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Executive Summary

Many telecommunications carriers are upgrading their networks to run cutting-edge new applications for 4G LTE networks. While these higher value services offer an opportunity for increasing revenue, carriers also want to be careful not to disrupt existing income-generating services, many of which are running on previous generation Netra SPARC servers from Oracle and Sun.

Consolidating both new and existing application services onto Oracle's latest generation of Netra SPARC T4 servers gives telecommunications carriers the opportunity to increase IT efficiency while also preserving the revenue stream of existing telecommunication services. Netra SPARC T4 servers can run existing services unchanged in a highly efficient virtualized environment while also enabling new 4G services to take advantage of a modernized platform that includes features to support higher service levels and cloud management.

All of the hardware and software components in Oracle's Netra SPARC T4 servers are engineered to work together for increased performance and availability. As illustrated in Figure 1, the integrated stack spans from server and storage hardware all the way to Oracle Database and Oracle Applications. The Oracle Solaris operating system, Oracle Solaris Cluster software, and Oracle VM for SPARC server virtualization environments all work seamlessly together. Telecommunications applications can take advantage of these integrated capabilities to achieve higher service levels and reduced risk of downtime.

Oracle Netra SPARC T4 servers are NEBS level 3 certified and offer the industry’s best value. Every server includes no-cost virtualization, the Oracle Solaris OS, and wire speed security. A full stack cloud management environment is also included at no additional cost for systems under an Oracle support agreement.

In addition to these advancements, Netra SPARC T4 servers continue to provide binary compatibility and secure isolated zones that make it easy to migrate existing applications to this modern high-performance platform. Telecommunications providers benefit by saving on operational costs and by having an opportunity to drive incremental revenue with new cloud-based 4G services.
By upgrading to Oracle Netra SPARC T4 servers, telecommunications providers can utilize the latest technology to:

- Increase performance by up to 5x (or more depending on the application)
- Expand capacity within existing data center space and power constraints
- Consolidate applications to dramatically reduce operational costs
- Deliver cloud-based services in an easy-to-manage cloud infrastructure
- Provide increased availability to meet the increase service level requirements for demanding 4G applications
- Reduce software license fees because fewer CPU cores are needed to do the same work as older servers
- Reduce service and support costs by replacing older servers

The sections below describe more about how these compelling benefits can be achieved.

**Deploy Services Faster and More Efficiently**

Keeping pace with the rapidly changing demands of mobile users means that telecommunications providers must constantly be rolling out new or expanded services. Refreshing aging UltraSPARC T2/T2+ or SPARC T3 based servers with new Netra SPARC T4 servers not only provides increased compute capacity for delivering services, but also provides a more efficient infrastructure with enhanced virtualization capabilities and support for a broader range of applications.

Netra SPARC T4 servers are the only products in the industry to offer two types of virtualization, on-chip cryptographic acceleration, and the operating system at no extra cost. As part of the integrated Oracle hardware and software stack, Netra SPARC T4 servers also offer robust integration with other Oracle software components for system management, high availability clustering, and middleware for application integration.

**Greater Compute Density for Better Efficiency**

Oracle Netra SPARC T4 servers improve upon the prior generations of Netra UltraSPARC T2/T2+ and SPARC T3 servers by providing up to 5x greater performance for single threaded workloads while also preserving excellent throughput for concurrent, multithreaded applications. Improved power and space efficiency also helps reduce data center costs. Netra SPARC T4 servers are based on the multicore SPARC T4 processor, enabling leading density with up to 64 threads in 2RU with Oracle’s Netra SPARC T4-1 server, or 128 threads in 4RU with the Netra SPARC T4-2 server. For blade server implementations, the Netra SPARC T4-1B server module gives organizations the flexibility to add 64 threads to the Sun Netra 6000 modular system, just by adding a single blade server module.
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Excellent performance and efficiency throughout the entire family of Oracle Netra SPARC T4 servers gives telecommunications providers the flexibility to deploy more compute capacity in the same footprint or the ability to reduce overall data center footprint. The servers enable quick deployment and efficient execution of virtually any Web, database, or enterprise application.

Improved Virtualization Capabilities

Virtualization technology is increasingly popular as organizations strive to consolidate disparate workloads onto fewer more-powerful systems to improve utilization. Netra SPARC T4-1 and T4-2 servers and the blade form factor Netra SPARC T4-1B server module are specifically designed for virtualization. They offer very fine-grained control of multiple resources—from processors to virtualized networking and I/O. Most importantly, Oracle’s virtualization technology is built-in as a part of the system, not an expensive add-on.

