

## ORACLE'S APPLICATION ENGINEERED STORAGE SYSTEMS PORTFOLIO

### HIGHLIGHTS

- Oracle offers a complete portfolio of products that combines storage, servers, software, and networking to deliver the most-innovative, performance-optimized solutions for the data center.
- Oracle All Flash FS1 Flash Storage System is engineered from the ground up expressly for Oracle Database performance and scale. It provides the industry's best all-flash capacity scaling, from one Oracle Database instance to hundreds of databases and to multitenant, pluggable databases—all in flash.
- Oracle ZFS Storage Appliances leverage a DRAM-centric architecture and an SMP operating system to deliver record performance and help enterprises realize up to a 75 percent cost savings over traditional storage solutions and can compress Oracle Database data up to 50x using Hybrid Columnar Compression.
- Oracle FS1-2 flash storage system is an enterprise-grade SAN storage system that is coengineered with Oracle software and optimizes data placement across flash and disk storage to maximize performance, efficiency, and cost based on usage profiles and business priorities.
- Oracle's StorageTek tape libraries, tape virtualization, tape drives, tape media, and tape device software are world-class solutions that scale to exabytes.
- High-performance, high-endurance enterprise-class SSDs and PCIe flash cards increase productivity and improve business response by accelerating databases and I/O-intensive applications while saving power and space.
- Ethernet, InfiniBand, and storage networking products allow the integration of Oracle's servers and storage into complete, high-performance infrastructure solutions.

### Taking Storage to the Extreme

Enterprises manage demanding applications with varying performance and latency requirements and access increasing amounts of data. They need computing power and powerful storage systems that match their needs and budget, where and when it matters most. Oracle's products and solutions can support business needs from end to end, throughout the lifecycle of a data center.

More than 40 years of storage expertise and innovative thinking have gone into creating Oracle's full portfolio of storage products: Oracle All Flash FS1 Flash Storage System, Oracle ZFS Storage Appliance, Oracle FS1-2 flash storage system, and Oracle's StorageTek tape storage products. These application engineered storage systems offer some of the highest performing, most reliable, scalable, and energy-efficient systems in the industry while providing unique coengineering benefits when used with Oracle Database and Oracle Applications and while reducing total cost of ownership. As core building blocks for mission-critical enterprise computing, enterprise application environments, virtualization, and cloud deployments, these storage systems help data center managers reduce costs, conserve energy, and operate more efficiently.

### The Right Solutions for Your Needs

The deployment of IT resources is vital to your enterprise. You want to plan your IT projects carefully so that you can select the right servers, storage products, and infrastructure to maximize performance and reduce TCO. An open and scalable design approach lets you mix and match Oracle's compute, storage, and network components so that all resources in the data center work as a powerful and integrated system, driving better efficiency across the IT infrastructure and supporting your business needs from end to end.

### Warranty Programs


Visit [Oracle Hardware Warranty Support](#) for information on Oracle's global warranty support for its hardware products.

### How to Use This Guide

This guide features all of Oracle's storage systems, with each section listing the full line of products and their specifications. Visit [Application Engineered Storage](#) for more information on Oracle's storage portfolio.




Read [Oracle's Full Line of Integrated Server Systems](#) to learn about all of Oracle servers.

