

SOFTWARE. HARDWARE. COMPLETE.

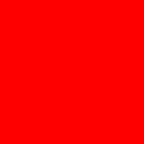


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Oracle Systems / Storage Product Briefing

John Fowler

Executive Vice President



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.

Sun Hardware

Mission Critical Apps In Demanding Environments



10 of the top 10 Global Banks

10 of the top 10 Telecommunications Companies

Server • Storage • Network • Solaris & Linux

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Complete. Open. Integrated.

Integrating Technologies To Better Your Business



- Performance
- Reliability
- Security
- Management
- Quality

Sun Oracle Database Machine

The First Generation of Engineered Systems



- Best for DW
 - Run data intensive query processing in storage grid
 - **10x compressed tables**
 - Up to 50TB of data in scalable PCI Flash
- Best for OLTP
 - Only database that scales real-world applications on grid
 - **Smart flash cache for 20x IOP's or 20x fewer disks**
 - **Up to 50x compression for archival data**
 - Secure, fault tolerant
- Best for Consolidation
 - Only database machine that runs and scales all workloads
 - Predictable response times in multi-database, multi-application, multi-user environments

Server Strategy

Deliver The Best Open Servers For Oracle Applications



Sun SPARC Enterprise Servers

Sun Fire Servers

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SPARC Technology Direction

- Delivering Mission Critical RAS
- Extending SPARC performance leadership
 - 2x plus performance improvement every 2 years
 - Scale to 1,000s of threads and multiple TBs of memory
- Eliminating complexity, improving execution
 - One SPARC architecture
 - One Operating System
 - One System Management solution
 - One Virtualization solution
- Accelerated deployment, reduced risk

