

EMC CLARiiON CX4 Series



Next-Generation Innovation for the Midrange

ראם מורד,
מנהל מרכז התמחות אחסון, גיבוי והמשכיות עסקית,
חטיבת האינטגרציה ותשתיות
מטריקס

Introducing the CLARiiON CX4 Series

Make IT Double

New

SCALABILITY



CX4-120

- Up to 120 drives
- 6 GB cache
- Standard 4 Fibre Channel/4 iSCSI
- Maximum 16 front-end Fibre Channel and/or iSCSI



CX4-240

- Up to 240 drives
- 8 GB cache
- Standard 4 Fibre Channel/4 iSCSI
- Maximum 20 front-end Fibre Channel and/or iSCSI



CX4-480

- Up to 480 drives
- 16 GB cache
- Standard 8 Fibre Channel/4 iSCSI
- Maximum 24 front-end Fibre Channel and/or iSCSI
- Flash drives



CX4-960

- Up to 960 drives
- 32 GB cache
- Standard 8 Fibre Channel/4 iSCSI
- Maximum 32 front-end Fibre Channel and/or iSCSI
- Flash drives



SERVICE LEVELS



Make IT Double

Next-Generation Innovation for the Mid-tier



UltraFlex technology

Dual protocol, hot pluggable, and future-ready

Concurrent local and remote (CLR) replication

Integrated RecoverPoint splitter to simplify deployments

Drive Spin Down, low power SATA II drives, Adaptive Cooling

New energy-efficiency technologies

64-bit FLARE and multi-core processors

Up to twice the performance and scale

Flash drives

Tier "0" storage with 30 times more IOPS

Virtual Provisioning

Increased utilization and easy provisioning



CLARiiON CX4

Next-generation architecture



CLARiiON CX4 Software: Innovative, Intuitive, Powerful



Make IT Double

Virtual Provisioning



Virtual LUN technology

Navisphere Quality
of Service Manager

RecoverPoint

Replication Manager

SAN Copy

SnapView

MirrorView

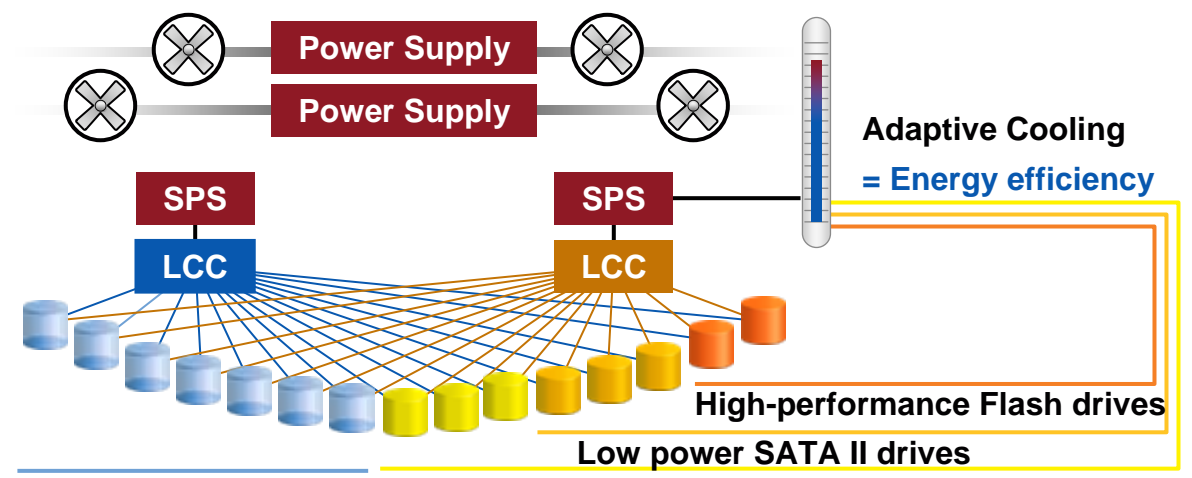
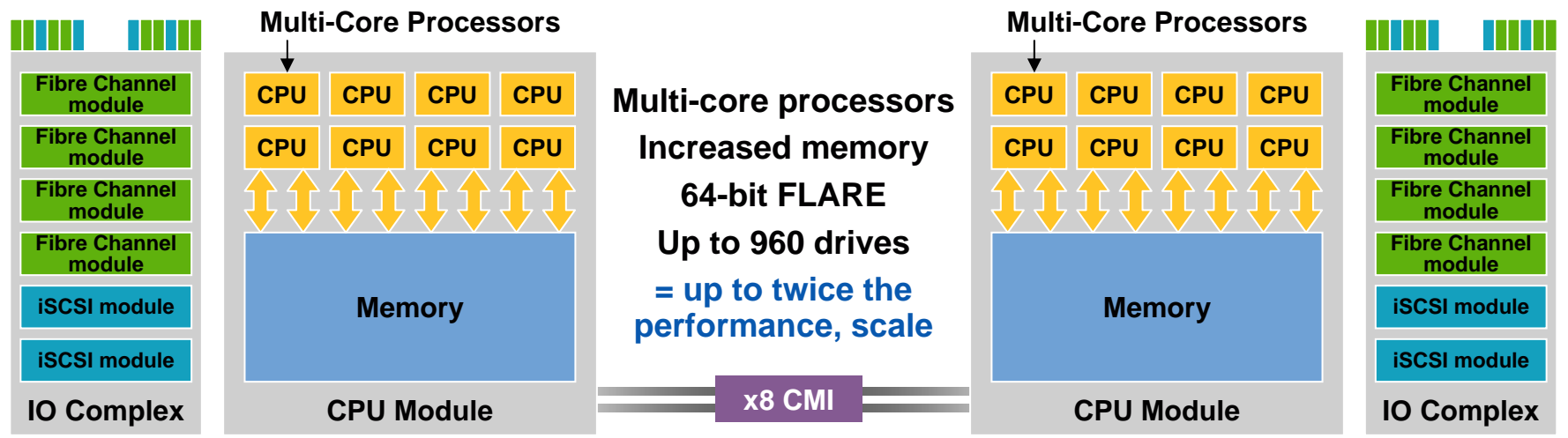


