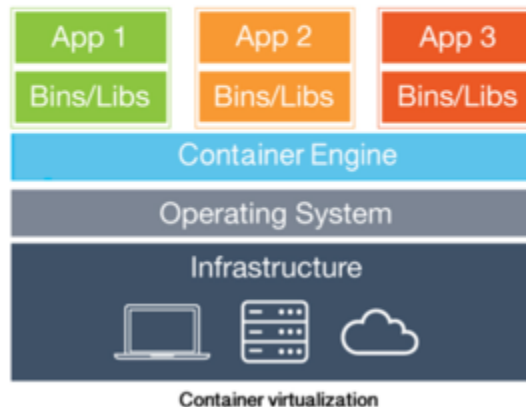
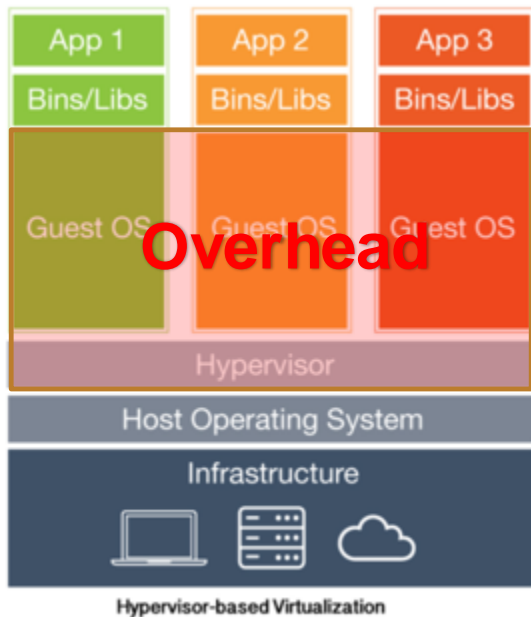


RED HAT
SUMMIT

Persistent Storage Management for Docker containers on Red Hat Enterprise Linux Atomic Host Platform

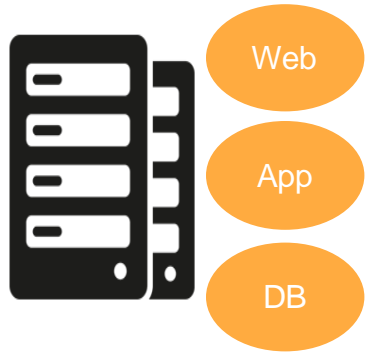
Mukesh Bafna
Sr. Principal Software Engineer, Veritas Technologies
May 2, 2017

Containers 101

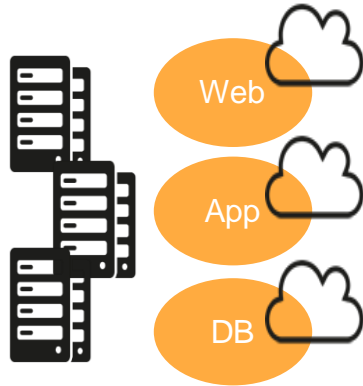


Application Deployment

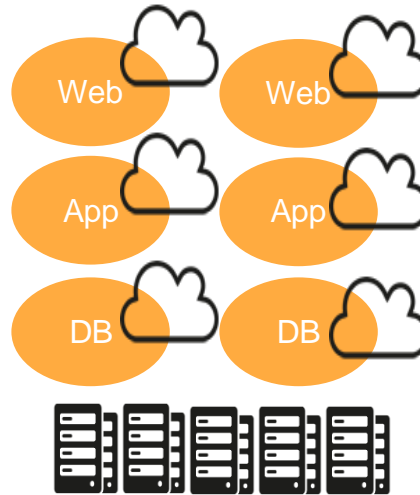
Monolithic Apps on Physical Servers



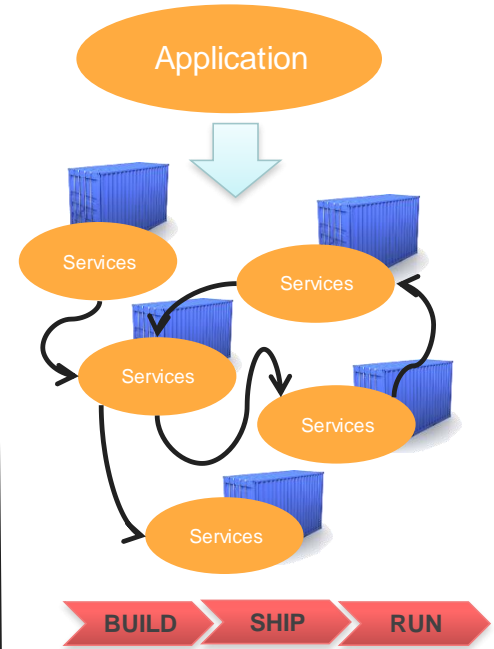
VM's Abstraction



Stateless & Horizontal Scalable Apps



Micro-services & Containers



RED HAT ENTERPRISE LINUX ATOMIC HOST

IT IS RED HAT ENTERPRISE LINUX



Inherits the complete hardware ecosystem, military-grade security, stability and reliability for which Red Hat Enterprise Linux is known.

OPTIMIZED FOR CONTAINERS



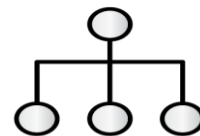
**MINIMIZED
FOOTPRINT**

Minimized host environment tuned for running Linux containers while maintaining compatibility with Red Hat Enterprise Linux.



