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Managing Application Modernization, Migration, and Digital Transformation with VMware in the Public Cloud

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IDC opinion

Enterprises have many options today when choosing a platform for application migration, modernization, and digital transformation. One of the most prominent is VMware Cloud Foundation (VCF), which can be deployed on premises and is natively supported in major public clouds, including Amazon Web Services (AWS), Google Cloud, IBM Cloud, Microsoft Azure, and Oracle Cloud Infrastructure (OCI).

IDC's research has shown that while application modernization provides benefits for companies in terms of improving internal operations, helping serve customers, and reaching new markets, it can be a long and difficult journey. Thus the benefits of a unified and mature platform such as VCF, coupled with hyperscale global infrastructure and a panoply of adjacent cloud services for data management, artificial intelligence, machine learning, and other tasks, are clear.

Customers intent on transforming their business need to choose a platform that will be here for the long term. VCF in the public cloud is a safe bet in this regard, but successful adoption for application modernization and digital transformation will require customers to undergo certain cultural changes — namely, the development of a robust DevOps culture in the IT organization and the close inclusion of business stakeholders in the process.

In this white paper

In this white paper, IDC examines the history, development, and current state of VMware's relationships with hyperscale public clouds. The paper also discusses how choosing this solution for application migration, modernization, digital transformation, and hybrid cloud can make sense for many companies.

Situation overview

Application modernization occurs against a backdrop made up of public cloud, hybrid cloud, multicloud, and private cloud deployment options. The flip side of having many choices is the potential for complexity, which means enterprises must develop a more holistic plan around application modernization when it comes to which applications should best live where, based on technical, governance-related, and financial reasons.

In today's landscape, application modernization refers to several modalities. A company may simply rehost an on-premises application to the public cloud with few changes, a practice commonly referred to as "lift and shift." In this case, the modernization refers only to the underlying infrastructure.

Other modalities see companies "replatform" an application to take advantage of basic cloud platform services such as autoscaling or "refactor" to use more sophisticated public cloud features. Finally, companies may desire to undertake a full cloud-native rewrite of an

application. This last category tends to involve adopting cloud-based DevOps tool chains, code editors, and other cloud-native services.

Enterprises undertake application modernization projects for multiple reasons. One common driver is when an enterprise wants to replace third-party applications that are going out of support or aging bespoke applications.

Another reason is rising concern over skills availability, such as with developers versed in critical procedural languages such as COBOL. This problem reared its head in 2020 at the start of the COVID-19 pandemic, when mainframe-based unemployment insurance systems were overwhelmed by demand and government agencies had to scramble to find experienced help.

A best practice is to take a pragmatic approach to modernization that allows customers to move at their own pace. This involves creating an inventory of existing applications and then triaging them into the appropriate modality.

Challenges facing application modernization

There are multiple approaches to application modernization, each with their own trade-offs:

- **Rehosting, also known as lift and shift:** This can be done relatively quickly since it is largely a move to new infrastructure. Lift and shift is usually part of a datacenter retirement plan, as companies would rather consume public cloud infrastructure than maintain and refresh their own servers. However, its benefits for application modernization are few since the software undergoes few changes or improvements in functionality.
- **Replatforming an application so it can take advantage of cloud platform capabilities such as autoscaling:** Other avenues for replatforming include moving from virtual machines to containers. If not done carefully, replatforming attempts can fail and cause problems with application stability.
- **Refactoring legacy applications to take advantage of new approaches, including microservices and serverless:** This approach is time consuming and often expensive due to the potential need to bring in outside experts.
- **A full application rewrite:** This gives an enterprise the most flexibility in terms of application functionality, but similar to refactoring, it is costly and complex.

Replacing an application completely, such as with a new SaaS application from an ISV: This approach can offer speed and free up internal development resources for other projects, but it could result in risk given the business process change, limitations to customizations, and the cultural adaptation to new software that it frequently involves.

