

# Dell Fluid Cache for SAN

## Compatibility Matrix

## Notes, cautions, and warnings

 **NOTE:** A NOTE indicates important information that helps you make better use of your product.

 **CAUTION:** A CAUTION indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.

 **WARNING:** A WARNING indicates a potential for property damage, personal injury, or death.

<b>Chapter 1: Overview.....</b>	<b>4</b>
About this document.....	4
Abbreviations.....	4
<b>Chapter 2: Dell Fluid Cache for SAN Compatibility Matrix.....</b>	<b>5</b>
Supported Fluid Cache versions.....	5
General Requirements.....	5
Compatible operating systems.....	5
Compatible client servers.....	6
Compatible cache contributor servers.....	6
Compatible network adapters.....	7
Compatible cache media.....	8
Compatible storage controller, EM, and SC.....	8
ESXi Fluid Cache Host connectivity to back-end SC8000 SAN storage .....	9
Compatible cache network switches.....	9
<b>Chapter 3: Other important Fluid Cache for SAN compatibility information.....</b>	<b>10</b>

# Overview

Dell Fluid Cache for SAN is a server-side caching accelerator software. Fluid Cache makes high-speed PCI Express (PCIe) SSDs a shared, distributed cache resource. Fluid Cache is deployed on clusters of Dell PowerEdge systems connected using RDMA over Converged Ethernet (RoCE)-enabled Ethernet adapters and operates within a SAN environment employing a Dell Compellent backing store.

## Topics:

- [About this document](#)
- [Abbreviations](#)

## About this document

This document lists the compatibility matrix of different components included in the Dell Fluid Cache for SAN infrastructure.

## Abbreviations

The following table lists the abbreviations used in this document:

**Table 1. Abbreviations**

Abbreviations	Description
CNA	Converged network adapter
CMC	Dell Chassis Management Controller
DCB	Data Center Bridging
EM	Enterprise Manager
FC	Fibre Channel
FCoE	Fibre Channel over Ethernet
HBA	Host Bus Adapter
iDRAC	integrated Dell Remote Access Controller
LC	Dell Lifecycle Controller
PCIe	PCI Express
RoCE	RDMA over Converged Ethernet
RDMA	Remote Direct Memory Access
SSD	Solid-state drive
SC/SCOS	Storage Center Operating System
SR-IOV	Single root I/O virtualization
PERC	Dell PowerEdge RAID Controller

# Dell Fluid Cache for SAN Compatibility Matrix

## Topics:

- Supported Fluid Cache versions
- General Requirements
- Compatible operating systems
- Compatible client servers
- Compatible cache contributor servers
- Compatible storage controller, EM, and SC
- ESXi Fluid Cache Host connectivity to back-end SC8000 SAN storage
- Compatible cache network switches

## Supported Fluid Cache versions

Following are the supported Fluid Cache for SAN versions:

- Fluid Cache for SAN for Linux systems, version 2.1.0
- Fluid Cache for SAN for VMware systems, version 2.1.0

## General Requirements

- Verify with your account team for supported VMware and Linux configuration for Fluid Cache deployments.
- The cluster on which you deploy Fluid Cache must contain a minimum of three servers per each cache cluster and a maximum of nine servers.
- The maximum cache size must not exceed 3.2 TB per server for Linux and VMware systems.
- There must be a cache device installed on at least two servers in the cluster for write-back caching.
- A network adapter that supports RoCE must be installed on each server in the cluster.
- Enterprise Manager must be started and configured to manage the Storage Center (SC) in use with Fluid Cache.
- All servers in the cluster must be connected to the SAN and be displayed on the Dell Compellent array.

For information on Fluid Cache deployment prerequisites, preparing the servers and cache network switch, installing and setting up Fluid Cache, and configuring and managing Fluid Cache clusters on VMware or Linux systems, see the respective Fluid Cache deployment guides available at [dell.com/CacheSolutions](http://dell.com/CacheSolutions).

