

ORACLE WHITEPAPER

ORACLE MINICLUSTER S7-2

Oracle MiniCluster S7-2

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MINICLUSTER



Oracle MiniCluster S7-2 is an extremely simple and efficient engineered system designed to run enterprise databases and applications with uncompromising security. Its simplicity, out-of-the-box performance and reliability, and small form factor make it an excellent choice for remote offices, small offices, and agile software development (DevOps) environments. It is ideal for highly security-sensitive applications, such as managing patient medical records, processing financial transactions, handling secure communications, running mission-critical enterprise resource planning (ERP) applications, and hosting security-related services.

Oracle MiniCluster S7-2 makes it easy for users to install, configure, patch, tune, and secure the system with no special training and with minimal effort. The system integrates and automates hundreds of unique security technologies and controls such as memory intrusion protection, comprehensive data protection, defense-in-depth access controls for the compute, storage, and networks, and full-visibility monitoring and auditing of user and system activities. Oracle MiniCluster S7-2 incorporates fully redundant, high-performance shared flash storage and active/active independent compute nodes with redundant network connectivity for a highly available architecture that is appropriate for extremely performance-sensitive, mission-critical applications. The system is powered by Oracle's SPARC S7 processor, which delivers higher baseline per-core performance than x86 processors. Several features of Oracle's SPARC M7 and SPARC S7 deliver unprecedented levels of security and analytics performance: Oracle's Silicon Secured Memory, Oracle's Data Analytics Accelerator (DAX), cryptographic acceleration, and Oracle's In-Line Decompression. The extreme efficiency of the system means workloads can be run with less hardware and software and with less administrative time and effort, resulting in lower operational costs, and faster time to value.

KEY FEATURES

- Oracle MiniCluster S7-2 virtual assistant
- 32 SPARC S7 processor cores and 1 TB of memory
- Silicon Secured Memory and DAX
- Near-zero-overhead encryption
- 35.2 TB of raw flash-based storage, and 60 TB of raw disk-based storage per tray
- Zero-overhead virtualization and automated application VM provisioning
- Built-in high availability
- Built-in comprehensive data protection and defense-in-depth access controls
- Automated compliance reporting
- Automated installation and zero-downtime patching
- Automated Oracle Database and Oracle RAC deployment
- Performance self-tuning

KEY BENEFITS

- Oracle MiniCluster S7-2 is a simple, secure, and efficient machine for database and applications.
- Oracle MiniCluster S7-2 is a single preintegrated system, from compute and storage to virtualization, operating system, and management.
- The virtual assistant enables push-button simplicity for the installation and deployment of complex Oracle RAC database clusters, setting up application VMs, managing security and compliance, and deploying full-system patches.
- Hundreds of security controls are preintegrated to deliver compliance-ready security posture for DISA-STIG, PCI-DSS, or CIS-equivalent security benchmarks through a single menu selection.
- Oracle MiniCluster S7-2 features on-demand compliance reporting, encryption key management, and a system health monitor.
- The SPARC S7 processor, all-flash database storage, and system-wide automation deliver outstanding operational, software, hardware, and data center resource efficiency.

Simple

The Oracle MiniCluster S7-2 operational suite dramatically reduces risk, required training, and administrator effort resulting in lower operational costs:

- **Run** virtually any Oracle workload, database, and applications at optimal performance out of the box.
- **Simplify day-to-day operations** with the virtual assistant, which abstracts the hardware and software stack and eliminates the need for specialized OS skills and training.
- **Deploy turn-key, error-free configurations** of Oracle Database. The virtual assistant automates the deployment of Oracle Real Application Clusters (Oracle RAC) and provides an easy, error-free approach to implementing highly available Oracle Database instances. Oracle Database 11g Release 2, Oracle Database 12c databases, and Oracle Database Standard Edition 2 databases are supported. Database instances can be single instance, Oracle RAC, or Oracle Real Application Clusters One Node.
- **Use the Virtual Tuning Assistant feature of Oracle MiniCluster to eliminate effort** and guesswork by automatically implementing, monitoring, and tuning system settings.
- **Keep your system up to date** using a unified full-system update bundle that can run in an automated, rolling manner.
- **Accelerate** application test and development by rapidly bringing up and resetting the system. Few or no system administration skills are required.

