

# VMware Cloud on AWS

## Choosing between VMware Cloud on AWS and native public cloud services

### 93%

of organizations are committed to or interested in hybrid cloud strategies in 2019, an increase from 81% in 2018.<sup>1</sup>

### 96%

of respondents consider it important that hybrid cloud vendors offer solutions that integrate with on-premises environments.<sup>1</sup>

Hybrid cloud has become the most adopted cloud strategy. On the one hand, organizations are recognizing the benefits of having consistent architecture on-premises and in the cloud – this enables consistent infrastructure and operations across on-premises and cloud, reducing complexity and management burdens. On the other hand, organizations seek to take full advantage of innovations by public cloud providers to modernize applications and accelerate digital transformation.

As a result, when undertaking a cloud initiative, customers are often made to compare VMware Cloud™ on AWS with native public cloud services. The goal of this buyer's guide is to help customers understand the major use cases in a cloud initiative and key factors that they need to consider in each use case before deciding to go with VMware Cloud on AWS, native public cloud services, or both. The first three scenarios that follow address existing workloads and the rest address net new workloads.

### Scenario #1: “Lifting and shifting” existing workloads to the cloud

Organizations may want to move an application from on-premises to the cloud without making significant changes to the code for various reasons, including but not limited to complying with time-pressed cloud initiatives, consolidating hosting environments after acquisitions, and leveraging a hardware refresh window to move to the public cloud while deriving instant business value.

VMware Cloud on AWS is ideal for this use case as it uniquely provides the following benefits for the migration:

#### Bi-directional and non-disruptive application migration

Leveraging VMware vSphere® cross-datacenter vMotion®, organizations have the option to live-migrate their most critical applications to the cloud with no downtime. This is especially important for applications such as an e-commerce website when a minute of downtime can lead to thousands or millions of dollars of lost revenue. Unlike most other cloud migration tools in the market, such migrations are bi-directional. Customers always have the choice to move their workloads back on-premises or to another vSphere-based cloud environment, and it can be done in hours or weeks, instead of months or years. Organizations can also migrate large-scale environments with secure multi-site interconnects between vSphere on-premises and VMware Cloud on AWS using VMware HCX.

#### Consistent infrastructure delivered as a service

VMware Cloud on AWS is a cloud service built on trusted VMware Software-Defined Data Center (SDDC) technologies with vSphere at its core – no conversions or re-architecture of workloads are required when moving to the cloud. Applications can be configured in the same or very similar fashion as on-premises, and application behavior is expected to remain consistent.

## WORKLOAD-SPECIFIC RESOURCES

Visit [www.cloud.vmware.com/workloads](http://www.cloud.vmware.com/workloads) to learn more about deploying specific workloads on VMware Cloud on AWS

Review [Microsoft SQL Server Workloads and VMware Cloud on AWS: Design, Migration, and Configuration](#)

Review [Oracle Workloads and VMware Cloud on AWS: Deployment, Migration, and Configuration](#)

## Consistent operations and management

VMware Hybrid Linked Mode capability allows customers to link their VMware Cloud on AWS vCenter Server® instance with an on-premises VMware vCenter® Single Sign-On domain, which enables customers to manage all vSphere workloads in a unified tool regardless of where they are instantiated.

It is possible to migrate workloads from on-premises to native public cloud Infrastructure-as-a-Service (IaaS) or Platform-as-a-Service (PaaS), and many customers have implemented it in the past with help from migration tools and resources from cloud providers and third parties. It usually entails changing the hypervisor, reconfiguring networking, redesigning storage (if using shared storage on-premises), resizing VMs to fit into one of the pre-defined t-shirt sizes, and testing the application for resiliency, security, and performance. Based on our conversations with customers who have successfully or unsuccessfully done so<sup>2</sup>, such migration projects require a long planning cycle and in-depth understanding of the cloud destination's architecture and software licensing model as organizations are moving their workloads to a very different environment:

### Difference in architecture

Each public cloud provider takes a unique approach to building its underlying compute, storage, and networking infrastructure, and it usually requires certain cloud optimizations or adaptations for the applications to work properly in the public cloud infrastructure. A good example is regarding high availability (HA) and disaster recovery (DR) options for Microsoft SQL Server. Failover Cluster Instances is a common enterprise DR solution by restarting the SQL Server service on another node with shared storage. However, it is typically a challenge to implement in the public cloud due to lack of shared storage support for Windows. VMware Cloud on AWS enables customers to leverage Failover Cluster Instances because it uses VMware vSANTM as its storage engine and creating shared storage volumes is easy.<sup>3</sup>

### Difference in licensing

The applications running on top of a hypervisor may be licensed differently in different public clouds, which sometimes leads to significant cost implications. A typical difference is regarding the licensing of Oracle workloads. On top of its traditional licensing policy which is the most common scenario for licensing Oracle software products running on vSphere on-premises, Oracle introduced cloud policy licensing for licensing Oracle in Azure and AWS EC2, and a separate licensing Bring-Your-Own-License (BYOL) policy for licensing Oracle in the Oracle Cloud. In essence, with two different licensing policies in the cloud, Oracle is allowing for the licensing of Oracle software products in their own cloud at half the cost of licensing similar virtual machines in the cloud policy Authorized Cloud Environments of AWS and Azure. VMware Cloud on AWS enables customers to minimize Oracle licensing costs by allowing customers to license based on traditional licensing policy (as if the workloads were on-premises), and disabling extra or unnecessary physical CPU cores in servers at a BIOS/UEFI firmware level, just as they would be able to do on-premises.<sup>4</sup>

## 27 Days

Average to refactor and migrate an application to the public cloud.<sup>1</sup> At this rate, it would take 7.4 years for a business to migrate 100 applications.

### Difference in compatibility

From our conversations with enterprises on their past migration experience<sup>2</sup>, a major barrier for enterprises to move their legacy databases to native public cloud infrastructure is version compatibility. If the existing database is not on one of the versions supported by the public cloud provider, the customer will have to first upgrade the database to a supported version before migrating it to native public cloud infrastructure. The upgrade can become complex and time-consuming, which makes the effort difficult to justify. Customers do not run into the same issue with VMware Cloud on AWS as long as the databases are running on compatible vSphere versions.

### Scenario #2: Modernization of existing applications

In a cloud initiative, many organizations seek to take the opportunity to modernize how their applications are developed and managed, which involves modifying or adapting the architecture or internal structure of an application to allow it to run more easily and effectively in the cloud without changing its fundamental capabilities or external behavior (e.g., by breaking the application into microservices and/or further abstracting the application components from the underlying platform). This is a non-trivial task and is, in most cases, a multi-year project.

Based on our conversations with enterprises who have tried re-architecting their applications for the cloud<sup>2</sup>, despite the growing ecosystem of tools to automate and accelerate the process, there are challenging but critical questions that customers need to address before making the move:

- Am I leveraging the best-of-breed technologies for a certain application? Am I being forced into a certain cloud platform with potential compromise in security, availability/reliability, and performance?
- Do I have visibility into dependencies and network traffic between application components?
- How do I break down a monolithic application? How do I know which microservice talks to which tables? How do I architect the primary database and the replicas in a way that is efficient and secure? To what extent can I tolerate out-of-sync data?
- How should API's be managed?
- If certain components of my application reside on-premises, how do I build a secure network connection for on-premises components and cloud components to talk to each other?
- If customer-managed keys are used, do all the cloud services I intend to use support customer-managed keys?
- Does the cloud platform support third-party software and services I am currently using? If not, do I have a replacement for those third-party software and services?
- Is my infrastructure compliant in the cloud? What additional steps do I need to take, or additional security controls do I need to set up in order for my cloud infrastructure to be compliant? What part of the activities are taken care of by the cloud provider or by my organization?
- Does my organization have the necessary skillsets and processes in place to manage the stack in the cloud(s)? What changes need to happen before my organization is "cloud-ready"?
- Have I established monitoring and governance optimized for day two cloud operations and cloud cost management?

