



# Efficient and Agile Persistent Storage for Containers

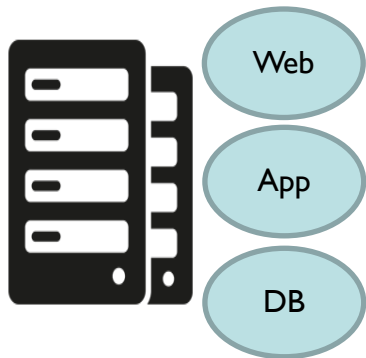
**Carlos Carrero & Chad Thibodeau**

**Veritas Technologies, LLC**

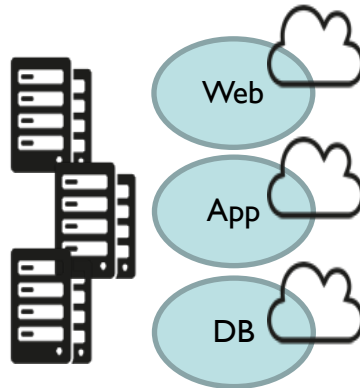
**VERITAS<sup>TM</sup>**

# Application Deployment History

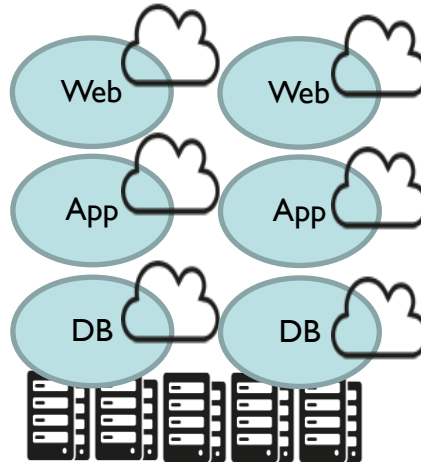
## Monolithic Apps on Physical Servers



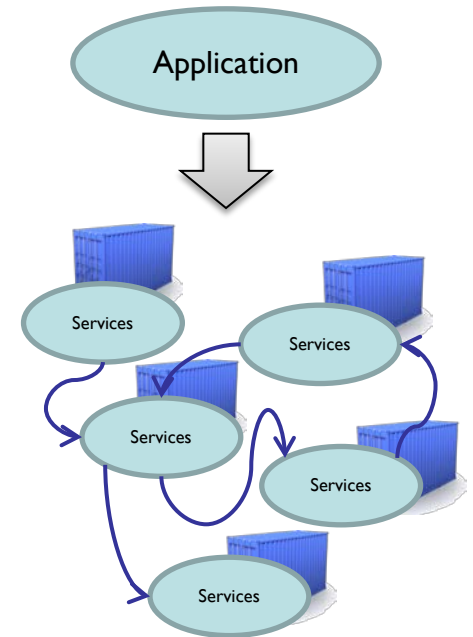
## VM's Abstraction



## Stateless & Horizontal Scalable Apps

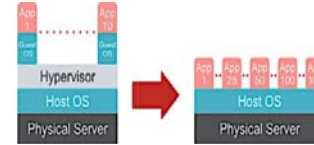


## Micro-services & Containers



# Driving Factors for Containers

Density & Performance



Licensing Costs



Shift to DevOps



Cloud-native Applications (Scale-out)

NETFLIX

Faster Exploration & Deployment  
(CI/CD)



“Containerization seems poised to offer both a **complement** and a **viable alternative** to server virtualization” - IDC

# Containers vs VMs vs Bare-metal Servers

	Container	Virtual Machine	Bare-Metal x86 Server
Underlying Platform	OS on Virtual Machine or Bare-Metal x86 Server	Hypervisor on Bare-Metal x86 Server	N/A
Performance: Speed and Consistency	Average	Average	Fastest
Provisioning Time	Seconds	Minutes	Hours
Tenant Isolation Enforcement	OS Kernel	Hypervisor	Physical
Ideal Application Types	Mode 2	Mode 1 or Mode 2	Mode 1 or Mode 2
Configuration and Reconfiguration Flexibility	Highest	Medium	Lowest
Host Consolidation Density	Maximum	Average	None
Application Portability	Application Packaging/Manifest*	VM Image, VM Migration Tools	Backup and Restore, ISO Images
Granularity	Extremely Small	Average	Largest
*While application portability is somewhat easier in container environments that are leveraging a container management and orchestration solution, portability should not assumed to be universal — differences in the underlying host OS below the containers could still present some interoperability challenges.			

