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Introduction

Whether consolidation is the main goal, or simply moving to a more agile computing infrastructure, Oracle has a wide portfolio for creating and managing an enterprise private cloud infrastructure that spans the portfolio from the Oracle SPARC SuperCluster to cloud-centric servers and storage that offer a method for understanding the Oracle vision for a modern and value-oriented cloud infrastructure.

The term cloud computing is used frequently by many people to mean many things, but there are some agreed-upon commonalities between all visions for cloud computing. One of the central themes around cloud computing is "doing more with less". This goal is most often accomplished through consolidating existing legacy systems to modern software and hardware, with layered capabilities of centralized management and unit-based metering being key tenets of "cloud" infrastructures. Oracle has offerings in the Oracle Cloud that offer true on-demand software-as-a-service (SaaS) for many Oracle applications, where the underlying hardware is completely abstracted from the customer. However, many companies need a technical computing infrastructure that is housed internally, and Oracle's private cloud offerings can help companies consolidate and evolve to a private cloud model.

This private cloud model is designed for both companies that are looking to consolidate their own internal data systems to realize the benefits of running a more streamlined and modernized platform, as well as service providers looking to build their own SaaS platforms for delivery of both private and public cloud-based offerings.

When a Private Cloud is the Right Choice

Many organizations have a desire to realize the benefits of a cloud-based model within the control of their own existing infrastructure. This is where the Oracle Cloud deployment solutions best fit. In fact, customers that have a significant investment in Oracle software and hardware technologies can make a smooth transition to a cloud infrastructure by simply consolidating their systems as a first step, and then enabling cloud services capabilities within the consolidated infrastructure.
A private cloud platform built on Oracle technologies has two goals that can be thought of as being both complementary and evolutionary. Many customers will not be able to transition their existing processes to an entirely centralized model where the individual software services are parsed out to each business unit based on resource need. Therefore, Oracle has a path through which older and less efficient systems can be moved in whole, or in part, to the parts of a cloud-based model based on their individual needs. Some components, for example, would be excellent candidates for moving to a self-service cloud model right away, enjoying the benefits of reduced maintenance costs, and faster response times to business challenges. Other pieces are more difficult to transition, due to the criticality of those services from a business perspective, or to other more technical reasons such as dependencies on older third-party software.

Architecting a cloud is not a "one size fits all" process. Oracle's vision is to identify the right migration steps to enable early benefits while balancing the need to implement a private cloud in stages. In some cases, an immediate transition to the full cloud model would be too much to take on at once, and a partial cloud implementation, where applications are consolidated into a common infrastructure, provides a good stepping stone.

**Oracle's Private Cloud Offerings**

Under the concept of the "enterprise cloud," Oracle separates its offerings into two categories: Enterprise Cloud Infrastructure and Enterprise Cloud Platform. Moving to an Enterprise Cloud Infrastructure is designed to be the first of two steps in adoption of cloud services, and has two options for the hardware platform upon which to run applications. The Enterprise Cloud Platform is a
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later stage in private cloud deployment where true platform-as-a-service methodologies are used to deliver services, such as the Oracle Database, rapidly and in a self-service model.

A starting step is looking at an enterprise cloud infrastructure which uses flexible SPARC servers from Oracle as building blocks to modernize and enhance performance for existing aging servers and software platforms (more information on the Oracle Optimized Solution for Enterprise Cloud Infrastructure can be found [HERE](#)). One of the best ways to understand the highest performance modernization platform is by evaluating the Oracle SPARC SuperCluster. Both regular SPARC servers and the SPARC SuperCluster are based on similar components, but the SPARC SuperCluster has special benefits all the way from low-level benefits like pre-integration at the factory, to high-level benefits such as extreme application acceleration through Oracle Database technologies enhanced by the Oracle Exadata software, and is part of the *engineered systems* product line from Oracle. For the purposes of application consolidation, the Oracle SPARC SuperCluster offers the simplest and easiest way to consolidate applications and bring them into a cloud infrastructure that comes with all of the hardware, software, and management tools needed to efficiently operate cloud services. The SPARC SuperCluster engineered system is Oracle's premiere platform for application consolidation for mission-critical applications using Oracle's latest database technologies.

