

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

8 Gb/s Fibre Channel Host/ SAN Ports
8 Gb/s Fibre Channel Remote Replication Ports
8 Gb/s FICON Host Ports
4 Gb/s Fibre Channel Host/SAN Ports
4 Gb/s Fibre Channel Remote Replication Ports
4 Gb/s FICON Host Ports
10 Gb/s 1 Gb/s Ethernet Remote Replication Ports
10 Gb/s FCoE Host Parts10
10 Gb/s iSCSI Host Parts10
1 Gb/s GigE Remote Replication Ports
1 Gb/s iSCSI Ports

USABLE SYSTEM PORTS

4-128 per array, 4-16 ports per engine
2-32 per array, 2-4 ports per engine
4-64 per array, 4-8 ports per engine
4-128 per array, 4-16 ports per engine
2-32 per array, 2-4 ports per engine
4-64 per array, 4-8 ports per VMAX engine
2-32 ports per array, 2-4 ports per engine
4-64 per array, 4-8 ports per engine
4-64 ports per array, 4-8 ports engine
2-32 ports per array, 2-4 ports per engine
4-64 per array, 4-8 ports per engine

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

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

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."

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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