Source: Gartner (September 2015)

# Evolving Market Trends



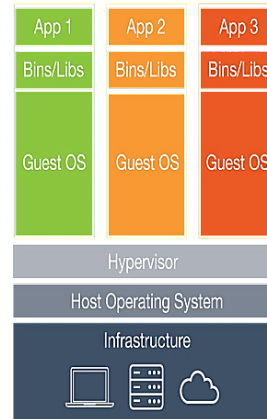
**95\$M**  
Series D Funding

Business Valuation at  
**1\$ billion**

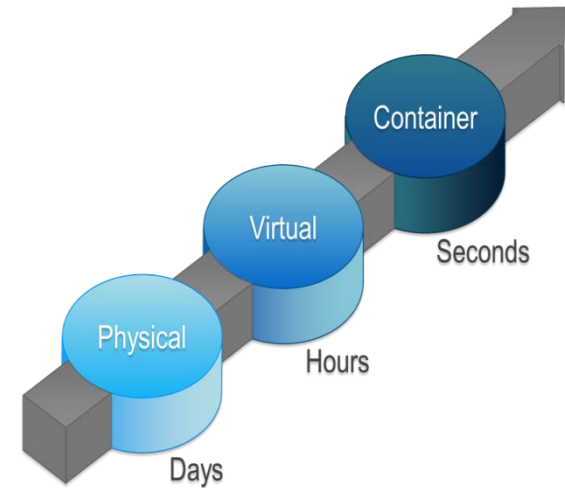
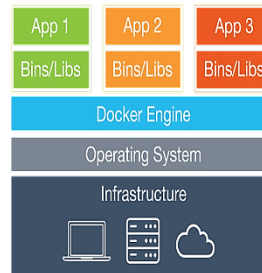
**300M+**  
Downloads

