

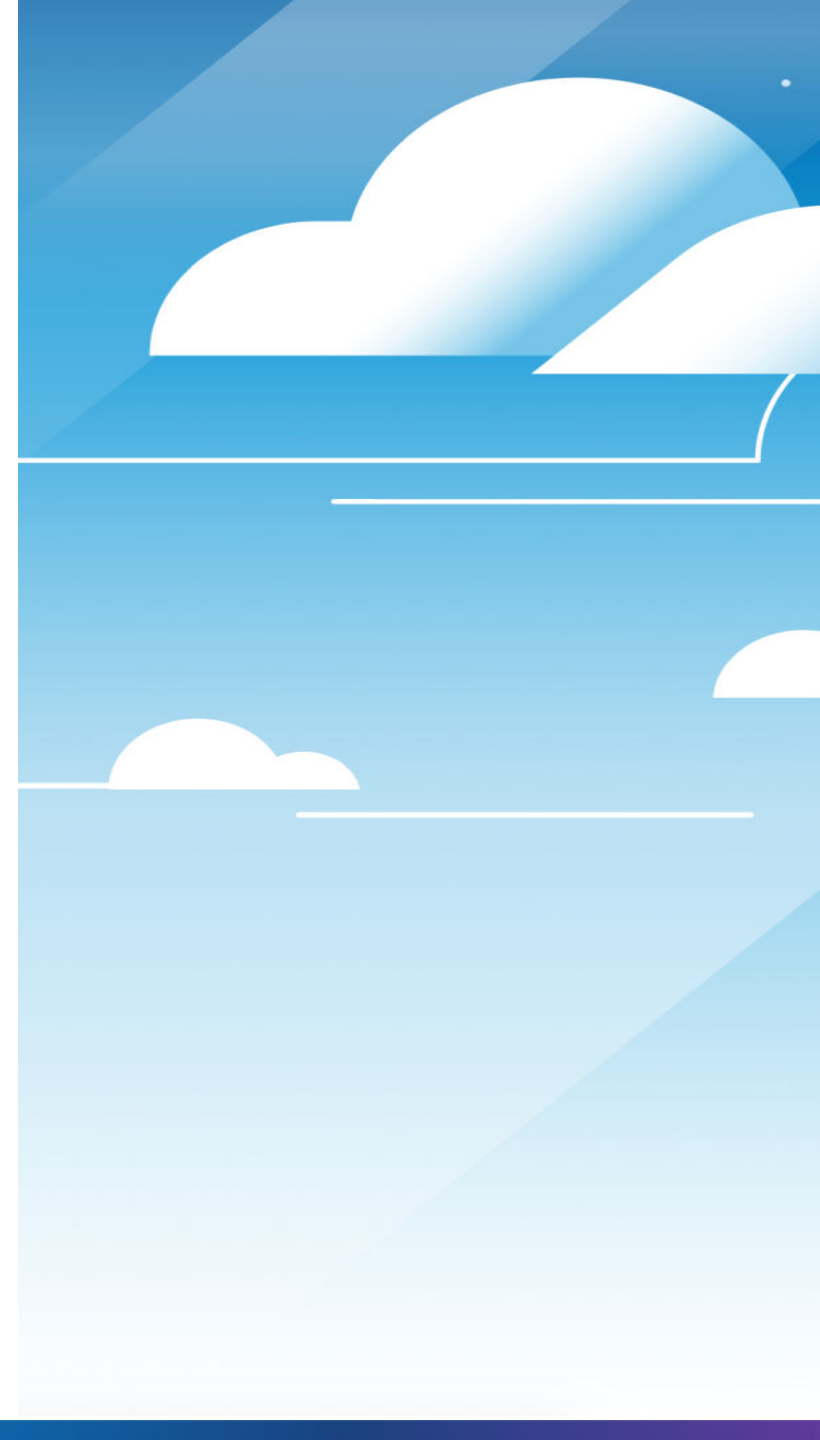
The Faster Path to Hybrid Cloud with VMware Cloud Foundation and VMware Cloud on AWS

Tony Sangha, VMware
Tom Cushing, VMware



Agenda

- Current State 2019
- The Hybrid Equation
- Hybrid Operations
- DEMOS!



Disclaimer

This presentation may contain product features or functionality that are currently under development.

This overview of new technology represents no commitment from VMware to deliver these features in any generally available product.

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Technical feasibility and market demand will affect final delivery.

Pricing and packaging for any new features/functionality/technology discussed or presented, have not been determined.

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The background of the slide is a photograph of a wind farm. In the foreground, a large white wind turbine is partially visible, with its blades extending towards the right. In the background, many other wind turbines are scattered across a green, hilly landscape under a cloudy sky. The image is overlaid with a large green triangle on the left side and a blue triangle on the bottom left corner.

Today's Hybrid Cloud

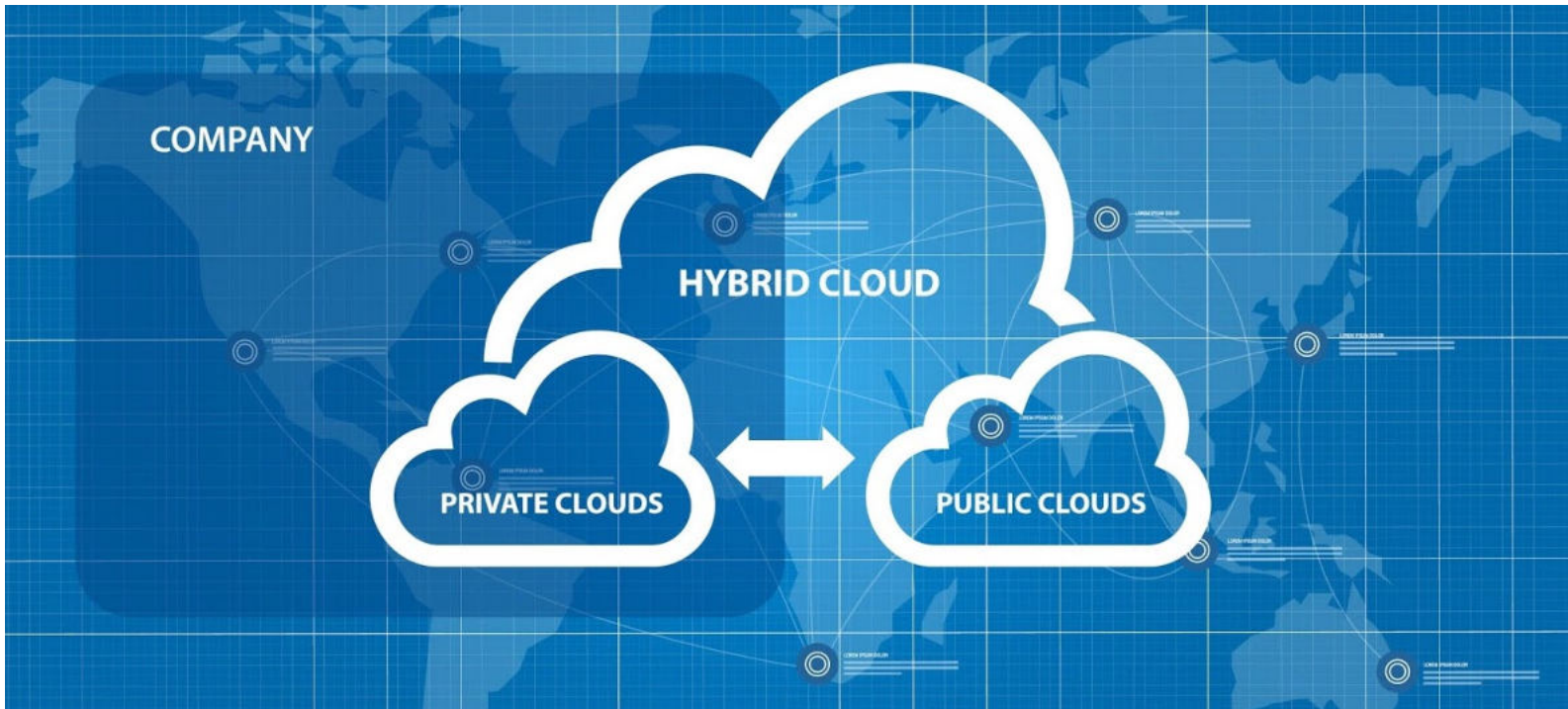
“Nearly all enterprises that AWS works with today start out with a significant on-premises footprint and take a hybrid approach to cloud computing.”

