

VMware vSphere Kubernetes Service

Accelerate Modern App deployment at scale with tighter security and lower TCO

Solution Overview

VKS is the CNCF-certified Kubernetes runtime built directly into VCF, to run all apps. VKS is among the first platforms certified under the new CNCF Kubernetes AI Conformance Program. VKS enables platform engineers to easily deploy, manage and scale Kubernetes clusters while leveraging a comprehensive set of cloud services included in VCF, as well as all CNCF-conformant third-party services.

Organizations seek a consistent, secure, and efficient way to run modern containerized applications as well as traditional applications that use virtual machines. With the industry experiencing a shift toward cloud-native technologies, Kubernetes is playing a pivotal role in this transition. According to the latest State of Platform Engineering Report¹, 64% of platform engineers identify Kubernetes as a primary focus area for achieving automated, reliable, and standardized application deployment.

VMware Cloud Foundation (VCF) delivers exactly what they look for: a unified platform that integrates compute, storage, networking, and security with built-in automation and lifecycle management. VCF helps organizations eliminate silos, reduce TCO, streamline management, and accelerate their modernization journey.

Organizations looking to modernize their workloads are often faced with a few key challenges:

1. Infrastructure Silos and Multiple Operating Models

Many organizations have fragmented and disconnected infrastructure environments driven by rapid business growth, shifting organizational needs, mergers, and acquisitions. Kubernetes often compounds this complexity when compute, storage, and networking are managed in separate silos, creating inconsistent operations and significant management friction.

2. Disparate Components Slowing Time to Market

While Kubernetes is incredibly powerful and a standard for modern infrastructure, it is also inherently complex. Kubernetes requires integration with dozens of separate tools to achieve enterprise-grade security, compliance, lifecycle management, and consistent operations at scale. Enterprises are responsible for integrating and operating a complex ecosystem securely and consistently. This is where many enterprises struggle, leading to increased operational overhead, risk, and slower time to value.

3. Skill Gaps in Modern IT

While Kubernetes is now the backbone of modern IT, the steep learning curve often leaves organizations struggling to upskill their teams. This expertise gap can trigger a cascade of issues ranging from longer deployment cycles to poor performance with heightened operational risk.

1. State of Platform Engineering: Report 4, December 2025:
<https://platformengineering.org/reports/state-of-platform-engineering-volume-4>

“According to the report from IDC 85% of containers are projected to run within VMs by 2028, driven by increasing demands for security and scalability².”

4. Outdated Infrastructure Services

Traditional IT infrastructure often acts as a bottleneck for platform teams, lacking the speed, agility, and automation required for rapid iteration. Consequently, platform engineers operating in Kubernetes environments are frequently constrained by rigid infrastructure that stifles the velocity of application deployment.

5. Security and Compliance

Organizations are increasingly caught between the need for rapid deployment and the stringent requirements of Security and Compliance. As infrastructure scales, managing sensitive credentials across fragmented environments becomes a major liability, often leading to a broadened attack surface and unauthorized access risks. Furthermore, navigating global regulatory frameworks with a patchwork of manual processes becomes challenging to sustain, leaving the organization vulnerable to both sophisticated cyberattacks and costly regulatory penalties.

Solution Description

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Cloud admins benefit from policies, governance and control, flexibility of upgrades, enterprise grade security, and simplified lifecycle management for easier modern apps adoption.

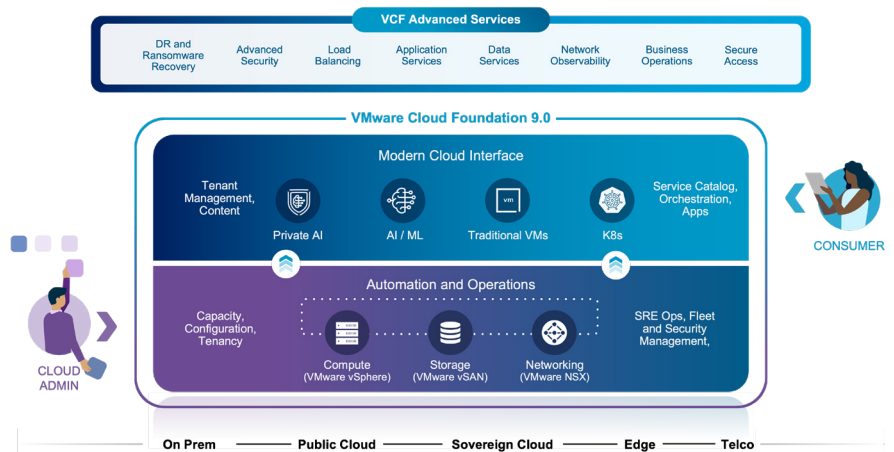


Figure 1: VMware Cloud Foundation

2. IDC Whitepaper on convergence of Containers and VMs in Modern IT Infrastructure: <https://www.vmware.com/docs/vmw-idc-containers-vms-modern-it-infrastructure-white-paper>



