

# Oracle SuperCluster: Secure Cloud Infrastructure for Database and Applications

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## Executive Overview

Tens of billions of dollars are lost or put at risk each year because of breaches of IT systems, and the frequency and scale of such breaches appears to be increasing rapidly. As modern enterprises have embraced and rapidly expanded their use of externally-accessible Web-based applications, mobile devices and social media their vulnerability to hacking has increased dramatically. As those systems have become more and more valuable, and perhaps essential to the operation of enterprises, the direct (loss of transactions or disruption of business) and indirect costs of breaches (customer retention and acquisition, brand value, penalties and litigation) have increased accordingly. Security has emerged as the defining quality of mission-critical systems, ahead of more traditional concerns like simple availability and usability.

In tandem with this new focus on security, modern enterprises have embraced and rapidly expanded their use of IT applications for day-to-day operations to include not only customer self care, e-commerce and management of supply chains but monitoring of remote assets, interaction with internet-connected automata and integration with social media platforms the sheer volume of data available to Enterprises has increased dramatically, and will continue to do so for the foreseeable future. Real-time analytics has become an essential tool for business decision makers who now have massive amounts of information at their fingertips but require new technology in order to understand that information and use it to make better, faster decisions.

Finally, as the scale and diversity of IT systems has increased over the course of this decade, these systems have become incrementally more difficult and expensive to manage and maintain. Enterprises, however, are under constant pressure to discover and develop innovative uses of new technologies that can generate new revenue streams, increase profitability and dramatically drive down costs. Last-generation approaches to agility and cost control through technology standardization have lost momentum in the marketplace and new approaches, like cloud and engineered systems, have emerged as the most promising way forward. In the former case, the opportunity to completely divest the enterprise from the costs and complexities of deploying and operating essential, but not necessarily differentiating, infrastructure and platforms has obvious and warranted appeal. Not all enterprises or workloads, however, are able to take full advantage of a shared public cloud offering. Those enterprises still seek relief from unwanted IT complexity, however, and are turning to engineered systems that deliver vertical integration of hardware and software for specific high-value workloads in packages that can be easily deployed on premise. The notion of a private cloud, supplied by a trusted vendor as a turn-key platform and infrastructure for applications has become the preferred approach for achieving lower costs, better security, more useable applications and greater IT agility.

SuperCluster M7 is a secure cloud infrastructure for databases and applications, and has been designed to compliment Oracle's public cloud by offering the greatest possible operational simplicity, cloud-oriented user self- management and extremely predictable high performance under the widest range of applications in the most demanding environments. Its unique ability to provide massive scalability and unbeatable performance for existing applications that rely on Oracle Database without changing a line of code, and its deep engineering with the Oracle Database 12c release in particular for real-time analytics on production OLTP applications, make it an ideal choice for implementation of private clouds and legacy application consolidation.

## Introduction

Oracle SuperCluster is a secure enterprise cloud infrastructure for Oracle Database and application consolidation. Customers can benefit from accelerating the performance of Oracle Database, Java, and many business applications on an integrated platform while speeding time to deployment and ensuring high levels of reliability and uptime. Oracle SuperCluster (Figure 1) sets the standard for business application solution deployments: maximizing customer value in a complete and tested offering.

