Oracle Flash Storage System

Support and Interoperability Guide

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Preface

Related Documentation

Familiarize yourself with the following related documents:

- *Oracle Flash Storage Systems Glossary*
- *Oracle Flash Storage System CLI Reference*
- *Oracle Flash Storage System X5-2 Release Notes*

Oracle Resources

Important: For the latest version of this document, visit the *SAN Storage – Oracle Flash Storage Systems* section at the Oracle Help Center (http://www.oracle.com/goto/fssystems/docs).

Table 1: Oracle resources

For help with...	Contact...
Support	*http://www.oracle.com/support* (www.oracle.com/support)
Training	*https://education.oracle.com* (https://education.oracle.com)
Documentation feedback	*http://www.oracle.com/goto/docfeedback* (http://www.orarcle.com/goto/docfeedback)
Contact Oracle	*http://www.oracle.com/us/corporate/contact/index.html* (http://www.oracle.com/us/corporate/contact/index.html)

Typographical Conventions

Table 2: Typography to mark certain content

Convention	Meaning
italics	Within normal text, words in italics indicate one of the following items: • Hypertext, as in a URL • A reference to a book title • New terms and emphasized words • Command variables
`monospace`	Indicates one of the following, depending on the context: • The name of a file or the path to the file • *Output* displayed by the system on the command line
`monospace` (bold)	*Input* provided by an administrator on the command line.
>	Indicates a menu item or a navigation path in Oracle FS System Manager (GUI). For example, "Click **SAN** > **Storage** > **LUNS** > **Action** > **Clone**" means to click the **Clone** link on the **SAN** page in the GUI.
...	Indicates that one or more steps have been omitted from the path or menu structure. The ellipsis is used within an expression of a navigation path or within a cascading menu structure. For example, in the **SAN** > **Storage** > **LUNS** > **...** > **Clone** menu structure, the **...** implies that one or more menu items have been omitted.

What's New for This Edition

Table 3: Updates for this edition

Item	Page
No support for Solaris Hybrid Columnar Compression within Solaris kernel zones.	22

Oracle Flash Storage Systems Hardware

The information in this guide is for the Oracle FS Systems listed in the following table.

Table 4: Oracle FS System hardware

Hardware model	Software version
Oracle FS System FS1-2 Base	Version 6.1.x, 6.2.x
Oracle FS System FS1-2 High-Performance	Version 6.1.x, 6.2.x

Terms Used in This Document

This document uses the processor terminology described in the following table.

Table 5: Oracle FS System hardware

Term	Description
PA-RISC	64-bit processors based on 'HP's PA-RISC architecture.
POWER	64-bit processors based on 'BM's POWER Architecture, such as POWER5.
SPARC-64	64-bit processors based on version 9 or later of SPARC International's architecture, such as Sun's UltraSPARC and Fujitsu's SPARC64.
x86-32	32-bit processors based on Intel's x86 architecture, such as the Intel Pentium family and AMD Athlon.
x86-64	64-bit processors based on AMD's 64-bit extensions to the Intel x86 architecture, such as the AMD Athlon 64 processor and the Intel processors with EM64T technology, such as the Intel Xeon processor.

Interoperability Overview

Interoperability Overview

This document is a supportability and interoperability guide for the current version of Oracle Flash Storage Systems. It provides a list of data center components that are supported by Oracle for Oracle FS Systems and certified partner products that are interoperable and supported by the respective partners for use with Oracle FS Systems and products. Oracle-developed products, such as plug-ins that integrate with partner ecosystem products, are also listed in this document.

The *Oracle Flash Storage Systems Support and Interoperability Guide* is intended as a reference for product support and interoperability information. It also serves as a quick reference for Data Center Administrators to check for compatible product versions for deployment.

Support Model

A component receives support service based on the support levels that are described in the following table:

Note: This document lists all products currently tested by or with Oracle. If your component is not listed in this document, contact your Oracle sales representative. Oracle, or an Oracle partner, might be testing that component with the Oracle FS System.

Table 6: Support model

Support level	Definition	Support services
Supported	Oracle sells all components.	For components purchased directly from Oracle or an authorized reseller and covered by a valid service contract, contact the Oracle Systems Technology Service Center.
Interoperable	Oracle does not sell qualified third-party components.	If you have questions about or issues with an Oracle FS System component of the interoperable solution, contact Oracle Systems Technology Service Center. If you have questions about or issues with other components not sold by Oracle, contact the vendor from which you purchased the component.

Flash Storage Path Manager Support

FSPM Support

Oracle Flash Storage Systems support multipathing using Oracle FS Path Manager (FSPM) software. FSPM also supports Oracle Axiom systems with Axiom Release 4.5 or higher installed.

FSPM Coexistence

Oracle FSPM can coexist with third-party path manager software on the same system if FSPM only manages paths to LUNs on the Oracle Flash Storage System FS1-2, and the other path manager only manages LUNs on its storage system.