**Navisphere
Manager**



New Architecture

UltraFlex = Dual Protocol, Expandable, and Future-Ready Systems



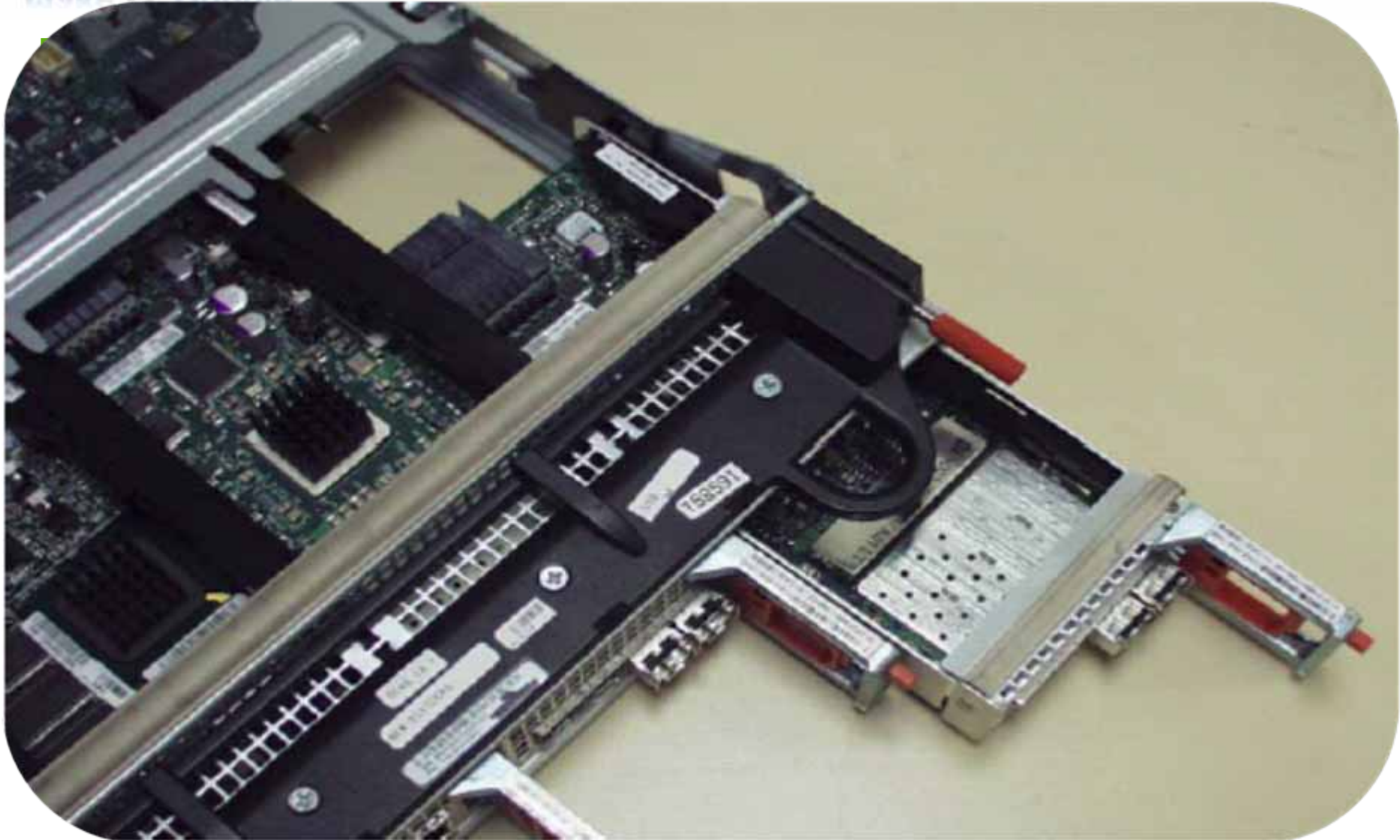
Virtual Provisioning Spin Down = Capacity optimization





