

# SUN ORACLE DATABASE MACHINE

## FEATURES AND FACTS

### FEATURES

- From 1 to 8 database servers
- From 1 to 14 Sun Oracle Exadata Storage Servers
- Each Exadata Storage Server includes 384 GB of Exadata Smart Flash Cache
- QDR (40 Gb/second) InfiniBand Switches
- Uncompressed user data capacity of up to 100 TB per rack
- Uncompressed I/O bandwidth of up to 50 GB/second per rack
- Exadata Hybrid Columnar Compression often delivers 10X compression ratios

### FACTS

- Ability to perform up to 1,000,000 I/O operations per second
- Easily upgrade from any one of four models to meet the needs of any size application
- Scale by adding more racks to the Sun Oracle Database Machine Full Rack. Up to 8 racks can be connected without requiring additional switches. Larger configurations can be built with additional switches
- Pre-configured system optimized for all database applications

*The Sun Oracle Database Machine delivers extreme performance and scalability for all your database applications including Online Transaction Processing (OLTP), Data Warehousing (DW) and consolidation of mixed workloads. Built using industry-standard hardware from Sun, and intelligent database and storage software from Oracle, the Sun Oracle Database Machine is a complete optimized package of software, servers, and storage. Simple and fast to implement, the Sun Oracle Database Machine is ready to tackle your largest and most important database applications — and often run them 10x faster, or more.*

### Extreme Performance for Online Transaction Processing, Data Warehousing and Consolidating Mixed Workloads

Oracle is offering a fully integrated platform for hosting all your database applications. The Sun Oracle Database Machine is an easy to deploy out of the box solution for hosting the Oracle Database. Ready to go day one much of the integration effort, cost and time of database deployment has been eliminated. Whether its OLTP, DW or mixed application workloads, a common deployment creates a tremendous opportunity for consolidation economies of scale in the data center. All this with breakthrough performance.

The unique technology driving the performance advantages of the Sun Oracle Database Machine is the Sun Oracle Exadata Storage Server. As data volumes continue to grow exponentially, conventional storage arrays struggle to efficiently process terabytes of data, and push that data through storage networks to achieve the performance necessary for demanding database applications. Sun Oracle Exadata Storage Servers provide a high-bandwidth, massively parallel solution delivering up to 50 GB per second of raw I/O bandwidth and up to 1,000,000 I/O operations per second (IOPS). Much of these performance gains come from the incorporation of Exadata Smart Flash Cache in each Exadata Storage Server. With 14 Exadata Storage Servers in a 42U Rack, 5.3 TB of Exadata Smart Flash Cache is integrated into the Sun Oracle Database Machine Full Rack.



## RELATED PRODUCTS AND SERVICES

### RELATED PRODUCTS

- Sun Oracle Exadata Storage Server
- Oracle Database 11g
- Real Application Clusters
- Partitioning
- Advanced Compression
- Advanced Security
- Active Data Guard
- Real Application Testing
- OLAP
- Data Mining
- Business Intelligence
- Enterprise Manager
- Enterprise Linux

### RELATED SERVICES

The following services are available from Oracle Support Services:

- Advanced Customer Services
- Consulting Services
- Exadata Premier Support

## Extreme Scalability

Four models of the Sun Oracle Database Machine are available. From the Full Rack system with 8 database servers and 14 Exadata Storage Servers to the Basic System with 1 database server and 1 Exadata Storage Server, there is a configuration that fits any application. One model can be upgraded to another ensuring a smooth upgrade path as processing requirements grow.

In addition to upgrading from a small to large Sun Oracle Database Machine, a building-block methodology is used that allows the largest Sun Oracle Database Machine Full Rack to quickly and easily scale to any size.

Sun Oracle Database Machine Full Racks can be coupled using the integrated InfiniBand fabric. As new racks of Sun Oracle Database Machines are incrementally added to a system, the storage capacity and performance of the system grows; a two-rack system is simply twice as powerful as a single rack system, providing double the I/O throughput and double the storage capacity. Scaling out is easy: Oracle Real Application Clusters (RAC) can dynamically add more processing power and Automatic Storage Management (ASM) can dynamically rebalance the data across Exadata Storage Servers to fully utilize all the hardware in each configuration.



