



VMware to Public Clouds

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Introduction



Before the advent of virtual machines (VMs), businesses typically dedicated entire physical servers to run individual applications or perform specific tasks. This practice often resulted in significant underutilization of hardware resources, as most applications do not require the full capacity of a server. Virtual machines revolutionized this model by enabling organizations to create multiple isolated virtual environments on a single physical machine. Each VM can operate its own operating system, applications, and configurations, facilitating the consolidation of workloads across fewer physical servers. While virtual machines were transformative at their inception, the emergence of more advanced systems, such as Kubernetes, is diminishing the relative advantages that VMs once provided.

In this paper, we elaborate on the migration strategies out of VMware infrastructure to public cloud alternatives and is the third of the three series paper. You can read about the open-source alternatives to VMware [here](#) and private cloud options [here](#).

Why do VMs no longer work?



Approximately a decade ago, virtual machines (VMs) began to present challenges related to system scaling, resource constraints, burst tolerance, and availability. These issues became increasingly prevalent across enterprise and cloud deployments, highlighting the limitations of traditional VM architectures in meeting the evolving demands of modern IT environments.

Limited resources

Virtual machines (VMs) operate with a fixed allocation of resources, including CPU, RAM, and disk space. This structure does not allow for on-demand resource adjustments; if an application requires additional power, the VM must be recreated with higher specifications. Consequently, organizations may find themselves compelled to overprovision resources to accommodate potential traffic spikes, leading to costs associated with underutilized capacity. Moreover, the limitations of allocated resources can adversely affect performance during periods of high demand. If an application exhausts the VM's capabilities, it may experience slowdowns or even crashes, compromising overall system reliability.

Slow scaling

When additional capacity is required, scaling with virtual machines (VMs) is a manual process that can be time-consuming. Organizations must provision a new, larger VM and migrate or replicate their applications, which is often too slow to effectively respond to sudden demand spikes. By the time scaling is completed, valuable business opportunities may be lost. Additionally, scaling down presents its own challenges, as it requires resizing or consolidating VMs, further complicating resource management in dynamic environments.

Traffic limitations

Even minor traffic spikes can overwhelm virtual machines (VMs) if they lack sufficient resources. Their fixed capacity can be easily maxed out during periods of high load, resulting in errors, slowdowns, or crashes. Furthermore, VMs typically do not incorporate automatic load balancing or failover mechanisms. Consequently, the only viable solution often becomes overprovisioning—allocating significantly more resources than are generally required. This approach is neither efficient nor cost-effective, leading to increased operational expenses without corresponding performance benefits.

Downtime risks

Most changes to virtual machines (VMs) necessitate restarts, redeployments, or even complete recreation, which inherently poses risks of downtime and service disruptions. Activities such as migration data and configuration updates can lead to potential data loss or unavailability. These manual processes are not only risky but also prone to errors; a single missed step can result in an outage. This challenge is particularly pronounced for high-availability services that struggle with VM maintenance.

In light of these limitations, relying on VMs for infrastructure management may seem outdated, especially when considering the advanced capabilities of Kubernetes, a leading platform for container orchestration. The following sections will compare how Kubernetes addresses the disadvantages associated with VMs.

Migrate from VMs to Containers



The evolution of container orchestration began with containers, which laid the foundational technology for managing containers. Subsequently, Docker emerged, providing a more user-friendly interface for containers. While Docker has maintained its popularity and widespread adoption, it often presents a learning curve for new users.

As developers began to recognize the limitations of deploying entire applications within a single container, the need for more sophisticated orchestration led to the introduction of Docker Compose. This tool simplified the process of creating compositions from multiple containers, significantly improving workflows. However, it fell short in addressing the scalability requirements of larger applications, particularly those involving AI-driven service management that necessitate substantial data processing capabilities.

This scalability challenge prompted the question: "How can we further optimize this process?" The answer was found in Kubernetes, a revolutionary technology that automates numerous processes and enhances flexibility in scaling workflows. Kubernetes represents a paradigm shift in container orchestration, effectively addressing the complex issues that its predecessors could not fully resolve. The following sections will explore the key advantages of migrating applications to Kubernetes in comparison to traditional virtual machines.

