



SAS® Software on Sun™ Storage 7000 Systems

Save Money and Expand Your SAS Throughput

Highlights

- Dramatically lower TCO that is up to 75% less than competitive solutions
- Easy installation and administration
- Improved service levels through DTrace Analytics
- No additional software license fees— all software features such as protocols and data services are included
- Better price/performance using an optimized storage hierarchy with flash technology
- Scalability in multiple dimensions to adapt to changing business needs
- Eco-efficiency due to flash memory and lower RPM disk drives
- Supports multiple platforms and operating systems as well as both Microsoft Windows and UNIX® clients
- Compression for large data sets

More Throughput Less Cost

With the right storage solution to power your SAS environment, you can expand total throughput for your SAS applications while also saving money on storage. SAS and Sun have teamed together to help you achieve unprecedented performance, reduce costs, and greatly simplify your storage infrastructure. The revolutionary new Sun™ Storage 7000 system offers the simplicity and platform independence of network attached storage while providing performance that approaches that of much more complex storage area network (SAN) solutions.

Challenges with data growth

Rapid data growth and the need to deliver high service levels for more and more SAS users is making it extremely difficult for organizations to contain costs while providing users with fast access to the right information. SAS applications are particularly challenging in that they require both high capacity storage and high I/O throughput for accessing the data repository.

Typical challenges in deploying and managing SAS storage environments include:

- Performance — Large SAS data sets require fast I/O processing with sustained high throughput to keep servers from being underutilized while waiting for data.
- Complexity — NFS environments are easy to setup, but have previously lacked the performance required for larger SAS installations. SAS sites that require high performance have traditionally had little choice but to deal

with the complexity of SAN or direct attached storage environments.

- Management — It often takes skilled storage administrator to keep SAS systems running smoothly. And, if storage performance issues occur, it is very difficult to trace the source of the problem.
- Cost — Users always want greater performance, but budgets are tight. It's difficult to find storage solutions that satisfy SAS users and enable them to get more value from running SAS analytics

Today's IT managers and SAS users are looking for ways to build a high performance SAS infrastructure while also making their budget stretch further.

Sun Storage 7000 Systems

The Sun Storage 7000 series is a family of unified storage systems that offers new innovations in storage, including enterprise-class data services, massive scale, and superior performance — all while delivering significant cost savings.

These systems feature a common, easy-to-use management interface that requires no additional training, and have the industry's most comprehensive analytics environment to help isolate and resolve performance issues.

An advanced Hybrid Storage Pool design automatically optimizes performance and helps lower power and cooling requirements, enabling the Sun Storage 7000 family to deliver breakthrough performance while radically simplifying the way you manage your SAS storage.

Ideal for SAS users

Sun Storage 7000 systems are ideally suited for SAS applications because they provide high-speed access to file-based data, allowing SAS programs to execute more quickly without the need for a complex storage area network. SAS users want a simple, easy-to-use, low-cost file system that offers high performance and minimal complexity.

Upon installation of a high-performance Sun Storage 7000 system, SAS users can immediately begin saving files over the network without even rebooting their client systems.

Platform Independent Storage

SAS sites running SAS on HP, IBM, Dell, or any brand of server or operating system can use the Sun Storage 7000 systems just as easily as sites running SAS on Sun servers. These network attached storage (NAS) appliances can be accessed by any client that supports a CIFS, NFSv3, NFSv4, or iSCSI protocol, making the system platform independent from a SAS client perspective.

For SAS sites with a heterogeneous mix of hardware and/or operating systems, this flexibility may be especially attractive since a single storage appliance can be leveraged across the entire environment.

An IT administrator's dream

Let's face it, administrators don't really want to spend their time setting up HBAs, mapping LUNs to system ports, and configuring network switches. Sun Storage 7000 systems can be installed and up and running within minutes instead of the hours or days that it can take for a full SAN installation. The Sun

