ORACLE EXADATA STORAGE SERVER X2-2

KEY FEATURES AND BENEFITS

FEATURES

- 12 x 3.5 inch High Performance or High Capacity SAS disks
- 384 GB of Exadata Smart Flash Cache
- 12 CPU cores for storage processing
- 24 GB memory
- Dual InfiniBand ports
- Redundant power supplies
- Oracle Exadata Storage Server software
- Oracle Linux

BENEFITS

- Uncompressed user data capacity of up to 2 TB per server when using High Performance SAS disks
- Uncompressed user data capacity of up to 7 TB per server when using High Capacity SAS disks
- Exadata Hybrid Columnar Compression often delivers 10X-15X compression ratios
- Effective data bandwidth with Flash and uncompressed data of up to 3.6 GB/second per server
- Effective data bandwidth with Flash and compressed data of up to 36 GB/second per server
- Software pre-installed

The Oracle Exadata Storage Server X2-2 is the storage building block of the Oracle Exadata Database Machine and is a storage product optimized for use with the Oracle Database. It uses a massively parallel architecture and Exadata Smart Flash Cache to dramatically accelerate Oracle Database processing and speed I/O operations. It may be attached to an Exadata Database Machine to build out the Database Machine and is ideal for Online Transaction Processing (OLTP), Data Warehousing (DW) and consolidation of mixed workloads. Simple to deploy and manage, the Oracle Exadata Storage Server provides linear I/O scalability and mission-critical reliability.

Oracle Exadata Storage Server

The Oracle Exadata Storage Server is a fast, reliable, high capacity, industry-standard storage server. Each server comes preconfigured with: 2 x six-core Intel® Xeon® L5640 Processors, 24 GB memory, 384 GB of Exadata Smart Flash Cache, 12 disks connected to a storage controller with 512MB battery-backed cache, and dual port InfiniBand connectivity. All software is preinstalled and comes complete with management interface for remote access, dual-redundant hot-swappable power supplies and takes up 2U in a 19-inch rack.

Intelligent Oracle Exadata Storage Server Software enables the Exadata Storage Server to quickly process database queries and return only the relevant rows and columns to the database server. By pushing SQL processing to the Exadata Storage Server all the disks can operate in parallel, reducing database server CPU consumption while using much less bandwidth to move data between storage and database servers. The Exadata Storage Server returns a query result set rather than entire tables, eliminates network bottlenecks, and frees up database server resources. This means users often see a performance increase of 10x when scanning and analyzing data.

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RELATED PRODUCTS

- Oracle Exadata Database Machine X2-2
- Oracle Exadata Database Machine X2-8
- Oracle Database 11g
- Real Application Clusters
- Partitioning
- Advanced Compression
- Advanced Security
- Active Data Guard
- Real Application Testing
- OLAP
- Data Mining
- Business Intelligence
- Enterprise Manager
- Oracle Linux

RELATED SERVICES

The following services are available from Oracle:

- Advanced Customer Services
- Consulting Services
- Oracle University courses
- Oracle Auto Service Request

The Oracle Exadata Storage Server comes with either twelve 600 GB 15,000 RPM High Performance Serial Attached SCSI (SAS) disks or twelve 2 TB 7,200 RPM High Capacity SAS disks. The High Performance SAS based Exadata Storage Servers provide up to 2 TB of uncompressed user data capacity, and up to 1.8 GB/second of raw data bandwidth. The High Capacity SAS based Exadata Storage Servers provide up to 7 TB of uncompressed user data capacity, and up to 1.0 GB/second of raw data bandwidth. When stored in compressed format, the amount of user data and the amount of data bandwidth delivered by each cell increases up to 10 times. User data capacity is an estimate of space available for table rows after mirroring all the disk space, allowing space to recover from disk failures, and setting aside space for database structures like logs, undo, temp space, and some indexes. Actual user data varies by application.

