becomes increasingly difficult and costly.

In an ideal cloud environment, organizations benefit from a single operating model that ultimately makes it easier for them to move forward with their transformation initiatives.

Organizations are also beginning to view app modernization technologies like containers and Kubernetes as crucial to an ideal cloud environment. While adoption is still nascent, these solutions will unlock developer productivity, app portability and greater agility, while also preserving the efficiency and security of IT operations.



Responding to this study, organizations used the following phrases to describe their ideal cloud environment.

Manage consistently, everywhere

All applications are managed consistently regardless of where they are deployed.

Build, move and run anywhere

Seamless portability that delivers the freedom to move applications from public cloud to public cloud without rewriting and to build on their cloud of choice.

Secure and protect every app

No matter where an application is run, it is secure and protected.

Dev/IT collaboration support

Developers and operations teams can collaborate easily.

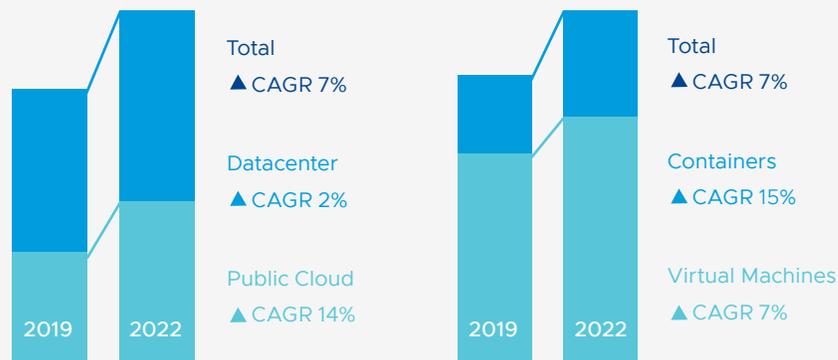
Change and adapt, without penalty

Migrate to a new cloud seamlessly and change environments without rewriting or refactoring.



Despite being clear on what they want, most organizations are still a long way from this ideal.

Planned Deployment of Infrastructure Platforms and Types



New Priorities for Enterprise Apps

The Next Generation of Applications is Here

This is all part of a larger and more profound generational shift in applications, driven by the need to rapidly deliver new services to advance digital transformation efforts. Cloud-native principles, containers, Kubernetes, and microservices are redefining how applications are built, run, and managed.

What's Emerging for Enterprise Apps?

- Exponential growth in the volume of applications
- Increasing diversity in the range of applications
- Rise of multi-cloud as the new architecture for IT and an imperative for business

This shift is placing organizations under intense pressure to deliver innovative services for their customers as rapidly as possible – while also addressing ongoing reliability, security, and performance concerns.

App Modernization Driving an Era of Transformation

Most organizations are still laying the foundations and refining the strategy around how they transform their application portfolios.

Three clear priorities emerged from the research:

Application transformation

72%

of businesses are focused on building a path forward for their existing applications – modernizing and refactoring for cloud-native architecture and accessing cloud services to develop hybrid applications

Cloud migration

44%

of businesses are focused on shifting applications to the public cloud

Developing new public cloud applications

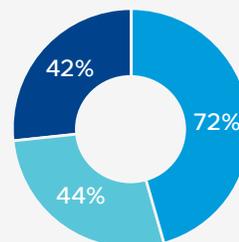
42%

of businesses confirmed building net new applications for public cloud as a priority

The key insight from these figures is that while significant attention is given to building new apps to deliver innovative new services, organizations are looking at a comprehensive strategy for how app modernization can create value. This includes a range of goals from deriving new value from existing apps, to matching each app to the optimal environment in terms of cost, security and scalability while simultaneously driving new, innovative services.

Top 3 Priorities for Application Portfolios

- Application Transformation
- Cloud Migration
- Develop New Cloud Apps



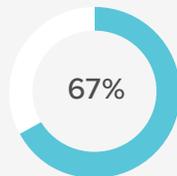
Containers and Kubernetes: Essential Building Blocks of Modern Apps

While app modernization encompasses a range of technologies and innovations, it is clear that organizations have containers and Kubernetes in their sights. In VMware's research, almost three-quarters (73%) of businesses plan to containerize existing applications and 41% plan to build most or all of their new apps as containerized apps.