Andy Jassy, CEO Amazon Web Services
Wall Street Journal, 2017



True Hybrid Cloud Lost in Translation

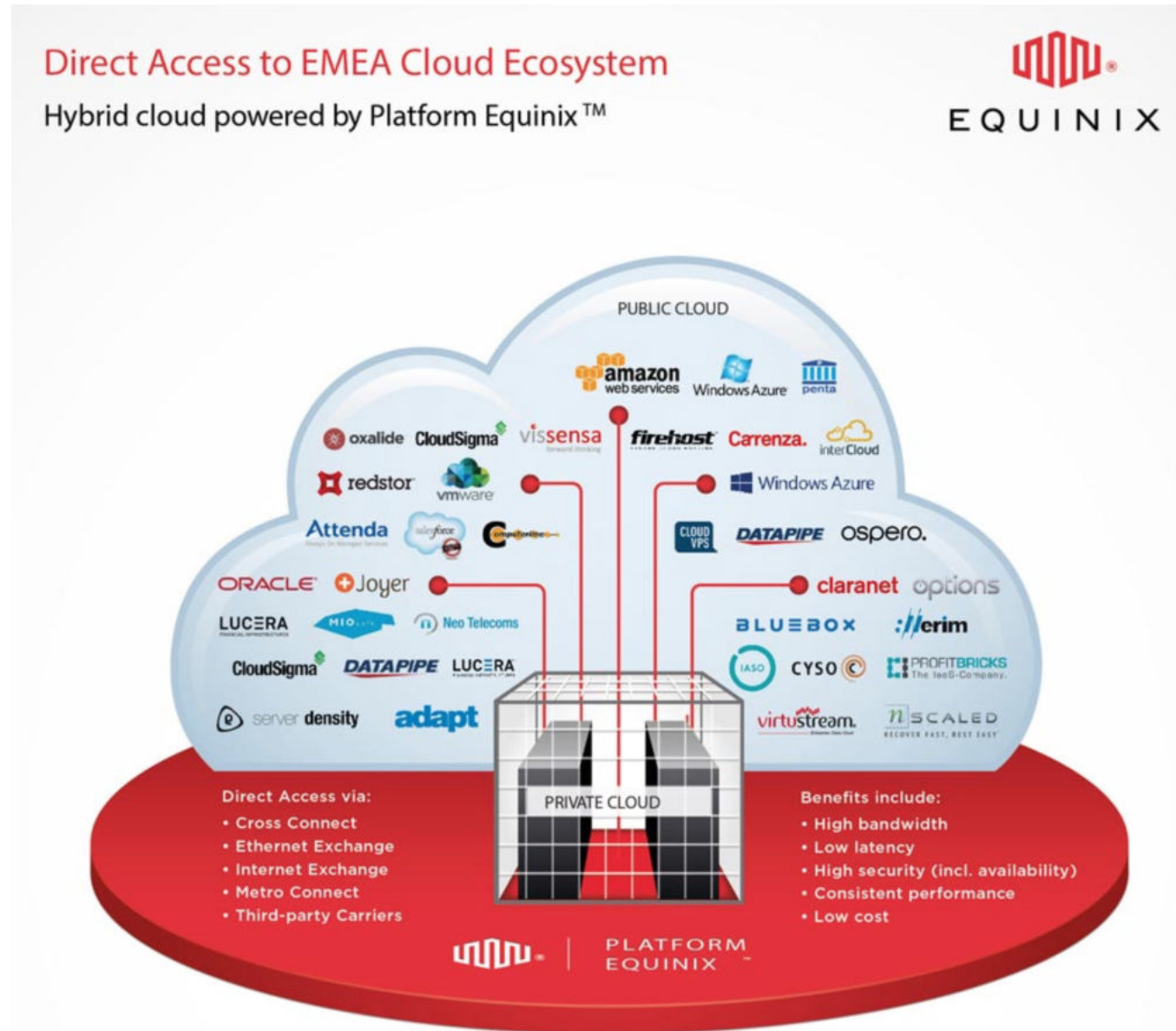
NIST definition



“A composition of two or more distinct cloud infrastructures that remain unique entities, but are bound together by technology that enables data and application portability.”

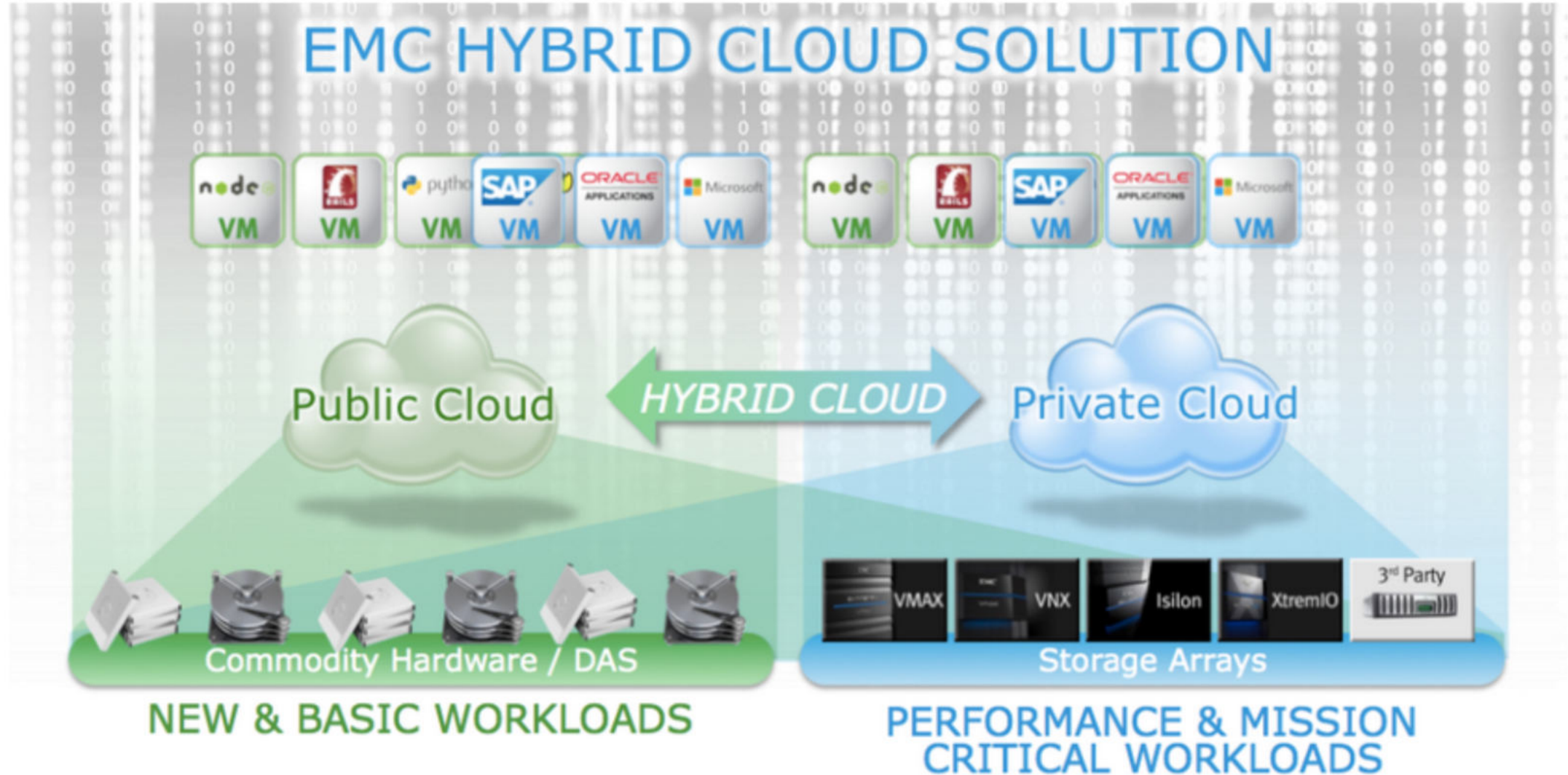
Hybrid Cloud = Network Connectivity?

Circa 2014



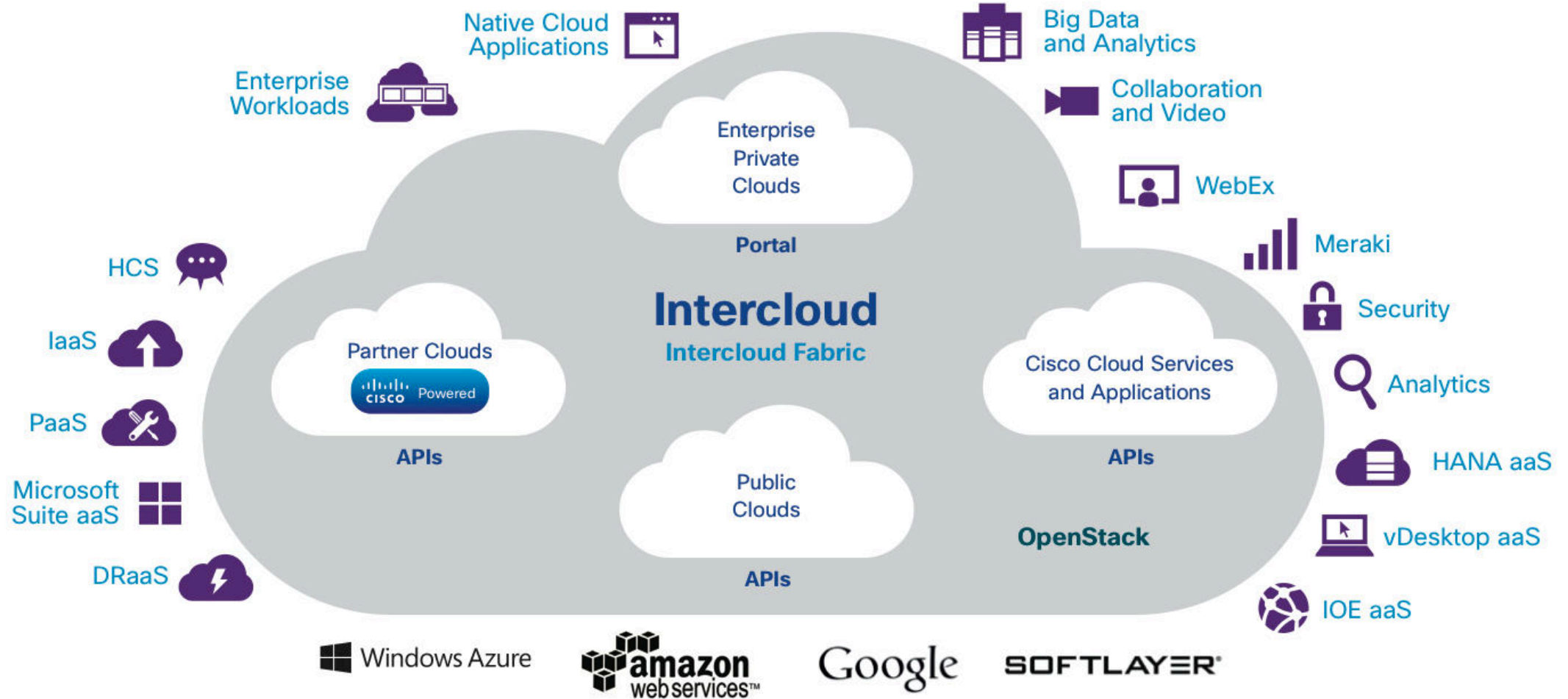
Hybrid Cloud = Storage Replication?

Circa 2014



Hybrid Cloud = Connect EVERYTHING!

Circa 2014



What Does Good Look Like?

