## Operational Efficiency VMware

Cuong Le Sy

CIO – USDC Technology







# All companies are now software companies

**60%** of customers are using a public cloud today

**48%** using multiple public clouds are using both AWS and Azure

**30%** of workloads estimated to run in public clouds in 2020

67% of VMware enterprise customers foresee an ideal end state where they rely on multiple clouds

# All software will run on a cloud

**Self-service** 

Scalable

No. of Lot, House, No. of Lot, H

Rich services Secure, compliant

Selfoptimized

Resilient



#### \$3.7 Trillion in 2018

Gartner Press Release, Gartner Says Global IT Spending to Reach \$3.7 Trillion in 2018, January 16, 2018

Smart Data Cente

**vm**ware<sup>®</sup>

#### \$91.4 Billion in 2018

Source: IDC, Worldwide Semiannual Security Spending Guide, #US42570018, March 2018

#### \$600 Billion in 2017

Source: Center for Strategic and Int'l Studies, Economic Impact of Cybercrime, February, 2018

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## But, getting "cloud" right is difficult







# Private cloud is not easy

- Complex, costly, difficult to operate
- Non-optimized, mismatched hardware
- Hard to keep up with public cloud services

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# Public cloud has its challenges

- Change is difficult
- Steep learning curve
- Security & data sovereignty
- Cost, lack of visibility, governance

## Hybrid cloud requires planning

- Migration complexities, integration challenges
- Security
- Lack of standards
- Networking challenges

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## Modern Infrastructure Needs To Be







Rapid response to new customer demands and faster time to market for new applications

## Efficient

Increased efficiency and reduced operational costs



#### Secure

Enhanced visibility and security to protect against cyber threats and hacks



### Scalable

Extensibility of infrastructure across clouds





## **Customer Challenges**



## New Demands on IT Infrastructure





## Increasing Security Risks

~	More businesses are moving online, making application security a top priority for enterprises
~	Security threats are increasing, creating need for visibility and context for applications across environments
~	Security must be enabled at the foundation of IT architecture and across the entire environment
	Traditional security models and anti-virus products react too late and are resource



heavy

## **Operational Excellence is Now Foundational**

Spinning up a datacenter, consolidating datacenters or seeking operational excellence and want to use existing resources better?	Capacity & Cost Optimization
Struggling to meet business SLAs and needs?	Continuous Performance Optimization
Deploying SDDC technologies and integrating public clouds, and want to comb metrics and alerts?	oine Intelligent Remediation/ Extensibility
Looking for ways to cut licensing costs?	Intent-Driven Workload Placement

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## The VMware Solution: Drive Operational Efficiency



## Build Your Hybrid Cloud on an Efficient and Secure Platform

vSphere Platinum





COMPREHENSIVE BUILT-IN SECURITY

- Secure Applications
- Secure Infrastructure
- Secure Data
- Secure Access



#### UNIVERSAL APP PLATFORM

- Enhanced Support for Intelligent
   Workloads
- Turbocharge App Performance
- Leverage Hardware Innovations



#### SEAMLESS HYBRID CLOUD EXPERIENCE

- Seamless Migration
- Unified Visibility
- Easier Lifecycle Management

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## Optimize Your Hybrid Cloud with a Consistent Operational Model

#### vRealize Operations Advanced



## Intelligently Manage and Modernize Your Data Centers

### Improve Operational Efficiency, Performance, and Security



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#### **Automated and Simplified Ops**

- Continuous Performance Optimization based on business and operational intent
- Efficient Capacity Management with optimal densification, proactive cloud planning
- Predict, prevent, and troubleshoot across SDDC and multiple clouds



#### **Universal App Platform**

- Run any application, on any device on any cloud
- Persistent memory makes apps faster



#### **Comprehensive Security**

- Intrinsic security of applications, data, infrastructure and access
- Support for Trusted Platform Module (TPM) 2.0, secures the hypervisor and guest-OS
- Securely migrate data with VM encryption & encrypted vMotion
- Integrated vSphere hardening, config and regulatory compliance



#### **Seamless Hybrid Cloud Experience**

- Unified visibility across infra, apps & logs
- Reduced/No downtime
- Hybrid linked mode provides unified visibility for workloads across hybrid clouds



