Frequently Asked Questions
Oracle ZFS Storage Appliance

Overview

The Oracle ZFS Storage Appliance family delivers enterprise-class data services, file and block-level support, scale, and performance. These systems have the industry's most comprehensive analytics environment provided by the DTrace Analytics feature, an innovative real-time instrumentation tool that helps isolate and resolve issues to minimize impact to your business. These systems are built on an innovative Hybrid Storage Pool architecture, another feature of Oracle ZFS Storage Appliance, which automatically optimizes performance by managing tiering among DRAM, flash, and disk—consolidating systems and lowering your power and cooling requirements.

Two controller models are available in the Oracle ZFS Storage Appliance family:

- Oracle ZFS Storage ZS3-2: The midrange enterprise multiprotocol storage system, which is ideal for use in performance-intensive workloads at an attractive price point

- Oracle ZFS Storage ZS4-4: The higher-end midrange multiprotocol storage system for workloads demanding extreme performance and scalability at an attractive price

Both models use the same intelligent storage OS and enterprise SAS disk enclosures, but feature different storage controllers to meet the appropriate level of performance required for particular environments.

Refer to the [NAS Storage page](#) for more information.

Customer Benefits

Optimized for Oracle Applications

Oracle's premier application-engineered storage for multiprotocol environments delivers extreme performance, superior efficiency, and deep Oracle integration.

Oracle ZFS Storage Appliance is designed to run applications fast and more efficiently, increase business and IT productivity, save valuable resources, and reduce risk—lowering total cost

of ownership. Furthermore, codevelopment with Oracle Database maximizes your return on Oracle software investments.

Easy to deploy, analyze, and optimize

Provisioning and management are dramatically simplified in Oracle ZFS Storage Appliance with an easy-to-use management interface that requires no additional training and takes the guesswork out of system installation, configuration, and tuning. DTrace Analytics is an intuitive analytical environment that provides storage administrators with the tools to optimize the configuration of their storage system and maximize performance to address their application requirements.

Rapidly diagnose, troubleshoot, and resolve issues

DTrace Analytics provides real-time analysis of Oracle ZFS Storage Appliance and of the enterprise network, from the storage system to the clients accessing the data. This unprecedented capability permits administrators to quickly find and troubleshoot issues affecting system performance, minimizing impact to business productivity. The data can be saved for further analysis to better understand network, application, and system behavior.

Frequently Asked Questions

Q: I currently own Oracle's Sun ZFS Storage 7120 system. What is the most similar product in the Oracle ZFS Storage Appliance family?

A: An unclustered Oracle ZFS Storage ZS3-2 with a single disk tray is most similar. Oracle ZFS Storage ZS3-2 has a higher initial cost, but it is more powerful and far more expandable than Sun ZFS Storage 7120, and unlike Sun ZFS Storage 7120, it can be clustered later for higher availability.

ORACLE®

Q: I currently own Oracle's Sun ZFS Storage 7320 system. What is the most similar product in the Oracle ZFS Storage Appliance family?

A: Oracle ZFS Storage ZS3-2. Oracle ZFS Storage ZS3-2 has a slightly higher initial cost, but it is far more flexible and expandable than Sun ZFS Storage 7320—scaling to four I/O slots per controller and 16 drive enclosures per system.

Q: I currently own Oracle's Sun ZFS Storage 7420 system with four 8-core processors and less than 512 GB DRAM. What is the most similar product in the Oracle ZFS Storage Appliance family?

A: Oracle ZFS Storage ZS3-2. Oracle ZFS Storage ZS3-2 has a lower initial cost and similar memory and expansion capabilities—scaling to four I/O slots per controller and 16 drive enclosures per system.

Q: I currently own a Sun ZFS Storage 7420 system with more than 512 GB DRAM. What is the most similar product in the Oracle ZFS Storage Appliance family?