Flexible resource management

While virtual machines (VMs) operate with fixed allocations of CPU, RAM, and disk space, Kubernetes provides a significantly more flexible approach to resource management. Following migration to Kubernetes, organizations are no longer constrained by predetermined resource limits. The platform facilitates dynamic resource allocation tailored to the specific needs of applications. If an application requires enhanced performance, there is no need to recreate an entire VM with higher specifications. Instead, Kubernetes can automatically adjust resource allocation in real time, optimizing performance without the overhead of manual intervention.

Autoscaling

This flexibility also encompasses scaling capabilities. Rather than over-provisioning a virtual machine to accommodate potential load spikes, Kubernetes can automatically scale applications as needed. When demand decreases, scaling can be reversed, ensuring that organizations do not incur costs for unused capacity. This dynamic approach to resource management enhances efficiency and cost-effectiveness in managing application workloads.

Dynamic traffic management

Kubernetes provides a robust approach to managing variable workloads, enabling organizations to dynamically adapt to changing demands following the migration from VM-based deployments. During traffic surges, Kubernetes can scale both horizontally and vertically.

With horizontal autoscaling, the number of running instances (pods) is automatically increased or decreased to accommodate fluctuations in workload. Vertical autoscaling, on the other hand, adjusts the CPU and memory resources allocated to existing pods, allowing them to handle increased work without necessitating additional instances.

Furthermore, Kubernetes can efficiently distribute incoming network traffic across multiple instances of an application, all without requiring manual intervention. This automated resource management significantly enhances application performance and reliability in dynamic environments.

Zero downtime

Kubernetes significantly reduces the failure risks commonly associated with virtual machines. It utilizes rolling updates, allowing organizations to gradually replace older versions of applications with newer ones while maintaining service availability throughout the update process. Additionally, when configuration changes are implemented, Kubernetes can apply these changes without requiring a container restart, further minimizing potential downtime.

The platform's self-healing capabilities enhance uptime by automatically replacing failed containers, often before users are even aware of an issue.

The advantages of Kubernetes extend beyond mere technical management efficiency, offering substantial potential to improve an organization's bottom line. The following section will provide insights to help determine whether migrating to Kubernetes aligns with your current business needs and strategic objectives.

Migrate from VMware to Different Public Clouds



Migrating from VMware to various public clouds allows organizations to leverage the scalability, flexibility, and cost-efficiency offered by cloud environments. This transition enables businesses to modernize their IT infrastructure while maintaining compatibility with existing applications and tools. By adopting a multi-cloud strategy, organizations can optimize workloads across different platforms, ensuring improved performance and resilience. Ultimately, this migration supports digital transformation initiatives and enhances the ability to innovate in a rapidly evolving technology landscape.

Migrating from VMware to AWS enables organizations to harness the scalability and flexibility of cloud computing while retaining their existing applications and workloads. This transition simplifies infrastructure management and reduces costs through AWS's pay-as-you-go model, allowing businesses to optimize resource utilization. By leveraging AWS's robust ecosystem, companies can enhance their operational efficiency and drive innovation in a rapidly changing digital landscape.

Migrating from VMware to Azure allows organizations to take advantage of Azure's extensive cloud capabilities while maintaining their existing VMware applications and management tools. This transition facilitates improved scalability, flexibility, and cost-efficiency, enabling businesses to modernize their IT infrastructure seamlessly. Additionally, Azure's integration with other Microsoft services enhances productivity and supports a comprehensive cloud strategy for digital transformation.



Migrating from VMware to Google Cloud Platform (GCP) opens the door to a world of possibilities, where organizations can harness the power of GCP's cutting-edge infrastructure and innovative services while keeping their VMware workloads intact. This journey not only facilitates seamless integration with Google's robust analytics and machine learning tools but also empowers businesses to transform their operations into data-driven powerhouses. By embracing GCP, organizations can scale effortlessly, unlock new opportunities, and thrive in today's dynamic digital scenario.

