

The Future of the Datacenter is Already Here.



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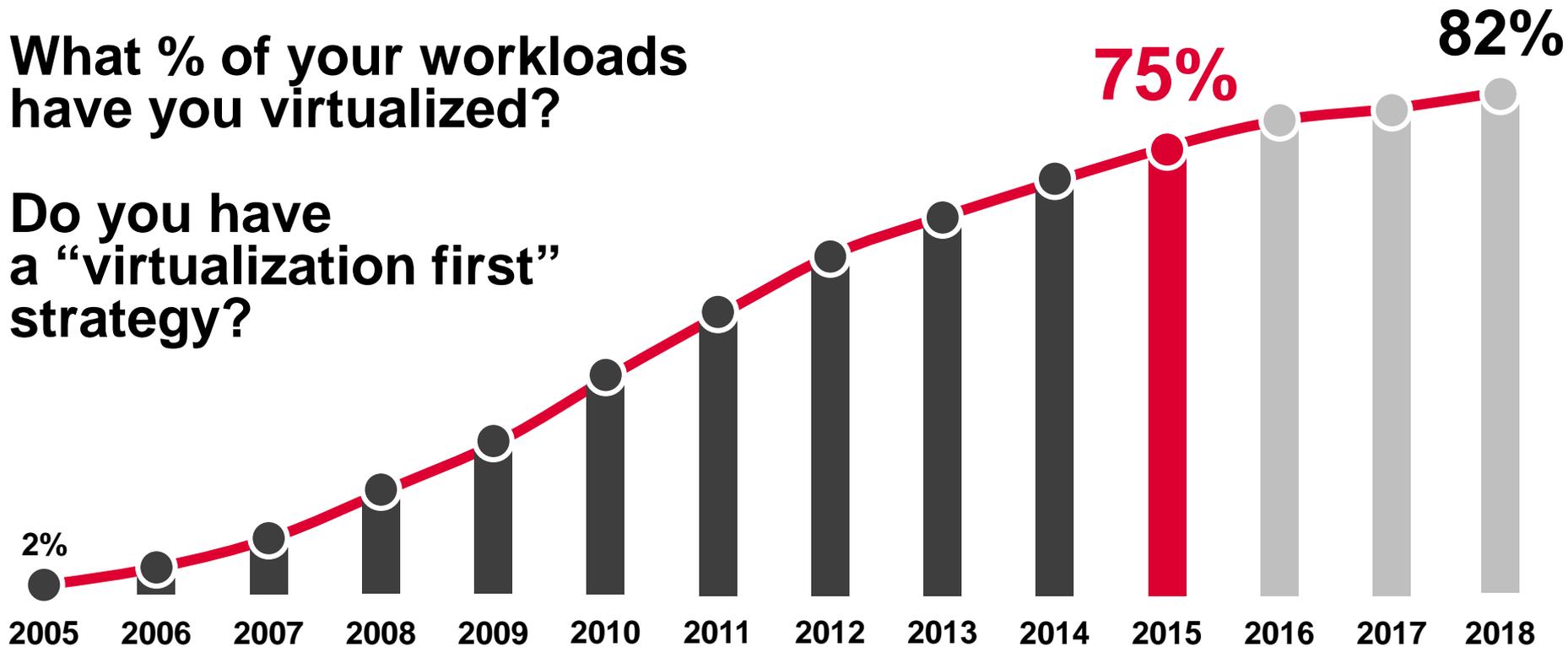
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Adoption of Virtualization

What % of your workloads have you virtualized?

Do you have a “virtualization first” strategy?



Virtualization Absorbs Cloud



Virtualization

Support existing apps without modification



Cloud

Mostly focused on new apps



VMware

“We believe we have the unique power to be the ‘and’ across these divides.”

