SUN ZFS STORAGE APPLIANCE

DELIVERING BEST-IN-CLASS PERFORMANCE, EFFICIENCY, AND ORACLE INTEGRATION

KEY FEATURES

- Advanced, intuitive management tools
- Real-time analysis and diagnostics for optimal performance
- Support for Oracle Hybrid Columnar Compression with Oracle Database delivers 10x to 50x compression ratios
- Sun ZFS Appliance Monitor for Apple iPhone/iPad remotely monitors multiple appliances
- Active-active cluster option
- Data compression and inline deduplication
- Optimized storage hierarchy with Hybrid Storage Pools containing dynamic random access memory (DRAM), flash cache, and hard disk drives (HDDs)
- High-performance NAS storage appliance with extensive SAN storage capabilities (unified storage)
- Seamless multiprotocol integration and secure data sharing between Microsoft Windows, Linux, and UNIX environments
- Exceptional results for all three major standard benchmarks: SPC-1, SPC-2, and SPECsfs

KEY BENEFITS

- Reduced complexity and simplified storage management
- High performance and high availability
- Reduced storage footprint, energy use, and cost with Oracle Hybrid Columnar Compression for Oracle Database
- Storage efficiency with integrated software
- Increased management efficiency with remote monitoring through iPhone/iPad
- Extreme performance and compelling economic advantages

Oracle's Sun ZFS Storage Appliance meets the most demanding enterprise storage requirements while delivering compelling economic advantages. Intelligent Hybrid Storage Pool architecture, a feature of the Sun ZFS Storage Appliance, and advanced compression technologies enable significant performance advantages while lowering capital costs. A unique set of management and analytics tools reduce time and complexity, lowering operating costs and simplifying management. The Sun ZFS Storage Appliance is an enterprise storage system offering extreme performance and efficiency.

Meeting Today's IT Challenges

Storage requirements are exploding for databases, virtualization, unstructured content, and data protection. One of the top requirements of today's storage applications is that they must provide both high performance and the ability to preserve and manage large volumes of file-based and/or block-based data. IT managers are being asked to continuously meet these growing storage capacity needs on flat or declining IT budgets—all while continuing to support high service levels for more and more users.

Sun ZFS Storage Appliance

The Sun ZFS Storage Appliance is Oracle's preferred NAS storage system with unified storage capability for enterprise tier 1 environments. It offers a rich set of enterprise-class data services, industry-leading performance, and Oracle Hybrid Columnar Compression—for Oracle Databases. These systems also feature a comprehensive and intuitive user interface and analytics environment that is unmatched in the industry in terms of its ease of use and simplicity. This reduces operating expenses by dramatically reducing management time and complexity. The Sun ZFS Storage Appliance design automatically optimizes performance over storage tiers, delivering breakthrough performance and simplifying storage management. The Sun ZFS Storage Appliance offers compelling economics along with extreme performance and efficiency for enterprise storage.

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Storage That Is Easy to Deploy, Analyze, and Optimize

Provisioning and management are dramatically simplified in the Sun ZFS Storage Appliance through the browser user interface that takes the guesswork out of system installation, configuration, and tuning.
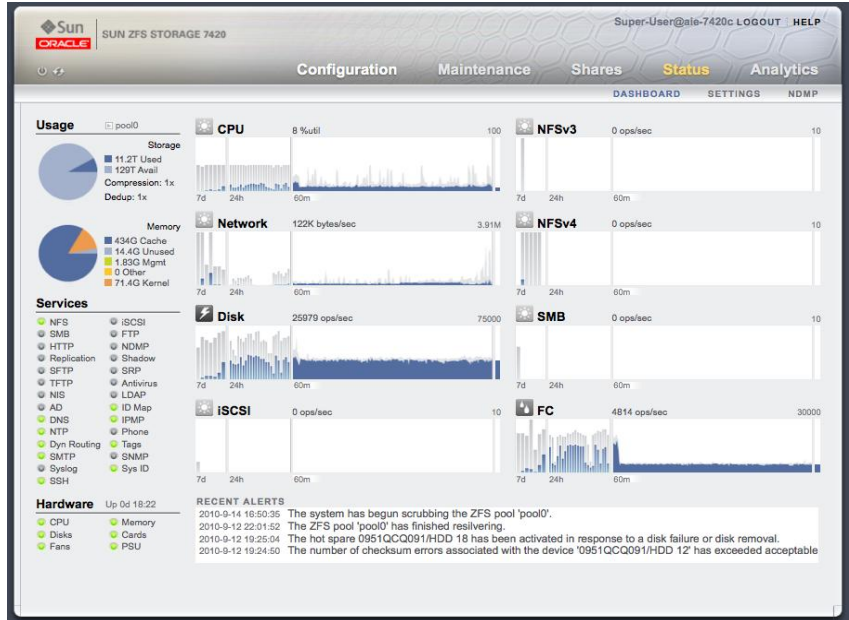

