White Paper

Embracing Private Cloud with VCF 9

Sponsored by: Broadcom

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April 2026

SITUATION OVERVIEW

Private clouds — what are they?

After decades of traditional IT, the strategies behind private clouds were built on the concepts and architecture derived from public clouds; the virtualization of compute, storage, and networking; and the emergence of converged and hyperconverged infrastructure. As a self-contained cloud computing environment designed for the exclusive use of a single organization, private clouds offer the benefits of public cloud computing, like on-demand elastic scalability, flexibility, and self-service, with the added advantage of high security and control over an organization's private data. This dedicated, private cloud infrastructure comes in various types, each tailored to specific organizational needs, economics, and deployment preferences:

- **Dedicated cloud infrastructure (DCI):** This is the most common type of private cloud where the infrastructure is owned by the organization and deployed within its own datacenter or colocation facility. In this scenario, the organization is responsible for managing and maintaining the infrastructure.
- **Dedicated cloud infrastructure as a service (DCIaaS):** This is a managed service type of private cloud where the infrastructure is provided and managed by a third party and deployed either in the service provider's datacenter or within an organization's datacenter or colocation facility. In this scenario, the organization is not responsible for managing and maintaining the infrastructure.

For organizations with the appropriate level of IT staffing and skill sets, going with dedicated cloud infrastructure in their own datacenter or colocation facility can be a good option as long as they can afford the up-front capital expenditures on servers, storage, and networking gear. Alternatively, managed service providers can deliver pay-as-you-go dedicated cloud infrastructure as a service.

April 2026, IDC #US54490126

Why are organizations implementing them?

Why would an organization want to keep apps and data on premises in their own private datacenters or colocation facilities when the larger trend over the past two decades has been to move workloads to the public cloud? Issues of data residency, government regulatory compliance, data + digital sovereignty, and the desire to train and fine-tune private AI models with private corporate data to derive insights through inference have resulted in organizations complementing their public cloud operations with private, dedicated cloud infrastructure. Private clouds enable organizations to place compute resources in close proximity to data sources and end users to meet performance and latency demands. For highly regulated industries, compliance is simplified by ensuring data never leaves designated jurisdictions and providing granular control over who can access information. Cost optimization is another driver, with private clouds providing more predictable operational costs for steady-state workloads compared with the variable pricing of public clouds.

When it comes to the growth of dedicated, private clouds, IDC revealed spending reached $9.3 billion in 3Q24, with a 47.6% year-over-year increase as published in IDC's Worldwide Quarterly Enterprise Infrastructure Tracker. This private, single-tenant infrastructure contrasts with the public, shared, multitenant infrastructure most associated with the hyperscale cloud providers. At the same time, these organizations want their private clouds to have the same scale-out, elastic performance as well as the same self-service, point-and-click ease of use they experience with public clouds when provisioning and managing resources. This level of simplicity is required since many organizations have lost the traditional IT skill sets that served them well prior to the emergence of public clouds. Converged and hyperconverged hardware combined with software stacks that mimic public cloud operations have made private clouds a viable reality for enterprises.

Common paths to unlock VMware Cloud Foundation 9 innovations

As a result of the Broadcom acquisition, many customers are undergoing a transition to fully realize the value derived from private cloud adoption with VMware Cloud Foundation 9 (VCF 9).

