

# EMC CLARiiON CX Series



## Extending the Lead in Mid-tier Storage

### The Big Picture

- Proven, high performance architecture scales from 5 to 240 drives in modular, pay-as-you-grow increments; incorporates the powerful FLARE storage operating environment; easily adapts to succeeding microprocessor generations; provides a flexible front-end design that supports Fibre Channel or iSCSI host connections; and accommodates SAN, NAS, DAS environments
  - Bet-your-business system and information availability through no-single-points-of-failure design; multi-path data access; mirrored cache; automated system diagnostics; non-disruptive hardware, operating environment, and storage application upgrades; global hot-spare technology; and system growth with data-in-place upgrades for safest investment protection
  - Advanced information replication with multiple choices: local or remote, synchronous or asynchronous; compatible with industry-standard application snapshot technology; and open, cross-platform source/target replication
  - Powerful storage management with EMC Navisphere: manage, discover, monitor, and configure CLARiiON systems from a Web browser—simply, anytime, anywhere; commonality with Symmetrix through EMC ControlCenter and PowerPath software; point-and-click storage and infrastructure management with VisualSRM and VisualSAN software
  - Exceptional affordability—today and tomorrow: unique mixing of ATA and Fibre Channel drive technology within the same system; industry-leading price/performance/functionality economics for low total cost of ownership (TCO); investment protection through incremental scalability and future-generation data-in-place upgrades
  - Backed by the storage industry's number-one-ranked services organization and supported by continuous system monitoring, call-home notification, and advanced remote diagnostics and service
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CLARiiON CX series arrays are unique with their data-in-place upgrade path to the next higher model in the series. Your data never needs to undergo a risky migration. Just swap storage processing enclosures and you're ready to go.

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## Affordable, leading-edge, mid-tier storage systems with high-end heritage

Storage capabilities that were once only possible in high-end enterprise-class storage systems are now necessary criteria in storage systems for growth businesses and departments within larger enterprises. Criteria such as a proven architecture, continuous data availability and integrity, advanced information replication, powerful management tools—all at an affordable price—are necessities in the mid-tier market.

EMC® CLARiiON®, now in its seventh generation, meets all these criteria. From the entry-level CLARiiON CX300 and the robust CX500 to the most powerful CX700, these mid-tier storage systems have the award-winning mix of features, power, capacity, and versatility you need to achieve the most value for your business. Over 200,000 shipments worldwide have proven why CLARiiON is the industry leader in mid-tier networked storage technology.

## CLARiiON architecture—built to last, built for value

All CLARiiON networked storage systems share a common, no-single-points-of-failure, high-availability architecture that enables the CX series to span a broad range of storage solutions, from the work group to the data center. The CLARiiON system can scale from five disk drives all the way to 240 without ever having to move your data. The modular design of the systems enables you to start with smaller configurations, the CX300 for example, and grow to the CX500 or CX700 as your needs and business expand.

The CLARiiON architecture also enables you to scale in terms of performance and functionality. By capitalizing on the latest microprocessor technologies, CLARiiON systems are able to apply ever-more powerful technology to your applications. Dual storage processors offer up to twice the performance since each is independently accessing disks in the array. In the rare event of a storage processor problem, the remaining storage processor is able to service applications. This advanced architecture with automated failover protects data access, yet is exceptionally cost-effective.

CLARiiON's FLARE™ storage operating environment keeps CLARiiON current with the latest application, interconnect, and storage software technologies, while maintaining backward compatibility with previous-generation systems for still greater investment protection. The CX series currently supports storage area network (SAN), direct attached storage (DAS), and network attached storage (NAS).

The CLARiiON architecture and FLARE also support metaLUN capability. MetaLUNs are groups of LUNs that enable better use of an enterprise's storage capacity. Through either striping or concatenation, metaLUNs enable a user to provide a high degree of flexibility and control of data layout in the array through limitless storage configuration options. MetaLUNs increase performance capability by allowing a volume to span a large number of drives, and they enable better capacity utilization by expanding capacity anywhere in the array. And since metaLUN capability is non-disruptive, it reduces out-of-disk-space issues and downtime.