Meeting Both IT and SAS User Requirements



Feature	SAS User Benefits	IT Benefits
Hybrid Storage Pools	<ul style="list-style-type: none"> • Much lower cost than SANs with similar performance 	<ul style="list-style-type: none"> • Excellent price/performance • Low power and cooling costs • Reduced complexity vs. SAN
Real-time Analytics and Simplified Management	<ul style="list-style-type: none"> • Improved service levels • Less reliance on IT admins 	<ul style="list-style-type: none"> • Management efficiency • Fast/easy root cause analysis
Sun Open Storage with open-source software	<ul style="list-style-type: none"> • Low cost, no add-on fees • Easy expansion 	<ul style="list-style-type: none"> • Flexible growth path • Ability to customize if needed
Multiple protocols (NFS, CIFS, iSCSI, Webdav)	<ul style="list-style-type: none"> • Ubiquitous NFS access • No need to reboot clients 	<ul style="list-style-type: none"> • Easy integration of PC and UNIX desktops • Simple security access controls

Sun Storage 7000 systems converge to meet the requirements of both IT administrators and SAS users.

Storage 7000 installation wizard takes the guess-work out of tuning the system, and even cluster scenarios are easy to configure and deploy.

Faster installation and setup not only makes it easier on administrators, but also enables quicker response when additional storage capacity must be brought online quickly to avoid business interruptions for SAS users.

The systems also provide unprecedented management tools that give administrators and users more control while also providing greater visibility into performance issues.

The following features make it easy to administer SAS data sets:

- Click-and-drag administration tools that circumvent the need for a highly trained storage administrator
- Instant point-in-time snapshot copies of SAS data sets, helping to minimize downtime and save valuable disk space
- Cloning to provide read/write access to snapshot copies, enabling access to the previous data set while the data mart is being updated

Fast access to large volumes of data

One of the unique requirements of today's SAS applications is that they must provide both high performance and the

ability to preserve and manage large volumes of data.

Sun Storage 7000 systems have been proven to deliver more than 750 MB/sec of I/O throughput in tests that simulate a SAS user load with network access from many client systems.

The systems utilize a Hybrid Storage Pool architecture that takes advantage of high performance flash memory to optimize performance by serving as a cache area for low RPM hard disk drives. This architecture yields much higher performance than traditional storage architectures at significantly less cost.

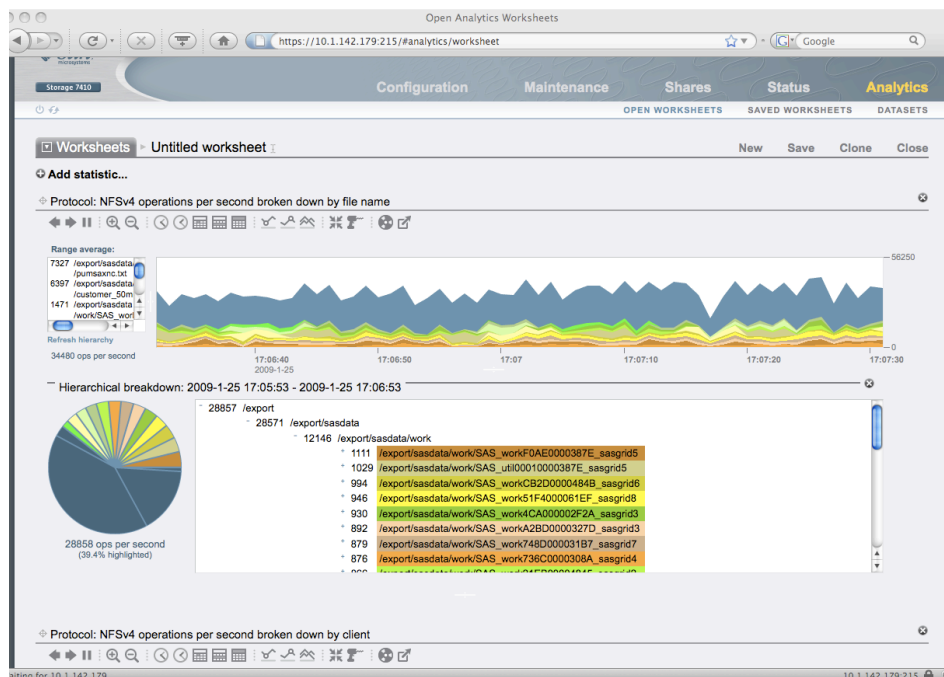
Increased visibility with DTrace Analytics

The industry's most comprehensive storage analytics environment can help isolate and resolve performance issues throughout the SAS environment. DTrace Analytics provides real-time analysis of the storage system and includes a graphical interface for visualizing results.