## Enterprise Ready

The Sun Oracle Database Machine has complete redundancy built in to support the demands of mission critical applications. Each Sun Oracle Database Machine has redundant InfiniBand connectivity and dual-redundant, hot-swappable power supplies for high availability. Oracle RAC protects against database server failure and ASM provides disk mirroring to protect against disk failures. Hot swappable components ensure the database can tolerate server and 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.

Oracle Enterprise Manager is available to manage the software environment on the Sun Oracle Database Machine. Also available is a system monitoring plug-in for the Exadata Storage Server that delivers comprehensive availability, performance, and configuration information for the Exadata environment. Using Enterprise Manager, administrators can perform proactive monitoring and detailed configuration analysis of their Sun Oracle Database Machine.

## Software from Oracle, Hardware from Sun

The Sun Oracle Database Machine builds upon years of Oracle and Sun jointly solving customers' business and technical challenges. The hardware technology and related hardware support services for the Sun Oracle Database Machine are provided by Sun and the Oracle Database and Exadata Storage Server Software are provided by Oracle.

By combining leading, industry-standard servers and storage hardware from Sun

with the intelligence built into the Oracle software, the Sun Oracle Database Machine delivers the industry's highest levels of performance, scalability and reliability, and is backed by Oracle Support.

Sun Oracle Database Machine Full Rack	Sun Oracle Database Machine Half Rack	Sun Oracle Database Machine Quarter Rack	Sun Oracle Database Machine Basic System
8 x Database Servers, with: <ul style="list-style-type: none"> <li>• 2 Quad-Core Intel® Xeon® E5540 Processors (2.53 GHz)</li> <li>• 72 GB memory</li> <li>• Disk Controller HBA with 512MB Battery Backed Write Cache</li> <li>• 4 x 146 GB SAS 10,000 RPM disks</li> <li>• Dual-Port QDR InfiniBand Host Channel Adapter</li> <li>• 4 Embedded Gigabit Ethernet Ports</li> </ul>	4 x Database Servers, with: <ul style="list-style-type: none"> <li>• 2 Quad-Core Intel® Xeon® E5540 Processors (2.53 GHz)</li> <li>• 72 GB memory</li> <li>• Disk Controller HBA with 512MB Battery Backed Write Cache</li> <li>• 4 x 146 GB SAS 10,000 RPM disks</li> <li>• Dual-Port QDR InfiniBand Host Channel Adapter</li> <li>• 4 Embedded Gigabit Ethernet Ports</li> </ul>	2 x Database Servers, with: <ul style="list-style-type: none"> <li>• 2 Quad-Core Intel® Xeon® E5540 Processors (2.53 GHz)</li> <li>• 72 GB memory</li> <li>• Disk Controller HBA with 512MB Battery Backed Write Cache</li> <li>• 4 x 146 GB SAS 10,000 RPM disks</li> <li>• Dual-Port QDR InfiniBand Host Channel Adapter</li> <li>• 4 Embedded Gigabit Ethernet Ports</li> </ul>	1 x Database Servers, with: <ul style="list-style-type: none"> <li>• 2 Quad-Core Intel® Xeon® E5540 Processors (2.53 GHz)</li> <li>• 72 GB memory</li> <li>• Disk Controller HBA with 512MB Battery Backed Write Cache</li> <li>• 4 x 146 GB SAS 10,000 RPM disks</li> <li>• Dual-Port QDR InfiniBand Host Channel Adapter</li> <li>• 4 Embedded Gigabit Ethernet Ports</li> </ul>
3 x 36 port QDR (40 Gb/sec) InfiniBand switches	3 x 36 port QDR (40 Gb/sec) InfiniBand switches	2 x 36 port QDR (40 Gb/sec) InfiniBand switches	1 x 36 port QDR (40 Gb/sec) InfiniBand switches
14 x Sun Oracle Exadata Storage Servers with 12 X 600 GB SAS disks or 12 x 2 TB SATA disks Includes 5.3 TB Exadata Smart Flash Cache	7 x Sun Oracle Exadata Storage Servers with 12 X 600 GB SAS disks or 12 x 2 TB SATA disks Includes 2.6 TB Exadata Smart Flash Cache	3 x Sun Oracle Exadata Storage Servers with 12 X 600 GB SAS disks or 12 x 2 TB SATA disks Includes 1.1 TB Exadata Smart Flash Cache	1 x Sun Oracle Exadata Storage Servers with 12 X 600 GB SAS disks or 12 x 2 TB SATA disks Includes 384 GB Exadata Smart Flash Cache
Additional Hardware Components Included <ul style="list-style-type: none"> <li>• InfiniBand cables</li> <li>• Ethernet switch for administration of the Database Machine</li> <li>• Keyboard, Video or Visual Display Unit, Mouse (KVM) hardware for local administration</li> <li>• Standard 19-inch 42U rack packaging</li> </ul>	Additional Hardware Components Included <ul style="list-style-type: none"> <li>• InfiniBand cables</li> <li>• Ethernet switch for administration of the Database Machine</li> <li>• Keyboard, Video or Visual Display Unit, Mouse (KVM) hardware for local administration</li> <li>• Standard 19-inch 42U rack packaging</li> </ul>	Additional Hardware Components Included <ul style="list-style-type: none"> <li>• InfiniBand cables</li> <li>• Ethernet switch for administration of the Database Machine</li> <li>• Keyboard, Video or Visual Display Unit, Mouse (KVM) hardware for local administration</li> <li>• Standard 19-inch 42U rack packaging</li> </ul>	Additional Hardware Components Included <ul style="list-style-type: none"> <li>• InfiniBand cables</li> <li>• Other components are customer supplied, as required</li> </ul>
Upgradability: Connect multiple Full Racks via included InfiniBand fabric	Upgradability: Field upgrade from Half Rack to Full Rack	Upgradability: Field upgrade from Quarter Rack to Half Rack	Upgradability: Custom field upgrade
Support Services <ul style="list-style-type: none"> <li>• Integrated support provided by Oracle</li> <li>• Hardware Warranty: 3 Year Parts/3 Year Labor/3 Year On-site 24x7, 4 Hour response time (where available), including Disk Retention Service</li> </ul>	Support Services <ul style="list-style-type: none"> <li>• Integrated support provided by Oracle</li> <li>• Hardware Warranty: 3 Year Parts/3 Year Labor/3 Year On-site 24x7, 4 Hour response time (where available), including Disk Retention Service</li> </ul>	Support Services <ul style="list-style-type: none"> <li>• Integrated support provided by Oracle</li> <li>• Hardware Warranty: 3 Year Parts/3 Year Labor/3 Year On-site 24x7, 4 Hour response time (where available), including Disk Retention Service</li> </ul>	Support Services <ul style="list-style-type: none"> <li>• Integrated support provided by Oracle</li> <li>• Hardware Warranty: 3 Year Parts/3 Year Labor/3 Year On-site 24x7, 4 Hour response time (where available), including Disk Retention Service</li> </ul>

