

# **Using Sun QFS and Sun Storage Archive Manager on Linux Clients**

Copyright © 2011, 2012, Oracle and/or its affiliates. All rights reserved.

This software and related documentation are provided under a license agreement containing restrictions on use and disclosure and are protected by intellectual property laws. Except as expressly permitted in your license agreement or allowed by law, you may not use, copy, reproduce, translate, broadcast, modify, license, transmit, distribute, exhibit, perform, publish, or display any part, in any form, or by any means. Reverse engineering, disassembly, or decompilation of this software, unless required by law for interoperability, is prohibited.

The information contained herein is subject to change without notice and is not warranted to be error-free. If you find any errors, please report them to us in writing.

If this is software or related documentation that is delivered to the U.S. Government or anyone licensing it on behalf of the U.S. Government, the following notice is applicable:

U.S. GOVERNMENT END USERS. Oracle programs, including any operating system, integrated software, any programs installed on the hardware, and/or documentation, delivered to U.S. Government end users are "commercial computer software" pursuant to the applicable Federal Acquisition Regulation and agency-specific supplemental regulations. As such, use, duplication, disclosure, modification, and adaptation of the programs, including any operating system, integrated software, any programs installed on the hardware, and/or documentation, shall be subject to license terms and license restrictions applicable to the programs. No other rights are granted to the U.S. Government.

This software or hardware is developed for general use in a variety of information management applications. It is not developed or intended for use in any inherently dangerous applications, including applications that may create a risk of personal injury. If you use this software or hardware in dangerous applications, then you shall be responsible to take all appropriate fail-safe, backup, redundancy, and other measures to ensure its safe use. Oracle Corporation and its affiliates disclaim any liability for any damages caused by use of this software or hardware in dangerous applications.

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

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

This software or hardware and documentation may provide access to or information on content, products, and services from third parties. Oracle Corporation and its affiliates are not responsible for and expressly disclaim all warranties of any kind with respect to third-party content, products, and services. Oracle Corporation and its affiliates will not be responsible for any loss, costs, or damages incurred due to your access to or use of third-party content, products, or services.

---

Ce logiciel et la documentation qui l'accompagne sont protégés par les lois sur la propriété intellectuelle. Ils sont concédés sous licence et soumis à des restrictions d'utilisation et de divulgation. Sauf disposition de votre contrat de licence ou de la loi, vous ne pouvez pas copier, reproduire, traduire, diffuser, modifier, breveter, transmettre, distribuer, exposer, exécuter, publier ou afficher le logiciel, même partiellement, sous quelque forme et par quelque procédé que ce soit. Par ailleurs, il est interdit de procéder à toute ingénierie inverse du logiciel, de le désassembler ou de le décompiler, excepté à des fins d'interopérabilité avec des logiciels tiers ou tel que prescrit par la loi.

Les informations fournies dans ce document sont susceptibles de modification sans préavis. Par ailleurs, Oracle Corporation ne garantit pas qu'elles soient exemptes d'erreurs et vous invite, le cas échéant, à lui en faire part par écrit.

Si ce logiciel, ou la documentation qui l'accompagne, est concédé sous licence au Gouvernement des Etats-Unis, ou à toute entité qui délivre la licence de ce logiciel ou l'utilise pour le compte du Gouvernement des Etats-Unis, la notice suivante s'applique:

U.S. GOVERNMENT END USERS. Oracle programs, including any operating system, integrated software, any programs installed on the hardware, and/or documentation, delivered to U.S. Government end users are "commercial computer software" pursuant to the applicable Federal Acquisition Regulation and agency-specific supplemental regulations. As such, use, duplication, disclosure, modification, and adaptation of the programs, including any operating system, integrated software, any programs installed on the hardware, and/or documentation, shall be subject to license terms and license restrictions applicable to the programs. No other rights are granted to the U.S. Government.

Ce logiciel ou matériel a été développé pour un usage général dans le cadre d'applications de gestion des informations. Ce logiciel ou matériel n'est pas conçu ni n'est destiné à être utilisé dans des applications à risque, notamment dans des applications pouvant causer des dommages corporels. Si vous utilisez ce logiciel ou matériel dans le cadre d'applications dangereuses, il est de votre responsabilité de prendre toutes les mesures de secours, de sauvegarde, de redondance et autres mesures nécessaires à son utilisation dans des conditions optimales de sécurité. Oracle Corporation et ses affiliés déclinent toute responsabilité quant aux dommages causés par l'utilisation de ce logiciel ou matériel pour ce type d'applications.