Cloud users define success criteria

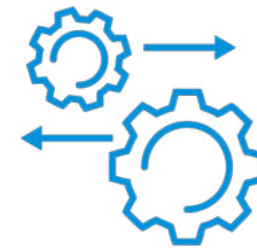
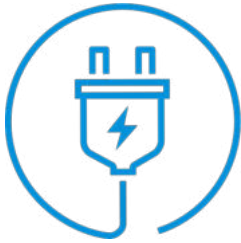


Consumer



Developer

Cloud should
be treated as
a utility



Programmatic
Access
API | CLI | GUI



Common Cloud Challenges

Factors affecting hybrid cloud deployments

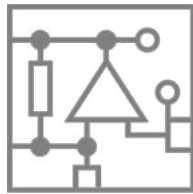


Consumer



Developer

Re-Architecture | Scaling



Operations | Lifecycle



Consolidation | Migration



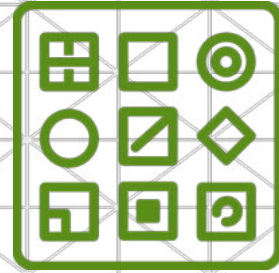
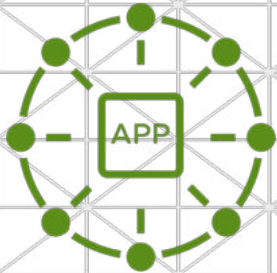
Governance | Security



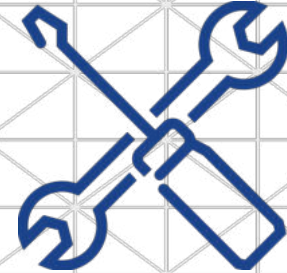
True Hybrid Cloud Requires Consistency

Consistent infrastructure / consistent operations

Developers build and manage applications for consumers without complicated refactoring



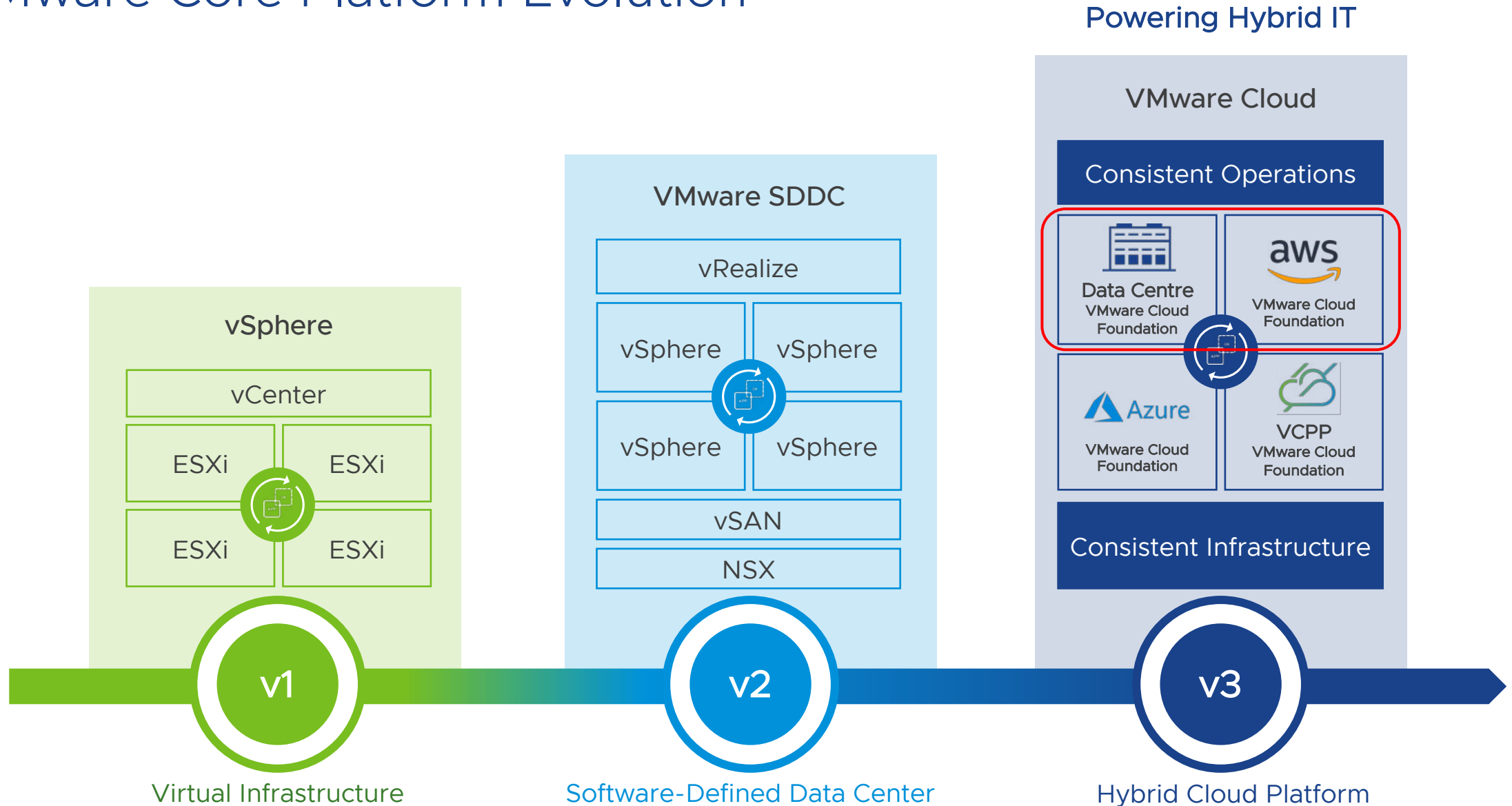
Operations use same tools for administration, migration, security on-prem and in the cloud



