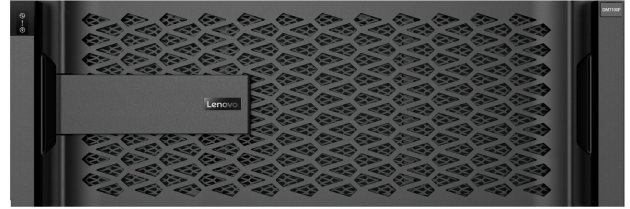# ThinkSystem DM Series All-Flash Array
Accelerate your business with all-flash NVMe transformation

The Challenge

Businesses must continually improve the speed and responsiveness of key business operations if they are to reduce time to market and increase customer satisfaction. One key ingredient of this effort is all-flash storage, which greatly accelerates critical workloads.

However, as all-flash becomes prevalent throughout the data center, it soon becomes apparent that enterprise-grade data management capabilities are critical in a shared environment. To deliver the ultimate solution, all-flash storage needs to offer robust data management, integrated data protection, and seamless scalability for hybrid cloud environments.

The Solution

To meet enterprise storage requirements, ThinkSystem All-Flash DM Series systems provide high performance, superior flexibility, best-in-class data management, and includes the industry first full end-to-end NVMe capabilities.

DM Series data management software gives customers unified storage across block, file, and object workloads. It accelerates your business while improving the efficiency, flexibility, and reliability of your IT operations.

This enterprise-class solution accelerates, manages, and protects your business-critical data. Customers should now consider all-flash solutions because they simplify data management at the same or better cost as traditional HDD-based arrays.

ThinkSystem DM Series provides an easy and risk-free transition to all-flash. Customers can seamlessly cluster DM Series hybrid and flash as well as multi-generational systems together to ensure absolute investment protection. DM Series systems were purpose-built for flash to deliver industry leading performance, capacity, and density.

Simplified Monitoring and Management

ThinkSystem Intelligent Monitoring is an intelligent and intuitive digital advisor which uses AI and predictive analytics to provide imperative insights, proactive care and optimization, and customized dashboards enabling users to manage multiple DM and DE Series systems in a single web-accessible platform. Preemptive system information and alerts will expose risk factors and prevent problems before they affect your business and cut down on support costs and engagements. Intelligent capacity and performance monitoring will allow you to stay ahead of the curve and plan accordingly to meet your business's growth needs.

Flexible management is also possible through XClarity support. With Lenovo XClarity management software, you can manage your Lenovo ThinkSystem servers, storage, and networking together.

ThinkSystem

Lenovo

Accelerate Your Data

The DM Series all-flash systems are a feature rich and fast storage platform that will beat your expectations of how a storage system should be. They offer superior performance and investment protection and allow you to scale your system up and out as your needs grow.

When you use the NVMe over Fibre channel protocol you can reduce your latency up to 50%, eliminating the bandwidth bottlenecks inherent in other systems caused by flash storage exceeding the speed of the network.

With Lenovo's all-flash DM Series systems, you can:

Accelerate the speed of business while increasing operational efficiency:

- Experience up to 5M IOPS in one cluster using DM Series All-Flash Array systems
- Reduce latency by 50% when using end to end NVMe over FC infrastructure
- Leverage Ethernet infrastructure to reduce latency and lower TCO with NVMe over TCP
- Tier cold data off your SSDs to lower cost object storage to optimize your flash performance

Simplify IT operations while transforming data center economics:

- All-flash arrays can slash support and performance-tuning costs by up to two-thirds versus hybrid systems
- Reduce rack space up to 38x and power consumption by 11x with deduplication and compression
- Onboard volume encryption, software-based data-at-rest encryption, and multi-factor authentication capabilities
- ThinkSystem Intelligent Monitoring that uses AI and predictive analytics to provide essential insights, prescriptive guidance, and proactive support to simplify your support experience and optimize your Lenovo Storage Environments.

Deploy flash everywhere with maximum flexibility while retaining the control and security of your data:

- Move data and applications to wherever they run best: on a DM Series system or in the cloud
- Get the broadest application ecosystem integration for enterprise applications, VDI, database, and server virtualization
- Integrate flash into your infrastructure non-disruptively, eliminating silos, and scale out as requirements grow

ThinkSystem DM Series All-Flash is ideal for performance critical applications such as Oracle, Microsoft SQL Server, VDI, and server virtualization. It is also a great choice for a variety of common data center workloads in shared environments.

ThinkSystem DM Series includes a suite of powerful integrated data protection software to help protect your competitive advantage. Key benefits include:

- Automatic ransomware protection against cyberattacks with preemptive detection and enhanced recovery, based on machine learning.
- Deduplication, compression, and compaction paired with cloning and Snapshot copies to reduce storage costs and minimize performance impact
- Application-consistent backup and recovery to simplify application management
- Flexibility and efficiency to support backup, data distribution, and disaster recovery with SnapMirror replication, including cloud-native S3 backup.
- Zero data loss and transparent application failover with SnapMirror Business Continuity leveraging simple administration and platform flexibility to retain high performance and business resiliency.
- Synchronous replication with MetroCluster software — an industry leading capability for all-flash arrays that delivers zero recovery point objective (possible data loss) and near-zero recovery time objective for mission-critical workload
- The ability to meet all of your data compliance and retention requirements via SnapLock.