SPARC Enterprise Servers

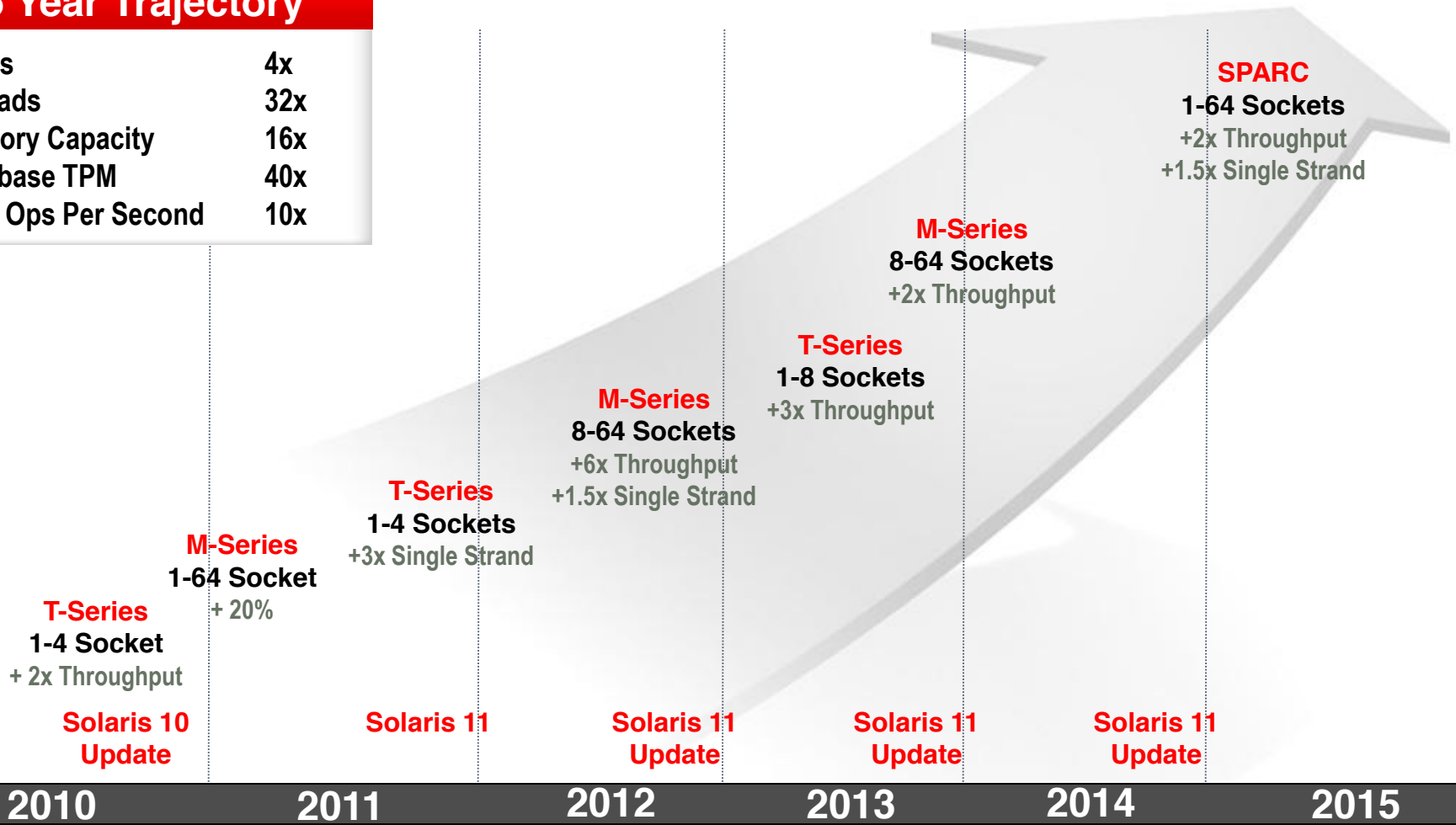
Maximizing Results

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SOLARIS

5 Year Trajectory

Cores	4x
Threads	32x
Memory Capacity	16x
Database TPM	40x
Java Ops Per Second	10x



2010

2011

2012

2013

2014

2015

T-Series
1-4 Socket
+ 2x Throughput

Solaris 10
Update

M-Series
1-64 Socket
+ 20%

T-Series
1-4 Sockets
+3x Single Strand

Solaris 11

M-Series
8-64 Sockets
+6x Throughput
+1.5x Single Strand

Solaris 11
Update

T-Series
1-8 Sockets
+3x Throughput

Solaris 11
Update

M-Series
8-64 Sockets
+2x Throughput

Solaris 11
Update

SPARC
1-64 Sockets
+2x Throughput
+1.5x Single Strand

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SPARC System Trajectory

	Today	2015	Improvement
Cores	32	128	4x
Threads	512	16,384	32x
Memory Capacity	4TB	64TB	16x
Logical Domains	128	256	2x
Operating System	Solaris 10	Solaris 11	countless
Database TPM	3M	120M	40x
Java Ops Per Second	5000	50,000	10x



Setting a New OS Standard

Solaris 11

**Next Generation Virtualized
Enterprise Operating System**

New Release Coming Soon

Oracle Solaris: The Mission Critical OS

If It Must Work, It Runs on Solaris

- The #1 deployment platform for the #1 mission critical Oracle Database
- **Extreme data integrity**: ZFS
- **Military-grade** security: Solaris Trusted Extensions
- Predictive **Self Healing**: FMA, SMF
- **Designed in Virtualization** with application isolation and security: Zones
- **Production Safe** Observability: DTrace
- Scales to thousands of threads, multiple terabytes of memory



Solaris Roadmap

Maximizing Integration

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SOLARIS

SPARC Trajectory

Cores	4x
Threads	32x
Memory Capacity	16x
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Java Ops Per Second	10x

