Shape Blue

Evaluating VMware Alternatives

Key Factors to Compare

When evaluating VMware alternatives, it's important to focus on **several critical dimensions that directly impact an organisation's infrastructure strategy**. These factors provide a **framework for comparing platforms** like Apache CloudStack, OpenStack, Proxmox, and Nutanix to determine their suitability for various use cases. Below are the key considerations:

Licensing Models

The licensing approach significantly affects costs, flexibility, and vendor lock-in. VMware operates under a proprietary licensing model, often associated with **high costs and restrictive terms**. In contrast:

VMware operates under a **proprietary licensing model**, often associated with **high costs and restrictive terms**. Licensing is typically based on per-core pricing, with additional costs for advanced features such as NSX (networking) and vSAN (storage), which are available only through VMware Cloud Foundation and vSphere Foundation bundles. VMware's complex pricing structure and frequent changes to licensing policies—especially following its acquisition by Broadcom—have introduced uncertainties for customers. This model ties organisations closely to VMware for updates, support, and feature enhancements, increasing the risk of vendor lock-in.

Apache CloudStack is a **fully open-source platform** licensed under the Apache 2.0 license, offering significant flexibility and freedom from vendor lock-in. This allows organisations to use, modify, and distribute the software **without incurring licensing fees**. CloudStack's open-source nature makes it an attractive option for businesses looking for a customisable solution that can integrate seamlessly into existing infrastructures.

OpenStack is a fully open-source platform. Its modular design allows organisations to deploy only the components they need (e.g., Nova for compute, Cinder for storage, or Neutron for networking). While the open-source model eliminates licensing fees, **OpenStack's complexity often necessitates hiring skilled engineers or partnering with vendors that provide managed distributions** (e.g., Red Hat OpenStack Platform or Canonical OpenStack). Using a distribution not directly associated with these vendors can make upgrades and maintenance significantly more challenging, as the platform's dependencies and configurations require deep expertise. Despite this complexity, OpenStack's flexibility and scalability make it a preferred choice for enterprises, telcos, and organisations managing large-scale workloads.

Proxmox Virtual Environment (PVE) operates under the GPLv3 license, providing a fully open-source solution with all core features available for free. However, **access to the enterprise-grade repository, which offers rigorously tested updates, requires a paid subscription**. This subscription also includes professional support, making it a valuable option for businesses seeking stability and reliability. Users without a subscription rely on the community repository, which may introduce less stable updates. Proxmox's hybrid licensing model balances cost-effectiveness with optional premium features, making it a popular choice for SMBs, labs, and development environments.

OpenNebula is an open-source platform licensed under the Apache 2.0 license, offering a simple yet robust framework for virtualisation and cloud orchestration. It supports a **hybrid licensing model where the core is free, but additional enterprise features and support require a subscription**. This makes OpenNebula cost-effective for small to medium businesses while providing scalability for larger deployments through its enterprise features.

Nutanix operates under a **proprietary, subscription-based licensing model** with tiered options (Starter, Pro, Ultimate) offering incremental features. While this model simplifies access to advanced capabilities, it creates a reliance on vendor-controlled updates and support, introducing a significant risk of vendor lock-in, similar to concerns associated with VMware. This dependency can lead to higher long-term costs, especially for organisations looking to scale their infrastructure. For businesses prioritising financial predictability, scalability, and open-source flexibility, Nutanix's proprietary approach may not fully align with their long-term strategic goals.

Technical Capabilities

Core Virtualisation

VMware offers industry-leading virtualisation through ESXi, with extensive features such as high availability (HA), live migration (vMotion), and fault tolerance. It also provides robust support for nested virtualisation and resource scheduling.

Apache CloudStack focuses on managing virtualisation environments and extends the existing features of supported hypervisors like KVM, VMware, and XenServer. By adding advanced orchestration, multi-tenancy, and API-driven management, CloudStack enhances the capabilities of the underlying hypervisors. This makes it a strong option for organisations building cloud infrastructure, especially those seeking features such as advanced networking, resource scheduling, and seamless integration with storage and Kubernetes.

OpenStack provides a modular framework for computing (Nova), networking (Neutron), and storage (Cinder). While OpenStack is designed to support multiple hypervisors, popular distributions like Red Hat OpenStack Platform and Canonical OpenStack focus exclusively on KVM, limiting multi-hypervisor capabilities in these implementations. Organisations using the OpenStack community version or other distributions can enable additional hypervisors, such as VMware vSphere, Hyper-V, Xen, and XenServer, but this often requires custom configurations, lacks official support, and offers no guarantees of seamless integration. OpenStack's flexibility and scalability make it particularly well-suited for large deployments in environments standardised on KVM.

