EBOOK:

VMware Cloud™ on AWS

Optimized for the next-generation hybrid cloud

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Introduction

If your organization runs VMware vSphere-based cloud infrastructure in your on-premises data center, but has been reluctant to migrate applications to the cloud for fear of losing some VMware vSphere-based cloud capabilities, VMware Cloud on AWS solves this problem by seamlessly integrating your familiar VMware virtualization and cloud management tools with Amazon Web Services (AWS). Many organizations believe that moving their applications to the cloud makes it necessary to introduce new tools, skills, and processes. This can present a new set of challenges because learning new tools, applying new skills, and adapting to new processes can be costly and time-consuming. These challenges include:

Lack of workload portability

Uncertainty surrounding workload and application portability and compatibility is a common reason that organizations are reluctant to migrate to the cloud. This often leads to them seeking to adopt a hybrid cloud environment that will enable them to seamlessly run their applications both on-premises and on the cloud, although this can raise concerns over the complexity of successfully implementing this capability.

Operational inconsistency

Implementing incongruent networks leads to operational inconsistency between an organization's on-premises data center and cloud environment. This can result in the adoption of a complex and costly strategy to optimize their cloud performance.

Multiple virtual machine formats

Another common issue arises when organizations use a different on-premises virtual machine (VM) format and/or hypervisor than the one they implement on the cloud. This can force them to develop or find a machine conversion solution, which is not typically a seamless process.

Hybrid cloud adoption without complexity: VMware Cloud on AWS

VMware Cloud on AWS enables your organization to bring VMware Software-Defined Data Center (SDDC)-based workloads to AWS, delivered as an on-demand service. This hybrid offering delivers high availability and durability by integrating the leading private cloud provider, VMware, with the AWS global infrastructure and breadth and depth of services.

This solution eliminates much of the complexity that is typically associated with deploying applications across a hybrid architecture by providing bi-directional workload portability between your on-premises and cloud SDDCs and granular VM-level control without having to maintain hardware. The environment is protected by enterprise-grade security that includes micro-segmentation and encryption, while a flexible consumption model helps align your IT spend with business needs.

With VMware Cloud on AWS, you can run VMware's compute, storage, and network virtualization solutions directly on the cloud without giving up any of the functionality, elasticity, or security you've come to expect from AWS. VMware Cloud on AWS provides enterprise-class application performance, reliability, availability, and security by optimizing VMware Cloud infrastructure technologies to run on AWS without nested virtualization.

This enables you to run production business critical applications across VMware vSphere-based hybrid cloud environments, with full access to native AWS services and the AWS global infrastructure. Sold, delivered, and supported by VMware and AWS as a service, VMware Cloud on AWS can be consumed on an hourly, on-demand basis or through a subscription.

VMware Cloud on AWS empowers your IT teams to manage their cloud-based resources with familiar VMware compute (VMware vSphere), storage (VMware vSAN), and network virtualization (VMware NSX) products. This versatility, along with VMware vCenter Server management, eliminates the hassles and overhead of using different tools, learning new skills or adopting new processes. Built on the same architecture and operational experience both on-premises and on the cloud, your organization can now quickly derive instant business value from use of the AWS and VMware hybrid cloud.

Benefits of adopting VMware Cloud on AWS

Leverage your existing VMware investments

You can use your existing VMware software licenses to run VMware Cloud on AWS. This helps you maximize the value of your existing VMware investments, allowing you to:

- Deploy a hybrid cloud solution that doesn't require new licenses or hardware
- Limit capital expenses and eliminate complexity as you transition to the cloud
- Minimize the need for staff to adopt new processes or learn new skills
- Predict costs more easily with a simple pricing model and the option of bringing your third-party licenses for simplified compliance

Optimized native AWS services integration

VMware Cloud on AWS is seamlessly integrated with native AWS services, giving you the VMware SDDC experience and providing access to all the available AWS offerings. It allows you to:

- Run applications on the cloud without the expense of re-factoring code
- Increase the value of your enterprise applications by giving you access to a broad range of AWS services for integrated application modernization
- Capitalize on cloud agility and scale in an operationally consistent and familiar way

Achieve operational consistency

With VMware Cloud on AWS, you can use the same toolset across on-premises and cloud environments, simplifying cloud adoption. VMware Cloud on AWS offers:

- 100% compatibility for existing and new enterprise workloads using VMware
- SDDC licensing, lifecycle management, and support from VMware and AWS
- A consistent and seamless hybrid IT environment that combines the VMware software with the unmatched functionality, security, and operational expertise of AWS

Powered by AWS

VMware Cloud on AWS brings VMware SDDC to the massively scalable AWS global infrastructure, giving you a simple and consistent way to access the full breadth and depth of AWS services. This hybrid cloud solution:

- Runs directly on the dedicated Nitro-based Amazon Elastic Compute Cloud (EC2) bare metal infrastructure with high bandwidth and advanced security
- Gives you access to public API endpoints for AWS services
- Allows you to host private resources in your Amazon Virtual Private Cloud (Amazon VPC) to help you maintain a strong security posture

VMware Cloud on AWS use cases

Run production applications across VMware vSphere-based private, public, and hybrid cloud environments. Implementing this on-demand service makes it possible for your organization to also more easily leverage and optimize native AWS services such as storage, databases, analytics, and more.

VMware Cloud on AWS integrates VMware's flagship compute, storage and network virtualization products (VMware vSphere, VMware vSAN and VMware NSX) along with VMware vCenter management, and optimizes it to run on elastic, bare-metal AWS infrastructure. With the same architecture and operational experience on-premises and on the cloud, IT teams can now quickly derive instant business value from use of the AWS and VMware, as evidenced in the following use cases:.

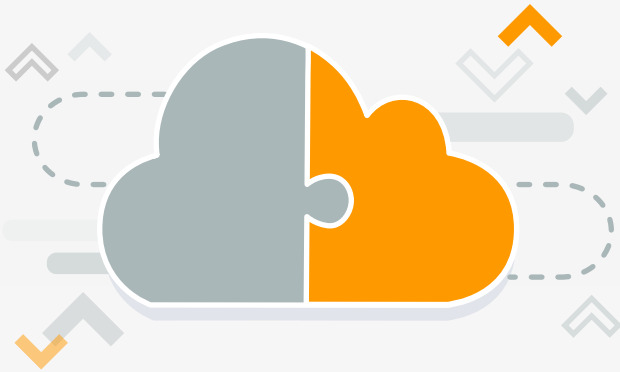
Cloud migration

The process of migrating to a hybrid cloud environment, or employing bi-directional workload mobility, can sometimes be complicated by software and network incompatibility between your on-premises and cloud environment. Migrating to VMware Cloud on AWS, however, is simplified by the use of VMware Hybrid Cloud Extension (HCX). This helps to overcome the challenges by building a layer on top of your existing site-specific implementations. It allows you to extend your networks and environments to the cloud without extensive reconfiguration or upgrades.

HCX has the ability to migrate workloads across different versions of vSphere (5.0 or later), and also provides WAN optimization, compression, and de-duplication to enable high throughput and accelerate cloud adoption. In addition, the network extension capabilities make it possible to stretch networks without reconfiguring, so VMs can be moved between your on-premises and cloud environments without having to change IP addresses.

Using vMotion enables the live migration of VMs with no downtime and helps to ensure that production critical VMs with high availability requirements can remain up and running throughout the migration process. There is also a bulk migration option that can be used to move hundreds of VMs in parallel and at scale, on a predefined schedule, and a cold migration option that can be used to move VMs that are powered off.

These services work seamlessly in conjunction with Microsoft Active Directory and AWS Directory Service to ensure the process of migrating to VMware Cloud on AWS is smooth and efficient.



Use cases (cont.)

Data center extension

By extending the capabilities of your on-premises data center to the cloud using VMware Cloud on AWS, you also benefit from on-demand capacity. You can leverage bi-directional workload portability between your on-premises data center and VMware Cloud on AWS, ensuring that you meet dynamic capacity needs for production applications while maintaining one consistent set of policies.

Shift your IT workloads to a familiar vSphere environment using this hybrid offering and also gain the ability to more rapidly integrate and optimize native AWS services. This also helps your organization transition to an OpEx pricing model, so your IT teams can focus on driving business benefits and innovation instead of having to deal with constant infrastructure lifecycle management. VMware Cloud on AWS also makes it easier to control IT initiatives for development teams and line-of-business managers.

In addition, you will be able to more readily leverage the elastic scalability of AWS to meet expected spikes in demand and reduce costs by streamlining the number of data centers you have to manage—which can help improve overall agility.