Some of the key advantages of using DTrace Analytics to observe SAS data access patterns include:

- Spot trends and potential performance issues before they impact SAS users.
- Facilitate capacity planning
- Troubleshoot storage and network problems.
- Identify SAS data sets that could benefit from pre-optimization.
- Uncover inappropriate uses of SAS data.
- Identify data sets that should be made available in multiple formats to avoid SAS cross-environment data access (CEDA) conversion.

As shown in the above figure, DTrace Analytics enables you to visualize I/O



DTrace Analytics enables a SAS administrator to break down I/O traffic by parameters such as network device, client system, or filename.

traffic patterns by parameters such as network devices or client systems. You can even isolate network traffic according to individual directories or file names. This makes it much easier to troubleshoot performance issues and find the source of I/O bottlenecks that might be difficult to identify without this utility.

Easy on your budget

The Sun Storage 7000 series changes the economics of storage by utilizing a high-performance Hybrid Storage Pool architecture, cost-effective industry-standard components, and open storage interfaces. When high performance is required, Sun Storage 7000 systems offer a much lower cost alternative compared to complex SAN solutions.

Eco-efficiency

The systems offer economic value by reducing energy consumption and datacenter space requirements. Energy efficiency is improved through the use of slower RPM drives and flash memory, both of which require significantly less power than high-speed 15K RPM drives.

No extra software costs

A rich set of built-in software features also helps reduce software costs. While many other vendors charge license fees for protocols and data services such as CIFS, NFS, HTTP, and Replication, these and other software features are included in the price of Sun Storage 7000 systems. No additional software licenses are required.

Reduced disk space with compression

The automatic compression feature in Sun Storage 7000 systems can also help SAS sites cost-effectively manage large data sets. Compression and decompression is transparent to users and is performed within the storage system rather than using precious CPU resources in the SAS server. The effectiveness of compressing SAS data sets is highly dependent on the data and could provide anywhere from 15% to 60% savings in disk space.

Although the processing for the compression is done in the storage system, it can still impact streaming I/O performance when data is being written to disk. Tests have shown negligible impact on read performance, so compression can be a very good option for certain types of SAS data.

A winning combination

For enterprises seeking to make full use of their SAS Business Analytics Framework, Sun Storage 7000 systems offer a winning combination of increased throughput for SAS programs and substantially lower TCO. The systems have all the right features for efficiently storing and managing SAS data files and offer exceptional price/performance. Sun Storage 7000 systems provide easy-to-use

network attached storage that is also easy to manage.

Reduce your risk with best practices

As part of the SAS and Sun Datacenter of the Future initiative, SAS and Sun engineers have worked jointly to reduce risk for SAS customers by characterizing solution performance and delivering a best practices white paper. The paper

provides recommendations for successful deployment and operation of Sun Storage 7000 systems with SAS software and is available in the Datacenter of the Future Knowledge Center at www.sas.com/partners/directory/sun/knowledge.html.

Find out for yourself

To see if the Sun Storage 7000 system is a good fit for your SAS workload, contact your local SAS representative to request a complementary sizing study. Or, run your own proof-of-concept test on a free trial system. Visit sun.com/tryandbuy/ to see if you are eligible for a free, no risk, 60-day trial through the Sun Try and Buy program.

Sun Storage 7000 systems come in four primary configurations to meet a variety of customer needs for capacity, price and performance.

	Key Customer Requirement	Max Storage Capacity	Space (Rack Units)	Write Optimized SSD	Read Optimized SSD	Cluster Option
Sun Storage 7110 system	Low priced entry level system with all software features	2 TB (16 x 2.5" disks)	2U	N	N	N
Sun Storage 7210 system	Mid-range scalability and performance in a compact energy efficient 4U system	46 TB (48 x 3.5" disks) and up to 142 TB with expansion arrays	4U	Y	N	N
Sun Storage 7310 system	Entry level cluster option for high availability	96 TB (96 x 3.5" disks)	1U per node, 4U per Storage Array	Y	Y	Y
Sun Storage 7410 system	Best price/performance and maximum growth path	576 TB (576 x 3.5" SATA II disks)	2U per node, 4U per Storage Array	Y	Y	Y