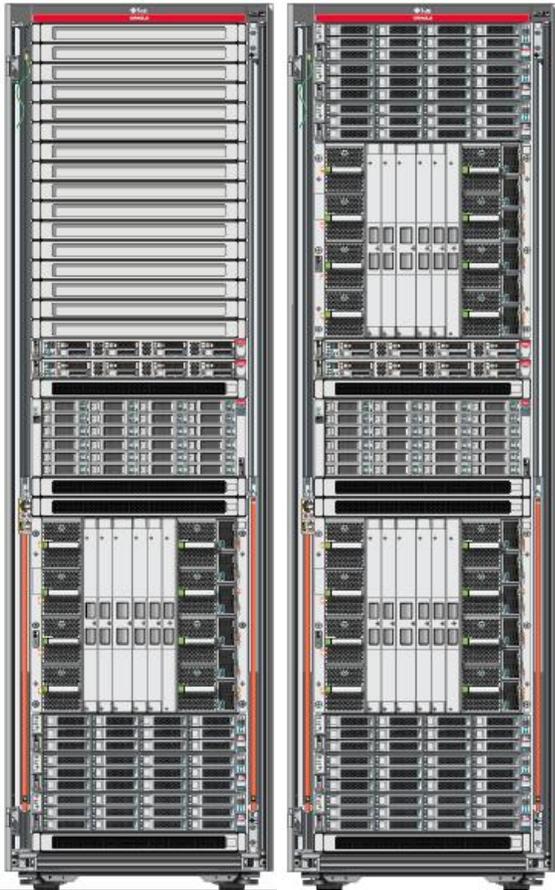


Figure 1. Oracle SuperCluster M7 in minimum and maximum compute configurations

The Oracle SuperCluster engineered system integrates Oracle's SPARC hardware, the Oracle Solaris operating system, virtualization, storage, networking, and systems management into a unified platform that delivers extreme business results.

The Oracle SuperCluster engineered system integrates the following Oracle technologies:

- » SPARC M7-8, featuring software in silicon technologies
- » Oracle Solaris operating systems
- » Oracle VM Server for SPARC virtualization
- » Oracle Solaris Zones

- » Oracle Exadata X5 Storage Server and Oracle's Exadata Storage Server Software
- » Oracle ZFS Storage Appliance
- » InfiniBand QDR networking
- » Oracle Enterprise Manager Ops Center 12c
- » Oracle Exalogic Elastic Cloud software (optional)
- » Oracle Solaris Cluster (optional)

Together, these components enable customers to quickly deploy apps-to-disk solutions that provide the highest security and performance combined with the lowest-cost infrastructure. Oracle SuperCluster offers lightning-fast improvements of up to 10x on data compression, queries, and OLTP response times, as well as significant analytics and Java middleware performance. Delivered tested and ready to run, this system can be deployed in days, not months, and include special enhancements unique to this Oracle product offering that cannot be replicated by other vendors or assembled separately by customers. To date, Oracle helps customers realize the value of SuperCluster when they move off IBM and HP systems and can assist customers with migrations to this integrated solution that drives down capital and operating expenditures.

Oracle SuperCluster is well suited for secure multitier application deployments and data center consolidation. The integrated approach of the Oracle SuperCluster solution will appeal to organizations seeking to reduce cost of operations, improve service delivery levels, and drive out complexity in the data center. Oracle SuperCluster enables customers to securely deploy cloud and virtualization technologies with a solution that integrates seamlessly into existing data centers. Existing applications can transition smoothly to Oracle SuperCluster and customers can grow and expand capacity as their compute requirements grow. Customers can continue to run applications on Oracle Solaris 11 and Oracle Solaris 10, which means more than 11,000 ISV applications can run on this platform. Further, Oracle continues to develop Oracle Optimized Solutions and use cases around Oracle SuperCluster so that customers can gain a better understanding of the best and most optimal ways to incorporate the solution into their data center operations. To date, a wide range of enterprise applications including Oracle E-Business Suite, Oracle's PeopleSoft, SAP, and Java middleware applications, such as Oracle WebLogic Server, have been demonstrated to run better and more cost effectively on Oracle SuperCluster. The key business benefits of Oracle SuperCluster are described in the subsections that follow.

### The Industry's Most Advanced Security

Oracle SuperCluster M7 delivers the industry's most advanced security in every layer of the stack: application to chip. As an engineered system, Oracle SuperCluster M7 is a complete stack of applications, database, server, operating system, networking, storage, and system management which has been integrated, preconfigured, pre-tuned, and pre-tested by Oracle experts. In each layer of the solution stack, there are industry leading security features that can be leveraged to make Oracle SuperCluster M7 the most secure platform available for enterprise workloads. With the Oracle SuperCluster M7, Oracle experts have pre-configured many of these security settings to make the Oracle SuperCluster M7 more secure at time of installation, reducing the workload for system administrators and security officers to implement security measures across the many technologies which need to be configured to ensure secure operations. **Out-of-the-box security controls** for SuperCluster M7 enables organizations to realize the value of pre-engineered, pretested and preverified systems; enabling organizations to have peace of mind when it comes to security.

