CITY OF SANTA ROSA
PROFESSIONAL SERVICES AGREEMENT
WITH ODP BUSINESS SOLUTIONS, LLC
AGREEMENT NUMBER _____

This "Agreement" is made as of this ____day of August, 2023, by and between the City of Santa Rosa, a municipal corporation ("City"), and ODP Business Solutions, LLC, a Delaware limited liability company ("ODP").

R E C I T A L S

A.   City desires to update Storage Area Network (SAN) Systems.

B.   City desires to retain a qualified firm to conduct the services described above in accordance with the Scope of Services as more particularly set forth in Exhibit A to this Agreement.

C.   ODP represents to City that it is a company composed of highly trained professionals and is fully qualified to conduct the services described above and render advice to City in connection with said services.

D.   The parties have negotiated upon the terms pursuant to which ODP will provide such services and have reduced such terms to writing.

AGREEMENT

NOW, THEREFORE, City and ODP agree as follows:

1.   SCOPE OF SERVICES

ODP shall provide to City the services described in Exhibit A ("Scope of Services"). ODP shall provide these services at the time, place, and in the manner specified in Exhibit A. Exhibit A is attached hereto for the purpose of defining the manner and scope of services to be provided by ODP and is not intended to, and shall not be construed so as to, modify or expand the terms, conditions, or provisions contained in this Agreement. In the event of any conflict between this Agreement and any terms or conditions of any document prepared or provided by ODP and made a part of this Agreement, including without limitation any document relating to the Scope of Services or payment therefor, the terms of this Agreement shall control and prevail.

2.   COMPENSATION

a.   City shall pay ODP for services rendered pursuant to this Agreement at the rates, times, and in the manner set forth in Exhibit B. ODP shall submit monthly invoices ("Invoices") to City in a form reasonably requested by City, which shall itemize the services performed as of the date of the

statement and set forth a progress report, including work accomplished during the period, percent of each task completed, and planned effort for the next period.

b. The payments prescribed herein shall constitute all compensation to ODP for all costs of services, including, but not limited to, direct costs of labor of employees engaged by ODP, travel expenses, telephone charges, copying and reproduction, computer time, and any and all other costs, expenses, and charges of ODP, its agents and employees. In no event shall City be obligated to pay late fees or interest, whether or not such requirements are contained in ODP's invoice.

c. Notwithstanding any other provision in this Agreement to the contrary, the total maximum compensation to be paid for the satisfactory accomplishment and completion of all services to be performed hereunder shall in no event exceed the sum of one hundred sixty thousand, five hundred dollars and thirty-three cents ($160,500.33). The City's Chief Financial Officer is authorized to pay all proper claims from Charge Number _____.

3. DOCUMENTATION; RETENTION OF MATERIALS

a. ODP shall maintain adequate documentation to substantiate all charges as required under Section 2 of this Agreement.

b. ODP shall keep and maintain full and complete documentation and accounting records concerning all extra or special services performed by it that are compensable by other than an hourly or flat rate and shall make such documents and records available to authorized representatives of City for inspection at any reasonable time.

c. ODP shall maintain the records and any other records specifically related to the performance of this Agreement and shall allow City access to such records during the performance of this Agreement and for a period of four (4) years after completion of all services hereunder.

4. INDEMNITY

a. ODP shall, to the fullest extent permitted by law, indemnify, protect, defend, and hold harmless City, and its employees, officials, and agents ("Indemnified Parties") from all claims, demands, costs, or liability (including liability for claims, suits, actions, arbitration proceedings, administrative proceedings, regulatory proceedings, losses, expenses or costs of any kind, interest, defense costs, and expert witness fees), that arise out of, pertain to, or relate to the negligence, recklessness, or willful misconduct of ODP, its officers, employees, or agents, in said performance of professional services under this Agreement, excepting only liability arising from the negligence, active negligence or intentional misconduct of City.

b. The existence or acceptance by City of any of the insurance policies or coverages described in this Agreement shall not affect or limit any of City's rights under this Section 4, nor shall the limits of such insurance limit the liability of ODP hereunder. This Section 4 shall not apply to any intellectual property claims, actions, lawsuits or other proceedings subject to the provisions of Section 17(b), below. The provisions of this Section 4 shall survive any expiration or termination of this Agreement.

5. INSURANCE

a.   ODP shall maintain in full force and effect all of the insurance coverage described in, and in accordance with, Attachment One, "Insurance Requirements." Maintenance of the insurance coverage set forth in Attachment One is a material element of this Agreement and a material part of the consideration provided by ODP in exchange for City's agreement to make the payments prescribed hereunder. Failure by ODP to (i) maintain or renew coverage, (ii) provide City notice of any changes, modifications, or reductions in coverage, or provide evidence of renewal, may be treated by City as a material breach of this Agreement by ODP, whereupon City shall be entitled to all rights and remedies at law or in equity, including but not limited to immediate termination of this Agreement. Notwithstanding the foregoing, any failure by ODP to maintain required insurance coverage shall not excuse or alleviate ODP from any of its other duties or obligations under this Agreement. In the event ODP, with approval of City pursuant to Section 6 below, retains or utilizes any subcontractors or subconsultantss in the provision of any services to City under this Agreement, ODP shall assure that any such subcontractor has first obtained, and shall maintain, all of the insurance coverages set forth in the Insurance Requirements in Attachment One.

b.   ODP agrees that any available insurance proceeds broader than or in excess of the coverages set forth in the Insurance Requirements in Attachment One shall be available to the additional insureds identified therein.

c.   ODP agrees that the insurance coverages and limits provided under this Agreement are the greater of: (i) the coverages and limits specified in Attachment One, or (ii) the broader coverages and maximum limits of coverage of any insurance policy or proceeds available to the name insureds.

6. ASSIGNMENT

The Parties shall not assign any rights or duties under this Agreement without the express prior written consent of the other Party, in the other Party's sole and absolute discretion. ODP agrees that the City shall have the right to approve any and all subcontractors to be used by ODP in the performance of this Agreement before ODP contracts with or otherwise engages any such subcontractors.

7. NOTICES

Except as otherwise provided in this Agreement, any notice, submittal, or communication required or permitted to be served on a party, shall be in writing to the person at the address of the office identified below. Service may also be made by certified mail, by placing first-class postage, and addressed as indicated below, and depositing in the United States mail to:

If to City:

_____

_____

_____

Attn:_____

If to ODP:

ODP Business Solutions,
LLC
6600 North Military Trail
Boca Raton, FL 33496
Attn: Vice President

With a copy to:

ODP Business Solutions,
LLC
6600 North Military Trail
Boca Raton, FL 33496
Attn: Office of the General
Counsel

8.   INDEPENDENT CONTRACTOR

a.   It is understood and agreed that ODP (including ODP's employees) is an independent contractor and that no relationship of employer-employee exists between the parties hereto for any purpose whatsoever. Neither ODP nor ODP's assigned personnel shall be entitled to any benefits payable to employees of City. City is not required to make any deductions or withholdings from the compensation payable to ODP under the provisions of this Agreement, and ODP shall be issued a Form 1099 for its services hereunder. As an independent contractor, ODP hereby agrees to indemnify and hold City harmless from any and all claims that may be made against City based upon any contention by any of ODP's employees or by any third party, including but not limited to any state or federal agency, that an employer-employee relationship or a substitute therefor exists for any purpose whatsoever by reason of this Agreement or by reason of the nature and/or performance of any services under this Agreement.

b.   It is further understood and agreed by the parties hereto that ODP, in the performance of ODP's obligations hereunder, is subject to the control and direction of City as to the designation of tasks to be performed and the results to be accomplished under this Agreement, but not as to the means, methods, or sequence used by ODP for accomplishing such results. To the extent that ODP obtains permission to, and does, use City facilities, space, equipment , or support services in the performance of this Agreement, this use shall be at the ODP's sole discretion based on the ODP's determination that such use will promote ODP's efficiency and effectiveness. Except as may be specifically provided elsewhere in this Agreement, the City does not require that ODP use City facilities, equipment, or support services or work in City locations in the performance of this Agreement.

c.   If, in the performance of this Agreement, any third persons are employed by ODP, such persons shall be entirely and exclusively under the direction, supervision, and control of ODP. Except as may be specifically provided elsewhere in this Agreement, all terms of employment, including hours, wages, working conditions, discipline, hiring, and discharging, or any other terms of employment or requirements of law, shall be determined by ODP. It is further understood and agreed that ODP shall issue W-2 or 1099 Forms for income and employment tax purposes, for all of ODP's assigned personnel and subcontractors.

d.   The provisions of this Section 8 shall survive any expiration or termination of this Agreement. Nothing in this Agreement shall be construed to create an exclusive relationship between City and ODP. ODP may represent, perform services for, or be employed by such additional persons or companies as ODP sees fit.

9.   ADDITIONAL SERVICES

Changes to the Scope of Services shall be by written amendment to this Agreement and rates set forth in Exhibit B, or paid as otherwise agreed upon by the parties in writing prior to the provision of any such additional services.

10.   SUCCESSORS AND ASSIGNS

City and ODP each binds itself, its partners, successors, legal representatives, and assigns to the other party to this Agreement and to the partners, successors, legal representatives, and assigns of such other party in respect of all promises and agreements contained herein.

11.   TERM, SUSPENSION, TERMINATION

a.   This Agreement shall become effective on the date that it is made, set forth on the first page of the Agreement, and shall continue in effect until both parties have fully performed their respective obligations under this Agreement, unless sooner terminated as provided herein.

b.   City shall have the right at any time to temporarily suspend ODP's performance hereunder, in whole or in part, by giving a written notice of suspension to ODP. If City gives such notice of suspension, ODP shall immediately suspend its activities under this Agreement, as specified in such notice.

c.   Either party shall have the right to terminate this Agreement for convenience at any time by giving thirty (30) days written notice of termination tothe other party. Upon such termination by City, ODP shall submit to City an itemized statement of services performed as of the date of termination in accordance with Section 2 of this Agreement. These services may include both completed work and work in progress at the time of termination. City shall pay ODP for any services for which compensation is owed; provided, however, City shall not in any manner be liable for lost profits that might have been made by ODP had the Agreement not been terminated or had ODP completed the services required by this Agreement. ODP shall promptly deliver to City all documents related to the performance of this Agreement in its possession or control. All such documents shall be the property of City without additional compensation to ODP.

12. TIME OF PERFORMANCE

The services described herein shall be provided during the period, or in accordance with the schedule, set forth in Exhibit A. ODP shall complete all the required services and tasks and complete and tender all deliverables to the reasonable satisfaction of City, not later than _____.

13. STANDARD OF PERFORMANCE

ODP shall perform all services performed under this Agreement in the manner and according to the standards currently observed by a competent practitioner of Consultant's profession in . All products of whatsoever nature that ODP delivers to City shall be prepared in a professional manner and conform to the standards of quality normally observed by a person currently practicing in ODP's profession. , and shall be provided in accordance with any schedule of performance. ODP shall assign only competent personnel to perform services under this Agreement. ODP shall notify City in writing of any changes in ODP's staff assigned to perform the services under this Agreement prior to any such performance. In the event that City, at any time, desires the removal of any person assigned by ODP to perform services under this Agreement, because City, in its sole discretion, determines that such person is not performing in accordance with the standards required herein, ODP shall remove such person immediately upon receiving notice from City of the desire of City for the removal of such person.

14. CONFLICTS OF INTEREST

ODP covenants that neither it, nor any officer or principal of its firm, has or shall acquire any interest, directly or indirectly, that would conflict in any manner with the interests of City or that would in any way hinder ODP's performance of services under this Agreement. ODP further covenants that in the performance of this Agreement, no person having any such interest shall be employed by it as an officer, employee, agent or subcontractor, without the written consent of City. ODP agrees to avoid conflicts of interest or the appearance of any conflicts of interest with the interests of City at all times during the performance of this Agreement.

15. CONFLICT OF INTEREST REQUIREMENTS

a.   **Generally.** The City's Conflict of Interest Code requires that individuals who qualify as "consultants" under the Political Reform Act, California Government Code sections 87200 *et seq*., comply with the conflict of interest provisions of the Political Reform Act and the City's Conflict of Interest Code, which generally prohibit individuals from making or participating in the making of decisions that will have a material financial effect on their economic interests. The term "_____" generally includes individuals who make governmental decisions or who serve in a staff capacity.

b.   **Conflict of Interest Statements**. The individual(s) who will provide services or perform work pursuant to this Agreement are "consultants" within the meaning of the Political Reform Act and the City's Conflict of Interest Code:
____ yes X no   *(check one)*

Professional Services Agreement
Form approved by the City Attorney 5-11-20

16.   CONFIDENTIALITY OF CITY INFORMATION

During performance of this Agreement, ODP may gain access to and use City information regarding inventions, machinery, products, prices, apparatus, costs, discounts, future plans, business affairs, governmental affairs, processes, trade secrets, technical matters, systems, facilities, customer lists, product design, copyright, data, and other vital information (hereafter collectively referred to as "City Information") that are valuable, special, and unique assets of the City. ODP agrees to protect all City Information and treat it as strictly confidential, and further agrees that ODP shall not at any time, either directly or indirectly, divulge, disclose, or communicate in any manner any City Information to any third party without the prior written consent of City. In addition, ODP shall comply with all City policies governing the use of the City network and technology systems. A violation by ODP of this Section 16 shall be a material violation of this Agreement and shall justify legal and/or equitable relief.

17.   ODP INFORMATION

a.   City shall have full ownership and control, including ownership of any copyrights, of all information prepared, produced, or provided by ODP pursuant to this Agreement. In this Agreement, the term "information" shall be construed to mean and include: any and all work product, submittals, reports, plans, specifications, and other deliverables consisting of documents, writings, handwritings, typewriting, printing, photostatting, photographing, computer models, and any other computerized data and every other means of recording any form of information, communications, or representation, including letters, works, pictures, drawings, sounds, or symbols, or any combination thereof. ODP shall not be responsible for any unauthorized modification or use of such information for other than its intended purpose by City.

b.   ODP shall fully defend, indemnify and hold harmless City, its officers and employees, and each and every one of them, from and against any and all claims, actions, lawsuits or other proceedings alleging that all or any part of the information prepared, produced, or provided by ODP pursuant to this Agreement infringes upon any third party's trademark, trade name, copyright, patent or other intellectual property rights. City shall make reasonable efforts to notify ODP not later than ten (10) days after City is served with any such claim, action, lawsuit or other proceeding, provided that City's failure to provide such notice within such time period shall not relieve ODP of its obligations hereunder, which shall survive any termination or expiration of this Agreement.

c.   All proprietary and other information received from ODP by City, whether received in connection with ODP's proposal, will be disclosed upon receipt of a request for disclosure, pursuant to the California Public Records Act; provided, however, that, if any information is set apart and clearly marked "trade secret" when it is provided to City, City shall give notice to Consultant of any request for the disclosure of such information. ODP shall then have five (5) days from the date it receives such notice to enter into an agreement with the City, satisfactory to the City Attorney, providing for the defense of, and complete indemnification and reimbursement for all costs (including plaintiff's attorneys' fees) incurred by City in any legal action to compel the disclosure of such information under the California Public Records Act. ODP shall have sole responsibility for defense of the actual "trade secret" designation of such information.

Professional Services Agreement
Form approved by the City Attorney 5-11-20

d. The parties understand and agree that any failure by ODP to respond to the notice provided by City and/or to enter into an agreement with City, in accordance with the provisions of subsection c, above, shall constitute a complete waiver by ODP of any rights regarding the information designated "trade secret" by ODP, and such information shall be disclosed by City pursuant to applicable procedures required by the Public Records Act.

18. MISCELLANEOUS

a. Entire Agreement. This Agreement contains the entire agreement between the parties. Any and all verbal or written agreements made prior to the date of this Agreement are superseded by this Agreement and shall have no further effect.

b. Modification. No modification or change to the terms of this Agreement will be binding on a party unless in writing and signed by an authorized representative of that party.

c. Compliance with Laws. ODP shall perform all services described herein in compliance with all applicable federal, state and local laws, rules, regulations, and ordinances, including to the extent applicable, but not limited to: (i) the Americans with Disabilities Act of 1990 (42 U.S.C. 12101, et seq.) ("ADA"), and any regulations and guidelines issued pursuant to the ADA; and (ii) applicable Labor Code *sections 1720, et seq., which require prevailing wages (in accordance with DIR determinations at www.dir.ca.gov) be paid to any employee performing work covered by Labor Code sections 1720 et seqp*provisions. *p*provisions. ODP shall pay to the City when due all business taxes payable by ODP under the provisions of Chapter 6-04 of the Santa Rosa City Code. The City may deduct any delinquent business taxes, and any penalties and interest added to the delinquent taxes, from its payments to ODP.

d. Discrimination Prohibited. With respect to the provision of services under this Agreement, ODP agrees not to discriminate against any person because of the race, religious creed, color, national origin, ancestry, physical disability, mental disability, medical condition, genetic information, marital status, sex, gender, gender identity, gender expression, age, sexual orientation, or military and veteran status of that person.

e. Governing Law; Venue. This Agreement shall be governed, construed, and enforced in accordance with the laws of the State of California. Venue of any litigation arising out of or connected with this Agreement shall lie exclusively in the state trial court in Sonoma County in the State of California , and the parties consent to jurisdiction over their persons and over the subject matter of any such litigation in such court, and consent to service of process issued by such court.

f. Waiver of Rights. Neither City acceptance of, or payment for, any service or performed by ODP, nor any waiver by either party of any default, breach or condition precedent, shall be construed as a waiver of any provision of this Agreement, nor as a waiver of any other default, breach or condition precedent or any other right hereunder.

g. Incorporation of Attachments and Exhibits. The attachments and exhibits to this Agreement are incorporated and made part of this Agreement, subject to terms and provisions

herein contained.

19. AUTHORITY; SIGNATURES REQUIRED FOR CORPORATIONS

ODP hereby represents and warrants to City that it is (a) a duly organized and validly existing limited liability company, formed and in good standing under the laws of the State of Delaware, (b) has the power and authority and the legal right to conduct the business in which it is currently engaged, and (c) has all requisite power and authority and the legal right to consummate the transactions contemplated in this Agreement. ODP hereby further represents and warrants that this Agreement has been duly authorized, and when executed by the signatory or signatories listed below, shall constitute a valid agreement binding on ODP in accordance with the terms hereof.