A: Oracle ZFS Storage ZS4-4, which has 1.5 TB DRAM per controller and expands to 36 disk enclosures. It is ideally suited for both performance- and capacity-intensive workloads.

Q: My current system uses 500 GB read flash drives. Can I install the newly released 1.6 TB read flash drives in the system?

A: No. The Oracle ZFS Storage ZS3-2 and ZS4-4 systems use a SAS internal bus. Sun ZFS Storage 7420 and 7320 use SATA technology. The two cannot be intermixed. The transition to upgraded read flash drives is because of a transition in market technology rather than an improvement in the actual drives. Using 500 GB read flash drives will allow you to see performance improvements simply by upgrading to OS 8.3.

Q: What is the reason for the Sun ZFS Storage 7420 system upgrade to SAS internals?

A: The primary driver for the timing of this release is the manufacturer's end of life (EOL) of the SATA read flash and 500 GB SATA boot drives used in the current Sun ZFS Storage 7420 configurations. This upgrade is an interim product that will be helpful if you require more time to transition to the new Oracle ZFS Storage ZS4-4 and OS 8.3 platform.

The last order date of the current Sun ZFS Storage 7420 configurations was September 30, 2013, because availability of existing SATA parts is limited. These systems will run 2011.1.x firmware, but like all 7x20 systems, they can be upgraded to OS 8.3 later.

Note: As of May 31, 2014, Sun ZFS Storage 7420 is EOL'd. The replacement products are Oracle ZFS Storage ZS3-2 and Oracle ZFS Storage ZS4-4.

Q: Are there any enhancements to Oracle ZFS Storage ZS3-2?

A: Yes, three enhancements have been made to Oracle ZFS Storage ZS3-2, effective June 3, 2014:

1. Oracle ZFS Storage ZS3-2 can support 16 trays (up to 384 drives) maximum. A second SAS HBA card and cables need to be added to the system to expand beyond 8 trays.
2. Oracle ZFS Storage ZS3-2 can support the 32 GB dual inline memory module (DIMM), in addition to the current 16 GB DIMM. This increases the maximum amount of memory per controller to 512 GB.
3. Oracle ZFS Storage ZS3-2 can have up to four network adapters of the same type, up from two network adapters supported previously.

Q: What is the hardware warranty?

A: The hardware warranty is one year with second business day hardware service response. See the complete terms.

Q: What's different about the Oracle ZFS Storage Appliance deduplication compared to other storage systems offering deduplication?

A: Unlike other unified storage systems, deduplication occurs inline on Oracle ZFS Storage Appliance. This means data is deduplicated as its being created. On other systems, the deduplication process is run as a daily scheduled process, at night for example, to limit system performance degradation. Oracle ZFS Storage Appliance can run deduplication inline because there are far more processors available in the system, and it has an efficient multithreading operating system (Oracle Solaris) that can take advantage of them. In addition, ZFS' large, 256-bit checksum, compared to the 16-bit checksums on other systems, allows a much more efficient deduplication. Oracle ZFS Storage Appliance also can deduplicate across much larger pools compared with competitive systems—meaning more data can be deduplicated.

Q: How does the snapshot capability work within Oracle ZFS Storage Appliance?

A: A snapshot is a read-only copy of a file system or volume. Snapshots can be created almost instantly, and initially consume no additional disk space within the pool. However, as data within the active data set changes, the snapshot consumes disk space by continuing to reference the old data and so prevents the space from being freed.

ZFS snapshots include the following features:

- They persist across system reboots.
- The theoretical maximum number of snapshots is 2^64.
- They use no separate backing store.
- Snapshots consume disk space directly from the same storage pool as the file system from which they were created.
- Recursive snapshots are created quickly as one atomic operation. The snapshots are created together (all at once) or not created at all. The benefit of atomic snapshot operations is that the snapshot data is always taken at one consistent time, even across descendent file systems.
- Snapshots of volumes cannot be accessed directly, but they can be cloned, backed up, rolled back to, and so on.