Oracle SuperCluster features Oracle's Software in Silicon technology—a breakthrough in microprocessor and server design, enabling databases and applications to run faster and with unprecedented security and reliability. One unique feature, **Silicon Secured Memory**, is the capability of detecting and preventing invalid operations to



application data, through hardware monitoring of software access to memory. This can stop malware from exploiting software vulnerabilities, such as buffer overflows. The hardware approach of the Silicon Secured Memory feature is much faster than traditional software-based detection tools, meaning that security checks can be done in production without significant impact to performance. In addition, each processor core contains the fastest cryptographic acceleration in the industry, allowing IT organizations to deliver end-to-end data encryption and secure transactions with near-zero performance impact. You can easily activate data protection and encryption security, by default, without additional investment.

### Improved Levels of Security Without Extra Cost

With attempted electronic intrusion and theft at an all-time high, secure communications and data protection has never been more important. The SPARC servers used in Oracle SuperCluster support many more cryptographic operations per second compared to competing systems with dedicated cryptographic accelerator cards—all with minimal impact to system overhead. With cryptographic accelerators embedded into each SPARC processor, hardware encryption comes at no additional cost and enables IT organizations to run transactions more securely without a performance penalty or with the added cost and complexity of acquiring additional hardware to perform encryption.

Oracle SuperCluster also includes superior security features at the operating system level to help administrators implement strong security policies. Oracle Solaris combines multiple security technologies, allowing it to monitor file integrity, verify user and process rights, and retain an end-to-end **audit trail** of all system events. Protection against inappropriate use of network resources is provided through its secure default networking configuration, which disables many unused network services to reduce exposure to attack. **Read-only virtual machines** (also known as Immutable Solaris Zones) ensure application administrators and compromised applications are unable to accidentally or deliberately alter the configuration of Virtual Machines in ways which would expose systems to attack. Oracle Solaris also offers **administrative access controls** for unique user and process rights management technology that reduces risks by granting users and applications only the minimum capabilities needed to perform their duties. No application changes are required to take advantage of these enhancements. For data security, system administrators also can detect possible attacks on their systems by monitoring for changes to file information. Oracle Solaris utilizes binaries that are digitally signed, so that administrators can easily track changes and maintain compliance.

**Compliance reporting automation** allows security experts and system administrators to quickly and easily verify that IT systems are secure and compliant with mandated standards and best practices. Oracle SuperCluster supports both the *Center for Internet Security (CIS)* and *Security Technical Information Guide (STIG)* security benchmarks and is *Payment Card Industry PCI-DSS* compliant.

## The World's Fastest Engineered System

### Engineered for Extreme Performance

Customers are looking for scalable platforms with the flexibility to adjust to workload needs and deliver high performance for the consolidation of applications running on older hardware. Oracle's approach with engineered systems is proven to deliver massive boosts in performance for database and middleware applications. Oracle SuperCluster combines the software from the Oracle Exadata and Oracle Exalogic solutions to offer the same level of performance improvement of up to 10x for Oracle Real Application Clusters (Oracle RAC) and Java middleware.



In addition, Oracle SuperCluster leverages SPARC servers and an InfiniBand unified server and storage network that enables users to experience a significant increase in performance and response times.

Oracle's SPARC servers have garnered performance benchmark world records. World-record benchmark performance in database, middleware, and every major application category demonstrates that SPARC servers in Oracle SuperCluster are capable of delivering accelerated performance and improved cost/performance across a broad range of workloads. In addition, Oracle's InfiniBand switches that are integrated into Oracle SuperCluster deliver up to 5x to 8x the performance of standard networks, meaning data in Oracle SuperCluster moves much faster than in traditional deployments. The integration of Oracle's SPARC servers, storage, and networking products is refined by hundreds of engineer years to ensure that Oracle SuperCluster delivers extreme performance right out of the box.