<b>Specifications</b>			
<b>Sun Oracle Database Machine Full Rack</b>	<b>Sun Oracle Database Machine Half Rack</b>	<b>Sun Oracle Database Machine Quarter Rack</b>	<b>Sun Oracle Database Machine Basic System</b>
<ul style="list-style-type: none"> <li>• Height: 42U, 78.66" - 1998 mm</li> <li>• Width: 23.62" – 600 mm</li> <li>• Depth: 47.24" – 1200 mm</li> </ul>	<ul style="list-style-type: none"> <li>• Height: 42U, 78.66" - 1998 mm</li> <li>• Width: 23.62" – 600 mm</li> <li>• Depth: 47.24" – 1200 mm</li> </ul>	<ul style="list-style-type: none"> <li>• Height: 42U, 78.66" - 1998 mm</li> <li>• Width: 23.62" – 600 mm</li> <li>• Depth: 47.24" – 1200 mm</li> </ul>	Customer supplied 19" rack required
Weight: 2171 lbs. (986 kg)	Weight: 1209 lbs. (549.5 kg)	Weight: 751 lbs. (341.3 kg)	Weight: 132 lbs. (60 kg)
<b>Power</b> <ul style="list-style-type: none"> <li>• Maximum power usage: 13.2 kW (13.6 kVA)</li> <li>• Typical power usage (varies by application load): 9.6 kW (9.9 kVA)</li> </ul>	<b>Power</b> <ul style="list-style-type: none"> <li>• Maximum power usage: 6.8 kW (7.1 kVA)</li> <li>• Typical power usage (varies by application load): 5.0 kW (5.2 kVA)</li> </ul>	<b>Power</b> <ul style="list-style-type: none"> <li>• Maximum power usage: 3.2 kW (3.3 kVA)</li> <li>• Typical power usage (varies by application load): 2.4 kW (2.5 kVA)</li> </ul>	<b>Power</b> <ul style="list-style-type: none"> <li>• Maximum power usage: 1.2 kW (1.25 kVA)</li> <li>• Typical power usage (varies by application load): 0.9 kW (0.93 kVA)</li> </ul>
<b>Cooling</b> <ul style="list-style-type: none"> <li>• At maximum usage: 44,800 BTU/Hour</li> <li>• At typical usage: 32,800 BTU/Hour</li> </ul>	<b>Cooling</b> <ul style="list-style-type: none"> <li>• At maximum usage: 23,100 BTU/Hour</li> <li>• At typical usage: 17,000 BTU/Hour</li> </ul>	<b>Cooling</b> <ul style="list-style-type: none"> <li>• At maximum usage: 10,800 BTU/Hour</li> <li>• At typical usage: 8,200 BTU/Hour</li> </ul>	<b>Cooling</b> <ul style="list-style-type: none"> <li>• At maximum usage: 4,100 BTU/Hour</li> <li>• At typical usage: 3,100 BTU/Hour</li> </ul>
<b>Airflow</b> <ul style="list-style-type: none"> <li>• At maximum usage: 1,680 CFM</li> <li>• At typical usage: 950 CFM</li> <li>• Airflow must be front-to-back</li> </ul>	<b>Airflow</b> <ul style="list-style-type: none"> <li>• At maximum usage: 840 CFM</li> <li>• At typical usage: 475 CFM</li> <li>• Airflow must be front-to-back</li> </ul>	<b>Airflow</b> <ul style="list-style-type: none"> <li>• At maximum usage: 480 CFM</li> <li>• At typical usage: 380 CFM</li> <li>• Airflow must be front-to-back</li> </ul>	<b>Airflow</b> <ul style="list-style-type: none"> <li>• At maximum usage: 190 CFM</li> <li>• At typical usage: 150 CFM</li> <li>• Airflow must be front-to-back</li> </ul>
<b>Environment</b> Operating temperature: 5° C to 35° C (41° F to 95° F). Nonoperating temperature: -40° C to 70° C (-40° F to 158° F). Operating relative humidity: 10–90%, Noncondensing. Nonoperating relative humidity: Up to 93%, noncondensing. Operating altitude: Up to 3,048m, maximum ambient temperature is derated by 1° C per 300m above 900m. Nonoperating altitude: Up to 12,000m. Acoustic noise: 8.4 B operating, 8.4 B idling — 69.8 dBA operating, 67.6 dBA idling.			