Each Exadata Storage Server includes 384 GB of Exadata Smart Flash Cache. This solid state storage delivers dramatic performance advantages with Exadata storage. The Flash provides intelligent caching for transaction processing applications. The Exadata Storage Server Software together with the Oracle Database keeps track of data access patterns and knows what data to cache, and how. The Flash is transparently integrated in to the Oracle Databases' storage hierarchy is managed automatically and does not require manual tuning. Overall it delivers a ten-fold increase performing a blended average of read and write operations. With Exadata Smart Flash Cache the effective data bandwidth delivered by each Exadata Storage Server is 3.6 GB/second for uncompressed data, and 36 GB/second for compressed data.

In addition, Exadata Database Machine is the world's most secure database system. Building on the high security capabilities in every Oracle Database, Exadata Database Machine provides the ability to query fully encrypted databases with near zero overhead at hundreds of gigabytes per second. This is done by moving decryption processing from software into the Exadata Storage Server hardware.

Intelligent Scalable Storage Grid

Oracle Exadata Storage Servers can be installed in to a standard 19-inch rack and are connected to an Oracle Database Machine via InfiniBand. Exadata Storage Servers have dual 40 Gigabit InfiniBand links that provide connectivity many times faster than traditional storage or server networks. Further, Oracle's interconnect protocol uses direct data placement to ensure very low CPU overhead by directly moving data from the wire to database buffers with no extra data copies.

Exadata Storage Servers are architected to scale-out easily. To achieve higher performance and greater storage capacity, additional Exadata Storage Servers can be added to a Oracle Database Machine. This, combined with faster InfiniBand interconnect, Exadata Smart Flash Cache and the reduction of data transferred due to offload processing, yields very large performance improvements. A 10x improvement in query performance compared to traditional database storage architectures is common, with much greater improvement possible.

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Enterprise Ready

The Oracle Exadata Storage Server has complete redundancy built in to support the demands of mission critical applications. Each Oracle Exadata Storage Server has dual port InfiniBand connections and dual-redundant, hot-swappable power supplies for high availability. Automatic Storage Management, a feature of Oracle Database 11g, provides disk mirroring. Hot swappable Exadata disks ensure the database can tolerate disk drive failure. In addition, data is mirrored across storage servers to ensure that storage server failure will not cause loss of data, or inhibit data accessibility.

The Oracle Enterprise Manager System Monitoring Plug-in for the Oracle Exadata Storage Server delivers comprehensive availability, performance, and configuration information for the Exadata environment. Using Enterprise Manager, administrators can perform proactive monitoring and detailed configuration analysis of the Exadata Storage Servers

Software from Oracle, Hardware from Sun

The Exadata product builds upon years of Oracle and Sun jointly solving customers' business and technical challenges. Integrated hardware and software technology, and related hardware support services, are provided in a unified fashion by Oracle. By combining leading, industry-standard servers and storage hardware from Sun with the intelligence built into the Oracle software, the Oracle Database Machine delivers the industry's highest levels of performance, scalability and reliability, and is backed by Oracle Support.

Oracle Exadata Storage Server X2-2 Hardware	
The Oracle Exadata Storage Server comes preconfigured with:	
Processors	2 x Six-Core Intel® Xeon® L5640 (2.26 GHz) Processors
Exadata Smart Flash Cache	384 GB
System Memory	24 GB
Disk Controller	Disk Controller HBA with 512MB Battery Backed Write Cache
InfiniBand Connectivity	Dual-Port QDR (40Gb/s) InfiniBand Host Channel Adapter
Power Supplies	Dual-redundant, hot-swappable power supply
Remote Management	Sun Embedded Integrated Lights Out Manager (ILOM)
Disk Drives	12 x 600 GB 15,000 RPM High Performance SAS or 12 x 2 TB 7,200 RPM High Capacity SAS For disk drives, 1 GB = 1 billion bytes. Actual formatted capacity is less.
Remote Management	Integrated Lights Out Manager (ILOM) Ethernet port

