SDS in Practice at Mission Community Hospital

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DataCore Software

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Agenda

- Why Software-defined Storage?
  - Customer example: Mission Community Hospital
  - DataCore Software-defined Storage
8 of 10 Healthcare Orgs are not Prepared for Disaster Recovery (DR) Incident

- **Data Loss**
  - 28% have experienced data loss in the past 12 months at a cost of $807,571 per incident
  - And of those, 39% have experienced 5 or more incidents in the past 12 months
  - Most Common causes: HW failure, Loss of Power, Loss of Backup Power

- **Unplanned Outage**
  - 40% have had an unplanned outage in the past 12 months at a cost of $432,000 per incident
  - On average, 57 hours of unplanned downtime over the past 12 months
  - Most Common Causes: HW failure, SW failure, data corruption

- **Summary**
  - 82% say their infrastructure is not fully prepared for a DR incident
  - Only 27% believe they are fully prepared to ensure continuous availability of electronic protected health information (ePHI) during outages
  - Only 50% are confident 100% of data can be restored per SLA
  - 56% would need 8 hours + to restore 100% of data

Source: Health IT Outcomes, February 10, 2014  *Link to Article*
Zero Downtime, Zero Touch

Zero Downtime
- Active/Active failover
- Same or different locations

Zero Touch Failover and Failback
- Completely automated
- Live maintenance (upgrades and migrations)

Lowest TCO
- Supports different storage environments on each side
- Use existing storage
**Stretch Cluster for Higher Availability**

Zero Downtime
- Active/Active failover
- Same or different locations

Zero Touch Failover and Failback
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Lowest TCO
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### Why Software-defined Storage (SDS)?

The right software must be able to do a few things...

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<thead>
<tr>
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<tbody>
<tr>
<td><strong>1</strong></td>
<td>Enable <strong>different</strong> storage devices to <strong>communicate</strong> with one another</td>
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<tr>
<td><strong>2</strong></td>
<td>Separate advances in <strong>software</strong> from advances in <strong>hardware</strong></td>
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<td><strong>3</strong></td>
<td><strong>Pool</strong> all storage capacity and provide centralized <strong>management</strong></td>
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<td><strong>4</strong></td>
<td>Make hardware maintenance, data migrations, and hardware refreshes <strong>easy</strong></td>
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- Why Software-defined Storage?
- Customer example: Mission Community Hospital
- DataCore Software-defined Storage
Creating an Enterprise Storage Strategy
Introduction to MCH

- 145 bed hospital located in Los Angeles area
- Specialize in acute, surgical & behavioral health
- 1K employees, including 500 physicians
- 7K in-patient visits per year
- 25K emergency room visits per year
MCH’s Clinical Objectives

- Provide high quality professional healthcare
  - Around the clock

- Reach more patients in northwest L.A.
Life-Critical Applications

- Paragon Integrated Clinical & Financial
  - Hospital Information System
  - Electronic Health Records (EHR)
- Horizon Patient Folder
  - Document management system
- Claims Administrator (Billing)
- Picture Archiving & Communication System (PACS)
MCH Storage Challenges

- Storage was primary DAS and NAS
  - Frequent downtime
  - Not enough performance
  - Maintenance & management complexity
- Cost constrained so storage based on projects
- Future: would be virtualizing apps & needed shared storage
  - Goal: Create tiered enterprise storage strategy
MCH Storage Goals

- High Availability for virtualized applications
- Simplify management
- Provide path for continual growth of data
- Cost-effectively raise performance levels to match needs of virtualized applications
  - Didn’t want tier 1 storage for everything
- Value more important than cost
Storage Options Considered

- Evaluated storage offerings from HP & Dell
- But,
  - Tied to that storage vendor
  - Only one vendor for diversity of projects
  - Adding capacity would be disruptive
  - No increase in functionality till renewal
    - New functionality would require buying new hardware platform
DataCore’s SDS Platform

- Virtualizes the storage layer
  - Deploy the best storage for each project in any tier from any hardware vendor
  - Lowest TCO
- Single pane management across all storage hw
- Add functionality without any disruption
  - Add functionality sooner than HW refresh
  - Functionality available for all storage HW
    - Not just for that storage system / device
MCH Infrastructure

- 20 physical hosts
  - 16 VMware vSphere
  - 4 Windows Servers
- 300+ VMs
- Dell R720 servers
- 120 TBs of storage
- FC
  - XIOtech
  - Dell Compellent
- iSCSI
  - HP MSA
  - Dell EqualLogic
Goal: No Downtime

- Synchronous mirroring across storage devices
  - One storage device failed, but data still available to apps
  - Able to take a storage device offline without affecting applications
- 2 years without any data outages
  - Since purchase & deployment of DataCore
Goal: Simplified Management

- Single administrative pane
- Easy to create virtual drives
- Storage maintenance during normal hours
  - Instead of nights and weekends

![Graph showing Time to Provision Capacity reduction](image)

Minutes

- Previous: 16 minutes
- DataCore: 2 minutes

87% Reduction
Goal: Easy Expansion

- Moving to full Electronic Health Record system
- Needed additional 20 TBs
- Previously, would have taken 1 week or more to get new capacity online
- With DataCore
  - A few hours, during normal business hours, with no downtime
Goal: High Performance

- Quite a few SQL databases in environment
- PACS system (CARESTREAM)
  - 2 Oracle DBs → write & retrieve large files
  - Recommended to NOT virtualize due to storage I/O bottlenecks
  - Virtualized with DataCore → No performance issues
Supercharged Performance

Response Time

- Database Restores
- PACS
- Screen Refresh

Before
After
Real-time & Historical Performance Charting
Deploying DataCore SDS Platform

- Migrate apps from physical to virtual machines
- Reconnect drives behind DataCore
  - “Pass-through” disks
- Incorporate additional storage arrays
Current Infrastructure with DataCore

- Environment has become more stable
- Significantly less (~90%) pages after hours
  - Previously, had lots of latency issues with slow applications, including clinical applications and email
- Also, great support team
  - Much better support than larger storage vendors
Why Software-defined Storage?
Customer example: Mission Community Hospital
DataCore Software-defined Storage
3X or better on price performance!
DATACORE PARALLEL I/O TECHNOLOGY

**WITHOUT PARALLEL I/O**

I/O processed sequentially...

