10 Reasons Why Oracle Solaris is the Best Platform for SAP Environments
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For years, Oracle solutions have provided a premier platform for developing and deploying SAP applications, and SAP customers have benefited from close collaboration. With the acquisition of Sun Microsystems, Oracle moves to the forefront of operating system and hardware vendors. Oracle offers innovative technologies designed to address IT challenges faced by enterprises the world over. This document explores 10 reasons why Oracle Solaris is the best platform for deploying SAP solutions.

1. The Oracle and SAP Partnership

Since 1988, applications in the SAP Business Suite have been developed on Oracle databases, and over 600 of SAP's own internal systems run on Oracle database technology. Agreements signed in November 1999 and renewed in 2008 by Oracle and SAP affirm Oracle's position as a Tier 1 SAP platform, ensuring cooperation between the two companies, and providing world-class support for SAP customers running applications on Oracle platforms.

Committed to the success of mutual customers, Oracle and SAP serve a large shared customer base and continue to commit significant resources to drive long-term technical innovation. These resources include a joint on-site Oracle Development team in Walldorf, Germany, as well as support teams in Walldorf, Palo Alto, California, and Tokyo, Japan.

From a technical standpoint, Oracle's acquisition of Sun Microsystems in 2010 further enhances Oracle's platform and provides exemplary infrastructure on which to run SAP Business Suite applications. With a complete hardware and software stack, Oracle engineers work together to ensure that SAP applications, the Oracle database, and Oracle systems are fully integrated and optimized with storage, networking, and operating system resources. For example, Oracle Solaris Zones (previously known as Oracle Solaris Containers) enable SAP engineers to virtualize the SAP landscape infrastructure, adding greater flexibility for tasks including consolidation, software upgrades and testing, and cloning environments. The result is an innovative infrastructure offering unique features, extreme performance, built-in robustness, exceptional security, and seamless integration of operating system, hardware, and application software.

2. Flexibility and Choice

Oracle Solaris is optimized for various hardware platforms, and leverages innovations for eco-efficiency found in both SPARC and x86 processor-based servers. Oracle servers adapt to application behavior by automatically adjusting processing power to deliver optimum performance, scaling energy use to the workload, and offering best-in-class virtualization. With a full line of SPARC and x86 systems that all run Oracle Solaris, Oracle platforms can help enterprises take advantage of the best technology to handle multitier enterprise SAP workloads.

- Oracle Solaris guarantees binary compatibility from release to release, made possible through architecture-neutral programming interfaces. The result is Oracle Solaris source code that is compatible between SPARC and x86 processors.
• Moving legacy applications to new Oracle Solaris platforms can be accomplished through a simple platform migration. Oracle Solaris Zones can be used to provide a virtual environment to quickly and easily run legacy applications on the latest systems.

• Oracle Solaris provides broad availability, backward compatibility, and support for SAP applications, enabling organizations to migrate SAP environments within a timeframe that best suits the environment.

Oracle also offers support for a wide variety of SPARC and x86-based systems from HP, IBM, Fujitsu, Dell, Cisco, and others, enabling organizations to deploy and support a single operating system in their SAP environments. With more certified applications than any other operating system—more than 11,000—deploying systems on Oracle Solaris makes it possible for one operating system to span the entire enterprise.

3. Innovative Virtualization Features

SAP environments derive the greatest benefit from platforms that offer new features to address the difficult task of supporting large-scale mission-critical environments. With virtualization features that target cloud and large enterprise environments, Oracle Solaris is designed to solve the most challenging issues customers face when deploying and managing a modern data center infrastructure.

• **Built-in virtualization.** The first fully virtualized operating system, only Oracle Solaris offers secure, flexible, virtualization services that are integrated into, rather than layered on top of, the operating system. This approach adds functionality and enables customers to maximize physical and virtual systems, and network and data resources without adding significant overhead and complexity.

• **Network virtualization.** The network virtualization features in Oracle Solaris 11 support the sharing of network resources to maximize throughput and decrease latency. As increasing numbers of users access SAP applications over a network, network virtualization allows administrators to allocate more resources to high priority, high bandwidth traffic, while more limited resources are assigned to low priority traffic. Without adding network devices, network throughput is increased simply by scheduling and handling packets more efficiently.