Loomis, a global leader in cash-handling products and services:

“We are moving more and more workloads on Kubernetes environments. It’s like a revolution where we migrate legacy solutions to a modern platform.”

Jean-Michel Blanc,
Ground Head of System Engineering,
Loomis

The Modern Cloud Interface facilitates the operation of services such as orchestration, applications, and service catalogs through an automated system. This means a more streamlined operational experience for both cloud admins and platform engineers.

Cloud admins can establish policies with the governance and controls they need. These policies enable platform engineers with self-service access to deploy and manage both virtual machines and Kubernetes clusters

Platform engineers can also define their virtual machine configuration in a manifest and deploy it using the same API patterns as they would use to deploy Kubernetes clusters.

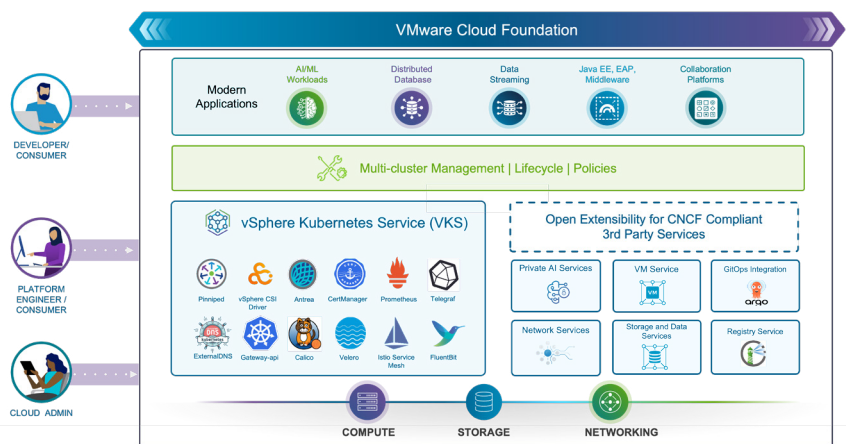


Figure 2: VKS offers comprehensive set of cloud services along with all conformant third-party services

Cloud admins can extend the service offering with a set of comprehensive cloud services required by Platform engineers to deploy their workloads. Let’s explore the key features that establish VKS as the preferred Kubernetes service for modern workloads running on VCF, the industry-leading private cloud platform for all enterprise applications:

- **Unified API to provision and manage both VMs and containers:** A consistent API that allows users to create, deploy, and manage both VMs and Kubernetes clusters. This simplifies automation, reduces integration challenges, and ensures uniform policies and security controls across all workloads. With a unified API, VCF allows platform engineers to interact with infrastructure resources in a consistent manner, eliminates the need for separate tooling, and lowers training costs.
- **Self-service access to cloud services with governance:** Through a role-based access model, Platform engineers can leverage self-service capabilities to provision infrastructure resources and rich cloud services, such as VM Service, Network Services, and Image Registry, on demand, while cloud admins maintain governance and control through policies and resource quotas. Self-service access also supports multi-tenancy with isolated environments for different teams and projects.



“We have to modernize our data center infrastructure. VMware Cloud Foundation allows us to build a flexible and scalable private cloud infrastructure that helps with our operational needs. And it complies with regulatory standards.”