**WITH PARALLEL I/O**

I/O processed in parallel...
DataCore SDS Platform is the Foundation for Responsive IT

- Healthcare Information Systems
- Electronic Health Records
- PACS / Radiology & Vendor Neutral Archives
- Claims Administration & Billing
- Electronic Document Management
- Payroll & Human Resource Management
- Mail, Messaging & Collaboration

Rapid data access
Optimal use of capacity
Continuous data availability
Full Stack of Storage Services

DataCore SANsymphony SDS Platform

**PERFORMANCE**
- High Speed Caching
- Auto-tiering
- Random Write Accelerator
- Quality of Service (QoS)

**AVAILABILITY**
- Synchronous Mirroring
- Asynchronous Replication
- CDP
- Snapshots / Backups

**EFFICIENCY**
- Storage Pooling
- Thin Provisioning
- Data Migration
- Deduplication/Compression

**MANAGEMENT**
- NAS/SAN (Unified Storage)
- Centralized Management
- VVols
- Cloud Integration
- Analysis & Reporting

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Compelling Outcomes

**DEPLOY FLASH STORAGE**
- 79% improved performance by 3X or more

**BC / DR**
- 60% reduced storage-related downtime by 90% of more

**STORAGE EXPANSION**
- 82% reduced storage-related spending by 25% or more

**STORAGE REFRESH**
- 100% saw a positive ROI in the first year
<table>
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<tr>
<th><strong>30,000+ Deployments Worldwide</strong></th>
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<tr>
<td><strong>10,000+ Customers</strong></td>
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<td><strong>Companies in all Industries &amp; Sizes</strong></td>
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<tr>
<td><strong>Market: Software-defined Storage</strong></td>
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<tr>
<td><strong>Technology: Storage Virtualization &amp; Parallel I/O</strong></td>
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Main Offices:
- Australia
- Germany
- France
- Japan
- UK
- USA
Thank You!

www.datacore.com
When HealthCare IT Under Delivers ...

- Staff suffers recurring lapses in information access
- Patients wait too long for service
- Get sicker as a result of avoidable errors
- Costs rise to correct & recover

Source: Gartner

Top Actions for Healthcare Delivery Organizations CIOs, G00261524
DataCore Speeds up Digital Transition

- Medical Imaging
- Electronic Health Records
- Regulatory Compliance

Funding & Time Constraints
Sample HealthCare Case Studies

NewYork-Presbyterian
Mount Sinai Medical Center
Community Health Network
Maimonides Medical Center
BlueCross BlueShield of Alabama
Mission Community Hospital
Kingsbrook Jewish Medical Center
American Society of Health-System Pharmacists
Spectrum Health

1000s of Healthcare customer sites
Case Study: NewYork-Presbyterianian

Challenges

- Downtime (Planned & unplanned)
- Explosive expansion

Benefits

- 100% Availability
- Seamless migration
- Seamless scaling
- Seamless Data Center move

<table>
<thead>
<tr>
<th>Capacity</th>
<th>&gt; 2PB</th>
<th>Mirrored</th>
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<tbody>
<tr>
<td>Users</td>
<td>5000</td>
<td>Doctors / Nurses / Staff</td>
</tr>
<tr>
<td>Servers</td>
<td>300+</td>
<td>Dell - Windows, Solaris, AIX</td>
</tr>
<tr>
<td>Clusters</td>
<td>MSCS, HACMP, VMware</td>
<td></td>
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<tr>
<td>Storage</td>
<td>EMC VNX, DMX, CX</td>
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<tr>
<td>Years</td>
<td>13</td>
<td>4 hardware refreshes</td>
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Case Study: BlueCross BlueShield of Alabama

Challenges
- 400TB Capacity
- High availability
- Limited budget

Solution
- DataCore SANsymphony-V
  - Dell R900 Servers
  - Hitachi VSP

Benefits
- High Availability - Metro Mirror
- Rapid implementation < 30 days
- Successful launch of BlueCloud
- Avoid Vendor Lock-in
Case Study: Southern New Hampshire Health System

Challenges
- Multiple Brands of Storage
- Additional Capacity Growth
- Downtime avoidance (metro-cluster)

Solution
- DataCore SANsymphony-V
  - Dell R720 Servers
  - EMC VNX-2 and EQL 6500 / 6510

Benefits
- High Availability - Metro Mirror
- Avoid Vendor Lock-in
Case Study: Englewood Hospital

- Reduced Downtime
- Performance Gains
- Improved IT Responsiveness
- Decreased storage-related spending
Case Study: Maimonides Medical Center

Metro-wide synchronous mirroring between diverse storage

MAIMONIDES MEDICAL CENTER
- 24x7x365 Critical Patient Care
- 8+ years without storage-related downtime
"If DataCore was not in the picture we would definitely need to hire more people to maintain the storage and buy more equipment and this would mean millions of dollars that we would have to spend."

Gabriel Sandu
CTO

Maimonides Medical Center