This uptake reflects a broader movement to redefine the architecture of modern applications. The monolithic applications that defined traditional applications are a thing of the past. Modern applications are built on smaller, more flexible components that promise to accelerate the delivery of new functionality and to create an environment of continuous innovation.

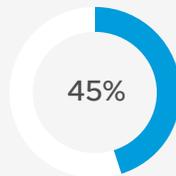
It is this combination of faster time to market, flexibility for business demands and opportunities for future value that is creating not just a powerful platform for IT, but the promise of stronger business impact as well.

Organizations are increasing investment in containers to achieve:



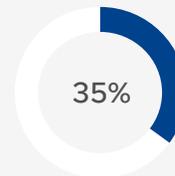
Improved Agility

Improved developer agility, driving both increased productivity and speed of app development.



Improved Availability

Increased app availability, based on a more scalable and flexible architecture for the future.



Continuous improvement

Freedom to evolve application functionality and realize continuous improvement.

Three-quarters of the market plans to use Kubernetes as the orchestration platform for their modern apps program.

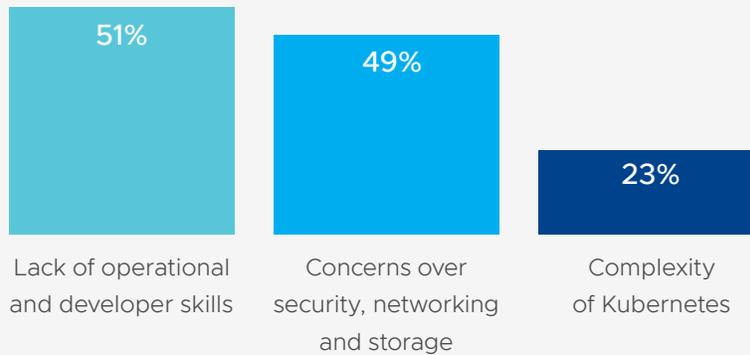
Container Adoption Is Still in Its Infancy

Even though organizations have ambitious goals for modernizing applications, only a very small percentage have progressed past experimentation. Over half (52%) of businesses surveyed have containerized less than a quarter of their application portfolio. Of this group, the vast majority (80%) have containerized less than 10% of apps.

The Value of Kubernetes Is Yet to Be Realized

Three-quarters of the market plans to use Kubernetes as the orchestration platform for their modern apps program. But 80% of businesses are still in the early experimental phase. They know Kubernetes holds incredible promise but they are being held back by fundamental challenges.

Key Challenges with Kubernetes



Migration Essential to Matching App Needs

What's Behind the Great App Migration?

App migration remains one of the most common IT initiatives. Organizations migrate apps to the cloud for a number of reasons, but the biggest driver is the desire to balance investments between their on-premises data centers and cloud, shifting consumption and economic models CapEx to OpEx.

Today, seven in ten organizations have a major cloud migration initiative in progress. Ideally, they'd be able to simply "Lift and Shift" their apps without having to change any core functionality. But in reality, many cloud migrations have proven costly, complex and time-consuming.

A Multi-Year Journey to the Cloud

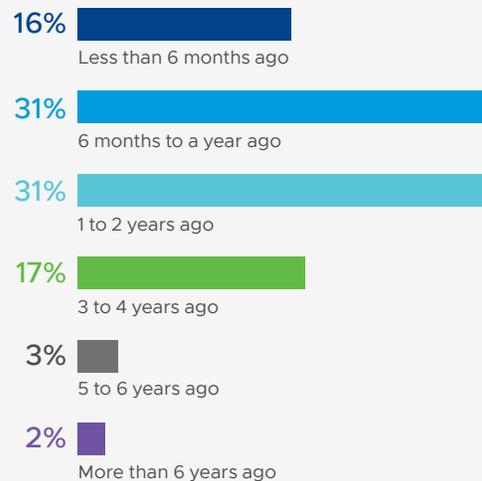
The reality of migration is more complex than many enterprises envisioned. App complexity, dependencies on existing infrastructure and the diverse architectures of public clouds have all generated significant and unexpected cost, complexity and risk to cloud migration efforts.