<b>Key Capabilities</b>			
<b>Sun Oracle Database Machine Full Rack SAS</b>	<b>Sun Oracle Database Machine Half Rack SAS</b>	<b>Sun Oracle Database Machine Quarter Rack SAS</b>	<b>Sun Oracle Database Machine Basic System SAS</b>
Up to 21 GB/second of uncompressed raw disk bandwidth	Up to 10.5 GB/second of uncompressed raw disk bandwidth	Up to 4.5 GB/second of uncompressed raw disk bandwidth	Up to 1.5 GB/second of uncompressed raw disk bandwidth
Up to 50 GB/second of uncompressed Flash data bandwidth	Up to 25 GB/second of uncompressed Flash data bandwidth	Up to 11 GB/second of uncompressed Flash data bandwidth	Up to 3.6 GB/second of uncompressed Flash data bandwidth
Up to 500 GB/second of compressed Flash data bandwidth	Up to 250 GB/second of compressed Flash data bandwidth	Up to 110 GB/second of compressed Flash data bandwidth	Up to 36 GB/second of compressed Flash data bandwidth
Up to 50,000 Disk IOPS	Up to 25,000 Disk IOPS	Up to 10,800 Disk IOPS	Up to 3,600 Disk IOPS
Up to 1,000,000 Flash IOPS	Up to 500,000 Flash IOPS	Up to 225,000 Flash IOPS	Up to 75,000 Flash IOPS
100 TB of raw disk data capacity	50 TB of raw disk data capacity	21 TB of raw disk data capacity	7.2 TB of raw disk data capacity
Up to 28 TB of user data (uncompressed)	Up to 14 TB of user data (uncompressed)	Up to 6 TB of user data (uncompressed)	Up to 2 TB of user data (uncompressed)
Data Load Rate: 5 TB/hour	Data Load Rate: 2.5 TB/hour	Data Load Rate: 1 TB/hour	Data Load Rate: 0.65 TB/hour
<b>Sun Oracle Database Machine Full Rack SATA</b>	<b>Sun Oracle Database Machine Half Rack SATA</b>	<b>Sun Oracle Database Machine Quarter Rack SATA</b>	<b>Sun Oracle Database Machine Basic System SATA</b>
Up to 12 GB/second of uncompressed raw disk bandwidth	Up to 6 GB/second of uncompressed raw disk bandwidth	Up to 2.5 GB/second of uncompressed raw disk bandwidth	Up to 0.85 GB/second of uncompressed raw disk bandwidth
Up to 50 GB/second of uncompressed Flash data bandwidth	Up to 25 GB/second of uncompressed Flash data bandwidth	Up to 11 GB/second of uncompressed Flash data bandwidth	Up to 3.6 GB/second of uncompressed Flash data bandwidth
Up to 500 GB/second of compressed Flash data bandwidth	Up to 250 GB/second of compressed Flash data bandwidth	Up to 110 GB/second of compressed Flash data bandwidth	Up to 36 GB/second of compressed Flash data bandwidth
Up to 20,000 Disk IOPS	Up to 10,000 Disk IOPS	Up to 4,300 Disk IOPS	Up to 1,440 Disk IOPS
Up to 1,000,000 Flash IOPS	Up to 500,000 Flash IOPS	Up to 225,000 Flash IOPS	Up to 75,000 Flash IOPS
336 TB of raw disk data capacity	168 TB of raw disk data capacity	72 TB of raw disk data capacity	24 TB of raw disk data capacity
Up to 100 TB of user data (uncompressed)	Up to 50 TB of user data (uncompressed)	Up to 21 TB of user data (uncompressed)	Up to 7 TB of user data (uncompressed)
Data Load Rate: 5 TB/hour	Data Load Rate: 2.5 TB/hour	Data Load Rate: 1 TB/hour	Data Load Rate: 0.65 TB/hour

