VMware Cloud Foundation

The Unified Platform to Run All Workloads

Solution Overview

VMware Cloud Foundation (VCF) offers a single platform with built-in Kubernetes runtime that orchestrates Kubernetes management, enabling enterprises to run modern applications alongside traditional workloads, and includes an upstream conformant certified Kubernetes distribution. With the vSphere Supervisor, VCF provides the users self-service access to a comprehensive set of cloud services. This includes VMware vSphere Kubernetes Service (VKS), which simplifies Kubernetes management and allows organizations to modernize applications at their own pace while maintaining operational consistency.

Enterprises today are running a mix of applications, leveraging both virtual machines and containers to meet their evolving infrastructure needs. Kubernetes has emerged as the leading solution for diverse workloads with offering seamless management across both virtual machines and containers.

The industry is experiencing a shift toward cloud-native technologies, with Kubernetes playing a pivotal role in this transition. According to the Spectro Cloud- State of Production Kubernetes 2024 Report, 75% of surveyed organizations are committed to adopting Kubernetes for future infrastructure needs. Additionally, 85% of respondents expressed the need for a unified API that can provision both virtual machines and containers[1]. This highlights the growing demand for integrated platforms that simplify modern application management.

When organizations are looking to modernize their infrastructure, they are often faced with a few key challenges:

1. Infrastructure Silos and Multiple Operating Models

Many organizations have ended up with fragmented and disconnected infrastructure environments due to mergers and acquisition. When infrastructure resources like compute, storage, and networking are managed in separate silos, managing Kubernetes clusters becomes more complex. This isolation leads to inconsistent management practices and operational inefficiencies.

2. Disparate Components Slowing Time to Market

Different Kubernetes distributions and third-party services require specialized knowledge or configuration, leading to delays in deployment and hindering the rollout of new features. Consequently, organizations face higher costs, slower innovation, and a diminished competitive edge.

3. Skill Gaps in Modern IT

Kubernetes has rapidly become the cornerstone of modern IT infrastructure, yet many organizations struggle to upskill their workforce to effectively manage these environments. Without the necessary Kubernetes expertise, organizations

1. The Spectro Cloud 2024 State of Production Kubernetes

may experience poor performance, longer development cycles, and increased operational risks.

4. Outdated Infrastructure Services

Traditional IT infrastructure services often fail to meet the needs of platform teams which require fast, agile workflows and automation to support rapid iteration. As a result, consumers working in Kubernetes environments face rigid infrastructure limitations that hinder the speed of application development.

Solution Description

VMware Cloud Foundation (VCF) delivers a single platform with built-in certified Kubernetes runtime, vSphere Kubernetes Service (VKS), that simplifies Kubernetes deployment and management, enabling enterprises to run modern applications alongside traditional workloads.

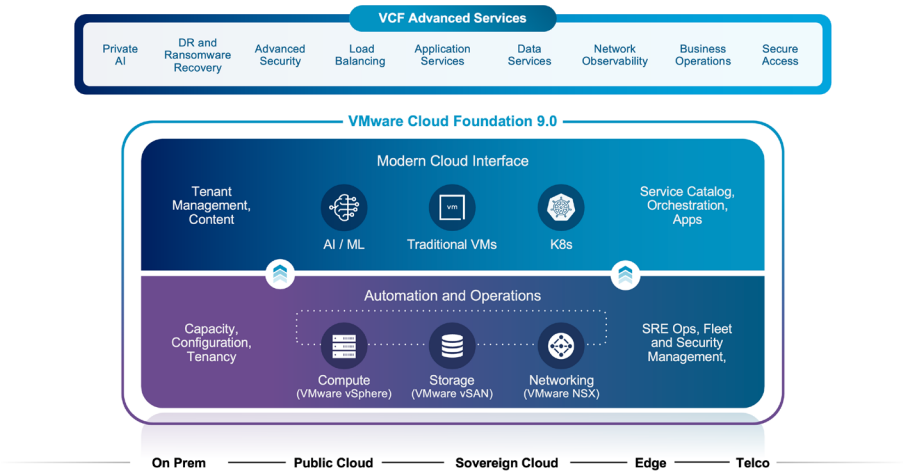

Figure 1: VMware Cloud Foundation.

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.

VMware Cloud Foundation Delivers

- Single Platform with fully integrated stacks for VMs and containers
- Consistent management tools, minimizing the learning curve
- Enterprise-grad security with end-to-end encryption
- Lower total cost of ownership
- Simplified Kubernetes deployment and management with scalability

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. The desired state of the virtual machines is then managed by the vSphere Supervisor.