Secure

Oracle MiniCluster S7-2 integrates a range of unique technologies and approaches in order to provide a highly secure infrastructure with minimal effort and risk. You can, for example, do the following:

- **Secure your applications with hundreds of security controls** that are integrated into the system by default:
 - Comprehensive built-in data protection with encrypted data at rest, transit, and assured secure data erasure
 - Ready-to-use hardened and minimized VMs and secure access via SSH, TLS, and IPSec
 - Multi Factor authentication with One Time Passwords and Smart card support
 - Built-in host-based firewalls and data link protection
 - Role-based access control with least privilege and separation of duties with authorization workflow for security sensitive operations.
 - Centralized key management with PKCS#11, KMIP, and FIPS-140 support
 - Comprehensive audit policy with dedicated auditor role and centralized audit store providing full visibility monitoring of user and system activities
- **Comply** with DISA-STIG, PCI-DSS, or CIS-equivalent security standards easily with the push of a button.
- **Verify the compliance** of VMs automatically either monthly or on demand through the built-in compliance verification tools. This allows security experts and system administrators to quickly and easily verify that IT systems are secure and compliant with mandated standards and best practices.

RELATED PRODUCTS

- Oracle SuperCluster M7
- Oracle's SPARC S7-2 server
- Oracle Solaris
- Oracle Database 11g, Oracle Database 12c, and Oracle Database Standard Edition 2
- Oracle RAC
- Oracle Optimized Solutions

RELATED SERVICES

- Oracle Premier Support for Systems
- Oracle Consulting services
- Oracle University courses

- **Actively protect data in memory** from security exploits, such as Heartbleed, with the SPARC S7 processor's **Silicon Secured Memory** capabilities. SPARC S7 processors have the unique ability to prevent software programs from gaining unintended or unauthorized access to physical system memory. This eliminates the risk that data held in memory can be compromised through well-known exploits, even when software programs have defects that would be relatively easy to exploit on other platforms.
- **Encrypt end-to-end data** with near-zero overhead through the SPARC S7 processor's **cryptographic acceleration** capability. By adding a broad range of enhanced cryptographic acceleration capabilities to the design of the SPARC S7 processor, Oracle makes it possible to fully secure data that is stored on disks or transmitted over networks with virtually no perceptible impact on application or database performance and efficiency.
- **Ensure application administrators** and compromised applications are unable to accidentally or deliberately alter the configuration of VMs in ways that would expose systems to attack, through read-only VMs,
- **Determine the root cause** of problems and take corrective action immediately, without lengthy and error-prone forensic analysis, through end-to-end audit trails, which are enabled by default.

Efficient

Oracle MiniCluster S7-2 is built with Oracle's SPARC S7 processor, all-flash database storage, and virtualization technologies that offer bare-metal performance and unique capabilities for accelerating in-memory databases and applications. As a result, Oracle MiniCluster S7-2 helps you achieve results like these:

- **Improve efficiency** across the board with the **SPARC S7 high-performance microprocessor**, which has additional performance enhancements for cryptographic acceleration. Oracle Database 12c query acceleration is integrated directly into the processor design.
- **Accelerate Oracle Database 12c performance** by storing databases many times larger than the physical memory in the system, thanks to a highly compressed format using the SPARC S7 processor's **In-Line Decompression**.
- **Speed up analytics** dramatically with the SPARC S7 processor's **SQL in Silicon**, a feature introduced in Oracle's SPARC M7 and incorporated into SPARC S7, that offloads key parts of SQL operations to instances of Data Analytics Accelerator. This drives simultaneous real-time analytics and transaction processing performance to levels that cannot be matched by any standard x86 or IBM Power system. By offloading these operations, compute cores are also freed to do other work.
- **Achieve high transaction processing** and batch performance on Oracle Database workloads with all-flash storage.
- **Reduce costs**, through subcapacity software licensing, by licensing software only on the specific processors that are actually running the software at any given time. As your software workload grows, simple configuration tools make it possible to add more processors to your deployment in a matter of moments.

