EMC SYMMETRIX VMAX 20K STORAGE SYSTEM

The EMC® Virtual Matrix Architecture™ is a new way to build storage systems that transcends the physical constraints of all existing architectures by scaling system resources through common building blocks called EMC® Symmetrix® VMAX® 20K engines.

A single VMAX 20K engine provides the complete foundation for a high-availability Symmetrix VMAX 20K system. Each VMAX 20K engine contains two Symmetrix VMAX 20K directors and redundant interfaces to the EMC Virtual Matrix™ interconnect. Each Symmetrix VMAX 20K director consolidates front-end, global memory, and back-end functions, enabling direct memory access to data for optimized I/O operations.

VMAX 20K engines are interconnected via a set of multiple active fabrics that provides scalable performance and high availability. VMAX 20K engines can be added non-disruptively to provide linear scale-out of Symmetrix system resources. The Virtual Matrix is architected to scale to dozens of engines, geographically dispersed throughout a data center, delivering unprecedented scale of infrastructure services under a single point of management.

VMAX 20K ENGINE MAXIMUM SPECIFICATIONS
- Four Quad-core 2.33 GHz Intel® Xeon® processors
- Up to 128 GB of memory
- Virtual Matrix bandwidth: 24 GB/s

VMAX 20K MAXIMUM SYSTEM SPECIFICATIONS
- Eight VMAX 20K engines
- 1 TB of memory
- Virtual Matrix bandwidth: 192 GB/s

VMAX 20K INTERCONNECT
- Industry-standard RapidIO® fabric (Virtual Matrix Architecture is extensible to other standard interconnects.)

CONNECTIVITY

Symmetrix VMAX 20K systems are available in configurations supporting up to eight VMAX 20K engines with a maximum of 128 front-end ports. Optimized hardware logic and data protection encoding ensures end-to-end data integrity with automated channel failover for a maximum availability and load balancing. Symmetrix VMAX 20K systems support all popular hardware and operating system platforms, storage area networks (SANs), and high-availability cluster environments. IPv6, IPsec, and compression support are available with 1 Gb/s Ethernet ports. IPv6 support is available with 10 Gb/s Ethernet.

PROTOCOL	USABLE SYSTEM PORTS
8 Gb/s Fibre Channel Host/ SAN Ports	4-128 per array, 4-16 ports per engine
8 Gb/s Fibre Channel Remote Replication Ports	2-32 per array, 2-4 ports per engine
8 Gb/s FICON Host Ports	4-64 per array, 4-8 ports per engine
4 Gb/s Fibre Channel Host/SAN Ports	4-128 per array, 4-16 ports per engine
4 Gb/s Fibre Channel Remote Replication Ports	2-32 per array, 2-4 ports per engine
4 Gb/s FICON Host Ports	4-64 per array. 4-8 ports per VMAX engine
10 Gb/s 1 Gb/s Ethernet Remote Replication Ports	2-32 ports per array, 2-4 ports per engine
10 Gb/s FCoE Host Parts10	4-64 per array, 4-8 ports per engine
10 Gb/s iSCSl Host Parts10	4-64 ports per array, 4-8 ports engine
1 Gb/s GigE Remote Replication Ports	2-32 ports per array, 2-4 ports per engine
1 Gb/s iSCSl Ports	4-64 per array, 4-8 ports per engine

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Mixed combinations of the above port types depend upon the configuration. Refer to the EMC Support Matrix at www.EMC.com, or contact your local EMC sales representative for specific configuration support. EMC Symmetrix VMAX 20K systems are available in two- to 11-bay configurations for up to two petabytes of usable storage capacity in a single system. With automated tiered storage capability for maximum TCO value, Symmetrix VMAX 20K arrays are the highest capacity, fastest, most-scalable, most-capable storage systems available and serve as the foundation of today's most-demanding intelligent information infrastructures.