In-Memory SQL Acceleration is another unique Software in Silicon feature in the Oracle SuperCluster M7 database and application servers. This is implemented through accelerators specifically designed into the chip's silicon to handle database primitives, such as those used by Oracle Database In-Memory in Oracle Database 12c. The accelerators operate on data at full memory speeds, taking advantage of the very high memory bandwidth of the processor. This produces extreme acceleration of in-memory queries while processor cores are freed to do other useful work. In addition, the ability of these accelerators to handle compressed data on the fly means that larger databases can be kept in-memory, or that less server memory needs to be configured for a given database size. Users can run fast in-memory analytics on databases, using much less memory than the size of the data, without significantly increasing server utilization rates or affecting OLTP operations.

In-Line Decompression (a feature of the SPARC M7 processor) units in the Software in Silicon acceleration engines significantly increase usable memory capacity. The units on a single processor run data decompression with extraordinary performance that is equivalent to 16 decompression PCI cards or 60 CPU cores. This capability allows compressed databases to be stored in-memory while being accessed and manipulated at full performance.

In-Memory SQL Acceleration and In-Line Decompression capabilities can be combined to provide increased performance and capacity resulting in maximizing usage of memory capacity, bandwidth, and CPU cores for a revolutionary impact on performance.

Additionally, with the integration of Oracle Exadata Storage Server in Oracle SuperCluster, a fully configured Oracle SuperCluster rack offers significant IOPS of storage performance and rapid query throughput, enabling databases and data warehouses to run faster and deliver quicker results than other platforms.

Oracle SuperCluster includes a unique technology that offloads data-intensive SQL operations into Oracle Exadata Storage Server, which runs Exadata Storage Server Software. Together they provide unique and powerful technology including the Exadata Smart Scan feature of Oracle Exadata; Storage Indexes, a feature of Exadata Storage Server Software; Exadata Smart Flash Cache, a feature of Oracle Exadata; Exadata Smart Flash Logging, a feature of Oracle Exadata; flash cache compression, I/O Resource Manager, a feature of Exadata Storage Server Software; network resource management; and Exadata Hybrid Columnar Compression, a feature of Oracle Exadata.

By pushing SQL processing to Exadata Storage Server, data filtering and processing occurs immediately and in parallel across all storage servers as data is read from disk. Oracle Exadata Storage Server offload reduces database server CPU consumption and greatly reduces the amount of data moved between storage and database servers. Exadata Smart Flash Cache dramatically accelerates Oracle Database processing by speeding I/O operations. Exadata Smart Flash Cache provides intelligent caching of database objects to avoid physical I/O operations and speeds database logging. Oracle Exadata Storage Server provides an advanced compression technology, the Hybrid Columnar Compression feature, that typically provides 10x and higher levels of data



compression and boosts the effective data transfer by an order of magnitude. The combination of these and many other features of the product are the basis of the outstanding performance of Oracle SuperCluster.

Oracle Database In-Memory in Oracle Database 12c delivers leading-edge in-memory performance without the need to restrict functionality or accept compromises, complexity, and risk. Deploying Oracle Database In-Memory in Oracle Database 12c with virtually any existing Oracle Database-compatible application is as easy as flipping a switch—no application changes are required. It is fully integrated with Oracle Database's scale-up, scale-out, storage tiering, availability, and security technologies, making it the most industrial-strength offering in the industry. Oracle Database In-Memory in Oracle Database 12c on Oracle SuperCluster delivers fast, real-time analytics results on production online transactions processing, making it fast and easy for users to make business decisions.

The in-memory offering on Oracle Applications such as Oracle's JD Edwards EnterpriseOne applications, Oracle's PeopleSoft applications, Oracle's Siebel applications, Oracle E-Business Suite, and Oracle's Hyperion applications, provides operational visibility against transactional data. Applications processes that could only be imagined as batch processes are now transformed to real time.

## Extreme Cost Efficiency

### Faster Time to Service Delivery

Oracle's integrated approach with Oracle SuperCluster allows customers to install and run applications and business services much faster than separately acquiring and then assembling and cabling the pieces together. Each Oracle SuperCluster engineered system is the same, allowing an integrated stack to be delivered tested and ready to run and deploy in a matter of days or weeks, as opposed to months. Customers receive the identical configuration that is used by Oracle engineering and there are no unique configuration issues or complex options to troubleshoot. Therefore, Oracle SuperCluster arrives not only as a highly optimized, integrated platform to run existing database, middleware, and customer applications, but it is also easily supportable because all systems are the same.