Oracle et Java sont des marques déposées d'Oracle Corporation et/ou de ses affiliés. Tout autre nom mentionné peut correspondre à des marques appartenant à d'autres propriétaires qu'Oracle.

Intel et Intel Xeon sont des marques ou des marques déposées d'Intel Corporation. Toutes les marques SPARC sont utilisées sous licence et sont des marques ou des marques déposées de SPARC International, Inc. AMD, Opteron, le logo AMD et le logo AMD Opteron sont des marques ou des marques déposées d'Advanced Micro Devices. UNIX est une marque déposée d'The Open Group.

Ce logiciel ou matériel et la documentation qui l'accompagne peuvent fournir des informations ou des liens donnant accès à des contenus, des produits et des services émanant de tiers. Oracle Corporation et ses affiliés déclinent toute responsabilité ou garantie expresse quant aux contenus, produits ou services émanant de tiers. En aucun cas, Oracle Corporation et ses affiliés ne sauraient être tenus pour responsables des pertes subies, des coûts occasionnés ou des dommages causés par l'accès à des contenus, produits ou services tiers, ou à leur utilisation.

# Contents

---

<b>Preface</b> .....	5
<b>1 Using Sun QFS and Sun Storage Archive Manager on Linux Clients</b> .....	7
About Shared File Systems and the Linux Client .....	7
Installing and Uninstalling the Linux Client .....	8
▼ How to Install the Linux Client .....	8
▼ How to Configure Access to Man Pages .....	10
Uninstalling the Linux Client Software .....	10
Linux Differences .....	11
Differences in Function .....	11
mcf File Differences .....	11
Mounting Differences .....	12
Execution Differences .....	12
Performance Differences .....	13
Linux Kernel Patch .....	13
SELinux Differences .....	13
Troubleshooting .....	14
Troubleshooting Tools .....	14
Frequently Asked Questions .....	15



# Preface

---

This book contains important information about Linux clients in the Sun QFS file system. It is written for system administrators and programmers who are already familiar with the Sun QFS software running on the Oracle Solaris operating system (OS). It explains the differences between installation and configuration on the Oracle Solaris OS and installation and configuration on the Linux OS.

## 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.

## 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 <code>.login</code> file. Use <code>ls -a</code> to list all files. <code>machine_name% you have mail.</code>
<b>AaBbCc123</b>	What you type, contrasted with onscreen computer output	<code>machine_name% su</code> Password:
<i>aabbcc123</i>	Placeholder: replace with a real name or value	The command to remove a file is <code>rm filename</code> .

TABLE P-1 Typographic Conventions (Continued)

Typeface	Description	Example
<i>AaBbCc123</i>	Book titles, new terms, and terms to be emphasized	Read Chapter 6 in the <i>User's Guide</i> .  <i>A cache</i> is a copy that is stored locally.  Do <i>not</i> save the file.  <b>Note:</b> 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#

# Using Sun QFS and Sun Storage Archive Manager on Linux Clients

---

This chapter contains important information about Linux clients in the Sun QFS file system. It is written for system administrators and programmers who are already familiar with the Sun QFS software running on the Oracle Solaris operating system (OS). It explains the differences between installation and configuration on the Oracle Solaris OS and installation and configuration on the Linux OS.

Before installing the software on a Linux client, you should be familiar with the detailed installation procedure for software as outlined in *Sun QFS and Sun Storage Archive Manager 5.3 Installation Guide*. You should also have an experienced system administrator's knowledge of the supported Red Hat Enterprise or SuSE Linux operating environment in which you are installing the software.

## About Shared File Systems and the Linux Client

A shared file system is a distributed, multihost file system that you can mount on multiple hosts. One Oracle Solaris OS host acts as the metadata server, and the others act as clients. You can also designate one or more Oracle Solaris clients as potential metadata servers, enabling you to switch metadata servers.

The Linux client is restricted to client-only behavior. Unlike shared Oracle Solaris clients, the Linux client cannot be configured as a potential metadata server. The Linux client supports interaction with Sun Storage Archive Manager (SAM) software, but does not support archiving commands such as `stage`, `archive`, `release`, and `samu`. The Linux client only supports file system commands.

