Sun QFS, Sun SAM-FS, and Sun SAM-QFS 4.0 Release Notes
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July 25, 2002

The Sun QFS, Sun SAM-FS, and Sun SAM-QFS 4.0 releases incorporate
design and feature changes, function enhancements, and bugfixes
over previous releases. System administrators and programmers
familiar with this software will see changes that can affect their
daily operations and automated scripts written to co-exist with
Sun QFS, Sun SAM-FS, or Sun SAM-QFS software.
For these reasons, Sun Microsystems, Inc. recommends that you
study this README file and the associated CHANGES file prior to
upgrading to the 4.0 software releases.

General 4.0 Notes
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* The Sun QFS, Sun SAM-FS, and Sun SAM-QFS 4.0 software is
supported on Solaris 7, 8, and 9.

* The Sun QFS, Sun SAM-FS, and Sun SAM-QFS 4.0 software is
distributed through Sun Microsystems, your reseller, or your
Authorized Service Provider. It is also available for download.

4.0 Features
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* Added the Sun QFS shared file system.

JUSTIFICATION: This change implements a distributed reader/writer
file system mounted on Solaris host systems. In a Sun QFS shared
file system environment, one Solaris host acts as the metadata
server, and additional hosts can be configured as clients.
The Sun QFS shared file system can be configured in either a Sun
QFS or a Sun SAM-QFS environment. If configured in a Sun SAM-QFS
environment, the active metadata server is the only host upon
which the staging (sam-stagerd) and archiving (sam-archiverd)
daemons are active.

The Sun QFS shared file system runs only in Solaris 8 and 9
operating environments. This restriction is due to the system
requirements for setting up Sun SAN 3.0/3.1. If you want to be
able to change the metadata server, such as in a Sun SAM-QFS
failover environment, the Sun Solaris systems to be configured as
potential metadata servers must be attached through a storage
area network (such as Sun SAN 3.0 or later) or through a network
attachment to the library and/or mount points that contain the
archive media repository. This enables the other potential

metadata servers in the Sun QFS shared file system to be able to access the archive images. For more information, see the Sun QFS, Sun SAM-FS and Sun SAM-QFS File System Administrator's Guide. USER IMPACT: When the sam-fsd daemon recognizes a Sun QFS shared file system, it starts a shared file system daemon (sam-sharefsd).

BSD sockets are used to communicate between the server and client hosts. IPv4 and IPv6 are supported. You must configure a unique port associated with each shared file system with the name of samsock.fs_name. You can define this port in /etc/services, or if you have configured NIS, you can define this port in /etc/yp/src/services.

A trace file records connection and shut down. It is located in /var/opt/SUNWsamfs/trace/sam-sharefsd. For the Sun QFS and SAM-QFS shared file system, the stripe width is set by default to stripe=0, which is round robin.

For the Sun QFS and SAM-QFS shared file system, the minimum allocation size is set by default to 8*DAU. If you have only small files, this size should be set to your average file size.
For the Sun QFS and SAM-QFS shared file system, the maximum allocation size is set by default to 32*DAU. This size should be set 2-4 times larger than the minimum allocation size if your site has a mixture of large and small files.

For the Sun QFS and SAM-QFS shared file system, the stage_n_window is set by default minimum allocation size. A small stage_n_window causes too much meta traffic over the wire.

The shared mount option is required to be specified in the /etc/vfstab file for the Sun QFS shared file system.

Executing the mountall script does not mount shared file systems, however, it does mount local samfs file systems.

KNOWN SIDE EFFECTS: The samfsrestore(1M) command does not work properly on a Sun QFS shared file system client. Administators should not attempt to issue the samfsrestore(1M) command on clients.

* The Sun QFS shared file system uses more extensive configuration information. Early versions of the system hosts file can be updated by issuing the samsharefs(1M) command with its '-Ru' option. For more information, see the samsharefs(1M) man page,

the /opt/SUNWsamfs/examples/hosts.*.local.* files, and the Sun
QFS, Sun SAM-FS, and Sun SAM-QFS File System Administrator's
Guide.

JUSTIFICATION: This is required in order to specify and use
private network connections for Sun QFS shared file system
communication, and in order to restrict incoming connections in
many environments.

* The mount(1M) command accepts the following options that
pertain to file leases in a Sun QFS shared file system:

o '-o rdlease=n' (read lease)

o '-o wrlease=n' (write lease)

o '-o aplease=n' (append lease)

JUSTIFICATION: These options are pertinent to the implementation
of the Sun QFS shared file system.

USER IMPACT: None.

WHO SHOULD USE THIS: Shared file system sites.

KNOWN SIDE EFFECTS: None.

DOCUMENTATION CHANGES: The mount_samfs(1M) man page has been
updated.

* The mount(1M) command's 'shared_reader' and 'shared_writer'
options have been changed to 'reader' and 'writer'. The 'shared_'
prefix has been removed. File systems mounted with a single writer
and multiple readers are now referred to as 'multireader file
systems'.

The main difference between a multireader file system and a Sun
QFS shared file system is that the multireader host reads metadata
from the disk, and the client hosts of a Sun QFS shared file
system read metadata over the network.

The 'shared_reader' and 'shared_writer' mount option syntax has
been retained for backward compatibility.

JUSTIFICATION: These options were renamed in an effort to reduce confusion between the Sun QFS shared file system and file systems with multiple readers and single writers.

USER IMPACT: None. The old syntax is retained for backward compatibility.

WHO SHOULD USE THIS: Multireader file system sites.

KNOWN SIDE EFFECTS: None.

DOCUMENTATION CHANGES: The mount_samfs(1M) man page has been updated.

* Archiver improvements.

1. The sam-archiverd daemon now performs all archive copy scheduling. Previously, each sam-arfind daemon scheduled copies independently resulting in some uncoordinated use of drives and volumes. Now, each sam-arfind daemon sends ArchReq-s (lists of files to be archived) to the sam-archiverd daemon for scheduling.

2. When the archiver.cmd file is changed, the sam-archiverd daemon rereads it. sam-archiverd does not restart itself and all its child processes. The following changes occur depending on the nature of the change:

a. If archive set definitions are changed, only the sam-arfind daemons on the affected file systems are restarted.

b. If only volume (VSN) assignments are changed, no processes are restarted. sam-archiverd is performing the copy scheduling, so the changed information is internal to sam-archiverd.

c. If archive set parameters are changed, no processes are restarted. Most parameters affect only sam-arcopy scheduling, and they are internal to sam-archiverd.

d. Changing log file names, VSN assignments, and other global parameters does not cause restarts.

3. The sam-archiverd daemon is started by sam-fsd. This allows disk archiving to be performed without sam-initd and the library daemons.

4. You must specify the '-c archive_cmd' option to the archiver(1M) command if a file other than the default file (/etc/opt/SUNWsamfs/archiver.cmd) is to be checked.

5. The samu 'A' display has been removed. There is no archiver shared memory segment.

* The Sun QFS, Sun SAM-FS, and Sun SAM-QFS environments now support file system quotas. Quotas can be set on a user, group, or admin set basis. Limits as to the number of files and the number of blocks can be set. Quotas apply only to disk and not to removable media.