# Why VMware is the Ideal Solution for Operational Efficiency



## vSphere is the Foundation of the Modern Infrastructure



## Vision – Self-Driving Automates and Simplifies

Autoration and a second and a s

Self-Driving

#### OPTIMIZES CONTINUOUSLY

OPERATES EFFICIENTLY ADAPTS TO ENVIRONMENT



## Self-Driving Vision – A Better Approach to Cloud Operations



#### **Current Practice Challenges**

- Limited infrastructure data and control across siloe'd domains
- Humans can't model at large scale
- Reactive, slow, error-prone



#### New Approach

- Comprehensive data and policy-based control across infrastructure
- Can optimize observable condition against a business KPI
- Proactive, real-time, reliable

#### 

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## Primary Pillars of Value - Self-Driving Operations

Run Production Operations Hands-off and Hassle-free





**Continuous Performance Optimization** – Assure application performance based on business and operational intent



**Efficient Capacity Management** – Run infrastructure like AWS – optimal densification, proactive planning, and procurement



Intelligent Remediation – Predict, prevent, and troubleshoot across SDDC and multiple clouds





Cut troubleshooting time in half



40% improvement in operational efficiency



30% Capacity Savings



hardware costs



75% reduction in unplanned downtime





## Thank You

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## Deep Dive Into Efficient and Secure Platform for Your Hybrid Cloud





# vSphere Platinum

## Simple and Efficient Management, At Scale





## **Experience Superior Performance at Scale**

vCenter Server Appliance 6.7 vs 6.5







### 3x Reduction in memory usage



# **3x** Faster DRS-related operations (e.g. Power-On VM)

#### vCenter Operations Per Second

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## Simplify ESXi Management at Scale



#### Manage Operational Complexity



Reduce Risk Exposure



Increase Memory Density per ESXi



WWARE USDC TECHNOLOGY Smart Data Center

## Linked Mode Support for vCSA with Embedded PSC



- ✓ Seamlessly link up to 15 vCenter Servers
- ✓ No Load Balancers needed
- ✓ Dramatically simplify installs & upgrades

vSphere Domain



## vCenter Server Appliance Backup Scheduler

Efficient Management, Exceptional User Experience



- ✓ Schedule vCSA backup
- ✓ Control # of backups retained
- $\checkmark\,$  Full REST API for backup and restore
- ✓ Enhanced REST APIs for other appliance management functions



### Single Reboot and vSphere Quick Boot - Faster Patching and Upgrades



- Apply new patches quickly and comply with security
- Ease operational
   complexity of increasing
   ESXi estate by keeping it
   updated with latest ESXi
   versions
- Confidently invest in high memory density systems

## Fully Featured HTML5-based vSphere Client

### Added Support & Functionality

- □ vCenter High Availability
- □ Top-N charts
- Search
- Alarms
- □ vSphere Update Manager (VUM)
- □ Key Management Servers
- □ System Configuration
- □ Complete remaining advanced workflows for below:
  - Content Library
  - Deploy OVF
- vCenter Server Extensions



#### Certified HTML Client Plugins





and more ...



## vCenter Server Converge Tool

#### Move your vCenter domain from using external PSC to vCenters with internal PSC



#### **Overview**

Converges your vCenter domain to vCenter Embedded Linked mode

Converge moves your architecture in the same version not based on upgrade

Decommission external PSCs

#### Benefits

Remove all external PSC thereby reducing your management VMs

Support 15 vCenters connected in Enhanced linked Mode

## **Distribute Content Anywhere with Content Library**

Centralized template management and distribution

rechnology

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#### Overview

Import and sync OVA

Native VM Template support

#### Benefits

Disk images and standardized partner content as one package

Enhanced security in OVA import

Precursor to syncing VM Template acrossvCenter Servers. Presents VM Templates as an object format familiar to VI Admins — without the need to capture as OVF

