



Azure VMware Solution

Run VMware Natively on Azure

Shannon Kuehn

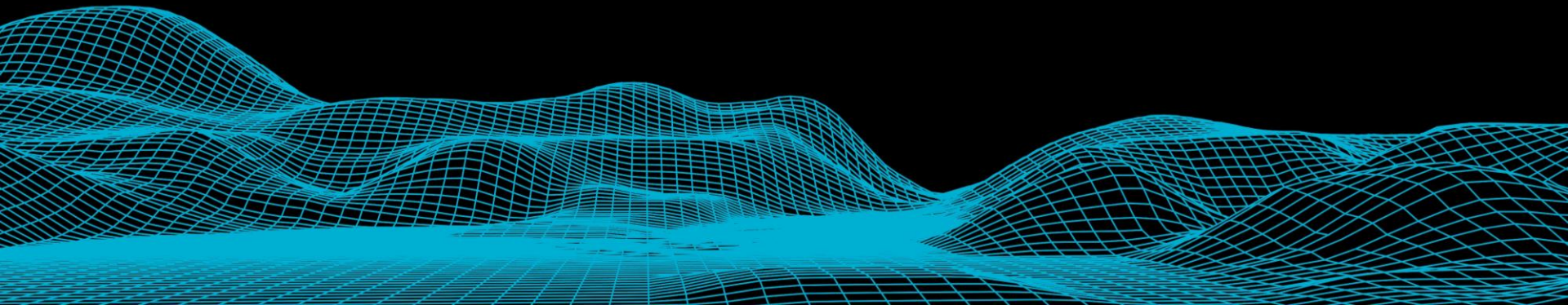
Senior Cloud Advocate

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Introduction & Background



Cloud migration considerations

Need for speed

Software end of support

Software & Hardware refresh

Urgent capacity needs

Datacenter contract expiry

Cost and complexity

Compliance and standards

Application refactoring

Business continuity/downtime

Project resourcing

People and processes

Impact of change management

Need for operational consistency

Update DR and Backup process

Need to grow cloud competency

Cloud migration strategies:

Rehost

Redeploy as-is to cloud

- Reduce Capex
- Free up datacenter space
- Quick cloud ROI

Refactor

Minimally alter to take better advantage of cloud

- Faster, shorter, updates
- Code portability
- Greater cloud efficiency (resources, speed, cost)

Rearchitect

Materially alter/decompose application to services

- App scale and agility
- Easier adoption of new cloud capabilities
- Mix technology stacks

Rebuild

New code written with cloud native approach

- Accelerate innovation
- Build apps faster
- Reduce operational cost

IaaS

and

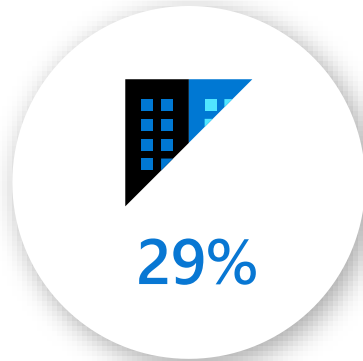
**Azure VMware
Solutions**

(Azure Dedicated)

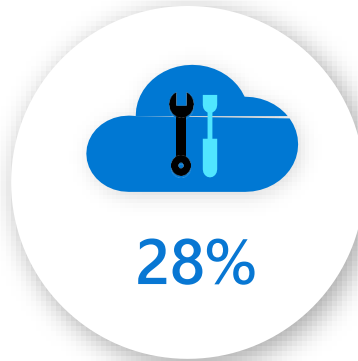
**Containers
PaaS**

**PaaS
Serverless
Microservices**

Challenges with migration of existing app estate



Risk of business
disruption



Cloud skilling
gap



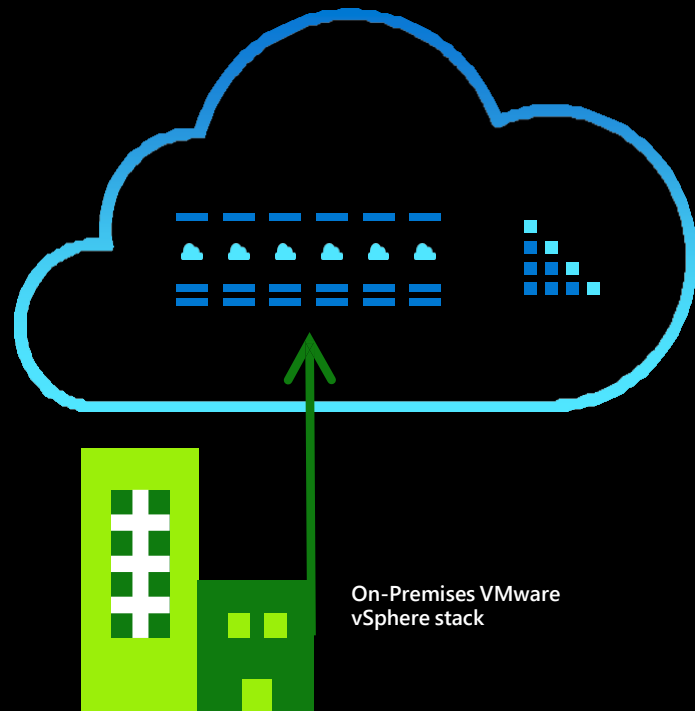
Refactoring
complexity

What is Azure VMware Solution?

It is a **comprehensive VMware environment on dedicated Azure infrastructure**. Built by Microsoft and VMware.

It runs **your VMware workloads natively on Azure**, supported and operated by Microsoft.

It allows **you to manage, and secure applications across VMware environments and Microsoft Azure** with a consistent operating framework.



Microsoft Azure

Infrastructure designed for every workload



Consistent operational experience across Azure



Modern
Apps



Business
Critical



Dynamic and
Scalable

Azure native IaaS and
PaaS offerings



AI



Monitoring



DevOps



Dev and Test



Backup



Security

Seamless integration with
other Azure Services



CRAY

Skytap
for IBM Power

NetApp

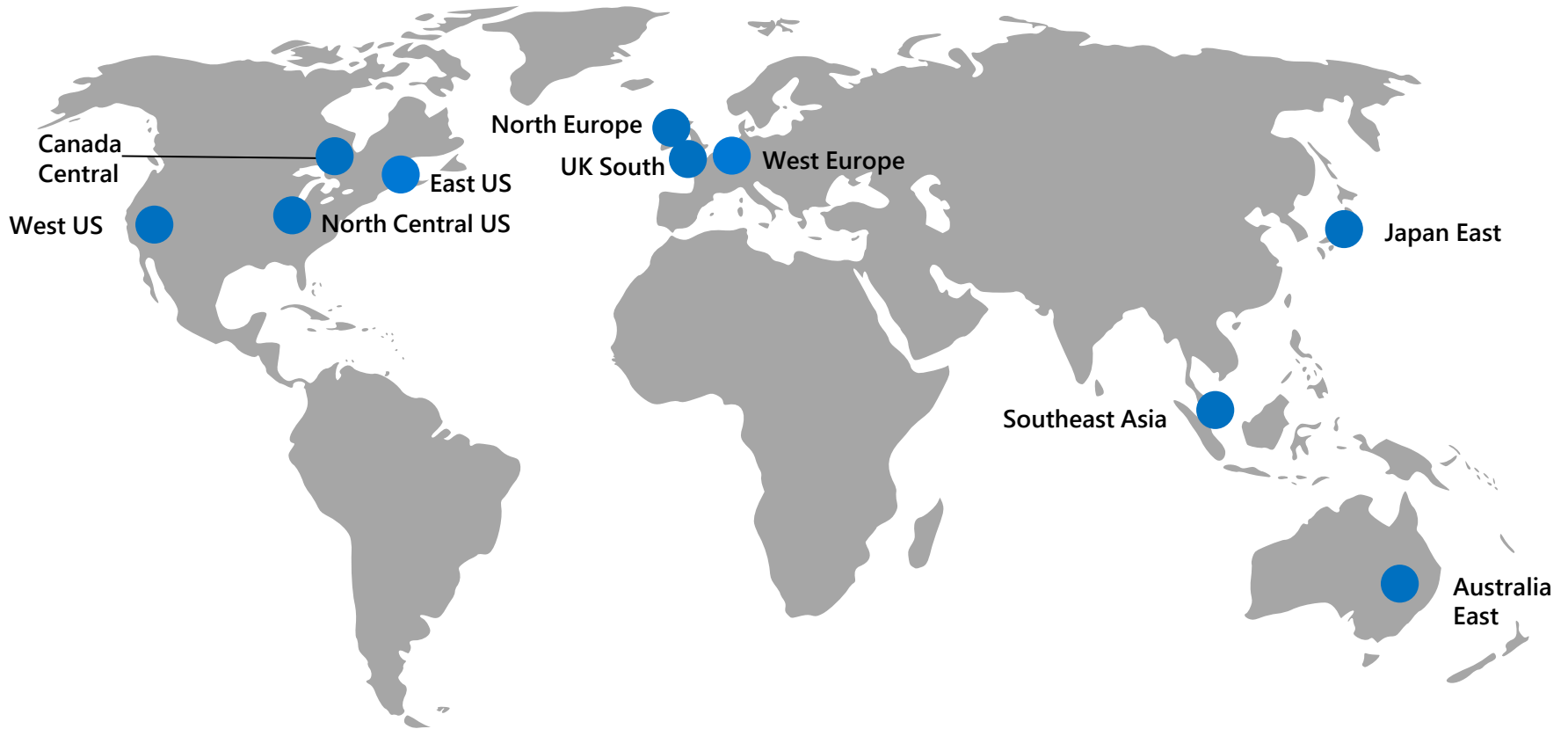
vmware®

SAP

NUTANIX™

Purpose-built Azure for
platform continuity

Azure VMware Solution Availability



Migrate and Extend VMware workloads to the cloud

Azure VMware Solution



Built-in continuity, speed
and scale with modern
infra



Use existing VMware
skills and tools



Seamlessly modernize
apps over time with Azure



Unmatched pricing for
Windows and SQL Server

← Accelerate your journey to the cloud →

Getting started with Azure VMware Solution

Use cases



Plan &
Deploy



Migrate



Manage &
Operate



Modernize



Datacenter expansion,
reduction, or retirement



Speed and simplification
of migration/hybrid
cloud



Disaster recovery and
business continuity

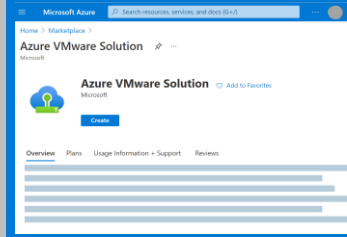


App and business
modernization, dev and
test

Microsoft + VMware
Specialists, Programs, Partners



Create and deploy AVS SDDC
environment from Azure portal
in just a few hours



Connect AVS and VMware on-
Prem

Use VMware HCX to quickly
Migrate VMs

Visualize VM resources in Azure,
continue to manage with
vSphere



Self-service elasticity & scale
Industry certifications
High availability, DR and backup
Low-latency ExpressRoute

