

# Oracle ZFS Backup Appliance



Oracle ZFS Backup Appliance is an integrated high-performance data protection solution that is ideal for backup and recovery of all workloads. Its unique coengineered capabilities with Oracle Database and Oracle engineered systems reduce backup and recovery time by more than half and increase TCO by up to 4x compared to competitive products. It is also coengineered with Oracle Public Cloud to seamlessly extend your data protection strategy to the cloud for robust multisite protection at a fraction of the cost. Furthermore, Oracle ZFS Backup Appliance extends your ROI with its ability to also be used for test, development, reporting, consolidation, and more.

## KEY FEATURES

- Efficient high-throughput architecture
- Fully tested, assembled, and integrated backup appliance
- Coengineered with Oracle Database, Oracle Public Cloud, and Oracle engineered systems
- Efficient, economical storage including services such as compression, cloning, encryption, and replication
- Advanced, intuitive management and granular analytics tools
- Granular two-tier AES encryption at the drive or share level
- Dual-controller architecture with built-in security features such as checksumming and mirroring

## High-Performance Backup and Recovery

Ever-growing amounts of data present system and database administrators with a number of challenges, including the difficult task of providing fast and efficient backup and recovery within ever-more-constrained backup windows. In addition to growing in size, today's databases often manage the bulk of an enterprise's mission-critical data and must, therefore, meet stringent data protection requirements—a task made more challenging by the significant failure rate of backup and recovery. According to industry reports, one out of every seven backups and one out of every six recoveries fail. Without reliable data protection and processes, mission-critical data is at risk.

Oracle ZFS Backup Appliance has a parallel, dynamic caching, high-throughput architecture ideal for cost-effective mixed workload backup and recovery. It delivers extremely fast backup and restore throughputs compared to competitive products, ensuring that backup windows and recovery time objectives (RTOs) are met.

Additionally, Oracle is leading the way with native high-bandwidth interconnects to accelerate IT operations. As a result, the QDR InfiniBand fabric provides a direct high-bandwidth connection between the Oracle engineered systems' InfiniBand backplane and Oracle ZFS Backup Appliance. Backup and restore operations can be automatically parallelized across all database nodes, storage cells, Oracle ZFS Backup Appliance channels, and controllers. This significantly reduces backup and recovery times compared to traditional NAS storage systems.

Due to its high-bandwidth interconnects and superior processing power, Oracle ZFS Backup Appliance testing shows Oracle Exadata backup performance at a data rate of up to 60 TB/hour and a restore rate of up to 62 TB/hour. Additionally, Oracle ZFS Backup Appliance is a scalable architecture, it can support up to 7.3 PB while maintaining balanced system performance.



#### KEY BENEFITS

- Delivers superior performance—up to 60 TB/hour backup and up to 62 TB/hour restore throughputs
- Speeds deployment
- Optimizes data protection for mission-critical parts of the business
- Provides cost effectiveness—lower TCO than comparable NAS storage systems and backup products
- Seamlessly leverages the capacity, cost structure, and multisite protection capabilities of cloud
- Offers easy-to-use, simplified management
- Allows you to protect data at rest when and where you need it through granular encryption
- Provides high availability (HA) and advanced protection

## Cloud Converged

While competitive systems require the management of external cloud gateways and separate third-party public clouds, Oracle ZFS Backup Appliance provides native extension to Oracle Public Cloud. This enables you to eliminate management complexity and cost while improving the robustness of your data protection strategy with offsite copies of your data. This built-in cloud gateway capability gives all users direct access to unlimited, on-demand storage capacity without cloud access licensing fees so users also can extend their retention requirements with ease. Furthermore, leveraging the economics of cloud directly from the device enables you to reduce cost dramatically—up to 80 percent versus competitive backup appliances.

## Cost-Effective Data Protection

Due to its architectural efficiencies, Oracle ZFS Backup Appliance provides low TCO while you gain superior price/performance over the competition. Furthermore, the appliance is not simply a single-use backup target; it also can be used for other use cases such as test, development, reporting, consolidation, and more.

From an administrative perspective, with monitoring and provisioning available from Oracle Enterprise Manager and highly granular drill-down analytics, your IT staffing resources will be optimized as well. Overall, with Oracle ZFS Backup Appliance, each dollar spent on backup delivers a greater ROI over competitive products.

## Optimizes the Most Important Parts of Your Business

Because databases support many of your revenue-generating applications, specialization around Oracle Database is a critical advantage of Oracle ZFS Backup Appliance.

In fact, it is the only network-attached storage system coengineered with Oracle software to deliver unmatched advantages in Oracle software environments. One such advantage is Oracle Intelligent Storage Protocol, a feature of Oracle ZFS Storage Appliance, which is a direct line of communication between Oracle Database 12c and Oracle ZFS Backup Appliance. The appliance is able to dynamically respond—tuning itself for the exact incoming database data. Therefore, when Oracle Recovery Manager (Oracle RMAN) blocks enter the system, it auto-configures for higher throughput.