Oracle Database Software (sold separately)	
For database servers	Oracle Database 11g Release 2 Enterprise Edition, Oracle Real Application Clusters, Oracle Partitioning, and other Oracle Database options
For storage servers	Oracle Exadata Storage Server Software
Exadata Storage Software Features	
<ul style="list-style-type: none"> <li>• Smart Scan Technology</li> <li>• Storage Index Technology</li> <li>• Hybrid Columnar Compression</li> <li>• Smart scans of Data Mining model scoring</li> </ul>	
High-Availability Features	
<ul style="list-style-type: none"> <li>• Redundant power supplies for all servers</li> <li>• Redundant InfiniBand switches</li> <li>• Oracle Automatic Storage Management: All database files mirrored; disk failures do not interrupt query processing</li> <li>• Oracle Real Application Clusters: database server failures are tolerated</li> <li>• Oracle Exadata Storage Server Software: storage server failures are tolerated</li> <li>• Backup is performed using Oracle Recovery Manager</li> <li>• Point in time restores are performed using Oracle Flashback Technologies</li> </ul>	
Manageability Features	
<ul style="list-style-type: none"> <li>• SUN Lights-Out hardware management</li> <li>• Oracle Enterprise Manager Database Control</li> </ul>	

### Contact Us

For more information about the Sun Oracle Exadata Storage Server, please visit [oracle.com](http://oracle.com) or call +1.800.ORACLE1 to speak to an Oracle representative.

Outside North America, visit [oracle.com/corporate/contact/global.html](http://oracle.com/corporate/contact/global.html) to find the phone number for your local Oracle office.



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