Lenovo ThinkSystem DM Series Storage Statements of Support

Contents

1 Overview

This support statement describes SAN and NAS components (such as switches, Host Bus Adapters, and operating systems) that have been tested, verified or unverified in Lenovo storage labs. The results demonstrate that ThinkSystem DM Series, under normal operating conditions, should perform as expected and as described in Lenovo Storage product documentation.

1.1 Definitions

For the purposes of this document, the following definitions apply:

Support: The existence of active services coverage defined by the following levels of service:

- **Essential Service:** 24x7x4 hour response time, includes YourDrive YourData coverage
- **Foundation Service:** Next Business Day Response, during normal business hours, 5 days per week
- **Premier with Essential Service:** Essential service defined as above with direct access to skilled Lenovo technicians through a dedicated phone number.
- **Premier with Foundation Service:** Foundation service defined as above with direct access to skilled Lenovo technicians through a dedicated phone number.

For additional details on Lenovo's Data Center Support please visit Lenovo Data Center Services Agreement and our Lenovo Support Services page

Storage solution: The end-to-end set of components, such as the operating system, network controller, switch, and switch firmware, and array firmware that permits a host-to-target communication.

Component: The individual parts of a storage solution in the form of host network interface adapters iSCSI initiators, iSCSI HBAs, switches, and arrays.

Category1: Storage solution tested end to end and Lenovo's agreement to support customer's infrastructure

Category 2: Lenovo recognizes compatibility of the DM Series product within a specific customer environment and will support DM Series within said customer environment, this must follow all requirements listed in section 2.2.

Category 3: Non supported customer infrastructure. Lenovo will not support DM Series within named customer environments in section 2.3.

Compatibility: When a storage solution should work within a certain environment, this is not a statement of support.

CORE: Lenovo Internal process used to evaluate exception-based requests to support customer environments that are not listed as supported in Lenovo's category 1 or category 2 support statements. For the DM interop CORE requests, the evaluation will be conducted by validating the submitted configuration against the established ONTAP Interoperability Matrix. There will be no additional testing to validate configuration.

1.2 Abbreviations and Terminology

Abbreviations and terminology used in this document are defined below

Abbreviation	**Term**	**Descriptions**
FC	Fibre Channel	A networking technology used in storage networks
iSCSI	iSCSI	A networking technology used in storage networks
FW	Firmware	Typically, the main operating system for an appliance-type device or component such as a NIC, switch, or other device; typically, not user-interactive, though it may contain subsystems that provide user interaction such as a command line interface

HBA	Host bus Adapter	Indicates a device that provides hardware-based FC /iSCSI storage functionality
CNA	Converged Network Adapter	Computer input/ output device which combines the functionality of an HBA with a Network Interface controller
OS	Operating system	The core software of a system

2 Lenovo Storage support policy statement

This support statement details the varying categories of Lenovo support for the entire line of DM Storage systems. While Lenovo tests on a wide variety of devices, it is impossible to test every device or version for all vendors with which Lenovo Storage products can interoperate. Therefore, **the information presented in this document does not constitute a complete list of what is supportable**, but simply a list of what has been specifically tested, what Lenovo deems as a compatible customer environment for DM Series and therefore should work as expected and what is not supported with DM Series.

2.1 Category 1: Full contractual support

For tested components listed in this compatibility matrix, (and for the specific firmware or software version listed), Lenovo may provide storage solution support under an active Lenovo Support contract, assuming that all other components in the storage solution are also **under contracted support with their respective manufacturers and that documented, recommended design best practices are followed.**

General support is provided as follows:

- Category 1 support for iSCSI and FC Lenovo sold switches
- Category 1 support for supported shipping versions of the following operating systems:
    - Windows Server
        - 2016/ Hyper-V
        - 2019/Hyper-V
    - RHEL
        - 7/U6/U7/U8
        - 8/U1
    - SLES
        - 12/SP4/SP5
        - 15/SP1
    - VMware ESXi
        - 6.7/U1/U2/U3
        - 7.0

For the full interoperability detail, please visit our support site

2.2 Category 2: Best Effort Support (BES)

Category 2 applies to components, or instances in which a customer has not or is not willing to apply accepted Lenovo recommended practices outlined in Category 1. **If the customer has an active support contract with the appropriate vendor(s), and an active Lenovo Services contract, Lenovo may provide support to the DM Series and any other Lenovo branded components if listed in our Category 2 interop matrix found here This support category lasts until such time as it is determined, in Lenovo's sole discretion, that a problem lies within the untested component. Lenovo is not required to support or assist with support of any third party products or any products not listed directly in our Category One interop.**