Two layers of virtualization technology are included in Netra SPARC T4 systems. Telecommunications providers can employ Oracle Solaris Zones or Oracle VM Server for SPARC virtualization technologies independently or together, depending on the application requirements. This flexibility gives telecommunications providers the power to fine-tune their consolidated application environment as business needs change while also providing an agile infrastructure that can support delivery of new and expanded services faster and more efficiently:

- **Oracle VM Server for SPARC** — Oracle VM Server for SPARC provides up to 128 full virtual machines (VMs) depending on the server model. Each VM runs an independent operating system instance and is granted specific virtualized resources, including CPU, memory, storage, cryptographic devices, and console access. Administrators can leverage virtual device capabilities and virtual
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networking so that entire software stacks can be easily hosted on any virtual machine and easily moved from one physical machine to another.

- **Oracle Solaris Zones** — Oracle Solaris Zones (known as Oracle Solaris Containers in Oracle Solaris 10 and earlier versions) enable multiple applications to each have an isolated and secure runtime environment within the same OS instance. Processes in one zone are prevented from interfering with processes running in another zone and each zone has its own set of resources. CPUs or CPU threads in the SPARC T4 processor can be logically partitioned into processor sets and bound to a resource pool, which in turn can be assigned to an Oracle Solaris Zone.

For situations where there is a need to capture the isolation, flexibility, and manageability features of both technologies, virtual machines running in Oracle VM Server for SPARC can also host Oracle Solaris Zones. Whether used together or separately, these no-cost virtualization technologies can enable real-time scaling and optimal resource utilization to ensure the maximum performance, scalability, and efficiency of telecommunications service deployments.

**New Cloud Infrastructure Capabilities**

The economic benefits of cloud computing are driven by better utilization of resources and by IT operating efficiencies that are the result of standardized components and simplified provisioning and management. The extent to which these operational efficiencies can be achieved is also heavily dependent on the management capabilities of the cloud environment.

Oracle Netra SPARC T4 servers include a complete lifecycle system management solution that provides deep visibility and control across the entire stack of Oracle hardware and software components, including both physical servers and virtual machines. This visibility throughout the stack enables faster, simpler, and better diagnosis of problems because it’s easier to identify which layer of the stack is involved and then drill down for more details. All layers of the stack can be monitored and controlled within Oracle Enterprise Manager 12c and administrators can easily access more details about hardware, OS, and virtual machine layers using Oracle Enterprise Manager Ops Center and other Oracle Enterprise Manager components.

Oracle Enterprise Manager Ops Center 12c, which is included at no extra charge for Netra SPARC T4 servers under an Oracle support agreement, provides a comprehensive solution for managing server platform components such as operating system, firmware and BIOS configuration, bare metal and virtual machine provisioning, hardware fault analysis, automatic My Oracle Support service request generation, and performance management.

**Reduce Risk and Minimize Service Interruptions**

Netra SPARC T4 servers are designed from the ground up to deliver continuous reliable service, proven long system lifecycles, and the stability to withstand challenging physical environments. They are designed to ensure continuous carrier grade service, minimizing interruptions from environmental factors, including excessive heat, moisture and physical abuse.
Long-term deployments are commonly required by communication providers due to the high costs of qualifying new platforms and the prohibitive costs of replacing hardware midstream. Netra SPARC T4 servers offer a safe choice for long-term deployments because they are designed with the highest quality components to ensure long lifecycles. And the servers can run existing Oracle Solaris applications to extend the life of existing deployments without requiring any changes to software or retraining of developers and system administrators.

Wire speed encryption capabilities built-in to the SPARC T4 processor also enable enhanced application and data security without the performance penalty typically associated with software-based encryption solutions.

High Availability with Oracle Solaris Cluster

Mission-critical network infrastructure applications in telecommunications often require high availability and therefore utilize clustered physical servers to help avoid single points of failure and minimize potential service interruptions or data loss. Oracle Solaris Cluster is designed to provide the highest availability for applications running on Oracle Solaris. As part of the integrated Oracle stack, Oracle Solaris Cluster is engineered and tested to work with Oracle Solaris, SPARC processors, and Oracle Applications as well as Oracle virtualization technologies. Oracle Enterprise Manager and other Oracle management tools also have built-in support for Oracle Solaris Cluster environments. By combining Oracle Solaris Cluster with Oracle Solaris Zones and/or Oracle VM for SPARC virtualization technologies, telecommunications providers can offer increased service levels at lower cost.