Migrate from VMware to AWS



Cloud-based solutions are a strategic priority for organizations seeking enhanced flexibility, scalability, and cost-efficiency. Migrating from VMware to Amazon Web Services (AWS) allows businesses to leverage cloud computing fully. This transition improves agility, optimizes resource allocation, and provides access to advanced technologies, positioning organizations for competitiveness in a dynamic digital landscape. AWS serves as a robust platform for modernizing IT infrastructure and driving long-term growth.

AWS offers significant advantages for organizations, including cost optimization through its pay-as-you-go model, eliminating upfront hardware investments. Its scalability allows seamless resource adjustments to meet changing demands. The global network of data centers ensures high availability and low-latency access to applications and data. Additionally, AWS continually introduces new services and features, empowering organizations to stay at the forefront of innovation.

in a rapidly evolving technology landscape, exemplified by Broadcom's acquisition of VMware, migrating from VMware to Amazon Web Services (AWS) with Cloudly offers a secure pathway forward. This transition reduces risks by leveraging Cloudly's expertise and the Concierto.Cloud platform, facilitating a smooth move to a stable, flexible cloud environment that ensures business continuity and future readiness.

AWS's extensive cloud services, ranging from AI to IoT, foster innovation. Cloudly's migration services provide seamless access to these technologies, transforming operations and driving growth. Our efficient migration process and fixed pricing enable quick access to AWS resources, maintaining competitiveness. By migrating to AWS with Cloudly, organizations can optimize IT operations and reduce costs through scalable solutions and transparent pricing. Our post-migration managed services, along with the efficiencies of the Cloud platform, ensure streamlined processes that deliver ongoing savings and enhance overall efficiency.

VMware to AWS migration involves transferring on-premises VMware virtual machines (VMs) to the Amazon Web Services (AWS) cloud, allowing businesses to leverage AWS capabilities while maintaining familiar VMware functionality. This process enables seamless relocation of VMs from a VMware vSphere environment to AWS without requiring conversion or re-platforming, ensuring a smooth transition with minimal operational disruption.

Multiple approaches to migrating from VMware to AWS are illustrated in the diagram below:

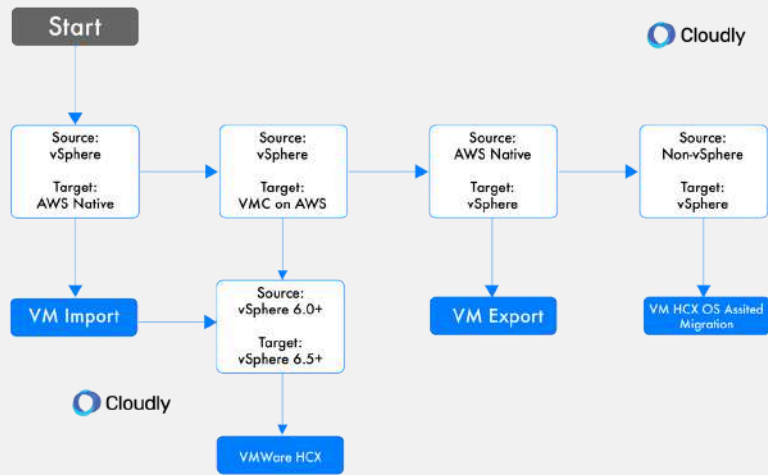


Fig.1. VMs to AWS Migration Process

Trianz. (2023, July 27). Trianz | Accelerating Digital Evolution.
<https://www.trianz.com/aws/vmware-to-aws-migration-services>

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Migrate from VMware to Azure



As businesses adapt to the digital landscape, the need for agile, scalable, and cost-effective IT solutions grows. Migrating VMware workloads to Azure provides significant benefits, enabling organizations to modernize their infrastructure and maximize cloud capabilities. This blog outlines the reasons for migrating VMware VMs to Azure, along with best practices and essential tools for a successful transition.

