



SUN ZFS STORAGE APPLIANCE

DATA MANAGEMENT SIMPLICITY COMBINED WITH STORAGE EFFICIENCY

KEY FEATURES AND BENEFITS

RADICAL SIMPLICITY
COMBINED WITH
BREAKTHROUGH
PRICE/PERFORMANCE

FEATURES

- Unprecedented management tools to easily find and fix issues as well as optimize performance
- All inclusive and integrated data services and protocols
- Active-active cluster option
- Data compression and in-line deduplication
- Optimized storage hierarchy with HSPs containing DRAM, flash cache, and HDDs
- Seamless multiprotocol integration and secure data sharing between Microsoft Windows, Linux, and UNIX environments

BENEFITS

- Reduce complexity- simplified storage management
- No additional software licenses High performance and high availability
- Storage efficiency, integrated software utilization suite with in-line data deduplication and compression
- Scalability in multiple dimensions to adapt to your changing business needs by increasing compute power, storage capacity, or performance independently
- Eco efficiency due to reduced power consumption of SSD and high capacity disk drives rather than high RPM drives

Endless data growth is challenging today's IT infrastructures and ever -increasing data management complexity. IT managers are forced to scale their storage capacity while still delivering high performance and staying within firm IT budgets. Oracle can help ease this pain by offering t unified storage solutions that optimizes performance with Hybrid Storage Pools (HSPs), optimizes capacity with data compression and deduplication, and delivers agile storage deployment and management all at a cost that redefines the economics of storage. Oracle's Sun ZFS Storage appliances help simplify storage deployment and management with its unprecedented easy-to-use administration and analytic. These features enable you to quickly find and fix issues, minimize downtime, and reduce deployment time and cost.

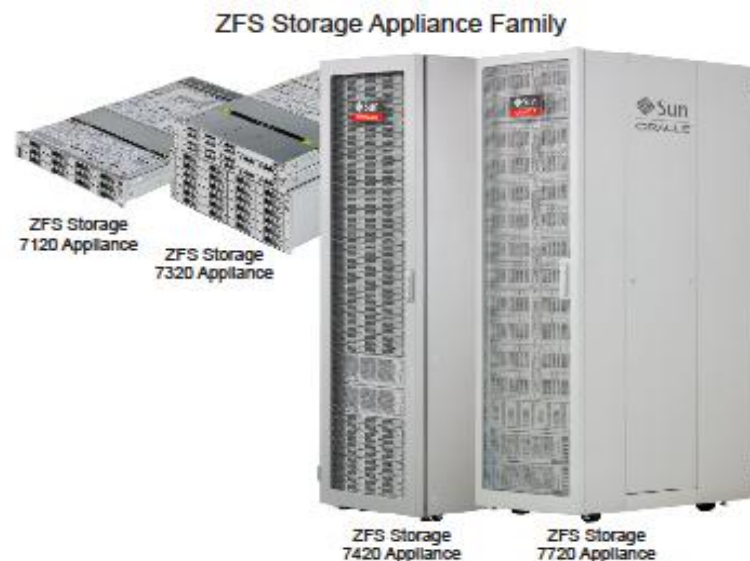


Figure 1. The Sun ZFS Storage Appliance family helps simplify storage deployment and management with its unprecedented easy-to-use management interface, DTrace Analytics, and self-healing capabilities.

Meeting Today's IT Challenges

Storage requirements are exploding for databases, unstructured content, and data protection (along with more restrictive SLA's). One of the unique requirements of today's virtualization, consolidation, data protection, database, and fixed media serving is that they must provide both high performance and the ability to preserve and manage large volumes of



file-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 Appliances

The Sun ZFS Storage appliances are a family of unified storage systems that offers new innovations in storage, including enterprise-class data services, massive scale, and industry leading performance while delivering significant cost savings. These systems feature a common, easy-to-use management interface that requires no additional training, and have the industry's most comprehensive analytics environment to help isolate and resolve issues to minimize impact to your business. An advanced HSP design automatically optimizes performance and helps lower power and cooling requirements, enabling the Sun ZFS Storage Appliances to deliver break-through performance while radically simplifying the way you manage your storage.

Storage That Is Easy to Deploy, Analyze, and Optimize

Provisioning and management is dramatically simplified in Sun ZFS Storage appliances through the easy-to-use browser user interface (BUI) management that takes the guesswork out of system installation, configuration, and tuning.