**SIMPLIFIED
MAINTENANCE**

Atomic updating and rollback means it's easy to deploy, update, and rollback using imaged-based technology.



**ORCHESTRATION
AT SCALE**

Build composite applications by orchestrating multiple containers as micro-services across multiple hosts.

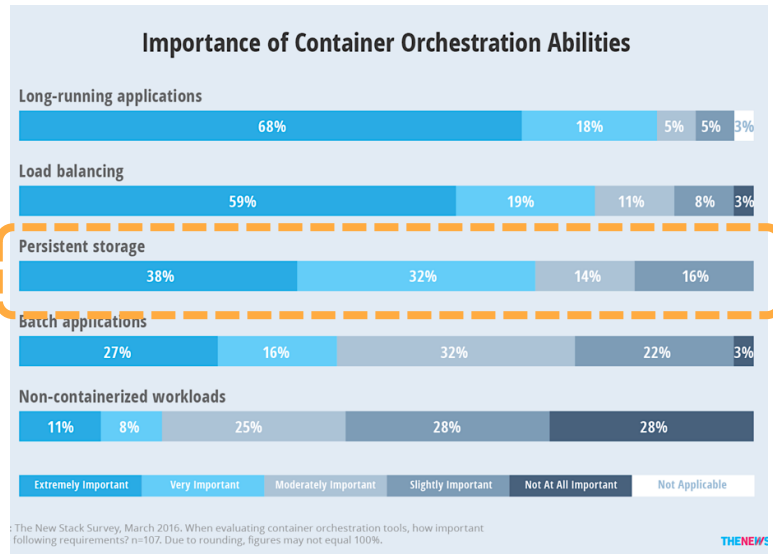
Persistent storage: a key challenge for containers

Container Journal

“ **Stateful container apps represent the next big IT challenge** ”

Gartner

“ **Stateful Database applications such as Redis, MySQL, MongoDB among most pulled images on Docker Hub** ”

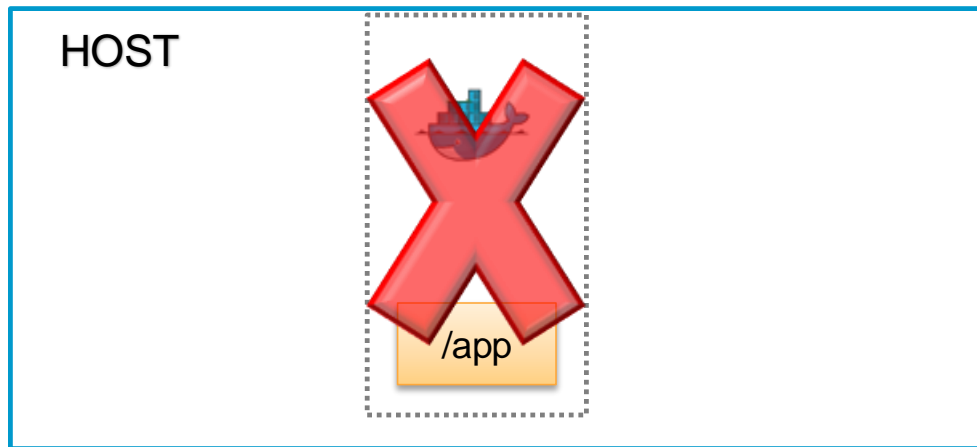


NewStack research.

“ **Persistent storage among top issues for container enterprise-readiness in production** ”