Given these limitations, it is not surprising that a large number of organizations have been at cloud migration for a year or more. Of those interviewed, 42% had been working on cloud migration for three or more years.

Shaping a View of the Multi-Cloud Future

The challenges cloud migration brings are now shaping how organizations view an ideal multi-cloud environment and what this will deliver. The aspiration to have a set of consistent operations across any cloud and the ability to seamlessly move applications across clouds is shaped by the realities of the effort required for cloud migration.

When Did You Begin Your Cloud Migration?





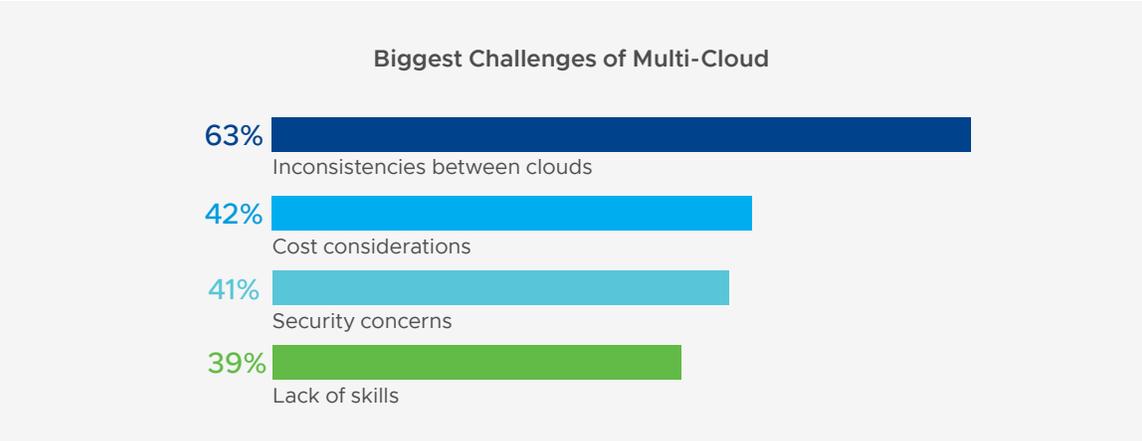
Multi-Cloud: Powering Business Innovation

Operating in a multi-cloud environment is more than an IT reality, it's a business imperative. Across all industries, IT faces the challenge of cloud services adopted by developers or lines of business outside the structure of IT governance. This has resulted in the majority of organizations having complex portfolios composed of multiple cloud providers without common standards for security, operations or governance. Worse still many of these teams lack insights into the actual services in use across their organization. The result can be unmanaged spending, misconfigured services and risks to apps and data.

In the study, the top four multi-cloud challenges faced by organizations included:



Cloud strategies are deeply connected to the choices organizations make about the clouds they use. Instead of ad-hoc, siloed cloud adoption, organizations need more strategic approaches to bringing the benefits of multi-cloud to multiple teams.



Inconsistencies Cause Chaos

The lack of consistency in multi-cloud environments creates a level of chaos that only exacerbates other challenges. Inconsistencies abound – in how each cloud is architected, in how Kubernetes is delivered across clouds, and in the tools and processes used to manage cloud. They all combine to overwhelm DevOps teams, and to increase the complexity and risk of production apps and systems as IT admins manage their portfolio across clouds.

Organizations continue to seek consistency. In the study, the major benefit of having consistent services and tools across clouds is around agility – that is, the flexibility to pick the right environment and the ability to develop new apps and features faster.