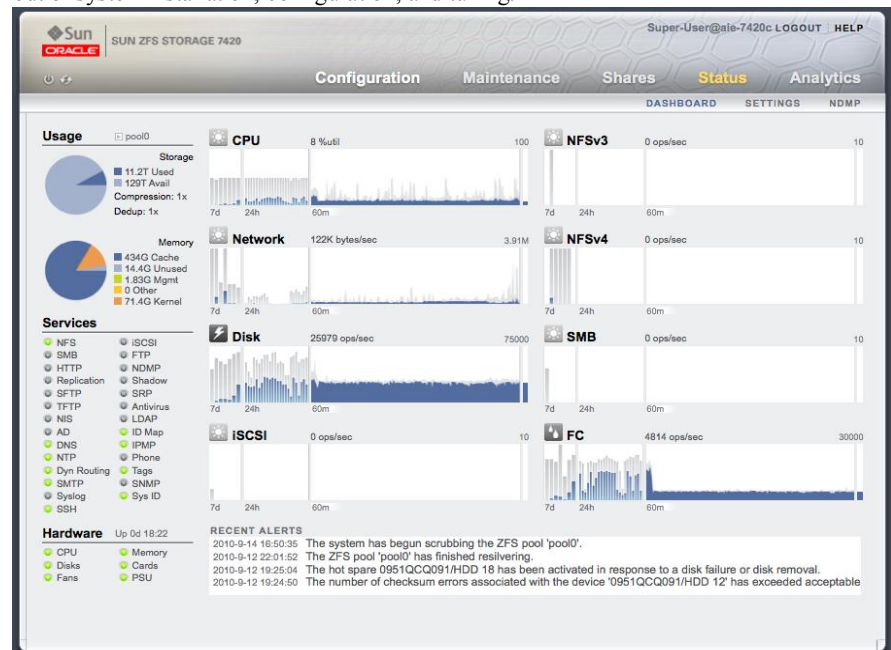


Figure 2 Browser User Interface makes it easy to deploy, access, and manage storage

DTrace Analytics software provides the industry's only comprehensive and intuitive analytics environment. Administrators have all of the tools they need to quickly identify and diagnose system performance issues, perform capacity planning, and debug live storage and networking problems before they become challenging for the entire network. The real-time analysis and monitoring functionality is based on the award-winning DTrace technology and



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uses built-in instrumentati on to provide in-depth analysis of key storage subsystems. Appliances also include the comprehensi

ve self-healing capabilities of

Oracle's Fault Management Architecture (FMA). FMA automatically and silently detects and diagnoses underlying system problems and automatically responds by taking faulty components offline.

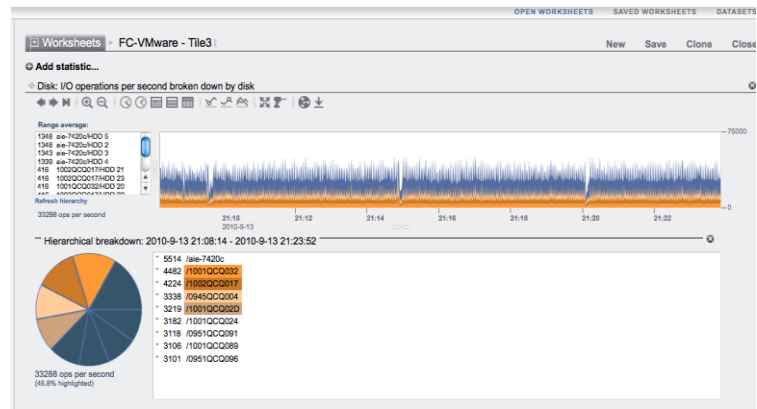


Figure 3 DT race Analytics offers the industry's only comprehensive and intuitive analytics environment

Performance and Scalability to Meet Your Business Needs

To deliver high performance using cost-effective components, the Sun ZFS Storage Appliance file system, Oracle Solaris ZFS, seamlessly optimizes access to the different types of media as part of the HSPs. Oracle Solaris ZFS was designed to automatically recognize different I/O patterns and place data in the best storage media for optimal performance.

For example, Oracle Solaris ZFS transparently executes writes to low-latency SSD media so that writes can be quickly acknowledged, allowing the application to continue processing. Oracle Solaris ZFS then automatically flushes the data to high-capacity 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.

