

EMC CLARiiON CX4 Series

The Big Picture

- Next-generation CX architecture: provides leading performance, new levels of scalability, and even higher resiliency.
- Lowest cost of ownership: consolidate twice the workload in a single system and future-proof your investment via UltraFlex technology.
- Best energy efficiencies: with power-saving technologies such as Flash drives, low-power SATA drives, and drive spin-down.
- Proven CLARiiON five-nines availability: multi-path data access, automated system diagnostics, online upgrades, global hot-spare technology resulting in no single points of failure.
- Optimized for virtualized environments: VMware integration and the reliability and high availability and software functionality required for all virtualized environments.
- Advanced information protection capabilities: local snapshots, clones, or continuous data protection (CDP) options; synchronous and asynchronous remote replication; and cross-platform data mobility for all CX4 series models.
- Powerful storage management with EMC Navisphere software: manage, discover, monitor, and configure CLARiiON systems from a Web browser—that can be enhanced with other EMC storage software to provide storage resource management, path management, and data protection.
- Ease-of-use capabilities: customer-replaceable components, including non-disruptive replacement of disk drives, power supplies, fans, and small-form-factor-pluggable (SFP) optical transceivers.

Midrange innovation that delivers more, for less

The EMC[®] CLARiiON[®] CX4 series delivers industry-leading innovation in midrange storage with the fourth-generation CLARiiON CX storage platform. The unique combination of flexible, scalable hardware design and advanced software capabilities enables EMC CLARiiON CX4 series systems, powered by Intel Xeon processors, to meet the growing and diverse needs of today's midsize and large enterprises. Through innovative technologies like Flash drives, UltraFlex™ technology, and CLARiiON Virtual Provisioning customers can decrease costs and energy use and optimize availability and virtualization.

All this is available with a choice of systems ranging from affordable entry-level solutions to high-performance, maximum-capacity configurations for the most demanding requirements. The powerful CX4 series includes the CX4 model 120, CX4 model 240, CX4 model 480, and CX4 model 960. All models come pre-configured with Fibre Channel and iSCSI connectivity, allowing customers to choose the best connectivity for their specific applications.

Delivering up to twice the performance and scale as the previous CLARiiON generation, CLARiiON CX4 is the leading midrange storage solution to meet a full range of needs—from departmental applications to data-center-class business-critical systems.

EMC CLARiiON CX4 technology advancements

Tier "0" Flash drives: EMC-customized Flash drive technology provides low latency and high throughput to break the performance barriers of traditional disk technology. EMC is the first to bring Flash drives to midrange storage and expects the technology to become mainstream over the next few years while revolutionizing networked storage.



Flash drives extend the storage tiering capabilities of CLARiiON by:

- Establishing a new tier “0” with 30 times the IOPS of a 15K RPM FC drive
- Consistently delivering less than 1 ms response times
- Requiring 98 percent less energy per I/O than 15K rpm Fibre Channel drives
- Weighing 58 percent less per TB than a typical Fibre Channel drive
- Providing better reliability due to no moving parts and faster RAID rebuilds

UltraFlex technology: The CLARiiON CX4 architecture features UltraFlex technology—a combination of a modular connectivity design and unique FLARE® operating environment software capabilities that deliver:

- Dual protocol support with FC and iSCSI as the base configuration on all models
- Easy, online expansion via hot-pluggable I/O modules
- Ability to easily add and/or upgrade I/O modules to accommodate future technologies as they become available (i.e., 8 Gb/s FC, 10 Gb/s iSCSI)

CLARiiON Virtual Provisioning: Allows CLARiiON users to present an application with more capacity than is physically allocated to it in the storage array. CLARiiON Virtual Provisioning can lower total cost of ownership and offers customers these benefits:

- Efficient tiering that improves capacity utilization and optimizes tiering capabilities across all drive types
- Ease of provisioning that simplifies and accelerates processes and delivers “just-in-time” capacity allocation and flexibility
- Comprehensive monitoring, alerts, and reporting for efficient capacity planning
- Supports advanced capabilities including Virtual LUN, Navisphere QoS Manager, Navisphere Analyzer, and SnapView

Multi-core Intel Xeon processors, increased memory, and 64-bit FLARE: The CX4 boasts up to twice the performance of the previous generation and provides up to 2.5 times more processing power with multi-core Intel® Xeon® processors. The CX4 architecture also delivers twice the capacity scale (up to 960 drives), twice the memory, and twice the LUNs than the previous generation CLARiiON.