If this Agreement is entered into by a corporation, it shall be signed by one corporate officers, one from each of the following two groups: a) the chairman of the board, president or any vice-president; b) the secretary, any assistant secretary, chief financial officer, or any assistant treasurer. The title of the corporate officer shall be listed under the signature.

20. COUNTERPARTS AND ELECTRONIC SIGNATURES

This Agreement and future documents relating thereto may be executed in two or more counterparts, each of which will be deemed an original and all of which together constitute one Agreement. Counterparts and/or signatures delivered by facsimile, pdf or City-approved electronic means have the same force and effect as the use of a manual signature. Both City and ODP wish to permit this Agreement and future documents relating thereto to be electronically signed in accordance with applicable federal and California law. Either Party to this Agreement may revoke its permission to use electronic signatures at any time for future documents by providing notice pursuant to the Agreement. The Parties agree that electronic signatures, by their respective signatories are intended to authenticate such signatures and to give rise to a valid, enforceable, and fully effective Agreement. The City reserves the right to reject any signature that cannot be positively verified by the City as an authentic electronic signature.

Executed as of the day and year first above stated.

Name of Firm:_**ODP BUSINESS SOLUTIONS,** **CITY OF SANTA ROSA**
LLC   a Municipal Corporation

TYPE OF BUSINESS ENTITY *(check one)*:

	By:_____
_____ Individual/Sole Proprietor	
_____Partnership	Print
_____Corporation	Name:_____
__X__ Limited Liability Company	
_____ Other (please specify: _____)	Title:_____

Signatures of Authorized Persons:

By: _____
  Glenn Brower, Vice President
Print Name: Glenn Brower

Title: Vice President

City of Santa Rosa Business Tax Cert. No.

_____

APPROVED AS TO FORM:

_____
Office of the City Attorney

ATTEST:

_____
City Clerk

Attachments:
Attachment One - Insurance Requirements
Exhibit A - Scope of Services
Exhibit B – Compensation

ODP Business Solutions, LLC

Exhibit A – Scope of Services

RFP 23-07 Storage Area Network (SAN) Systems Update

Storage System Network and Components: ODP Business Solutions presents the Exhibit A scope of services per our response proposal.

Scope of Services

ODP Business Solutions will be supporting the coordination of Lenovo Services as per the RFP 23-07 submission to deliver and deploy all products and services from Lenovo USA.

1. Contract Management and Project Oversight

    a. Executing project requirements and elements with Lenovo team

    b. Lenovo Professional Services will perform the workstreams noted in 2-6 herein during 9 a.m. to 5 p.m. local time, Monday to Friday, excluding public and Lenovo holidays.

    c. Engagement with City of Santa Rosa, coordination with City Key personnel and end users, billing and invoicing, and escalation and resolution for customer satisfaction

2. Remote workstreams:

    a. Review the DM solution design with the Customer.

    b. Collaborate with the Customer to complete the DM deployment worksheet.

    c. Review and agree together on the knowledge transfer curriculum.

    d. Review and agree together on the DM fault injection exercise.

3. Onsite workstreams:

    a. Perform physical installation of the two DM units (DM7100F and DM240N).

    b. Assess the storage firmware and if necessary, update it to the latest Lenovo best recipe.

    c. Configure the DM units in accordance with the approved deployment worksheet.

    d. Install and configure an instance of XClarity Administrator and inject the DM solution into its management domain for system monitoring.

    e. Perform a fault injection exercise against the DM solution in accordance with the fault injection plan.

    f. Provide to the Customer online pdf materials from Lenovo Support for operation and administration of the DM solution.

    g. Provide knowledge transfer via verbal communications, product demonstrations and hands on activities against the agreed upon knowledge transfer curriculum. The knowledge transfer sessions will be two 4 hour sessions across two consecutive business days onsite for up to 4 Customer team members. If necessary, a third session of up to 2 hours via remote meeting tool after the conclusion of the onsite deployment phase.

4. Fundings:

The following Lenovo part numbers are used in support of the above workstreams and are specifically captured on pricing proposals.

i. 1 x p/n 5AS7A83056

ii. 1 x p/n 5AS7A83040

iii. 1 x p/n 5MS7A24102

iv. 9 x p/n 5MS7A35284

5. Flows:

   a. Upon Lenovo receiving the purchase order containing all the above part numbers, from ODP Business Solutions. Lenovo will assign the Consultant's and send out the final Statement of Work to the Customer for review and signature.

   b. Lenovo will coordinate a Project Kick-Off meeting to introduce the Lenovo team member(s) on this project.

   c. Lenovo will coordinate subsequent pre-deployment meetings to work on the remote workstreams.

   d. When all the hardware is onsite and the Customer datacenter is ready (network drops, network switches, power, rack space), then Lenovo will coordinate with the Customer for the onsite work schedule.

6. Hardware Architecture Design Build and System Testing: 50TB System.

   a. See Technical Report for 50TB and hardware architecture design in following pages.

Lenovo Solution Technical Report – 50TB**

Manually Designed Solution

Report Generated:

23-Feb-2023

Project ID:

f4b54528

**Confidential – not for Public Disclosure.

1   Business Requirements

[REQUEST FOR PROPOSALS (RFP) 23-07Storage Area Network (SAN) System Update]

2   Solution Summary

2.1   Proposed Solution Summary

This is a summary of what the proposed solution will deliver.

THROUGHPUT	**RAW CAPACITY**	**STORAGE EFFICIENCY***
10,000 IOPS / 78.13 MB/s	92.16 TB	1.5 : 1
AVERAGE UTILIZATION	**USABLE CAPACITY**	**EFFECTIVE CAPACITY***
4%	56.09 TiB	84.1396 TiB
MAXIMUM THROUGHPUT*	**RAW CAPACITY HEADROOM****	**USABLE VS EFFECTIVE**
313,901 IOPS / 2,452.36 MB/s	645.12 TB	56.09 TiB / 84.1396 TiB
* assumes best practice configuration of aggregates and workload to aggregate mapping	** assumes future expansion using drives of same capacity	*** assumes use of storage efficiency technologies like compression and deduplication
		*** Lowest efficiencies have been applied to unused capacity within the cluster.

Note: Fusion calculates and reports usable and effective capacity in base-2 format which aligns with values reported in ONTAP CLI as well as System Manager and Unified Manager. It should be noted that ONTAP CLI, System Manager and Unified Manager display base-2 capacity values, but labels these values using base-10 descriptors (e.g. GB/TB/PB).

	CONFIGURATION			ENVIRONMENTAL	
Model:	DM7100F-HA Ethernet Bundle	**Onboard Ethernet Ports:**	25GbE (8) 40GbE (4)	**Rack Units:**	6 U
				System Weight:	167.77 lbs
Nodes:	2	**Onboard UTA2 Ports:**	0	**AC Power:**	1738.00 W
Total Drives:	12	**Onboard SAS Ports:**	8	**Current Draw:**	17.64 A
				BTU/hr:	5934.00
Drive Type:	7.68TB NVMe SSD	**Expansion Slots:**	10		
Cluster Switches:	N/A	**Stge Switches:**	N/A		

3 Solution Details

3.1 System Details

For rack elevation, please refer to the Storage Solution Visio Diagram

cluster1: lenovo1/lenovo2

Bill Of Materials			Total
Description		**Part Number**	**Qty**
Systems			
DM7100F-HA Ethernet Bundle	9.11.1 ONTAP		1
		Grand Total	1
Storage			
DM240N w/ 12x7.68TB NVMe SSD		NOFRU_7.6TB_SED_NVMe_DM240N	1
		Grand Total	1
Adapter Cards/ Flash Cache			
		Grand Total	0

3.2 Environmental Details

Line Voltage: 110

System Components	Qty	Rack Units	Current (Amps)		AC Power (Watts)		AC Power (VA)		Thermal Rating (BTU/hr)		Power (kWh/year)	
			Typical	**Worst**	**Typical**	**Worst**	**Typical**	**Worst**	**Typical**	**Worst**	**Typical**	**Worst**
DM7100F-HA Ethernet Bundle (2xControllers, 1xChassis)	1	4	12.83	16.12	1,257	1,579	1,323.16	1,662.11	4,291	5,389	11,018.86	13,841.51
DM240N w/ 12x7.68TB NVMe SSD	1	2	4.81	7.53	481	753	506.32	792.63	1,643	2,572	4,216.45	6,600.8
Total	**2**	**6**	**17.64**	**23.65**	**1,738**	**2,332**	**1,829.48**	**2,454.74**	**5,934**	**7,961**	**15,235.31**	**20,442.31**

3.3   Aggregate Details: lenovo1/lenovo2

This configuration leverages the Root-Data-Data partitioning which creates one small root partition (P3) for the root aggregates and two larger equally sized partitions (P1 and P2) for data aggregates. Up to 48 drives are partitioned in this format when ONTAP first initializes. The partition sizes and number of partitions are dependent on the number of drives installed when ONTAP first initializes.

Root-Data-Data (RD2) Partition Format	SSD Drives			
	1	2	3	4
P1 Data Partition	P1	P1	P1	P1
P2 Data Partition	P2	P2	P2	P2
P3 Root Partition	P3	P3	P3	P3

Root-Data (RD) Partition Format	HDD or SSD Drives			
	1	2	3	4
P1 Data Partition	P1	P1	P1	P1
P2 Root Partition	P2	P2	P2	P2

Storage Pool Partition Format	SSD Drives			
	1	2	3	4
P1 Cache Partition	P1	P1	P1	P1
P2 Cache Partition	P2	P2	P2	P2
P3 Cache Partition	P3	P3	P3	P3
P4 Cache Partition	P4	P4	P4	P4

Root Aggrs	Node	Devices	Total	Data	Parity	RAID/Size	Reserve (TiB)	WAFL (TiB)	Parity (TiB)	Root (TiB)
lenovo1_root	lenovo1	62.35GiB P3 Partition	5	3	2	RAID_DP/5	0.0000	0.0183	0.1217	0.1644
lenovo2_root	lenovo2	62.35GiB P3 Partition	5	3	2	RAID_DP/5	0.0000	0.0183	0.1217	0.1644
			10	6	4	Totals	0.0000	0.0366	0.2434	0.3288

Data Aggrs	Node	Devices	Total	Data	Parity	RAID/Size	Reserve (TiB)	WAFL (TiB)	Parity (TiB)	Usable (TiB)
lenovo1_aggr1	lenovo1	3.46TiB P1 Partition	11	9	2	RAID_DP/11	0.0000	3.1163	6.9251	28.0465
lenovo2_aggr1	lenovo2	3.46TiB P2 Partition	11	9	2	RAID_DP/11	0.0000	3.1163	6.9251	28.0465
			22	18	4	Totals	0.0000	6.2326	13.8502	56.0930

Spares	Devices	Total	Capacity (TiB)
Root	62.35GiB P3 Partition	2	0.1218
Data	3545.66GiB P1 Partition	1	3.4626
Data	3545.66GiB P2 Partition	1	3.4626
	Total		7.0470

	Capacity (TiB)	Allocation
Drive Formatting	0.0038	0%
Root	0.3288	0.39%
Parity	14.0936	16.81%
WAFL	6.2692	7.48%
Reserve	0.0000	0%
Spare	7.0470	8.41%
Usable	56.0930	66.9%
Total	83.8354	100.0%

3.4   Drive Calculation Summary

Node	Drives (Qty) (#Partitions, #Non-Partitioned)	Flash Pool Drives (Qty) (#Partitions, #Non- Partitioned)	Aggregates (Qty)	Space Utilization
lenovo1	(16, 0)	(0, 0)	2	59.08%
lenovo2	(16, 0)	(0, 0)	2	59.08%

3.5 Workload Descriptions

Workload Name	Workload Type	Throughput	Effective Capacity (TiB)	Protocol	Read Latency(MS)	IO Percentages				IO Block Sizes (KB)				Working Set %
						Rand Read	Rand Write	Seq Read	Seq Write	Rand Read	Rand Write	Seq Read	Seq Write	
workload 1	Custom	10,000.00 IOPS	50.00	NFS	1	80	20	0	0	8	8	32	32	5

3.6 Workload Aggregate Assignments

Node	Aggregate	Workload	Workload Type
lenovo1	lenovo1_aggr1	workload 1	custom
lenovo2	lenovo2_aggr1	workload 1	custom

4   Copyright

Refer to the Interoperability Matrix on the <u>Lenovo Support site</u> (Navigate to Data Center Storage, Lenovo Storage, Applicable DM-Series Product, Documentation, Interoperability Matrix – User Guides checkbox) to validate that the exact product and feature versions described in this document are supported for your specific environment. The Lenovo Interoperability Matrix defines the product components and versions that can be used to construct configurations that are supported by Lenovo. Specific results depend on each customer's installation in accordance with published specifications.

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Lenovo ThinkSystem DM7100F Unified All Flash Storage Array
Product Guide

Lenovo ThinkSystem DM7100F is a scalable, unified, all flash storage system that is designed to provide high performance, simplicity, capacity, security, and high availability for large enterprises. Powered by the ONTAP software, ThinkSystem DM7100F delivers enterprise-class storage management capabilities with a wide choice of host connectivity options, flexible drive configurations, and enhanced data management features, including end-to-end NVMe support (NVMe over Fabrics and NVMe drives). The DM7100F is a perfect fit for a wide range of enterprise workloads, including big data and analytics, artificial intelligence, engineering and design, hybrid clouds, and other storage I/O-intensive applications.

The ThinkSystem DM7100F 4U controller enclosure is shown in the following figure.
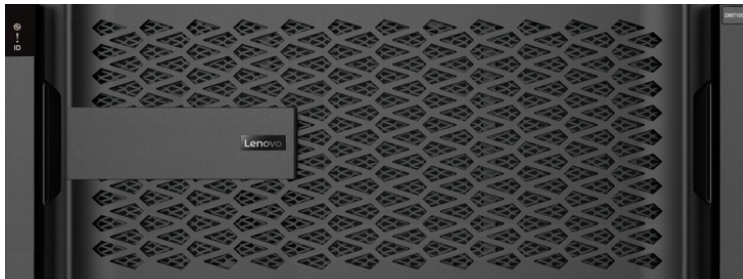
Figure 1. Lenovo ThinkSystem DM7100F

Up to 12 DM7100F Storage Arrays can be combined into a clustered system in a NAS environment, or up to 6 DM7100F Storage Arrays can be combined into a clustered system in a SAN environment.

Did you know?

The ThinkSystem DM7100F offers end-to-end NVMe storage connectivity with NVMe over Fabrics (NVMeOF) and NVMe drives by implementing NVMe/FC with 32 Gb Fibre Channel host interfaces.

A single ThinkSystem DM7100F scales up to 7.37 PB of raw storage capacity. A cluster of the DM7100F storage systems scales up to 88.4 PB for NAS or up to 44.2 PB for SAN environments.

The ThinkSystem DM7100F offers unified file and block storage connectivity, and it supports multiple storage protocols simultaneously with a choice of 1/10 GbE, 25 GbE, and 40/100 GbE NAS and iSCSI, 8/16/32 Gb Fibre Channel, and 32 Gb NVMe/FC.

Key features

A single ThinkSystem DM7100F Storage Array consists of the 4U rack-mount controller enclosure and one or more expansion enclosures. The controller enclosure includes two controllers, 256 GB RAM (128 GB RAM per controller), and 32 GB battery-backed NVRAM (16 GB NVRAM per controller). 25 GbE SFP28 NAS/iSCSI or 4/8/16 Gb Fibre Channel (FC) ports on the controller's mezzanine cards provide base host connectivity, with adapter card options for additional 1/10 GbE, 25 GbE, or 40/100 GbE NAS/iSCSI, 8/16/32 Gb FC, or 32 Gb NVMe/FC connections. The attachment of the Lenovo ThinkSystem DM240N 2U24 SFF and DM240S 2U24 SFF Expansion Enclosures to the controller enclosure provides scalability up to 48 NVMe and 432 SAS SFF solid-state drives (SSDs), or up to 480 SAS SSDs.

The ThinkSystem DM7100F Unified All Flash Array offers the following key features and benefits:

- All-flash array capabilities with end-to-end NVMe to meet the demand for higher storage performance at lower latency and provide higher IOPs and bandwidth with lower power usage and total cost of ownership than hybrid or HDD-based solutions.
- NVMe and SAS drive-side connectivity with up to 24x 2.5-inch small form factor (SFF) drives in the 2U24 SFF expansion enclosures.
- Scalability to up to 48 NVMe and 432 SAS, or 480 SAS SFF solid-state drives with the attachment of the ThinkSystem DM240N 2U24 SFF and DM240S 2U24 SFF expansion enclosures to satisfy growing needs for storage performance and capacity.
- Scalable, all flash storage with dual active/active controller configurations for high availability and performance.
- Improved performance and data protection with RAID-DP and RAID-TEC, as well as support for traditional RAID 4.
- Flexible host connectivity to match diverse customer needs with support for unified NAS and SAN storage protocols, including 1/10 GbE, 25 GbE, and 40/100 GbE NAS and iSCSI, 8/16/32 Gb Fibre Channel, and 32 Gb NVMe over Fibre Channel (NVMe/FC) connectivity.
- Rich set of standard storage management functions available at no extra cost, including snapshots, volume copy, quality of service, thin provisioning, compression, deduplication, encryption, disk-based backup, application- and virtual machine-aware backup, quick data recovery, clustering, synchronous replication, and asynchronous replication.
- Optional licensed functions, including WORM (write once, read many) data protection (SnapLock) and automated tiering of data from high-performance SSDs to object storage in public or private clouds (FabricPool).
- Scale-out clustering of up to 12 ThinkSystem DM Series storage systems for NAS connectivity or up to six DM Series storage systems for SAN connectivity.
- Intuitive, web-based GUI for easy system setup and management.
- Lenovo XClarity support for centralized systems management of Lenovo x86 servers, switches, and storage, which provides automated agent-less discovery, inventory, monitoring, and additional platform-specific functions across multiple systems.
- Designed for 99.9999% availability with redundant hot-swap components, including controllers and I/O modules, power supplies, system fans (4U controller enclosures), and non-disruptive firmware upgrades.
- Certified storage for Oracle VM
- Certified storage for Citrix XenServer

The DM7100F controller enclosure supports attachment of up to two ThinkSystem DM240N 2U24 SFF NVMe and up to 18 DM240S 2U24 SFF SAS expansion enclosures, or up to 20 DM240S 2U24 SFF SAS expansion enclosures. The following SFF drives are supported:

- 1.92 TB and 3.84 TB NVMe hot-swap SSDs.
- 1.92 TB, 3.84 TB, 7.68 TB, and 15.36 TB NVMe hot-swap SSD SEDs.
- 960 GB, 3.84 TB, 7.68 TB, and 15.36 TB 12 Gbps SAS hot-swap SSDs.