**Up 5x**  
Adoption in One Year

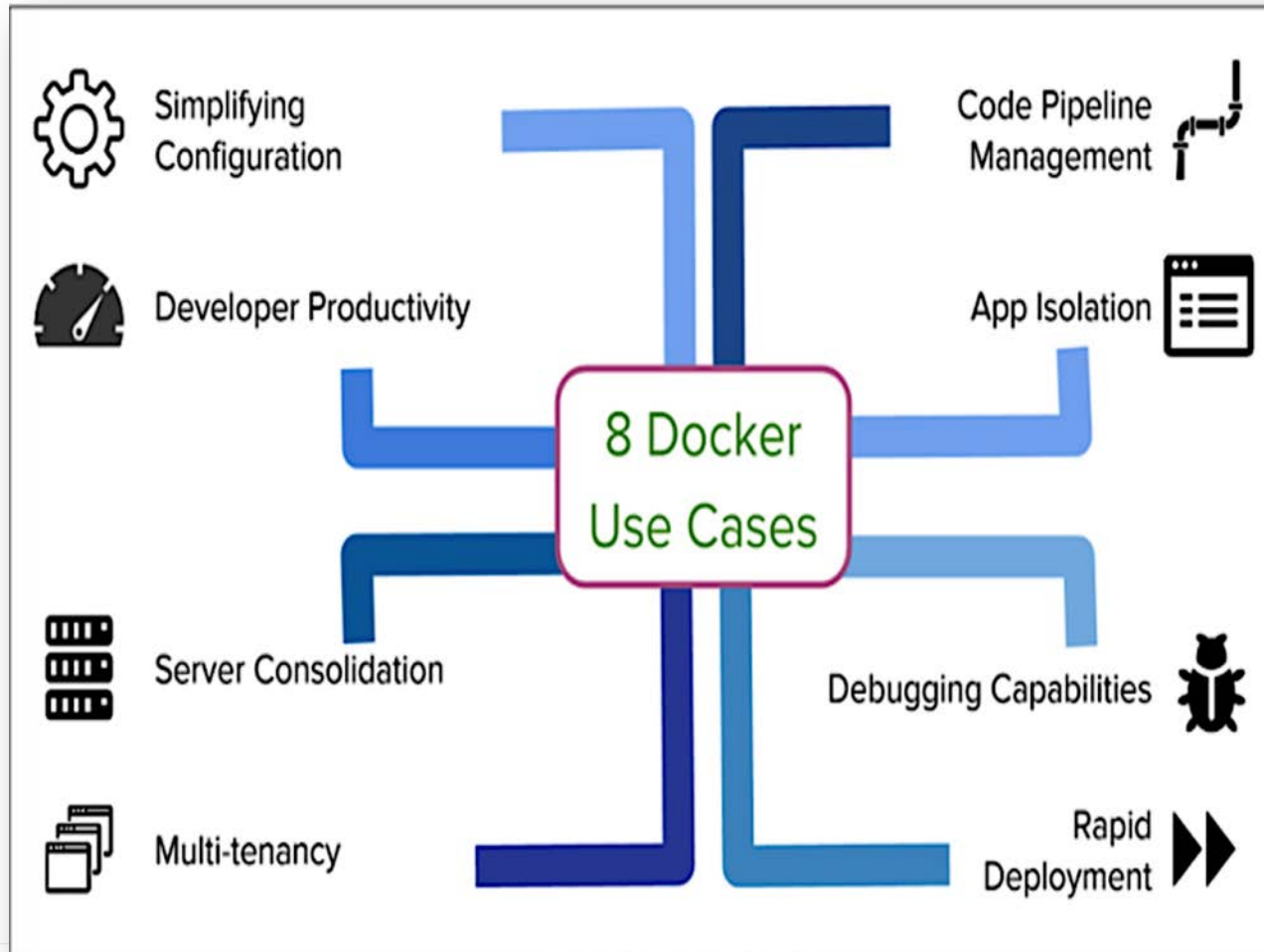
## Virtual Machines



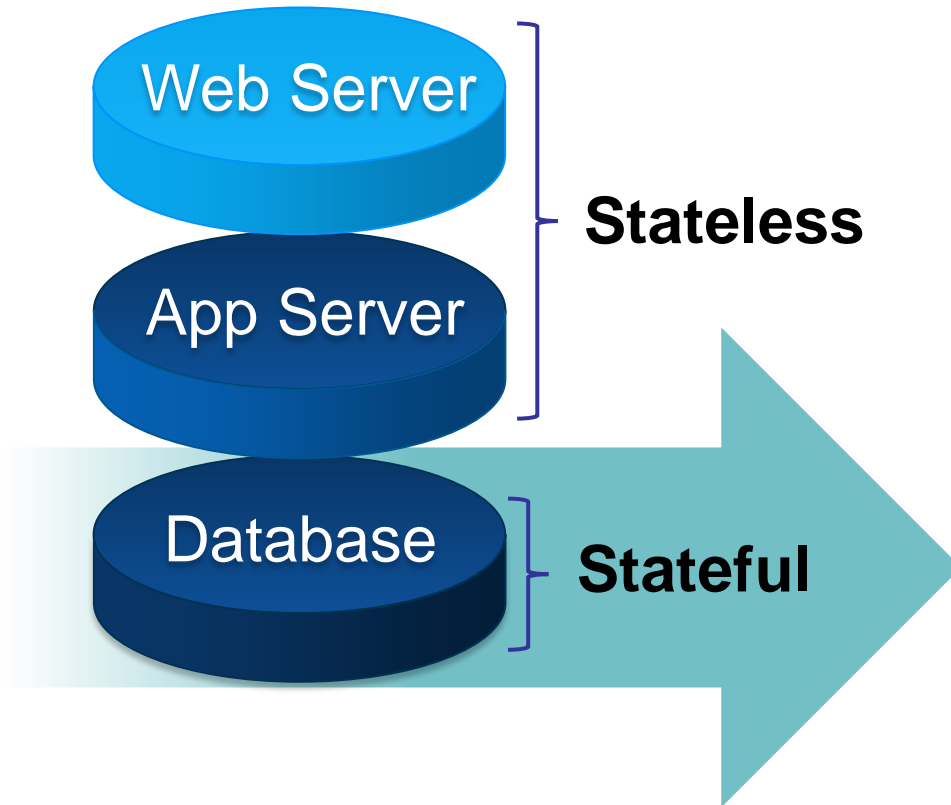
## Containers



# 8 Common Use Cases



# Persistent Storage Needs



## Traditional Challenges

- Persist data
- Share Copies Across Teams
- Disaster Recovery
- Data Management
- Quality of Service