The file system functionality is largely the same for the Oracle Solaris and Linux clients. Software components are stored in the `/opt/SUNWsamfs`, `/etc/opt/SUNWsamfs`, and `/var/opt/SUNWsamfs` directories on the Linux client, just as they are on an Oracle Solaris system. The `sam-fsd` and `sam-sharefsd` commands function the same way on both platforms.

Within a shared file system, the Sun QFS software can be installed on Linux clients as well as on Oracle Solaris clients. The Sun QFS Linux client software supports the following Linux distributions on x64 platforms:

- Oracle Enterprise Linux (OEL) 5.4
- Oracle Enterprise Linux (OEL) 5.6
- Red Hat Enterprise Linux 4.5
- Red Hat Enterprise Linux 5.4 (via OEL 5.4)
- Red Hat Enterprise Linux 5.6 (via OEL 5.6)
- SuSE Linux Enterprise Server 9 (service pack 4)
- SuSE Linux Enterprise Server 10 (service pack 2)
- SuSE Linux Enterprise Server 10 (service pack 3)
- SuSE Linux Enterprise Server 11 (service pack 1)

## Installing and Uninstalling the Linux Client

This section provides instructions for installing and uninstalling the Sun QFS Linux Client software.

The differences in installation between the Oracle Solaris client and the Linux client are:

- The Linux software comes in two folders on the DVD or in the download packages. The installation files can be found in the `linux1` directory on that DVD or in the downloaded software package.
- The Linux installation packages are in the form of RPM (Red Hat Package Manager) and SRPM (Source RPM) packages. RPMs typically contain binary commands and loadable modules, whereas SRPMs contain source code RPMs.
- Because so many variations of the Linux kernel exist, the installation program also includes custom kernel capability, which enables the software to work with as many kernel variations as possible.

### ▼ How to Install the Linux Client

- 1 **Edit the Oracle Solaris metadata server's `/etc/opt/SUNWsamfs/hosts.fsname` file to add the Linux client's address.run `samsharefs` to update the information on disk.**

In the following example, `hiball-mn` is the Oracle Solaris metadata server:

```
hiball-mn 10.1.170.213 1 0 server
linux-mn 10.1.170.210 0 0
rollerball-mn 10.1.170.132 0 0
sandiego-mn 10.1.170.8 0 0
```

Run `samsharefs` to update the information on disk.

## 2 Insert the installation DVD into the Linux system or locate the downloaded software package.

### 3 Install the software.

- If you are installing from the DVD, type the following commands as root on the Linux system:

```
# mount -o ro -t iso9660 /dev/cdrom /mnt
# /mnt/linux1/Install
```

- If you are installing from a downloaded software package, type the following commands as root on the Linux system:

```
# mount -o ro,loop -t iso9660 StorageTek_QFS_5.3.iso /mnt
# /mnt/linux1/Install
```

The installation program installs the software.

If the installation program does not recognize the Linux kernel version, it will display the following message:

```
A direct match for your kernel wasn't found. Attempt creating a custom rpm for your kernel /
(yes/no)?
```

Select yes to enable the installation program to adapt the loadable binary kernel module to the Linux system. If you select no, the installation cannot be completed.

---

**Note** – The `Module.symvers` file is required for the Linux client installation and is included in the Linux kernel development package. For example, in Oracle Linux 5.6 the package is `kernel-devel-2.6.18-238.el5.x86_64.rpm`. You can install the package with the following command:

```
# yum install kernel-devel-2.6.18-238.el5.x86_64.rpm
```

---

## 4 Review the `/etc/opt/SUNWsamfs/mcf` file to verify that it contains the correct paths for your installation.

---

**Note** – An `mcf` file is automatically generated for the Linux client. For more information, see [“mcf File Differences” on page 11](#).

---

For most installations, the `mcf` file that is created will be correct, but it might have to be edited to reflect your specific environment.