Proxmox is designed as an alternative to VMware vSphere, focusing on on-premises server infrastructure rather than cloud environments. It integrates KVM for virtualisation and provides enterprise-grade features such as high-availability clustering, software-defined storage, and centralised management through a unified web interface.

OpenNebula is designed for simplicity, focusing on managing private, hybrid, and edge cloud environments. It supports multiple hypervisors, including KVM, VMware vSphere, and LXC containers, offering flexibility for diverse infrastructures. While it lacks the advanced orchestration features of some other platforms, its straightforward architecture and lightweight nature make it easy to deploy and manage.

Nutanix uses AHV (Acropolis Hypervisor), a purpose-built hypervisor integrated into its hyper-converged infrastructure. While not as feature-rich as VMware, AHV is optimised for simplicity and performance in Nutanix environments.

Networking

VMware offers advanced networking capabilities through NSX, including micro-segmentation, network virtualisation, and software-defined networking (SDN). Additionally, VMware supports VLANs natively within its virtual switches (vSS and vDS), providing robust Layer 2 network segmentation even without NSX. These features are critical for enterprises with complex network requirements, enabling efficient traffic isolation and advanced network configurations.

Apache CloudStack provides robust networking features, including isolated networks and VPC configurations, with support for traffic isolation using VLANs, VXLANs, and SDN technologies. It also supports Security Groups for instance-level traffic control. Additionally, CloudStack integrates with Open vSwitch (OVS) for network virtualisation and supports software-defined networking (SDN) solutions such as OpenSDN/Tungsten Fabric and Netris when using the KVM hypervisor, and NSX-T when using VMware, enabling advanced network isolation and management. These features make CloudStack a flexible and powerful platform for managing diverse and complex network architectures.

OpenStack offers highly flexible networking capabilities through Neutron, providing support for dynamic network configurations and software-defined networking (SDN). Neutron integrates with various technologies, such as Open vSwitch (OVS), OVN, Juniper Contrail, Cisco ACI, Tungsten Fabric, and Calico, enabling advanced services. This versatility allows organisations to tailor their network infrastructure to specific requirements.

Proxmox offers flexible yet straightforward networking capabilities, including VLANs (802.1q) support, Linux bridges for virtual machine connectivity, and network bonding for redundancy and improved throughput. Additionally, Proxmox provides a built-in Software Defined Networking (SDN) feature for creating virtual networks at the data centre level, enhancing its capabilities for more complex setups. These features make it suitable for small to medium-scale environments.

OpenNebula provides basic but effective networking capabilities, including support for VLANs, VXLANs, and hybrid cloud networking. Its OpenNebula Flow feature enables simplified software-defined networking (SDN) configurations for dynamic and scalable networking environments. However, its networking options may not match the depth offered by other platforms.

Nutanix prioritises simplicity with built-in networking capabilities designed to complement its hyper-converged infrastructure (HCI). Leveraging Open vSwitch (OVS) and support for VLAN tagging, it provides efficient traffic management and network segmentation for most workloads. However, its networking features may lack the advanced customisation and depth required for highly complex enterprise environments.

Storage Integration

VMware provides robust storage solutions with vSAN for hyper-converged infrastructure, offering advanced features like deduplication, compression, replication, and tiering. It also supports traditional storage options like NFS and iSCSI, though these lack the advanced capabilities of vSAN. VMware's integration within its ecosystem ensures seamless management and high performance for enterprise workloads.

CloudStack supports industry-standard storage protocols compatible with its underlying hypervisors, providing seamless integration with diverse storage backends. It is also integrated with Software-Defined Storage (SDS) solutions such as Ceph, StorPool, and Linbit, enabling advanced storage features like replication, scaling, and high availability. This flexibility empowers organisations to design cost-effective, scalable storage infrastructures tailored to their specific workloads and operational requirements.

OpenStack offers robust storage solutions through Cinder (block storage), Swift (object storage), and Manila (shared file systems). It integrates seamlessly with various backends, including Ceph, NFS, and other enterprise-grade systems. OpenStack's modular design provides flexibility and scalability, making it ideal for diverse storage requirements.

Proxmox provides a flexible storage framework with support for ZFS-based storage, Ceph integration, and local or network-attached storage options. It allows seamless management of storage pools and supports advanced features like snapshots, replication, and thin provisioning. Proxmox's versatility makes it a cost-effective choice for environments needing scalability and high availability without added complexity.

OpenNebula supports a wide range of storage options, including shared file systems, block storage, and object storage. It integrates seamlessly with backends such as Ceph and NFS while offering native drivers for efficient storage management. These capabilities make it suitable for small and mid-sized environments but may lack the extensive customisation available in OpenStack or CloudStack.

Nutanix's HCI model is built around a tightly integrated distributed file system that delivers advanced storage features such as deduplication, compression, and tiering. This design ensures simplicity and high performance. However, its proprietary nature can limit customisation and interoperability with third-party storage solutions, potentially constraining organisations seeking more diverse or adaptable storage options.