# InfoScale Value Propositions for Containers

**Persistent  
Storage  
Management**



**Scale-Out**



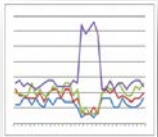
**Snapshots**



**I/O  
Acceleration**



**Quality of  
Service**



**Encryption**



**Disaster  
Recovery**

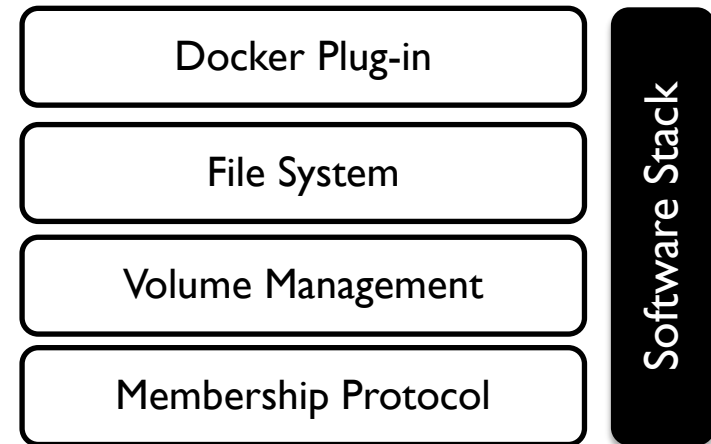
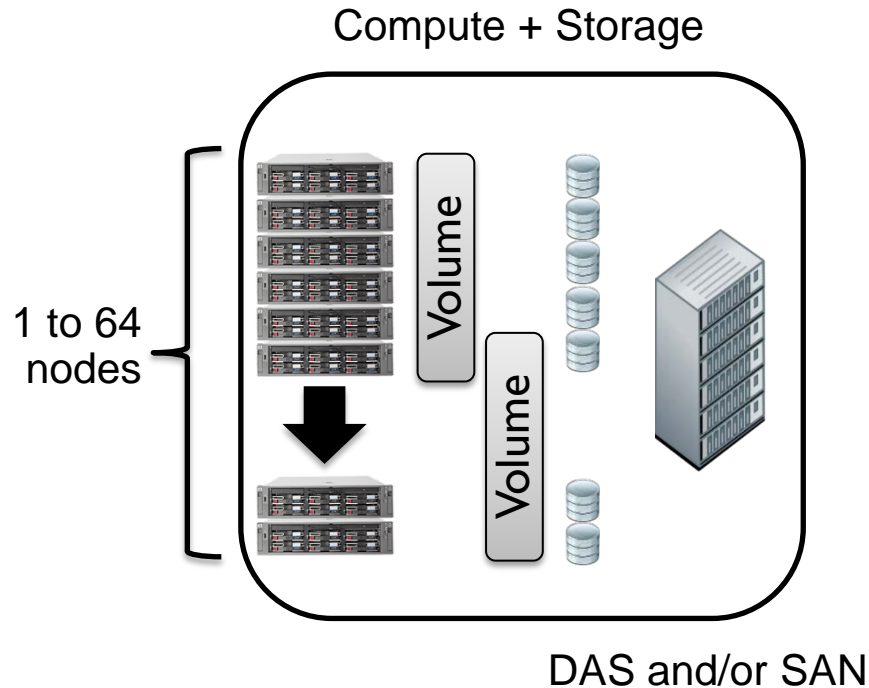