## All-Flash Storage Solutions



ORACLE ALL FLASH FS CONTROLLER SPECIFICATIONS		
		
Cache and I/O Ports—Oracle All Flash FS Controller (High-Availability Pair)		
	<b>Oracle All Flash FS Controller</b>	
CPU	4 Intel E5-2620 CPUs (24 cores, 2.0 GHz)	
Cache	384 GB RAM cache/32 GB NV-DIMM	
Maximum cache hold-up time (after power failure)	Infinite hold-up time (using Oracle FS1 energy storage modules with super capacitors and Oracle-designed flash-backed DIMM modules)	
Host ports	12 ports –16 Gbit FC	
Storage ports	Standard 12 ports (six 6-Gbit 4-lane SAS-2 HBAs)	
Oracle All Flash FS Storage Drive Enclosure Specifications		
Maximum disk configurations	<ul style="list-style-type: none"> <li>SSD capacity: 912 TB maximum</li> <li>Maximum of 30 drive enclosures</li> </ul>	
Drive Enclosure Types		
Oracle Storage Drive Enclosure DE2-24P	2U rack size with twenty-four 2.5-inch drive bays	
Drive Enclosures		
SSD Types/Usage	Drive Enclosure Layout	Total Capacity
SSD (2.5-inch SAS-2)	13 x 400 GB drives	5.2 TB
	7 x 400 GB drives	2.8 TB
	19 x 1.6 TB drives	30.4 TB
	13 x 1.6 TB drives	20.8 TB
	7 x 1.6 TB drives	11.2 TB
Oracle All Flash FS Controller Dimensions, Power, and Environmental Specifications		
Rack Options	Description	
Racked	All components rackmounted, cabled, tested, and shipped as a complete system.	
Not racked	All components rackmounted, cabled, and tested. Components then are removed from the rack and packaged individually for installation in a customer's own rack.	
Oracle All Flash Oracle FS1 Controller (per node)		
Power Specifications		
Frequency	50 Hz–60 Hz	
Rated line voltage	100–240 VAC	
Rated input current	100–127 VAC 12.0 A, 200–240 VAC 5.9 A	
Maximum power	830 watts	

Dimensions/Weight		
Height	8.74 cm (3.4 in.) 2U per node	
Width	44.5 cm (17.5 in.)	
Depth	52.8 cm (20.8 in.) including PDU handles	
Weight	18.5 kg (40.8 lb.)	
Environmental Specifications	Operating	Nonoperating
Temperature	5°C–35°C	–40°C–70°C
Relative humidity	10%–90% noncondensing	Up to 93% noncondensing
Oracle All Flash FS Storage Drive Enclosure Dimensions, Power, and Environmental Specifications		
Dimensions		
Height	8.89 cm (3.5 in.) 2U per enclosure	
Width	45 cm (17.7 in.)	
Depth	55.5 cm (22 in.)	
Weight (maximum with all slots populated)	24 kg (52.9 lb.)	
Environmental Specifications—Power and Thermal		
Power (varies with drive type and activity)	Typical: 379 watts, maximum: 889 watts	
BTU (typical/maximum)	Typical: 1,108 BTU/hr., maximum: 2,385 BTU/hr.	
Environmental Specifications	Operating	Nonoperating
Temperature	5°C–35°C	–40°C–70°C
Relative humidity	10%–85% noncondensing	5%–95% noncondensing
Oracle All Flash FS Storage System Regulations (meets or exceeds the following requirements)		
Regulations <sup>1, 2, 3</sup>	<ul style="list-style-type: none"> <li>Product safety: UL/CSA 60950-1, EN 60950-1, IEC 60950-1 CB Scheme with all country differences</li> <li>EMC</li> <li>Emissions: FCC CFR 47 Part 15, ICES-003, EN55022, EN61000-3-11, EN61000-3-12</li> <li>Immunity: EN55024</li> <li>Emissions and Immunity: EN300 386</li> </ul>	
Certifications <sup>2</sup>	<ul style="list-style-type: none"> <li>North America (NRTL)   European Union (EU)   International CB Scheme</li> <li>BIS HSE Exemption (India)   BSMI (Taiwan)   RCM (Australia)</li> <li>Customs Union   EAC (Customs Union)   CCC (PRC)</li> <li>MSIP (Korea)   VCCI (Japan)</li> </ul>	
European Union Directives	<ul style="list-style-type: none"> <li>2006/95/EC Low Voltage Directive</li> <li>2004/108/EC EMC Directive</li> <li>2011/65/EU RoHS Directive</li> <li>2012/19/EU WEEE Directive</li> </ul>	
<p>1. All standards and certifications referenced are to the latest official version. For additional detail, please contact your sales representative.</p> <p>2. Other country regulations/certifications may apply.</p> <p>3. In some cases, as applicable, regulatory and certification compliance were obtained at the component level only.</p>		

