

Oracle Solaris 11: No-Compromise Virtualization



Oracle Solaris 11 is a complete, integrated, and open platform engineered for large-scale enterprise environments. Its built-in virtualization provides a highly efficient and scalable solution that sits at the core of the platform. With the inclusion of Oracle Solaris Kernel Zones, Oracle Solaris 11 provides a flexible, cost-efficient, cloud-ready solution that is perfect for the data center.

KEY BENEFITS

- Simplifies operations in a heterogeneous data center environment
- Provides secure, agile, and compliant application provisioning optimized for the complete software lifecycle
- Runs mission-critical workloads without restrictions with zero-overhead virtualization
- Maintains service levels through application-driven resource management
- Maximizes performance and efficiency and reduces costs through "Oracle on Oracle" solutions

KEY FEATURES

Oracle Solaris virtualization enables customers to easily build efficient, secure, and compliant enterprise environments.

- Integrated, built-in virtualization
- No-compromise virtualization with highly scalable, bare-metal performance
- Kernel Zones providing independent patching and kernel versions with secure live migration
- Recognized industry-wide as a license boundary
- Application-driven software defined networking through Elastic Virtual Switch

Built-In Virtualization

Oracle Solaris 11 enables no-compromise virtualization, allowing enterprise workloads to be run within a virtual environment with no performance cost as if they were being run in a bare-metal environment. The virtualization capabilities of Oracle Solaris are integrated into the core of the operating system, making them easily accessible and cost-effective.

In addition, the combination of Oracle Solaris Zones, Oracle VM Server for SPARC, and physical domains in Oracle's high-end system portfolio provides extreme administrative efficiency and a feature-rich environment to suit every workload. Both Oracle Solaris Zones and Oracle VM Server for SPARC are recognized as license boundaries by most enterprise software vendors, leading to significant cost savings.

Oracle Solaris Kernel Zones

Oracle Solaris Kernel Zones, the latest Oracle Solaris Zones technology, were added in Oracle Solaris 11.2. Kernel zones provide zero-overhead virtualization capability that enables independent kernel versions and independent patching for greater flexibility with application workloads. With Secure Live Migration, kernel zones can limit the impact of planned outages on end users by migrating users to standby systems or load balancing workloads across the data center. Kernel zones maintain the same, simple-to-use interface of other Oracle Solaris Zones types, including the same resource controls, enabling them to be instantly adopted.

In addition, with the inclusion of seamless physical-to-virtual (P2V), virtual-to-virtual (V2V), and virtual-to-physical (V2P) portability, it is possible to move between and utilize any of the Oracle Solaris virtualization technologies, eliminating the penalty previously incurred when changing virtualization types and allowing the most suitable virtualization technology to be selected. It is also possible to go back to no virtualization at all (that is, running directly on bare metal), which can be useful to aid debugging system problems.

RELATED PRODUCTS

Oracle recommends the use of the following products alongside Oracle Solaris:

- Oracle Solaris Cluster, which provides high availability
- The Oracle Enterprise Manager Ops Center management suite
- The Oracle Solaris Studio compiler

RELATED SERVICES

Oracle offers the following support options for Oracle Solaris:

- Oracle Premier Support for Systems
- Oracle Premier Support for Operating Systems
- Oracle Solaris Premier Subscription for Non-Oracle Hardware

Defense-in-Depth Security

With the rise in malicious attacks and security breaches, it is in the interest of every enterprise to secure and protect not only their data but also their environment.

The need is not, however, just about protection from external threats. Unintentional internal errors can also be a problem. In one company's case, up to half of their outages were caused by user error. Any security solution must provide defense in depth by being available at several levels while being easy to configure and maintain; otherwise, the complexity will outweigh the benefits.

To address these needs, Oracle Solaris includes Immutable Zones, which can lock down an application environment so that it is read-only. Multiple ready-made levels of immutability are available, so the environment can simply and quickly be made as strict or as open as needed. Once an environment is locked down, it can be securely deployed across the data center, which is useful for compliance as well as security.

Security is not just about the application environment, however. Oracle Solaris also includes security protection at the network and storage layers with data link protection and ZFS encryption. Actions that users can take can be limited through access controls so the possibility of errors and mistakes is eliminated. With onboard hardware encryption, it is now possible to protect data inside and outside the enterprise at no additional cost.

Highly Efficient and Scalable

Oracle Solaris 11 allows enterprise workloads to be run within a virtual environment with no performance cost. What this means in practice is that Oracle Solaris Zones have the ability to provide 32x the virtual machine (VM) density compared to the technology of the leading virtualization vendor while also negating the 25 percent "virtualization tax" that the vendor's solution imparts. This not only leads to the need for fewer systems, but also enables more-efficient use of those resources. In essence, with Oracle Solaris 11, the platform resources are all deployed to power the application environment rather than being wasted on the virtualization solution itself.

In addition, the ability of Oracle Solaris virtualization to scale linearly to thousands of processors and tens of terabytes of RAM means that it is possible to virtualize even the biggest workloads so that many more applications, from the smallest to the largest, can be virtualized. These advantages result in less complexity, much more flexibility, and previously unachievable levels of efficiency. The number of systems to manage is greatly decreased, and ultimately the cost to business is significantly reduced.

Driving Data Center Cost Efficiency

Businesses are achieving significant advantages with Oracle's virtualization solutions by avoiding the virtualization performance tax of other leading virtualization vendors while also increasing VM density per system.

The combination of Oracle Solaris and SPARC-based hardware is also driving a reduction in management costs with a 6x savings compared to an equivalent solution

using Red Hat Enterprise Linux and x86-based systems over a three-year period.