Irrespective of the modernization approach, many enterprises encounter problems with a lack of clear and current documentation, an issue that worsens as an application ages. Earlier workarounds and modifications added to the application by individuals who are no longer working at the organization can result in a tangle of "spaghetti code" that may require specialized tools to unravel.

Overall, there are inherent operational challenges to consider when modernizing an application. If a company has deemed it important enough to modernize, that means the application has business process value and needs to keep running during the modernization project and the integration of new functions.

Considering VCF in the public cloud

VCF is a full-stack cloud platform that supports digital transformation initiatives by enabling organizations to accelerate developer productivity, embracing cloud-native and AI technologies to deliver apps and services to market faster.

The platform is designed to address three key areas:

- **Modern infrastructure.** VCF plays a crucial role in transforming traditional IT infrastructures into a more agile and adaptable cloud environment. This transformation is key to enabling organizations to deploy core cloud use cases that deliver strategic outcomes and lower the total cost of ownership (TCO) and increase productivity. VCF provides organizations with a consistent infrastructure layer that results in a consistent cloud operating model across cloud endpoints, combined with automation and orchestration to standardize and simplify the entire infrastructure life cycle, including day 0 deployment, day 1 provisioning, and day 2 patching and updates.
- **Unified cloud experience.** To keep continuous development pipelines running at peak efficiencies, it's critical to ensure that developers have frictionless access to application code, infrastructure services, runtime environments, system tools, libraries, and registries. VCF includes an embedded, upstream-compliant Kubernetes runtime via vSphere Kubernetes Service (VKS), combined with a cloud consumption interface and a set of infrastructure and automation services, including infrastructure as code (IaC), software configuration management, and infrastructure pipelines.
- **Security and resilience.** VCF provides a consistent, secure platform with the ability to extend the security architecture even further with intrusion detection and recovery, addressing key challenges such as ransomware threats, disaster scenarios, and the need for advanced security architectures. This is critical for regulated industries and public sector organizations that must meet compliance standards for data privacy.

To benefit from the complementary nature of public cloud and on-premises environments, VMware has partnered with hyperscalers to integrate VCF into its clouds. Examples include:

- Amazon Elastic VMware Service
- Azure VMware Solution
- Google Cloud VMware Engine
- IBM Cloud for VMware Solutions
- Oracle Cloud VMware Solutions
- VMware Cloud on AWS

The integrated approach of running VCF both in the public cloud and on premises allows customers to protect existing investments in infrastructure and skills while benefiting from

increased flexibility and agility. In addition, the availability of vast partner ecosystems makes it easier to support the unified management of both traditional and modern applications.

VCF deployed in public cloud infrastructure supports a hybrid cloud strategy, as administrators control clusters in the public cloud and their on-premises datacenter with the same console.

In its early days, core use cases included datacenter backup, the creation of development and testing environments, and application migration in the interest of datacenter consolidation. Today, customers are also using it for datacenter extension use cases and to deliver on-demand workload bursting capacity as the needs arise.

These use cases persist today, yet more customers are now using VCF in the public cloud to create entirely new, cloud-native applications that leverage hyperscaler native cloud services for data management, machine learning and artificial intelligence, analytics, and many other areas.

VMware's attention to detail around developer needs is pragmatic. Developers have access to an array of APIs, Terraform IaC, PowerCLI, and other command line tools, along with many training labs and extensive documentation. By supporting a customer's DevOps activities, the benefits of VCF are relevant to both operations and development teams.

VCF customers can expect increased integration and alliance with VMware's Tanzu portfolio for container-based applications, which is already underway. VMware faces competition in containers from other vendors. Tanzu is the company's bid to maintain its dominance in virtualization while keeping that installed base in the fold as more enterprises adopt container-based workloads and develop more sophisticated DevOps workflows.