Pat Gelsinger VMworld 2014

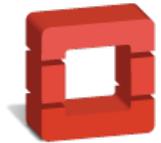


Other Stacks



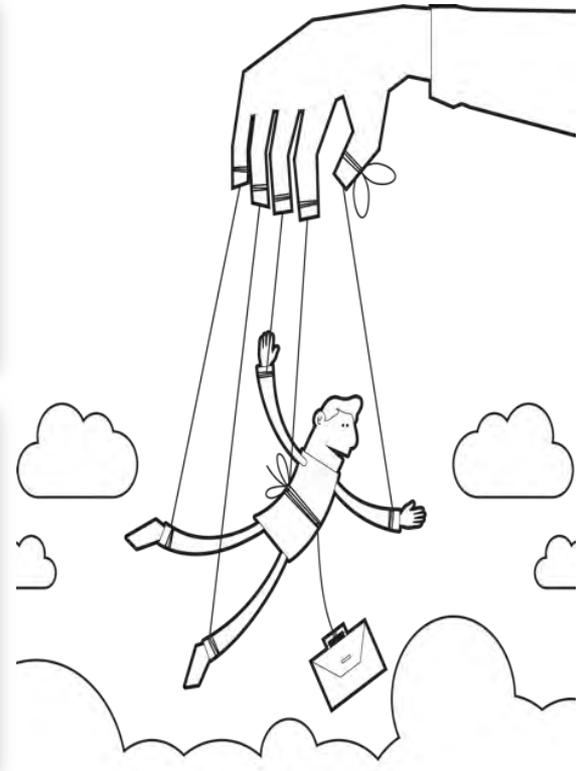
Microsoft

Microsoft



openstack™
CLOUD SOFTWARE

OpenStack

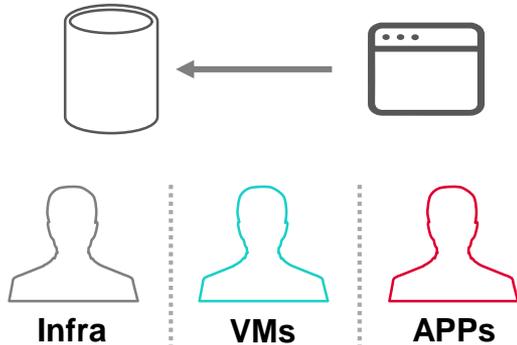




Enabling Your Vision

1

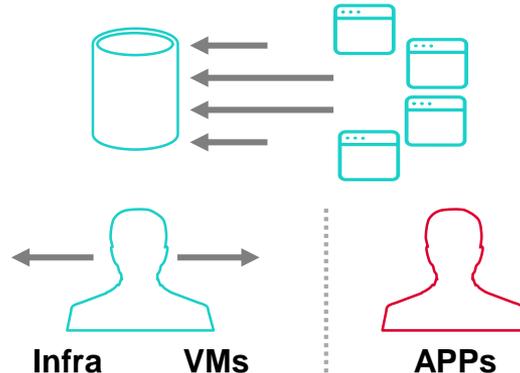
Physical



1 to 100s of physical machines

2

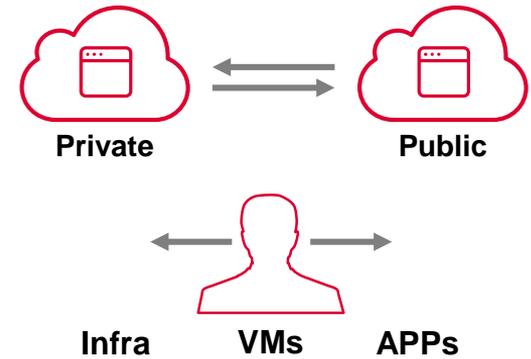
Virtualized



1,000s to 10,000s of VMs
VDI & Server Virtualization

3

Hybrid Cloud

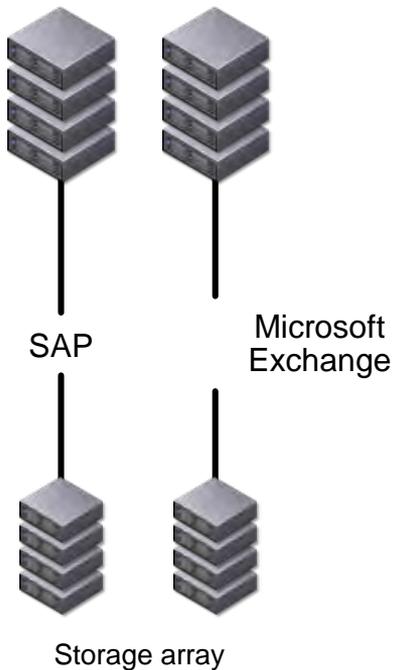


100,000s to 1,000,000s of VMs
Dev / Test and Private Cloud



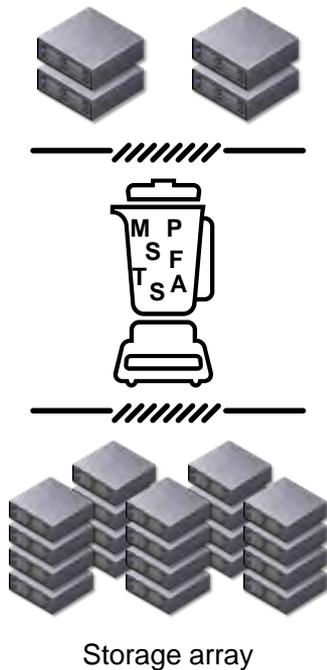
VM-aware Storage

PHYSICAL DATA CENTER



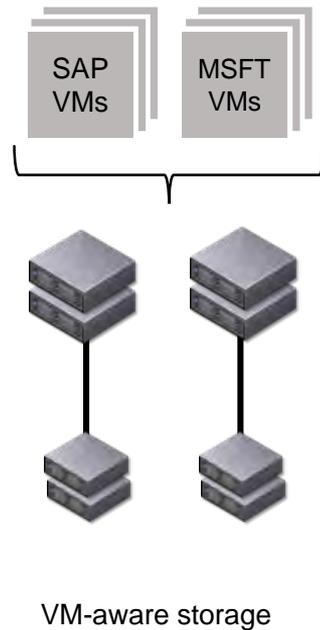
VIRTUALIZED DATA CENTER

With traditional storage



VIRTUALIZED DATA CENTER

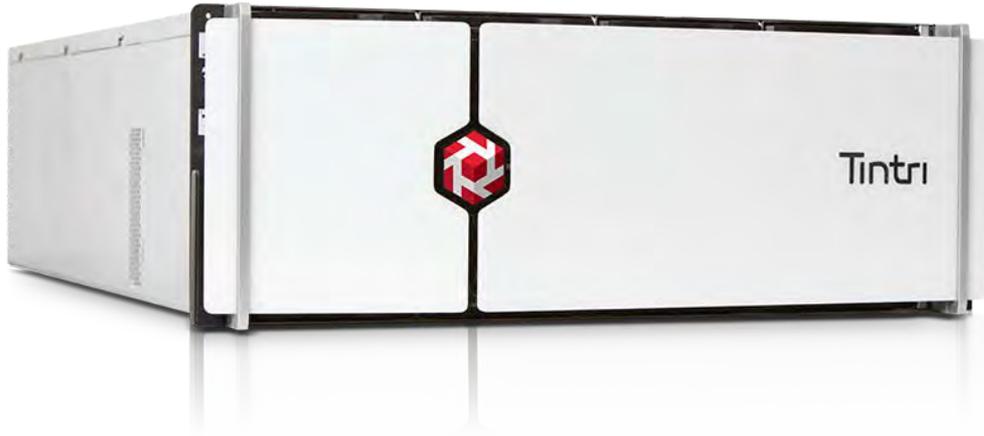
With VM-aware storage





It's a Very Noisy Market





Tintri **VM-Aware Storage (VAS)**
Appliances (“**VMstore**”) storage
are explicitly designed to deliver
“**Virtual Machine Level**” Data
Management!

