Migrating from VMware to OpenStack: Optimizing your Infrastructure to Save Money and Avoid Vendor-Lock-in

by Steven Vaughan-Nichols

Overview

VMware to OpenStack for the Win! There are many excellent reasons to move from VMware to the OpenStack software stack, ranging from technical to pragmatic business reasons.

As VMware's future becomes increasingly cloudy following its acquisition by Broadcom, many businesses are exploring alternatives for their virtualization and cloud infrastructure needs. Fortunately, there is an alternative: OpenStack, the mature, powerful, open-source cloud and enterprise-ready computing platform.

Will this be easy? No. Will some businesses find it necessary? Yes.

For you see, as the cloud-native service provider Civo found in its research, 48% of 1,000 current or recent VMware users are now paying more to access the same cloud features. How much more? "Nearly half (48%) reported their costs have doubled. Over a quarter (30%) have seen a fourfold increase, and 15% have experienced a tenfold surge in prices."

VMware's customers are expecting the worst. According to the cloud analysis firm CloudBolt, 73% expect more than a 100% price hike under Broadcom's ownership. Indeed, 12% anticipate 301 to 500% increases.

Those are business-killing numbers.

They're not the only ones seeing this trend. Before the deal closed, David Vallante, CEO of WikiBon Research, observed, "52% of VMware customers with flat spending are ripe for the Broadcom picking. That's the 'fat middle,' those customers are locked and loaded for future rent extraction via perpetual renewals and price increases."

You can look at your own VMware costs going forward.

What's driving this is Broadcom's usual tactic of trying to squeeze more money from their acquisition's existing products. As theCUBEResearch analyst and chief technology officer, David Nicholson has noted, "Broadcom buys old cars. Not to restore them to their original beauty… nope… it buys classic cars to extract the platinum that's inside the catalytic converter."

Strip-mining VMware Customers

Specifically, Broadcom is strip-mining VMware customers with the following changes:

1. Transition to Subscription-Based Licensing
Broadcom has shifted VMware from perpetual licenses to a subscription-based model. This means you'll now pay recurring fees based on usage. These tend to be higher than the one-time costs of perpetual licenses.

2. Product Bundling
Broadcom has consolidated VMware's product offerings into fewer, more comprehensive bundles. While this might simplify the portfolio, it forces customers to purchase more extensive packages, even if they only need specific components. This bundling strategy has led to higher overall costs for many customers, particularly those who previously used only a subset of VMware's products.

3. Removal of Discounts and Special Pricing
Broadcom has eliminated many discounts and special pricing arrangements that VMware previously offered. For example, educational institutions and smaller businesses that once benefited from discounted rates now face substantial price hikes. Finally, as we all know, VMware's ESXi, the company's flagship virtual machine (VM) hypervisor, is no longer free.

4. Increased Focus on Larger Enterprises
Broadcom's strategy appears to prioritize larger enterprises over smaller customers. This shift has led to pricing models that are more favorable to large-scale deployments but significantly more expensive for smaller organizations. As a result, many small and medium-sized businesses have seen their costs skyrocket.

5. Strategic Overhaul and Cost Recovery
Broadcom's acquisition of VMware for approximately $61 billion represents a significant investment. Broadcom has implemented aggressive pricing strategies to maximize revenue and recover from this substantial expenditure. These strategies include rationalizing the product set, discontinuing less profitable offerings, and increasing prices across the board.

6. Changes in Support and Partnership Structures
Broadcom has restructured VMware's support and partnership programs, moving to an invite-only model for resellers and service providers. This new structure has created additional barriers for smaller partners and increased costs for customers with fewer support and service options.

If you want to keep maintaining business continuity at an affordable price, it's time to look beyond VMware. You won't be alone. CloudBolt has found that 46% of VMware customers see these changes as very to extremely disruptive.

As one end-user put it on an Ars Technica forum, "We're sticking with VMware on this generation of our private cloud as we don't have a choice, but the next generation went from a 'when's the next version of VMware coming out' to 'What are our options now?'"

Companies are understandably worried about what this new look VMware will mean for their bottom line. CloudBolt found that while 40% of customers will stick with VMware--for at least the next buying cycle anyway--a plurality of users, 43%, plan on replacing some of their VMware programs, and over a third are looking to move lock, stock, and barrel to cloud-based or other programs.