• **Storage virtualization.** Oracle Solaris provides virtualized pools of storage devices through the Oracle Solaris ZFS file system. Storage virtualization completely eliminates the concept of volumes and the problem of partitions, provisioning, wasted bandwidth, and stranded storage. Offering a dramatic advance in data management with built-in data integrity mechanisms, Oracle Solaris ZFS also provides tremendous performance improvements and integrates file system and volume management capabilities. It also enables organizations to contain costs by selecting the optimal storage for the need at hand. Slower storage media can be used for archiving older information while data that needs to be accessed rapidly can be located on high-performance solid-state disks.
• **Server virtualization.** Oracle Solaris Zones (previously known as Oracle Solaris Containers) enable organizations to isolate application components from one another. When used to consolidate applications or tiers on a single server, Oracle Solaris Zones can increase utilization rates and reduce data center complexity. The isolation of applications within zones prevents processes in one zone from monitoring or affecting processes running in another zone. Even a super user process from one zone cannot view or affect activity in other zones.

• **Virtual machines.** Purpose-built for Oracle’s servers with chip multithreading technology, Oracle VM Server for SPARC (previously called Sun Logical Domains) provides a full virtual machine that runs an independent operating system instance and contains a wide range of virtualized devices. With a hypervisor that largely resides in a chip on the server, Oracle VM Server for SPARC is tightly integrated with the hardware. This enables virtual machines to take advantage of underlying system advancements and reduce the overhead typically associated with software-based solutions. As a result, development, test, or production SAP environments can be deployed with full partitioning and isolation on a single server.

• **Live migration.** Oracle Solaris includes tools to enable migration from physical to virtual or virtual to virtual environments for rapid roll out of applications, reduced downtime, and automatic roll back to development and testing systems when needed. This means that SAP environments can be easily migrated and redeployed, including specific configurations of the Oracle Solaris operating system along with other installed applications. Using Oracle Solaris Zones, applications can be developed in an isolated environment and packaged for movement to testing systems. Once tested, applications can be moved quickly to production systems. Using Oracle Solaris Zones, applications can be developed in an isolated environment and packaged for movement to testing systems. Once tested, applications can be moved quickly to production systems.

Each of these powerful virtualization features can help IT organizations move toward agile, efficient, and secure SAP environments, but they can also be used in combination to even greater effect. For example, using zones and network virtualization together makes it possible to deploy virtual topologies on a single host with limited physical resources. Particularly useful for SAP Development or Testing and QA environments, the low overhead of Oracle Solaris Zones coupled with the resource management and network virtualization features in Oracle Solaris enables developers to replicate multiple servers of an SAP environment on a single instance of Oracle Solaris. Different scenarios can be tested without impacting production systems or acquiring additional servers for testing.

4. **Reliability**

Powerful Oracle Solaris capabilities can reduce unplanned SAP downtime by helping to identify and solve potential problems before they impact applications. Predictive Self Healing, Oracle Solaris Fault Manager, and Oracle Solaris Service Management Facility (SMF) features work together to enable business-critical SAP applications and essential system services to continue uninterrupted if software fails, a major hardware component fails, or software is incorrectly
configured. SAP administrators can use these features to proactively monitor hardware and software problems and even restart services before they can adversely impact the SAP landscape.

Oracle Solaris Dynamic Tracing (DTrace) is a comprehensive dynamic tracing facility built into Oracle Solaris that can help administrators to perform troubleshooting in real time without significantly impacting production systems. Dynamic instrumentation of user-specified probes embedded in the Oracle Solaris kernel and other software components provide for observation of application and operating system behavior. Trace points are completely passive until enabled for data collection, and can be disabled when observation no longer is required. Also useful with Oracle Solaris Zones, DTrace can be used to examine applications, identify performance bottlenecks, and quantify application resource requirements within individual zones.

Features in Oracle Solaris make it possible for administrators to perform most management and maintenance tasks while the system is online and full data access is possible. In the unlikely event of a system failure, recovery of an Oracle database is fast and fully automatic.

With Oracle Solaris 11, planned downtime due to software upgrades can be minimized. Zones in the Oracle Solaris ZFS pool each have their own Boot Environment (BE). Updates to the operating system result in alternate BEs (ABEs). A zone can be booted into the old BE or the new ABE, enabling system administrators to test new updates prior to being installed in production environments. In the event of an upgrade issue, administrators can undo a software update and revert to a previous version of the operating system with a simple zone reboot.

In addition, Oracle Solaris 11 provides better software management features, such as the Image Packaging System (IPS), which aids installation, upgrades, and removal of software packages. It also reduces the amount of time needed for patching.

5. High Availability

Today, most enterprises compete on a global scale and have international customers, requiring SAP solutions to be available 24x7x365. In addition to the high availability (HA) features built into Oracle databases, such as Oracle Real Application Clusters (RAC), Oracle Solaris offers Oracle Solaris Cluster and Oracle Solaris Cluster Geographic Edition to protect against system and site failures and provide even higher availability and disaster recovery functionality.

