VMAX ALL FLASH FAMILY

VMAX 250F, 950F

The exciting Dell EMC VMAX® family of all-flash arrays now includes the newest powerful member, the VMAX 950F. The VMAX 950F delivers unparalleled performance and scalability as a mission-critical multi-controller platform utilizing Intel® Xeon® E5-2697-v4 18 core processors running at 2.3GHz. With the highest capacity 7.68 and 15.36TB Enterprise Flash drives, and Dual V-Brick/cabinet packaging this new Enterprise class array offers a compelling value proposition designed for the most demanding storage workloads, including new support for Mixed Mainframe and Open Systems hosts. Like all members of the All Flash family, your data always resides in the fastest possible tier (Diamond) to deliver the highest IOPS throughput and lowest possible latency.

VMAX All Flash

VMAX All Flash arrays extend the long tradition of VMAX® Reliability, Availability and Serviceability that our customers have come to expect. A single V-Brick is architected to provide six-nines (99.9999%) of Availability in the most demanding, mission critical environments. Ranging from 1 to 8 V-Bricks packaged in dual V-Brick racks along with their associated DAEs, the VMAX All Flash family offers unprecedented scale and footprint efficiency. The built-in hypervisor enables VMAX All Flash to offer Unified block and file support through Embedded NAS (eNAS), as well as Embedded Management.

VMAX All Flash arrays are available in two software packages, the standard “F” package and the application rich “FX” package, which makes ordering easy. The FX package includes licensed support for SRDF S/A/STAR/Metro, Data at Rest Encryption, eNAS, and both include VASA Provider Certified support for VVols, and Secure Snaps, a new SnapVX feature eliminating the ability for admins to delete snapshots. And now, for the first time, VMAX All Flash arrays offer the optional support for RecoverPoint for heterogeneous replication with Dell EMC arrays. As always, VMAX All Flash arrays come fully pre-configured out of the factory to significantly shorten the time to first I/O.

Specifications

Appliance-based packaging

The Dynamic Virtual Matrix Architecture that allows aggregate scaling of system resources has been extended to VMAX All Flash Arrays, where basic storage building blocks are defined by appliance-based entities called V-Bricks. Each V-Brick includes an engine with two VMAX directors, packaged software, and, depending on the platform, from 512 GB to 2 TB of cache, and two 25-slot Drive Array Enclosures housing a minimum base capacity of 13.2 TBu of flash capacity in the VMAX 250F, or two 120-slot Drive Array Enclosures with minimum base capacities of 13.2 TBu for 100% CKD MF systems, and 53.6TBu for Open Systems on the VMAX 950F. Multi V-Brick systems also include redundant InfiniBand interfaces to connect all V-Bricks in the array. Additional flash capacity can be added to each V-Brick in varying increments up to a total usable capacity of 4.4 PB on the VMAX 950F, along with inline compression, supported on all members of the VMAX All Flash family.

Inline compression is supported across the entire VMAX All Flash family as of the Q3 2016 HYPERMAX 5977 release. Each director consolidates front-end, global memory, and back-end functions, enabling direct memory access to data for optimized I/O operations. Depending on the array chosen, up to eight (8) VMAX All Flash V-Bricks can be supported for highly scalable performance and high availability. Additional specifications and a comparison of the VMAX 250F and 950F arrays follow.