No LUNs, No Volumes,
No Complex Storage Management
10 minute install

Tintri **VMstore** delivers superior
performance, visibility, scalability,
simplicity than you’ve yet to
experience inside your datacenter



Tintri **VM-Aware Storage** Differentiation



VM-is unit of management / not LUNs or Volumes

VM-Level Quality of Service & Performance Isolation

VM-Level Analytics/Visualization; Host, Network, Storage

VM-Level Automation with PowerShell and REST

Multi-Hypervisor (vSphere, Hyper-V, RHEV, OpenStack)

Table Stakes: Flash Performance / Thin Provisioning / Dedupe / Compression

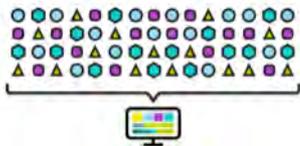
Tintri VM-aware Storage Portfolio



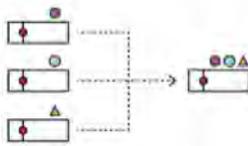
VMware Integration:

- vSphere web plugin
- VAAI
- VCAI
- vROps pack
- VIO support
- PowerCLI
- VMware SRM

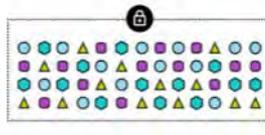
Tintri Global Center



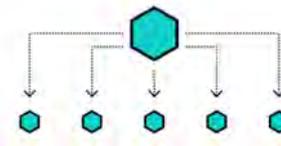
ReplicateVM



SecureVM



SyncVM

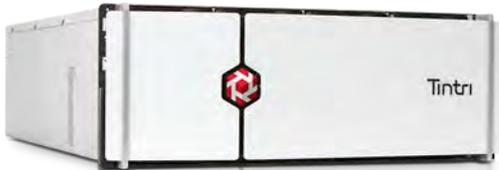


Appliance – Designed to Perform Specific Task

Toaster



Tintri



vmware®



Windows Server
Hyper-V™



openstack™



Tintri VMstore Series – Performance, Density, Scale!



Model	T5080	T5060	T880	T850	T820
Type	All Flash	All Flash	Hybrid Flash	Hybrid Flash	Hybrid Flash
VMs (max)	5,000	2,500	3,500	2,000	750
vDISKS (max)	15,000	7,500	10,500	6,000	2,250
Raw Capacity	23 TB	11.5 TB	78 TB	52 TB	20 TB
Effective Capacity	Up to 73 TB	Up to 36 TB	Up to 100TB	Up to 66 TB	Up to 23 TB
IOPS	200K	120K	106K	75K	30K
Connectivity	(12) 10GbE	(8) 10GbE	(4) 10GbE + (8) 1GbE	(4) 10GbE + (8) 1GbE	(4) 10GbE + (8) 1GbE
Dimensions	2U	2U	4U	4U	4U

BELIEVE

“VM-awareness is the most important development in storage and the future of the software-defined data center.”

~ Carl Eschenbach
President & COO, VMware



Who uses Tintri “VM-aware” Storage Appliances Today?

FINANCIAL SERVICES



HEALTHCARE



MANUFACTURING



MEDIA



TECHNOLOGY



EDUCATION



PUBLIC SECTOR





Taneja Group Validation

Based on Interviews with Tintri Customers

Observed mixed R/W Performance per VMstore

6x better than HDD systems

Capacity Advantage

10x more than traditional storage

Routine Management Time and Effort at Scale (8,000 VMs)

