Sun QFS and Sun Storage Archive Manager 5.3 Release Notes

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Preface

This document contains information about new features, significant bug fixes, support changes, and known limitations for the Sun QFS and Sun Storage Archive Manager 5.3 release.

Related Books

- *Sun QFS and Sun Storage Archive Manager 5.3 Installation Guide*
- *Sun QFS File System 5.3 Configuration and Administration Guide*
- *Sun Storage Archive Manager 5.3 Configuration and Administration Guide*
- *Using Sun QFS and Sun Storage Archive Manager with Oracle Solaris Cluster*
- *Using Sun QFS and Sun Storage Archive Manager on Linux Clients*
- *Sun QFS and Sun Storage Archive Manager 5.3 Reference Manual*

Access to Oracle Support

Oracle customers have access to electronic support through My Oracle Support. For information, visit `http://www.oracle.com/pls/topic/lookup?ctx=acc&id=info` or visit `http://www.oracle.com/pls/topic/lookup?ctx=acc&id=trs` if you are hearing impaired.

Online Support for SAM-QFS

Oracle customers with a support contract have access to the following information by logging into My Oracle Support.

- **Service Requests** – Submit, update, or review your service requests.
- **Knowledge Database for SAM-QFS**
  1. Log in to My Oracle Support.
  2. Click the Knowledge tab.
  3. In the Search Knowledge Base field, type `QFS`.

     The Information Center: SAM-QFS Overview Advisor page is displayed.
- **Oracle Community for SAM-QFS**

1. Log in to My Oracle Support.
2. Click the Community tab.
3. In the Search Field for Find a Community, type `QFS`.
4. Scroll down the list of communities to find SAM/QFS Storage Archive Manager and Sun OFS.
5. Click SAM/QFS Storage Archive Manager and Sun OFS.

   The SAM-QFS community page is displayed.

Typographic Conventions

The following table describes the typographic conventions that are used in this book.

TABLE P–1 Typographic Conventions

Typeface	Description	Example
`AaBbCc123`	The names of commands, files, and directories, and onscreen computer output	Edit your `.login` file. Use `ls -a` to list all files. `machine_name% you have mail.`
`AaBbCc123`	What you type, contrasted with onscreen computer output	`machine_name%` **`su`** `Password:`
aabbcc123	Placeholder: replace with a real name or value	The command to remove a file is `rm` *filename*.
AaBbCc123	Book titles, new terms, and terms to be emphasized	Read Chapter 6 in the *User's Guide*. A *cache* is a copy that is stored locally. Do *not* save the file. **Note:** Some emphasized items appear bold online.

Shell Prompts in Command Examples

The following table shows the default UNIX system prompt and superuser prompt for shells that are included in the Oracle Solaris OS. Note that the default system prompt that is displayed in command examples varies, depending on the Oracle Solaris release.

TABLE P–2 Shell Prompts

Shell	Prompt
Bash shell, Korn shell, and Bourne shell	`$`
Bash shell, Korn shell, and Bourne shell for superuser	`#`
C shell	`machine_name%`
C shell for superuser	`machine_name#`

◆ ◆ ◆ CHAPTER 1

What's New

This chapter summarizes new features in the Sun QFS and Sun Storage Archive Manager 5.3 release.

Operating Systems

SAM-QFS Manager and Sun QFS 5.3 software require the following minimum operating system releases:

- Oracle Solaris 10 10/08 or later
- Oracle Solaris 11

In addition, you can use any of the following operating systems as a client in a shared file system:

- Oracle Solaris 10 10/08 or later
- Oracle Solaris 11
- Oracle Solaris 10 10/08 or later for x86 (32-bit)
- Oracle Enterprise Linux 5.6 for x64 platforms
- Oracle Enterprise Linux 5.4 for x64 platforms
- Red Hat Enterprise Linux 5.6 for x64 platforms (via OEL 5.6)
- Red Hat Enterprise Linux 5.4 for x64 platforms (via OEL 5.4)
- Red Hat Enterprise Linux 4.5 for x64 platforms
- SuSE Linux Enterprise Server 9 (service pack 4) for x64 platforms
- SuSE Linux Enterprise Server 10 (service pack 3) for x64 platforms
- SuSE Linux Enterprise Server 10 (service pack 2) for x64 platforms
- SuSE Linux Enterprise Server 11 (server pack 1) for x64 platforms

New Devices Qualified With SAM-QFS 5.3

The following devices are now qualified to work with Sun QFS and SAM-QFS. For a complete list of supported devices, see SAM-QFS Tape Library and Drive Support (http://wikis.oracle.com/display/SAMQFS/SAM-QFS+Tape+Library+and+Drive+Support).