Use multiple HBAs to separate I/O paths to each storage system for ease of administration. A single-dual ported HBA can be shared by both drivers.

Support for listed HBAs is obtained through FSPM support.

FSPM Support Quick Reference Table

The quick reference table for the operating system (OS) versions support Oracle FS Path Manager (FSPM) Release 4.0. This table is a superset of all supported versions.

For support based on a specific protocol, refer to that protocol in the following sections.

The use of the plus sign (+) following an OS release (for example, 11.1+) in the table below indicates that FSPM supports all derivatives of that release. The plus sign (+) does not include the next major OS release. For example, 11.1+ does not include OS release 12+, which is listed separately.

Note: If you would like FSPM support for an OS release that is not listed here, contact your Oracle sales representative.

Table 7: Oracle FS Path Manager OS support matrix

Operating system (OS)	OS release	Oracle FS Path Manager release	Platforms
AIX	5300-12+	4.1	All platforms
	6100-05+		
	7100-00+		
	7200-00+		
Community Enterprise Operating System (CentOS)	5.8+	4.0	32-bit x86, 64-bit x86
	6.2+		
	7.0+		
Oracle Linux (OL)	5.8+	4.0	32-bit x86, 64-bit x86
	6.2+		
	7.0+		
SUSE Linux	11.1+	4.0	32-bit x86, 64-bit x86
	12.0+		
Red Hat Enterprise Linux (RHEL)	5.8+	4.0	32-bit x86, 64-bit x86
	6.2+		
	7.0+		
Oracle Solaris	10	4.1	All platforms
	11		
HP-UX	11i v3	4.0	PA-RISC and IA64
Oracle VM Server for x86	3.1+	4.0	All platforms
Windows	Server 2008	4.0	All platforms
	Server 2008 R2		
	Server 2012		
	Server 2012 R2		

FSPM Fibre Channel Support

Oracle FS Path Manager (FSPM) support for Fibre Channel (FC) covers numerous OSs and HBA models.

The following sections are separated by OS. Within each section, the supported HBA model and driver is listed with the associated OS version.

The Oracle Flash Storage System FS1-2 supports single path connectivity with any OS as long as the HBA driver is listed in the following SAN connectivity tables. The Oracle FS System supports booting from SAN LUNs, if the HBA BIOS and the driver also support booting from SAN.

FSPM FC Support for AIX

This section shows AIX FSPM multipathing support for Fibre Channel HBAs. For detailed configuration guidelines, refer to the installation guide and release notes for each AIX platform.

Support Level: Supported

Note: Booting from SAN on AIX OSs requires the user to select the **Boot from SAN** option in the UI.

The following table shows the support matrix for AIX 5.3, 6.1, and 7.1.

Table 8: Support matrix for FSPM FC support for AIX

FSPM version	Oracle FS System release	Advanced feature support	HBA vendor	HBA model	HBA vendor driver
4.0	Oracle FS System 6.1+	- BFS - VIO - LPAR - Fast Fail - Dynamic Tracking - PowerHA 7.1 - LPM >2TB LUNs	IBM	Supported by IBM for the AIX release in use	Use the embedded drivers included in the OS.

FSPM FC Support for HP-UX

This implementation of FSPM for HP-UX 11i v3 uses the native support for multipathing with ALUA devices in HP-UX 11i v3 Update 3 and later. It does not include a driver component. FSPM consists of a daemon which monitors the native multipathing functionality, and provides integration with the management system on the attached Oracle Flash Storage Systems.

Support Level: Supported

This section shows HP-UX FSPM multipathing support for Fibre Channel HBAs. For detailed configuration guidelines, refer to the *Installation Guide* and *Release Notes* for each HP-UX platform.

The host cannot access a LUN 0 on the Oracle FS System. When configuring the Oracle FS System FS1-2, enabling HP-UX mode is recommended.

The following table shows the support matrix for HP-UX 11i v3 on PA-RISC and IA64.

Note: Booting from SAN on HP-UX requires the user to select the **Boot from SAN** option in the UI.

Table 9: Support matrix FSPM FC support for HP-UX

FSPM version	Oracle FS System release	Advanced feature support	HBA vendor	HBA model	HBA vendor driver
4.0	Oracle FS System 6.1+	BFS	Tachyon	A6795A	Use the embedded drivers included in the OS.
			QLogic	A6826A	
				A9782A	
				A9784A	
				AB378A	
				AB379A	
				AB378B	
				AB379B	
				AD193A	
				AD194A	
				AD300A	
				AH400A	
				AH401A	
			Emulex	AD299A	
				AD355A	
				AD221A	
				AD222A	
				AD393A	
				AH402A	
				AH403A	
				AT094A	
				AT111A	

FSPM FC Support for Linux

Support Level: Supported

This section shows Linux FSPM multipathing support for Fibre Channel host bus adapters. For detailed configuration guidelines, refer to the *Installation Guide* and *Release Notes* for FSPM for Linux.

