Oracle FS1-2 Flash Storage System

Customer Release Notes 6.1

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Revision History

Table 1: Revisions

Revision description	Revision date
Release 06.01.01	2014-10-31

CHAPTER 1

Product Release Information

Purpose

This document describes release 06.01.00 of the Oracle FS1 Flash Storage System.

- Hardware features and software features of the Oracle FS System
- System configuration requirements
- System operating limits and ranges
- Known issues and their working solutions
- Specific notes of interest
- Corrections to technical documentation

The information provided is accurate at the time of printing. Newer information might be available from your Oracle authorized representative.

Note: For information regarding defects and how to work around them, sign in to *My Oracle Support* (https://support.oracle.com/) and locate the Release Notes or ReadMe for the latest software patch for this release.

Product Features

Release 06.01.00 of the Oracle Flash Storage System is a general availability release.

Software Features

- QoS-driven adaptive tiering and application storage tuning
- Enhanced QoS (referred to as *QoS Plus*)
    - I/O prioritization that is based on business value
    - Storage utilization that is optimized based on cost and performance
- Oracle MaxRep for SAN 3.0 with new hardware
- Oracle business-application profiles

Note: The iSCSI protocol and the NAS protocol are not supported in this release.

Hardware Features

- Storage arrays can consist partially or wholly of flash storage.

- Storage arrays consisting partially of flash storage can be scaled incrementally to 100% flash.

Supported Platforms

You can manage an Oracle FS System by means of any of the supported platforms listed below.

- Oracle FS System Manager(GUI)
- Oracle FS CLI
- Oracle MaxMan
- Oracle FS Mobile
- Oracle FS Path Manager (FSPM)
- Oracle FS Data Protection Manager
- Oracle Enterprise Manager for Oracle Flash Storage Systems
- Oracle vSphere Plug-In for Oracle Flash Storage Systems 3.5 for VMWare
- Oracle Flash Storage System Statistics Tools
- Oracle FS Volume Shadow Copy Service Provider

You can monitor an Oracle FS System by means of any tool that can utilize the Oracle FS System management information base (MIB), such as an Simple Network Management Protocol (SNMP) client.

Caution: Remote access by any other means (ssh, telnet, ftp, and other such methods) by anyone other than authorized service personnel is not supported and voids the warranty for your Oracle FS System. Furthermore, remote access might also compromise the integrity of the data that is stored on the Oracle FS System.

Configuration Documentation

A variety of technical documentation is available to help you configure your Oracle Flash Storage System.

Access to Technical Documentation

Navigate to the following locations:

- In Oracle FS System Manager (GUI): **Help** > **Documents**
- On the Oracle Help Center website: *SAN Storage - Oracle Flash Storage Systems* (http://docs.oracle.com/en/storage/#fla)

System Features and Essential Configuration Tasks

- Read the *Oracle Flash Storage System Administrator's Guide*.
- Read the *Oracle Flash Storage System CLI Reference*.
- Read the appropriate *Oracle FS1-2 Flash Storage System Installation Guide*.
- Browse the online help in the GUI.

Connectivity and Interoperability

See your Oracle Account Representative.

CHAPTER 2

Network Requirements

Pilot Network Requirements

For a Pilot to integrate successfully into a customer network, that network needs to be configured properly.

The Pilot management network has the following requirements:

- Two 10 GbE, full-duplex ports for the public connection to the management network. For added redundancy, the two connections should be to separate switches. The Oracle FS System provides a standard Cat6 RJ-45 jack on each of the two Pilot nodes for this connection.
- Three IP addresses on the same subnet: one IP for the physical interface of each Pilot and one public IP that is shared between the two Pilots.

For complete information on setting up and using the management network, refer to the following documentation:

- *Oracle FS1-2 Flash Storage System Installation Guide*
- *Oracle Flash Storage System Administrator's Guide*

The Oracle FS Path Manager (FSPM) communicates with the Pilot over secure, encrypted XML. If FSPM is installed on a SAN host, that host requires an Ethernet interface for communication with the Oracle FS System Manager that is running on the Pilot. The network configuration must allow the SAN host to reach the Pilot management IP interfaces.

