Extreme database performance from Oracle engineered systems and shorter time windows for backup and restore procedures have made backup and restore performance a critical requirement for business continuity. Consider that if you have an Oracle Exadata production system with 150 TB of data and your backup system supports only 2 TB/hr in restore throughput, it would take three days to completely restore your system. Such extensive downtime is simply not acceptable for businesses that are expected to operate 24/7.

Oracle ZFS Storage ZS3 backup appliance (ZS3-BA) has been co-engineered with Oracle Database and Oracle engineered systems to enable extreme performance and superior efficiency to help reduce backup and restore windows while providing mission-critical data protection. Industry-leading backup rates of up to 26 TB/hour and restore rates up to 17 TB/hour enable the ZS3-BA to restore a 150 TB database in just nine hours. With leading performance and efficiency as well as up to 5x better TCO, the Oracle ZS3-BA offers excellent value over competing products and is the best solution for protecting data in your Oracle engineered systems.

The following sections describe key considerations for protecting the data in your Oracle engineered systems and elaborate on why the Oracle ZS3-BA is the right choice.
High-Speed and Cost-Effective Data Protection for Oracle Engineered Systems

Performance Considerations — Up to 80% Faster Restore Time

Protecting large databases of 50 to 300 TB or more in Oracle engineered systems requires extreme performance in order to meet recovery time objective (RTO) and recovery point objective (RPO) goals. Here’s what you need to consider with regard to backup and restore performance.

Does the storage system architecture support high throughput and advanced data services?

The Oracle ZS3-BA is based on the same technology as the Oracle ZFS Storage ZS3-4 system, which has demonstrated record setting performance on the SPC-2 benchmark (see sidebar). The SPC-2 benchmark provides a source of comparative storage performance for streaming data workloads as in backup applications.

The Oracle ZS3-BA system features an innovative architecture that maximizes I/O throughput. This architecture includes an intelligent cache design based on Hybrid Storage Pools (HSPs) that leverage very large DRAM and flash cache capacity, a multi-threaded SMP operating system that takes full advantage of 64 CPU cores across two controllers, and high bandwidth InfiniBand storage network interconnects. With these robust capabilities, the Oracle ZS3-BA not only delivers leading performance throughput but also can offload processing from the Oracle Exadata host system by running advanced data services such as compression at network speeds.

Does the storage vendor publish backup and restore performance results?

Due to its high performance architecture and co-engineering with Oracle engineered systems, the Oracle ZS3-BA can deliver 26 TB/hr throughput for full backups and 17 TB/hr for full restores of Oracle engineered systems. These throughput rates increase Oracle’s storage performance lead over published competitive results and offer 80% faster restore throughput as well as 30% faster backup throughput compared to the previous generation Sun ZFS Storage Backup Appliance. The backup rate is fast enough to completely backup an Oracle Exadata Database Machine X4-2 half rack configuration in less than 6 hours, or a full rack configuration in less than 12 hours.

Does I/O connectivity create a bottleneck for backup and restore performance?

As the only network attached storage (NAS) vendor to support InfiniBand as a storage network for backup and restore operations, Oracle is leading the way with native high-bandwidth interconnects to Oracle engineered systems. The InfiniBand network provides 40 Gb/s of bandwidth per port between the database servers, storage cells, and the Oracle ZS3-BA. Backup and restore operations can be automatically parallelized across all database nodes, Oracle Exadata storage cells, Oracle ZS3-BA channels, and controllers.

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High-Speed and Cost-Effective Data Protection for Oracle Engineered Systems

Cost-Effectiveness — Up to 75% Better TCO

Today's increasingly large databases have made storage efficiency and TCO key considerations for backup solutions. Nearly every storage vendor will say they offer leading storage efficiency. Here are some important questions you can ask to find out how cost-effective a backup solution will be when supporting Oracle engineered systems or other Oracle Database environments.

What is the total cost of ownership?

The Oracle ZS3-BA offers up to 5x lower total cost of ownership (TCO) over a three-year period versus comparable EMC Data Domain solutions (see sidebar).² Competitive backup solutions often require software licenses and support for disk-based backup media management software, which adds cost to the initial purchase and increases ongoing support and maintenance costs. In addition, more third party components can mean additional risk.

The Oracle ZS3-BA enables organizations to leverage Oracle RMAN, which is included in Oracle Database at no extra cost. Oracle's Hybrid Columnar Compression (HCC) is also included with Oracle Database and is uniquely available with Oracle storage. HCC can reduce storage capacity requirements by 3x-5x, thereby reducing capital costs as well as ongoing data center expenses such as floor space, power, and cooling. In addition, the Oracle ZS3-BA eliminates the cost of upgrading a LAN segment to handle high speed I/O flowing to and from the Oracle Exadata system. This is because the appliance has a direct-connect architecture that leverages the internally managed high-speed InfiniBand network in the Oracle Exadata system as the storage network.

Does the backup solution preserve space efficiencies in snapshots and clones for development and test environments?