VMware Cloud Foundation Platform

Automated Deployment | Lifecycle | Reference Architecture

VMware Core Platform Evolution

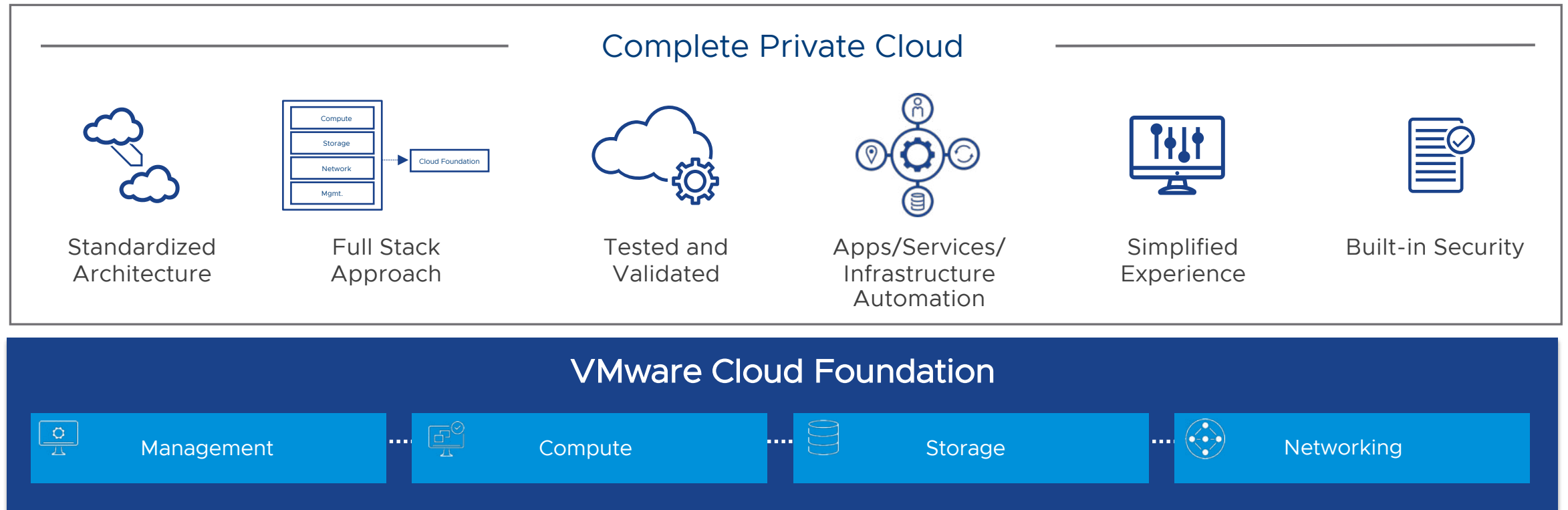


On-Premises VMware Cloud

Modernise In Place

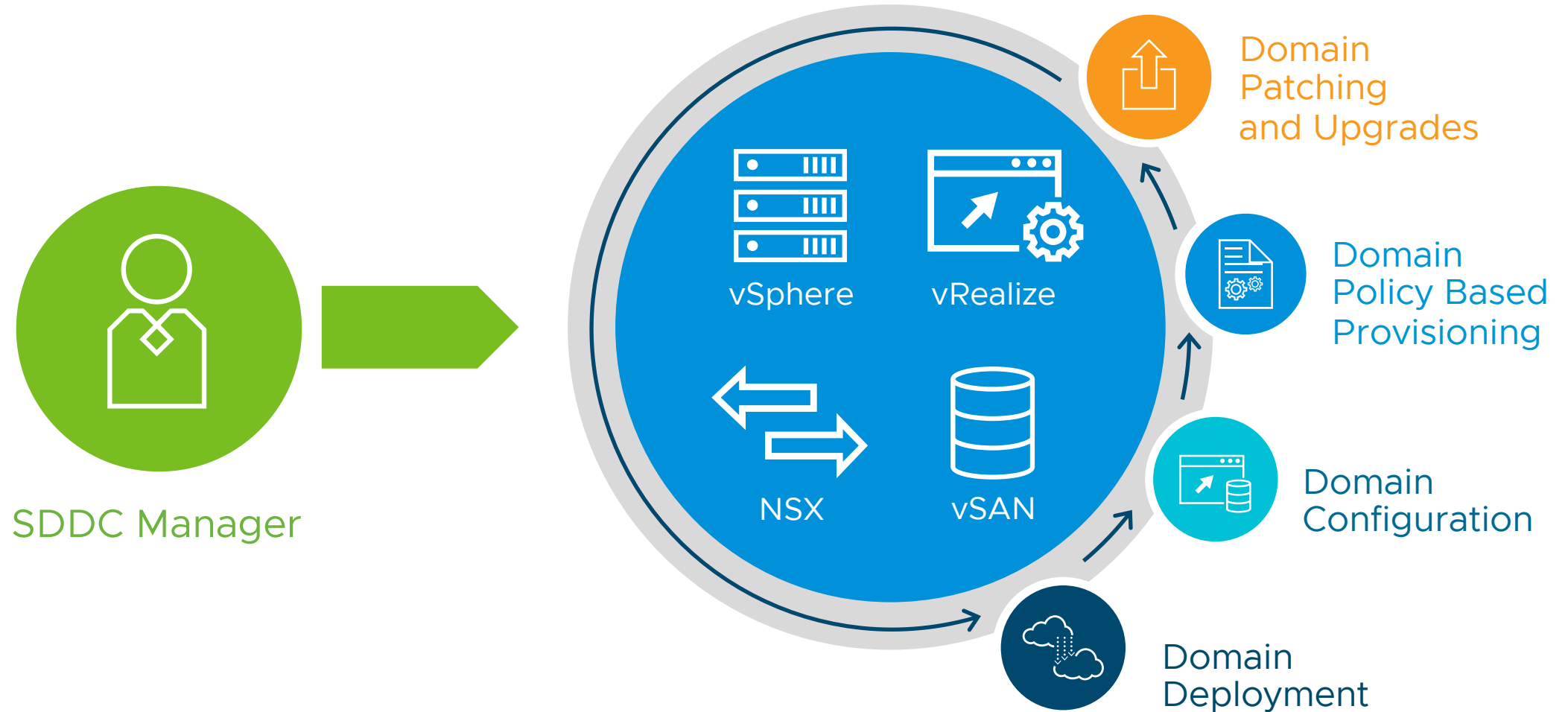
VMware Cloud Foundation On-Premises

Consistent infrastructure and operations to speed modernisation



Brought Together by the SDDC Manager Control Plane

Automated day 0 to day 2 operations of the entire cloud infrastructure



SDDC Manager Dashboard

+ WORKLOAD DOMAIN ▾

COMMISSION HOSTS

...

Dashboard

Inventory ▾

Workload Domains

Hosts

Repository >

Administration ▾

Network Settings

Licensing

Users

Repository Settings

Composable Infrastru...

vRealize Suite

Security

Backup Configuration

VMware CEIP

Developer Center

2 Workload Domains

Management Domain

1

VI Domain

1

Host Type and Usage

Host Types

Hybrid Host

5

All Flash Host

3

Usage

8 Hosts Total



7 Hosts Used

1 Hosts Unallocated

Top Domains in Host Allocation



MGMT



Production

Ongoing and Scheduled Updates

You don't have any ongoing and scheduled updates.

Update History in past month

CPU, Memory, Storage Usage

CPU

288.51 GHz Total



36.31 GHz Used

252.2 GHz Free

Top Domains in allocated CPU Usage



MGMT



Production

Memory

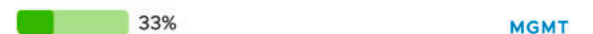
1.87 TB Total



0.59 TB Used

1.28 TB Free

Top Domains in allocated Memory Usage



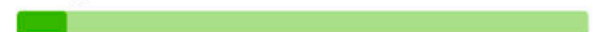
MGMT



Production

Storage

29.25 TB Total



2.57 TB Used

26.68 TB Free

Top Domains in allocated Storage Usage



MGMT

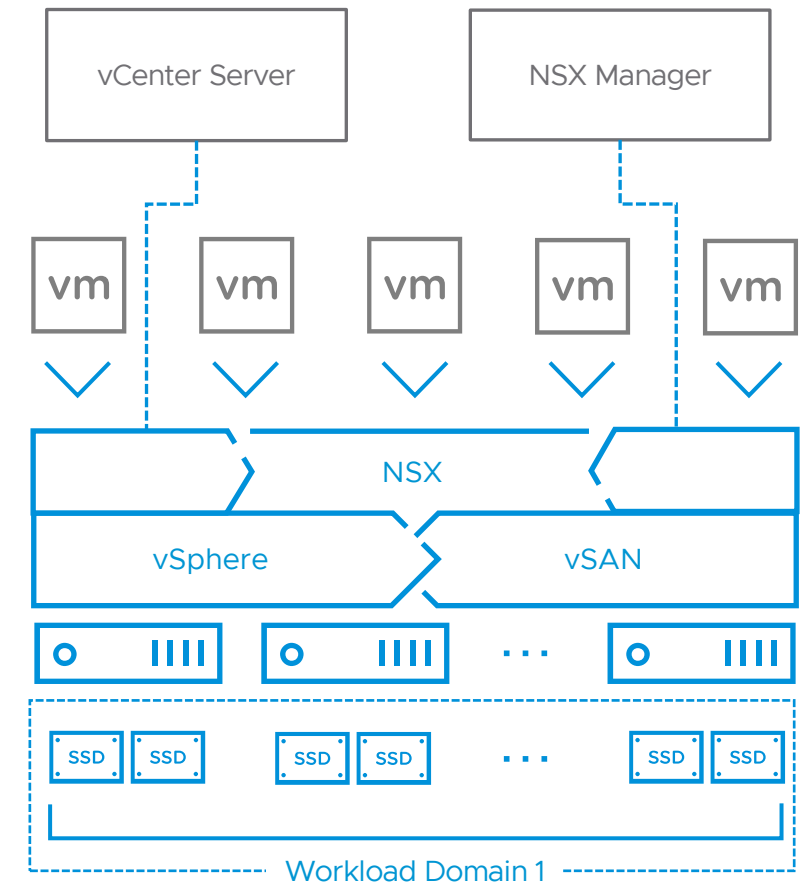
Recent tasks

- | Time | Status | Task |
|--------------------|-------------|--|
| 11/11/19, 1:17 PM | ✓ Succeeded | Connect vRealize Operations to Workload Domain Production |
| 11/9/19, 10:04 PM | ✓ Succeeded | Creating domain Production |
| 11/9/19, 10:00 PM | ❗ Failed | Creating domain Production |
| 11/9/19, 9:47 PM | ✓ Succeeded | Commissioning host(s) cbr-prod-esxi02.hcibu.local,cbr-prod-esxi03.hcibu.local,cbr-prod-esxi01.hcibu.local to VMware Cloud Foundation |
| 10/31/19, 10:37 AM | ✓ Succeeded | Deploy vRealize Operations |
| 10/31/19, 10:37 AM | ✓ Succeeded | Validate vRealize Operations Deployment Parameters |

Cloud Foundation Workload Domain

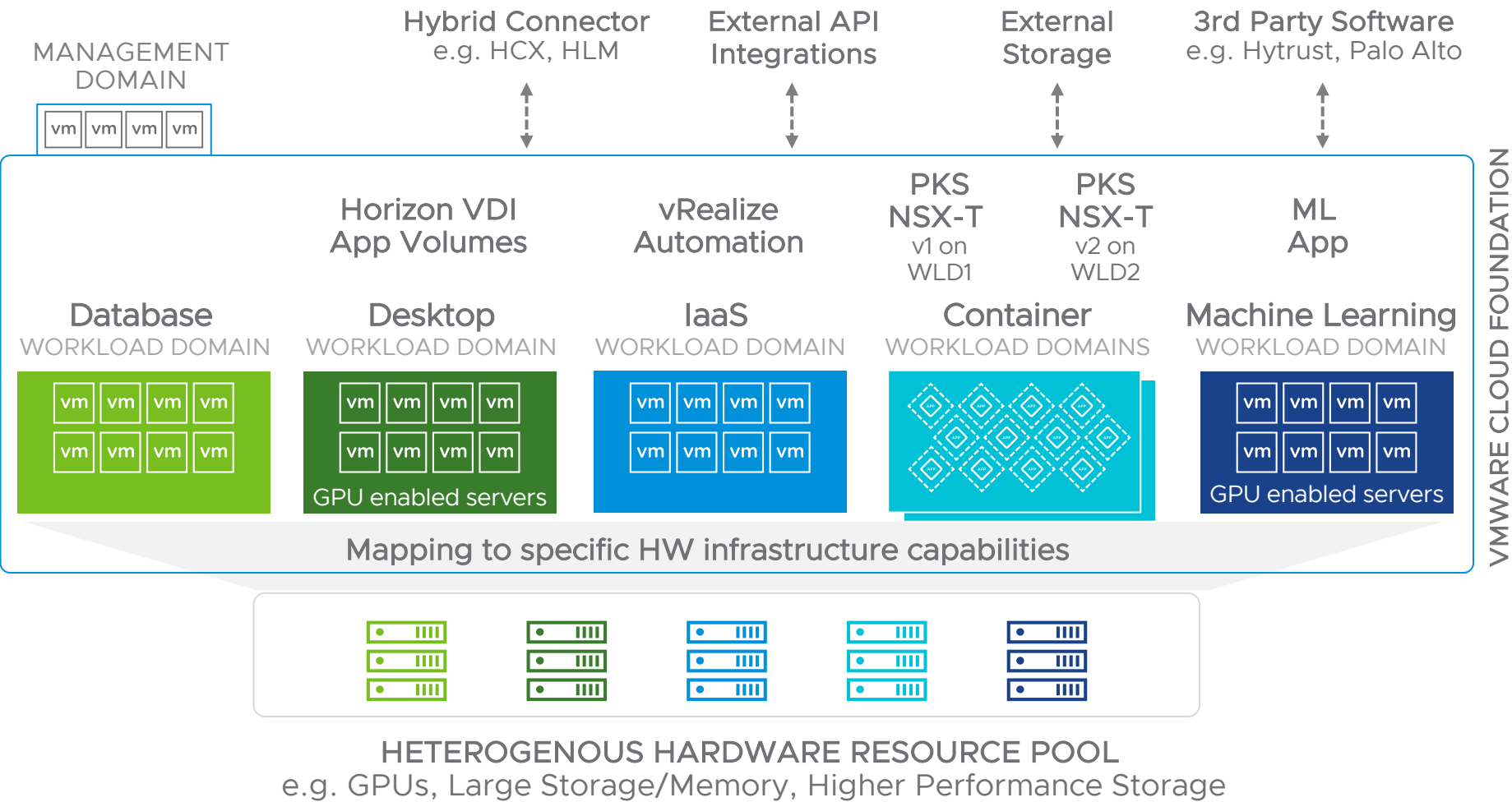
Building block of your modern private cloud

- **Purpose Built SDDC Environment**
 - Dedicated vSAN Ready Nodes
 - Create, expand, and delete independently
- **Automated Provisioning**
 - Management Domain provisioned at initial Bring Up
 - Virtual Infrastructure (VI) WLD provisioned on-demand
 - Horizon – automated deployment to an existing VI WLD
 - Enterprise PKS - automated deployment to an existing VI WLD
- Deploy up to 15 Workload Domains
- Multiple vSphere Clusters per Workload Domain
- Scale out VCF instances for capacity and federation





Cloud Foundation Workload Domains

On-demand, policy managed infrastructure for workloads



vm Cloud Foundation



?

administrator@vsphere.local

<<

MANAGEMENT ACTIVE

Dashboard

Inventory

Workload Domains

Hosts

Repository

Administration

Network Settings

Licensing

Users

Repository Settings

Composable Infrastru...

vRealize Suite

Security

Backup Configuration

VMware CEIP

Developer Center

CPU166.4 GHz Total
39.07 GHz Used127.33 GHz Free

Memory1.5 TB Total
0.49 TB Used1.01 TB Free

vSAN Storage24.82 TB Total
2.37 TB Used22.45 TB Free

Summ...