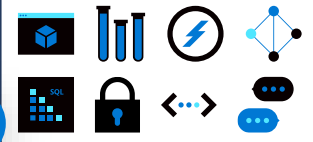


VMware Cloud Foundation

- Native vSphere experience
- vSAN for storage
- NSX-T networking
- HCX for migration



Azure Services

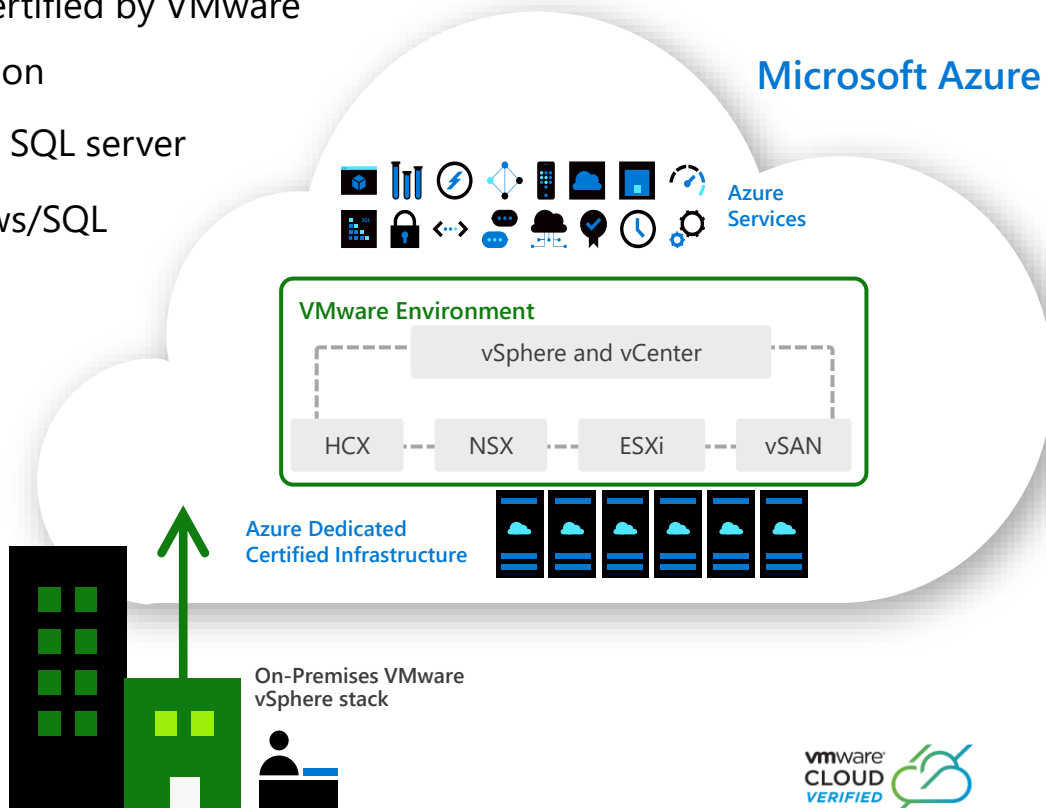


Modernize apps with seamless
connection to Azure Services

- Central API Management
- Hybrid Hub and spoke
- Azure Security Center
- Azure Monitor
- Storage Optimization

New and differentiated features

- Microsoft **first party Azure service**, cloud certified by VMware
- Seamless **Azure experience**, native integration
- **Azure Hybrid Use Benefit** for Windows and SQL server
- Free **extended security updates** for Windows/SQL Server 2008/2008R2
- **Single Point of Support**
- Latest **VMware technology updates**
- **HCX Enterprise Edition** available
- High performance **dedicated hosts**
- Unified **licensing and consumption**
- **Simplified NSX Interface**



Azure VMware Solution Software and Hardware Package

Software Specifications

ESXi - 6.7U3 Enterprise Plus

vCenter - 6.7U3 Standard

vSAN - 6.7 Enterprise

NSX-T - 2.5 Advanced

HCX - 4.0



Hardware Specifications

Model - AV36 (36 cores)

CPU- Intel Xeon Gold 6140 2.3 GHz

Memory - 576 GB

Storage vSAN Caching - 2 × 1.6 TB NVMe

Storage vSAN Capacity - 8 × 1.92 TB SSD

Network - 2 - Dual Port 25 GbE

*HCX Enterprise available – monthly pricing
(public preview)

*Minimum 3 nodes per vSphere cluster

*Maximum 16 nodes per vSphere cluster

Maximum 96 nodes to an Azure Private Cloud instance

Azure VMware Solution Features

Familiar VMware technology

- Native vSphere support
- Fully featured networking stack
- vSphere management, vSAN, and NSX-T
- HCX Enterprise now available to support migration



Integration with Azure

- Management and governance
- Security
- Low-latency connectivity to Azure
- Leverage Azure ecosystem
- Single point of support
- DevOps toolchain



High performance cloud infra

- Optimized elastic infrastructure
- Automated self-service provisioning
- Dedicated, isolated, bare metal infrastructure
- Redundancy and placement control
- Security and encryption

Azure pricing benefits for Azure VMware Solution

Hourly Pay as You Go (PAYG) billing

Reserved Instances

1 year or 3 years Reserved Instance discounts for Azure VMware Solution.

Save 30-50% on the cost of dedicated nodes with RIs



Azure Hybrid Benefit

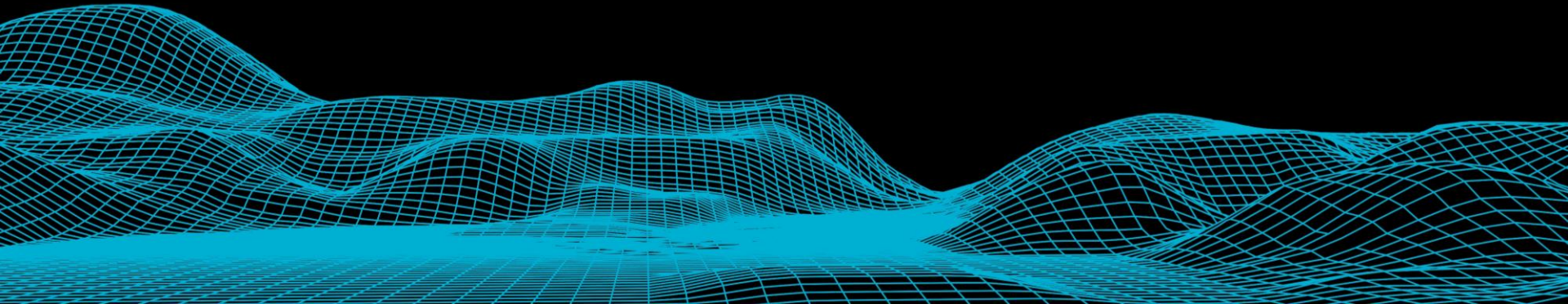
Bring Windows Server and SQL Server on-premises licenses with Software Assurance to Azure



Free Extended Security Updates

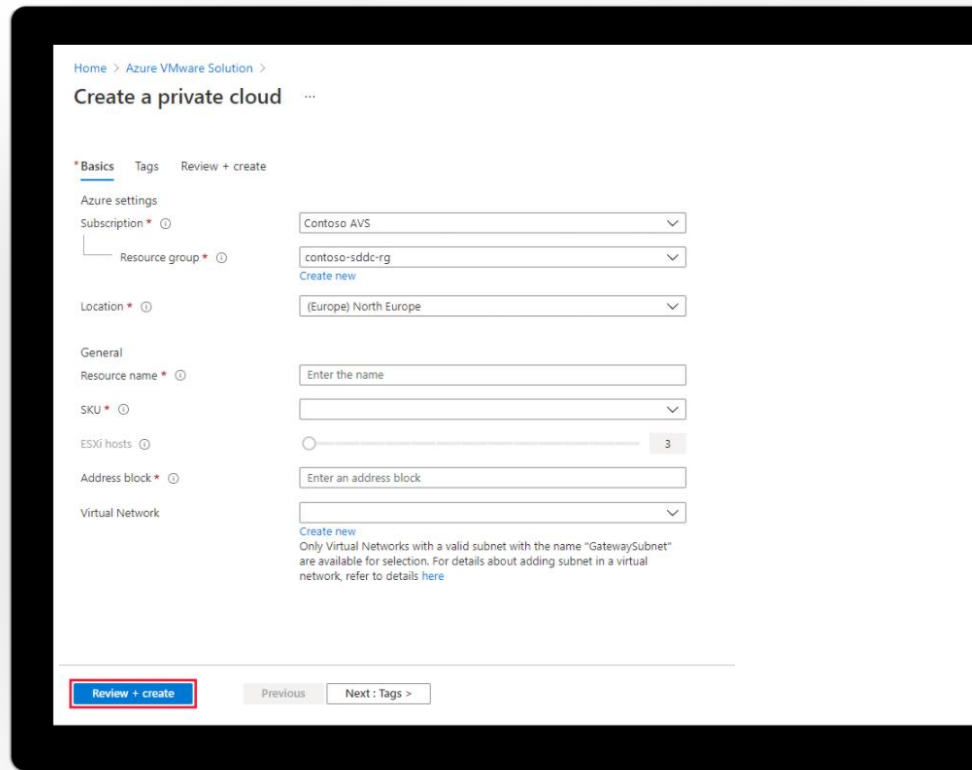
3 years free security updates for Windows Server 2008/2008R2
SQL Server 2008/2008R2

Deploy



Steps to deploying the SDDC through Azure

- 1 Deploy Private Cloud in Azure
- 2 Create a virtualized network (VNet)
- 3 Create an Azure Bastion & jump host
- 4 Create a gateway subnet & VNet gateway
- 5 Create auth key in VNet gateway
- 6 Connect AVS ExpressRoute to VNet gateway



The screenshot shows the 'Create a private cloud' wizard in the Azure portal, specifically the 'Basics' tab. The breadcrumb navigation at the top reads 'Home > Azure VMware Solution >'. The title is 'Create a private cloud' with a three-dot menu icon. Below the title are tabs for 'Basics', 'Tags', and 'Review + create'. The 'Basics' tab is active and contains the following fields:

- Azure settings:**
 - Subscription ***: A dropdown menu showing 'Contoso AVS'.
 - Resource group ***: A dropdown menu showing 'contoso-sddc-rg' with a 'Create new' link below it.
- Location ***: A dropdown menu showing '(Europe) North Europe'.
- General:**
 - Resource name ***: A text input field with the placeholder 'Enter the name'.
 - SKU ***: A dropdown menu.
 - ESXi hosts**: A slider control set to '3'.
 - Address block ***: A text input field with the placeholder 'Enter an address block'.
 - Virtual Network**: A dropdown menu with a 'Create new' link below it.