For complete information on using FSPM, refer to the appropriate version of the *Oracle FS Path Manager Installation Guide*.

Controller Network Requirements

For the Controllers to integrate successfully into a customer network, that network needs to be configured properly.

The data network to which the Controllers connect must use Fibre Channel data paths that are based on optical connections that are capable of 8 Gb/s or 16 Gb/s speeds. These connections can be single-mode or multi-mode.

You should specify the type of connection when you order your Oracle FS System. Contact your Oracle Account Representative if you need to change the type of physical connection.

For complete information on setting up and using the data network, refer to the following documentation:

- *Oracle FS1-2 Flash Storage System Installation Guide*
- *Oracle Flash Storage System Administrator's Guide*

SAN Hosts Requirements

All Linux users with Qlogic adapters are advised to upgrade the QLogic driver to 8.07.00.16-k.

This driver upgrade enables the Linux client to handle correctly any warmstarts that occur in an Oracle FS System Controller.

Qlogic adapters without this driver upgrade do not properly logout after a Controller warmstart. The improper logout requires the Oracle FS System software to recognize that condition and to force an explicit logout. Usually this handling succeeds. When this handling does not succeed, loss of I/O from the adapter to the LUNs on that Controller can result.

CHAPTER 3

Software Support

Software Versions

After the installation of an Oracle FS1 Flash Storage System, ensure that your system is running the current release of the software. You can check your installed software versions in the GUI by navigating to **Support** > **Software and Firmware**.

Table 2: Oracle FS System software and firmware

Software module	Version
Enclosure Firmware	06.01.00
HDD firmware *(Optional. If HDDs are present, the model and the capacity can vary)*	*Depends on the HDD model and its capacity.*
M3 Controller BIOS	06.01.00
Oracle FS1-2 Controller Software	06.01.01
Pilot OS	06.01.01
Pilot Software	06.01.01
SSD firmware *(Optional. If SSDs are present, the model and the capacity can vary)*	*Depends on the SSD model and its capacity.*

Download System Software Updates

You can check for the current recommended release of the software on My Oracle Support (MOS).

Important: All systems require a hardware audit before those systems can be upgraded to Release 06.01.00, which is a general availability release. The hardware audit ensures that these systems meet the hardware configuration requirements for the general release. This audit is performed by Oracle Customer Support. Any hardware changes that might be required must be performed before you upgrade the system software.

1. Navigate to *My Oracle Support* (https://support.oracle.com/) and sign in.
2. On the top menu bar, click **Patches & Updates**.

3 In the Patch Search frame, click **Product or Family (Advanced)**.

4 In the **Product is** list box, enter your system model.
The product family is named *Oracle Flash Storage Systems*.

Tip: As you begin entering characters, appropriate items appear in the dropdown list. Select the model that corresponds to your system.

5 Click the **Release is** list box and select the latest software release.

6 Click **Search**.
The Patch Search Results window displays. Check the file size of the download and be sure that your local host has sufficient space.

Important: Ensure that the system where you download the software has free capacity that is at least 2.2 times the size of the file download.

7 In the Patch Advanced Search Results window, click the patch number.

8 (Optional) To view the patch release notes, click **Read Me**.

9 To download the software package, click **Download**.

10 In the File Download dialog, click **Download All**.

11 Browse to the location on your system where you want to save the software update package.

12 Extract the contents of the downloaded zip file.

Note: All Oracle FS System updates are RPM files. The single RPM file contains system software and possibly drive firmware. Preserve the original file names and extensions of the extracted contents. Renaming the files might prevent successful staging.

After downloading the latest software package, install the software and firmware before placing the Oracle FS System in production mode.

Updating System Software

If you are logged in using the administrator account or a support account, do not change the default **Install if newer version** setting in the **Install actions** column unless the Patch Release Notes for a specific upgrade, a My Oracle Support KB article, or Oracle Customer Support instructs you to do so.

Important: Before you update the 06.01.00 software that is currently running on your Oracle FS1 Flash Storage System, ensure that all background processes are completed and that no task appears to be hung. You can check for running background processes from Oracle FS System Manager (GUI) by clicking **Task** in the lower right corner of a GUI screen.

System software updates and drive firmware updates are packaged into a single archive. However, each type of update must be installed separately.