JUSTIFICATION: User requests.

USER IMPACT: Users should be aware that quotas can be set for them, and they should be told of the samquota(1) command, which they can use to check their quotas.

WHO SHOULD USE THIS: Sites wishing to enforce quotas.

KNOWN SIDE EFFECTS: None.

DOCUMENTATION CHANGES: The Sun QFS, Sun SAM-FS, and Sun SAM-QFS File System Administrator's Guide describes this feature. In addition, see the following man pages: samedquota.sh(1M), saminitfsquota.sh(1M), samquota(1), samquota(1M), and samquotastat(1M).

EXAMPLE: Several examples are provided in the 4.0 documentation.

* Trace file controls. Several Sun QFS, Sun SAM-FS, and Sun SAM-QFS daemons write messages to trace files. These messages contain information about the state and progress of the work performed by the daemons. The messages are primarily used by Sun engineers and support personnel to improve performance and diagnose problems. As such, the message content and format are subject to change with bugfixes and feature releases.
The following daemons write trace files: sam-archiverd, sam-catserverd, sam-fsd, sam-ftpd, sam-recycler, sam-sharefsd, and sam-stagerd.

By default, no trace files are written. The trace file names and the options can be specified in the defaults.conf configuration file. See the defaults.conf(4) man page.

During execution, you can make changes by using the samu 'dtrace' command.

USER IMPACT: The trace directive in the archiver.cmd file is no longer valid. The artrace and cattrace samu(1M) commands are no longer valid.

* Trace file rotation. To prevent trace files from growing indefinitely, the sam-fsd daemon monitors the size of the trace files and periodically executes the /opt/SUNWsamfs/sbin/trace_rotate.sh script. This script moves the trace files to sequentially numbered copies. The script is executed when the trace file exceeds a specified size or age. The size and age are specified in the defaults.conf file.

You can modify this script to suit your operation. Alternatively, you can provide this function using cron(1) or some other facility. If the /opt/SUNWsamfs/sbin/trace_rotate.sh script does not exist, sam-fsd performs no action.

* Added Access Control List (ACL) capabilities to Sun SAM-FS file systems. The Solaris ACL features now work in Sun QFS, Sun SAM-FS, and Sun SAM-QFS file systems just the way they do on Solaris file systems. This capability allows you to define a narrower, more specific, access group for a file, or group of files, than can be obtained by setting standard UNIX permissions.

JUSTIFICATION: Sun QFS, Sun SAM-FS, and Sun SAM-QFS file systems have been deficient in their support for file system ACL capabilities.

USER IMPACT: This feature allows users to control access to files and directories using the same commands and system calls used for the UFS file system under Solaris.

WHO SHOULD USE THIS: Any user wanting to control file and directory access at a finer granularity than that provided by typical Solaris permissions.

KNOWN SIDE EFFECTS: None.

DOCUMENTATION CHANGES: None. Refer to the following Solaris man pages for more information: getfacl(1), setfacl(1), acl(2), aclcheck(3), aclsort(3), acltomode(3), acltopbits(3), acltotext(3). Also refer to Solaris system administration documentation.

EXAMPLE: See Solaris documentation.

* Added the sam-fsd file system daemon.

JUSTIFICATION: This change was required to implement the Sun QFS
shared file system and the disk archiving feature. In addition, it
allows the product to move towards a distributed architecture.

USER IMPACT: System administrators will note that issuing 'samd
stop' or 'samd start' no longer stops or starts all daemons.
Rather, the samd(1M) command affects only the robotic daemons,
which are as follows: sam-initd, sam-catserverd, sam-robotsd, and
any associated robotic daemons depending on the library type,
such as sam-stkd, sam-stk_helper, ssi_so, etc. The start up and
shutdown processes are affected.
sam-fsd is the start-up daemon associated with Sun QFS, Sun
SAM-FS, and Sun SAM-QFS. sam-fsd is located in
/usr/lib/fs/samfs/sam-fsd.

At the time of the first file system operation (for example, this
could occur the first time any of the following commands are
issued: the mount(1M), samfsck(1M), sammkfs(1M), etc.), the
/etc/inittab file is modified to start up sam-fsd automatically.
The following entry is added to /etc/inittab:

sf:23:respawn:/usr/lib/fs/samfs/sam-fsd

sam-fsd has a parent id of 1 and is the parent of sam-initd.

sam-fsd automatically starts the following child daemons:

sam-archiverd   Archiver daemon.
                 Scans file systems (sam-arfind)
                 and copies files (sam-arcopy) for
                 archiving to removable media and disk.

sam-stagealld   Associative staging daemon.

sam-stagerd   Stage daemon.
                 Stages files from removable media or disk.

sam-ftpd   Communications daemon for disk archiving.

sam-sharefsd   Sun QFS shared file system daemon.
                 Enabled when the file system is

initialized using the 'shared' option to
                    the sammkfs(1M) command.

sam-fsd also notifies the archiver of file system mounts and
unmounts.

sam-fsd reads the base configuration files when it starts up, and
it reads them again whenever it receives a HUP signal. The base
configuration files are as follows:

o LICENSE.4.0 (required)

o mcf (required)

o diskvols.conf (if available)

o samfs.cmd (if available)

o defaults.conf (if available)

sam-fsd exits when it receives a TERM signal. For information on
the HUP signals, see the signal(5) man page.

sam-fsd can also be used as a syntax checker. Running this daemon
from the command line checks the configuration files or reports
the state of the system. The files are checked for syntax, in the
order listed. sam-fsd stops checking configuration files when it
encounters an error. To check all syntax, you must execute sam-fsd
until no syntax errors are reported.

For example, the following error is generated due to a
misconfigured mcf file:

/usr/lib/fs/samfs/sam-fsd 26: /dev/rmt/1cbn 101 sg stk9738 off
*** Error in line 26: Equipment ordinal 101 already in use 1 error
in '/etc/opt/SUNWsamfs/mcf' sam-fsd: Read mcf
/etc/opt/SUNWsamfs/mcf failed.

Errors are written to the /var/adm/messages file.

WHO SHOULD USE THIS: All sites that upgrade from 3.5.0 to 4.0 will
be affected by these changes.

KNOWN SIDE EFFECTS: The presence of daemons that persist after
issuing a samd stop command are to be noted.

DOCUMENTATION CHANGES: The following documentation has been
updated to reflect this new daemon:

o sam-fsd(1M) man page

o samd(1M) man page

o Sun QFS, Sun SAM-FS, and Sun SAM-QFS File System Administrator's
Guide

o mcf(4) man page

o defaults.conf(4)

OTHER CHANGES: The 'weight_size=' and 'weight_age=' mount(1M)
options are no longer valid. These are releaser parameters, and
they must be set in the releaser command file,
/etc/opt/SUNWsamfs/releaser.cmd.

The path to the raw special file (such as /dev/rdsk/c?t?d?s?) is
no longer required in the /etc/opt/SUNWsamfs/mcf for magnetic
disks.