## Compatible operating systems

**Table 2. Compatible operating systems**

Fluid Cache for SAN version	Compatible operating system
2.1.0 (VMware)	<ul style="list-style-type: none"> <li>• VMware ESXi 5.5 Update 2 (64-bit), VMware vCenter Server 5.5</li> <li>• VMware ESXi 5.5 Update 3 (64-bit), VMware vCenter Server 5.5</li> <li>• VMware ESXi 6.0 (64-bit), VMware vCenter Server 6.0</li> <li>• VMware ESXi 6.0 Update 1 (64-bit), VMware vCenter Server 6.0</li> <li>• VMware ESXi 6.0 Update 2 (64-bit), VMware vCenter Server 6.0</li> </ul>

**Table 2. Compatible operating systems (continued)**

Fluid Cache for SAN version	Compatible operating system
	<p><b>i</b> <b>NOTE:</b> vSphere Enterprise Plus license required for SR-IOV support (for Mellanox ConnectX-3 Adapters).</p> <p><b>i</b> <b>NOTE:</b> VMware ESXi 5.5 versions up to update 3 and VMware ESXi 6.0 versions up to update 2 support iSCSI or FC to access Fluid Cache volumes.</p>
2.1.0 (Linux)	<ul style="list-style-type: none"> <li>• Red Hat Enterprise Linux 6.4 (64-bit)</li> <li>• Red Hat Enterprise Linux 6.5 (64-bit)</li> <li>• Red Hat Enterprise Linux 6.7 (64-bit)</li> <li>• Novell SUSE Linux Enterprise Server (SLES) 11 SP3 (64-bit)</li> <li>• Oracle Enterprise Linux 6.4 (64-bit)</li> <li>• Oracle Enterprise Linux 6.5 (64-bit)</li> </ul>

## Compatible client servers

**i** **NOTE:** For Fluid Cache for VMware, all servers must support Single Root Input/Output Virtualization (SR-IOV).

Compatible with Dell's 11th, 12th, and 13th generation of PowerEdge servers and non-Dell servers that meet the following requirements:

- Must run latest firmware versions on the server components, such as BIOS, iDRAC, Chassis Management Controller (CMC), and Lifecycle Controller (LC).
- Must run a compatible operating system that support installing Mellanox Ethernet adapter.
- Must support Mellanox ConnectX-3 10G/40G adapters used in private cache network with compatible firmware and driver versions.
- RAM requirements:
  - Linux systems — Minimum 32 GB RAM, 64 GB recommended
    - i** **NOTE:** If you are using more than 1.6 TB of cache per server, minimum 128 GB of RAM is recommended.
  - VMware systems — Minimum 64 GB RAM (VSA uses 24 GB of DRAM)
- Dell Fluid Cache for SAN software.

## Compatible cache contributor servers

This section lists the compatible cache contributor servers for Fluid Cache for SAN (Linux and VMware) systems.

### PowerEdge rack servers

Compatible with following rack servers running latest firmware versions.

**i** **NOTE:** Ensure that Dell's 12th generation of PowerEdge servers are purchased with an Express Flash NVMe PCIe slot.

- Dell PowerEdge R620
- Dell PowerEdge R630
- Dell PowerEdge R720
- Dell PowerEdge R730

**i** **NOTE:**

Dell PowerEdge R730 is a validated Cache Contributor server that does not support SSDs. In a three node configuration, you must use two validated Cache Contributor server nodes with PCIe SSDs and the third server could be the R730 without PCIe SSDs

- Dell PowerEdge R730xd
- Dell PowerEdge R820
- Dell PowerEdge R920
- Dell PowerEdge R930

## PowerEdge modular servers

Compatible with following modular servers within M1000e and FX2s chassis running the latest firmware versions.

- M1000e:
  - Dell PowerEdge M620
  - Dell PowerEdge M820
  - Dell PowerEdge M630
- FX2s:
  - PowerEdge FC630

## PowerEdge tower servers

Compatible with Dell PowerEdge T630 running the latest firmware versions.

## Compatible network adapters

### Cache network adapters

The following table lists the Fluid Cache versions and compatible cache network adapters.