**HYBRID CLOUD BENEFITS<sup>6</sup>**

- 44% – Ability to scale as needed
- 41% – Ability to migrate applications as needed
- 34% – Choice of where to deploy applications
- 36% – Broader choice of hardware
- 35% – Best for application development
- 34% – Broader range of services available
- 31% – Can deploy on lowest cost infrastructure
- 29% – Benefit from fixed price and pay-as-you-go models
- 43% – Improve security and reliability

In addition to the technical and operational challenges, it is in the organization's best interest to rationalize the effort of application modernization by giving an estimate of the total cost of ownership (TCO) and return on investment (ROI) before making the move. When calculating the TCO/ROI of application modernization, customers must factor in the costs associated with re-writing and migrating the applications, as well as those associated with having separate tools and processes. For many applications, if organizations choose the right cloud platform, there is no necessity to re-factor or re-architect their applications to realize the benefits of the cloud, and "lift-and-shift" may be a good alternative. According to a Total Economic Impact™ study by Forrester Consulting<sup>5</sup>, customers of VMware Cloud on AWS experienced:

- Savings of more than \$1,000 per virtual machine in migration costs
- Savings of over \$2.7M by avoiding application rearchitecting
- Reductions in infrastructure and operational costs of 59% by migrating to the cloud vs same-capacity deployment on premises
- A return on investment of 108% over a three year period by migrating and modernizing with VMware Cloud on AWS

VMware Cloud on AWS also enables customers to modernize their applications in a stepwise fashion – customers can migrate their applications to VMware Cloud on AWS first, and modernize individual components as time and budget allow. For example, customers can first swap out their databases, add machine learning components when they are ready, and replace the web tier later.

### Scenario #3: Disaster Recovery as a Service (DRaaS) for existing workloads

There can be multiple scenarios for disaster recovery of existing workloads:

- Customers implementing a DR solution for the first time;
- Customers looking to reduce existing DR site costs by moving their DR operations to the cloud or wanting to modernize their existing DR solutions;
- Customers protecting additional workloads and complementing their existing DR strategy with a cloud-based DR solution for specific applications.

There are many DRaaS solutions natively available on public cloud platforms or provided by third-party vendors in the marketplace of public cloud platforms. VMware Site Recovery, disaster recovery delivered as a service for VMware Cloud on AWS, differentiates in the following ways:

**Increased reliability: secure, global DR with verified RTOs and low RPOs**

- Verify workload protection and desired Recovery Time Objectives (RTOs) with built-in, non-disruptive testing
- Protect your data, independent of the underlying storage, with native replication delivering 5-minute Recovery Point Objectives (RPOs)
- Recover your applications to a secure environment running on the mega-scale, global infrastructure of AWS

### Simplify DR deployment: build on existing know-how

- Minimize disruptive changes to your on-prem environment by using your existing software and hardware
- Leverage a consistent vSphere-based operational model both on-prem and off-prem
- Automate failover, fallback, network re-mapping, and scripting using proven VMware SRM
- Reduce DR Costs: comprehensive solution with built-in benefits
  - Offload infrastructure maintenance tasks to an elastic cloud environment managed and supported by VMware
  - Streamline time-consuming DR audits with system-generated failover reporting
  - Save on software costs – no extra software licenses required.

### Scenario #4: New application build-out

For building the next generation applications, different developers may have different preferences in terms of tools they'd like to use. Each of the top public cloud platforms has established a comprehensive set of software development tools as well as specialized services that differentiate it from other cloud platforms. If developers in an organization tend to standardize on the tooling of a certain cloud platform, it makes sense to go with native public cloud infrastructure of that platform for the test/dev workloads as it will reduce complexity and ensure compatibility of services.

In addition to developer preference, if applications require on-demand access to resources with granular billing (e.g. billing by the second), or if applications need flexibility and can benefit from the microservices architectural pattern, customers may consider adopting native public cloud services.

If AWS is the preferred cloud platform for building the next generation applications, VMware Cloud on AWS provides organizations with a simple and consistent way for their applications to access native AWS services by offering high bandwidth, low latency connectivity to those services, while enabling rapid, on-demand capacity provisioning to support development efforts.