Below the 'Virtual Network' dropdown, there is a note: 'Only Virtual Networks with a valid subnet with the name "GatewaySubnet" are available for selection. For details about adding subnet in a virtual network, refer to details [here](#)'.

At the bottom of the form, there are three buttons: 'Review + create' (highlighted with a red box), 'Previous', and 'Next : Tags >'.

Connect VMware on-Premises and AVS

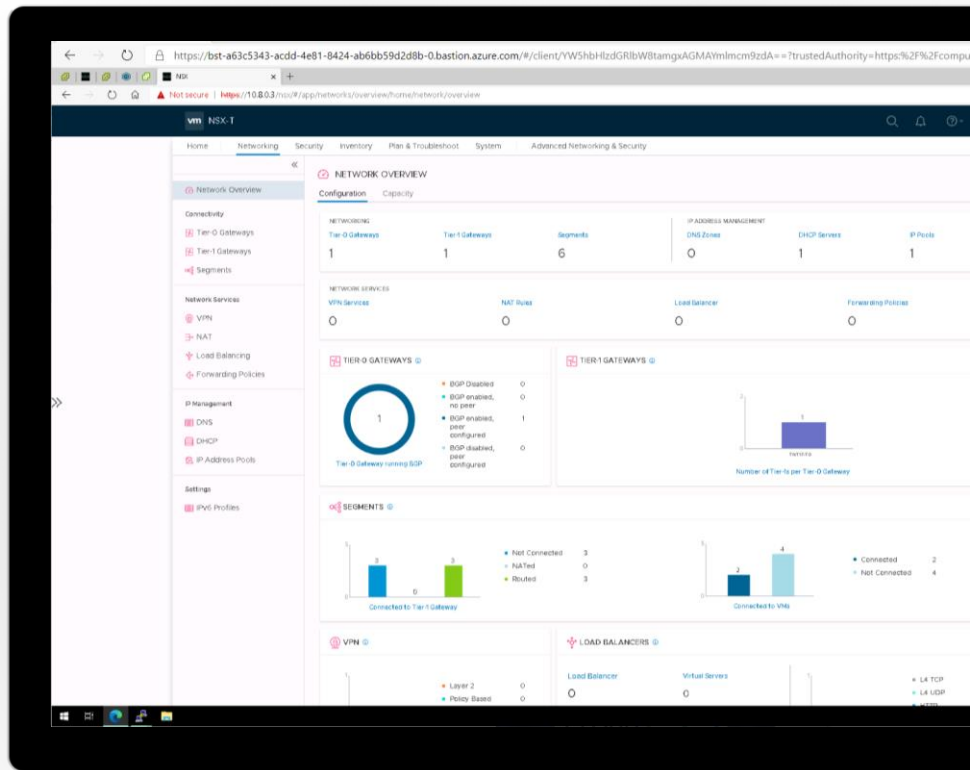
1 Connect to jump host behind Azure Bastion

2 Connect to vCenter

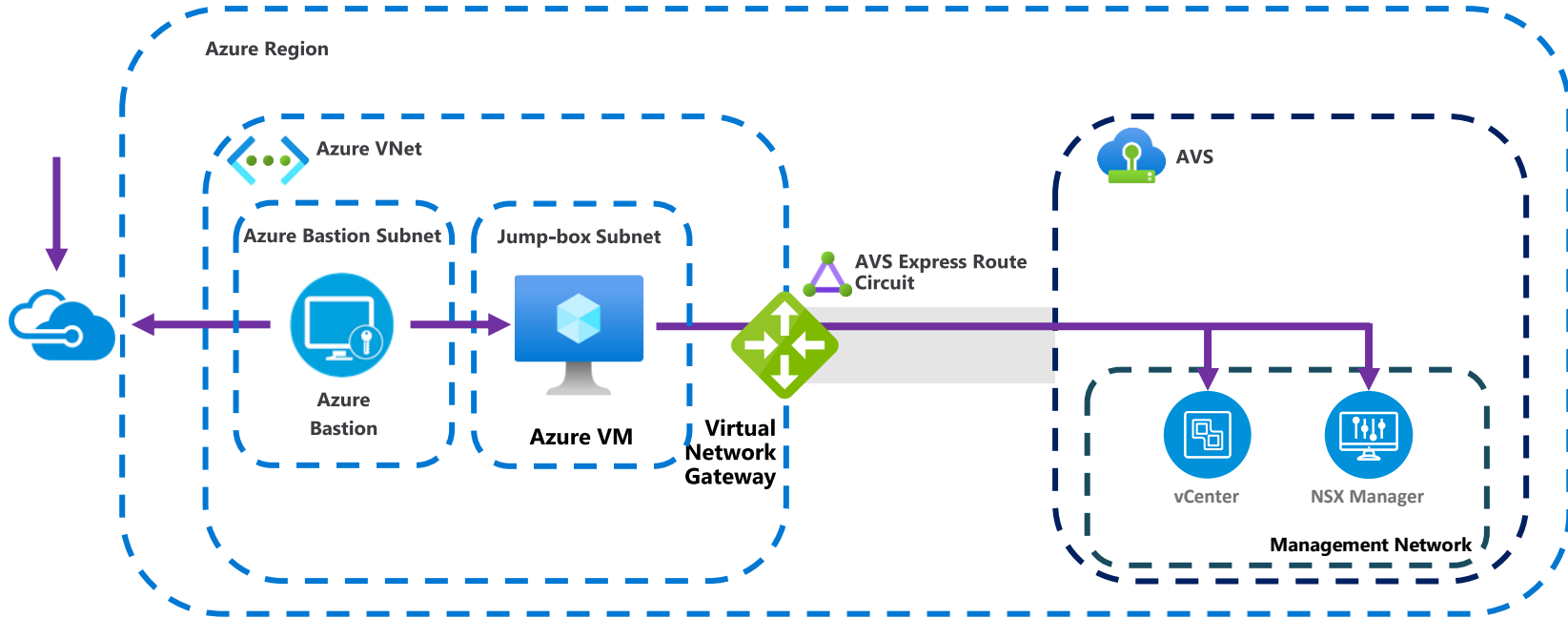
3 Connect to NSX-T

4 Enable Global Reach for on-premises access

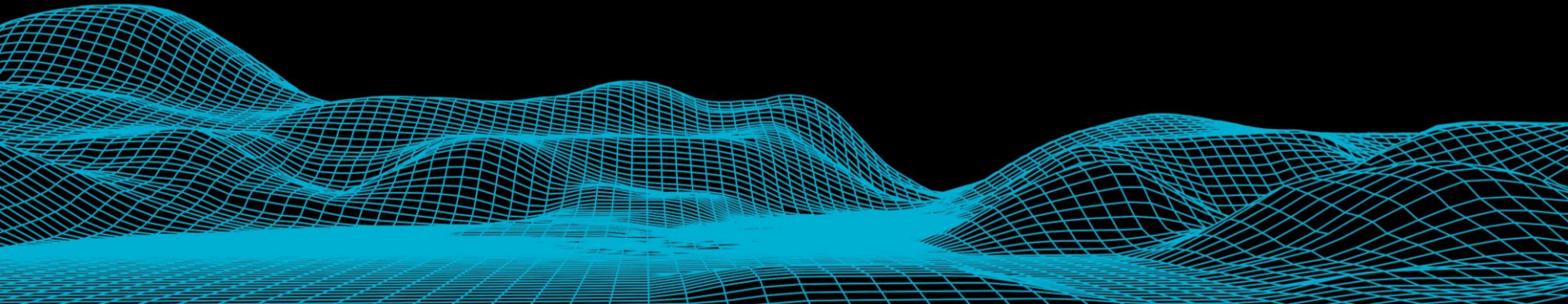
5 Join domain & configure identity source