Did someone say cloud-based?

Did someone say cloud-based? OpenStack is here, ready and waiting.

You should know that you don't have to decide between OpenStack and VMware at this junction. You can, and many companies already do, use both platforms in your master IT structure. Typically, OpenStack is used to manage private cloud resources, while VMware handles traditional virtualization workloads.

As Sergey Dobrovolsky, Virtuozzo's Chief Technology Officer, said, "VMware will continue to be a significant player, but we expect a market shift as more companies look for alternatives. OpenStack's open-source model and vendor flexibility make it an attractive option for enterprises aiming to reduce costs and avoid lock-in."

Still, according to the OpenInfra Foundation, 80% of its members have already received inquiries about migrating workloads from VMware to OpenStack. That's a telling number.

As Canonical Cloud Product Manager Tytus Kurek told me, "Customers are worried about potential price hikes and changes in service commitments. This, combined with high licensing costs and vendor lock-in, is driving many to explore alternatives like OpenStack."

Josh Villarreal, Rackspace's General Manager of OpenStack, echoed these comments. He said, "The acquisition has certainly created uncertainty. Customers are concerned about potential price hikes and changes in service commitments." So it is that cost and lock-in concerns have pushed many VMware users to give OpenStack a long, hard look.

Another common theme I heard from many analysts and OpenStack vendors is that OpenStack companies don't need to sell VMware customers on the benefits of OpenStack. No. The customers are often coming to them.

Why? Let us count the reasons.

The Business Case for OpenStack

Cost Efficiency

One of OpenStack's most significant advantages is simple: Once in place, it's cheaper. As an open-source platform, OpenStack eliminates the need for expensive licensing fees that come with VMware's proprietary approach.

Your organization can also leverage its existing hardware. OpenStack will run quite happily on the same in-house gear you already use for VMware. As Kevin Carter, a Rackspace Product Director, observed, “The cloud repatriation movement is more important today than ever before, and putting existing cap-ex to work is a big part of open-source solutions.”

No Vendor Lock-in

With VMware, you can use VMware or, well, VMware. Whatever Broadcom decides to charge, you have to pay.

If you elect to go with OpenStack, you have a choice of more than a dozen different partners. These include B1 Systems, Binario Cloud, Canonical, Cleura, Cloud&Heat, Cloudbase Solutions, Cloudification, Coredge, Fairbanks, Huawei, Mirantis, Okestro, OpenMetal, PlanetHoster, Rackspace, Red Hat, Sardina Systems, Ultimum Technologies, VEXXHOST, and Virtuozzo. Are you not happy with the migration proposal from one of them? There's always another company willing to tackle your project.

These companies deliver their services in several different ways. For instance, Dobrovolsky explained that Virtuozzo's main offering is its Virtuozzo Hybrid Infrastructure. This is built on OpenStack and includes an OpenStack-based control plane, our own Linux distribution, and proprietary storage solutions. We provide a complete stack from the bare metal up through the operating system and the cloud infrastructure, including virtual machines and storage. This makes it very similar to what VMware offers but with the added benefits of open-source flexibility and cost savings."

Paul Miller, Chief Technology Officer at Wind River Software, said his company takes another approach, "Our business has

had an OpenStack offering for many years." On top of it, Wind River has built a "modern architecture that also integrated cloud-native Kubernetes simultaneously in the same technology stack." This combination of virtual machine cloud and container technology has proven interesting to many people.

In addition, Wind River Software offers StarlingX the best-of-breed open-source programs to deliver a complete edge computing stack that some VMware customers will find appealing. This program starts with Ceph, the Red Hat-sponsored do-it-all, open-source software-defined storage platform can work with object-level, block-level, and file-level storage. For cloud management, of course. StarlingX uses the tried and true OpenStack. For container orchestration, StarlingX uses Kubernetes.

Of course, you do not need to go with an OpenStack distro at all. While running your own VMware to OpenStack migration isn't for everyone, GEICO, an American insurance giant, is doing exactly that.

Why? Tad Van Fleet, GEICO Distinguished Architect, explained, “OpenStack allows us to avoid vendor lock-in and allows us to customize our infrastructure to meet our specific needs. We can integrate various open-source tools and platforms, which is something we couldn't do with proprietary systems. Additionally, OpenStack's community-driven development model means we can contribute back and benefit from innovations made by others."