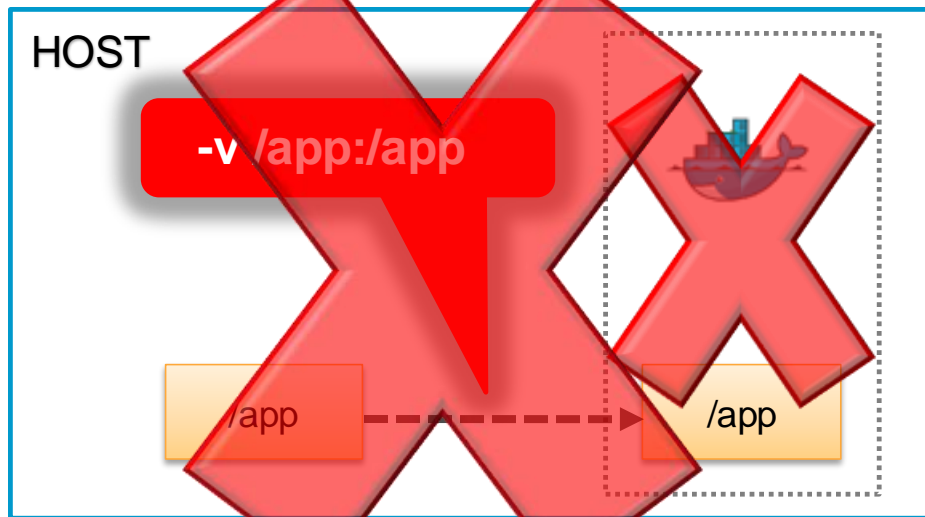
Persistent Storage Types in Docker

Default

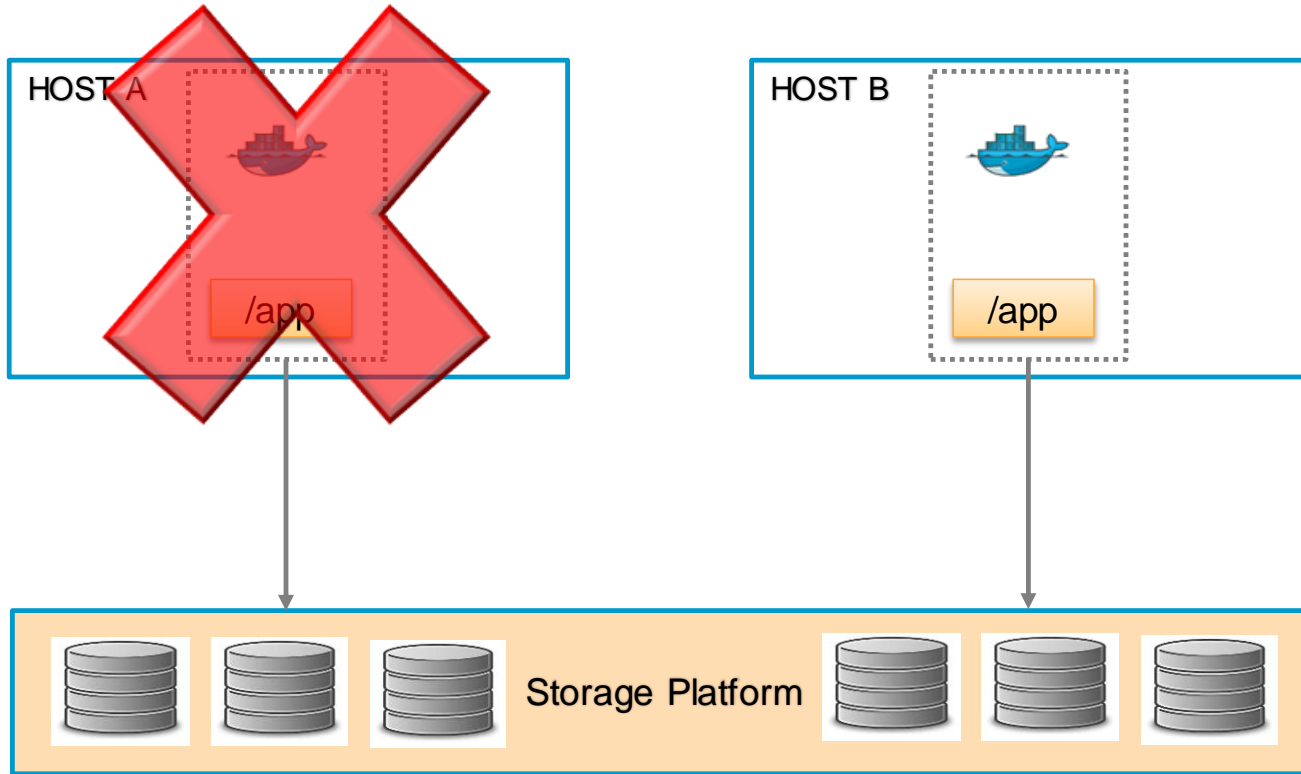


No data persistence

Docker Volume

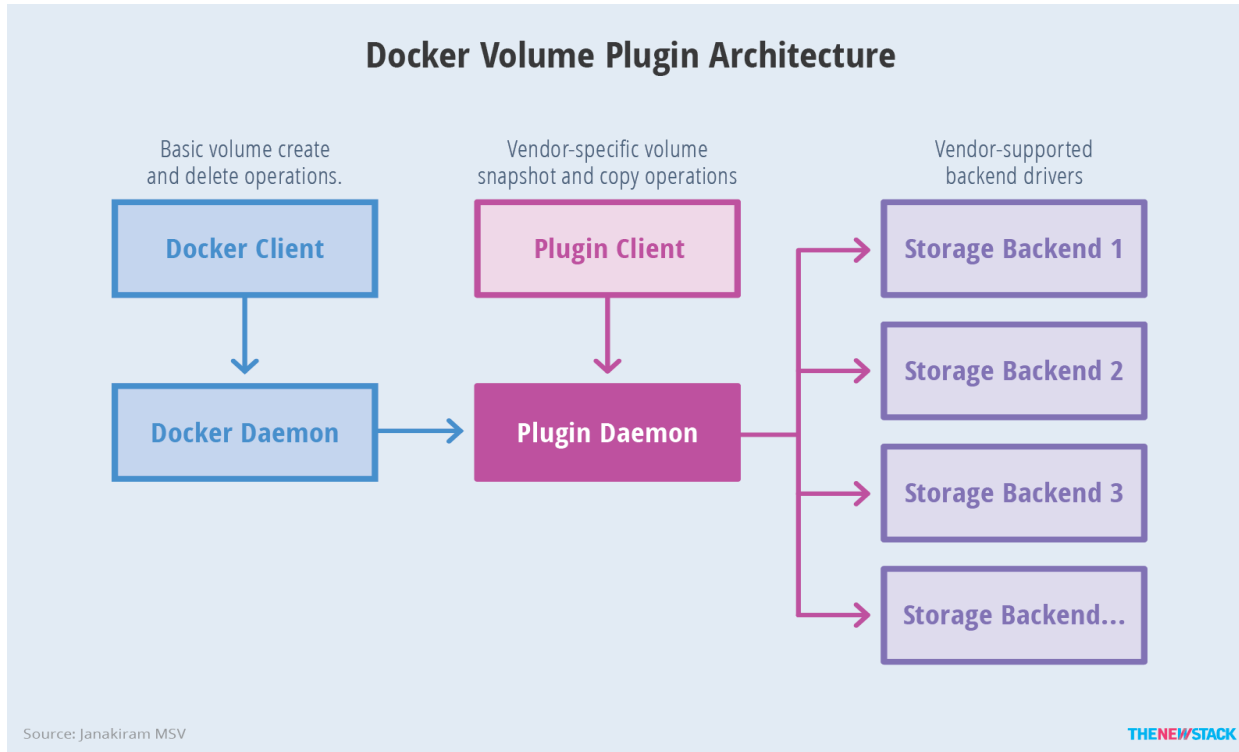


Container Persistence



Host Persistence

Docker Volume Plugin



Kubernetes Persistent Volumes

❑ Similar to Docker volume plugins

❑ Types of persistent volumes –

- GCEPersistentDisk
- AWSElasticBlockStore
- AzureFile
- AzureDisk
- FC (Fibre Channel)
- Flocker
- NFS
- iSCSI
- RBD (Ceph Block Device)
- CephFS
- Cinder (OpenStack block storage)
- Glusterfs
- VsphereVolume
- Quobyte Volumes
- HostPath (single node testing only)
- VMware Photon
- Portworx Volumes
- ScaleIO Volumes