Solaris 10
Platform Support
SW Integration

Solaris 11
Software Lifecycle
Scalability
Networking
Security

Solaris 11 Update
High-Availability
Memory Scalability
Virtualization

Solaris 11 Update
System Management
IO Scalability

Solaris 11 Update
Core Scalability

2010

2011

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2015

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Oracle VM



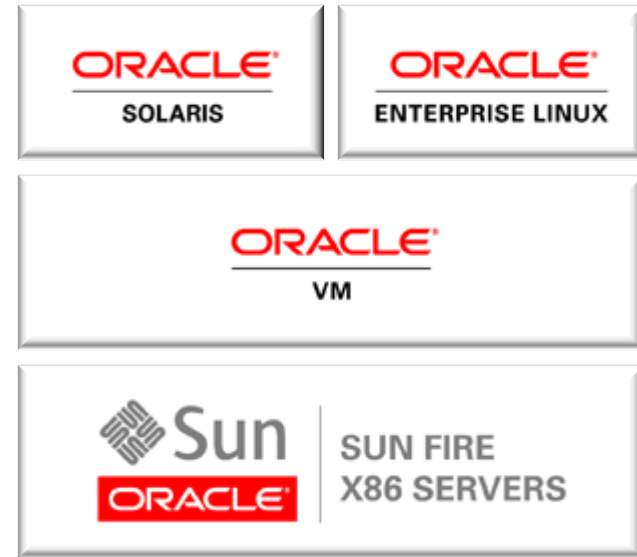
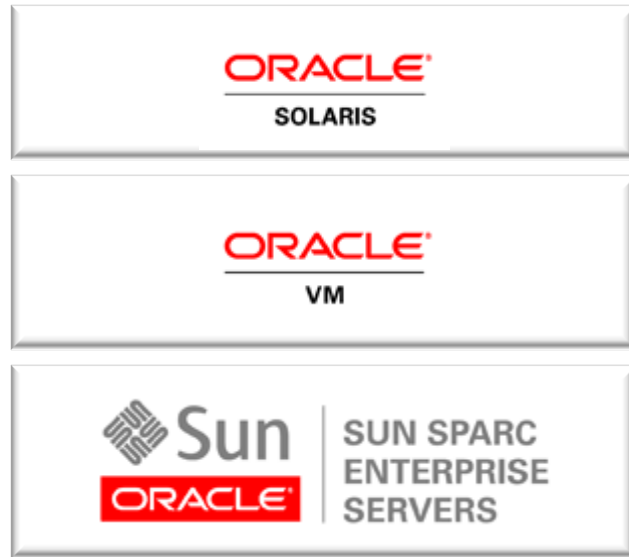
- For x86
 - Host Oracle Solaris, OEL, Windows
 - Proven Oracle Clusterware high availability
- For SPARC
 - Hundreds of domains per system
 - Scale up to number of T-Series threads
 - Predictive Self Healing integration
- Single management layer –
Hardware to Application

Oracle Enterprise Linux



- Management
 - Integrated with Oracle EM
 - Hosted by OVM, native
 - Provisioned with OpsCenter
- Quality
 - Certified configurations, testing, and tuning with Oracle
 - World wide support
- Specifically enhanced for Oracle
 - Oracle Clustering
 - Infiniband