- StorageTek T10000C tape drive with Data Integrity Validation (minimum firmware level is 1.53.315)
- StorageTek ACSLS 8.0.1
- StorageTek ACSLS 8.0.2
- StorageTek LTO–5 with WORM media support
- IBM LTO-5 with WORM media support
- HP LTO–5 with WORM media support
- StorageTek T10000C tape drive for Standard and VolSafe media

---

Note – The following were supported in the Sun QFS and Sun Storage Archive Manager 5.2–01 patch release.

- StorageTek T10000C tape drive without Data Integrity Validation
- StorageTek LTO-5, IBM LTO-5, and HP LTO-5 without WORM media

---

Support for the SMB Service in Oracle Solaris 11

This release provides support for the Oracle Solaris Server Message Block (SMB) service in the Sun QFS and SAM-QFS software. This feature provides the ability to share files between Oracle Solaris and Windows systems.

The following new SAM-QFS properties facilitate sharing files between these systems by using the Oracle Solaris SMB service:

- Case-insenstivity support
- DOS attributes support
- NFSv4 ACL support

For more information, see Chapter 8, "SMB Service in SAM-QFS," in *Sun QFS File System 5.3 Configuration and Administration Guide*.

Support for DIV in Oracle Solaris 11

This release supports the Data Integrity Validation (DIV) feature, which provides end-to-end data user data protection from the SAM disk cache to and from the tape archives. This feature is currently supported on Oracle StorageTek T10000C tape drives only.

SAM-QFS supports a new `tpverify` command for the StorageTek T10000C drive which will verify the data written to tape without staging the data.

For more information about the DIV feature, see Chapter 13, "Data Integrity Validation in SAM-QFS," in *Sun Storage Archive Manager 5.3 Configuration and Administration Guide*.

WORM Functionality Included With the Base Packages

The `SUNWsamfswm` package has been merged with the `SUNWqfs` and `SUNWsamfs` packages. You do not have to install the `SUNWsamfswm` package separately to enable the WORM-FS functionality.

To enable the WORM-FS functionality, specify the mount options from the following list:

- `worm_capable`
- `worm_lite`
- `worm_emul`
- `emul_lite`

For more information about the WORM-FS file system, see Chapter 9, "Configuring WORM-FS File Systems," in *Sun QFS File System 5.3 Configuration and Administration Guide*.

`sfind` Command Enhancements

This section describes the enhancements made to the `sfind` command in this release.

`sfind` Command Can Print All Time Attributes of a File

New directives have been added to the `sfind -printf` command to print specific time attributes of the Sun QFS and SAM-QFS file systems. The new directives for creation, attributes, residence, and WORM times are listed in the following table.

Directive	Description
%B	File's start time for the WORM retention period in the format returned by the C `ctime` function.

Directive	Description
%e	File's creation time in the format returned by the C ctime function.
%E	File's creating time in the user-specified C strftime format.
%j	File's last attribute change time in the format returned by the C ctime function.
%J	File's last attribute change time in the user-specified C strftime format.
%R	The WORM retention period for a WORM capable directory or WORM file in YYYYy, DDd, HHs, MMm format.
%W	The retention state of the directory or file. If the WORM is capable for a directory, then worm-capable is written. If the WORM is capable for a file, then either active or over is written.
%X	File's expiration date for the WORM retention period in the format of %c of the C strftime function. If the retention period is 0 (never expire), then * is written.
%y	File's residence time in the format returned by the C ctime function.
%Y	File's residence time in the user-specified strftime format.

Note – For the creation, attributes, and residence related directives, a dash, -, is the output if the item does not reside in a QFS or SAM-QFS file system. For the WORM-related directives, a dash is the output if the item is not a WORM file or does not reside in a Sun QFS or SAM-QFS file system.