To read more on Oracle's enterprise private cloud offerings, please visit this link: [http://www.oracle.com/us/solutions/cloud/private/overview/index.html](http://www.oracle.com/us/solutions/cloud/private/overview/index.html)

Steps for Migrating to a Private Cloud

A private cloud runs many applications and takes advantage of a flexible infrastructure with automated management for maximum efficiency. In many cases, the first step toward the private cloud is to focus on simply consolidating the applications to run on a common infrastructure.

Oracle views migration to the private cloud as consisting of the following two major steps:

- Consolidating applications onto a modernized hardware and software infrastructure
- Providing service-centric compute resources and tools for enterprise end users upon that consolidated foundation which is based on transparent virtualization of underlying hardware and software platforms

This approach enables organizations to take advantage of the complementary and additive benefits of the two stages while providing actionable goals that can be achieved within a short time period. Very few companies worldwide are able to move all applications and technologies to the latest hardware and software version, so an approach that accommodates a phased approach will be the most useful. The following two sections provide more information about what is included in each of these steps and what benefits can be realized at each stage.

The intent of these steps is to describe how the underlying hardware and software becomes less apparent to end-users due to virtualization and management of the software resources:

- Step 1: Management of "building blocks" of hardware, operating systems, and software running on modernized systems. This step describes the benefits of moving to a modern computing platform
that by its very nature of being "modern" has centralized management and virtualization built in. Even at this level, significant benefits can be found through the manipulation of virtualized software instances to help make software applications more flexible and adaptive.

- Step 2: The move from managing hardware to a fully realized service delivery model where end users receive the services they need delivered to them on-demand, rapidly, and with the ability to manage costs by providing those services to internal users through metered usage.

What follows is a more detailed description of these two steps.

**Step 1 — Consolidating Applications to Prepare for the Private Cloud**

The first step of consolidating applications yields the following technical advantages that apply to all services, whether cloud-enabled or not:

- Higher performance, modernized hardware, with the benefits of centralized management with near-zero overhead virtualization
- An opportunity to move to more recent software versions, resulting in higher performance and more features

![Figure 2. Step one in consolidating to a private cloud](image)

This first step allows for applications to move to the modernized hardware and software components that make the best sense for them. Some applications will be great candidates for moving to the latest version of the Oracle Database, or other Oracle technologies. Some other applications will need time
to test and settle in on the newer hardware before taking advantage of the very latest enhancements. This first step is designed to help organizations move to a modern platform that does not introduce too many radical changes, but is focused more on faster performance, reduced licensing costs, centralized management, and the latest security best practices.

Oracle SPARC SuperCluster as a Platform for Application Consolidation

As a way of understanding more fully how to accomplish a move to an enterprise cloud infrastructure, there is no better platform in the Oracle portfolio than the SPARC SuperCluster. The SPARC SuperCluster is Oracle’s premier platform for running applications, the Oracle Database, and Oracle middleware in one engineered system designed for all components to work together seamlessly. Because the SPARC SuperCluster is part of the Engineered Systems family of products from Oracle, special technologies are offered for that platform that are not offered for other platforms. The SPARC SuperCluster is notable for its extreme performance, and also for its ability to run the Oracle Exadata enhanced Oracle Database, as well as applications and middleware all on one integrated system.

The SPARC SuperCluster comes to the customer pre-assembled and integrated from the factory, allowing for greatly reduced implementation times compared to similar competitive solutions assembled from independent components. Oracle SPARC SuperCluster is an ideal environment for consolidating UNIX applications that are from Oracle, ISVs, or custom developed, and is the best way to understand how to accomplish a consolidation onto modern hardware and software. The SPARC SuperCluster can replace many existing legacy servers with a single rack system that includes server, storage, networking hardware, and systems software technology all engineered to optimize performance and availability.

