



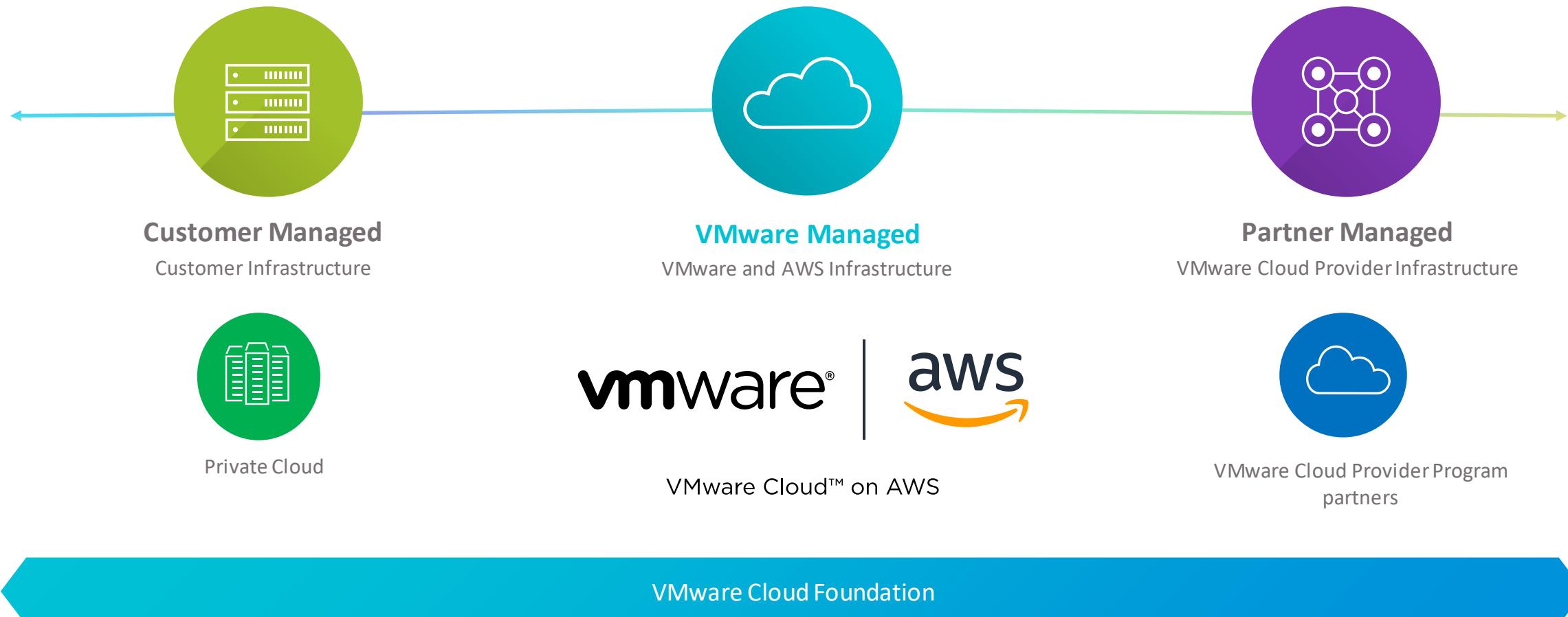
# VMware Cloud on AWS

## for VMware, VCPP & AWS Partners



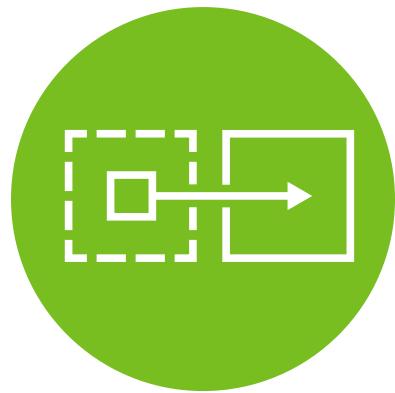
# Addressing Hybrid Cloud Challenges with VMware Cloud Foundation

A single platform to deploy and operate your hybrid environment with consistency



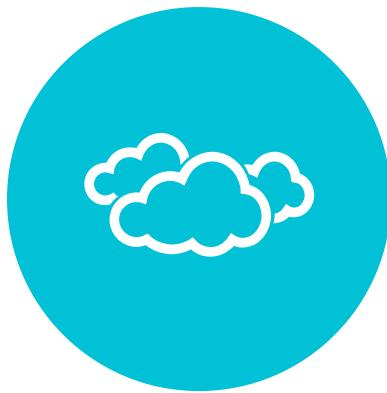
# VMware Cloud on AWS

Delivering proven enterprise capabilities on the world's most popular public cloud



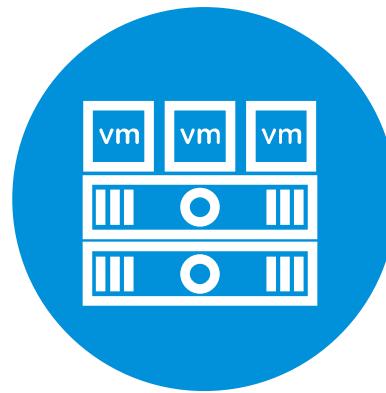
## Seamless migration

Fast, cost effective and low risk migration to the cloud



## As-a-Service

Rich VMware SDDC delivered as a cloud service on AWS



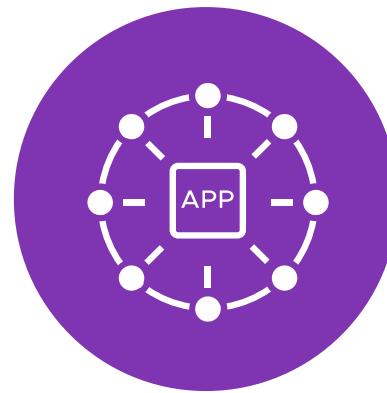
## Consistent

Consistency and familiarity of VMware technologies



## Portable

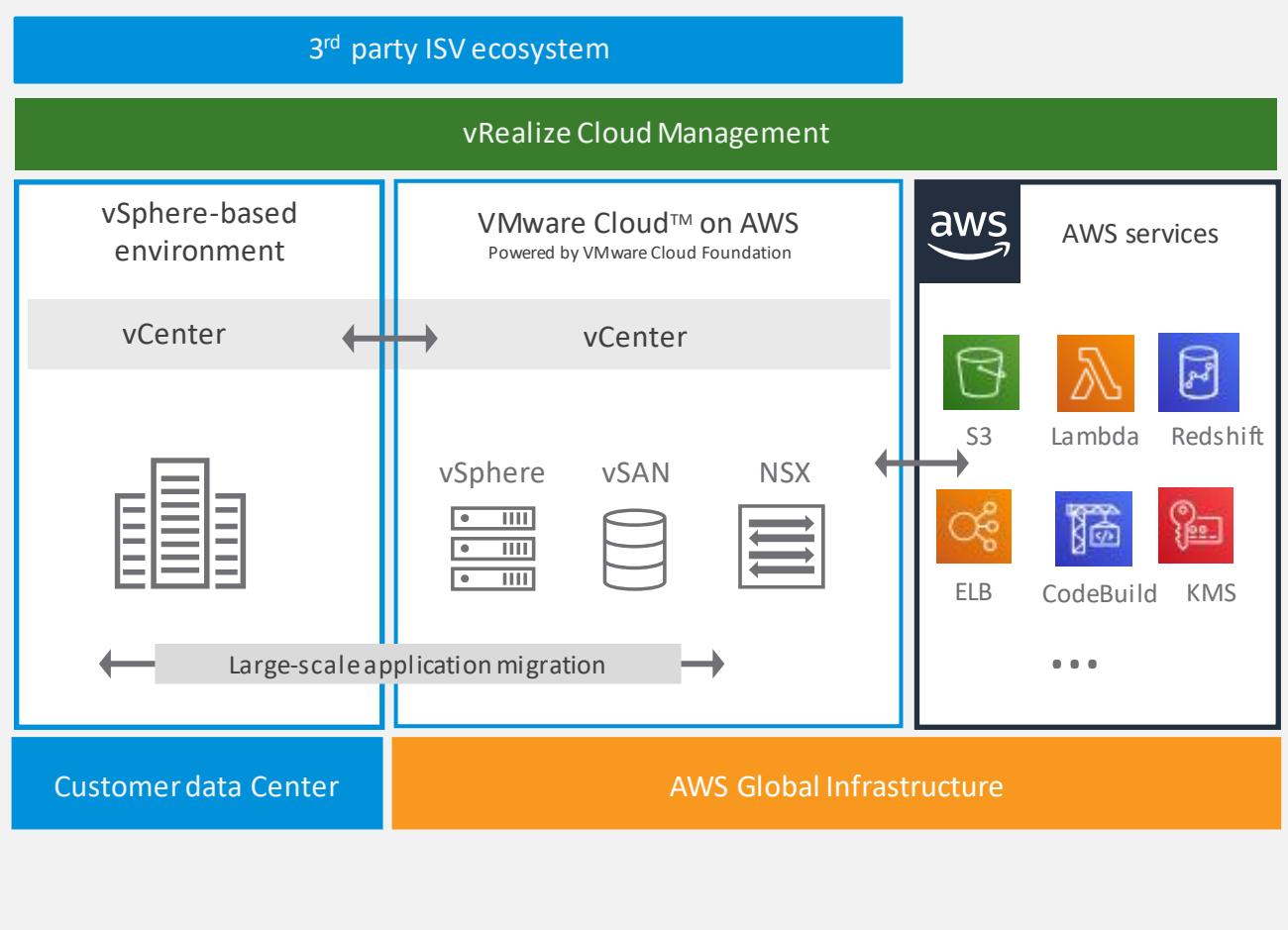
Easy workload portability and hybrid capabilities



## Modern apps

Kubernetes, containers, virtual machines support and access to AWS services

# VMware Cloud on AWS: Jointly Engineered Cloud Service



- VMware SDDC running on AWS bare metal
- Delivered, operated, supported by VMware
- On-demand capacity and flexible consumption
- Consistent cloud operating model
- Seamless, large-scale workload portability and hybrid ops
- Global AWS footprint, reach, availability
- Direct access to native AWS services

# The Power of VMware Software-Defined Data Center

Unified Hybrid Cloud Management with support for vRealize Cloud Management Platform and CloudHealth

vCenter Server and vCenter Cloud Gateway Appliance with Hybrid Linked Mode

Single pane of management and API across on-premises and cloud



## vSphere

ESXi on dedicated, AWS bare-metal  
Support for containers and VMs

- t3.metal, r5.metal  
AWS bare-metal instances
- Stretched Clusters for AZ resiliency
- Automatic scalability with Elastic DRS



## vSAN

vSAN for enterprise storage  
Replication and DR orchestration

- High-performance all flash and scalable block storage options
- Granular data protection with policy-based management and encryption at rest
- Site Recovery for simple, reliable DR with run-book automation



## NSX

NSX-T for enterprise networking  
Advanced network/security services

- L3 VPN, L2 stretched networks, AWS Direct Connect connectivity options
- Micro-segmentation with distributed firewalls (DFW) and edge firewalls
- Network visibility and troubleshooting

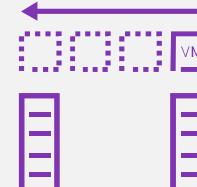
VMware HCX for WAN-optimized, encrypted, large-scale migration of workloads

Seamless access to broad range of AWS services

Broad VMware Cloud Ready ISV ecosystem support

# Platform for Business-Critical Applications

Failure domain →

VM	Host	Rack / Availability Zone	AWS Region
			

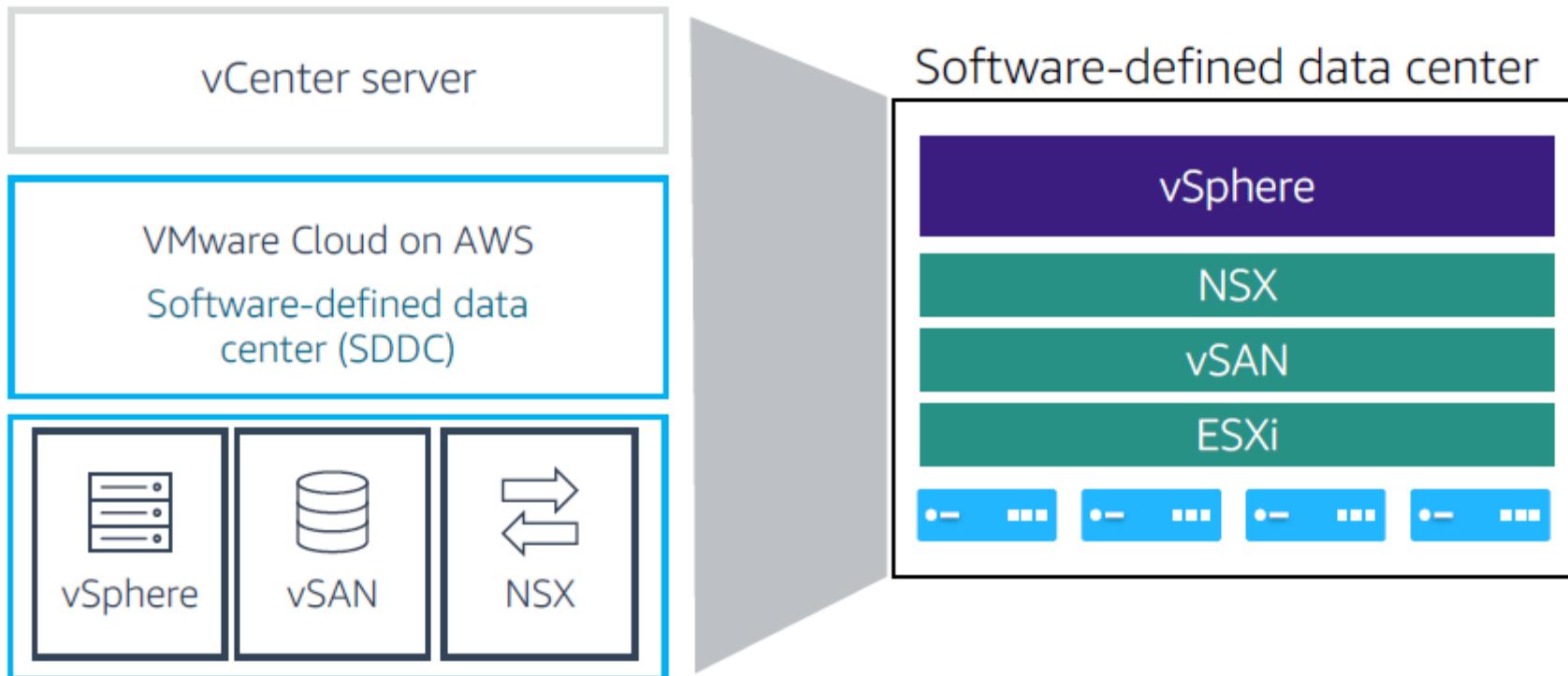
**Rich VMware vSphere Capabilities**  
VMware HA, DRS, and third-party Data Protection products  
  
**Provides a secure, VM optimized foundation for existing and new workloads**

**Automatic Failed Host Remediation**  
VMware Cloud on AWS, vSAN and vSphere HA  
  
**Automatic host protection seamlessly replaces failed hosts in a cluster**

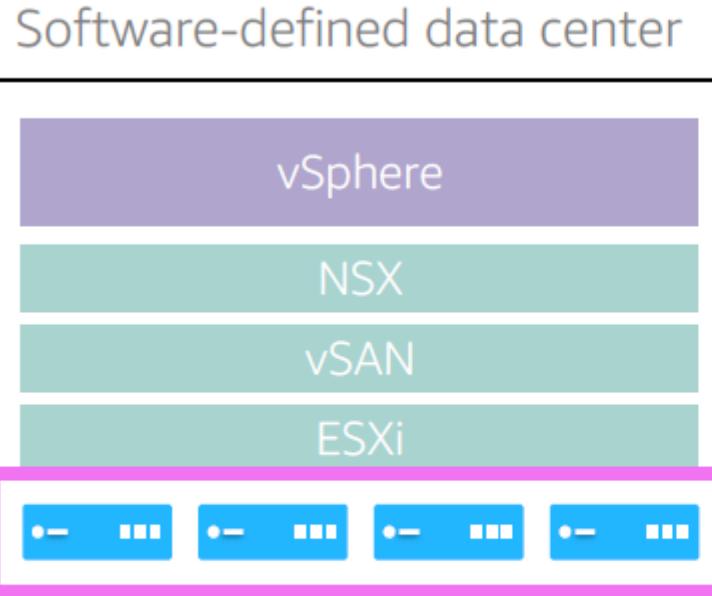
**Stretched Clusters**  
VMware Cloud on AWS, vSAN and vSphere  
  
**Synchronous block-level replication between clusters in different Availability Zones**  
Unique to VMware Cloud on AWS

**VMware Site Recovery**  
VMware Cloud on AWS, VMware Site Recovery  
  
**Disaster Recovery as a Service solution across multiple on-premise and VMware Cloud on AWS locations**

# VMware Cloud on AWS: SDDC Components

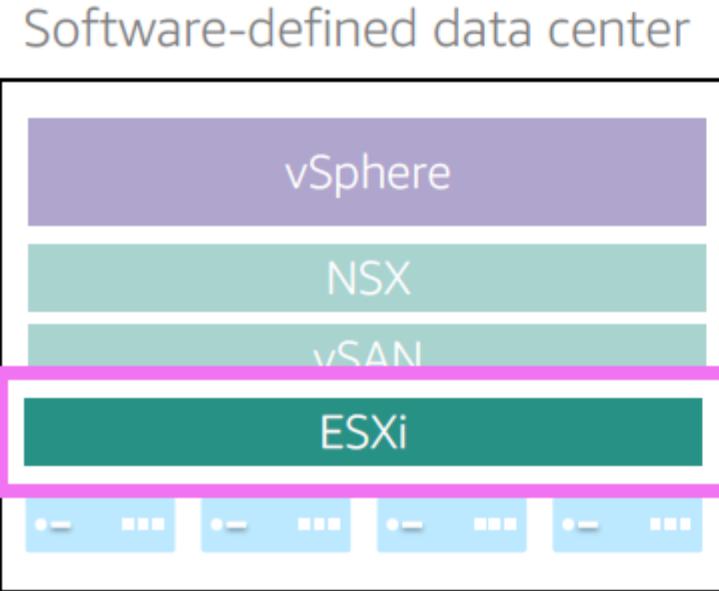


# VMware Cloud on AWS: SDDC Components



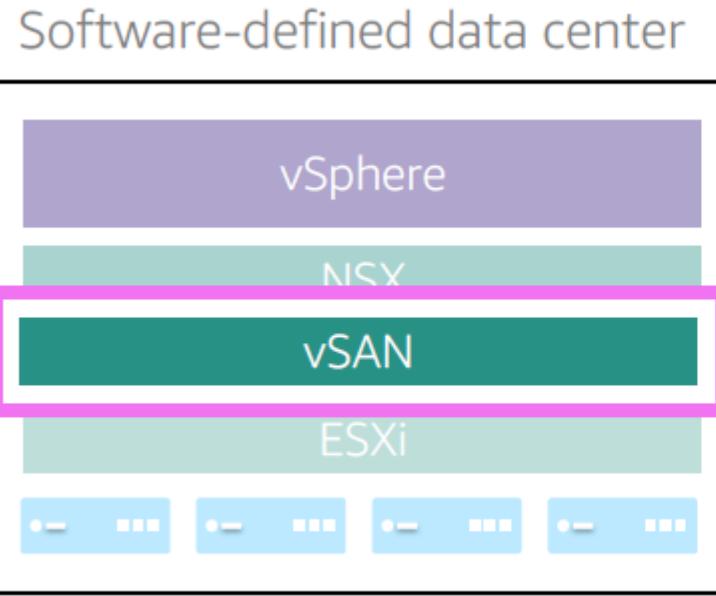
- Bare Metal
- i3.metal & i3en.metal instances
- I3.metal: 36 Cores/72 vCPU, 512GiB Memory
- I3en.metal: 48 Cores/96 vCPU, 768 GiB RAM
- 25Gbps ENA for i3.metal
- 100Gbps ENA for i3en.metal (VMware Supports 25Gbps)

# VMware Cloud on AWS: SDDC Components



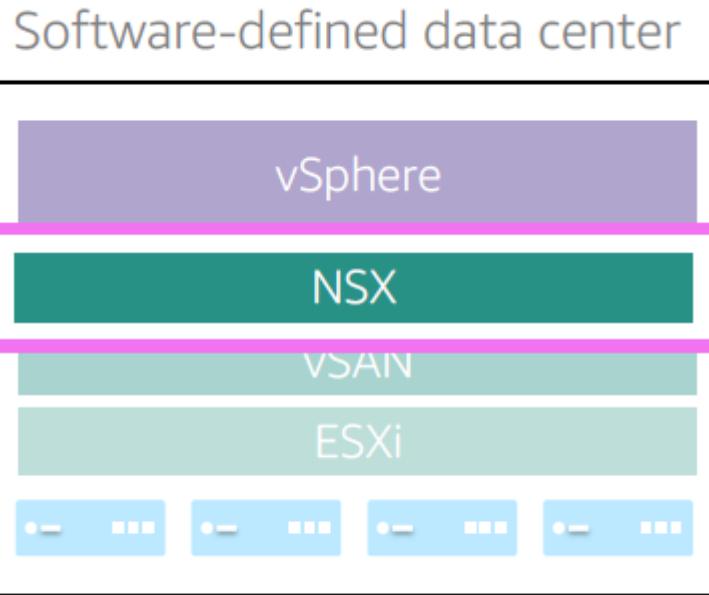
- ESXi
- 2–16 host cluster
- Maintained by VMware
- Privileged user account instead of Secure Shell (SSH) or root privilege
- No support for vSphere Installation Bundle (VIB) or vCenter server plugins

# VMware Cloud on AWS: SDDC Components



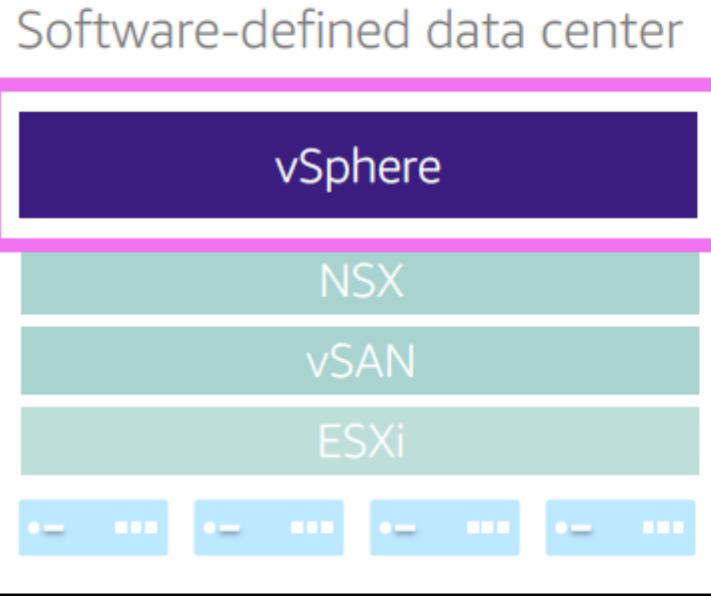
- Aggregate Instance Storage
- All Flash (Capacity/Cache)
- VM Storage Policies

# VMware Cloud on AWS: SDDC Components



- Logical networks
- North-south (in/out of the data center) routing
- Micro-segmentation
- Compute and management gateways
- IPsec VPN termination

# VMware Cloud on AWS: SDDC Components



- VMware managed
- Delegated permissions
- Hybrid Linked Mode

# Available in AWS Regions Worldwide



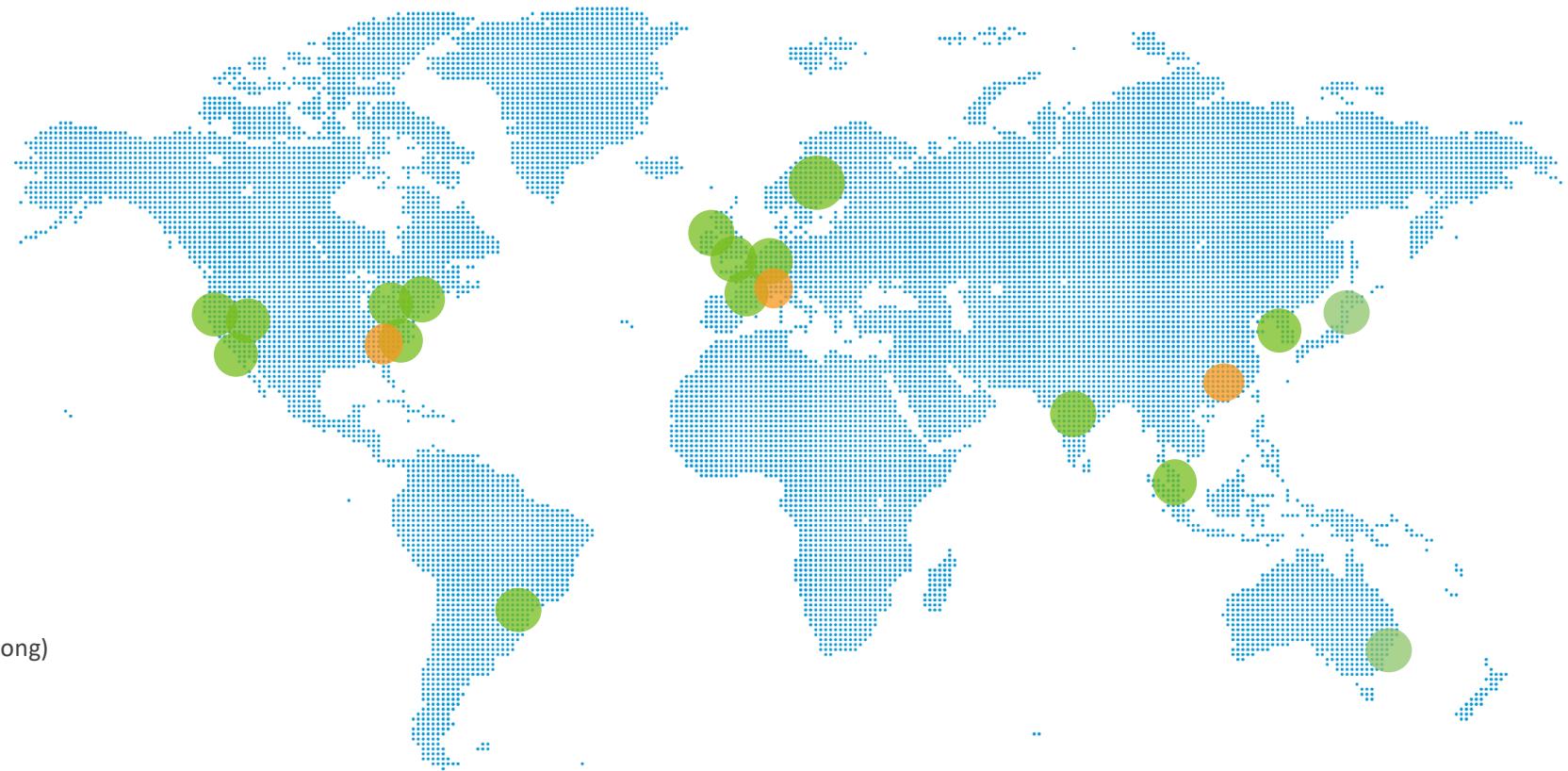
## Available Regions

US West (Oregon)  
US East (N. Virginia)  
US West (N. California)\*  
US East (Ohio)  
GovCloud US-West  
Canada (Central)\*  
South America (Sao Paulo)  
Europe (London)  
Europe (Frankfurt)  
Europe (Ireland)  
Europe (Paris)  
Europe (Stockholm)  
Asia Pacific (Sydney)  
Asia Pacific (Tokyo)  
Asia Pacific (Singapore)  
Asia Pacific (Seoul)  
Asia Pacific (Mumbai)



## Planned Regions

Asia Pacific (Hong Kong)  
Europe (Milan)  
GovCloud (US-East)



\* Stretched cluster not supported

Last updated: Dec, 2020



SOC 2 Type 2



HM Government  
G-Cloud  
Approved Supplier

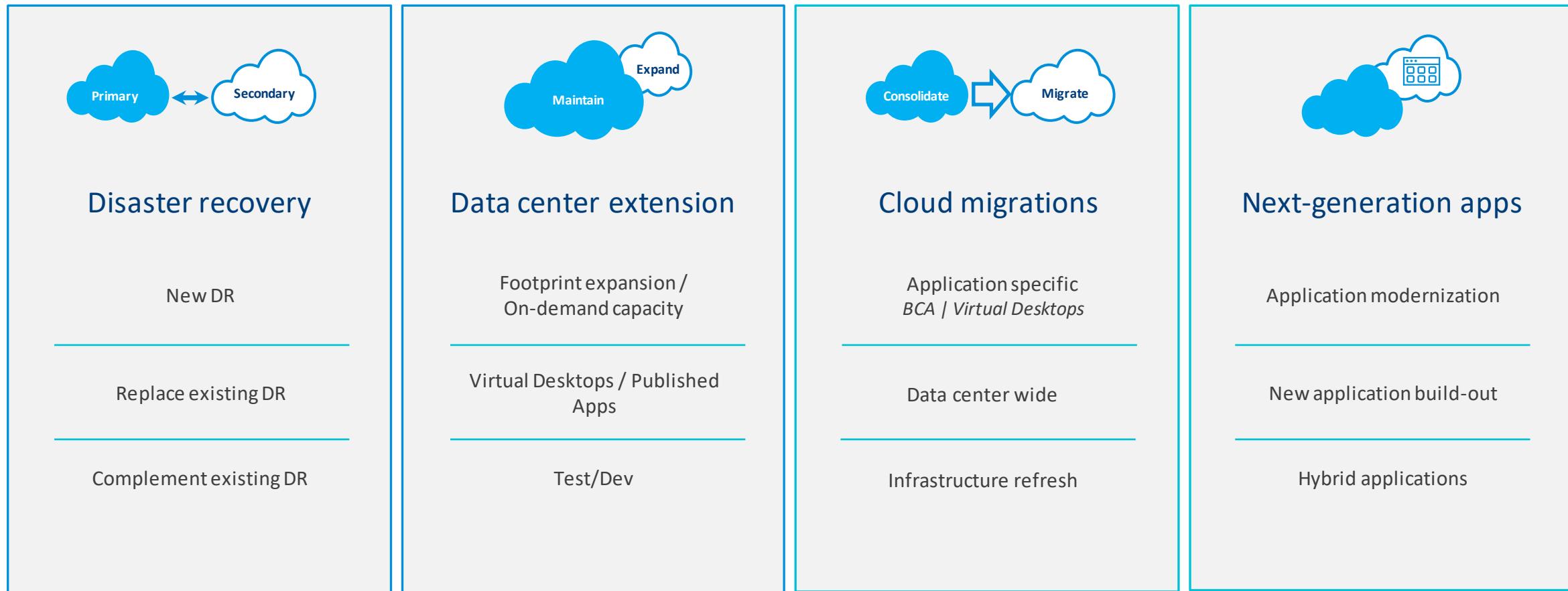


FIEC



# Use-cases

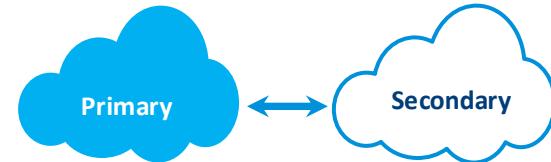
Aligning intended use to long term cloud strategy



# Disaster Recovery Use Case

# Disaster Recovery

Simple, reliable, cloud-based DR orchestration and automation

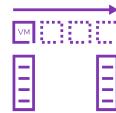


## Key Capabilities



### Streamlined DR automation and reporting

- Frequent, non-disruptive DR testing
- DR runbooks for full-site and by app-group
- Flexible protection topologies



### Hypervisor-based VM replication

- vSphere replication, independent of storage
- Network-efficient data movement and replication



### Elastic and consistent cloud infrastructure

- On-demand capacity and per-VM pricing
- Post-failover cluster scaling
- Management with familiar vCenter & vRealize tools



### Cloud management to reduce risk

- App dependencies for DR inventory readiness
- Confirm recovery and monitor health and performance of DR sit

## Benefits

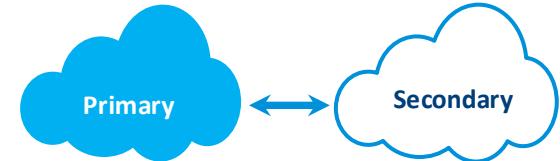
- **Diversify risk** – global reach and scale with **16 AWS Regions** and **>40 Availability Zones**
- **Improve preparedness** – deployment in **5 easy steps**
- **Minimize impact** – granular protection with **5 min RPO**
- **Reduce errors** – audit DR readiness

“VMware tools are crucial to **PLM’s DR environment**. With the underlying support of VMware vSphere and VMware Site Recovery Manager, we can **automate operations, perform tests with minimal disruption and act fast in the event of downtime.**”

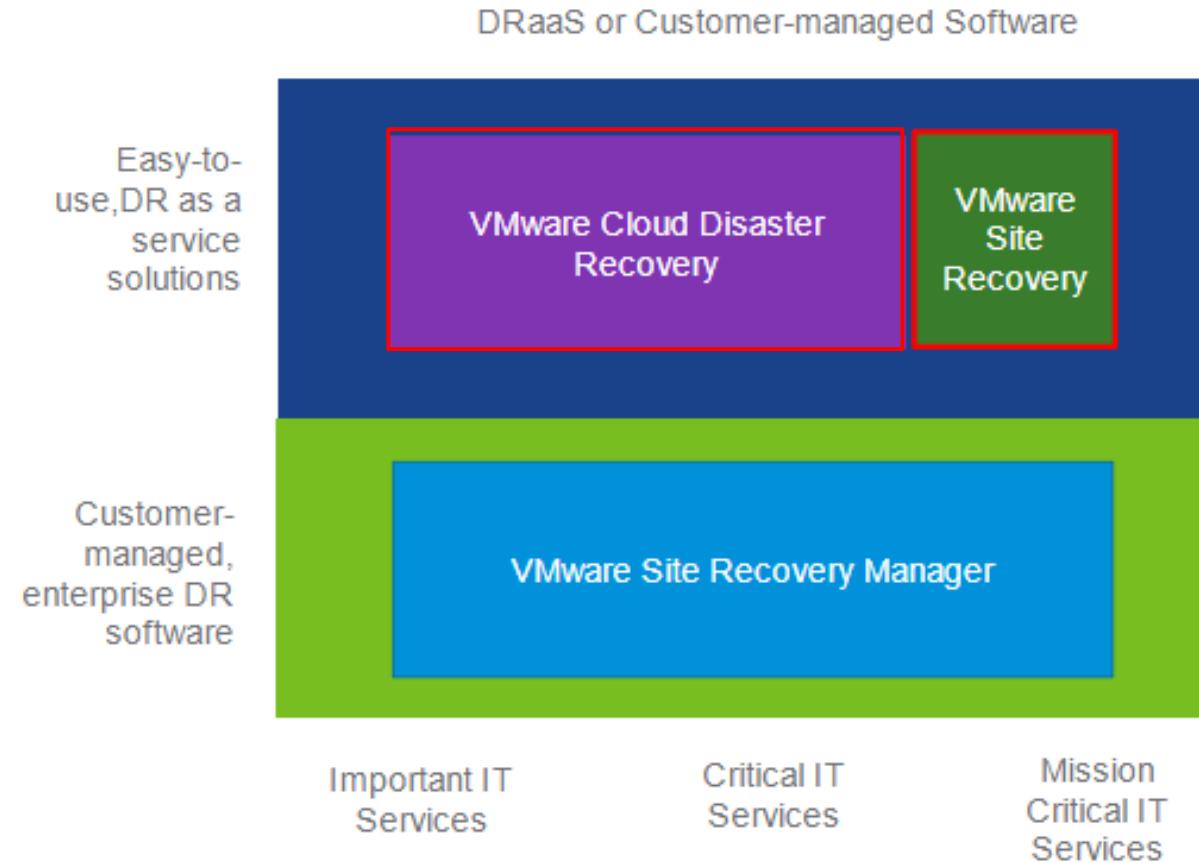
Shaun Brower, Systems Engineer at Faction, MSP for Pennsylvania Lumbermens Mutual (PLM)