**Table 3. Cache network adapters**

Fluid Cache version	Adapter	Required driver version (Required)	Minimum firmware version	
			Rack servers	Blade servers
2.1.0 (VMware)	<ul style="list-style-type: none"> <li>• Mellanox ConnectX-3 Dual Port 10 GbE SFP+ Adapter</li> <li>• Mellanox ConnectX-3 Dual Port 40 GbE QSFP+ Adapter</li> <li>• Mellanox ConnectX-3 Dual Port 10 GbE KR Mezzanine Adapter</li> </ul>	<ul style="list-style-type: none"> <li>• 1.9.10.2</li> <li>• 1.9.10.6</li> </ul> <p><b>NOTE:</b> These driver version supported on all versions of VMware.</p>	2.30.5118	2.30.5160
2.1.0 (Linux)	<ul style="list-style-type: none"> <li>• Mellanox ConnectX-3 Dual Port 10 GbE SFP+ Adapter</li> <li>• Mellanox ConnectX-3 Dual Port 40 GbE QSFP+ Adapter</li> <li>• Mellanox ConnectX-3 Dual Port 10 GbE KR Mezzanine Adapter</li> </ul>	<ul style="list-style-type: none"> <li>• RHEL 6.7: 3.2-1.0.1.1</li> </ul>		

\* The Mellanox ConnectX-3 Driver version 2.0-2.6.8 will not install by default on OEL6.4 systems. Workaround: Edit the distro file for RHEL6.4 and change the RHEL6.4 to OEL6.4.

## Fibre Channel HBAs

The following are the validated Fibre Channel Host Bus Adapters (HBA). For more information on compatible Fibre Channel HBAs, see the section 4.1.1 Fibre Channel host bus adapters of the [Dell Storage Compatibility Matrix](#).

- QLogic 2560, single-port 8 GB, Optical Fibre Channel HBA
- QLogic 2562, dual-port 8 GB, Optical Fibre Channel HBA
- QLogic 2660, single-port 16 GB, Fibre Channel HBA, full height
- QLogic 2662, dual-port 16 GB, Fibre Channel HBA, full height
- Emulex LPE 12000, single-port 8 GB, Fibre Channel HBA
- Emulex LPE 12002, dual-port 8 GB, Fibre Channel HBA
- Emulex LPe16000B, single-port 16 GB, Fibre Channel HBA
- Emulex LPe16002B, dual-port 16 GB, Fibre Channel HBA


## iSCSI HBAs and Software iSCSI Initiator

For the list of validated compatible iSCSI HBAs that can be used with Dell Storage, see the section 4.1.3 *iSCSI converged network and host bus adapters* of the [Dell Storage Compatibility Matrix](#).

For the list of compatible software iSCSI initiators that can be used with Dell Storage and Fluid Cache for SAN for VMware systems, see the section 4.1.5 *Software iSCSI initiators* of the [Dell Storage Compatibility Matrix](#).

## Compatible cache media

The following table lists the supported cache media with compatible storage sizes, drivers, versions, and maximum SSD storage capacity supported by Fluid Cache on each cache node.

 **NOTE:** The SSD cache media are supported only with the validated driver versions listed in the table.

**Table 4. Compatible cache media**

Cache media	Supported storage size	Supported drivers	Supported versions	Maximum SSD storage capacity supported on each cache node
Dell Express Flash PCIe SSD SLC Drives	175 GB or 350 GB	Refer to the respective server platform specifications for the supported drivers.	IPM0DD3Q170	<ul style="list-style-type: none"> <li>• * 3.2 TB for 2.1.0 (VMware)</li> <li>• 3.2 TB for 2.1.0 (Linux)</li> </ul>
Dell Express Flash PCIe SSD MLC NVMe Drives	400 GB, 800 GB or 1.6 TB		IPM0DD3Q170	
Micron P420m MLC SSD card	700 GB or 1.4 TB		B1490908	

*\*To support 3.2 TB of SSD memory size, the memory size of the VSA should be increased to 34 GB.*

## Compatible storage controller, EM, and SC

The following table lists the Fluid Cache for SAN versions with compatible Storage Controller, Enterprise Manager (EM) software, and Storage Center (SC) versions. For more information about compatibility with Dell Storage and EM, see the [Dell Storage Compatibility Matrix](#).