Jump-Box VM with Azure Bastion

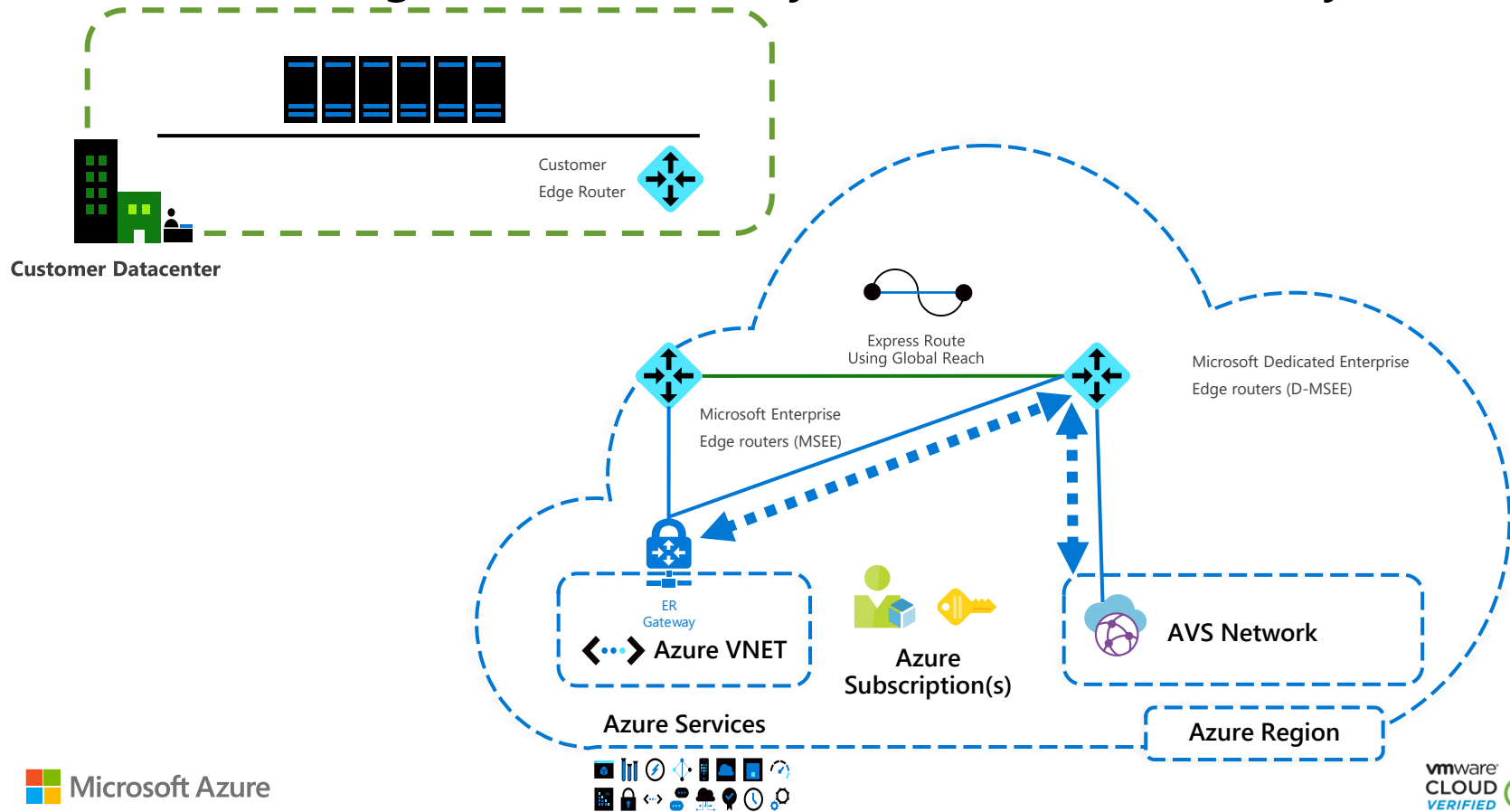


Network Architecture



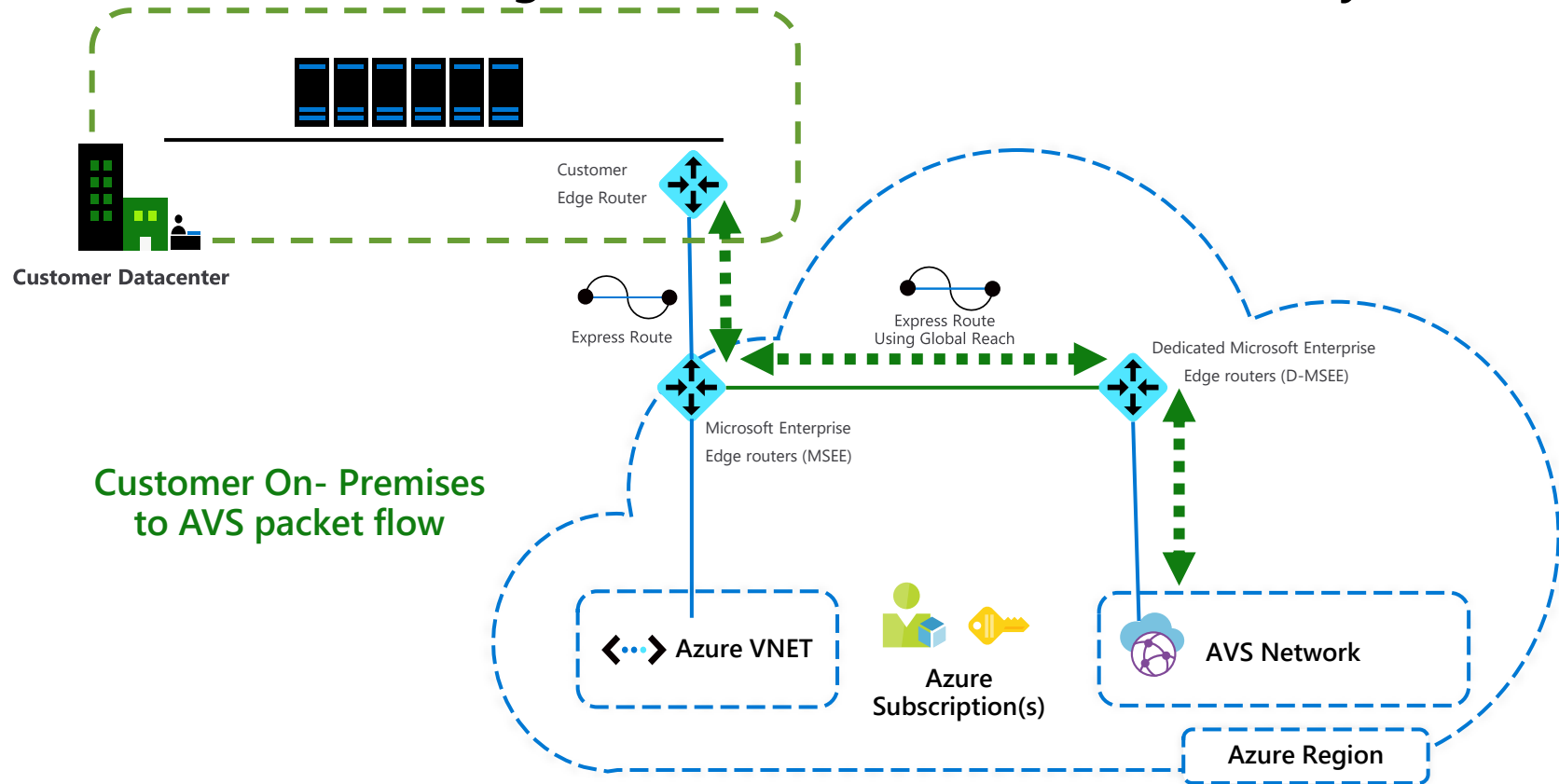
Azure VMware Solution

AVS to VNET using VNET ER Gateway – Basic Interconnectivity



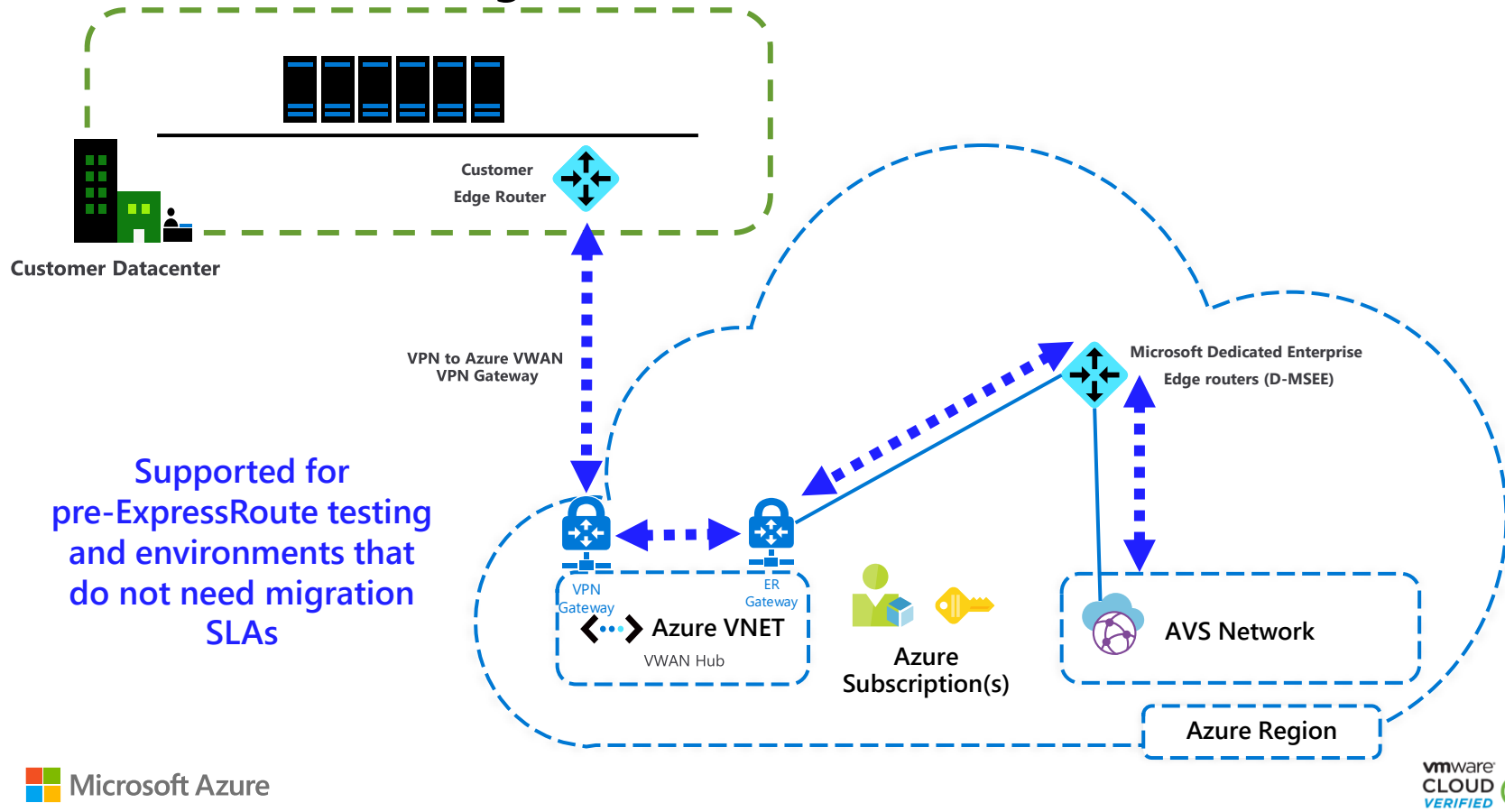
Azure VMware Solution

On Prem to SDDC using Global Reach – Full Interconnectivity

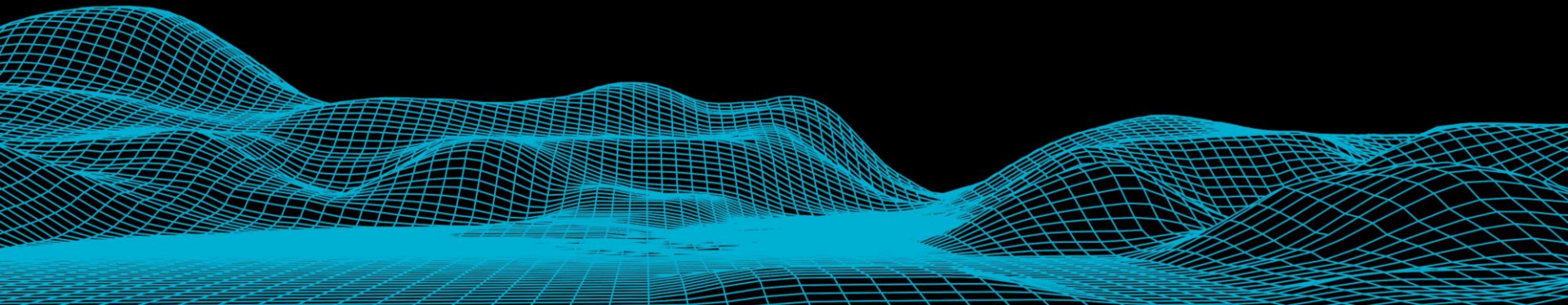


Azure VMware Solution

On Prem to SDDC using VPN*



Migrate



Pre-Migration steps and process

Solution Assessment

Assess VMware environment



Identify workload(s) to migrate



Define migration approach
HCX (Live, Bulk, Cold)