Table 10: Support matrix for Linux x86-32 and x86-64

Linux FSPM version	Oracle FS System release	Supported Linux versions	Supported Linux releases	FC adapter support
4.0	Oracle FS System 6.1+	CentOS	5.8+ 6.2+ 7.0+	FSPM supports all FC adapters which are fully supported for the operating system distribution. Select FC adapters carefully to ensure that the adapter can be used in a multipath environment with large IO loads.
		Oracle Linux	5.8+ 6.2+ 7.0+	
		Red Hat Enterprise Linux	5.8+ 6.2+ 7.0+	
		Oracle VM Server for x86	3.1+	
		SUSE Linux Enterprise Server	11.1+ 12.0+	

FSPM FC Support for Solaris

Support Level: Supported

This section shows Solaris 10 and 11 FSPM multipathing support for Fibre Channel host bus adapters. For detailed configuration guidelines, refer to the FSPM *Installation Guide* for each Solaris platform.

The following table shows the support matrix for Solaris 10, 11 on x86-32 (Solaris 10 only), x86-64, and SPARC-64.

Note:

1 See Solaris 11 FSPM *Release Notes* for required patch levels.

2 Booting from SAN on Solaris requires the user to select the **Boot from SAN** option in the UI.

Table 11: Support matrix for FSPM FC support for Solaris

FSPM version	Oracle FS System release	Advanced feature support	FC adapter support
4.0	Oracle FS System 6.1+	BFS Cluster	FSPM supports all FC HBAs supported by the Solaris I/O multipathing features.

FSPM FC Support for Windows

Support Level: Supported

This section shows Windows FSPM multipathing support for Fibre Channel HBAs. For detailed configuration guidelines, refer to the *Installation Guide* and *Release Notes* for Windows.

All FSPM versions for Windows in this section are certified by the Windows Hardware Quality Labs (WHQL) or the Windows Hardware Certification Kit (HCK).

Server vendor branded HBAs from QLogic and Emulex using firmware provided by vendors such as HP, IBM, Sun, and others are supported for the Oracle FS System FS1-2 under the following conditions:

- A WHQL or WHCK-certified driver for QLogic and Emulex HBAs is installed.

- An Oracle-supported version of Windows is installed.

The following table provides the support matrix for Windows Server 2008, Windows 2008 R2, Windows Server 2012, Windows 2012 R2 on x86-32, x86-64, and IA-64.

Note:

1   The Oracle FS System FS1-2 has not tested Boot from SAN with the Extensible Firmware Interface (EFI) on Itanium-based systems. If you want to use this configuration, contact your host hardware vendor first and then contact Oracle Systems Technology Service Center.

2   MS Failover Clustering support is available for Enterprise and Datacenter only.

3   Child partitions can only access SAN LUNs using software iSCSI initiators. Parent partitions can access SAN LUNs using Fibre Channel, software iSCSI, and iSCSI HBA.

Table 12: Support matrix for FSPM FC support for Windows

FSPM version	Oracle FS System release	Advanced feature support	HBA vendor	HBA model	HBA vendor driver
4.0.3	Oracle FS System 6.1+	BFS MS Failover Clustering Hyper-V	All WHQL and WHCK-approved vendors	All WHQL and WHCK approved models	WHQL and WHCK approved Drivers for each specific model

FSPM Fibre Channel over Ethernet Support

Listed in this section are all supported Fibre Channel over Ethernet (FCoE) FSPM versions and their related OSs.

The Advanced Feature Support column shows additional supported features besides the standard multipath capabilities.

FSPM FCoE Support for HP-UX

This section shows HP-UX FSPM multipathing support for FCoE HBAs. For detailed configuration guidelines, refer to the *Installation Guide* and *Release Notes* for HP-UX.

Support Level: Supported

Note:

- The host cannot access a LUN 0 on the Oracle FS System.
- When configuring the Oracle FS System FS1-2, enabling HP-UX mode is recommended.

Note: Booting from SAN on HP-UX requires the user to select the **Boot from SAN** option in the UI.

Table 13: HP-UX 11i v3 on PA-RISC and IA64 support matrix

FSPM version	Oracle FS System release	Advanced feature support	HBA vendor	HBA model	HBA vendor driver
4.0.3	Oracle FS System 6.1+	BFS	Emulex	AT111A	Use the embedded drivers included in the OS.

FSPM FCoE Support for Linux

Support Level: Supported

Table 14: FSPM FCoE support for Linux

Linux FSPM version	Oracle FS System release	Supported Linux versions	Supported Linux releases	FCoE adapter support
4.0	Oracle FS System 6.1+	CentOS	5.8+ 6.2+ 7.0+	FSPM supports all FCoE adapters which are fully supported for the operating system distribution used. The adapters connect through a fabric to FC ports on the Controller.
		Oracle Linux	5.8+ 6.2+ 7.0+	
		Red Hat Enterprise Linux	5.8+ 6.2+ 7.0+	
		Oracle VM Server for x86	3.1+	
		SUSE Linux Enterprise Server	11.1+ 12.0+	

FSPM FCoE Support for Solaris

Support Level: Solaris 10 and 11 are supported.