Optimized Oracle Infrastructures

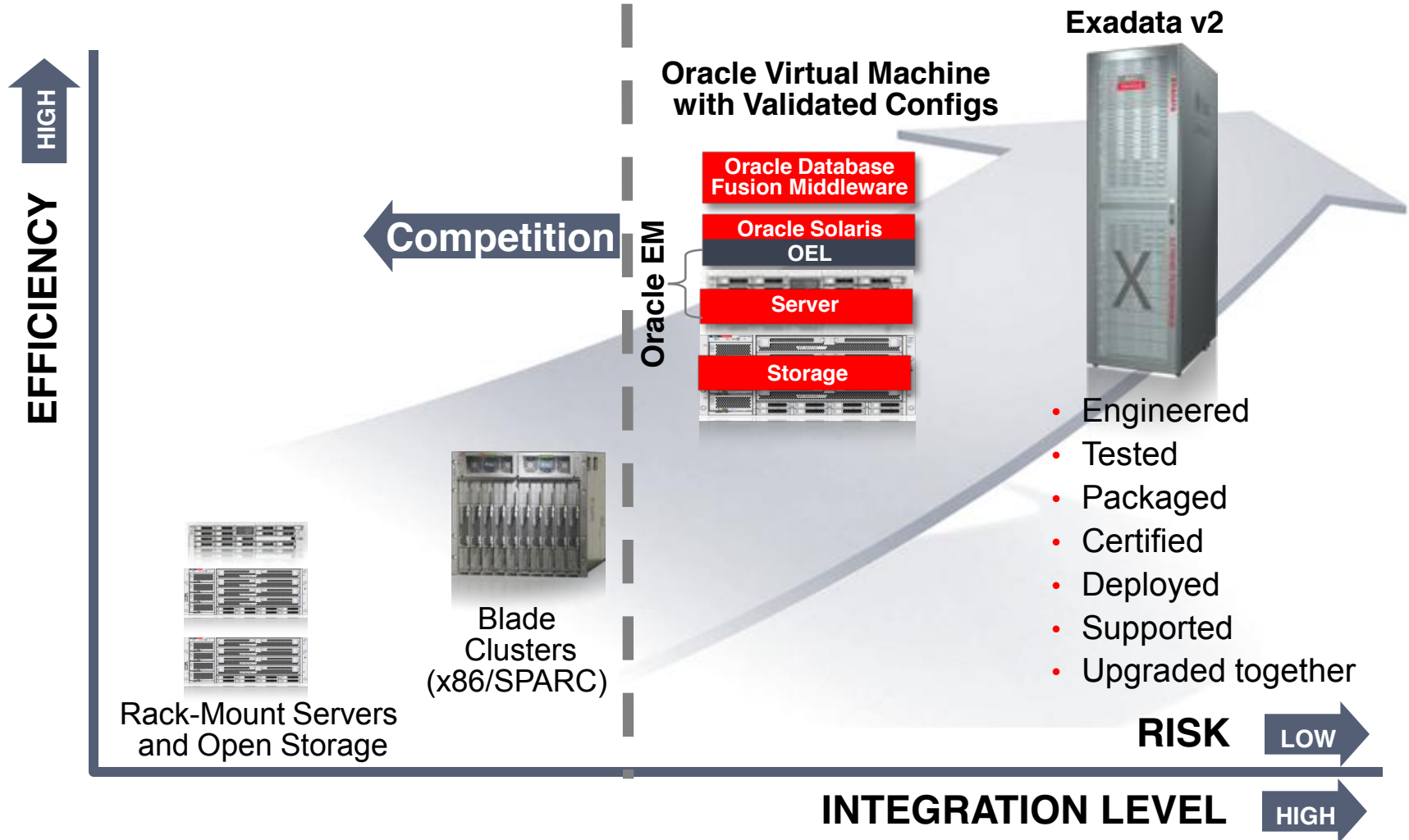


- Best symmetric multiprocessing (SMP) scalability
- Highest throughput per watt

- Best multi-operating system virtualization
 - Choice of Solaris or Linux

Oracle x86 Clusters

Open Application-to-Disk Solutions from a Single Vendor



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Storage Strategy

Delivering Technology Innovation



Oracle Storage Strategy

- **#1 Database and #1 Filesystem.** We engineer and tune them from the software all the way down to disk and flash controllers.
- Complete line of **enterprise-grade storage products**: database machine, disk, tape, flash, software and management tools.
- Oracle solution ecosystem tuned and validated on our storage platforms, with integrated support and phone-home telemetry.
- Work as best-of-breed for every use case or application; or combine with our software, servers, and networking for best tuned and integrated solution.

Storage Requirements and Solutions

Managing Your Data, Not Devices, Not Technology

Requirement	Challenges	Key Technologies	Strategy
Data Warehouse Business Analytics	IOPS, MB/s, Scale	Flash, Infiniband	Database Machine, Flash Acceleration, Infiniband Fabric
Private Cloud Global Namespace	\$/G, MB/s, Scale	Global Namespace Live Data Migration	Global Namespace for File and Block, Live Data Migration, N-Way Management
Data Protection Security, Compliance	\$/G, Key Management	Snap, Clone, Replicate Encrypt, Dedup, Compress	One unified stack, disk to tape, with all these primitives
Predictable Performance	QoS, Observability, Resilvering	CPU, I/O, and Network QoS Scheduling, Dynamic Real-Time Observability	Data Set QoS, Flash Hybrid Storage, DTrace Analytics