Azure's cloud infrastructure allows businesses to scale operations according to their needs, facilitating growth and adaptation to fluctuating demands without the constraints of physical hardware. The transition to Azure can lead to significant cost savings through its pay-as-you-go pricing model, reducing the need for large capital investments in hardware, while its cost management tools optimize spending by providing insights into resource usage. Additionally, Azure integrates seamlessly with Microsoft services like [Microsoft 365](#), [Entra ID](#), and [Power BI](#), enhancing productivity. With robust security features, including encryption and threat detection, Azure ensures compliance with industry standards to protect data. Its global network of data centers also offers advanced disaster recovery and high availability, ensuring continuous operations during disruptions.

VMware has been the leading virtualization solution for two decades, enabling organizations to optimize data center deployment and management. As businesses seek the agility of the cloud, migrating can be challenging due to significant investments in VMware tools. Fortunately, the partnership between VMware and Microsoft has produced the [Azure VMware Solution \(AVS\)](#) providing a hybrid approach & Cloudly quickly adopted this solution and specializes in this platform.

As customers look for VMware alternatives, this partnership becomes more useful than ever.

Agent-Based Migration is suited for complex environments, requiring detailed control through agents installed on VMs for replication and synchronization. Agentless Migration simplifies setup and management by eliminating the need for agents. The Azure VMware Solution (AVS) allows users to retain VMware management tools while utilizing Azure's infrastructure for a hybrid cloud experience.

Backup-based Migration, using Cloudly's expert team, enables direct cross-platform restores of VMware backups to Azure without needing new tools. Developing a clear VMware-to-Azure migration plan that outlines steps, timelines, and responsibilities is crucial for aligning stakeholders with the objectives and expected outcomes.

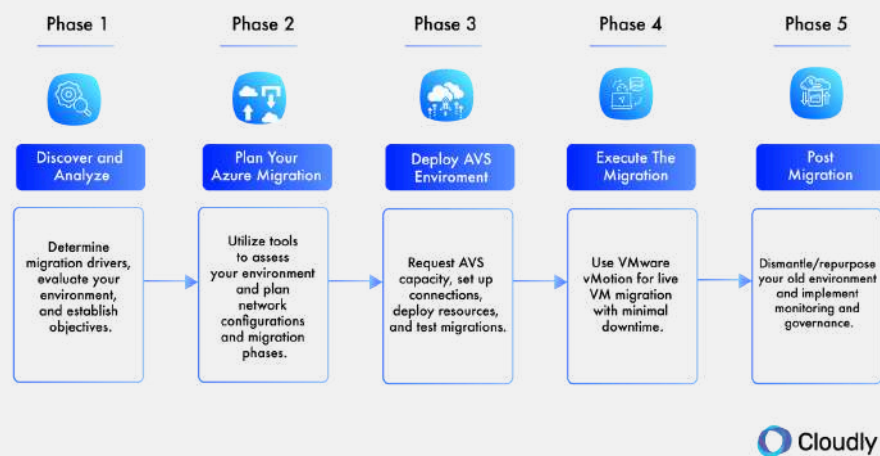


Fig.1. VMs to Azure Migration Process

Sedlak, R. (2024, July 18). Migrating VMware to Azure VMware solution: Run workloads natively on Azure - Neudesic. <https://www.neudesic.com/blog/migration-azure-vmware-solution-guide/>

Crape, M., & Crape, M. (2024, July 15). Migrating VMware to Azure: A Comprehensive Overview. Veeam Software Official Blog. <https://www.veeam.com/blog/migrating-vmware-to-azure-guide.html>

Migrate from VMware to GCP



Migrating virtual machine (VM) workloads from your data center to Google Cloud or between clouds may appear to be a straightforward lift-and-shift process, but it can quickly become complex. Challenges such as external dependencies, application or network intricacies, and variations in operating systems must be addressed. Additionally, schedule constraints and compliance with regulatory requirements can impact the timely execution of the migration.

Despite these complexities, cloud migration offers significant benefits, including cost reduction and simplified management. It also supports a 'cloud-first' strategy and modernizes your IT infrastructure, enabling value-driven activities like automation and analytics. With the right approach, you can migrate VMware workloads to Google Cloud without changing your applications, tools, or processes.