Furthermore, when the appliance is deployed in Oracle engineered systems environments, you gain additional advantages including a rapid-start configuration utility to eliminate guesswork during the installation process. And, Oracle Platinum Services is included to ensure maximum uptime and rapid resolution with 24/7 remote fault monitoring, industry-leading response times, and patch deployment services.

## Superior Security

Oracle ZFS Backup Appliance has numerous built-in security features including advanced checksumming, triple mirroring, and more. Furthermore, the appliance supports and maintains all Oracle Database security best practices including the use of the Transparent Data Encryption feature of Oracle Database, and it offers highly granular data-at-rest encryption. This allows you to protect your data throughout its

lifecycle in the manner best suited to your demands, without incurring waste or risk.

## Accelerates Implementation Success

Oracle ZFS Backup Appliance expedites the ROI on its numerous advantages by speeding deployment and removing implementation guesswork. By receiving a racked and configured system, you leverage the best practices from Oracle engineering and support teams to ensure that a fully optimized system arrives at your door, ready to turn on. And, you receive the highest performance while maintaining the highest level of data availability.

Ultimately, Oracle ZFS Backup Appliance is designed to run backups faster and more efficiently, providing a ready-to-deploy optimal storage architecture for data protection.

## Hardware Architecture and Configuration

Oracle ZFS Backup Appliance is based upon three primary components:

- **Software.** In addition to the unique, intelligent multithreaded symmetric multiprocessing (SMP) storage OS and the Hybrid Storage Pool feature of Oracle ZFS Storage Appliance for dynamic caching and high performance, Oracle ZFS Backup Appliance also includes analytics, replication, cloning, and encryption software in the base system. A built-in cloud gateway that leverages Hybrid Storage Pool technology also is included for seamless extension to Oracle Public Cloud.
- **High-availability controllers.** Each Oracle ZFS Backup Appliance contains two Oracle ZFS Storage ZS5 controllers that provide a high-end enterprise multiprotocol storage system—at a price point that rivals competitive high-end systems—for workloads demanding HA with rapid failover, extreme performance, and scalability.
- **Storage.** Enterprise-grade disk enclosures contain SAS hard disk drives (HDDs) and write flash accelerators for high-performance, high-availability persistent storage. There is a minimum of two high-capacity disk enclosures and a maximum of eight high-capacity disk enclosures per single rack.

## Optional Software

Using Oracle ZFS Backup Appliance for test and development is seamless and accessible through preferred administrative interfaces, including Oracle Snap Management Utility for Oracle Database. This utility is a standalone management tool for Oracle ZFS Backup Appliance that provides a fast, efficient, and automatic way to snapshot, clone, and provision Oracle Database instances from the copies stored on Oracle ZFS Backup Appliance.

### HARDWARE SPECIFICATIONS

Oracle ZFS Backup Appliance	
Architecture	Dual-controller HA cluster with disk storage enclosures
Processors	<ul style="list-style-type: none"> <li>• Oracle ZFS Backup Appliance ZS5-4: 8x 18-core 2.6 GHz processors</li> <li>• Oracle ZFS Backup Appliance ZS5-2: 4x 18-core 2.3 GHz processors</li> </ul>
DRAM cache	<ul style="list-style-type: none"> <li>• Oracle ZFS Backup Appliance ZS5-4: 3 TB</li> <li>• Oracle ZFS Backup Appliance ZS5-2: 1.5 TB</li> </ul>
Read flash cache	<ul style="list-style-type: none"> <li>• Oracle ZFS Backup Appliance ZS5-4: up to 486 TB</li> <li>• Oracle ZFS Backup Appliance ZS5-2: up to 204 TB</li> </ul>
<b>Storage Configurations</b>	

Configuration options	<ul style="list-style-type: none"> <li>Oracle ZFS Backup Appliance ZS5-4: 322 TB to 7.3 PB scalability</li> <li>Oracle ZFS Backup Appliance ZS5-2: 322 TB to 3 PB scalability</li> <li>Choice of 20 or 24 HDD disk shelf types</li> <li>With 20 HDDs per disk shelf, choice of two or four read or write SSD accelerators per disk shelf</li> <li>Oracle ZFS Backup Appliance ZS5-4: 2–38 disk shelves can be attached for storage</li> <li>Oracle ZFS Backup Appliance ZS5-2: 2–16 disk shelves can be attached for storage</li> </ul>
Disk shelf/HDD options	Oracle Storage Drive Enclosure DE3-24C: 8 TB, SAS-2, 3.5-inch 7,200 RPM HDDs
<b>Standard and Optional Interfaces</b>	
Integrated network	8x 10 GbE Base-T Ethernet ports
Optional network connectivity	10 GbE, QDR InfiniBand HCA, 16 Gb FC HBA, 40 GbE
Optional tape backup HBA	Dual-channel 16 Gb FC HBA