Figure 1. Real-time analytics increase storage optimization and reduce down time.

Administrators have all of the tools they need to quickly identify and diagnose system performance issues and debug live storage and networking problems before they affect the application infrastructure. Real-time analysis and monitoring functionality is provided by the award-winning DTrace Analytics software, a feature of the Sun ZFS Storage Appliance. DTrace Analytics uses built-in instrumentation to provide in-depth analysis of key storage subsystems. In addition, the Sun ZFS Storage Appliance family includes the comprehensive self-healing capabilities of Oracle's fault management architecture, which automatically and silently detects and diagnoses underlying system problems and automatically responds by taking faulty components offline.
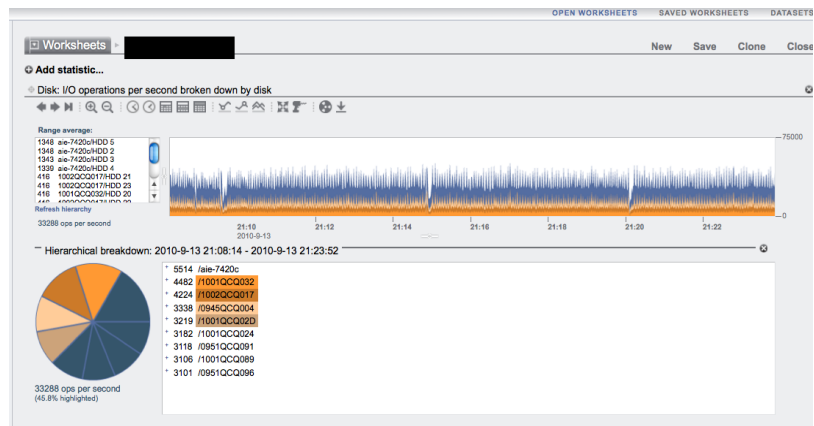

Figure 2. DTrace Analytics is intuitive and comprehensive for seamless optimization.

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Performance and Scalability to Meet Business Needs

To deliver high performance, the Sun ZFS Storage Appliance file system, Oracle Solaris ZFS, seamlessly optimizes performance. It is designed to recognize I/O patterns automatically and place data on the best storage media using Hybrid Storage Pools.

For example, Oracle Solaris ZFS transparently executes writes to low-latency solid-state drive (SSD) media so that writes can be acknowledged quickly, allowing the application to continue processing.

Then, Oracle Solaris ZFS automatically flushes the data to hard disk drives as a background task. Another type of SSD media acts as a cache to reduce read latency, and Oracle Solaris ZFS also transparently manages the process of copying frequently-accessed data into this cache to seamlessly satisfy read requests from clients.

This technology has allowed Oracle to post impressive results for all three major industry standard benchmarks (SPC-1, SPC-2, and SPECsfs), outperforming more expensive competitors in many cases.

Sun ZFS Storage Appliance also offers a high degree of flexibility in scalability. Disk shelves can be added to increase both capacity and performance, while flash cache and DRAM can be scaled independently in order to optimize the price/performance balance for specific workloads. I/O can also be added on an as-needed basis.