Enterprise Storage Key Capabilities

Enterprise Storage Key Capabilities

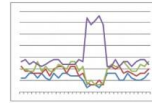
Persistent
Storage
Management



Scale-Out



Quality of
Service



Snapshots



Enterprise Storage Key Capabilities

Policy
Driven



I/O
Acceleration



Zero Impact
Backup



Cloud
Mobility



Enterprise Storage Key Capabilities

Deduplication



Encryption



Ecosystem
Support



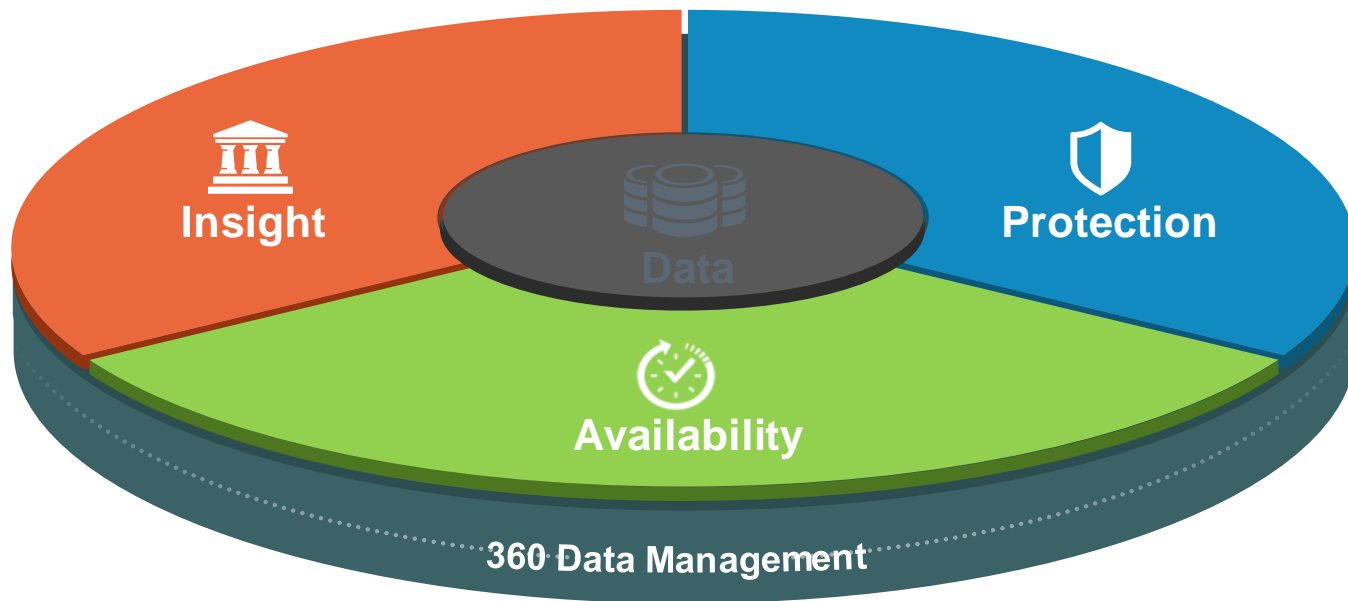
GUI



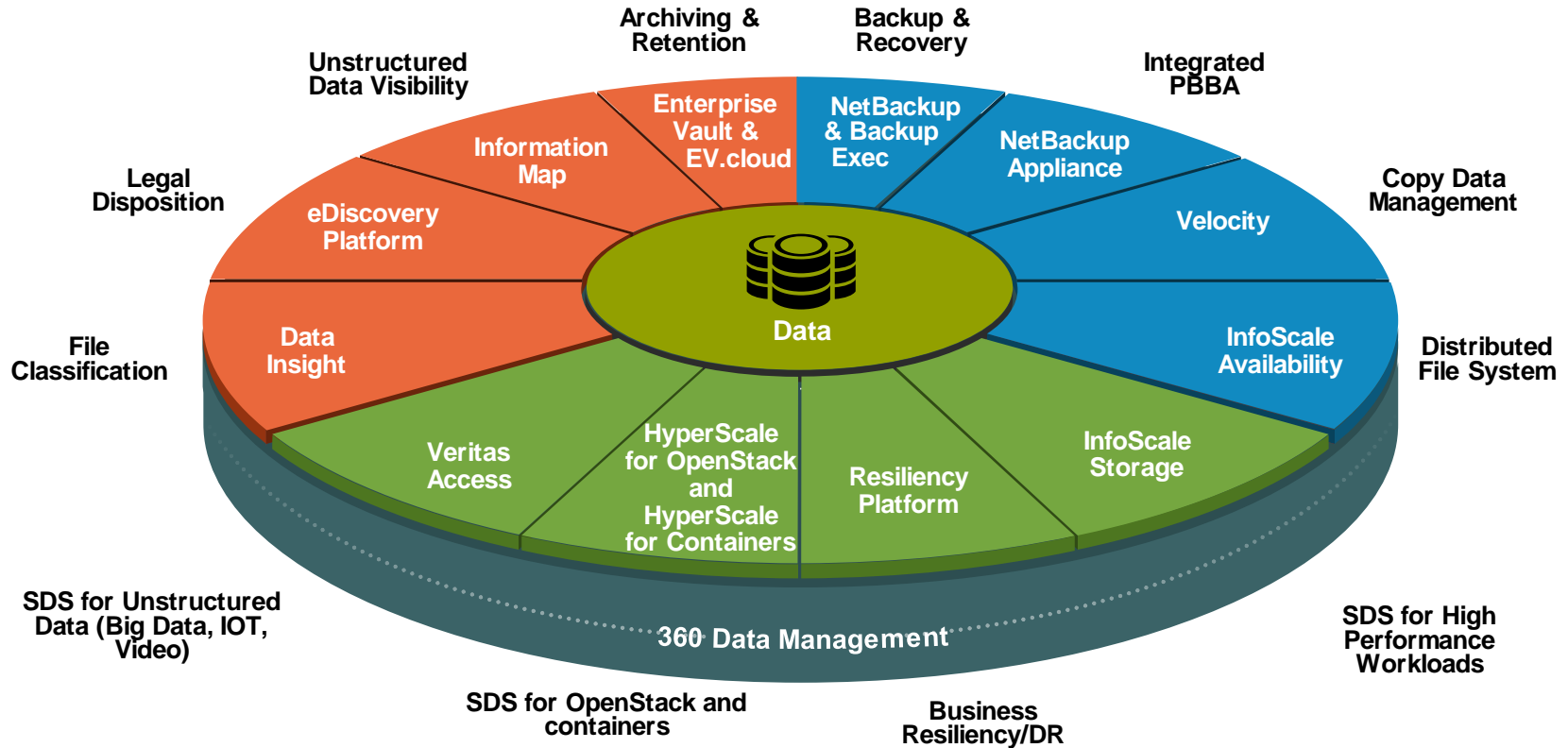
Docker Volume Plugin Storage Vendors



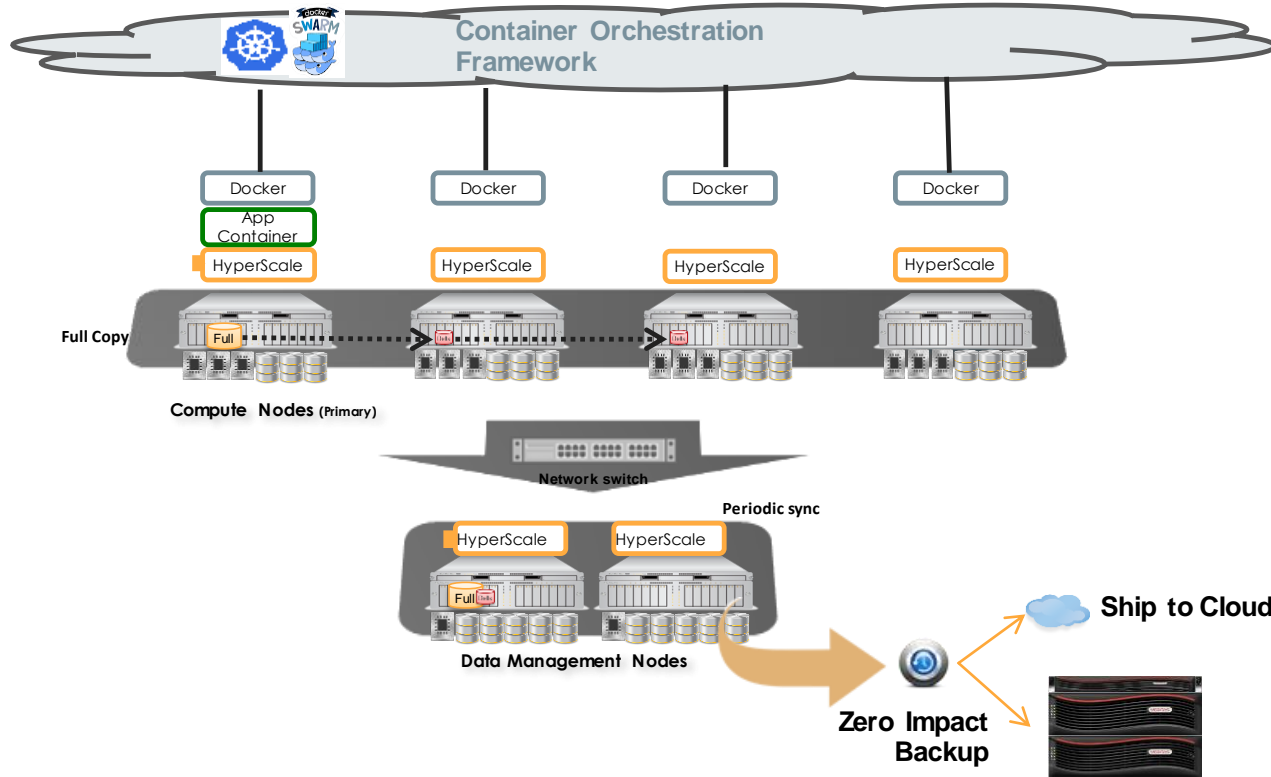
About Veritas



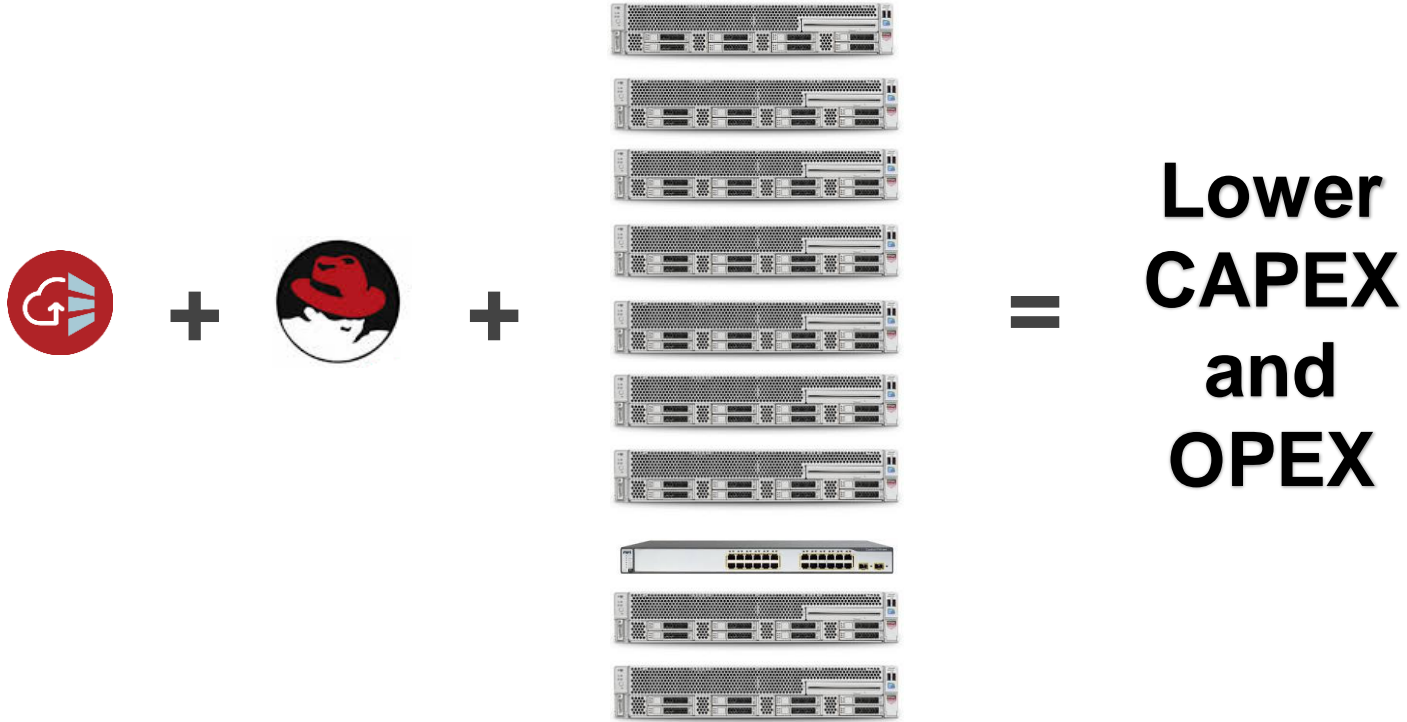