* Added disk archiving capabilities. Archiving is the process of
copying a file from SAM-FS file system to an archive volume.
Archive volumes can reside on removable media cartridges in a
library, or they can reside in a file on a mounted file system.
When disk archiving is implemented, each volume on a disk must be
identified by a unique VSN identifier. The
/etc/opt/SUNWsamfs/diskvols.conf file describes volumes for disk
archiving. Disk archiving can be configured to archive files to a
file system on a remote machine. If disk archiving to a remote
system, a host name must be specified when defining the disk VSN,
and the host system must have at least one Sun SAM-FS or Sun
SAM-QFS file system installed upon it.

The -disk_archive directive is an archive set processing
directive in the params subsection of the archiver.cmd file. This
is the directive that defines a disk archive set.

JUSTIFICATION: User requests.

USER IMPACT: None.

KNOWN SIDE EFFECTS: None.

DOCUMENTATION CHANGES: For more information, see the Sun SAM-FS
and Sun SAM-QFS Storage and Archive Management Guide. Also see the
following man page: diskvols.conf(4) and archiver.cmd(4).

EXAMPLE: If file /sam2/my_proj/filea is in the archive set for
arset0.1, the archiver archives the content of this file to the
destination path named /sam_arch1 on the remote server mars.
File diskvols.conf contains:
disk01 mars:/sam_arch1

The params subsection of the archiver.cmd file contains:

params arset0.1 -disk_archive disk01 endparams

* Added the System Error Facility (SEF) reporting mechanism. This
feature allows you to capture and compile a report from the log
sense pages of peripheral tape devices in Sun SAM-FS and Sun
SAM-QFS environments. When this feature is enabled, log sense
data is written to a log file (/var/opt/SUNWsamfs/sef/sefdata by
default) for eventual inclusion in a report. The sefreport(1M)
command allows you to customize the log sense data in your report.
For more information on using this feature, see the sefreport(1M)
man page, the sefdata(4) man page, and Sun SAM-FS and Sun SAM-QFS
Storage and Archive Management Guide.

JUSTIFICATION: With the data found in the log sense pages,
administrators can track errors occurring in tape device
operation and in volume use. This allows administrators to
identify a problem device or a faulty volume. The adminstrator
could possibly predict device or volume failure before a critical
situation develops.

USER IMPACT: None.

WHO SHOULD USE THIS: System administrators who want more
information about the errors occuring on tape devices and with
specific volumes used with their Sun SAM-FS and Sun SAM-QFS
systems.

KNOWN SIDE EFFECTS: None.

DOCUMENTATION CHANGES: Added the sefreport(1M) and sefdata(4) man
pages. Added information to the Sun SAM-FS and Sun SAM-QFS Storage
and Archive Management Guide.

* Changed the sam_trace(1M) command name to samtrace(1M). The associated man page has also been changed. This has been done for command and man page naming consistency reasons.
JUSTIFICATION: Consistency with other 'sam' prefixed command names.

USER IMPACT: The command and man page have now changed to samtrace(1M). The underscore character has been removed.

WHO SHOULD USE THIS: All.

KNOWN SIDE EFFECTS: None.

DOCUMENTATION CHANGES: The sam_trace(1M) man page is now the samtrace(1M) man page.

* Removed the undocumented archiver directive 'reserve ='. This directive was in releases previous to 3.5.0. It was not documented in 3.5.0, but it was processed in the archiver.cmd file. The functionality was replaced by the use of the '-reserve' parameter in an 'allsets' definition.

* Changed the '-c' option of the archive(1) command to '-C'. The '-C' option specifies concurrent archiving. The sls(1) command has also been changed to reflect this change.

JUSTIFICATION: Consistency with other commands that specify an archive copy.

USER IMPACT: The command and man page have been changed.

WHO SHOULD USE THIS: All.

KNOWN SIDE EFFECTS: None.

DOCUMENTATION CHANGES: archive(1), sls(1), and sam_archive(3) man pages.

* Removed the sam-notifyd daemon and its associated fifo. The notify functionality is performed by the sam-fsd daemon using a UNIX Domain Socket.

JUSTIFICATION: Reduce number of daemons.

USER IMPACT: None.

WHO SHOULD USE THIS: All.

KNOWN SIDE EFFECTS: None.

DOCUMENTATION CHANGES: Removed notify daemon man pages.

* The documentation for the sam-clientd and sam-serverd daemons
has been removed from the sam-robotsd(1M) man page and is now
included on the new sam-remote(7) man page.

JUSTIFICATION: Documentation for these daemons was more
appropriate on a man page for Sun SAM-Remote.

USER IMPACT: New man page added.

WHO SHOULD USE THIS: Sun SAM-Remote users.

KNOWN SIDE EFFECTS: None.

DOCUMENTATION CHANGES: New man page, sam-remote(7).

EXAMPLE: None.

* Added the Equipment Ordinal of the drive on which the file was
archived to the archive log information.

JUSTIFICATION: This change was requested by customers.

USER IMPACT: Scripts that process the archiver log should be
examined. Since the new field is the last one, it's unlikely
changes are needed.

WHO SHOULD USE THIS: Sites that need to correlate media errors
with specific drives.

KNOWN SIDE EFFECTS: None.

DOCUMENTATION CHANGES: See sam-archiverd(1M).

* Added support for md devices to the Sun QFS file system.
DOCUMENTATION CHANGES: See the Sun QFS, Sun SAM-FS, and Sun
SAM-QFS File System Administrator's Guide. Also see the mcf(4)
man page.

* Added the 'w' display to samu(1M) to show stage requests waiting
for media.

* The volume reservation capability is moved from the ReservedVSNs file to the library catalog. The ReservedVSNs file is no longer used. The archiver will initially use its contents to make volume reservations in the catalog. Two commands, reserve(1M) and unreserve(1M), are provided to alter the catalog entries. The dump_cat(1M) command can produce text output that can be used to build a ReservedVSNs file if necessary.

JUSTIFICATION: Simplify management of reserved archive volumes.

USER IMPACT: If a site wishes to downgrade from the 4.0 release to a prior release, the backto350.sh script must be run to recreate the reserved VSNs information that is now stored in the 4.0 catalog. This script creates the ReservedVSNs file using catalog information available from the dump_cat(1M) command.

KNOWN SIDE EFFECTS: None.

DOCUMENTATION CHANGES: The Sun SAM-FS and Sun SAM-QFS Storage and Archive Management Guide has been updated to reflect this change. In addition, the ReservedVSNs(4) man page has been removed. The reserve(1M) and unreserve(1M) man pages have been added.

* The hwm_archive option has been added to the mount(1M) command. This option directs the file system to start the archiver when the high threshold is reached. By default, the archiver does NOT start when the high threshold is reached.

JUSTIFICATION: This change was requested by tech support.

USER IMPACT: None.

WHO SHOULD USE THIS: Sites that have a lot of incoming files into a file system. It is possible that the archive interval is set to too long a duration, and the file system could fill up before the archiver runs.

KNOWN SIDE EFFECTS: None.

DOCUMENTATION CHANGES: See mount_samfs(1M).