### Scenario #5: New application in production

If the application requires the latest application-level technologies uniquely available in public cloud platforms, such as AR and VR, game tech, robotics, media services, and satellite, it would be best to host those workloads in the native public cloud platform of choice.

If one of the following applies to certain applications, VMware Cloud on AWS should be considered:

#### Bi-directional portability is key

According to a recent IDC survey, 77% of respondents indicate that they have moved or plan on moving workloads/data from public cloud to on-premises private cloud, due to concerns about data security, consolidation of IT resources, better TCO, etc.<sup>7</sup> VMware Cloud on AWS uniquely allows customers to move their vSphere-based workloads across cloud platforms without re-formatting or re-writing the applications and with little to zero downtime.

## RESOURCES

Get started now with VMware Cloud on AWS: <https://cloud.vmware.com/vmc-aws/get-started>

Learn more about our VMware Cloud on AWS service at the [VMware Cloud on AWS website](#)

Review the [VMware Cloud on AWS Solution Brief](#) and [VMware Cloud on AWS TCO 1-pager](#)

Watch informative demos, overview videos, webinars and hear from our customers: [VMware Cloud on AWS on YouTube](#)

Read our latest [VMware Cloud on AWS blogs](#)

Listen to the [VMware Cloud on AWS Unplugged podcasts](#)

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## Enterprise-grade security is desired

With NSX, customers get consistency in security from the data center to the cloud. Customers can use the foundational capabilities of stretching their L2 networks between on-premises and VMware Cloud on AWS as well as edge firewall services, internet connectivity, and logical networking within VMware Cloud on AWS. With the advanced NSX capabilities now in VMware Cloud on AWS, customers can also leverage powerful features such as micro-segmentation security for VMware Cloud on AWS.

## Storage performance matters

Cloud storage provided by top public cloud platforms usually break down into tiers: 1) archival, 2) hard disk (HDD), 3) solid-state drive (SSD), and 4) local solid-state (SSD/NVMe). VMware Cloud on AWS (IOPs-optimized instance) is built on local SSD/NVMe, which is the fastest and lowest latency storage tier that ensures optimal performance of database workloads like Microsoft SQL Server. This storage tier is not generally available on every native public cloud platform.

## Resiliency is critical

With Stretched Clusters for VMware Cloud on AWS, VMware Cloud on AWS drastically improves infrastructure availability by stretching clusters across two AWS availability zones (AZs) within the same region. If an AZ goes down, it is treated as an HA event and the virtual machine is restarted on the second AZ with zero RPO. VMware Cloud on AWS protects against failures of AWS AZs at an infrastructure level, so that customers do not need to architect it into their applications or pay for third-party solutions in the marketplace for such capabilities.

## Conclusion

As hybrid cloud becomes the most adopted cloud strategy, customers are often made to choose between VMware Cloud on AWS and native public cloud services. Customers need to take a use case-based approach and determine the right cloud solution for workloads in each use case. Before making the decision, customers need to consider how best the organization may leverage existing investments in on-premises infrastructure, be as comprehensive and granular as possible in laying out and addressing possible challenges in the cloud, and rationalize the decision with detailed TCO/ROI analysis. Choose native public cloud services if the main goal is to leverage cloud-native technologies and capabilities that are uniquely available in the cloud. Choose VMware Cloud on AWS for rapid realization of cloud benefits, consistent infrastructure and operations across on-premises and clouds, bi-directional portability of workloads, and enterprise-grade infrastructure capabilities and performance.

1. Enterprise Strategy Group: Hybrid Cloud Trends, October 2019
2. VMware Cloud Migration Journey In-Depth Interview, July 2018
3. A Denny Cherry & Associates White Paper: Microsoft SQL Server on VMware Cloud on AWS Total Cost of Ownership, April 2019
4. House of Brick: Optimizing Oracle Costs in the Cloud, VMware Cloud on AWS versus Oracle Cloud, 2018
5. "The Total Economic Impact™ of VMware Cloud on AWS," a commissioned study conducted by Forrester Consulting on behalf of VMware, August, 2019
6. VMware Core Metrics Survey, 2019 (N=600)
7. IDC, Public to Private: Top Reasons Behind Workload Migration, Doc # US45102019, May 2019