**Ecosystem  
Support**





# Persistent Storage Management



# Plug-in Utilization

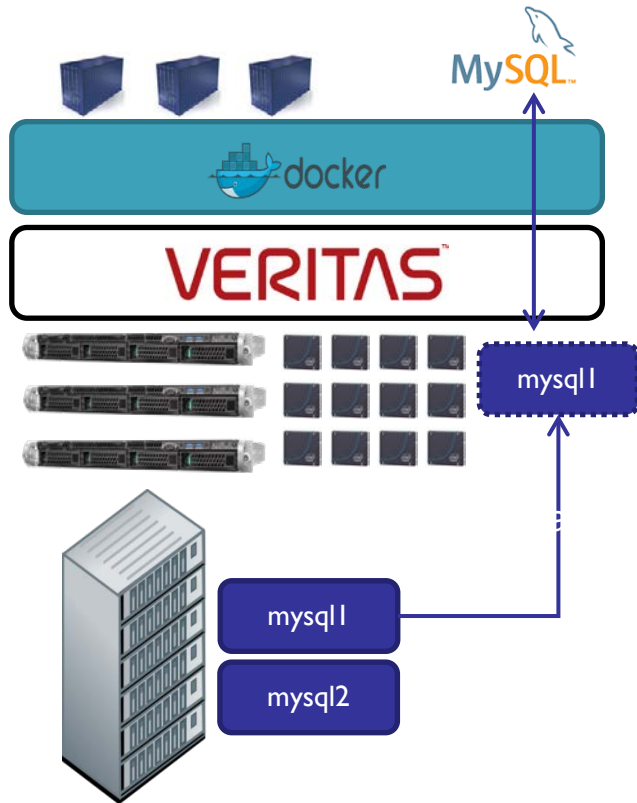


Name of the volume to be created

```
# docker volume create -d veritas -name volume1 -o size=300m
```

Volume automatically carved  
from storage pool

# I/O Acceleration

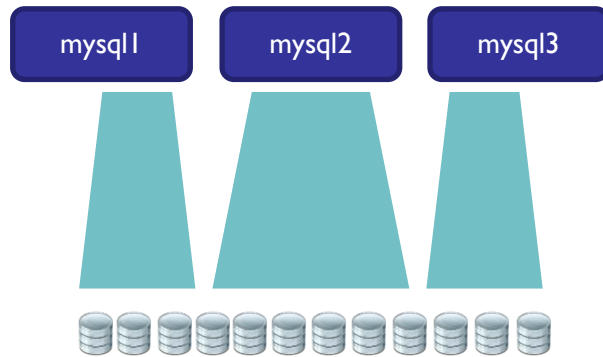
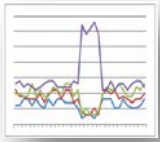


## Intelligent Caching

- ❖ Improve application performance
- ❖ Use commodity server-side SSDs
- ❖ Enable at Container data object granularity
- ❖ Use SAN or DAS as needed
- ❖ Reduce storage costs without losing performance

```
# docker volume create .. -o iocache=on
```