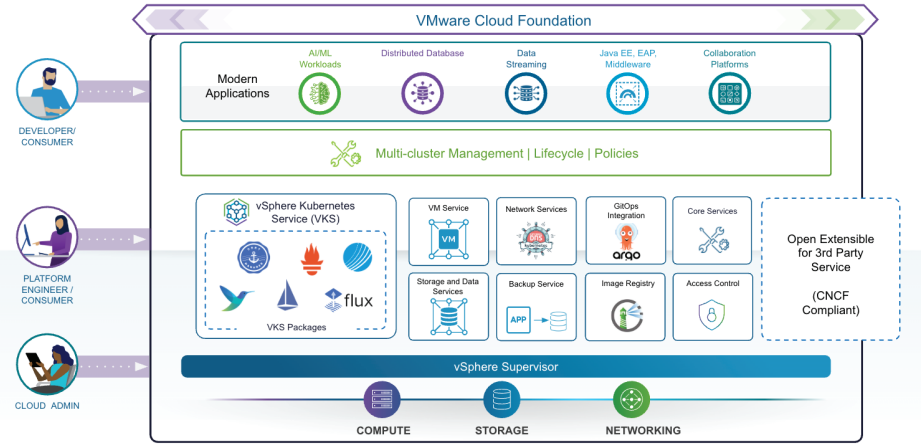

Figure 2: VMware Cloud Foundation with Applications and Services

With vSphere Supervisor, Cloud Admins can extend the service offering with a set of comprehensive cloud services required by consumers for their workloads. Now let's explore the key features that make VCF the best platform for all workloads:

- **Unified API to provision and manage both VMs and containers:** A consistent API 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, it allows Platform Engineers to interact with compute resources in a consistent manner, eliminate the need for separate tooling, and lower 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 in vSphere Supervisor, 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.
- **Embedded declarative API, CLI, and UI access with vSphere Supervisor**: VCF empowers Cloud Admins and Platform Engineers by offering a range of flexible interfaces that align with their preferred workflows. 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, VCF ensures that teams can be efficient and productive, instead of having to learn new toolsets.

- **Independently Upgradable vSphere Supervisor:** The vSphere Supervisor is now a separate component that can be updated asynchronously within vCenter. This allows customers to access newer supervisor versions more quickly, reducing operational complexity and improving flexibility.
- **Custom zones to optimize resources allocation:** VCF 9.0 introduces enhanced flexibility through workload zones, enabling Cloud Admins to define and manage workload zones independently to better align infrastructure resources with workload needs. vSphere Namespaces support both single-zone and multi-zone configurations, making it easier to accommodate varied high availability requirements and disaster recovery scenarios. Cloud Admins can also extend private cloud infrastructure by adding specialized zones, such as dedicating resources for GPU-intensive workloads, offering greater control, optimized resource utilization, and improved agility for diverse deployments.
- **Service autoscaling up from zero and down to zero:** VKS now supports autoscaling, automatically adjusting the number of service instances based on real-time resource metrics like CPU and memory usage. With vSphere Kubernetes release (VKr) 1.31 and later, clusters can scale up from zero worker nodes and down to zero when not in use, improving resource efficiency and reducing costs.
- **Integrated VKS Cluster Management and Istio Service Mesh:** VKS Cluster Management (previously known as Tanzu Mission Control) and Service Mesh are now part of VCF. VKS Cluster Management provides industry leading capabilities including RBAC and policy management, cluster inspections, data protection, package management, and continuous delivery. Service Mesh is an enterprise-class service mesh solution that provides reliable control and security for microservices, users, and data across all clusters. With the integration of both tools, it completes VCF with unified Kubernetes operations with visibility, governance, and control, and further enhances end-to-end security and observability for distributed applications.

Key Benefits:

Once VMware Cloud Foundation is installed, the Cloud Admins and Platform Engineers can leverage a self-service private cloud platform that supports modern use cases quickly with the following benefits:

- Improve the automation of the IT infrastructure and incorporate existing, established governance policies and management tools are needed to manage both virtual machines and container-based workloads in a consistent manner. With this unified platform, it reduces complexity and ensures smooth integration of modern and traditional applications.
- Deploy the CNCF Certified upstream Kubernetes distribution across your private cloud with VCF. With the latest VKS 3.4 release, it adds compatibility for VKr version 1.33
- VCF simplifies Kubernetes operations by providing built-in, certified Kubernetes runtime with easy deployment and lifecycle management. It enables rapid scaling, clusters can scale up or down in minutes, even from or to zero nodes, helping organizations meet dynamic workload demands with speed and flexibility.

- Run your sensitive and regulated workloads on a secure, compliant platform that meets data residency and data sovereignty requirements. VKS simplifies the deployment of self-contained Kubernetes environments, providing enhanced security for application data in isolated regions with flexible security postures at the cluster level.
- A new 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.
- Offer patches for qualified critical security vulnerabilities. The extended support will be provided for an additional 12 months for vSphere Kubernetes release 1.33 and subsequent odd-numbered minor versions (1.35, 1.37, etc.). Extended support gives Cloud Admins additional time and flexibility to plan Kubernetes upgrades
- 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.

Conclusion

VMware Cloud Foundation is a single platform with built-in Kubernetes runtime that enables enterprises to run VMs and containers. 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.

Ready to take the next step?

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

- Learn more at VCF website and VCF Blog page
- Explore the Forrester webinar and blog
- Check out the Kubernetes on VCF Infographic
- Access to technical resources at VCF Resource Center
- Follow us on VCF social media: X, Linkedin, and Youtube