## 5 Verify that `sam-fsd` is running and that the expected file systems are mounted on the metadata server.

For example:

```
# ps -ef | grep sam-fsd
root 22054      1  0  May 09  ?           0:00 /opt/SUNWsamfs/sbin/sam-fsd -D
```

```
# mount -v | grep samfs
sqfs1 on /testqfs1_1488 type samfs \
read/write/setuid/devices/rstchown/intr/largefiles/onerror=panic \
/nologging/noxattr/dev=4440064 on Thu May 10 11:22:43 2012
sqfs2 on /testqfs2_1488 type samfs \
read/write/setuid/devices/rstchown/intr/largefiles/onerror=panic \
/nologging/noxattr/dev=44400c8 on Thu May 10 11:23:41 2012
```

## 6 Mount the filesystem.

For example:

```
# mount -t samfs -o shared sqfs1 /sqfs1
Using /etc/fstab:
sqfs1          /sqfs1        samfs          shared,noauto  0 0

# mount sqfs1
```

---

**Note** – The mount command requires that the shared mount option be set, either on the command line or in the `/etc/fstab` file. For SuSE Linux Enterprise Server 10, any Sun QFS file system with devices missing that are configured as mount on boot in the `/etc/fstab` file may cause Linux to hang during the boot process.

---

When you mount the file system, the following message is displayed:

```
Warning: loading SUNWqfs will taint the kernel: SMI license
See http://www.tux.org/lkml/#export-tainted for information
about tainted modules. Module SUNWqfs loaded with warnings
```

This message is a normal result of the installation and can be disregarded.

## ▼ How to Configure Access to Man Pages

Sun QFS man pages are located in section `1m`. In order to ensure access to the man pages from the Linux client:

- **Add the man page section to your configuration.**
  - On Red Hat Linux clients, add `1m` to `MANSECT` in the `/etc/man.config` file.
  - On SuSE clients, add `1m` to `SECTION` in the `/etc/manpath.config` file.

## Uninstalling the Linux Client Software

To uninstall the Linux client software, use the `Uninstall` script in the `/var/opt/SUNWsamfs/Uninstall` directory.

---

**Note** – Do not use other processes, such as `rpm -e`, to uninstall the software. They can cause unexpected results and problems with uninstalling or reinstalling the software.

---

## Linux Differences

The following sections describe the functionality, mounting, and execution differences between the Linux and Oracle Solaris clients.

### Differences in Function

In a few areas, the Linux client does not match the functionality of the Oracle Solaris client. The Linux client does not support the following functions:

- Remote file sharing
- `sambaio`
- Quotas
- Access control lists (ACLs)
- Buffer-cache readahead
- Browser interface (BI) support
- Forced unmount
- IPv6

The Linux client supports striping, but striped performance is generally limited to the performance of a single device.

### mc f File Differences

The `mc f` file, `/etc/opt/SUNWsamfs/mc f`, defines the topology of the equipment that the file system manages.

The Linux client software automatically generates an `mc f` file. If an `mc f` file does not exist, the Linux client will create one when the system is booted or when `samd config` is run. This file should be examined to verify that it correctly reflects the Sun QFS environment. It might need to be manually edited to match your specific file system configuration. Note that if you create your own `mc f` file or edit the auto-generated `mc f` file, the system will no longer auto-generate the file.

When an existing disk is repartitioned or a new file system is created, run `samd config` or reboot the system to create a new `mc f` file that reflects the changes. When new hardware is added, the SCSI bus needs to be rescanned with the “add single device” mechanism, or the equivalent, and then `samd config` must be run. Rebooting the system will also cause the SCSI bus to be rescanned.

If you need to modify the Linux client `mcf` file, run the `samfsconfig` command first to display the existing file system names and the Linux device path names that are associated with them. When editing the `mcf` file, take into account the differences between Oracle Solaris and Linux logical unit numbers (LUNs) in the device paths.

Instead of specifying an actual device path for the metadata device (`mm`), specify `nodev` in the Linux `mcf` file. This value is the default in the auto-generated `mcf` file.

```
belmont 40 ma belmont on shared
nodev 43 mm belmont on
/dev/sdb5 44 mr belmont on
```

For more information about creating `mcf` files, see “[mcf\(4\)](#)” in *Sun QFS and Sun Storage Archive Manager Reference Manual* or Chapter 2, “About the Master Configuration File,” in *Sun QFS File System 5.3 Configuration and Administration Guide*.

## Mounting Differences

Mounting functions are almost identical on the Linux and Oracle Solaris clients. However, the mount options available for the Linux client are limited to the following:

- `rw, ro`
- `retry`
- `shared`
- `meta_timeo`
- `rdlease, wrlease, aplease`
- `minallopsz, maxallopsz`
- `min_pool` (ignored outside of `samfs.cmd`)
- `noauto, auto` (ignored outside of `/etc/fstab`)

No other mount options are available for the Linux client.