Current state

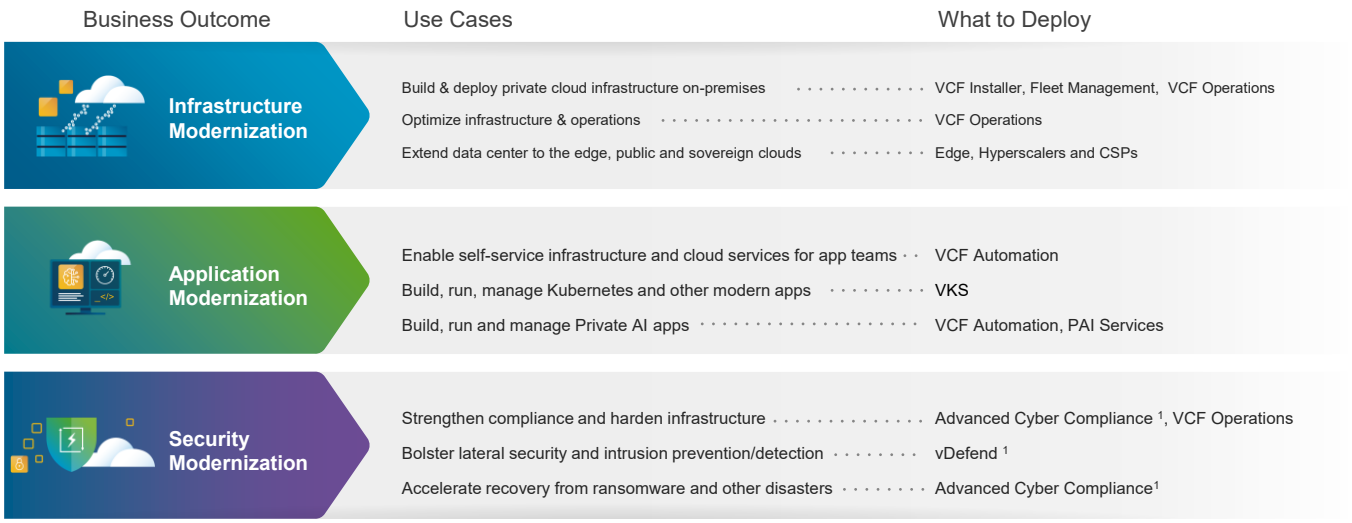
It's important to note that VCF 9 can meet customers wherever they are on their modernization journey. This starting point could include earlier versions of VCF or could also be the deployment of vSphere and any additional components such as NSX and vSAN. Of course, it could be a fresh greenfield deployment of VCF 9. Getting started typically involves a maturity and optimization assessment, a jumpstart to get things moving, and a variety of service offerings and learnings along the way.

There are common paths to unlocking VCF 9 innovation (see Figure 1):

- **Infrastructure modernization:**
  - **Build and deploy private cloud:** Customers can utilize the VCF Installer and VCF Operations to migrate existing environments or stand-up net-new infrastructure.
  - **Optimize infrastructure operations:** Customers can optimize performance, capacity, and utilization of deployed infrastructure to maximize efficiency and performance.
  - **Extend to edge, public, and sovereign cloud:** Customers can utilize edge and hybrid topologies to bring together remote sites, hyperscaler, cloud service provider (CSP), and sovereign cloud.
- **Application modernization:**
  - **Enable self-service infrastructure:** Customers can empower platform and developer teams to utilize cloud infrastructure services to remove friction and accelerate innovation with VCF Automation and Data Services Manager.
  - **Build, run, and manage modern apps:** Customers can deploy VM and container-based applications at scale with a compliant runtime and application development environment with vSphere Kubernetes Service (VKS).
  - **Deploy secure private AI environments:** VMware Private AI Foundation within the VCF platform delivers a complete environment designed to help organizations build, run, and customize GenAI models (LLMs, RAG) at scale.
- **Security modernization:**
  - **Strengthen compliance with hardened infrastructure:** Customers can utilize the built-in security operations (SecOps) dashboard for real-time monitoring of compliance requirements with VCF Operations.
  - **Bolster lateral security:** By adding vDefend to any VCF deployment, organizations can utilize distributed firewalls to provide a secure environment that utilizes intrusion detection and prevention to actively protect against cyberthreats.
  - **Accelerate cyber-recovery:** By adding the Advanced Cyber Compliance service to any VCF deployment, organizations can address any compliance challenge with a consolidated view of IT environmental health with integrated ransomware and disaster recovery capabilities.

FIGURE 1

Common paths to unlock VCF 9 innovation



[1] Advanced service for VCF; requires additional licensing

Source: Broadcom, 2026

Why upgrade individual components to VCF 9

From vSphere to VCF 9

Broadcom estimates moving to VCF 9 can reduce server costs by more than 40% by consolidating servers with NVMe tiering, consolidating VMs by using monster VMs, utilizing cost-effective servers with heterogeneous clusters, increasing GPU utilization via GPUaaS, and eliminating redundant K8s platforms by using VKS. Broadcom estimates operational efficiency gains of up to 77% can be realized by implementing fleet-level management with VCF Operations, performing upgrades without maintenance windows, and using a single platform for all your apps. Empower your developers with an IaaS self-service catalog; let them run all apps, including VMs, K8s, and private AI; eliminate tickets; and cut deployment waiting times from days to minutes.