Service...

Update/Patc...

Update Hist...

Ho...

Clust...

Secur...

VMware Cloud Foundation Components

Component	IP Address
vCenter Server cbr-mgmt-vc01.hcibu.local	192.168.150.10
Platform Services Controller cbr-mgmt-psc01.hcibu.local cbr-mgmt-psc02.hcibu.local	192.168.150.11 192.168.150.12
vRealize Log Insight cbr-mgmt-vrli01.hcibu.local	-
vRealize Operations cbr-mgmt-vrops.hcibu.local	-

Cloud Foundation Workload Domain

vCenter server managed by SDDC Manager

This vCenter Server is managed by SDDC Manager (cbr-sddc-mgr.hcibu.local), making modifications directly in vCenter Server may break SDDC Manager workflows. Please ch

vm vSphere Client Menu Search in all environments Administrator@VSPHERE.LOCAL


cbr-mgmt-esxi01.hcibu.local ACTIONS

Summary Monitor Configure Permissions VMs Datastores Networks Updates

Left Navigation Tree:

- cbr-mgmt-vc01.hcibu.local
 - cbr-m01-dc
 - cbr-m01-mgmt01
 - cbr-mgmt-esxi01.hcibu.local** (selected)
 - cbr-mgmt-esxi02.hcibu.local
 - cbr-mgmt-esxi03.hcibu.local
 - cbr-mgmt-esxi04.hcibu.local
 - cbr-w01-sddc-edge
 - cbr-w01-sddc-mgmt
 - cbr-w01-user-edge
 - cbr-w01-user-vm
 - vGhetto-Nested-Pr...
 - syd-cldbldr-mgmt

Summary Tab Details:

	Hypervisor: VMware ESXi, 6.7.0, 14320388	CPU Free: 36.54 GHz Used: 5.06 GHz Capacity: 41.6 GHz
	Model: PowerEdge R720	Memory Free: 226.8 GB Used: 157.15 GB Capacity: 383.96 GB
	Processor Type: Intel(R) Xeon(R) CPU E5-2670 0 @ 2.60GHz	Storage Free: 22.88 TB Used: 2.43 TB Capacity: 25.31 TB
	Logical Processors: 32	
	NICs: 3	
	Virtual Machines: 7	
	State: Connected	
	Uptime: 10 days	

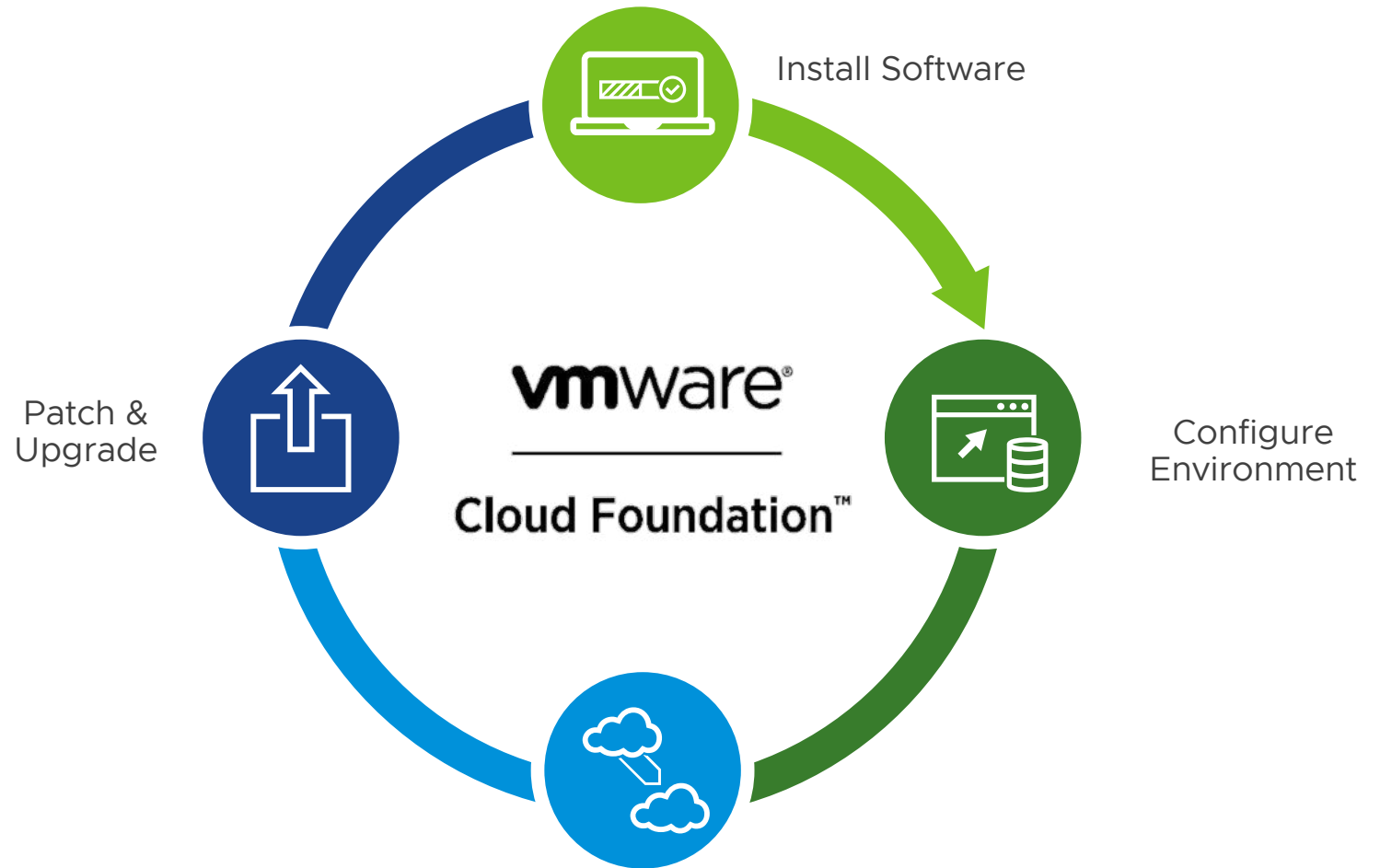
Logos: DELL EMC

Hardware **Configuration**

Ease of the Public Cloud in your Data Center

VMware Cloud Foundation delivers the modern private cloud

- Rapid deployment and configuration
- On-demand provisioning of infrastructure pools
- One-click patching and upgrading



Provision Infrastructure Resources (workload domains)

Off-Premises VMware Cloud

VMware Cloud on AWS

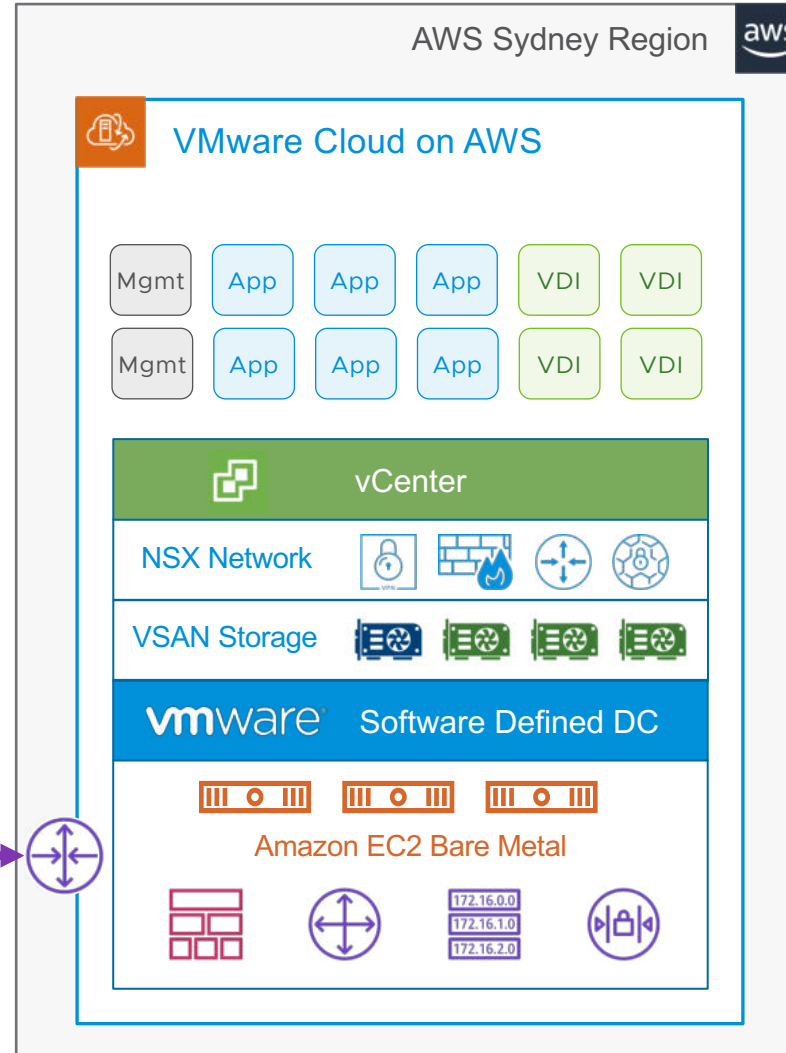
VMware Cloud on AWS

Cloud Foundation Data Centre On-Demand

Amazon EC2 Bare Metal Hosts:

