Storage Virtualization in Modern Data Centers

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Presentation Overview

- About me
- Modern Data Centers
- Role of Storage in Modern Data Centers
  - Storage Virtualization
  - Challenges
  - Opportunities
- Q&A
Modern Data Centers

- Scale-Out
- Lights Out
- Always On
- Everything as a service
- Virtualization and Integration
- Less complex
Storage Trends in Scale-Out Data Centers

- Explosive Growth in Storage
  - Big Data Analytics,
  - Object Store,
  - Cloud,
  - No-SQL

- Disaggregation of Compute and Storage
  - Scaling and Refresh
  - Application Driven Tiering

- Increased Network Bandwidth

- Scale-Out solutions driven by TCO
  - Storage density, Cost, Performance
Storage Trends in Scale-Out Data Centers

- Flash Everywhere
- Storage Class Memory
- Storage Density Scales to 1Pb/RU
- Storage networking moves to Ethernet
- Software Defined Everything
- Hyperscale Storage Implementations
- Exabytes of Analytics
- Multiple Flash Tiers:
  - High Performance
  - Commodity Flash
Hyper-scale Storage Infrastructure

- **Mission Critical**
- **Balanced Performance**
- **High Capacity**

<table>
<thead>
<tr>
<th>Topology</th>
<th>OLTP</th>
<th>NoSQL</th>
<th>Big Data</th>
<th>Cloud</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scale</td>
<td>Centralized</td>
<td>DAS → Disaggregated</td>
<td>DAS → Disaggregated</td>
<td>DAS → Disaggregated</td>
</tr>
<tr>
<td>Growth</td>
<td>SAN / STORAGE APPLIANCE</td>
<td>TB → PB Disaggregate</td>
<td>Medium High</td>
<td>High</td>
</tr>
<tr>
<td>Protocols</td>
<td>FC, NFS → ISCSI</td>
<td>DAS, ISCSI</td>
<td>DAS, ISCSI, Object</td>
<td>DAS, ISCSI, Object, File</td>
</tr>
<tr>
<td>Management</td>
<td>SAN/NAS</td>
<td>Local/Cinder</td>
<td>Cinder</td>
<td>Cinder, Swift, Ceph?</td>
</tr>
</tbody>
</table>
Not all data is the Same

- Data is as critical to a business as are people and capital
- Not all data is the same
- Different data types require different ways to manage and protect
- Traditional approaches (SAN, NAS, DAS) require new levels of optimization and efficiency
- Silo approach can’t scale
Modernizing Traditional Infrastructure is HARD

- Legacy is expensive to modernize
- New technology does not fit easily
- Change can introduce more complexity
The cloud is not as Simple as it appears

- Moving the data
- Common tools to manage across platforms
- Tracking & managing by user, tenant and/or location
Rethink How Data is Managed

A new, comprehensive approach to real-world data management challenges

Intelligent Abstraction

Intelligent Predictive Analytics

Intelligent Action
What is FreeStor?

- FreeStor® is a software-defined storage platform that gives customers the power to seamlessly migrate, recover, protect, and deduplicate data -on or off the cloud - without tying their business to specific hardware, networks, or protocols.

- FreeStor gives customers the Power to Be Free:
  - Free to choose
  - Free to innovate
  - Free to do business
Storage Abstraction

**BEFORE:** Traditional Approach

- Low to Medium Standardization, High Touch, High Capex and Opex
- Dedicated platforms (HW & SW)
- Manual or limited automation & optimization

**AFTER:** SDS Approach

- Highly Standardized, Low Touch, Low Opex
- Shared/non-dedicated platforms
- Automated, continuous optimization

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The Power of Intelligent Abstraction

Decouples the storage hardware, networks, and protocols, enabling the free flow of data and common services regardless of environment or location.
Intelligent Abstraction Architecture

FreeStor Data Services Resource Pool
- Virtualization
- Replication
- Clustering
- Automated Recovery
- Snapshots
- Deduplication