Orchestration and Automation

VMware provides robust orchestration tools, including Cloud Foundation Automation, which enables complex workflows, policy-based automation, and lifecycle management for hybrid cloud environments. VMware integrates seamlessly with third-party tools like Ansible, Terraform, OpenTofu, and SaltStack, offering flexibility for custom automation tasks. Its advanced capabilities allow organisations to automate resource provisioning, optimise workload placement, and maintain compliance across multi-cloud and on-premises environments.

Apache CloudStack offers powerful orchestration capabilities, focusing on API-driven management for seamless integration with tools like Terraform, OpenTofu, Ansible and SaltStack. Its automation features simplify the provisioning of compute, storage, and networking resources while supporting advanced workflows such as autoscaling and disaster recovery. CloudStack's extensive API support makes it a flexible choice for businesses seeking to integrate orchestration into existing IT workflows.

OpenStack features Heat, a native orchestration service that supports Infrastructure as Code (IaC) workflows for automating the deployment and management of resources. It integrates with third-party tools like Terraform, OpenTofu, Ansible and SaltStack, enabling the automation of complex multi-tier applications. OpenStack also supports advanced capabilities such as resource scaling, service chaining, and multi-cloud orchestration, making it ideal for large-scale environments requiring high levels of customisation.

Proxmox includes basic orchestration tools, such as the ability to automate VM lifecycle operations and resource management through its API and web interface. While these features are sufficient for small to medium-scale deployments, more advanced automation relies on third-party tools like Terraform, OpenTofu, Ansible and SaltStack. Proxmox's straightforward automation capabilities are ideal for SMBs and labs seeking simplicity without extensive orchestration needs.

OpenNebula includes robust orchestration capabilities for automating the provisioning of compute, storage, and networking resources. It supports integration with popular tools such as like Terraform, OpenTofu, Ansible and SaltStack, making it a versatile choice for automating hybrid and edge cloud environments. OpenNebula's hybrid cloud features enable integration with public cloud providers like AWS and Azure for workload bursting. While easy to use, its orchestration capabilities are less advanced than those of OpenStack or CloudStack.

Nutanix simplifies orchestration through Prism Central, its centralised management platform that offers built-in automation for resource provisioning, scaling, and lifecycle management. Prism Central integrates with third-party tools like Terraform, OpenTofu and Ansible to extend its capabilities. With Nutanix Calm, an application-centric orchestration service, organisations can streamline multi-cloud and hybrid cloud deployments, enabling consistent workflows and rapid application delivery.

Kubernetes and Cloud-Native Support

VMware features Tanzu, a Kubernetes-native platform for modern workloads. It integrates seamlessly with existing VMware environments to support containerised applications.

Apache CloudStack includes CloudStack Kubernetes Service (CKS), allowing organisations to deploy Kubernetes clusters natively.

OpenStack supports Kubernetes through integrations like Magnum and external tools. Its flexibility makes it a strong choice for containerised workloads at scale.

Proxmox provides basic Kubernetes support through external tools like Rancher or manual setup. Additionally, it offers Linux Containers (LXC) as a lightweight alternative for containerised workloads, enabling efficient resource utilisation alongside virtual machines.

OpenNebula features OneKE (OpenNebula Kubernetes Engine) for deploying Kubernetes clusters, offering streamlined setup and lifecycle management.

Nutanix includes Nutanix Kubernetes Engine (NKE), optimised for containerised workloads within its HCI ecosystem.

Use Cases

Ideal for: Companies prioritising advanced virtualisation capabilities and seamless integration within an existing VMware ecosystem.

Why Choose VMware: Best suited for organisations requiring robust hybrid cloud support, advanced networking with NSX, and enterprise-grade features like DRS, vSAN, and vMotion. Its extensive toolset and established reputation make it a strong choice for enterprises with complex infrastructure needs.

Ideal for: Cloud Service Providers and businesses of all sizes building private or hybrid clouds.

Why Choose Apache CloudStack: A versatile option for organisations seeking multi-hypervisor support, advanced networking capabilities, and seamless integration with storage and Kubernetes. Its open-source nature offers cost-efficient customisation, scalability, and the flexibility to adapt to the needs of small, medium, and large enterprises alike.

Ideal for: Large-scale deployments in enterprises, telecommunications, and research institutions.

Why Choose OpenStack: Known for its modularity and scalability, OpenStack is ideal for managing complex workloads or creating custom configurations for networking, storage, or compute resources. However, its complexity often requires large, skilled teams to deploy, operate, and maintain effectively. Managed distributions like Red Hat OpenStack or Canonical OpenStack can help simplify deployment and reduce operational overhead for organisations.