Identify steps to full production



Testing and Validation

Initial workload Proof-of-Concept (PoC)

Create Private Cloud, Move few VM's using preferred migration type



Transition to Production


At-scale migration & adoption

Use Microsoft FastTrack, support from certified Partners


Azure VMware Solution + Azure Migrate

Cost and readiness

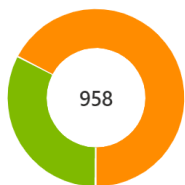
Total monthly cost estimate ⓘ

198530.8 
USD

Average cost estimate per VM ⓘ

207.23 
USD

AVS readiness for on-premises servers



Ready for AVS
312
Ready with conditions
646
Not ready for AVS
0
Readiness unknown
0

Assessed virtual machines ⓘ

958 

Utilization across AVS nodes

Total AVS nodes required ⓘ

65 
AVS nodes

CPU utilization (projected) ⓘ

49.85%



Memory utilization (projected) ⓘ

26.58%

9108.43 out of 34268 (GBs)



Storage utilization (projected) ⓘ

9.65%

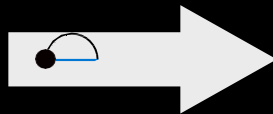
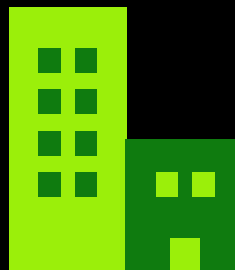
103893.64 out of 1076618 (TBs)



Use VMware HCX to Migrate to Azure

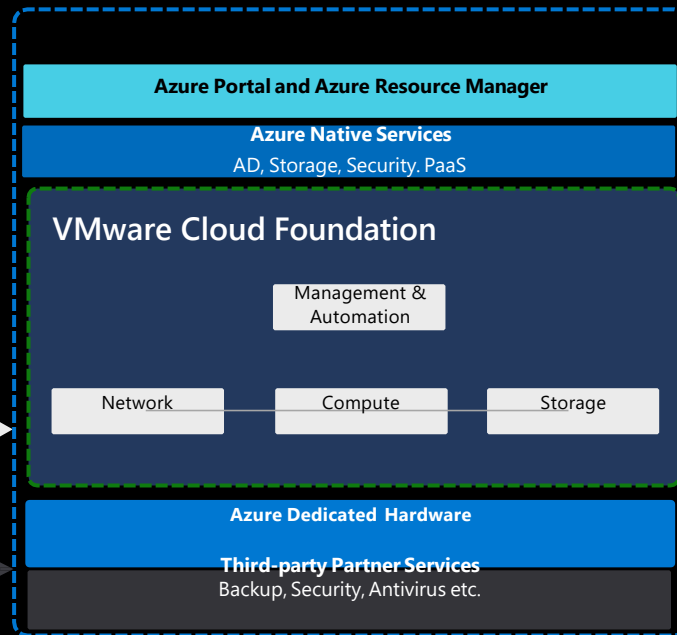


- Live migration without the cost, complexity or risk of refactoring
- Minimal downtime
- Extend proven tools, skills, policies
- Eliminate need and cost of reskilling

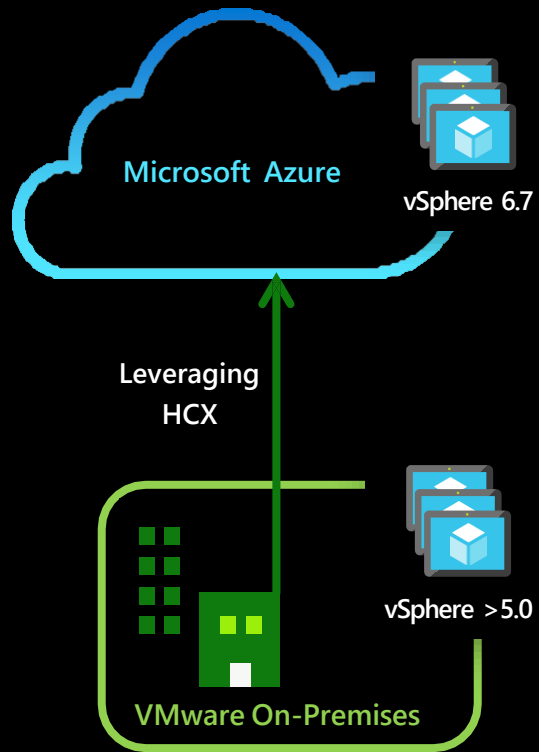


← **HCX** →

Microsoft Azure

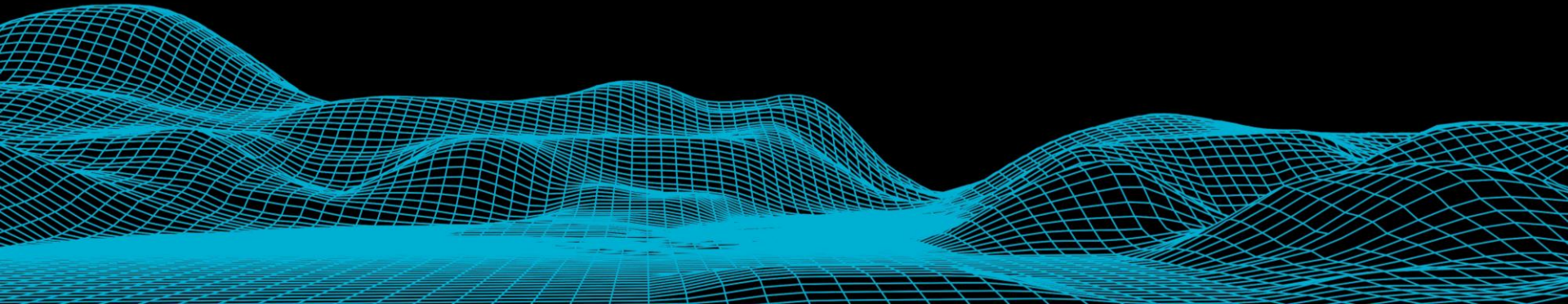


Using VMware HCX for Migration to Azure VMware Solution

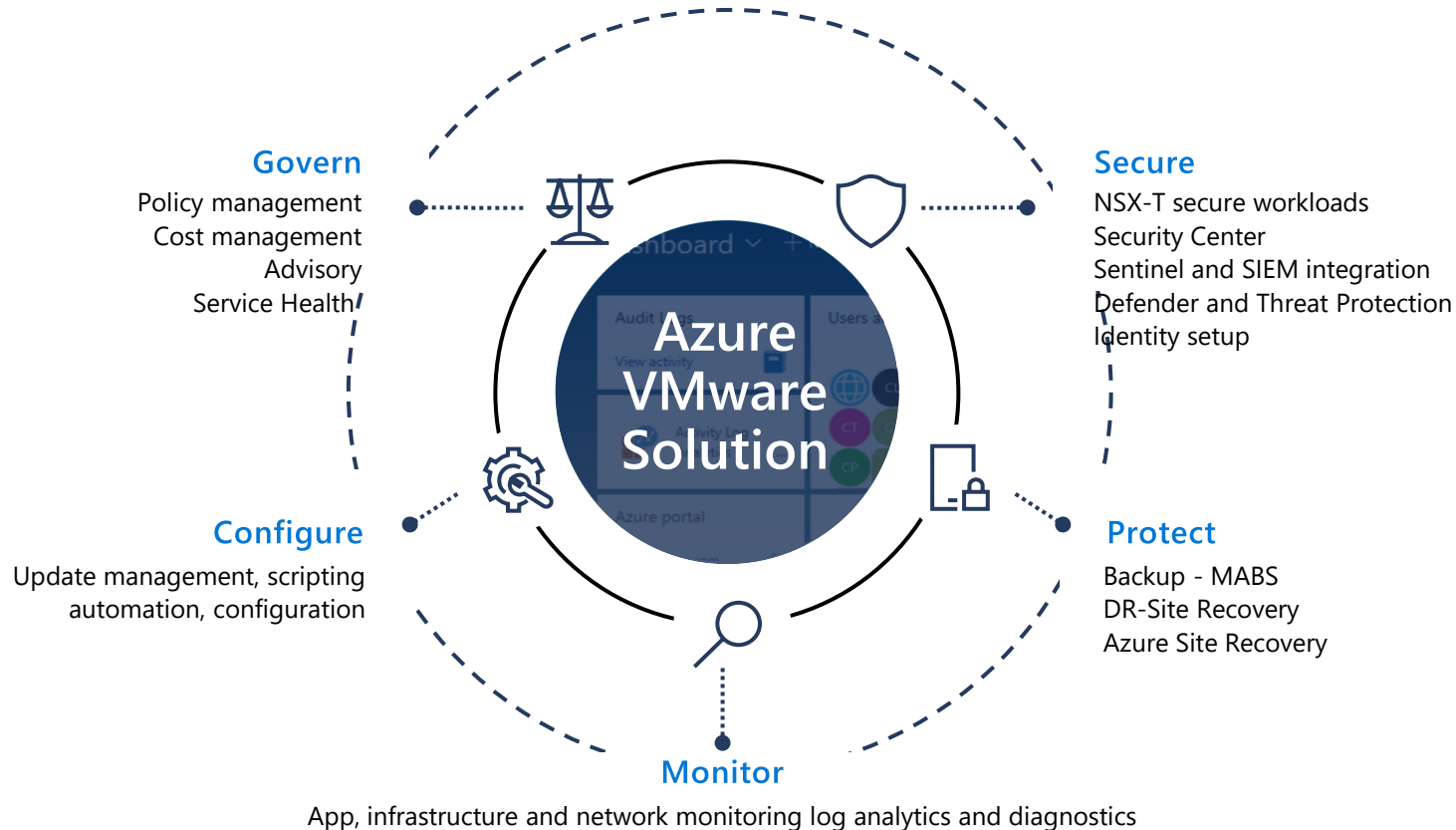


- Large scale **bulk migration** using HCX
- **Replication Assisted vMotion**
- Any **vSphere to vSphere** migration
- **HCX for site pairing** and DR
- **Parallel VM migration** threads
- **No change in IP**, no NAT
- **Secure proxy** for vMotion and replication traffic