- **Oracle Solaris Cluster.** Oracle Solaris Cluster integrates tightly with Oracle Solaris Predictive Self Healing and enables applications controlled by the Oracle Service Management Facility to be automatically integrated within Oracle Solaris Cluster. Cluster-ready SAP agents are built into the Oracle Solaris Cluster software, contributing high availability for SAP environments with little or no effort. Tight integration with the SAP software eliminates the need for coding and enables failover support for HA features such as replicated enqueues.

- **Support for Oracle Solaris Zones.** Oracle Solaris Cluster provides extended zones support, enabling server consolidation even in HA environments. Applications can be configured to
first restart in their own zones. If the restart fails, they can attempt to restart in another zone. Should the restart fail, the application can failover to a different server.

- **Oracle Solaris Zone Clusters.** Oracle Solaris Cluster extends support for Oracle Solaris Zones. Zone clusters allow fully isolated virtual clusters to be created based on virtual nodes in Oracle Solaris Zones. Distributed applications such as Oracle RAC databases can be run in separate virtual clusters, enabling highly available consolidated services at a lower cost. Multiple databases or database versions can be consolidated into one physical cluster for highly available consolidated service.

- **Oracle Solaris Cluster Geographic Edition.** Oracle Solaris Cluster Geographic Edition enables multi-site, multi-cluster support for HA and disaster recovery that manages the availability of application services and data for local, campus, metropolitan and worldwide clusters in physical and virtual environments. It offers automated application failover and coordinates with application, storage, and host-based replication solutions.

6. **Performance and Scalability**

Today’s SAP environments must be able to respond quickly to increased demand in order to adapt to changing market conditions. Ongoing improvements in Oracle Solaris enhance scalability and enable Oracle servers to deliver the highest performance as SPARC and x86 processor counts and memory capacities increase. Designed to support massive vertical scalability, Oracle Solaris 11 supports tens of thousands of hardware threads, hundreds of terabytes of system memory, and hundreds of gigabits per second of I/O.

Oracle Solaris is platform-aware and makes the best use of the processors on which it runs. For example, Oracle Solaris 11 leverages the unique chip multithreading capabilities of Oracle servers containing Oracle’s SPARC T4 processors, providing fast and efficient thread implementation that can enhance SAP performance. Oracle Solaris 11 also can optimize the resources of Oracle’s SPARC Enterprise M-Series and x86 servers as well.

The large storage requirements of most SAP environments demand platforms to be able to store and access data efficiently in order to optimize storage resources and reduce operational costs. The Oracle Solaris ZFS file system supports files and file systems as large as 16 exabytes (EB) and provides innovative data storage and management features to handle huge amounts of data cost-effectively. Some of these features include:

- **Data deduplication and data compression.** Data deduplication reduces the amount of total data stored by eliminating and sharing common components while data compression transparently compresses file system data and can be enabled or disabled dynamically. These features help contain the amount of storage space used on a system.
• **Improved data handling.** Oracle Solaris ZFS optimizes the code paths from the application to the hardware, producing sustained throughput at near-disk speeds and preventing application performance degradation when handling vast amounts of data.

• **Flash technology support.** Oracle Solaris ZFS seamlessly and transparently supports Flash technology for accelerated application performance. This is very helpful in SAP environments that are using tiered storage for faster storage performance and lower overall costs.

• **Data backup and migration technologies.** Oracle Solaris ZFS supports *snapshots*, read-only copies of file systems or volumes that can save the state of a file system at a particular point in time and be used to recreate the file system later. This technology is vital for SAP administrators who need to regularly backup large volumes within tight timeframes or recreate environments for development, QA, and testing purposes.

Oracle Solaris offers increased Oracle Database 11g, Oracle Fusion Middleware 11g, and Java technology-based application performance, availability, security, and manageability through jointly engineered improvements.

The performance gains of running SAP applications on Oracle platforms can be seen not only in customer empirical evidence, but also in a variety of SAP standard benchmarks. Oracle Solaris systems running SAP software have set a number of world records. For up-to-date benchmark results, see: [www.oracle.com/solutions/performance_scalability/benchmark_results.html](http://www.oracle.com/solutions/performance_scalability/benchmark_results.html)

7. **Rapid Deployment**

Purchasing, configuring, provisioning, and deploying SAP systems and services can be a time-consuming and labor-intensive task. Enterprise software can contain various components that may need to be installed and configured separately. These components frequently have software dependencies on patches, specific operating system versions, or other software packages, all of which must be installed in the proper order. These factors contribute to lengthy efforts to get new applications or services up and running reliably, and can be an obstacle to meeting SAP production environment uptime requirements.