FLARE offers simultaneous support for a variety of the most popular server operating environments. These include Windows, Linux, NetWare, Solaris, HP-UX, AIX, Tru64, and popular cluster configurations. And, new server support is added as demand and industry directions dictate.

## Continuous availability and data integrity to keep your business running

A superior architecture with high performance is meaningless without uninterrupted information access. All CLARiiON systems come well equipped to meet this requirement.

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CLARiiON CX300, CX500, and CX700 Fibre Channel systems are NEBS Level 3 certified, delivering the benefits of automated networked storage to the most rugged computing environments.

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Each storage processor's cache mirrors the other. The write cache in each storage processor contains both primary cached data for the LUNs it owns and a secondary copy of the cache of its peer storage processor. If a storage processor fails, the cached data in the surviving storage processor, both primary and secondary, are immediately written to disk, ensuring writes are safely stored. Battery backup for controllers and cache vault disks, with an orderly shutdown that saves cached data on disks, ensures data protection in the event of a power failure.

CLARiiON systems offer a variety of RAID data-protection choices. These include RAID levels 1/0, 0, 1, 3, and 5. All levels can co-exist in the same array simultaneously to match the right protection characteristics to the value of the data. All disks have dual-path access for redundant access should one port fail. And all major CLARiiON components—power supplies, disk drives, storage processors—are capable of non-disruptive field replacement.

Continuous cache and disk data integrity detection/correction, fault isolation, hot disk sparing, automatic diagnosis, and advanced phone-home capabilities round out CLARiiON's data integrity features. A variety of local and remote replication software options is also available for business continuity and disaster recovery peace of mind.

### Match drive technologies to application and performance requirements

The CLARiiON CX series supports both Fibre Channel and lower cost, lower performing ATA (Advanced Technology Attachment) disk drives in the same array. CLARiiON is unique in the industry in its flexibility to mix and match different drive technologies. This deployment flexibility enables customers to more optimally match the application requirements with the performance and cost requirements. Since the introduction of ATA, CLARiiON's management and software functionality has been 100 percent compatible with both drive technologies. There's nothing new to learn.

CLARiiON with ATA is bringing new economics to online storage. The economics of ATA enable customers to keep more information online for longer periods of time. Customers are using ATA drives for:

- Backup-to-disk applications—improving their service levels over traditional tape solutions
- Data replication—deploying low cost ATA drives with EMC SnapView™ and MirrorView™ replication storage
- Large file applications—enabling faster processing at lower cost for applications that handle massive data sets

### *CLARiiON CX300—small in size and price, big on capability*

The CLARiiON CX300 is optimized for organizations deploying cost-effective, Windows, Linux, NetWare and UNIX workgroup SAN and direct-attach storage solutions. It offers the ease of management and performance required by companies running file/print, e-mail, light database, and Web services applications. Designed with flexibility and ease-of-deployment in mind, the CX300 delivers the same modularity and Web-based storage management interface as other members of the CLARiiON CX series.

Available in a rack-mount chassis, the CLARiiON CX300 offers an attractive storage entry point of just five disk drives that dynamically scale to 60. Fully redundant components, dual storage processors, and array-based local replication through EMC SnapView provides the highest levels of availability and data integrity, making the CX300 the most advanced disk array in its class. The CX300 design fully exploits 2Gb Fibre Channel technology, delivering both high data throughput and high I/O performance. The CX300 boasts cached performance of 50,000 I/Os per second, which means you can service more users with consistent response times.



The CLARiiON CX300 scales from 5 to 60 disk drives, offers cached performance of 680 MB per second and 50,000 I/Os per second, can take advantage of EMC's unique data-in-place upgrade to CX500 or CX700 models, and can be outfitted with a broad complement of storage software for exceptional functionality for this class of storage system.