Connectivity to other systems and storage in the customer's existing data center can be achieved over the integrated 10GbE Ethernet NICs included in each SPARC server compute node. This allows for a gradual migration to Oracle engineered systems by supporting connectivity to existing SAN storage. Optional Fibre Channel connectivity is available to facilitate migration of data from legacy storage subsystems to the instances of Exadata Storage Server integrated with the Oracle SuperCluster.

### Elastic Configuration and Seamless Upgrade Path to Expand as Requirements Grow

Customers deploying enterprise solutions are frequently looking for the ability to expand and increase computational power in the future without disrupting current operations. For years, Oracle's enterprise-class servers have provided the capability to upgrade compute and memory capacity within the chassis as business needs dictate. Oracle SuperCluster takes a similar approach, enabling customers to initially invest in a rack configuration that is right for the organization's workload requirements today and expand for growth in the future with additional compute nodes and storage servers when users desire. SuperCluster M7 introduces low-cost elastic configurations that allow even small and midsize enterprises to deploy right-sized systems and seamlessly add capacity as business needs change over time. Additionally, multiple Oracle SuperCluster systems can be cabled together and connected to Exadata Storage Expansion Racks for larger deployments.

For situations in which customers are not ready to upgrade or migrate to Oracle Database 11g Release 2 or higher, the Oracle SuperCluster has the capability of incorporating Fibre Channel cards in the compute nodes to attach to



existing storage and SAN infrastructures. This functionality also can be useful for moving data over to Oracle SuperCluster when leveraging Oracle Database 11g Release 2 or higher with instances of Exadata Storage Server for high-performance database operation. However, Oracle SuperCluster does allow the ability to run other databases, including third-party products, when it is necessary to attach to SAN environments for an extended period of time and for protecting SAN investments. The only caveat is that performance is not accelerated through the Exadata Storage Server systems in the solution. Still, this can be a useful strategy for customers that are on a path to upgrade older Oracle Database instances to Oracle Database 11g Release 2 or higher and want to take advantage of the consolidation benefits and higher performance afforded by Oracle SuperCluster while completing the upgrade for Oracle Database 11g Release 2 or higher.

### **Extreme Efficiency for Cloud Services**

Oracle SuperCluster helps customers rapidly deliver cloud services “out of the box” and transition smoothly from decentralized siloed IT models into a highly efficient and flexible service delivery model. Oracle Optimized Solutions offerings, like the Oracle Optimized Solution for Oracle Database as a Service for cloud, provide the template that customers can leverage to reduce operating costs on aging assets while delivering a flexible service environment to internal application users. Customers can deploy enterprise cloud services quickly with 24/7 availability, secure multitenancy, and a radically simplified management, patching, and support model. The result is an agile and secure database environment that is better able to support business needs by enabling high end-user productivity, increased utilization, and reduced IT costs.

Customers using Oracle SuperCluster for cloud services benefit from cloud governance and control using quote, retirement policies, and showback to allow end user organizations to understand their usage and make informed decisions. Additionally, the use of Oracle VM Server for SPARC virtualization enables provisioning of databases and applications across a range of performance, capacity, and availability attributes to enable cost-effective management of SLAs. Databases can grow dynamically and shrink with evolving business needs, and databases can be deployed 5x faster than a do-it-yourself approach, resulting in faster time to value and better return on investment. Oracle’s cloud services offerings on Oracle SuperCluster deliver up to 4x better price performance than competitive solutions, lowering operating costs for increased profit margins.

### **Reduced Cost of Deployment, Acquisition, and Operation**

Oracle’s engineered systems strategy is to deliver preintegrated ready-to-run systems that reduce the cost and complexity of IT infrastructures. As a single-vendor stack, Oracle SuperCluster simplifies and reduces the costs associated with purchasing, deploying, and supporting IT environments. One of the biggest areas of cost savings associated with Oracle SuperCluster and engineered systems in general is derived from the ability of an IT organization to move applications and begin operating in a matter of days rather than weeks or months. Systems are tested by Oracle engineering before and after shipping and include a 40-page test plan to ensure a seamless and easy process of rapidly deploying cloud services and consolidating Oracle Database and other business applications. Customers already using Oracle SuperCluster talk about how it took them just three to five days to start using the solution versus the weeks and months required to unpack, rack, cable, test, configure, and tune shipments of traditional servers. Further, customers can move into full production in just weeks from the time that the system is up and running. That time translates into cost savings and the ability for IT personnel to focus on other critical business problems or the next application implementation.