## Radically Simplified HCI Cluster Creation/Extension Experience

Integrate guided wizard exper vm vSphere Client

Build-in HCI cluster best pract

Automate batch server operation

 $\odot$ Menu 🗸 Q Search C Administrator@VSPHERE.LOCAL ~ HCI-Cluster E. P ACTIONS ~ 🗗 sc-rdops-vm07-dhcp-214-1... Summary Monitor Configure Permissions Hosts VMs Datastores Networks Updates ∨ Datacenter Services ✓ I HCI-Cluster Nice work! vSphere DRS 10.160.193.35 vSphere Availability 10.160.211.120 Configuration Your cluster is now successfully configured and ready to run workloads. In the future you can add more hosts to your cluster by doing Step 10.160.220.196 Quickstart 2: Add Hosts again. 10.192.112.26 General Licensing  $\bigcirc$  $\bigcirc$  $\oslash$ 1. Cluster basics 2. Add hosts 3. Configure hosts VMware EVC VM/Host Groups Hosts: 4 Selected services: / Network VM/Host Rules A Hardware compatibility VM Overrides vSphere DRS Online health (Last check: 54 Host Options vSphere HA minute(s) ago) Host Profile vSAN Physical disk I/O Filters V Data More Cluster Alarm Definitions Limits Scheduled Tasks ▼ vSAN Performance service × Recent Tasks Alarms Task Name ✓ Target ✓ Status ✓ Initiator ✓ Queued For ✓ Start Time ↓ Completion Time ✓ Server

2



## VUM-based Firmware Update for vSAN

Extending vSAN-VUM integration to host I/O controller firmware



Dell, Lenovo, SuperMicro, and Fujitsu ReadyNodes

• Including Dell HBA330 platforms

Built-in HCL health checks and release notifications

Upload custom ISOs for OEMspecific builds

Manually upload release catalog for offline vCenter environments





## vSphere Platinum Secures Applications, Infrastructure, Data & Access



TECHNOLOGY

Secure Applications

**AppDefense** Visibility, Control, Detection, Response

Secure Infrastructure

- ESXi support for Secure Boot & TPM 2.0
- VM support for vTPM 2.0 & VBS

#### **Secure Access**

• Audit Quality Logging

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## vSphere Platinum: Value Proposition

#### **Comprehensive Built-in Security Across the Entire IT Environment**

Secure applications by leveraging hypervisor and machine learning for authoritative knowledge of application's intended state

"Know what's good, so you can detect what's bad" Orchestrate threat response, reduce the attack surface

"The right response at the right time"

Secure applications, infrastructure, data and access

"Heart of a secure SDDC"

Embed threat detection and response into the virtualization layer





## vSphere Platinum: Key Benefits

ECHNOLOGY

#### vSphere Admins

#### **Security Teams**

Better protection with a light-weight security solution, no agents to manage, and minimal overhead

#### Faster detection, analysis, and time to response with greater accuracy gained from machine learning and behavioral analytics

#### Visibility

- Visibility into intent of VMs, inventory of apps
- Understand application behavior

#### Readiness

- Get alerted on potential issues and deviations
- Shrink attack surface and reduce risk of security compromise
- Collaborate with security, compliance, application teams

#### Detection

- Increase accuracy of threat detection with machine learning and behavioral analytics
- Enhance existing security tools, support compliance efforts

#### Response

- Investigate alerts with indepth app context
- Automated/orchestrated responses maximize efficiency and reduce potential damage



Support For TPM 2.0 and Virtual TPM 2.0: Enhance Security and Compliance

Deliver security for hypervisor and guest operating system





Shields guest's secrets from the Operator of Public or Private Cloud as well as from in-guest attacks

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## Seamlessly Migrate VMs Across vCenters Using Encrypted vMotion



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TECHNOLOGY

#### **Overview**

- Encrypted vMotion between two different vCenter Servers, on different versions
- Provide live and cold migration support from UI and API for VMs Benefits
- Enables long distance vMotion with Encryption, i.e. you can now vMotion across datacenters spread over different regions with encryption.
- Enables security for use cases like disaster avoidance