Note: See the *Solaris 11 FSPM Release Notes* for required patch levels.

Table 15: FSPM FCoE support for Solaris

FSPM version	Oracle FS System release	Advanced feature support	FCoE adapter support
4.0	Oracle FS System 6.1+	BFS Cluster	FSPM supports all FCoE Converged Network Adapters (CNAs) supported by Solaris I/O multipathing features.

FSPM FCoE Support for Windows

Support Level: Windows 2008 Standard, Enterprise, Datacenter, and R2, Windows 2012 and 2012 R2 Foundation, Essentials, Standard, and Datacenter are supported.

Table 16: FSPM FCoE support for Windows

FSPM version	Oracle FS System release	Advanced feature support	Interface card vendor	Interface card vendor driver
4.0	Oracle FS System 6.1+	None	Emulex	Firmware and Boot Code: 2.102.200.28 Ethernet NDIS miniport driver: 2.102.200.13 FCoE Storport miniport driver: 2.32.002
			Brocade (now QLogic BR series)	Boot Code: 2.2.0.0 Driver 2.2.0.0
4.0	Oracle Flash Storage 6.1+	None	QLogic QLE Series	• Boot code from multi-boot image: 1.01.54 • Ethernet NDIS miniport driver: 1.0.1.0 • FCoE Storport miniport driver: 9.1.8.26 • iSCSI Storport miniport driver: 2.1.5.37

Oracle Management Projects

Oracle Virtual Networking for Solaris

Oracle Virtual Networking (OVN) is supported when utilized with the Oracle FS Path Manager (FSPM).

For Solaris, Oracle Solaris 11.2 and later releases support Oracle Virtual Networking. Release 5.5.0 or later of the Oracle Virtual Networking Host Drivers must be installed on the host.

Oracle DPM for Windows and Solaris

Oracle Data Protection Manager (DPM) enables a Storage Administrator to create application-consistent backups of Oracle FS System LUNs. This product supports creation of Checkpoints, which are backups of LUN Consistency Groups.

Usually LUNs used by an application are grouped as an Application Consistency Group. Checkpoints can be scheduled based on the backup policies defined by the administrator.

For more information, refer to the *Oracle Data Protection Manager 3.5 User's Guide*.

Table 17: Applications supported by Data Protection Manager (DPM)

Storage model	DPM	Supported applications	Supported platforms
Oracle FS System 6.1+	3.5	Microsoft Exchange Server 2003, 2007, 2010, 2013 Microsoft SharePoint Server 2011, 2013 Microsoft SQL Server 2005, 2008, 2012	Windows Server 2008, 2008R2, 2012, 2012R2
		Oracle RDBMS 10g, 11g, 12c	Solaris (SPARC and x86-64) Release 10, 11 Oracle Linux 6.5, 7.0+ RHEL 5.8, 6.0, 7.0+

Oracle Front Porch Digital DIVA for Windows

Oracle Front Porch DIVA Content Storage Management software has been tested to work with the Oracle FS System FS1-2 Release 6.1 on Fibre Channel.

Support Level: Supported

Table 18: Oracle Front Porch DIVA content storage management support matrix

Storage model	Front Porch products	OS
Oracle FS System 6.1+	DIVArchive 7.2.2 DIVAdirector 5.2	Windows 2012 R2

Oracle Hybrid Columnar Compression

Hybrid Columnar Compression (HCC) for Oracle Flash Storage System is enabled on Oracle Database 11g R2 and 12c.

Support Level: Windows, Oracle Linux, and Solaris are supported.

Note: Oracle HCC is not supported with virtual disks when used with ASM within Solaris kernel zones.

The following table shows supported Oracle FS System firmware versions.

Table 19: Oracle Front Porch DIVA content storage management with Oracle FS R6.1

Storage model	ASM and RDBMS version	Platform	Notes
Oracle FS System 6.1+	11.2.0.4	Windows 2k8 R2/ 2k12 R2	
		Oracle Linux 6.6 - 7.1	
		Solaris Sparc 10, 11	Patch 20502905: WINDOWS DB BUNDLE PATCH 11.2.0.4.14
		Solaris x86 10, 11	Request this patch through MOS.
	12.1.0.2	Oracle Linux 6.6 - 7.1	Request this patch through MOS.
		Solaris Sparc 10, 11	Request this patch through MOS.
		Solaris x86 10, 11	No patch is necessary with 12.1.0.2 or later.
		Windows 2k8 R2/ 2k12 R2	Request this patch through MOS.