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Key Capabilities	
Oracle Exadata Storage Server (High Performance SAS disks)	• Up to 1.8 GB/second of uncompressed raw disk bandwidth per cell • Up to 3.6 GB/second of uncompressed Flash data bandwidth per cell • 7.2 TB of raw disk data capacity • Up to 2 TB of uncompressed user data capacity per cell
Oracle Exadata Storage Server (High Capacity SAS disks)	• Up to 1.0 GB/second of uncompressed raw disk bandwidth per cell • Up to 3.6 GB/second of uncompressed Flash data bandwidth per cell • 24 TB of raw disk data capacity • Up to 7 TB of uncompressed user data capacity per cell

Oracle Exadata Storage Server Environmental Specifications	
Specifications	
Dimensions and Weight	Height: 3.43 in. (87.12 mm) Width: 16.75 in. (425.45 mm) Depth: 30.0 in. (762.0 mm) Weight: 65 lbs. (29.54 kg)
Environment	Operating temperature: 5 ºC to 35 ºC (41 ºF to 95 ºF) Non-operating temperature: -40 ºC to 70 ºC (-40 ºF to 158 ºF) Operating relative humidity 10% to 90% non-condensing Non-operating relative humidity: up to 93%, non-condensing Operating altitude: Up to 3,000 m, maximum ambient temperature is derated by 1° C per 300 m above 900 m Non-operating altitude: Up to 12,000 m Acoustic noise: 7.6 B operating, 7.6 B idling; 63.1 dBA operating, 60.5 dBA idling
Power	Dual-redundant, hot-swappable power supply Maximum output power: 1200 W Maximum AC input current at 100 V AC and 1200 W output: 13.0 A Specified power supply efficiency at 1200 W (100%) load: 90%
Regulations	Safety: UL 60950-1 2nd Ed, EN60950-1:2006 2nd Ed, CB Scheme with all country differences RFI/EMI: FCC CFR 47 Part 15 Subpart B Class A, EN 55022:2006+A1:2007 Class A, EN 61000-3-2:2006, EN 61000-3-3:1995+A1:2001+A2:2002, ETSI EN 300 386 V1.4.1 (2008) Immunity: EN 55024:1998+A1:2001:+A2:2003
Certifications	Safety: UL/cUL, CE, BSMI, GOST R, S-Mark, CSA C22.2 No. 60950-1-07 2nd Ed. EMC: CE, FCC, VCCI, ICES, C-Tick, KCC, GOST R, BSMI Class A Other: Complies with WEEE Directive (2002/96/EC) and RoHS Directive (2002/95/EC)

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Oracle Exadata Storage Server Software
• Oracle Exadata Storage Server Software 11g Release 2 (release 11.2.2.1 or later) • Oracle Linux 5 Update 5 • Requires Oracle Database 11g Release 2 Enterprise Edition or later for the database accessing Exadata storage
High-Availability Features
• Redundant power supplies • Redundant InfiniBand ports • Hot swappable disk drives • Oracle Automatic Storage Management: All database files either double or triple mirrored; Disk failures do not abort queries or transactions • Oracle Exadata Storage Server Software: Storage server failure can be tolerated without data loss or aborting queries or transactions
Manageability Features
• Oracle Embedded Integrated Lights Out Manager (ILOM) • Oracle Enterprise Manager Grid Control and Exadata Plug- In • Oracle Auto Service Request (ASR)
Support Services Provided By Oracle
• Hardware Warranty: 1 year with a 4 hour web/phone response during normal business hours (Mon-Fri 8AM-5PM), with 2 business day on-site response/Parts Exchange
• Oracle Premier Support for Systems: Oracle Linux support and 24x7 with 2 hour on-site hardware service response (subject to proximity to service center)
• Oracle Premier Support for Operating Systems
• Oracle Customer Data and Device Retention
• System Installation Services
• Software Configuration Services

Contact Us

For more information about the Oracle Exadata Storage Server, 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

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