Christian Böke,
Project Management Lead,
Ratiodata

- **Multi-modal access with declarative API, CLI, and UI:** VCF offers cloud admins and platform engineers with a range of flexible interfaces that align with their preferred choice for workflows. VCF provides a consistent operational experience and standardized way to manage resources whether it's Graphical User Interface (GUI) for visual management, the powerful Command Line Interface (CLI) for scripting and automation, or the robust APIs for integration with external tools and CI/CD pipelines. By leveraging existing expertise, teams maintain high productivity and operational efficiency without the friction of learning entirely new toolsets.
- **Operational agility with Multiple Clusters per Zone and Custom Zones:** With VCF multiple clusters can be deployed in each zone enabling cloud admins to replace, retire, or upgrade hardware without impacting application availability or disrupting the desired state. VCF also brings intelligent node pool placement defaults to accelerate deployment cycles while eliminating the risk of placement failures and the operational burden of debugging complex configuration errors. VCF also supports independent workload zones, enabling cloud admins to align resources with application needs. Supporting both single and multi-zone configurations, this flexibility simplifies high availability and disaster recovery. By creating specialized zones, such as dedicated GPU clusters for AI, organizations can achieve granular control, optimized utilization, and the agility to support diverse, high-performance deployments at scale.
- **Efficient Cluster scaling:** VKS can scale to support 500 clusters in a single control plane, ensuring seamless expansion within the management domain. Organizations can achieve better isolation, a reduced blast radius, and customized cluster configurations offering greater flexibility for large-scale Kubernetes deployments. VKS supports autoscaling, automatically adjusting the number of service instances based on real-time resource metrics like CPU and memory usage. VKS clusters deploy rapidly in minutes and scale dynamically from zero to peak capacity, and back to zero when idle, maximizing resource efficiency, accelerating deployments, and slashing infrastructure costs.
- **Multi-Cluster management at scale:** With VKS multi-cluster management platform engineers get visibility and control over the entire cluster fleet without sacrificing the simplicity and operational consistency required at scale. VKS multi-cluster management provides industry leading capabilities including RBAC and policy management, cluster inspections, data protection, package management, and continuous delivery. Leveraging VCF Automation, organizations can automate the manual toil using fleet-wide multi-cluster management with visibility into cluster health, utilization, and Kubernetes version details. Organizations can enforce consistent security and compliance policies implemented using Open Policy Agent (OPA) Gatekeeper. VKS ensures resilience with integrated data protection to easily backup and restore clusters, namespaces, and groups of resources. Add-on management simplifies lifecycle tasks for core and user-managed packages.
- **Distributed application security with Istio service mesh:** While the shift to microservices has enabled greater architectural flexibility, it has also introduced significant operational complexity. Specifically, managing secure and reliable connectivity between these distributed components has become a primary challenge Istio Service Mesh provides traffic management, security, and observability features, making it easier to deploy, manage, and secure microservices at scale. Istio Service Mesh is integrated with VCF to simplify service-to-service communication in modern applications. This

integration simplifies Kubernetes operations with visibility, governance, and control, and enhances end-to-end security and observability for distributed applications.

- **Broadcom-built ArgoCD Operator:** Purposefully designed for VCF, the ArgoCD operator seamlessly integrates GitOps workflows into the platform. This enables platform teams to manage Kubernetes clusters, virtual machines, and vSphere Pods through a single, version-controlled, and declarative deployment model. Once deployed by cloud admins, platform engineers can provision self-service ArgoCD instances scoped to specific vSphere Namespaces. This ensures that while engineers have the autonomy they need, the lifecycle, access control, and resource governance remain centrally managed. By leveraging Git as the single source of truth, the ArgoCD operator enables unified, auditable, and consistent delivery across both traditional and cloud-native workloads.
- **Robust security and resiliency:** VCF provides built-in fault tolerance, high availability, and six levels of workload isolation from data center to the application namespace, ensuring that the infrastructure remains secure, resilient, and compliant. VKS takes advantage of enterprise-grade security in VCF with features like end-to-end encryption (at rest and in transit), role-based access control, integrated security dashboards, and distributed firewalls. VCF delivers a consistent and streamlined secret injection workflow that helps strengthen security, improves auditability, and ensures secrets are managed consistently across all workloads. VKS supports encryption classes for workload clusters and granular policies to access secrets offering better control of encryption keys and meeting internal and external regulatory encryption requirements. With VKS organizations achieve better security hardening with declarative orchestration for AppArmor by establishing uniform security baseline and preventing both known and unknown application flaws from being exploited at the operating system level. Option to enable FIPS mode at the OS level further strengthens security by ensuring only FIPS-approved cryptographic modules are used within the operating system.