Oracle Solaris Cluster

Support Level: Supported

The Oracle Flash Storage System FS1-2 has passed the Sun Cluster Open Storage certification requirements for Oracle Solaris Cluster 3.3.

Note:

1   The Oracle Solaris Cluster supports up to a 4-node cluster.

2   To download the *Solaris Cluster 3 Configuration Guide*, which includes server and HBA details, refer to the following link: *http://my.oracle.com/content/native/cnt386993*.

Table 20: Oracle Solaris Cluster 3.3 on Oracle FS System R6.1 and higher

Storage	Oracle Solaris	Oracle Solaris cluster	Volume manager	Multi-path driver
Oracle FS System 6.1+	10	3.3 u2	Oracle Solaris Volume Manager	Oracle SAN driver in Solaris 10

The Oracle FS System FS1-2 has passed the Sun Cluster Open Storage certification requirements for Oracle Solaris Cluster 4.2.

Note:

1   The Oracle Solaris Cluster supports up to a 4-node cluster.

2   The Oracle Solaris Cluster 4.2 supports Solaris 11, starting with SRU2.

3   To view the *Solaris Cluster 4 Compatibility Guide,* refer to *http://
    www.oracle.com/technetwork/server-storage/solaris-cluster/overview/
    solariscluster4-compatibilityguide-1429037.pdf*

Table 21: Oracle Solaris Cluster 4.2 on Oracle FS System R6.1 and higher

Storage	Oracle Solaris	Oracle Solaris cluster	Volume manager	Multi-path driver
Oracle FS System 6.1+	11	4.2	Oracle Solaris Volume Manager	Oracle SAN driver in Solaris 11

Oracle Utilities

The Oracle FS CLI is a client-based application available to run administrative commands from a shell. Oracle FS System 6.1+ supports the CLI.

Support Level: Oracle FS CLI for Windows, Linux, Oracle VM Server, and Mac and OSX are supported.

The Oracle FS CLI software supports the OS platforms listed in the following table.

Table 22: Oracle utilities

Operating system	Version	Processor
Microsoft Windows	Windows 7, Windows 8, 2008, 2008 R2, 2012, 2012 R2	x86-32, x86-64
Oracle Linux, Red Hat Enterprise Linux, CentOS	5.8+, 6.2+, 7.0+	x86-32, x86-64
SuSE Linux	11.1+, 12.0+	
OVM	3.1+	Oracle Linux
Sun Solaris	10, 11	SPARC/x86
HP-UX	11i, v3	IA-64
AIX	5.3+, 6.1+, 7.1+	PPC
MAC and OSX	10.6+	PowerPC and Intel Core Duo

Oracle Plug-Ins

Oracle VM Storage Connect Plug-In

The Oracle Virtual Manager Storage Connect plug-in allows provisioning of the Oracle Flash Storage System directly through the Oracle Virtual Manager.

Support Level: Supported

Table 23: Oracle FS System Oracle Virtual Manager 3.3 Storage Connect plug-in

Oracle FS System release	Plug-in version
6.1	2.0

Oracle Flash Storage Enterprise Manager Plug-In for Oracle

The Oracle Flash Storage Systems EM Plugin extends Oracle FS Systems EM Plugin Grid Control to enable system monitoring and provisioning of one or more instances of the FS1-2 system.

Support Level: Supported

Table 24: Oracle FS Systems EM Plugin Plug-in support matrix

Oracle FS System release	Plug-in version	Oracle database
6.1, 6.2	12.1.0.2.0	13c Release 1
6.1, 6.2	12.1.0.2.0	12c Release 5
6.1	11.1.0.1	11g Release 1

Oracle FS1 VASA Provider for VMware

Oracle FS1 VASA Provider is an Oracle implementation of the VMware vSphere Storage APIs for Storage Awareness for Oracle FS System. VASA integrates Oracle FS CLI with the vCenter for management functionality.

The FS1 VASA Provider 1.0 supports the ESXi 5.x Host. The FS1 VASA Provider 2.0 supports the ESXi 6.x Host.

The following table shows the supported operating systems for the VASA provider:

Table 25: Oracle FS1 VASA Provider

Storage model	VASA provider products	Operating systems
Oracle FS CLI 6.1+	Version 1.0	• Windows 2012 R2 • Oracle Solaris Release 11+ (SPARC x86 and x64) • Oracle Unbreakable Linux Version 7.0+ (x64), Version 6.0 (x86)
Oracle FS CLI 6.2+	Version 2.0	• Windows 2012 R2 • Oracle Solaris Release 11+ (SPARC x86 and x64) • Oracle Unbreakable Linux Version 7.0+ (x64), Version 6.0 (x86) • Oracle Linux 6.0 (x64)

Oracle vSphere Plug-In 3.5

The Oracle vSphere Plug-in 3.5 provides additional tabs in the vSphere console that enables an Administrator to view, to provision, and to manage Oracle FS System.