With the CLARiiON CX4, the FLARE operating environment has also been upgraded from a 32-bit to a 64-bit environment. This enhancement enables the scalability improvements and also provides the foundation for more advanced software functionality such as Virtual Provisioning.

Low-power SATA II drives, adaptive cooling and drive spin-down:

- Low-power SATA II drives deliver the highest density at the lowest cost and require 96 percent less energy per terabyte than 15K rpm Fibre Channel drives, and 32 percent less than traditional 7.2K rpm 1 TB SATA drives.
- Adaptive cooling is a new feature that provides improved energy efficiency by dynamically adjusting cooling and airflow within the CX4 arrays based on system activity.
- Drive spin-down allows customers to set policies at the RAID group level to place inactive drives in sleep mode. Target applications include backup-to-disk, archiving, and test and development.



CLARiiON CX4 Model 120

Best value entry-level networked storage: The CX4 model 120 can be configured with 5 to 120 disk drives to support up to 128 dual-connected hosts. CX4 model 120 customers can take advantage of EMC's unique data-in-place upgrade to the CX4-240, CX4-480, or CX4-960 models. This system comes with EMC PowerPath® software and supports the full suite of CLARiiON advanced software functionality, including the local and remote replication offerings EMC SnapView™, MirrorView™ and RecoverPoint.



CLARiiON CX4 Model 240

Best-in-class performance for midrange networked storage—EMC CLARiiON CX4-240 provides powerful networked storage that scales seamlessly—up to 231 TB of capacity. The CX4 model 240 supports up to 256 highly available, dual-connected hosts, and scales from 5 to 240 disk drives. CX4-240 customers can take advantage of EMC's unique data-in-place upgrade to the CX4-480 or CX4-960 models.

Save energy, protect data, and virtualize—at a low cost of ownership

Lowest cost of ownership: CLARiiON CX4 systems deliver the scale, performance, and advanced technologies to run your infrastructure for less. The CX4 series allows customers to take cost out of their business in the following ways:

- **Consolidating twice the workload in a single system.** Competing storage providers require customers to deploy multiple arrays to equal the performance and scalability of a single CX4.
- **Optimize storage capacity.** Customers can provision less often by leveraging CLARiiON virtual provisioning. This means rather than buying additional capacity upfront, customers can reduce and/or defer initial capacity requirements and save on acquisition and energy costs by running their systems at higher utilization rates and adding capacity as needed without disrupting applications. Additionally, CLARiiON's unique Virtual LUN technology allows customers to move data non-disruptively between storage tiers as requirements change.
- **Future-proof your investment.** The CX4 series provides investment protection. Via UltraFlex technology. Built into CLARiiON CX4, this expandable connectivity lets customers add future connectivity like 8 Gb/s FC and 10 Gb/s iSCSI rather than buying another system to support new technology. Additionally, data-in-place upgrades allow for in-family and cross-CX-series-generation upgrades to CX4 while leveraging prior investments in drives, disk enclosures, I/O modules, and system software.

Save energy

CLARiiON CX4 power-saving technologies allow customers to reduce energy use—without sacrificing performance or scalability.

- **Flash drives** provide 98 percent better efficiency per I/O than with 15K FC disks, and 30 times the performance.
- **Low-power SATA drives** use 96 percent less energy per TB versus 15K FC drives and 32 percent less energy than traditional SATA disks.
- **Policy-based disk spin-down** automatically places inactive drives in sleep mode; activates on-demand to meet application requirements.
- **Adaptive cooling** dynamically adjusts cooling based on system activity.