i3 512GB instances w/ NVMe
R5 768GB instances w/ EBS

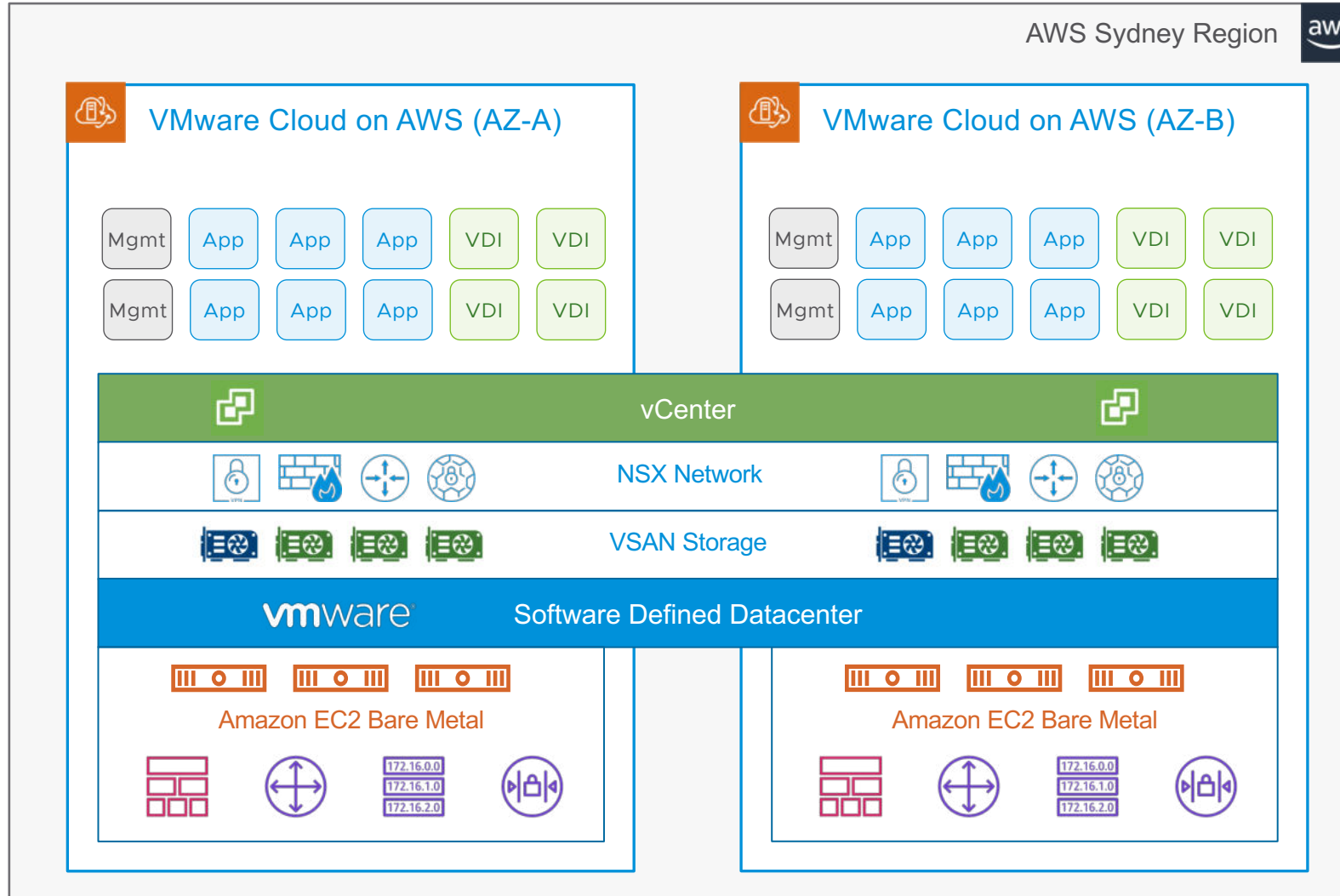
Up to 16 hosts per cluster
Up to 10 clusters per SDDC



- **Immediately Leverage** VMware Cloud Foundation as a service (vCenter, ESXi, vSAN, NSX)
- **Jointly Engineered** cloud platform by VMware and Amazon Web Services
- **All Lifecycle Management**, patching, updates by VMware
- **Scale Elastically** by adding EC2 nodes on demand in ~15mins
- **Infrastructure Resiliency** for applications in a single AWS Availability Zone (AZ)

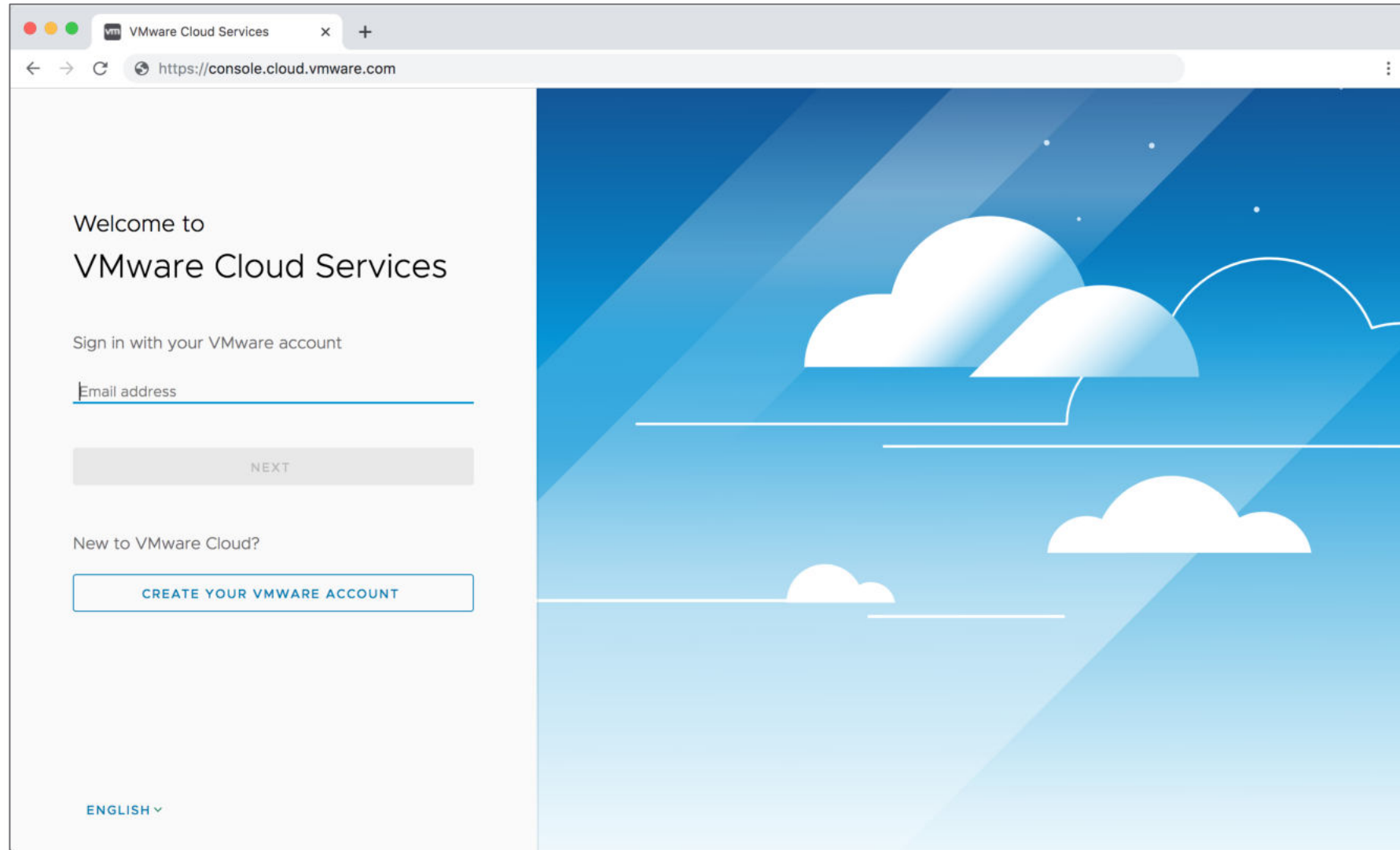
VMware Cloud on AWS

Stretched Cluster SDDC Configuration



- Extend SDDC high availability for applications across AWS Availability Zones
- Stretched VSAN storage and NSX logical networks
- AZ downtime treated as a vSphere HA event with apps auto-restarted in other zone
- First time **infrastructure level AZ resilience** within AWS!

VMware Cloud Services Console



VMware Cloud on AWS Standup

On-Demand SDDC in ~2 Hours

VMware Cloud on AWS Sub N... x

vmc.vmware.com/console/sddcs/create

vm VMware Cloud on AWS

Tom Cushing
VMC-SET-ANZ

< Create Software-Defined Data Center (SDDC)

1. SDDC Properties

Give your SDDC a name, choose a size, and specify the AWS region where it will be created.

Cloud	<input checked="" type="radio"/> AWS
AWS Region	Asia Pacific (Sydney) More regions coming later
Deployment	<input type="radio"/> Single Host <input checked="" type="radio"/> Multi-Host <input type="radio"/> Stretched Cluster ⓘ
Host Type	<input checked="" type="radio"/> I3 (Local SSD) ⓘ <input type="radio"/> R5 (EBS) ⓘ
SDDC Name	VFORUM-SYD-HYBRID
Number of Hosts	3
Host Capacity	2 Sockets, 36 Cores, 512 GB RAM, 10.7 TB Storage
Total Capacity	6 Sockets, 108 Cores, 1.5 TB RAM, 32.1 TB Storage

NEXT

SUPPORT

VMware Cloud on AWS Standup

Connect to “sidecar” AWS account

VMware Cloud on AWS Sub Na X

vmc.vmware.com/console/sddcs/create

vm VMware Cloud on AWS

Tom Cushing
VMC-SET-ANZ

< Create Software-Defined Data Center (SDDC)

- 1. SDDC Properties** Give your SDDC a name, choose a size, and specify the AWS region where it will be created.
- 2. Connect to AWS** Specify the AWS account that you want to connect your SDDC with.