## NAS Storage Solutions




ORACLE ZFS STORAGE APPLIANCE			
			
Name	Oracle ZFS Storage Appliance Racked System	Oracle ZFS Storage ZS5-2	Oracle ZFS Storage ZS5-4
Processor	8x 18-core 2.6 GHz Intel® Xeon® processors	4x 18-core 2.3 GHz Intel® Xeon® processors	8x 18-core 2.6 GHz Intel® Xeon® processors
Main memory	3 TB per cluster system	1.5 TB per cluster system	3 TB per cluster system
Read-optimized flash	Up to 614 TB per cluster system	Up to 1204 TB	Up to 486 TB
Write-optimized flash	Up to 28 TB per cluster system	Up to 12 TB	Up to 38 TB
Mass Storage			
Max. storage	6.9 PB	3 PB	9 PB
Network			
Integrated network	8x 10Gb Base-T Ethernet ports	8x 10Gb Base-T Ethernet ports	8x 10Gb Base-T Ethernet ports
Optional network connectivity	40 Gigabit Ethernet, 10 Gigabit Ethernet, QDR InfiniBand HCA., 16 Gb FC HBA		
Optional tape backup HBA	Dual channel 16 Gb FC HBA		
Power/Cooling			
Power	<a href="#">Please refer to Oracle's Power Calculator</a>	<a href="#">Please refer to Oracle's Power Calculator</a>	<a href="#">Please refer to Oracle's Power Calculator</a>
Altitude (operating)	Up to 3000 m		
Nonoperating temperature/humidity (single, nonrack system)	-40°C to 68°C (-40°F to 154°F), up to 90% relative humidity, noncondensing		
Rack units	42U for system rack	2U	3U
Physical Specifications (controller only)			
Height	1998 mm (78.66 in.)	87.1 mm (3.43 in.) 2U (rack units)	129.9 mm (5.1 in.) 3U (rack units)
Width	600 mm (23.62 in.)	445 mm (17.52 in.)	436.5 mm (17.2 in.)
Depth	1200 mm (47.24 in.)	640 mm (25.2 in.)	732 mm (28.8 in.)
Weight	630 kg (1389 lb.)	17.5 kg (38.5 lb.)	40 kg (88 lb.) max.
File system	Oracle Solaris ZFS (128-bit addressability)		
Warranty/Service			
Warranty/service	<a href="#">Oracle Technical Support Policies</a>	<a href="#">Oracle Technical Support Policies</a>	<a href="#">Oracle Technical Support Policies</a>


## SAN Storage Solutions

ORACLE FS1-2 FLASH STORAGE SYSTEM			
			
Oracle FS1-2 Specifications			
Oracle FS1-2 Controller (High-Availability Pair)			
	Base Controller	Performance Controller	
CPU	4 Intel E5-2620 CPUs (24 cores, 2.0 GHz)		
Cache	64 GB RAM cache/16 GB NV-DIMM	384 GB RAM cache/32 GB NV-DIMM	
Maximum cache hold-up time (after power failure)	Infinite hold-up time (using Oracle FS1-2 energy storage modules with super capacitors and Oracle-designed flash backed DIMM modules)		
Host ports	4 to 12 ports (2 to 6 CNAs/HBAs) –16 Gbit FC		
Storage ports	Standard 4 ports (two 6 Gbit 4-lane SAS-2 HBAs) Optional factory-installed 8 ports (four 6 Gbit 4-lane SAS-2 HBAs)	Standard 12 ports (six 6 Gbit 4-lane SAS-2 HBAs)	
Maximum drive enclosures	<ul style="list-style-type: none"> <li>• 10 drive enclosures (standard)</li> <li>• 20 drive enclosures (with optional factory-installed storage 8-port option)</li> </ul>	<ul style="list-style-type: none"> <li>• Maximum of 30 drive enclosures</li> </ul>	
Maximum storage capacity (raw)	<ul style="list-style-type: none"> <li>• SSD capacity: 304 TB (10 drive enclosures) or 608 TB (20 drive enclosures) maximum</li> <li>• Disk drive capacity: 1920 TB (10 drive enclosures) or 3840 TB (20 drive enclosures) maximum</li> </ul>	<ul style="list-style-type: none"> <li>• SSD capacity: 912 TB maximum</li> <li>• Disk drive capacity: 5,760 TB maximum</li> </ul>	
Oracle's Storage Drive Enclosure Specifications			
Drive Enclosure Types			
Oracle Storage Drive Enclosure DE2-24P	2U rack size with twenty-four 2.5-inch drive bays		
Oracle Storage Drive Enclosure DE2-24C	4U rack size with twenty-four 3.5-inch drive bays		
Drive Enclosures			
SSD Types/Usage	Drive Enclosure Layout	Total Capacity per Drive Enclosure	Drive Enclosure Type
SSD (2.5-inch SAS-2)	13 x 400 GB drives	5.2 TB	Oracle Storage Drive Enclosure DE2-24P (2U)
	7 x 400 GB drives	2.8 TB	Oracle Storage Drive Enclosure DE2-24P (2U)
	19 x 1.6 TB drives	30.4 TB	Oracle Storage Drive Enclosure DE2-24P (2U)
	13 x 1.6 TB drives	20.8 TB	Oracle Storage Drive Enclosure DE2-24P (2U)
	7 x 1.6 TB drives	11.2 TB	Oracle Storage Drive Enclosure DE2-24P (2U)
HDD Types/Usage	Drive Enclosure Layout	Total Capacity per Drive Enclosure	Drive Enclosure Type
Performance disk drive (2.5-inch SAS-2)	24 x 1.2 TB 10 K RPM drives	28.8 TB	Oracle Storage Drive Enclosure DE2-24P (2U)
Capacity disk drive (3.5-inch SAS-2)	24 x 8 TB 7,200 RPM drives	192 TB	Oracle Storage Drive Enclosure DE2-24C (4U)