Continuous availability and data protection to keep your business running

CLARiiON delivers superior levels of protection through advanced capabilities of the system—with proven CLARiiON five-nines availability—with built-in support for concurrent local and remote replication. This provides customers with system-level and site-level protection from planned and unplanned outages.

Proven system-level availability: All CX4 systems are built on technology with five-nines availability, the highest in the midrange.

- Up to 11 GB of mirrored write cache, where each storage processor contains both primary cached data for its LUNs under management and a secondary copy of the cache for its peer storage processor.
- Battery backup for controllers and cache vault disks which allows for an orderly shutdown and cache destaging to ensure data protection in the event of a power failure.
- RAID protection levels 0, 1, 1/0, 3, 5, and 6, all of which can co-exist in the same array simultaneously to match the different protection requirements of your data.
- Proactive hot sparing enhances system robustness and delivers maximum reliability and availability.
- Redundant data paths, power supplies, drive connections, storage processors—all with non-disruptive field-replacement capabilities.
- Continuous cache and data integrity error detection/correction, automatic diagnosis, and advanced call-home capabilities for enhanced availability.
- Backed by the storage industry's number-one-ranked services and support organization
- More granular fault detection, isolation, and error correction capabilities with all CX4 series systems—leading to even higher levels of system reliability
- Continuous system monitoring, call-home notification, and advanced remote diagnostics



CLARiiON CX4 Model 480

Flexible, high-capacity networked storage—EMC CLARiiON CX4 model 480 supports up to 256 highly available, dual-connected hosts and has the capability to scale up to 480 disk drives for a maximum capacity of 471 TB. The CX4-480 supports Flash drives for maximum performance and CX4-480 customers can take advantage of EMC's unique data-in-place upgrade to the CX4-960.



CLARiiON CX4 Model 960

Premium-performance, maximum-capacity networked storage—EMC CLARiiON CX4 model 960 enables you to handle the most data-intensive workloads and large consolidation projects, while reducing energy consumption. CLARiiON CX4-960 supports Flash drives for premium-performance. The CX4 model 960 supports up to 512 highly available, dual-connected hosts and scales up to 960 disk drives for a maximum capacity of 951 TB.

Comprehensive site-level data protection: Through integration with EMC RecoverPoint/SE for CLARiiON, the CX4 offers concurrent local and remote replication of the same data, so you can simplify deployments and manage operational and disaster recovery from a single management interface. CLARiiON CX4 arrays include the RecoverPoint splitter function which simplifies RecoverPoint/SE deployments and lowers bandwidth and installation costs since no additional fabric components are required. The CLARiiON array-based splitter built into FLARE also provides protection for FC and/or iSCSI environments and can optimize bandwidth up to 10 times.

Optimized for Virtualized Environments: VMware-certified CLARiiON CX4 is the leading midrange storage platform for VMware® and delivers the reliable, high-availability storage required for all virtualized environments.

CLARiiON's full integration with VMware extends the value of virtualized server environments:

- **Share storage easily.** Dual-protocol Fibre Channel and iSCSI connectivity provides more flexibility to meet application needs while UltraFlex technology, Flash drive support, and five-nines availability provide customers with a shared storage solution that's integrated with VMware Storage VMotion™ for maximum flexibility and the best resiliency in the midrange.
- **Simplify disaster recovery.** Customers can ensure rapid, reliable disaster recovery by leveraging VMware Site Recovery Manager (SRM) using RecoverPoint or MirrorView/S software to simplify and automate disaster recovery setup, failover, failback, and testing; and ensure the proper execution and management of recovery plans.
- **Improve resource management.** Integrated CLARiiON Navisphere® Quality of Service with VMware DRS provides end-to-end application service-level management from the virtual server to the CLARiiON storage. CLARiiON virtual provisioning allows customers to quickly and efficiently provision storage to meet the dynamic needs of virtual machines.