Oracle has developed a plug-in that supports a Single Pane of Glass (SPOG) monitoring and administering capability for customers using Oracle FS System FS1 for VMware environments.

Note: This version of the plug-in supports vSphere 5.5 and Oracle FS Systems Release 6.1.

Refer to the *Oracle vSphere Plug-in for Oracle Flash Storage Systems User's Guide* for more information on the features and instructions on installation and configuration. The vSphere 5.5 plug-in is available for download on OTN from the section Oracle Flash Storage and Pillar Axiom Downloads.

Table 26: Oracle vSphere plug-in

Storage model	Oracle vSphere plug-in	VMware vSphere
Oracle FS System 6.1+	Plug-in version 3.5	vSphere release 5.5

Oracle Flash Storage System Manager Java GUI

Support Level: Supported

Oracle FS System R6.1 provides a Java-based GUI which is downloadable from the Oracle FS System array web IP address.

Note:

1   Linux and Windows platforms require Java version 1.7.0 or higher.

2   For more information on the Flash Storage Systems Manager Java GUI, refer to the *Oracle Flash Storage Administrator's Guide* and the latest release notes.

Table 27: Oracle FS System Manager operating system support

Operating system	Version
Windows	7, 32/64 bit 8, 32/64 bit 2008, R2 2012, R2
Linux	Oracle Linux Red Hat Enterprise Linux SuSE CentOS
Solaris	10, 11

Third-Party Certifications and Hardware

Brocade Fibre Channel Switches

Support Level: Supported

Support for the Brocade family of switches is listed with the major and minor release (that is, 6.2). Any patch release is also considered supported (that is, 6.2e). The following table contains information for the Oracle FS System F1-2 R6.1+ release.

Note:

1   End-of-life products are listed only for the existing installed base. End-of-life products include:

- 200E
- 3900
- 3250
- 3850
- 12000
- 24000

2   To view the Brocade Compatibility Matrix, refer to: *http://www.brocade.com/ content/dam/common/documents/content-types/product-matrix/brocade-compatibility-matrix-fos-7x-mx.pdf*

Table 28: Brocade switches on the Oracle FS System

Data rate	Model	Blade	Firmware level
4 Gb/s	M4400 or M4700	N/A	8.00.01.2, 8.02.00
	M6140		8.00.01.2, 8.02.00
	200E		5.3.0, 6.1, 6.2
	3900		5.2.0b, 5.2.1
	3250, 3850		5.2.1, 5.3.0
	4100, 4900, 5000		5.3.0, 6.3, 6.4, 7.x
	12000	FC4-16, FC4-32, FC4-48	5.0.5b
	24000		5.3.0

Table 28: Brocade switches on the Oracle FS System (continued)

Data rate	Model	Blade	Firmware level
4 Gb/s 8 Gb/s	48000	FC4-16, FC4-32, FC4-48 FC8-16	5.3.0, 6.3, 6.4, 7.x
		FC8-32 FC8-48	6.1, 6.2, 6.3, 6.4, 7.x
8 Gb/s	300 5100, 5300, 8000	N/A	6.3, 6.4, 7.x
	DCX Backbone	FC8-16, FC8-32, FC8-48	6.3, 6.4, 7.x
	DCX-4S		6.3, 6.4, 7.x
16GB/s	6505, 6510, 6520	N/A	7.x
	8510	FC16-32, FC16-48	

Cisco Converged Switches

Support for the Cisco converged switches is listed with the protocol and firmware level.

Support Level: Interoperable

The following table contains information for the Oracle Flash Storage F1-2 R6.1+ release.

Note: When testing 10 Gb switches, the ports are configured for 10 Gb Ethernet only. Use the appropriate physical hardware components to achieve connectivity.

Table 29: Cisco switches on the Oracle Flash Storage System

Model	Protocol	Firmware level
Nexus 2000	FC	5.2(1)N1(4)
Nexus 5000	FC	7.0(5)N1(1)
	10Gb	5.2(1)N1(4) 7.0(5)N1(1)
Nexus 7000	FC	5.2(1)N1(4) 7.0(5)N1(1)
MDS 9000 Series	FC	5.2x 6.2x

Cisco Unified Computing System (UCS)

The UCS Managed Servers (versions 2.2.6, 2.2.7, and 2.2.8) are interoperable with the Oracle FS System FS1-2, R6.2 release and beyond.

Support Level: Interoperable

The following table contains information for the Cisco UCS Managed Servers on the Oracle FS System.

Note: You can refer to the Cisco UCSM Compatibility and Support Matrix at: *https://ucshcltool.cloudapps.cisco.com/public/*.

Table 30: Cisco switches on the Oracle FS System

Model	Protocol	Firmware level
Nexus 2000	FC	5.2(1)N1(4)
Nexus 5000	FC	7.0(5)N1(1)
	10Gb	5.2(1)N1(4) 7.0(5)N1(1)
Nexus 7000	FC	5.2(1)N1(4) 7.0(5)N1(1)
MDS 9000 Series	FC	5.2x 6.2x

Citrix XenServer

Citrix XenServer has been certified for use with Oracle FS System for all guest OSs supported by Citrix for XenServer.