The SPARC SuperCluster has numerous advantages for consolidation:

- **Run all tiers of an infrastructure** on one SPARC SuperCluster: database, middleware, and applications in one platform.
- **Realize consolidation ratios up to 1.5x higher than the leading virtualization vendor’s solution with zero performance loss.**
- **Enjoy the benefits of the Oracle Exadata enhancements to the Oracle Database that are only offered as part of the engineered systems program.** Such benefits offer **10x-50x faster queries, 4x-10x faster OLTP transactions**, and a **decrease of up to 10x in storage infrastructure**
- The SPARC SuperCluster comes pre-assembled from the factory saving on deployment time. The assembled rack can be rolled into a data center, plugged in, and time to service can be measured in **days**, not months.
- The internal networking fabric of the SPARC SuperCluster is **5x-9x the speed of legacy networking**, allowing applications to run faster, and for security to be enforced throughout all applications the SPARC SuperCluster controls.
• Management tools used to manage the system are common across all building blocks of a consolidation platform, whether it is on SPARC SuperCluster, or on other systems (see below).

• There is single-patching of the entire engineered system, which can result in up to 90 percent reduction in downtime for proactive critical application patching due to the redundant capabilities of the hardware and software.

As a consolidation platform, the SPARC SuperCluster fills an important role for mission-critical applications, on a high-performance, highly available system.

Both line of business managers and data center managers will see immediate benefits from moving to a newer hardware and software platform. Specifically, the SPARC SuperCluster environment can provide the following advantages:

• **Reduced licensing costs.** That which takes 2 to 10 or more software licenses to perform today, can take less on the modernized SPARC SuperCluster cloud infrastructure, cutting costs significantly.

• **Reduced hardware maintenance costs.** Legacy hardware gets more and more expensive to maintain every year. Standardizing on a single integrated hardware platform makes upgrades and routine maintenance more easily and quickly performed, saving both time and money.

• **Oracle Premier Support.** Customers who maintain certified configurations on Oracle engineered systems such as SPARC SuperCluster receive Oracle Premier Support, which offers 24/7 remote fault monitoring, 5 minute fault notification, 15 minute restoration or escalation to Development resources, and 30 minute joint debugging with Development engineers.

• **Single infrastructure management.** Oracle has one software platform to manage both hardware and software, called Oracle Enterprise Manager. Oracle Enterprise Manager as well as the included hardware management plug-in, Oracle Enterprise Manager Ops Center, is a premier management platform that not only can monitor, manage, and affect complex software workflows, but also report on, and reduce the time of, hardware failure resolution for any Oracle systems that are deployed as part of a cloud.

• **Enhanced capabilities from new software.** While upgrading to new software is not required, the modernized infrastructure of the SPARC SuperCluster supports all the latest versions of Oracle software, enabling access to new features that allow the flexibility to attack new markets or increase user acceptance of existing offerings.

Virtualization technologies are built in to all levels of Oracle products. The Oracle Solaris operating system works in partnership with Hypervisor technology in Oracle VM Server for SPARC to offer no added cost, very low overhead virtualization to run varieties of applications at will, allowing for freedom in choice and freedom from expensive licensing requirements found in other vendors' products. Furthermore, many published world-record benchmarks are actually running under Oracle virtualization technologies, showing that performance can be expected (and demanded) by applications running under virtualization in a cloud.
Step 2 — Cloud-Enabling the Consolidated Architecture

The second step to running a successful private cloud is adopting a robust, user-centric model of service delivery. Some definitions of what Oracle considers features of "private cloud computing" are:

- The separation of the underlying software infrastructure (servers, hardware, management) from the interfaces to that software from an end user perspective
- Role-based, rapid, on demand provisioning of software and services
- Metering ability for monitoring how much of a service a user or user group uses in a given amount of time, or system resources
- Billing and showback functionality to allow for used services to be billed to internal groups

These capabilities talk about the separation of services from the underlying computing platforms, allowing the end users to request and use resources with ease while still allowing IT management to monitor and manage those services dynamically. This allows for data center managers to build their architectures with predicable building blocks, and allows end users and business owners to focus on projects that benefit from taking charge of the software that powers their own businesses.
What this means in practice is that all of the benefits of a consolidation platform are additive to any cloud-enabled services that are layered on top of that platform.