A complete suite of advanced storage software

EMC CLARiiON offers a complete suite of advanced storage software—the most extensive in the industry—designed for full backwards compatibility.

Storage Management Software

EMC Navisphere Manager—easily manage CLARiiON storage from anywhere, anytime

The EMC Navisphere Management Suite simplifies the management of the CX4 series and previous generations of CLARiiON arrays, enabling you to discover, monitor, provision, and manage CLARiiON replication software. Its secure, easy-to-use browser-based GUI or command-line interface (CLI) also facilitates management. The Navisphere Task Bar makes managing CLARiiON storage extremely easy—one terabyte of storage can be provisioned in just one minute. Navisphere Analyzer provides detailed realtime and historical performance information about your CLARiiON array, allowing you to investigate performance patterns and trends before problems occur.

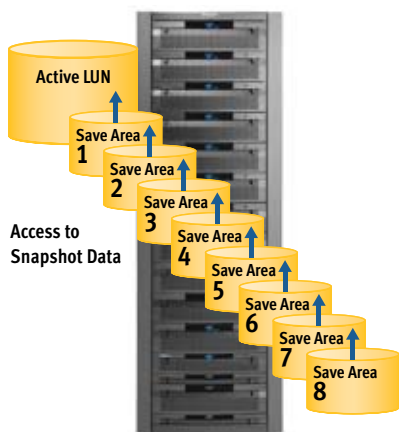
Navisphere Management Suite also integrates with the EMC ControlCenter® family of enterprise-class storage resource management software. In addition, EMC fully supports, and all CLARiiON CX4 series systems can be managed by, SMI-S, the emerging industry standard for storage management.

EMC CLARiiON Virtual Provisioning—automate storage growth management

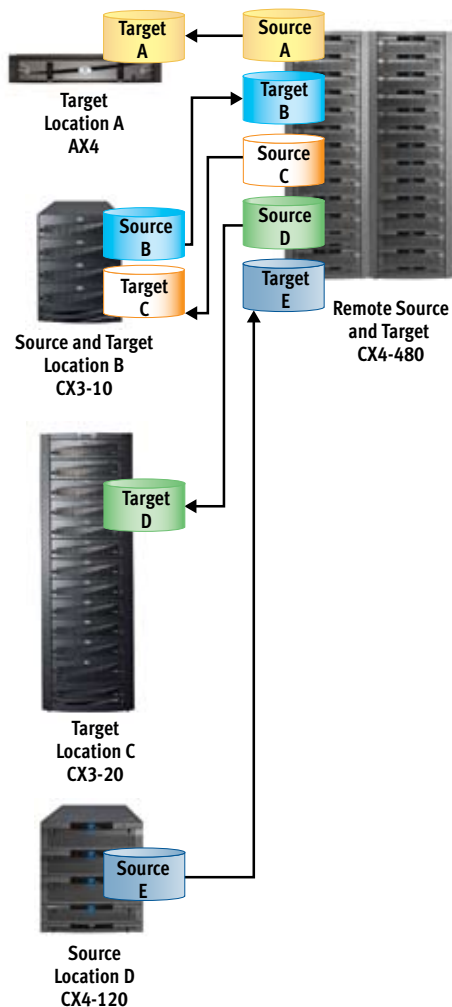
Virtual Provisioning enables organizations to reduce storage costs by increasing capacity utilization, simplifying storage management, and reducing application downtime. CLARiiON Virtual Provisioning integrates with existing CLARiiON storage management and replication software and supports advanced capabilities including Virtual LUN, Navisphere QoS Manager, Navisphere Analyzer, and SnapView.

EMC Navisphere Quality of Service Manager—manage CLARiiON to meet performance service levels

EMC Navisphere Quality of Service Manager (NQM) enables you to monitor and achieve performance objectives for applications. With NQM, you can schedule user-defined policies and benefit from consolidation while optimizing the performance of mission-critical applications. For example, you can set up a policy to optimize response time for your e-mail application during the day and another policy to optimize bandwidth when your backup process runs in the evening.