Q: What RAID levels are supported on Oracle ZFS Storage Appliance?

A: See the latest information on the appliance data sheet.

Q: Is there any limit to the size of a storage pool?

A: There is no limit to the size of a pool, other than the disk capacity in the system.

Q: Does adding additional disk arrays require downtime?

A: No downtime is required to add a disk array to an existing SAS HBA in the controller.

Q: How fast is Oracle ZFS Storage Appliance?

See the SPC-1 official benchmark results. Also see the SPC-2 and SPC-2E results.

Q: What are the key features and benefits of Oracle ZFS Storage Appliance?

A: The Oracle ZFS Storage Appliance systems provide several key storage technologies that set them apart from other appliances in the market. Please refer to the product web page and data sheet for details.

Q: Do the software features for Oracle ZFS Storage Appliance need to be ordered separately?

A: With the exception of Oracle ZFS Storage Appliance Replication, Oracle ZFS Storage Appliance Encryption, Snap Management Utility for Oracle Database, and Oracle ZFS Storage Appliance Cloning, all other features are included with the price of the Oracle ZFS Storage Appliance.

Q: What are the specifications, including environmental?

A: Please refer to the data sheet.

Q: What are the network connectivity options and supported protocols?

A: Please refer to the data sheet.

Q: Where can I find the official end-user documentation for Oracle ZFS Storage Appliance?

A: You can find it on this documentation web page.

Q: Is there a licensing requirement to store data compressed by Oracle Hybrid Columnar Compression in Oracle ZFS Storage Appliance?

A: There is no need to license the Advanced Compression option, nor is there anything extra to license on Oracle ZFS Storage Appliance. You must be running Oracle Database 11.2.0.3 Enterprise Edition in order to use the Oracle Hybrid Columnar Compression feature of Oracle ZFS Storage Appliance.

Q: Is there a way to estimate the storage savings for Oracle Hybrid Columnar Compression?

A: Yes, Oracle's Compression Advisor, which is included in Oracle Database 11*g* Release 2, can be used to estimate Oracle Hybrid Columnar Compression storage savings. Note that the version of Compression Advisor that is available for download from Oracle Technology Network is NOT able to estimate Oracle Hybrid Columnar Compression storage savings; it can be used only to estimate storage savings for OLTP table compression and BASIC table compression.

Q: Is there a specific Oracle ZFS Storage Appliance software version to support Oracle Hybrid Columnar Compression?

A: No, but it is recommended that the latest offering be installed.

Q: Is the license for the Cloning feature an unlimited license (number of copies of clones)?

A: Yes, there is no limit on the number of clones.

Q: How can users download the Oracle ZFS Storage Appliance software and the available plugins (including VMware)?

A: Visit this download page.

Q: Can Oracle Enterprise Manager be used to monitor Oracle ZFS Storage Appliance?

A: Yes, the Oracle Enterprise Manager Plug-in for Oracle ZFS Storage Appliance connects Oracle ZFS Storage Appliance with Oracle Enterprise Manager to allow for n-way views of all appliances in the infrastructure.

Q: Do I also need Oracle Enterprise Manager Ops Center to monitor Oracle ZFS Storage Appliance?

A: No. While there is support for Oracle ZFS Storage Appliance in Oracle Enterprise Manager Ops Center, it is optional management software that is available for streamlining multisystem management.

Q: How does Oracle Enterprise Manager enable self-service storage?

A: The plugin now provides the ability to provision file systems and LUNs on Oracle ZFS Storage Appliance through Oracle Enterprise Manager. The storage administrator can also allow users to access this capability with their own login to provision a project they have permissions to edit. Therefore, the storage administrator can create a project, assign a user and role to have limited rights to the project, and share these permissions with users to allow them to self-administer their allocated storage through Oracle Enterprise Manager.

Q: Where can I find documentation for the Oracle Enterprise Manager Plug-in for Oracle ZFS Storage Appliance?