Additional cost savings in implementing Oracle SuperCluster come from total cost of ownership (TCO) savings including both lower cost of acquisition and decreased operational costs. Reducing the quantity of server assets to run database/middleware and applications onto a single, unified, high-performance platform eliminates monthly



spending on maintenance, power, cooling, and space. Storage costs also can be significantly reduced when leveraging the storage available in Oracle SuperCluster with instances of Exadata Storage Server. Oracle's Exadata Hybrid Columnar Compression and Oracle Advanced Compression in the database mean less data to store and ultimately less data to back up.

Customers can reduce or eliminate the need to continuously add more and more expensive SAN-based storage, as storage is included in Oracle SuperCluster. Fewer systems and less storage to maintain also equates to a reduction in IT administrators' effort to maintain an environment. These assets can be repurposed to attack other key IT problems or work to provide further automation and cost savings in the data center. Another area of savings comes from the ability to save on the cost of licensing software. Oracle's SPARC servers offer an advantageous Oracle software licensing multiplier compared to competing CPU architectures, and with Oracle SuperCluster, customers have the option to license only the amount of database that they are using. Oracle VM Server for SPARC and Oracle Solaris Zones, along with replication and cloning licenses for Oracle ZFS Storage Appliance, are included at no extra charge with Oracle SuperCluster.

Finally, Oracle SuperCluster helps customers realize cost savings by reducing risk. Oracle removes many variables around supporting heterogeneous deployments (patching, drivers, etc.) by delivering a unified, pre-engineered, and pretested solution. The movement into cloud computing models of operation creates an opportunity for massive standardization, with self-service, metering, and charge-back capabilities. Oracle SuperCluster addresses the need for standardization and allows companies to show that IT services can deliver real monetary value to user departments.

### **Highest Service Levels for Mission-Critical Applications**

Oracle SuperCluster includes built-in hardware redundancy, multiple I/O paths and advanced clustering technologies, providing mission-critical levels of availability for database and other 'always-on' business applications. These features address customer uptime requirements through hardware availability delivered via hot-swap capabilities and system partitioning options as well as through the predictive self-healing and fault management capabilities of Oracle Solaris. To address higher uptime requirements, Oracle SuperCluster features built-in availability at each level of the stack, including clustering capabilities. SPARC systems running the Oracle Solaris operating system have a solid reputation for reliability and include hot-swap and hot-plug components at the hardware layer. The entire system is tested with a variety of applications on an ongoing basis and patch sets are tested prior to release to customers. All of these features and activities dramatically reduce the need for planned downtimes and lower the occurrence of unplanned downtime for the platform.

Use of Oracle Solaris Cluster enables greater levels of availability along with disaster recovery across all software tiers in traditional and virtualized data centers. Oracle Solaris Cluster is the clustering solution designed for Oracle Solaris, and it is optimized to leverage the Oracle SuperCluster redundancy and reliability features. It provides built-in support for a large portfolio of applications and databases, with a wide range of options for virtualized deployment based on Oracle VM Server for SPARC and Oracle Solaris Zones in Oracle SuperCluster configurations.

Oracle SuperCluster provides the perfect environment for deploying high availability clustering—preintegrated hardware cluster and pretested platform: no errors in cabling and no issues in hardware compatibility. It includes built-in redundancy for network, storage, server and connectivity, seamless integration, and thorough testing with operating system and clustering software. Together Oracle SuperCluster and Oracle Solaris Cluster deliver the highest service level for mission-critical applications across all tiers of the data center.