Array family	VMAX 250F/VMAX 250FX	VMAX 950F/VMAX 950FX
V-BRICKS		
Number of V-Bricks	1 to 2	1 to 8
ENGINE ENCLOSURE	4u	4u
CPU	Intel Xeon E5-2650-v4 [4]2.5 GHz 12 core	Intel Xeon E5-2697-v4 [4]2.8 GHz 18 core
# CORES PER CPU/PER ENGINE/PER SYSTEM	12/48/96	18/72/576
DYNAMIC VIRTUAL MATRIX INTERCONNECT	Direct Connect InfiniBand 56 Gbps per port	InfiniBand Dual Redundant Fabric: 56 Gbps per port
CACHE		
CACHE-SYSTEM MIN (RAW)	512 GB	1,024 GB
CACHE-SYSTEM MAX (RAW)	4 TB (with 2,048 GB engine)	16 TB (with 2,048 GB engine)
CACHE-PER ENGINE OPTIONS	512 GB, 1 TB, and 2 TB	1 TB, 2 TB
VAULT		
VAULT STRATEGY	Vault to Flash	Vault to Flash
VAULT IMPLEMENTATION	2 to 4 NVMe Flash SLICs / Engine	4 to 8 NVMe Flash SLICs / Engine
FRONT END I/O MODULES		
MAXIMUM FRONT-END I/O MODULES/V-BRICK	8	6 (up to 8 on Mainframe)
FRONT-END I/O MODULES AND PROTOCOLS SUPPORTED	FC: 4 x 8 Gbs (FC, SRDF) FC: 4 x 16 Gbs (FC, SRDF) 10 GbE: 4 x10 GbE(iSCSI, SRDF) GbE: 4 x 1 GbE(2 Cu/2 Opt SRDF)	FC: 4 x 8 Gbs (FC, SRDF) FC: 4 x 16 Gbs (FC, SRDF) 10 GbE: 4 x10 GbE (iSCSI, SRDF) GbE 4 x 1 GbE (2 Cu/2 Opt SRDF) FICON: 4 x 16 Gbs (FICON)
eNAS I/O MODULES		
MAX eNAS I/O MODULES/ SOFTWARE DATA MOVER	[5]3	[5]3
eNAS I/O MODULES SUPPORTED	10 GbE: 2 x 10 GbE Optical [1]10 GbE: 2 x 10 GbE Cu [2]8 Gbs: 4 x 8 Gbs FC (Tape BU)	10 GbE: 2 x 10 GbE Optical [1]10 GbE: 2 x 10 GbE Cu [2]8 Gbs: 4 x 8 Gbs FC (Tape BU)
eNAS SOFTWARE DATA MOVERS		
MAX SOFTWARE DATA MOVERS	4 (3 Active + 1 Standby) (4 Data Movers requires minimum 2 V-Bricks)	[3]8 (7 Active and 1 Standby) (8 Data Movers requires minimum 4 V-Bricks)
MAX NAS CAPACITY/ARRAY (TERABYTES USABLE)	1158 (cache limited)	3584

[1] Quantity one (1) 2 x 10 GbE Optical module is the default choice/Data Mover.

[2] Used to support NDMP Tape Backup

[3] Support for 8 Data Movers on the VMAX 950F/FX is available by request.

[4] CPUs run in Turbo Mode except at elevated ambient temperatures.

[5] Two eNAS I/O modules/Datamover standard. Three can be supported depending on configuration via RPQ.

Array family	VMAX 250F/VMAX 250FX	VMAX 950F/VMAX 950FX
CAPACITY, DRIVES		
Max Capacity per Array (Open)[1]	1.16 PBe	4.42 PBe
Base Capacity per V-Brick (Open)	[3]13.2 TBu	52.6 TBu
Base Capacity per V-Brick (Mainframe)	N/A	13.2 TBu
Incremental Capacity Blocks	[3]13.2 TBu	13.2 TBu
Max Drives per V-Brick	50	240
Max Drives per Array	100	1,920
Max Drives per System Bay	100/200[2]	480
Min Drive Count per V-Brick	8 + 1 Spare	16 + 1 spare
FLASH DRIVES		
Flash Drives Supported (2.5")	960 GB, 1.92 TB, 3.84 TB, 7.68 TB, 15.36 TB	960 GB, 1.92 TB, 3.84 TB, 7.68 TB, 15.36 TB
BE Interface	12 Gbps SAS	6 Gbps SAS
RAID Options Supported	RAID 5(7+1) (default) RAID 5(3+1) RAID 6(6+2)	RAID 5(7 +1) RAID 6(14+2)
Mixed RAID Group Support	No	No
Support for Mixed Drive Capacities	Yes	Yes
FLASH ARRAY ENCLOSURES		
120 x 2.5" Drive DAE	No	Yes
25 x 2.5" Drive DAE	Yes	No
CABINET CONFIGURATIONS		
Standard 19" bays	Yes	Yes
Single V-Brick System Bay Configuration	No (Packaging based on Dual V-Bricks, but initial V-Brick in each System Bay supported)	No (Packaging based on Dual V- Bricks, but initial V-Brick in each System Bay supported)
Dual V-Brick System Bay Configuration	Yes (Default packaging)	Yes (Default packaging)
Third Party Rack Mount Option	Yes	Yes
DISPERSION		
Third Party Rack Mount Option	N/A-single floor tile system	Yes (on request)
PRE-CONFIGURATION FROM FACTORY		
100% Thin Provisioned	Yes	Yes
HOST SUPPORT		
Open Systems	Yes	Yes
Mainframe	No	Yes
Mixed Mainframe and Open	No	Yes
POWER OPTIONS		
Input Power Options	Single or Three Phase Delta or Wye	Single or Three Phase Delta or Wye

[1] Max capacity per array based on over provisioning ratio of 1.0.