# Quality of Service

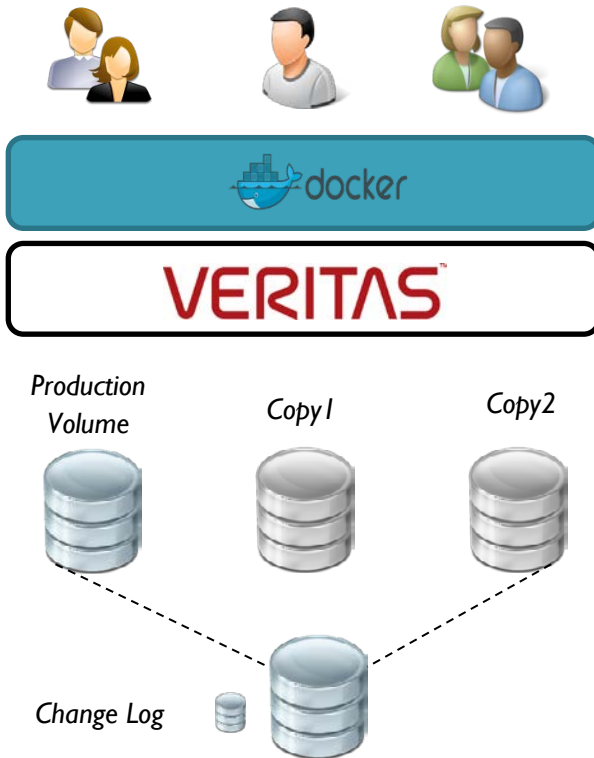


## Avoid Noisy Neighbour

- ❖ Avoid un-controlled containers impact performance
- ❖ Limit how much IO a volume can consume
- ❖ Improve utilization

```
# docker volume create .. -o maxiopts=<limit>
```

# CI/CD with Persistent Data



## Continuous Access to Information

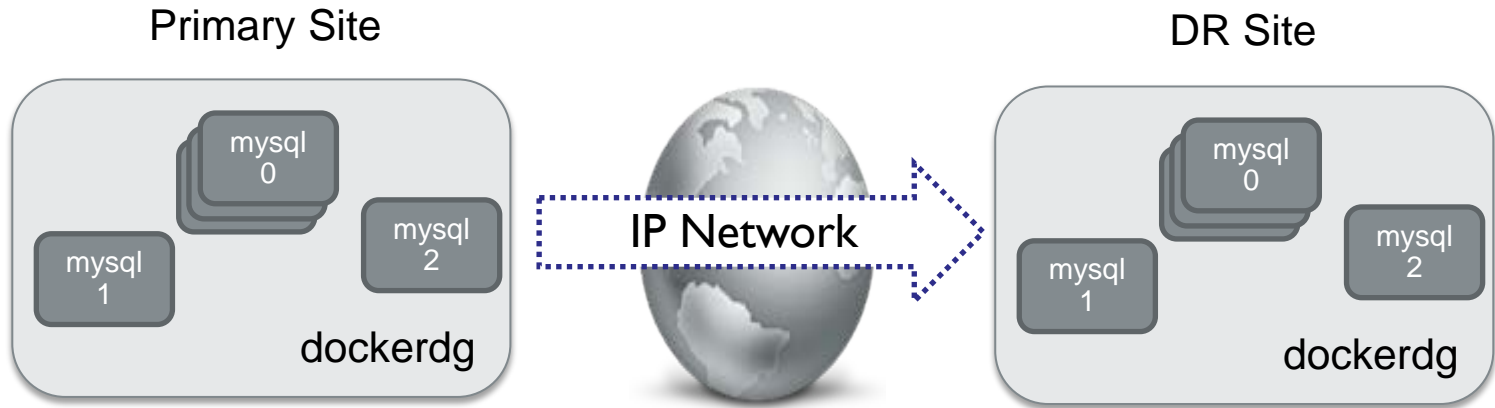
- ❖ Take immediate copies of persistent data anytime
- ❖ Data accessible from any server
- ❖ Increased agility
- ❖ Simultaneous access to volumes

```
# docker volume create .. -o sourcevol=<volume>
```

(1)

(1) Integration not yet available within the Plug-in – needs additional manual steps

# Disaster Recovery



## Guided Replication Wizard



Configure Replication - Create primary

RVG name:

Volume

Name	File System	State	Size	Replicate ?
mysql0	/dockerfs/mysql0_docke...	Healthy	7.0 GB	<input checked="" type="checkbox"/>
mysql1	/dockerfs/mysql1_docke...	Healthy	7.0 GB	<input checked="" type="checkbox"/>
mysql2	/dockerfs/mysql2_docke...	Healthy	7.0 GB	<input checked="" type="checkbox"/>