Scalability in Multiple Dimensions

Unlike traditional storage architectures, Oracle's Unified Storage Systems support scalability in multiple dimensions with the ability to scale I/O throughput, processor performance, and total storage capacity to meet your application needs. As application requirements change, IT managers can choose to

- Increase resources by adding more CPU, cache, I/O.
- Expand total capacity by adding enterprise-class high capacity disk shelf units
- Increase performance using additional flash to buffer storage reads or writes

Easy on Your Budget

Oracle's Unified Storage Systems deliver higher performance at costs lower than traditional storage solutions by using cost-effective components and providing a rich set of built-in



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software features. While many other vendors charge license fees for protocols and data services such as CIFS, NFS, HTTP, deduplication, and replication, these and other software features are included in the price of the Unified Storage Systems. No additional software licenses are required. Administrative overhead associated with managing licenses is also avoided. The systems also offer economic value by reducing energy consumption and data center space requirements. Energy efficiency is improved through the use of 7200 RPM drives and flash, both of which require significantly less power to operate than 15K RPM drives.

A Range of Configurations

To meet a variety of customer needs for capacity, price, and performance, the Sun ZFS Storage Appliances come in four different configurations plus two cluster configurations that offers maximum availability.

All non-clustered systems come bundled with the same software including data protocols, replication, compression, and DTrace Analytics software for system troubleshooting and performance optimization. Clustered systems include an additional software module for cluster features.

Sun ZFS Storage 7120 appliance

This entry-level, easy-to-install storage appliance is ideal for small and medium businesses, departments, and or remote offices of large corporations. It includes the same feature rich software as the high-end configurations, and delivers 12 TB to 120 TB of raw capacity using 7200 RPM SAS drives with 96GB Write cache. With the Sun Storage 7120 appliance, customers can acquire easy-to-use enterprise data management functionality at entry-level costs.

Sun ZFS Storage 7320 appliance

The Sun ZFS Storage 7320 redefines mid-range storage for the enterprise, with simplified management, performance, efficiency, and seamless expansion to meet your growing needs. It provides a high-availability cluster option with scalability up to 192 TB raw capacity, and supports the HSP that can be configured with up to 4 TB of read-cache and optional write-optimized cache for enhanced application performance.

Sun ZFS Storage 7420 appliance

This unified storage system gives a competitive advantage to data intensive businesses, and is uniquely designed for virtualized environments requiring multiple data services, and heterogeneous file sharing. It is available in a single or cluster configuration, offers simplified storage management and over 1 PB of raw capacity for extreme scalability. The Sun ZFS Storage 7420 system also delivers superior performance while reducing energy consumption with its HSP architecture.

Sun ZFS Storage 7720 appliance

The Sun ZFS 7720 appliance features ease of deployment and industry leading storage density that is designed to fulfill the needs for the largest bulk storage and backup requirements and also serves in mid-scale mixed workload environments. This appliance



includes the same, all inclusive data services for simplified storage management and will initially scale to 720 TB. All configurations are delivered fully clustered, with starting capacities of 240 TB, and maximum number of CPUs and backend I/O. And finally, this unique architecture is not only designed with space efficiency, it also features an energy saving cooling system to reduce power and cooling costs.

Cluster Configurations

For customers that require maximum protection against downtime, the Sun ZFS Storage 7320 and 7420 systems also support a two-node cluster configuration with no single point of failure. The Sun Storage 7720 ships with cluster configuration by default. The Sun ZFS Storage 7320 and 7420 Cluster Systems feature active-active architecture with no single point of failure that enables high performance and high availability to maximize business productivity.

Sun ZFS Storage Appliance Configurations

Sun ZFS Storage Appliance Configurations						
	Key Customer 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 all software features	120 TB	2U for controller, 4U per disk shelf	96 GB	N	N
Sun ZFS Storage 7320	Entry-level cluster option for high availability	192 TB	1U per node, 4U per disk shelf	Up to 16 SSDs for cluster configuration	Up to 8 (4 TB total)	Y
Sun ZFS Storage 7420	Best price/performance	1.15 TB	3U per node, 4U per disk shelf	Up to 96 SSDs	Up to 8 (4 TB total)	Y
Sun ZFS Storage 7720	High capacity and data growth rates	720 TB	at 42U each	24 per rack,	Up to 8 (4 TB total)	Standard