# Disaster Recovery

Simple, reliable, cloud-based DR orchestration and automation

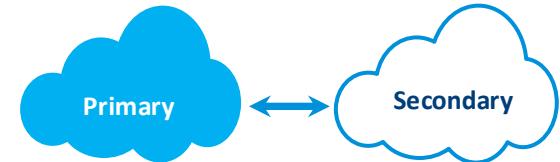


## Protect Any vSphere Workload

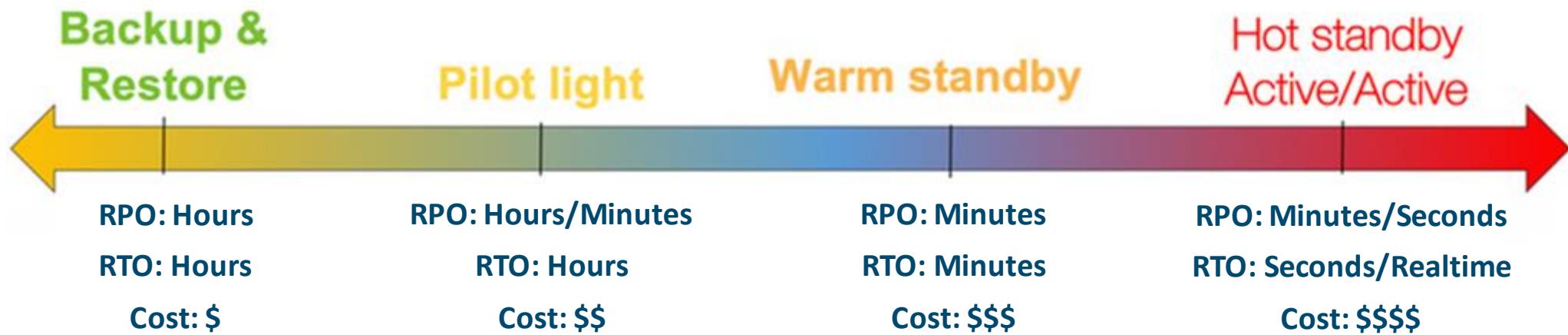


# Disaster Recovery

Simple, reliable, cloud-based DR orchestration and automation

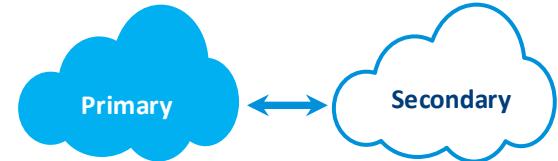


VMware Cloud on AWS offers four levels of DR support across a spectrum of complexity and time

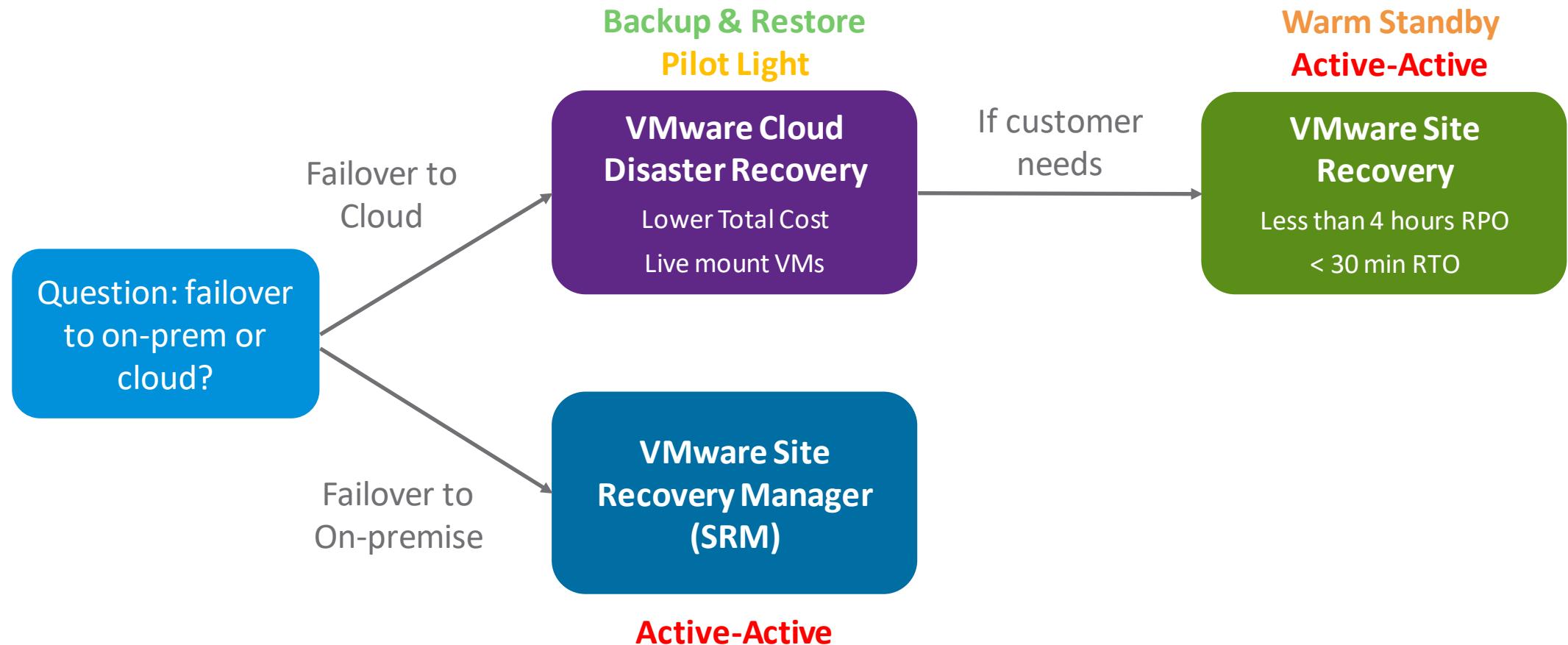


# Disaster Recovery

Simple, reliable, cloud-based DR orchestration and automation

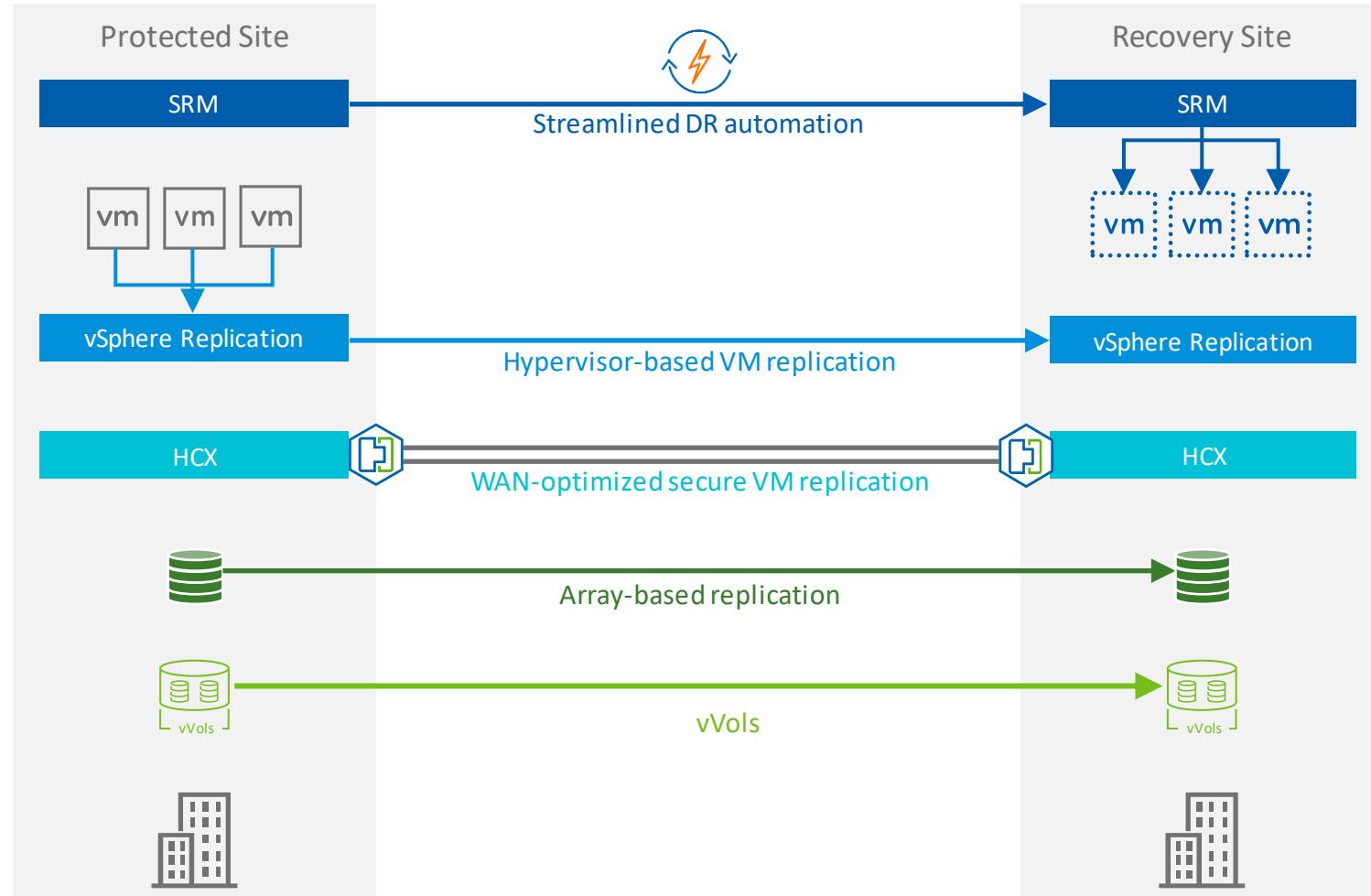


## Decision Tree



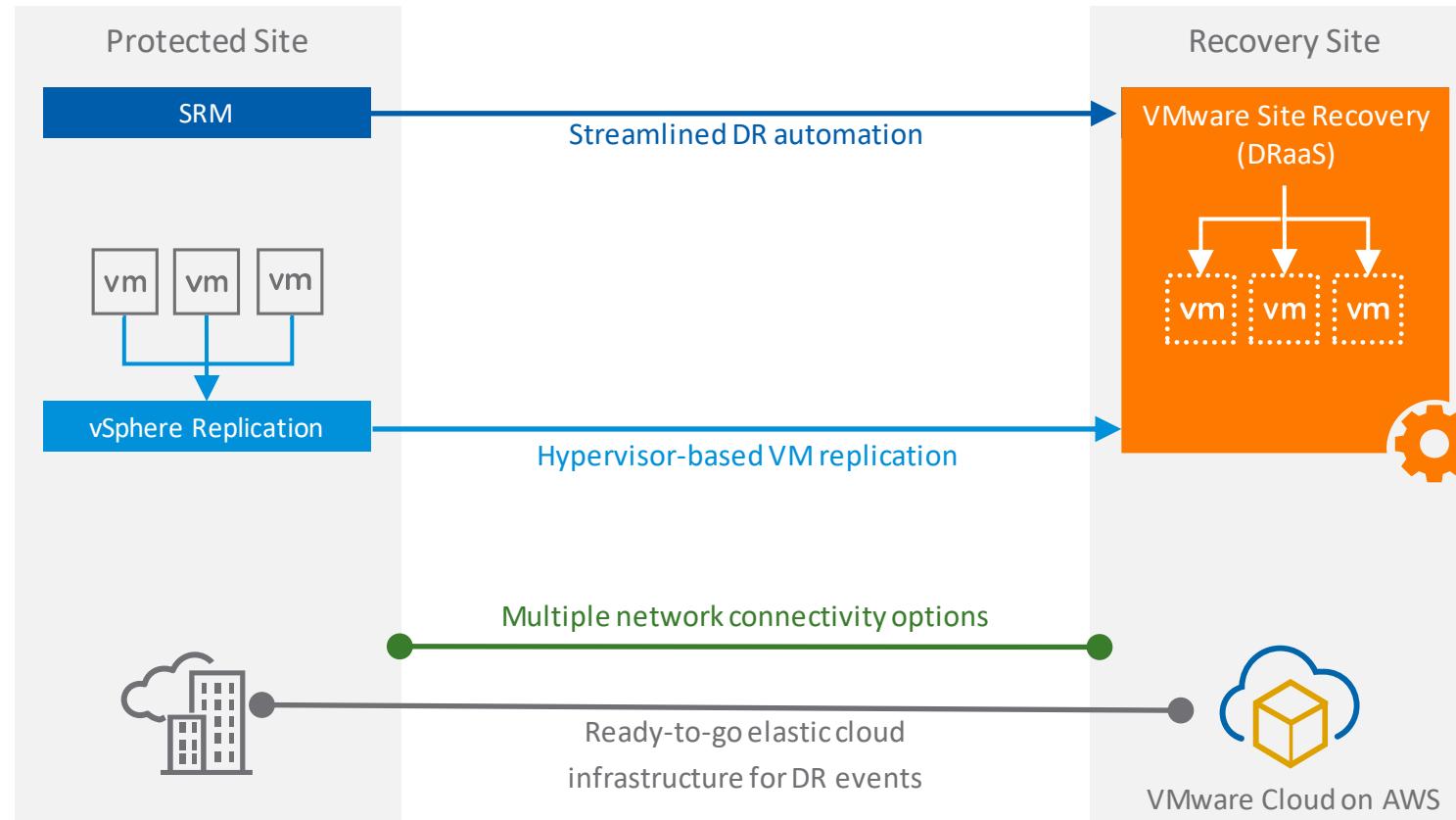
# VMware Site Recovery Manager (on-prem)

Simple and reliable recovery of VMs across sites with minimal or no downtime



# VMware Site Recovery (DRaaS) for VMware Cloud on AWS

Combines the power of SRM/VR with the elasticity and operational simplicity of the cloud



## Disaster Recovery as a Service

- Accelerate time to protection
- Cloud economics with on-demand pricing
- Integrated into VMware Cloud console
- Post-failover cluster scaling with Elastic DRS
- Inter-region protection

# VMware Site Recovery (DRaaS) for VMware Cloud on AWS

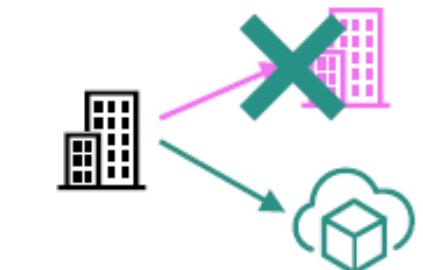
Combines the power of SRM/VR with the elasticity and operational simplicity of the cloud

## Scenarios

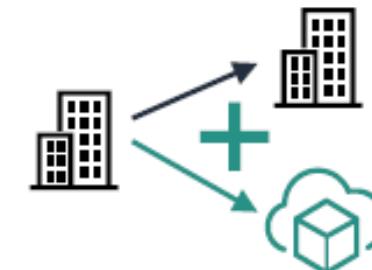
Establish new DR solution for on-premises applications.



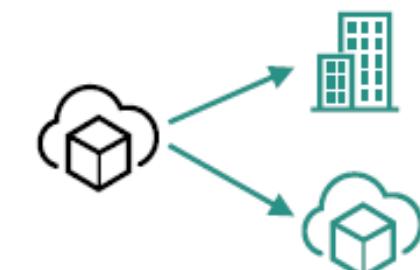
Replace existing DR site or solution for on-premises applications



Complement existing DR site or solution for on-premises applications



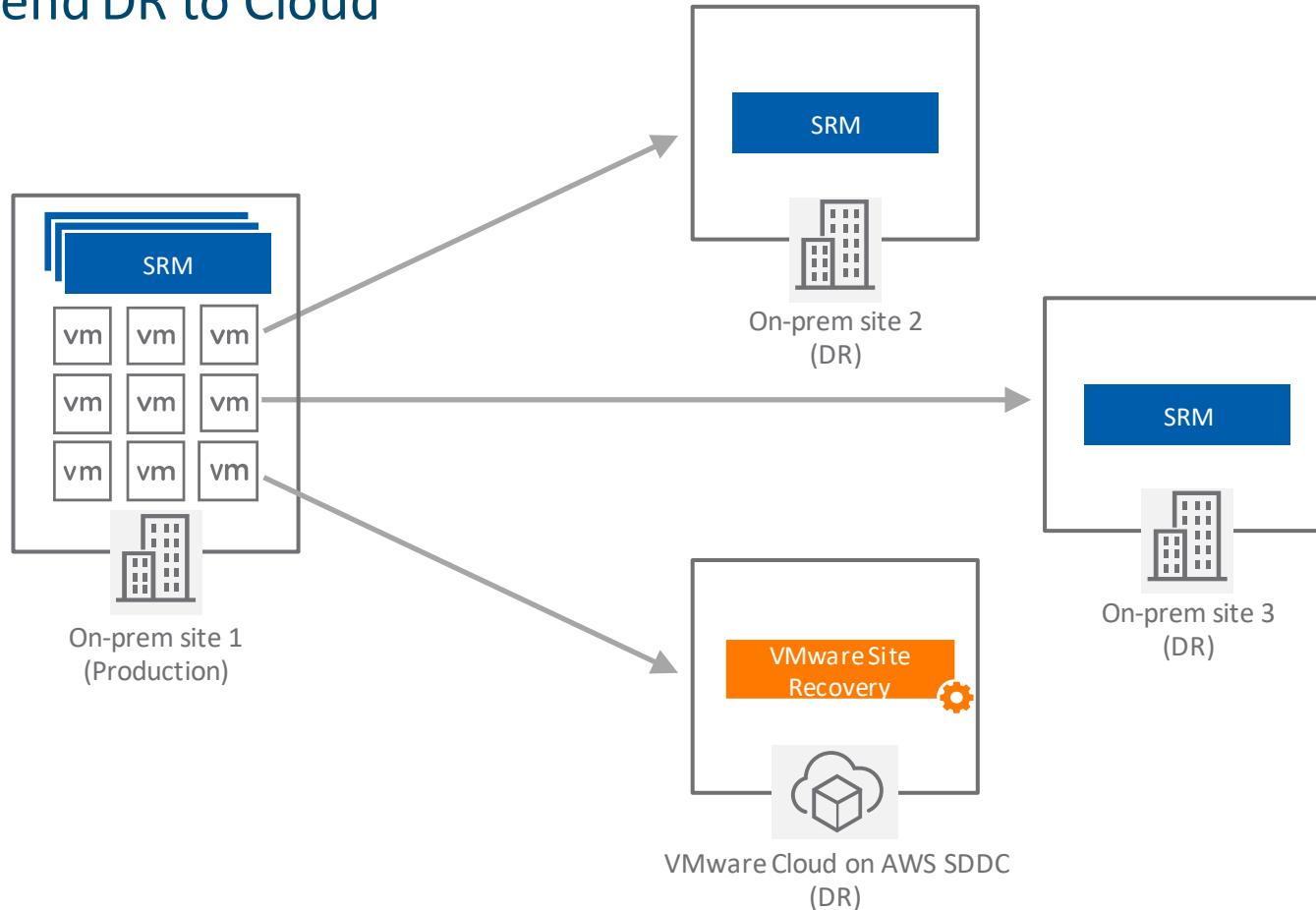
DR for VMware Cloud on AWS applications to other regions or to on premises



# VMware Site Recovery (DRaaS) for VMware Cloud on AWS

Combines the power of SRM/VR with the elasticity and operational simplicity of the cloud

## Extend DR to Cloud



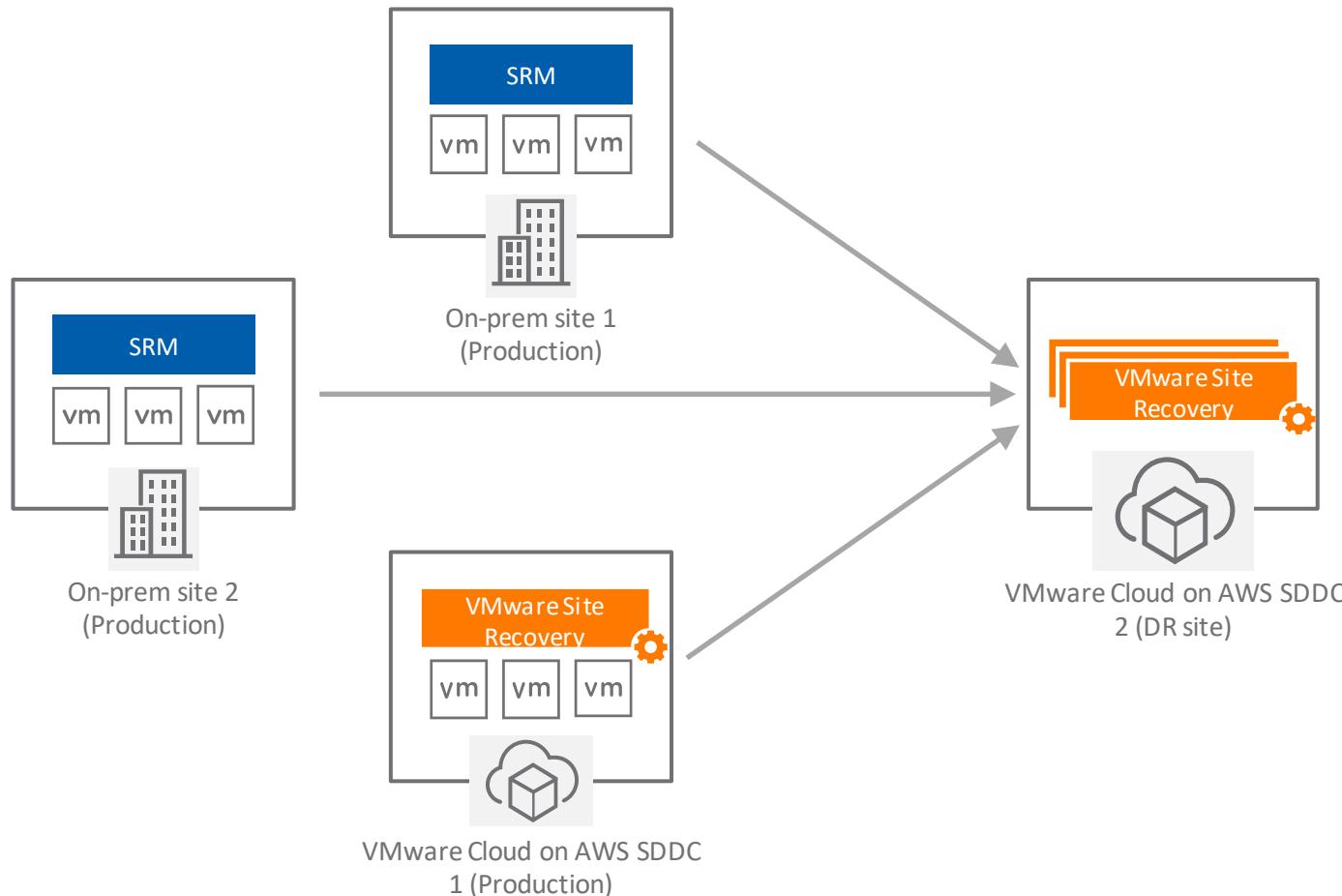
Extend your existing on-premises based DR strategy to the cloud while continuing to leverage the powerful DR orchestration capabilities of SRM

Gradually transition DR for your critical applications to the cloud over time instead of trying to move to cloud-based DR in one shot

# VMware Site Recovery (DRaaS) for VMware Cloud on AWS

Combines the power of SRM/VR with the elasticity and operational simplicity of the cloud

## Protect Multiple Sites



Protect multiple sites to a single VMware Cloud on AWS SDDC

Reduce costs and operational complexity

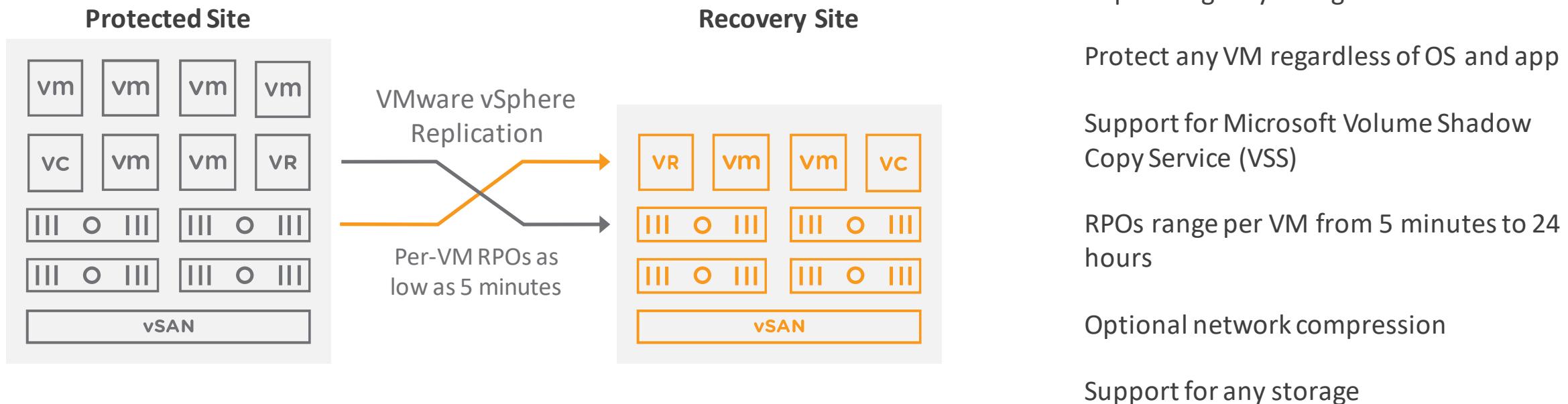
Protected sites can be on-premises or other cloud SDDCs

Other multi-site topologies also supported

# VMware Site Recovery (DRaaS) for VMware Cloud on AWS

Combines the power of SRM/VR with the elasticity and operational simplicity of the cloud

## Replication Capabilities



# VMware Site Recovery (DRaaS) for VMware Cloud on AWS

Combines the power of SRM/VR with the elasticity and operational simplicity of the cloud

## Protection Groups

Protection Group 1  
**Web App**



Group VMs as desired into Protection Groups

Protection Group 2  
**Email**



VMs in a Protection Group will be recovered as a unit

Protection Group 3  
**SharePoint**

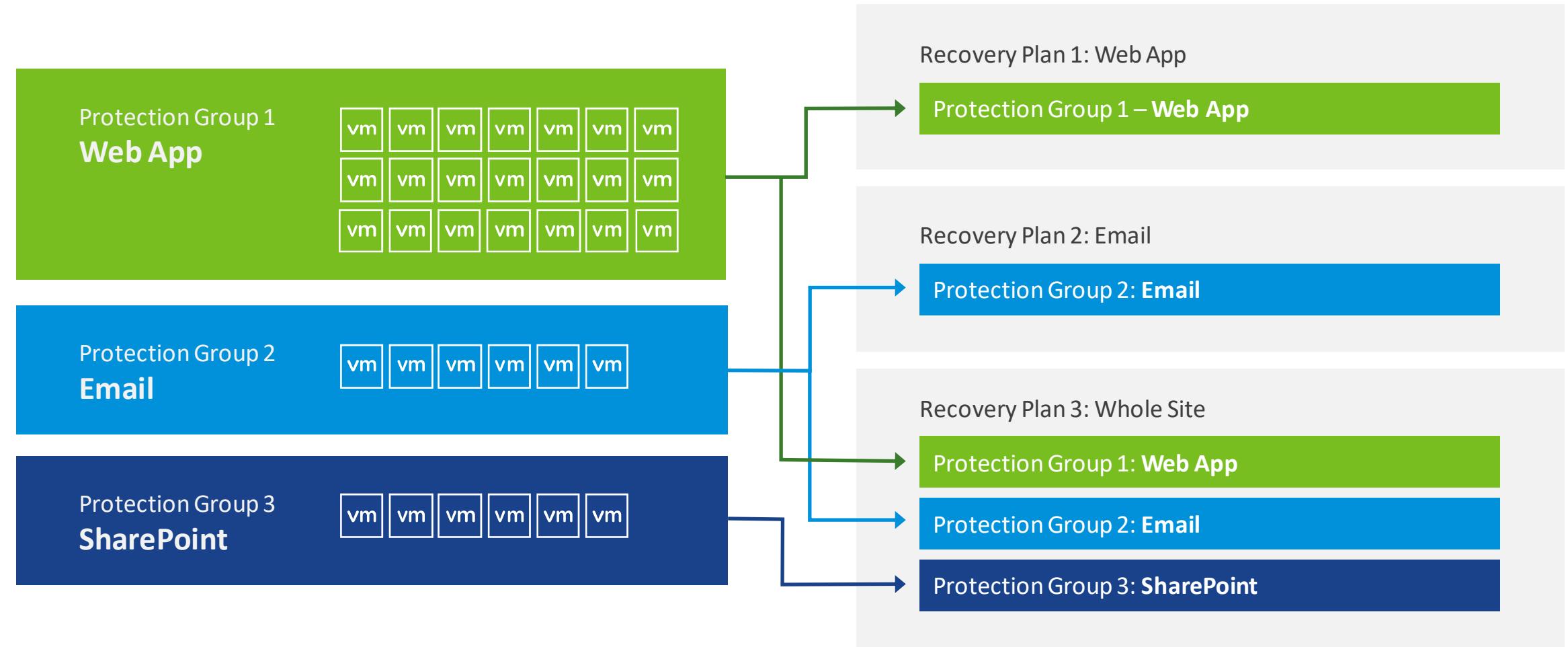


One VM can only belong to one Protection Group

# VMware Site Recovery (DRaaS) for VMware Cloud on AWS

Combines the power of SRM/VR with the elasticity and operational simplicity of the cloud

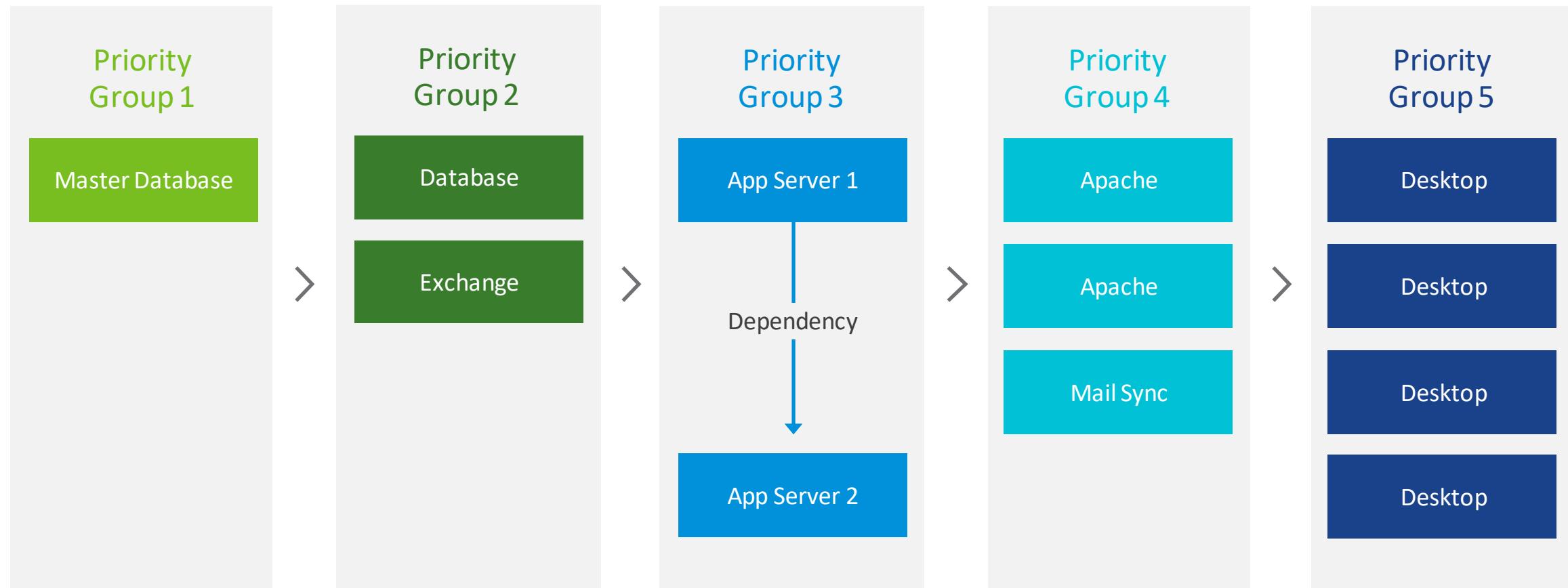
## Recovery Plans



# VMware Site Recovery (DRaaS) for VMware Cloud on AWS

Combines the power of SRM/VR with the elasticity and operational simplicity of the cloud