Google Cloud VMware Engine (GCVE) is tailored for enterprises seeking scalability and elasticity, enabling the deployment of private clouds in about 30 minutes with dynamic resource management and auto-scaling. It seamlessly integrates core enterprise applications with existing database, storage, disaster recovery, and backup solutions while allowing the use of the same IT management tools as on-premises.

You can migrate VMware-based disaster recovery and backup workloads to Google Cloud with familiar processes and store data across multiple zones for improved disaster recovery. GCVE offers a fully integrated VMware experience on Google Cloud's scalable infrastructure, featuring dedicated 100 Gbps networking and 99.99% availability. Additionally, it provides access to other Google Cloud services through native VPC networking, facilitating a unified user experience and the ability to derive insights from your data.

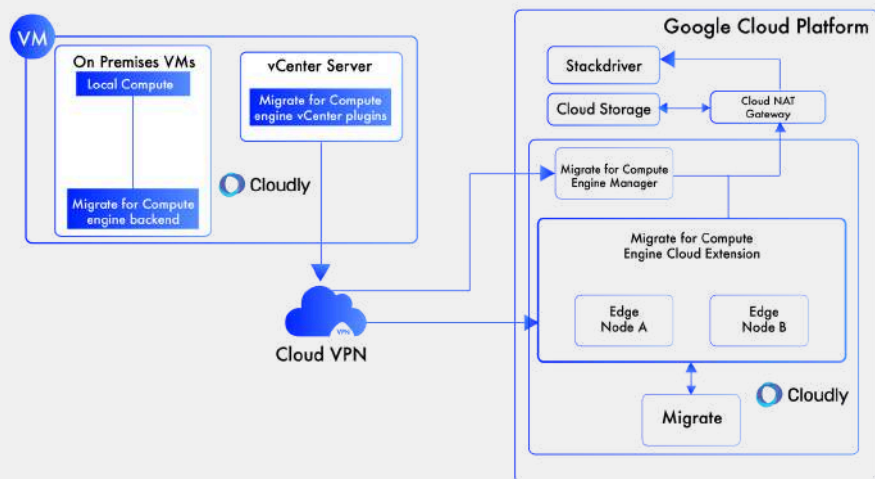


Fig.1. VMs to GCP Migration Process

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Land on your Preferred Cloud with Cloudly



Cloudly is deeply rooted in cloud infrastructure, platform and applications so that we can offer the best-in-class migration, integration, and managed services in a cloud-neutral way and help you benefit the most out of cloud. We only offer high touch, solution-focused services and nothing less.

We offer expert cloud migration services designed to smoothly transition your applications, data, and workloads from private clouds, data centers, on-premises environments, or other cloud platforms to a modern cloud infrastructure. Our migration strategies include lift and shift, replatforming, and refactoring, each tailored to meet your specific business needs. We leverage powerful tools to ensure efficient and effective migrations, minimizing downtime and maximizing operational continuity. Our process is grounded in best practices, including thorough assessments, pilot testing, and task automation, to address challenges, such as data security, workload compatibility, app integration, and cost optimization, ensuring a seamless transition.

At Cloudly, security and scalability are fundamental to our cloud migration services. We implement advanced security protocols to safeguard your data throughout the migration process, ensuring compliance with regulatory standards at all times. Our solutions also emphasize scalability, allowing your business to dynamically adjust resources according to demand, optimizing both performance and costs. With Cloudly as your partner, you can confidently migrate your most complex workloads to the cloud that returns the highest ROI for your business. We don't compromise in anything less as the cloud migration experts for 12+ years, optimally migrating thousands of workloads to the cloud.

Conclusion



In today's cloud-driven world, seamless migration and management of cloud environments are critical for organizational success. Cloudly offers a powerful solution that simplifies the transition from legacy systems while unlocking the full potential of cloud computing. Cloudly provides a reliable framework for virtual machine migration, minimizing disruptions and ensuring a high success rate.

By integrating advanced cloud orchestration with a focus on operational efficiency, Cloudly helps organizations adapt to evolving demands while reducing costs and complexity. As businesses prioritize flexibility and innovation, Cloudly serves as a strategic partner in optimizing your cloud infrastructure management, driving long-term success.

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