This position is supported by respondents' infrastructure growth predictions over three years to 2022:

15%

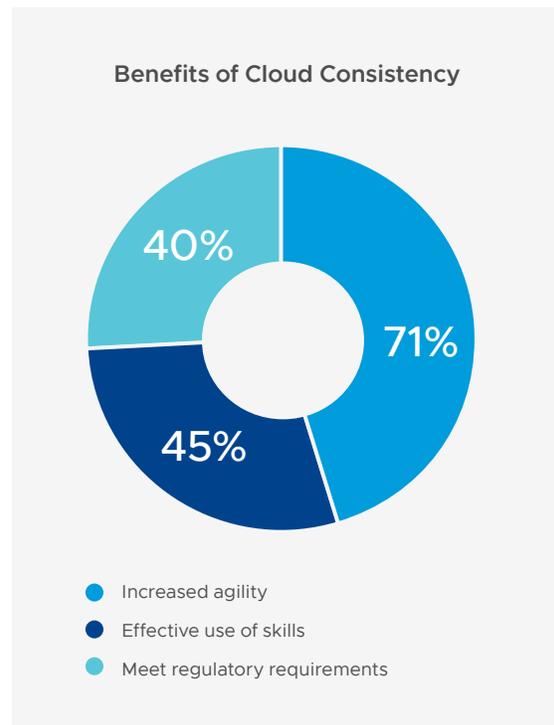
compound annual growth rate (CAGR) predicted for containers

7%

CAGR predicted for virtual machines

The statistics indicate organizations anticipate a need to invest significantly in multi-cloud portability to drive agility, while continuing to hedge their bets with hybrid cloud capabilities.

Other benefits of consistency include the more effective usage of operational team members and skills, and the ability to meet regulatory requirements, including data sovereignty.



The Benefits of Seamless Multi-Cloud Portability

The study revealed that beyond the natural complexity of multi-cloud, the market has recognized the value of building a multi-cloud strategy that increases access to innovative cloud services from cloud providers.

We asked organizations about the benefits they expect to achieve by being able to easily move applications from one cloud to another. While cost still factors into decisions about app deployment choices, the ability to rapidly meet the needs of both customers and internal stakeholders emerged as the top priority for customers working across multi-cloud environments.

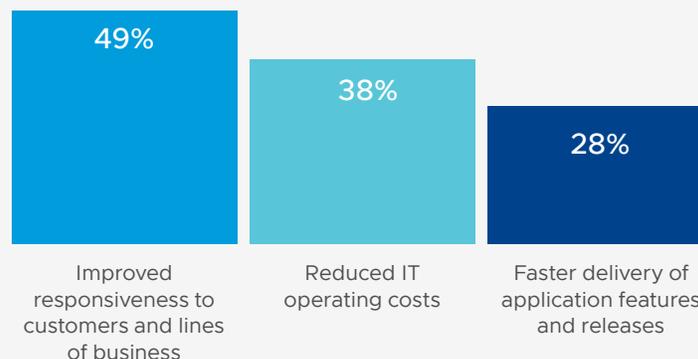
Access To Innovation

The freedom to move workloads to any cloud, at any time, without incurring a penalty, is deeply connected to a key attribute organizations cite as part of an ideal multi-cloud environment. This is, providing internal stakeholders access to the massive amounts of innovation enabled by public cloud providers.

Developer teams also recognize the marketplace as highly dynamic. Primarily because, the best combination of innovative services today may differ in the future. They want their multi-cloud environment to support not just first time deployment to any cloud, but also easy redeployment to a different cloud if that is the right decision for the business.



Primary Benefits of Consistency Across Multi-Cloud Environments



Supporting Your Modern Apps Journey

As the research reveals, the path to an ideal state where modern apps operate seamlessly across multiple clouds can be fraught with obstacles.

Organizations have told us a range of challenges are holding them back from multi-cloud app modernization, in particular a lack of skills, the complexity of the task, and security concerns.

Helping You Tackle the Challenges

Arriving at an idealized cloud environment is not simple, but it is certainly made easier when you have the right technology partners beside you.