Sun ZFS Appliance Monitor for Apple iPhone and iPad

Access your Oracle Sun ZFS Storage Appliance remotely with Oracle's Sun ZFS Appliance Monitor for Apple iPhone and iPad, an easy-to-use, secure, graphical, and intuitive application that provides mobile monitoring, including DTrace Analytics. With the Sun ZFS Appliance Monitor you have the ability to check storage services, logs, I/O statistics, real-time analytics, component status, faults, and recommended repair procedures. The Sun ZFS Appliance Monitor is ideal for executives and storage administrators who need instant, on-the-go access to their storage system information. Available at the Apple App Store.

Figure 3. ZFS Storage Appliance Monitor for the iPhone and iPad

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Easy on Your Budget

The Sun ZFS Storage Appliance family offers configurations that deliver higher performance at costs lower than traditional storage solutions by using cost-effective components managed under the high-performance Hybrid Storage Pool architecture and providing a rich set of base software features. The configurations offer economic value by reducing energy consumption and data center space requirements through the use of 7,200 RPM drives and flash. Configurations with 3.5" 15,000 RPM and 2.5" 10,000 RPM drives are offered for customers who want to maximize performance for specific high I/O use cases involving uncached, random data.

Superior Oracle Integration

The Sun ZFS Storage Appliance is integrated with Oracle applications, such as Oracle Database, Oracle VM, and Oracle Enterprise Manager, to automate and simplify common storage management-related tasks, as shown with the following two application integrations.

• **Oracle Hybrid Columnar Compression for Oracle Database**
  Enterprises with NAS-based Oracle Databases with in-database archives for OLTP, data warehousing, or mixed workloads, can achieve 10x to 50x reductions in their data volumes by using Oracle Hybrid Columnar Compression on the Sun ZFS Storage Appliance. Unique to Oracle storage, this capability helps customers achieve 3x to 5x reductions in their storage footprints by replacing their existing storage with the Sun ZFS Storage Appliance, and significant performance gains because the data is moved in compressed format.

• **Oracle Snap Management Utility for Oracle Database**
  The Oracle Snap Management Utility for Oracle Database is a standalone management tool specifically engineered to work with the Sun ZFS Storage Appliance. It provides an efficient and automatic way to back up, restore, clone, and provision Oracle Databases that are stored on the Sun ZFS Storage Appliance, saving costs while increasing overall business productivity.

A Range of Configurations

To meet a variety of customer needs for capacity, price, and performance, the Sun ZFS Storage Appliance is available in three configurations, including dual cluster configurations that offer maximum availability. Each configuration comes bundled with the same software including data protocols, compression, and DTrace Analytics software, for system troubleshooting and performance optimization.

Sun ZFS Storage 7120

This easy-to-install storage appliance is ideal for small enterprises, departments, and remote offices of large corporations. It delivers 3.3 TB to 177 TB of raw capacity and provides customers with easy-to-use enterprise data management functionality at an entry-level cost.

Sun ZFS Storage 7320

The Sun ZFS Storage 7320 redefines midrange storage for enterprises, with simplified management, performance, efficiency, and seamless expansion to meet growth needs. It provides a high-availability, entry-level cluster option with scalability up to 432 TB raw capacity, and supports Hybrid Storage Pools that can be configured with up to 4 TB of read-optimized cache and optional write-optimized cache for enhanced application performance.

Sun ZFS Storage 7420

The Sun ZFS Storage 7420 is ideal for data-intensive business applications and for virtualized environments that require multiple data services and heterogeneous file sharing.

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Available in single or cluster configurations, it can expand to nearly 2.6 PB of raw capacity for extreme scalability.

Cluster Configurations

For customers who require maximum protection against downtime, Oracle's Sun ZFS Storage 7320 and Sun ZFS Storage 7420 appliances also support a two-node cluster configuration with no single points of failure. These cluster configurations feature active-active architecture that enables high performance and high availability to maximize business productivity.