<b>Oracle FS1-2 Controller and Oracle FS Pilot Dimensions, Power, and Environmental Specifications</b>		
<b>Rack Options</b>	<b>Description</b>	
Racked	All components rackmounted, cabled, tested, and shipped as a complete system.	
Not racked	All components rackmounted, cabled, and tested. Components then are removed from the rack and packaged individually for installation in a customer's own rack.	
<b>Power Specifications</b>		
	<b>Base Controller</b>	<b>Performance Controller</b>
Frequency	50 Hz – 60 Hz	50 Hz – 60 Hz
Rated line voltage	100 – 240 VAC	100 – 240 VAC
Rated input current	100 – 127 VAC 7.2 A 200 – 240 VAC 3.4 A	100 – 127 VAC 12.0 A 200 – 240 VAC 5.9 A
<b>Dimensions/Weight—Oracle FS Pilot and Oracle FS1 Controller</b>		
	<b>Oracle FS Pilot (per node)</b>	<b>Oracle FS1 Controller (per node)</b>
Height	42.6 mm (1.7 in.)	87.4 mm (3.4 in.)
Width	436.5 mm (17.2 in.)	445.0 mm (17.5 in.)
Depth	737.0 mm (29 in.)	527.8 mm (20.8 in.) including PDU handles
Weight	18.9 kg (40.0 lb.)	18.5 kg (40.8 lb.)
<b>Environmental Specifications—Operating</b>		
Temperature	5°C – 35°C	
Relative humidity	10% – 90% noncondensing	
<b>Environmental Specifications—Nonoperating</b>		
Temperature	–40°C – 70°C	
Relative humidity	Up to 93% noncondensing	
<b>Oracle's Storage Drive Enclosure Dimensions, Power, and Environmental Specifications</b>		
<b>Dimensions</b>	<b>2U</b>	<b>4U</b>
Height	3.5 in. (8.89 cm), 2U	6.89 in. (17.5 cm), 4U
Width	17.7 in. (45 cm)	19.0 in. (48.3 cm)
Depth	22 in. (55.5 cm)	24.8 in. (63.0 cm)
Weight (maximum with all drive bays populated)	52.9 lb. (24 kg)	101.4 lb. (46 kg)
<b>Environmental Specifications—Power and Thermal</b>		
Typical power	325 watts	469 watts
Maximum power	699 watts	699 watts
Typical BTU	1,108 BTU/hr.	1,600 BTU/hr.
Maximum BTU	2,385 BTU/hr.	2,385 BTU/hr.
<b>Environmental Specifications—Operating</b>		
Temperature	5°C – 35°C	
Relative humidity	10% – 85% noncondensing	
<b>Environmental Specifications—Nonoperating</b>		
Temperature	–40°C – 70°C	
Relative humidity	5% – 95% noncondensing	
Warranty/service	<a href="#">Oracle Technical Support Policies</a>	