Key Benefits

VCF enables platform teams to leverage self-service experience with VKS and deploy modern workloads with the following benefits:

- **Unified platform for managing VMs and Containers:** VCF enables unified management of traditional and modern workloads through consistent API, simplifying operations, and reducing the need for separate platforms. This helps organizations leverage their skillset to deploy all workloads without fragmenting the IT teams. With centralized policy management, consistent lifecycle, and infrastructure abstraction organizations achieve a seamless operational experience across traditional and modern workloads.
- **Simplified Kubernetes operations using existing skillset:** VCF provides a robust set of consistent APIs across all building-block services including AI to create, deploy, and manage both VMs and Kubernetes clusters. This simplifies automation, reduces integration challenges, and ensures uniform policies and security controls across all workloads. Platform engineers interact with compute resources in a consistent manner, eliminating the need for separate tooling, lowers training costs, and addressing skillset gaps.

- **Multi-Cluster lifecycle management, policy, and backup at scale:** Using VCF Automation platform engineers get visibility and control over the entire cluster fleets without sacrificing the simplicity and operational consistency required at scale. Platform engineers can automate lifecycle management of VKS packages, enforce security and compliance policies, and eliminate configuration drift.
- **CNCF certified Kubernetes runtime:** VKS empowers organizations to capitalize on the latest open-source innovations by deploying a CNCF-certified Kubernetes distribution. This ensures full compatibility with the broader cloud-native ecosystem, providing upstream concurrency that prevents vendor lock-in. Platform engineers can run all modern applications on VKS and easily migrate existing workloads on other certified Kubernetes environments. The latest VKS 3.6 release adds support for VKr version 1.35.
- **CNCF certified Kubernetes AI Conformant platform:** VKS is among the first platforms certified under the new CNCF Kubernetes AI Conformance Program. VKS provides a standardized way to validate behavior of AI and machine learning workloads including accelerator usage, scheduling patterns, and reproducibility. Platform teams can offer a consistent and standardized AI platform that supports innovation, portability, and performance while adhering to the governance, privacy, and sovereignty constraints. Data Scientists can move faster from development to production.
- **Multiple Kubernetes versions supported for upgrade flexibility:** VKS ensures compatibility across three Kubernetes versions at any given time that allows different enterprise teams to run the version their apps need and have the control and flexibility to upgrade at their own pace. VKS supports three vSphere Kubernetes release (VKr) versions.
- **LTS for Kubernetes minor releases:** Stable deployments with 24 months support for every vSphere Kubernetes release minor version, including patches for quantified critical security vulnerabilities. With long term support enterprises can plan upgrades aligned with business priorities.
- **Seamless CI/CD pipeline and tooling alignment:** VCF and VKS align with an organization's Continuous Delivery (CD) pipeline integrating with the broader ecosystem of platform engineering tools like ArgoCD, Harbor, and Helm among others. Ecosystem collaboration with partners in networking, security, and API management further reduces the need for costly re-tooling. Broader autonomy for platform engineers with choice of OS and CNI add-ons.
- **Security and Compliance:** Organizations can run sensitive and regulated workloads on a secure, compliant platform that meets data residency and data sovereignty requirements. VKS simplifies the deployment of Kubernetes clusters, providing enhanced security for application data in isolated regions with flexible security postures at the cluster level. VKS leverages the six layers of fault and threat isolation to enhance security and significantly reduces the attack surface.
- **Lower Total Cost of Ownership:** By enabling higher VM density per host, advanced memory management, and disaggregated vSAN storage with features like deduplication and compression, VCF drives better resource utilization and infrastructure efficiency. Organizations also reduce costs by lowering licensing fees and maximizing the value of existing hardware.

Ready to take the next step?

Explore VMware Cloud Foundation resources, hands-on labs, and technical guides to start your journey today:

- Learn more about VKS at [vSphere Kubernetes Service website](#) and [VCF Blog page](#)
- Explore the [Forrester webinar](#) and [blog](#)
- Check out the [VKS Infographic](#)
- Access to technical resources at [VCF Resource Center](#)
- Follow us on VCF social media: [X](#), [LinkedIn](#), and [YouTube](#)

Conclusion

VMware Cloud Foundation is a single platform with built-in Kubernetes runtime that enables enterprises to run modern applications alongside virtual machines. It simplifies deployment, integrates infrastructure components, automates lifecycle management, and ensures security and scalability. As a result, VMware Cloud Foundation reduces TCO and complexity while delivering high performance with consistency.