vm vSphere Client	Menu ~ Q Search			U Administrat	or@VSPHERE.LOCAL ~ Help ~ 🥴
AppDefense	Dashboard 10.160.30.49   STANDALONE V				
Dashboard Installation and Upgrade	External API Connectivity: No connectivity	ENABLE		AppDefense Manager: No con	nectivity ENABLE
	Hosts			VMs	
	3 Hosts have lost connectivity			234 VMs require AppDefense upgrad	de
	21 Hosts require AppDefense upgrade			167 VMs have the latest AppDefense	e installed
	13 Hosts have the latest AppDefense installed			85 VMs are unsupported	
	8 Hosts are unsupported			109 VMs have alarms	
	Total processes vetted: 5000	Top 5 binaries witl	h bad reputatio	'n	Anomalous Behaviors
	Suspicious Trusted	Process name	Instances Has	sh	239 No Anomaly
	1530 Unknown	systemexe	304 7c4	9ff5849b16e0d9e761cf3365e7d91	
	1000	svchost.exe	234 acat	faa0d3f65d05817d1feb54f66e45f	
	Processes 5710	python.exe	188 d2b	093988b35ad00f3510a55b88a6a77	Behaviors
		cmd.exe	78 855	3f42d804ee1993b4d971811dbcc89	1783
		explorer.exe	65 4aa	8cef6ee3e140185b574a4d4f98194	
	FILTER BY APP IN APPDEFENSE MANAGER	VIEW ALL			Analysis available only for common OS processes

Menu ~

vm-windows-3

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#### AppDefense

#### Dashboard

Installation and Upgrade

Dashboard > Processes				
Hash T	Process Name	т	Instances T	Description
7c49ff5849b16e0d9e761cf3365e7d91	systemexe		304	Binary has a bad reputation because of lorem ipsum lorem ipsum
acafaa0d3f65d05817d1feb54f66e45f	svchost.exe		234	Binary has a bad reputation because of lorem ipsum lorem ipsum
d2b093988b35ad00f3510a55b88a6a77	python.exe		188	Binary has a bad reputation because of lorem ipsum lorem ipsum
8553f42d804ee1993b4d971811dbcc89	cmd.exe		78	Binary has a bad reputation because of lorem ipsum lorem ipsum
4aa8cef6ee3e140185b574a4d4f98194	explorer.exe		65	Binary has a bad reputation because of lorem ipsum lorem ipsum
355cef6ee3e140185b574a4d4f98194	systemexe		55	Binary has a bad reputation because of lorem ipsum lorem ipsum
7wes8cef6ee3e140185b574a4d4f98194	explorer.exe		49	Binary has a bad reputation because of lorem ipsum lorem ipsum
8422cef6ee3e140185b574a4d4f98194	cmd.exe		34	Binary has a bad reputation because of lorem ipsum lorem ipsum
				1-8 of 100 processes 1 2 13 >
Instances for svchost.exe				
VM T	Latest run date	Ŧ	Path	
vm-rhel-1	12/12/2017		C:\Windows\System	i32\svchost.exe
vm-centos-1	12/12/2017		C:\Windows\System	i32\svchost.exe
vm-windows-1	12/12/2017		C:\Windows\System	132\svchost.exe
vm-windows-2	12/12/2017		C:\Windows\System	132\svchost.exe