## Tape Storage


TAPE LIBRARIES			
			
Name	Oracle's StorageTek SL8500 Modular Library System	Oracle's StorageTek SL3000 Modular Library System	Oracle's StorageTek SL4000 Modular Tape Library
Max. throughput/hr., native; alternative tape drives provide varying throughput rates	<ul style="list-style-type: none"> <li>Enterprise-class StorageTek T10000D (640 drives, 252 MB/sec): 581 TB/hr.</li> <li>Mid-range StorageTek LTO 7 (640 drives, 300 MB/sec): 691 TB/hr.</li> </ul>	<ul style="list-style-type: none"> <li>Enterprise-class StorageTek T10000D (56 drives, 252 MB/sec): 51 TB/hr.</li> <li>Mid-range StorageTek LTO 7 (56 drives, 300 MB/sec): 60 TB/hr.</li> </ul>	<ul style="list-style-type: none"> <li>StorageTek T10000D (120 drives, 252 MB/sec): 104 TB/hr.</li> <li>StorageTek LTO 7 (120 drives, 300 MB/sec): 124 TB/hr.</li> </ul>
Max. capacity, native; alternative tape drives provide varying capacities	<ul style="list-style-type: none"> <li>Enterprise-class StorageTek T10000D (100,000 slots): 850 PB</li> <li>Mid-range StorageTek LTO 7 (100,000 slots): 600 PB</li> </ul>	<ul style="list-style-type: none"> <li>Enterprise-class StorageTek T10000D (5,925 slots): 50 PB</li> <li>Mid-range StorageTek LTO 7 (5,925 slots): 35 PB</li> </ul>	<ul style="list-style-type: none"> <li>StorageTek T10000D (9,004 slots): 76.5 PB</li> <li>StorageTek LTO 7 (9,004 slots): 54 PB</li> </ul>
Max. number of cartridge slots	100,000 slots	5,925 slots	9,004 slots
Number and type of tape drives	Up to 64 drives of any combination of supported drives, including Oracle's StorageTek T10000: Fibre Channel and FICON StorageTek LTO: Fibre Channel	Up to 56 drives of any combination of supported drives, including StorageTek T10000: Fibre Channel and FICON StorageTek LTO: Fibre Channel	Up to 120 drives of any combination of supported drives, including StorageTek T10000: Fibre Channel and FICON StorageTek LTO: Fibre Channel
Supported host platforms	A wide variety, including Oracle Solaris, z/OS, AS/400, AIX, HP-UX, Microsoft Windows, Linux; please check with your Oracle account rep for your specific environment.	Oracle Solaris, Oracle Linux, Microsoft Windows, UNIX, z/OS	Oracle Solaris, Oracle Linux, Microsoft Windows, UNIX
Any-cartridge Any-slot technology	Yes	Yes	Yes
Dimensions (H x W x D)	Min. configuration: 93.15 in. x 67.3 in. x 109.0 in. (236.6 cm x 170.81 cm x 276.9 cm)	Min. configuration: 77.5 in. x 36 in. x 48 in. (1.97 cm x 91.4 cm x 122.1 cm)	Min. configuration: 77.5 in. x 36 in. x 48 in. (1.97 cm x 91.4 cm x 122.1 cm)
Weight	Min. configuration: 3,300 lb. (1,497 kg)	Min. configuration: 790 lb. (361.1 kg)	Min. configuration: 790 lb. (361.1 kg)