* The '-n' and '--newer_than_existing' options have been added to the star(1M) command. These options extract only those files from the archive image that have newer modification times than the corresponding files in the file system. This allows reloading

files from a series of archive tapes without the possibility of extracting older files after newer.

JUSTIFICATION: This change was requested by tech support.

USER IMPACT: None.

WHO SHOULD USE THIS: Sites that need to restore files using star(1M) for disaster recovery of a lost file system.

KNOWN SIDE EFFECTS: None.

DOCUMENTATION CHANGES: See star(1M).

EXAMPLE: The following example commands extract all files newer than those existing from the archive images at position 0x286 on vsn YYY.

request -p 0x286 -m lt -v YYY xxx star xvnf xxx

* The '-g logfile' option has been added to the samfsrestore(1M) command. This option generates a log file that lists files that were fully or partially online before the samfsdump(1M) command was issued. This file can be used as input to the restore.sh(1M) script to stage those files back after a restore operation.

JUSTIFICATION: This change was requested by technical support.

USER IMPACT: None.

WHO SHOULD USE THIS: Sites that need to restore the previous state of a file system after issuing a samfsrestore(1M) command.

KNOWN SIDE EFFECTS: None.

DOCUMENTATION CHANGES: See the sammkfs(1M) and samfsdump(1M) man pages.

* The default DAU sizes on Sun QFS and Sun SAM-QFS systems have changed. The default DAU sizes for SAM-FS file systems did not change. The DAU sizes are specified on the '-a allocation_unit' option of the sammkfs(1M) command. For Sun QFS and Sun SAM-QFS file systems, the defaults have changed for QFS file systems as follows:

o ms file system 16k

o ma file system without striped groups 64k

o ma file system with striped groups 256k

JUSTIFICATION: This change was requested by technical support.
These defaults can cause more efficient I/O resulting in higher
I/O rates than with the previous defaults. The sammkfs(1M)
command continues to process the '-a allocation_unit' argument,
where the DAU can be specified. File systems that contain
predominantly large files with greater I/O rate requirements will
benefit most from the larger defaults.

USER IMPACT: ma file system users with small files will want to
set the DAU smaller than the default. For ma striped groups, more
disk space is likely to be unusable since the minimum allocation
unit is larger. Striped groups are generally used with large files
with greater I/O rate requirements.

KNOWN SIDE EFFECTS: none.

DOCUMENTATION CHANGES: The sammkfs(1M) man page and the Sun QFS,
Sun SAM-FS, and Sun SAM-QFS File System Administrator's Guide.

EXAMPLE: None.

* The '-copy_r n' and '-any_copy_r' options have been added to the
sfind(1) command. JUSTIFICATION: Consistency within the sfind(1)
command.

USER IMPACT: None.

WHO SHOULD USE THIS: Any end user.

KNOWN SIDE EFFECTS: None.

DOCUMENTATION CHANGES: sfind(1) man page.

* It is no longer necessary to include a white space character on
either side of the equal-to signs (=) in command files.

* The 'min_residence_age = time' directive has been added to the
releaser.cmd file. This allows you to adjust the minimum
residency age for the releaser.

JUSTIFICATION: This change was requested by customers.

USER IMPACT: None.

WHO SHOULD USE THIS: Sites that want the minimum residence age for files to be released to be other than the 10 minute default.

KNOWN SIDE EFFECTS: None.

DOCUMENTATION CHANGES: See the sam-releaser(1M) and releaser.cmd(4) man pages.

EXAMPLE: The following example directive line sets the minimum residency age to 1 hour in the releaser.cmd file:

min_residence_age = 3600

* The load_notify.sh(1M) shell script has been added. This script provides a mechanism for notifying the operator when exported or manually mounted media is requested. It is run when there is a load request for an 'available' volume that is not in an automated library, and the operator state is 'attended'. The default script sends email to root showing the VSN.

JUSTIFICATION: This change was requested by customers.

USER IMPACT: None.

WHO SHOULD USE THIS: Sites that want operator notification when a request for manually mounted or exported media occurs.

KNOWN SIDE EFFECTS: None.

DOCUMENTATION CHANGES: See the load_notify.sh(1M) man page.

EXAMPLE: To enable the feature, issue the following command:

cp /opt/SUNWsamfs/examples/load_notify.sh /opt/SUNWsamfs/sbin

And then modify the script as desired.

* The samfsconfig(1M) command and man pages have been added. This command analyzes the superblock and assists in the reconstruction of the mcf file if controller numbers are reassigned or disks are moved between controllers.

JUSTIFICATION: This is a disaster recovery feature.

USER IMPACT: None.

WHO SHOULD USE THIS: System administrators.

KNOWN SIDE EFFECTS: None.

DOCUMENTATION CHANGES: New samfsconfig(1M) man page.

EXAMPLE: See the samfsconfig(1M) man page.

* The archive copy commands now support the -M option, which
specifies metadata only. If the -M is not specified, the command
acts upon only regular files. If the -M is specified, the command
acts upon only metadata files (directories, symlinks, removable
media file, segment index), will have the operation performed.

The archive copy commands that now support the -M option are as
follows: damage(1M), exarchive(1M), rearch(1M), unarchive(1M),
undamage(1M), unrearch(1M).

JUSTIFICATION: This allows a system administrator to manipulate
metadata archives without affecting data archives.

USER IMPACT: None.

WHO SHOULD USE THIS: System administrators.

KNOWN SIDE EFFECTS: None.

DOCUMENTATION CHANGES: The -M option has been added to the man
pages for each of these commands.

* Added the stager daemon, sam-stagerd. In addition to the new
stager daemon, several other capabilities were added. These new
capabilities include a more sophisticated stage log facility and
a stager daemon configuration file.

JUSTIFICATION: This feature improves the supportability and
usability of the stager.

USER IMPACT: The following commands in defaults.conf(4) have been
obsoleted: lock_stage_buffer, stage_retries, stages,
tp_stage_buffer_size. See the stager.cmd(4) man page for
equivalent functionality.

WHO SHOULD USE THIS: Sites wishing to customize file stage activities.

KNOWN SIDE EFFECTS: sammkfs(1M) -r was removed as a means of disaster recovery. (See additional note under "Other 4.0 Release Changes").

DOCUMENTATION CHANGES: In addition to the daemon, the following new man pages have been added: sam-stagerd(1M), sam-stagerd_copy(1M), stager.cmd(4). The following man page has been obsoleted: sam-logd(1M). New text has been added to the Sun SAM-FS and Sun SAM-QFS Storage and Archive Management Guide to describe the new daemon.

EXAMPLE: None.

* Support is added for the following hardware:

o Libraries: ADIC Scalar 100 AIT library. ADIC Scalar 1000 AIT library. Exabyte X80 tape library. IBM 3584 UltraScalable tape library. For information on configuring cleaning, see the ibm3584(7) man page. StorageTek L20, L40, and L80 tape libraries. Qualstar 82xx series of tape libraries.

o Drives: IBM 3580 (LTO) tape drive. Quantum SDLT220 (SuperDLT) tape drive. Seagate Viper 200 (LTO) tape drive. Sony AIT drives in ADIC libraries using the DAS/ACI interface. StorageTek T9940B tape drive.

o Media: STK 9840 VolSafe write-once tape.