## Veritas Replication

- ❖ Guaranteed RTO / RPO
- ❖ Across any distance
- ❖ Intelligent wizard or CLI
- ❖ Efficiently uses IP network
- ❖ Recovery testing at DR site

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**Scale-Out**



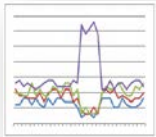
**Snapshots**



**I/O  
Acceleration**



**Quality of  
Service**



**Encryption**



**Disaster  
Recovery**



**Ecosystem  
Support**



# Future container storage challenges

## ❑ Migration

- ❑ Host-node evacuation
- ❑ Host-to-Host
- ❑ Hybrid Cloud
- ❑ Public Cloud-to-Cloud



## ❑ Encryption



## ❑ Backup



## ❑ DR/BC



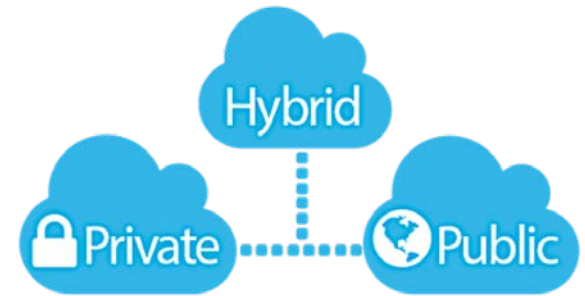


# Container Nirvana

**Run containers anywhere**

**True CI/CD pipeline development**

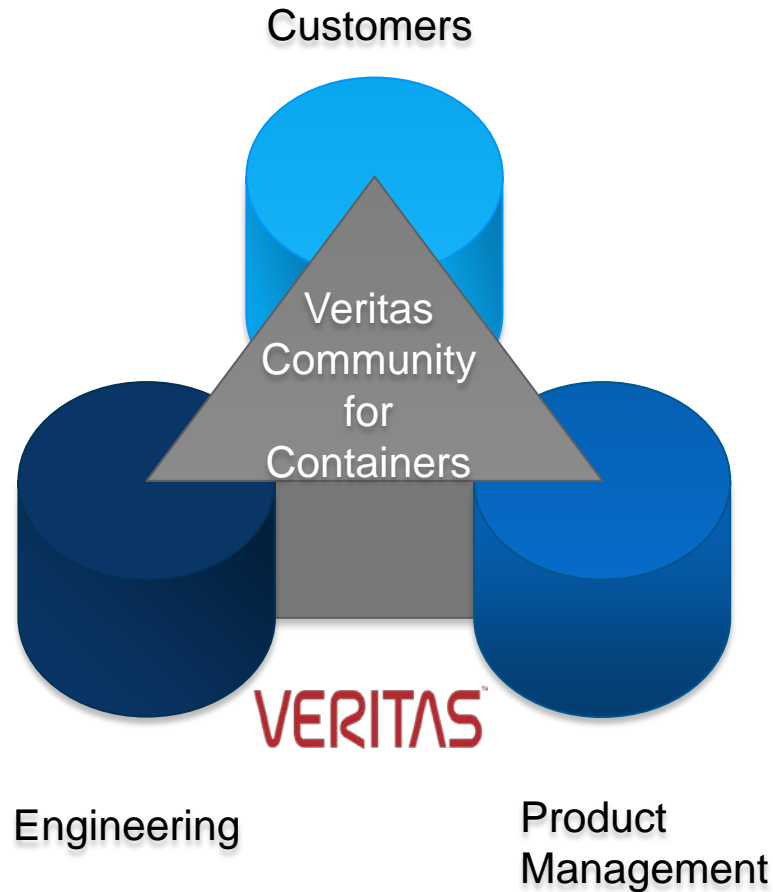
**DevOps is pervasive and is considered the standard IT role**



Endless Possibilities: DevOps can create an infinite loop of release and feedback for all your code and deployment targets.



# Get Connected



## Learn more

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- ✧ Blogs
- ✧ Feedback



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