TAPE LIBRARIES	
	
<b>Name</b>	<b>Oracle's StorageTek SL150 Modular Tape Library</b>
Max. throughput/hr., native; alternative tape drives provide varying throughput rates	Mid-range StorageTek LTO 7 (20 drives, 300 MB/sec): 22 TB/hr.
Max. capacity, native; alternative tape drives provide varying capacities	Mid-range StorageTek LTO 7 (300 slots): 1.8 PB
Max. number of cartridge slots	300 slots, Mid-range StorageTek LTO only
Number and type of tape drives	1 to 20 of Oracle's half-height StorageTek LTO 6 or StorageTek LTO 7 drives (FC, SAS)
Supported host platforms	Oracle Solaris, Oracle Linux, Microsoft Windows, UNIX
Any-cartridge Any-slot technology	No
Dimensions (H x W x D)	Min. configuration: 5.15 in. x 18.9 in. x 36.4 in. (13.08 cm x 48.1 cm x 92.5 cm)
Weight	Min. configuration: 47 lb. (21.5 kg)



TAPE DRIVES		
		
<b>Name</b>	<b>StorageTek T10000 Tape Drives</b>	<b>StorageTek LTO Tape Drives</b>
Average file access time (+load/thread)	StorageTek T10000D: 63 sec	StorageTek LTO 7: 67 sec StorageTek LTO 6: 61 sec (69 sec half-height)
Data transfer rate, native	StorageTek T10000D: 252 MB/sec (uncompressed) 630 MB/sec (with 2.5:1 compression)	StorageTek LTO 7: 300 MB/sec (uncompressed) 650 MB/sec (with 2.5:1 compression) StorageTek LTO 6: 160 MB/sec (uncompressed) 400 MB/sec (with 2.5:1 compression)
Capacity, native (uncompressed)	StorageTek T10000D: up to 8.5 TB*	StorageTek LTO 7: up to 6.0 TB StorageTek LTO 6: up to 2.5 TB
Interface	16 Gb FC, FICON	6 Gb SAS, 8 Gb FC (automation only)
Dimensions—automation (H x W x D)	3.5 in. x 5.75 in. x 16.75 in. (8.89 cm x 14.61 cm x 42.55 cm)	5.7 in. x 1.6 in. x 8.1 in. (14.47 cm x 4.1 cm x 20.82 cm)

\*Using Maximum Capacity feature


TAPE ENCRYPTION	
	
<b>Name</b>	<b>Oracle Key Manager 3</b>
Components	Consists of a cluster configuration (2–20) of Oracle's Netra SPARC T4-1 rack-mounted servers running Oracle Solaris 11 and each may contain an optional Sun Crypto Accelerator 6000 PCIe Card from Oracle
Standards/drives supported	FIPS 140-2 security requirements, CCM-AES-256 encryption, up to 2,000 drives (StorageTek T10000A, StorageTek T10000B, StorageTek T10000C, StorageTek T10000D, StorageTek T9840D, StorageTek LTO 4, StorageTek LTO 5, StorageTek LTO 6, StorageTek LTO 7), and 1,000,000 keys from a single Oracle Key Manager cluster

TAPE VIRTUALIZATION		
		
<b>Name</b>	<b>Oracle's StorageTek Virtual Storage Manager System 6 (StorageTek VSM System 6)</b>	<b>Oracle's StorageTek Virtual Library Extension (StorageTek VLE)</b>
Capacity per StorageTek VSM/VLE (at 4:1 compression)	10 TB – 1.6 PB* (at 10 TB increments)	200 TB – 1.6 PB* (scalable at 200 TB increments)
Max capacity (256 systems)	409 PB*	409 PB*
Host connectivity	Mainframe	Mainframe
Storage connectivity	8 FICON (Host/RTD) 8 Ethernet IP support (between StorageTek VLE, StorageTek VSM System 5, StorageTek VSM System 6)	16 Ethernet IP (connection to StorageTek VSM System 5)
Virtual tape libraries/drives/carts	256 virtual tape drives	N/A
Cache	128 GB (physical) 512 GB (effective—4:1 compression)	128 GB (physical) 512 GB (effective—4:1 compression)
Nonvolatile storage	1,752 MB (effective—4:1 compression)	N/A
Min. software requirements	Oracle's StorageTek Host Software Component (HSC) 6.2 / StorageTek Virtual Tape Control System (VTCS) 6.2, z/OS 1.1+	StorageTek HSC 6.2 / StorageTek VTCS 6.2, z/OS 1.1+