Sun ZFS Storage Appliance Software	
Included Features	**Details**
File system	Oracle Solaris ZFS (128-bit addressability)
File-level protocol	NFS v2/v3/v4, CIFS, HTTP, WebDAV, FTP/SFTP/FTPS
Block-level protocol	ISCSI, Fibre Channel, iSER, SRP, IP over InfiniBand, RDMA over InfiniBand
Data compression	Four levels of data compression available
Oracle Hybrid Columnar Compression	3x to 5x reduction in storage footprint for customers with existing NAS- based Oracle Databases with in-database archives for OLTP, data warehousing, or mixed workloads
Data deduplication	Inline, block-level deduplication
Monitoring	DTrace Analytics (for system tuning and debugging); dashboard monitoring for key system performance metrics; plug-in for Oracle Enterprise Manager 10*g* Cloud Controller 1.0
Automated serviceability	"Phone Home" capability with automatic case creation, configurable alerts
RAID	Striping, mirroring, triple-mirroring single-parity RAID, double-parity RAID, triple-parity RAID, wide stripes
Remote management	HTTPS, SSH, SNMP v1/v2c, IPMI
Snapshots	Read only, restore, Microsoft Volume Shadow Copy Support (VSS)
Directory services	NIS, AD, LDAP
Data security	Checksum data and metadata, antivirus quarantine
Network services	NTP, DHCP, SMTP
Backup	NDMP v3/v4, ZFS NDMP
Local replication	Replication within same Sun ZFS Storage Appliance configuration (single or cluster)
Separately Licensed Features	**Details**
Clones	Writable snaphots
Remote replication	Replication from one Sun ZFS Storage Appliance product to another. 1:N, N:1, manual, scheduled, continuous
Oracle Snap Management Utility for Oracle Database	Fast, efficient, and automatic way to back up, restore, clone, and provision Oracle Databases that are stored on Sun ZFS Storage Appliance

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Sun ZFS Storage Appliance Configurations						
	Key Requirement	Maximum Storage Capacity	Space (Rack Units)	Write Optimized Flash	Read Optimized Flash	Cluster Option
Sun ZFS Storage 7120	Low-priced entry-level system with enterprise features	177 TB	2U/controller, 4U or 2U/disk shelf	73 GB	N	N
Sun ZFS Storage 7320	Mid-level enterprise storage with advanced capabilities	432 TB	1U/controller, 4U or 2U/disk shelf	Up to 1.8 TB	Up to 4 TB per active-active cluster	Y
Sun ZFS Storage 7420	Best price/ performance high-end enterprise storage	2.6 PB	3U/controller, 4U or 2U/disk shelf	Up to 10.5 TB	Up to 4 TB per active-active cluster	Y

Sun ZFS Storage Appliance Specifications			
	Sun ZFS Storage 7120	**Sun ZFS Storage 7320**	**Sun ZFS Storage 7420**
Architecture	Single controller only with integrated storage and optional disk shelf expansion.	Single controller or dual controller HA cluster with external disk shelf storage (stated specs assume active-active cluster)	Single controller or dual controller HA cluster with external disk shelf storage (stated specs assume active-active cluster)
Processor	1x 4-core 2.4 GHz Intel® Xeon® Processor	Up to 4x 4-core 2.4 GHz Intel® Xeon® Processors	Up to 8x 8-core 2.0 GHz or 10-core 2.4 GHz Intel® Xeon® Processors
Main memory	48 GB	192 GB to 288 GB	256 GB to 2 TB
Read flash cache	not available	0–4 TB	0–4 TB
Storage Configurations			
Configuration options	• 3.3 TB to 177 TB scalability • Base controller contains 11 HDDs and one SSD write accelerator • Option to add 0–2 additional disk shelves • 24 HDDs per additional disk shelf	• 6 TB to 432 TB scalability • Attach 1–6 disk shelves for storage • Choose 20 or 24 HDDs per disk shelf • If 20 HDDs, choose 0–4 SSD write accelerators per disk shelf	• 6 TB to 2.6 PB scalability • Attach 1–36 disk shelves for storage • Choose 20 or 24 HDDs per disk shelf • If 20 HDDs, choose 0–4 SSD write accelerators per disk shelf
Disk shelf / HDD options	• DE2-24C: SAS-2 3.5" 7,200 RPM (3 TB) HDDs • DS2: SAS-2 3.5" 15,000 RPM (300 GB or 600 GB) HDDs • DE2-24P: SAS-2 2.5" 10,000 RPM (300 GB or 900 GB) HDDs		
Standard and Optional Interfaces			
Integrated network	Four 10/100/1000 Base-T Ethernet ports		
Optional network connectivity	Quad Gigabit Ethernet UTP; Dual 10 GigE, QDR InfiniBand HCA, 8 Gb FC HBA		
Optional tape backup HBA	Dual channel 8 Gb FC HBA		
Maximum ports per system			
1GbE/10GbE/IB/FC	12/4/4/6	16/4/4/4	56/24/16/24