The following link displays the Xenserver Hardware Compatibility and Support Matrix: *http://hcl.xensource.com/*

Table 31: Oracle FS System and Citrix XenServer

Version	FS1-2 base	FS1-2 performance
Citrix XenServer Release 6.5	R6.1, FC Protocol	6.1, FC Protocol

FalconStor Servers

The Oracle FS System is supported on the following FalconStor Network Storage Server (NSS) and Freestor Storage Server (FSS) with Asymmetric Logic Unit Access (ALUA).

Note: When ALUA certification is listed for a device, it is only valid for CDP/NSS and FSS.

Table 32: FalconStor devices supported on Oracle FS System

Manufacturer	Device	Product	Comments
Oracle	Oracle FS System	CDP/NSS, versions: • 8.00 • 7.8.0 • 7.7.0 • 7.6.0 • 7.5.0 • 7.0.0	• Firmware 06.00.00 • Fibre Channel only • Implicit ALUA certified
		FS HA with stretch cluster	Firmware 06.00.00 to 06.02.04
		FSS I/O multicluster with stretch cluster	Firmware 06.00.00 to 06.02.04
		FDR OBD 8.20	• Firmware 06.00.00 • Fibre Channel only

Fujitsu M10 Server Series

The Oracle FS System FS1-2, R6.1+ platform and software release is supported for use with the Fujitsu M10 Server Series Platforms: M10-1 (single-socket), M10-4 (quad socket without interconnect), and M10-4S (quad socket with interconnect).

Fujitsu M12 Server Series

Support Level: Supported

The Oracle FS System FS1-2, R6.2+ platform and software release is supported for use with the Fujitsu M12 Server Series platforms; M12-2 (Dual-Socket without Interconnect) and the M12-2S (Dual & Quad-Socket with Interconnect)

IBM SAN Volume Controller

Oracle Flash Storage System FS1-2 has been certified for use with the IBM SAN Volume Controller (SVC).

Support Level: Interoperable

Note: To view the latest supported hardware list and device driver and firmware levels for the IBM SAN Volume Controller, refer to the following link: *http://www-01.ibm.com/support/docview.wss?uid=ssg1S1004946*.

Table 33: Oracle FS System and IBM SVC

Model	Firmware	SVC Version	Supports SAN volume controller quorum disks	Support for MDisks > 2 TB	Multipathing
Oracle FS System FS1-2	6.1	7.4	Yes	Yes	Mdisk Group Balancing
Oracle FS System FS1-2	6.2.x	7.4	Yes	Yes	Mdisk Group Balancing

Microsoft Windows Certifications

Oracle FS System FS1-2, R6.1 has been certified for the Microsoft Windows Server after succesful completion of the Windows HCK (Hardware Certification Kit) suite of tests for RAID-based storage systems.

To view the Oracle FS System in the Microsoft Server Catalog of Tested Products, refer to the *http://www.windowsservercatalog.com/item.aspx?idItem=cae0f9ba-4795-4e94-0d94-237265aa6f3f&bCatID=1282*.

Table 34: Microsoft HCK Certified Configurations for x86-64

Host operating system	Windows Server 2008 R2	Windows Server 2012 and Windows Server 2012 R2
Protocol	FC	FC
Host Multi-Path Software Used	Oracle FSPM 4.0	Oracle FSPM 4.0

OpenStack Cinder Driver for Oracle FS1-2

The Oracle Cinder Driver provides the capability for provisioning and maintaining Oracle FS System SAN Storage Volumes.

Support Level: Supported

The drivers are currently not available in the upstream release, but you can download the drivers from the following site: *http://www.oracle.com/technetwork/ server-storage/san-storage/downloads/index.html*

Table 35: Oracle FS System qualification for OpenStack

Model	Firmware	Oracle FS System Cinder Driver	OpenStack release
Oracle FS System FS1-2	6.1	Release 1.0	Juno
		Release 1.0.1	Kilo

Veritas Symantec VCS for HA for Linux 7.1

The Veritas/Symantec Cluster Server (VCS) provides high reliability for host-side applications, such as the Oracle RDBMS.

Support Level: Interoperable

Only one of the host application instances is active at once. The VCS services ensure that host applications fail over to the stand-by node in case of disruption.

Note:

1 The Oracle database high availability (HA) configuration was tested on LVM and native filesystems on which the Oracle FSPM was used to manage the device.

2 I/O fencing and dynamic multipathing (DMP) are not supported without the Oracle FS System FS1-2 Array Support Library (ASL).