For more information and for examples on using sfind to print the time attributes, see "sfind(1)" in *Sun QFS and Sun Storage Archive Manager 5.3 Reference Manual*.

sfind Command Can Test for All File Attributes

The following new tests added to the sfind command reference characteristics that are specific to files that reside in Sun QFS and SAM-QFS file systems.

Test	Description
-any_copy_archive_i	File's copy is marked to be archived immediately
-any_copy_s	File has an archive copy that is staled
-any_copy_u	File has an unarchived copy
-archive_C	File has had the equivalent of archive -C run
-archive_I	File has had the equivalent of archive -I run
-copy_archive_i n	File's copy *n* is marked to be archived immediately
-copy_s n	File has a staled archive copy number *n*
-copy_u n	File's archive copy number *n* is unarchived by the unarchive command
-is_setfa_D	File has had its direct I/O attribute set using the setfa -D command
-rmedia	File is a removable media file

For more information, see "sfind(1)" in *Sun QFS and Sun Storage Archive Manager 5.3 Reference Manual*.

stager.cmd Allows Change in Copy Sequence

A new configuration option, copysel, has been added to the stager.cmd file to enable users to change the stager copy selection sequence per file system.

By default, the copy selection for staging is from copy number 1 to copy number 4. Copy number 1 is selected first, then copy 2, then copy 3, and finally copy number 4. You can change the stager copy selection sequence for each file system by entering values 1 through 4 for *n* for the configuration option, copysel = *n1:n2:n3:n4*. Four copies, *n1* through *n4*, must be defined even if four copies are not available.

The following example log file shows the result of the stager.cmd operation.

EXAMPLE 1–1 Log File of the stager.cmd Operation

```
logfile = /var/opt/SUNWsamfs/log/stager
drives = hp30 1
copysel = 4:3:2:1
fs = samfs1
copysel = 3:1:4:2
streams
dk -maxsize 2G -maxcount 10000
endstreams
```

The log file in the example is interpreted as follows:

EXAMPLE 1–1 Log File of the stager.cmd Operation *(Continued)*

- The log file is in the `/var/opt/SUNWsamfs/log/stager` directory.
- The media drive, HP30, is allowed to use only one drive for staging files.
- By default, the stager selects copies in the order 4, 3, 2, and 1, for staging the files.
- For the file system `samfs1`, the stager selects copies in the order 3, 1, 4, and 2 for staging the files.
- The maximum size of the stream for the `dk` media type is 2 Gbytes, and the maximum file count for each stream is 10,000.

For more information, see "stager.cmd(4)" in *Sun QFS and Sun Storage Archive Manager 5.3 Reference Manual*.

DTrace Enhancement

Static Defined Tracing (`sdt`) probes added to the SAM-QFS DTrace feature enable you to obtain information that cannot be obtained from the existing Function Boundary Tracing (`fbt`) probes. You can use the `sdt` probes to obtain information about individual file activity that can be used for debugging or for performance measurement.

The following `sdt` probes have been added to the SAM-QFS DTrace feature:

- `sdt:samfs::sam-open-ret`
- `sdt:samfs::sam-close-ret`
- `sdt:samfs::sam-read-ent`
- `sdt:samfs::sam-read-ret`
- `sdt:samfs::sam-write-ent`
- `sdt:samfs::sam-write-ret`
- `sdt:samfs::sam-syscall-ent`
- `sdt:samfs::sam-syscall-ret`
- `sdt:samfs::sam-msgread-client`
- `sdt:samfs::sam-msgread-server`
- `sdt:samfs::sam-lookup-name`
- `sdt:samfs::sam-find-component`

For more information about the new probes and for examples of scripts that show how to use them, see "sam_dtrace(5)" in *Sun QFS and Sun Storage Archive Manager 5.3 Reference Manual*.

The two examples, `ino_mon` and `fs_mon`, in the `/opt/SUNWsamfs/examples/dtrace` file show how to use the DTrace probes.

Tape and Disk Drive Sizes Can Be Displayed in Base 10 Units

In addition to displaying tape and disk sizes in base 2 units, you can now display sizes in base 10 units also by using a new `-b` option that has been added to the following commands :

- `archiver`
- `chmed`
- `sam-recycler`
- `sdu`
- `showqueue`

The `control-j` hot key has been added to the `samu` command so you can switch between base 2 and base 10 units for displaying the size of the tape and disk drives for the `D,:a,l,n,m` and `v` displays.