Next-generation applications

Modernize your applications and manage them more efficiently by migrating Oracle and/or Microsoft SQL Server to VMware Cloud on AWS. These database systems are employed by organizations of all sizes around the world and are used for a variety of relational database and custom-built solutions by ISVs. Migrating Oracle and Microsoft SQL Server workloads to VMware Cloud on AWS enables your organization to quickly modernize your legacy applications and focus on newer, more innovative solutions. This hybrid offering eliminates the need for such undifferentiated heavy lifting activities such as procuring and managing hardware. It also lifts the burden of software and firmware patching for compute, networking, and storage components.

Running Oracle and Microsoft SQL Server databases and applications on VMware Cloud on AWS can help your organization improve flexibility because it makes it easy for you to set up, scale, and operate your workloads. Once deployed on VMware Cloud on AWS, these workloads become interoperable with your on-premises environment and AWS.

Use cases (cont.)

This solution supports advanced, highly available architecture patterns such as Oracle Real Application Clusters (RAC) and Microsoft SQL Server AlwaysOn Availability Groups across Stretched Clusters in VMware Cloud on AWS. VMware Cloud on AWS can be deployed in multiple Availability Zones (AZs) and AWS Regions, and offer scalability on demand to meet your organization's business needs, while removing the need for you to plan for the next 2-3 years.

Realize the value of moving Oracle and Microsoft SQL Server databases, applications, and workloads to VMware Cloud on AWS:

Benefits of running databases on VMware Cloud on AWS

Accelerated provisioning

- Takes weeks or months to procure and add new bare-metal servers on-premises with no access to servers during this time
- Provisioning your Oracle environment can be done almost instantly because the underlying infrastructure available with VMware Cloud on AWS is ready to use
- Everything (network, firewall, storage, compute) in VMware Cloud on AWS is provisioned

Application modernization

- Employ microservices to generate new software patterns
- Move web servers to containers quickly and easily
- Cost-effectively improve performance

Optimized use of more than 160 native AWS resources

- Move your legacy tape backup solution to the cloud by using Amazon Simple Storage Service (Amazon S3) and/or Amazon Glacier and AWS Storage Gateway for backups and archiving, and Amazon Elastic Load Balancer to direct traffic to web servers
- Integrate managed AWS Directory Service and/or Amazon Route 53 for your naming resolution and application servers
- Encrypt VMware Cloud on AWS storage using AWS Key Management Service

Use cases (cont.)

Disaster Recovery

As your organization migrates to, and operates on, VMware Cloud on AWS, you may discover that you also need to update your Disaster Recovery (DR) strategies to limit downtime and its potential negative impact on your business. DR solutions using VMware Cloud on AWS can help accelerate restoration and simplify operations.

After you have deployed the VMware SDDC in VMware Cloud on AWS, the disaster recovery use case enables you to quickly activate the site recovery service and components, including replication and orchestration. Upon activation, the site recovery service allows access to the site recovery UI, and it is linked to the download group with the on-premises components.

The disaster recovery use case can be used in conjunction with your existing solutions that are based on VMware Site Recovery Manager (SRM) and VMware vSphere Replication. If you use VMware Site Recovery Manager in your on-premises environment, you can also use it to rapidly execute your disaster recovery solution on VMware Cloud on AWS.

Unified management across your entire environment delivers high levels of control and increased resource efficiency with VM-level granularity, while the consistent operating environment helps ensure faster time-to-protection. DR solutions on VMware Cloud on AWS also reduce the need for idle resources with elastic, on-demand compute and storage capabilities, and negate the need for a secondary DR location.

One of the main tenets of this DR solution is the ability to backup and restore to VMware Cloud on AWS. It is based on AWS object level storage, using such native services as Amazon S3, AWS Storage Gateway, and Amazon Glacier to transfer data to and from these storage services through your network. This ensures the data is accessible from any location, and this approach requires only these storage tiers and includes optional connectivity to enhance your Recovery Time Objective (RTO). Backup and Restore can also be used with VMware SRM to protect workloads from higher RTO requirements, as the VMware SDDC cluster scales in capacity during DR failover.

For solutions with low Recovery Restore Points (RPO), data replication emerges as a key differentiator from the Backup and Restore approach described above. In this case, data replication is configured from the primary node in the database node in the primary site, to the secondary database node in the DR site.

Use cases (cont.)