The CX500 can be configured with 5 to 120 disk drives, delivers 760 MB/s and 120,000 I/Os per second cached performance, can take advantage of EMC's unique data-in-place upgrade to the CX 700 model, and can expand functionality through a broad range of EMC and third-party storage software.

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This reliable 2Gb full Fibre Channel system provides high functionality and performance, while offering the highest availability and data integrity—all at a very affordable price. And unlike any competitive product in its class, the CX300 offers a “data-in-place” upgrade to the more powerful CX500 or CX700 models to meet expanding business needs.

### ***CLARiiON CX500—most features, smallest package***

The CLARiiON CX500 extends the CX family into the heart of the mid-tier storage market. The CX500 shares consistent software and the identical architecture with the CX700 and it fits in a standard EMC 40U cabinet or an industry-standard rack. The entry CX500 configuration is only 4U (7 inches) high and offers up to 2TB of raw storage.

The CX500 can be configured with 5 to 120 disk drives in a maximum of 25U of rack space (43.75 inches). The compact form factor maximizes density, driving the highest capacity per unit of rack space in the industry. In fact, in an average configuration, the CX500 requires only 50 percent of the rack space of competing products.

The CX500 offers the highest performance of any product in its class. With cached throughput rates of 760 MB/s and 120,000 I/Os per second, the CX500 delivers data fast. Graphics and video applications can use this performance to stream information to data-hungry applications.

The CX500 shares proven hardware components with the CX300 and CX700 and software functionality with the CX700. All CX models use the same modular architecture, disk drives, disk array enclosures (DAEs), and share the advanced FLARE operating environment. Navisphere®, the industry's most user-friendly storage management application, is common across the CX series and previous generations of CLARiiON arrays.

### ***The CX700—bigger and faster, best economics***

The CX700 extends the reach of the CX series, providing the industry's most powerful mid-tier storage platform. It shares the same hardware and software technologies as the CX500 and incorporates faster processors, more cache, higher capacity, greater connectivity, and greater throughput. The CX700 delivers over 1,520 MB/s of cached throughput and more than 200,000 cached I/Os per second. The CX700 fits in a standard EMC 40U cabinet or an industry-standard rack and can be configured with 5 to 240 disk drives.

### **Software functionality that provides CLARiiON with powerful management tools and advanced replication**

EMC offers a complete suite of advanced storage software—the most extensive in the industry. Many software offerings are in their fifth or sixth generation with full backwards compatibility.

### ***Navisphere—the starting point for an automated information infrastructure***

The EMC Navisphere Management Suite simplifies and automates the management of your CLARiiON storage infrastructure through a simple-to-use, browser-based GUI application. Navisphere Management Suite provides the comprehensive management foundation that enables you to maximize your CLARiiON CX series investment. With Navisphere, you can securely discover, monitor, tune, and provision storage on multiple CLARiiON storage systems from anywhere, at any time.

Navisphere is offered in three suites that scale with the performance levels of your CX array: Navisphere Workgroup, Navisphere Departmental, and Navisphere Enterprise. Included in these suites are all traditional “management” functions enabled by Navisphere Manager, as well as LUN-masking, host-to-array mapping, and CLI scripting, formerly offered in separate products.

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The enterprise-class CX700 shares the same hardware and software architecture as the CX500, but with faster processors, higher capacity, greater connectivity, and greater throughput. It scales from 5 to 240 disk drives, delivers over 1,520 MB/s cached bandwidth and more than 200,000 cached I/Os per second.

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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 Analyzer technology is included with the Navisphere Enterprise Suite or can be purchased as a separate product.

Navisphere Management Suite also integrates into and can be operated through the EMC ControlCenter™ family of enterprise-class storage infrastructure management software. This integration enables you to easily manage your entire mixed heterogeneous storage infrastructure—consisting of EMC CLARiiON, EMC Symmetrix, and non-EMC storage arrays—all from one control panel.

