Integrated Cloud
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ORACLE'S APPLICATION ENGINEERED STORAGE SYSTEMS PORTFOLIO

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.

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All-Flash Storage Solutions

ORACLE ALL FLASH FS CONTROLLER SPECIFICATIONS

Cache and I/O Ports—Oracle All Flash FS Controller (High-Availability Pair)

	Oracle All Flash FS Controller
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	• SSD capacity: 912 TB maximum • Maximum of 30 drive enclosures

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[1],[2],[3]	- Product safety: UL/CSA 60950-1, EN 60950-1, IEC 60950-1 CB Scheme with all country differences - EMC - Emissions: FCC CFR 47 Part 15, ICES-003, EN55022, EN61000-3-11, EN61000-3-12 - Immunity: EN55024 - Emissions and Immunity: EN300 386
Certifications[2]	- North America (NRTL) | European Union (EU) | International CB Scheme - BIS HSE Exemption (India) | BSMI (Taiwan) | RCM (Australia) - Customs Union | EAC (Customs Union) | CCC (PRC) - MSIP (Korea) | VCCI (Japan)
European Union Directives	2006/95/EC Low Voltage Directive 2004/108/EC EMC Directive 2011/65/EU RoHS Directive 2012/19/EU WEEE Directive

1. All standards and certifications referenced are to the latest official version. For additional detail, please contact your sales representative.
2. Other country regulations/certifications may apply.
3. In some cases, as applicable, regulatory and certification compliance were obtained at the component level only.

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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 15-core 2.8 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 12.8 TB per cluster system	Up to 102.4 TB	Up to 230.4 TB (Up to 307 TB with Oracle Storage Drive Enclosure DE3*)
Write-optimized flash	Up to 28 TB per cluster system	Up to 12 TB	Up to 28 TB (Up to 38 TB with Oracle Storage Drive Enclosure DE3*)
Mass Storage			
Max. storage	6.9 PB	3 PB	9 PB (with Oracle Storage Drive Enclosure DE3*)
Network			
Integrated network	8x 10Gb Base-T Ethernet ports	8x 10Gb Base-T Ethernet ports	8x 10Gb Base-T Ethernet ports
Optional network connectivity	10 Gigabit Ethernet, QDR InfiniBand HCA, 8 Gb FC HBA, 16 Gb FC HBA		
Optional tape backup HBA	Dual channel 16 Gb FC HBA		
Power/Cooling			
Power	Please refer to Oracle's Power Calculator	Please refer to Oracle's Power Calculator	Please refer to Oracle's Power Calculator
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	Oracle Technical Support Policies	Oracle Technical Support Policies	Oracle Technical Support Policies

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ORACLE ZFS STORAGE APPLIANCE

Name	**Oracle ZFS Storage ZS4-4**	**Oracle ZFS Storage ZS3-2**
Processor	4x 15-core 2.8 GHz Intel® Xeon® processors	4x 8-core 2.1 GHz Intel® Xeon® processors
Main memory	3 TB per cluster system	512 GB per cluster system
Read-optimized flash	Up to 12.8 TB per cluster system	Up to 12.8 TB per cluster system
Write-optimized flash	Up to 28TB per cluster system	Up to 12.8 TB per system
Mass Storage		
Max. storage	6.9 PB	3.1 PB
Network		
Integrated network	8x 10Gb Base-T Ethernet ports	4x 10Gb Base-T Ethernet ports
Optional network connectivity	Gigabit Ethernet, 10 GbE, QDR InfiniBand HCA, 8 Gb FC HBA	
Optional tape backup HBA	Dual-channel 8 Gb FC HBA	
Power/Cooling		
Power	Please refer to Oracle's Power Calculator	Please refer to Oracle's Power Calculator
Altitude (operating)	Up to 3000 m, temperature is derated by 1°C per 300 m above 900 m	
Nonoperating temperature/ humidity (single, nonrack system)	-40°C to 70°C (-40°F to 158°F), up to 93% relative humidity, noncondensing	
Rack units	4U for controller, 4U for Oracle Storage Drive Enclosure DE2-24C, 2U for Oracle Storage Drive Enclosure DE2-24P	3U for controller, 4U for Oracle Storage Drive Enclosure DE2-24C, 2U for Oracle Storage Drive Enclosure DE2-24P
Physical Specifications (controller only)		
Height	129.9 mm (5.1 in.)	87 mm (3.43 in.)
Width	436.5 mm (17.2 in.)	445 mm (17.52 in.)
Depth	732.0 mm (28.8 in.)	527.8 mm (20.78 in.)
Weight	40 kg (88 lbs.) max	18.5 kg (40.8 lbs.)
File system	Oracle Solaris ZFS (128-bit addressability)	Oracle Solaris ZFS (128-bit addressability)
Warranty/Service		
Warranty/service	Oracle Technical Support Policies	Oracle Technical Support Policies

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[*] Oracle Storage Drive Enclosure DE3-24P and Oracle Storage Drive Enclosure DE3-24C planned availability CY2017

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	• 10 drive enclosures (standard) • 20 drive enclosures (with optional factory-installed storage 8-port option)	• Maximum of 30 drive enclosures
Maximum storage capacity (raw)	• SSD capacity: 304 TB (10 drive enclosures) or 608 TB (20 drive enclosures) maximum • Disk drive capacity: 1920 TB (10 drive enclosures) or 3840 TB (20 drive enclosures) maximum	• SSD capacity: 912 TB maximum • Disk drive capacity: 5,760 TB maximum

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 x1.6 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)

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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)

Oracle FS1-2 Controller and Oracle FS Pilot 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.