SnapView can create up to eight clones from a production source, and up to eight fully readable and writeable point-in-time snapshots of logical units (LUNs) using EMC's copy-on-first-write algorithm. These can be used for non-disruptive backups, testing, analysis, or simply to be kept on a rotational basis for potential recovery.



MirrorView sessions for remotely mirroring information are quickly and easily managed from one central location using EMC Navisphere software. MirrorView is compatible with midsize and high-end CLARiiON CX3 UltraScale series arrays as well as most previous generation CX arrays.

Path Management Software

EMC PowerPath—keep your critical applications online

EMC PowerPath offers multi-path access between CLARiiON and attached servers for path failover, load-balancing, array-to-array migration, and data encryption.

Data Protection and Data Mobility Software

EMC has a broad portfolio of data protection and data mobility software to meet a wide range of customer requirements.

EMC PowerPath Encryption with RSA—protect information from unauthorized access

PowerPath Encryption with RSA® allows you to add a high level of protection to enable compliance with internal, private, and government standards. This host-based encryption product incorporates RSA Key Manager for the data center for centralized enterprise key management, which enables consistent encryption methodology in heterogeneous environments.

EMC SnapView—accelerate backup and restore, application integrity, and application development, all from one software product

EMC SnapView software is available across the CLARiiON CX4 series. SnapView creates consistent point-in-time snapshots and full-copy clones of production data while maintaining application integrity for non-disruptive backup. Restore information and applications consistently in seconds versus the hours often required for traditional tape-based methods.

SnapView can create up to eight clones from a production source, and up to eight fully readable and writeable point-in-time snapshots of logical units (LUNs) using EMC's copy-on-first-write algorithm. These can be used for non-disruptive backups, testing, analysis, or simply to be kept on a rotational basis for potential recovery.

EMC MirrorView—maximize data availability through advanced synchronous and asynchronous disaster recovery

EMC MirrorView software provides highly available data storage by performing remote data mirroring between CLARiiON arrays across campus or across the globe. And because MirrorView is array-based, applications and servers are free to service users. MirrorView/Synchronous (MirrorView/S) replicates data continuously for maximum availability. MirrorView/Asynchronous (MirrorView/A) replicates data independent of the application I/O, ensuring recoverability and extending distance.

MirrorView/Synchronous and MirrorView/Asynchronous run on all CX4 series, CX3 UltraScale™ series, and CX700, CX500, and CX300 array platforms.

EMC SAN Copy—copy data between multi-vendor storage systems for data mobility

EMC SAN Copy™ software enables high-speed data copying between multi-vendor storage systems. With SAN Copy you can rapidly copy data between CLARiiON and EMC Symmetrix® systems and between EMC, HDS, IBM (Shark and DS4000 series), Sun, and HPQ systems. SAN Copy is tightly integrated with SnapView software so that a replica that is created via SnapView can be replicated to a second array with SAN Copy. SAN Copy runs on the all CX4 models and CX700, CX500, CX600, and CX400 arrays.

EMC RecoverPoint—cost-effective network-based data protection

EMC RecoverPoint/SE is a comprehensive data protection solution for CLARiiON providing operational recovery to any point in time with the continuous data protection (CDP) license option or asynchronous remote replication for disaster recovery with the continuous remote replication (CRR) option. RecoverPoint/SE protects companies from data loss due to common problems such as data corruption, software errors, viruses, and end-user errors, while also protecting against catastrophic events that can bring an entire data center to a standstill.

EMC RepliStor—host-based data protection software for Windows servers

EMC RepliStor® software provides file-based local and remote asynchronous replication for Microsoft Windows environments via IP.