### ***VisualSRM and VisualSAN—point-and-click storage and infrastructure management***

VisualSRM™ and VisualSAN® software offer point-and-click management of heterogeneous storage systems (VisualSRM) and storage area networks (VisualSAN). VisualSRM is data-center-class storage management software that provides centralized storage resource management for mid-tier storage environments. It supports a wide range of storage platforms (SAN, NAS, and DAS), server platforms (Windows, Solaris, AIX, HP-UX, Linux, and NetWare), and enterprise applications (Exchange, Oracle databases, Sybase databases, and SQL Server databases). It integrates with leading storage management applications from backup and framework vendors such as IBM, VERITAS, HP, CA, and BMC and is one of the most intuitive and easy to use storage management solutions available today.



SnapView can create up to eight business continuance volumes (BCVs) from a production source, and up to eight fully readable and writable point-in-time snapshots of logical units 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.

VisualSAN network management software automatically discovers, manages, and monitors multi-vendor SAN devices, generating a topology map that depicts the entire SAN environment. This drill-down map, viewed via an intuitive user interface, indicates the realtime status of the SAN. VisualSAN actively polls SAN devices and monitors for traps to quickly and intelligently distinguish urgent SAN events and generate alerts based on user-defined policies. It also provides historical references to previous SAN configurations to for troubleshooting and change management control.

### ***PowerPath—keep your critical applications online***

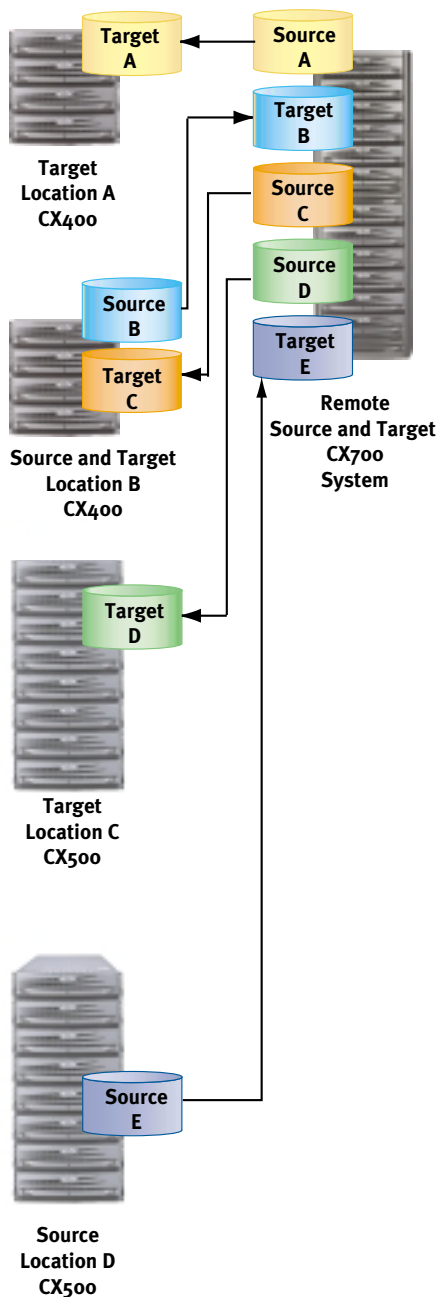
EMC PowerPath® software provides application continuity in the event of an I/O channel failure. Properly configured, it offers multi-path access between servers and storage, automatically shifting the I/O load to surviving paths if one or more fails, and resumes use of failed paths upon repair. PowerPath also dynamically balances the I/O load over all channels, enabling more work to be done in less time.

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

EMC SnapView software cost-effectively accelerates backup and recovery through economical, disk-based “instant restore” of production data. SnapView creates point-in-time snapshots and full-copy business continuance volumes of production data for non-disruptive backup. Restore information and applications in seconds versus the hours often required for traditional tape-based methods. SnapView is available for CLARiiON CX700, CX500, CX300, CX600, CX400, and FC4700 networked storage systems.

SnapView gives you maximum availability and usability of critical data.