About Veritas



HyperScale for Containers



HyperScale for Containers Deployment



Files > Red Hat Summi... > HyperScale

✓	↑ Name	Modified	Modified By	File Size	Sharing
<input type="checkbox"/>	HFC - Docker Service Create with SQL IO Load.mp4	4 minutes ago	Mukesh Bafna	5.58 MB	🔒 Shared
<input type="checkbox"/>	HFC - Docker Service Create with SQL IO Load.srt		Mukesh Bafna	1.64 KB	🔒 Shared
<input type="checkbox"/>	HFC - Installation.mp4		Mukesh Bafna	4.08 MB	🔒 Shared
<input type="checkbox"/>	HFC - Installation.srt		Mukesh Bafna	1013 bytes	🔒 Shared
<input type="checkbox"/>	HFC - Introduction.mp4		Mukesh Bafna	5.40 MB	🔒 Shared
<input type="checkbox"/>	HFC - QOS.mp4		Mukesh Bafna	2.89 MB	🔒 Shared
<input type="checkbox"/>	HFC - QOS.srt		Mukesh Bafna	1.02 KB	🔒 Shared
<input type="radio"/>	HFC - Volume-From-Snapshot.mp4	3 minutes ago	Mukesh Bafna	2.20 MB	🔒 Shared
<input type="checkbox"/>	HFC - volume-From-Snapshot.srt	4 minutes ago	Mukesh Bafna	520 bytes	🔒 Shared Shared with some
<input type="checkbox"/>	rhsummit 2017 Veritas v1.pptx	A few seconds ago	Mukesh Bafna	14.6 MB	🔒 Shared
<input type="checkbox"/>	rhsummit Booth Deck v1.pptx	About a minute ago	Mukesh Bafna	982 KB	🔒 Shared