C:\Windows\System32\svchost.exe

12/12/2017

#### vm vSphere Client

Q Search

Menu 🗸

#### Q New Virtual Machine-VBS ACTIONS ~ 9 v Sc-rdops-vm13-dhcp-137-19... Monitor Configure Permissions Summary Datastores Networks ✓ ☐ Datacenter W belongs to scope "TestScope" and service "App Tier" Open AppDefense Issues and Alarms V 🗍 New Cluster All Issues ◄ Previous ► Next. 10.160.152.38 **Triggered Alarms** Trust Score Process Name Hash v Path Last Activity Number of behaviors Behavior Threat score 5 ~ 🕆 New Virtual Machin... 126 0 3 8 isass.exe e4ca434f251681590d0538bc21c32d2f C:\Windows\System32\Jsass.exe 01/12/2017 01:12:23 Performance 10.160.14.8 126 0 e4ca434f251681590d0538bc21c32d2f C:\Windows\System32\Jsass.exe 01/12/2017 01:12:23 3 8 Isass.exe Overview 0 3 8 Isass.exe e4ca434f251681590d0538bc21c32d2f C\Windows\System32\Jsass.exe 01/12/2017 01:12:23 126 Advanced 126 ۲ 3 8 isass.exe e4ca434f25168159Od0538bc21c32d2f C:\Windows\System32\Jsass.exe 01/12/2017 01:12:23 Tasks and Events 0 126 3 8 e4ca434f251681590d0538bc21c32d2f C\Windows\System32\Jsass.exe 01/12/2017 01:12:23 Isass.exe Tasks 0 3 8 isass.exe e4ca434f251681590d0538bc21c32d2f C:\Windows\System32\Jsass.exe 01/12/2017 01:12:23 126 Events e4ca434f251681590d0538bc21c32d2f C\Windows\System32\Jsass.exe 01/12/2017 01:12:23 126 0 3 8 Isass exe 126 0 e4ca434f251681590d0538bc21c32d2f C\Windows\System32\Jsass.exe Utilization 3 8 Isass exe 01/12/2017 01:12:23 e4ca434f251681590d0538bc21c32d2f C:\Windows\System32\Jsass.exe 01/12/2017 01:12:23 126 0 isass.exe 3 8 AppDefense 8 e4ca434f251681590d0538bc21c32d2f 126 0 3 Isass.exe C\Windows\System32\Jsass.exe 01/12/2017 01:12:23 Processes e4ca434f251681590d0538bc21c32d2f 126 0 3 8 isass.exe C\Windows\System32\Jsass.exe 01/12/2017 01:12:23 0 e4ca434f251681590d0538bc21c32d2f 01/12/2017 01:12:23 126 3 8 lsass.exe C\Windows\System32\Jsass.exe 0 126 3 8 e4ca434f251681590d0538bc21c32d2f C\Windows\System32\Jsass.exe 01/12/2017 01:12:23 isass.exe 0 isass exe e4ca434f251681590d0538bc21c32d2f C\Windows\System32\Jsass.exe 01/12/2017 01:12:23 126 3 8 ۲ 3 8 Isass.exe e4ca434f251681590d0538bc21c32d2f C:\Windows\System32\Jsass.exe 01/12/2017 01:12:23 126 0 8 126 3 e4ca434f25168159Od0538bc21c32d2f C:\Windows\System32\Jsass.exe 01/12/2017 01:12:23 isass.exe 60 items CLI: C:\Windows\system32\/sass.exe ~ Outbound Connections Inbound Connections

C

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Administrator@VSPHERE.LOCAL ~

## Universal Application Platform





## Boost Application Performance with vSphere Persistent Memory

#### **Enable More Memory Choices**



#### **Overview**

DRAM like performance with flash like prices

PMem exposed as Block Storage to VMs

PMem exposed to guest OS as byte addressable storage

#### Benefits

Turbo charge existing applications and boost performance up to 6X

Minimal overhead, no lift and shift needed with block storage

Support new use cases and build high performance applications

Developers can now make memory trade-offs to optimize apps; realize new capabilities

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## Introducing vMotion for NVIDIA GRID vGPU Powered VMs



- Enhanced NVIDIA GRID vGPU integration with vSphere
- Completely eliminating enduser disruption during infrastructure maintenance\*
- VMware and NVIDIA are committed to close collaboration to further increase the productivity of GPU end users and infrastructure admins



## Seamless Hybrid Cloud Experience



## vCenter Hybrid-Linked Mode for VMware Cloud on AWS

#### Enabling a Consistent Hybrid Cloud Management Experience

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	🗗 sc2-rdops-	vm06-dhcp	-196-76.eng	g.vmware.co		TIONS 🗸			
✓	Summary Monite	or Configure	Permissions	Datacenters	Hosts & C	lusters	VMs Datastores	Networks	Linked vCe
<ul> <li>✓          ☐ Datacenter         ✓ ▲ 10.161.228.151         ↓ TinyCoreVM         </li> </ul>	Virt Hos	ual Machines: 1 :s: 1					CPU Used: 29 M	ЛНz	Free: 4.97 GHz Capacity: 4.99 GHz
✓							Memory		Free: 2.54 GB
✓ III SDDC-Datacenter							Used: 1.46	GB	Capacity: 4 GB
✓ ☐ Cluster-1							Storage		Free: 1,889.46 TB
esx-0.cdc-34-210-1							Used: 2,17	О.17 ТВ О	Capacity: 4,059.63 TB
esx-1.cdc-34-210-19									
esx-2.cdc-34-210-1	Custom Attributes			~	Tags				~
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## vCenter Hybrid-Linked Mode for VMware Cloud on AWS