The supported replication techniques depend on the database engine being used. AWS offers the AWS Database Migration Service (DMS) to support continuous database replication by capturing changes on the source database and applying them in a consistent way to the target. The Pilot Light solution can be used in conjunction with VMware SRM to protect applications with low RTO requirements, and backup/recovery capabilities for workloads with higher RTO requirements.

Simplify the recovery of low RTO/RPO requirement mission-critical workloads by using VMware SRM because it allows you to expand DR operations with on-demand workload protection built on proven VMware orchestration, automation, and replication technologies. You can obtain protection between your on-premises and VMware Cloud on AWS environments, as well as between multiple VMware Cloud on AWS environments, in separate AWS Regions and AZs.

The flexibility of DR infrastructure solutions built using VMware Cloud on AWS can help meet your necessary RTO/RPO requirements. It also helps reduce costs because you will no longer have to pay to manage and maintain a full set of resources at a secondary site.

Applying these existing disaster recovery solutions can help you realize the benefits of operational simplification and a more rapid time to protection for disaster recovery and testing. It also proves beneficial by providing simplified, modernized DR solutions, ample storage capacity, rapid retrieval of files, and ability to add any amount of data quickly—all built on a stable and secure platform.

Technical components of VMware Cloud on AWS

Compute

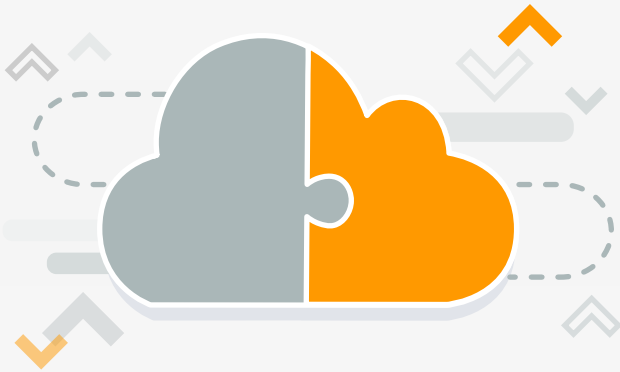
With comprehensive, powerful, and highly optimized Amazon EC2 instances running through the VMware vSphere virtualization platform, a scalable, single tenant infrastructure supports 4 to 16 node clusters delivered on dedicated, highly performant, and secure Nitro-based bare metal infrastructure. Additional hosts can be manually added to a VMware Cloud on AWS cluster using the VMware Cloud Portal, or programmatically with VMware Elastic Distributed Resource Scheduler (DRS). Each Amazon EC2 node used for VMware Cloud on AWS will be provisioned using a common, familiar format, and will have compute capacity that includes 36 physical cores (pCPUs) and 72 virtual cores (vCPUs) per node, with 512GB RAM and a dedicated host in a minimum 4-node cluster.

Consider using the Amazon EC2 R5 instance to support the high memory requirements of high-performance databases, real-time big data analytics, and other enterprise applications powered by the AWS Nitro System. Also available are Amazon EC2 I3 instances, which can be used for I/O intensive workloads and are a great fit for high transaction, low latency workloads.

Network

VMware Cloud on AWS leverages VMware NSX, the SDDC network virtualization platform that features advanced networking and security services, including switching, routing, firewalling, and load balancing. The host nodes and instances will be supported by robust networking capabilities of VMware Cloud on AWS, allowing the interoperability of the nodes to function with very high throughput. This enables you to automate network and security services and policies that are consistent with what you have on-premises, delivered through NSX, with secure connectivity to and from application workloads.

A simple networking mode (Firewall rules, VPN, etc.) for customers who are not familiar with NSX will be available through the VMware Cloud Web Console. An advanced networking mode with full access to NSX functionality will also be available. Hence, if your organization relies on full NSX functionality, you should be aware of the initial “simple mode” limitations.



Technical components (cont.)

Storage

Proven storage solutions are provided by VMware vSAN, which allows you to leverage zero-click shared storage that is natively integrated with vSphere. All the available storage will be housed on the 16TB of solid-state storage available in each node mentioned above and will operate using vSAN. You can increase storage efficiency and performance with advanced data services, including Quality of Service and snapshots. VMware Cloud on AWS utilizes an "all flash" vSAN storage solution built on low-latency Non-Volatile Memory Express (NVMe)-based instance storage.