From a practitioner's point of view, the move to VCF 9 delivers new features such as the ability to move AI/ML workloads with zero downtime as well as working with conformant Kubernetes. The boost in efficiency with VCF Operations provides fleet-level life-cycle management, live patching across multiple ESXi hosts, centralized certificate and password management, a built-in SecOps dashboard, and GPU as a service. The cloud operating model with VCF Automation gives practitioners a single platform for VMs, containers, and AI workloads. In addition, developers get a self-service catalog, and VPCs are integrated within vCenter.

From Aria Operations to VCF 9

Broadcom estimates operational gains of up to 77% can be realized via scalable fleet-level management instead of performing it manually at the component level. Centralized identity, certificate, password, and license management, along with fleet-level upgrades, and the ability to perform live patching of hosts results in fewer reboots and minimal downtime. Easier compliance enforcement is facilitated by the SecOps dashboard with configuration drift detection. Organizations gain public cloudlike usage, capacity, and granular control over cost management and chargebacks.

Practitioners get unified visibility across the entire stack through the unification of nine distinct tools to facilitate better capacity planning, app visibility, and faster troubleshooting. Simplified security and compliance ops are achieved through event auditing and a real-time view of user authentication, permissions, and security.

From vSphere + vSAN to VCF 9

With up to an 8x reduction in required hardware due to global deduplication, along with unified monitoring of all VCF storage types across sites, the storage TCO is reduced by up to 34%. App availability is improved via 1-minute versus 5-minute RPO and automated recovery of VMs is 92% faster. Infrastructure as a service is enabled for storage to provide volume services to multiple tenants.

Practitioners enjoy multisite visibility with the replacement of three separate consoles that speed up issue detection and resolution. A consistent storage operational model exists across on-premises, edge, as well as public and sovereign clouds, with the ability to implement policy-based sharing of storage resources with quotas and limits.

From NSX to VCF 9

Self-service networking and automation for app teams is enabled by VPCs integrated with vCenter and VCF Automation, creating isolation among tenants and allowing for the deployment of apps in minutes instead of weeks. Virtual networking is preinstalled, and network topology changes are not required. Agile operations include automated life-cycle management with simpler upgrades and patches.

Practitioners enjoy a faster time to value through easy deployments that eliminate complex, manual setups. The removal of complex routing and edge nodes for external services ensures effortless connectivity. A single NSX manager topology facilitates lightweight management. Tighter integration with VCF Operations makes VCF 9 easier to operate with simplified life-cycle management, efficient NSX upgrades, and faster troubleshooting and trend analysis.

From Aria Automation to VCF 9

Developer productivity is boosted through public cloudlike IaaS for compute, storage, networking, and databases. Governance and compliance are scaled through multi-tenancy with faster onboarding and isolated private clouds. Aria Automation serves as a single platform for all apps with a unified, self-service catalog and the ability to utilize GPUs as a service.

Practitioners benefit from an out-of-the-box, public cloudlike IaaS that facilitates the building, running, and management of AI, Kubernetes, and VM-based applications. A Content Hub manages and publishes resources to the self-service catalog with a single click. In the governance department, admins gain monitoring and management capabilities for tenant usage, cost, and resource consumption. The cost and complexity of maintaining a redundant Kubernetes platform is eliminated with the VKS runtime available out of the box. Extensible Kubernetes services, including the Harbor image registry, service mesh, and data services, are supported and easily integrated. Furthermore, the consumption of costly GPU resources can be monitored and managed.

CHALLENGES/OPPORTUNITIES

It's important to keep in mind that with all the benefits of a private cloud strategy, organizations often confront new complexities related to management, security, and integration between their private cloud infrastructure and their chosen public cloud vendor. The IT skill sets needed to manage private, dedicated cloud infrastructure in an organization's datacenter or colocation facility may have atrophied in the decades since point-and-click public clouds arrived on the scene. It's therefore important to choose a hyperconverged, private cloud stack that incorporates a public cloudlike user interface and APIs for management and operation.

Since most organizations that implement a private cloud will also maintain workloads in one or more public clouds, bringing hybrid cloud capabilities to life can be challenging. A lack of native or standard API-based workload integrations between private and public clouds can make it difficult to seamlessly move VMs, containers, or various PaaS-based workloads between them as required by business operations. Furthermore, network performance issues can negatively impact the movement of data and workloads across a hybrid cloud infrastructure. It's important to utilize dedicated, high-speed, low-latency, private circuits between those computing environments to mitigate this connectivity challenge.