Oracle Storage

Leading HW and SW to Address Data Management Needs



Disk Storage

Primary

- Mission Critical Databases
- High-Performance Applications
- Flash Storage
- Hybrid Storage

Secondary

- Fixed Content
- Backup and Recovery
- Business Continuity
- Snap/Mirror/Replication
- Online Archive

Tape Storage

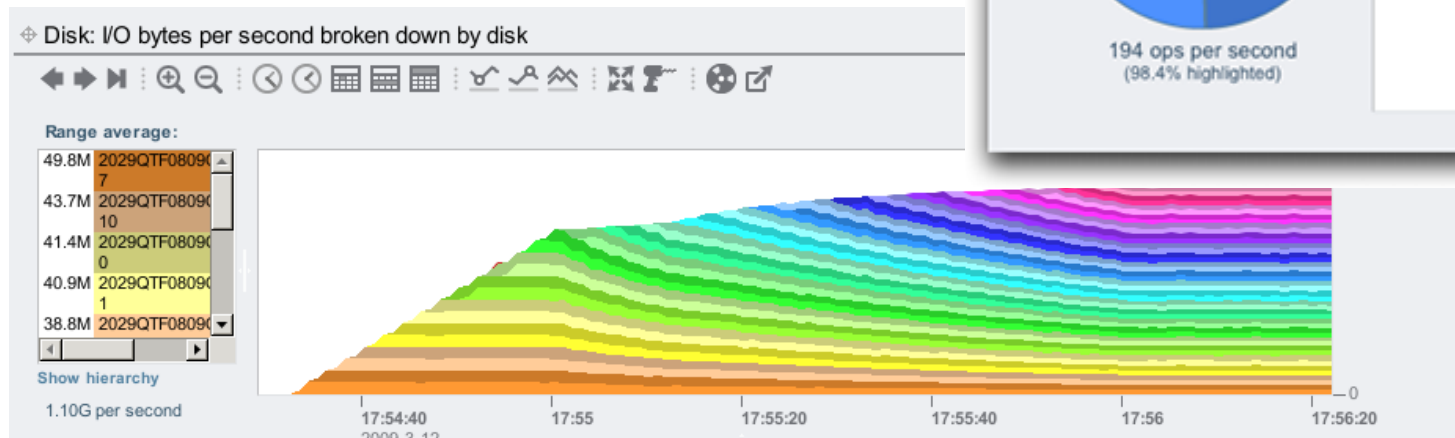
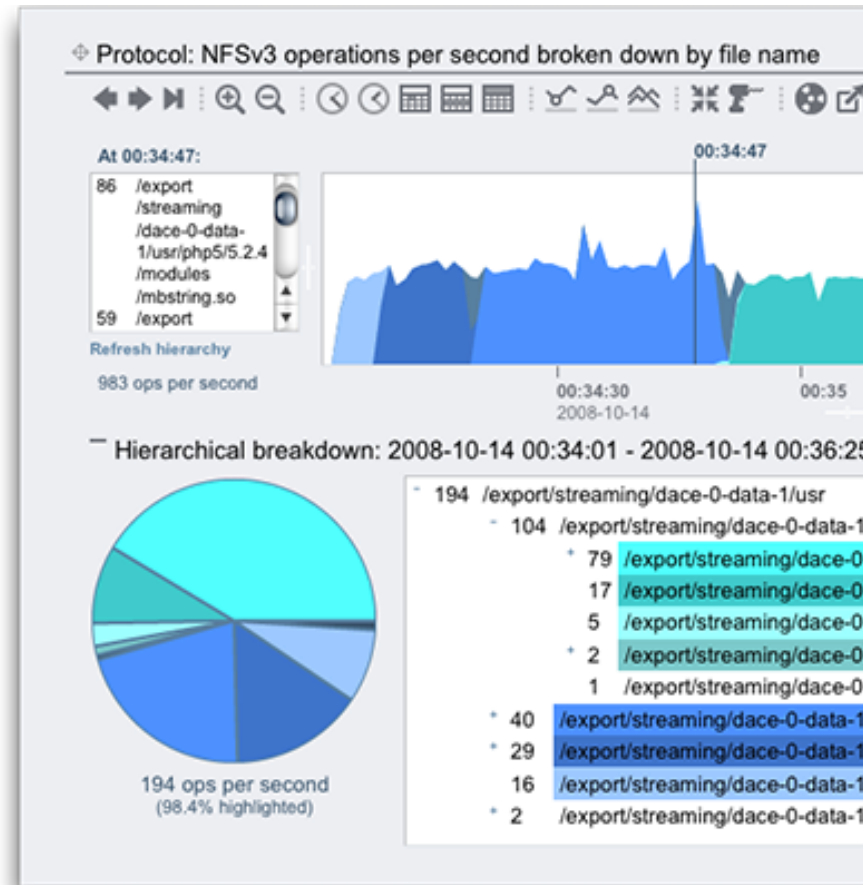
- Video, Medical, Data Archive
- Regulatory Compliance
- Disaster Recovery