Flexibility and Customization

OpenStack offers unparalleled flexibility, allowing businesses to tailor their cloud environments to specific needs. This level of control enables organizations to optimize performance, integrate seamlessly with existing infrastructure, and adapt to changing requirements without being constrained by a vendor's roadmap.

For example, Mirantis's latest offering, Mirantis OpenStack for Kubernetes (MOSK) 24.2, comes with a dynamic resource balancer that's comparable to VMware’s Distributed Resource Scheduler (DRS) feature. This feature automates workload distribution to solve hotspot and “noisy neighbor” problems.

As Shaun O’Meara, Mirantis CTO, explained, “MOSK is a viable and proven open source-based technology option that is especially relevant as many VMware users seek alternatives. It makes the operation of OpenStack-based cloud and virtualization solutions simpler and can be deployed as a unified solution on a range of cost-effective, hyper-converged, modular hardware, providing a full-featured, scalable on-premises cloud. It is engineered as an ideal host environment for migrated VMware VM workloads – enabling businesses to achieve optimal resource management and network performance on open infrastructure with proven reliability.”

Community-Driven Innovation and Stability

With a global community of over 110,000 contributors, OpenStack users benefit from rapid innovation and continuous improvement. This collaborative ecosystem, which the OpenInfra Foundation oversees, ensures that the platform evolves to meet emerging industry needs and provides a wealth of readily available tools and integrations.

OpenStack, which began as an open-source project in 2010 as a joint project of Rackspace and NASA, is also a very mature set of programs. In particular, OpenStack has become the platform of choice for major 5G telecoms. Top companies such as AT&T, Deutsche Telekom, Orange, SK Telecom, Verizon, and Comcast all rely on it for their 5G services with its 99.9999% reliability requirements.

Beyond telecommunications, OpenStack is business-proven in many other areas. For example, Walmart has almost a million OpenStack cores running its private cloud. In addition, Blizzard Entertainment, the video game developer behind such hit games as Warcraft, Diablo, StarCraft, and Overwatch, uses OpenStack autoscaling to run its games in the cloud. Last but not least, PayPal uses OpenStack to run over 1 billion transactions per day on its core financial transaction system.

In short, OpenStack has what it takes to run serious business, mission-critical applications. You may not know OpenStack, but it has a proven track record for the most demanding end-user requirements.

Technical Challenges

While the business benefits of OpenStack are compelling, the technical aspects of migration require careful planning and execution. It starts with the simple fact that they have two different architectures.

Architecture Differences

OpenStack and VMware have fundamentally different architectures. VMware is primarily a virtualization platform that specializes in virtualizing physical hardware. OpenStack, on the other hand, is an Infrastructure-as-a-service (IaaS) cloud infrastructure that incorporates virtualization. One way to think of it is as a matter of scale. While you can certainly build large installations from VMware, OpenStack is designed from the bottom up for enterprise-sized jobs. This distinction means organizations must rethink their approach to resource management, networking, and storage when transitioning to OpenStack.

OpenStack consists of several core components, each responsible for specific functions:

- Keystone: Identity service for authentication and authorization.
- Nova: Compute service for managing virtual machines.
- Glance: Image service for storing and retrieving VM images.
- Neutron: Networking service for creating and managing virtual networks.

- Cinder: Block storage service.
- Ironic: Bare metal provisioning
- Swift: Object storage system.
- Horizon: The OpenStack Dashboard Project
- Manila: Shared file systems

Understanding these components and their interactions is crucial for a successful migration. If you don't have a handle on OpenStack's software family, be certain to find a partner who does. Fortunately, there are many of them.

Porting issues

Ensuring compatibility between existing applications and the new OpenStack environment is a significant hurdle. Applications designed to run in a VMware environment may require modifications to work optimally in OpenStack. Additionally, integrating OpenStack with existing infrastructure and tools can be complex and time-consuming.

Most OpenStack companies have already faced and overcome these challenges. While you may not have thought of switching from VMware to OpenStack until recently, companies have been making the move for over a decade. With their help, you won't need to reinvent the wheel for a successful migration.

As Wenhai Li, a Huawei senior engineer, said, "You'll need a team to integrate OpenStack into a workable solution to satisfy customer and management expectations." Those people and teams are available. You'll just need to find them before making your migration move.

