

EMC Celerra NS-960 Unified Storage



EMC[®] Celerra[®] NS-960 systems can be integral elements of a comprehensive information lifecycle management strategy—a strategy that helps your enterprise attain the maximum value from its information, at the lowest TCO. Gain advanced failover to multi-protocol environments with the Celerra NS-960 enterprise-class unified storage system.

Specifications

Architecture

The NS-960 unified storage platform supports flexible X-Blade configurations, from 2 to 8 blades. X-Blade configurations can be deployed in N+M Primary/Standby mode for flexible hardware availability protection (i.e., X-Blade failover where N is the number of active X-Blades and M is the number of X-Blades in the standby pool). The Celerra family of unified storage platforms delivers the utmost flexibility with full concurrent support for NAS (NFS and CIFS), iSCSI, and can be configured with native Fibre Channel host connections. The NS-960 utilizes proven EMC CLARiiON[®] CX4 array technology.

Each base X-Blade consists of the following:

- Dual Quad Core 2.3 GHz Intel[®] Xeon[®] CPUs
- 4 GB Double Data Rate RAM (333 MHz) on a 1.33 GHz FSB
- Two 4 Gb/s or 8 Gb/s Fibre Channel ports for storage array connectivity*
- Up to two 4 Gb/s or 8 Gb/s Fibre Channel ports for tape connectivity*
- One 10/100/1000 management port
- Instance of DART File Server software

Ethernet Blade Options add the following connectivity to the base (All X-Blades in a single NS-960 system must contain the same Ethernet configuration.):

- Option 1: eight 10/100/1000 BaseT ports
- Option 2*: four 10/100/1000 BaseT ports plus one 10 Gigabit Ethernet Optical
- Option 3: sixteen 10/100/1000 BaseT ports
- Option 4: four 10/100/1000 BaseT ports plus four 1 Gigabit Ethernet Optical
- Option 5: eight 10/100/1000 BaseT ports plus eight 1 Gigabit Ethernet Optical
- Option 6: two 10 Gigabit Ethernet Optical
- Option 7: four 10 Gigabit Ethernet Optical
- Option 8: two 10 Gigabit Ethernet plus eight 10/100/1000 BaseT ports
- Option 9: two 10 Gigabit Ethernet Optical plus four 10/100/1000 BaseT ports plus four 1 Gigabit Ethernet Optical

* Option 2 is only offered with 4 Gb/s Fibre Channel ports for storage array connectivity and tape connectivity.

X-Blades can be added non-disruptively up to an eight X-Blade configuration.

Storage Array I/O Connectivity

EMC UltraFlex[™] I/O modules offer additional flexibility for X-Blade, host, and disk connectivity. The I/O modules, per storage processor, provide up to a maximum of eight 4 Gb or 8 Gb Fibre Channel ports for X-Blade connectivity, up to ten 4 Gb or 8 Gb Fibre Channel ports for host (FC, MPFS, or EMC MirrorView[™] host) connectivity or up to six 1 Gb or 10 Gb Ethernet Optical ports for host (iSCSI, MPFS, or MirrorView) connectivity subject to slot limits and certain other restrictions.

Note: FC supports FCP SCSI-3 protocol, FC-AL, and FC-SW with command tag queuing up to 256 tags.

SP System Memory and CPU

- Two identical storage processors per NS-960 platform
- 16 GB of memory per storage processor

Maximum Cable Lengths

Shortwave optical OM2: 50 meters (8 Gb), 100 meters (4 Gb), 300 meters (2 Gb), and 500 meters (1 Gb)

Shortwave optical OM3: 150 meters (8 Gb), 380 meters (4 Gb), 500 meters (2 Gb), and 860 meters (1 Gb)

Disk Connectivity

Each storage processor connects to one side of each of four, or optionally eight, redundant pairs of 4 Gb/s Fibre Channel buses, providing continuous drive access to hosts in the event of a storage processor or bus fault

NS-960 requires a minimum of five drives (Fibre Channel) and supports a maximum of 960 disk drives in a 64 disk expansion chassis



Platform managed by 1 or 2 control stations:

- Connection to each X-Blade via 10/100 interface
- Manages X-Blade failover
- Manages all file systems via GUI
- SNMP MIB II manageability
- Secure Shell (SSH) for remote access
- HTTP server management interface
- Dual USB, 250 GB drive, DVD drive
- Single control station contains a 3.4 GHz Single Core Xeon CPU with 800 MHz FSB, 2 MB cache, and 2 GB memory

NS-960 comes with integrated CLARiiON (CX4-960 based) storage with the following drive attributes:

- Six (includes a hot spare) to 960 FC, SATA, and Flash drives in up to 64 drive trays configured as
 - All FC drives
 - Mixed FC, SATA*, and Flash* drives (FC, SATA, and Flash drives must be in separate trays)

* SATA and Flash drives are not configured in the first drive tray.