DOCUMENTATION CHANGES: Additional information regarding these devices can be found in the mcf(4), inquiry.conf(4), and intro_devices(7) man pages.

JUSTIFICATION: All of these devices have been added because of vendor requests or because of Sun Microsystems business decisions.

* sambcheck(1M) command and man pages have been added to the SAM-FS and QFS packages. This command is a file system block usage identifier that reports the current usage of a block on one or more partitions of a file system.

JUSTIFICATION: This change was requested by customers.

USER IMPACT: None.

WHO SHOULD USE THIS: System admins attempting to identify usage of block numbers found in /var/adm/messages or output from various utilities such as samfsck(1M).

KNOWN SIDE EFFECTS: None.

DOCUMENTATION CHANGES: New sambcheck(1M) man page.

* The Sun QFS, Sun SAM-FS, and Sun SAM-QFS file systems now support an enhanced superblock. The version 2 superblock supports the following new features:

o Access Control Lists (ACLs)

o The Sun QFS shared file system

o A dual allocation scheme for mm devices in Sun QFS and Sun SAM-QFS file systems

o The ability to define md devices in Sun QFS and Sun SAM-QFS file systems

Not all 4.0 features depend on the version 2 superblock for their support, but the features in the preceding list do depend on the version 2 superblock for their functionality. It is not possible to use these features in a file system initialized with a version 1 superblock. To use these features, you need to reinitialize your file system using the 4.0 sammkfs(1M) command.

JUSTIFICATION: The version 2 superblock design is needed to support some release 4.0 features.

USER IMPACT: At the time a file system is initialized, the site must decide whether the file system should use the new version 2 superblock or whether it should remain backward compatible with the pre-4.0 software and use the version 1 superblock.

If you are using 4.0 software and you want to initialize a file system with a version 1 superblock, you must specify the -P option on the sammkfs(1M) command.

The software detects the superblock used in the file system and supports features that can be enabled in the superblock that is present in the mounted file system. It is not possible to mount a

file system with a version 2 superblock using pre-4.0 Sun QFS, Sun SAM-FS, or Sun SAM-QFS software.

For disaster recovery purposes, a samfsdump(1M) or qfsdump(1M) file created using 4.0 software can be used to restore file systems to either a version 1 sperblock or a version 2 superblock.

o To restore the file system using a version 2 superblock, reinitialize the file system using the sammkfs(1M) command before issuing the samfsrestore(1M) or qfsrestore(1M) command.

o To restore the file system using a version 1 superblock, reinitialize the file system using the sammkfs(1M) command with its -P option before issuing the samfsrestore(1M) or qfsrestore(1M) commands. When restored, unsupported functionality is omitted.

WHO SHOULD USE THIS: Sites needing the features supported only with the version 2 superblock.

KNOWN SIDE EFFECTS: If you initialize a new file system with a version 2 superblock, you cannot mount such a file system if you back up your software level to a pre 4.0 release using the backto350.sh(1M) script.

DOCUMENTATION CHANGES: sammkfs(1M) man page, the Sun QFS, Sun SAM-FS, and Sun SAM-QFS File System Administrator's Guide, and the Sun QFS, Sun SAM-FS, and Sun SAM-QFS Installation and Configuration Guide. The samu(1M) file system displays and samfsinfo(1M) contain a version number in the output examples.

EXAMPLE: None

* Superblock version detection is added in release 4.0. The software can detect the superblock version used in a mounted file system and can control the use of release-specific features. The Sun QFS, Sun SAM-FS, and Sun SAM-QFS file systems now support both version 1 and version 2 superblocks.

JUSTIFICATION: Some features introduce on-disk data structures that are not supported in previous releases. In the past, data corruption has occurred when a file system containing new structures is inadvertently used under an older release. This change can prevent such corruption.

USER IMPACT: The new features available with the version 2 superblock.

* You can now specify the size of the buffer to be used when copying a file from disk cache to the archive media. This size can be specified in the archiver.cmd(4) file on a global basis or on an archive set basis. In addition, you can also specify whether or not the file system or the archiver should control the buffer lock. The directives to control these actions are as follows:

o bufsize=media_type buffer_size [lock]

o -bufsize=buffer_size o -lock

JUSTIFICATION: Performance.

USER IMPACT: None.

WHO SHOULD USE THIS: Sites wishing to improve their archiving performance should experiment with the values on these directives.

KNOWN SIDE EFFECTS: None.

DOCUMENTATION CHANGES: For more information, see the Sun SAM-FS and Sun SAM-QFS Storage and Archive Management Guide or see the archiver.cmd(4) man page.

EXAMPLE: None.

* The Sun SAM-FS and SAM-QFS software supports the sharing of drives by more than one Sun SAM-FS or Sun SAM-QFS host system for drives in certain network-attached libraries. A shared drive is a drive that can be used by multiple Sun SAM-FS or Sun SAM-QFS processes on multiple servers. These network-attached libraries include all StorageTek network-attached libraries, all Sony network-attached libraries, and the IBM 3494 network-attached library.

JUSTIFICATION: User requests.

USER IMPACT: None.

WHO SHOULD USE THIS: Sites wishing to share a single network-attached library and its drives with more than one copy of Sun SAM-FS or Sun SAM-QFS software.

KNOWN SIDE EFFECTS: None.

DOCUMENTATION CHANGES: Documentation for the shared drives feature can be found in the Sun SAM-FS and Sun SAM-QFS Storage and Archive Management Guide and in the appropriate man pages.

EXAMPLE: Examples are provided in the stk(7), sony(7), and ibm3494(7) man pages.

* The samunhold(1M) command has been added to release SANergy file holds. This command is intended to assist system administrators with SANergy File Sharing running on Sun QFS file sytems.

JUSTIFICATION: This allows an administrator to release SANergy holds in an emergency.

USER IMPACT: None.

WHO SHOULD USE THIS: SANergy system administrators.

KNOWN SIDE EFFECTS: This command releases all held files in the specified file system.

DOCUMENTATION CHANGES: samunhold(1M) man page.

* Added the 'rearch_no_release' directive to the releaser command file. JUSTIFICATION: Needed to prevent files from being released before they have had a chance to rearchive.

WHO SHOULD USE THIS: Sites using the migration toolkit and sites that recycle.

KNOWN SIDE EFFECTS: None.

DOCUMENTATION CHANGES: The sam_releaser(1M) and releaser.cmd(4) man pages, and the Sun SAM-FS and Sun SAM-QFS Storage and Archive Management Guide.

Other 4.0 Release Changes
=========================

* The package names have changed as follows:

OLD NAME NEW NAME
-------- --------

```
LSCsamfs SUNWsamfs
LSCqfs   SUNWqfs
LSCtools SUNWsamtp
```

* The SUNWsamfs package now includes the content that was formerly in the LSCdst, LSCibm, LSCsony, LSCstk, LSCremote, and LSCmig.

* The directory path components have changed from 'LSCsamfs' to 'SUNWsamfs'. For example, /var/opt/LSCsamfs has changed to /var/opt/SUNWsamfs.