Oracle Solaris 11 automates the process of installing and updating software and completely eliminates the need for patching operating system software. New platforms can be deployed quickly and accurately through use of an Automated Installer that enables infrastructure software deployment to multiple systems simultaneously over the network. Installation profiles can be created with the correct software specifications and configurations, making it possible for each system to automatically find a profile that matches its specifications and download and install the appropriate software. The Image Packaging System (IPS) in Oracle Solaris 11 tracks every operating system software component on each system in the SAP landscape and can determine what must be done to update it. A dependency-checking feature can be combined with automated patch installation to ease the process of installing software.
8. Manageability

Consolidating hundreds of physical server nodes to thousands or more of virtual nodes can reduce system utilization and decrease costs, but if not done carefully, it can present a challenge in scaling and administration. Oracle Solaris has many features built into it to address those challenges and make IT infrastructures easier to manage.

- Innovative installation and deployment tools automate installation and update processes and eliminate the process of patching the operating system.

- An Automated Installer allows administrators to deploy software to multiple systems at once over the network, rapidly adding infrastructure to the environment. Installation profiles are used by the installer to download and install the appropriate software for each system automatically.

- The Oracle Solaris ZFS file system enables rollbacks to older software versions if patches or upgrades do not perform as expected.

- Oracle Solaris enables administrators to consolidate applications onto fewer servers using Oracle VM Server for SPARC and Oracle Solaris Zones. These technologies can be used separately or together to enable applications and databases to run in isolated environments to increase system utilization and ensure that system resources are properly allocated to critical SAP processes. For SAP applications that are not yet certified for Oracle Solaris 11, Oracle Solaris Zones can be used to provide an Oracle Solaris 10 environment to applications.

With businesses dependent on SAP solutions, it is critical for IT organizations to be able to observe and manage the underlying infrastructure. Oracle Enterprise Manager Ops Center provides integrated, simplified management of virtual and physical environments. IT administrators can actively manage and monitor thousands of geographically distributed systems and infrastructure resources from virtually anywhere on the network.

Simplifying the management of Oracle Solaris 11 and enabling automated lifecycle processes, Oracle Enterprise Manager Ops Center provides full lifecycle management of virtual guests, and observability and manageability for SAP environments running in Oracle Solaris Zones. Lifecycle management simplifies and accelerates compliance reporting and the discovery, provisioning, updating, monitoring, and reporting of physical and virtual assets through a unified, browser-based interface.

9. Security and Compliance

Enterprise applications such as SAP solutions must be able to support local and remote users while ensuring information assets remain secure. In addition, many SAP systems are subject to corporate governance or must comply with stringent regulatory security requirements.
Employing security principles such as *least privilege* and *secure by default*, Oracle Solaris 11 provides a number of enhancements and new security features that enable security administrators to minimize and harden the environment to an even greater degree than ever before. The result is a secure environment that protects data assets from end to end without special intervention from system administrators.

- **Digitally signed binaries.** Digital signatures are provided for all files shipped in Oracle Solaris 11, enabling administrators to check the integrity of critical system files. This feature can also help organizations to meet requirements for security compliance.

- **Secure execution.** Secure execution in Oracle Solaris 11 makes it possible to configure a system to run only valid, signed executables from a list of trusted authorities, preventing rogue applications, Trojan horses, and viruses from executing.

- **Oracle Solaris user rights and process rights management features.** Oracle Solaris users and applications are granted only the minimum capabilities needed to perform specific tasks. When integrated with industry-leading Oracle Identity Management tools, and the SAP specific Governance, Risk, and Compliance (GRC) components, the result is the most powerful security solution on the market. The combined software tools address the end-to-end lifecycle of user identities across all enterprise resources, within and beyond the firewall.

- **Oracle Solaris Trusted Extensions.** Oracle Solaris Trusted Extensions control access to data and applications based on sensitivity level, not just ownership.

- **Oracle Solaris Cryptographic Framework.** The Oracle Solaris Cryptographic Framework provides application access to hardware-accelerated cryptographic functions at no additional cost. It takes advantage of hardware acceleration in SPARC and x86 platforms and features strong cryptographic routines.

### 10. Oracle Expertise for SAP Environments

The Oracle Global Technology Centers for SAP offer joint Oracle and SAP customers the following services:

- Advanced customer services
- Performance analysis and tuning
- System architecture and sizing
- Reference architectures for SAP deployment
- Formulation of procedures for backup/restore/recovery, high availability, and SAP administration
- Security procedures
- Performance optimization for Advanced Business Application Programming/4 (ABAP/4) programs
- Oracle Database migration services
• Integration of products and services

Oracle Global Technology Centers for SAP are located in Walldorf, Germany, Tokyo, Japan, and Palo Alto, California in order to provide the highest level of expertise available. Customers also can utilize consulting services in conjunction with the Oracle Global Technology Centers for SAP for optimal results in the most challenging technical situations.