More drives and expansion enclosures are designed to be dynamically added with virtually no downtime, which helps to quickly and seamlessly respond to ever-growing capacity demands.

The ThinkSystem DM7100F Unified All Flash Array offers high levels of system and data availability with the following technologies:

- Dual-active controllers (high availability pair) with automatic load balancing and failover

- Mirrored, battery-backed controller NVRAM*

- Automatic drive failure detection and rebuild

- Redundant, hot-swappable and customer replaceable hardware components, including SFP+/QSFP+ transceivers, controller and I/O modules, power supplies, system fans (4U controller enclosure), and drives

- Automated failover for the data path between the host and the drives with multipathing

- Non-disruptive controller and drive firmware upgrades

- Scale-out clustering

*NVRAM is battery-backed memory used to protect inbound writes as they arrive. This fact allows write operations to be safely acknowledged without having to wait for a disk operation to complete, greatly reducing write latency.

Components and connectors

The following figure shows the front of the ThinkSystem DM7100F 4U controller enclosure without a front bezel.
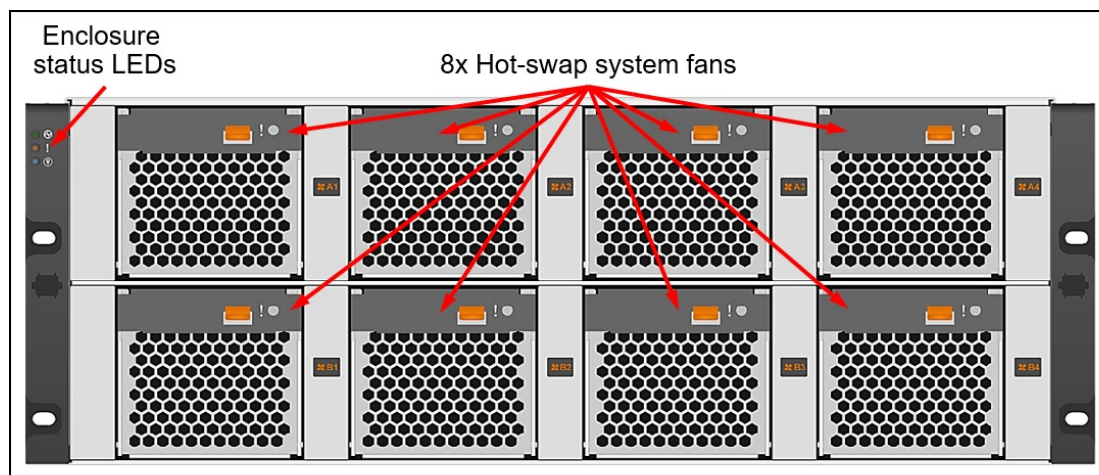
Figure 2. ThinkSystem DM7100F 4U controller enclosure front view

The front of the ThinkSystem DM7100F controller enclosure includes the following components:

- 8x Redundant hot-swap system fans.
- Enclosure status LEDs.

The following figures show the rear of the ThinkSystem DM7100F 4U controller enclosure.
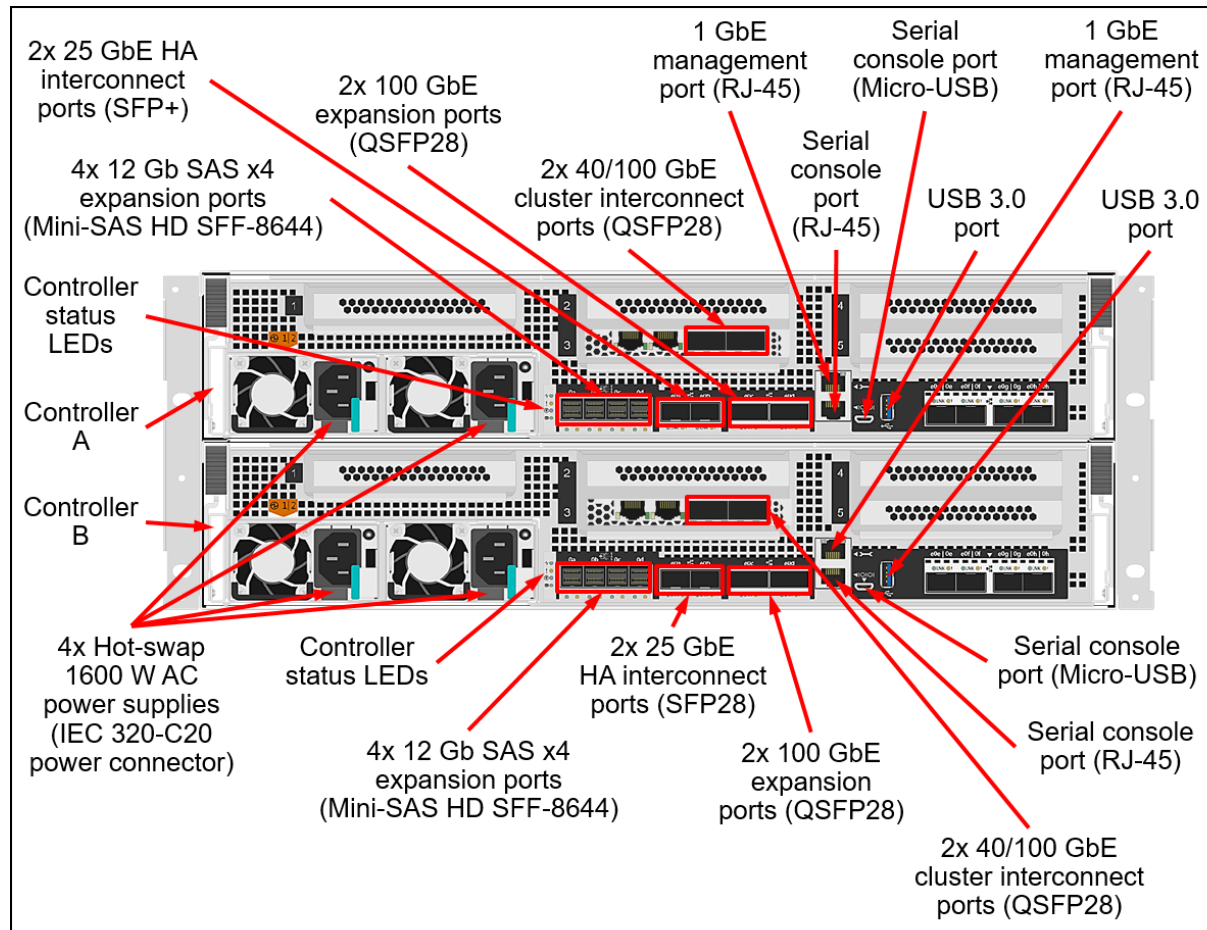
Figure 3. ThinkSystem DM7100F 4U controller enclosure rear view: Ports

4x Slots for adapter cards (ports per adapter):
- 2x 1/10 GbE RJ-45 host ports
- 4x 10 GbE host ports (SFP+)
- 2x 25 GbE host ports (SFP28)
- 2x 40/100 GbE host ports (QSFP28)
- 4x 8/16/32 Gb FC host ports (SFP+)
- 4x 12 Gb SAS expansion ports (SFF-8644)
- 2x 100 GbE expansion ports (QSFP28)
- 2x 4/8/16 Gb FC-VI MetroCluster FC ports (SFP+)*

1x Slot for mezzanine cards (ports per card):
- 4x 25 GbE host ports (SFP28)
- 4x 4/8/16 Gb FC host ports (SFP+)

Controller A

Controller B

4x Slots for adapter cards (ports per adapter):
- 2x 1/10 GbE RJ-45 host ports
- 4x 10 GbE host ports (SFP+)
- 2x 25 GbE host ports (SFP28)
- 2x 40/100 GbE host ports (QSFP28)
- 4x 8/16/32 Gb FC host ports (SFP+)
- 4x 12 Gb SAS expansion ports (SFF-8644)
- 2x 100 GbE expansion ports (QSFP28)
- 2x 4/8/16 Gb FC-VI MetroCluster FC ports (SFP+)*

1x Slot for mezzanine cards (ports per card):
- 4x 25 GbE host ports (SFP28)
- 4x 4/8/16 Gb FC host ports (SFP+)

* Planned for the future

Figure 4. ThinkSystem DM7100F 4U controller enclosure rear view: Slots

The rear of the ThinkSystem DM7100F 4U controller enclosure includes the following components:

- Two redundant hot-swap controllers, each with the following ports:
  - Two 25 GbE SFP28 ports for direct-attach HA pair interconnect.
  - Two 40/100 GbE QSFP28 onboard ports for connections to the NVMe expansion enclosures.
  - Two 40/100 GbE QSFP28 ports on the SmartIO adapter in Slot 3 for direct-attach or switched cluster interconnect.
  - Four 12 Gb SAS x4 ports (Mini-SAS HD SFF-8644) for connections to the SAS expansion enclosures.
  - A mezzanine slot for one of the following mezzanine cards (a mezzanine card is required):
    - Four 25 GbE SFP28 host ports (NAS or iSCSI).
    - Four 4/8/16 Gb FC SFP+ host ports (FC only).
  - Four slots for the following optional adapter cards (ports per adapter card):
    - Host ports:
      - Two 1/10 GbE RJ-45 host ports (NAS or iSCSI).
      - Four 10 GbE SFP+ host ports (NAS or iSCSI).
      - Two 25 GbE SFP28 host ports (NAS or iSCSI).
      - Two 40/100 GbE QSFP28 host ports (NAS or iSCSI).
      - Four 8/16/32 Gb FC SFP+ host ports (FC or 32Gb NVMe/FC).
    - Expansion ports:
      - Two 100 GbE QSFP28 expansion ports (NVMe/RoCE).
      - Four 12 Gb SAS x4 expansion ports (Mini-SAS HD SFF-8644).
    - MetroCluster ports:
      - Two 4/8/16 Gb FC SFP+ MetroCluster FC ports (planned for the future).
      - Two 40/100 GbE iWARP QSFP28 MetroCluster IP ports.
  - One RJ-45 10/100/1000 Mb Ethernet port for out-of-band management.
  - Two serial console ports (RJ-45 and Micro-USB) for another means to configure the system.
  - One USB Type A port (read-only) for software updates.
- Four redundant hot-swap 1600 W (100 - 240 V) AC power supplies (IEC 320-C14 power connector) with integrated cooling fans.
- Controller status LEDs.

The following figure shows the front of the ThinkSystem DM240N 2U SFF NVMe expansion enclosure.
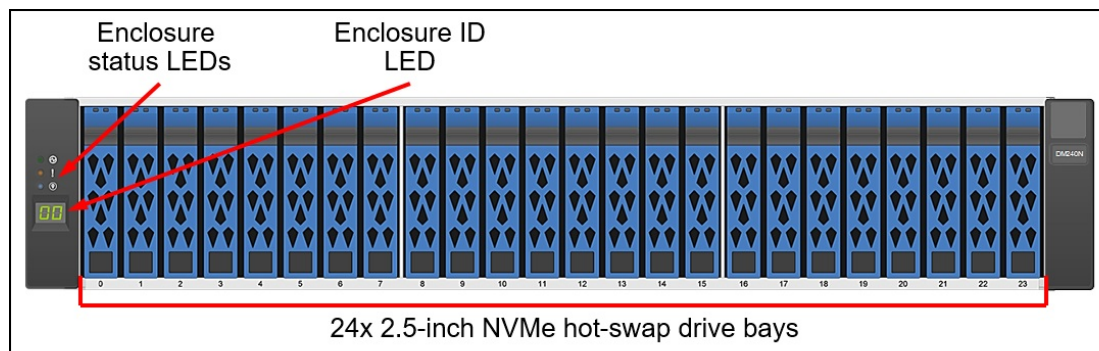
Figure 5. ThinkSystem DM240N 2U SFF NVMe expansion enclosure front view

The front of the ThinkSystem DM240N 2U SFF NVMe expansion enclosure includes the following components:

- 24 SFF hot-swap drive bays.
- Enclosure status LEDs.

- Enclosure ID LED.

The following figure shows the rear of the ThinkSystem DM240N 2U SFF NVMe expansion enclosure.
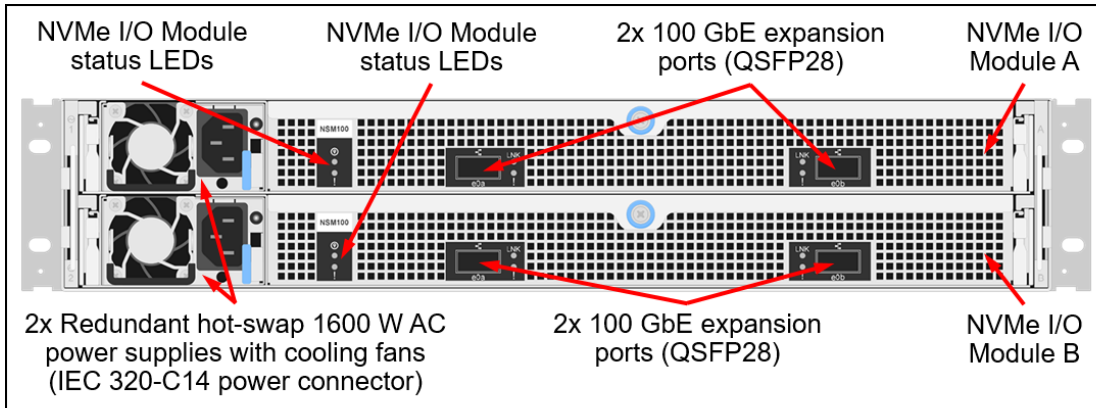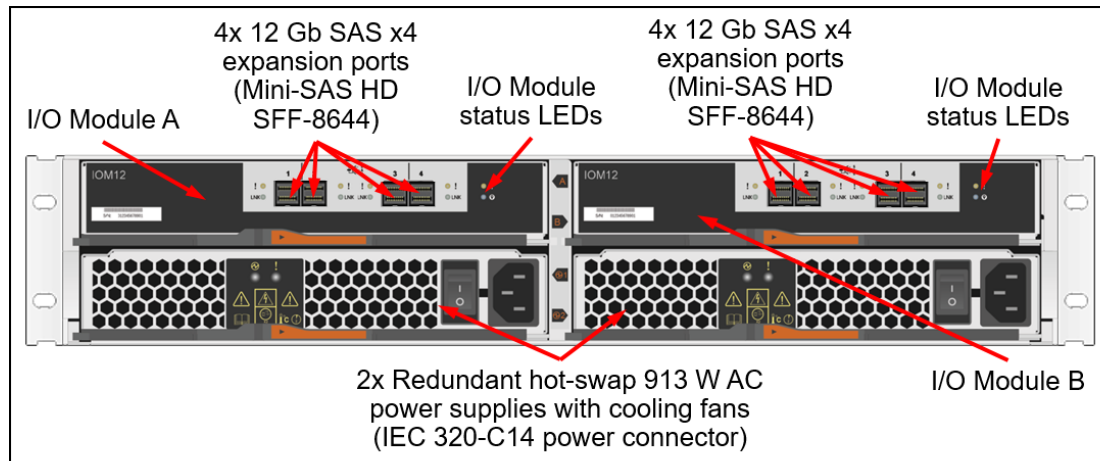

Figure 6. ThinkSystem DM240N 2U SFF NVMe expansion enclosure rear view

The rear of the ThinkSystem DM240N 2U SFF NVMe expansion enclosure includes the following components:

- Two redundant hot-swap NVMe I/O Modules; each NVMe I/O Module provides two 100 GbE QSFP28 expansion ports for connections to the controller enclosures.
- Two redundant hot-swap 1600 W (100 - 240 V) AC power supplies (IEC 320-C14 power connector) with integrated cooling fans.
- NVMe I/O Module status LEDs.

The following figure shows the front of the ThinkSystem DM240S 2U SFF SAS expansion enclosure.
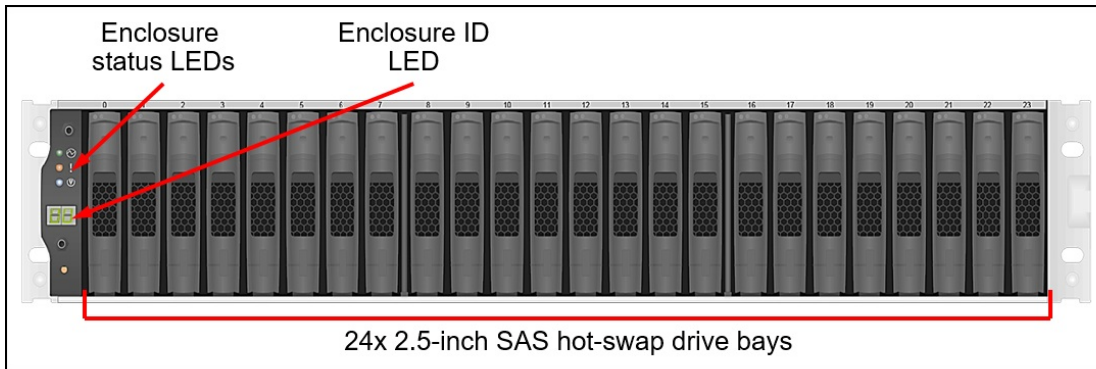
Figure 7. ThinkSystem DM240S 2U SFF SAS expansion enclosure front view

The front of the ThinkSystem DM240S 2U SFF SAS expansion enclosure includes the following components:

- 24 SFF hot-swap drive bays.
- Enclosure status LEDs.
- Enclosure ID LED.

The following figure shows the rear of the ThinkSystem DM240S 2U SFF SAS expansion enclosure.

Figure 8. ThinkSystem DM240S 2U SFF SAS expansion enclosure rear view

The rear of the ThinkSystem DM240S 2U SFF SAS expansion enclosure includes the following components:

- Two redundant hot-swap I/O Modules; each I/O Module provides four 12 Gb SAS x4 expansion ports (Mini-SAS HD SFF-8644) for connections to the controller enclosures and for connecting the expansion enclosures between each other.
- Two redundant hot-swap 913 W (100 - 240 V) AC power supplies (IEC 320-C14 power connector) with integrated cooling fans.
- I/O Module status LEDs.

System specifications

The following table lists the ThinkSystem DM7100F Unified All Flash Array storage system specifications.