<b>Maximum Ports per System</b>	
10 GbE Base-T/10 GbE optical/InfiniBand/16 Gb FC	<ul style="list-style-type: none"> <li>Oracle ZFS Backup Appliance ZS5-4: 48/24/16/16</li> <li>Oracle ZFS Backup Appliance ZS5-2: 16/8/8/8</li> </ul>
<b>Environmental</b>	
Nonoperating temperature/humidity (standalone, nonrack system)	-40°C to 70°C (-40°F to 158°F), up to 93% relative humidity, noncondensing
Altitude (operating)	Up to 3,000 m; temperature is derated by 1°C per 300 m of elevation above 900 m
<b>Regulations (meets or exceeds the following requirements)</b>	
Safety	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

**POWER AND THERMAL**

Item Description		Typical	Maximum
Oracle ZFS Backup Appliance	Power (W)	5,090 W	6,820 W
<b>Physical Specifications</b>			
Oracle ZFS Backup Appliance	Height	1,998 mm (78.66 in.) 42R (rack units)	
	Width	600 mm (23.62 in.)	
	Depth	1,200 mm (47.24 in.)	
	Weight	535 kg (1,180 lb.)	
Oracle Storage Drive Enclosure DE3-24C (fully loaded with drives)	Height	175 mm (6.89 in.) 4R (rack units)	
	Width	483 mm (19 in.)	
	Depth	630 mm (24.8 in.)	
	Weight	46 kg (101.41 lb.)	

**ORACLE ZFS BACKUP APPLIANCE SOFTWARE**

Included Features	Details
Oracle Intelligent Storage Protocol, a feature of Oracle ZFS Storage Appliance	Oracle Database 12c sends metadata to Oracle ZFS Backup Appliance about each I/O operation, enabling the appliance to dynamically tune itself for optimal performance. This provides visibility at the database and per-pluggable-database level for actionable insight.
File system	Oracle Solaris ZFS (128-bit addressability)

File-level protocol	NFS v2/v3/v4, SMB1/2/2.1, HTTP, WebDAV, FTP/SFTP/FTPS
Block-level protocol	ISCSI, Fibre Channel, iSER, SRP, IP over InfiniBand, RDMA over InfiniBand
Data compression	Four distinct compression options to balance data reduction with performance for specific workloads
Hybrid Columnar Compression, a feature of Oracle Database	3x to 5x reduction in storage footprint with existing instances of Oracle Database for OLTP, data warehousing, or mixed workloads
Data deduplication	Inline, block-level deduplication
Monitoring/real-time analytics	DTrace Analytics (a feature of Oracle ZFS Storage Appliance) for system tuning and debugging, and dashboard monitoring for key system performance metrics; plugin available for Oracle Enterprise Manager
Automated serviceability	"Phone home" capability with automatic case creation and 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, RESTful API, OpenStack Cinder, OpenStack Manila
Snapshots	Read-only, restore, Microsoft Volume Shadow Copy Service support
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 Oracle ZFS Backup Appliance configuration
Clones	Writable snapshots
Remote replication	<ul style="list-style-type: none"> <li>• Replication from one Oracle ZFS Backup Appliance to another</li> <li>• 1:N, N:1, manual, scheduled, or continuous</li> </ul>
Encryption	Highly secure, easy-to-implement two-level AES 256/192/128-bit granular data encryption at project/share/LUN level and key management flexibility for data breach protection and security
<b>Optional Software</b>	
Oracle Snap Management Utility for Oracle Database	Fast, efficient, and automatic way to back up, restore, clone, and provision Oracle Database when one or more databases are stored on Oracle ZFS Backup Appliance

## Oracle Support

Oracle Premier Support services provide the complete system support you need to proactively manage your Oracle storage systems, with swift resolution and rapid-response hardware service when problems do arise, keeping your business information available 24/7.

Oracle Platinum Services provides an enhanced level of service for supported configurations of Oracle ZFS Backup Appliance. Oracle Platinum Services offerings are supported when Oracle ZFS Backup Appliance is attached to Oracle Exadata, Oracle SuperCluster, or Oracle Exalogic.

With Oracle Advanced Customer Support services, you get mission-critical support with a focused support team, proactive guidance to tailor storage systems for optimal performance and increased competitiveness, and preventative monitoring to help you achieve HA and optimized system performance.

For more information about Oracle Support and Oracle Advanced Customer Support services, please speak with your Oracle representative or Oracle authorized partner, or visit <http://www.oracle.com/support> or <http://www.oracle.com/acs>.

## Oracle's Upgrade Advantage Program

The upgrade advantage program (UAP) is a trade-in program that offers upfront discounts on new Oracle systems for the trade-in of older Oracle and competitors' eligible systems. Oracle also provides free return shipping and free state-of-the-art recycling of the old systems so you don't need to worry about the disposal of hazardous waste.

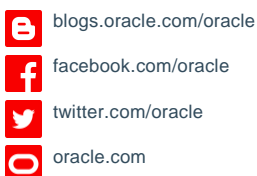
For more information about the UAP, go to <http://www.oracle.com/us/products/servers-storage/upgrade-advantage-program/index.html>.



### CONTACT US

For more information about Oracle ZFS Backup Appliance, visit [oracle.com](http://oracle.com) or call +1.800.ORACLE1 to speak to an Oracle representative.

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### Integrated Cloud Applications & Platform Services

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