Optimize Your Data with Flexible Design

The inline data reduction technologies built into DM Series systems will provide 3x space savings, and the following benefits:

- **Inline data compaction** technology uses an innovative approach to place multiple logical data blocks from the same volume into a single 4KB block. It frees up substantial space for database workloads that have relatively small I/O sizes. When combined with inline compression, customers have reported space savings as high as 67:1 for an Oracle database.
- **Inline compression** has a near-zero performance impact. Detection of incompressible data eliminates wasted cycles.
- **Enhanced inline deduplication** maximizes the space savings by eliminating redundant blocks. Some workloads, such as VDI OS patches, can achieve as much as a 70:1 reduction rate.

Whether your performance and capacity needs change or your cloud strategy evolves in the future, your investment is protected:

- DM Series has proven cloud connectivity. Easily tier data between the cloud and on-premises storage for maximum performance and return on your investment.
- Replicate your critical data to the cloud using Cloud Volumes, enhancing: data protection, security, and compliance.
- Data can be tiered or replicated to multiple cloud vendors, ensuring the best value and cloud features with no vendor lock-in.
- All-flash systems seamlessly cluster with DM Series hybrid systems, enabling you to transparently move workloads between high-performance tiers and low-cost capacity tiers — eliminating any performance silos.
- DM Series enables you to grow and adapt as your business changes. It enables you to intermix different controllers, SSD sizes, and next-generation technologies so your investment is protected. DM Series also provides the industry's first full end-to-end NVMe solution.

Specifications

	DM7100F	DM5100F DM5100F SAN	DM5000F DM5000F SAN
NAS Scale-out**	12 High Availability pairs		
Maximum SSDs	5760 (576 NVMe + 5184 SAS)	576 NVMe	1728
Maximum Raw Capacity: All Flash	88PB* / 78.15PiB*	8.84PB / 7.85PiB	24.1PB / 21.5PiB
Effective Capacity (based on 3:1)	264PB / 234.45PiB	26.43PB / 23.47PiB	72.3PB / 64.2PiB
Maximum Memory	3072GB	1536GB	768GB
SAN Scale-out	6 High Availability pairs		
Maximum SSDs	2880 (288 NVMe + 2592 SAS)	288 NVMe	864
Maximum Raw Capacity	44PB / 39.08PiB	4.42PB / 3.92PiB	13.2PB / 11.7PiB
Effective Capacity	132PB / 117.24PiB	17PB / 15.1PiB	39.6PB / 35.17PiB
Maximum Memory	1536GB	768GB	384GB
Cluster Interconnect	2x 100GbE	4x 25GbE	4x 10GbE
Per High Availability Array Specifications	Active-Active Controller		
Maximum SSDs	480 (48 NVMe + 432 SAS)	48 NVMe	144
Maximum Raw Capacity: All-Flash	7.37PB / 6.55PiB	737.28TB / 670.29TiB	2.2PB / 1.9PiB
Effective Capacity	22.11PB / 19.65PiB	2.11PB / 1.87PiB	6.6PB / 5.8PiB
Controller Form Factor	4U chassis with two High Availability controllers	2U chassis with two High Availability controllers and 24 NVMe SSD slots	2U chassis with two High Availability controllers and 24 SSD slots
Memory	256GB	128GB	64GB
NVRAM	32GB	16GB	8GB
PCIe Expansion Slots (maximum)	10	4	Not applicable
FC Target Ports (32Gb autoranging, maximum)	24	16	Not applicable

	DM7100F	DM5100F DM5100F SAN	DM5000F DM5000F SAN
FC Target Ports (16Gb autoranging, maximum)	8	Not applicable	8
40GbE Ports (maximum)	Not applicable	Not applicable	Not applicable
25 GbE Ports	20	16	Not applicable
10GbE Ports (maximum)	32	Not applicable	8
100GbE ports (40GbE autoranging)	12	4	Not applicable
10GbE BASE-T Ports (1GbE autoranging) (maximum)	16	4	8
12Gb / 6Gb SAS Ports (maximum)	24	Not applicable	4
Cluster Interconnect	2x 100GbE	4x 25GbE	4x 10GbE
Storage Networking Supported	FC, iSCSI, NFS, pNFS, SMB, NVMe/FC, S3	**DM5100F**: FC, iSCSI, NFS, pNFS, SMB, NVMe/FC, S3 **DM5100F SAN****: FC, iSCSI, NVMe/FC	**DM5000F**: FC, iSCSI, NFS, pNFS, SMB, S3 **DM5000F SAN****: FC, iSCSI
Software Version	9.7 or later	9.8 or later	9.4 or later
Shelves and Media	DM240N, DM240S	DM240N	DM240S
Host/Client OSes Supported	Microsoft Windows, Linux, VMware ESXi		
DM Series All-Flash Software	The DM Series software bundles include a set of products that delivers leading data management, storage efficiency, data protection, high performance, and advanced capabilities such as instant cloning, data replication, application-aware backup and recovery, and data retention.		