You can also increase the value of VMware Cloud on AWS adoption by using Amazon Elastic Block Store (Amazon EBS)—which runs on Amazon R5 instances (Amazon EC2.r5.metal)—to augment your existing vSAN solution in storage-dense environments. This option enables you to store an additional 15TB to 35TB in increments of 5TB, based on the amount of storage you may require. The versatility of this solution makes it possible for you to implement this on all hosts within an existing SDDC cluster—if at least one is provisioned accordingly—to fit your needs.

If you seek a storage option that must be run in Amazon VPC, consider running the Storage Optimized Amazon EC2 I3 instances. These are designed for I/O intensive workloads and are a great fit for high transaction, low latency scenarios. Amazon EC2 I3 instances are commonly used for relational databases, NoSQL databases, search engines, real-time analytics, and more.

vSphere management and virtualization

VMware vSphere features available within VMware Cloud on AWS include the high availability of vSphere, vMotion, and VMware's Distributed Resource Scheduler (DRS). Workload portability is delivered through vMotion across hosts within a cluster, as well as VM cold migration and scripted bulk VM migration between your on-premises environment and AWS. The elastic DRS capabilities in VMware Cloud on AWS will make it possible for you to balance workloads across newly provisioned clusters in minutes (not days or weeks), without having to acquire new hardware.

Using VMware Cloud on AWS

Consuming native AWS services

VMware Cloud on AWS is delivered as a service, with AWS managing the physical resources and VMware managing the hypervisor and management components (including monitoring, patching, upgrades, etc.). Your organization manages the VMs and networks. To build your architecture, you will begin by selecting the size of the cluster and the provisioning process will begin. The full VMware Cloud on AWS stack and ESX nodes will be automatically provisioned and configured at launch with a single tenant AWS account that will be owned and operated by VMware. You will be able to designate an existing AWS account, or create a new one to interoperate with the Amazon VPC that will be created to run on VMware Cloud on AWS..

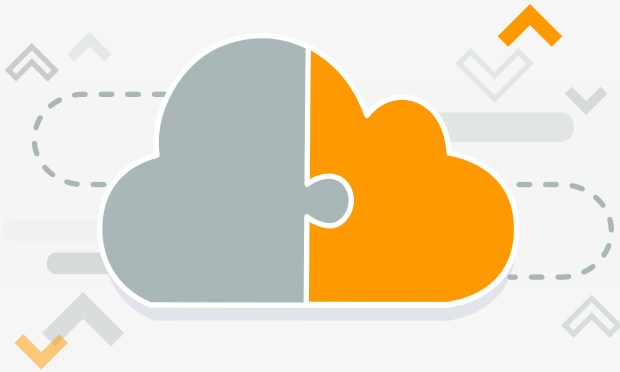
In this section, we will cover some example scenarios that you may encounter once you have connected VMware Cloud on AWS to your existing data center as part of a hybrid architecture.

Migrating a VM

You can use vMotion to migrate a VM from an existing data center to VMware Cloud on AWS. To move a VM into VMware Cloud on AWS using AWS Direct Connect, the VM will leave the VLAN and go through the virtual private Gateway (VGW) in the VMware account and end up being routed directly to the ESX that has been set up within VMware Cloud on AWS. These are the same steps you would take with vMotion in an existing data center environment, and is not a new interface or plug-in. When using AWS Virtual Private Network (AWS VPN), the traffic goes through the NSX edge instead of the private VGW.

Copying objects to an Amazon S3 bucket

For storage, you will be able to copy an object from a VM within VMware Cloud on AWS, and route it directly through a VPC to a separate VPC private endpoint and then to Amazon S3. This means the packets will never have to go out to the public Internet, following standardized best practices.



Using VMware Cloud on AWS (cont.)

Connecting to native AWS services

To connect a VM from VMware Cloud on AWS to an AWS Managed Service, such as an Amazon Redshift cluster, the path is similar to what is described in the page above for storage. The VM will go from the Amazon VPC hosted on VMware Cloud on AWS to a separate VPC private endpoint and then to Amazon Redshift. This enables you to outsource your big data capabilities, so they do not use excessive resources on your cluster, while also turning them into a managed service.

Connecting to a web server

When connecting a web server hosted on a VM in VMware Cloud using public Internet access, you begin by sourcing the traffic from the Internet and connecting that to a VPC within VMware Cloud on AWS. To establish this connection, you will assign an elastic IP to your VM. The traffic will then be sourced through your gateway to an established NSX Edge node.