EMC Replication Manager—automate replication management

EMC Replication Manager simplifies management and automation of the entire information replication process from the application layer to the array for CLARiiON SnapView, SAN Copy, RecoverPoint, and other EMC replication software. From replica discovery, configuration, and scheduling to a simple wizard-driven process for recovery operations, Replication Manager allows you to maximize the value of point-in-time copies of application data.

Online upgrades

CLARiiON offers the best investment protection through data-in-place upgrades for both in family (CX4-to-CX4) and intergenerational (CX300, CX500, CX700, and CX3 series to CX4). This helps customers preserve investments in hardware drives, disk array enclosures (DAEs), and IO modules and provides a cost-effective way to get the latest in technology innovation.

Look to EMC Global Services to maximize CLARiiON CX4 series benefits

EMC Global Services provides the strategic guidance and technology expertise organizations need to address their business and information infrastructure challenges and derive the maximum value from their CLARiiON hardware and software. EMC is committed to exceptional total customer experience through service excellence. Our 13,000+ professional- and support-service experts worldwide, plus a global network of alliances and partners, leverage proven methodologies, industry best practices, experience, and knowledge derived from EMC's 30-year information-centric heritage to address the full spectrum of customer needs across the information lifecycle: strategize, advise, architect, implement, manage, and support.

With CLARiiON CX4 series arrays, customers can non-disruptively replace disk drives, power supplies, fans, and small form-factor pluggable (SFP) optical transceivers. EMC provides a disk replacement utility wizard that guides a customer through the disk replacement process while automatically checking each step to make sure data is protected at all points in the process.

EMC support options for CLARiiON CX4

CLARiiON CX4 series systems include three-year Enhanced warranty—5X9 onsite support with next-business-day response on hardware and the FLARE storage operating environment, and a 90-day warranty on software media. Customers can upgrade to the Premium level of service—7x24 four-hour onsite response, critical escalation management, EMC replacement of parts, and root-cause analysis—during the warranty period.

Warranties can be extended with an EMC Service Agreement.* Ask your EMC sales representative about the full spectrum of services from EMC that can benefit your organization.

* Warranties may vary outside the United States. Contact your EMC representative for local warranty and service terms and conditions.

- **Easy to manage:** Powerful tools deliver easy service, maintenance, and management features to get maximum performance.
- **Easy to support:** EMC eServices available on EMC Powerlink®, EMC's secure extranet, deliver information and tools to optimize your CLARiiON investment. Support tools and easy-to-replace components empower customers to resolve most routine issues.

EMC Service Offerings for CLARiiON CX4

EMC offers a full range of services to help customers maximize the value of their information and their EMC investment. The services include:

- **EMC Implementation for CLARiiON CX4 Series QuickStart** is an installation and implementation service available for each of the CLARiiON CX4 series storage arrays and includes connectivity to hosts within your SAN.
- **EMC SAN Design and Implementation** is a consultative service that delivers a customized implementation of SAN storage into your information infrastructure.
- **EMC Two-Terabyte Data Migration Service** delivers data migration in conjunction with a new CLARiiON storage array implementation for up to 2 TB of data in standard fixed-file formats within a single authentication domain.
- **EMC Implementation for CLARiiON SAN Copy** installs and initializes EMC SAN Copy or SAN Copy/E software in a CLARiiON storage array.
- **Implementation for CLARiiON SnapView**—Replication Manager QuickStart implements Replication Manager software to support replication operations on an EMC CLARiiON storage array using SnapView.
- **EMC Implementation for CLARiiON MirrorView Services** implements EMC Mirrorview replication technology bounded by two CLARiiON storage systems in a single physical location, or, with a custom engagement, a review of the customer's requirements to determine the implementation parameters.

Let EMC Global Services help you strategize, implement, and derive maximum business value from your information infrastructure.



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Take the next step

For more information on the superior performance, functionality, and economics offered by the CLARiiON CX series of mid-tier networked storage systems, contact your EMC sales representative or authorized EMC value-added systems integrator. You can also visit our website at www.EMC.com or, in North America, call EMC directly at 1-866-464-7381.