52x advantage

Estimated annual management time and effort impact

60x reduction

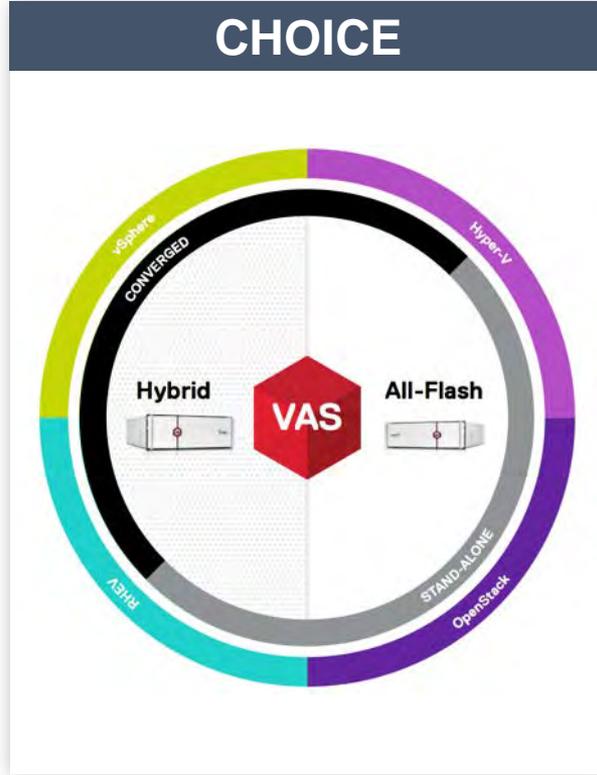


Fundamental Principles

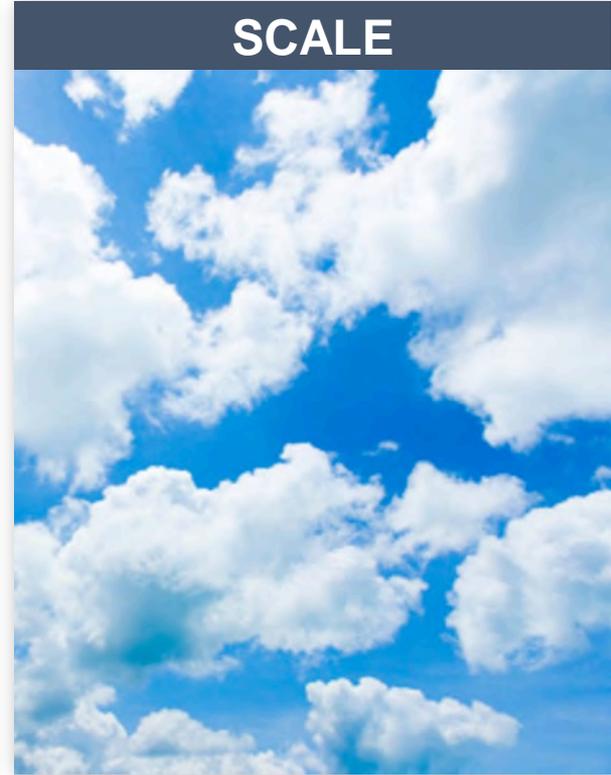
SIMPLICITY



CHOICE



SCALE





Abstraction hides complexity

SIMPLICITY



Cocoa Touch

UIKit

Media

Core Graphics

Open GL ES

Core Animation

Core Services

Core Data

Foundation

Core OS

Core Tintri objects: VM and VMstore



Right Abstraction Provides Choice

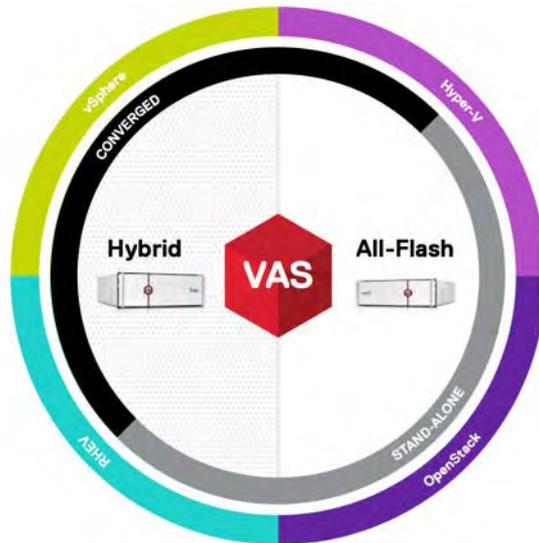
Applications

Existing + Cloud Native

Storage Platform

Hybrid + All-Flash

CHOICE



Hypervisor / Cloud OS

VMware + OpenStack + Hyper-V + RHEV

Form Factor

Standalone + Converged



Tintri Vision



Cloud and Management

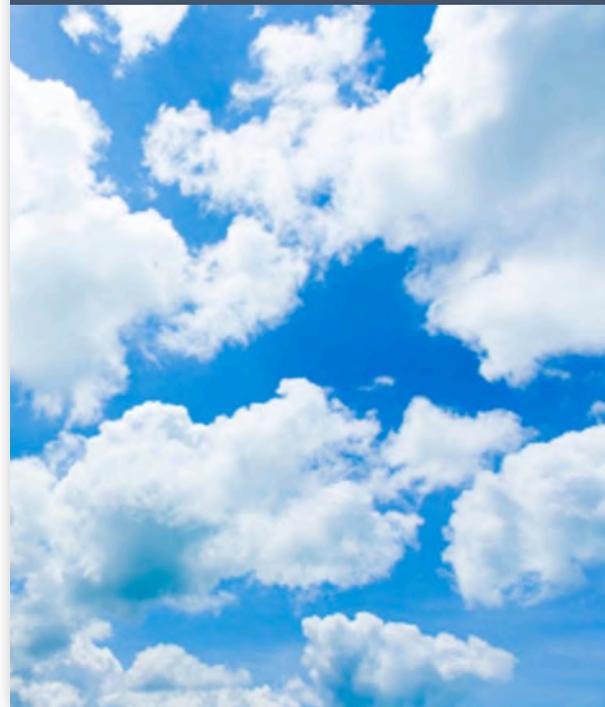
- **Scale:**
 - 100 to 1,000,000 VMs
- **Global Visibility and Analytics**
- **Automation and Self Service**
- **VM Scale-out**



Storage

- **Storage Platform**
 - Hybrid and AFA
 - Converged and Modular
 - Isolation and Quality of Service
- **Data Management**
 - VM DR/Data Protection
 - SyncVM

SCALE





The Remainder of this Talk

- **VM Scale-out**
- **VM Analytics**
- **Deep Hypervisor Integration**





VM Scale Out



Versatile

- Loosely coupled scaling
- Hybrid & AFA support
- Hypervisor agnostic



Intelligent

- Based on deep VM workload analysis
- Optimized distribution across hardware platforms / capabilities

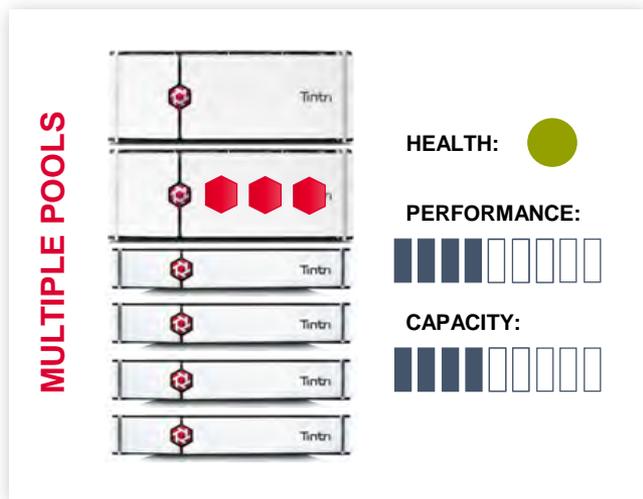
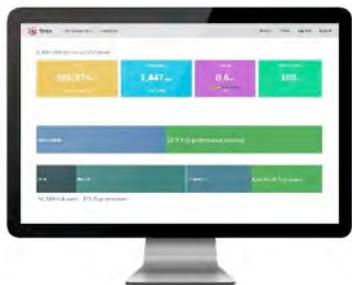