Note: The supported hardware options, software features, and interoperability listed in this product guide are based on the ONTAP software version 9.7. For details about specific software releases that introduced support for certain hardware options and software features, refer to the Change History for the particular software release for the ThinkSystem DM7100F Unified All Flash Array that can be found at: http://datacentersupport.lenovo.com

Table 1. ThinkSystem DM7100F system specifications

Attribute	Specification
Form factor	- DM7100F controller enclosure (machine type 7D25): 4U rack mount. - DM240N 2U24 SFF expansion enclosure (machine type 7Y62): 2U rack mount. - DM240S 2U24 SFF expansion enclosure (machine types 7Y58, 7D7Y): 2U rack mount.
Controller configuration	Dual active-active controller configuration (HA pair). Up to 6 HA pairs can be combined into a single SAN cluster, or up to 12 HA pairs can be combined into a single NAS cluster.
HA pair interconnect ports	4x 25 GbE SFP28 onboard ports (DAC cables) (2 ports per controller).
Cluster interconnect ports	4x 100 GbE QSFP28 ports (DAC cable or SW fiber optic cable, MPO) (2 ports per controller on the pre-installed SmartIO adapter cards).

Attribute	Specification
MetroCluster connectivity	• MetroCluster IP: 4x 40/100 GbE QSFP28 ports (SW fiber optic cable, MPO) (2 ports per controller on the optional 100 GbE iWARP adapter cards). (requires ONTAP 9.8 or later) • MetroCluster FC: 4x 4/8/16 Gb FC SFP+ ports (SW fiber optic cable, LC) (2 ports per controller on the optional 16 Gb FC-VI adapter cards).
RAID levels	RAID-4, RAID-DP, RAID-TEC. **Note:** RAID-4 can be configured only through the CLI.
Controller memory	256 GB RAM per system (128 GB per controller). 32 GB battery-backed NVRAM per system (16 GB per controller) mirrored between the controllers.
Drive bays	Up to 480 SFF hot-swap drive bays: • Up to 48 NVMe and up to 432 SAS (Up to two 2U24 NVMe and up to 18 2U24 SAS expansion enclosures); or • Up to 480 SAS (Up to 20 2U24 SFF SAS expansion enclosures).
Drive technology	NVMe SSDs, SAS SSDs.
Drive expansion connectivity	• 2x 100 GbE QSFP28 onboard expansion ports and 2x 100 GbE QSFP28 additional expansion ports with one 100 GbE adapter card on each of two controllers in the controller enclosure for the attachment of the NVMe expansion enclosures. • 2x 100 GbE QSFP28 expansion ports on each of two NVMe I/O modules in the NVMe expansion enclosure for the attachment to the controller enclosure. • 4x 12 Gb SAS x4 (Mini-SAS HD SFF-8644) base expansion ports and 4x or 8x 12 Gb SAS x4 (Mini-SAS HD SFF-8644) additional expansion ports with one or two SAS adapter cards on each of two controllers in the controller enclosure for the attachment of the SAS expansion enclosures. • 4x 12 Gb SAS x4 (Mini-SAS HD SFF-8644) expansion ports on each of two SAS I/O modules in the SAS expansion enclosure for the attachment to the controller enclosure and daisy chaining of the expansion enclosures.
Drives	• 1.92 TB and 3.84 TB NVMe SSDs. • 1.92 TB, 3.84 TB, 7.68 TB, and 15.36 TB NVMe SSD SEDs. • 960 GB, 3.84 TB, 7.68 TB, and 15.36 TB SAS SSDs.
Storage capacity	Up to 7.37 PB (480x 15.36 TB SSDs).
Storage protocols	• NAS (File access): NFS and CIFS/SMB. • SAN (Block access): iSCSI, FC, NVMe/FC.
Host connectivity	Base ports on the mezzanine cards (per controller enclosure): • 8x 25 GbE SFP28 (DAC cable or SW fiber optic cable, LC) (4 ports per controller); or • 8x 4/8/16 Gb FC SFP+ (SW fiber optic cable, LC) (4 ports per controller). Optional additional ports on up to four pairs of the adapter cards (up to four adapter cards per controller) with the following ports per adapter card: • 2x 1/10 GbE RJ-45 (UTP Category 6/6a cables). • 4x 10 GbE SFP+ (DAC cables). • 2x 25 GbE SFP28 (DAC cables or SW fiber optic cables, LC). • 2x 40/100 GbE QSFP28 (DAC cables or SW fiber optic cables, MPO). • 4x 8/16/32 Gb FC SFP+ host ports (SW fiber optic cables, LC).
Host operating systems	Microsoft Windows Server 2012 R2, 2016, and 2019; Red Hat Enterprise Linux (RHEL) 6, 7, and 8; SUSE Linux Enterprise Server (SLES) 11, 12, and 15; VMware vSphere 6.0, 6.5, 6.7, and 7.0. **Note:** NVMe/FC is supported with RHEL 8 and SLES 15 only (seeOperating systems for specific version details).
Performance*	Up to 650 000 random read IOPS (8 KB blocks).

Attribute	Specification

Configuration maximums**	• Maximum raw storage capacity: 7.37 PB
	• Maximum aggregate size: 800 TB
	• Maximum number of FlexVol volumes per HA pair: 5000
	• Maximum FlexVol volume size: 100 TB
	• Maximum number of LUNs per HA pair: 24 576
	• Maximum number of LUNs per FlexVol volume: 512
	• Maximum LUN size: 16 TB
	• Maximum number of drives in a RAID group (data + parity drives):
	    ○ RAID 4: 14 (13 + 1 SAS SSDs or NVMe SSDs)
	    ○ RAID-DP: 28 (26 + 2 SAS SSDs or NVMe SSDs)
	    ○ RAID-TEC: 29 (26 + 3 SAS SSDs or NVMe SSDs)
	• Maximum number of initiators per HA pair: 8192
	• Maximum number of snapshots per FlexVol volume: 1023

Cooling	Redundant cooling: • DM7100F 4U: Eight hot-swap system fans. • DM240N 2U24 SFF: Fans that are built into I/O modules and power supplies. • DM240S 2U24 SFF: Fans that are built into power supplies.
Power supply	Four 1600 W (100 - 240 V) (DM7100F 4U controller enclosure), or two 1600 W (100 - 240 V) (DM240N 2U24 SFF expansion enclosure), or two 913 W (100 - 240 V) (DM240S 2U24 SFF expansion enclosure) redundant hot-swap Platinum AC power supplies.
Hot-swap parts	Controllers, I/O modules, drives, system fans (DM7100 4U only), power supplies, and SFP+/SFP28/QSFP+/QSFP28 transceivers and DAC cables.
Management ports	• 1x 1 GbE port (UTP, RJ-45) per controller for out-of-band management. • 2x Serial console ports (RJ-45 and Micro-USB) for system configuration. • 1x USB Type A port (read-only) for software updates.
Management interfaces	ThinkSystem Storage Manager web-based GUI; SSH CLI; Serial console CLI; SNMP, email, and syslog alerts; optional Lenovo XClarity.
Security features	Secure Socket Layer (SSL), Secure Shell (SSH), user level security, role-based access control (RBAC), LDAP authentication.
Warranty and support	Three- or five-year customer-replaceable unit and onsite limited warranty with selectable service levels: 9x5 coverage with next business day (NBD) parts delivered (base warranty), 9x5 coverage with NBD onsite response (Foundation Service), 24x7 coverage with 4-hour onsite response (Essential Service), or 24x7 coverage with 2-hour onsite response or 6-hour committed repair (select areas) (Advanced Service). Premier Support is also available. Software support is included in the base warranty or Foundation, Essential, or Advanced Service for the duration of the warranty period.
Dimensions	4U controller enclosure: • Height: 175 mm (6.9 in.) • Width: 447 mm (17.6 in.) • Depth: 828 mm (32.6 in.) 2U24 SFF NVMe expansion enclosure: • Height: 87 mm (3.4 in.) • Width: 447 mm (17.6 in.) • Depth: 543 mm (21.4 in.) 2U24 SFF SAS expansion enclosure: • Height: 85 mm (3.4 in.) • Width: 449 mm (17.7 in.) • Depth: 484 mm (19.1 in.)
Weight	• Controller enclosure (fully configured): 49.2 kg (108.5 lb) • 2U24 SFF NVMe expansion enclosure (fully configured): 30.2 kg (66.7 lb) • 2U24 SFF SAS expansion enclosure (fully configured): 24.4 kg (53.8 lb)

Attribute	Specification

* Estimated theoretical performance based on the capacity planning for specific configurations and workloads.

** For a detailed list of configuration limits and restrictions for a specific version of the software, refer to the Lenovo Data Center Support website:

http://datacentersupport.lenovo.com

Controller enclosures

Factory-integrated models of the ThinkSystem DM7100F Unified All Flash Array are configured by using the Lenovo Data Center Solution Configurator (DCSC):

http://dcsc.lenovo.com

The following table lists the CTO base models for the ThinkSystem DM7100F Unified All Flash Array.

Table 2. ThinkSystem DM7100F CTO base models

Description	Machine Type/Model	Feature code
Lenovo ThinkSystem DM7100F	7D25CTO1WW	B94E

Configuration note: Two DM7100 controllers (feature code B94T) are pre-selected in the configurator.

The models of the ThinkSystem DM7100F ship with the following items:

- One chassis with the following components:
    - Two controllers
    - Four power supplies
- Rack Mount Kit
- 2 m USB Cable (USB Type A to Micro-USB)
- *Electronic Publications Flyer*
- Four customer-configured power cables

Controllers

The ThinkSystem DM7100F controller enclosure ships with two DM7100 controllers. A *controller* provides interfaces for host connectivity, management, and internal drives, and it runs ONTAP storage management software. Each ThinkSystem DM7100 controller enclosure provides 256 GB RAM and 32 GB battery-backed NVRAM (128 GB RAM and 32 GB NVRAM per controller).

The ThinkSystem DM7100F controller enclosures ship with four HA interconnect 25 GbE SFP28 ports (two ports per controller) to cable a directly-connected dual-controller HA pair, and four cluster interconnect 100 GbE QSFP28 ports (two ports on the 100 GbE SmartIO adapter card [feature code BAZ1] installed in the Slot 3 on each of the DM7100 controllers) to cable a directly connected (one HA pair) or switched (multiple HA pairs) cluster. Up to six HA pairs can be combined into a single SAN cluster or up to 12 HA pairs can be combined into a single NAS cluster.

The ThinkSystem DM7100F controller enclosure provides four QSFP28 ports for 100 GbE NVMe expansion connectivity, and it also has two mezzanine slots (one slot per controller) for mezzanine cards and eight available expansion slots (four slots per controller) for adapter cards.

The ThinkSystem DM7100F controller enclosure also provides eight integrated 12 Gb SAS x4 expansion ports (Mini-SAS HD SFF-8644 connectors) (four ports per controller) for the attachment of the DM240S 2U24 SFF SAS expansion enclosures.

The ThinkSystem DM7100F controller enclosure provides a choice of the following interfaces on the mezzanine cards for base host connectivity (ports per mezzanine card):

- 4x 25 GbE SFP28 ports for NAS or iSCSI connectivity (require optical transceivers or DAC cables that should be purchased for the mezzanine card).
- 4x 4/8/16 Gb FC SFP+ ports for FC connectivity (require SFP+ SW optical transceivers that should be purchased for the mezzanine card).

The following interfaces can be added to the ThinkSystem DM7100F controller enclosures with optional adapter cards (ports per adapter card):

- Host interfaces
  - 2x 1/10 GbE RJ-45 ports for NAS or iSCSI connectivity (require RJ-45 UTP Category 6 cables that should be purchased for the adapter card).
  - 4x 10 GbE SFP+ ports for NAS or iSCSI connectivity (require DAC cables that should be purchased for the adapter card).
  - 2x 25 GbE SFP28 ports for NAS or iSCSI connectivity (require optical transceivers or DAC cables that should be purchased for the adapter card).
  - 2x 40/100 GbE QSFP28 ports for NAS or iSCSI connectivity (require optical transceivers or DAC cables that should be purchased for the adapter card).
  - 4x 8/16/32 Gb FC SFP+ ports for FC connectivity, or NVMe/FC with 32 Gb ports (SW SFP+ transceivers with LC connectors included).
- Expansion interfaces:
  - 2x 100 GbE RoCE QSFP28 ports for NVMe/RoCE expansion connectivity.
  - 4x 12 Gb SAS x4 ports (Mini-SAS HD SFF-8644) for SAS expansion connectivity.
- MetroCluster interfaces:
  - 2x 40/100 GbE iWARP QSFP28 ports for MetroCluster IP connectivity (require optical transceivers that should be purchased for the adapter card).
  - 2x 4/8/16 Gb FC SFP+ ports for MetroCluster FC connectivity (require SFP+ SW optical transceivers that should be purchased for the adapter card) (planned for the future).

Configuration notes:

- A pair of the mezzanine cards is required for selection.
- The optional adapter cards should be installed in pairs: Up to four pairs of the adapter cards are supported per controller enclosure (up to four adapter cards per controller), including a combination of the adapter card pairs.
- Both controllers must have matching configurations of the mezzanine ports (type and physical connections) and adapter cards (type, quantity, slot location, and physical connections).
- The optional adapter cards should be installed in the controller's expansion slots in the following order: Slot 2, Slot 4, Slot 1, Slot 5.
  Note: In the configurations with two DM240N expansion enclosures, a pair of additional 100 GbE RoCE adapter cards is required for dual HA direct connectivity to the expansion enclosures, and these cards must be installed in the Slot 5 of the DM7100 controllers.

The following table lists the controller for the ThinkSystem DM7100F Unified All Flash Array and supported connectivity options.

Table 3. DM7100F controller and connectivity options

Description	Part number	Feature code	Maximum quantity per controller enclosure
Controllers			
Lenovo ThinkSystem DM7100 NVMe Controller	None*	B94T	2
Mezzanine cards: Base host interfaces			
Lenovo ThinkSystem DM Series 25Gb 4 Port Ethernet Mezz Card	4XC7A60826	B94J	2
Lenovo ThinkSystem DM Series 16Gb 4 Port Fibre Channel Mezz Card	4XC7A60827	B94K	2
Adapter cards: Additional host interfaces			
Lenovo ThinkSystem DM Series 10Gb BaseT 2 port Ethernet Card	4XC7A60794	B94F	8
Lenovo ThinkSystem DM Series 10Gb 4 port Ethernet Card	4XC7A38329	B730	8
Lenovo ThinkSystem DM Series 25Gb 2 port Ethernet Card	4XC7A38328	B72Z	6
Lenovo ThinkSystem DM Series 100Gb 2 port Ethernet Card	4XC7A38327	B72Y	6
Lenovo ThinkSystem DM Series 32Gb 4 port Fibre Channel Card	4XC7A38326	B72X	6
Adapter cards: Additional expansion interfaces			
Lenovo ThinkSystem DM Series 100Gb 2 port Ethernet Card	4XC7A38327	B72Y	2
Lenovo ThinkSystem DM Series 12Gb SAS 4 Port Card	4Y37A60797	B94X	6
Adapter cards: MetroCluster interfaces			
Lenovo ThinkSystem DM Series 100Gb iWARP 2 Port Ethernet Card (requires ONTAP 9.8 or later)	4XC7A60795	B94G	2
Lenovo ThinkSystem DM Series 16Gb FC-VI 2 Port SFP+ Card	4XC7A60796	B94H	2
SFP+ transceivers for 10Gb 4 port Ethernet Card (4XC7A38329)			
Intel 10G Ethernet SFP+ SR Optics Module	4TC7A69986	B4SY	32
SFP+ transceivers for 16 Gb FC-VI MetroCluster adapter cards			
16Gb Fibre Channel SFP+ Module 1 pack	4TC7A69990	BF5V	12
SFP+ transceivers for 16 Gb FC mezzanine cards			
16Gb Fibre Channel SFP+ Module 1 pack	4XF7A14920	B4KA	12
SFP+ and SFP28 transceivers for 25 GbE mezzanine cards and 25 GbE adapter cards			
10Gb SW Optical iSCSI SFP+ Module 1 pack	4XF7A14919	B4K9	24
25Gb Ethernet Optical SFP28 Shortwave Module 1 pack	4XF7A39597	B732	24
Lenovo 25GBase-SR SFP28 Transceiver	7G17A03537	AV1B	24
QSFP+/QSFP28 transceivers for 100 GbE adapter cards and SmartIO cards			
100Gb Ethernet Optical QSFP28 Shortwave Module 1 Pack	4XF7A39598	B733	20
Lenovo 100Gb SR4 QSFP28 Ethernet Transceiver	4M27A67042	BFH1	20
OM4 cables for 100 GbE QSFP28 transceivers			
Lenovo 5m MPO-MPO OM4 MMF Cable	7Z57A03567	AV25	20
Lenovo 7m MPO-MPO OM4 MMF Cable	7Z57A03568	AV26	20
Lenovo 10m MPO-MPO OM4 MMF Cable	7Z57A03569	AV27	20
Lenovo 15m MPO-MPO OM4 MMF Cable	7Z57A03570	AV28	20
Lenovo 20m MPO-MPO OM4 MMF Cable	7Z57A03571	AV29	20
Lenovo 30m MPO-MPO OM4 MMF Cable	7Z57A03572	AV2A	20