Some companies, such as Rackspace, have been helping companies move to OpenStack from VMware almost since OpenStack's first days. Carter said, "We launched our first OpenStack public cloud back in 2012. We've always offered our customers a choice between VMware and OpenStack. However, the current market conditions have accelerated the interest in OpenStack as a viable and cost-effective alternative."

Data Migration

Migrating data from VMware's storage solutions to OpenStack's Swift (object storage) and Cinder (block storage) services involves challenges such as data consistency and managing dynamic changes in data. Ensuring that data is accurately and efficiently transferred without disrupting ongoing operations is critical.

Luckily, with more than 50 drivers supported by OpenStack Cinder, one can easily attach existing storage solutions to OpenStack.

Feature Parity

While OpenStack has matured significantly, some organizations will find that certain VMware-specific features are not directly replicated in OpenStack. You'll need to carefully consider such functionality issues for a successful migration.

Carter noted, in particular, that "Understanding dependencies on VMware’s peripheral capabilities is crucial. OpenStack offers equivalents for most VMware features, but the approach to high availability and application management differs. OpenStack relies on the application for high availability, which can be a shift in philosophy."

Make no mistake about it: OpenStack is very powerful and possesses many features, but moving from one platform to another will require a great deal of thought and planning before starting work on the transition.

Performance Tuning

Achieving optimal performance in OpenStack may require more hands-on tuning compared to VMware's often pre-optimized configurations. Organizations should be prepared to invest time in performance optimization post-migration.

In particular, managing CPU resources, memory allocation, and ensuring that virtual machines do not compete excessively for resources, which can lead to performance degradation, will all be a challenge for VMware administrators moving to an OpenStack environment.

Virtualization and Resource Management

OpenStack supports multiple hypervisors, including KVM and Hyper-V. This flexibility allows organizations to choose the best virtualization technology for their needs. However, it also requires careful planning to ensure compatibility and optimal performance.

The OpenStack community focuses its efforts on KVM, the most popular open-source hypervisor, which is also used by cloud giants such as AWS and Google. It also supports relevant current technologies like GPUs, NUMA, PCI, and network accelerators.

Networking Considerations

OpenStack's networking model, managed by Neutron, offers advanced software-defined networking (SDN) capabilities. While this provides greater flexibility, it may require reconfiguring existing network topologies and security groups.

Storage Migration

Transitioning from VMware's storage solutions to OpenStack storage services (Cinder, Manila, Swift) requires careful planning. Organizations must consider data migration strategies, performance requirements, and compatibility with existing storage systems.

Operational Issues

Then, of course, there are the operational challenges. Walking down the list:

1. Skill Gaps
Transitioning to OpenStack requires a different set of skills than managing VMware environments. Organizations will need to invest in training or hiring new talent with expertise in OpenStack, which can be a significant investment in time and resources.

Many, but not all, OpenStack vendors offer classes.

2. Complexity
In particular, OpenStack's flexibility and modularity come with increased upfront complexity. Managing and maintaining an OpenStack environment can be more challenging than a VMware setup, which is often more streamlined and user-friendly. This complexity can lead to longer initial deployment times and a learning curve for administrators; however, like all things, change in the technical stack will have some form of a learning curve.

3. Vendor Lock-in and Support
One motivation for moving to OpenStack is to avoid vendor lock-in associated with VMware. However, the transition itself can be complicated by dependencies on VMware-specific features and integrations.

4. Cost and Resource Allocation
While OpenStack can offer cost savings in the long run, the initial migration process can be resource-intensive. This includes costs associated with planning, testing, and executing the migration, as well as potential downtime or performance issues during the transition period.

5. Ensuring Business Continuity
Maintaining business continuity during the migration is crucial. This involves rigorous testing and validation of the new environment to ensure that all workloads function correctly and that there are no disruptions to critical business operations. A phased migration approach can help mitigate risks but requires meticulous planning and execution.

Finding the help you need

Fortunately, neither you nor your partner have to figure out how to make this migration on your own. OpenStack providers have been helping companies like yours migrate to this popular private cloud for over a decade.