◆ ◆ ◆ CHAPTER 2

Significant Bugs Fixed in This Release

This chapter lists bugs that have been fixed in the SAM-QFS 5.3 release

File System Manager

Bug Number	Description
6949731	GUI fails to list files while browsing directory with more than 300000 file
6993491	`fsmgrd` core dumps in `get_catalog_entry`
7000564	GUI fails to restore when a file system name is a substring of the dump directory name
7014230	SAM GUI: Add library operation causes core dump in the File System Manager daemon
7077402	SAM-QFS GUI: Unable to see "Recovery Points" from File Browser
7087430	SAM-QFS GUI: `/var` fills up with `fsmdb` log files
7095507	SAM-QFS GUI: Adding notification email causes FS Manager daemon (`fsmgmt`) to dump core

File Systems

Bug Number	Description
6922218	ELNRNG write error from client on a very large single-device `ms` file system
6975318	Performance issue when using a large 32M DAU and writing small files (<8k)
6983987	Shared Linux client can't write to LUNs larger than 8 TB
7020784	Slow writes to a QFS file system - not aligned with DAU

Bug Number	Description
7036853	QFS Shared clients panic after upgrading from 4.6 to 5.2
7063533	Adding and removing files causes directory size to grow when no new files added

Shared File Systems

Bug Number	Description
6963176	Advisory file locks not always honored by Linux clients
7017163	Copying a file with the `suid` bit set to QFS volume hangs Linux client
7022413	Linux client application hangs when multiple executables open the same online file
7050578	Severe performance drop on MDS for multi-client cluster due to lease expiration thread
7058079	`sam_expire_client_leases` runs continuously using a full CPU on a very active QFS shared MDS
7077030	Shared QFS Linux clients do not remove MMAP leases for shared library (`.so`) files
7096814	Shared QFS: Linux clients: `ms/md` file system: file system corruption occurs

Archiver

Bug Number	Description
6719097	Archiver will select locked files, but cannot archive or drop them
6853576	`MapFileGrow` OS error from `arfind` causing rescan of file system when trying
6959905	Inconsistent archiving behavior with large archive age values
6965637	SAM-QFS 5.0.12 : `sam-arcopy`, `sam-arfind` core dumping
7093524	SAM-QFS 5.2 archiver stops working. The `sam-arfind` exits and core dumps.

Stager

Bug Number	Description
6997971	Cannot stage from tape with `E` flag set
7010201	samfs 5.1.5: `sam-stagerd` stuck in BDB code on a lock held by a dead process

Storage Devices

Bug Number	Description
6952459	SAMQFS 5.0.12 : Tape drives become inaccessible occasionally

SAM-QFS Utilities

Bug Number	Description
6962817	`samfsdump` with `-I includelist` selects wrong files
7011242	`samload` command hangs and blocks stager
7044224	`samfsck` runs extremely long when many duplicate blocks are found

◆ ◆ ◆ CHAPTER 3

Support Changes

This chapter provides information about support changes for this release.

Features Removed in This Release

This section provides information about features that have been removed in this release.

stage_retries Mount Option

The `stage_retries` mount option, which has been obsolete since the SAM-QFS 4.0 release, has been removed in this release . This mount option has been replaced by the `maxretries` option in the `stager.cmd` file.

Features That Might Be Removed in a Future Release

This section provides information about features that might be removed in a future release.

Support for Linux OS Versions

The following Linux OS releases will no longer be supported in the next feature release:

- Oracle Enterprise Linux 5.4 for x64 platforms
- Red Hat Enterprise Linux 5.4 for x64 platforms
- Red Hat Enterprise Linux 4.5 for x64 platforms
- SuSE Linux Enterprise Server 9 (service pack 4) for x64 platforms
- SuSE Linux Enterprise Server 10 (service pack 2) for x64 platforms

V1 Inode and V1 Superblock

V1 inode and V1 superblock will no longer be supported in the next release.

◆ ◆ ◆ CHAPTER 4

Known Limitations

This chapter provides information and describes issues that relate to the Sun QFS and Sun Storage Archive Manager 5.3 release.