- Enhance application uptime through fast, easy restoration of enterprise information
  - Accomplish restores or backups quickly, frequently, and non-disruptively
  - Accelerate application development by providing the most current data for testing
  - Gain operational efficiencies by enabling multiple servers or users read/write access to copies of production data—without affecting production
  - Accelerate Microsoft Exchange and SQL Server backup and recovery through SnapView integration modules
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MirrorView sessions for remotely mirroring information are quickly and easily managed from one central location using EMC Navisphere software. MirrorView is compatible with mid-size and high-end CLARiiON CX series arrays as well as previous generation FC4700 arrays.

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

MirrorView provides highly available data storage by performing remote data mirroring—uni-directionally or bi-directionally—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 replicates data continuously—on an application I/O-by-I/O basis for maximum availability. MirrorView/Asynchronous replicates data independent of the application I/O, ensuring recoverability and extending distance while reducing network bandwidth requirements.

MirrorView maximizes data availability and business continuity.

- Maintain an exact byte-for-byte copy of your production data in a secure, remote location
- Deploy remote mirroring solutions over dark fiber and/or lower cost IP communication links
- Perform concurrent mirroring from one source logical unit to two different target systems
- Deploy multiple source CLARiiON production systems mirrored to one business continuity target system
- Perform cross-generational mirroring between CLARiiON FC4700 and CX series systems

MirrorView is tightly integrated with SnapView software for simplification and consolidation of routine processes. SnapView and MirrorView operations are managed from one central location through a single Navisphere management interface. MirrorView/Synchronous runs on the CX700, CX500, CX600, CX400, and FC4700 networked storage systems. MirrorView/Asynchronous runs on the CX700, CX500, CX600, and CX400 networked storage systems.

### **EMC SAN Copy—copy data between multi-vendor storage systems**

EMC SAN Copy™ enables high-speed data copying between multi-vendor storage systems without affecting server cycles or LAN bandwidth. With SAN Copy you can rapidly copy data between CLARiiON and Symmetrix systems—and even between EMC, IBM, Sun, and HPQ systems. So you get the flexibility to deploy a data mobility configuration that includes all of your data center, regional, and distributed systems—regardless of location.

SAN Copy reduces risk and lowers costs associated with routine data movement.

- Rapidly copy data—where and when you need it
- Copy large amounts of information over the SAN or WAN via full or incremental (only copy changes) technologies
- Eliminate impact on production activities during data copying and movement
- Quickly distribute the freshest data for application testing and development
- Distribute and collect content without affecting application server cycles or LAN bandwidth
- Perform storage management tasks such as resource balancing and RAID scheme changes

In addition to these EMC software applications, a wealth of third-party solutions is available from independent software vendors. As members in the EMC Developers Program™, they have access to EMC’s application programming interfaces (APIs) and develop solutions that take advantage of the latest CLARiiON capabilities.



The CLARiiON CX300i scales from 5 to 60 disk drives, simultaneously supports high-performance Fibre Channel and low-cost ATA drives, and offers unmatched value for this class of networked storage system.

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## iSCSI—bringing low-cost IP connectivity to the leading CLARiiON CX series

The iSCSI-based CX models deliver the architecture, functionality, and scalability of the CLARiiON CX series, including its design for high availability and data integrity, with the modularity to simultaneously support high-performance Fibre Channel drives and high-capacity ATA disks. The CX300i and CX500i support Windows hosts with advanced software functionality, including full Navisphere Manager, SnapView, and PowerPath for rapid I/O path failover and automated load balancing.

The CX300i makes true networked storage affordable by adding IP connectivity at the entry point to the CLARiiON CX series. The CX300i delivers cost-effective storage consolidation for servers in workgroups and small-to-medium-size businesses.

The CX500i delivers data-center-class networked storage and functionality combined with low-cost IP connectivity. As expected, the CX500i provides leading iSCSI performance with the best disk scalability in its class.

And, by incorporating high-speed iSCSI TOEs (iSCSI TCP/IP off-load engines) in the CX300i and CX500i hardware designs, you can be assured of getting the most out of your IP storage network.