* The default message catalog has been moved from /var/opt/SUNWsamfs/nl_messages.cat to /usr/lib/locale/C/LC_MESSAGES/SUNWsamfs to allow localization.

* After the 4.0 release, upgrade patches are available from the following URL:

http://www.sunsolve.sun.com

* The sammkfs(1M) -r option has been removed. The ability to copy the .inodes file in each Sun SAM-FS root directory has also been disabled. This eliminates one form of disaster recovery (using sammkfs(1M) -r). These items were disabled due to constraints imposed by the implementation of a stager daemon. Customers who used this method of backup are encouraged to backup regularly using samfsdump(1M).

* The Sun SAM-FS Java runtime environment, package LSCjre, is no longer released with the Sun QFS, Sun SAM-FS, and Sun SAM-QFS 4.0 releases. The SAM GUI tools still require the Java Runtime Environment (JRE) to be installed. You must download and install the JRE software yourself. Our recommendation is to install the Java Runtime Environment v 1.2.2 (JRE) from java.sun.com. After you install JRE, you must define a symbolic link in /opt/SUNWsamfs. For example:

ln -s /usr/local/jre /opt/SUNWsamfs/jre

* Added support for the DAS/ACI 3.02 through 3.10 software levels. The Sun SAM-FS and Sun SAM-QFS software interoperates with the DAS/ACI software only at the 3.02 through 3.10 release levels. * Added support for the StorageTek ACSLS 6.0 release.

The SAM-FS and SAM-QFS environments now support the StorageTek ACSLS 6.0 release for network-attached StorageTek automated libraries.

JUSTIFICATION: The ACSLS 6.0 release supports Solaris 2.7 and Solaris 2.8.

WHO SHOULD USE THIS: Solaris 2.8 sites.

KNOWN SIDE EFFECTS: None.

DOCUMENTATION CHANGES: None.

* Changed the drive selection algorithm for StorageTek Passthru environments.

The drive selection algorithm for StorageTek Passthru environments no longer chooses a drive for mounting tapes based on a simple round-robin mechanism. The new selection algorithm first looks for an empty drive in the library in which the requested volume resides. Then it searches for an idle drive in the local library if no empty drives are available. Finally, if neither an empty drive nor an idle drive are available in the local library of the requested volume, the algorithm looks for any empty drive, and then any idle drive, in order to satisfy the mount request.

JUSTIFICATION: The simple round-robin method of drive selection is not efficient in a StorageTek Passthru environment.

WHO SHOULD USE THIS: All users in a StorageTek Passthru environment.

KNOWN SIDE EFFECTS: None.

DOCUMENTATION CHANGES: None.

* A new license scheme has been implemented. Sites upgrading to SAM-FS 4.0 from 3.5.0 or older releases must have a set of new license keys supplied by their Authorized Service Provider (ASP) or Sun Microsystems, Inc. These keys should be placed in /etc/opt/SUNWsamfs/LICENSE.4.0. The license "l" display in samu(1M) allows you to view the products for which the system is licensed.

Some notes about licensing:

1. The license is divided into two logical sections: system and media.

o The system license licenses the host, expiration date, and the features.

o The media license licenses a library type and media type pair. This is tied to the system license by hostid.

2. If the license is missing, is corrupted, has an incorrect hostid, or has expired, the license is regarded as expired or corrupt. This means that the system no longer allows file system mounts, archiving, media mounts, or staging.

If the number of slots in use exceeds the licensed amount, the license is regarded as suspended. This means that the system will no longer allow media mounts, labelling new media, staging, or importing media. Relabelling of old media is still allowed if the license is suspended.

Since exporting is still allowed in the suspended condition, you can export enough media to bring the number of slots in use back into conformance with the license to clear the suspended condition.

The Sun QFS, Sun SAM-FS, and Sun SAM-QFS 4.0 releases will not run with old (pre-4.0) licenses. New license keys must be obtained in order to run release 4.0, and these keys must be put into a license file named LICENSE.4.0 (instead of LICENSE.3.5, LICENSE.3.3, etc.).

Attempting to run without a LICENSE.4.0 file causes the software to write the following message to the sam-log:

Fatal error - License has expired or is corrupted; initialization failed.: No such file or directory

Attempting to run with a pre-4.0-generated license in the LICENSE.4.0 file causes the software to write the following message to the sam-log:

Fatal error - License has expired or is corrupted; initialization failed.

* The mount_samfs(1M) wr_throttle parameter, which is used to limit the number of outstanding bytes to be written (on a per-file

basis), has its default value changed to 16 megabytes.
Previously, the default was calculated based on physical memory
size. The rapid increase in memory sizes and dynamic
reconfiguration capabilities make the former default unrealistic.
The file system administrator is still allowed to modify
wr_throttle; only the default has changed.

JUSTIFICATION: This change was requested by an architecture
committee.

USER IMPACT: none.

KNOWN SIDE EFFECTS: none.

DOCUMENTATION CHANGES: mount_samfs(1M) man page.

* The samsys64 system call has been removed. The only system call
in effect for the 4.0 release is samsys and its number is 181.

Known Problems
==============

The following Sun Bugs are known to exist in this release. They
will be addressed in patch releases.

* 4688854

When a Sun SAM-QFS file system fills, generally the system waits
for the releaser to run to free archived space. Exceptions to this
are Sun QFS standalone (no SAM component) and Sun SAM-QFS, in
which only the metadata portion fills (as described in this bug).
It is unlikely that the releaser will release sufficient (or any)
metadata space. In such a situation, file creation does not
complete. In addition, threads hang when files are created and
opened.

If this situation occurs, the remedy is to kill the processes. To
prevent this problem, there must be adequate space for metadata,
so monitor the metadata levels and respond to any of the following
messages written to /var/adm/messages:

o SAM-FS: sam_wait_space: /samfs10: File system full - waiting

This message is generated if data space has been exhausted and Sun
SAM-QFS or Sun SAM-FS is waiting for the releaser to run.

o SAM-FS: sam_wait_space: /samfs10: File system full - ENOSPC

This message is generated if data space has been exhausted and Sun QFS is running.

o SAM-FS: sam_wait_space: /samfs10: File system full - META ENOSPC

This message is generated if metadata space has been exhausted.

o SAM-FS: sam_wait_space: /samfs10: File system full - EINPROGRESS

This message is generated if data space has been exhausted, Sun SAM-QFS or Sun SAM-FS running, and the requester is an NFS server thread.

* 4689562

The Sun QFS shared file system does not support flock(3UCB) capabilities. In a Sun QFS shared file system, when the metadata server is being changed, flock(3UCB) locks are lost. Because flock(3UCB) allows cooperating processes to perform consistent operations on files, this situation can provide inconsistency within a file.

Users should be aware that flock(3UCB) is not supported in a Sun QFS shared file system configured for failover, so they must not use this library routine in Sun QFS shared file systems in which you might want to change metadata servers.