Lenovo does not guarantee that issues undertaken on a BES basis will be resolved in a timely fashion, or at all. There is a possibility that the customer would need to replace an untested component or take the affected system out of production to resolve the issues. In order to provide Best Effort Support it is required that the system being serviced has Auto Support enabled and is properly registered. OS's that fall under BES support:

- Oracle:
  - Linux 7.7, 7.8, 8.0, 8.1
  - VM 3.4.4, 3.4.5
- Citrix
  - Citrix Hypervisor 8.0, 8.1
- CentOS
  - CentOS 7.6, 7.7, 8.0, 8.1
- Ubuntu 18.04
- Solaris:
  - Solaris 11.4

Typically, the versions of OS that Lenovo can provide BES support for are N-1 from the most recent OS version that is in the market today. If there is a request for a non N-1 OS please visit section 2.2.1. **The OS's listed above must be deployed on an x86 server to be considered Category 2 support. If these OS's are not deployed on an x86 server please see Section 2.2.1 for more details. For additional information regarding our Category 2 support, please consult our Category 2 interop found here.**

2.2.1 Category 2: BES Engagement (non x86 servers and non N-1 OS's)

Host OS's not listed under category 2 but do not fall under category 3 or are listed within category 2 but are not being ran on x86 servers will be considered under the CORE process. The CORE process is for internal use only and more information can be found here for our internal Lenovo employees (internal Storage support addendum).

Once submitted, an assessment will be conducted, and a written response will be provided.

All defect resolution triage of 3rd party components is the responsibility of the customer or designated 3rd party system Integrator. Lenovo supports our DM Series Storage and Lenovo Servers under active support contracts, but Lenovo will not be responsible for leading a multi-vendor triage and defect resolution across different component vendors compromising the total solution. Specifically, the customer or 3rd party must establish a test bed, conduct tests, and retrieve traces/ logs to be used by all parties to debug the issue. Lenovo, by supporting this request, does not agree to establish a test bed within Lenovo nor to perform defect triage nor interact directly with all other component suppliers.

2.3 Category 3: No support

Category 3 indicates that the device is not supported in any way for use within the listed Operating System and Host connectivity environments.

Operating Systems that Lenovo has deemed as **No Support:**

- AIX
- HP-UX
- iOS
- Solaris 10

Host Connectivity that Lenovo has deemed as **No Support:**

- iSeries Systems
- iOS / AS/400
- Power Systems

2.4 Server interoperability

This document details interoperability from the storage array to various server hosts via switched network and one or more Network Adapters or Host Bus Adapters (HBAs). Testing of, and support for, a specific 3rd party server platform was not performed as part of this program and customers should visit the server vendor's website to determine which operating systems and Adapters are supported by the server vendor. Lenovo will only support the storage system if it is attached to a 3rd party (non-Lenovo server) and is running a configuration listed within the Category 1 or Category 2 interop matrix.

2.5 Host connectivity adapters and server vendor support

The Category 1 interop matrix lists many host network adapters and HBAs that have been tested for use within the indicated Lenovo DM Series Storage array family. It is not implied that all of these adapters and their driver/firmware stacks are supported by any or all 3rd parties server vendors. The user must ensure that the host network adapter and its associated drivers are included on the 3rd parties vendor's hardware compatibility list. Inclusion in this document's adapter compatibility tables should not be interpreted as that adapter and driver/firmware combination as being supported by any vendor's for use with their server products. The user must confirm with their server provider if their HBA and network adapters are compatible with their servers.

2.6 Limits of supportability

If any recommendations made by Lenovo to resolve customer issues — whether they are functional or performance related — are not followed, Lenovo cannot guarantee that the issue can be resolved to the satisfaction of the customer. The ability of Lenovo to provide customer support is dependent on the customer's willingness to implement solution recommendations from Lenovo.

3.0 Switch Support Policy

Fibre Channel switches listed in this section may be supported at Category 1 (as described previously).