Tiered Storage Software	Business Applications (11g partitions)	Unified Storage Hybrid Storage Pool	Archive Manager
Average Days Since creation	0 Days	30+ Days	90 Days to Forever
Recovery Time Objectives (RTO)	Milliseconds	Seconds	Minutes

ZFS Storage

With DTrace Analytics

- Dynamic real-time visualization of application and storage related workloads
- Simple yet sophisticated instrumentation provides real-time comprehensive analysis
- Supports multiple simultaneous application and workload analysis in real-time
- First and only storage system with this unique tuning + capacity planning capability



Disk Storage Technology Leadership

Innovation Connected to Value and Differentiation



- Database (Oracle)
 - Filesystem (ZFS)
 - Aggregate Throughput (Lustre)
 - High-Performance Cluster Storage (Lustre)
 - Flash Acceleration Capacity Shipped (Exadata + ZFS)
-
- First to ship unified FC, IB, 10GbE platform (ZFS Storage)
 - First to ship Triple-Parity RAID (ZFS Storage)
 - First to ship real-time storage Analytics (ZFS Storage)
 - First to ship Flash Hybrid Storage Pool (ZFS Storage)

Oracle Archive and Tape Drives

Industry Leading

5 Year Trajectory

Tape Capacity	12 - 20x
Tape Data rate	3.3 - 5x
Archive Capacity	12 - 20x
Archive Data Throughput	3.3 - 5x