Management & Operations



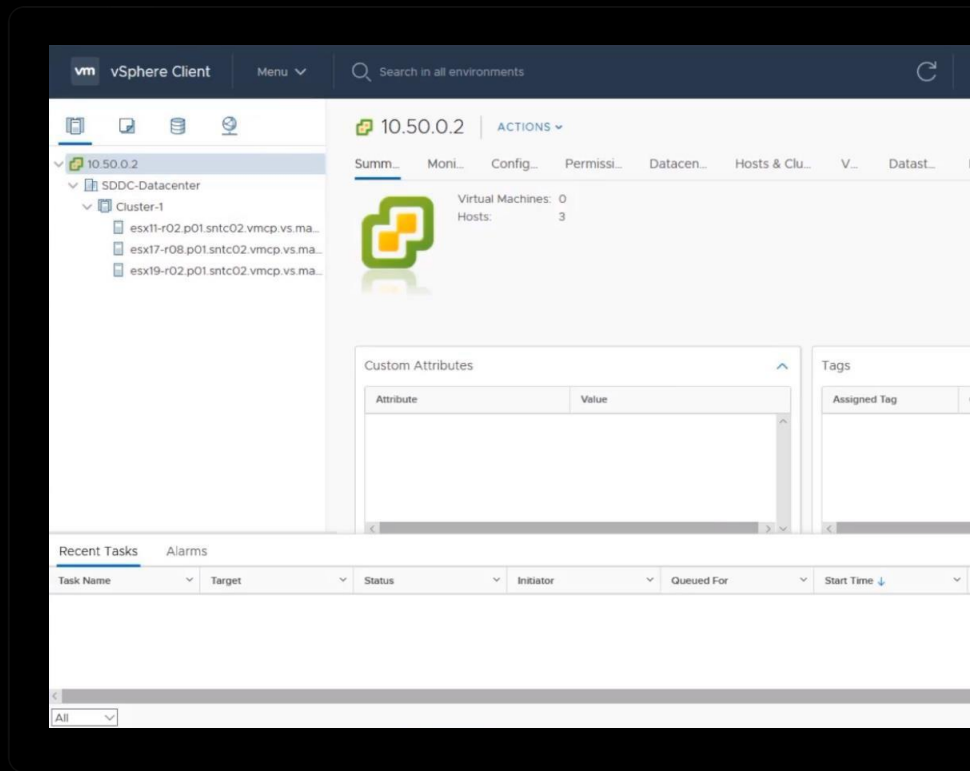
Azure VMware Solution - Managed IT



Familiar and consistent VMware tools and technology

Create operational consistency for admins as you **continue to use VMware for resources running on Azure infrastructure**, including the vSphere client and NSX-T Manager.

Access to **vSphere, HCX, and NSX-T** are **enabled during the Private Cloud deployment** process. Credentials are registered in Azure to connect to the private cluster hosts.



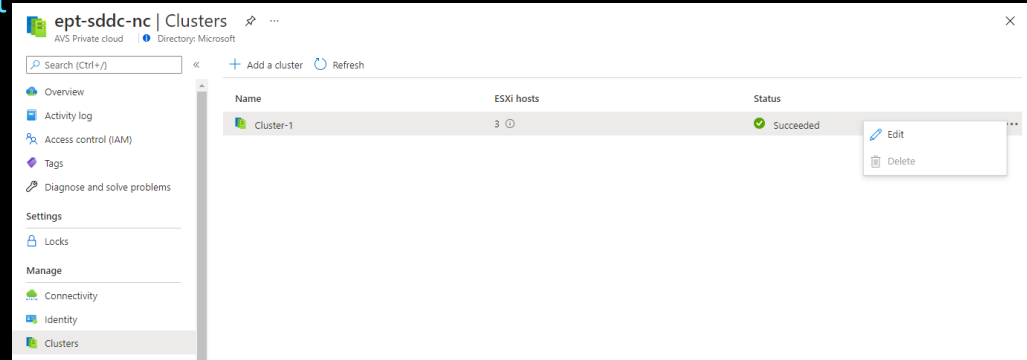
Seamless management for Azure infrastructure resources

Easily **scale infrastructure** as your business needs it through the Azure Portal.

Add new nodes as required to **increase compute and storage during peak times**. And **delete nodes seasonally** when infrastructure demands are lower.

Add and delete new clusters as required:

- Min 3 nodes per cluster
- Max 16 nodes in a vSphere cluster
- Max 96 nodes to an Azure Private Cloud instance



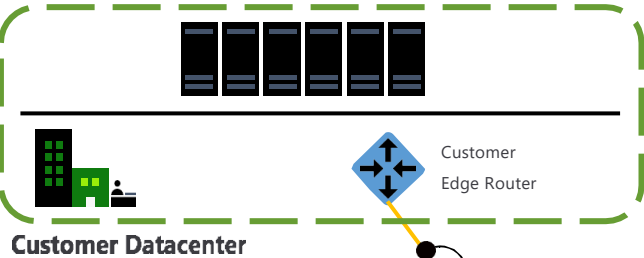
Azure VMware Solution – Shared responsibility matrix

Control boundaries

	Physical Infrastructure	Physical Security	Azure/AVS Portal	Hardware Failures	ESXi Host	Host Patching	NSX-T	Identity Management	vCenter	VSAN	Guest OS	Applications	Virtual Machines
Deployment													
Life-Cycle													
Configuration													

 – Microsoft Responsibility
 – Customer Responsibility

Azure VMware Solution Deployment



ExpressRoute



ExpressRoute Using Global Reach



Microsoft Enterprise Edge routers (MSEE)



Azure VNET

Azure Services



Azure Subscription(s)

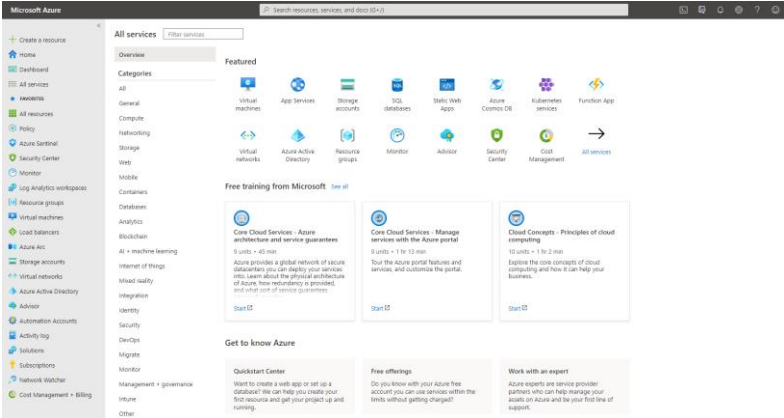


Microsoft Dedicated Enterprise Edge routers (D-MSEE)



AVS Private Cloud

vCenter, NSX-T, HCX, 3rd party services




Azure Portal






Manage Private Cloud

Dashboard > Subscriptions > AVS Dogfood > azcat-avs-srm > azcat-avs-usnc-pc01

 **azcat-avs-usnc-pc01** | Identity  ... 

AVS Private cloud

 Search (Cmd+/) <<

-  Overview
-  Activity log
-  Access control (IAM)
-  Tags
-  Diagnose and solve problems

Settings

 Locks

Manage

 Connectivity

 Identity

 Clusters

 Add-ons

Workload Networking

 Segments

 DHCP

 Port mirroring

 DNS

Default

vCenter Web Client URL 

vCenter admin user 

vCenter admin password 


vCenter Certificate Thumbprint 

NSX-T Manager URL 

NSX-T Manager admin user 

NSX-T Manager admin password 


NSXT Certificate Thumbprint 

https://10.112.0.2/ 

cloudadmin@vsphere.local 



95BA285538D4AA2CC2D30BAC12501ADD397E932B 

https://10.112.0.3/ 

admin 



8626DEF30452DBD63740BAB551946F943CEE63B8 

Access:



vSphere admin using "CloudAdmin"

The screenshot displays the vSphere CloudAdmin web interface. The browser address bar shows the URL `https://10.109.0.2/ui/#?extensionId=com.vmware.samples.dashboard.mainView`. The interface includes a sidebar with navigation options like Home, Shortcuts, Hosts and Clusters, VMs and Templates, Storage, Networking, Content Libraries, Global Inventory Lists, Policies and Profiles, Auto Deploy, Developer Center, HCX, vRealize Operations, Site Recovery, Administration, Update Manager, Tasks, Events, and Tags & Custom Attributes.

The main content area, titled "Home", shows system metrics for the environment `VC.3F6F9CF927C34252B67ED0.WESTUS.AVS.AZURE.COM`:

- CPU:** 996.88 GHz free (18.87 GHz used | 1.02 THz total)
- Memory:** 3.35 TB free (338.24 GB used | 3.68 TB total)
- Storage:** 1,029.27 TB free (12.65 TB used | 1,041.92 TB total)