DART File Server Facilities**Protocols Supported**

- NFSv2, v3, and v4, CIFS (SMB 1 and SMB 2), FTP, FTP Secure, iSCSI, Fibre Channel
- Network Lock Manager (NLM) v1, v3, v4
- Routing Information Protocol (RIP) v1-v2
- Simple Network Mgmt Protocol (SNMP)
- Network Data Mgmt Protocol (NDMP) v1-v4
- Address Resolution Protocol (ARP)
- Internet Control Message Protocol (ICMP)
- Network Time Protocol (NTP) client
- Simple Network Time Protocol (SNTP)
- Kerberos Authentication
- Lightweight Directory Access Protocol (LDAP)

Optional DART Software Facilities

- Celerra Event Enabler (CEE): Integration facilities with third-party vendors
 - Celerra Anti-virus: Celerra integration with industry-leading, anti-virus vendors
 - Celerra Event Publishing Agent: Celerra integration with industry-leading, quota-management vendors
- EMC Celerra Replicator™: Replicate over IP for disaster recovery, backup, and/or testing
- Celerra Manager Advanced Edition: Extended management and monitoring of multiple Celerra systems
- Celerra File-Level Retention (FLR): Create WORM (write once/read many) file systems with specified retention periods
 - Celerra File-Level Retention—Enterprise
 - Celerra File-Level Retention—Compliance
- Celerra Multi-Path File System (MPFS): Delivers improved performance and scalability over traditional NAS

Note: Celerra Manager-Basic, Virtual Provisioning, Deduplication, and EMC SnapSure™ are bundled.

Client Connectivity Facilities

- File access by FTP, NFS, CIFS and MPFS
- Block access by Fibre Channel and iSCSI
- Virtual Data Movers for Microsoft® Windows® clients
- Ethernet Trunking
- Link Aggregation (IEEE 802.3ad)
- Virtual LAN (IEEE 802.1q)
- UNIX archive utilities (tar/cpio)
- Network Status Monitor (NSM) v1
- Portmapper v2
- Network Information Service (NIS) Client
- Supports Microsoft DFS as Leaf node or Root Server
- Native Windows 2000/2003/2008 support
- NT LAN Manager (NTLM)
- LDAP signing for Windows
- Microsoft Windows Server® 2003 Access-based Enumeration (ABE)

Optional CLARiiON Software Facilities

- EMC Navisphere® Manager: Comprehensive configuration, management, and event notification for single or multiple CLARiiON systems
- Navisphere Analyzer: Comprehensive performance, management, and event notification
- Navisphere Quality of Service Manager (NQM): Manage CLARiiON to meet performance service levels
- EMC SnapView™: Point-in-time view of information for non-disruptive backup and recovery
- MirrorView/A and MirrorView/S: Remote asynchronous or synchronous replication for disaster recovery
- EMC PowerPath®: Path management
- EMC SAN Copy™: Enables local or long-distance data movement among various arrays (e.g., CLARiiON, EMC Symmetrix®, non-EMC)

High-Availability Features

NS-960 X-Blade Enclosure

- Redundant power supplies for X-Blades and Control Stations
- Hot-swappable power and cooling
- Internal environmental status monitoring

DART Software Capabilities

- Celerra Manager: Web-based configuration and management
- Automated Volume Management (AVM): File system provisioning
- Virtual provisioning: Enables logical sizing and physical provisioning
- SnapSure: Creates read-only or read-write, point-in-time logical snaps
- Monitoring: At-a-glance system status and performance statistics
- Data deduplication: File-based deduplication and compression
- FileMover API: Open API for automated, transparent data movement between tiers of storage
- Ethernet trunking
- Link aggregation
- Failsafe networking
- Network interface port failover
- N to M X-Blade failover

Optional VMware Facilities

- EMC PowerPath®/VE: Path management for iSCSI and Fibre Channel
- VMware® vCenter™ plug-ins: For provisioning and management
- Site Recovery Manager (SRM): Managing failover and failback making disaster recovery rapid and reliable
- Replication Manager: Host-based management of array-based copies of data

Additional Facilities

- Celerra Fully Automated Storage Tiering (FAST): Automated, policy-based file tiering within cabinet, between cabinets, or to purpose-built storage
- PowerPath: Path management
- Replication Manager: Host-based management of array-based copies of data
- EMC Rainfinity® File Management Appliance (FMA and FMA/VE): File virtualization for transparent data mobility

Control Station

- Administration and management
- X-Blade installation and configuration
- X-Blade failover
- Monitor diagnostics
- Configuring network interfaces
- Creating and exporting file systems
- File-system consistency checks
- Extending file systems
- Auto-call event alerting
- Call-in remote maintenance

Note: Optional second control station is supported.