Storage Controller	Vendor	Switch	Part number(s)
DM series	Lenovo	Lenovo B300, 8 ports activated, 8x 8Gb SWL SFPs, 1 PS, Rail Kit, 3Yr FW	3873AR3
		Lenovo B300 (Eport) FC SAN Switch (1yr)	3873AR6
		Lenovo B6505 FC SAN Switch, 12 x 16Gb SWL SFP+ (1yr)	3873ER1
		Lenovo B6510 FC SAN Switch, 24 x 16Gb SWL SFP+ (1yr)	3873IR1
		Lenovo ThinkSystem DB610S, 8 ports activated, 1 PS	6559D3Y
		Lenovo ThinkSystem DB610S, 24 ports activated with 16Gb SWL SFP, Enterprise SW, 1 PS, rail kit	6559D1Y
		Lenovo ThinkSystem DB610S, 8 ports activated (No optics), 1 PS, rail kit	6559D2Y
		Lenovo ThinkSystem DB610S Gen6 FC Switch 24x16Gb SWL SFP (E.bundle) (1yr)	6559F1A
		Lenovo ThinkSystem DB610S Gen6 FC Switch 8x16Gb SWL SFP (1yr)	6559F2A
		Lenovo ThinkSystem DB610S Gen6 FC Switch 8-port base (No Optics) (1yr)	6559F3A
		Lenovo ThinkSystem DB620S Gen6 FC Switch 24x32Gb SWL SFP (1yr)	6415H11
		Lenovo ThinkSystem DB620S Gen6 FC Switch 48x32Gb SWL SFP (E.Bundle) (1yr)	6415H2A
		Lenovo ThinkSystem DB620S, 24 Ports Activated, 24x 32Gb SWL SFPs, 2 PS	6415G11
		Lenovo ThinkSystem DB620S, 48 Ports Activated, 48x 32Gb SWL SFPs, 2 PS	6415G2A
		Lenovo ThinkSystem DB620S, 24 ports activated, No SFPs, Reverse Airflow, 2x Power Supplies, Rail Kit (1yr)	6415G3A
		Lenovo ThinkSystem DB630S, 48 ports licensed, No SFPs, 2 PS, Rail Kit, 1Yr FW	7D1SA001WW
		Lenovo ThinkSystem DB630S, 48 ports licensed, 48x 32Gb SWL SFPs, 2 PS, Rail Kit, 1Yr FW	7D1SA002WW
		Lenovo ThinkSystem DB630S, ENT Bundle, 96 ports licensed, 96x 32Gb SWL SFPs, 2 PS, Rail Kit, 1Yr FW	7D1SA003WW
		Lenovo ThinkSystem DB400D 32Gb FC Director, up to 192 ports, 8U	6684B2A
		Lenovo ThinkSystem DB800D FC SAN Director (1yr)	6682D1A
		Lenovo ThinkSystem DB400D FC SAN Director (1yr)	6684D2A
		Lenovo ThinkSystem DB800D 32Gb FC Director, up to 384 ports, 14U	6682B1A
	Lenovo Flex	Lenovo Flex System EN4023 10Gb Scalable Switch	94Y5212
		Lenovo Flex System Fabric CN4093 10Gb Converged Scalable Switch	00FM510
		Lenovo Flex System Fabric EN4093R 10Gb Scalable Switch	00FM514
		Lenovo Flex System Fabric CN4093 10Gb Converged Scalable Switch	00D5823
		Lenovo Flex System FC3171 8Gb SAN Switch	69Y1930
		Lenovo Flex System FC5022 16Gb SAN Switch*	88Y6374
		Lenovo ThinkSystem NE2552E Flex Switch	4SG7A08868

MetroCluster FC switches in this table have been tested and verified by Lenovo. The MetroCluster IP ethernet switches are purchased through third party vendors and will need to hold applicable support contracts with said vendor.