This step gives VMware permission to set up networking correctly for your SDDC on your AWS infrastructure using cross-account rules.

Choose an AWS account 9687800898

OPEN AWS CONSOLE WITH CLOUDFORMATION TEMPLATE

I don't have an AWS account. [Click here to create one.](#)

Instructions

- Click on the "OPEN AWS CONSOLE WITH CLOUDFORMATION TEMPLATE" button to launch AWS in a separate browser tab. Each template is time-bounded for security reasons. To restart the task, simply click the button again.
 - ☐ Go to AWS console and complete the linking process in CloudFormation. This task will time out in 00:56:57.

VMware has defined a CloudFormation template to connect your AWS account. This template creates the IAM roles necessary to allow communication between your SDDC and your AWS account.

[What is CloudFormation?](#)

[What are IAM roles?](#)

SUPPORT

VMware Cloud on AWS Standup

Select sidecar VPC & subnet

vmware VMware Cloud on AWS

< Create Software-Defined Data Center (SDDC)

- 1. SDDC Properties** Give your SDDC a name, choose a size, and specify the AWS region where it will be created.
- 2. Connect to AWS** Aws Account ID ed96d871-c7eb-3505-8190-522aeffae17a
- 3. VPC and subnet** Specify the VPC and the subnet to connect to your AWS account.

VPC vpc-05c7b0f829e76be40 (10.0.0.0/16) ↕ ↻

Subnet Subnet_AZ3 (10.0.3.0/24, ap-southeast-2a) ▼

❗ To leverage native AWS services on your SDDCs, deploy your AWS EC2 workloads in the same availability zone to avoid cross AZ traffic charge.

Network Architecture Diagram:

- VMware Cloud VPC** (Blue box) contains **VMC SDDC ESXi Hosts**.
- Your Amazon Account VPC** (Yellow box) contains two Availability Zones:
 - Availability Zone 1** contains **AWS Subnet 1 EC2 Instances**.
 - Availability Zone 2** contains **AWS Subnet 2 EC2 Instances**.
- Network Traffic** is shown as dashed lines connecting the VMC SDDC ESXi Hosts to the EC2 Instances in both Availability Zones.
- An information icon (i) is placed between the two Availability Zones, indicating a cross-AZ connection.

VMware Cloud on AWS Standup

Choose SDDC management network CIDR

VMware Cloud on AWS Sub Na X +

vmc.vmware.com/console/sddcs/create

vm VMware Cloud on AWS

Tom Cushing VMC-SET-ANZ

< Create Software-Defined Data Center (SDDC)

- 1. SDDC Properties** Give your SDDC a name, choose a size, and specify the AWS region where it will be created.
- 2. Connect to AWS** Aws Account ID ed96d871-c7eb-3505-8190-522aeffae17a
- 3. VPC and subnet** VPC - vpc-05c7b0f829e76be40
- 4. Configure Network** Management Subnet (optional)
 - Specify a private subnet range (RFC 1918) to be used for vCenter Server, NSX Manager, and ESXi hosts.
 - Choose a range that will not conflict with other networks you will connect to this SDDC.
 - Minimum CIDR sizes: /23 for up to 27 hosts, /20 for up to 251 hosts, /16 for up to 4091 hosts.
 - Reserved CIDRs: 10.0.0.0/15, 172.31.0.0/16.

Management Subnet CIDR Block Default: 10.2.0.0/16

NEXT
- 5. Review and acknowledge** Review and acknowledge cost before deployment

VMware Cloud on AWS Standup

Accept & deploy

vmware VMware Cloud on AWS

vmware VMware Cloud on AWS Sub Net x

vmc.vmware.com/console/sddcs/create

< Create Software-Defined Data Center (SDDC)

- 1. SDDC Properties** Give your SDDC a name, choose a size, and specify the AWS region where it will be created.
- 2. Connect to AWS** Aws Account ID ed96d871-c7eb-3505-8190-522aeffae17a
- 3. VPC and subnet** VPC - vpc-05c7b0f829e76be40
- 4. Configure Network** Default
- 5. Review and acknowledge** Review and acknowledge cost before deployment

Please confirm that you are aware of the following before deploying this SDDC

- ☒ Charges begin as soon as you start deploying this SDDC. Accrued charges will be billed at end of the month.
- ☒ Pricing is per host-hour consumed for each host, from the time a host is launched until it is deleted.

[For up-to-date pricing and promotions, visit our website. Learn more](#)

DEPLOY SDDC

VMware Cloud on AWS Standup

New SDDC available ~2 hours

The screenshot shows the VMware Cloud on AWS console interface. The top navigation bar includes the VMware logo, the text 'VMware Cloud on AWS', and user information for 'Tom Cushing VMC-SET-ANZ'. Below the navigation bar, there are tabs for 'SDDCs', 'Subscriptions', 'Activity Log', 'Tools', and 'Developer Center'. The main heading is 'Software-Defined Data Centers (SDDC)'. On the right, there are three buttons: 'CREATE SDDC', 'INVITE USERS', and 'PURCHASE TERM SUBSCRIPTION'. The main content area displays two SDDCs:

SDDC Name	Region	Status	CPU	Memory	Storage	Actions
VFORUM-SYD-HYBRID	Asia Pacific (Sydney)	Ready	249 GHz	1.5 TB	32 TB	VIEW DETAILS OPEN VCENTER ACTIONS
VMC-SET-ANZ-DEMO	Asia Pacific (Sydney)	Ready	249 GHz	1.5 TB	32 TB	VIEW DETAILS OPEN VCENTER ACTIONS

A red box highlights the first SDDC, and a red arrow points to the 'OPEN VCENTER' link.

VMware Cloud on AWS SDDC

vSphere - 10.2.2.5 - Summary

← → ↻

vcenter.sddc-54-66-194-166.vmwarevmc.com/ui/#?extensionId=vsphere.core.inventory.serverObjectViewsExtension&objectId=urn:vmomi:...

☆

vm vSphere Client

Menu

Search in all environments

↺

?

cloudadmin@vmc.local

😊

📁

📄

🗄️

🌐

✓ vcenter.sddc-54-66-194-166.vmwarevmc....

✓ SDDC-Datacenter

✓ Cluster-1

10.2.2.5

10.2.2.7

10.2.2.8

✓ Compute-ResourcePool

> AV-Demo

> DC-Demo

> GV-Demo

> MC-Demo

> SET-ANZ

> TC-Demo

✓ Mgmt-ResourcePool

📁 hcx_cloud_manager

📁 NSX-Controller-0

📁 NSX-Controller-1

📁 NSX-Controller-2

📁 NSX-Edge-0

📁 NSX-Edge-1

📁 NSX-Manager

📁 srm

📁 vcenter

📁 vr

10.2.2.5

ACTIONS

Summary

Monitor

Configure


Permissions

VMs

Datastores

Networks

Updates



Hypervisor: VMware ESXi, 6.9.1, 14411217

Model: Amazon EC2 i3.metal

Processor Type: Intel(R) Xeon(R) CPU E5-2686 v4 @ 2.30GHz


Logical Processors: 36

NICs: 1

Virtual Machines: 16

State: Connected

Uptime: 57 days



CPU

Free: 79.9 GHz

Used: 2.86 GHz

Capacity: 82.76 GHz

Memory

Free: 387.72 GB

Used: 124.13 GB

Capacity: 511.85 GB

Storage

Free: 24.76 TB

Used: 6.34 TB

Capacity: 31.1 TB

Hardware

Manufacturer	Amazon EC2
Model	Amazon EC2 i3.metal
> CPU	36 CPUs x 2.3 GHz
Memory	124.13 GB / 511.85 GB
> Virtual Flash	5.75 GB / 9.75 GB
Resource	
> Networking	esx-1.sddc-54-66-194-166.vmwarevmc.com

Configuration

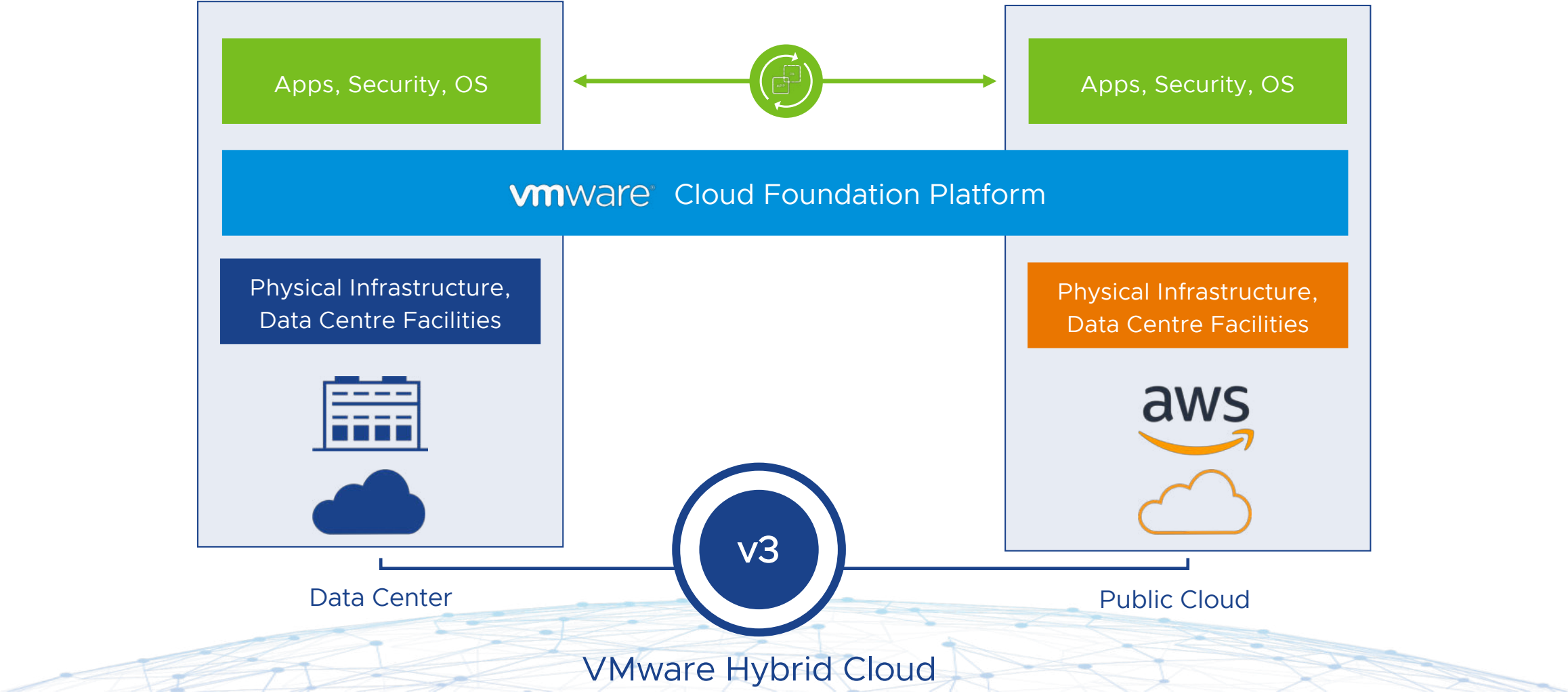
Image Profile	(Updated) ESXi-6.9.1-14414514-physical-amz-ena-nsxt
> vSphere HA State	✓ Connected (Slave)
> Fault Tolerance (Legacy)	Unsupported
> Fault Tolerance	Unsupported
> EVC Mode	Disabled

