Moving Data and Distributing Data

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Sun’s Enterprise Archive Alternatives

Structured Data

SAP
Oracle

Primary Database

Database Archive

Database Backup

Unstructured Data

Email
Audio/Video
Images

Applications and User Data

Long-term Preservation & Retention Archive

Green Archive

Primary Access/Ingest

Replication

NFS

Remote Disk, Tape Libraries & Virtual TL

SAM-FS (IAS)

Capacity Disk Unified Storage or JBOD

Tiered Storage Management Assured Delete

Tiered Storage Management

Encryption

Assured Delete

Local Tape

VTL

Data Deduplication

Encryption

Tiered Storage Management

Encryption

Local Tape

VTL
Challenge: Manage Data for 75++ Years

• HW typically only backward compatible N-1
• Yearly capacity increases
• Every 2-5 years HW becomes obsolete:
  > Need to migrate current data to newer HW components
  > Replace compute parcels
  > Replace FC Parcel for performance and capacity
  > Replace tape drives and media to current technology
  > Replace SATA parcels for capacity / footprint
• Minimize vulnerability
• HW migration is inevitable; PLAN for it
What's SNIA Doing About All This?

- Educates, Defines and Taking Action to Address Industry Challenges
- Specific Activities
  - XAM – eXtensible Access Method
  - Self-Contained Information Retention Format (SIRF)
    - Rationale & Objectives
    - Requirements & Use Cases
  - Bridging Terminology
  - Green Storage Initiative
  - Cloud Storage Initiative (CSI)
What is XAM?

• XAM is a SNIA Architecture
  > The XAM Architecture spec defines the normative semantics of the API for use by applications and implementation by storage systems and standardizes metadata and services across XAM compliant systems

• XAM is an Application Programming Interface (API)
  > The XAM Java API spec defines the binding of the XAM Architecture to the Java Language
  > The XAM C API spec defines the binding of the XAM Architecture to the C Language

• XAM is SNIA Software
  > The XAM SDK provides a common library and reference implementation to promote widespread adoption of the standard
The need for MetaData Standards

- Which can contains corn?
- Open the cans.
- How much does it cost?
- Ask the clerk.
- How many calories does it have?
- Ask the vendor.
- How does the store automatically manage inventory?
- They can’t.
MetaData Standards

Standardized labeling allows multiple vendors to consistently represent information to consumers.

Extended labeling for LOB uses...
What's Sun Doing About All This?

- Open Source/Standards Community Engagement
- Specific Activities
  - Open Solaris – ZFS (Hybrid Storage Pool)
  - Open Storage
  - Cloud Computing
The Evolution of Data Storage:

- **DAS**: Direct Attached Storage
- **SAN**: Storage Area Network
- **NAS**: Network Attached Storage
- **OSD**: Object Storage Device
- **ISD**: Intelligent Storage Device
What is ZFS?
A new way to manage data

**End-to End Data Integrity**
With check-summing and copy-on-write transactions

**Immense Data Capacity**
The world's first 128-bit file system

**Easier Administration**
A pooled storage model – no volume manager

**Data Services**
Snapshots Clones Replication

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FS/Volume Model vs. ZFS

**Traditional Volumes**
- Abstraction: virtual disk
- Partition/volume for each FS
- Grow/shrink by hand
- Each FS has limited bandwidth
- Storage is fragmented, stranded

**ZFS Pooled Storage**
- Abstraction: malloc/free
- No partitions to manage
- Grow/shrink automatically
- All bandwidth always available
- All storage in the pool is shared
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Integrated Data Services
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ZFS Snapshots

Provide a read-only point-in-time copy of file system
Copy-on-write makes them essentially “free”
Very space efficient – only changes are tracked
And instantaneous – just doesn't delete the copy
Open Storage/Open Archive Anatomy

Open Storage Appliances
- Sun Storage 7110
- Sun Storage 7210
- Sun Storage 7310
- Sun Storage 7410

Storage Servers
- SunFire X4240
- SunFire X4250
- SunFire X4540
- CMT Servers

Open Storage Arrays
- Storage J4200
- Storage J4400
- Storage J4500

SAS HBA's

Open Storage Flash
- SSD

File-Systems
- ZFS
- Lustre
- SAM/QFS
- pNFS

ZFS - opensolaris - SAM-QFS

Replication
Security
Mirror/Snap
Search
Encryption
De-duplication
Migration
Backup
Compliance
Thank You
for
Your Time and
Attention

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