A: Documentation can be found online.

Q: Does the plugin work with all types of storage?

A: No. This plugin is for Oracle ZFS Storage Appliance only. Other storage devices need their own plugin to integrate with Oracle Enterprise Manager.

Q: What is the cost for Oracle Enterprise Manager Plug-in for Oracle ZFS Storage Appliance?

A: There is no additional cost for the plugin. The software is available for download for any registered oracle.com user.

Q: Does Oracle ZFS Storage Appliance have a programming API?

A: Yes. With the OS 8.2 release, Oracle ZFS Storage Appliance supports a full-featured RESTful management API, which is ideal for public and private cloud orchestration.

Q: Does Oracle ZFS Storage Appliance support OpenStack?

A: Yes. In the OpenStack Kilo release, Oracle added appliance support for Cinder and Manila. Oracle also has a reference architecture for Swift implementation..

Q: Does Oracle ZFS Storage Appliance support VMware storage APIs?

A: Yes. Oracle is developing an entire suite of integrations. Today, there is a Site Recovery Adapter, a vSphere API plugin, and the full clone function for vStorage APIs for Array Integration VAAI.

Q: When should I select 10,000 RPM drive configurations versus 7,200 RPM configurations?

A: Oracle ZFS Storage Appliance uses Hybrid Storage Pool technology to manage storage across DRAM, flash, and disk media in order to optimize performance. This means that systems with 7,200 RPM drive configurations can perform extremely fast. Also, 7,200 RPM drives use less power, cost less on a per-GB basis, and consume less floor space on a per-GB basis. Thus, 7,200 RPM drives are recommended for the majority of situations.

However, 10,000 RPM drives are also available if you require the absolute maximum I/O performance in certain use cases involving rapid I/O operations for random, uncached data such as virtualization, mixed environments, OLTP, and e-mail storage.

Q: You used to offer 15,000 RPM drives. Won't the slower 10,000 RPM drives reduce performance by one-third?

A: No. The high amount of flash and DRAM, combined with Hybrid Storage Pool technology, makes the performance impact of "slower" HDDs indiscernible in most environments.

Q: Can I configure Oracle ZFS Storage Appliance with both high-speed and high-capacity drives?

A: Yes, as long as the high-speed drives and high-capacity drives are in separate disk shelves and separate storage pools, a given Oracle ZFS Storage Appliance controller can manage both types of drives. It is also recommended, if possible, to put drives of different speeds into separate SAS fabrics.

Q: What is the maximum number of snapshots and clones that can be taken of a share or LUN?

A: There is no limitation aside from available storage space.

Q: Can a LUN or share be restored to a state from a previous point in time?

A: Yes, you can restore a share or LUN to any previous snapshot. Snapshots can be taken manually or scheduled to occur on an ongoing basis.

Q: Is user quota management possible on an appliance?

A: Yes, you can assign quotas to individual users or to groups. This can be accomplished via the browser-based user interface (BUI), via the command-line interface (CLI), or via workflows.

Q: Can shares or LUNs be expanded after initial creation?

A: Yes, you can add new disks to an existing pool, and then the existing shares and LUNs in that pool are able to use the additional capacity.

Q: What is the maximum number of LUNs, targets, and initiators supported?

A:

	iSCSI	FC	InfiniBand
Max. Number of Targets	255	1 per HBA port	1 per HBA port 255 (iSER)
LUN/Target	16,384	16,384	16,384
Initiators	64,000	64,000 (appliance) 2,048 (HBA port)	64,000

Q: Are both VLANs and link aggregation supported?

A: Yes, VLANs (IEEE 802.1Q) and LACP (IEEE 802.3ad) are supported.

Q: What is the maximum file size and maximum file/directory/share count?