Oracle Solaris Cluster is the industry’s only application-specific failover solution for virtualized applications and provides five 9’s availability for continuous cloud services. Key benefits of Oracle Solaris Cluster include:

- Optimized resource use along with high availability and fault isolation of virtualized resources by supporting both Oracle VM Server for SPARC and Oracle Solaris Zones.
- Consolidation of multiple applications within the same cluster of physical servers using virtual nodes or virtual clusters
- Disaster Recovery through multi-site, multi-cluster configurations

Simplicity of Single-Vendor Support

An important customer benefit of running Oracle software on Oracle hardware is the simplicity and reliability of having a single vendor to call for support. In multivendor support environments, production teams can spend hours debugging or tracing an issue before they can even determine whether the source of the problem is the application, the virtual machine, the OS, or the hardware server itself. When running an all Oracle stack, Oracle Support can be engaged right away, enabling faster and easier problem resolution to help avoid downtime. Oracle Support Engineers can address service and support issues from a holistic vantage point and can gain access to engineering resources at
all levels of the stack if necessary. It is also easy for Oracle to replicate a customer's entire hardware and software stack for support purposes because Oracle owns all of the products in the stack.

**Industry's Best Value**

New Oracle Netra SPARC T4 servers offer the industry’s best value by providing an extremely scalable, highly available platform designed for next generation services, including comprehensive cloud services. An extensive list of built-in features along with cost savings in the areas of software licenses, service and support, and a low initial platform purchase price make the Netra SPARC T4 server an excellent value. As previously mentioned, Oracle’s Netra SPARC T4 servers are the only products in the industry to offer two types of virtualization, on-chip cryptographic acceleration, and the operating system at no extra cost. Customers with an Oracle support contract also benefit from integrated hardware and software management as well as cloud provisioning capabilities. Other vendors offer similar functionality, but this is usually provided at an additional cost that is frequently much higher than the initial hardware acquisition cost.

In addition, Netra SPARC T4 servers also help reduce the cost of Oracle Database software licenses due to their 0.50 Oracle core factor. A 0.50 core factor means that Oracle Database software licenses count each CPU core as a half core for pricing purposes (Oracle Database is priced per core).

The built-in, no-cost capabilities, potential software licensing savings, and additional benefits derived from an Oracle support contract can add up to a significant cost savings, making Netra SPARC T4 servers the industry's best value for consolidating and optimizing telecommunications services. The fact that the entire Oracle hardware and software environment is engineered to work together brings additional value by simplifying deployment and management.

**Impressive Scalability in a Cost-Effective 4-Core Server**

For customers that do not require an 8-core system, Oracle Netra SPARC T4-1 servers offer an even more affordable 4-core option that provides significantly better speed and performance over previous generation 4-core Netra UltraSPARC T2 servers for about the same initial purchase price.

The 4-core server uses the same SPARC T4 processor in a 4-core version rather than the 8-core SPARC T4 processor. The 4-core server is built in the same chassis as the 8-core system and comes in a 2-RU form factor. The 4-core server features the same integrated on-chip cryptographic support and comes with the same Oracle Solaris and virtualization software as the 8-core server. It has the same management environment, I/O interfaces, power supplies, and even the same memory capacity. Because the software environment is identical, it's also very easy to migrate applications to an 8-core server if additional capacity becomes necessary.

**Conclusion**

Modernizing the telecommunications infrastructure with Oracle's new Netra SPARC T4 servers can help telecommunications companies expand services quickly and be prepared for rapid growth in
today's fast changing telecommunications market. The systems include everything needed to build, deploy, and manage a flexible and high performance telecommunications infrastructure, and provide simple, comprehensive manageability, making them ideal for cloud deployments and the introduction of new services.

Carrier-grade Netra SPARC T4 servers are also designed to reduce risk and avoid service interruptions. When coupled with Oracle Solaris Cluster software, the servers provide continuous cloud service availability. Running the robust Oracle Solaris operating system and taking advantage of the complete application-to-disk integration across Oracle products and technologies enables Oracle to deliver a proven and optimized solution stack that is fully supported by a single vendor.

To deliver increased value and ensure successful telecommunications deployments, all Netra SPARC T4 servers come with comprehensive virtualization capabilities, the Oracle Solaris operating system, on-chip security, infrastructure provisioning, and Oracle's unique application-to-disk system management environment—all at no extra charge for servers under an Oracle support agreement.

Learn More
For more information about Netra SPARC T4 servers visit http://www.oracle.com/goto/netra/ or call 1-800-ORACLE1 to speak to a representative.