Visit us at Veritas Booth



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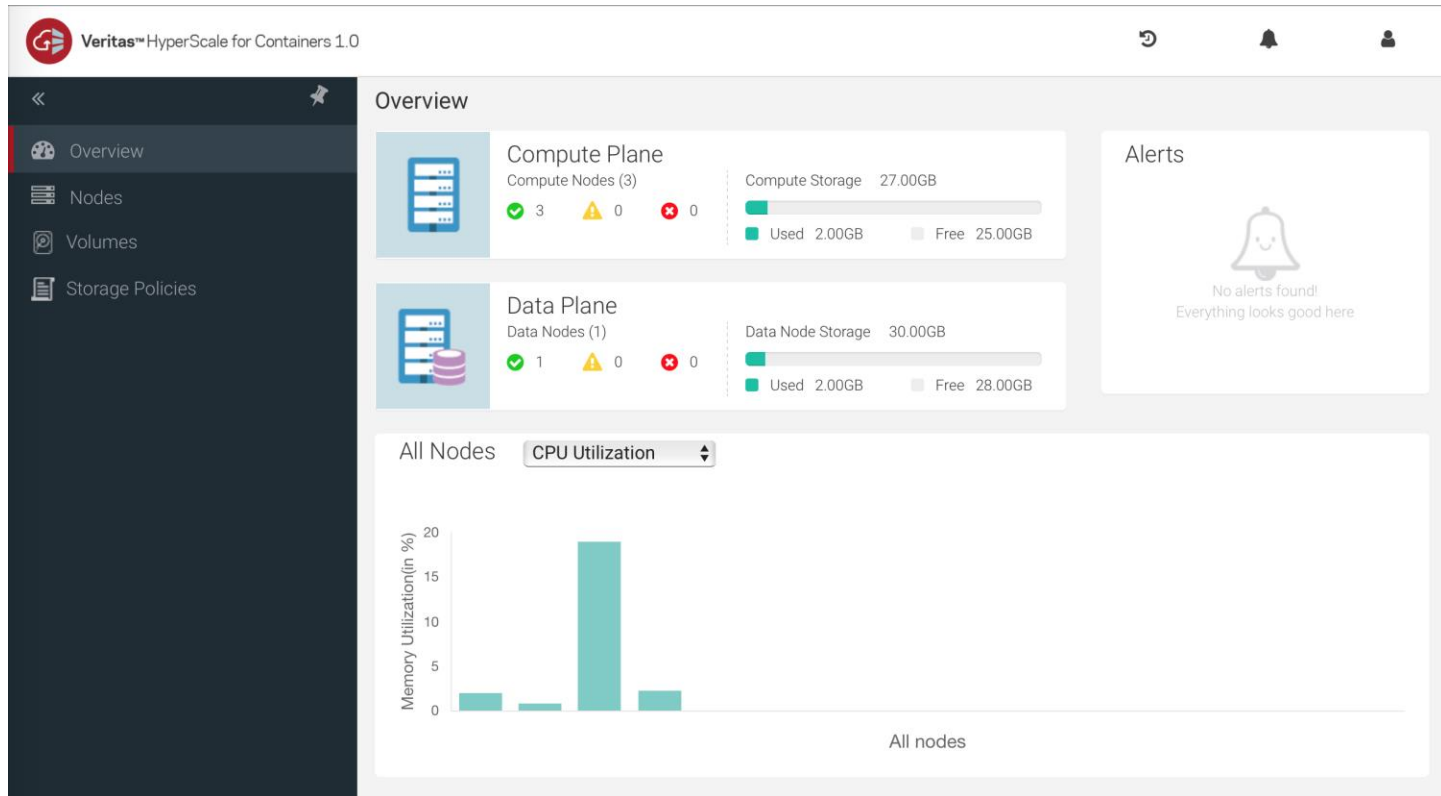
 linkedin.com/company/red-hat