Oracle Solaris Cluster is the only HA solution that integrates with Oracle Solaris at the kernel level. The resulting instant and load-resilient system failure detection allows recovery to start within a second. Oracle Solaris Cluster monitors the server nodes, storage, network components, operating system, virtual machines, and applications running in Oracle SuperCluster. Its policy-based application-specific recovery actions can significantly reduce end-to-end services recovery time. This deep integration of Oracle Solaris Cluster with the Oracle SuperCluster engineered system delivers multinode high availability and is extensively tested by Oracle to reinforce reliability and minimize downtime.

### **Simplified Operation With Unified Management and Patching**

One of the most critical aspects of successfully deploying and operating IT assets is systems management. Many customers are looking to begin building out internal private cloud deployments, and Oracle SuperCluster fits perfectly into that strategy as it is much easier and cost effective to manage than traditional servers. Oracle SuperCluster includes Oracle Enterprise Manager Ops Center, which enables customers to provide comprehensive management for all hardware components and virtualization technologies in the stack. Oracle Enterprise Manager Ops Center saves time and reduces complexity by allowing customers to manage the application stack in the same manner regardless of whether applications are deployed on physical or virtual machines. This facilitates consistent management practices and tools as well as improved management efficiency and a reduction in risk of operator error linked to coordination of multiple, disparate tools.

Oracle Enterprise Manager Ops Center also provides the basic elements necessary for managing the lifecycle across the entire hardware infrastructure of Oracle SuperCluster. Customers can perform regular maintenance activities such as health checks, proactive support, and resource monitoring and measurement. Additionally, Oracle Enterprise Manager Ops Center provides powerful capabilities to manage virtual environments. Technologies such as Oracle VM Server for SPARC, Oracle Solaris Zones, and an intuitive GUI interface enable improved management of virtual machines.

Beyond Oracle Enterprise Manager Ops Center, customers can gain operational efficiencies through the unified patching and upgrading processes that are offered with Oracle SuperCluster. Unlike traditional server environments that require complex and frequently time-consuming patching and upgrade maintenance windows, Oracle SuperCluster is designed to offer a more seamless and integrated process around software and system updates. Embedded hardware diagnostic capabilities provide 'phone home' automated service requests. The standard and pretested configuration also enables proactive advice from Oracle Advanced Customer Support. Customers can mitigate risk and free resources by removing the guesswork from managing critical software updates, essential patches, feature enhancements, and new releases, as these are automated in Oracle SuperCluster. Upgrades and enhancements are delivered pretested so customers can operate comfortably knowing that the entire system is managed and patched from a central point of service accountability.

## **Oracle SuperCluster Use Cases and TCO**

This section highlights use cases for Oracle SuperCluster and explores some of the price/performance advantages for customers to consider when they evaluate Oracle SuperCluster relative to other offerings. Oracle already has replaced many competing platforms with Oracle SuperCluster and is ready to assist customers with migrations. Across all use cases highlighted, the biggest benefit customers are experiencing is the rapid time from initial system configuration to production. Several customers were running live in production in less than one month.



The use cases discussed below include:

- » Oracle SuperCluster as the lowest-cost and best price/performance platform to consolidate HP and IBM legacy platforms
- » Oracle SuperCluster for high performance for broad enterprise application deployments
- » Oracle SuperCluster as an optimal platform for consolidation of SPARC servers

### Use Case #1: Competitive Displacement of HP and IBM Systems

This use case recommends the Oracle SuperCluster engineered system as the lowest-cost platform for customers to consolidate existing HP and IBM servers running database, middleware and business applications. Many customers running these competitive systems are seeking to refresh their environment with more cost-effective platforms that are integrated, enable more control, and offer cloud-like operational models. Oracle SuperCluster presents a way to cost effectively migrate off competitive platforms to a private cloud service offering while saving money in acquisition costs and also achieving high levels of reliability through clustering functionality. Additionally, the versatile nature of Oracle SuperCluster means that it can accommodate not just the database or middleware layers, but also drive high performance for the Oracle or third-party applications that may be hosted on those machines.

As an example, a large pharmaceutical manufacturer and distributor in Latin America was seeking a consolidation solution for its implementation of Oracle's JD Edwards EnterpriseOne SP12 and Oracle Database 9i Release 2 in a mixed system environment consisting of IBM UNIX servers, x86 systems, and EMC storage. Oracle SuperCluster was presented as the optimal engineered system from Oracle to enable this customer to add additional workloads to the company's software stack while consolidating away from the existing mixed set of servers.

