Storage Architectures
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The following is intended to outline our general product direction. It is intended for information purposes only, and may not be incorporated into any contract. It is not a commitment to deliver any material, code, or functionality, and should not be relied upon in making purchasing decisions. The development, release, and timing of any features or functionality described for Oracle’s products remains at the sole discretion of Oracle.
Systems Vision
Hardware and Software
Engineered to Work Together

Making IT Simpler
Hardware and Software
Engineered to Work Together

System Characteristics:
- Engineered and Tested together
- Certified and Packaged together
- Deployed and Managed together
- Supported and Upgraded together

Architecture Principles:
- Complete Solutions
  Built on Open Standards
  Integrated by Engineering
Hardware and Software
Engineered to Work Together

Customer Benefits

- Innovation delivered faster
- Better performance, reliability, security
- Shorter deployment times
- Easier to tune, manage and upgrade
- Lower cost of ownership
- Reduced change management risk
- One-stop support
Transforming The Technology Stack
Vertical Integration Across the Stack

Traditional

Software, Compute, Storage

Optimized Core

Optimized Systems and Solutions

Cloud

Engineered Systems

Transforming Best-In-Class components to Best-In-Class Solutions

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Oracle’s Complete Storage Portfolio

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<tr>
<th>Exadata</th>
<th>Exalogic</th>
<th>Unified Storage</th>
<th>FC Array Storage</th>
<th>Tape and Virtual Tape</th>
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<td><img src="image2" alt="Exalogic" /></td>
<td><img src="image3" alt="Unified Storage" /></td>
<td><img src="image4" alt="FC Array Storage" /></td>
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<th>Flash Storage</th>
<th>Enterprise Software</th>
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<td>Management, Analytics, Data Replication/Copy, Deduplication, Compression, Encryption, Hybrid Storage Pools, ZFS, Lustre, SAM/QFS, ACSLS, CAM, DTrace Analytics, Oracle Secure Backup, ELS, Crypto Key Management, Oracle 11g ASM, Oracle 11g Partitions, Oracle 11g Smart Flash Cache, Oracle 11g Advanced Compression</td>
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Flash Storage
Storage Challenges
Why Applications Don’t Perform

- Server throughput is limited by storage today
- Faster Servers only wait faster for storage
- Application performance remains sluggish
- More DRAM and "short-stroking" disks are expensive and inefficient
New Storage Architecture

Server
- Multi-Core, Multi Socket CPUs
- High Performance DRAM

Flash
- Performance Affinity
- High Performance Flash Devices

Storage
- Capacity Expansion
- High Capacity HDDs
Example: Flash vs. Disk

1.6M IOPS of HDDs:
3,000 Disks
14 racks
54 kWh

1.6M IOPS of Flash:
1 Flash Array*
1 rack unit
0.3 kWh

Flash Saves 180x the Power and 672x the Rack Space

* Sun F5100 Flash Array
New Inflection Point in Storage
Price of Flash to Overtake HDDs Within the Decade

“50% of the hard disk market will no longer exist in 5 years, and none of it will exist in 10 years (except in museums).”

- Editor, StorageSearch.com, Nov. 2009

Source: Oracle study
Oracle Enterprise Flash Storage Portfolio
Comprehensive and Complete

Accelerate Your Application
Reduce Operating Costs

Flash Modules*
Embedded in Servers and Flash Array

Flash Drives (2.5” & 3.5” SSDs)
Optional with Servers and Storage

Flash Accelerator*
Flash PCIe card for Servers

Flash Array*
Compact Storage Device

• Based on Sun Flash Fire SLC Technology - delivering the highest level of performance, durability and reliability
Unified Storage

Oracle Sun ZFS Storage Appliance
Sun Storage 7000 Systems

Breakthrough Storage Economics

Gain significant cost savings

• **Reduce** your footprint and power bill
• **Speed** – Better price/performance
• **Reduce** operational costs with **simple** data management
• No additional software license fees
• Enjoy a Single Point of Contact (SPOC) with Oracle Services

• Fastest ramping storage product in Sun/Oracle history
• In first year and half:
  • Shipped over 4000+ systems
  • Shipped over 100 PB+ of storage
Oracle Solaris™ OS –
The Heart of Unified Storage Systems
Sun Unified Storage
Best Speed and Efficiency

Only Storage Appliance with Hybrid Storage Pools (HSPs)

• Data is intelligently and automatically migrated between DRAM, Flash and Disk
• Continuously optimizes storage system performance and efficiency
• Simplifies management, transparently managed as a single storage pool
• Combines high density 7200 RPM SAS drives with Read and Write SSD for best price/performance
• Delivers great performance while reducing rack space and power consumption per TB dramatically
STANDARD FEATURES (ALL MODELS)
All Data Protocols: FC, iSCSI, IB, NFS, CIFS, WebDAV, etc.
Advanced Data Services: Snap, dedup., compression, replication, etc.

CLIENTS AND APPLICATIONS (ALL MODELS)
Oracle Solaris • Oracle Linux
Oracle Database, Middleware, and Applications
Oracle VM • VMware • Windows
More than 50 business applications supported

NEW BENEFITS
Best Density and Scale: Industry-leading density, scale up to 1PB for Consolidation
Flash Everywhere and More Of It: Industry-leading flash capacity for Application Performance
Doubled the Processing Power: Performance to drive enterprise Data Protection
Tape Storage
Oracle StorageTek Tape
Trusted Technology

10 of the top 10 Financial Institutions rely on Oracle StorageTek Tape

10 of the top 10 Telecommunications Companies rely on Oracle StorageTek Tape

8 of the top 10 Pharmaceutical Companies rely on Oracle StorageTek Tape
Oracle StorageTek Tape Portfolio

- Highest scalability
- Industry-leading reliability and availability
- Best TCO
- Best investment protection

Software

Device Management
Data Management
Tiered Storage
Virtualization
Encryption
StorageTek T10000C Tape Drive

Product Details

5 TB native – 10 TB compressed 2:1
Performance: 240 MB/sec native
Investment protection:
  Legacy read head that reads
    StorageTek T10000A & B tapes
  Media re-use at higher capacity with
    next Generation 4 drive
2 GB buffer
SL8500, SL3000, rack-mount
2 x 4Gb ports for full redundancy
Native FC & FICON connectivity
  (without external control unit)
SAM-QFS & Archive
The Painful Truth about Archives

Data will live forever

- Hardware: 3-10 Years
- Software: 5-20 Years
- Data: forever

People will come and go

Economic conditions will change
Enterprise Class Archive Software
SAM: Virtual Disk for Archive Applications

- Reduces operating costs by providing data classification and customer policy-based data movement across tiers of storage
- Unlocks the value of previously-untapped archived corporate data by providing rapid access and a consistent view across tiered storage
- Supports IT governance and compliance with access logging and WORM support
- Uses open data format for customer flexibility and long-term access of data
- Migrates data to new media transparently to application
SAM-QFS Overview

Enterprise Network

SAM-QFS Server
(Solaris)

Releaser

Disk Cache

Archiver

Stager

Archive Media

Recycler
Oracle and SAM QFS

• The SAM/QFS customer base is critical to Oracle’s success.
• We will invest the resources to ensure that archive technologies are is best-in-class, reliable and delivered as promised.
• We will continue to offer world-class support and design features to protect our existing customers’ investment.
• We will evolve SAM/QFS and complimentary technologies to provide unique capabilities and compelling economic benefits to our customers in protecting, preserving and managing their data.
Questions..