General Information

This section provides information such as behavior changes in this release.

samst Driver Fails to Attach While Adding the SUNWsamfsu and SUNWsamfsr Packages

The information in this section is applicable while installing Sun QFS and Sun Storage Archive Manager 5.3 on Oracle Solaris 10 8/11 and Oracle Solaris 11 operating systems.

Installing the `SUNWsamfsu` and the `SUNWsamfsr` packages removes the media changer driver alias `scsiclass,08`, from an installed driver before the `samst` driver is added to the system. During the installation, the driver aliases file is copied to the `/etc/driver_aliases.old` file before any modification is made to the system. If a driver alias is removed from an existing driver, you can find the information in the `/tmp/SAM_install.log` file.

To use the `sgen` and the `samst` drivers with different media changer products, use the `update_drv` command to add the media changer by assigning the vendor ID and the product ID to the `sgen` driver. **Do not** assign a vendor ID and product ID driver alias to the `samst` driver. The following example shows how to add a media changer by assigning the vendor ID and the product ID to the `sgen` driver.

```
# update_drv -a -m "* 0666 root sys" -i scsiclass,08.vSTK.pL700 sgen
# devfsadm -i sgen
```

To use an optical disk with SAM-QFS, manually add the optical disk driver alias `scsiclass,07` to the `samst` driver. The following example shows how to add the optical disk driver alias to the `samst` driver.

```
# update_drv -a -m "* 0666 root sys" -i scsiclass,07 samst
# devfsadm -i samst
```

Uninstalling the SAM-QFS software will not restore the `scsiclass,08` driver alias to the previous driver. The following example shows how to restore the media changer driver alias to the `sgen` driver after the `SUNWsamfsu` and the `SUNWsamfsr` packages are uninstalled.

```
# update_drv -a -m "* 0666 root sys" -i scsiclass,08 sgen
# devfsadm -i sgen
```

Media Changer Catalog

The media changer catalog has been changed for this release and is not compatible with the previous releases. SAM-QFS will automatically upgrade the catalog when migrating from SAM-QFS 5.2 to SAM-QFS 5.3 without any input from the system administrator. The SAM-QFS 5.3 `backto` command converts all media changer catalogs and the historian from the SAM-QFS 5.3 version to the SAM-QFS 4.1 version, which is suitable for any SAM-QFS 5.2 release. If you fail to run the SAM-QFS 5.3 `backto` command, your media changer catalogs and the historian file will show a `.bad` file extension after you run the `samd start` command for the first time.

To recover the 5.3 catalogs and historian:

1. Reinstall the SAM-QFS 5.3 software.
2. Move the `.bad` media changer catalogs and the historian back to the original file name as listed in your `mcf` file.
3. Run the `backto` command.
4. Uninstall the SAM-QFS 5.3 software.
5. Install the SAM-QFS 5.2 software.

For more information about installing and uninstalling the SAM-QFS software, see *Sun QFS and Sun Storage Archive Manager 5.3 Installation Guide*.

For more information about the `backto` command, see "backto(1M)" in *Sun QFS and Sun Storage Archive Manager 5.3 Reference Manual*.

Special Notes

This section describes some special notes about the Sun QFS and Sun Storage Archive Manager software.

Support for Rolling Upgrades in a Shared Environment

If you are already running SAM-QFS versions 5.0 or later, you can upgrade to the next incremental release by performing a rolling upgrade without taking down the rest of the file system. At any given time, the metadata server and the clients can be only one release apart. To perform a rolling upgrade, your environment must include one primary metadata server and at least one potential metadata server.

Follow these steps:

1. Upgrade the potential metadata server.
2. Failover to the potential metadata server.
3. Upgrade the primary metadata server.
4. Failover to the primary metadata server.
5. Upgrade the clients.

Tape Size Reporting in SAM-QFS

With the advent of larger tape sizes being supported by SAM-QFS, the page size as reported by `samu` and the file system manager GUI may be confusing. The size reported by SAM-QFS has always been in "powers of two" units. For example, 1 Gbyte = 1,073,741,824 bytes and 1 Tbyte = 1,099,511,627,776 bytes. If you are using a 5–Tbyte T10000C tape which is 5,000,000,000,000 bytes, SAM-QFS will report it as 4.54 Tbytes.