Development, test or quality assurance (QA) environments often need a copy of some portion of the production database for secondary processing. The Oracle ZS3-BA greatly simplifies the process of creating copies of the database and offers unmatched space efficiencies for these environments.

Only Oracle storage systems, including the Oracle ZS3-BA, are able to provide full system operation on cloned data while preserving the space savings provided by Oracle's Hybrid Columnar Compression. Snapshots of compressed tables can be cloned without decompression overhead, and can then be immediately available for use in the compressed format for development, test, quality assurance, reporting, etc. Oracle ZS3-BA is the only backup solution to support secondary processing of this Hybrid Columnar Compression data, allowing cloned databases to retain the space savings. Storage systems from other vendors can't take advantage of Hybrid Columnar Compression, resulting in 3x to 5x greater storage capacity requirement for database tables. In addition, the restore process requires that the data be rehydrated (decompressed), adding delay and lengthening RTO.

Can multiple Oracle Database backups be consolidated onto the same backup system?

The Oracle ZS3-BA is the only backup solution that offers multiple high-speed InfiniBand and multiple 10Gb Ethernet connections. Unlike other vendors' backup solutions that require multiple backup targets to support multiple Oracle engineered systems, the Oracle ZS3-BA provides sufficient bandwidth and connectivity to consolidate the backups onto the same backup appliance, eliminating the extra cost of purchasing and managing more backup targets.

³ Three-year TCO data was computed by Oracle using non-discounted list prices and specifications available on the Internet. Subsequent year cost data takes into consideration annual costs for service, power, cooling, and floor space, which are estimated based on documented specifications for the equipment.
Does the backup solution support tape storage?

The Oracle ZS3-BA supports both 10GbE and 16Gb FC options in addition to InfiniBand, providing added flexibility and rapid access to Oracle StorageTek tape storage solutions. Oracle’s proven StorageTek tape and library solutions, including the world’s first exabyte storage system, offer an additional level of data protection as well as long-term data preservation in on- or off-site tape storage configurations that help ensure your data is available 24/7.

Enhanced Data Protection — High Availability and End-to-end Data Integrity

IT departments need to be sure that after a backing up operation, data is actually available to be restored when needed. Not all vendors provide high-availability configurations or protection against silent data corruption—both of which can lead to data loss and, of course, incomplete restores.

Does the backup solution provide a high-availability configuration with data integrity verification?

With single-controller backup appliances offered by some leading vendors, a hardware failure can mean that backup data is unavailable until a part is replaced or even that some data may be lost. In either case, a restore operation can’t bring back the data as required. By contrast, Oracle ZS3-BA systems are available only in dual-controller configurations with active-active clustering for failover. If one controller fails, the other can continue the backup operation and the data is readily available if a restore is needed.

Oracle ZS3-BA systems, like other members of the Oracle ZFS Storage Appliance ZS3 Series, are based on the Oracle Solaris operating system, which is designed to provide end-to-end checksums for all data to verify data integrity. The software constantly reads and checks data to help ensure that it is correct, protecting against costly and time-consuming data loss—even previously undetectable silent data corruption. This level of data protection helps to ensure that data is available when a restore is needed—not leaving it to chance.

Operational Efficiency — Faster Deployment and Save up to 30% on Management

IT departments are looking for ways to stretch their administrative resources. Here are some points to consider about how your backup solution can impact your operational efficiency.

How easy is it to deploy and manage the backup solution for use with Oracle engineered systems?

The Oracle ZS3-BA is a tested, validated and supported backup appliance specifically engineered and tuned for backup and restore of Oracle engineered systems. It comes in a single pre-packaged configuration and includes the Oracle Backup Configuration Utility. This eliminates the need for solution design and also reduces deployment cost and risk as well as speeding overall deployment time. Furthermore, the Oracle ZS3-BA requires no changes to RMAN best practices. So your DBAs will maintain their existing operating procedures for data protection without needing to acquire additional third-party skill sets. The Oracle ZS3-BA also uses the same intuitive user interface and industry-leading DTrace Analytics tools that were demonstrated by a third party to make Oracle ZFS Storage Appliances 36% easier and faster to manage compared to NetApp filers.

ORACLE®
Does your backup solution have monitoring tools that provide visibility into performance bottlenecks and other issues?

Oracle’s DTrace Analytics provides unparalleled visibility for administrators to monitor vital system parameters that can affect backup and restore of Oracle engineered system environments. Performance bottlenecks and other issues can be pinpointed and resolved faster than ever before—thus shortening backup windows, supporting shorter RTO and RPO goals, and helping you meet service-level agreements (SLAs).

Does your backup vendor understand how to support their solution with Oracle engineered systems?

If an issue arises during a restore procedure, time is of the essence. Only Oracle can provide a single point of contact for support across both Oracle engineered systems and the Oracle ZS3-BA. This means reduced risk to your business while avoiding multi-vendor finger pointing. It can also help streamline your IT operations by eliminating the need to trace issues to a specific system before calling Oracle support.

CONTACT US

For more information about the Oracle ZFS Storage ZS3-BA, visit oracle.com or call +1.800.Oracle1 to speak to an Oracle representative.