* 4689698

When running multiple samfsrestore(1M) commands in a Sun QFS shared file system, in a Sun QFS environment, a page lock deadlock can occur in that file system and the file system in question can hang. Only the file system for which two samfsrestore(1M) commands has been entered is affected. To avoid this problem, do not attempt to run two samfsrestore(1M) commands at the same time. To recover from the problem, schedule a reboot for the server. The problem has never been seen when running a single samfsrestore(1M) command in a Sun QFS file system in a Sun SAM-QFS environment. Nor has it been seen in an unshared Sun SAM-QFS file system.

* 4703334

The problem is an interaction between NFS and the Sun QFS shared file system that occurs during metadata server failover. If NFS I/O is active at the time of failover, the original server and the host doing the NFS I/O might hang.

Rebooting the affected servers clears the problem. Manually starting a second sam-sharefsd daemon has also worked.

If you want to use the Sun QFS shared file system in failover situations, use host clustering software, such as Sun Cluster software, to prevent this problem from occurring. Not using host failover features in conjunction with NFS also prevents this problem.

* 4705412

When using the multireader capability in a Sun QFS file system, the ls(1) output is not as expected.

The two possible workarounds are as follows:

(1) Use the umount(1M) command to unmount the file system and mount it again.

(2) Work with standard NFS instead of the multireader capability.

* 4708449

The soft link to the JRE package is made incorrectly for libmgr(1M). A link to an installed JRE package is not made if one is present. This is for the use of the libmgr(1M) tool. Attempting to run libmgr(1M) produces the following output:

"Cannot locate Java Runtime Environment in /opt/SUNWsamfs/jre. SAM GUI tools require the Java Runtime Environment (JRE) to be installed. You must download and install the JRE software yourself. Our recommendation is to install the Java Runtime Environment v 1.2.2 (JRE) from java.sun.com.

Once you have installed JRE, you must define a symbolic link in /opt/SUNWsamfs. For example, ln -s /usr/local/jre /opt/SUNWsamfs/jre "

If the JRE package is already installed, run the preceding command to make the link.

* 4709129

When a metadata device fails (whether because the disk was put
offline; because Fibre Channel attachment was pulled, etc.), the
Sun QFS file system recognizes the failed I/O, but it can leave
data in the page and/or buffer cache. This leftover data can be
interpreted as a data corruption (ENOCSI) or a page panic. Since
the timing of such failures is random, several different results,
one of which is a panic, can occur.

To avoid this situation, configure a mirror device for the
metadata partition and/or fix the failing device. Avoid offlining
an active metadata device.

* 4709892

Enabling direct access to tape by using the stage(1) command's -n
option is not possible with a file in a Sun QFS shared file
system.

When the direct access (stage -n) attribute is set on a file, the
staging process generates an error.

The workaround to this problem is to stage the file without using
direct access. This is accomplished by using the stage(1)
command's -d option to remove the never-stage attribute. For more
information, see the stage(1) man page.

* 4713609

A samfsck(1M) command run on a Sun QFS file system generates the
following errors:

#:samfsck -F fs1
samfsck: /dev/rdsk/c8t8d0s6: Device busy
samfsck: Open failed on (/dev/rdsk/c8t8d0s6)
samfsck: Configuration error
#:samfsck -V fs1 First pass
samfsck: Read failed on eq 61 at block 0x500080, length = 128
samfsck: Ino 1659925 read failed on eq 61
samfsck: Read failed on eq 61 at block 0x5000a0, length = 128
samfsck: Ino 1711863 read failed on eq 61
samfsck: Read failed on eq 61 at block 0x5000b0, length = 128
samfsck: Ino 1711864 read failed on eq 61
samfsck: Read failed on eq 61 at block 0x5000d0, length = 128

```
samfsck: Ino 1711874 read failed on eq 61
samfsck: Read failed on eq 61 at block 0x5000e0, length = 128
samfsck: Ino 1711882 read failed on eq 61
.
.
.
#:
```

The metadata DAU size is 16k. The samfsck(1M) command should not be reading 128k, which is the file system DAU. When the samfsck(1M) gets to the end of the metadata disk and is reading an indirect, the improper read size causes errors.

* 4714303

Delays and high system time have been experienced in QFS file systems mounted with the shared_reader mount option. This is caused by an apparent performance and usage issue in dnlc_purge_vp in some versions of Solaris 8.

When a Sun QFS file system is mounted with the QFS 3.5.0 shared_reader mount option, the performance is 300 times slower than the performance when the same file system is mounted with the shared_writer mount option.

If files are accessed with NFS, the performance is 10 times better than the performance with 3.5.0 QFS and the shared_reader mount option.

* 4715216

Attempting to install the SUNWsamfs or SUNWqfs package in multibyte character set environments, such as ko, zh, or ja locales, results in an error.

To avoid this problem, set the locale to C before installing the package, as follows:

C shell: # setenv LANG C Bourne shell: # LANG=C; export LANG

* 4717672

The archiver does not always recognize changes made to the diskvols.conf file. If you are using disk archiving, and you modify the /etc/opt/SUNWsamfs/diskvols.conf file while the

archiver is running, the archiver might produce errors like the
following:

Jul 18 15:23:27 brm7b2-106 ac-rm0[2086]: err Fatal OS call error:
getVolInfo(/sam1/.archive/rm0) called from: rmarchive.c:446:
Unknown error
Jul 18 15:23:27 brm7b2-106 ac-rm1[2087]: err Fatal OS call error:
getVolInfo(/sam1/.archive/rm1) called from: rmarchive.c:446:
Unknown error
Jul 18 15:23:27 brm7b2-106 ac-rm1[2088]: err Fatal OS call error:
getVolInfo(/sam1/.archive/rm1) called from: rmarchive.c:446:
Unknown error
Jul 18 15:23:27 brm7b2-106 ac-rm0[2089]: err Fatal OS call error:
getVolInfo(/sam1/.archive/rm0) called from: rmarchive.c:446:
Unknown error

To eliminate this problem, issue a samd stop, unmount the file
system(s), issue a pkill -HUP sam-fsd, and remount the file
system(s).

* 4721477

When using the Sun QFS shared file system, forcing a metadata
server changeover while write+allocate operations are occurring
on a client or metadata server can cause a data integrity problem
that is not reflected back to the writing/allocating application.

At some later time, the customer might notice that incorrect data
have apparently been written to the file. Delayed panics
subsequent to metadata host changeover have also been observed.

Do not change the metadata server while the Sun QFS shared file
system is mounted. A workaround to the release has been prepared
that disables the ability of the system administrator to switch
metadata servers on shared, mounted filesystems.

The samsharefs(1M) command forbids host configuration changes on
mounted file systems or from hosts other than the metadata server.
This is temporary; it is not reflected in the command's man page,
but it is reflected in the command's -h (help) option.

Compatibility Issues
====================

The following information pertains to upgrade issues and other
compatibility issues.

* When upgrading to 4.0 or downgrading from 4.0, be aware of the install process.

When upgrading from a pre-3.5.0 SAM-FS release to 4.0 (for instance, 3.3.0 or 3.3.1), pkgadd(1M) checks for any files remaining in the /etc/fs/samfs directory. If files exist in /etc/fs/samfs, they will be moved to /etc/opt/SUNWsamfs/samfs.old for future reference. If the directory /etc/opt/SUNWsamfs/samfs.old is already present (presumably from a previous update), a directory with the current date/time appended will be created and used instead. Additionally, the pre-3.5.0 catalogs will be converted to the 4.0 catalog format when the catalog server starts.