Automated

- Scheduled redistribution, fully-automated
- Policy stickiness



VM Scale-Out



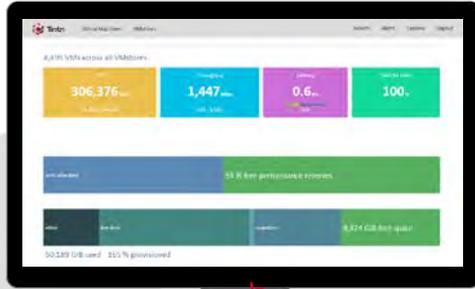
- **Multi-hypervisor within the same pool**
- **Dynamic addition of all-flash or hybrid**
- **Automated load balancing**
- **Retain snapshots, policies and stats during migration**



Make it EASY to globally manage: All of your VMs – 1 pane of glass



Tintri Global Center



- 32 VMStores
- 112,000 Virtual Machines
- Single pane of glass



Per-VM Analytics on Storage, Host, Network



VM	IOPS	MBps	Latency ms	Provisioned GiB	Used GiB	Change MB/day	Replication state	Host
tingle pd-t880-01	16,798	171.5	0.6	53	357.8	691,494	Catching up...	pd-esx-01.proddemo.tintri.com
tintri-demo-aligned-not pd-t880-01	5,333	43.	0.6	51	10.4	0	Not configured	pd-esx-04.proddemo.tintri.com
tintri-demo-aligned pd-t880-01	5,268	43.	0.6	51	18.8	0	Not configured	pd-esx-03.proddemo.tintri.com
csears-ubuntu	4,159	34.	0.6	51	34.0	0	Not configured	pd-esx-01.proddemo.tintri.com
vgentry-demo	1,119	9.	0.6	53	67.7	0	Not configured	pd-esx-01.proddemo.tintri.com
tintri-demo-hostlatency pd-t880-01	172	3.5	40.0	41	16.8	0	Not configured	pd-esx-01.proddemo.tintri.com
tintri-demo-flass-miss pd-t880-01	87	0.4	0.5	1,065	556.1	0	Not configured	pd-esx-02.proddemo.tintri.com
tintri-demo-slownetwork pd-t880-01	32	0.5	12.8	43	1.8	0	Not configured	pd-esx-04.proddemo.tintri.com
pd-t880-01-RG_SQL_Thick	4	0.04	0.5	328	11.8	0	Not configured	pd-esx-02.proddemo.tintri.com
ExtraHop Discovery Edition	2	0.01	0.0	20	0.6	0	Not configured	pd-esx-02.proddemo.tintri.com
vc-srm-pri	2	0.02	0.0	208	26.9	2,680	Replica up to date	pd-esx-02.proddemo.tintri.c...
SPhillips-Win81	2	0.02	0.0	68	58.6	0	Not configured	pd-esx-02.proddemo.tintri.com
test-clucas-demo	1	0.02	0.0	47	16.2	0	Not configured	pd-esx-01.proddemo.tintri.com
vSphere 6GA	1	0.06	0.0	108	0.3	0	Not configured	pd-esx-03.proddemo.tintri.com
vc-srm-sec	1	0.01	0.0	208	24.2	3,010	Replica up to date	pd-esx-02.proddemo.tintri.c...
Win10-TechPreview--64	0	0.0	0.0	50	6.6	0	Not configured	pd-esx-01.proddemo.tintri.com
Jay_SyncVM_demo-dev03	0	0.0	0.0	266	18.4	539	Not configured	pd-esx-01.proddemo.tintri.com
Win10-TechPreview--61	0	0.0	0.0	50	6.5	0	Not configured	pd-esx-02.proddemo.tintri.com
Win10-TechPreview--65	0	0.0	0.0	50	12.2	0	Not configured	pd-esx-02.proddemo.tintri.com
Win10-TechPreview--211	0	0.0	0.0	50	10.7	0	Not configured	pd-esx-02.proddemo.tintri.com
Win10-TechPreview--313	0	0.0	0.0	50	10.0	0	Not configured	pd-esx-02.proddemo.tintri.com
Win10-TechPreview--209	0	0.0	0.0	50	10.5	0	Not configured	pd-esx-02.proddemo.tintri.com
Win10-TechPreview--213	0	0.0	0.0	50	10.5	0	Not configured	pd-esx-01.proddemo.tintri.com
Win10-TechPreview--643	0	0.0	0.0	50	9.5	0	Not configured	pd-esx-02.proddemo.tintri.com
Win10-TechPreview--307	0	0.0	0.0	50	6.5	0	Not configured	pd-esx-01.proddemo.tintri.com
Win10-TechPreview--302	0	0.0	0.0	50	6.3	0	Not configured	pd-esx-01.proddemo.tintri.com
Win10-TechPreview--295	0	0.0	0.0	50	9.8	0	Not configured	pd-esx-01.proddemo.tintri.com
Win10-TechPreview--308	0	0.0	0.0	50	6.4	0	Not configured	pd-esx-01.proddemo.tintri.com



Takes “Guess Work” out of Identifying Root Cause of VM Latency

Tintri

Dashboard Virtual Machines

Search VM Alerts Settings Diagnose Logout ?