**Oracle SPARC SuperCluster as a Consolidated Cloud Platform**

There is no better place to look at the whole picture for cloud-enabled computing than the SPARC SuperCluster. The SPARC SuperCluster is an integrated platform that is ideally positioned for cloud-enhanced computing service delivery:

- The Oracle Exadata Storage Servers running the Oracle Database increase application performance dramatically.
- Multi-tenancy of the Oracle Database enabled by Oracle's near-zero overhead virtualization technologies in the SPARC SuperCluster allows for multiple workloads to have dedicated resources on one high-performance server platform, while taking into account full security and workload isolation to fulfill compliance and reporting requirements.
- The SPARC SuperCluster can mix and match running the Oracle Database with running the applications that use those database resources. This allows for everything to run in one server platform, gaining efficiencies and performance while doing so.

![Figure 4. SPARC SuperCluster running multiple Oracle Database instances](image)

The SPARC SuperCluster can run the Oracle Database software in one (or more) environments while simultaneously running Oracle and third-party applications on other resources. Combine that with the ability to self-provision Oracle Database instances on demand, and you have a compelling platform on which to run many applications and services concurrently.
Oracle Enterprise Manager Cloud Control

It is at this evolution of an infrastructure where software like the Oracle Database has its underlying complexity abstracted away from end users, while delivering to those end users what they really want: The capabilities of the Oracle Database without the complexity of setting up their own instance. The key to this ability is found in Oracle Enterprise Manager Cloud Control. Oracle Enterprise Manager Cloud Control allows for IT architects to set up Oracle Database templates ahead of time, allowing end users to log in, request a new database instance from a selection of pre-sized templates, and have that new instance set up for them rapidly. Initially those templates are created as a partnership between the IT department and the user groups, but once set up, all that remains for end users and developers is to request database resources and have those resources spun up for them on demand.

Enterprise Database Cloud versus Traditional Provisioning

By moving to a service-based delivery platform for the Oracle Database, numerous benefits can be seen:

- **Deploy an enterprise database cloud environment 5x faster than do-it-yourself** approach enabling faster time to value and shorter time to return on investment

- **Provision databases 32x faster than traditional methods**, accelerating the ability to react to changing business needs

- **Experience 4x better price performance** than competitive solutions, enabling higher profitability

The benefits to all aspects of a business are here, experienced by everyone: the IT/data center architects who get streamlined manageability, business-centric users and managers who desire faster and easier reaction times to changing business environments, and to end users who are able to provision and start their projects more easily and quickly.

Conclusion

Oracle's vision for service and technology delivery for internal enterprise users is inclusive of the fact that a staged and/or hybrid approach is the best way to modernize and streamline an IT infrastructure. Modernizing hardware and software with virtualization built in to the very core of the Oracle Solaris operating system, along with management tools, higher performance hardware, and software upgrades for new features are easily achievable steps in moving to a private cloud. Oracle has tools and processes in place to ease that process with industry-class management for both the hardware and enterprise software from application layers all the way down to individual hardware component layers. Building upon that foundation, cloud-enabled services like the Enterprise Database Cloud realize all the benefits and operational capabilities present in a consolidation scenario, while adding additional benefits on top. Oracle is committed to infusing its offerings with virtualization-powered cloud services which create value at all levels of a computing architecture. Oracle is the only vendor in the industry capable of having a pervasive view that informs and affects the actions of all hardware and software in an architecture to deliver unique and readily realized value to private cloud implementations.
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