A: The theoretical maximum file size is 2^{64} bytes. (This is equal to the maximum volume size, also.) The theoretical maximum number of files/directories that can exist on a single share (via NFS, CIFS, and so on.) is 2^{48}. Additionally, 2^{48} shares can exist per pool. That means a total of 2^{96} objects per share.

Q: How many concurrent users can access a share?

A: The maximum number of users who can access a share (either CIFS or NFS) is theoretically unlimited. However, practical limitations, such as from the network or other infrastructure, exist in any environment.

Q: Is snapshot integration with Microsoft products possible to create logical backups?

A: Yes, a Volume Shadow Copy Service for Oracle ZFS Storage Appliance is available for Microsoft products that use this technology.

Q: Are there any planned scalability enhancements?

A: Yes, Oracle ZFS Storage ZS3-2 currently supports 8 trays (up to 192 drives) maximum. Oracle plans to double this to 16 trays (up to 384 drives) in the future. A second SAS HBA card needs to be added to the system to expand beyond 8 trays.

Q: What is the hardware warranty?

A: The hardware warranty is one year with second business day hardware service response. See the complete terms.

As with all product warranties, this warranty is designed to offer consumers basic recourse if a product defect is discovered. For more complete support, you should purchase the recommended support coverage at the point of product purchase to gain access to the services and resources you need and to avoid potential reinstatement fees down the road.

Q: What is the recommended support for Oracle ZFS Storage Appliance systems?

A: For all storage systems being used in critical production and test environments, Oracle recommends Oracle Premier Support for Systems. This service provides the support, firmware updates, and proactive support tools you need to work efficiently, to minimize business risk, and to get the most from your investment. Features include access to 24/7 support and online resources as well as 24/7 hardware service coverage with rapid onsite response. For more information on Oracle Premier Support for Systems, visit this web page.

Q: Where can I learn more about use cases involving Oracle ZFS Storage Appliance?

A: Use this link and scroll down to the Solutions section.

Q: How do I purchase this product?

A: Contact your Oracle sales representative or an Oracle authorized partner.

Q: Is there a trade-in program for my existing storage system if I wish to buy an Oracle ZFS Storage Appliance system?

A: An upgrade allowance program (UAP) is in place for trade-ins on Oracle's Sun Storage 7000 Unified Storage Systems. Not only qualified Sun products, but also competitive unified storage products, can be traded in.

Q: Are data migration services and tools available to assist my move to Oracle ZFS Storage Appliance?

A: Yes, there are two options. Using the Shadow Migration feature included with Oracle ZFS Storage Appliance, you can migrate your own data from any NFS system (EMC, NetApp, Oracle's Sun StorageTek 5320, and so on). Alternatively, Oracle is able to assist you with custom migration. Call 1-800-Oracle1 or contact your Oracle sales representative for more information.

Q: Are any customer training courses available?

A: Yes, training is available through Oracle University. Contact your Oracle sales representative directly or call 1-800-Oracle1 for information.

Q: Is there a way to try out the Oracle ZFS Storage Appliance features without having to buy a system?

A: Yes, you can get a feel for the appliance features and BUI by downloading the simulator.

Q: Where can I find more information about Oracle ZFS Storage Appliance?

A: **A**: You can contact your Oracle sales representative directly or call 1-800-Oracle1. For more information about Oracle ZFS Storage Appliance, visit this web page.

Q: How secure is Oracle ZFS Storage Appliance Encryption?

A: Highly secure. It's based on a high-availability two-tier Advanced Encryption Standard (AES) 128/192/256-bit encryption architecture. The first tier encrypts the data stored on an appliance, and the second tier encrypts those encryption keys with another encryption layer called the key wrapper keys, which are stored in the key store of the key manager. AES 256-bit encryption is the most secure encryption available.

Q: Do I have to encrypt the whole storage system or can I encrypt just certain volumes?