A major US telecommunications provider also saw significant savings through improved management. After deploying Oracle Solaris 11, they calculated they had saved over US\$500 per VM when compared to conventional x86 virtualization solutions. Their total savings could increase to over US\$20 million over time with their environment of over 40,000 VMs. These benefits come from the improvements that Oracle has made to simplify administration, eliminate the cost of compliance, and use hardware more efficiently.

Integrated into the Core Platform

Oracle Solaris virtualization is tightly integrated into all the key platform components—compute, network, storage, lifecycle management, and security—providing an easy-to-manage environment. This allows the day-to-day costs running of a business to be funneled into growing and transforming the business. Strategic thinking is enabled because tactical issues are taken care of quickly and easily.

In practice, this means rapid application deployment, increased compliance, reduced planned service outages, and the ability to provide a highly available environment. For example, Oracle Solaris Zones leverage ZFS, which in turn allows boot environments that are used by built-in Oracle Solaris lifecycle management technology to update zones quickly. Oracle Solaris Zones can be deployed automatically into the infrastructure, and a newly deployed zone comes with an automatically configured network device. This means that tasks are much easier to perform (usually through a single command) and best practices are built in, reducing costly errors.

Agile and Compliant Application Deployment

Agility, flexibility, and time to market are key factors for businesses. Oracle Solaris 11 introduced a new archive format called Unified Archives, which enables applications to be deployed twice as fast as they can be deployed with leading Linux-based platforms. Unified Archives enable the rapid cloning of virtualized and bare-metal application environments through the development, test, and production lifecycle with full V2P and P2V portability.

This integrated deployment workflow has been extended to ensure businesses can stay secure and compliant during the entire application lifecycle. For example, once an application environment has been developed, tested, and certified, it can be securely deployed and locked down for production use through Immutable Oracle Solaris Zones. Immutable zones help to ensure that applications are not compromised and always compliant, which is critical when deploying thousands of VMs in a cloud environment.

Application-Driven Software Defined Networking

With the trend towards cloud computing, businesses are struggling to translate existing quality of service metrics for service-level agreements (SLAs) into more-complex environments that have a greater amount of consolidation and multitenancy. Oracle Solaris 11 includes integrated software defined networking (SDN) technologies to provide much greater application agility without the added overhead of expensive network hardware.

Elastic Virtual Switch in Oracle Solaris 11 enables application agility across a completely distributed set of systems and across an arbitrary geographic region without having to redefine the physical network topology. Through the use of VXLANs and centralized virtual switching, the physical network infrastructure can be entirely decoupled, leading to lower hardware costs, greater network density, and more-flexible resource control.

Oracle Solaris 11 uniquely extends this base SDN functionality up into the application layer (Layer 7), including all Java-based applications, by exposing APIs that enable applications to drive their own priority traffic through a series of resource flows right down to the underlying storage. This advanced capability enables the automation of resource management and the ability to meet critical cloud SLAs.

An Enterprise OpenStack Distribution

Oracle Solaris 11 includes a full distribution of OpenStack—the popular open source project that provides cloud management infrastructure—as a standard, supported part of the platform. OpenStack for Oracle Solaris provides a seamless, enterprise-class experience for managing compute, storage, and network resources in the data center through a centralized web-based portal. This combination enables organizations to securely deliver services in minutes rather than weeks or months and, using OpenStack’s vendor-neutral API, also manage a heterogeneous mix of hypervisors and infrastructure in the data center. In addition, with Oracle Solaris virtualization, OpenStack is able to take full advantage of all the benefits that come with no-compromise virtualization.

A full OpenStack-based cloud can be up and running in less than 10 minutes on Oracle Solaris 11 using a preconfigured Unified Archive image that includes all the OpenStack services, ready to run your first compute instance. With integrated lifecycle management technologies, a single click updates the cloud all the way down to the firmware including all virtualized environments, with the ability to do full fail-safe rollback if necessary. For a major US financial customer, the overall simplicity of Oracle Solaris software lifecycle management enabled administrators to manage a larger number of VMs, which led to a 16x efficiency gain compared to managing VMs with leading Linux-based platforms.

More Information

For more information about Oracle Solaris 11, visit oracle.com/solaris.

CONTACT US

For more information about Oracle Solaris, call +1.800.ORACLE1 to speak to an Oracle representative.

CONNECT WITH US



blogs.oracle.com/solaris



facebook.com/oraclesolaris



twitter.com/orcl_solaris



oracle.com/solaris

Integrated Cloud Applications & Platform Services

Copyright © 2015, Oracle and/or its affiliates. All rights reserved. This document is provided for information purposes only, and the contents hereof are subject to change without notice. This document is not warranted to be error-free, nor subject to any other warranties or conditions, whether expressed orally or implied in law, including implied warranties and conditions of merchantability or fitness for a particular purpose. We specifically disclaim any liability with respect to this document, and no contractual obligations are formed either directly or indirectly by this document. This document may not be reproduced or transmitted in any form or by any means, electronic or mechanical, for any purpose, without our prior written permission.

Oracle and Java are registered trademarks of Oracle and/or its affiliates. Other names may be trademarks of their respective owners.

Intel and Intel Xeon are trademarks or registered trademarks of Intel Corporation. All SPARC trademarks are used under license and are trademarks or registered trademarks of SPARC International, Inc. AMD, Opteron, the AMD logo, and the AMD Opteron logo are trademarks or registered trademarks of Advanced Micro Devices. UNIX is a registered trademark of The Open Group. 1015