Picking the right partner for your transition is critical. Take your time and make sure that your OpenStack vendor is the best choice for your needs. An OpenStack business ideal for your friend's large corporation may not, for example, be the best choice for your SMB. Nor may one based in the States be the right pick for a European Union-sited company.

A full list of OpenStack partners can be found on the OpenStack Marketplace.

Migration Tools

Several approaches and tools can facilitate the migration process. These include:

Johan Holmström, Global Sales Manager at Cloudbase Solutions explained its Cloudbase Coriolis is a platform that supports live migration scenarios. "This migration tool is designed to be as non-intrusive as possible. It allows customers to migrate workloads from VMware to OpenStack without the need for agents or significant downtime. Coriolis supports various source and destination cloud environments, making it an ideal solution for customers looking to move away from VMware."

He continued, "Coriolis can migrate a single virtual machine or thousands while ensuring minimal disruption to the running workloads. It leverages REST APIs to interact with VMware and OpenStack, making the process seamless."

Specifically, Coriolis works by "communicating with VMware's vSphere and using Changed Block Tracking (CBT) snapshotting to capture data. On the OpenStack side, it creates new volumes and streams data to them. The source VM continues to run during the data replication, and only at the final stage do we shut down the source VM and complete the migration."

VEXXHOST also has a similar tool: MigrateKit. This command-line tool helps you migrate your VM from VMware to OpenStack with near-zero downtime. It does this by first making a full copy of your VM to the OpenStack cloud. On subsequent migration cycles, Migratekit will only copy the changes that have been made since the last migration cycle.

Mohammed Naser, VEXXHOST's CEO explained that "existing tools either require significant downtime or are commercial solutions that can be costly. To address this, we developed this open-source project. It takes snapshots of virtual machines and copies data incrementally to OpenStack, minimizing downtime during the migration process."

When a customer is ready to transition to OpenStack, Naser concluded, "This reduces the final cutover time to as little as 60 seconds, regardless of the data size. This approach ensures that critical workloads experience minimal disruption."

Other OpenStack distributors have their own vendor-specific migration tools. These include Red Hat with its Migration Toolkit for Virtualization (MTV) to move workloads from VMware vSphere to OpenShift and Mirantis's VMware to OpenStack Migration Framework. There are also vendor-neutral migration tools on the market, including Coriolis, MigrateKit, and ZConverter.

Or, if you'd prefer a more hands-on, open-source approach, there's Red Hat's Virt-V2V: With this tool, you can convert VMware virtual machines to the KVM, Linux's built-in virtual machine hypervisor format.

Phased Migration

A phased approach allows organizations to gradually transition workloads from VMware to OpenStack, minimizing disruption to ongoing operations. This strategy typically involves:

- Setting up a parallel OpenStack environment
- Migrating non-critical workloads first
- Testing and optimizing the new environment
- Gradually moving more critical applications

Here's how it can work in practice, according to GEICO's Van Fleet. GEICO's migration plan is already well underway. It started with "right-sizing our environment to eliminate over-provisioned resources. This allowed us to reduce the number of physical servers and streamline our infrastructure. We also provide extensive support and professional services to guide our teams through the migration process, ensuring minimal disruption." GEICO is holding true to its course and expects to hit its deadlines.

DevOps and Orchestration

Leveraging DevOps tools such as Ansible and Infrastructure as Code (IaC) programs such as Terraform can significantly streamline the migration process. These tools can help with tasks such as:

- Discovering VMware workloads
- Creating migration plans
- Executing migrations
- Validating results

Of course, even with all this, it won't be all smooth sailing. No move from a legacy platform goes without some sweat and tears. That all said, this move will be well worth your time and efforts for both its business and technical advantages.

Conclusion

The transition from VMware to OpenStack represents a significant shift in how organizations approach their virtualized infrastructure. While the migration process involves careful planning and potential challenges, the benefits of increased flexibility, cost savings, and community-driven innovation make OpenStack an attractive alternative for many businesses. Plus, you’re backed by a global open-source community of 110,000 individuals from hundreds of organizations and 187 countries.

As the cloud computing landscape evolves, OpenStack's open and adaptable nature positions it as a future-proof solution for organizations looking to break free from vendor lock-in and take control of their infrastructure. By carefully considering migration's business and technical aspects, organizations can successfully leverage OpenStack to build a more flexible, cost-effective, and innovative cloud environment.