Description	Part number	Feature code	Maximum quantity per controller enclosure
OM4 cables for 16/32 Gb FC and 25 GbE SFP28 optical transceivers			
Lenovo 0.5m LC-LC OM4 MMF Cable	4Z57A10845	B2P9	32
Lenovo 1m LC-LC OM4 MMF Cable	4Z57A10846	B2PA	32
Lenovo 3m LC-LC OM4 MMF Cable	4Z57A10847	B2PB	32
Lenovo 5m LC-LC OM4 MMF Cable	4Z57A10848	B2PC	32
Lenovo 10m LC-LC OM4 MMF Cable	4Z57A10849	B2PD	32
Lenovo 15m LC-LC OM4 MMF Cable	4Z57A10850	B2PE	32
Lenovo 25m LC-LC OM4 MMF Cable	4Z57A10851	B2PF	32
Lenovo 30m LC-LC OM4 MMF Cable	4Z57A10852	B2PG	32
OM3 cables for 16/32 Gb FC and 25 GbE SFP28 optical transceivers			
Lenovo 0.5m LC-LC OM3 MMF Cable	00MN499	ASR5	32
Lenovo 1m LC-LC OM3 MMF Cable	00MN502	ASR6	32
Lenovo 3m LC-LC OM3 MMF Cable	00MN505	ASR7	32
Lenovo 5m LC-LC OM3 MMF Cable	00MN508	ASR8	32
Lenovo 10m LC-LC OM3 MMF Cable	00MN511	ASR9	32
Lenovo 15m LC-LC OM3 MMF Cable	00MN514	ASRA	32
Lenovo 25m LC-LC OM3 MMF Cable	00MN517	ASRB	32
Lenovo 30m LC-LC OM3 MMF Cable	00MN520	ASRC	32
SFP+ DAC cables for 10 GbE SFP+ adapter cards			
0.5m Passive DAC SFP+ Cable	00D6288	A3RG	32
1m Passive DAC SFP+ Cable	90Y9427	A1PH	32
1.5m Passive DAC SFP+ Cable	00AY764	A51N	32
2m Passive DAC SFP+ Cable	00AY765	A51P	32
3m Passive DAC SFP+ Cable	90Y9430	A1PJ	32
5m Passive DAC SFP+ Cable	90Y9433	A1PK	32
SFP28 DAC cables for 25 GbE onboard ports, mezzanine cards, and adapter cards			
Lenovo 1m Passive 25G SFP28 DAC Cable	7Z57A03557	AV1W	26
Lenovo 3m Passive 25G SFP28 DAC Cable	7Z57A03558	AV1X	26
Lenovo 5m Passive 25G SFP28 DAC Cable	7Z57A03559	AV1Y	26
QSFP+ DAC cables for 100 GbE adapter cards and SmartIO cards (operating at 40 Gbps)			
Lenovo 1m Passive QSFP+ DAC Cable	49Y7890	A1DP	20
Lenovo 3m Passive QSFP+ DAC Cable	49Y7891	A1DQ	20
Lenovo 5m Passive QSFP+ DAC Cable	00D5810	A2X8	20
QSFP28 DAC cables for 100 GbE adapter cards and SmartIO cards (operating at 100 Gbps)			
Lenovo 1m Passive 100G QSFP28 DAC Cable	7Z57A03561	AV1Z	20
Lenovo 3m Passive 100G QSFP28 DAC Cable	7Z57A03562	AV20	20
Lenovo 5m Passive 100G QSFP28 DAC Cable	7Z57A03563	AV21	20
UTP Category 6 cables for 1/10 GbE RJ-45 adapter cards and 1 GbE RJ-45 management ports			
0.75m Green Cat6 Cable	00WE123	AVFW	18

Description	Part number	Feature code	Maximum quantity per controller enclosure
1.0m Green Cat6 Cable	00WE127	AVFX	18
1.25m Green Cat6 Cable	00WE131	AVFY	18
1.5m Green Cat6 Cable	00WE135	AVFZ	18
3m Green Cat6 Cable	00WE139	AVG0	18
10m Cat6 Blue Cable	90Y3721	A1MU	18
10m Cat6 Green Cable	90Y3718	A1MT	18
10m Cat6 Yellow Cable	90Y3715	A1MS	18
25m Cat6 Blue Cable	90Y3730	A1MX	18
25m Cat6 Green Cable	90Y3727	A1MW	18
25m Cat6 Yellow Cable	90Y3724	A1MV	18

* Factory-installed only.

Expansion enclosures

The ThinkSystem DM7100F controller enclosure supports attachment of up to two ThinkSystem DM240N 2U24 SFF NVMe and up to eight DM240S 2U24 SFF SAS expansion enclosures. The expansion enclosures can be added to the system non-disruptively.

Note: The addition of the second DM240N NVMe expansion enclosure to the storage arrays that were previously configured with one DM240N NVMe expansion enclosure requires planned system downtime.

The following table lists the CTO base models for the expansion enclosures.

Table 4. CTO base models for the ThinkSystem DM Series expansion enclosures

Description	Machine Type/Model	Feature code
DM240S 2U24 SFF Expansion Enclosure (1-year warranty)	7Y58CTO1WW	BEY7
DM240S 2U24 SFF Expansion Enclosure (3-year warranty)	7D7YCTO1WW	BEY7
DM240N NVMe 2U24 SFF Expansion Enclosure (3-year warranty)	7Y62CTO1WW	B6W6

Configuration notes:

- Two NVMe I/O expansion modules (feature code B73A) are pre-selected in the configurator for the DM240N 2U24 SFF expansion enclosures.
- Two SAS I/O expansion modules (feature code B39J) are pre-selected in the configurator for the DM240S 2U24 SFF expansion enclosures.

The models of the ThinkSystem DM240N and DM240S 2U24 SFF expansion enclosures ship with the following items:

- One chassis with the following components:
    - Two I/O modules (NVMe or SAS)
    - Two power supplies
- Rack Mount Kit
- *Electronic Publications Flyer*
- Two customer-configured power cables

The following expansion connectivity topologies are supported:

- NVMe expansion connectivity
- SAS expansion connectivity

NVMe expansion topology

Each ThinkSystem DM240N expansion enclosure ships with two NVMe I/O expansion modules. Each *NVMe I/O expansion module* provides two external 100 GbE QSFP28 ports (labelled Ports A and B) that are used for direct-attach connections to the ThinkSystem DM7100F controller enclosures.

The ThinkSystem DM7100F controller enclosure supports direct attachment of up to two DM240N NVMe expansion enclosures for a total of up to 48 NVMe drives. For one NVMe expansion enclosure, the integrated 100 GbE QSFP28 ports on the DM7100 controller can be used. For two NVMe expansion enclosures, an additional 2-port 100 GbE QSFP28 adapter card is required for the DM7100 controller.

The example expansion connectivity topologies for one and two enclosures with dual-path HA (high availability) are shown in the following figures.
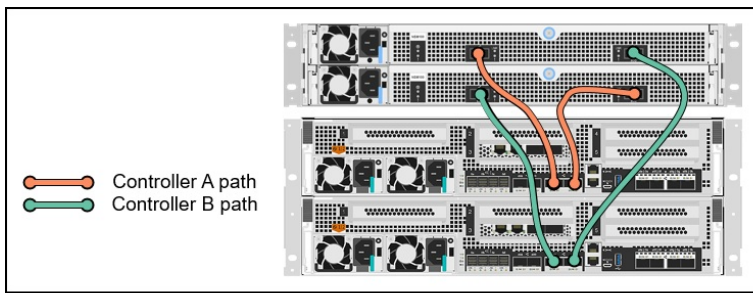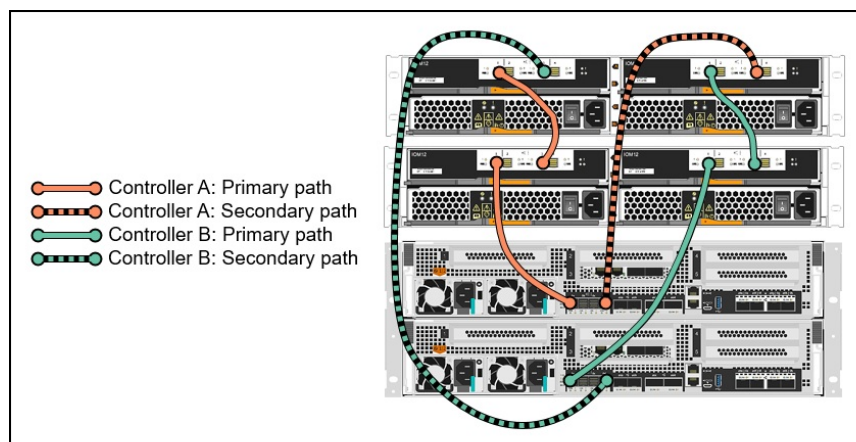

Figure 9. DM7100F NVMe expansion connectivity topology: One enclosure
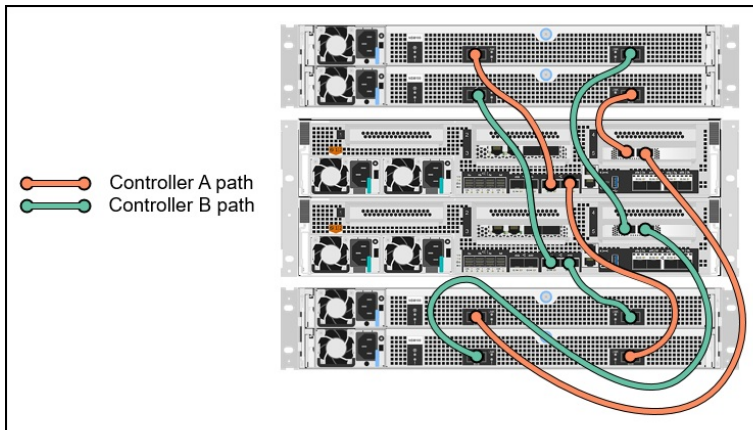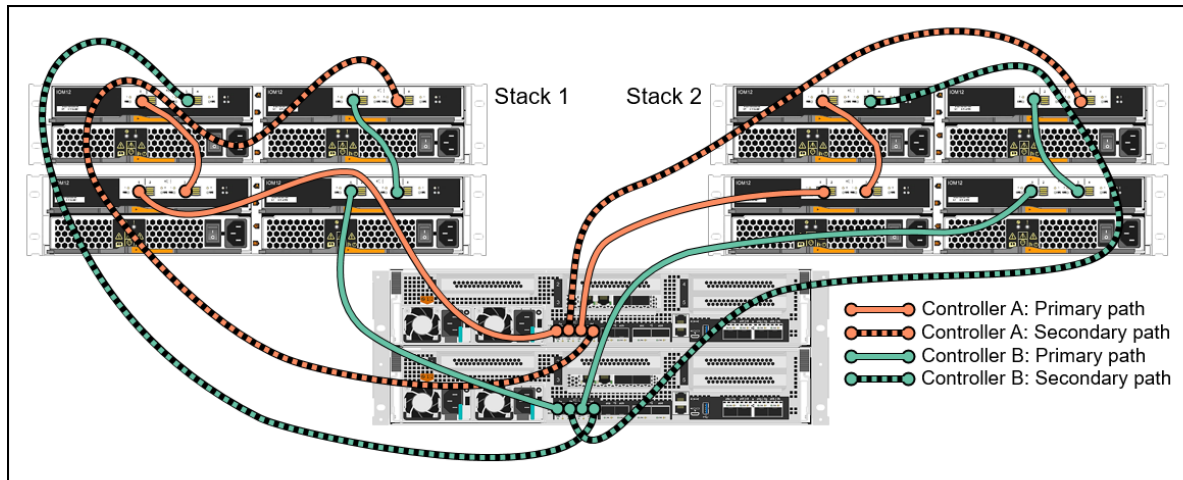

Figure 10. DM7100F NVMe expansion connectivity topology: Two enclosures

NVMe expansion cabling rules:

- On the Controller A, the integrated 100 GbE Port C is connected to the Port A on the NVMe I/O Module A in the first expansion enclosure, and the integrated 100 GbE Port D is connected to the Port B in the NVMe I/O Module B in the same (in case of only one expansion enclosure) or second expansion enclosure.

- On the Controller B, the integrated 100 GbE Port C is connected to the Port A on the NVMe I/O Module B in the first expansion enclosure, and the integrated 100 GbE Port D is connected to the Port B in the NVMe I/O Module A in the same (in case of only one expansion enclosure) or second expansion enclosure.

- On the Controller A, the Port 1 on the 100 GbE adapter card is connected to the Port A on the NVMe I/O Module A in the second expansion enclosure, and the Port 2 on the 100 GbE adapter card is

connected to the Port B in the NVMe I/O Module B in the first expansion enclosure.

- On the Controller B, the Port 1 on the 100 GbE adapter card is connected to the Port A on the NVMe I/O Module B in the second expansion enclosure, and the Port 2 on the 100 GbE adapter card is connected to the Port B in the NVMe I/O Module A in the first expansion enclosure.

The following table lists ordering information for the NVMe expansion enclosure connectivity options.

Table 5. NVMe expansion enclosure connectivity options

Description	Part number	Feature code	Maximum quantity per one expansion enclosure
Lenovo 1m Passive 100G QSFP28 DAC Cable	7Z57A03561	AV1Z	4
Lenovo 3m Passive 100G QSFP28 DAC Cable	7Z57A03562	AV20	4
Lenovo 5m Passive 100G QSFP28 DAC Cable	7Z57A03563	AV21	4

Configuration note: Four 100G QSFP28 DAC cables are needed per expansion enclosure for directly connecting the expansion enclosure to the controller enclosure.

SAS expansion topology

Each ThinkSystem DM240S expansion enclosure ships with two SAS I/O expansion modules. Each *I/O expansion module* provides four external 12 Gb SAS x4 ports (Mini-SAS HD SFF-8644 connectors labelled Port 1-4) that are used for connections to the ThinkSystem DM7100F controller enclosure and for daisy chaining the expansion enclosures between each other.

The ThinkSystem DM7100F controller enclosure supports up to six SAS expansion enclosure stacks with up to four enclosures in each stack for a total of up to 480 SAS SSDs. For one or two stacks, the integrated SAS expansion ports on the DM7100 controller can be used. For three or four stacks, an additional 4-port SAS adapter card is required for the DM7100 controller. For five or six stacks, two additional 4-port SAS adapter cards are required for the DM7100 controller.

The example expansion connectivity topology for one or two enclosure stacks with dual-path HA (high availability) are shown in the following figures.

Figure 11. DM7100F SAS expansion connectivity topology: One stack

Figure 12. DM7100F SAS expansion connectivity topology: Two stacks

SAS expansion cabling rules:

- Ports A and C (integrated and on the SAS adapter cards) on the Controller 1 are primary paths to separate stacks; each port is connected to the Port 1 on the I/O Module A in the first expansion enclosure in the stack.

- Ports A and C (integrated and on the SAS adapter cards) on the Controller 2 are primary paths to separate stacks; each port is connected to the Port 1 on the I/O Module B in the first expansion enclosure in the stack.

- Ports A at the same location (either integrated or on the SAS adapter cards) on both controllers are connected to the same stack; Ports C at the same location (either integrated or on the SAS adapter cards) on both controllers are connected to the same stack.

- Ports B and D (integrated and on the SAS adapter cards) on the Controller 1 are secondary paths to separate stacks; each port is connected to the Port 3 on the I/O Module B in the last expansion enclosure in the stack.

- Ports B and D (integrated and on the SAS adapter cards) on the Controller 2 are secondary paths to separate stacks; each port is connected to the Port 3 on the I/O Module A in the last expansion enclosure in the stack.

- Ports B at the same location (either integrated or on the SAS adapter cards) on both controllers are connected to the same stack; Ports D at the same location (either integrated or on the SAS adapter cards) on both controllers are connected to the same stack.

- Port 3 on the I/O Module A in the first expansion enclosure in a stack is connected to Port 1 on the I/O Module A in the adjacent expansion enclosure in the same stack, and so on (until the last expansion enclosure in the stack is cabled).

- Port 3 on the I/O Module B in the first expansion enclosure in a stack is connected to Port 1 on the I/O Module B in the adjacent expansion enclosure in the same stack, and so on (until the last expansion enclosure in the stack is cabled).

The following table lists ordering information for the SAS expansion enclosure connectivity options.

Table 6. SAS expansion enclosure connectivity options

Description	Part number	Feature code	Maximum quantity per one expansion enclosure
External MiniSAS HD 8644/MiniSAS HD 8644 0.5M Cable	00YL847	AU16	4
External MiniSAS HD 8644/MiniSAS HD 8644 1M Cable	00YL848	AU17	4
External MiniSAS HD 8644/MiniSAS HD 8644 2M Cable	00YL849	AU18	4
External MiniSAS HD 8644/MiniSAS HD 8644 3M Cable	00YL850	AU19	4

Configuration notes:

- The following quantities of SAS cables are needed per stack of the SAS expansion enclosures:
    - Two SAS cables per expansion enclosure in the stack for connecting the first expansion enclosure in the stack to the controller enclosure and for connections to the adjacent expansion enclosures.
    - Two additional SAS cables for connecting the last expansion enclosure in the stack to the controller enclosure.
- The length of the SAS cables that connect a 2U24 SAS enclosure to an adjacent 4U controller enclosure should be at least 1 meter.

Drives

With the DM7100F, the drives are installed in the expansion enclosures. The ThinkSystem DM240N 2U24 SFF expansion enclosures support up to 24 SFF NVMe hot-swap SSDs, and the DM240S 2U24 SFF expansion enclosures support up to 24 SFF SAS/SATA hot-swap SSDs.

The following table lists supported drive packs for the controller and expansion enclosures.

Configuration notes:

- When ordering the systems, select the drives that match the ONTAP offering and bundle you are installing on the DM controller. Drive feature codes are specific to Unified or SAN Only offerings, and to Base, Fundamentals and Premium bundles. See the Software section for details.
- Drives are sold in packs. Supported quantities are as follows:
    - The DM240N 2U24 SFF expansion enclosure supports 12, 18 or 24 NVMe drives (4 packs of 6 drives)
    - The DM240S 2U24 SFF expansion enclosure supports 12, 18 or 24 SAS/SATA drives (4 packs of 6 drives)
    - A minimum of 2 drive packs is required.
- For factory-installed drive packs, all drives in the enclosure must be of the same type and capacity.

Field upgrades: Drive packs for field upgrades can be ordered via the CTO base 7D4FCTO1WW, ThinkSystem DM Drive Pack Upgrades for DM7100. These are for use in existing expansion enclosures that have not been fully populated with the factory-installed drive packs

Table 7. DM240N 2U24 SFF drive options

Description	Part number	Feature code	Maximum quantity per 2U24 enclosure
2.5-inch NVMe hot-swap SSDs (non-SED)			
Lenovo ThinkSystem 11.5TB (6x 1.92TB NVMe Non-SED) Drive Pack	None*	BC81	4
Lenovo ThinkSystem 23TB (6x 3.84TB NVMe Non-SED) Drive Pack	None*	BC7W	4
2.5-inch NVMe hot-swap SSD SEDs**			
Lenovo ThinkSystem 11.5TB (6x 1.92TB NVMe SED) Drive Pack	None*	BC7Z	4
Lenovo ThinkSystem 23TB (6x 3.84TB NVMe SED) Drive Pack	None*	BC7U	4
Lenovo ThinkSystem 23TB (6x 3.84TB NVMe SED FIPS) Drive Pack	None*	BC7V	4
Lenovo ThinkSystem 46TB (6x 7.68TB NVMe SED) Drive Pack	None*	BC7Y	4
Lenovo ThinkSystem 92TB (6x 15.36TB NVMe SED) Drive Pack	None*	BC80	4

* Drive packs for field upgrades can be ordered via the CTO base 7D4FCTO1WW (refer to the configuration note).
** Available worldwide except PRC and RUCIS markets

The following table lists supported drive options for the DM240S 2U24 SFF expansion enclosures.