\* Effective capacity—assumes 4:1 compression

TAPE MEDIA		
		
<b>Name</b>	<b>Oracle's StorageTek T10000 T2 Data Cartridge</b>	<b>Oracle's StorageTek T10000 Data Cartridge</b>
Capacity, native (uncompressed)	StorageTek T10000D: up to 8.5 TB*, 1.6 TB (Sport) StorageTek T10000C: up to 5.5 TB*, 1 TB (Sport)	StorageTek T10000B: 1 TB, 240 GB (Sport) StorageTek T10000A: 500 GB, 120 GB (Sport)
Drive compatibility	StorageTek T10000D: Read/write (up to 8.5 TB) StorageTek T10000C: Read/write (up to 5.5 TB)	StorageTek T10000C/T10000D: Read only StorageTek T10000A/T10000B: Read/write
WORM or VolSafe secure media technology available	Yes	Yes
		
<b>Name</b>	<b>Oracle's StorageTek LTO Ultrium 7 Data Cartridge</b>	<b>Oracle's StorageTek LTO Ultrium 6 Data Cartridge</b>
Capacity, native (uncompressed)	6.0 TB	2.5 TB
Drive compatibility	StorageTek LTO 7: Read/write	StorageTek LTO 7: Read/write (at 2.5 TB) StorageTek LTO 6: Read/write

## Storage Networking

STORAGE NETWORKING			
			
Adapters	Sun Storage 16 Gb FC PCIe Universal HBA	Sun Storage 16 Gb FC ExpressModule Universal HBA	Sun Storage 6 Gb SAS PCIe HBA
Interface type	16 Gb FC or 10 GbE	16 Gb FC or 10 GbE	6 Gb SAS
Server compatibility	Oracle's x86 and SPARC PCIe servers	Oracle's blade servers and ExpressModule servers	Oracle's x86 and SPARC PCIe servers
Operating system	Oracle Solaris, Oracle Linux, Oracle VM, Red Hat Enterprise Linux, Novell SUSE Enterprise Linux, VMware, Microsoft Windows	Oracle Solaris, Oracle Linux, Oracle VM, Red Hat Enterprise Linux, Novell SUSE Enterprise Linux, VMware, Microsoft Windows	Oracle Solaris, Oracle Linux, Oracle VM, Red Hat Enterprise Linux, Novell SUSE Enterprise Linux, VMware, Microsoft Windows
Form factor / ports	PCIe low profile, two 16 Gb FC ports or two 10 GbE ports	ExpressModule, two 16 Gb FC ports or two 10 GbE ports	PCIe Low Profile, 8 ports (2 x 4 configuration)
Adapters	Sun Storage 10 GbE FCoE PCIe Converged Network Adapter	Sun Storage 10 GbE FCoE ExpressModule Converged Network Adapter	Sun Storage 6 Gb SAS ExpressModule HBA
Interface type	10 GbE FCoE	10 GbE FCoE	6 Gb SAS
Server compatibility	Oracle's x86 and SPARC PCIe servers	Oracle's blade servers and ExpressModule servers	Oracle's blade servers and ExpressModule servers
Operating system	Oracle Solaris, Oracle Linux, Oracle VM, Red Hat Enterprise Linux, Novell SUSE Enterprise Linux, VMware, Microsoft Windows	Oracle Solaris, Oracle Linux, Oracle VM, Red Hat Enterprise Linux, Novell SUSE Enterprise Linux, VMware, Microsoft Windows	Oracle Solaris, Oracle Linux, Oracle VM, Red Hat Enterprise Linux, Novell SUSE Enterprise Linux, VMware, Microsoft Windows
Form factor / ports	PCIe low profile, two 10 GbE ports	ExpressModule, two 10 GbE ports	ExpressModule, 8 ports (2 x 4 configuration)
Brocade Fibre Channel Switches	Brocade 6505 Switch	Brocade 6510 Switch	Brocade 6520 Switch
Form factor	1U	1U	2U
Speed/performance	16 Gb/sec Fibre Channel	16 Gb/sec Fibre Channel	16 Gb/sec Fibre Channel
Port count	24-48 Fibre Channel ports	24-48 Fibre Channel ports	48, 72, 96 Fibre Channel ports
Protocol support	Fibre Channel	Fibre Channel	Fibre Channel
Scalability	Full fabric architecture with maximum 239 switches	Full fabric architecture with maximum 239 switches	Full fabric architecture with maximum 239 switches
Optional software	12-port upgrade, integrated routing, adaptive networking, ISL trunking, Fabric Watch, Advanced Performance Monitoring	12-port upgrade, integrated routing, adaptive networking, ISL trunking, Fabric Watch, Advanced Performance Monitoring	24-port upgrade, integrated routing, adaptive networking, ISL trunking, Fabric Watch, Advanced Performance Monitoring
Brocade Backbone Directors	Brocade 8510-4	Brocade 8510-8	Brocade 300 Switch
Form factor	4U	8U	1U
Speed/performance	16 Gb/sec Fibre Channel	16 Gb/sec Fibre Channel	8 Gb/sec Fibre Channel
Port count	192 Fibre Channel ports	384 Fibre Channel ports	8-24 Fibre Channel ports
Protocol support	Fibre Channel	Fibre Channel	Fibre Channel
ICL bandwidth	16 ICLs provide the equivalent of 64 16-Gb/sec ports. Each ICL port provides 64 Gb/sec bandwidth over a QSFP (4x16 Gb/sec) link.	32 ICL ports provide the equivalent of 128 16-Gb/sec ports. Each ICL port provides 64 Gb/sec bandwidth over a QSFP (4x16 Gb/sec) link	Full fabric architecture with maximum 239 switches
Available blades	Brocade FX8-24 blade, Brocade 48 port 16 Gb blade	Brocade FX8-24 blade, Brocade 48 port 16Gb blade	8-port upgrade