Power Specifications

	Base Controller	Performance Controller
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

Dimensions/Weight—Oracle FS Pilot and Oracle FS1 Controller

	Oracle FS Pilot (per node)	Oracle FS1 Controller (per node)
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.)

Environmental Specifications—Operating

Temperature	5°C – 35°C
Relative humidity	10% – 90% noncondensing

Environmental Specifications—Nonoperating

Temperature	–40°C – 70°C
Relative humidity	Up to 93% noncondensing

Oracle's Storage Drive Enclosure Dimensions, Power, and Environmental Specifications

Dimensions	2U	4U
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)

Environmental Specifications—Power and Thermal

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.

Environmental Specifications—Operating

Temperature	5°C – 35°C
Relative humidity	10% – 85% noncondensing

Environmental Specifications—Nonoperating

Temperature	–40°C – 70°C
Relative humidity	5% – 95% noncondensing
Warranty/service	Oracle Technical Support Policies

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Tape Storage

TAPE LIBRARIES			
Name	**Oracle's StorageTek SL8500 Modular Library System**	**Oracle's StorageTek SL3000 Modular Library System**	**Oracle's StorageTek SL150 Modular Tape Library**
Max. throughput/hr., native; alternative tape drives provide varying throughput rates	• Enterprise-class StorageTek T10000D (640 drives, 252 MB/sec): 581 TB/hr. • Mid-range StorageTek LTO 7 (640 drives, 300 MB/sec): 691 TB/hr.	• Enterprise-class StorageTek T10000D (56 drives, 252 MB/sec): 51 TB/hr. • Mid-range StorageTek LTO 7 (56 drives, 300 MB/sec): 60 TB/hr.	Mid-range StorageTek LTO 7 (20 drives, 300 MB/sec): 22 TB/hr.
Max. capacity, native; alternative tape drives provide varying capacities	• Enterprise-class StorageTek T10000D (100,000 slots): 850 PB • Mid-range StorageTek LTO 7 (100,000 slots): 600 PB	• Enterprise-class StorageTek T10000D (5,925 slots): 50 PB • Mid-range StorageTek LTO 7 (5,925 slots): 35 PB	Mid-range StorageTek LTO 7 (300 slots): 1.8 PB
Max. number of cartridge slots	100,000 slots	5,925 slots	300 slots, Mid-range StorageTek LTO only
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	1 to 20 of Oracle's half-height StorageTek LTO 6 or StorageTek LTO 7 drives (FC, SAS)
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	No
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: 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: 3,300 lb. (1,497 kg)	Min. configuration: 790 lb. (361.1 kg)	Min. configuration: 47 lb. (21.5 kg)

TAPE DRIVES

Name	StorageTek T10000 Tape Drives	StorageTek LTO Tape Drives
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

Name	Oracle Key Manager 3
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

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TAPE VIRTUALIZATION		
Name	**Oracle's StorageTek Virtual Storage Manager System 6 (StorageTek VSM System 6)**	**Oracle's StorageTek Virtual Library Extension (StorageTek VLE)**
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

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TAPE MEDIA

Name	**Oracle's StorageTek T10000 T2 Data Cartridge**	**Oracle's StorageTek T10000 Data Cartridge**
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

Name	**Oracle's StorageTek LTO Ultrium 7 Data Cartridge**	**Oracle's StorageTek LTO Ultrium 6 Data Cartridge**
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

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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 (4×16 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 (4×16 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

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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	• Low latency • Very high random IOPS	• Low latency • Very high random IOPS
Reliability	• Enhanced endurance • Proactive monitoring • Power loss protection	• Enhanced endurance • Proactive monitoring • Power loss protection
Usage	• In-server flash cache (works with Oracle Database Smart Flash Cache software) • High-performance, low-latency PCIe storage	• In-server flash cache (works with Oracle Database Smart Flash Cache software) • High-performance, low-latency PCIe storage
Applications	• Databases (OLTP) • I/O-intensive application bottlenecked by slow disk I/O	• Databases (OLTP) • I/O-intensive application bottlenecked by slow disk I/O
Warranty/service	Oracle Technical Support Policies	Oracle Technical Support Policies

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For more information about Oracle's servers, storage, and networking equipment, visit oracle.com or call +1.800.ORACLE1
to speak to an Oracle representative.

Oracle is committed to developing practices and products that help protect the environment

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