 twitter.com/RedHatNews

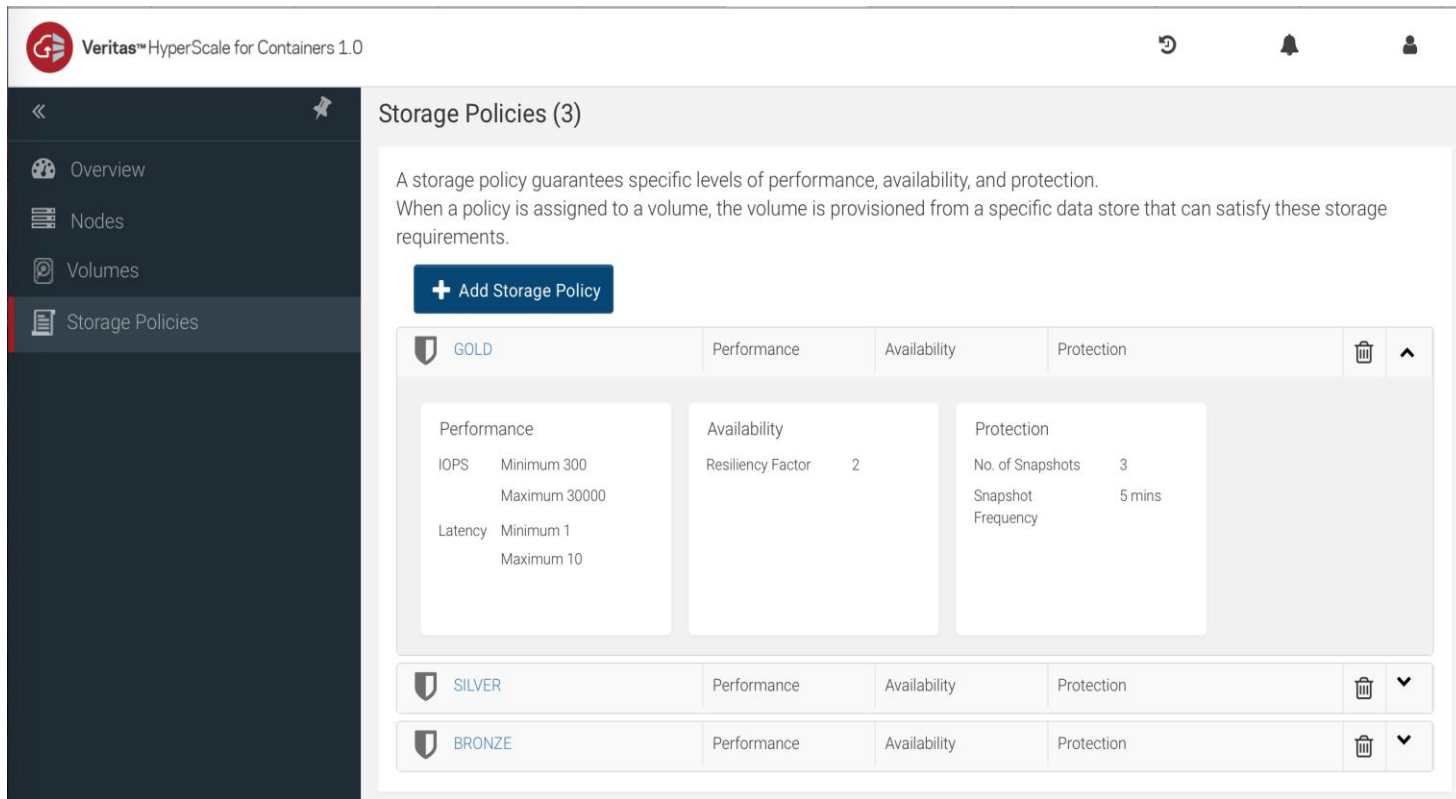
 youtube.com/user/RedHatVideos

Backup Slides

Simplified Management & API Driven



Data Protection and Resiliency












The screenshot shows the Veritas HyperScale for Containers 1.0 interface. The top navigation bar includes the Veritas logo, the product name, and icons for refresh, notifications, and user profile. A dark sidebar on the left contains navigation links for Overview, Nodes, Volumes, and Storage Policies (which is highlighted). The main content area is titled "Storage Policies (3)" and contains a descriptive paragraph, an "Add Storage Policy" button, and a table of existing policies.

Veritas™ HyperScale for Containers 1.0

Storage Policies (3)

A storage policy guarantees specific levels of performance, availability, and protection. When a policy is assigned to a volume, the volume is provisioned from a specific data store that can satisfy these storage requirements.

[+ Add Storage Policy](#)

 GOLD	Performance	Availability	Protection		
<p>Performance</p> <p>IOPS Minimum 300 Maximum 30000</p> <p>Latency Minimum 1 Maximum 10</p>	<p>Availability</p> <p>Resiliency Factor 2</p>	<p>Protection</p> <p>No. of Snapshots 3 Snapshot Frequency 5 mins</p>			
 SILVER	Performance	Availability	Protection		
 BRONZE	Performance	Availability	Protection		

Predictable Performance via Policies

The screenshot displays the Veritas HyperScale for Containers 1.0 management console. The left sidebar contains navigation options: Overview, Nodes, Volumes, and Storage Policies (which is currently selected). The main content area is titled "Storage Policies (4)" and includes a descriptive paragraph: "A storage policy guarantees specific levels of performance, availability, and protection. When a policy is assigned to a volume, the volume is provisioned from a specific data store that can satisfy these storage requirements." Below this text is a "+ Add Storage Policy" button. A table lists four storage policies: BRONZE, GOLD, SILVER, and TEST_POLICY. The BRONZE policy is expanded to show its specific configuration details.

Policy Name	Performance	Availability	Protection	Actions
BRONZE	IOPS Minimum 100 Maximum 10000 Latency Minimum 1 Maximum 100	Resiliency Factor 0	No. of Snapshots 3 Snapshot Frequency 5 mins	🗑️ ⬆️
GOLD				🗑️ ⌵
SILVER				🗑️ ⌵
TEST_POLICY				🗑️ ⌵

The logo consists of a red speech bubble shape pointing downwards, containing the text "RED HAT" in a smaller font above "SUMMIT" in a larger font, both in white.

RED HAT
SUMMIT

LEARN. NETWORK.
EXPERIENCE
OPEN SOURCE.