## Flash Solutions

SUN FLASH ACCELERATOR		
		
Name	Oracle's Sun Flash Accelerator F40 PCIe Card	Oracle's Sun Flash Accelerator F80 PCIe Card
Storage type	Enterprise-class PCIe flash card	Enterprise-class PCIe flash card
Flash type (NAND)	400 GB usable (512 GB raw)	800 GB usable (1024 GB raw)
Storage capacity	4	4
Domains/controllers	149,250 IOPS read 121,018 IOPS write	155,193 IOPS read 133,390 IOPS write
Random I/O performance (8 K)	2.16 GB/sec read 1.06 GB/sec write	2.099 GB/sec read 1.25 GB/sec write
Sequential throughput performance (1 M)	PCI Express 2.0 (x8)	PCI Express 2.0 (x8)
Dimensions	Low-profile PCIe ( 2.7 x 6.6 inches)	Low-profile PCIe ( 2.7 x 6.6 inches)
Power	25 watts	25 watts
Features	<ul style="list-style-type: none"> <li>• Low latency</li> <li>• Very high random IOPS</li> </ul>	<ul style="list-style-type: none"> <li>• Low latency</li> <li>• Very high random IOPS</li> </ul>
Reliability	<ul style="list-style-type: none"> <li>• Enhanced endurance</li> <li>• Proactive monitoring</li> <li>• Power loss protection</li> </ul>	<ul style="list-style-type: none"> <li>• Enhanced endurance</li> <li>• Proactive monitoring</li> <li>• Power loss protection</li> </ul>
Usage	<ul style="list-style-type: none"> <li>• In-server flash cache (works with Oracle Database Smart Flash Cache software)</li> <li>• High-performance, low-latency PCIe storage</li> </ul>	<ul style="list-style-type: none"> <li>• In-server flash cache (works with Oracle Database Smart Flash Cache software)</li> <li>• High-performance, low-latency PCIe storage</li> </ul>
Applications	<ul style="list-style-type: none"> <li>• Databases (OLTP)</li> <li>• I/O-intensive application bottlenecked by slow disk I/O</li> </ul>	<ul style="list-style-type: none"> <li>• Databases (OLTP)</li> <li>• I/O-intensive application bottlenecked by slow disk I/O</li> </ul>
Warranty/service	<a href="#">Oracle Technical Support Policies</a>	<a href="#">Oracle Technical Support Policies</a>

## Contact Us

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