## Execution Differences

The Linux application programming interface (API) differs from the Oracle Solaris API in many respects. For example, upon lookup of a directory that has been removed, the Oracle Solaris system returns an `ENOENT` message, whereas the Linux system returns an `ESTALE` message.

Several host bus adapter (HBA) failover methods are supported in the various Linux distributions, and failover is included in QLogic drivers. None of these methods have been exhaustively tested with the Linux client.

---

**Note** – Do not use the `mdadm` (multiple devices admin) package for path failover on a Linux client. The `mdadm` package writes a superblock to devices that it uses. The result is that `mdadm` has the potential to corrupt data that Oracle Solaris has written to those devices. Furthermore, Oracle Solaris can also corrupt the superblock that `mdadm` has written to the devices.

---

## Performance Differences

Performance of the Linux client is affected by the fact that direct I/O is more restrictive on the Linux client. The Linux device layer supports a maximum of 4 kilobytes per I/O operation. Therefore, large requests in a Linux environment must be broken up and serviced individually.

## Linux Kernel Patch

Oracle Solaris 10 added a new partition ID for storage management initiative (SMI) labels on x86 and x64 platforms. Linux kernels with versions before 2.6.10 do not recognize this partition ID, so those kernels will need a patch in order to support Sun QFS Linux client interaction with a Sun QFS metadata server running Oracle Solaris 10 on an x64 platform.

A patch is included with the Sun QFS Linux client software in the `linux1/patches` directory. To install the patch, navigate to the top level of the Linux kernel source directory and run the `patch` command. For example:

```
# cd /usr/src/linux
# patch -p1 < /path-to-patch/linux_2.6_smi.patch
```

## SELinux Differences

Unexpected results might occur when you run the Sun QFS Linux client software on a system with SELinux enabled, depending on your site's specific SELinux configuration. For example, the `df` command may return `Permission denied` when run by a non-root user.

If you encounter a similar error, check the security context settings in the `/dev/samsys` file. The correct settings should be similar to the following:

```
crw-r-r- 1 user_u:object_r:device_t root root 253, 0 Jan 31 17:19 /dev/samsys
```

You might also want to check the security label of the user and verify that the user has a sufficient security label to access the object, given the object's security label.

# Troubleshooting

Linux clients and Oracle Solaris clients use different procedures to store system information that might be used to diagnose Sun QFS issues.

Files that contain system information from the Linux kernel are in the `/proc` directory. For example, the `/proc/cpuinfo` file contains hardware information. The following table describes some files that contain useful troubleshooting information.

TABLE 1-1 Linux Files for Troubleshooting

File Name	Information Provided
<code>version</code>	Running kernel version
<code>cpuinfo</code>	Hardware information
<code>uptime</code>	Time in seconds since boot time, and total time used by processes
<code>modules</code>	Information about the modules that are loaded
<code>cmdline</code>	Command-line parameters that are passed to the kernel at boot time
<code>filesystems</code>	Existing file system implementations
<code>scsi/scsi</code>	Attached SCSI devices
<code>fs/samfs/&lt;QFS file system&gt;/fsid</code>	File system ID, which must be included in the share options for network file system (NFS)

---

**Note** – Linux kernel log messages are stored in the `/var/log/messages` file.

---

## Troubleshooting Tools

Because the Linux kernel has many variations, troubleshooting problems can be very challenging. The following tools might help in debugging:

- Projects such as `lkcd` and `kgdb` can provide kernel crash dump information.
- Projects such as `kdb`, `kgdb`, and `icebox` are kernel debuggers.

---

**Note** – These projects are not present by default in Red Hat or SuSE Linux. You must obtain the appropriate RPMs or SRPMs and might have to reconfigure the kernel to use them.

---

- The `strace` command traces system calls and signals. It is similar to the Oracle Solaris `truss` command.

- The Sun QFS `samt race` command dumps the trace buffer.
- The Sun QFS `samexplorer` command generates a Sun QFS diagnostic report script.

---

**Note** – Trace files are placed in the `/var/opt/SUNWsamfs/t race` directory on the Linux client, just as they are on the Oracle Solaris client.