For reference, the reported units can be changed to "powers of 10" units by doing the following math:

```
4.54 Tbytes * 1,099,511,627,776/1,000,000,000,000 = 5.0 Tbytes
(where 1,099,511,627,776 is 1 Tbyte)
```

Similar calculations can be done to convert Gbytes into "power of 10" Gbytes.

Runtime Issues

This section describes runtime issues that relate to the Sun QFS and Sun Storage Archive Manager 5.3 release.

sammkfs Command Does Not Support the -A Option if the SUNWqfs Package Is Installed

The `sammkfs -A` option is not supported if the `SUNWqfs` packages is installed and will result in an error.

For example:

```
# sammkfs -A -S sqfs1
sammkfs: illegal option -- A
sammkfs: Unrecognized argument -A.
Usage: sammkfs [-i ninodes] [-a allocation] [-P] [-S] [-V] fs_name
sammkfs: sammkfs: Unrecognized argument.
sammkfs: Argument error.
```

Workaround: Use the following workaround:

1. Build a Sun QFS file system by using the `sammkfs` command without the `-A` option.
2. Run the `samfsck -AF` command to convert POSIX style ACL to NFSv4 style ACL.

samst and sgen Drivers in SAM-QFS

In the Oracle Solaris 11 and Oracle Solaris 10 09/10 releases, the media changer driver alias `scsicalss,08`, is assigned to the `sgen` driver. The SAM-QFS driver uses the same driver for media changers. SAM-QFS resolves the conflict by removing the `scsicalss,08` driver alias from the `sgen` driver and adding it to the SAM-QFS `samst` driver during package post-install.

Note – The `samst` and `sgen` drivers can both be installed on the system and used for different media changers by using the `update_drv` device identify options.

If you want to use magneto-optical drives with SAM-QFS, add the `scsiclass,07` driver alias to the `samst` driver by using the `update_drv` command.

For example:

```
# update_drv -a -m "* 0666 root sys" -i \"scsiclass,07\" samst
```

After uninstalling SAM-QFS, if you want to use media changers with the `sgen` driver, update the `sgen` driver with the driver alias.

For example:

```
# update_drv -a -m "* 0666 root sys" -i \"scsiclass,08\" sgen
```

Solaris I/O Multipathing and Direct-Attached StorageTek Libraries

When Solaris I/O multipathing (MPxIO) is enabled, some StorageTek libraries do not work correctly with the multipathing software and will require additional configuration.

Workaround: In order to make the library usable by Oracle Solaris, disable the library from being included in MPxIO by modifying the `/kernel/drv/scsi_vhci.conf` file and issuing the `stmsboot -u` command.

To modify the `/kernel/drv/scsi_vhci.conf` file in the Oracle Solaris 10 releases:

```
device-type-scsi-options-list =
"STK     SL500", "DISABLE",
"Sun     SL500", "DISABLE";
DISABLE = 0x7000000;
```

To modify the `/kernel/drv/scsi_vhci.conf` file in the Oracle Solaris 11 releases:

```
device-type-scsi-options-list =
"STK     SL500", "NONE",
"SUN     SL500", "NONE";
```

For more information about configuring devices, see the "Configuring Third-Party Storage Devices" section in *Oracle Solaris Administration: SAN Configuration and Multipathing*.

Online Shrink Issues

Normal file system activity may leave the file system with a few data blocks missing from the free space list. This is not a problem for normal operation. However, it will leave the file system in a state where an online shrink made via the `samadm eq-remove` command will not succeed. If this happens, the following message will appear in the `/var/adm/messages` directory:

```
cannot OFF ord=4 space 0xba0ce80 KB is not equal to capacity 0xba0cec0 KB
```

where `ord` is the affected device, and space and capacity numbers are arbitrary.

Workaround: Unmount the file system first, perform a `samfsck -F` on it, remount the file system, and then do the remove.

Restoring Files With ACLs

In addition to the older POSIX style ACLs, SAM–QFS 5.3 now supports NFSv4 style ACLs too. If a `samfsdump` file that contains ACLs of one type is restored to a file system that is made with the other type of ACLs, a warning message will be printed. Also, ACLs conversion will not happen and files will be restored with empty ACLs.

Workaround: Recreate the file system with the correct ACL type and redo the restore.