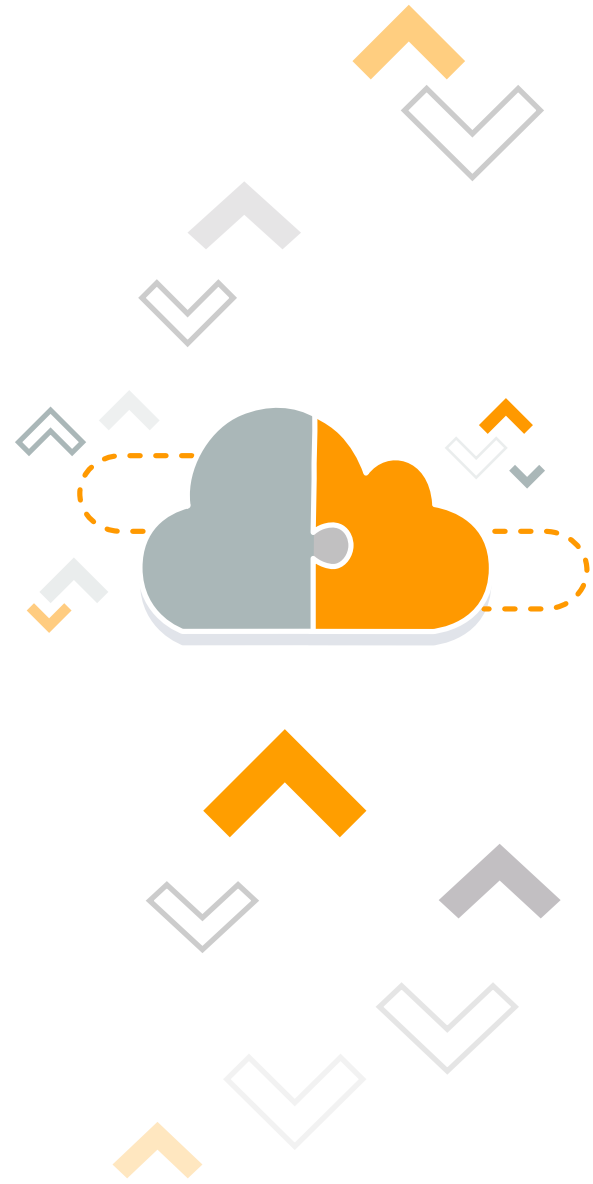
Getting started

VMware Cloud on AWS makes it easier for your organization to run VMware workloads on AWS, giving you a simple path to hybrid cloud deployment. Adopting this service will allow your organization to preserve your investments in existing applications, licenses, and processes, while taking advantage of the advanced capabilities that AWS has to offer.

With just a few clicks, you will be able to rapidly provision and scale AWS resources that are operationally consistent with vSphere. VMware Cloud on AWS delivers workload portability powered by the VMware technology in your on-premises data center, combined with the cloud-scale resources and global footprint of AWS. It is truly a next-generation solution that gives you the best of both worlds.

Post-migration, the hybrid environment enables the simplification of workload management, with the downtime caused by having to replace failing hardware no longer a primary concern. You will also realize the value of rapid scalability by right-sizing your workloads the first time, and not having to pay for unused hardware.

To get started, engage with VMware Sales or your AWS Sales Representative for a face-to-face workshop to map out a vision, assessment, strategy, and plan for migrating your on-premises SDDC to VMware Cloud on AWS..



Microsoft SQL Server on VMware Cloud on AWS Resources

VMware Cloud on AWS Home

VMware Cloud on AWS (on AWS website)

VMware Cloud on AWS (on VMware website)

VMware Cloud on AWS webinar series

Webinar 1 – Introduction to VMware Cloud on AWS

Webinar 2 – Accelerate Hybrid Cloud Adoption

Webinar 3 – Extend your Data Center with VMware Cloud on AWS

Webinar 4 – Modernize Disaster Recovery with VMware Cloud on AWS

Webinar 5 – Modernize Oracle databases and applications with VMware Cloud on AWS

Webinar 6 – Maximize the value of the Microsoft SQL Server investments with VMware Cloud on AWS

TCO tools

VMware Cloud on AWS Pricing Calculator

VMware Cloud on AWS Sizer and TCO

VMware roadmap

VMware Cloud on AWS Roadmap