CLARiiON Storage

- Disk scrubbing
- Mirrored write cache with de-stage on AC power loss
- Redundant hot-swap power, bus structures and I/O subsystems
- Online global hot-spare disks
- PowerPath failover for Windows and UNIX hosts

RAID Levels

RAID 1/0: Data mirrored, then striped across four to 16 drives

RAID 5: Independent data access on three to 16 drives (with striped parity)

RAID 6: Dual parity distributed across four to 16 drives

Any combination of these RAID levels can exist on a single NS-960

RAID stripe depth configurable to 4, 16, 64, 128, or 256 sectors per disk

MetaLUNs: Storage virtualization via online LUN expansion through either striping or concatenation

Configurable global hot spares

Rebuild priority tuning: Adjustment of minimum I/O reserved for server use during rebuild

Supported Disk Drives

Nominal Capacity	73 GB 4 Gb/s	200 GB 4 Gb/s	400 GB 4 Gb/s	146 GB 4 Gb/s	300 GB 4 Gb/s	450 GB 4 Gb/s
Formatted Capacity* (520 bytes/sector, 1 MB = 1,048,576 bytes)	Enterprise Flash Drive 72.67 GB	Enterprise Flash Drive 186.31 GB	Enterprise Flash Drive 372.5 GB	135 GB	272 GB	408 GB
Form Factor	3.5"	3.5"	3.5"	3.5"	3.5"	3.5"
Height	1.0"	1.0"	1.0"	1.0"	1.0"	1.0"
Rotational Speed	N/A—Solid State	N/A—Solid State	N/A—Solid State	15,000 rpm	15,000 rpm	10,000 rpm
Interface	Fibre Channel	Fibre Channel	Fibre Channel	Fibre Channel	Fibre Channel	Fibre Channel
Access Time						
Average Seek	0.020 ms Read	0.020 ms Read	0.020 ms Read	3.7 ms Read	3.5 ms Read	3.8 ms Read
	0.020 ms Write	0.020 ms Write	0.020 ms Write	4.2 ms Write	4.0 ms Write	4.4 ms Write
Rotational Latency	N/A—Solid State	N/A—Solid State	N/A—Solid State	2.0 ms	2.0 ms	3.0 ms
Nominal Power Consumption						
Operating Mode	8.4 W	8.4 W	8.4 W	16.5 W	18.8 W	9.54 W
Idle Mode	5.4 W	5.4 W	5.4 W	10.7 W	13.7 W	5.96 W
Number of Drives per Disk Expansion Chassis	2-15	2-15	2-15	2-15	2-15	2-15
Nominal Capacity	450 GB 4 Gb/s	600 GB 4 Gb/s	600 GB 4 Gb/s	1 TB 4 Gb/s	1 TB 4 Gb/s Low Power	2 TB 4 Gb/s Low Power
Formatted Capacity* (520 bytes/sector, 1 MB = 1,048,576 bytes)	408.896 GB	545 GB	545.195 GB	931.5 GB	931.5 GB	1,852.09 GB
Form Factor	3.5"	3.5"	3.5"	3.5"	3.5"	3.5"
Height	1.0"	1.0"	1.0"	1.0"	1.0"	1.0"
Rotational Speed	15,000 rpm	10,000 rpm	15,000 rpm	7,200 rpm	5,400 rpm	5,400 rpm
Interface	Fibre Channel	Fibre Channel	Fibre Channel	SATA	SATA	SATA
Access Time						
Average Seek	3.4 ms Read	3.8 ms Read	3.4 ms Read	8.5 ms Read	8.9 ms Read	N/A Read
	3.9 ms Write	4.4 ms Write	3.9 ms Write	9.5 ms Write	N/A Write	N/A Write
Rotational Latency	2.0 ms	3.0 ms	2.0 ms	4.16 ms	4.2 ms	4.2 ms
Nominal Power Consumption						
Operating Mode	15.01 W	10.07 W	15.01 W	11.6 W	8.2 W	8.4 W
Idle Mode	10.38 W	6.49 W	11.82 W	8.0 W	5.9 W	4.0 W
Number of Drives per Disk Expansion Chassis	2-15	2-15	2-15	2-15	15	2-15

Dimensions, approximate

(Please note, the NS-960 always ships in a minimum of one EMC 40U rack.)