## SMI-S compliance (Storage Management Initiative Specification)

EMC fully supports the emerging industry standard SMI-S for storage management. SMI-S, the storage industry's implementation of CIM (Common Information Model), is a set of interfaces designed to make it easier for storage hardware and management software from different vendors to work together. All CLARiiON CX models are manageable via SMI-S. Providers for SMI-S are now generally available for both CLARiiON and Symmetrix platforms and are part of Solutions Enabler which is a no-charge orderable item.

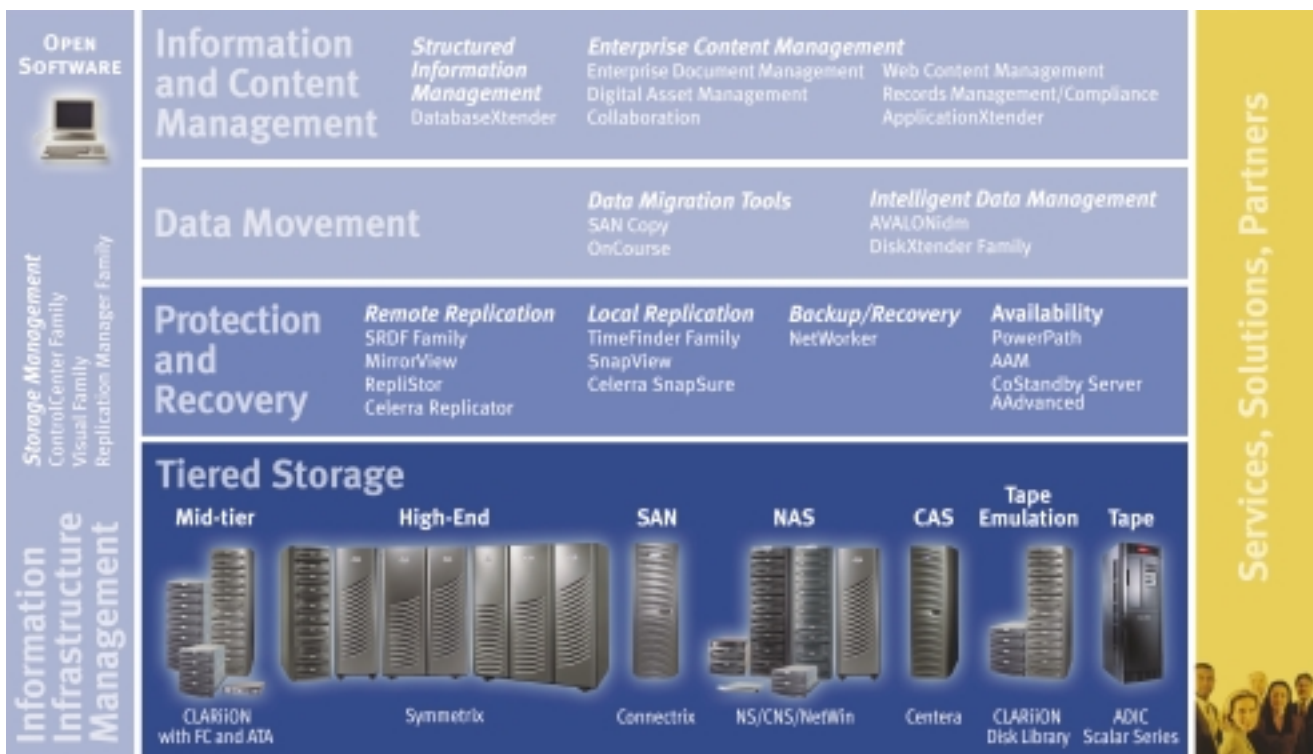


The CLARiiON CX500i scales from 5 to 120 disk drives, simultaneously supports high-performance Fibre Channel and low-cost ATA drives, and can be outfitted with a broad complement of storage software for exceptional functionality for this class of networked storage system.