- The patch Readme or the software Release Notes indicate whether the system software requires a disruptive update or can be installed as a non-disruptive update.

Note: A disruptive update temporarily places the Oracle FS System in an inactive state and takes all user data paths offline.

- All drive firmware updates are disruptive. Drive firmware updates do not need to be installed with the software update unless the patch Readme or the software Release Notes indicate otherwise.

To update the system software and firmware to the latest version, refer to the *Oracle Flash Storage System Administrator's Guide*.

After a successful software update, all system components report Normal in the GUI and all user data, if any, is accessible.

FSPM Support

The Oracle FS Path Manager (FSPM) is optional software that can be installed on a SAN host to manage multiple paths to the Oracle Flash Storage System.

Important: SAN hosts that access the Oracle FS System over multiple paths must use FSPM 4.0, not Pillar Axiom Path Manager (APM).

FSPM release 4.0 and higher support both Oracle Flash Storage Systems and Pillar Axiom systems.

The FSPM software performs the following primary functions:

- Shares traffic among the available paths and ensures that access to the LUNs is not interrupted if some paths fail.
- Automatically configures the host into the Oracle FS System Manager and updates the configuration if it changes.

Table 3: FSPM support

Operating system (OS)	OS release	FSPM release	Notes
AIX	5.3 6.1 7.1	4.0	All platforms
Community Enterprise Operating System (CentOS)	5.8 5.9 5.10 5.11 6.2 6.3 6.4 6.5 7.0	4.0 Linux	32-bit x86, 64-bit x86
HP-UX	11i v3	4.0	All platforms

Table 3: FSPM support (continued)

Operating system (OS)	OS release	FSPM release	Notes
Oracle Linux (OL)	5.8 5.9 5.10 5.11 6.2 6.3 6.4 6.5 7.0	4.0 Linux	32-bit x86, 64-bit x86
Oracle Solaris	10 11	4.0	All platforms
Oracle VM Server for x86	3.1 3.2 3.3	4.0 Linux	All platforms
Red Hat Enterprise Linux (RHEL)	5.8 5.9 5.10 5.11 6.2 6.3 6.4 6.5 7.0	4.0 Linux	32-bit x86, 64-bit x86
SUSE Linux Enterprise Server (SLES)	11.1 11.2 11.3 12.0	4.0 Linux	32-bit x86, 64-bit x86
Windows	Server 2008 Server 2008 R2 Server 2012 Server 2012 R2	4.0	All platforms

For FSPM release information, refer to the *Oracle FS Path Manager Release Notes* for your platform.

CHAPTER 4

System Limits

Operating Limits for an Oracle FS System

The following table lists the numbers of objects that can be configured for an Oracle FS System.

Table 4: System limits

Object	Quantity range
repositories[1]	Maximum: 1024
Storage Domains	Minimum: 1 Maximum: 64 per Oracle FS System
virtual LUNs (VLUNs)	Maximums:[2] • 8192 per Controller • 8192 per Oracle FS System
VLUN block snapshots, full (copies)	Maximum: 12 full snapshots per VLUN
VLUN block snapshots, partial (clones)	Maximum: 1024 partial snapshots of a single source volume active at a time
volume groups	Minimum: 1 Maximum: 5000 total
volume size	Minimum: • 1 GB and 50% of maximum capacity • Minimum growth increment: 1 GB Maximum: System capacity

[1] A repository is a VLUN and is associated with a logical volume. A repository holds metadata for the clones of that volume. A volume has at most one repository VLUN.

[2] Recommended maximums are 4096 per Controller and 4096 per system.

The following table lists the numbers of objects that are related to a Drive Enclosure that can be configured for an Oracle FS System.

Table 5: Drive Enclosure configuration limits

Object	Quantity range
Drive Enclosures (DE)	Minimum: 1 Maximums: • Per Oracle FS System: 30 • Per Storage Domain: 30 • Per SAS HBA: 10 • Per DE string: 5
drive groups	Minimum: 1 Maximums: • Per Oracle FS System: 1024 • Per Storage Domain: 1024
drives	**Per DE** • HDDs: 24 drives of the same type (in groups of 12) • Performance SSDs: 13 drives of the same type (in groups of 6, plus 1 as a hot spare) • Capacity SSDs: 19 drives of the same type (in groups of 6, plus 1 as a hot spare) **Per drive group** • HDDs: 12 • SSDs: 6

System Limits for SAN Objects

The following table lists the numbers of SAN-related objects that can be configured for an Oracle FS System.