Ideal for: Small and medium-sized enterprises (SMEs), development environments, and labs that do not require cloud-like features.

Why Choose Proxmox: Proxmox offers a simple, cost-effective alternative to VMware vSphere, providing essential enterprise features such as high availability, ZFS-based storage, and lightweight containerised workloads with LXC. Its on-premises focus makes it a practical choice for organisations seeking a virtualisation platform without the complexity of larger cloud platforms.

Ideal for: Small and medium-sized businesses (SMBs), edge computing environments, and hybrid cloud setups.

Why Choose OpenNebula: OpenNebula's simplicity, cost-effectiveness, and hybrid cloud support make it an attractive option for businesses seeking straightforward cloud management. Its multi-hypervisor support and lightweight architecture are ideal for those who prioritise ease of use over extensive customisation.

Ideal for: Enterprises adopting hyperconverged infrastructure (HCI) and seeking simplicity in IT management.

Why Choose Nutanix: Optimised for high performance and ease of use, Nutanix is best for organisations that value tightly integrated hardware and software solutions. Its support for containerised workloads through Nutanix Kubernetes Engine (NKE) ensures readiness for modern IT demands.

Comparison Matrix

Criteria/Feature	vmware	apachecloudstack	openstack	PROXMOX	Open Nebula	NUTANIX
Cost	High	Low	Medium	Low	Medium	Medium
Total Cost of Ownership (TCO)	High	Low	Medium	Low	High	Medium
Ease of Deployment	Moderate	Easy	Complex	Easy	Easy	Easy
Vendor Lock-in	Strong	None	None	None	Partial	Strong
Scalability	High	High	High	Moderate	Moderate	High
Hardware Requirements	Strict	Flexible	Moderate	Flexible	Flexible	Strict
Operational Complexity	Moderate	Moderate	High	Low	Low	Low
Full Tenant Isolation	Yes	Yes	Yes	No	Partial	Yes
GPU passthrough & vGPU	Yes	Yes	Yes	Yes	Passthrough Only	Yes
API-First Architecture	Yes	Yes	Yes	Yes	Yes	Yes
Infrastructure as a Code	Yes	Yes	Yes	Yes	Yes	Yes
Network Capability	Rich	Rich	Rich	Basic	Basic	Moderate
Storage Flexibility	Rich	Rich	Rich	Moderate	Moderate	Moderate
Multi-hypervisor Support	No	Yes	Yes	No	Yes	Yes
Multi-zone Management	Yes	Yes	Yes	No	No	Yes
Resource Scheduler	Yes	Yes	Yes	Yes	No	Yes
Distributed Switch	Yes	Partial	Yes	No	No	No
Live Migration	Yes	Yes	Yes	Yes	Yes	Yes
Cross Cluster Live-Migration	Yes	Yes	Yes	No	No	Yes
Cross DC Live-Migration	Yes	Partial	Yes	No	No	No
Storage Live-Migration	Yes	Yes	Yes	Yes	No	Yes
High Availability	Yes	Yes	Yes	Yes	Yes	Yes
Self-Service	Yes	Yes	Yes	No	Yes	Yes

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Disaster Recovery	Add-on	Partial	Yes	Partial	3rd Part	Yes
SDN Integration	Yes	Yes	Yes	Partial	No	Yes
SDS Integration	Yes	Yes	Yes	Yes	Yes	Yes
Multi-Cloud	Yes	No	Yes	No	Yes	No
Hybrid Cloud	Yes	Yes	Yes	Yes	Yes	Yes
Capacity Analytics	Yes	Yes	Yes	Yes	Yes	Yes
Life Cycle Management	Yes	Yes	Yes	Yes	Yes	Yes
Firewall	Add-on	Yes	Yes	No	Yes	Yes
Load Balancer	Add-on	Yes	Yes	No	Yes	Yes
Usage Metering	Yes	Yes	Yes	Partial	Yes	Yes
Object Storage Integration	No	3rd Part	Yes	No	No	Yes
Edge Zone Capabilities	No	Yes	Yes	No	Partial	Yes
VNF Orchestration	No	Yes	Yes	No	Partial	No
Auto Scaling & Elasticity	Yes	Yes	Yes	No	Yes	Yes
Identity & Access Management	Yes	Yes	Yes	No	Yes	Yes
Micro-Segmentation	Yes (NSX)	Yes (SDN)	Yes	No	No	Yes
VMware Conversion Tool	-	Yes	No	No	No	Yes
Container as a Service (CaaS)	Yes	Yes	Yes	No	Yes	Yes

ShapeBlue is the largest independent integrator of CloudStack technologies globally. We combine 100s of man-years of experience in designing and building complex cloud, network and storage infrastructure with globally leading skills in Apache CloudStack.

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