Intelligent Abstraction Core

Storage Resources
- HDD
- SSD
- Hybrid
- Tape
- Physical
- Virtual
- Cloud

Unified GUI

REST API

FMDB

Applications & Platforms (Physical & Virtual)
Intelligent Predictive Analytics

Stop guessing and start using real-time information across your entire storage infrastructure

Real-Time Views • Real-Time Metrics • Real-Time Answers
Intelligent Predictive Analytics

Easily identify hotspots and bottlenecks to optimize performance and availability
Intelligent Predictive Analytics

Predict capacity utilization across ALL storage

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Total Size</th>
<th>Allocated Size</th>
<th>Free Size</th>
<th>Free %</th>
<th>Days to reach 100%</th>
<th>% free in 1 month</th>
</tr>
</thead>
<tbody>
<tr>
<td>FSS-VA-DEMO-T1</td>
<td>Server</td>
<td>399.98 GB</td>
<td>161.93 GB</td>
<td>238.05 GB</td>
<td>59%</td>
<td>98</td>
<td>41.97%</td>
</tr>
<tr>
<td>Wittenstein_Pool1</td>
<td>Storage Pool</td>
<td>349.99 GB</td>
<td>146.19 GB</td>
<td>203.79 GB</td>
<td>58%</td>
<td>108</td>
<td>42.91%</td>
</tr>
<tr>
<td>Wittenstein_Pool2</td>
<td>Storage Pool</td>
<td>49.99 GB</td>
<td>15.74 GB</td>
<td>34.25 GB</td>
<td>68%</td>
<td>145</td>
<td>65.30%</td>
</tr>
</tbody>
</table>

Analysis for FSS-VA-DEMO-T1

Capacity trend with prediction

Current Allocation

Growth Rate 2.46 GB/Day

Used: 161.93 GB Free: 238.05 GB (59%)

Prediction Based on Usage Thresholds

- 90% full: < 81 Day(s)
- 95% full: < 90 Day(s)
- 100% full: < 98 Day(s)

Prediction Based on Time Thresholds

- 1 Week: 56%
- 1 Month: 42%
- 3 Months: 5%
- 6 Months: 0%
Intelligent Action

**Take Action** - Only FreeStor offers analytics and insight across heterogeneous storage environments, allowing users to take action, both proactively and reactively, as needed.

- Open Approach
- Move data
- User-Defined Smart Rules
- Proactively Detect & Alert
- Optimize & Simplify
- Point & Click Easily

![Diagram of data tiers and vendors]

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FreeStor – What’s New

- Centralized monitoring, analytics, and configuration
- New GUI to simplify and improve usability
- Historical and real-time trends and reports
- Streaming analytics and real-time insights
- Real-time performance, health and inventory monitoring
- Proactively detect and alert using real-time analytics
- Personalized, customizable dashboards
- Native iPhone/Android apps
- OpenStack Cinder Driver
- SAP Hana Certification
Customer Use Case
Key Challenges to Address

- **Migrations**: Move to a new platform WITHOUT downtime

- **Business Continuity**: Eliminate silos and point solutions, unify capability across applications and department

- **Vendor lock-in**: Remove limitations and costly licensing of features by each storage array vendor

- **Internal SLA fulfillment** for the business services

- **Flexibility** to react to business needs for new services
Outcome With FreeStor

- **Migrations**: Leverage existing investments while providing evolution path forward (new platforms/technology)

- **Business Continuity**: Improve Business Continuity/HA to active/active with synchronous replication across existing dis-similar storage arrays

- **Vendor lock-in**: Lower costs – savings from eliminating multiple feature licensing fees and maintenance will pay for and SDS platform

- **Internal SLA fulfillment**: Common data services across all storage, no longer array by array ensures consistent internal SLA’s

- **Flexibility**: Single console to manage storage infrastructure to reduce complexity/silos
THANK YOU

Q&A