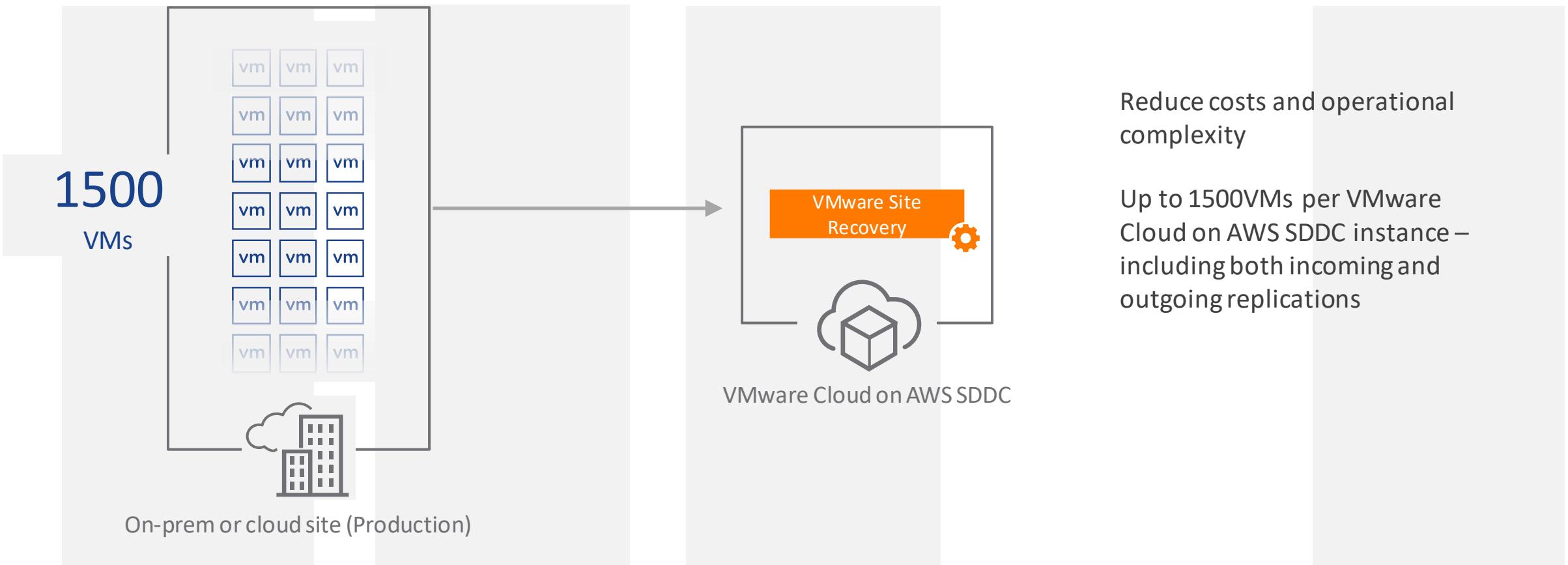
## Priorities and Dependencies



# VMware Site Recovery (DRaaS) for VMware Cloud on AWS

Combines the power of SRM/VR with the elasticity and operational simplicity of the cloud

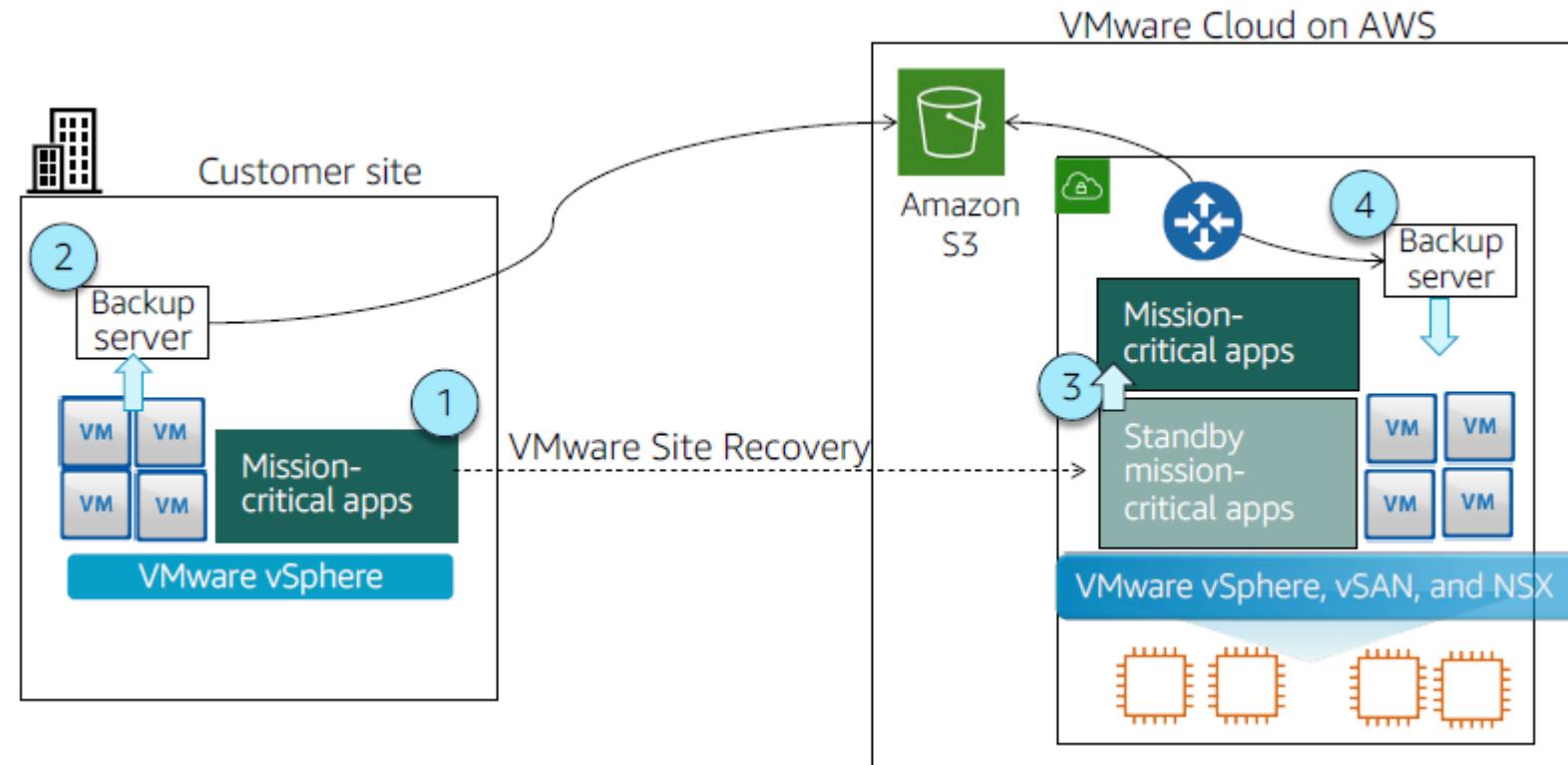
Protect 1500 VMs per SDDC



# VMware Site Recovery (DRaaS) for VMware Cloud on AWS

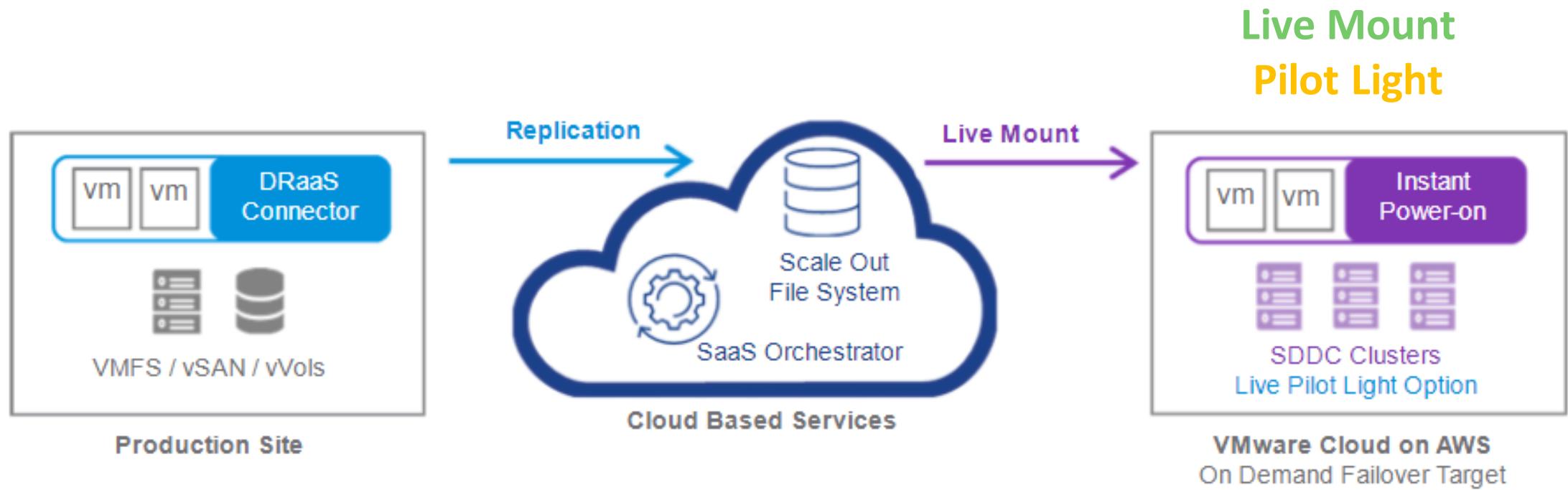
Combines the power of SRM/VR with the elasticity and operational simplicity of the cloud

Warm standby architecture with Site Recovery



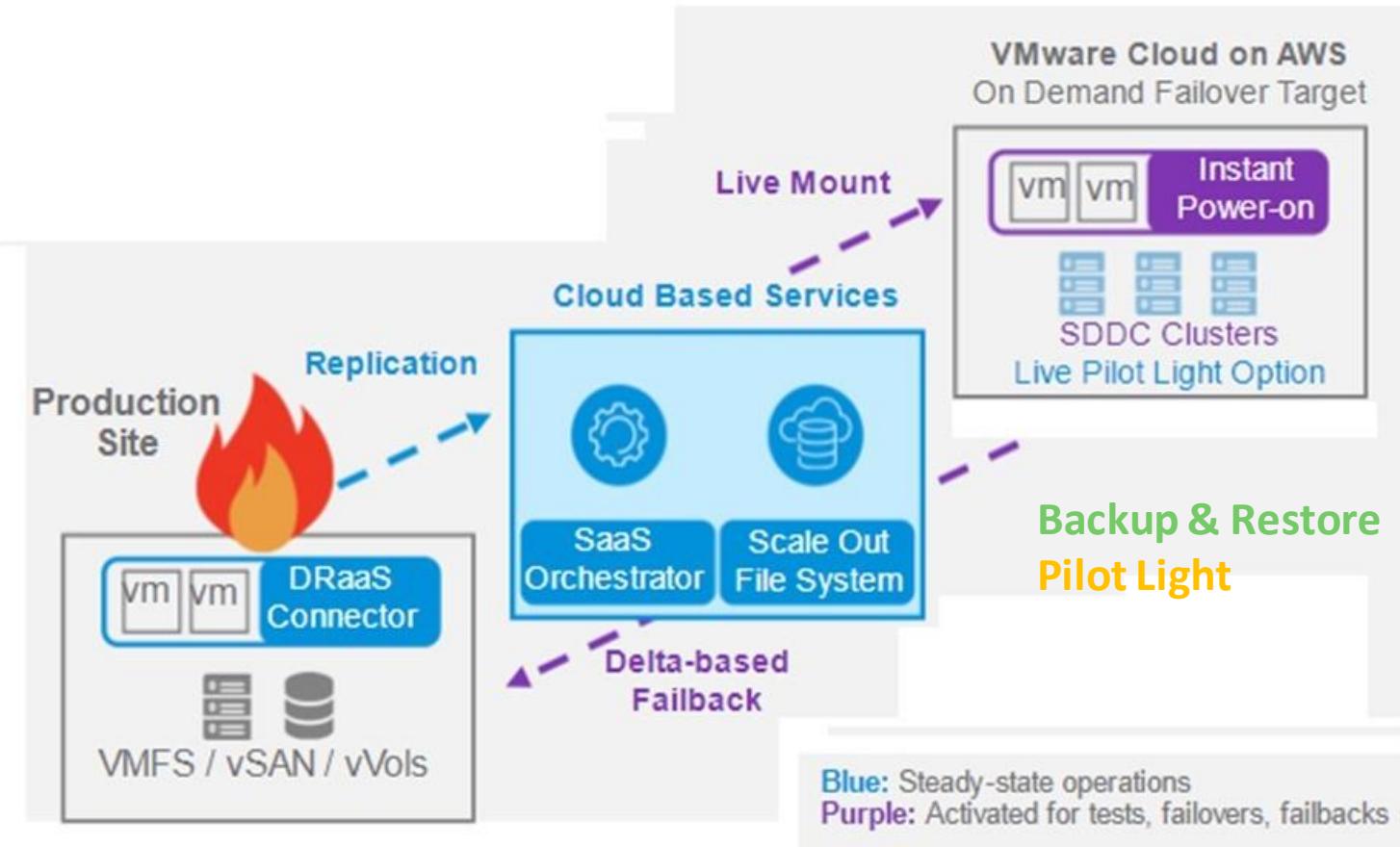
# VMware Cloud Disaster Recovery

On-demand, SaaS, easy to use, cloud economics



# VMware Cloud Disaster Recovery

On-demand, SaaS, easy to use, cloud economics



**Pilot Light option:** Minimally SDDC deployed on AWS (2 nodes) in-waiting for faster recovery

**Instant power on (Live mount):** Cloud backup can be started directly in VMC, no rehydration

No VM format conversion

Manage both production and DR sites with vCenter

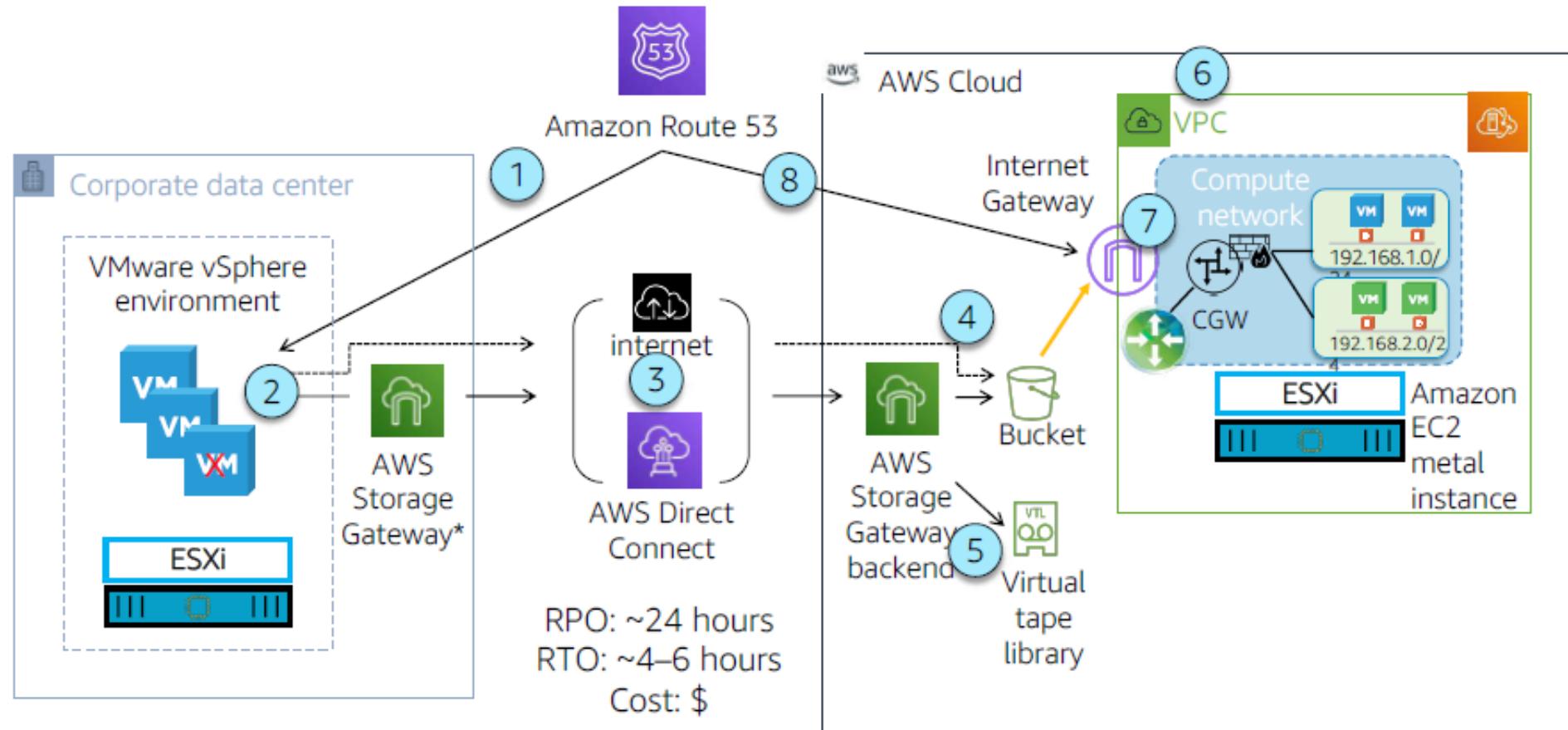
Continuous DR health checks every 30 minutes

Immutable Cloud Storage, encrypted, forever incremental backup

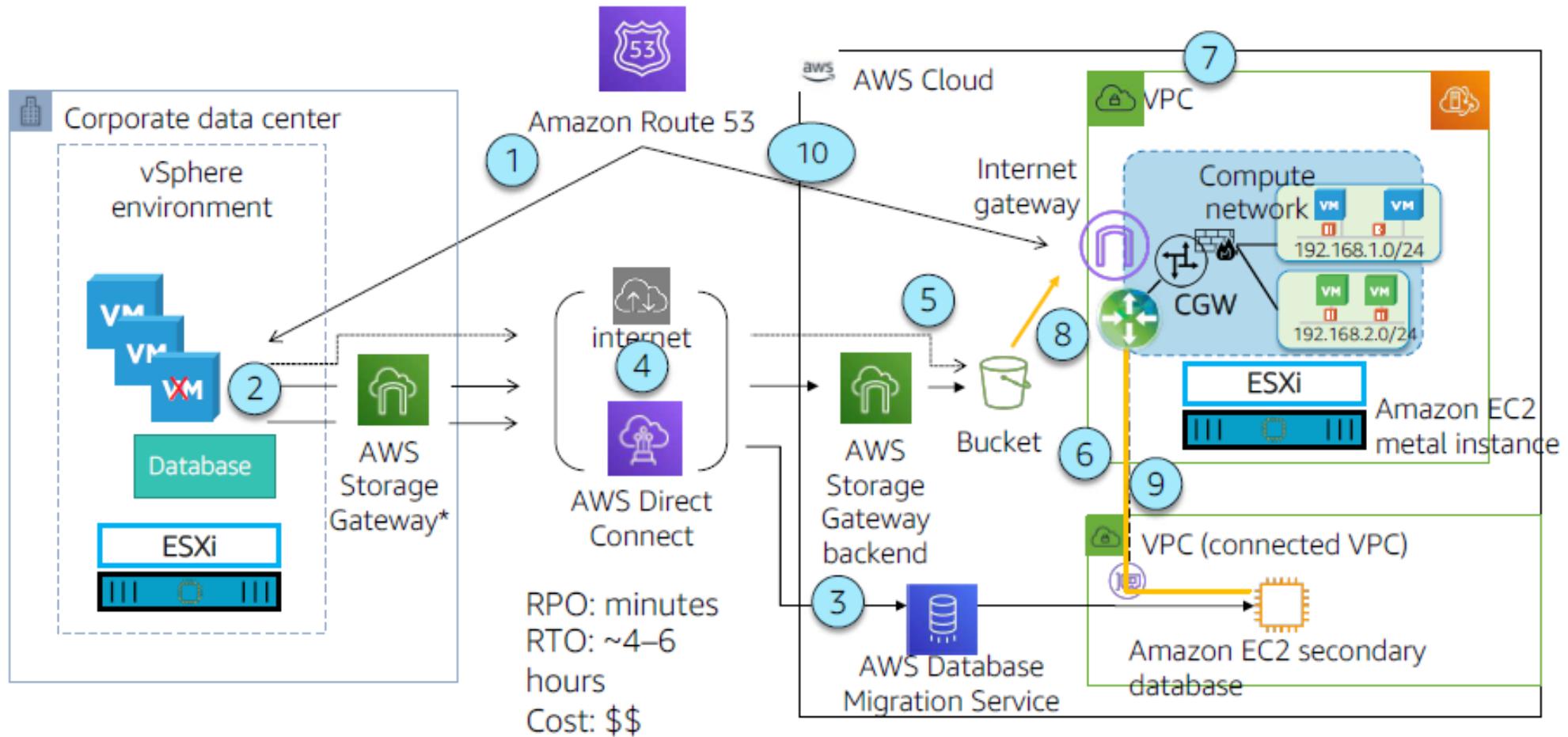
Optimized failback, egress charges minimized, only changed data is transferred

Pay as you go for capacity

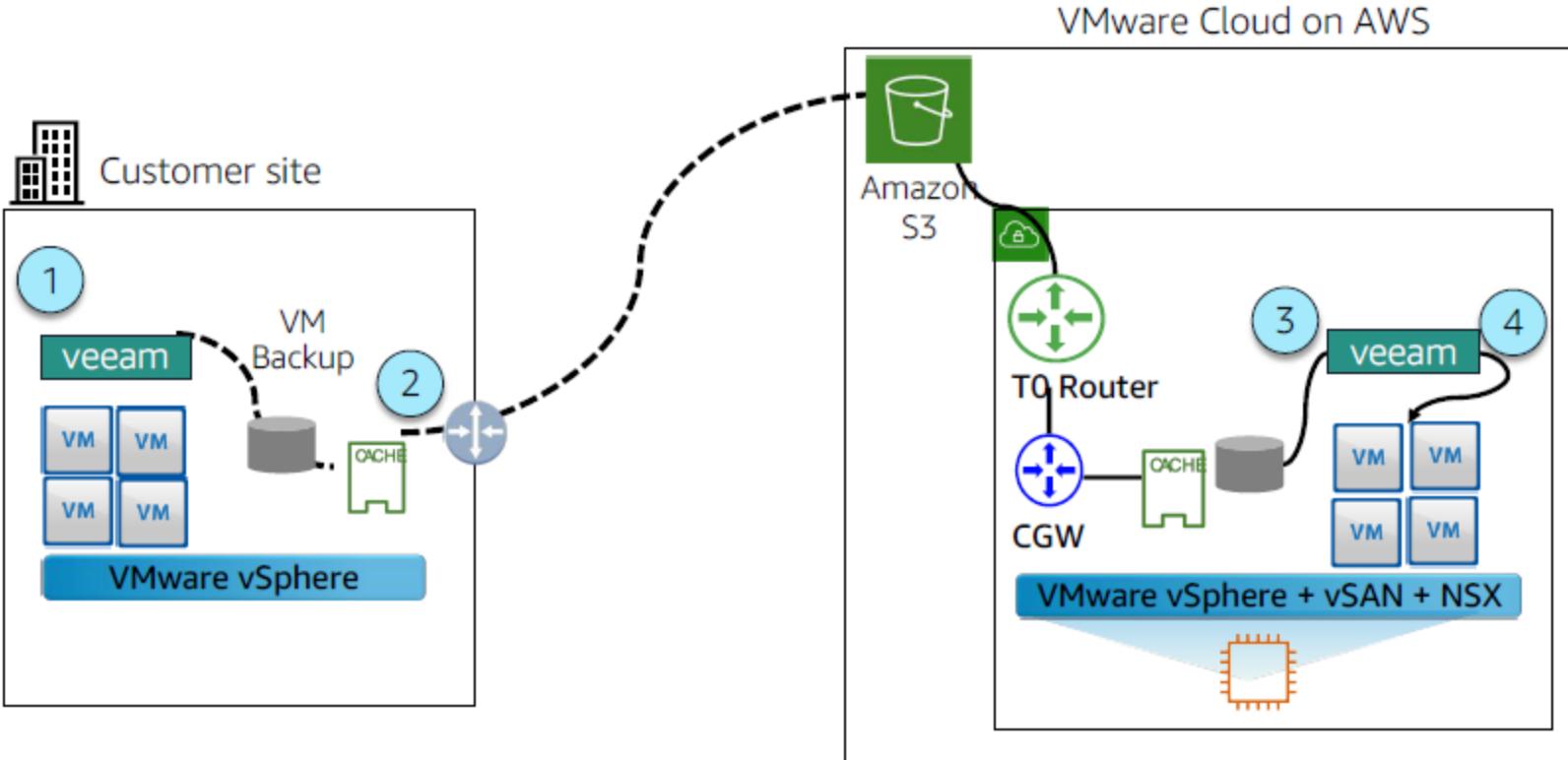
# Backup & Restore with AWS Services - example



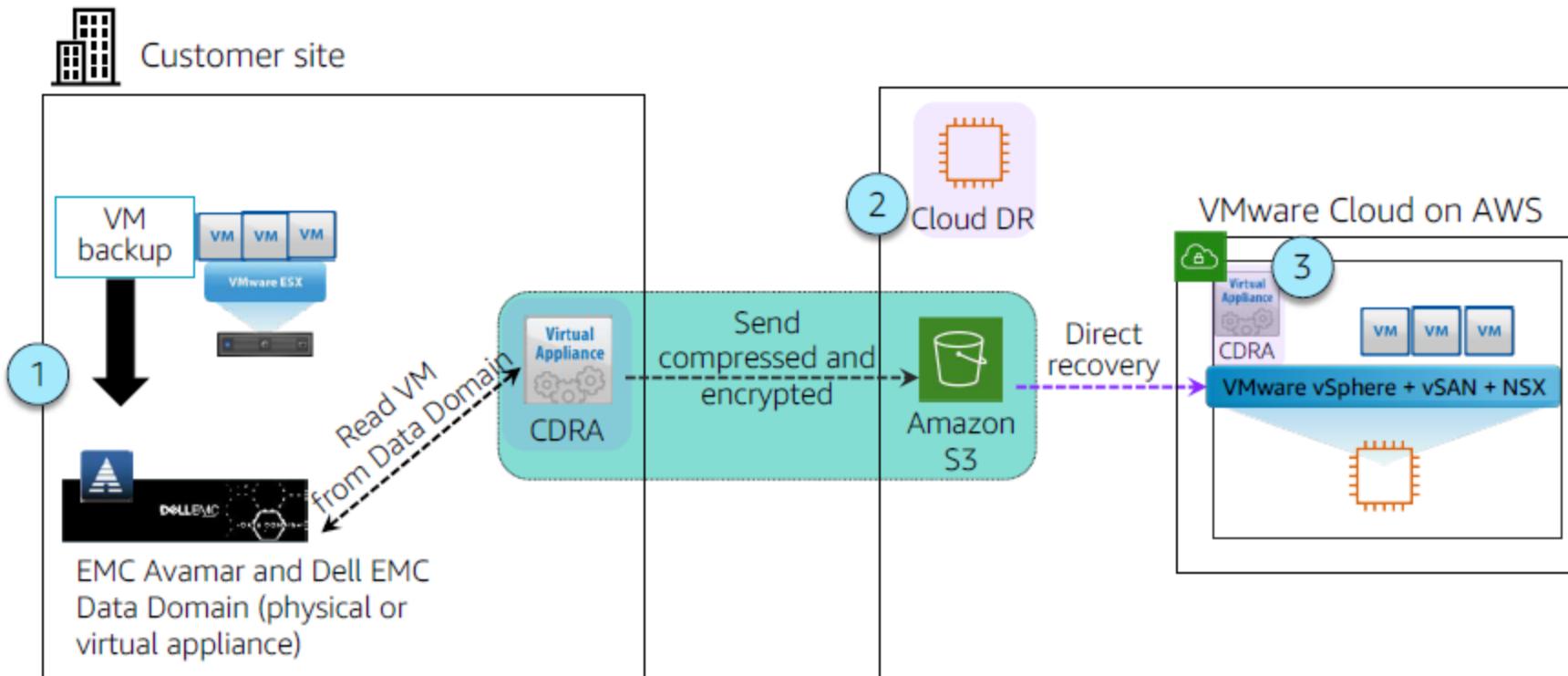
# Pilot Light with AWS Services - example



# Backup & Restore with Veeam VBR - example



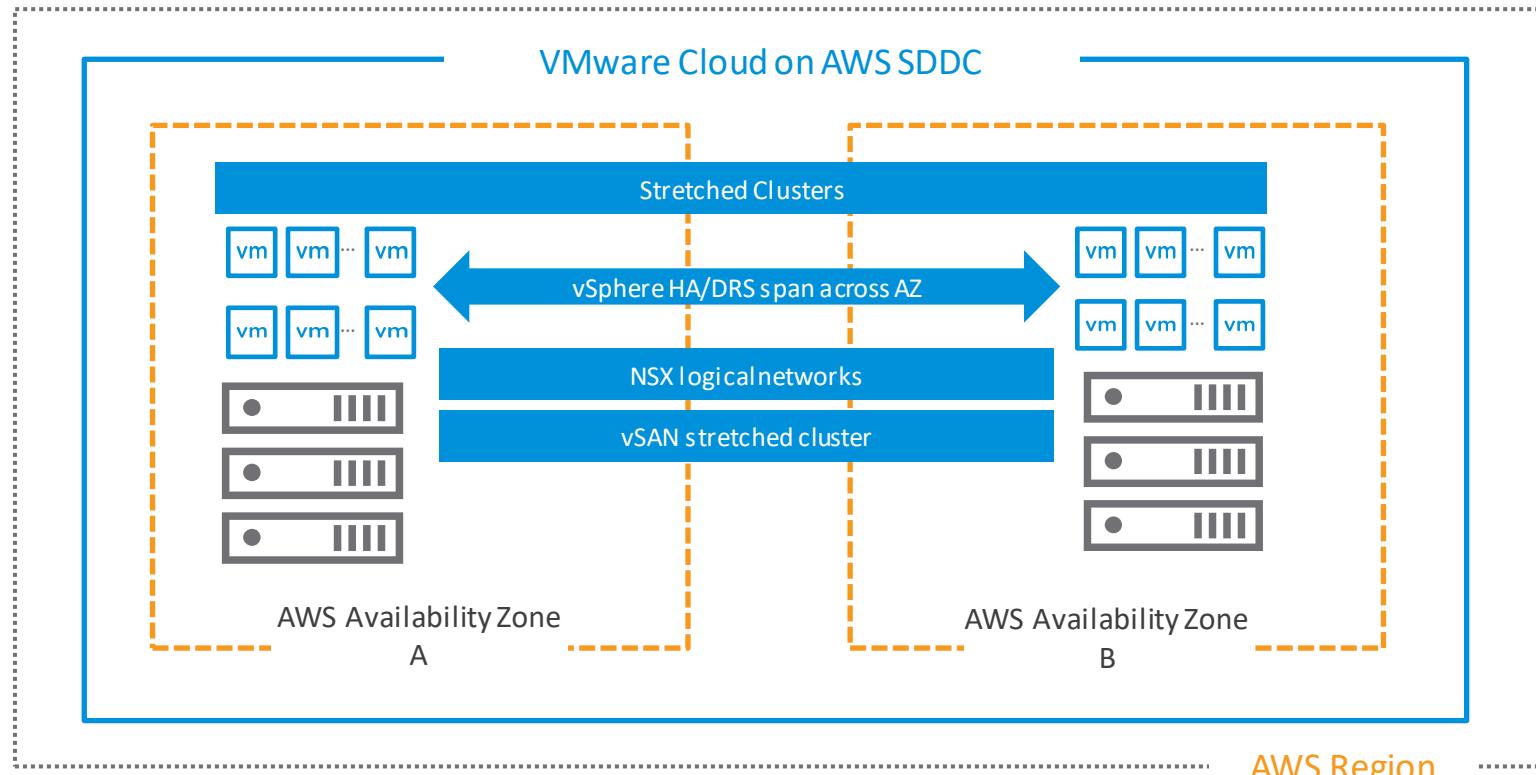
# Backup & Restore with Dell EMC Cloud DR - example



# Stretched Clusters for VMware Cloud on AWS

Deliver protection against AWS Availability Zone failure at an infrastructure level

## Active-Active



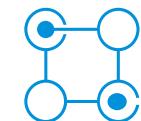
### Higher SLA

Covered by four 9s (99.99%) SLA  
Ideal for business-critical applications



### Instant High Availability

Zero RPO to restart affected VMs in mirror AZ  
No reconfiguration due to common network



### Built Into Infrastructure

Not necessary to re-architect applications  
Reduces risk of potential implementation errors

# Data Center Extension Use Case

# Data Center Extension

Consistent infrastructure capabilities for easy extensibility to the cloud

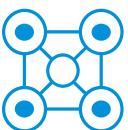


## Key Capabilities



### Consistent infrastructure

- Seamless application portability
- Same industry-leading vSphere platform
- Familiar vCenter-based management
- Rich ecosystem technology support



### Enterprise-grade infrastructure

- <2 hours to spin up SDDC, minutes to add hosts
- Flexible, policy-driven resource management
- Failure protection at VM, host and AZ level
- Predictable, high-performance compute with vSphere
- Comprehensive networking with NSX-T, incl. micro-seg.
- Policy-driven enterprise storage with vSAN



### Consistent cloud operating model

- End-to-end monitoring, troubleshooting, and network visibility
- Holistic capacity, cost, and performance optimization
- Self-service consumption and delivery of services

## Benefits

- **Expand seamlessly** – cloud consistent with on-prem.
- **Scale rapidly** – on-demand vSphere environment
- **Manage as one** - unified management for hybrid cloud
- **Minimize learning** – reuse familiar skills & tools

59%

Recurring savings:  
Infrastructure  
+ operations<sup>1</sup>

Up to 71%

Savings in operations  
and training costs<sup>2</sup>

1. The Total Economic Impact™ Of VMware Cloud On AWS, an August 2019 commissioned study conducted by Forrester Consulting on behalf of VMware

2. IDC White Paper, sponsored by Dell EMC, Benefits of the Consistent Hybrid Cloud: A Total Cost of Ownership Analysis of the Dell Technologies Cloud, 2019; VMware analysis

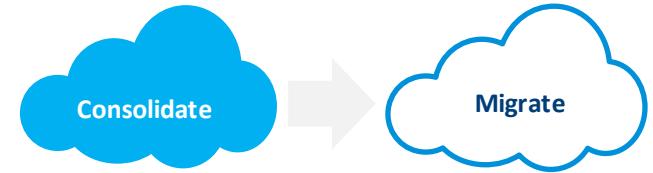
# Cloud Migration and Next-Gen Apps Use Cases



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# Cloud Migrations

Rapid, low risk and cost-effective migrations at scale



## Key Capabilities

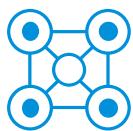


### Large-scale migration with minimal disruption

- No necessity to re-factor/re-architect apps
- Choice of live, warm and cold migration
- WAN-optimized, encrypted migration at scale
- No config changes needed (e.g., OS, IP or MAC address)
- Familiar vCenter-based management
- Prescriptive, guided workflows

## Benefits

- **Save time** – rapid migration at large scale
- **Lower cost** – no re-factoring expenses
- **Reduce risk** – no changes to applications
- **Minimize learning** – reuse familiar skills & tools



### Enterprise-grade infrastructure for app modernization

- Predictable, high-performance compute with vSphere
- Feature rich SDDC, including NSX-T and vSAN
- <2 hours to spin up SDDC, minutes to add hosts
- Support for Kubernetes and containers
- Access to 165+ native AWS services



### Cloud management to accelerate migration

- Build migration strategy, assess capacity, discover apps
- Gain visibility of dependencies, costs, compliance, & network