Table 36: Oracle FS1 qualification for Veritas/Symantec VCS

Model	Firmware	Symantec VCS	Host OS
Oracle FS System FS1-2	6.1	Release 6.2	Oracle Linux 7.1 (unbreakable kernel)

Veritas/Symantec SFHA/SFRAC for Solaris 11 SPARC

Veritas/Symantec Storage Foundation for Oracle RAC (SFRAC) leverages storage management and high availability technologies to enable robust, manageable, and scalable deployment of Oracle RAC on UNIX platforms. Veritas has developed the Array Support Library (ASL) to enable Oracle FS1-2 Storage support for the SFHA/SFRAC stack.

Support Level: Interoperable

Oracle FS System FS1-2 has been certified for use with the Veritas/Symantec 6.2 SFRAC stack with the Oracle 12c database on Solaris 11 SPARC platforms.

Note:

1   SAN boot with Oracle FS System FS1-2 is supported, but the SFRDE feature is not supported with ZPOOL.

2   Oracle RAC database version 12.1.0.2.0 was tested with the SFRAC 6.2 stack.

Table 37: Oracle FS System qualification for Veritas/Symantec SFRAC stack

Model	Firmware	Symantec VCS	Host OS
Oracle FS System FS1-2	6.1	Release 6.2	Solaris 11 SPARC

Veritas Symantec SFHA/SFRAC for Windows 2012 R2

Veritas Storage Foundation for Oracle RAC (SFRAC) leverages storage management and high availability technologies to enable robust, manageable, and scalable deployment of Oracle RAC on UNIX platforms. Veritas has developed the Array Support Library (ASL) to enable Oracle FS System FS1-2 support for the SFHA/SFRAC stack.

Support Level: Interoperable

Oracle FS System FS1-2 has been certified for use with the Veritas/Symantec 6.2 SFRAC stack with the Oracle 12c database.

Note:

1   Storage Foundation for Windows 6.1, 6.2, and 7.0 supports the Windows Server 2012 and Windows Server 2012 R2 with Virtual Fibre Channel configurations.

2   Cluster Volume Manager now only supports Microsoft Failover Cluster (FOC) with A/A and A/A-A (ALUA) arrays.

Table 38: Oracle FS System qualification for VERITAS SFRAC stack for Windows

Model	Firmware	SFRAC	Host OS
Oracle FS System FS1-2	6.2	Release 6.2	Windows 2012

VMware ESXi 5.1 Certification

VMware vSphere ESXi 5.1 server has been certified for Oracle FS Systems for FC SAN protocol.

Multipath support is provided by the ESXi server. The Oracle FS Path Manager is not needed nor recommended.

Table 39: Oracle FS Systems certified for VMware ESXi 5.1

Version	FS1-2 base	FS1-2 performance
FC	6.1	6.1

VMware ESXi 5.5 Certification

VMware vSphere ESXi 5.5 server has been certified for Oracle FS1 Flash Storage systems for FC SAN protocol.

Note:

1   Multipath support is provided by the ESXi server. The Flash Storage Path Manager is not needed nor recommended.

2   For more information, refer to the *VMware HCL Compatibility Guide* at *http:// www.vmware.com/resources/compatibility/search.php* for details.

Table 40: Oracle Flash Storage Systems certified for VMware ESXi 5.5

Version	FS1-2 base	FS1-2 performance
FC	6.1 6.2	6.1 6.2

VMware ESXi 6.0 Certification

VMware vSphere ESXi 6.0 server has been certified for Oracle FS Systems for FC SAN protocol.

Note:

1   Multipath support is provided by the ESXi server. The Oracle FS Path Manager is not needed nor recommended.

2   For more information, refer to the *VMware HCL Compatibility Guide* at *http:// www.vmware.com/resources/compatibility/search.php* for details.

Table 41: Oracle FS Systems certified for VMware ESXi 6.0

Version	FS1-2 base	FS1-2 performance
FC	6.1 6.2	6.1 6.2

VMware VAAI Integration

The Oracle FS System supports all of the SCSI primitives that make up the vSphere® Storage APIs – Array Integration (VAAI) component of VMware. These SCSI primitives consist of ATS, UNMAP, WRITE_SAME, and XCOPY.

To utilize VAAI, ensure that the following environmental requirements are satisfied:

- The Oracle FS System storage array is running software release 06.02.02 or higher.

- The SAN hosts are running one of the following GA versions of VMware ESXi and vSphere:

  - 5.1

  - 5.5

  - 6.0

- The SAN hosts are running one of the following guest OSs:

  - Windows Server 2008 or higher

  - OL6 or higher

  - Solaris 10 or higher

Important: For the UNMAP and the XCOPY primitives to function as expected, use the VMware GUI to configure the LUNs that will be used to support VAAI. The VMware GUI will configure the partition offsets of these LUNs correctly. The VMware CLI tools, however, will not configure those offsets correctly. For more information, refer to the VMware Knowledge Base article that is titled Thin Provisioning Block Space Reclamation (VAAI UNMAP) does not work: *http:// kb.vmware.com/kb/2048466*.

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