## Extend networked storage value throughout your enterprise

All CLARiiON CX systems can, when combined with EMC Connectrix™ Fibre Channel directors or switches and Navisphere software, form the backbone of powerful, virtually unlimited storage area networks (SANs) and network attached storage (NAS) infrastructures. You can link, manage, share, and protect all of your enterprise-wide information resources, regardless of geography, connectivity, or information-type and apply those resources to your most pressing business and service-level challenges. And by virtue of EMC's extensive interoperability testing—the most complete and comprehensive in the industry—you can do so with the confidence that everything will work together in one unified EMC automated networked storage environment.

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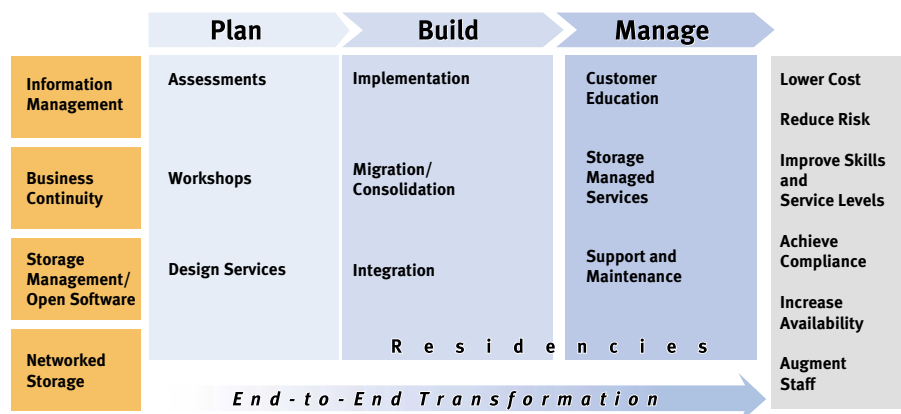
EMC's vision is to create the ultimate information lifecycle management company—to help our customers get the maximum value from their information, at the lowest total cost, at every point in the information lifecycle. Automated Networked Storage is the foundation of information lifecycle management.

The CLARiiON CX series is a key element in the realization of EMC's information lifecycle management strategy—a strategy for proactive management of information that is business-centric, unified in approach, policy-based, heterogeneous, and aligned with information value.

### Maximize CLARiiON CX series benefits with EMC Services

EMC Services provides expert plan, build, and manage services to ensure that your EMC CLARiiON hardware and software perform optimally in your environment and meet your business objectives. Trained services professionals and project management teams, leveraging EMC's extensive storage deployment best practices and proven methodology, accelerate time-to-value without straining the resources you have, minimizing risk to your business and your budget.

In addition to exceptional performance, availability, functionality, and economic benefits, CLARiiON CX customers have access to the world's top-rated customer service and support. The EMC Services organization helps you make the most of your EMC technology investment with a continuum of best-in-class services spanning the entire information lifecycle.



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## EMC Services for the IT Lifecycle

EMC Services delivers results to our customers throughout the IT lifecycle: Plan, Build, Manage. Strategic storage consulting services from Information Solutions Consulting help companies achieve the maximum value from their information, at the lowest total cost, at every point in the information lifecycle. EMC Technology Solutions professionals deliver product-specific point solutions in addition to comprehensive custom planning, design, implementation, and integration services for EMC technology—everything from consolidation of your current resources to a transformation of your environment to achieve information lifecycle management. EMC Customer Service—four-time winner of the SSPA STAR Award for outstanding mission-critical support—helps you keep your information available 24/7 to deliver competitive advantage and drive revenue. And EMC Global Education drives the value of your investment with a comprehensive portfolio of customer courses.

CLARiiON CX300, CX500, CX700, CX300i, and CX500i systems come standard with a two-year, 24/7, onsite warranty on hardware and the FLARE storage operating environment, and a 90-day warranty on software. 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.

## 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](http://www.EMC.com) or, in North America, call EMC directly at 1-866-464-7381.



**EMC Corporation**  
Hopkinton  
Massachusetts  
01748-9103  
1-508-435-1000  
In North America 1-866-464-7381

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