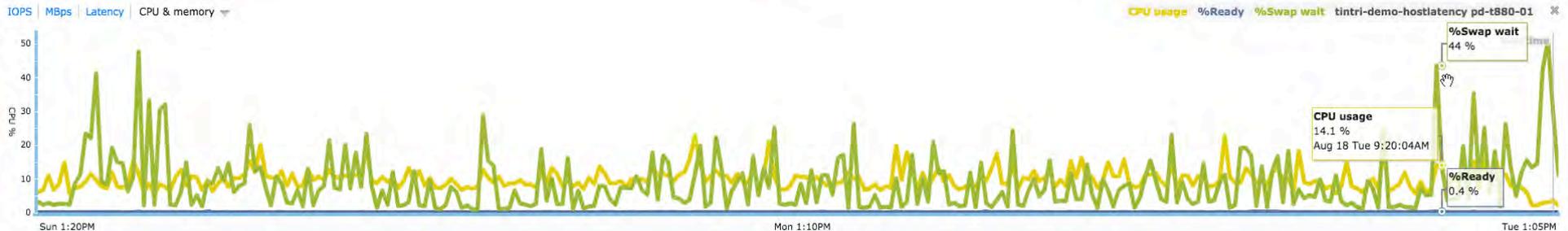
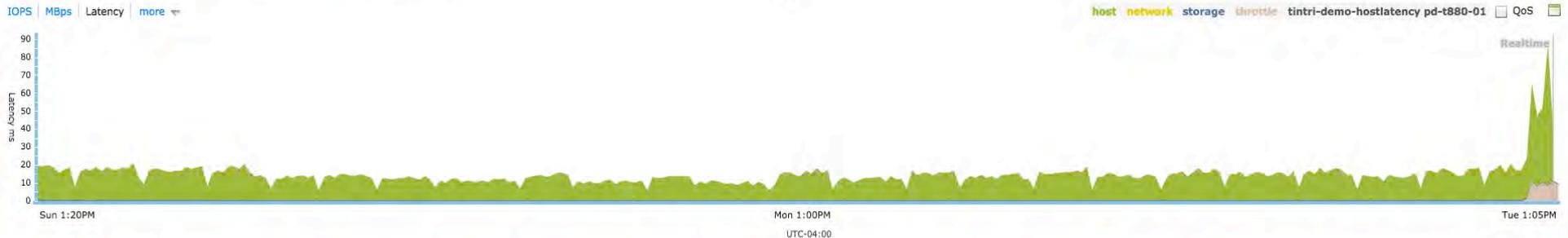
Service groups VMs Virtual disks Snapshots

Stats at 1:00 PM Clone... Refresh

VM	IOPS	MBps	Latency ms	Provisioned GiB	Used GiB	Change MB/day	Replication state	Host
tintri-demo-hostlatency pd-t880-01	172	3.5	3.5	40.0	41	16.8	0	pd-esx-01.proddemo.tintri.com
tintri-demo-flask-miss pd-t880-01	87	0.4	0.4	0.5	1,065	556.1	0	pd-esx-02.proddemo.tintri.com
tintri-demo-slownetwork pd-t880-01	32	0.5	0.5	12.8	43	1.8	0	pd-esx-04.proddemo.tintri.com
pd-t880-01-RG_SQL_Thick	4	0.04	0.04	0.5	328	11.8	0	pd-esx-02.proddemo.tintri.com

Selected: 1 VM 172 IOPS, 17 GiB | VMstore: 33,173 IOPS, 11,089 GiB, 1 ms, 118 % provisioned

1 to 28 | 946 total < > | Hide graphs



Guided Recommendation. Manual Execution

The interface is titled "Guided Recommendation. Manual Execution" and is divided into three main sections: "Workload Context", "Optimization Tasks", and "Review Outcome & Take Action".

Workload Context:

- tt23 is in danger of running out of space within the next week.**
 - Space usage is increasing by 50 GiB/day.
 - There is a 80% chance that tt23 will run out of space in 7 days.
- ttha17 is oversubscribed on the minimum QoS.**

Optimization Tasks:

- Migrate 20 VMs from tt23 to tafm3.
- Migrate 10 VMs from ttha17 to ttha40.

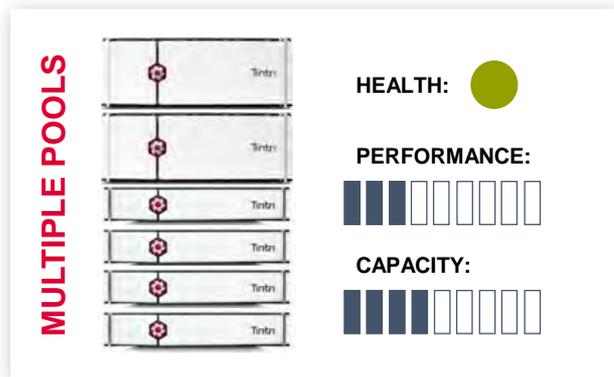
Review Outcome & Take Action:

- Reduce space usage on tt23 by 234 GiB.
- Reduce QoS oversubscription on ttha17 by 20k normalized IOPS.

At the bottom right, there are two buttons: "Execute" (red) and "Decline" (grey).