Recent Tasks

Alarms

Consistent Hybrid Infrastructure

Built on VMware Cloud Foundation



Consistent Operations

VMware Hybrid Cloud

Common Cloud Challenges Revisited

Factors affecting hybrid cloud deployments

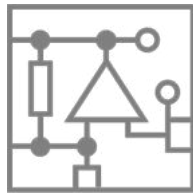


Consumer



Developer

Re-Architecture | Scaling



Operations | Lifecycle



Consolidation | Migration



Governance | Security



Consistent Tools & Processes

Hybrid cloud operations

vCenter Cloud Gateway



vCenter proxy appliance
deployed on-prem and linked
to VMware Cloud on AWS

Familiar vSphere UI to
manage and operate across
the VMware Hybrid Cloud

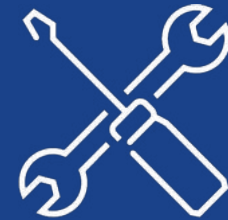
vRealize Management



Native VMware management
tools extend on-prem services
across VMware Hybrid Cloud

vRealize adapters allow
“first class citizen” status for
VMware Cloud on AWS

3rd Party / Bespoke



Leverage same in-house
VMware tools and processes
across VMware Hybrid Cloud

Support the cloud agility
strategy of the organisation
without disruption

Hybrid Operations

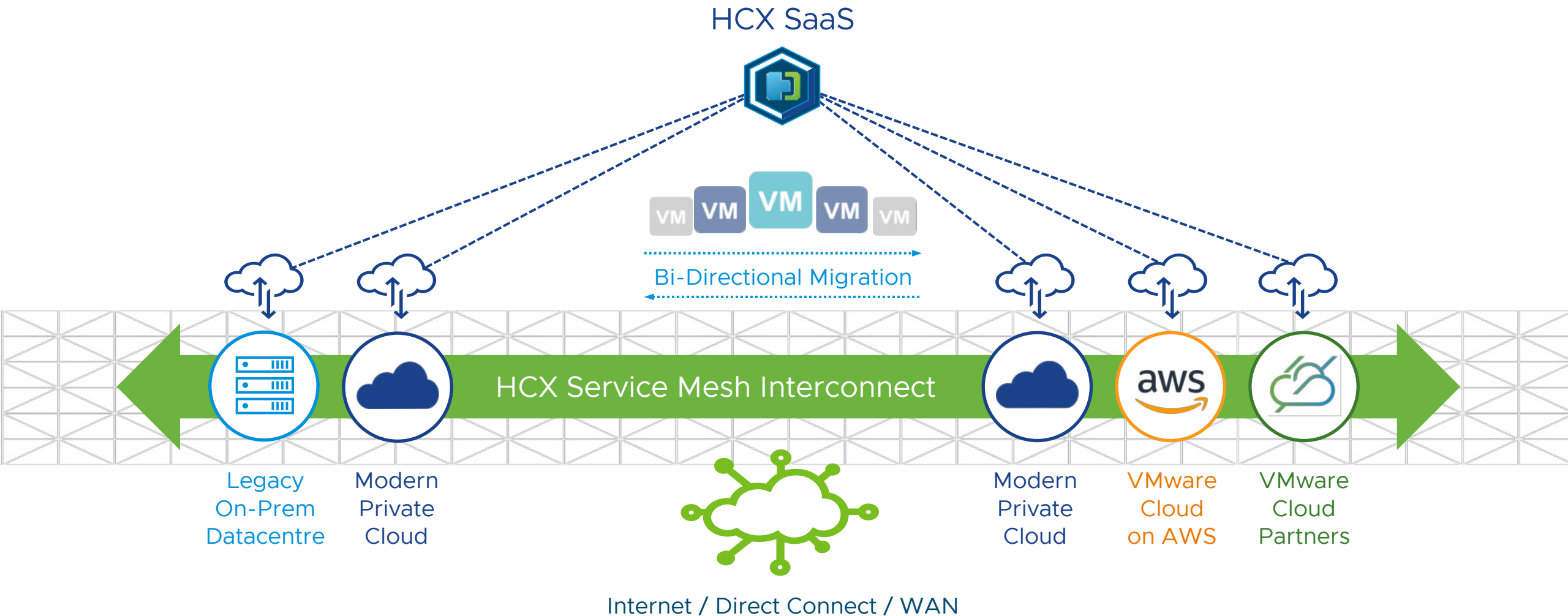
vCenter Cloud Gateway Demo

Hybrid Operations

vRealize Operations Demo

VMware Hybrid Cloud Extension (HCX)

Enabling true application portability



Hybrid Operations

HCX Application Portability Demo

HCX Adapter for vROPs

Environment and migration metrics

vm

vRealize Operations Manager

Home

Dashboards

Alerts

Environment

Administration

BACK

Dashboards

HCX Environment Overview

HCX Extended Networks

HCX Migrations

HCX Disaster Recovery

Getting Started

Datastore Utilization

Cluster Configuration

Host Utilization

Cluster Utilization

Utilization Overview

Datastore Usage Overview

vSAN Capacity Overview

AWS Disk Space

AWS Alerts

AWS Troubleshooting

AWS ASG Utilization

AWS Instance Utilization

AWS Volume Performance

AWS Instance Heatmap

HCX Migrations

Actions

All Dashboards

Shared

Recent Completed Migrations

HCX World

Name	Type	HCX Server	Source	Destination	Start Time	End Time	Time Taken (mins)
(forward) NespindolaDemo	vMotion	HCX RAX	vcenter01.set.local	HCX Cloud - vmc-set...	Nov 11, 2019 3:56 PM, UTC	Nov 11, 2019 3:58 PM, UTC	2
(reverse) anz-hcx-fleet-04	Cold	HCX RAX	HCX Cloud - vmc-set-us-ea...	vcenter01.set.local	Nov 11, 2019 4:24 AM, UTC	Nov 11, 2019 4:28 AM, UTC	4
(reverse) anz-hcx-fleet-01	Cold	HCX RAX	HCX Cloud - vmc-set-us-ea...	vcenter01.set.local	Nov 11, 2019 4:24 AM, UTC	Nov 11, 2019 4:29 AM, UTC	5
(reverse) anz-hcx-fleet-02	Cold	HCX RAX	HCX Cloud - vmc-set-us-ea...	vcenter01.set.local	Nov 11, 2019 4:24 AM, UTC	Nov 11, 2019 4:30 AM, UTC	5
(reverse) anz-hcx-fleet-03	Cold	HCX RAX	HCX Cloud - vmc-set-us-ea...	vcenter01.set.local	Nov 11, 2019 4:24 AM, UTC	Nov 11, 2019 4:31 AM, UTC	6

1 - 50 of 255 items

Ongoing Migrations

Name	Type	HCX Server	Source	Destination	Start Time	Latest Source State	Latest Destination S...
(forward)	vMotion	HCX RAX			Jan 1, 1970 12:00 AM...	-	-

Consistent Application Governance

Hybrid cloud operations

Cost Controls



Extend policy based controls established on-premises to include public cloud resources

Evaluate cost impact to operate applications across the VMware Hybrid Cloud

Resource Management



Consistent policy controls for application placement across the VMware Hybrid Cloud

Standardize new application onboarding, drift analysis, and capacity planning

Security Enforcement



Enforce consistent security policies for applications regardless of location

Leverage unique VMware network capabilities such as HCX L2 extension to contain application traffic

A photograph of a wind turbine farm in a green field under a cloudy sky. The image is overlaid with a large green triangle on the right and a blue triangle on the left, meeting at a diagonal line. The text "True Hybrid Cloud" is centered in white.

True Hybrid Cloud

VMware Hybrid Cloud Platform

The faster path to hybrid cloud

Consistent Infrastructure

Deploy and manage applications freely across on-premises and cloud



Consistent Operations

Leverage existing skills, tools, and processes to operate the hybrid cloud



VMware Cloud Foundation

Automated Deployment | Lifecycle | Reference Architecture



Data Centre

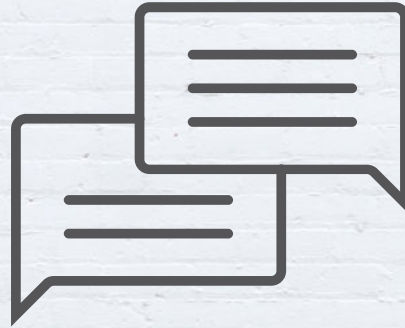
Public Cloud



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