Table 8. DM240S 2U24 SFF drive options: 2.5-inch SAS hot-swap SSDs

Description	Part number	Feature code	Maximum quantity per 2U24 enclosure
ThinkSystem 5.76TB (6x 960GB, 2.5", SSD) Drive Pack for DM7100F	None*	BC7L	4
ThinkSystem 23TB (6x 3.84TB, 2.5", SSD) Drive Pack for DM7100F	None*	BC7M	4
ThinkSystem 46TB (6x 7.68TB, 2.5", SSD) Drive Pack for DM7100F	None*	BC7Q	4
ThinkSystem 92TB (6x 15.36TB, 2.5", SSD) Drive Pack for DM7100F	None*	BC7S	4

* Drive packs for field upgrades can be ordered via the CTO base 7D4FCTO1WW (refer to the configuration note).

Software

In this section:

- Feature bundles
- ONTAP software versions
- Extended ONTAP features
- Upgrading to Unified Premium ONTAP
- Ansible playbooks for DM Series

ONTAP software unifies data management across flash, disk, and cloud to simplify the Lenovo DM storage environment. It builds the foundation for a Data Fabric, making it easy to move the data where it is needed across flash, disk, and cloud resources.

Feature bundles

Controller software for the DM7100F is available in the following bundles of features:

- Unified Base (China only) (Feature B5RH)
- Unified Premium (Feature B5RJ)

The following table summarizes the features in each bundle for the DM7100F.

Table 9. Comparison of software features for the DM7100F

Feature	Unified Base (PRC only)	Unified Premium
Controller software feature code	B5RH	B5RJ
RAID-4, RAID-DP, and RAID-TEC data protection	Included	Included
All Flash Array (AFA) capability	Included	Included
Thin provisioning	Included	Included
Compression	Included	Included
Compaction	Included	Included
Deduplication	Included	Included
Snapshots	Included	Included
Encryption*	No	Included*
Balanced placement	Included	Included
Dynamic capacity expansion	Included	Included
Adaptive Quality of Service	Included	Included
SnapRestore	Included	Included
FlexClone	Included	Included
FlexVol	Included	Included
FlexCache	Included	Included
SnapMirror asynchronous replication	No	Included
SyncMirror data protection	Included	Included
Trusted Platform Module (TPM) support	No	Included
MetroCluster IP	Included	Included
NVMe over FC Protocol	Included	Included
NVMe over TCP Protocol	Included	Included
SnapMirror Business Continuity (SMBC)	No	Included
SnapMirror synchronous replication	No	Included
FlexGroup	Included	Included
SnapVault disk-based storage backup	No	Included
SnapCenter	No	Included
ONTAP S3	Included	Included
ONTAP S3 SnapMirror	No	Optional
FabricPool object storage tiering	Optional	Optional
SnapLock data protection	No	Optional
Security and Compliance Bundle (Anti-ransomware, MTKM, SnapLock)	No	Optional
Hybrid Cloud Bundle (FabricPool, SnapMirror Cloud)	Optional**	Optional

* Requires the encryption version of ONTAP. See the ONTAP software section.
** When used with bundles other than Unified Premium, Hybrid Cloud Bundle only adds FabricPool. The use of SnapMirror Cloud requires Unified Premium.

The features are summarized as follows:

- **RAID-4, RAID-DP, and RAID-TEC data protection** : Provides the flexibility to choose the level of data protection required and helps improve performance and availability with built-in spare capacity and by distributing data across all physical drives in the aggregate, sustaining to up to one (RAID-4), two (RAID-DP), or three (RAID-TEC) concurrent drive failures.

- **All Flash Array (AFA) capability** : Meets the demand for higher speed, lower latency storage and provides higher IOPS and bandwidth with lower power usage and total cost of ownership than hybrid or HDD-based solutions.

- **Thin provisioning**: Optimizes efficiency by allocating storage space based on the minimum space required by each application at any given time, so that applications consume only the space they are actually using, not the total space that has been allocated to them, which allows customers to purchase storage they need today and add more as application requirements grow.

- **Compression:** Provides transparent inline and post-process data compression to reduce the amount of storage that customers need to purchase and manage.

- **Compaction:** enhances compression to further reduce the amount of storage that customers need to purchase and manage.

- **Deduplication:** Performs general-purpose deduplication for removal of redundant data to reduce the amount of storage that customers need to purchase and manage.

- **Snapshots**: Enables creation of read-only copies of data for backup, parallel processing, testing, and development, and have the copies available almost immediately.

- **Encryption:** Provides software-based encryption for data at rest for enhanced data security with the traditional drives and embedded key management (requires the encryption-capable version of the ONTAP software).

- **Balanced placement:** Provides automated workload distribution across the cluster to help increase utilization and performance.

- **Dynamic capacity expansion:** Allows the capacity of a volume or aggregate to be expanded by adding new physical drives.

- **Adaptive Quality of Service:** Simplifies operations and maintains consistent workload performance by defining QoS policies and automatically adjusting storage resources to respond to workload changes.

- **SnapRestore:** Enables quick recovery of data by reverting a local volume or file to its previous state from a particular snapshot copy stored on the file system.

- **FlexClone:** References snapshot metadata to create writable point-in-time copies of a volume.

- **FlexVol:** Provides abstraction layer between the logical volume and its physical location in the storage array.

- **FlexCache:** Speeds up access to data and offloads traffic from heavily accessed volumes for read-intensive workloads by placing frequently used data in cache locally or remotely (closer to the point of client access) and serving the data to the clients directly from cache without accessing the data source.

- **SnapMirror asynchronous replication:** Provides storage system-based data replication between the storage systems containing source (local) and destination (remote) volumes by using asynchronous (at specified regular intervals) data transfers over IP communication links.

- **SyncMirror data protection:** Adds extra level of data protection and availability by mirroring a pair of RAID aggregates.

- **Trusted Platform Module (TPM)** : For encryption enabled systems. The encryption keys for the onboard key manager (OKM) are no longer stored in the boot device, but instead are stored in the physical TPM for systems so equipped, offering greater security and protection. Moving to the TPM is a nondisruptive process.

- **MetroCluster IP:** Provides storage system-based clustering with online, real-time data mirroring

between the local and remote sites by using synchronous data transfers over IP communication links to deliver continuous availability with zero RPO and near-zero RTO. All storage systems in a MetroCluster IP configuration must be of the same model. New to ONTAP 9.11: MetroCluster with Storage Virtual Machine Disaster Recovery (SVM-DR) can now use a third site for the SVM-DR

- **NVMe over FC Protocol**: Enables NVMe over FC
- **NVMe over TCP Protocol**: Enables NVMe over TCP
- **Data Protection Optimized (DPO)**: Increases the amount of concurrent SnapMirror sessions per node, as well as improving SnapMirror performance to the cluster.
- **SnapMirror Business Continuity (SMBC):** Non-disruptive failover active-active cross site clusters. Based on existing SnapMirror Synchronous Replication. Offers Zero data loss, zero downtime. You do not have to failover the application. If there is a failure the application will continue to run and there will be no need to restart.
- **SnapMirror synchronous replication:** Provides storage system-based data replication between the storage systems containing source (local) and destination (remote) volumes by using synchronous (as soon as the data is written to the source volume)
- **FlexGroup:** Enables a single volume to span across multiple clustered storage arrays to maximize storage capacity and automate load distribution. New to ONTAP 9.11: FlexGroups can now be created as SnapLock volumes.
- **SnapVault disk-based storage backup:** Enables data stored on multiple systems to be backed up to a central, secondary system quickly and efficiently as read-only snapshot copies.
- **SnapCenter:** Provides application- and virtual machine-aware backup and restoration of data by using the Snapshots technology and leverages the SnapMirror capabilities of storage systems to provide onsite or offsite backup set mirroring for disaster recovery.
- **ONTAP S3**: Expands the DM Series unified story and allows customers to manage, block, file, and object data from one interface. Customers can now natively store data in S3 buckets onboard the DM Series.
- **ONTAP S3 SnapMirror** : Enables you to protect buckets in ONTAP S3 object stores using familiar SnapMirror mirroring and backup functionality. Requires ONTAP 9.10.1 or later on both source and destination clusters. Requires the Unified Premium Bundle.
- **SnapMirror Cloud**: A backup and recovery technology designed for ONTAP users who want to transition their data protection workflows to the cloud. SnapMirror Cloud is an extension to the family of SnapMirror replication technologies. While SnapMirror is frequently used for ONTAP-to-ONTAP backups, SnapMirror Cloud uses the same replication engine to transfer Snapshot copies for ONTAP to S3-compliant object storage backups.
- **Multitenant Key Management (MTKM)**: Provides the ability for individual tenants or storage virtual machines (SVMs) to maintain their own keys through KMIP for NVE. With multitenant external key management, you can centralize your organization's key management functions by department or tenant while inherently confirming that keys are not stored near the assets. This approach decreases the possibility of compromise.
- **Anti-ransomware**: Uses workload analysis in NAS (NFS and SMB) environments to proactively detect and warn about abnormal activity that might indicate a ransomware attack. When an attack is suspected, anti-ransomware also creates new Snapshot backups, in addition to existing protection from scheduled Snapshot copies. New to ONTAP 9.11: Optional multi-admin verification to approve administration functions that could result in data loss.

Add-on feature bundles:

- **Security and Compliance Bundle**: Licensed per 2-node HA Pair, the Security and Compliance Bundle provides built-in protection from ransomware and while also providing the ability to meet regulatory compliance and organizational data retention requirements.
  - Includes: Anti-ransomware feature with Multitenant Key Management (MTKM) and SnapLock

- **Hybrid Cloud Bundle**: Licensed per TB (3 Year & 5 Year Offerings) the Hybrid Cloud Bundle provides the ability to use S3 SnapMirror from ONTAP to the Public Cloud (AWS S3) and/or SnapMirror Cloud with participating ISV Backup providers.
  - Includes SnapMirror Cloud and FabricPool

Optional Extended features also available via Feature on Demand (FoD) (see the Extended ONTAP features section)

- **FabricPool**: FabricPool is a hybrid storage solution that uses an all flash (all SSD) aggregate as the performance tier and an object store as the external capacity tier. Data in a FabricPool is stored in a tier based on whether it is frequently accessed or not. Using a FabricPool helps you reduce storage cost without compromising performance, efficiency, or protection.
- **SnapLock data protection:** Creates Write-Once-Read-Many (WORM) non-rewritable, non-erasable data on hard disk drives to prevent files from being altered or deleted until a predetermined or default retention date.

ONTAP software versions

The following table lists the software selection options for the DM7100F. The table also indicates which markets each version is available in.

Table 10. Software selection

Feature code	Description	Availability
ONTAP 9.10		
BNLY	Lenovo ThinkSystem DM Series ONTAP 9.10 Software Base NonEncryption	China only
BNM2	Lenovo ThinkSystem DM Series ONTAP 9.10 Software Encryption	All markets except China
BNM1	Lenovo ThinkSystem DM Series ONTAP 9.10 Software NonEncryption	All markets
ONTAP 9.11		
BRK0	Lenovo ThinkSystem DM Series ONTAP 9.11 Software Base NonEncryption	China only
BRJW	Lenovo ThinkSystem DM Series ONTAP 9.11 Software Encryption	All markets except China
BRJX	Lenovo ThinkSystem DM Series ONTAP 9.11 Software NonEncryption	All markets

Software maintenance is included in the DM7100F warranty and support (see Warranty and support for details).

Extended ONTAP features

FabricPool and SnapLock WORM data protection are optional extended features. To obtain these feature licenses, order the part numbers as listed in the following table. Upgrades are supported in specific bundles as listed in the Comparison of software features table .

Note: Extended features are only available as field upgrades and are not orderable as part of a CTO configuration.

Table 11. Optional software features

Part number	Feature code	Description	Quantity
4P47A16547	None*	DM Series SnapLock License	1 per system (contains two licenses)
4P47A37057	None*	DM Series FabricPool – 1TB Increment – 3 years	1 per TB of storage capacity
4P47A37288	None*	DM Series FabricPool – 1TB Increment – 5 years	1 per TB of storage capacity
4P47A82668	BPQ6	Security and Compliance Bundle	1 per system (contains two licenses)
4P47A83121	BQ8X	Hybrid Cloud Bundle 3 year per TB License	1 per TB of storage capacity
4P47A83123	BQ8W	Hybrid Cloud Bundle 5 year per TB License	1 per TB of storage capacity

* Field upgrade only; no factory installation.

Configuration notes:

- The SnapLock feature is licensed on a per-controller basis; that is, two licenses are needed per system, and these two licenses are contained in a single orderable part number. These licenses also include 5-year software support entitlement.
- The FabricPool feature is a cluster-wide, capacity-based license that is available for 3-year or 5-year subscription terms.

Upgrading to Unified Premium ONTAP

PRC only: This section only applies to customers in China who are using the Unified Base offering.

To upgrade your existing ONTAP installation to Unified Premium ONTAP, use DCSC to specify the storage you already have installed, since the upgrade license is based on your existing configuration.
https://dcsc.lenovo.com/#/configuration/cto/7D4FCTO2WW?hardwareType=storage

The software license for field upgrades is ordered via the CTO base 7D4FCTO2WW, as listed in the following table.

Table 12. Feature codes for ONTAP upgrades (MTM 7D4FCTO2WW)

Feature code	Description
BNKN	Unified Base to Unified Premium CFC Selection (PRC only)

Ansible playbooks for DM Series

Ansible Playbooks give customers the ability to quickly deploy and use DM Series storage systems using a standard open source deployment tool. Each playbook executes a set of tasks to achieve a configuration/provisioning goal.

Lenovo has created playbooks that can be used with DM Series storage systems to help with:

- Provisioning
- Configuring

To access the Ansible Playbooks for Lenovo ThinkSystem DM Series storage systems, go to the following page:
https://github.com/lenovo/ansible-dm-series-ontap

Management

The ThinkSystem DM7100F Unified All Flash Array supports the following management interfaces:

- Lenovo ThinkSystem Storage Manager, a web-based interface via HTTPS for single-system management or centralized management of the cluster of systems, that runs on the storage system itself and requires only a supported browser (Microsoft Internet Explorer, Google Chrome, or Mozilla Firefox), so there is no need for a separate console or plug-in.
- Command line interface (CLI) via SSH or through serial console.
- Syslog, SNMP, and e-mail notifications.
- Optional Lenovo XClarity for discovery, inventory, monitoring, and alerts.

Power supplies and cables

The ThinkSystem DM7100F 4U controller enclosure ships with four redundant hot-swap 1600 W (100 - 240 V) Platinum AC power supplies, each with an IEC 320-C14 connector.

The ThinkSystem DM240N 2U24 SFF expansion enclosures ship with two redundant hot-swap 1600 W (100 - 240 V) Platinum AC power supplies, each with an IEC 320-C14 connector.

The ThinkSystem DM240S 2U24 SFF expansion enclosures ship with two redundant hot-swap 913 W (100 - 240 V) Platinum AC power supplies, each with an IEC 320-C14 connector.

Each ThinkSystem DM Series enclosure requires the selection of two or four power cables, depending on the quantity of the power supplies in the enclosure.

The following table lists the rack power cable and line cord options that can be ordered for the DM7100F 4U, DM240N 2U24 SFF, and DM240S 2U24 SFF enclosures (two or four power cords per enclosure).

Table 13. Power cables for DM7100F 4U, DM240N 2U24 SFF, and DM240S 2U24 SFF enclosures

Description	Part number	Feature code
Rack power cables		
1.0m, 13A/100-250V, C13 to IEC 320-C14 Rack Power Cable	4L67A08367	B0N5
1.2m, 16A/100-250V, 2 Short C13s to Short C20 Rack Power Cable	47C2491	A3SW
1.5m, 13A/100-250V, C13 to IEC 320-C14 Rack Power Cable	4L67A08368	B0N6
2.0m, 13A/125V-10A/250V, C13 to IEC 320-C14 Rack Power Cable	4L67A08369	6570
2.5m, 16A/100-250V, 2 Long C13s to Short C20 Rack Power Cable	47C2492	A3SX
2.8m, 13A/125V-10A/250V, C13 to IEC 320-C14 Rack Power Cable	4L67A08370	6400
2.8m, 16A/100-250V, 2 Short C13s to Long C20 Rack Power Cable	47C2493	A3SY
4.1m, 16A/100-250V, 2 Long C13s to Long C20 Rack Power Cable	47C2494	A3SZ
4.3m, 13A/125V-10A/250V, C13 to IEC 320-C14 Rack Power Cable	4L67A08371	6583
Line cords		
2.8m, 10A/250V, C13 to AS/NZS 3112 Line Cord	39Y7924	6211
2.8m, 10A/250V, C13 to BS 1363/A Line Cord	39Y7923	6215
2.8m, 10A/250V, C13 to CEE7-VII Line Cord	39Y7917	6212
2.8m, 10A/250V, C13 to CEI 23-16 Line Cord	39Y7921	6217
2.8m, 10A/250V, C13 to CNS 10917-3 Line Cord	81Y2375	6317
2.8m, 10A/250V, C13 to DK2-5a Line Cord	39Y7918	6213
2.8m, 10A/250V, C13 to GB 2099.1 Line Cord	39Y7928	6210

Description	Part number	Feature code
2.8m, 10A/250V, C13 to IRAM 2073 Line Cord	39Y7930	6222
2.8m, 10A/250V, C13 to IS 6538 Line Cord	39Y7927	6269
2.8m, 10A/250V, C13 to NBR 14136 Line Cord	69Y1988	6532
2.8m, 10A/250V, C13 to NEMA 6-15P Line Cord	46M2592	A1RF
2.8m, 10A/250V, C13 to SABS 164 Line Cord	39Y7922	6214
2.8m, 10A/250V, C13 to SEV 1011-S24507 Line Cord	39Y7919	6216
2.8m, 10A/250V, C13 to SI 32 Line Cord	39Y7920	6218
2.8m, 12A/125V, C13 to JIS C-8303 Line cord	46M2593	A1RE
2.8m, 12A/250V, C13 to JIS C-8303 Line Cord	4L67A08357	6533
2.8m, 12A/250V, C13 to KS C8305 Line Cord	39Y7925	6219
2.8m, 13A/125V, C13 to NEMA 5-15P Line Cord	00WH545	6401
2.8m, 15A/125V, C13 to CNS 10917-3 Line Cord	81Y2374	6402
4.3m, 10A/250V, C13 to AS/NZS 3112 Line Cord	81Y2383	6574
4.3m, 10A/250V, C13 to BS 1363/A Line Cord	81Y2377	6577
4.3m, 10A/250V, C13 to CEE7-VII Line Cord	81Y2376	6572
4.3m, 10A/250V, C13 to CEI 23-16 Line Cord	81Y2380	6493
4.3m, 10A/250V, C13 to CNS 10917-3 Line Cord	81Y2389	6531
4.3m, 10A/250V, C13 to DK2-5a Line Cord	81Y2382	6575
4.3m, 10A/250V, C13 to GB 2099.1 Line Cord	81Y2378	6580
4.3m, 10A/250V, C13 to IRAM 2073 Line Cord	81Y2384	6492
4.3m, 10A/250V, C13 to IS 6538 Line Cord	81Y2386	6567
4.3m, 10A/250V, C13 to NBR 14136 Line Cord	81Y2387	6404
4.3m, 10A/250V, C13 to NEMA 6-15P Line Cord	4L67A08361	6373
4.3m, 10A/250V, C13 to SABS 164 Line Cord	81Y2379	6576
4.3m, 10A/250V, C13 to SEV 1011-S24507 Line Cord	81Y2390	6578
4.3m, 10A/250V, C13 to SI 32 Line Cord	81Y2381	6579
4.3m, 12A/125V, C13 to JIS C-8303 Line Cord	39Y7926	6335
4.3m, 12A/250V, C13 to JIS C-8303 Line Cord	4L67A08362	6495
4.3m, 12A/250V, C13 to KS C8305 Line Cord	81Y2385	6494
4.3m, 13A/125V, C13 to NEMA 5-15P Line Cord	4L67A08360	AX8A
4.3m, 15A/125V, C13 to CNS 10917-3 Line Cord	81Y2388	6530

Rack installation

The individually shipped ThinkSystem DM Series enclosures come with the following rail kits:

- DM7100F: ThinkSystem Storage Rail Kit 4U60
- DM240N 2U24 SFF: ThinkSystem NVMe Rail Kit 4 post
- DM240S 2U24 SFF: ThinkSystem Storage Rack Mount Kit 2U24/4U60

The rack mount kits are listed in the following table.