**71%**

Less staff time  
required compared  
to native cloud  
migration<sup>1</sup>

**1000**

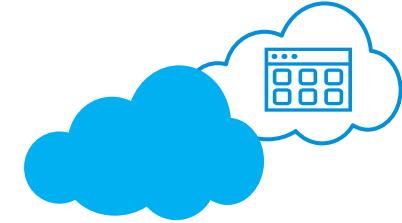
workloads migrated  
in weeks

**30%**

Less capacity in the  
cloud was needed

# Next-generation Applications

Unified cloud infrastructure for modern applications



## Key Capabilities



### Automate infrastructure operations

- Embrace Infrastructure as Code, GitOps and infrastructure pipelines
- SDK, RESTful API and CLI
- In-product developer center



### Transform applications with Kubernetes

- Automation and operations for Kubernetes and VMs in the same platform
- VMware Tanzu Kubernetes Grid support
- Agile development with VMware Pivotal Labs
- CI/CD ecosystem support



### Enrich with cloud services

- Direct access to AWS services
- Access to VMware partner ready solutions

## Benefits

- **Minimize disruption** – migrate and modernize
- **Provide portability** – optimize app placement as needed
- **Abstract complexity** – infrastructure provided resiliency
- **Empower IT** – DevOps ready platform and services access

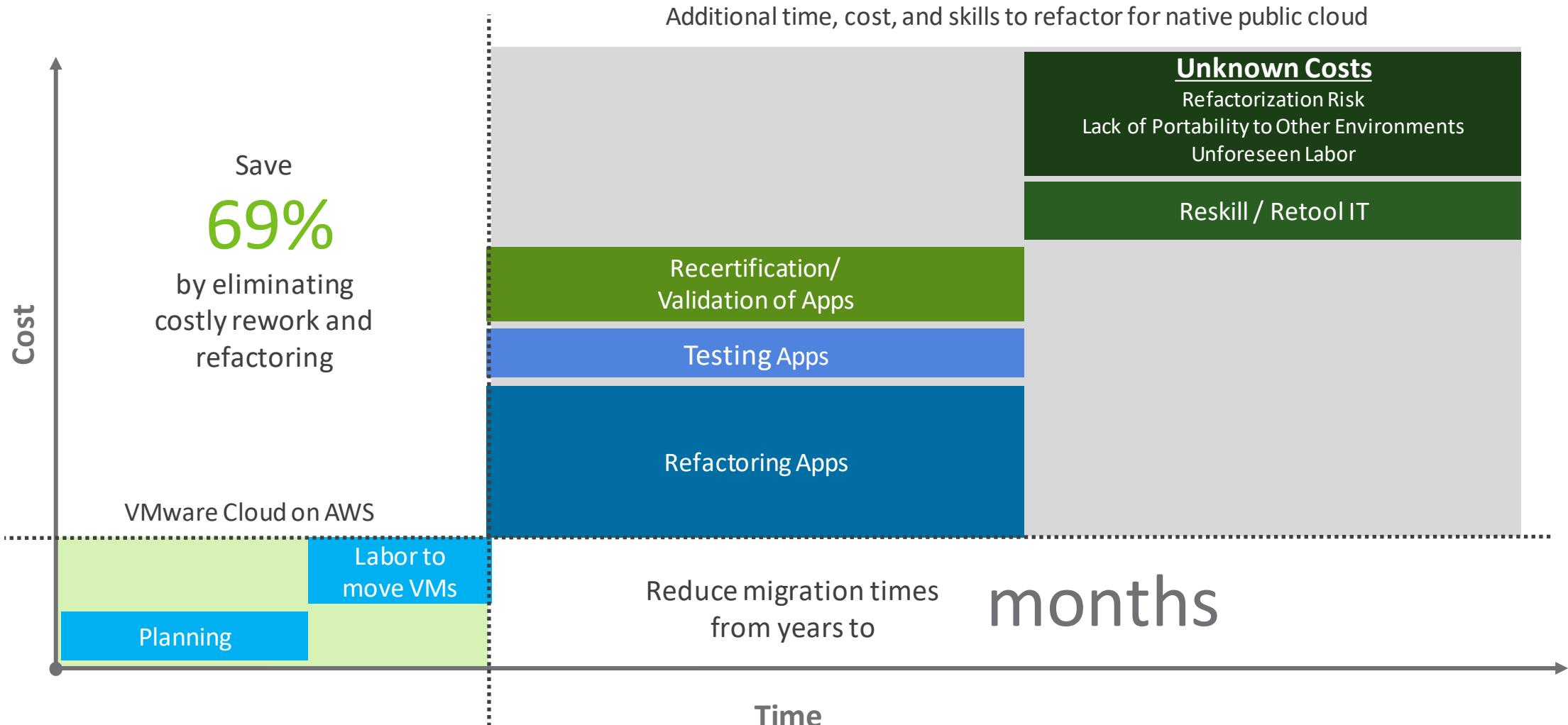
175+

AWS services, incl.  
AI/ML, analytics, IoT  
and more

300+

Partner ready solutions  
across DevOps,  
migration, monitoring  
and more

# Cost of Migrating to Public Cloud

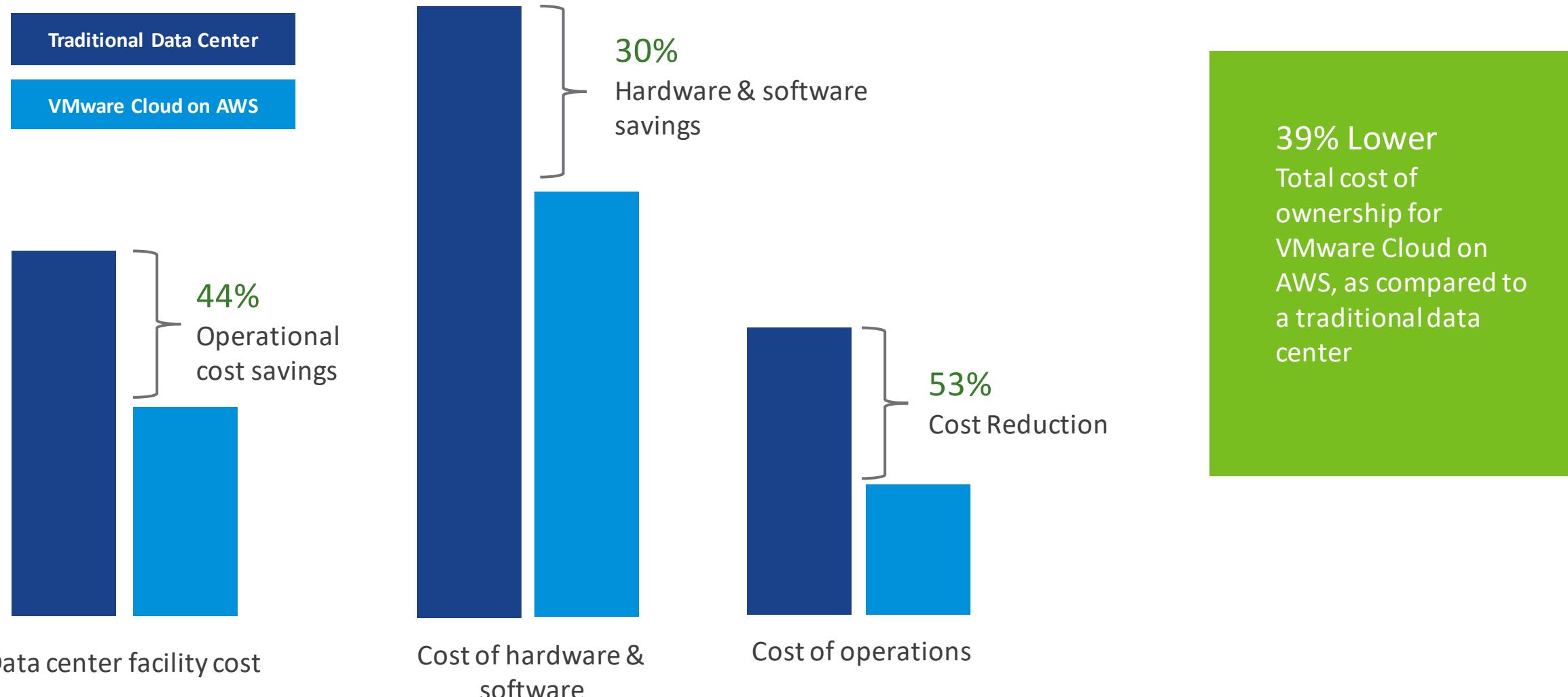


Sources: IDC White Paper, sponsored by VMware, The Business Value of Hybrid Cloud with VMware, 2019; Hybrid Cloud Trends Survey, The Enterprise Strategy Group, March 2019 (N=309)

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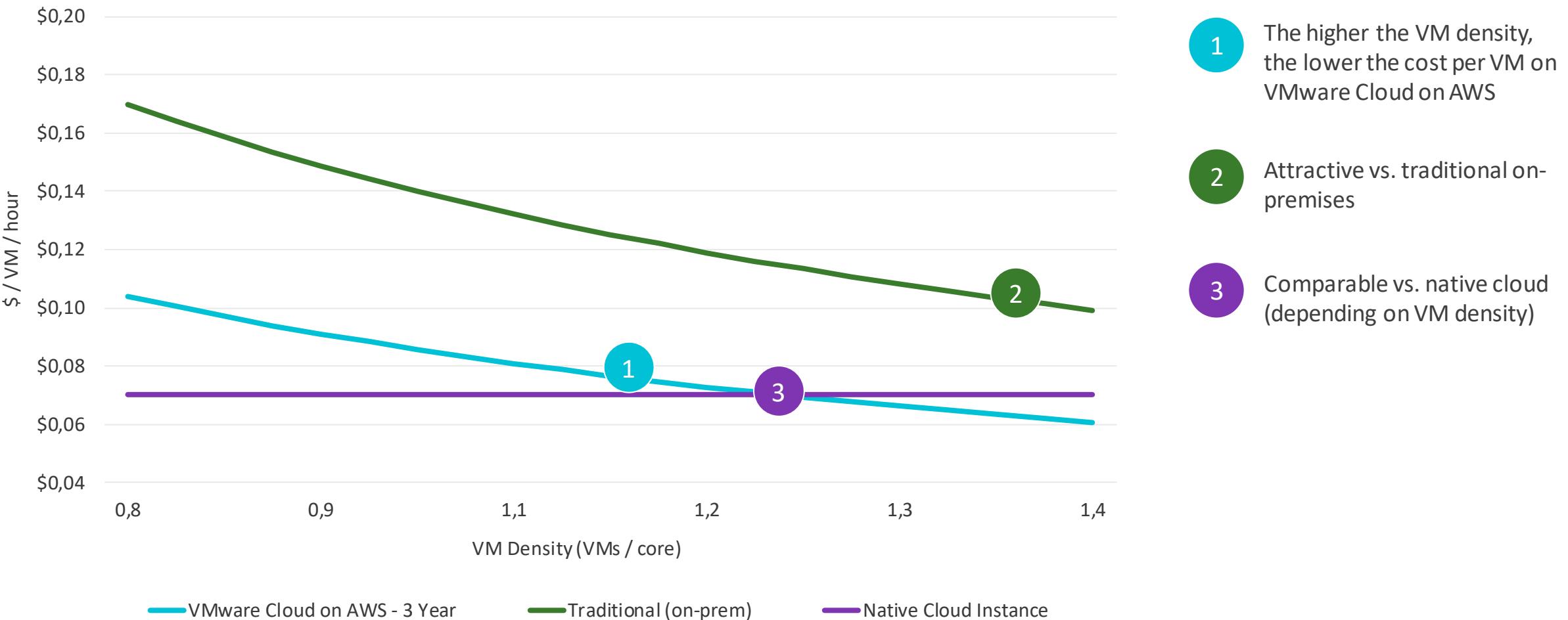
# Unmatched Economic Value Compared to Traditional DC Options

Real customer cost comparison of VMware Cloud on AWS Vs. traditional Data Center



Source: The Total Economic Impact™ Of VMware Cloud On AWS, an August 2019 commissioned study conducted by Forrester Consulting on behalf of VMware

# VMware Cloud on AWS Infrastructure TCO – 3 Year Subscription



Note: Reference VM size of 2 vCPU, 8GB of RAM, 150GB of storage. Factors in overhead VMs. Includes VMware license and support costs.  
Traditional on-premises includes traditional servers, storage, networking, vSphere, power and cooling and rackspace.

Native cloud instance includes similarly sized compute instance with external storage. Excludes bandwidth/IP and admin expenses.

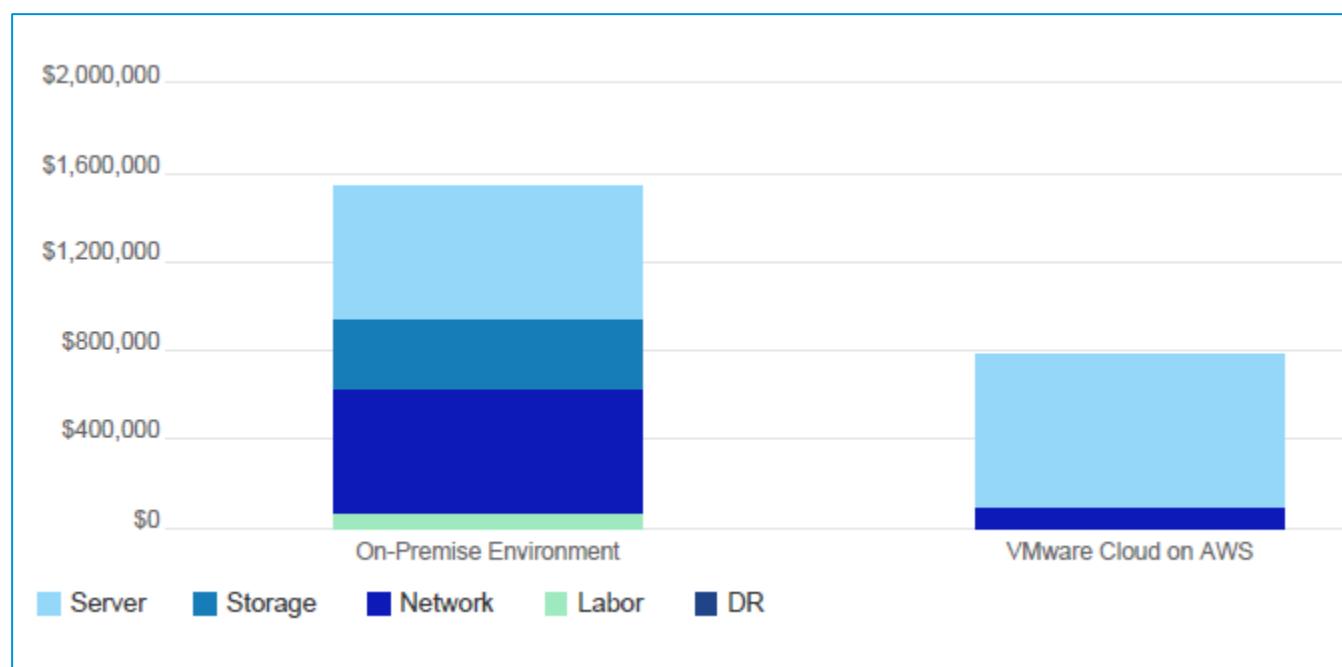
# Cloud Economics and Speed

52%

Recurring savings:

Infrastructure  
+ operations

Lower TCO than  
**Real Case in Ingram Micro Brasil**  
Three-year comparison



Faster and lower cost to migrate  
vs. native cloud

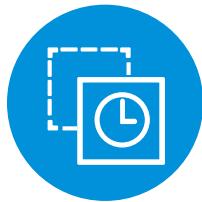


Save  
**57%**  
by eliminating  
costly rework and  
refactoring

Reduce migration  
times from years  
to  
**months**

Sources: IDC, The Business Value of Running Applications on VMware Cloud on AWS in VMware Hybrid Cloud Environments, Sponsored by VMware, October 2020; Hybrid Cloud Trends Survey, The Enterprise Strategy Group, March 2019 (N=309)

# Differentiating Capabilities Over Native Public Clouds



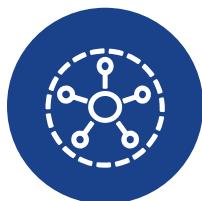
## Rapid, Cost-Effective and Low Risk Migration

- No application refactoring
- No infrastructure retrofit
- Zero-downtime, large-scale migrations
- Prescriptive migration workflows



## Hybrid Cloud with Consistent Infrastructure and Operations

- Same vSphere as on-premises
- Consistent cloud operating model
- Secure, WAN-optimized, and stretched L2 networks
- Rich ecosystem of proven partner solutions



## Enterprise-grade Availability and Optimization

- Predictable, high-performance compute
- Elastic, policy-driven resource management
- Policy-driven enterprise storage services
- Built-in resiliency for VM, host and AZ failures
- Enterprise-grade L2 and L3 networking

# How Can You Accelerate Your Journey to Public Cloud?

Migrate rapidly to public cloud by using your existing VMware investments



## Understand

how VMware Cloud on AWS  
accelerates the migration  
process



## Analyze

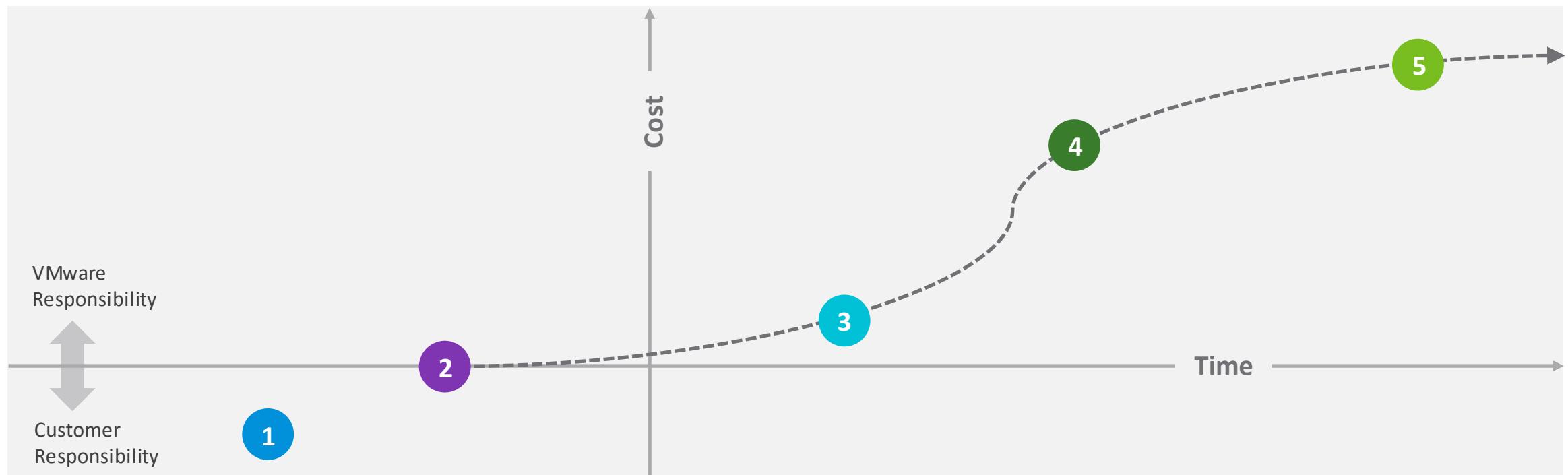
VMware Cloud on AWS  
economics by requesting a  
TCO analysis:  
<http://bit.ly/vmctco>



## Experience

by trying a hands-on-lab or  
requesting for a pilot/POC

# Mapping The Customer's Cloud Journey



## 1. Assessment

- Workloads identified
- App dependency complete
- Network assessment done
- Security posture identified

## 2. Design & Build Hybrid Cloud Strategy

- Requirements complete
- Architecture Diagram in place
- Risk & assumptions identified
- VMware specificsizing done

## 3. Migration Prep

- Workloads right-sized
- App dependencies validated
- Migration plan for different scenarios complete
- Set Up the SDDC
- Setup network for hybrid cloud
- Workload mobility with HCX

## 4. Execute Migration

## 5. Operate

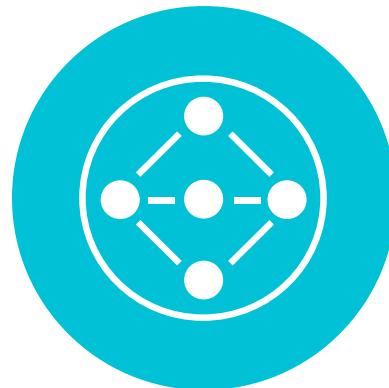
- Monitoring the hybrid environment
- Governance & control
- Patching & on-going maintenance

# Migration Planning and Considerations

## Applications



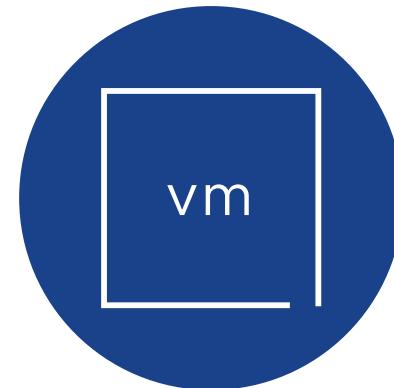
## Network



## Storage



## Configuration



Network insight

Infrastructure services

Sizing

Virtual hardware

App dependencies

Firewall rules

Bandwidth

EVC

Migration waves

Virtual switches

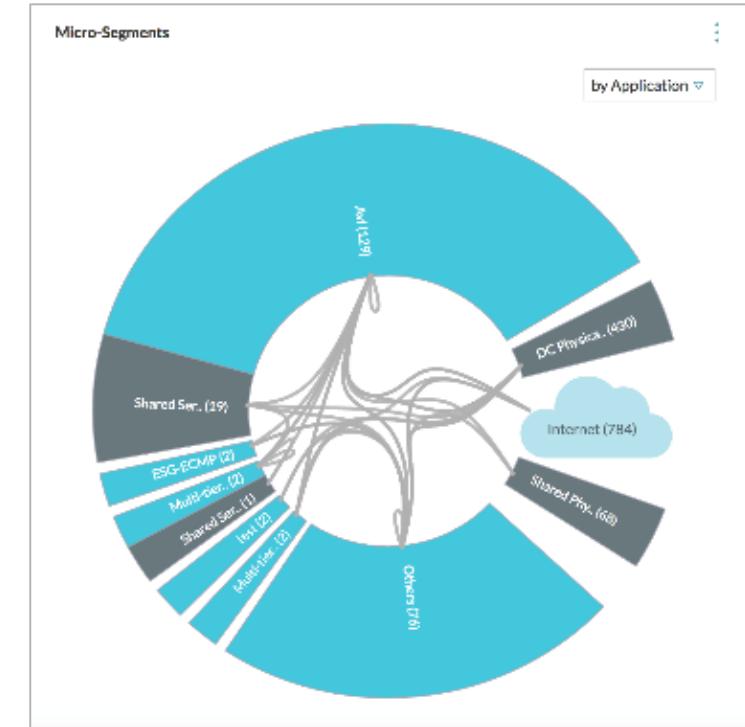
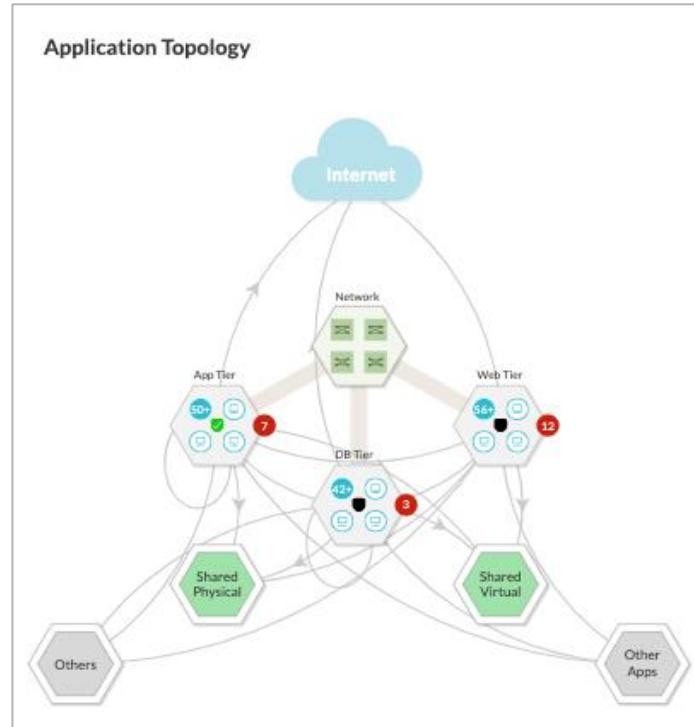
Storage policies

Metadata

# Use vRealize Network Insight for Dependency Mapping

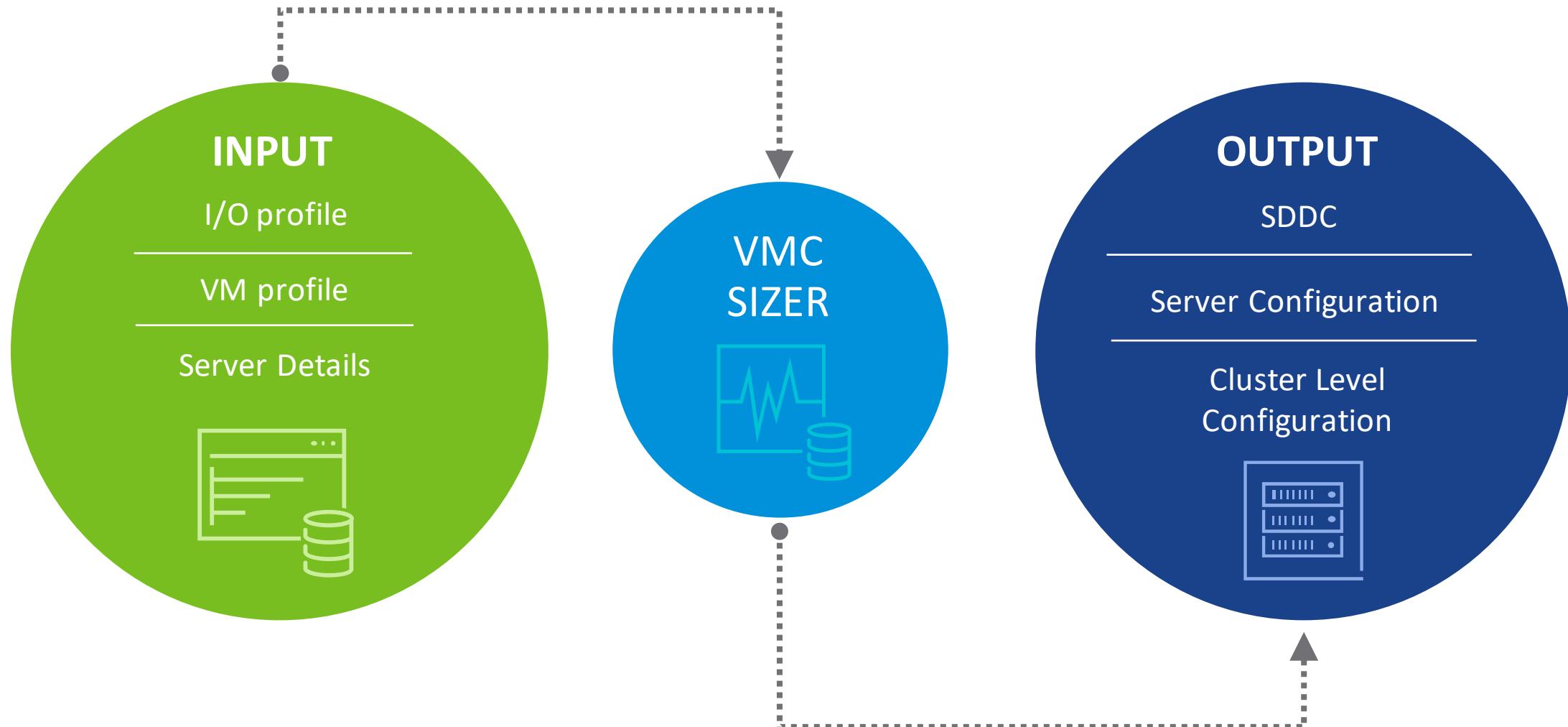
Discover application dependencies. Plan and validate security

- Discover applications (VMs, containers) to migrate traffic patterns
- Plan security including recommend firewall policies, application micro-segmentation
- Troubleshoot security for hybrid applications (cross VMs, containers and hybrid clouds)



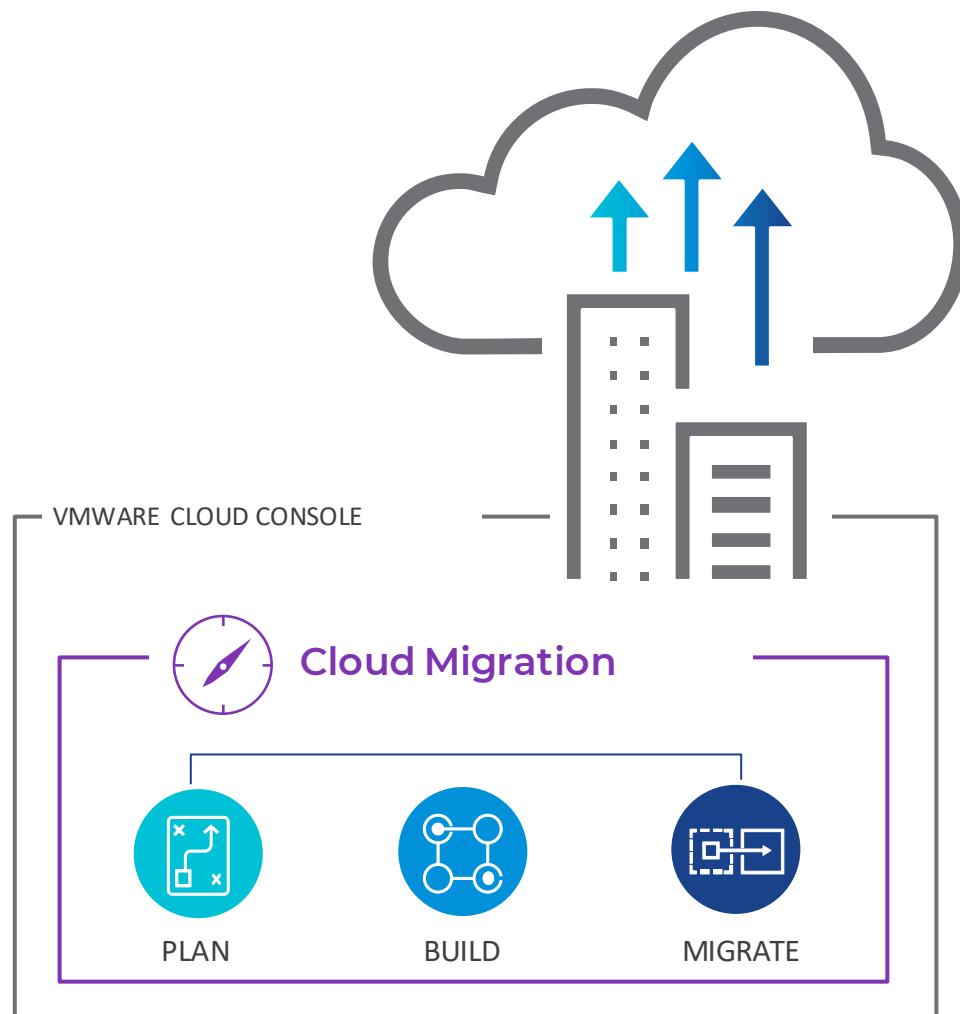
# Find the Most Optimized SDDC Configuration

<https://vmcsizer.vmware.com/>



# Simplify VMware Cloud on AWS Migration Experience

A prescriptive, intuitive and integrated workflow



Turn-key migration experience for customer convenience



Plan, build and execute migrations with a single end-to-end workflow, with step-by-step guided migration experience

Increased velocity of migrating workloads to VMware Cloud



Leverage relevant tools presented at the right stage of the journey with streamlined documentation to help users understand the VMware Cloud on AWS platform and the migration process, saving time for users

Simplified workflow with end-to-end visibility



Track status of each step of the process, providing visibility into the migration progress

<https://vmc.vmware.com/solutions/migration/>

# VMware Cloud Migration Experience In Action

The screenshot shows the VMware Cloud Solutions Data Center Migration interface. At the top, there's a navigation bar with 'Launched' and 'Data Center Migration' selected. Below it, a sidebar has 'Home' and 'Migration' options. The main area says 'Your migration journey starts here' and features three vertical columns representing stages:

- Stage 1 Plan:** Contains a 'VIEW DETAIL' button and a list of tasks:
  - Get to know VMware Cloud on AWS
  - Create VMware Cloud on AWS account
  - Analyze on-premises workloads
  - Analyze network dependencies (optional)
  - Size your workloads
  - Prepare AWS resources
  - Prepare network ranges
  - Prepare DNS strategy
  - Prepare for network connectionA detailed description of the Plan stage follows: "In the Plan stage, you will learn about the VMware Cloud on AWS platform, assess the size of your on-premises workloads and determine the networking, security and other resources required to support those workloads. This information will help you determine the size and configuration of your VMware Cloud on AWS infrastructure. Planning is a very important stage that creates the foundation for your migration."
- Stage 2 Build:** Contains a 'VIEW DETAIL' button and a list of tasks:
  - Create SDDC
  - Configure network
  - Configure intra AWS connectivity
  - Download HLM Gateway (Optional)
  - Enable vRealize Log Insight Cloud (Optional)A detailed description of the Build stage follows: "In the Build stage, you will build your VMware Cloud on AWS infrastructure based on the needs you determined in the Plan phase. You will create a cloud SDDC and configure it to be ready to run your workloads."
- Stage 3 Migrate:** Contains a 'VIEW DETAIL' button and a list of tasks:
  - Planning for migration
  - Installing and Testing HCX
  - Migrate by waveA detailed description of the Migrate stage follows: "In the Migrate stage, you will configure HCX and establish a tunnel that you will use to migrate your workloads. You will also test the result of the migration with application users. At the end of this stage, you will have successfully migrated virtual machines from your on-premises data center to VMware Cloud on AWS."