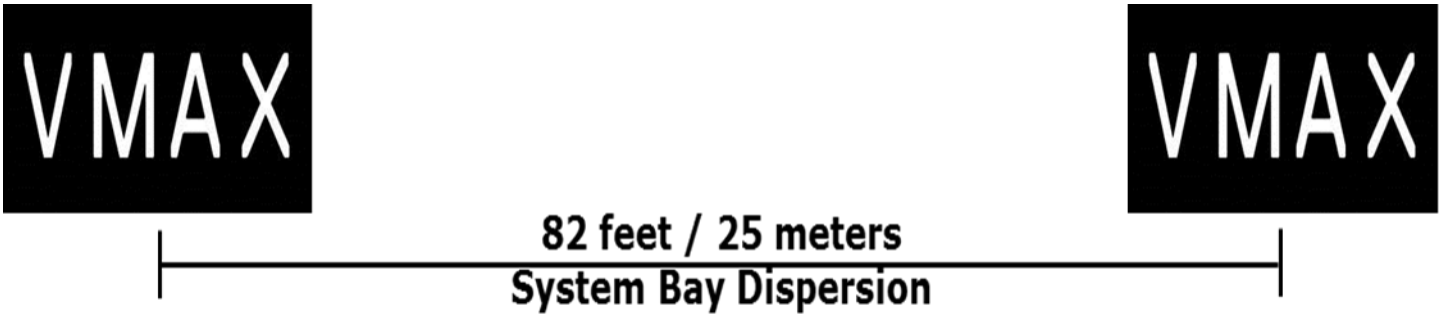
[2] 200 drives can be supported in a single cabinet when two systems are packaged in the same rack.

[3] 13.2TBu V-Brick and Capacity Block usable capacities are based on RAID 5 (7+1). 11.3TBu base capacity and Capacity Block increments possible with RAID 5(3+1) on VMAX 250F

Array family	VMAX 250F/VMAX 250FX	VMAX 950F/VMAX 950FX
I/O PROTOCOLS SUPPORTED		
8 Gb/s FC Host/SRDF Ports		
Maximum/V-Brick	32	24
Maximum/array	64	192
16 Gb/s FC Host Ports		
Maximum/V-Brick	32	24
Maximum/array	64	192
16 Gb/s FICON Host Ports		
Maximum/V-Brick	N/A	32
Maximum/array	N/A	256
10 GbE iSCSI Ports (Optical)		
Maximum/V-Brick	32	24
Maximum/array	64	192
10 GbE SRDF Ports (Optical)		
Maximum/V-Brick	32	24
Maximum/array	64	192
GbE SRDF Ports (Optical/Cu)		
Maximum/V-Brick	16/16	12/12
Maximum/array	64	96
Embedded NAS ports		
10 GbE Optical Ports		
Max ports/Software Data Mover	4	4
Maximum ports/array	16	32
10 GbE Copper Ports		
Max ports/Software Data Mover	4	4
Maximum ports/array	16	32
8 Gb/s FC Tape Back Up Ports		
Max ports/Software Data Mover	2	2
Maximum ports/array	8	16

System bay dispersion

System Bay Dispersion allows customers to separate any individual or contiguous group of system bays by up to a distance of 82 feet (25 meters) from System Bay 1. This provides unsurpassed datacenter flexibility in solving floor loading constraints or working around obstacles that might preclude fully contiguous configurations. This is applicable to VMAX 950F, as the VMAX 250F is a single bay solution.



Flash drive support

The VMAX 250F/FX (12 Gb/s) and the 450F/FX and 850F/FX (6 Gb/s) support the latest dual ported native SAS Flash drives. All Flash drives support two independent I/O channels with automatic failover and fault isolation. Check with your Dell EMC sales representative for the latest list of supported drives and types. All capacities are based on 1 GB = 1,000,000,000 bytes. Actual usable capacity may vary depending upon configuration.