Table 14. 4-post rack mount kit

Description	Feature code	Quantity
Lenovo ThinkSystem Storage Rail Kit 4U60	BE28	1
Lenovo ThinkSystem NVMe Rail Kit 4 post	B6Y6	1
Lenovo ThinkSystem Storage Rack Mount Kit 2U24/4U60	B38Y	1

When the ThinkSystem DM Series enclosures are factory-integrated and shipped installed in a rack cabinet, the rack mount kits that support Ship-in-Rack (SIR) capabilities are derived by the configurator.

The SIR-capable rack mount kits are listed in the following table.

Table 15. 4-post SIR rack mount kits

Description	Feature code	Quantity
Lenovo ThinkSystem Storage Rail Kit 4U60	BE28	1
Lenovo ThinkSystem NVMe Adjustable Rail Kit (SIR)	B6Y7	1
Lenovo ThinkSystem Storage SIR Rack Mount Kit (for 2U24 SAS enclosures)	B6TH	1

The following table summarizes the rack mount kit features and specifications.

Table 16. Rack mount kit features and specifications summary

| Attribute | Screw-in fixed rail with adjustable depth | | | | |
	2U24 NVMe	2U24 SAS	2U24 NVMe SIR	2U24 SAS SIR	4U60
Feature code	B6Y6	B38Y	B6Y7	B6TH	BE28
Enclosure support	DM240N	DM240S	DM240N	DM240S	DM7100F
Rail type	Fixed (static) with adjustable depth	Fixed (static) with adjustable depth	Fixed (static) with adjustable depth	Fixed (static) with adjustable depth	Fixed (static) with adjustable depth
Tool-less installation	No	No	No	No	No
In-rack maintenance	Yes*	Yes*	Yes*	Yes*	Yes*
Ship-in-rack (SIR)	No	No	Yes	Yes	Yes
1U PDU support	Yes	Yes	Yes	Yes	Yes
0U PDU support	Limited**	Limited**	Limited**	Limited**	Limited**
Rack type	IBM or Lenovo 4-post, IEC standard-compliant				
Mounting holes	Square or round	Square or round	Square or round	Square or round	Square or round
Mounting flange thickness	2 mm (0.08 in.) – 3.3 mm (0.13 in.)	2 mm (0.08 in.) – 3.3 mm (0.13 in.)	2 mm (0.08 in.) – 3.3 mm (0.13 in.)	2 mm (0.08 in.) – 3.3 mm (0.13 in.)	2 mm (0.08 in.) – 3.3 mm (0.13 in.)
Distance between front and rear mounting flanges^	605 mm (23.8 in.) – 812.8 mm (32 in.)	605 mm (23.8 in.) – 812.8 mm (32 in.)	605 mm (23.8 in.) – 812.8 mm (32 in.)	605 mm (23.8 in.) – 812.8 mm (32 in.)	605 mm (23.8 in.) – 812.8 mm (32 in.)

* The majority of the enclosure components can be serviced from the front or rear of the enclosure, which does not require the removal of the enclosure from the rack cabinet.
** If a 0U PDU is used, the rack cabinet must be at least 1000 mm (39.37 in.) deep for 2U24 enclosures, or at least 1200 mm (47.24 in.) deep for 4U enclosures.
^ Measured when mounted on the rack, from the front surface of the front mounting flange to the rear most point of the rail.

Physical specifications

The ThinkSystem DM7100F controller enclosure has the following dimensions and weight (approximate):

- Height: 175 mm (6.9 in.)
- Width: 447 mm (17.6 in.)
- Depth: 828 mm (32.6 in.)
- Weight (fully configured): 49.2 kg (108.5 lb)

The ThinkSystem DM240N 2U24 SFF enclosures have the following dimensions and weight (approximate):

- Height: 87 mm (3.4 in.)
- Width: 447 mm (17.6 in.)
- Depth: 543 mm (21.4 in.)
- Weight (fully configured): 30.2 kg (66.7 lb)

The ThinkSystem DM240S 2U24 SFF enclosures have the following dimensions and weight (approximate):

- Height: 85 mm (3.4 in.)
- Width: 449 mm (17.7 in.)
- Depth: 484 mm (19.1 in.)
- Weight (fully configured): 24.4 kg (53.8 lb)

Operating environment

The ThinkSystem DM7100F, DM240N 2U24 SFF, and DM240S 2U24 SFF enclosures are supported in the following environment:

- Air temperature:
  - Operating:
    - DM7100F: 10 °C - 35 °C (50 °F - 95 °F)
    - DM240N 2U24 SFF: 5 °C - 45 °C (41 °F - 113 °F)
    - DM240S 2U24 SFF: 10 °C - 40 °C (50 °F - 104 °F)
  - Non-operating: -40 °C - +70 °C (-40 °F - 158 °F)
  - Maximum altitude: 3050 m (10,000 ft)

- Relative humidity (non-condensing):
  - Operating:
    - DM7100F: 8% - 80%
    - DM240N 2U24 SFF: 8% - 90%
    - DM240S 2U24 SFF: 20% - 80%
  - Non-operating: 10% - 95%

- Electrical power:
  - DM7100F
    - 100 to 127 (nominal) V AC; 50 Hz or 60 Hz; 16.12 A
    - 200 to 240 (nominal) V AC; 50 Hz or 60 Hz; 8.06 A
    - Maximum system power load: 1579 W
  - DM240N 2U24 SFF
    - 100 to 127 (nominal) V AC; 50 Hz or 60 Hz; 8.66 A
    - 200 to 240 (nominal) V AC; 50 Hz or 60 Hz; 4.33 A
    - Maximum system power load: 848 W
  - DM240S 2U24 SFF
    - 100 to 127 (nominal) V AC; 50 Hz or 60 Hz; 4.11 A
    - 200 to 240 (nominal) V AC; 50 Hz or 60 Hz; 2.05 A
    - Maximum system power load: 390 W

- Heat dissipation:
  - DM7100F: 5388 BTU/hour
  - DM240N 2U24 SFF: 2894 BTU/hour
  - DM240S 2U24 SFF: 1331 BTU/hour

- Acoustical noise emission:
  - DM7100F: 8.5 bels
  - DM240N 2U24 SFF: 6.4 bels
  - DM240S 2U24 SFF: 6.9 bels

Warranty and support

The DM7100F and DM240N enclosure have a 3-year warranty and the DM240S enclosure has a 1-year or 3-year warranty based on the machine type of the system, as listed in the following table.

Table 17. Duration of standard warranty

System	Machine type 1 year warranty	Machine type 3 year warranty
DM7100F Controller Enclosure	-	7D25
DM240N 2U24 SFF Expansion Enclosure	-	7Y62
DM240S 2U24 SFF Expansion Enclosure	7Y58	7D7Y

The standard warranty terms are customer-replaceable unit (CRU) and onsite (for field-replaceable units FRUs only) with standard call center support during normal business hours and 9x5 Next Business Day Parts Delivered.

Lenovo's additional support services provide a sophisticated, unified support structure for your data center, with an experience consistently ranked number one in customer satisfaction worldwide. Available offerings include:

- **Premier Support**

  Premier Support provides a Lenovo-owned customer experience and delivers direct access to technicians skilled in hardware, software, and advanced troubleshooting, in addition to the following:

  - Direct technician-to-technician access through a dedicated phone line
  - 24x7x365 remote support
  - Single point of contact service
  - End to end case management
  - Third-party collaborative software support
  - Online case tools and live chat support
  - On-demand remote system analysis

- **Warranty Upgrade (Preconfigured Support)**

  Services are available to meet the on-site response time targets that match the criticality of your systems.

  - 3, 4, or 5 years of service coverage
  - 1-year or 2-year post-warranty extensions
  - **Foundation Service**: 9x5 service coverage with next business day onsite response. YourDrive YourData is an optional extra (see below).
  - **Essential Service:** 24x7 service coverage with 4-hour onsite response or 24-hour committed repair (available only in select markets). Bundled with YourDrive YourData.
  - **Advanced Service:** 24x7 service coverage with 2-hour onsite response or 6-hour committed repair (available only in select markets). Bundled with YourDrive YourData.

- **Managed Services**

  Lenovo Managed Services provides continuous 24x7 remote monitoring (plus 24x7 call center availability) and proactive management of your data center using state-of-the-art tools, systems, and practices by a team of highly skilled and experienced Lenovo services professionals.

  Quarterly reviews check error logs, verify firmware & OS device driver levels, and software as needed. We'll also maintain records of latest patches, critical updates, and firmware levels, to ensure you systems are providing business value through optimized performance.

- **Technical Account Management (TAM)**

  A Lenovo Technical Account Manager helps you optimize the operation of your data center based on a deep understanding of your business. You gain direct access to your Lenovo TAM, who serves as your single point of contact to expedite service requests, provide status updates, and furnish reports to track incidents over time. In addition, your TAM will help proactively make service recommendations and manage your service relationship with Lenovo to make certain your needs are met.

- **Enterprise Server Software Support**

  Enterprise Software Support is an additional support service providing customers with software support on Microsoft, Red Hat, SUSE, and VMware applications and systems. Around the clock availability for critical problems plus unlimited calls and incidents helps customers address challenges fast, without incremental costs. Support staff can answer troubleshooting and diagnostic questions, address product comparability and interoperability issues, isolate causes of problems, report defects to software vendors, and more.

- **YourDrive YourData**

  Lenovo's YourDrive YourData is a multi-drive retention offering that ensures your data is always under your control, regardless of the number of drives that are installed in your Lenovo server. In the unlikely event of a drive failure, you retain possession of your drive while Lenovo replaces the failed drive part. Your data stays safely on your premises, in your hands. The YourDrive YourData service can be purchased in convenient bundles and is optional with Foundation Service. It is bundled with Essential Service and Advanced Service.

- **Health Check**

  Having a trusted partner who can perform regular and detailed health checks is central to maintaining efficiency and ensuring that your systems and business are always running at their best. Health Check supports Lenovo-branded server, storage, and networking devices, as well as select Lenovo-supported products from other vendors that are sold by Lenovo or a Lenovo-Authorized Reseller.

Examples of region-specific warranty terms are second or longer business day parts delivery or parts-only base warranty.

If warranty terms and conditions include onsite labor for repair or replacement of parts, Lenovo will dispatch a service technician to the customer site to perform the replacement. Onsite labor under base warranty is limited to labor for replacement of parts that have been determined to be field-replaceable units (FRUs). Parts that are determined to be customer-replaceable units (CRUs) do not include onsite labor under base warranty.

If warranty terms include parts-only base warranty, Lenovo is responsible for delivering only replacement parts that are under base warranty (including FRUs) that will be sent to a requested location for self-service. Parts-only service does not include a service technician being dispatched onsite. Parts must be changed at customer's own cost and labor and defective parts must be returned following the instructions supplied with the spare parts.

Lenovo Service offerings are region-specific. Not all preconfigured support and upgrade options are available in every region. For information about Lenovo service upgrade offerings that are available in your region, refer to the following resources:

- Service part numbers in Lenovo Data Center Solution Configurator (DCSC):
  http://dcsc.lenovo.com/#/services
- Lenovo Services Availability Locator
  http://lenovolocator.com/

For service definitions, region-specific details, and service limitations, please refer to the following documents:

- Lenovo Statement of Limited Warranty for Infrastructure Solutions Group (ISG) Servers and System Storage
  http://pcsupport.lenovo.com/us/en/solutions/ht503310
- Lenovo Data Center Services Agreement
  http://support.lenovo.com/us/en/solutions/ht116628

Services

Lenovo Services is a dedicated partner to your success. Our goal is to reduce your capital outlays, mitigate your IT risks, and accelerate your time to productivity.

> **Note**: Some service options may not be available in all markets or regions. For more information, go to https://www.lenovo.com/services. For information about Lenovo service upgrade offerings that are available in your region, contact your local Lenovo sales representative or business partner.

Here's a more in-depth look at what we can do for you:

- **Asset Recovery Services**

  Asset Recovery Services (ARS) helps customers recover the maximum value from their end-of-life equipment in a cost-effective and secure way. On top of simplifying the transition from old to new equipment, ARS mitigates environmental and data security risks associated with data center equipment disposal. Lenovo ARS is a cash-back solution for equipment based on its remaining market value, yielding maximum value from aging assets and lowering total cost of ownership for your customers. For more information, see the ARS page, https://lenovopress.com/lp1266-reduce-e-waste-and-grow-your-bottom-line-with-lenovo-ars.

- **Assessment Services**

  An Assessment helps solve your IT challenges through an onsite, multi-day session with a Lenovo technology expert. We perform a tools-based assessment which provides a comprehensive and thorough review of a company's environment and technology systems. In addition to the technology based functional requirements, the consultant also discusses and records the non-functional business requirements, challenges, and constraints. Assessments help organizations like yours, no matter how large or small, get a better return on your IT investment and overcome challenges in the ever-changing technology landscape.

- **Design Services**

  Professional Services consultants perform infrastructure design and implementation planning to support your strategy. The high-level architectures provided by the assessment service are turned into low level designs and wiring diagrams, which are reviewed and approved prior to implementation. The implementation plan will demonstrate an outcome-based proposal to provide business capabilities through infrastructure with a risk-mitigated project plan.

- **Basic Hardware Installation**

  Lenovo experts can seamlessly manage the physical installation of your server, storage, or networking hardware. Working at a time convenient for you (business hours or off shift), the technician will unpack and inspect the systems on your site, install options, mount in a rack cabinet, connect to power and network, check and update firmware to the latest levels, verify operation, and dispose of the packaging, allowing your team to focus on other priorities.

- **Deployment Services**

  When investing in new IT infrastructures, you need to ensure your business will see quick time to value with little to no disruption. Lenovo deployments are designed by development and engineering teams who know our Products & Solutions better than anyone else, and our technicians own the process from delivery to completion. Lenovo will conduct remote preparation and planning, configure & integrate systems, validate systems, verify and update appliance firmware, train on administrative tasks, and provide post-deployment documentation. Customer's IT teams leverage our skills to enable IT staff to transform with higher level roles and tasks.

- **Integration, Migration, and Expansion Services**

  Move existing physical & virtual workloads easily, or determine technical requirements to support increased workloads while maximizing performance. Includes tuning, validation, and documenting ongoing run processes. Leverage migration assessment planning documents to perform necessary migrations.

Regulatory compliance

The ThinkSystem DM Series enclosures conform to the following regulations:

- FCC Part 15, Class A; UL 60950-1
- ICES-003, Class A; CAN/CSA-C22.2 60950-1
- NOM
- CE Mark (EN55032 Class A, EN55024, IEC/EN60950-1, IEC/EN62368-1); ROHS Directive 2011/65/EU
- EAC
- CCC GB 4943.1, GB 17625.1, GB 9254 Class A; CELP; CECP
- VCCI, Class A
- CNS 13438, Class A; CNS 14336-1
- KN32/35, Class A
- AS/NZS CISPR 22 Class A

Interoperability

Lenovo provides end-to-end storage compatibility testing to deliver interoperability throughout the network. The ThinkSystem DM7100F Unified All Flash Array supports attachment to Lenovo servers by using NVMe over Fibre Channel (NVMe/FC), NAS (NFS and CIFS/SMB), iSCSI, and Fibre Channel storage connectivity protocols.

For end-to-end storage configuration support, refer to the Lenovo Storage Interoperation Center (LSIC): https://datacentersupport.lenovo.com/us/en/lsic

Use the LSIC to select the known components of your configuration and then get a list all other supported combinations, with details about supported hardware, firmware, operating systems, and drivers, plus any additional configuration notes. View results on screen or export them to Excel.

Cluster interconnect

The following table lists the Ethernet storage switch that can be used with the ThinkSystem DM7100F Unified All Flash Array for cluster interconnect and MetroCluster IP configurations.

Table 18. Ethernet storage switch

Description	Part number
BES-53248 Ethernet Storage Switch: 16x SFP ports and 2x QSFP ports active, 2 PS (CTO only)	7D2SCTO1WW

For more information, see the BES-53248 Ethernet Storage Switch for Lenovo Product Guide:
http://lenovopress.com/lp1226

Fibre Channel SAN switches

Lenovo offers the ThinkSystem DB Series of Fibre Channel SAN switches for high-performance storage expansion. See the DB Series product guides for models and configuration options:

- ThinkSystem DB Series SAN Switches:
  https://lenovopress.com/storage/switches/rack#rt=product-guide

Rack cabinets

The following table lists the supported rack cabinets.