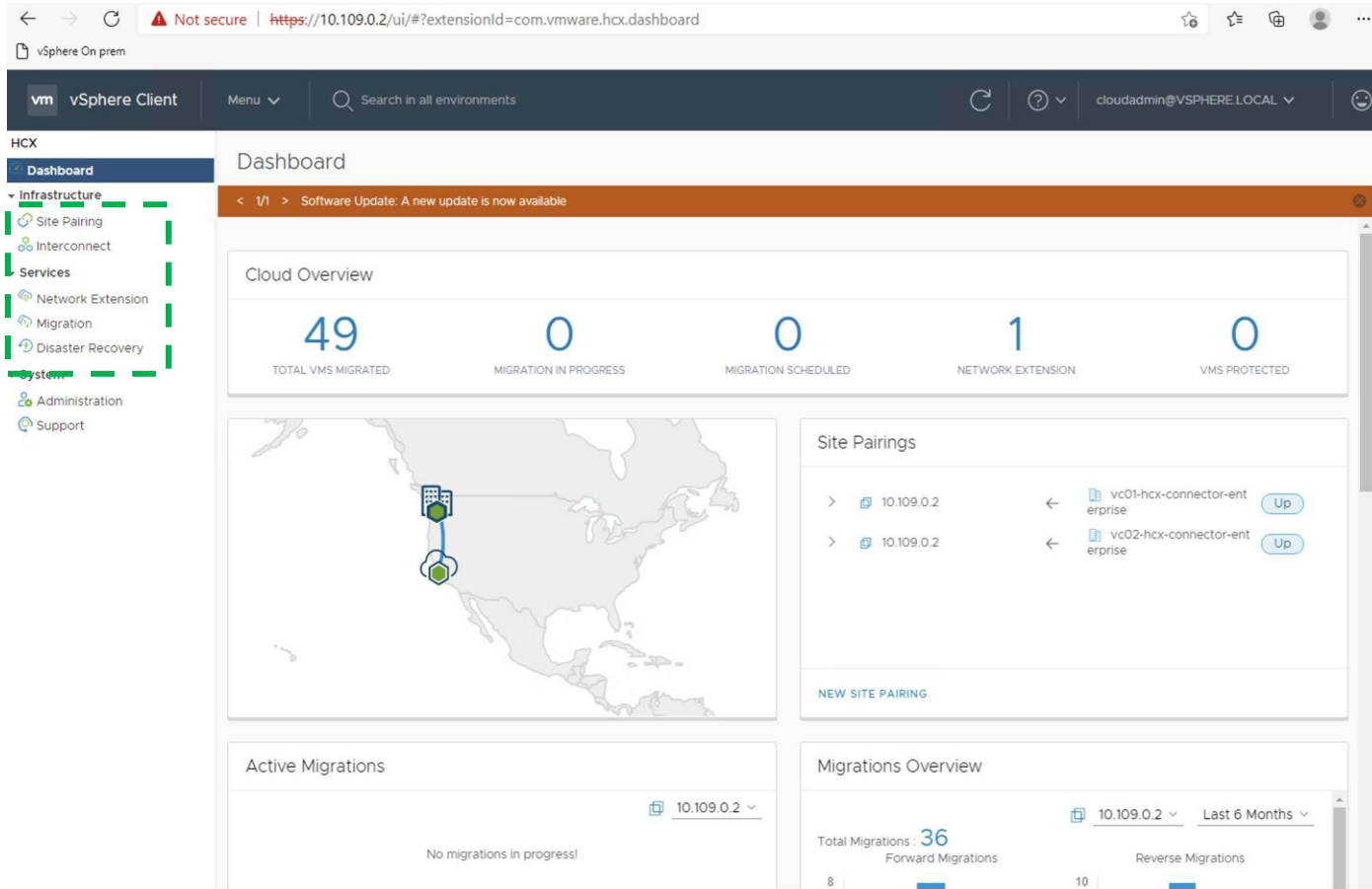
Below the metrics, there are two summary cards:

- VMs:** 43 total. 34 Powered On, 9 Powered Off, 0 Suspended.
- Hosts:** 5 total. 5 Connected, 0 Disconnected, 0 Maintenance.

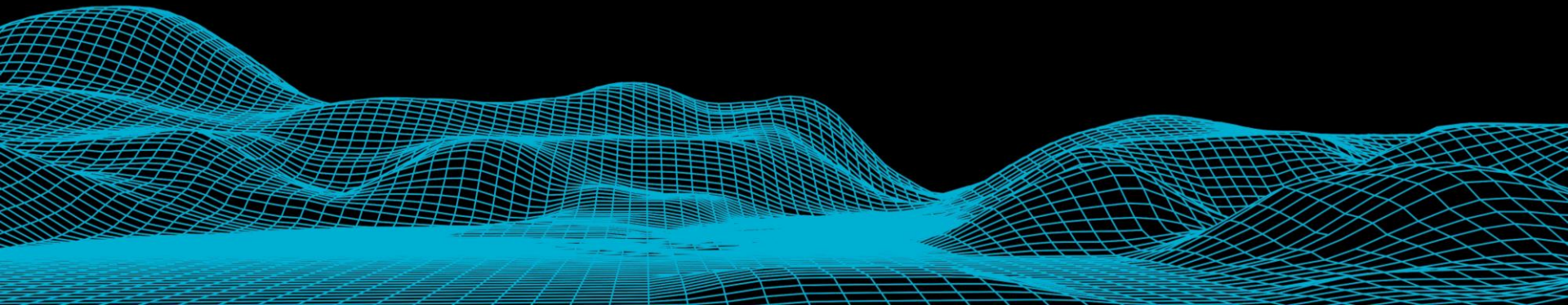
At the bottom, there are two more sections:

- Objects with most alerts:** 1 item. A table shows `Cluster-1` with 0 Alerts and 1 Warning.
- Installed Plugins:** 12 items. A list includes HCX Mobility Plugin, HCX Audit Log Plugin, HCX Disaster Recovery Plugin, HCX Dashboard Plugin, HCX Interconnect Deployment Plugin for NGC, and HCX Update Plugin.

AVS uses HCX for Hybrid and Lift and Shift



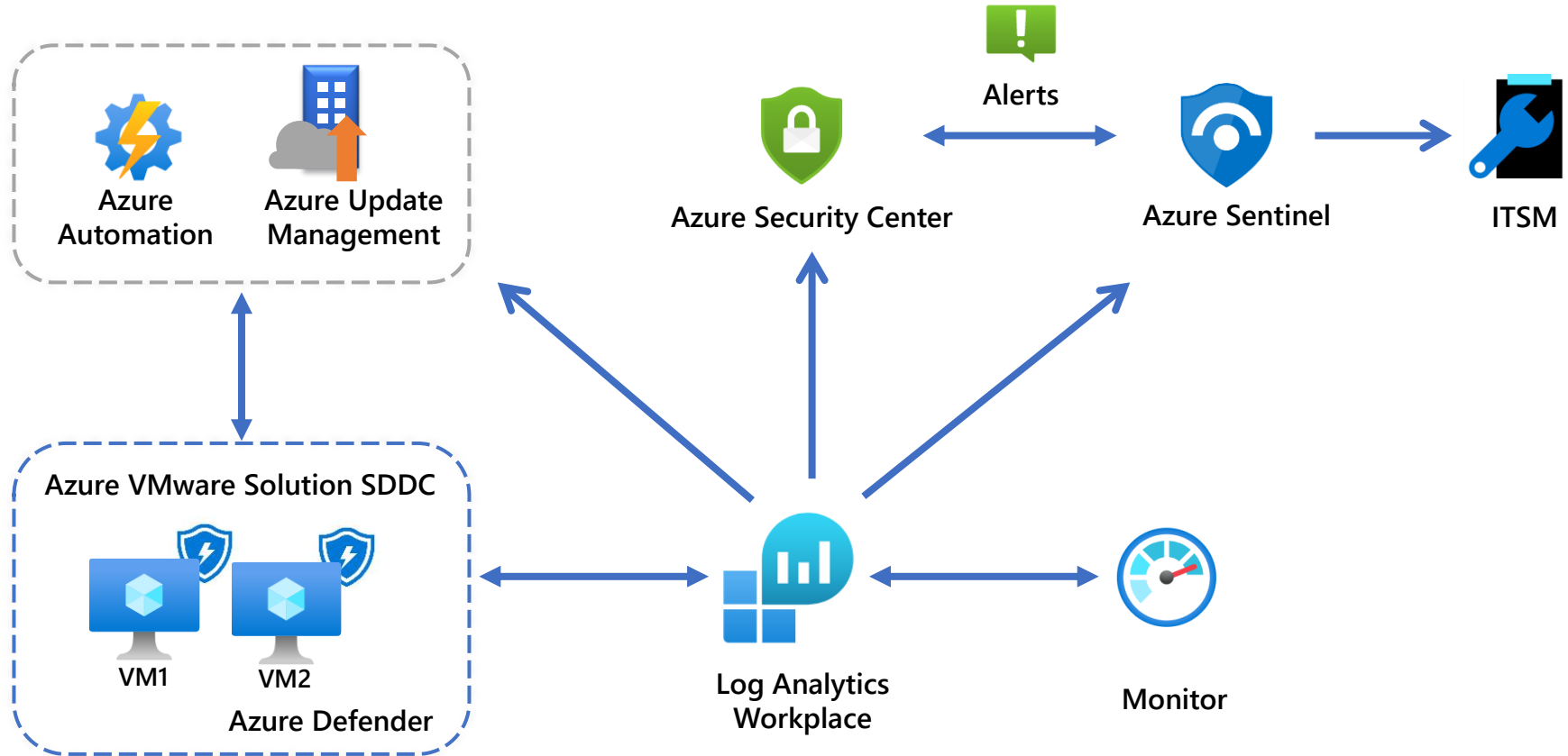
Integrations



Popular Azure VMware Solution Integrations

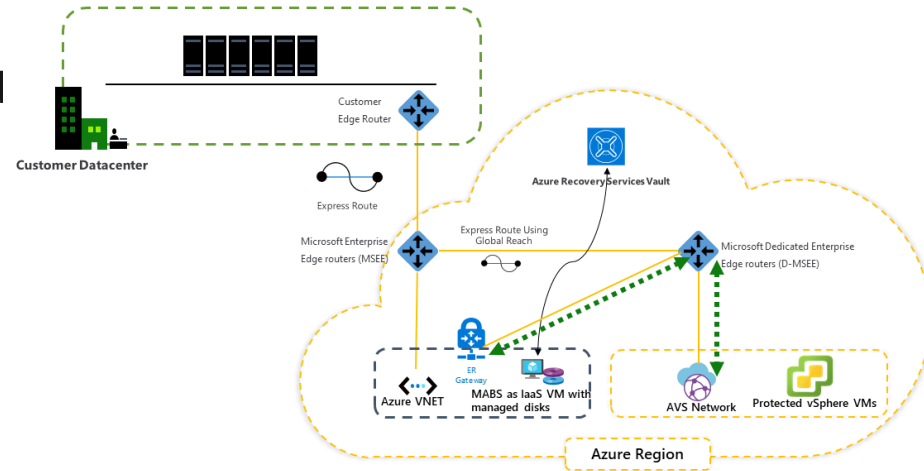
- Azure NetApp Files for file share
- Azure Blob Storage
- Azure Traffic Manager, Application Gateway
- Support for Hub and Spoke
- Azure Backup Server
- Azure Monitor
- Azure Security Center/Azure Sentinel