Only VMware has the capabilities that help all organizations at all points in their app modernization journey. Wherever your priorities lie, VMware can support you across the broadest multi-cloud environment, all clouds (public, private, and edge), across all application types (traditional and modern), and across both virtual machines and containers.

Transform and Modernize Applications

VMware's modern application portfolio gives developers and IT Operators all of the resources needed to efficiently and effectively build modern apps that can be deployed at cloud scale, and are highly available and always secure. It provides:

- Instant access to the resources developers need
- Support for the broadest range of application types
- Access to innovation from any cloud provider

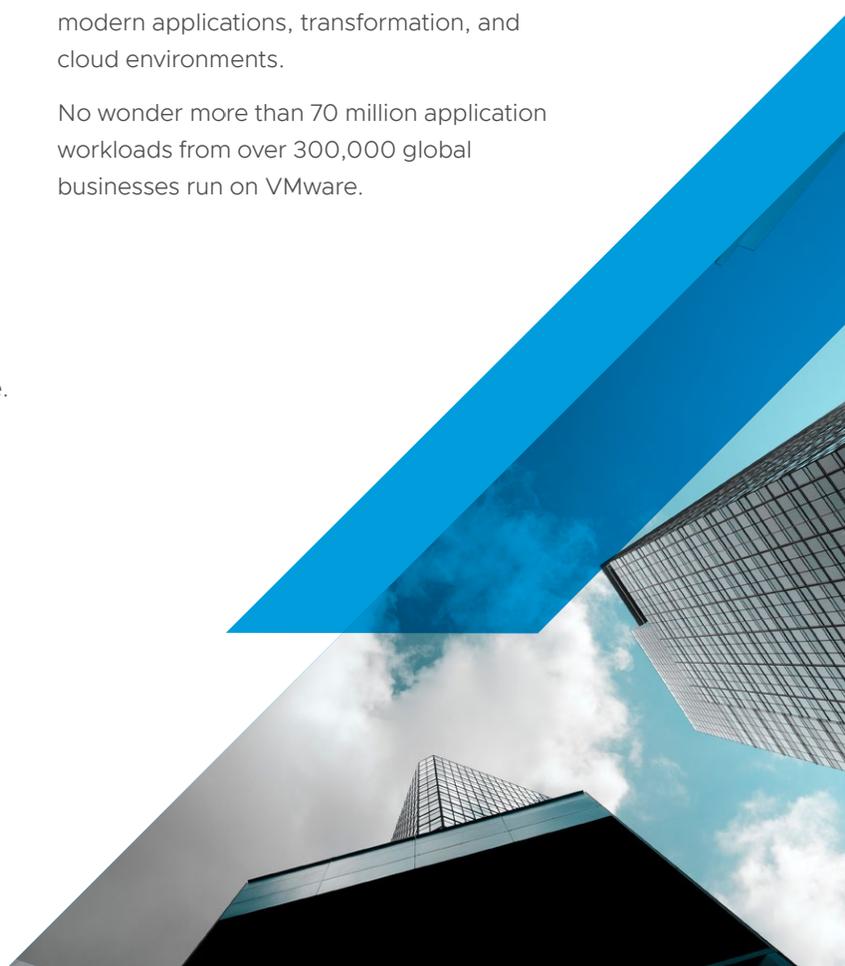
Leverage Existing Skills

VMware Cloud Foundation is the technology that powers multi-cloud environments to deliver seamless workload portability and offer the simplicity of single operating model across clouds. Whether you are running VMs or containers, VMware Cloud Foundation provides consistent infrastructure underlying a consistent cross cloud operating model. Running a multi-cloud environment with VMware technology means teams can leverage skills developed in the data center across any combination of clouds you choose to use.

Proven and Trusted

From the very beginning, VMware set out to create the most powerful environment not just for modern applications, but for all apps. Today, it is the only vendor that can support organizations across the full spectrum of modern applications, transformation, and cloud environments.

No wonder more than 70 million application workloads from over 300,000 global businesses run on VMware.





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