Tintri Analytics



**Application
Visibility**



Application Aware

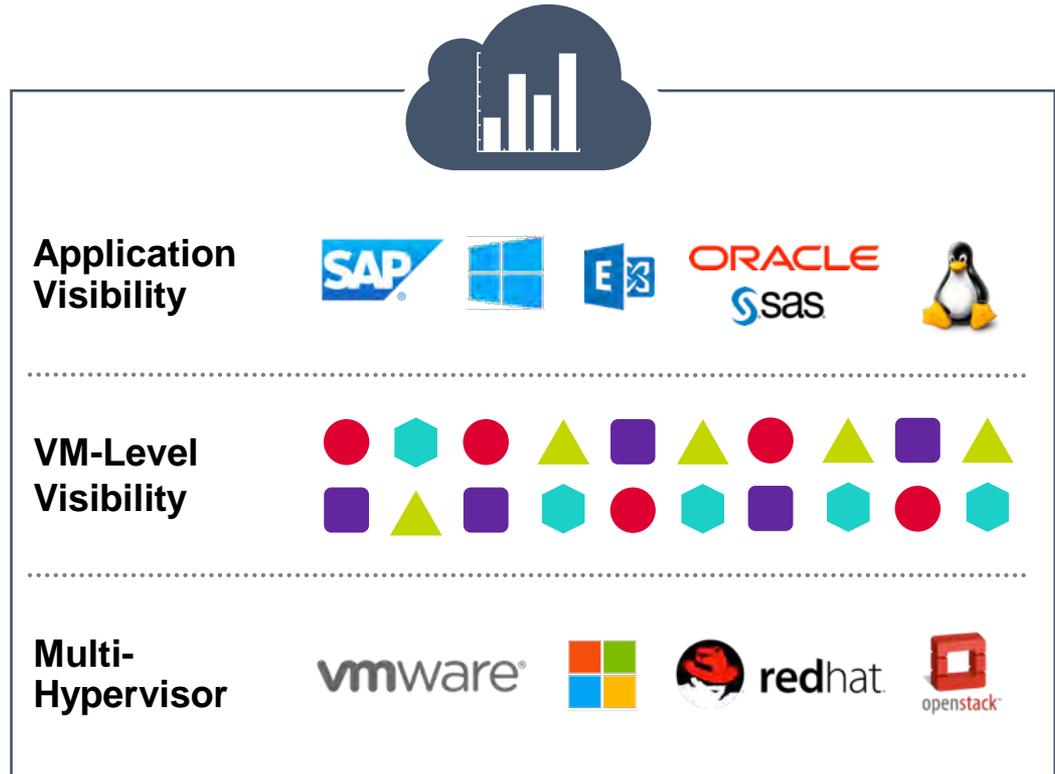
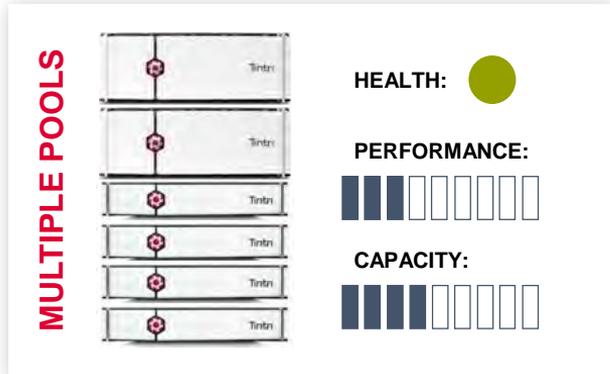
- Applications and VMs
- Capacity Planning based on **Application Profile**

Scale

- Insight across all apps and data centers
- 3 years of data

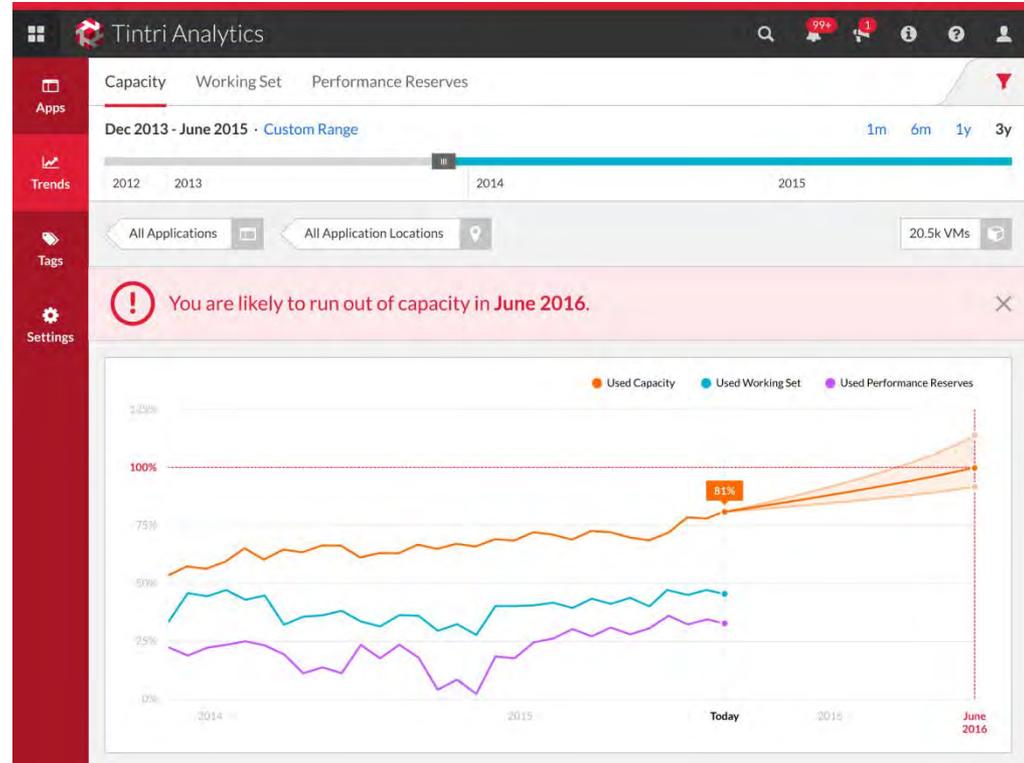


Analytics



Application Aware Capacity Planner

1. Analyze your historical Application and VM profiles
2. Model your workloads growth and additional need (ie: 250 VDI + 50 DB VMs + 20 WebServer VMs)
3. Determine additional capacity to support planned workload
4. Balance workload leveraging VM Scale-out