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Environmental	
Non-operating temperature/humidity (standalone, non-rack system)	-40°C to 70°C (-40°F to 158°F), up to 93% relative humidity, non condensing
Altitude (operating)	Up to 3000 m, temperature is derated by 1C per 300 m of elevation above 900 m *except in China markets where regulations may limit installations to a maximum altitude of 2km

Regulations (Meets or Exceeds the Following Requirements)			
Safety	UL 60950-1 2nd Ed, EN60950-1:2006 2nd Ed, CB Scheme with all country differences	UL 60950-1 2nd Ed, EN60950-1:2006 2nd Ed, CB Scheme with all country differences	IEC 60950, UL/CSA 60950, EN60950, CB Scheme with all country differences
RFI/EMI	FCC CFR 47 Part 15 Class A, EN 55022 Class A, EN 61000-3-2, EN 61000-3-3, EN 300-386		
Immunity	EN55024:1998+A1:2001:+A2:2003		

Physical Dimensions			
Height	87.12 mm (3.43 in.)	43.43 mm (1.71 in.)	129.85 mm (5.1 in)
Width	425.45 mm (16.75 in.)	425.5 mm (16.75 in.)	436.5 mm (17.2 in.)
Depth	762.0 mm (30.0 in.)	685.8 mm (27.0 in.)	732 mm (28.8 in.)
Weight	29.54 kg (65 lbs.)	16.36 kg (36 lbs)	38.5 kg (85 lbs) max

Disk shelves	DS2	DE2–24C	DE2–24P
Note: Sun / Oracle disk shelves / disk enclosures models listed below are the only supported storage for Sun ZFS Storage Appliance.			
EIA rack units	4	4	2
H x W x D	6.88 in. x 17.52 in. x 23.39 in. (174.8 mm x 445.0 mm x 594 mm)	6.89 in. x 19 in IEC x 24.8 in. (175 mm x 483 mm IEC x 630 mm)	3.46 in. x 19 in. IEC x 24.8 in. (87.9 mm x 483 mm IEC x 630 mm)
Weight (max, all drives)	110.23 lb. (50 kg)	101.41 lb. (46 kg)	52.91 lb. (24 kg)

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Power and Thermal			
Item Description		**Typical**	**Maximum**
Sun ZFS Storage 7120 (controller only)	Power (w)	378 w	1,236 w
	Thermal (BTU/hr)	1,290 BTU/hr	4,212 BTU/hr
Sun ZFS Storage 7320 (controller only)	Power (w)	331 w	873 w
	Thermal (BTU/hr)	1,129 BTU/hr	2,977 BTU/hr
Sun ZFS Storage 7420 (controller only)	Power (w)	1,752 w	2,341 w
	Thermal (BTU/hr)	5,975 BTU/hr	7,988 BTU/hr
DS2	Power (w)	426 w	912 w
	Thermal (BTU/hr)	1,453 BTU/hr	3,112 BTU/hr
DE2-24C	Power (w)	469 w	699 w
	Thermal (BTU/hr)	1,600 BTU/hr	2,385 BTU/hr
DE2-24P	Power (w)	325 w	699 w
	Thermal (BTU/hr)	1,108 BTU/hr	2.385 BTU/hr
Note: The Sun ZFS Storage 7420 is compatible with 200–240VAC sources only. All other items listed above are compatible with 100–120VAC or 200–240VAC sources.			

Contact Us

For more information about Sun ZFS Storage Appliance, please 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

Hardware and Software, Engineered to Work Together

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