Efficient and Agile Persistent Storage for Containers

Carlos Carrero & Chad Thibodeau

Veritas Technologies, LLC
Application Deployment History

Monolithic Apps on Physical Servers

VM’s Abstraction

Stateless & Horizontal Scalable Apps

Micro-services & Containers

Web
App
DB

Web
App
DB

Web
App
DB

Application
Services
Services
Services

BUILD
SHIP
RUN
Driving Factors for Containers

- Density & Performance
- Licensing Costs
- Shift to DevOps
- Cloud-native Applications (Scale-out)
- 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

<table>
<thead>
<tr>
<th></th>
<th>Container</th>
<th>Virtual Machine</th>
<th>Bare-Metal x86 Server</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underlying Platform</td>
<td>OS on Virtual Machine or Bare-Metal x86 Server</td>
<td>Hypervisor on Bare-Metal x86 Server</td>
<td>N/A</td>
</tr>
<tr>
<td>Performance: Speed and Consistency</td>
<td>Average</td>
<td>Average</td>
<td>Fastest</td>
</tr>
<tr>
<td>Provisioning Time</td>
<td>Seconds</td>
<td>Minutes</td>
<td>Hours</td>
</tr>
<tr>
<td>Tenant Isolation Enforcement</td>
<td>OS Kernel</td>
<td>Hypervisor</td>
<td>Physical</td>
</tr>
<tr>
<td>Ideal Application Types</td>
<td>Mode 2</td>
<td>Mode 1 or Mode 2</td>
<td>Mode 1 or Mode 2</td>
</tr>
<tr>
<td>Configuration and Reconfiguration Flexibility</td>
<td>Highest</td>
<td>Medium</td>
<td>Lowest</td>
</tr>
<tr>
<td>Host Consolidation Density</td>
<td>Maximum</td>
<td>Average</td>
<td>None</td>
</tr>
<tr>
<td>Application Portability</td>
<td>Application Packaging/Manifest*</td>
<td>VM Image, VM Migration Tools</td>
<td>Backup and Restore, ISO Images</td>
</tr>
<tr>
<td>Granularity</td>
<td>Extremely Small</td>
<td>Average</td>
<td>Largest</td>
</tr>
</tbody>
</table>

*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

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8 Common Use Cases
Persistent Storage Needs

Stateless
- Web Server
- App Server
- Database

Stateful

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

Compute + Storage

1 to 64 nodes

DAS and/or SAN

Volume Management

Docker Plug-in

File System

Membership Protocol

Software Stack
Plug-in Utilization

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

Name of the volume to be created

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

```bash
# docker volume create .. -o iocache=on
```
Quality of Service

Avoid Noisy Neighbour

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

```bash
# docker volume create .. --maxiops=<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) Integration not yet available within the Plug-in – needs additional manual steps
Disaster Recovery

Veritas Replication
- Guaranteed RTO / RPO
- Across any distance
- Intelligent wizard or CLI
- Efficiently uses IP network
- Recovery testing at DR site
InfoScale Value Propositions for Containers

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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
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