Table 6: SAN operating limits

Object	Quantity range
LUN-to-host mappings	Maximum: 33,554,432 per Oracle FS System
SAN host connections (active)	Maximum: • 512 active connections per SAN CU port • 3072 per SAN CU (with 6 ports) • 6144 per Oracle FS System (with 12 ports)
SAN LUNs	Maximum[3]: • 4096 visible for any given SAN Controller • 4096 visible across all SAN Controllers in a given system • 4096 visible per SAN host
SAN LUN size	Minimum: • 1 GB and 50% of maximum capacity • Minimum growth increment: 1 GB Maximum: System capacity

The following table lists the numbers of SAN-related objects that can be configured for an Oracle FS Path Manager (FSPM) host. See the appropriate *Oracle FS Path Manager Installation Guide* for a complete list of operating limits.

Table 7: FSPM operating limits

Object	Quantity range
system connections	Maximum: 8 **Note:** The connections can be to any combination of Oracle FS Systems and Pillar Axiom systems.
LUN data paths	Maximum: 32 to each LUN
HBA ports	Maximum: 32

[3] A visible (active) SAN LUN requires one virtual LUN (VLUN) for user data and one VLUN for metadata. A clone of a SAN LUN requires one VLUN for the metadata and one VLUN for the data repository. If the clone is active, a third VLUN is required, making a total of five VLUNs for the SAN LUN and its clone.

CHAPTER 5

Additional Notes

Migrating Pillar Axiom Data

Oracle MaxRep 3.0 supports the replication of data between an Pillar Axiom system and an Oracle FS System. To migrate some of the data or all of the data from the Pillar Axiom system to the Oracle FS System, use Oracle MaxRep.

Note: To use Oracle MaxRep 3.0 to migrate data or to perform replication operations between a Pillar Axiom system and an Oracle FS System, the Pillar Axiom system must be running release 5.4.14 (or higher) software.

After the Oracle FS System enters production mode, you can use the Pillar Axiom system as a replication target or as a repository for legacy data.

Alternative methods include the use of a host-based copy operation and the use of a third-party migration appliance.

For more information about Oracle MaxRep, refer to the *Oracle MaxRep for SAN white paper*.
(http://www.oracle.com/us/products/maxrep-r3-ds-2301400.pdf)

CHAPTER 6

Technical Documentation Errata

Oracle Flash Storage System Administrator's Guide

The following items describe information that was not able to be corrected in time for the current release of the Oracle FS System.

- The iSCSI protocol is not supported in this release. As such, ignore all references to the iSCSI protocol throughout this document.
- The NAS protocol is not supported in this release. As such, ignore all references to the NAS protocol throughout *Oracle Flash Storage System Administrator's Guide*.

Oracle Flash Storage System CLI Reference

The following items describe information that was not able to be corrected in time for the current release of the Oracle FS System.

- The iSCSI protocol is not supported in this release. As such, ignore all references to the iSCSI protocol throughout this document.
- The NAS protocol is not supported in this release. As such, ignore all references to the NAS protocol throughout *Oracle Flash Storage System CLI Reference*.

Oracle FS1-2 Flash Storage System Customer Service Guide

The following items describe information that was not able to be corrected in time for the current release of the Oracle FS System.

- On each of the following pages, replace the content in the Type designation column with *FRU*:
  - Page 23, Table 2, in the "Energy storage module (ESM)" row
  - Page 24, Table 2, in the "Rail kit assembly" row
  - Page 24, Table 2, in the "Riser board assembly" row
- On page 114, for the *Replace a Controller Energy Storage Module (ESM)* topic, replace the sentence "ESMs are customer replaceable units (CRUs)" with "ESMs are field replaceable units (FRUs)."

- On page 121, for the *Replace a Controller Riser* topic, replace the sentence "The risers are customer replaceable units (CRUs)" with "The risers are field replaceable units (FRUs)."

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