DISK DRIVE AND ENTERPRISE FLASH DRIVE CONNECTIVITY

The Symmetrix VMAX 20K drive infrastructure is architected with 4 Gb/s dual-ported Fibre Channel drives, Enterprise Flash drives, SAS drives, and SATA drives, each supported by two independent I/O channels with automatic failover and fault isolation.

3.5" FIBRE CHANNEL DRIVES

CAPACITY	146 GB	300 GB	300 GB	450 GB	450 GB
Rotational Speed (rpm)	15,000	10,000	15,000	10,000	15,000
Form Factor	3.5 in	3.5 in	3.5 in	3.5 in	3.5 in
Internal Data Rate (Mb/s)	685-1,142	1,010-1,840	685-1,142	1,010-1,840	1,051-2,225
Average Seek Time (read/write)	3.4/3.9 ms	3.8/4.4 ms	3.4/3.9 ms	3.8/4.4 ms	3.4/3.9 ms
Raw Capacity	145.7 GB	292.7 GB	292.6 GB	439.0 GB	439.0 GB
FORMATTED CAPACITY					
Open Systems	143.5 GB	288.1 GB	288.1 GB	432.2 GB	432.2 GB
MainFrame	139.3 GB	279.7 GB	279.7 GB	419.6 GB	419.6 GB
IBM i	141.7 GB	288.2 GB	288.2 GB	435.1 GB	435.1 GB

3.5" FIBRE CHANNEL DRIVES [continued]

CAPACITY	600 GB	600 GB	1 TB	2 TB	3 TB
Rotational Speed (rpm)	10,000	15,000	7,200	7,200	7,200
Form Factor	3.5 in	3.5 in	3.5 in	3.5 in	3.5 in
Internal Data Rate (Mb/s)	1,010-1,840	1,051-2,225	470-1,070	470-1,070	470-1,070
Average Seek Time (read/write)	3.8/4.4 ms	3.4/3.9 ms	8.2/9.2 ms	8.2/9.2 ms	8.2/9.2 ms
Raw Capacity	585.4 GB	585.4 GB	1000.2 GB	1912.1 GB	3000.5 GB
FORMATTED CAPACITY					
Open Systems	576.3 GB	576.3 GB	984.8 GB	1882.7 GB	2954.4 GB
MainFrame	559.5 GB	559.5 GB	956.0 GB	1827.6 GB	2868.0 GB
IBM i	580.1 GB	580.1 GB	n/a	1912.1 GB	2955.1 GB

2.5" SAS DRIVES*

CAPACITY	300 GB	450 GB	600 GB
Rotational Speed (rpm)	10,000	10,000	10,000
Form Factor	2.5 in	2.5 in	2.5 in
Internal Data Rate (Mb/s)	1219-2029	1219-2029	1219-2029
Average Seek Time (read/write)	3.7/4.2 ms	3.7/4.2 ms	3.7/4.2 ms
Raw Capacity	292.7 GB	439.0 GB	585.4 GB
FORMATTED CAPACITY			
Open Systems	288.1 GB	432.2 GB	576.3 GB
MainFrame	279.7 GB	419.6 GB	559.5 GB
IBM i	288.2 GB	435.1 GB	580.1 GB

* 2.5" drives in 3.5" drive carriers.

ENTERPRISE FLASH DRIVES

CAPACITY	100 GB	200 GB	400 GB
Form Factor	3.5 in	3.5 in	3.5 in
Internal Data Rate (Mb/s)	800-1,600	800-1,600	800-1,600
Raw Capacity	100.0 GB	200.0 GB	400.0 GB
FORMATTED CAPACITY			
Open Systems	98.4 GB	196.9 GB	393.8 GB
MainFrame	95.6 GB	191.2 GB	382.3 GB
IBM i	98.5 GB	197.0 GB	389.8 GB