Table 19. Rack cabinets

Part number	Description
93072RX	25U Standard Rack (1000mm)
93072PX	25U Static S2 Standard Rack (1000mm)
7D6DA007WW	ThinkSystem 42U Onyx Primary Heavy Duty Rack Cabinet (1200mm)
7D6DA008WW	ThinkSystem 42U Pearl Primary Heavy Duty Rack Cabinet (1200mm)
93604PX	42U 1200mm Deep Dynamic Rack
93614PX	42U 1200mm Deep Static Rack
93634PX	42U 1100mm Dynamic Rack
93634EX	42U 1100mm Dynamic Expansion Rack
93074RX	42U Standard Rack (1000mm)
7D6EA009WW	ThinkSystem 48U Onyx Primary Heavy Duty Rack Cabinet (1200mm)
7D6EA00AWW	ThinkSystem 48U Pearl Primary Heavy Duty Rack Cabinet (1200mm)

For specifications about these racks, see the Lenovo Rack Cabinet Reference, available from:
https://lenovopress.com/lp1287-lenovo-rack-cabinet-reference

For more information, see the list of Product Guides in the Rack cabinets category:
https://lenovopress.com/servers/options/racks

Power distribution units

The following table lists the power distribution units (PDUs) that are offered by Lenovo.

Table 20. Power distribution units

Part number	Feature code	Description	ANZ	ASEAN	Brazil	EET	MEA	RUCIS	WE	HTK	INDIA	JAPAN	LA	NA	PRC
0U Basic PDUs															
00YJ776	ATZY	0U 36 C13/6 C19 24A 1 Phase PDU	N	Y	Y	N	N	N	N	N	N	Y	Y	Y	N
00YJ777	ATZZ	0U 36 C13/6 C19 32A 1 Phase PDU	Y	Y	N	Y	Y	Y	Y	Y	Y	N	N	Y	Y
00YJ778	AU00	0U 21 C13/12 C19 32A 3 Phase PDU	Y	Y	N	Y	Y	Y	Y	Y	Y	N	N	Y	Y
0U Switched and Monitored PDUs															
00YJ783	AU04	0U 12 C13/12 C19 Switched and Monitored 48A 3 Phase PDU	N	N	Y	N	N	N	Y	N	N	Y	Y	Y	N
00YJ781	AU03	0U 20 C13/4 C19 Switched and Monitored 24A 1 Phase PDU	N	N	Y	N	Y	N	Y	N	N	Y	Y	Y	N
00YJ782	AU02	0U 18 C13/6 C19 Switched and Monitored 32A 3 Phase PDU	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N	Y
00YJ780	AU01	0U 20 C13/4 C19 Switched and Monitored 32A 1 Phase PDU	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N	Y
1U Switched and Monitored PDUs															
4PU7A81117	BNDV	1U 18 C19/C13 switched and monitored 48A 3P WYE PDU - ETL	N	N	N	N	N	N	N	N	N	N	N	Y	N
4PU7A77467	BLC4	1U 18 C19/C13 Switched and Monitored 80A 3P Delta PDU	N	N	N	N	N	N	N	N	N	Y	N	Y	N
4PU7A77469	BLC6	1U 12 C19/C13 switched and monitored 60A 3P Delta PDU	N	N	N	N	N	N	N	N	N	N	N	Y	N
4PU7A77468	BLC5	1U 12 C19/C13 switched and monitored 32A 3P WYE PDU	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y
4PU7A81118	BNDW	1U 18 C19/C13 switched and monitored 48A 3P WYE PDU - CE	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N	Y
1U Ultra Density Enterprise PDUs (9x IEC 320 C13 + 3x IEC 320 C19 outlets)															
71763NU	6051	Ultra Density Enterprise C19/C13 PDU 60A/208V/3PH	N	N	Y	N	N	N	N	N	N	Y	Y	Y	N
71762NX	6091	Ultra Density Enterprise C19/C13 PDU Module	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
1U C13 Enterprise PDUs (12x IEC 320 C13 outlets)															
39M2816	6030	DPI C13 Enterprise PDU Plus Module (WW)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
39Y8941	6010	DPI C13 Enterprise PDU Module (WW)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
1U C19 Enterprise PDUs (6x IEC 320 C19 outlets)															
39Y8948	6060	DPI C19 Enterprise PDU Module (WW)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
1U Front-end PDUs (3x IEC 320 C19 outlets)															
39Y8938	6002	DPI Single-phase 30A/120V Front-end PDU (US)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
39Y8939	6003	DPI Single-phase 30A/208V Front-end PDU (US)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
39Y8934	6005	DPI Single-phase 32A/230V Front-end PDU (International)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Part number	Feature code	Description	ANZ	ASEAN	Brazil	EET	MEA	RUCIS	WE	HTK	INDIA	JAPAN	LA	NA	PRC
39Y8940	6004	DPI Single-phase 60A/208V Front-end PDU (US)	Y	N	Y	Y	Y	Y	Y	N	N	Y	Y	Y	N
39Y8935	6006	DPI Single-phase 63A/230V Front-end PDU (International)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
1U NEMA PDUs (6x NEMA 5-15R outlets)															
39Y8905	5900	DPI 100-127V NEMA PDU	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Line cords for 1U PDUs that ship without a line cord															
40K9611	6504	4.3m, 32A/380-415V, EPDU/IEC 309 3P+N+G 3ph wye (non-US) Line Cord	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
40K9612	6502	4.3m, 32A/230V, EPDU to IEC 309 P+N+G (non-US) Line Cord	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
40K9613	6503	4.3m, 63A/230V, EPDU to IEC 309 P+N+G (non-US) Line Cord	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
40K9614	6500	4.3m, 30A/208V, EPDU to NEMA L6-30P (US) Line Cord	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
40K9615	6501	4.3m, 60A/208V, EPDU to IEC 309 2P+G (US) Line Cord	N	N	Y	N	N	N	Y	N	N	Y	Y	Y	N
40K9617	6505	4.3m, 32A/230V, Souriau UTG Female to AS/NZ 3112 (Aus/NZ) Line Cord	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
40K9618	6506	4.3m, 32A/250V, Souriau UTG Female to KSC 8305 (S. Korea) Line Cord	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

For more information, see the Lenovo Press documents in the PDU category:
https://lenovopress.com/servers/options/pdu

Uninterruptible power supply units

The following table lists the uninterruptible power supply (UPS) units that are offered by Lenovo.

Table 21. Uninterruptible power supply units

Part number	Description
55941AX	RT1.5kVA 2U Rack or Tower UPS (100-125VAC)
55941KX	RT1.5kVA 2U Rack or Tower UPS (200-240VAC)
55942AX	RT2.2kVA 2U Rack or Tower UPS (100-125VAC)
55942KX	RT2.2kVA 2U Rack or Tower UPS (200-240VAC)
55943AX	RT3kVA 2U Rack or Tower UPS (100-125VAC)
55943KX	RT3kVA 2U Rack or Tower UPS (200-240VAC)
55945KX	RT5kVA 3U Rack or Tower UPS (200-240VAC)
55946KX	RT6kVA 3U Rack or Tower UPS (200-240VAC)
55948KX	RT8kVA 6U Rack or Tower UPS (200-240VAC)
55949KX	RT11kVA 6U Rack or Tower UPS (200-240VAC)
55948PX	RT8kVA 6U 3:1 Phase Rack or Tower UPS (380-415VAC)
55949PX	RT11kVA 6U 3:1 Phase Rack or Tower UPS (380-415VAC)
55943KT†	ThinkSystem RT3kVA 2U Standard UPS (200-230VAC) (2x C13 10A, 2x GB 10A, 1x C19 16A outlets)
55943LT†	ThinkSystem RT3kVA 2U Long Backup UPS (200-230VAC) (2x C13 10A, 2x GB 10A, 1x C19 16A outlets)
55946KT†	ThinkSystem RT6kVA 5U UPS (200-230VAC) (2x C13 10A outlets, 1x Terminal Block output)
5594XKT†	ThinkSystem RT10kVA 5U UPS (200-230VAC) (2x C13 10A outlets, 1x Terminal Block output)

† Only available in China and the Asia Pacific market.

For more information, see the list of Product Guides in the UPS category:
https://lenovopress.com/servers/options/ups

Lenovo Financial Services

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We are dedicated to delivering a positive finance experience for customers like you who want to maximize your purchase power by obtaining the technology you need today, protect against technology obsolescence, and preserve your capital for other uses.

We work with businesses, non-profit organizations, governments and educational institutions to finance their entire technology solution. We focus on making it easy to do business with us. Our highly experienced team of finance professionals operates in a work culture that emphasizes the importance of providing outstanding customer service. Our systems, processes and flexible policies support our goal of providing customers with a positive experience.

We finance your entire solution. Unlike others, we allow you to bundle everything you need from hardware and software to service contracts, installation costs, training fees, and sales tax. If you decide weeks or months later to add to your solution, we can consolidate everything into a single invoice.

Our Premier Client services provide large accounts with special handling services to ensure these complex transactions are serviced properly. As a premier client, you have a dedicated finance specialist who manages your account through its life, from first invoice through asset return or purchase. This specialist develops an in-depth understanding of your invoice and payment requirements. For you, this dedication provides a high-quality, easy, and positive financing experience.

For your region-specific offers, please ask your Lenovo sales representative or your technology provider about the use of Lenovo Financial Services. For more information, see the following Lenovo website:

https://www.lenovo.com/us/en/landingpage/lenovo-financial-services/

Related publications and links

For more information, see the following resources:

- Lenovo ThinkSystem DM Series product page
  https://www.lenovo.com/us/en/c/data-center/storage/unified-storage
- Lenovo Data Center Solution Configurator
  http://dcsc.lenovo.com
- ThinkSystem DM Series documentation
  http://thinksystem.lenovofiles.com/help/topic/ontap_software/overview.html
- ThinkSystem DM Series Installation Videos and Video Tutorials
  https://www.youtube.com/playlist?list=PLLQcIfVNrqzcBW55-7IAe7_Our6nMQxak
- Lenovo Data Center Support
  http://datacentersupport.lenovo.com

Related product families

Product families related to this document are the following:

- DM Series Storage
- External Storage
- Lenovo Storage

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ODP Business Solutions, LLC

Exhibit B - Compensation Schedule

RFP 23-07 Storage Area Network (SAN) Systems Update

Storage System Network and Components: ODP Business Solutions presents the Exhibit B compensation schedule per our response proposal.

RFP 23-07 Storage Area Network (SAN) Systems | 50TB System

License	Maintenance		Implementation	Shipping		
Hardware	Professional Services		Software			

Part number	Product Description	Qty	MSRP	Total MSRP Price	ODP Price
7D25CTO1WW	Controller : Lenovo ThinkSystem DM7100F All Flash Array	1	$1.00	$1.00	Included
B94E	Lenovo ThinkSystem DM 4U Chassis	1	$11,659.00	$11,659.00	Included
B5RJ	DM Series Premium Offering	1			
B94T	Lenovo ThinkSystem DM7100 Controller	2	$25,579.00	$51,158.00	$130,550.00
B72Y	Lenovo ThinkSystem DM Series 100Gb 2 port Ethernet Card	2	$2,379.00	$4,758.00	Included
BAZ1	2P 100Gb PCIe Ethernet SmartIO Adapter for DM Series AFF Storage	2	$4,979.00	$9,958.00	Included
B94J	Lenovo ThinkSystem DM Series 10/25Gb 4 Port Ethernet Mez Card	2	$1,319.00	$2,638.00	Included
AV1W	Lenovo 1m Passive 25G SFP28 DAC Cable	2	$59.00	$118.00	Included
A1DQ	3m QSFP+ to QSFP+ Cable	4	$229.00	$916.00	Included
AV1Z	Lenovo 1m Passive 100G QSFP28 DAC Cable	2	$99.00	$198.00	Included
B4BP	Lenovo ThinkSystem Storage USB Cable, Micro-USB	1	$15.00	$15.00	Included
6400	2.8m, 13A/100-250V, C13 to C14 Jumper Cord	4	$15.00	$60.00	Included
BRJW	Lenovo ThinkSystem DM Series ONTAP 9.11 Software Encryption	1	$-		
B38Y	Lenovo ThinkSystem Storage Rack Mount Kit 2U24/4U60	1	No charge		
B4SU	TPM	2	$-		
B4SF	DM Series CIFS Protocol License	2	$-		
B4SG	DM Series NFS Protocol License	2	$-		
B4SH	DM Series iSCSI Protocol License	2	$-		
B4SJ	DM Series FCP Protocol License	2	$-		
B4SK	DM Series SnapMirror License	2	$-		
B4SL	DM Series SnapRestore License	2	$-		
B4SM	DM Series FlexClone License	2	$-		

B4SN	DM Series Software Encryption License	2	$-		
B4SP	DM Series SnapManager License	2	$-		
B5AZ	DM Series SnapVault License	2	$-		
B7AQ	SnapMirror Synchronous	2	$-		
B7N1	NVMe over FC Protocol	2	$-		
BH56	S3 Protocol License	2	$-		
9170	Storage SubSystem ID 01	1	$-		
BAGD	Configured with Lenovo ThinkSystem DM7100F	1			
B6YR	Lenovo ThinkSystem DM Series 4U NVMe, Ship Kit (ROW)	1	No charge		$0.00
B738	Lenovo ThinkSystem NVMe Accessory	1	$29.00	$29.00	Included
B94V	Lenovo ThinkSystem DM Series 4U NVMe Bezel	1	$199.00	$199.00	Included
B94W	Lenovo ThinkSystem DM Series NVMe Packaging	1	No charge		$0.00
BAZ2	DM7100F Controller CFC	2			Included
BD0T	Lenovo ThinkSystem DM7100F Product System Label	1	No charge		$0.00
B94L	Lenovo ThinkSystem DM7100F NVMe Agency Labels	1	No charge		$0.00
	Auto-Derived Part Items				
B4K5	DM Controller Parent MFG Inst	1	$-		$0.00
5PS7A92227	Premier Essential 5Y 24x7x4+YDYD ThinkSystem DM7100F AFA Premium	1	$10,008.00	$10,008.00	Included
5AS7A83056	Hardware Installation (Business Hours) for DM7100F	1	$459.00	$459.00	Included
5MS7A24102	ThinkSystem DM Onsite Deployment	1	$7,130.00	$7,130.00	Included
7Y62CTO1WW	Storage : Lenovo ThinkSystem DM240N 2U24 NVMe Expansion Enclosure	1	$1.00	$1.00	Included
B6W6	Lenovo ThinkSystem Storage NVMe 2U24 Chassis	1	$4,919.00	$4,919.00	Included
B73A	ThinkSysytem Storage NVMe Expansion IOM	2	$11,279.00	$22,558.00	Included
BC7Y	Lenovo ThinkSystem 46TB (6x 7.68TB NVMe SED) Drive Pack for DM7100F	2	$137,499.00	$274,998.00	Included
AV1Z	Lenovo 1m Passive 100G QSFP28 DAC Cable	4	$99.00	$396.00	Included

Part	Description	Qty	Unit Price	Extended	Status
6311	2.8m, 10A/100-250V, C13 to IEC 320-C14 Rack Power Cable	2	$15.00	$30.00	Included
B6Y6	Lenovo ThinkSystem NVMe Rail Kit 4 post	1	No charge		$0.00
9170	Storage SubSystem ID 01	1	$-		Included
B6YR	Lenovo ThinkSystem DM Series 4U NVMe, Ship Kit (ROW)	1	No charge		$0.00
B738	Lenovo ThinkSystem NVMe Accessory	1	$29.00	$29.00	Included
BAKT	Lenovo ThinkSystem Tied Controller MTM-SN Asset Tag Label	1	No charge		$0.00
B6Y5	Lenovo ThinkSystem NVMe SFF Filler	12	No charge		$0.00
B739	Lenovo ThinkSystem NVMe End Cap Kit (pair)	1	$29.00	$29.00	Included
B70J	Lenovo ThinkSystem Storage 2U Packaging	1	No charge		$0.00
B6BH	Lenovo ThinkSystem DM 2U24 Expansion Chassis CFC	1			Included
B6YQ	Lenovo ThinkSystem DM240N NVMe Exp System Labels	1	No charge		Included
B6YP	Lenovo ThinkSystem DM240N NVMe Exp Product Label	1	No charge		Included
	Auto-Derived Part Items				
B4K6	DM Expansion Child MFG Inst	1	$-		
B5RJ	DM Series Premium Offering	1	$-		
B4E6	Controller is defined from Linked Product	1	$-		
B48J	Premier with Essential	1	$-		
B5XW	SW Offering is defined from linked Product	1	$-		
BAGD	Configured with Lenovo ThinkSystem DM7100F	1	$-		
B0W2	5 Years	1	$-		
5PS7A92172	Premier Essential 5Y 24x7x4+YDYD ThinkSystem DM240N 2U24	1	$2,496.00	$2,496.00	Included
5WS7A77737	Premier Essential 5Y 24x7x4 DM7100F 92TB (12x7.68TB NVMe)Pack Premium	1	$19,999.00	$19,999.00	Included
5MS7B07545	CO2 Offset 10 Metric Tonnes	1	$95.00	$95.00	Included
5MS7B07546	CO2 Offset 20 Metric Tonnes	1	$191.00	$191.00	Included
5AS7A83040	Hardware Installation (Business Hours) for DM240N	1	$399.00	$399.00	Included

	Standalone Items				
5MS7A35284	Professional Services PC 20xx Custom - NA	9	$2,116.00	$19,044.00	$17,874.45
			MSRP	**$444,488.00**	
			Discount 67%	**-$296,063.55**	
			Sub Total	$148,424.45	
			Tax	$12,075.88	
			Total Extended	**$160,500.33**	
	YEAR 6 - Quote Requested				
TBD	Premier Essential 1Y 24x7x4+YDYD ThinkSystem DM7100F		**Sub Total**	$27,900.00	
TBD	Premier Essential 1Y 24x7x4+YDYD ThinkSystem DM240N 2U24				Included
TBD	Premier Essential 1Y 24x7x4 DM7100F 92TB (12x7.68TB NVMe)Pack Premium				Included
TBD	Lenovo ThinkSystem DM Series ONTAP 9.11 Software Encryption				Included