

# QUICK TAKE



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## Solaris 10 — Major Value For Sun Customers

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### EXECUTIVE SUMMARY

Operating systems are like fine wines, with some releases being better than others. The upcoming Solaris 10, Sun's long-awaited upgrade to its Solaris OS, looks to be the best vintage since Solaris 2.6, a release that was consumed with gusto by its customer base and still remains in production more than seven years later. Solaris 10 is a major functional upgrade to Solaris 9 and offers several major features that should be of significant value to a wide range of customers. It features a differentiated approach to virtualization, very granular performance optimization tools, an advanced file system, and full support on AMD-based systems, effectively removing any price-performance issues for low-end to midrange Sun systems. Forrester strongly recommends that current Sun users contemplating a migration to Linux evaluate Solaris 10 on Opteron-based systems and that all current Solaris users evaluate the potential benefits of upgrading to Solaris 10.

### RESEARCH CATALYST

This research is the result of discussions with Sun and Sun users and an evaluation of Solaris 10's technology and features.

### SOLARIS 10 OFFERS MAJOR NEW FEATURES

Solaris 10 is the culmination of several successive releases of Solaris, some of which laid the groundwork for Solaris 10 but did not deliver impressive new user visible functions or benefits other than support for new hardware. With Solaris 10, Sun brings together several streams of development in a product that offers solid value to customers.

#### Solaris 10 Grid Containers

Perhaps the most dramatic new feature in Solaris 10 is Solaris Containers, a form of OS virtualization technology that offers most of the advantages of multiple separate virtual OS images while maintaining a single OS image to manage.

Containers create a private, isolated execution space for each application within the context of a single master OS instance, each with its own local variables and proxy copies of global variables, IP address, security permissions, file system view, etc. Sun claims that in addition to being lightweight in terms of resource overhead, containers are also extremely dynamic, capable of being created in under 10 seconds. Resource allocation is granular, in single-digit percentages of CPU, physical

memory, and I/O. Containers are managed by the Solaris Container Manager, which creates and deletes containers and defines container resource policies.

Containers remedy a significant deficit of Sun relative to HP and IBM, and the combination of hardware partitions and containers offers users considerable flexibility in deciding on how to host multiple applications on a single system. The competitive environment surrounding OS virtualization is getting complex and includes fully virtualized OS image technology, such as VMware, Microsoft Virtual Server, IBM and HP virtual OS technology, and technologies such as Sun Solaris containers and Softricity, which provide secure proxy namespaces running on top of a single OS image. The former approach offers — in theory — better isolation, while the latter offers the convenience and cost of only managing a single copy of the OS, because all the virtual partitions run under a single OS instance.

Containers also offer a tangible value add for Linux users, because a Linux program can run inside a Solaris 10 Container, either as an isolated application or alongside a Solaris application (see the Linux Runtime Environment section below).

### DTrace

DTrace is an integrated, real-time tool for performance analysis and diagnosis. It provides granular kernel and application monitoring capabilities and run on live applications as well as in development. It contains integrated event management and scripting capabilities and can deliver detailed information about the operation of a Solaris 10 for performance analysis and application debugging. By substituting a low-overhead integrated monitoring capability for specialized instrumented kernels, etc., Sun puts a robust tool in the hands of its power users. Sun claims that so far it has not seen less than a 30% performance gain from using DTrace, though increases are often much higher and can be realized with an investment measured in four to 16 hours of effort.

To the best of our knowledge, this is a unique capability in the industry. DTrace is also a major tangible value-add for Linux, since it can be used to analyze a Linux program running under Solaris.

### ZFS File System

ZFS is a new file system that combines a volume manager and a file system with essentially unlimited file capacity. In addition, ZFS adds significant data protection and integrity features, including full end-to-end check sums, with Sun claiming “19 nines” data reliability. In addition, Sun claims 70% to 80% reduction in file-system administration time through automation of common tasks, such as setting up and managing volumes. While 128 bits may be excessive, it does address real user demands for larger than terabyte file systems. ZFS will

be included with the standard version of Solaris 10, but Sun will also include the standard UFS file system for those who do not want to cope with the new technology.

### Linux Runtime Environment

Under the name of Project Janus, Sun has implemented a Linux binary compatible runtime environment as part of the Solaris kernel. It is not an emulator but rather a system call handler in the Solaris kernel that dispatches Linux calls to standard distribution-specific Linux libraries. Since Sun uses the actual Linux source libraries, they are comfortable with guaranteeing compatibility and correct execution. The first released certification for compatibility is with Red Hat Enterprise Linux 3.

### Predictive Self-Healing

Sun has made major improvements to error detection and recovery with Solaris 10, which Forrester believes were needed to catch up with its major competitors. Sun now implements a flexible framework for setting error thresholds for CPU, memory, and disk and can then trigger automated responses, including migration of process and data away from the suspect resource. Sun claims that its major differentiation versus similar offerings from IBM and HP is that while there is an extensive set of features defined as defaults, Sun has implemented an extensible framework that can be extended to other services and software. The API will be published and documented so that users and ISVs can integrate these capabilities into their own applications.

### AMD System Support

A cornerstone of the announcement is full support for Solaris on x86 architectures, with a focus on support for Sun's own family of AMD Opteron-based servers. Sun has committed to a "bug-compatible" release of the OS with full compatibility across its SPARC and AMD product line, with support for all the Solaris 10 advanced features, including containers, DTrace, ZFS, and Janus. Obviously, certain SPARC hardware-specific functions — such as hardware partitions — will not be supported.

### BENEFIT TO SUN CUSTOMERS

The benefits to Sun customers are significant. Sun users now have more flexible options for consolidation with containers, the opportunity to easily optimize their applications with DTrace, and the option to jump to a commodity hardware price-performance curve with the AMD-based systems. Forrester strongly recommends that any Sun customer considering migrating to another environment evaluate Solaris 10 before doing so. For new workload opportunities, Solaris 10 appears to be a fully viable option, and the combined Sun/AMD and Fujitsu road map will be capable of addressing almost any reasonable computing scenario in the modern enterprise in a very competitive manner.

## RECOMMENDATIONS

### MAJOR UPGRADE FOR SOLARIS USERS

- **Evaluate Solaris 10 before migrating.** Sun customers considering migrating to another environment should evaluate Solaris 10 before doing so.
- **Consider Solaris 10 if consolidating.** Solaris 9 and earlier users considering a consolidation project should strongly consider moving up to Solaris 10 to take advantage of containers.
- **Engage Sun if facing performance problems.** Solaris customers with performance/throughput problems should engage Sun to learn how to use DTrace to analyze their problems.
- **Investigate ZFS for cost savings.** Sun customers with large file systems or with complex storage management requirements should investigate ZFS for its performance and potential cost savings.

## WHAT IT MEANS

### FEWER REASONS TO LEAVE SUN FOR WAVERING CUSTOMERS

The combination of Solaris 10 and new low-cost hardware makes it more attractive for Sun customers to remain with Sun. For competitors, it means the low-hanging fruit will quickly disappear, making any further inroads into Sun's base more difficult.