SYSTEM CAPACITY IN TERABYTES

		146 GB DRIVES		3 TB DRIVES	
		Min.	Max.	Min.	Max.
# OF DRIVES		48	2,400	48	2,400
MIRRORED	Open Systems	2.8	168.7	37.6	2,067
	Mainframe	2.7	163.8	36.5	2,006
RAID-5 3+1	Open Systems	4.3	253.1	56.4	2,067
	Mainframe	4.1	245.8	54.8	2,006
RAID-5 7+1	Open Systems	5.0	295.3	65.9	2,055
	Mainframe	4.8	286.7	63.9	1,995
RAID-6 6+2	Open System	4.3	253.1	56.4	2,067
	Mainframe	4.1	245.8	54.8	2,006
RAID-6 14+2	Open System	5.0	295.3	79.0	2,055
	Mainframe	4.8	286.7	76.7	1,955

Configurations with mixed drive capacities and speeds are allowed depending upon the configuration.
64 GB of total capacity will be reserved for internal Symmetrix file system use. All capacities are based on
1 GB = 1,000,000,000 bytes. Actual usable capacity may vary depending upon configuration.

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DATA AT REST ENCRYPTION

Data at Rest Encryption is delivered through a unique Symmetrix VMAX 20K engine model with built-in, hardware-based data encryption. Data is encrypted when written to drives and decrypted when read from drives with no impact on performance or local and remote replication. Symmetrix Data at Rest Encryption addresses security and compliance concerns regarding data exposure when drives are removed or arrays are replaced.

PHYSICAL AND COOLING SPECIFICATIONS (FRONT / REAR SERVICE)

	HEIGHT* (IN/CM)	WIDTH (IN/CM)	DEPTH (IN/CM)	AREA (IN/CM)	WEIGHT (IN/CM)	POWER (KVA)	COOLING (BTU/HR)
4-Engine System Bay	76.66/194.7	30.2/76.7	41.88/106.4	42.0/106.7	1,830/830.0	4.1	13,700
8-Engine System Bay	76.6/194.7	30.2/76.7	41.88/106.4	42.0/106.7	2,774/1,258.3	7.8	26,300
Storage Bay	76.6/194.7	30.2/76.7	41.88/106.4	42.0/106.7	2,144/972.5	6.1	19,800

All dimensions are cabinet/enclosure size without shipping brackets or securing brackets. Weight, power, and cooling are maximum for a full configuration. Cooling is front to rear for system bay and front to top for storage bays.

*An additional 18 in. (45.7 cm) is recommended for ceiling/top clearance.

POWER SPECIFICATIONS - STORAGE BAY AND SYSTEM BAY

	NORTH AMERICA 3-PHASE (DELTA 4-WIRE)	INTERNATIONAL 3-PHASE (WYE 5-WIRE)	NORTH AMERICA SINGLE-PHASE	INTERNATIONAL SINGLE-PHASE
INPUT VOLTAGE (VAC)	200-240	200-240	200-240	200-240
FREQUENCY (HZ)	50-60	50-60	50-60	50-60
CIRCUIT BREAKER (AMPS), RECOMMENDED	50	32	30	32
AC POWER CONNECTIONS	2 per bay	2 per bay	4 per bay	4 per bay
POWER CONNECTOR	CS-8365C	S52.30	L6-30P	L6-30P
USER CONNECTOR	See Note 1	See Note 1	See Note 1	See Note 1

*Specifications given are for the power connectors located inside the Symmetrix VMAX 20K system and storage bays. EMC offers a selection of power cable extensions with different power connectors for connection to the customer's power source. Refer to the "VMAX 20K Series Physical Planning Guide" for details. The power cable extension type desired must be verified at the time of quotation and ordering.

Note 1: Refer to the "VMAX 20K Series Physical Planning Guide."

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ENVIRONMENTAL SPECIFICATIONS (OPERATING)

Temperature (F/C)	50-90/10-32
Altitude (ft/m), max.	7,500/2,286
Humidity (%), Non-condensing	20 - 80
Raised Floor	Recommended

CONTACT US

To learn more about how EMC products, services, and solutions can help solve your business and IT challenges, contact your local representative or authorized reseller—or visit us at www.EMC.com.

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