A: You can encrypt just certain volumes, such as projects shares, or LUNs. This flexibility allows you to better manage your sensitive and nonsensitive data within the same storage systems with better granularity, securing,

and controls. You can find more information on Oracle ZFS Storage Appliance Encryption in these blogs: "ZFS Data Encryption…Secure, Flexible, and Cost-Effective" and "Data Encryption…Software vs Hardware."

Q: What's the key management system for Oracle ZFS Storage Appliance Encryption?

A: You can use local ZFS key management or centralized key management, such Oracle Key Manager.

Q: What ZFS storage systems use Oracle ZFS Storage Appliance Encryption?

A: The Oracle ZFS Storage Appliance Encryption feature is currently supported on the Oracle ZFS Storage ZS3-4 and ZS4-4 systems starting with the OS 8.4 software release.

Q: How is Oracle ZFS Storage Appliance Encryption licensed?

A: One license per ZFS controller. This license also includes integrated local key management.

Q: What benefits does Oracle ZFS Storage Appliance present for media and entertainment customers?

A: From ingestion, postproduction, supporting massive render farms, and broadcasting to archiving rich media assets, Oracle ZFS Storage Appliance presents compelling technical advantages at an attractive price point for media and entertainment customers by providing Hybrid Storage Pool technology for high streaming performance, a massive number of CPU cores with a symmetric multiprocessing OS for large render farm support, and adjustable record sizes for efficiently handling large 2K and 4K media files.

Q: Where can I learn more about how Oracle ZFS Storage Appliance is ideally suited for media and entertainment workloads?

A: Download the solution brief about Oracle ZFS Storage Appliance for media and entertainment workloads.

Q: What is Oracle's Front Porch Digital DIVArchive?

A: Front Porch Digital DIVArchive provides a content storage management (CSM) solution for broadcast and production environments.

It can be deployed easily in a range of customer environments, because it integrates with a variety of broadcast and video management applications such as media asset management (MAM), non-linear-editing (NLE), traffic, automation, newsroom systems, and shared storage systems.

Q: How can customers benefit from the combination of Oracle ZFS Storage Appliance and Front Porch Digital DIVArchive?

A: Front Porch Digital DIVArchive combined with Oracle ZFS Storage Appliance provides a fast and reliable digital archiving solution. While Front Porch Digital DIVArchive handles the seamless flow of media assets across a workflow, Oracle ZFS Storage Appliance offers a high-performance disk storage solution for faster access to content. Additionally, unparalleled intelligence and coengineering efforts between Oracle ZFS Storage Appliance and Front Porch Digital DIVArchive provide an intelligent advantage over non-Oracle disk offerings in the market.

Q: How do I do remote replication with Oracle ZFS Storage Appliance?

A: Oracle ZFS Storage Appliance offers snapshot-based asynchronous replication software with Intelligent Replication Compression that dynamically autotunes itself to changing network speeds and system workloads for optimum efficiency and performance, which increases effective throughput and reduces WAN costs.

It is capacity-independent and licensed per active ZFS controller.

Q: How can I "seed" or do my first full replica offline to save time and WAN costs?

A: Oracle ZFS Storage Appliance allows you to do it two ways. You can do a copy to another Oracle ZFS Storage Appliance locally, and then ship that appliance to a remote site, or you can do a replication "offline" to an existing remote site by using an NFS server (or disk set) as a physical transport medium. Incremental replications can then be done over the WAN.

Q: What can I use to migrate data off my old NAS system to a new Oracle ZFS Storage System?

A: Oracle ZFS Storage Shadow Migration software allows you to migrate your data from any NAS source (Oracle or non-Oracle) to a target Oracle ZFS Storage Appliance automatically and transparently allowing full access to data during the background operation. Shadow Migration software is included free with the appliance.

ORACLE®

Oracle Corporation, World Headquarters
500 Oracle Parkway
Redwood Shores, CA 94065, USA

Worldwide Inquiries
Phone: +1.650.506.7000
Fax: +1.650.506.7200

Hardware and Software, Engineered to Work Together