SL8500
100 PB Capacity
276 TB/hr

SL8500
300 - 500 PB
Capacity
414 - 621 TB/hr

Gen3
3 - 5 TB Capacity
180 - 270 MB/sec

T10k-B
1 TB Capacity
120 MB/sec

SL8500
600 - 1000 PB
Capacity
621 - 920 TB/hr

Gen4
6 - 10 TB Capacity
270 - 400 MB/sec

SL8500
1.2 - 2.0 Exabyte
Capacity
920 - 1380 TB/hr

Gen5
12 - 20 TB Capacity
400 - 600 MB/sec

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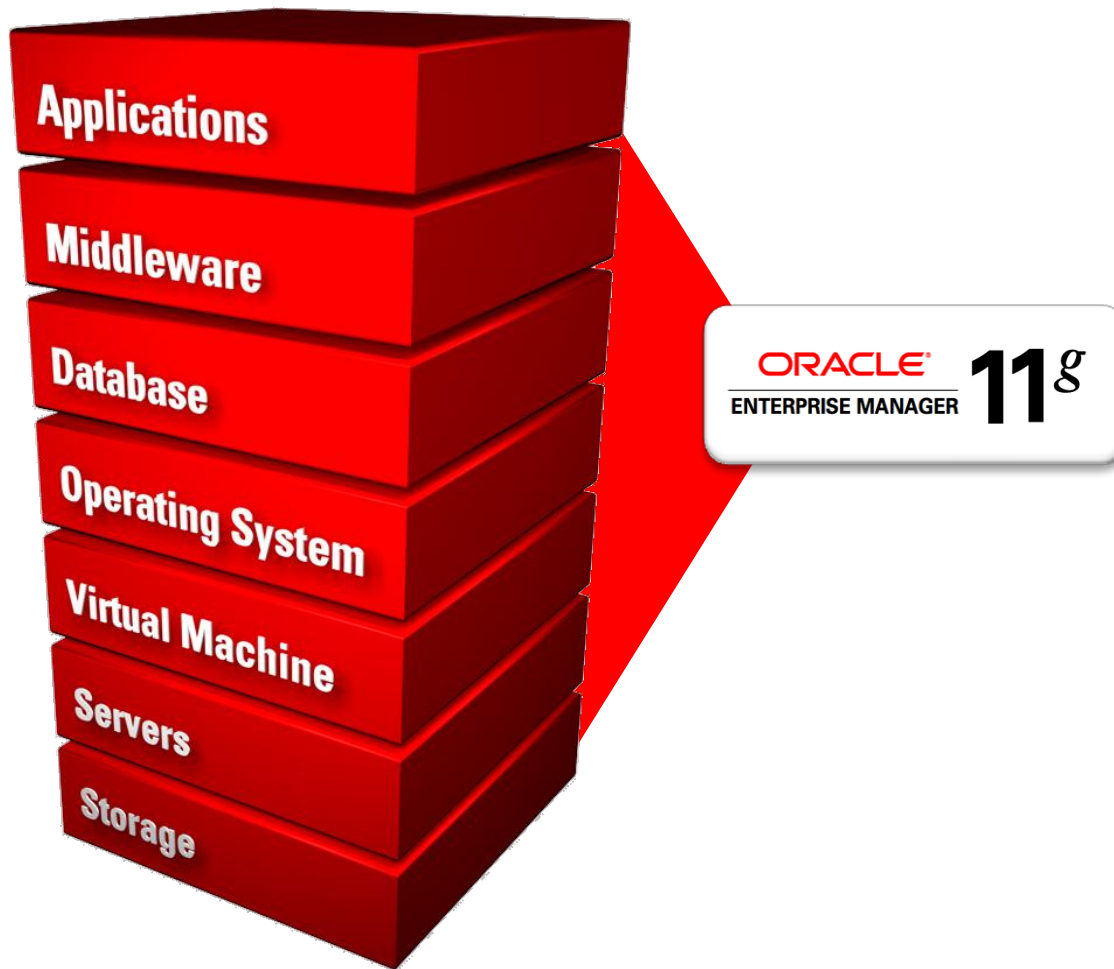
Storage Trajectory

Oracle Storage Scales at the Speed of Compute + I/O

	Today	2015	Improvement
Controller Throughput	2 GB/s	44 GB/s	15x
Cluster Throughput	240 GB/sec	3 TB/sec	12x
Write Performance	250K IOPS	8M IOPS	32x
Controller Capacity	576TB	30PB	50x
Cluster Capacity	20PB	400PB	20x
Tape Capacity	1TB	20TB	20x
Archive Capacity	100PB	2,000PB	20x
Tape Performance	120MB/sec	600MB/sec	5x
Archive Performance	276TB/hr	1.4PB/hr	5x

Oracle Enterprise Manager

Only Oracle Can Deliver Complete Stack Management



- Integrated manageability across the entire stack
- Best of breed manageability built into each tier
- Foundation for enterprise cloud computing

Managing Oracle Sun Systems with Ops Center

Deploy Oracle Sun Servers 90% Faster



- **Unified lifecycle management**
 - Discovery, provisioning, updating, monitoring & management
- **Physical & virtual systems mgmt**
 - SPARC & x86 servers
 - Solaris Containers
 - Oracle VM for SPARC (LDoms)
- **Rich operating systems support**
 - Oracle Solaris
 - Linux (Oracle Enterprise, Red Hat, SUSE)
 - Windows

Complete. Open. Integrated.

Integrating Technologies To Better Your Business



- Performance
- Reliability
- Security
- Management
- Quality