Storage Controller	MetroCluster configration	Switch	Part number(s)
DM series	MetroCluster FC FC Switch	Atto 7600N_FC to SAS bridge	
		Lenovo B6505 FC SAN Switch, 12 x 16Gb SWL SFP+ (1yr)	3873ER1
		Lenovo B6510 FC SAN Switch, 24 x 16Gb SWL SFP+ (1yr)	3873IR1
		Lenovo ThinkSystem DB610S, 8 ports activated, 1 PS	6559D3Y
		Lenovo ThinkSystem DB610S, 24 ports activated with 16Gb SWL SFP, Enterprise SW, 1 PS, rail kit	6559D1Y
		Lenovo ThinkSystem DB610S, 8 ports activated (No optics), 1 PS, rail kit	6559D2Y
		Lenovo ThinkSystem DB610S Gen6 FC Switch 24x16Gb SWL SFP (E.bundle) (1yr)	6559F1A
		Lenovo ThinkSystem DB610S Gen6 FC Switch 8x16Gb SWL SFP (1yr)	6559F2A
		Lenovo ThinkSystem DB610S Gen6 FC Switch 8-port base (No Optics) (1yr)	6559F3A
		Lenovo ThinkSystem DB620S Gen6 FC Switch 24x32Gb SWL SFP (1yr)	6415H11
		Lenovo ThinkSystem DB620S Gen6 FC Switch 48x32Gb SWL SFP (E.Bundle) (1yr)	6415H2A
		Lenovo ThinkSystem DB620S, 24 Ports Activated, 24x 32Gb SWL SFPs, 2 PS	6415G11
		Lenovo ThinkSystem DB620S, 48 Ports Activated, 48x 32Gb SWL SFPs, 2 PS	6415G2A
		Lenovo ThinkSystem DB620S, 24 ports activated, No SFPs, Reverse Airflow, 2x Power Supplies, Rail Kit (1yr)	6415G3A
		Lenovo ThinkSystem DB630S, 48 ports licensed, No SFPs, 2 PS, Rail Kit, 1Yr FW	7D1SA001WW
		Lenovo ThinkSystem DB630S, 48 ports licensed, 48x 32Gb SWL SFPs, 2 PS, Rail Kit, 1Yr FW	7D1SA002WW
		Lenovo ThinkSystem DB630S, ENT Bundle, 96 ports licensed, 96x 32Gb SWL SFPs, 2 PS, Rail Kit, 1Yr FW	7D1SA003WW
	MetroCluster IP Ethernet Switches	Cisco Nexus 5596UP	-
		Cisco Nexus 3232C	-
		Cisco Nexus 3132Q-V Switch	-
		Broadcom BES-53248	-

Lenovo DM Series is compatible with the following 3rd party switches for clustering and MetroCluster IP deployments:

- Cisco Nexus 5596UP
- Cisco Nexus 3232C
- Cisco Nexus 3132Q-V
- Broadcom BES-53248

3.1 25/40/100Gb iSCSI Switches

Lenovo will provide support (Category 2) for the DM Series with the iSCSI protocol when connected to switches that meet the below criteria:

• All switching components in the SAN must have active support contracts in place with the device vendor
• Non-blocking backplane
• Link category flow control (IEEE 802.3x) on ingress/inbound switch ports (also known as “Rx Flow

Control" or "receive-side flow control" from the switch port's point of view)
• Dynamic packet buffer management with a minimum of:
• 4MB of packet buffer for 1Gbps switches
• 9MB of packet buffer for 10Gbps switches
• Ability to configure ports to immediate forwarding state for edge ports (may be known as "portfast" mode)
• Jumbo Frames (MTU 9000+ bytes) support if enabled on storage array
• Unicast storm control configuration
• VLAN and VLAN Tagging support
• Switch has a valid support contract in effect from the switch vendor at the time of the incident
Protocols and standards requirements:
• IEEE 802.1 AB LLDP
• IEEE 802.1p L2 Prioritization
• IEEE 802.1X Network Access Control
• IEEE 802.3x Flow Control
• IEEE 802.3z Gigabit Ethernet (1000Base-X) with QSA
• IEEE 802.1Q VLAN Tagging, Double VLAN Tagging, GVRP if enabled on storage array
• IEEE 802.3ac Frame Extensions for VLAN Tagging
• IETF RFC793 TCP
• IETF RFC1042 Ethernet Transmission
The listed features are usually present in certain classes of switches from switch vendors that are targeted at data center environments. These switches may be described by switch vendors as "enterprise class", "top of rack" or "data center edge" offerings. Please work with your Lenovo storage expert to determine whether your switch is suitable for use with an iSCSI SAN solution.

4.0 Required Adapter and Server OS Settings

Server HBA's and CNA's require specific configuration settings in order to maintain IO during Storage Center controller failovers and network/fabric path failovers. Some of these settings are identical for all supported operating systems and others vary by operating system. For Category 1 support refer to our Interop matrix for Category 2 support refer to our category 2 interop matrix..

5.0 Disclaimer

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