Make IT Double

New UltraFlex Technology

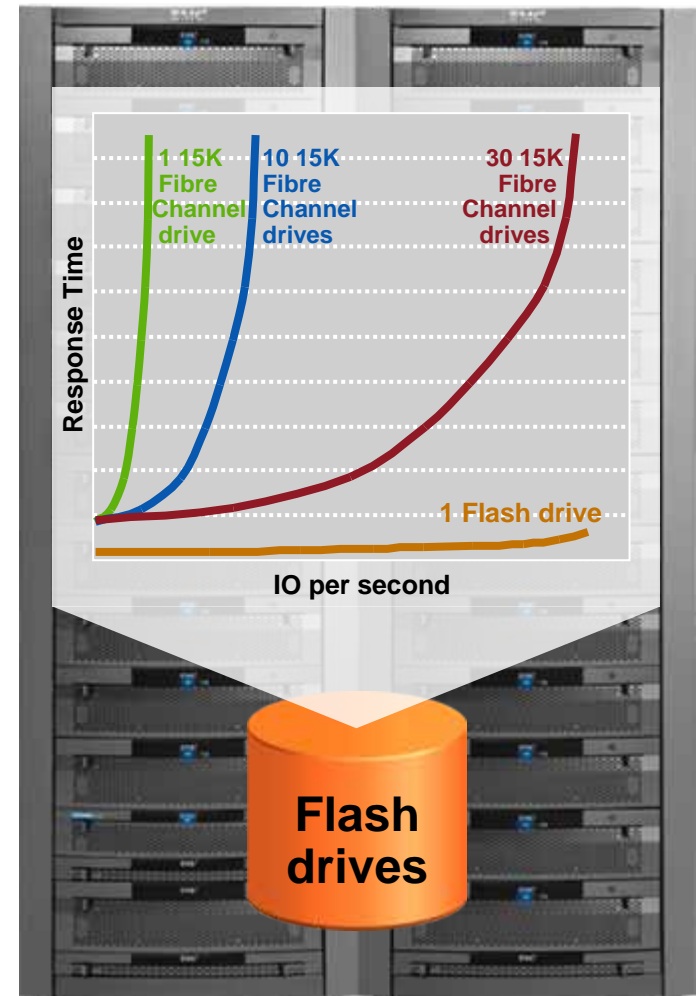




Flash Drives for Tier “0” Requirements

- Faster performance
 - 30 times IOPS and less than 1 millisecond response time
- More energy efficient
 - 38 percent less per terabyte and 98 percent less per IO
- Better reliability
 - No moving parts, faster RAID rebuilds