Finally, customers considering VCF in the public cloud should understand the full spectrum of opportunities they have for application modernization with the platform. It can serve as a pivot point, giving customers the best of both worlds: migrate and modernize an application now or migrate and maintain the application's state until the organization sees fit to refactor it.

VCF also gives customers multiple levels of reassurance when it comes to cluster resiliency. For clusters confined to a single availability zone, they can use vSphere High Availability for cluster monitoring, detecting when underlying infrastructure and guest OSs experience problems and restarting the virtual machines automatically.

For customers with even higher resiliency requirements, VMware gives them the ability to deploy what it calls "stretched clusters." This means they can continuously replicate cluster data to an additional availability zone, protecting against the most severe types of infrastructure failure.

Customers that use NSX for networking and security can also carry NSX's capabilities over to the public cloud environment, preserving existing configurations and policies. In all, VMware has ensured customers that choose to deploy on public cloud infrastructure will find it has parity to their on-premises environments, coupled with the additional benefits of scalability, elasticity, adjacent native cloud services, and other factors previously discussed in this paper.

Challenges/opportunities

When migrating to the public cloud, customers have the option of adopting the native infrastructure services provided by that cloud provider, including virtual machines, containers, and storage. However, this involves a learning curve that can slow down migration and modernization efforts.

An even bigger problem can be mapping application dependencies. This issue is exacerbated when deploying to multiple public clouds as each has its own set of APIs and management consoles.

Standardizing on VCF provides a consistent experience across on-premises environments and multiple clouds while leveraging existing skill sets. This is why IDC predicts that by 2025, 75% of organizations will favor technology partners that can provide a consistent application deployment experience across cloud, edge, and dedicated environments. A VCF-powered cloud can eliminate common migration challenges by accelerating project timelines.

Conclusion

Both enterprises and the public sector must prioritize application modernization. Failing to do so means being saddled with ageing and increasingly irrelevant assets that will cause them to lag behind competitors and serve customers less efficiently. The COVID-19 pandemic underscored the need for enterprises to be nimble in the face of adversity, and the cloud computing model proved the feasibility of rapid adaptation to such crises.

Meanwhile, the advent of cloud-native development means that organizations must move away from aging patterns such as waterfall and inject DevOps practices into Agile teams. Platforms such as VCF enable these changes.

IDC recommends the following essential guidance when embarking on an application and data modernization journey:

- Elevate the strategic importance of modernization to the organization as a whole, ensuring that the appropriate resources, schedule, and executive sponsorship are in place.
- Acknowledge that modernization is not just about new technology — it is also a shift in culture that may require new skills and training.
- Perform an inventory and audit of all existing applications to determine the appropriate level of modernization for each.
- Choose a cloud provider that supports a wide range of application frameworks and data management technologies, with flexibility in how those services are deployed in hybrid and multicloud environments.

About the IDC analyst

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Dave McCarthy leads IDC's cloud and infrastructure services global research subdomain with two primary focuses. The first is cloud infrastructure and its related adoption strategies: public, private, hybrid, multicloud, distributed, sovereign and edge. The second is infrastructure services: flexible consumption, deployment, support, and the circular economy. Benefiting both technology suppliers and IT decision makers, Dave's insights delve into ways in cloud and infrastructure services provide the foundation for both general purpose and AI workloads, enabling organizations to innovate faster, create new revenue streams, and achieve competitive advantages. His research is available via syndicated research programs (subscription services), data products (IDC Trackers) and custom engagements.

More about Dave McCarthy

Message from the sponsor

VMware offers organizations choices to build, deploy, and operate each application in the cloud environment (on-premises, industry/sovereign/regulated, or public cloud) that best meets the applications' requirements while providing operational consistency across all of the organization's clouds. Moreover, VMware customers have the flexibility to change their application placement decisions anytime through a license portability entitlement of their VMware Cloud Foundation license, and tools, APIs, and runtimes to pragmatically modernize their application estate over time based on the organizations' skills, timelines, and budgets.

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