* SAS+NVMe SSD scale out

** An optional software license upgrade is available for the DM5100F SAN and DM5000F SAN models to enable NAS support (NFS, pNFS, SMB file and S3 object storage connectivity).

Software Features

Feature	Function	Benefits
Ransomware Protection	Provides built-in, robust features that detect ransomware activity, prevent its spread, and enable quick recovery – including automatically taking snapshots and alerting administrators when abnormal file activity is detected	Automatically protects against ransomware attacks and enables quick recovery to avoid paying the ransom
Data Reduction	Utilizes data compaction, compression, and deduplication to reduce the storage space needed for your data	Reduces the amount of storage that you need to purchase and maintain
Unified Data Management	Onboard management of Block, File and Object data	Flexibility to manage and store every type of data on one system and one management interface
FlexClone®	Instantaneously creates file, LUN, and volume clones without requiring additional storage	Saves time in testing and development and minimize storage use
FlexGroup™	Enables a single namespace to scale up to 20PB and 400 billion files	Maintains consistent high performance and resiliency for compute-intensive workloads
FlexVol®	Creates flexibly sized volumes across a large pool of disks and one or more RAID groups	Enables storage systems to be used at maximum efficiency and reduces hardware investment
MetroCluster	Combines array-based clustering with synchronous mirroring to deliver continuous availability	Maintains business continuity for critical enterprise applications and workloads
SnapMirror® Business Continuity	Non-disruptive failover active-active cross site clusters. Based on existing SnapMirror Synchronous Replication.	Zero data loss, zero downtime—with no more application failover. If there is a failure, the application will continue to run, with no need to restart.
QoS (adaptive)	Easy setup of QoS policies; automatically adjusts storage resources based on work-load changes	Simplifies operations and maintains consistent workload performance within IOPS boundaries
RAID-TEC and RAID DP Technologies	Provides triple parity or double-parity RAID implementation to protect against data loss	Protect data without the performance impact of other RAID implementations

SnapCenter®	Provides host-based data management of Lenovo storage for databases and business applications	Offers application-aware backup and clone management; automates error-free data restores
SnapMirror®	Enables automatic, incremental asynchronous and synchronous data replication	Provides flexibility and efficiency to support backup, data distribution, and disaster recovery
SnapRestore®	Rapidly restores single files, directories, or entire LUNs and volumes from any Snapshot copy backup	Instantaneously recover files, and complete volumes from your backup with SnapCenter and supported database plugins
SnapLock®	Provides WORM file-level locking, preventing changes and deletion of the file	Supports regulatory compliance and organizational data retention requirements. Enables air-gap separation of Snapshot copies for enhanced ransomware protection and quick recovery from an attack
Volume and Aggregate Encryption	Provides built-in FIPS 140-2 data-at-rest encryption	Easily and efficiently protect at-rest data by encrypting any volume or aggregate on DM Series system

Software Bundles

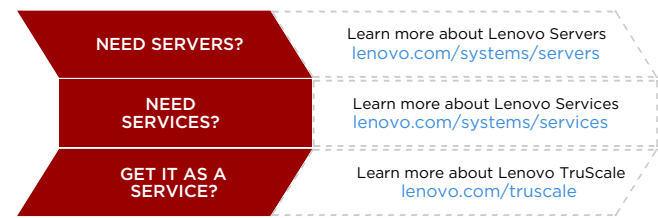There are several DM Series software bundles available:

- The Unified Premium bundle for customers who require systems with clustering, application-aware snapshots, and enhanced management capabilities
- The Unified Fundamentals (WW excluding PRC) and Unified Base (PRC only) bundles for customers who need a unified storage solution with data efficiency features, snapshots, and replication (Fundamentals only)
- The SAN Premium, SAN Fundamentals (WW excluding PRC), and SAN Base (PRC only) bundles for customers who want to start with a block storage array that provides advanced data management features, with the possibility to upgrade to unified storage in the future.

About Lenovo

Lenovo (HKSE: 992) (ADR: LNVGY) is a US$62 billion revenue global technology powerhouse, ranked #171 in the Fortune Global 500, employing 77,000 people around the world, and serving millions of customers every day in 180 markets. Focused on a bold vision to deliver smarter technology for all, Lenovo is expanding into new growth areas of infrastructure, mobile, solutions and services. This transformation is building a more inclusive, trustworthy, and sustainable digital society for everyone, everywhere.

For More Information

To learn more about the Lenovo DM Series All-Flash Array, contact your Lenovo representative or Business Partner, or visit lenovo.com/storage. Or for detailed specifications, read the Product Guides.

NEED SERVERS?	Learn more about Lenovo Servers lenovo.com/systems/servers
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