AVS Workload Integrations

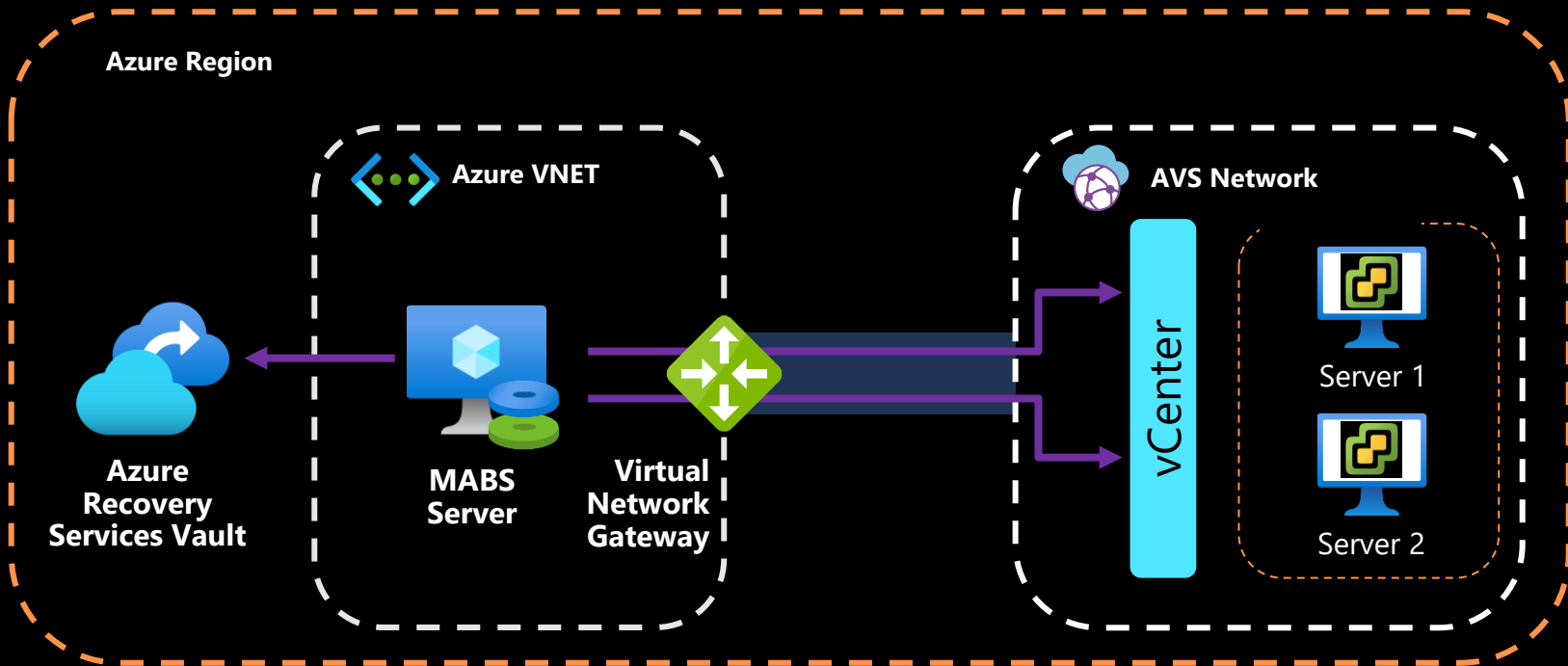


Workload backup – Azure Backup

- **Microsoft Azure Backup Server (MABS)** can be used to backup AVS running workloads
- MABS servers is deployed on Azure IaaS and connects to AVS through the ExpressRoute circuit
- Check the procedure details in [AVS documentation](#)



Azure VMware Solution with MABS For Backup



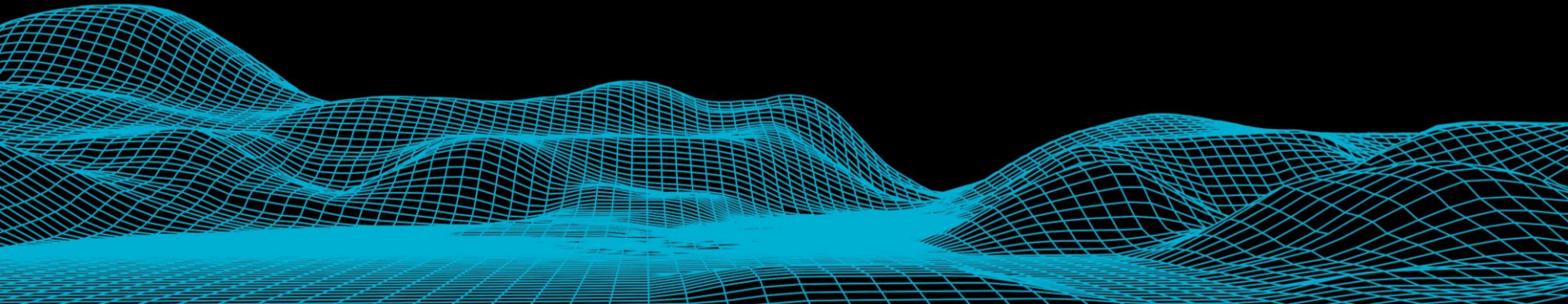
Available today

COMMVAULT® 

VERITAS™

veeam

Support



Microsoft support – single point of contact

Azure VMware Solution is validated, supported,
and certified by VMware and Microsoft.



Problem Management

Microsoft is first contact and will make decision based on problem type.

Azure-related issues are addressed by Microsoft.



When VMware support is required

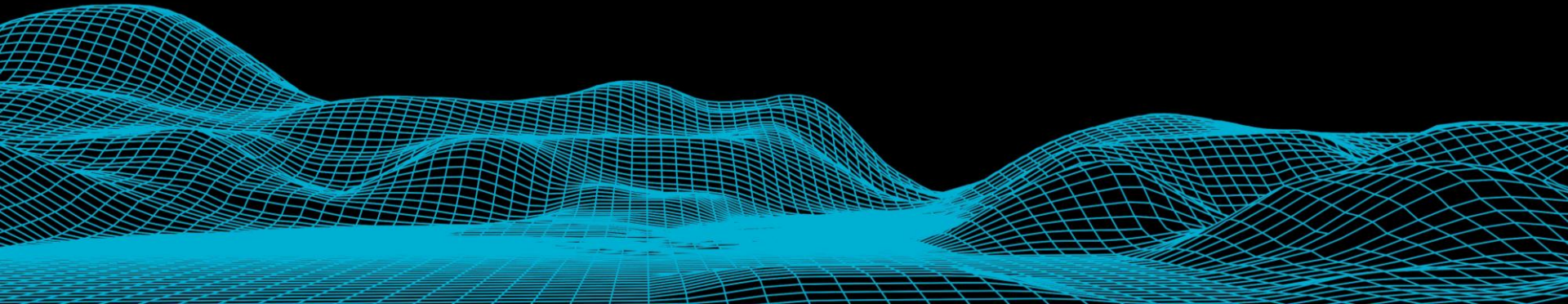
Microsoft coordinates with VMware for product-specific support.

Microsoft continues to be central point to resolution.

Built with VMware,
delivered by
Microsoft



Resources





VMware Hands-On-Lab

vmware VMware Hands-on Labs



Azure VMware Solution

Seamlessly extend or migrate your existing on-premises VMware environment to Azure VMware Solution.



Overview

Azure VMware Solution is built on VMware Cloud Foundation - a comprehensive offering of software-defined compute, storage, networking and management - deployed in Azure along with an integrated set of Azure services. Customers can capitalize on their existing VMware skills and tools while leveraging the global Microsoft Azure infrastructure. Azure VMware Solution enables a fast path to the cloud, seamlessly migrating or extending existing VMware workloads from on-premises environments to Azure without the cost, effort or risk of re-architecting applications or retooling operations. Build, run, manage, and secure applications across VMware environments and Microsoft Azure while leveraging familiar and established VMware tools, skills and processes.

Azure VMware Solution Private Cloud Deployment and Connectivity

In this lab, we will provide an overview of Azure VMware Solution. You will go through the steps to deploy a Private Cloud, connect the private cloud to an Azure Virtual Network, and access vCenter for your Azure VMware Solution Private Cloud. Then, we will establish connectivity from an on-premises environment to the Private

Take This Lab

Azure VMware Solution Workload Migration with VMware HCX

In this lab, we will be downloading, deploying, and configuring VMware HCX on-premises, including all its components (Interconnect, Network Extension, and WAN Optimization). Then we will connect our on-premises environment via site pairing and stretch our Apps network to the Azure VMware Solution Private Cloud for zero-

Take This Lab

<http://hol.pub/avs>

Azure VMware Solution Learn Module



Prepare to migrate VMware workloads to Azure by deploying Azure VMware Solution

✓ 1200 XP

56 min • Module • 8 Units

★★★★★ 4.9 (11) RATED ✓

Intermediate Solution Architect Administrator Azure VMware Solution

Learn how to plan an Azure VMware Solution deployment by reviewing the requirements and assessing your migration. Prepare for the VMware workload migration by deploying an Azure VMware Solution resource. Then, configure Azure ExpressRoute Global Reach to connect your on-premises VMware vSphere environment to Azure VMware Solution.

Learning objectives

By the end of this module, you will be able to:

- Plan a successful Azure VMware Solution deployment
- Connect to an on-premises VMware environment

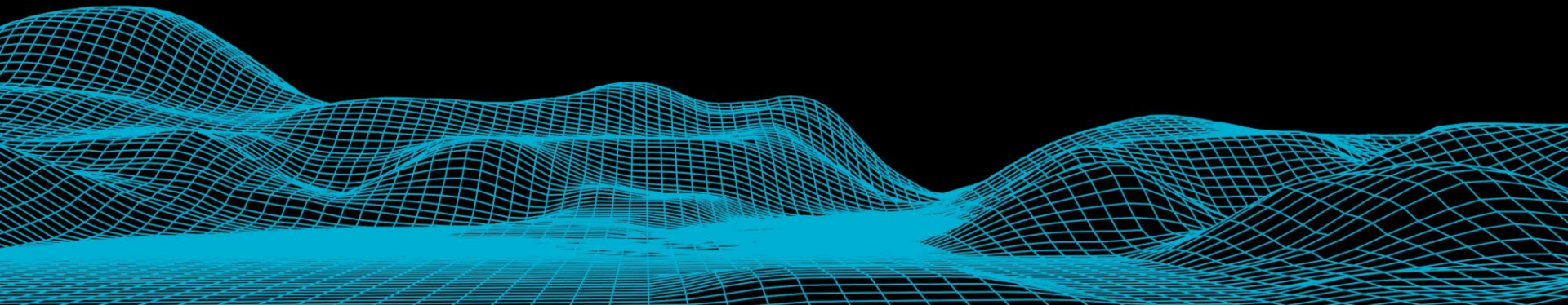
Bookmark Add to collection

<https://aka.ms/learn-avs1>

Resources

- AVS Overview - <https://azure.microsoft.com/services/azure-vmware/>
- AVS Documentation - <https://docs.microsoft.com/azure/azure-vmware/>
- Azure VMware Solution Videos - <https://tinyurl.com/yal7r33d>
- VMware Ports and Protocols - <https://ports.vmware.com/>
- VMware HCX Documentation - <http://www.vmw.re/hcxdocs>
- VMware HCX Release Notes - <http://www.vmw.re/hcxrn>
- Azure Migrate Documentation - <https://docs.microsoft.com/azure/migrate/migrate-services-overview>

Demo



Thank you!