ORACLE MINICLUSTER S7-2 HARDWARE SPECIFICATIONS

Component	Description
System architecture	Two SPARC S7-2 servers from Oracle with up to two storage shelves per system
SPARC S7-2 servers	<p>Each SPARC S7-2 server is configured with the following:</p> <ul style="list-style-type: none"> Two eight-core SPARC S7 processors (4.27 GHz) 512 GB (16 x 32 GB) of memory Standard I/O <ul style="list-style-type: none"> One Oracle Quad 10 Gb Ethernet Adapter (Fibre) Four on-board 1000/10000 Mb/sec Base-T ports Two 12 Gb SAS PCIe HBAs from Oracle for external storage connectivity Storage <ul style="list-style-type: none"> Two 2.5-inch 1.2 TB 10 K rpm HDDs per server for the OS Four 2.5-inch 1.2 TB 10 K rpm HDDs per server for local storage External NFS storage support
Oracle Storage Drive Enclosure DE3-24C	<p>Up to two instances of Oracle Storage Drive Enclosure DE3-24C. Each enclosure is configured with the following:</p> <ul style="list-style-type: none"> Eleven 3.5-inch 3.2 TB SSDs for Databases <ul style="list-style-type: none"> 35.2 TB raw; 17.6 TB (double-mirrored) or 11.7 TB (triple-mirrored) usable capacity Four 2.5-inch (3.5-inch bracket) 200 GB SSDs for database redo logs Six 3.5-inch 10 TB 7.2 K rpm HDDs for shared application and database storage
Systems management interfaces	<ul style="list-style-type: none"> Dedicated 100/1000Base-T network management port In-band, out-of-band, and side-band network management access RJ45 serial management port
Service processor	<p>Oracle ILOM, which provides the following:</p> <ul style="list-style-type: none"> Remote keyboard, video, mouse redirection Full remote management through command-line, IPMI, and browser interfaces Remote media capability (USB, DVD, CD, ISO image) Advanced power management and monitoring Active Directory, LDAP, RADIUS support Dual Oracle ILOM flash Direct virtual media redirection FIPS 140-2 mode using OpenSSL FIPS certification (#1747)

ORACLE MINICLUSTER S7-2 SOFTWARE

Component	Description
Oracle software (included)	<ul style="list-style-type: none"> Oracle Solaris 11.3 Oracle MiniCluster S7-2 virtual assistant Oracle Engineered Systems Hardware Manager, a feature of Oracle MiniCluster
Oracle software (sold separately)	<p>Choice of Oracle Database software, depending on the desired level of availability:</p> <ul style="list-style-type: none"> Oracle Database 11g Release 2 Enterprise Edition or Oracle Database 12c Enterprise Edition Oracle Database Standard Edition 2 Oracle Real Application Clusters One Node Oracle Real Application Clusters

ORACLE MINICLUSTER S7-2 SUPPORT

Component	Description
Oracle software (included)	<ul style="list-style-type: none"> Oracle Premier Support for Systems <ul style="list-style-type: none"> Essential support services including 24/7 support with two-hour onsite hardware service response time (subject to proximity to service center), proactive tools, and online resources Oracle Auto Service Request