Sun ZFS Storage Appliance Specifications

Sun ZFS Storage Appliance Specifications				
	7120	7320	7420	7720
Architecture				
Processor	4x 2.4 GHz Intel cores	8x 2.4GHz Intel cores per controller	Up to 32x 1.86 GHz or 2.0GHz Intel cores per controller	32x 2.26 GHz Intel cores per controller
Main memory	24 GB	Up to 72 GB per node	Up to 512 GB per node	Options of 128 GB, 256 GB, and 512 GB per node



Sun ZFS Storage Appliance (cont'd)				
	7120	7320	7420	7720
Base Configurations				
Configuration options	<ul style="list-style-type: none"> 12 TB to 120 TB using high capacity SAS 7200 rpm disks Base system comes with 12 TB (12x1TB) or 24TB with (12x2 TB) Supports up to 2 additional disk shelves with 24 disks each (1 TB or 2 TB) 	<ul style="list-style-type: none"> Up to 192 TB using high capacity 7200 RPM disks Supports up to 4 disk shelves with optional Write Flash Accelerator (SSD) 	<ul style="list-style-type: none"> Up to 1.15 PB using high capacity 7200 RPM disks Supports up to 24 disk shelves with optional Write Flash Accelerator (SSD) 	<ul style="list-style-type: none"> Up to 720 TB with (360) 2 TB SAS-2 7200 rpm disks Upgrade with disk shelves containing (30) 2 TB SAS-2 disk, (2) LCC and optional (2) Write Optimized SSD
Software				
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			
Data Deduplication	Inline, block-level deduplication			
Replication	1:N, N:1, manual, scheduled, continuous			
Monitoring	DTrace Analytics (for system tuning and debugging); dashboard monitoring for key system performance metrics, plug-in for Oracle Enterprise Manager 10g Grid 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, read/write (clone), 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			
Standard and Optional Interfaces				
Integrated network	Four 10/100/1000 Base-T Ethernet ports			
Optional network connectivity	Dual GigE UTP; Dual GigE MMF; Quad Gigabit Ethernet UTP; Dual 10 GigE, QDR Infiniband HCA, 8Gb FC HBA			
Optional tape backup HBA	Dual channel 4 Gb FC HBA; 8Gb FC HBA			



Sun ZFS Storage Appliance (cont'd)				
Power	7120	7320	7420	7720
Nonoperating temperature/humidity (single, non-rack system)	40°C to 70°C (-40°F to 158°F), up to 93% relative humidity, noncondensing	40°C to 70°C (-40°F to 149°F), up to 93% relative humidity, noncondensing	-40°C to 70°C (-40°F to 158°F), up to 93% relative humidity, noncondensing	-40 °C to 65 °C Non-operating Humidity (standalone) 93% RH, 38C max. wet bulb (non condensing)
Altitude (operating) (single, non-rack system)	Up to 3,048 m, maximum ambient temperature is derated by 1°C per 300 m above 900 m	Up to 3,000 m, maximum ambient temperature is derated by 1°C per 300 m above 900 m	Up to 3,048 m, maximum ambient temperature is derated by 1°C per 300 m above 900 m	Altitude (operating) (single, standalone) Up to 3000m, temperature is derated by 1C per 300m of elevation above 900m
Regulations (Meets or Exceeds the Following Requirements)				
Safety	IEC 60950, UL/CSA 60950, EN60950, CB Scheme with all country differences	IEC 60950, UL/CSA 60950, EN60950, CB Scheme with all country differences	IEC 60950, UL/CSA 60950, EN60950, 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	FCC CFR 47 Part 15 Class A, EN 55022 Class A, EN 61000-3-2, EN 61000-3-3, EN 300-386	FCC CFR 47 Part 15 Class A, EN 55022 Class A, EN 61000-3-2, EN 61000-3-3, EN 300-386	FCC CFR 47 Part 15 Class A, EN 55022 Class A, EN 61000-3-2, EN 61000-3-3, EN 300-386
Immunity	EN55024, EN300-386	EN55024, EN300-386	EN55024, EN300-386	EN55024, EN300-386

Warranty

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Services

Visit oracle.com/sun/services for information on Oracle's service program offerings for Sun products.

Contact Us

For more information about Oracle's Sun ZFS Storage Appliances, please visit oracle.com/storage or call +1.800.786.0404 to speak to an Oracle representative.



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

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