---

## Frequently Asked Questions

The following questions about the Linux client are frequently asked by users who are familiar with Sun QFS file systems on the Oracle Solaris platform.

**Q:** The Linux install script reports that I got a negative score and cannot install the software. Is there any way I can still install the software?

**A:** You can try the `-force-custom` and `-force-build` install options. However, this method might cause a system panic when installing the modules. This method is especially risky if your kernel is built with some of the kernel hacking options such as `spinlock debugging, enabled`.

**Q:** Can I use commands such as `vmstat`, `iostat`, `top`, `truss`, and `sar` on Linux?

**A:** The `vmstat`, `top`, `sar`, and `iostat` commands are found in many Linux Red Hat installations. If they are not installed, they can be added using the `sysstat` and `procps` RPMs. The Linux equivalents of `truss` are `lt race` and `st race`.

**Q:** How can I do multipath failover with QFS on Linux?

**A:** If you are using the Oracle's StorageTek 6130, you can use the multipath tool found at <http://www.oracle.com/technetwork/indexes/downloads/index.com>. Otherwise, several path failover methods are possible, depending on your Linux distribution and type of HBAs. These include but are not limited to StorageTek Traffic Manager (SSTM), multipulse, device mapper, and `qlongic` path failover. None of these have been tested exhaustively with Sun QFS.

Do not use the `mdadm` (multiple devices admin) package for path failover on a Sun QFS Linux client. The `mdadm` package writes a superblock to devices that it uses. Therefore `mdadm` has the potential to corrupt data that Oracle Solaris has written to those devices. Furthermore, Oracle Solaris can also corrupt the superblock that `mdadm` has written to the devices.

**Q:** Can StorageTek Traffic Manager be used with the Sun QFS Linux client?

**A:** Yes. First build a custom kernel with multipathing support as described in the StorageTek Traffic Manager documentation. Then install the Linux client software.

**Q:** Can Extensible Firmware Interface (EFI) labels be used on the Sun QFS Linux client?

A: Most Linux Red Hat kernels are not built with support for EFI labels with GPT (GUID Partition Table) partitions. Therefore, to use EFI labels, you must rebuild the kernel with the `CONFIG_EFI_PARTITION` option set. For more information about building a custom kernel, see the distribution documentation.

Q: Can I use other Linux volume managers such as logical volume management (LVM), Enterprise Volume Management System (EVMS), or Device Mapper with the Sun QFS Linux client software?

A: No. To use a file system with EVMS, you need to have a File System Interface Module (FSIM) for that file system. No FSIM exists for the Sun QFS product. To use LVM, the partition type that `fdisk` shows must be LVM(8e). Partitions that Sun QFS uses must be SunOS partitions.

Q: Can I use file systems that are larger than 2 TB?

A: Yes, but some utilities that provide file system information, such as `df`, might return incorrect information when run on Linux. In addition, you might encounter problems when sharing the file system with NFS or Samba.

Q: Are there any differences between the mount options supported on the Linux client and those supported on the Oracle Solaris client?

A: Many `sunfs` mount options are not supported on the Linux client. Two to be aware of are `nosuid` and `forcedirectio`. See [“Mounting Differences” on page 12](#) for a complete list of supported mount options on the Linux client.

Q: How can I mount file systems that have SMI labels generated by X64 Oracle Solaris 10 metadata server?

A: Apply one of the patches available for the 2.4 or 2.6 kernel.

Q: The SAM-QFS Manager user interface does not show Sun QFS installed on my Linux clients. Why?

A: The SAM-QFS Manager software does not support operations on Linux clients.

Q: Is there a Linux version of `cfgadm` or `devfsadm` to rescan/reprobe the SCSI devices?

A: On Linux, you must reboot the system in order to guarantee that the SCSI devices are rescanned. You can also try removing and reinstalling the HBA driver. For example:

```
rmmod qlaXXXX; modprobe qlaXXXX
```

If you are using a Qlogic driver that supports LUN hot add, you can try the following:

```
echo "scsi-qlascan" > /proc/scsi// (The qllogic driver will re-scan)
```

Q: There is no forced unmount on the Linux client like Oracle Solaris. What can I do when I encounter a busy file system when attempting to unmount?

*A:* First try the `fuser -k` command. If the busy file system message persists, use the `lsof` command to find any open files and their associated PIDS, then kill the processes.