ORACLE MINICLUSTER S7-2 ENVIRONMENTAL SPECIFICATIONS

Component	Description	
Configuration	1 Storage Tray Configuration	2 Storage Tray Configuration
Dimensions	<ul style="list-style-type: none"> 1.7" H x 17.2" W x 29" D per SPARC S7-2 server 6.89" H x 17.64" W x 21.96" D per Oracle Storage Drive Enclosure DE3-24C 	
Maximum SQL Flash Read IOPS ⁴	<ul style="list-style-type: none"> 825,000 	<ul style="list-style-type: none"> 1,650,000
Maximum SQL Flash Write IOPS ⁵	<ul style="list-style-type: none"> 260,000 	<ul style="list-style-type: none"> 520,000
Weight	<ul style="list-style-type: none"> 153 lb. 	<ul style="list-style-type: none"> 236 lb.
Power	<ul style="list-style-type: none"> 1,760 VA max; 1,097 VA typical 1,672 W max; 1,042 W typical 	<ul style="list-style-type: none"> 2,212 VA max; 1,409 VA typical 2,101 W max; 1,338 W typical
Cooling	<ul style="list-style-type: none"> 6,005 BTU/hour max; 3,742 BTU/hour typical 6,330 J/hour max; 3,944 J/hour typical 	<ul style="list-style-type: none"> 7,547 BTU/hour max; 4,807 BTU/hour typical 7,956 J/hour max; 5,066 J/hour typical
Airflow	<ul style="list-style-type: none"> 278 CFM max, 173 CFM typical 	<ul style="list-style-type: none"> 349 CFM max, 222 CFM typical
Operating temperature/humidity	<ul style="list-style-type: none"> 5° C to 35° C (41° F to 95° F), 10% to 90% relative humidity, noncondensing 	
Altitude operation	<ul style="list-style-type: none"> Up to 9,840 feet (3,048 m) ², maximum ambient temperature is derated by 1° C per 300 m above 900 m 	
Regulations ^{1,2,3}	<ul style="list-style-type: none"> Product safety: UL/CSA 60950-1, EN60950-1, IEC 60950-1 CB Scheme with all country differences EMC emissions: FCC 47 CFR 15, ICES-003, EN55022, EN61000-3-2, EN61000-3-3 EMC immunity: EN55024 	
Certifications ²	<ul style="list-style-type: none"> NRTL, EU, International CB Scheme, BIS, BSMI, RCM, MSIP, VCCI, Morocco, Republic of Srpska, Vietnam 	
Other ³	<ul style="list-style-type: none"> Complies with 2014/35/EU Low Voltage Directive, 2014/30/EU EMC Directive, 2011/65/EU RoHS Directive, 2012/19/EU WEEE Directive 	

¹ All referenced standards of certification are to the latest official version.

² Other county regulations/certifications may apply.

³ In some cases, as applicable, regulatory and certification compliance were obtained at the component level.

⁴ Based on 8K I/O requests running SQL. For reads, physical IOPS are equivalent to the reported SQL IOPS.

⁵ Based on 8K I/O requests running SQL. For writes, physical IOPS are twice the reported SQL IOPS, due to ASM mirroring which issues multiple storage IOs to maintain redundancy.

CONTACT US

For more information about Oracle MiniCluster S7-2, visit oracle.com or call +1.800.ORACLE1 to speak to an Oracle representative.



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ÜBER HUNKLER

Das Karlsruher Systemhaus HUNKLER wurde 1988 erster offizieller Partner von Oracle in Deutschland. Ein Team von rund 20 Mitarbeitern unterstützt Kunden aus Industrie, öffentlicher Verwaltung, Gesundheits- und Finanzwesen mit Beratung, Lösungsentwicklung und Managed Services.

Im Fokus von HUNKLER stehen leistungsfähige, wirtschaftliche Infrastrukturen für Oracle-datenbanken mit den Schwerpunkten Hochverfügbarkeit, Ausfallsicherheit und Zero Downtime Migration. Die integrierten Komplettlösungen der Produktfamilie Oracle Engineered Systems sowie der Datenbank-/Anwendungsbetrieb in der Oracle Cloud sind weitere Themenfelder, die das Unternehmen umfassend abdeckt.

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