For Enterprise Manager and SCOS compatibility information, see the section “3.2 Enterprise Manager” of the [Dell Storage Software Release and Support Policy](#).

**Table 5. Compatible storage controller, EM, and SC**

Fluid Cache version	Storage Controller	Enterprise Manager Version	Storage Center Version
2.1.0 (VMware)	<ul style="list-style-type: none"> <li>• SC8000</li> </ul>	<ul style="list-style-type: none"> <li>• Dell Compellent Enterprise Manager 2015 R3</li> </ul>	<ul style="list-style-type: none"> <li>• Dell Compellent Storage Center version 6.7.4 and 6.7.5</li> </ul>
2.1.0 (Linux)	<ul style="list-style-type: none"> <li>• SC9000</li> <li>• SC8000</li> </ul>	<ul style="list-style-type: none"> <li>• Dell Compellent Enterprise Manager 2015 R3</li> </ul>	<ul style="list-style-type: none"> <li>• Dell Compellent Storage Center version 6.7.4 and 6.7.5</li> </ul>

For best practices to be followed on configuring Dell Storage, see the following links:

- <http://en.community.dell.com/techcenter/storage/w/wiki/5018.compellent-technical-content>

- <http://en.community.dell.com/techcenter/storage/w/wiki/2648.dell-compellent>
- [http://en.community.dell.com/techcenter/extras/m/white\\_papers/tags/Compellent](http://en.community.dell.com/techcenter/extras/m/white_papers/tags/Compellent)

## ESXi Fluid Cache Host connectivity to back-end SC8000 SAN storage

The following are the required iSCSI and Fibre Channel ESXi host back-end connectivity to Dell Storage Controller SC8000 SAN Storage platforms.

- **SCSI/iSCSI ( iSCSI to both standard CML volumes and FLDC volumes)** — Requires a minimum of one dual port iSCSI NIC/HBA adapters.

**NOTE:** When using standard storage volume, to avoid high availability and possible performance issues by using two dual port iSCSI NIC/HBA adapters, use the first dual port iSCSI NIC/HBA for standard volume traffic and the second dual port iSCSI NIC/HBA for Fluid Cache volume traffic.

- **FC/iSCSI (FC to Standard CML volumes and iSCSI to FLDC volumes)** — Requires a dual port FC HBA and a dual port iSCSI Nic/HBA.
- **iSCSI/FC (iSCSI to standard CML volumes and FC to FLDC volumes)** — Requires a dual port iSCSI Nic/HBA and a dual port FC HBA.
- **FC/FC (FC to Standard CML volumes and FC to FLDC volumes)** — Requires two dual port FC Adapters.

## Compatible cache network switches

**NOTE:** Data Center Bridging (DCB) is not supported on cache network.

Fluid Cache is validated with the following compatible Dell or Cisco RoCE compliant switches running the latest firmware versions. For information on host and switching devices that have been validated for use with SC Series (Compellent), see the section 3 *Switches* of the [Dell Storage Compatibility Matrix](#). For information on how to configure cache network switches, see the [Switch Configuration Guides for EqualLogic or Compellent SANs](#).

- Dell Networking N4032F
- Dell Networking N4064F
- Dell Networking S4048-ON
- Dell Networking S4810
- Dell Networking S5000
- Dell Networking S6000
- Dell Networking Z9500
- Dell Networking MXL Blade
- Cisco Nexus 5548UP

## Other important Fluid Cache for SAN compatibility information

The following table lists Fluid Cache for SAN compatibility and interoperability information with other miscellaneous features or products.

**Table 6. Miscellaneous Fluid Cache for SAN compatibility information**

<b>Feature or Product</b>	<b>Support capability by Dell Fluid Cache for SAN</b>
Live Volume	Not Supported
Replication: Sync	Not Supported. If it is configured, can cause data loss.
FCoE Protocol Usage	Not Supported
Compellent SRS with VMware SRM	Not Supported