Deep Hypervisor Integration

vCenter plugin 2.0

vmware vSphere Web Client

Navigator: HQTM-T820

Virtual Machines: Demo-03, Demo-05, VC01, Win2K12-Demo

Actions:

- Power
- Guest OS
- Snapshots
- Open Console
- Migrate...
- Clone
- Template
- Fault Tolerance
- VM Policies
- Compatibility
- Export System Logs...
- Edit Resource Settings...
- Edit Settings...
- Move To...
- Rename...
- Edit Notes...
- Refresh Virtual Disks
- Restore VM
- Detach Virtual Disks

Take snapshot

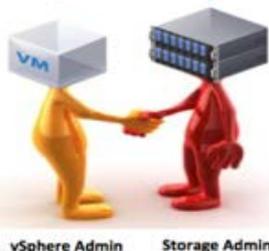
Clone

Protect

Synchronize

Configure QoS

Tintri enables ALL teams to work and speak "VM"



vRealize Operations Manager

vmware vRealize Operations Manager

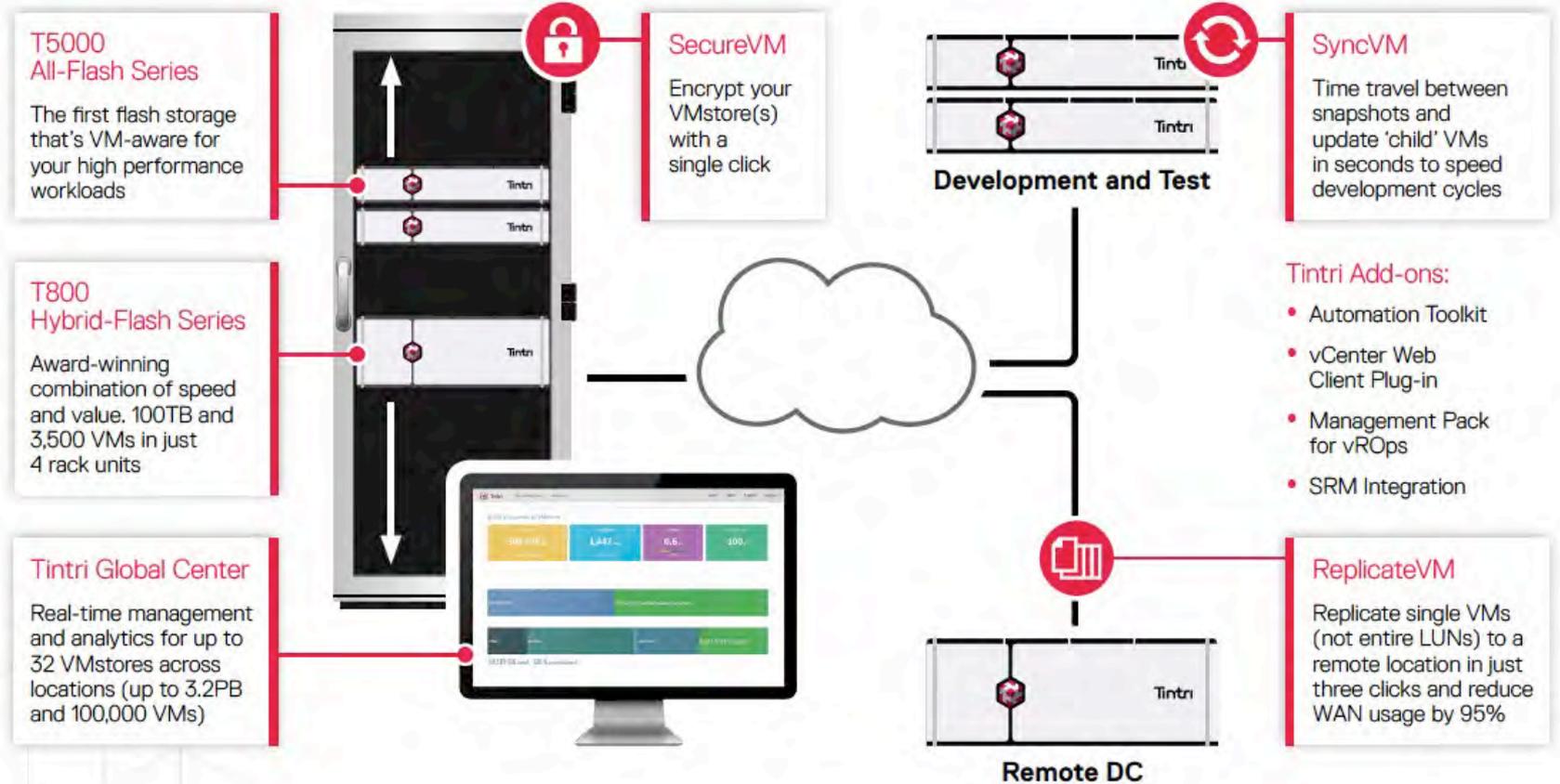
Performance SCOREBOARD

Total IOPS	Total throughput
1,680	365.2
Total latency	Flash hit
0.4	100
Performance reserves used	
100.2	

SPACE SAVINGS

Clone Dedupe Factor	Compression Factor
1.0x	6.8x
Space Saving Factor	Space used
6.8x	0.5
Space used physical	Space used logical
58.5	399.7

Federated Global Management



The background is a vibrant red color with a complex geometric pattern of overlapping hexagons. Some hexagons are solid red, while others contain intricate patterns of concentric hexagons or parallel lines in various shades of red and dark red, creating a layered, 3D effect.

Thank you!

Q & A