#### Enabling a Consistent Hybrid Cloud Management Experience

vm vSphere Cli	Actions - TinyCoreVM	earch <b>b</b> joinuser@bma.local	v Help v 🥴 🥴
C Sc2-rdops-vmO6-c → Datacenter	Power  Guest OS Snapshots	ACTIONS ~         nitor       Configure       Permissions       Datastores       Networks         Guest OS:       CoreOS Linux (64-bit)	CPU USAGE
<ul> <li>✓ ▲ 10.161.228.151</li> <li>➡ TinyCoreV</li> <li>✓ ➡ SDDC-Datacent</li> <li>✓ ➡ SDDC-Datacent</li> <li>⊂ □ cluster-1</li> <li>■ esx-0.cdc-</li> <li>■ esx-1.cdc-3</li> </ul>	Open Remote Console       Migrate       Clone       Fault Tolerance       VM Policies	Compatibility: ESXi 6.5 and later (VM version 13) VMware Tools: Not running, not installed More info DNS Name: IP Addresses: Host: 10.161.27 Cross-vCenter Mixed-Version Provisioning	<ul> <li>O Hz</li> <li>MEMORY USAGE</li> <li>O B</li> <li>STORAGE USAGE</li> <li>479.87 KB</li> </ul>
esx-2.cdc- esx-3.cdc- esx-4.cdc- esx-5.cdc- > © Compute-F	Template Compatibility Edit Settings	Notes Edit Notes	^
> 🥟 Mgmt-Res	Move to folder Rename Edit Notes Tags & Custom Attributes Add Permission Remove from Inventory	IO.161.228.151       VM Network       datastore1	
Recent Tasks Ala	Delete from Disk	AWS Global Infrastructure	



## **Cross-Cloud Hot and Cold VM Migration**



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## Per-VM Enhanced vMotion Compatibility (EVC)



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rechnology

#### **Overview**

Granularly enable EVC for specific VMs rather than a cluster of hosts.

#### **Benefits**

Improved mobility of VM beyond a cluster with compatibility for returning.

Persists EVC mode:

- Cross-cluster/datacenter/vCenter vMotion
- Through a power cycle

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# Deep Dive Into Self-Driving Operations



## Summary – What's New in vRealize Operations 7.0

#### Identifying Value to the Customer

Intent-Driven Continuous Performance Optimization	Efficient Capacity Management	Intelligent Remediation	PnP Changes
<ul> <li>Fully automated workload balancing across clusters based on operational and business intent (e.g., utilization, compliance, license cost)</li> <li>vRA integration for initial and on- going workload placement</li> <li>Host-based placement to automate DRS based on business intent and control workload placement within a cluster</li> <li>Right-size workloads with new workflows</li> </ul>	<ul> <li>Real-time, predictive capacity, and cost optimization</li> <li>Capacity analytics enhanced with exponential decay and calendar-awareness</li> <li>Multiple what-if planning scenarios including adding new workloads, hardware procurement, and AWS and VMC migration planning</li> </ul>	<ul> <li>Predict, prevent and troubleshoot across SDDC, VMC and AWS with simplified UI, enhanced dashboarding and native integrations</li> <li>Built-in vSphere config and compliance: PCI, HIPAA, DISA, FISMA, ISO, CIS</li> <li>Extend to the entire data center and cloud with updated mgmt. packs for Storage, vRO, Kubernetes, Federation, and AWS</li> <li>vSAN performance, capacity, and troubleshooting including through vROps plug-in in vCenter</li> <li>Wavefront integration for application operation</li> </ul>	<ul> <li>vROps has added private cloud costing features comparable to vRBC STD</li> <li>vCM is no longer bundled with vROps and has a standalone SKU</li> <li>vROps has configuration and compliance capabilities for vSphere: vSphere hardening and change, configuration and regulatory compliance mgmt</li> </ul>
Assure application performance based on business and operational intent	Run infrastructure like AWS – optimal densification, proactive planning, and procurement	Predict, prevent and troubleshoot across SDDC and multiple clouds	Enhanced features in vROps Adv and simplified packaging for vROps and vRS/vCS STD



## vRealize Operations 7.0

#### **Getting Started**



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## **Continuously Optimize Performance**

Smart Data Center

#### **Self-Driving Operations**



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## **Business Or Operational Intent**