<https://vmc.vmware.com/solutions/migration/>

# Other Migration Considerations



## Physical Hardware

- Physical to virtual migration
  - Begin migration of virtual workloads which will free up on-premises capacity
- Co-locate equipment in proximity



## Active Directory/DNS/DHCP/Time Sync

- Use native cloud services where it makes sense
- Migrate into VMware Cloud on AWS



## Load Balancing/Edge Security

- AWS Elastic Load Balancer
- Avi load balancer
- Use virtual load balancing appliances

# Downtime Tolerance

Business and technical impact of the migrations

## Workload Migrations



Cold Migration



Replication



vMotion

Prolonged Downtime

Minimal Downtime

Zero Downtime

# NSX live migration with vMotion

## Benefits

- Migrate virtual machines (VMs) in a running state without downtime
- Familiar, easy-to-use solution
- Can migrate back to on-premises environment

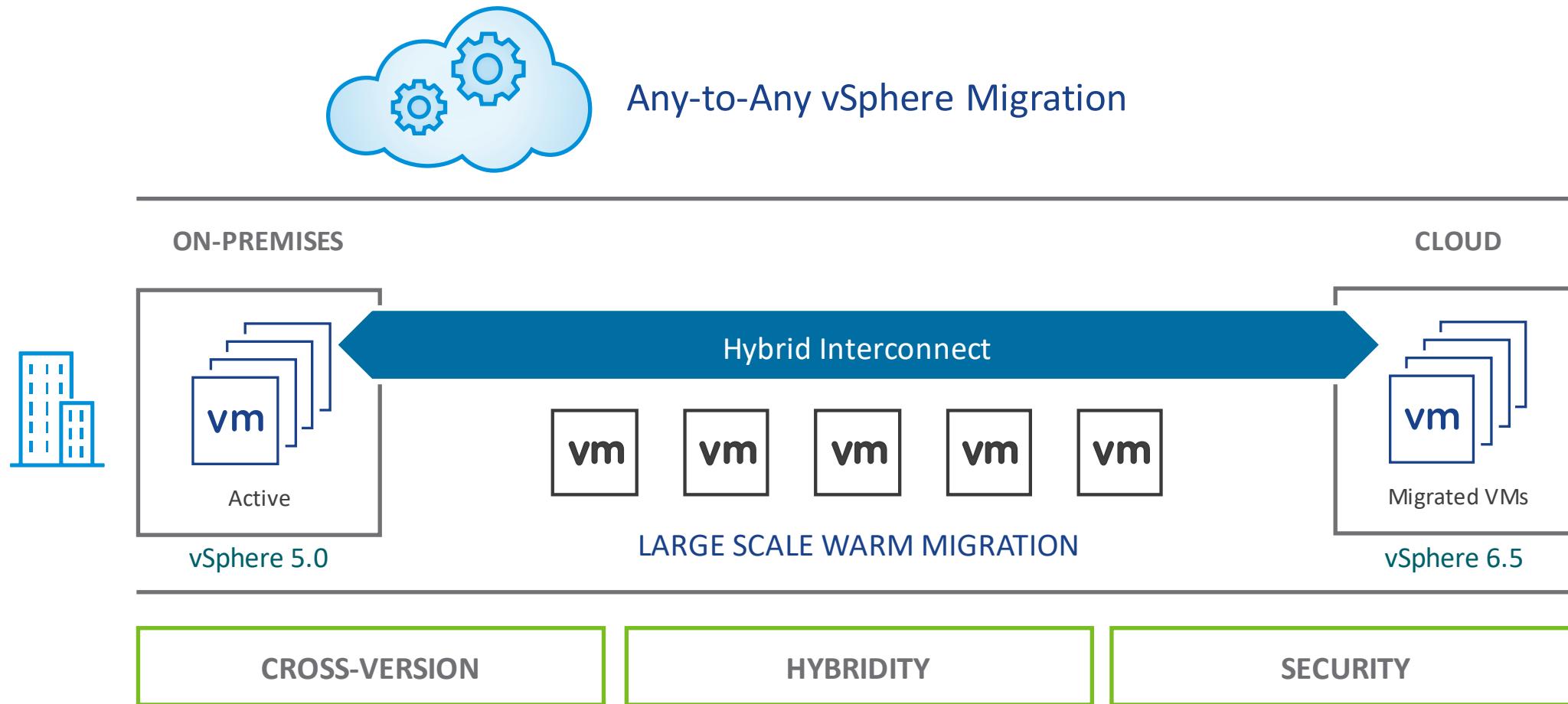


## Key requirements

- On-premises installation of VM vSphere
  - vSphere 6.5P03 (or later)
  - vSphere 6.7U2 (or later)
- Hybrid Linked Mode
- AWS Direct Connect (DX)

# VMware HCX

Application mobility at scale, infrastructure hybridity, large scale migration



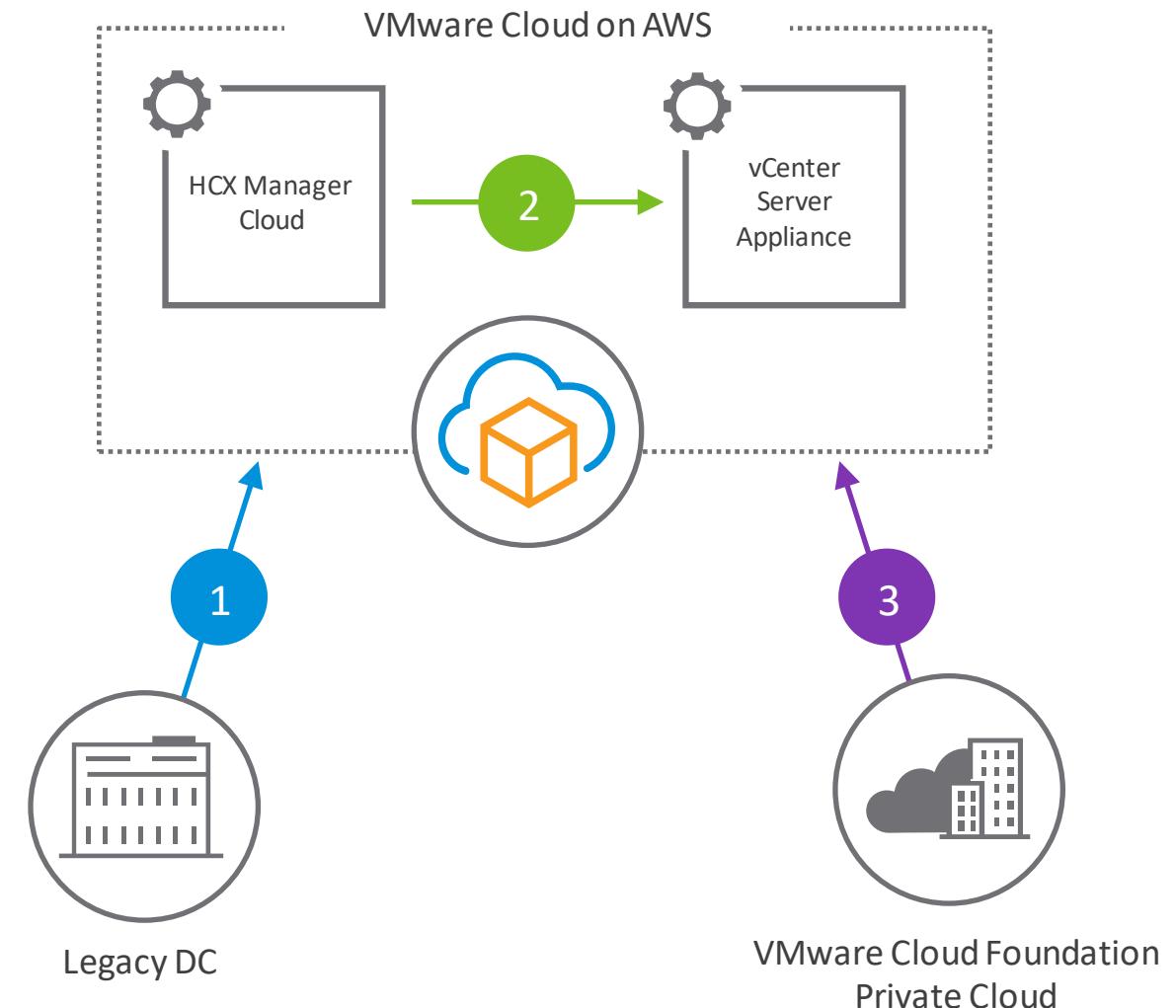
# Accelerating Cloud Migration With VMware HCX

## Sample customer scenarios

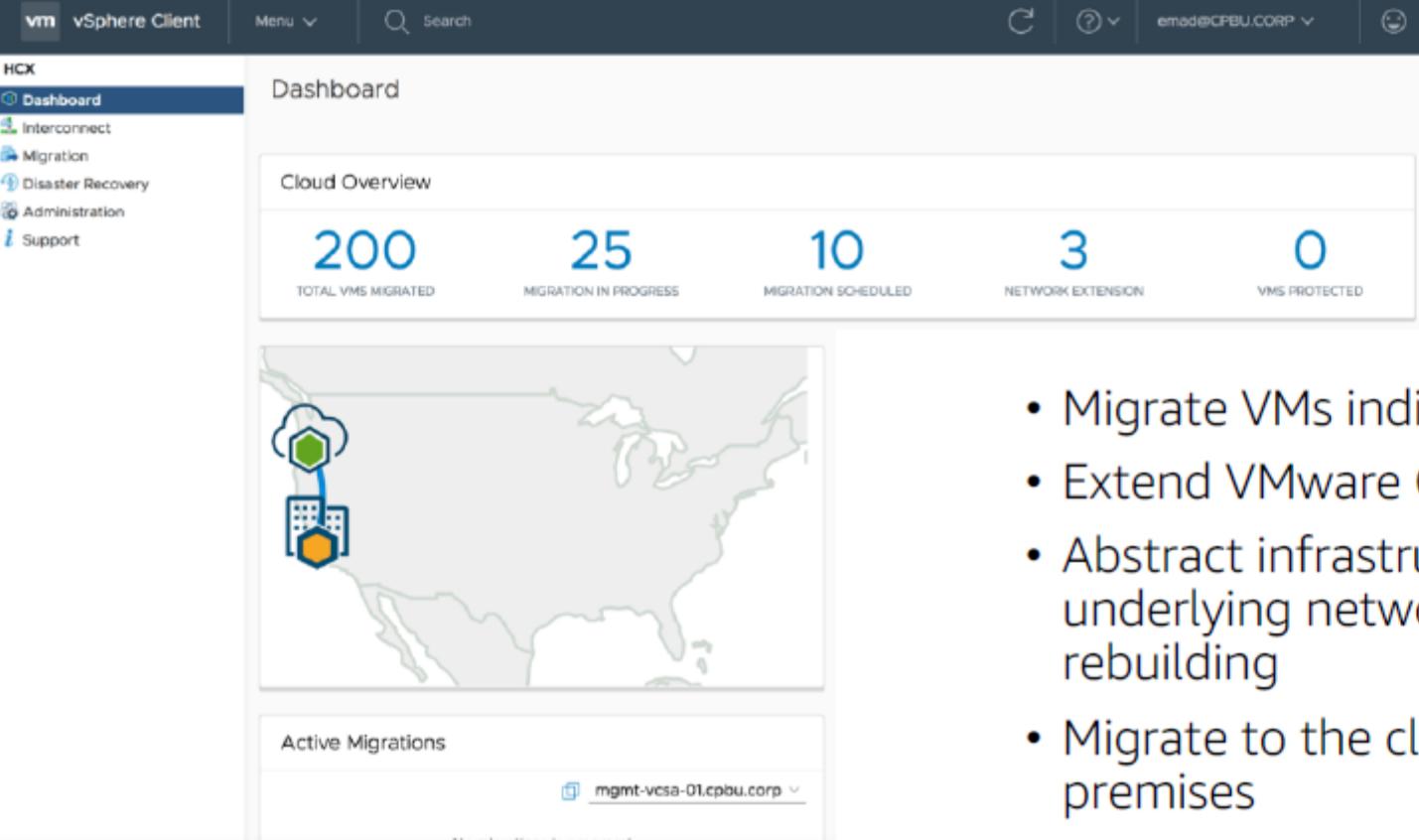
- 1 Migrating from On-Premises to VMC
- 2 Rebalancing across VMC Regions
- 3 Extending from on-prem VCF to VMC

### HCX Advantage

- Live Large-scale migration
- Region to region migration
- Secure migration and DR traffic
- Network and IP preservation
- High scale L2 Extensibility



# Accelerating Cloud Migration With VMware HCX



The screenshot shows the vSphere Client HCX Dashboard. The left sidebar lists 'HCX' categories: Dashboard (selected), Interconnect, Migration, Disaster Recovery, Administration, and Support. The main area displays a 'Cloud Overview' with the following metrics:

Metric	Value
TOTAL VMs Migrated	200
Migration in Progress	25
Migration Scheduled	10
Network Extension	3
VMS Protected	0

Below the overview is a map of North America with icons representing cloud and on-premises environments. A detailed 'Active Migrations' section shows a single entry for 'mgmt-vcsa-01.cpblu.corp'.

- Migrate VMs individually or in bulk
- Extend VMware Cloud on AWS
- Abstract infrastructure and underlying network without rebuilding
- Migrate to the cloud and back to on premises

# Accelerating Cloud Migration With VMware HCX



- Consolidate heterogeneous environments
- Migrate large-scale workloads
- Lower bandwidth requirements than NSX vMotion
- Support older vSphere versions

# VMware HCX types of migrations

Method	Impact	Requirements
Hybrid migration with VMware HCX	Scheduled cutover, minimal downtime	Requires VM power cycle
Hybrid migration with vMotion	Avoids downtime for mission-critical applications	One VM at a time
Hybrid cold migration	Migrate powered-off VMs at the same time	Longer downtime
Cloud Motion with vSphere Replication	Bulk migrate VMs without downtime	Requires vSphere 6.8.1 or later for SDDC and VMware HCX release 105 or later

# Migration Automation

Increasing the efficiency of the migration tasks

## Progression of Automation



Cold  
Migration



vMotion



Bulk  
Migration



Replication  
Assisted vMotion



HCX  
vMotion

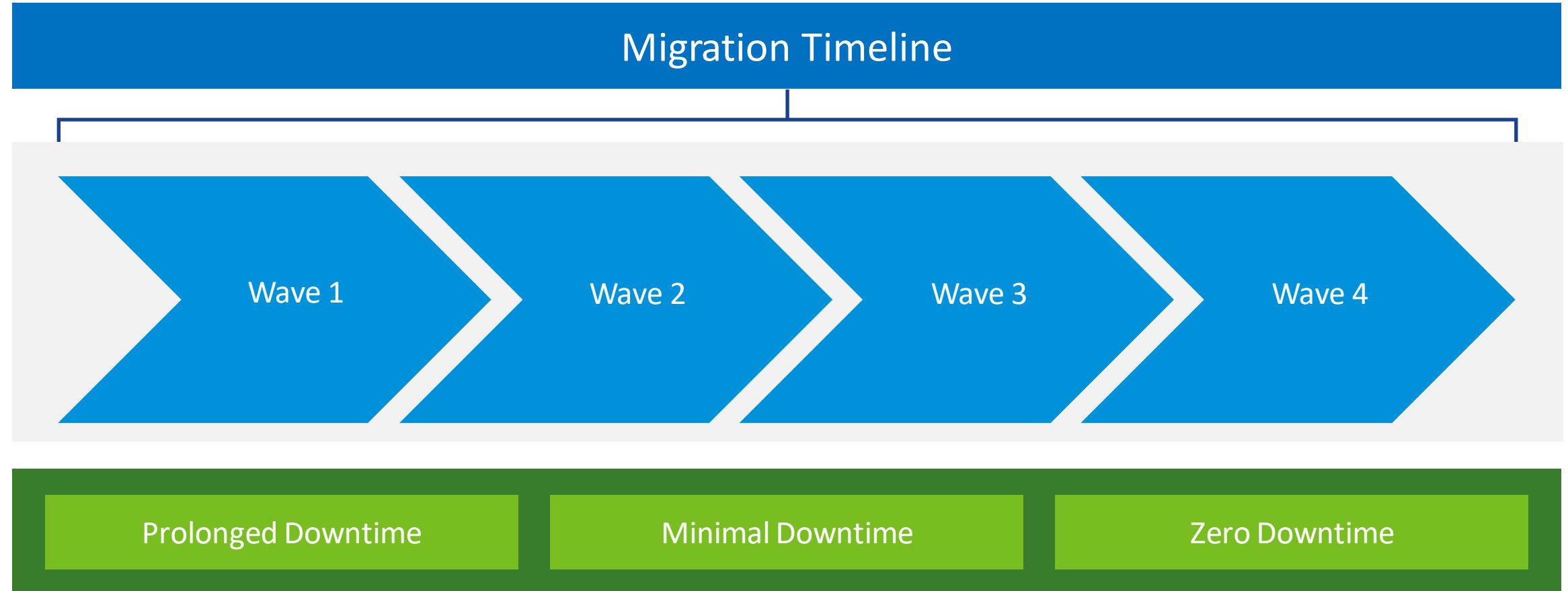
> 100 Workloads

Hundreds of Workloads

Thousands of Workloads

# Migration Waves

Working with the business and operations



# Day Two Operations



Maintenance  
and Support



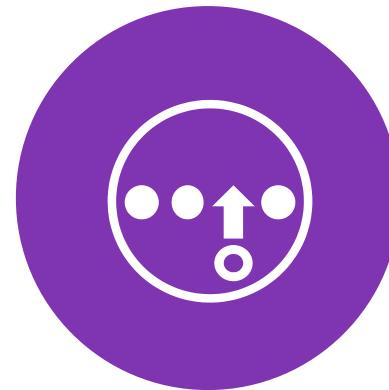
Monitoring



Logging



Data Protection



Networking

# Maintenance and Support

## Responsibilities

### VMware



Provider AWS VPC

Management/Compute Gateway

Management Virtual Machines

- vCenter, NSX-T, HCX, Site Recovery

ESXi Hosts

vSAN

### Customer



Customer AWS VPC

Management/Compute Gateway Configuration

Customer Virtual Machines

- Guest OS and VM Tools

Guest Applications

Guest Data

# Built-in Notification Services

Customers would get notifications through various channels

Email, VMC UI, vCenter UI, Activity Log

Events that customers would get notified currently

EDRS add host events, maintenance events, SDDC upgrade events, expiring subscription reminders, DRaaS events, account linking reminders

This list would grow as more features onboard to the notification platform

## Activity Log

Event Name	Event Type	Time	SDDC Name	Task Owner	Description
SDDC upgrade health check	Notification	10/31/19, 11:32 AM	MW Test	cjebakumar@vmware.com	SDDC upgrade health check completed successfully
Deployment of SDDC	Activity	10/29/19, 5:37 PM	MW Test	mumeno@vmware.com	Deployment of SDDC by mumeno@vmware.com succeeded
Removal of SDDC	Activity	10/29/19, 5:36 PM	MW Test	mumeno@vmware.com	Removal of SDDC by mumeno@vmware.com succeeded
Change Canceled	Notification	10/29/19, 5:36 PM		Internal-Operator	Change Canceled notification sent via Email, Webhook
Initial Rollout Scheduled	Notification	10/29/19, 5:33 PM		Internal-Operator	Initial Rollout Scheduled notification sent via Email, Webhook
Change Canceled	Notification	10/29/19, 5:31 PM		Internal-Operator	Change Canceled notification sent via Email, Webhook
Deployment of SDDC	Activity	10/8/19, 12:52 PM	MW Test	mumeno@vmware.com	Deployment of SDDC by mumeno@vmware.com succeeded
Removal of SDDC	Activity	10/2/19, 10:06 AM	MW Test	mumeno@vmware.com	Removal of SDDC by mumeno@vmware.com succeeded
Deployment of SDDC	Activity	9/27/19, 10:17 AM	MW Test	mumeno@vmware.com	Deployment of SDDC by mumeno@vmware.com succeeded
Deployment of SDDC	Activity	9/16/19, 12:24 PM	MW Test	mumeno@vmware.com	Deployment of SDDC by mumeno@vmware.com succeeded

Historical notification events are available through Activity Log

# Use vRealize Log Insight Cloud for Additional Operating Insight

Log analytics with zero touch management



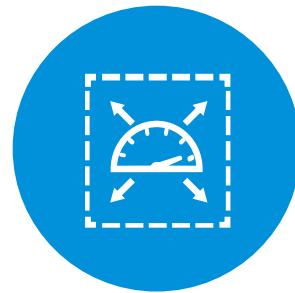
## Audit and secure VMware Cloud on AWS

All VMware Cloud on AWS audit logs, vCenter alarms and events are automatically ingested\*



## Out of box VMware Cloud on AWS content

Out of box dashboards, alerts and queries for vSphere, NSX-T, vSAN and VMware Cloud on AWS audit activities\*



## Integrate with your monitoring ecosystem

Log forwarding [on-premises and SaaS destinations], real time alerts, email and webhook integrations\*



## Analyze NSX-T firewall rules

Single click ingestion of NSX-T firewall rules in customer's Log Insight Cloud paid instance



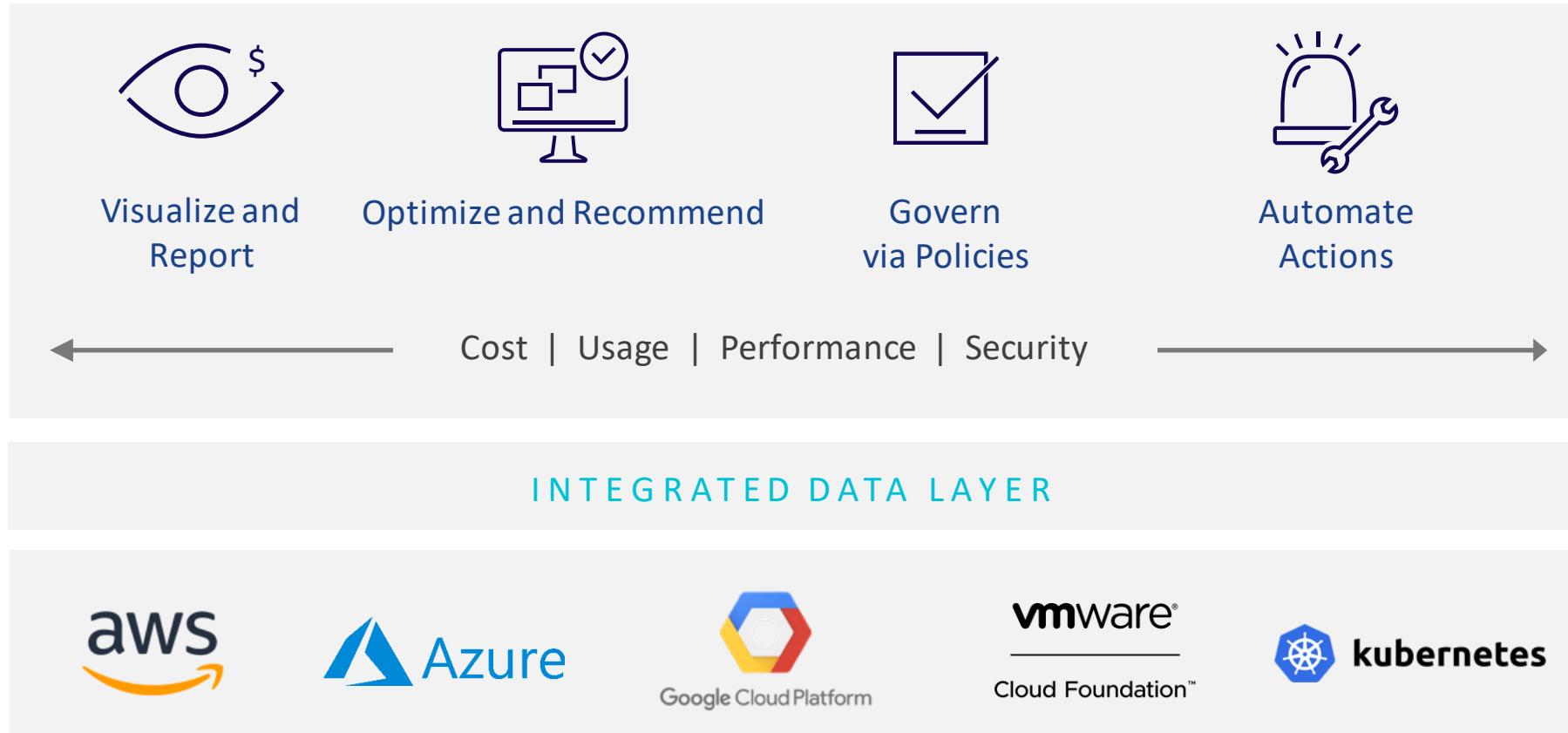
## Bring your own logs for convenience

Bring logs from any of the [200+](#) supported destination using FluentD including AWS, Kubernetes and Apps in customer's Log Insight Cloud paid instance

# Use CloudHealth for Cost Optimization

Provide cost comparison, visibility, and optimization across DC, Edge, and Cloud

CloudHealth  
by vmware®



# VMC on AWS Management

# Access VMware Cloud on AWS

 VMware Cloud on AWS portal	 vSphere Client (HTML 5)	 AWS Management Console
--	---	--

- ESXi host addition and removal
- Console user and role management
- Firewall configuration
- Elastic IP address and network address translation (NAT) configuration
- Virtual private network connectivity
- Logical network configuration
- AWS Direct Connect configuration

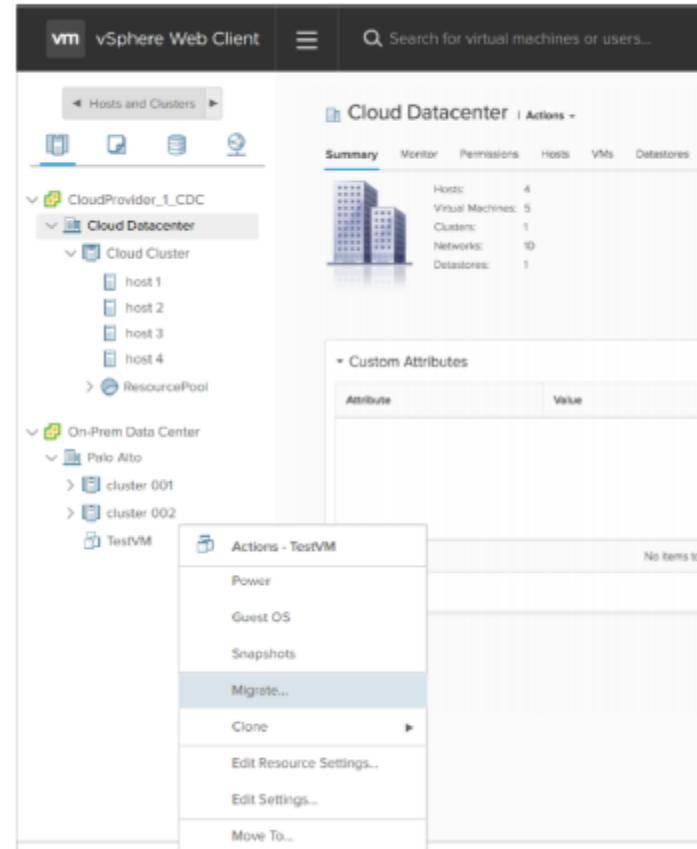
- Hybrid Linked Mode (HLM)
- Virtual machine (VM) administration
- VM storage policies

- Amazon Virtual Private Cloud (Amazon VPC) configuration
- Network and security configuration to access AWS services
- Manage AWS services

# vCenter Hybrid Linked Mode

## vCenter Hybrid Linked Mode

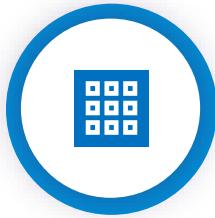
- In-Cloud SDDC vCenter VCSA 6.5+
- Embedded PSC + DB
- One vSphere SSO domain allowed to join VMware Cloud on AWS
- On-premise vCenter 6.5d required at IA
  - Plans to be backward compatible to 6.0 U3
- L3 Network Connectivity required



# vRealize Cloud Management: VMware Cloud on AWS

## Use cases

ENABLES



### Cloud Migration

Accelerate app migration with full visibility of dependencies, costs, compliance, and network requirements; and consistent operations post migration



### Data Center Extension

Operationalize a hybrid cloud strategy with self-service automation, governance and consistent operations across hybrid cloud



### DR in The Cloud

Assure readiness and monitor health and performance of the DR site



### VDI Operations

Unify Horizon operations with performance optimization, capacity and cost management, and monitoring across users, sessions, pods etc.

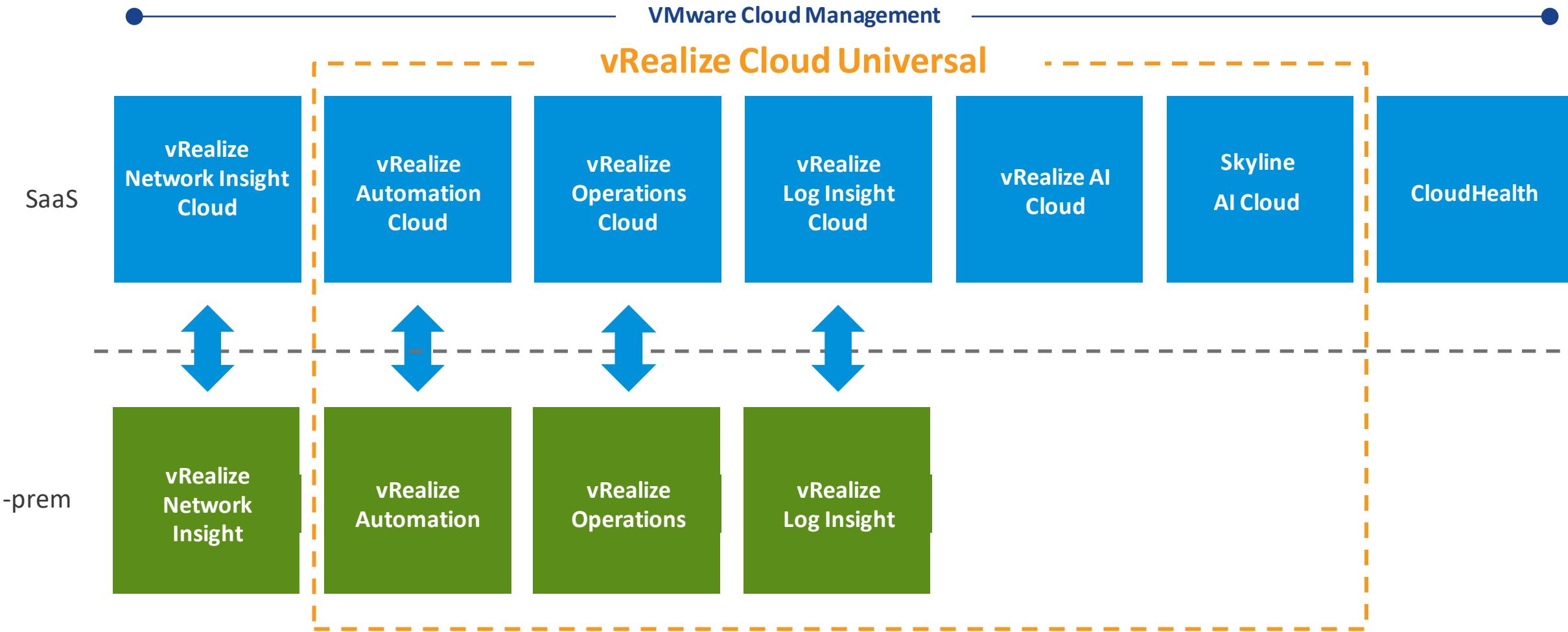


### Next Gen Apps

Deliver developer-ready infrastructure with Kubernetes automation and operations; streamline developer experience with infrastructure-as-code

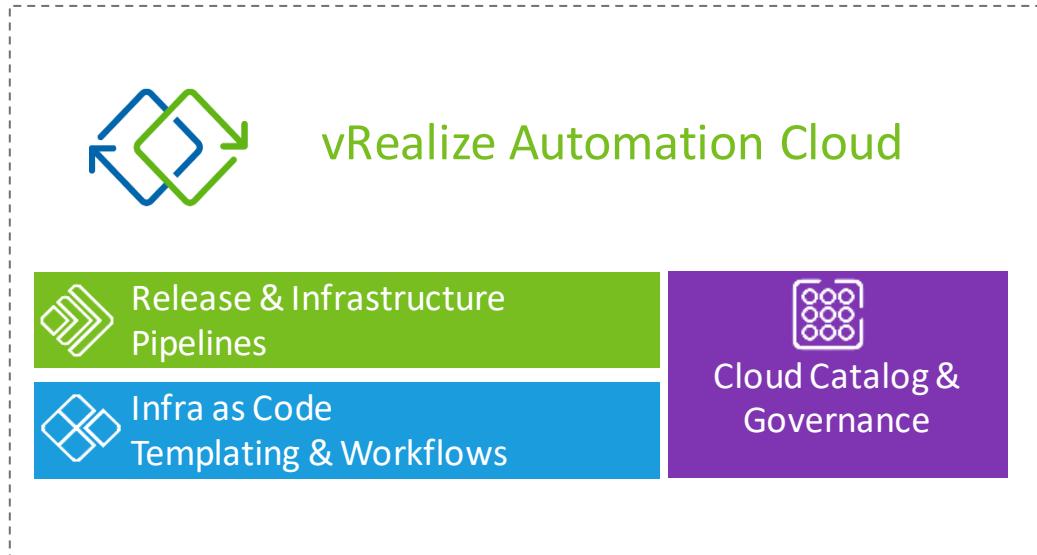
# VMware Cloud Management portfolio

Delivering industry-leading cloud management



# vRealize Automation Cloud

Standardize and simplify consumption and operations



Self-service consumption for VMware Cloud on AWS with consistent policies across VMware and public clouds



Smart – Intuitive – Inclusive Infrastructure as Code with VMware Cloud Templates



Embrace DevOps practices for infrastructure use cases

**15%**

cost savings from infrastructure resource utilization

**1 week**

faster deployment of environments for end users

**5-6 hours**

saved per VM on deployment & lifecycle management

# vRealize Operations Cloud

Powered by AI, from apps to infra, across VMware Cloud on AWS, on-premises or SaaS



## Continuous Performance Optimization

Assure performance with automatic workload placement and balancing based on business and operational intent

## Efficient Capacity & Cost Management

Run infrastructure for optimal consolidation, proactive planning, and procurement

## App-Aware Intelligent Remediation

Predict, prevent, and troubleshoot across VMware Cloud and multi-clouds, from apps to infrastructure

## Integrated Configuration & Compliance

Reduce risk and enforce IT and regulatory standards with integrated compliance and automated remediation