2.5” support flash drives used in V-Bricks and capacity upgrades

Platform support	VMAX 250F, 950F	VMAX 250F, 950F	VMAX 250F, 950F	VMAX 250F, 950F	VMAX 250F, 950F
Nominal capacity (GB)	[1]960	[1]1920	[1]3840	[1]7680	[1]15360
Type	Flash	Flash	Flash	Flash	Flash
Average seek time (read/write ms)	N/A	N/A	N/A	N/A	N/A
Raw Capacity (GB)	960	1920	3840	7680	15360
[3]Open systems formatted capacity (GB)	938.94	1879.64	3761.03	7522.06	15047.65
Mainframe 3390 formatted capacity	[2]940.26	[2]1880.52	[2]3761.80	[2]7523.61	[2]15047.98

[1] V-Bricks and capacity upgrades in any given configuration could contain a maximum of two different underlying drive sizes in order to best achieve the desired usable capacity. This is automatically optimized by the VMAX Sizer Tool.

[2] Mainframe is not supported on VMAX 250F.

[3] Open systems formatted capacity is also referred to as TBu in this document.

Power consumption and heat dissipation at <26 and >35 degrees C

Component	VMAX 250F/FX				VMAX 950F/FX			
Maximum power and heat dissipation at temperatures <26° C and >35° C [2,3]	Maximum Total power consumption (kVA)		Maximum Heat dissipation (Btu/hr)		Maximum Total power consumption (kVA)		Maximum Heat dissipation (Btu/hr)	
	<26° C	>35° C	<26° C	>35° C	<26° C	>35° C	<26° C	>35° C
System bay 1, dual engine	4.13	5.19	14,090	17,698	7.25	9.61	24,712	32,760
System bay 2, dual engine [1]	N/A	N/A	N/A	N/A	6.80	8.90	23,178	30,339

[1] Power values for System Bay 2 and all subsequent system bays where applicable.

[2] Power values and heat dissipations shown at >35 degrees C reflect the higher power levels associated with both the battery recharge cycle, and the initiation of high ambient temperature Adaptive Cooling algorithms.

[3] Values at <26° C are reflective of more steady state maximum values during normal operation.

Physical specifications

Component	Height (in/cm)	Width (in/cm)	Depth (in/cm)	Weight (maximum lbs/kgs)
System bay, dual engine 950F	75/190	24/61	47/119	1860/844
System bay, dual engine 250F	75/190	24/61	42/106.7	850/385
System bay, dual engine, dual system 250F	75/190	24/61	42/106.7	1410/640

Input power requirements

Single phase North American, international, Australian

Specification	North American 3-wire connection (2 L and 1 G) [1]	International and Australian 3-wire connection (1 L and 1 N and 1 G) [1]
Input nominal voltage	200 – 240 VAC +/- 10% L- L nom	220 – 240 VAC +/- 10% L - N nom
Frequency	50 – 60 Hz	50 – 60 Hz
Circuit breakers	30 A	32 A
Power zones	Two	Two
Power requirements at customer site (min)	One 30A, single phase drop per zone (250F) Three 30A, single phase drops per zone (950F) Two power zones require 2 drops (250F), 6 drops (950F) with each drop rated for 30A	

[1] L = line or phase, N = neutral, G = ground

Three-phase North American, international, Australian

Specification	North American (DELTA) 4-wire connection (3 L and 1 G)[1]	International (WYE) 5-wire connection (3 L and 1 N and 1 G)[1]
Input voltage[2]	200 – 240 VAC +/- 10% L- L nom	220 – 240 VAC +/- 10% L - N nom
Frequency	50 – 60 Hz	50 – 60 Hz
Circuit breakers	50 A	32 A
Power zones	Two	Two
Power requirements at customer site (min)	Two 50 A, three-phase drops per bay	Two 32 A, three-phase drops per bay

[1]L = line or phase, N = neutral, G = ground

[2]An imbalance of AC input currents may exist on the three-phase power source feeding the array, depending on the configuration. The customer's electrician must be alerted to this possible condition to balance the phase-by-phase loading conditions within the customer's data center

Radio frequency interference

Electro-magnetic fields which include radio frequencies can interfere with the operation of electronic equipment. Dell EMC products have been certified to withstand radio frequency interference in accordance with standard EN61000-4-3. In Data Centers that employ intentional radiators, such as cell phone repeaters, the maximum ambient RF field strength should not exceed 3 Volts /meter.

Repeater power level (watts)	Recommended minimum distance (feet/meters)
1	9.84 FT (3 M)
2	13.12 FT (4 M)
5	19.69 FT (6 M)
7	22.97 FT (7 M)
10	26.25 FT (8 M)
12	29.53 FT (9 M)
15	32.81 FT (10 M)

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