Measurement Item	NS-960 – 4 X-Blade system with 1x15 disk tray	NS-960 – 6 X-Blade system with 1x15 disk tray	NS-960 – 8 X-Blade system with 1x15 disk tray	Expansion Disk Tray (can add 63)
Height	31.5 in (80.0 cm), 18 NEMA units (U), including mounting rails	38.5 in (97.8 cm), 22 NEMA units (U), including mounting rails	45.5 in (115.6 cm) 26 NEMA units (U), including mounting rails	5.25 in (13.34 cm) 3 NEMA units (U)
Width	18.92 in (48.06 cm); mounting bars fit standard 19-in NEMA cabinets	18.92 in (48.06 cm); mounting bars fit standard 19-in NEMA cabinets	18.92 in (48.06 cm); mounting bars fit standard 19-in NEMA cabinets	17.72 in (45.0 cm)
Depth	Chassis to rear: 31.58 in (80.21 cm)	Chassis to rear: 31.58 in (80.21 cm)	Chassis to rear: 31.58 in (80.21 cm)	14.00 in (35.56 cm)
Weight (including cabinet)	918 lb (416.4 kg)	1,023 lb (464.0 kg)	1,128 lb (511.7 kg)	68 lb (30.8 kg)

Operating Environment

Temperature:	50–104 degrees F (10–40 degrees C)
Temperature Gradient:	18 degrees F/hr (10 degrees C/hr)
Relative Humidity:	20% to 80% (non-condensing)
Altitude:	7,500 ft. (2,286.4 m) @ 104 degrees F (40 degrees C) max. 10,000 ft (3,048 m) @ 98.6 degrees F (37 degrees C) max.

Electromagnetic Emissions and Immunity

FCC Class A EN55022 Class A
CE Mark VCCI Class A (for Japan)
ICES-003 Class A (for Canada) AS/NZS 3548 Class A (for Australia/New Zealand)
EN55024 Immunity, ITE BSMI Class A (for Taiwan)

Quality and Safety Standards

UL 60950; CSAC 22.2-60950, FN 60950
Manufactured under an ISO 9000-registered quality system
ETSI EN 300 386

AC Power and Dissipation

Requirements are approximate. For exact power requirements, consult the EMC Power Calculator at <http://powercalculator.EMC.com>.

Requirement	NS-960 – 4 X-Blade System with 1x15 Disk Tray	NS-960 – 6 X-Blade System with 1x15 Disk Tray	NS-960 – 8 X-Blade System with 1x15 Disk Tray	Expansion Disk Tray
AC line voltage	180 to 240 VAC ± 10%, single-phase, 47 to 63 Hz	180 to 240 VAC ± 10%, single-phase, 47 to 63 Hz	180 to 240 VAC ± 10%, single-phase, 47 to 63 Hz	100 to 240 VAC ± 10%, single-phase, 47 to 63 Hz, full auto-ranging
AC line current	14.1 A at 200 VAC	18.0 A at 200 VAC	21.9 A at 200 VAC	3.8 A at 100 VAC, 1.9 A at 200 VAC
Power consumption	2,830 VA (2,690 W) max.	3,600 VA (3,440 W) max.	4,380 VA (4,190 W) max.	380 VA (365 W) max. (fully configured)
Power factor	0.95 min. at full load, low voltage	0.95 min. at full load, low voltage	0.95 min. at full load, low voltage	0.98 min. at full load, low voltage
Heat dissipation	9.69 x 106 J/hr (9,200 BTU/hr) max.	1.24 x 107 J/hr (11,800 BTU/hr) max.	1.51 x 107 J/hr (14,300 BTU/hr) max.	1.31 x 106 J/hr (1,250 BTU/hr) max.
In-rush current	220 A max. for ½ line cycle, per power supply at 240 VAC	285 A max. for ½ line cycle, per power supply at 240 VAC	325 A max. for ½ line cycle, per power supply at 240 VAC	50 A max. for ½ line cycle, per power supply at 240 VAC 25 A max for ½ line cycle, per power supply at 120 VAC
Startup surge current	57 A pk (40.3 A rms) max. for 100 ms, at any line voltage	71 A pk (50.2 A rms) max. for 100 ms, at any line voltage	85 A pk (60.1 A rms) max. for 100 ms, at any line voltage	15 A pk (10.6 A rms) max. for 100 ms, at any line voltage
AC protection	20 A fuse on each power supply, both phases	20 A fuse on each power supply, both phases	20 A fuse on each power supply, both phases	10 A fuse in each power supply, both phases
AC inlet type	IEC320-C14 appliance coupler, per power supply	IEC320-C14 appliance coupler, per power supply	IEC320-C14 appliance coupler, per power supply	IEC320-C14 appliance coupler, per power supply
Ride-through time	30 ms min.	30 ms min.	30 ms min.	30 ms min.
Current sharing	± 10% of full load, between power supplies	± 10% of full load, between power supplies	± 10% of full load, between power supplies	± 10% of full load, between power supplies



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