**93%**

Reduction in unplanned downtime

**50%**

Reduction in meantime to resolution

**50%**

Reduction in software licensing costs

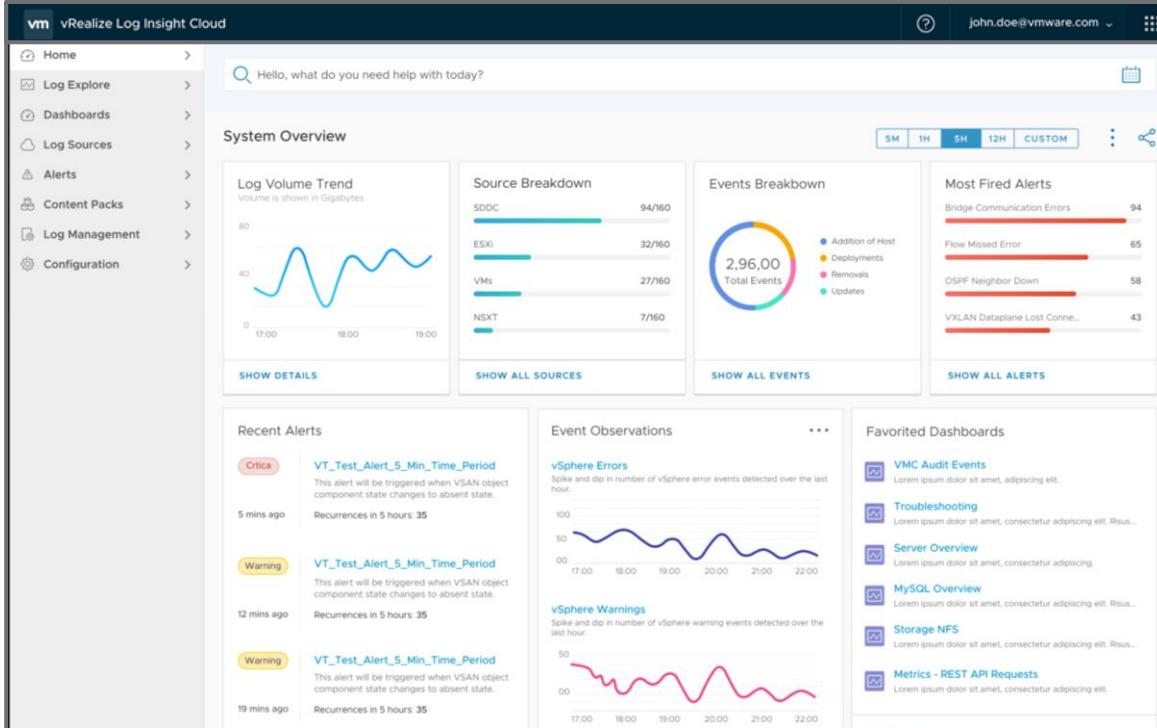
**20%**

Reduction in hardware costs

Source: Results are for a composite organization based on interviewed customers. The Total Economic Impact™ of VMware vRealize Network Insight, a commissioned study conducted by Forrester Consulting on behalf of VMware, July 2019

# vRealize Log Insight Cloud

Centralized log management across private and public clouds



## Compliance

Monitor VMware Cloud on AWS deployments for potential security breaches or internal misuses of infrastructure



## Security

Monitor VMware Cloud on AWS deployments for security breaches, internal misuses of infrastructure, and increase support for cloud-native apps



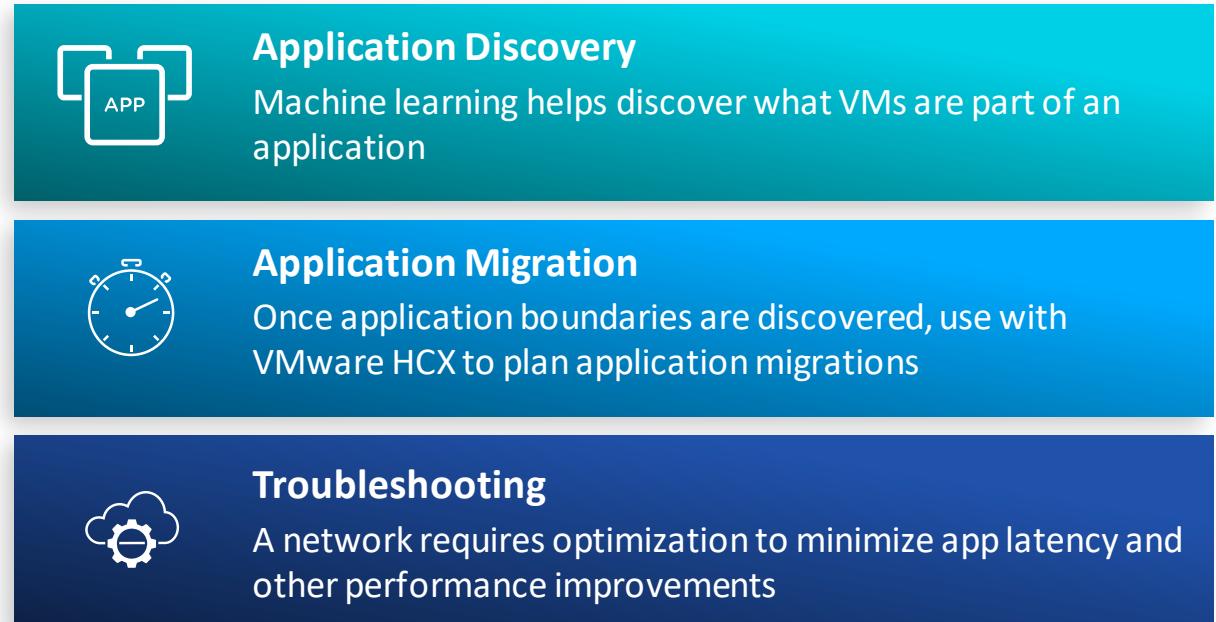
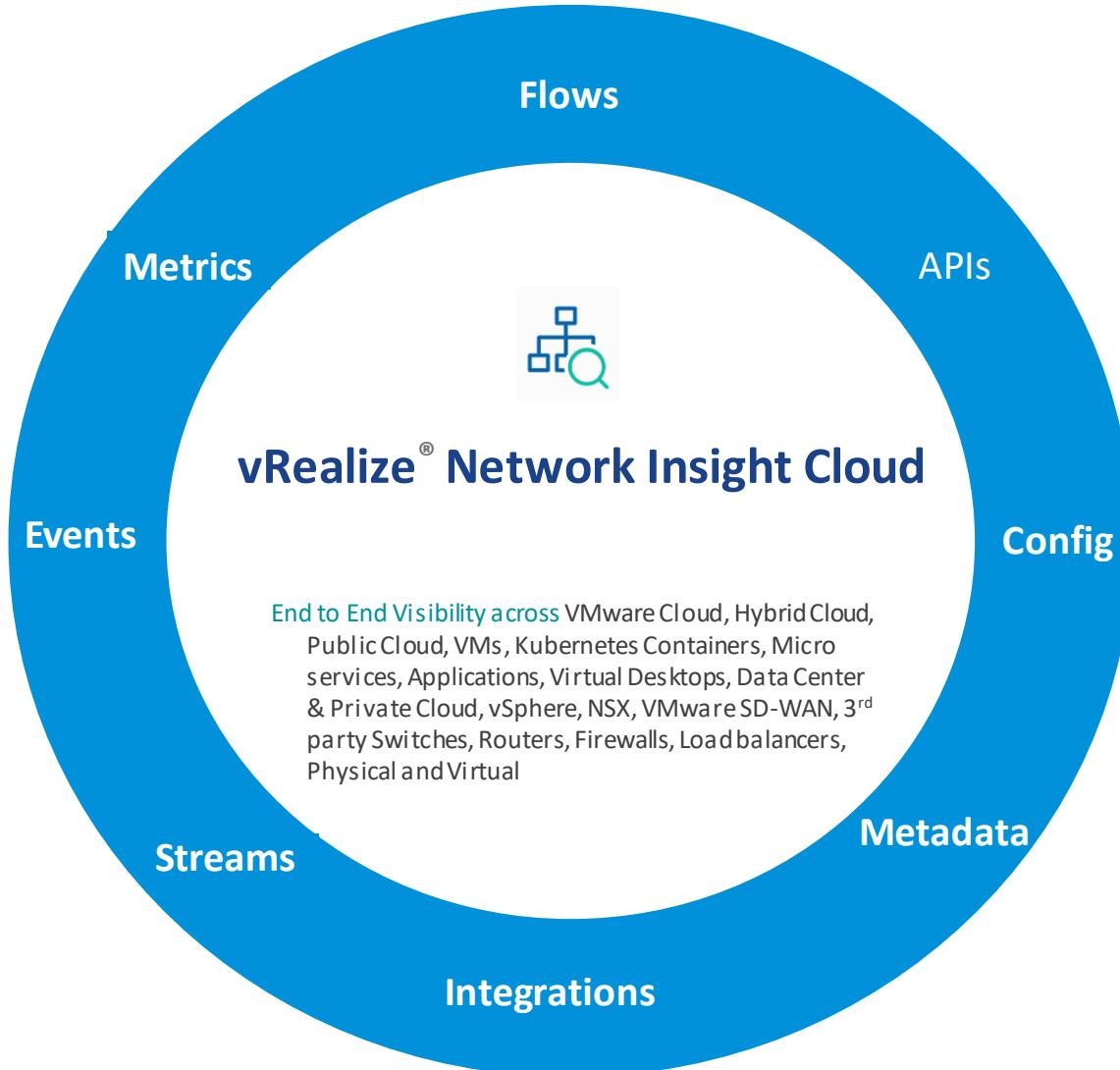
## Troubleshooting

Unified visibility for operational insights and faster root cause analysis to add structure to unstructured data with innovative indexing and machine learning



# vRealize Network Insight Cloud

Application-Centric Network Visibility and Analytics Platform for application discovery



**477%**

return on investment over three years

**95%**

reduced time addressing network errors

**80%**

reduced time conducting network flow analysis

Source: Results are for a composite organization based on interviewed customers. The Total Economic Impact™ Of VMware vRealize Network Insight, a commissioned study conducted by Forrester Consulting on behalf of VMware, May 2018.

# Service Details

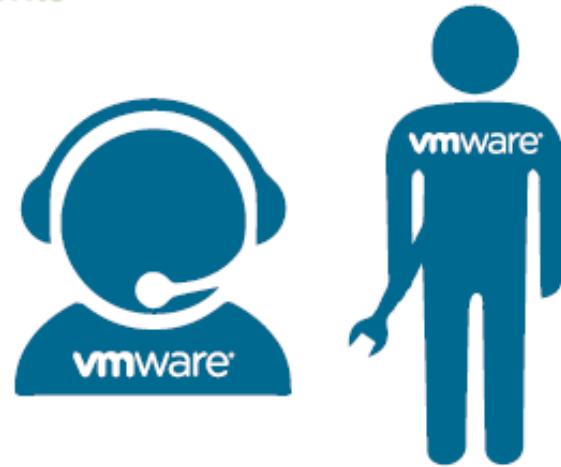
# VMware Cloud on AWS is sold as a Service

- ‘As a Service’ Model means:
  - VMware manages hypervisor and management components
  - AWS manages physical resources
  - Customer manages VMs
  - Customer decides how many VMs to run on vSphere
- Customer access is via vCenter Server and VMC Portal, with some restrictions:
  - No root ESXi access
  - No VIB Installations
  - No VDS configuration access
  - No direct Management VM and Edge access



# VMware Cloud on AWS is sold as a Service

- VMware manages hypervisor and management components
- AWS manages physical resources
- Customer manages VMs
- Customer decides how many VMs to run on vSphere



# Simple Packaging, Purchasing and Consumption

Includes VMware software, AWS infrastructure and VMware support

## PRODUCTION ENVIRONMENT (3+ HOSTS)



### Lifecycle Management

VMware manages infrastructure software updates, upgrades and patches

[Service Level Agreement](#): 99.9% for non-stretched clusters;  
99.99% for stretched clusters



### Global Support

Customer support: Chat, my vmware

[VMware Global Support](#): 24/7, 365



### VMware Software

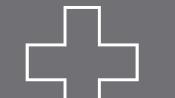
SDDC software: vSphere, vSAN, NSX-T, vCenter Server

[VMware HCX](#); [Specific vRealize Log Insight Cloud features for logging](#)



### AWS Hardware

Dedicated Amazon EC2 bare-metal instances (HW)



### Optional Add-Ons (Purchase separately, as needed)

e.g., VMware Site Recovery for DR

## PURCHASE FROM



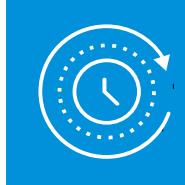
- VMware
- AWS
- VMware/AWS partner networks
- VMware VCPP

## PAYMENT METHODS



- Credit card
- VMware SPP/HPP credits
- Pay by invoice

## CONSUMPTION



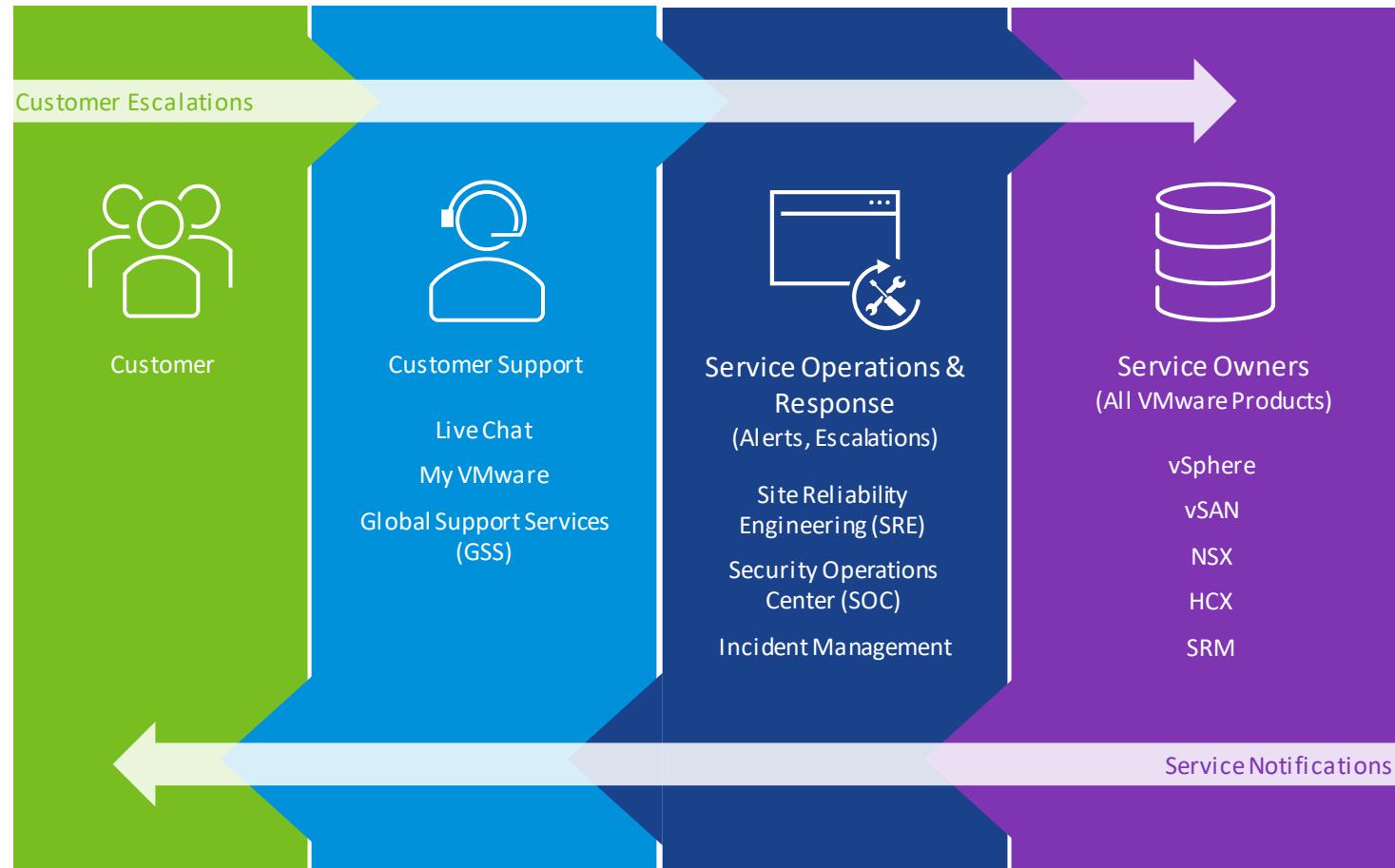
- On-demand (hourly)
- 1-year subscription
- 3-year subscription

# AWS Bare-metal Host Instance Types

		i3.metal vSAN	i3en.metal vSAN
Typical Use Case	General purpose Clusters	Storage bound clusters	
Suitable for	Workloads with high transaction rates <ul style="list-style-type: none"><li>Databases used in OLTP</li><li>High-speed analytics</li></ul>	Workloads with high storage capacity needs and high transaction rates. E.g., <ul style="list-style-type: none"><li>NoSQL Databases</li><li>Distributed File Systems</li><li>Data Warehouse with high random I/O</li></ul>	
Compute			
CPU Type	Intel® Xeon® E5-2686	2nd generation Intel® Xeon® Scalable Processor	
CPU Cores	36 Cores @ 2.3Ghz	48 Cores @ 2.5Ghz Hyperthreading enabled by default	
Memory			
RAM	512 GiB	768 GiB	
Storage			
Type	vSAN with Local NVMe Flash	vSAN with Local NVMe SSD (checksum only)	
Capacity Tier	10.3 TiB (raw storage capacity)	~45 TiB (raw storage capacity)	
Network			
Physical Speed	25 Gbps	25 Gbps w native encryption at NIC-level for east-west traffic within SDDC boundaries	

# VMware Cloud on AWS Support

With end-to-end service support and a robust operations model in place



Service is delivered and supported by VMware and its partners



Updates, upgrades and patches of the SDDC managed by VMware

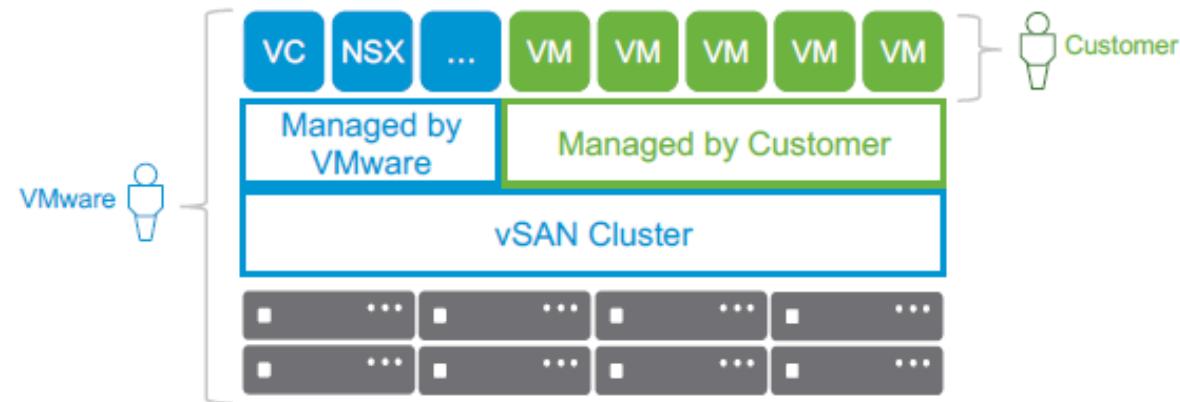


Mature service operations and response teams in place to provide world-class experience

# Access Level, RDS, and HA

# Restrictive Access Model

- No root ESXi access
- No VIB installations
- No VDS configuration access
- No direct management VM access



# Elastic DRS

## Auto-scaling and load balancing

Elastic DRS allows you to maintain an optimal number of powered-on hosts such that cluster utilization is high while preserving desired CPU, memory, and storage performance.

### Default Storage Scale-Out

We'll add a host when cluster storage utilization becomes critical.

### Optimize for Best Performance

Based on cluster utilization, we'll add hosts more quickly (and remove hosts more slowly) to ensure best possible performance.

Minimum cluster size:

Maximum cluster size:

### Optimize for Lowest Cost

Based on cluster utilization, we'll remove hosts more quickly (and add hosts more slowly) to keep cost as low as possible.

Minimum cluster size:

Maximum cluster size:

### Optimize for Rapid Scale-Out

Based on cluster CPU and memory utilization, we'll add multiple hosts at a time. (Hosts must be removed manually when no longer needed.) Based on cluster storage utilization, we'll add one host at a time when storage utilization becomes critical.

Minimum cluster size:

Maximum cluster size:



## Automated

Scale clusters automatically and elastically by adding or removing hosts based on specific policies



## Flexible

Optimize for performance, cost or speed of scale out or when storage utilization becomes critical



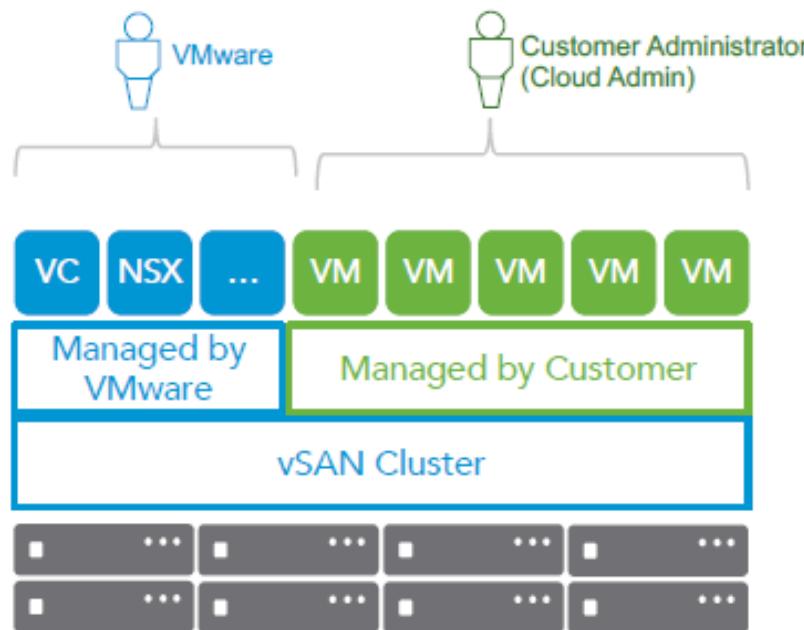
## Built Into Infrastructure

Not necessary to re-architect applications

For more information: [Elastic DRS Policy documentation](#).

# vSphere DRS Configuration

## vSphere DRS Configuration



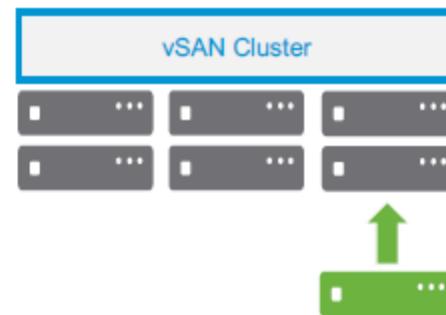
- DRS Enabled
- Migration threshold = 3
- DPM = Disabled
- Resource Pools created to isolate MGMT from customer VMs

# Elastic DRS Integration

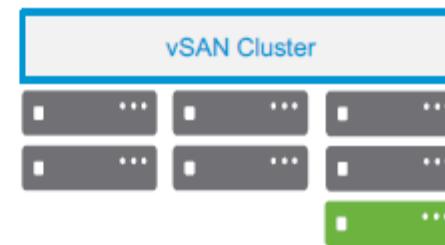
## 1. CLUSTER OPERATING WITHIN TARGET THRESHOLDS



## 2. THRESHOLD EXCEEDED PROVISION ADDITIONAL HOST



## 3. CLUSTER RETURNS TO TARGET THRESHOLD

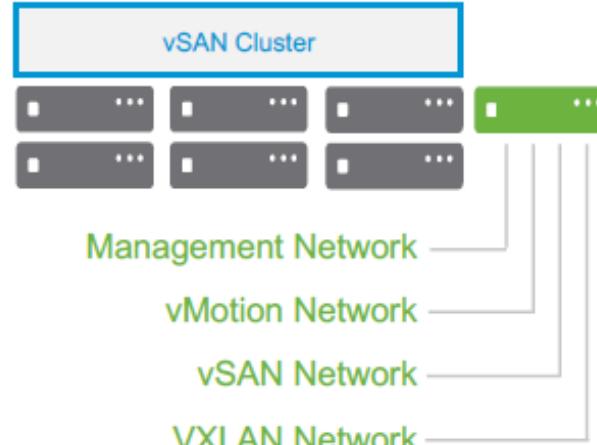


# Automatic Cluster Configuration

1. HOST IS ADDED



2. AUTOMATIC NETWORK CONFIGURATION



3. vSAN DATASTORE CAPACITY INCREASE

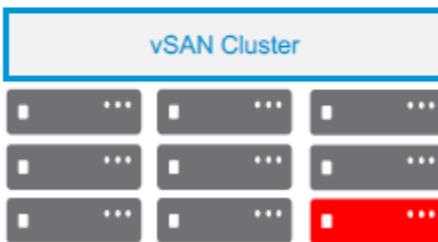


# HA Cluster Configuration

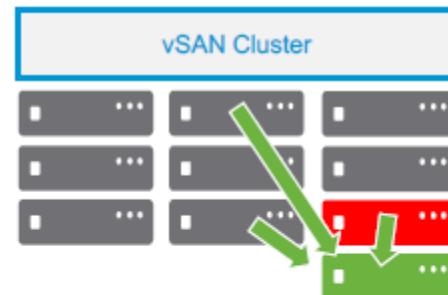
- Host failure remediation is the responsibility of VMware.
- As HA settings impact consolidation ratio, the following settings are used to provide excellent service while minimizing overhead:
  - Host Monitoring Enabled
  - Admission Control Policy: Percentage Based
  - Host Failures Tolerate: 1
  - VM & App Monitoring Enabled
  - Host Isolation Response: Power off and Restart VMs

# Automated Cluster Remediation

1. HOST FAILS, OR  
PROBLEM IDENTIFIED



2. NEW HOST ADDED TO CLUSTER.  
DATA FROM PROBLEM HOST  
REBUILT, AND/OR MIGRATED

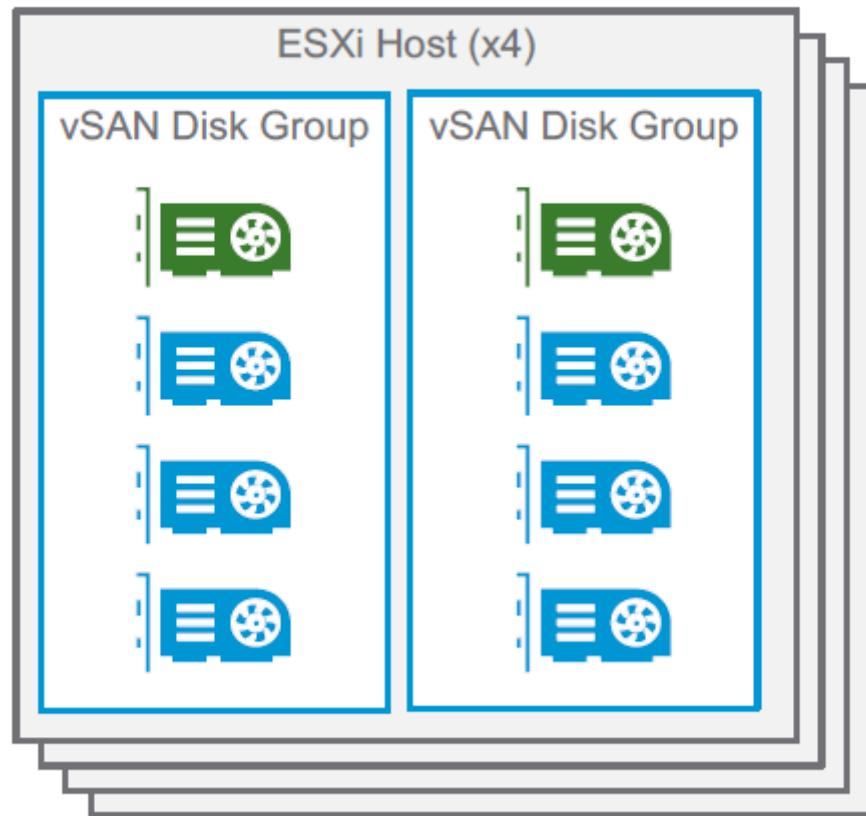


3. PREVIOUS HOST EVACUATED  
FROM CLUSTER, FULLY  
REPLACED BY NEW HOST



# VSAN and Storage integration

# vSAN Architecture

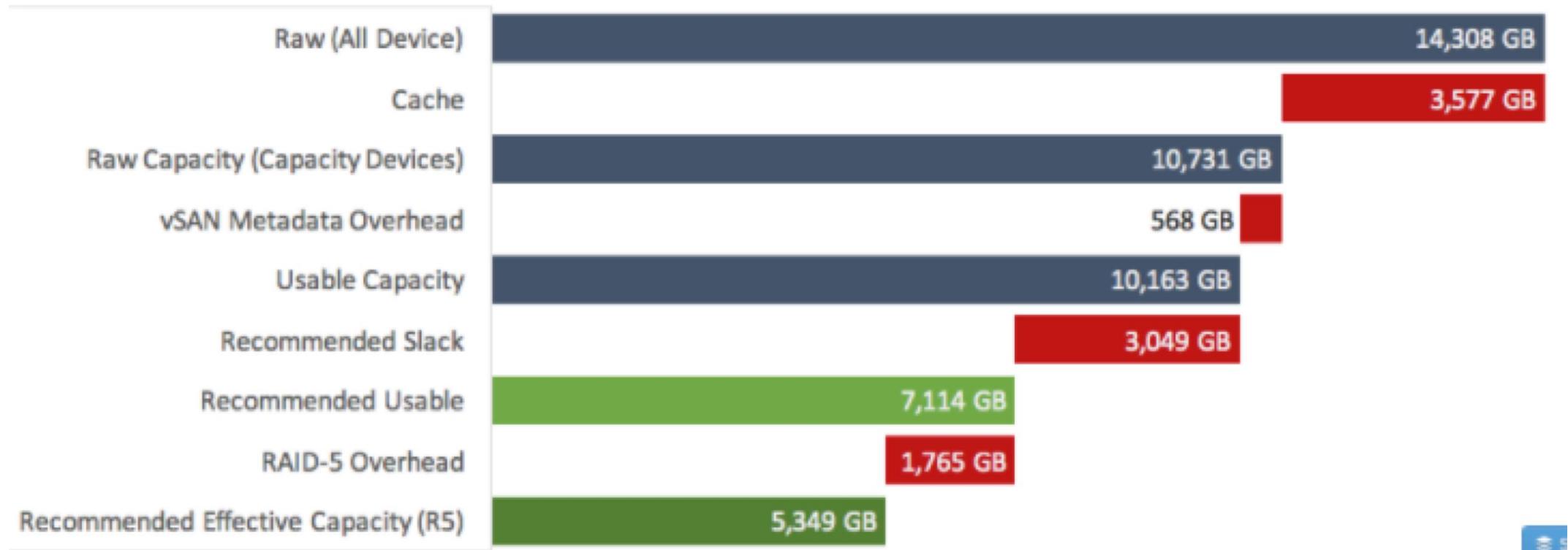


## vSAN Node Configuration

- 2 Disk Groups
- 2 devices write-caching tier
- 6 devices capacity tier

- vSAN pools local NVMe devices of hosts into a shared volume storage
- Delivers enterprise-grade performance
- Managed through per-VM storage policies
- Provides deduplication and compression
- Provides data-at-rest encryption fully integrated with AWS KMS
- Automatically remediates in case of host and NVMe device failures
- Usable VM storage capacity depends on per-VM storage policy (RAID 1, 5, & 6
- available)

# Usable vSAN Storage Per Host



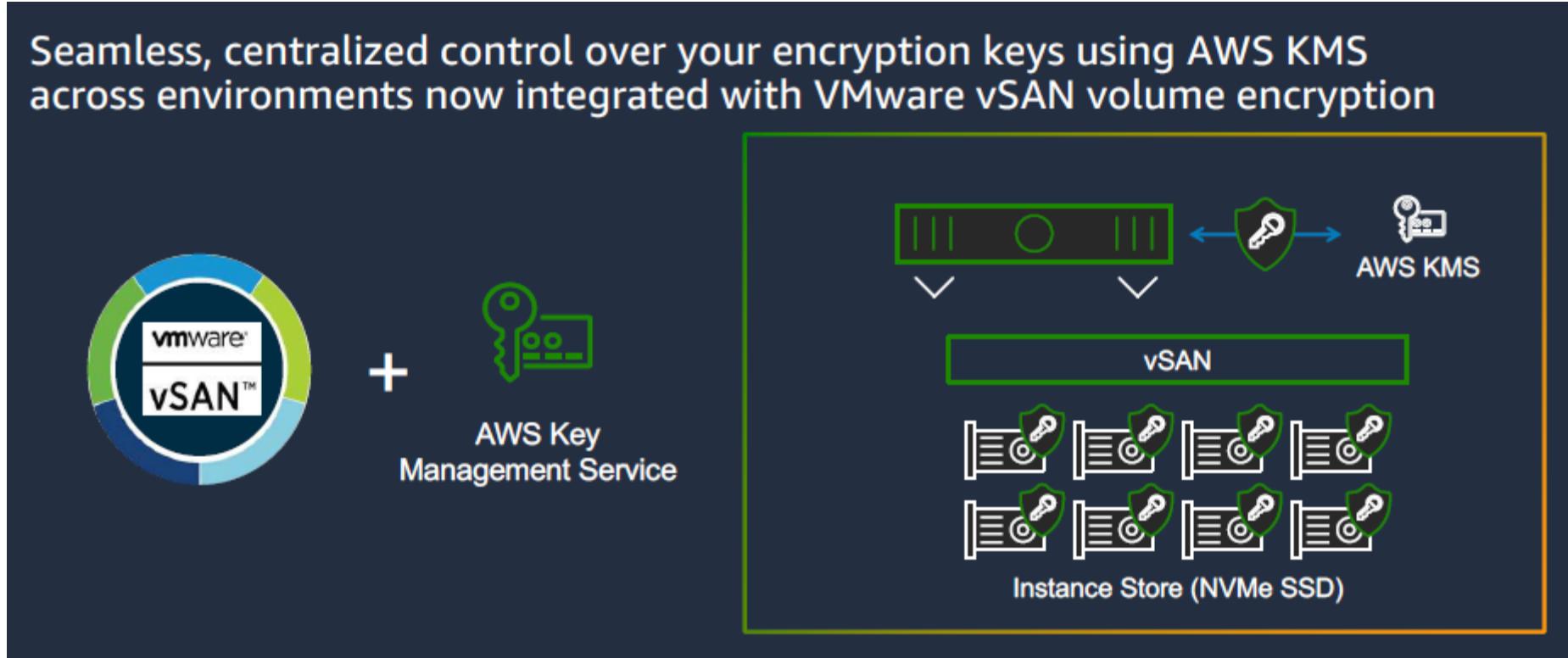
# vSAN Policies

The vSAN storage policy should balance capacity overhead and failure protection. Choose a policy that includes:

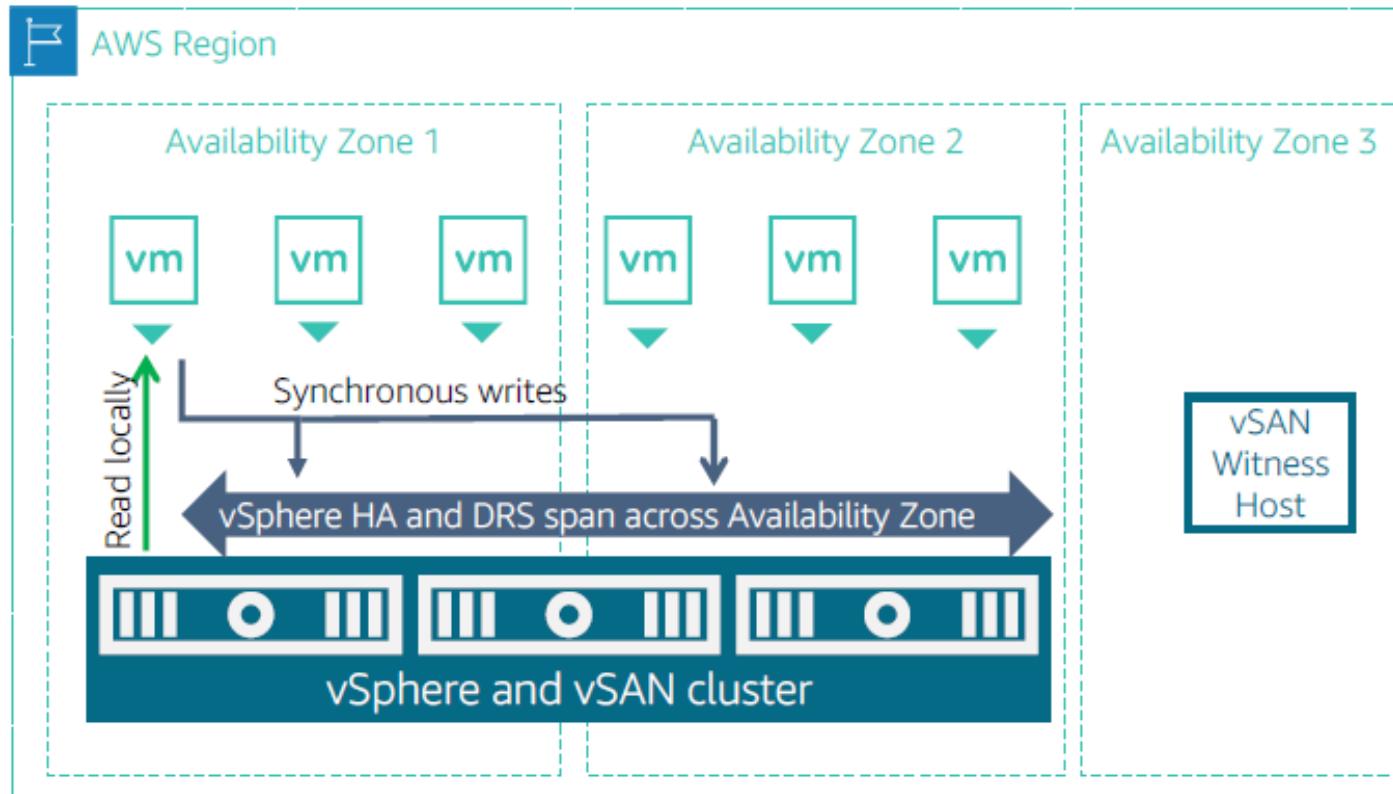
- Six or more hosts in the cluster
- RAID-6 configuration

RAID Configuration	Failures to Tolerate (FTT)	Minimum Hosts Required
RAID-1 – default	1	3
RAID-5	1	4
RAID-1	2	5
RAID-6	2	6
RAID-1	3	7

# vSAN encryption at rest by default

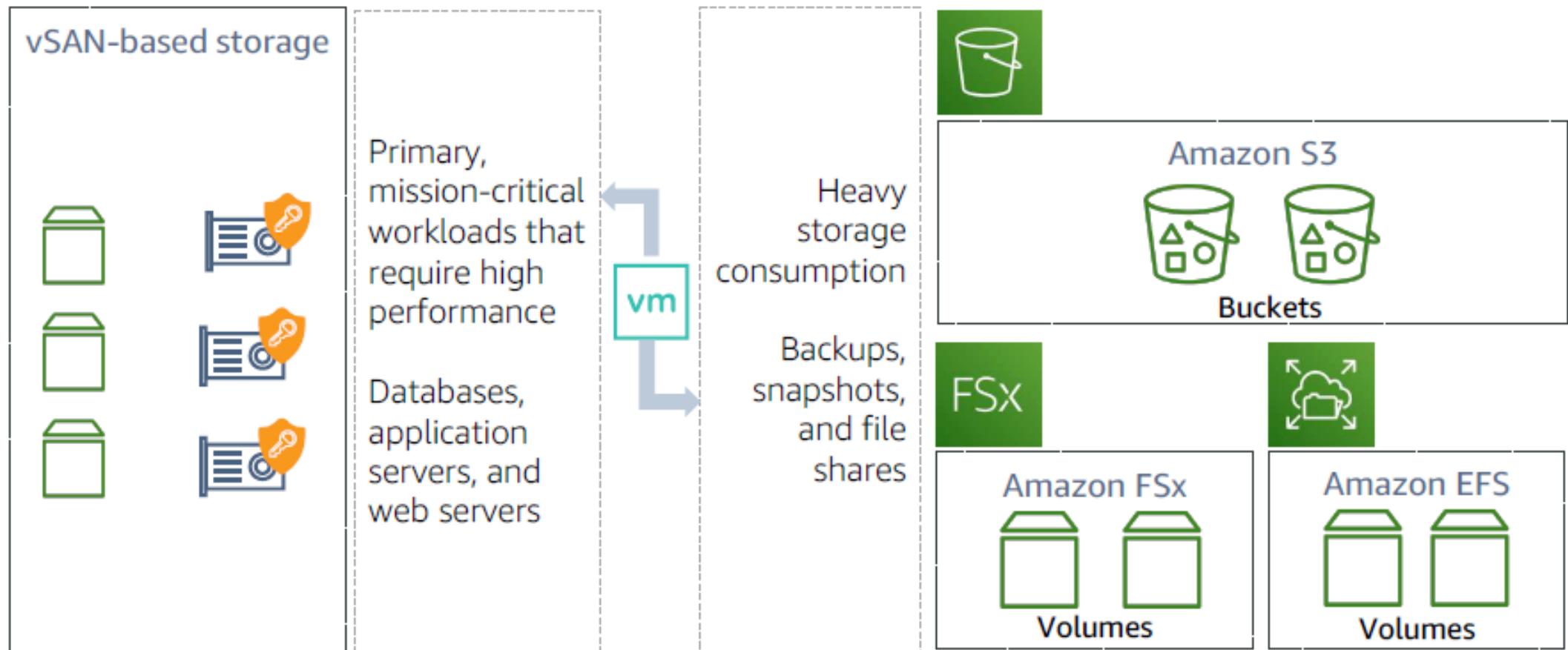


# vSAN stretched clusters

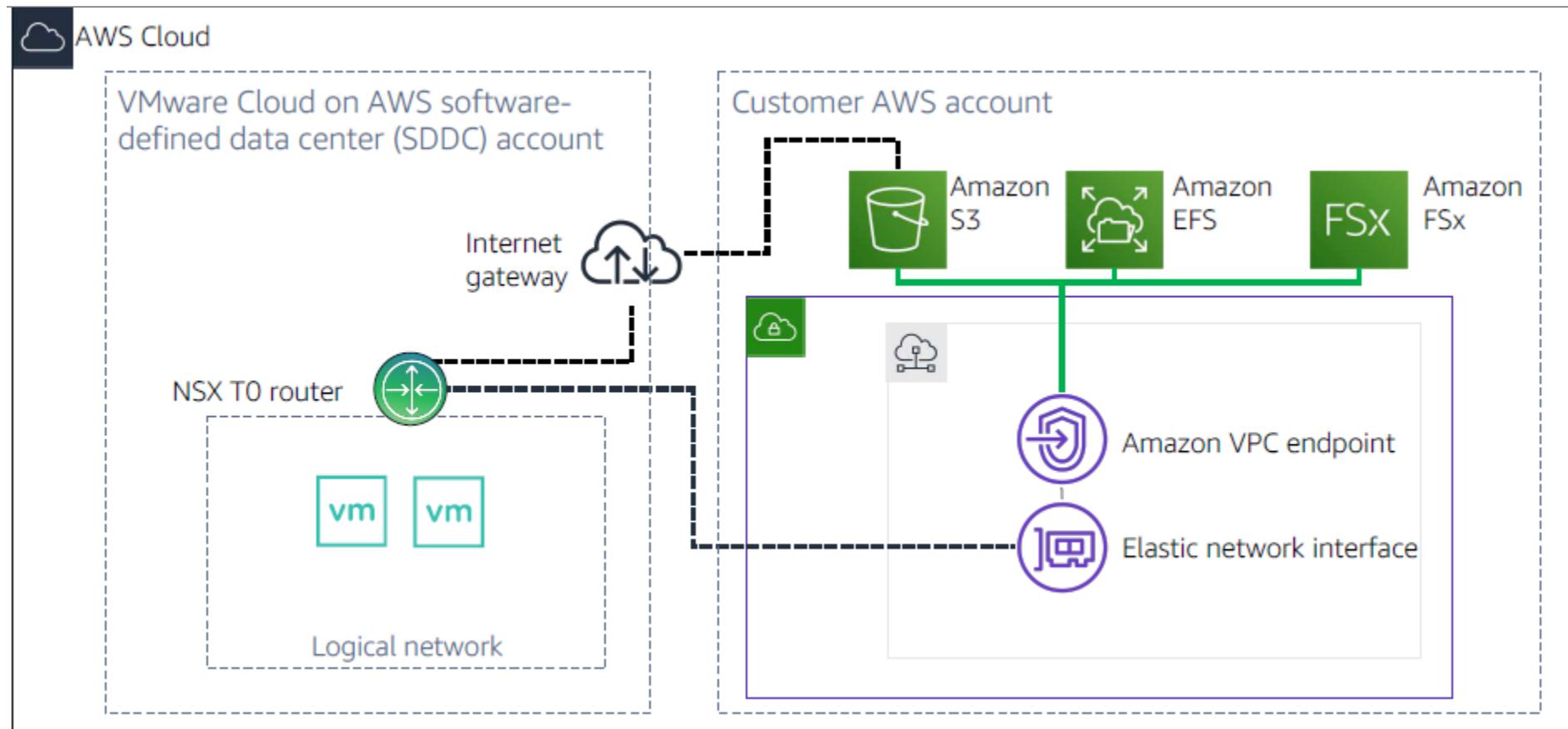


- Common logical network with vSphere high availability (HA) and distributed Resource scheduler (DRS) clusters enabled
- Synchronous replication

# Integration with AWS Storage Services



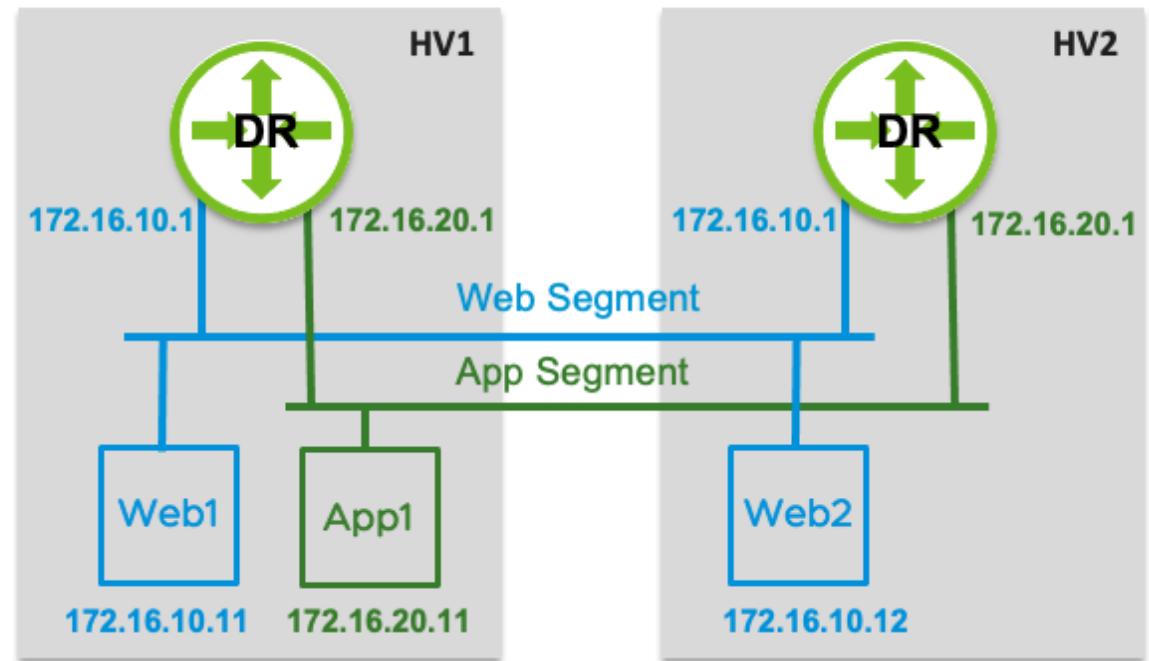
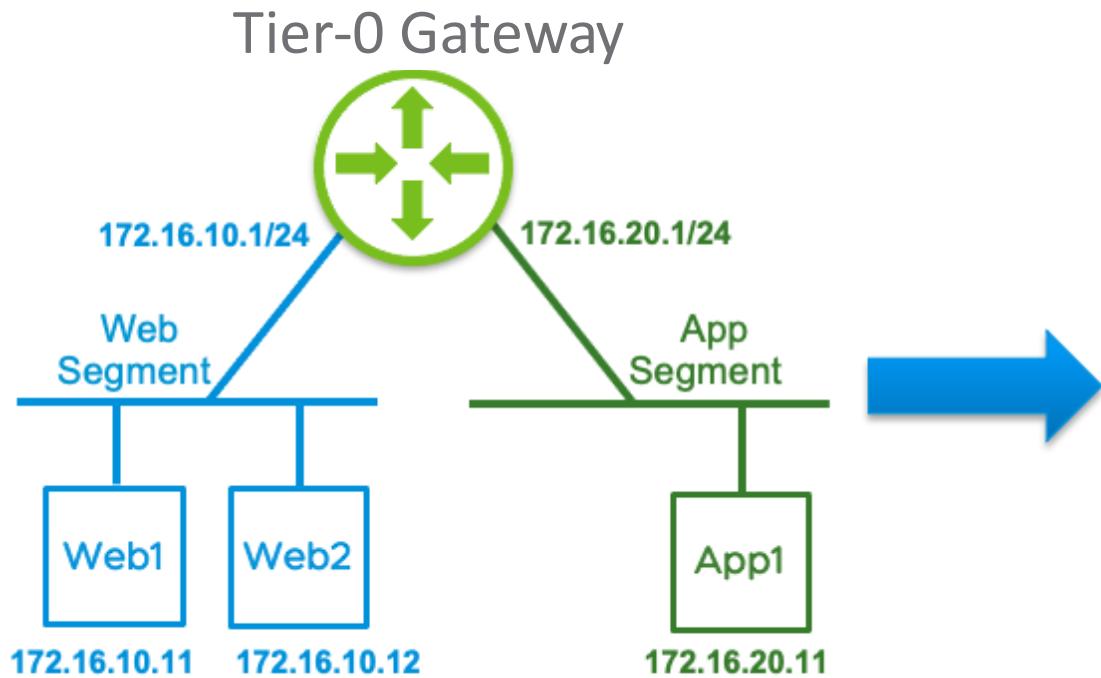
# Integration with AWS Storage Services



# NSX and Network integration

# NSX-T Logical Routing

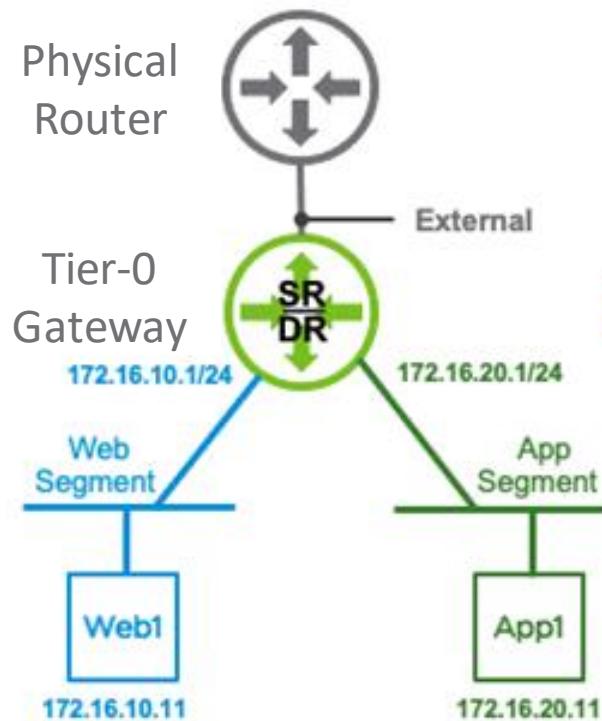
## Distributed Router (DR)



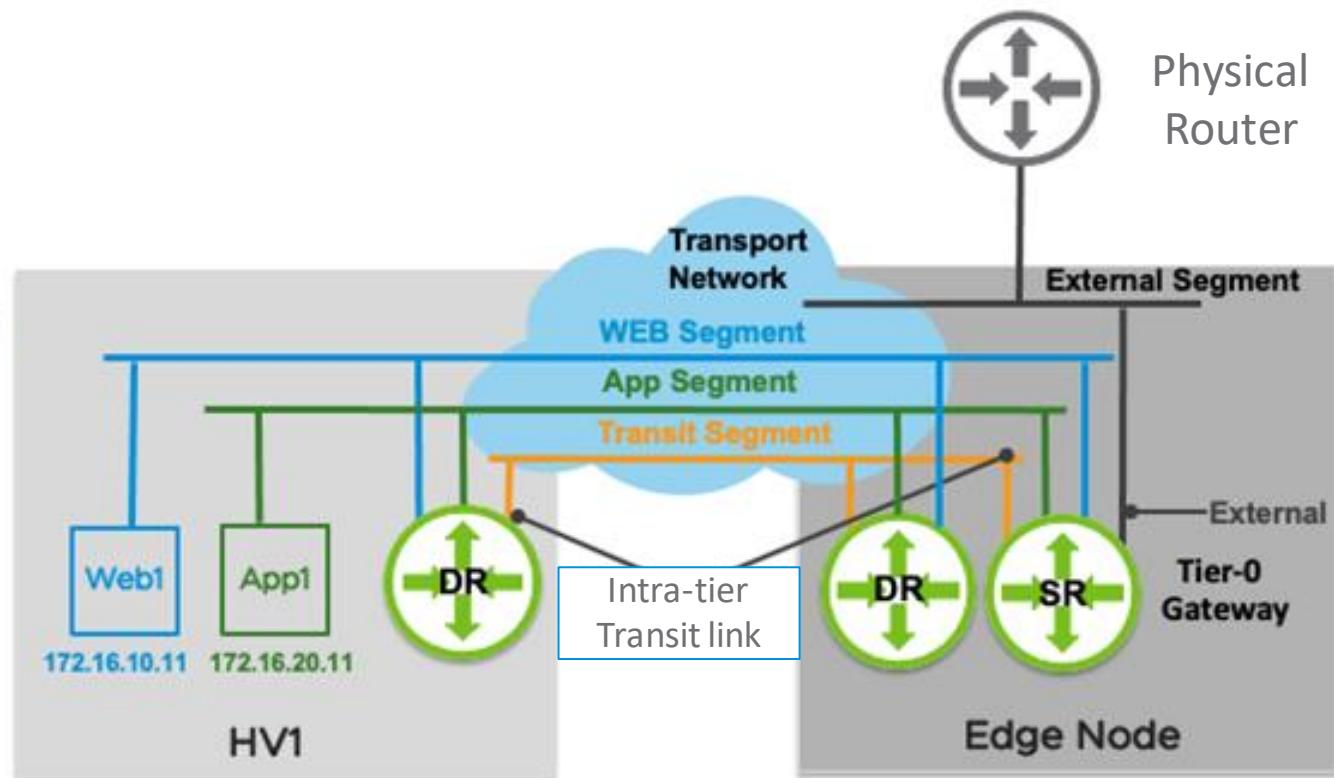
# NSX-T Logical Routing

## Services Router (SR)

Logical Topology

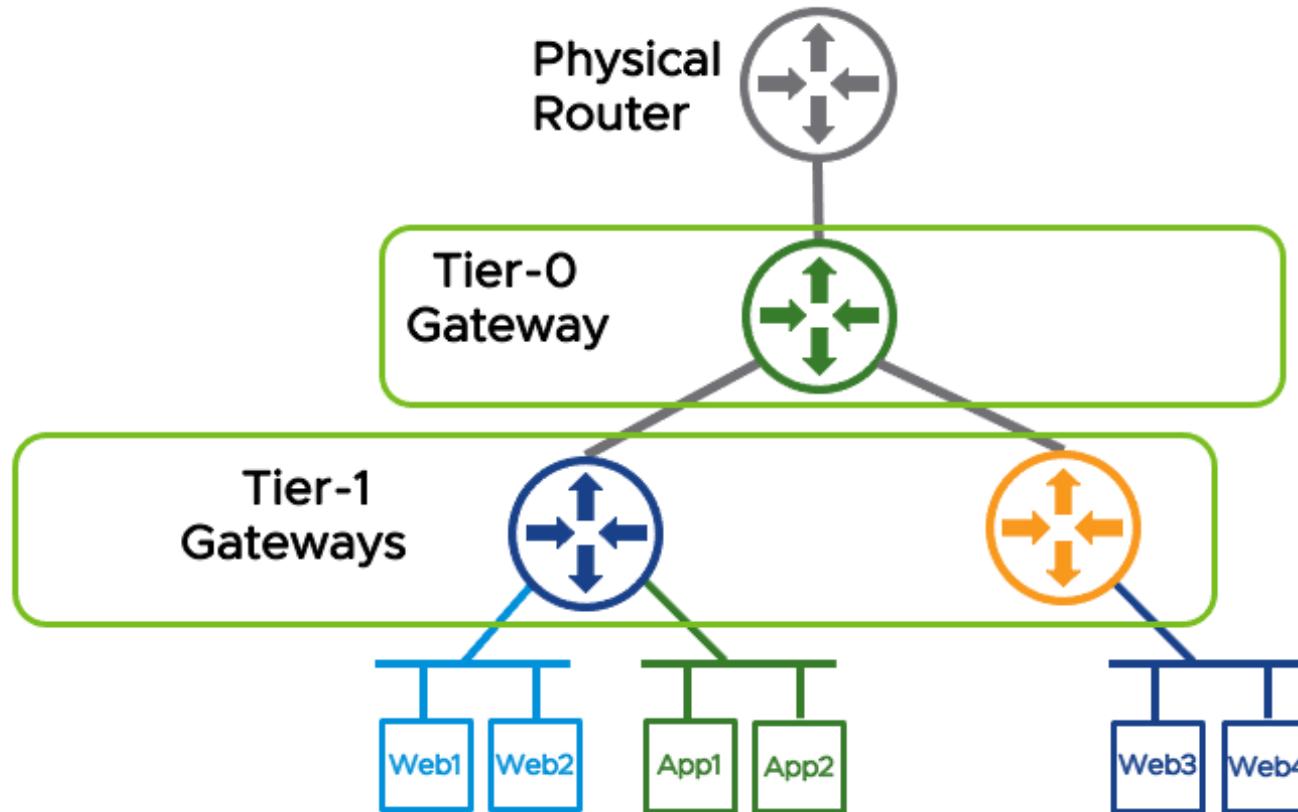


Physical Topology



# NSX-T Logical Routing

## 2-Tier Routing



# VMware Cloud on AWS routers and gateways

## Tier 0

---



### Tier 0 router (T0)

- An NSX Edge Appliance
- All traffic between on-premises networks and SDDCs passes through this
- Provides VPN termination

## Tier 1

---

Compute network subnets



### Compute Gateway (VMware CGW)

- An NSX Edge firewall
- Provides north-south network connectivity for virtual machines

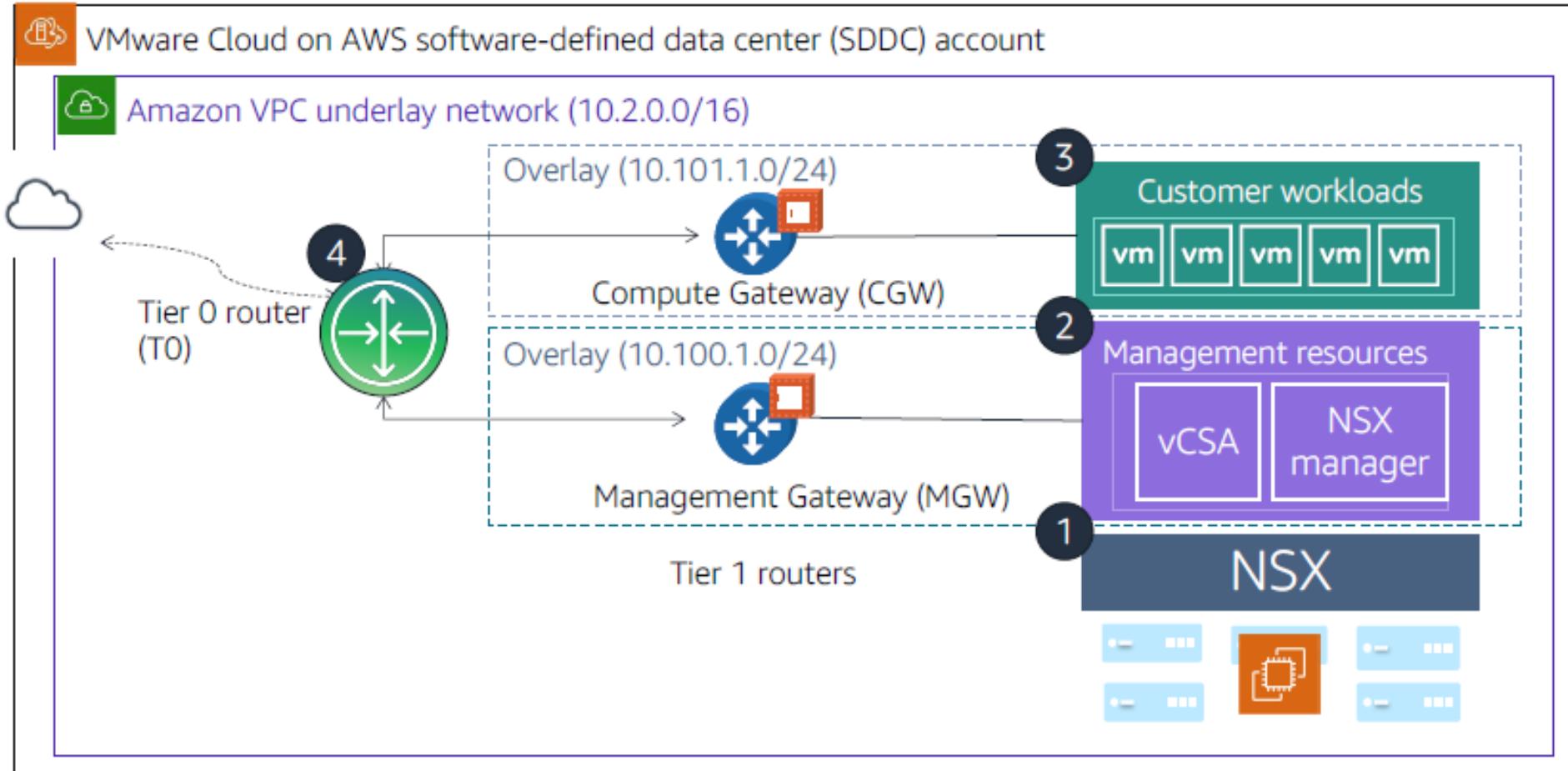
Management network subnets



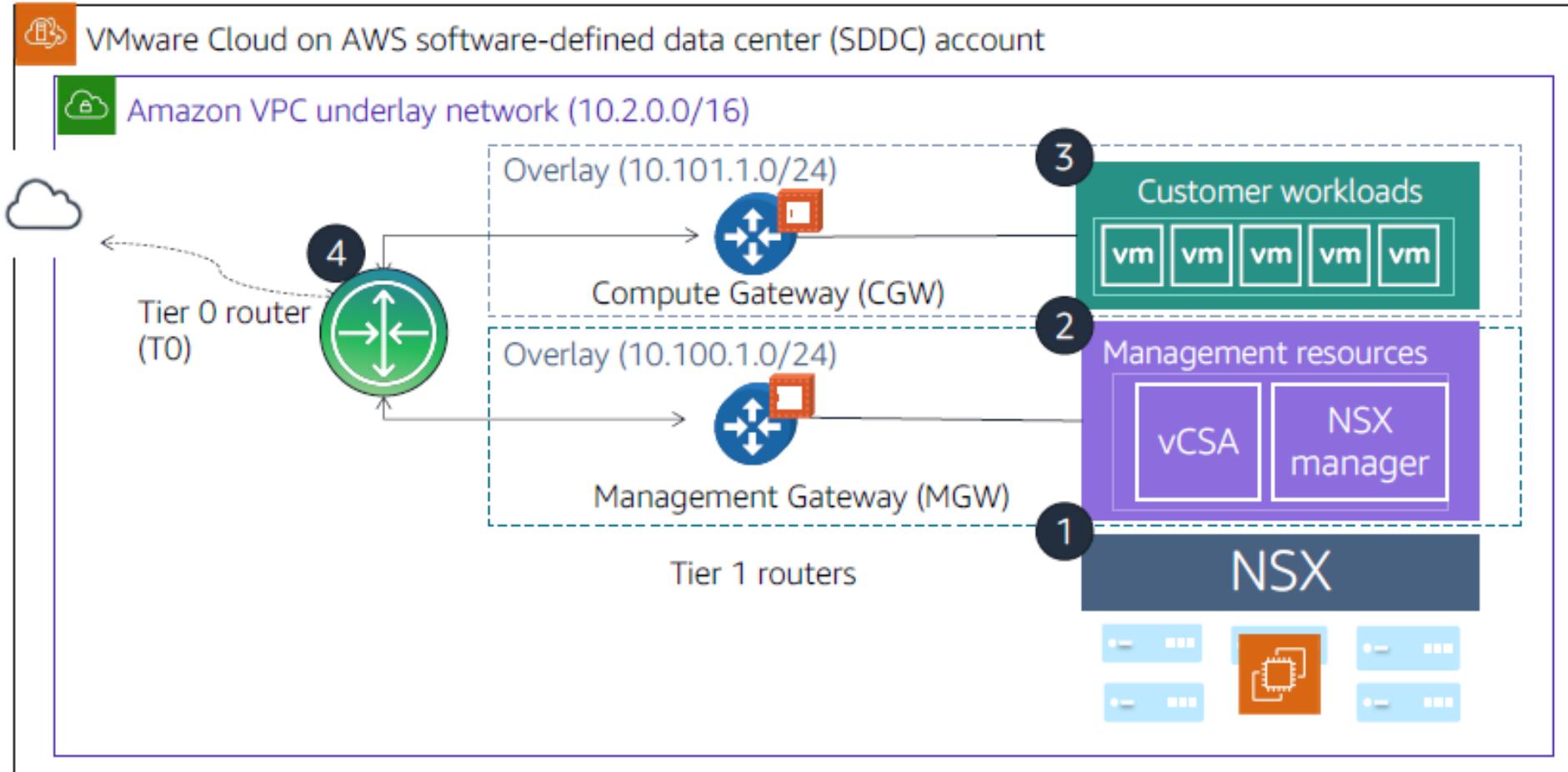
### Management Gateway (VMware MGW)

- An NSX Edge firewall
- Provides north-south network connectivity for the vCenter Server and other management appliances

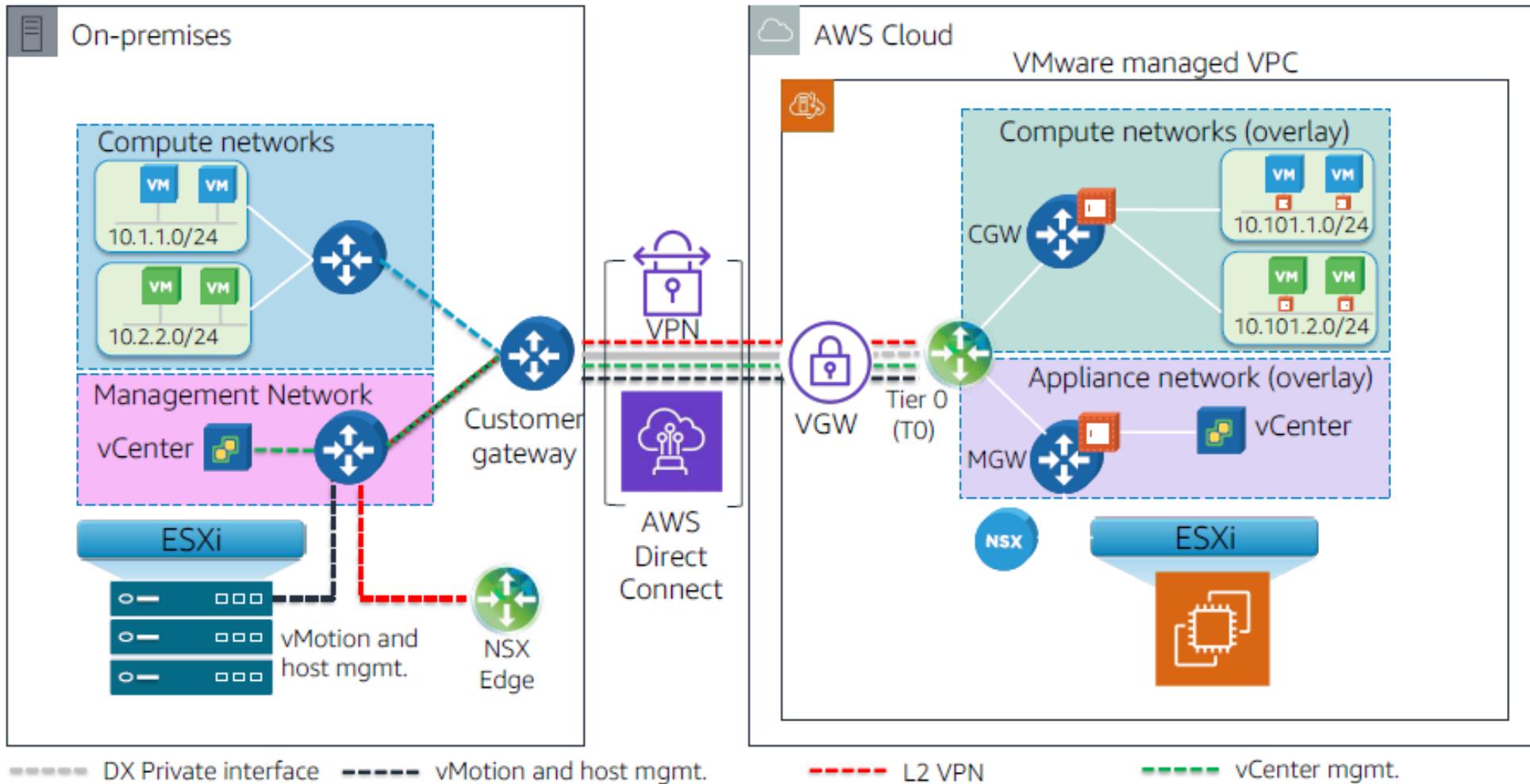
# Overlay networks for VMware Cloud on AWS