Facing higher-than-normal interest rates or contending with cash flow limitations can impact an organization's ability to invest in various styles of cloud computing. Adverse economic environments have favored pay-as-you-go, consumption-based, OpEx business models utilized by public clouds while delaying CapEx investments in private and hybrid clouds.

Therefore, it's important to choose a private cloud vendor that supports flexible business models.

CONCLUSION

VMware Cloud Foundation 9 represents a transformative approach to private cloud infrastructure, addressing the evolving needs of modern enterprises seeking to balance the agility of public clouds with the control and security of on-premises environments. As organizations navigate an increasingly complex landscape of data sovereignty requirements, regulatory compliance mandates, and AI-driven workload demands, VCF 9 emerges as a comprehensive solution that bridges traditional IT operations with public cloud capabilities.

The flexibility of VCF 9's deployment pathways ensures that organizations can modernize at their own pace, whether they are upgrading from existing vSphere environments, consolidating disparate management tools, or building greenfield infrastructure from scratch. By providing multiple entry points based on infrastructure, application, or security modernization priorities, VCF 9 meets customers wherever they are in their cloud journey. This adaptability extends across deployment models, from dedicated cloud infrastructure managed in-house to cloud infrastructure as a service delivered by partners, enabling organizations to align their technology investments with their operational capabilities and financial models.

The compelling economics of VCF 9 deliver substantial value across multiple dimensions. Organizations can achieve up to 77% operational efficiency gains through unified fleet management and automated life-cycle operations while reducing infrastructure costs by more than 40% through intelligent resource consolidation and heterogeneous cluster support. The platform's ability to eliminate redundant systems, consolidate management tools, and optimize resource utilization translates directly to improved total cost of ownership. Beyond cost savings, VCF 9 dramatically accelerates time to value by reducing application deployment cycles from weeks to minutes and empowering developers with self-service capabilities that eliminate traditional bottlenecks.

For IT practitioners, VCF 9 simplifies what has historically been a fragmented operational landscape. The unification of previously disparate management tools into cohesive operations platforms reduces cognitive overhead and streamlines day-to-day administration. Features such as live patching, centralized identity and certificate management, and automated compliance monitoring transform security and maintenance from labor-intensive tasks into policy-driven workflows. Meanwhile, developers gain access to public cloudlike experiences with self-service catalogs, integrated virtual private clouds, and native support for diverse workload types, including virtual machines, Kubernetes containers, and private AI applications.

The transition to VMware Cloud Foundation 9 is not merely a technology upgrade but a strategic investment in infrastructure modernization that aligns IT capabilities with business objectives. By delivering the operational simplicity and elastic scalability of public clouds while maintaining the governance, security, and performance control that enterprises demand, VCF 9 enables organizations to confidently navigate their digital transformation journeys. Whether the priority is reducing operational complexity, accelerating application delivery, strengthening security posture, or preparing for AI-driven workloads, VCF 9 provides a proven, integrated platform that transforms private cloud infrastructure from a constraint into a competitive advantage.

MESSAGE FROM THE SPONSOR

VMware Cloud Foundation (VCF) is a modern private-cloud platform that combines the scale and agility of public cloud with security and performance of on-premises infrastructure, delivering increased productivity and lower TCO. Modernize infrastructure with integrated, software-defined compute, networking, storage, management, and security across all cloud endpoints. With automated infrastructure and intelligent operations, organizations can optimize performance, lower costs and reduce operational overhead. VCF 9 enables organizations to accelerate innovation with a unified consumption experience that delivers a modern cloud interface to run VMs, containers and AI workloads. With built-in security and resiliency, VCF 9 ensures business continuity, and frees up teams to focus on innovation while automatically addressing potential security threats.

ABOUT IDC

International Data Corporation (IDC) is the premier global market intelligence, data, and events provider for the information technology, telecommunications, and consumer technology markets. With more than 1,300 analysts worldwide, IDC offers global, regional, and local expertise on technology and industry opportunities and trends in over 110 countries. IDC's analysis and insight help IT professionals, business executives, and the investment community make fact-based technology decisions and achieve their key business objectives.

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