#### Set your Business Intent







### **Continuous Performance Optimization**



## Automate Performance Based on Business or Operational Intent

#### Turn on Your Self-Driving Operations

Optimization Recommendation	Turn on your self-driving operations
Status: (Not Optimized)	Run it now based on recommendation
$[\overline{.}] \rightarrow \overline{1} \rightarrow \overline{1}$	Schedule it for an automated ongoing optimization
You can optimize your datacenter by moving workloads to avoid performance issues and resolve tag violations	Automate to run when performance troubles occur
OPTIMIZE NOW	? X
Virtual Machine ↑       Compute Cluster Move       Manage Rebatility <sup>1</sup> / <sub>1</sub> vm-cls1-bolero - Ubun       E2E-Bolero-TC1-Cls1-2HRStr       Schedule List::       Message <sup>1</sup> / <sub>1</sub> vm-cls1-bolero - Ubun       E2E-Bolero-TC1-Cls1-2HRStr       Schedule Name:       Su <sup>1</sup> / <sub>1</sub> vm-cls1-bolero - Ubun       E2E-Bolero-TC1-Cls1-2HRStr       Recurrence:       Once <sup>1</sup> / <sub>1</sub> vm-cls1-bolero - Ubun       E2E-Bolero-TC1-Cls1-2HRStr       Once       Daily <sup>1</sup> / <sub>1</sub> vm-cls1-bolero - Ubun       E2E-Bolero-TC1-Cls1-2HRStr       Once       Daily <sup>1</sup> / <sub>1</sub> vm-cls1-bolero - Ubun       E2E-Bolero-TC1-Cls1-2HRStr       Once       Daily <sup>1</sup> / <sub>1</sub> vm-cls2-bolero - Ubun       E2E-Bolero-TC1-Cls1-2HRStr       Oweekly       Monthly	lance Schedules ? × vschedule vsched
	Image: Continuously looking for optimization opportunities.       Image: Continuously looking for optimization opportunities.         Image: Continuously looking for optimizations will be disabled during the time.       Image: Continuously looking for optimizations will be disabled during the time.         Image: Continuously looking for optimizations will be disabled during the time.       Image: Continuously looking for optimizations will be disabled during the time.

## Automated Host Based Placement -- Driven by Business Intent





TECHNOLOGY

Smart Data Center

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- vROps enforces across the clusters
- DRS enforces within the cluster

#### Teach DRS your business needs

- Create new placement zones across hosts regardless of the cluster boundary
- Host placement for License Enforcement, Compliance, Tiering

vROps creates and maintains DRS Affinity Rules to match Business Intent within cluster

## vRealize Operations 7.0

Self-Driving Operations



nware

	Optimize Capacity
	US\$15,859
	TOTAL SAVINGS OPPORTUNITY
	Assess Capacity
	Determine if there is sufficient capacity in your environment.
저	Reclaim
(= <u>)</u>	Reduce waste by reclaiming unused resources.
[會]	Plan
	changes.
	Assess Cost
	Analyze the costs of running your environment.

#### **Enhanced Capacity Analytics**

- Exponential decay to give more relevance to changing patterns and react better to more recent spikes without losing periodicity
- Calendar aware periodicity to detect, the nth day of the month, the end of the month, and the first day of the month

#### **New What-if Project Planning Scenarios**

- Procurement planning to model hardware purchases to meet future demands with full visibility into capital expenditure
- Public Cloud Migration Planning with complete visibility into costs for VMware Cloud On AWS and native AWS through analytics based forecast

## vRealize Operations Capacity Analytics Engine

New "Forward-Looking" Forecast Analytics

#### **Delivered in vROps 6.7**

- Real-Time Predictive Capacity Analytics, based on industrystandard ARIMA statistical analysis model
- Improved capacity accuracy; including for Workload Optimization (aka Workload Balancing)
- Self-learning, updated in real-time; calculations available immediately
- Integrated costing with capacity

#### What's New in vROps 7.0

- Exponential decay to give more relevance to changing patterns and react better to more recent spikes without losing periodicity
- Calendar aware periodicity to detect, the nth day of the month, the end of the month, and the first day of the month.



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## Plan Capacity across Private Cloud, VMW Cloud on AWS

Smart Data Center

What-If to Make Room for New Apps, Procure Hardware or Migrate Workloads to Cloud



## **Self-Driving Operations Journey**

Run Production Operations Hands-off and Hassle-free Across SDDC and Hybrid Cloud



## VMware vSphere Customers

Leaders in every industry around the world run their enterprises on VMware



## VMware vRealize Operations Customers

Leaders across industries manage their infrastructure with self-driving operations



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