With Oracle SuperCluster, this customer experienced a 34x improvement in batch processing with Oracle Database 11g Release 2 connected to Oracle ZFS Storage Appliance in Oracle SuperCluster. Oracle Database batch reporting improved by up to 153x and sales order processing resulted in a 2.5x improvement. The Oracle SuperCluster domain configuration was engineered specifically for the company's architecture, allocating the optimal CPU and memory resources for the Oracle Database domain and for JD Edwards EnterpriseOne. The customer benefits from the rapid deployment time that Oracle SuperCluster affords, and expects a reduction in operating costs over time due to the transition to centralized management of an integrated solution with a single point of technical support for all components.

### Use Case #2: High-Performance Applications Engine

As demonstrated previously in this white paper, Oracle SuperCluster incorporates many technologies that allow Oracle Database, Oracle Fusion Middleware, and business applications to be accelerated in performance. From a business perspective, this equates to faster time to results, better decision-making and improved SLAs to internal and external stakeholders. The second use case for Oracle SuperCluster shows how it can be a super-fast engineered system for new application deployments spanning multiple tiers of the datacenter.

A large global technology manufacturing company evaluated Oracle SuperCluster as a new hosting environment for Oracle Database 11g, Oracle E-Business Suite, and Oracle Fusion Middleware. The customer evaluated Oracle SuperCluster performance to define the proof of value (POV) of a migration to Oracle Database 11g Release 2. Overall, performance testing showed an average performance improvement of 3x and a maximum of 5x versus the current environment. Oracle SuperCluster enabled this customer to achieve the objective of delivering higher performance for applications and database while simplifying the company's legacy systems with one platform that can integrate the database and applications tiers together.



### Use Case #3: SPARC and Oracle Solaris Application Consolidation

SPARC systems running Oracle Solaris have a massive installed base of hundreds of thousands. For systems that are more than three years old, there is an opportunity to drive operating cost savings while preserving investments and skillsets around the Oracle Solaris operating system. Oracle SuperCluster presents the most efficient way to transition from SPARC server assets and gain massive increases in performance while reducing cost associated with deployment and maintenance. Oracle estimates that on average, an Oracle SuperCluster consolidation of older SPARC and Oracle Solaris assets enables customers to realize up to 5x improved TCO over a five-year duration.

A large telecommunications and media corporation evaluated Oracle SuperCluster as a consolidation platform for its database and telecommunications applications running on SPARC servers. Oracle SuperCluster provided the ability to combine the Oracle Database 11g Enterprise Edition installation with common core calling environment workloads. The single platform now can be centrally managed and allows for future growth and expansion via further consolidation. The performance testing results demonstrated a 10x compression improvement and a 7x performance gain with compressed data for Oracle Database (OLTP). Additionally, Oracle Recovery Manager (Oracle RMAN), a feature of Oracle Database, helped increase I/O throughput by 5x and backups took only one-fifth the time. Finally, queries showed a 60x to 90x improvement over the current servers.



## Conclusion

With the Oracle SuperCluster engineered systems, Oracle continues to demonstrate the power and potential of harnessing an entire stack of hardware and software products to deliver exceptional customer value and cost savings through a comprehensive, tightly integrated solution.

As demonstrated above, Oracle SuperCluster is an ideal consolidation solution for enterprises plagued by insecure, aging, legacy platforms as well as for new application deployments when enterprises are looking to move towards private cloud models. Regardless of the situation, customers stand to benefit from huge gains in performance that can enhance and revolutionize the way they conduct business on a daily basis. Improved TCO via reduced acquisition and operating costs can be realized rapidly with Oracle SuperCluster by leveraging support from a single point of contact, lower cost of acquisition and software support, and a future-proof system that can be upgraded with minimal disruption to daily business operations.

Oracle SuperCluster is a powerful Oracle engineered system that delivers advanced security, extreme performance, and a cost-effective solution for deploying a secure cloud infrastructure in a complete and tested package that offers rapid deployment and simple administration.



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