When upgrading from a 3.5.0 SAM-FS release to 4.0, pkgadd(1M) checks for the presence of the file /etc/opt/LSCsamfs/mcf and the absence of the file /etc/opt/SUNWsamfs/mcf. If this is true, the configuration files in /etc/opt/LSCsamfs are copied to /etc/opt/SUNWsamfs. Scripts which may have been modified will be copied to /opt/SUNWsamfs/sbin with ".350" appended to the name for comparison with the new versions.

Conversely, just before a 4.0 package is removed, appropriate files in /etc/opt/SUNWsamfs and /var/opt/SUNWsamfs can be moved to /etc/fs/samfs by running the script /opt/SUNWsamfs/sbin/backto331.sh, or to /etc/opt/LSCsamfs and /var/opt/LSCsamfs by running the script /opt/SUNWsamfs/sbin/backto350.sh. Running these scripts will also convert the catalogs to the older format. Although most cases of catalog conversion are handled, if either conversion should fail, the appropriate catalog will be converted to a text format if possible. The location and name of the text file will be emitted at the time of the conversion during installation or removal of the package.

The conversion to 4.0 from 3.3.x can be avoided by moving (or removing) the /etc/fs/samfs directory before installing 4.0. The conversion to 4.0 from 3.5.0 can be avoided by moving the /etc/opt/LSCsamfs/mcf file. The conversion from 4.0 will not occur unless the backto331.sh or backto350.sh script is run.

If you have initialized any file systems using the 4.0 version of the sammkfs(1M) command without the -P option, these file systems use a version 2 superblock. A file system that uses a version 2 superblock cannot be mounted using 3.5.0 or earlier software.

See the other notes in this section concerning the directory reorganization and catalog re-design for more details.

* If you plan to enable the Sun SAN-QFS file system, verify that you have Tivoli SANergy File Sharing API software at release level 2.2.3; this release level is also known as 2.3 and 3.1. For more information about the SAN-QFS file system, see the Sun QFS, Sun SAM-FS, and Sun SAM-QFS File System Administrator's Guide.

Previous SANergy File Sharing software does not support the new SANergy API.

This feature is also included in the SANergy documentation.

* The 'queuedir =' and 'datadir =' directives are no longer supported in the archiver.cmd(4) file. These directives must be removed. If these directives are not removed, an error message is generated and the archiver does not run.

The archiver queue files are written to the following directory:

/var/opt/SUNWsamfs/archiver/Queues

The archiver data directory is as follows:

/var/opt/SUNWsamfs/archiver

* A change in directory structure, directory entry hash, was made to QFS, SAM-FS, SAM-QFS at SAM-FS 3.5.0. A 16-bit hash value was implemented in a previously unused field within the directory structure. However, testing discovered that in early SAM-FS file systems (version 3.0.X and previous), this field was already used.

When upgrading from one of these early file systems to 3.5.0, this problem could manifest itself in a message such as the following when using sfind(1) or sls(1):

No such file or directory entry

Because of this problem, and for general performance enhancement reasons, it is strongly recommended that a site upgrading to 3.5.0 or higher run the following:

samfsck -F -G family_set_name

This should be performed on each upgraded file system.

* The ssum(1) command's -a option has been removed and is no longer supported.

* Sun QFS, Sun SAM-FS, and Sun SAM-QFS 4.0 do not support Solaris 2.5 or Solaris 2.6.

* SAM-FS 3.1.0 is no longer supported as of May 31, 1998.

* SAM-FS 3.2.0 is no longer supported as of April 13, 1999.

* SAM-FS 3.3.1 is no longer supported as of June 26, 2001.

Required Solaris Patches
========================

Some of the Solaris patches can inadvertently remove the samsys entry from the /etc/name_to_sysnum file when the patch is installed. One indication of the problem is the following message:

"WARNING: system call missing from bind file"

appearing in the /var/adm/messages file. For a procedure that describes the preventative measures you can take to avoid receiving this message after installing Sun Solaris patches, see the Sun QFS, Sun SAM-FS, and Sun SAM-QFS Installation and Configuration Guide.

The patches listed below can be obtained from Sun. Refer to the Sun Microsystems web page for a list of recommended patches:

http://sunsolve.Sun.COM/pub-cgi/show.pl

All of our testing was done with the patches at the revision level shown:

o Sun SAM-FS and Sun SAM-QFS need the following patches installed when running with Solaris 2.7:

106541-04 kernel update patch
106541-12 kernel update patch for hot swappable hardware support only

* Sun SAM-FS and Sun SAM-QFS need the following patches installed when running with Solaris 2.8:

108528-02 kernel update patch for hot swappable hardware support only

* Sun SAM-FS and Sun SAM-QFS need the following patches installed when running with Solstice DiskSuite 4.1:

104172-24 Solstice DiskSuite 4.1 product patch

* Sun SAM-FS and Sun SAM-QFS need the following patches installed when running with Solstice DiskSuite 4.2:

106627-11 Solstice DiskSuite 4.2 product patch

* Sun SAM-FS needs the following patches installed when running with Fibre Channel tape drives:

111095-06 SunOS 5.8: fctl/fp/fcp/usoc driver patch

Documentation Updates
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* The following Sun Microsystems documentation is available in PDF format:

- SAM-Remote Administrator's Guide, part number 816-2094-10 (816-2094-10.pdf)

Note that the SAM-Remote Administrator's Guide has not been updated for the 4.0 release, nor it is included on the release CD. The 3.5.0 revision of this manual is available from the products-n-solutions website. The 4.0 revision will be provided at a later date.

- Sun QFS, Sun SAM-FS, and Sun SAM-QFS Disaster Recovery Guide, part number 816-2540-10 (816-2540-10.pdf)

- Sun QFS, Sun SAM-FS, and Sun SAM-QFS File System Administrator's Guide, part number 816-2542-10 (816-2542-10.pdf)

- Sun QFS, Sun SAM-FS, and Sun SAM-QFS Installation and Configuration Guide, part number 816-2543-10 (816-2543-10.pdf)

- Sun SAM-FS and Sun SAM-QFS Storage and Archive Management Guide, part number 816-2544-10 (816-2544-10.pdf)

- Sun QFS, Sun SAM-FS, and Sun SAM-QFS README File, part number 816-7675-10 (816-7675-10.pdf)

NOTE: If you find discrepancies between the PDF version of the README file and the README file contained in /opt/SUNWsamfs/doc/README, you can assume that /opt/SUNWsamfs/doc/README is the most current version of this file.

* If you have obtained a CD-ROM distribution of the software, manuals are available on the CD-ROM in the /cdrom/cdrom0/admin directory. These manuals are in PDF format.

* All Sun QFS, Sun SAM-FS, and Sun SAM-QFS publications are available format from one or both of the following public websites:
o http://www.sun.com/products-n-solutions/hardware/docs/Software/Storage_Software

o http://docs.sun.com

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