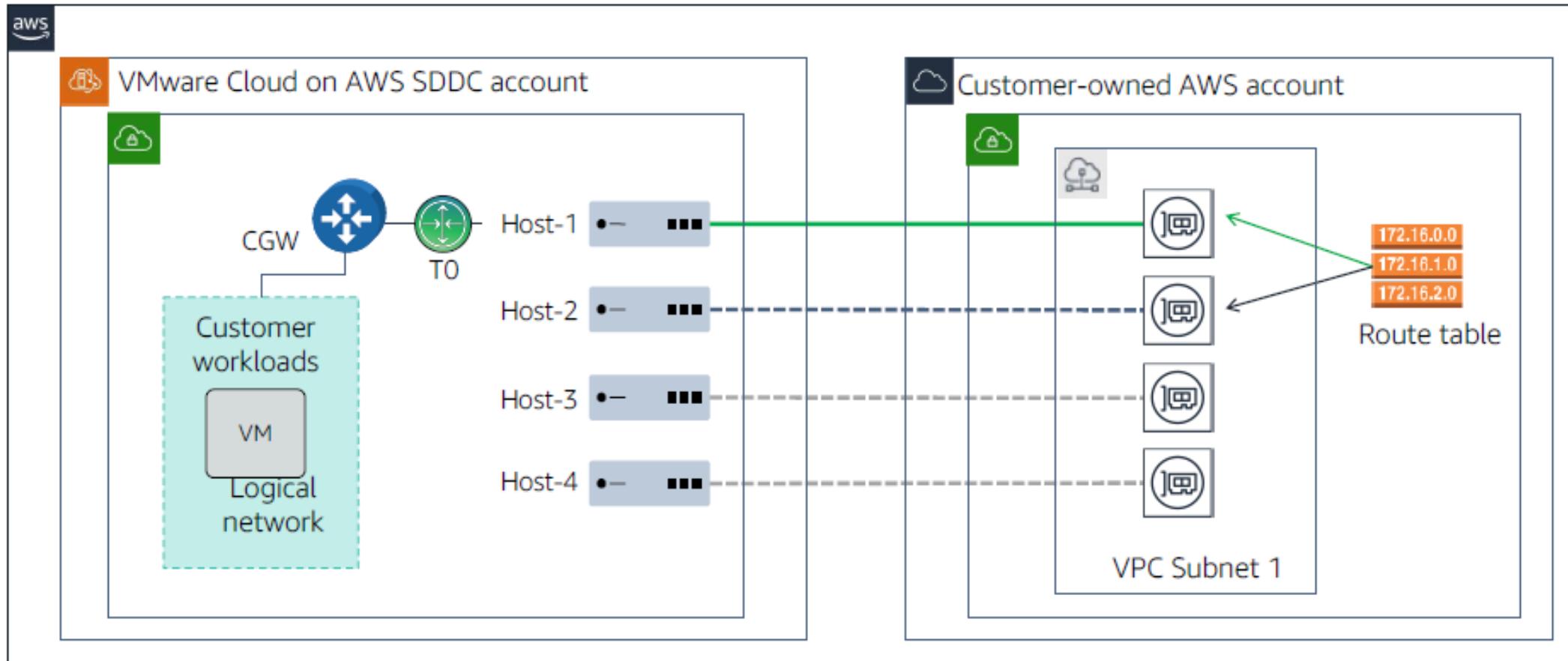
# Overlay networks for VMware Cloud on AWS



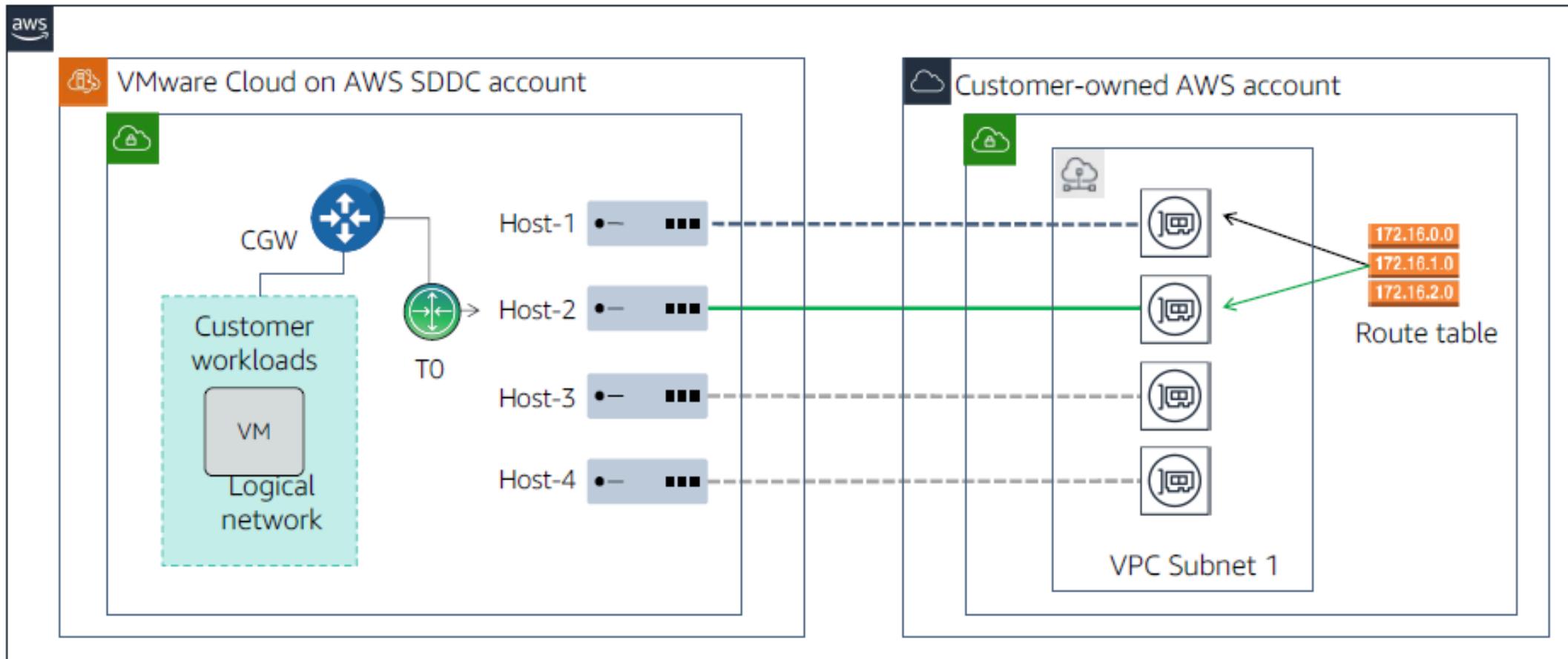
# Connect to on-premises networks



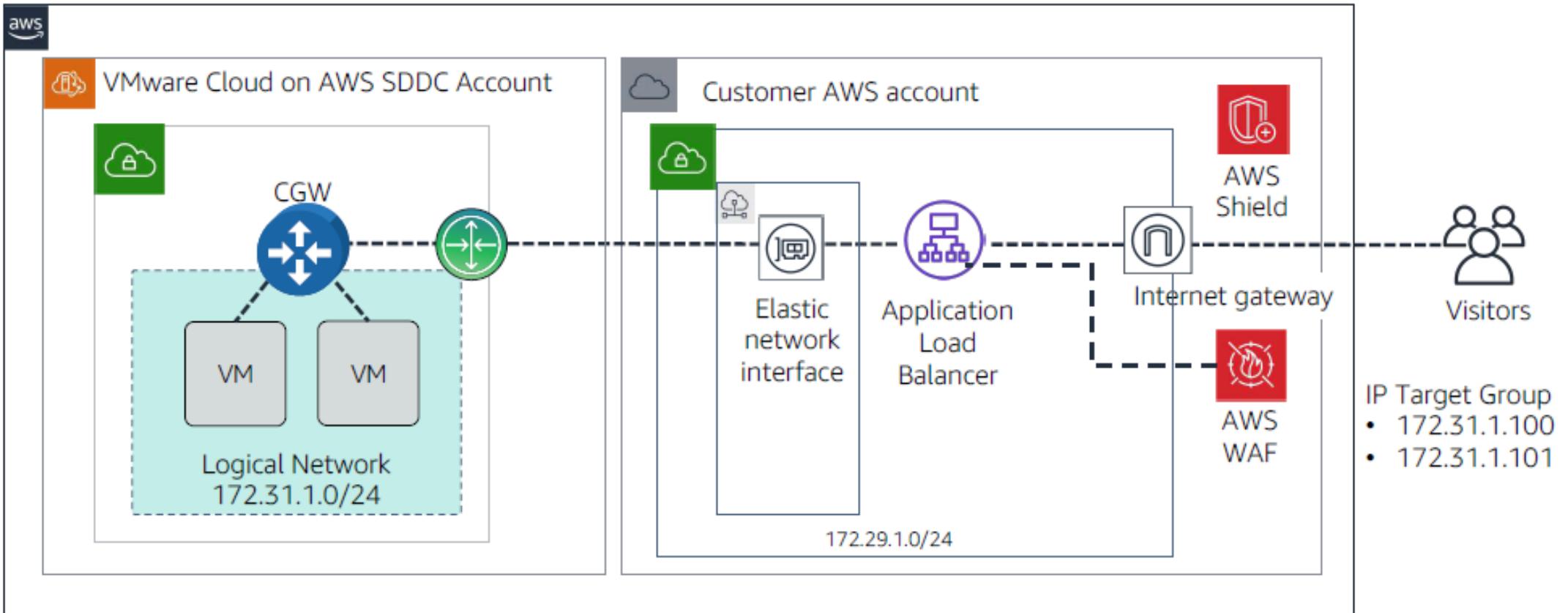
# Connections to customer VPCs



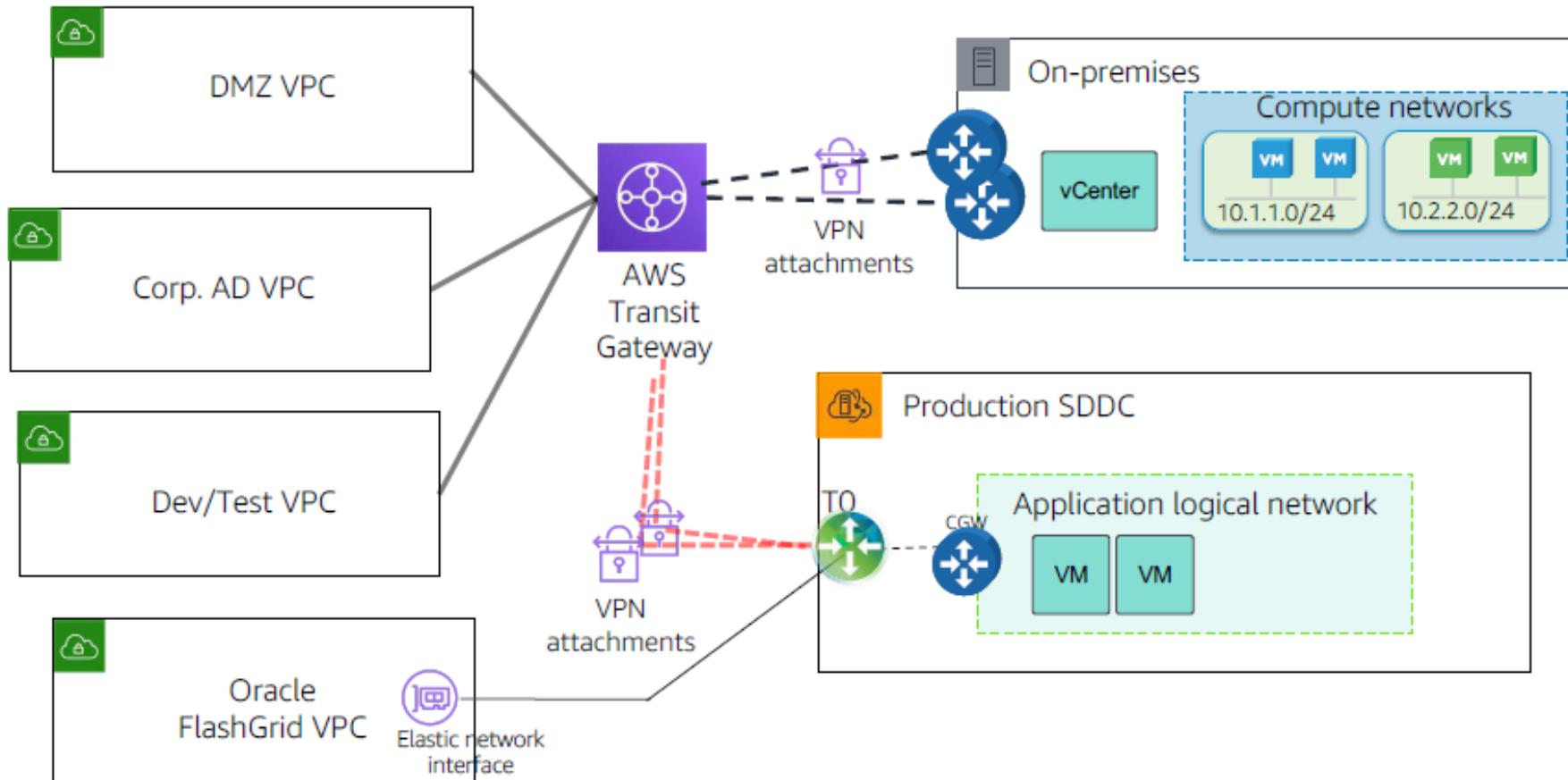
# Recovered connections to customer VPCs



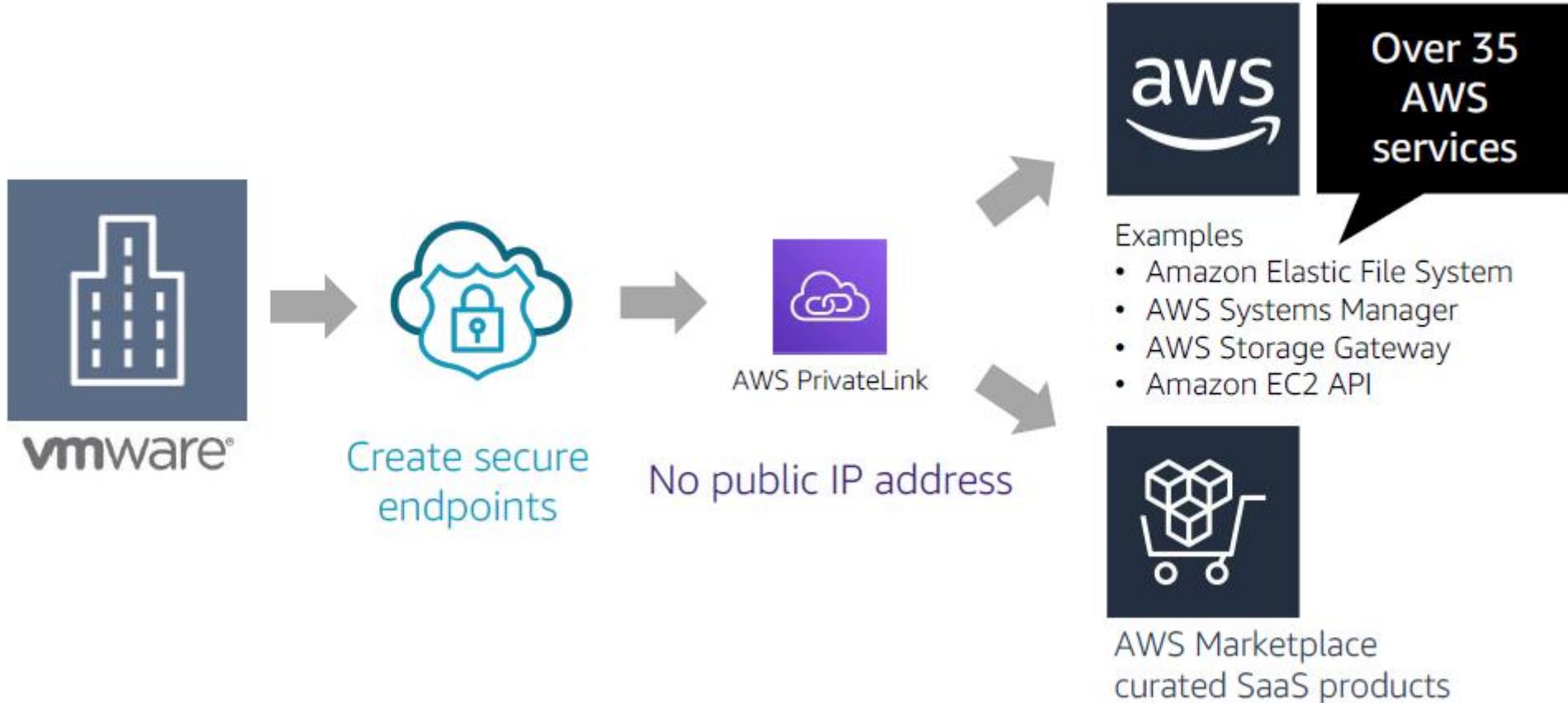
# Modernize applications at the web tier



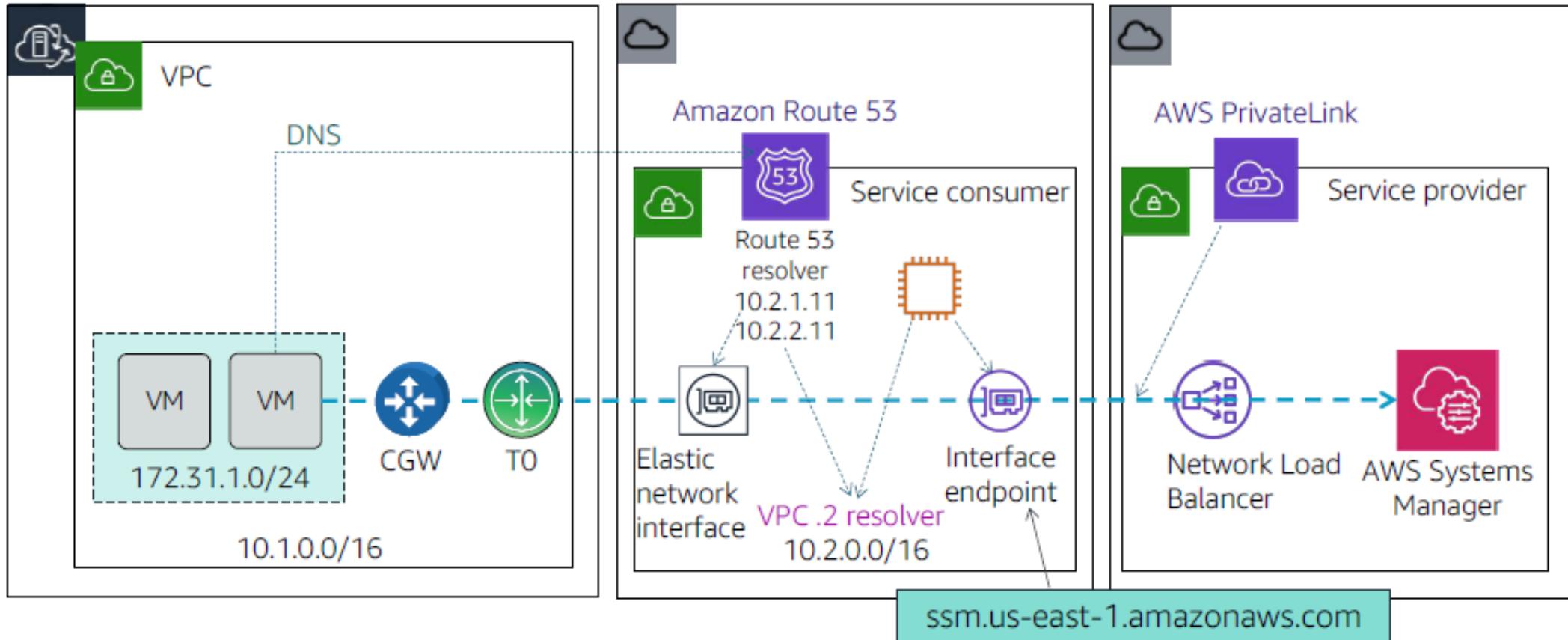
# Connect multiple clouds



# Integrate AWS services privately



# Integrated AWS services example



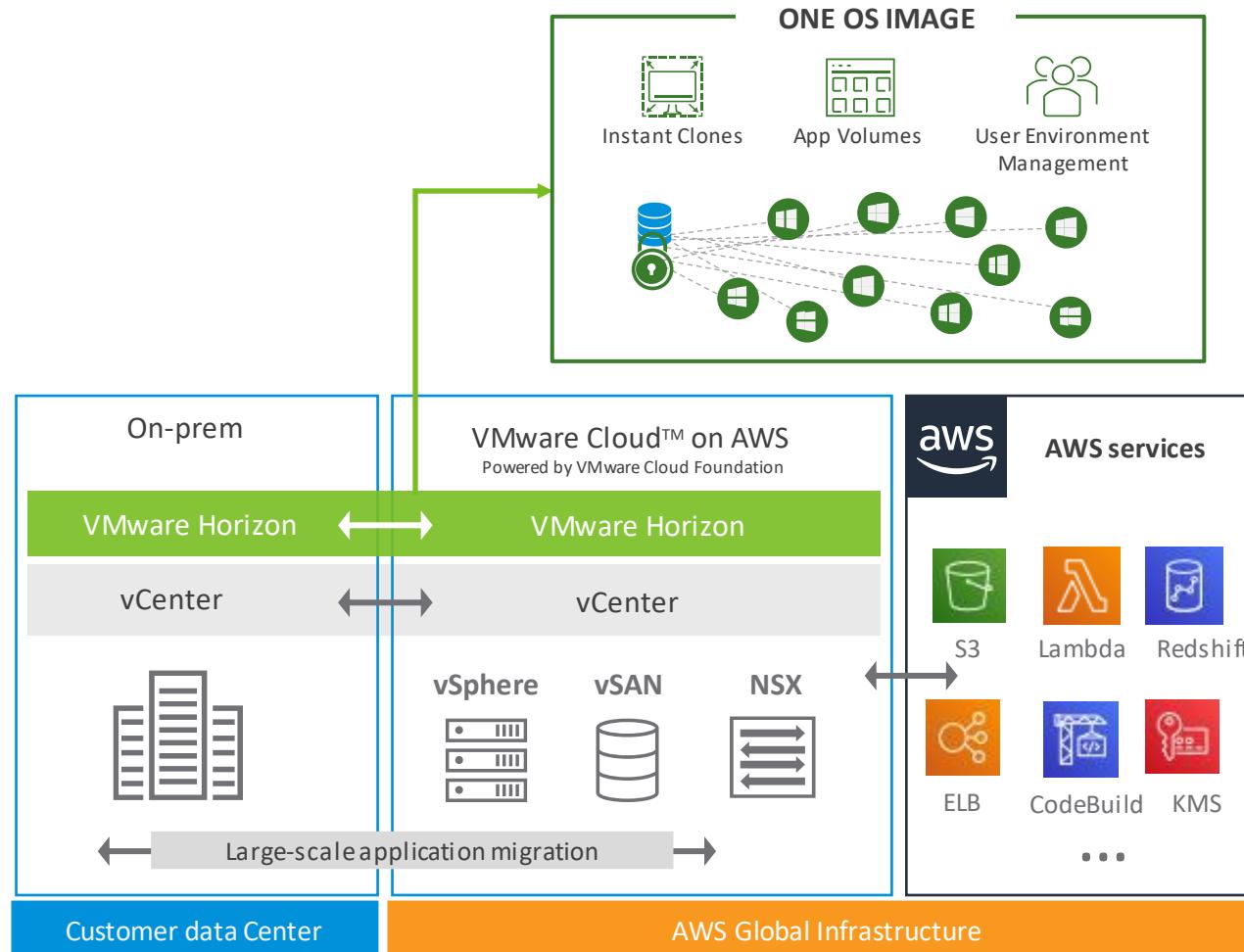
# VMware Horizon on VMC on AWS



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# VMware Horizon on VMware Cloud on AWS

Rapid scale up with just-in-time desktop and on-demand infrastructure provisioning



## Simplify Desktop Ops

Rolling desktop patching as user logs off eliminates maintenance window for patching



## Fast Provisioning

1-2 seconds per desktop, 10 minutes for additional host on average



## Space efficient

Instant clones share a base image reducing required storage by up to 80%

# How to perform a Sizing?

<https://vmc.vmware.com/sizer/quick-sizing>



The logo consists of a yellow cloud icon with a white cube inside it, followed by the text "VMware Cloud on AWS Sizer".

## Start a new Project

**Quick Sizer**  
Good to size quickly with the least input. Useful if you have only one workload type to size.

[GET STARTED](#)

**Advanced Sizer - Import**  
Import Collector tool extracts like RVTools, LiveOptics etc. Useful if you have more than one workload type or would like to fine tune your input.

[IMPORT ▾](#)

**Advanced Sizer - Manual**  
Enter more details than Quick sizer. Useful if you have more than one workload type or would like fine tune your input

[GET STARTED](#)

<https://vmc.vmware.com/sizer/quick-sizing>



## Advanced Sizer - Manual

Workload Type ⓘ General Purpose (General VMs) ▾

Profile name Workload Profile 1

Sizer Input

Basic  Additional

Total number of VMs ⓘ 100

vCPU/pCore ⓘ 4

Input Averages  Input Totals

CPU

vCPUs/VM ⓘ 2

Memory

vRAM/VM (GiB) ⓘ 4

Storage

Utilized Storage/VM (GiB) ⓘ 200

I/O

IOPs / VM ⓘ 50

Workload Type ⓘ General Purpose (General VMs) ▾

Profile name Workload Profile 1

Sizer Input

Basic  Additional

Note: Values below are pre-filled to default. You can change them or leave them as is.

CPU

CPU utilization ⓘ 30

Memory

Memory utilization ⓘ 100

Target RAM ratio ⓘ 1.25

Storage

Dedup ⓘ (applicable only to i3)

Compression Ratio ⓘ (applicable only to i3en)

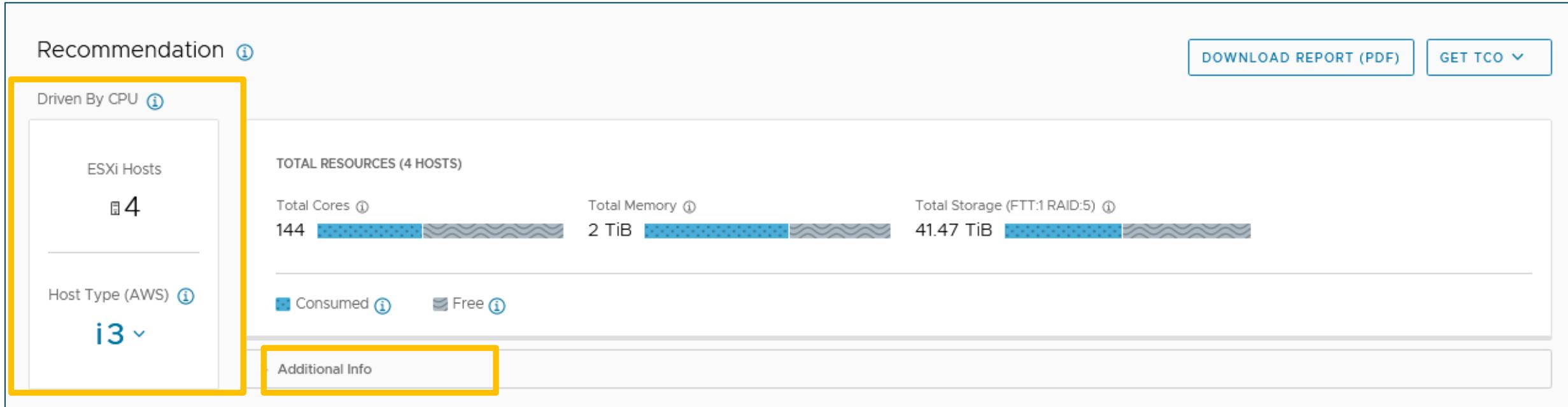
I/O

I/O Access Pattern ⓘ Random

I/O Size (KB) ⓘ 4KB

I/O Ratio ⓘ 70/30

<https://vmc.vmware.com/sizer/quick-sizing>



<https://vmc.vmware.com/sizer/quick-sizing>



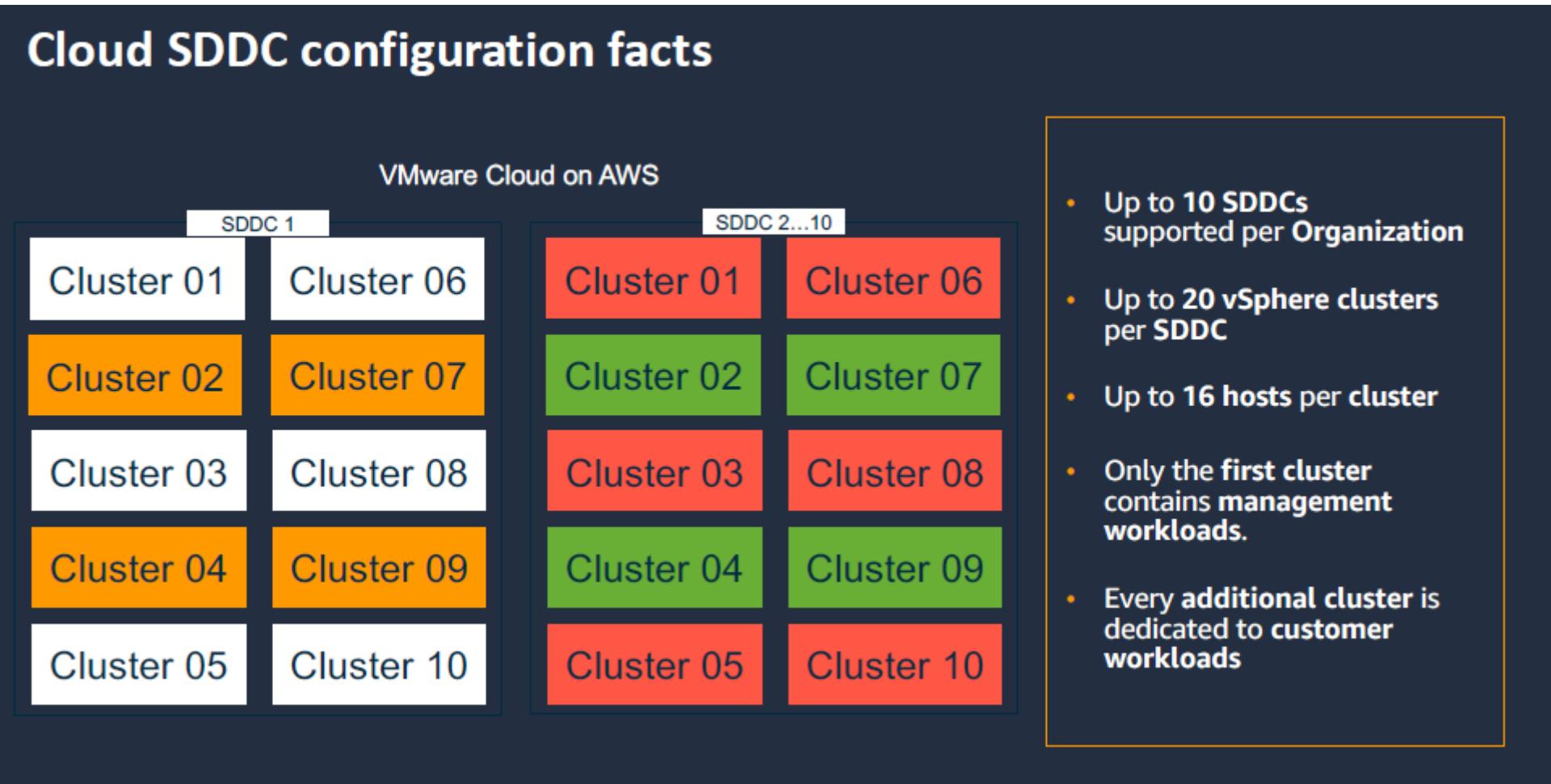
## All Projects

[VIEW LOGS](#)

Project Name	Tag	Workload Types	Recommendation	Version	Created by	Comment	Date Modified	Report
...	██████████	General Purpose	Hosts: 4 • Type: i3	v5.0.0	luiz.serrano@ingrammicro.com		Nov 27, 2021, 11:27:24 AM	<a href="#">PDF</a>
██████████					Objects	10		



<https://vmc.vmware.com/sizer/quick-sizing>



# Resources to Learn More



## Technical Content

- Website: <https://vmware.com/go/vmc-aws>
- Blog: <https://vmwa.re/vmc-blog>
- Podcast: <https://vmc.techzone.vmware.com/podcast>
- YouTube: <https://vmwa.re/vmc-video>
- Tech Zone: <https://vmc.techzone.vmware.com>
- Release Notes: <https://vmwa.re/vmc-rn>



## HANDS ON LABS

- HOL-2187-91-ISM - VMware Cloud on AWS - Lightning Lab
- HOL-2187-01-ISM - VMware Cloud on AWS - Fundamentals
- HOL-2187-02-ISM - VMware Cloud on AWS - Key Use Cases

<https://vmc.techzone.vmware.com/vmc-hol>



## Social Media

- Follow us on Twitter: [@vmwarecloudaws](https://twitter.com/vmwarecloudaws)
- Give us a shout out with [#VMWonAWS](#)



## Quick Start Series

- Get started quickly by following activity paths to learn basic concepts and view demonstrations.

<https://vmc.techzone.vmware.com/quick-start>

# Resources to Learn More



<https://aws.amazon.com/vmware/resources/>

# Resources to Learn More



## APN Navigate

A prescriptive path to build an AWS business and specialize on AWS  
<https://aws.amazon.com/partners/navigate/>

## APN Navigate for VMware Cloud on AWS

A prescriptive path to build expertise supporting AWS customer projects for VMware Cloud solutions on AWS

<https://aws.amazon.com/partners/navigate/vmware/>

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# Demonstration

# UNDER DEPLOYMENT

Realize the  
Promise of  
Technology

A photograph of a modern building at night. The building's facade features large, illuminated blue letters spelling "INGRAM" and smaller letters spelling "MICRO" above it. To the right, another section of the building has similar lettering with "OFFICES" below "INGRAM". The sky is dark with visible stars and a few small, thin clouds.

INGRAM MICRO  
OFFICES



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# Appendix

<https://vmc.techzone.vmware.com/vmc-arch/docs/introduction/vmc-aws-a-technical-overview#sec377-sub1>