First and only midrange storage array to support Flash drives

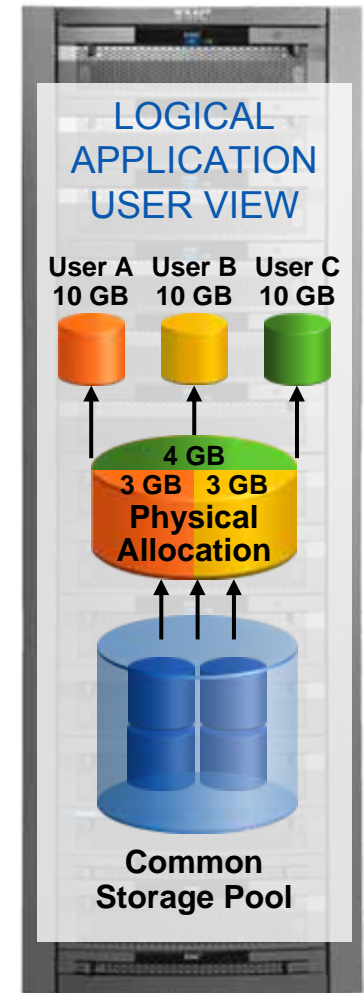




CLARiiON Virtual Provisioning

- Simple to create
 - Assign a pool name (e.g., “Test and dev pool 2”)
 - Select resources (e.g., # of disks or GB capacity)
 - Choose your protection level (e.g., RAID 5 or 6)
- Simple to assign
 - Select a pool
 - Choose a host
 - Specify virtual capacity
- Simple to manage
 - Expand pools nondisruptively
 - Monitor usage versus virtually allocated capacity
 - Trigger alerts and generate reports

**Supports advanced capabilities: Virtual LUN,
Navisphere Quality of Service Manager,
Navisphere Analyzer, SnapView**



Dynamically Exp and Mig LUNs in Real Time

Make IT Double

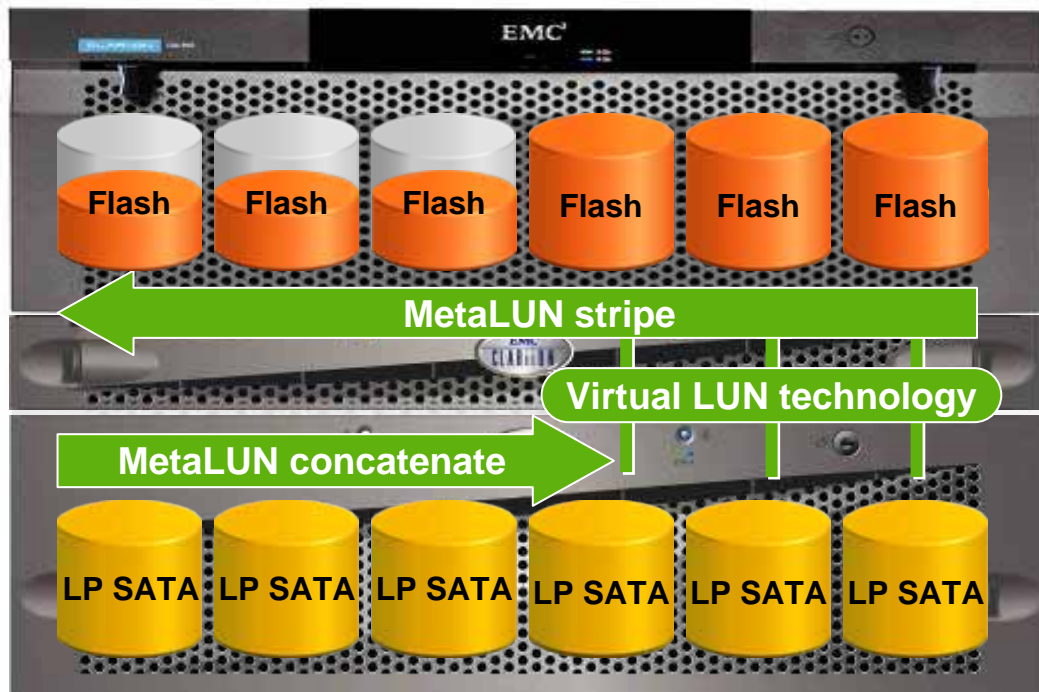
Virtual LUN Technology

- Nondisruptive data movement across storage tiers
 - Higher performance
 - Lower cost

MetaLUN Technology

- Dynamic extension of volumes
 - Higher performance
 - Better protection
 - Better utilization of capacity

Tier 1 Applications



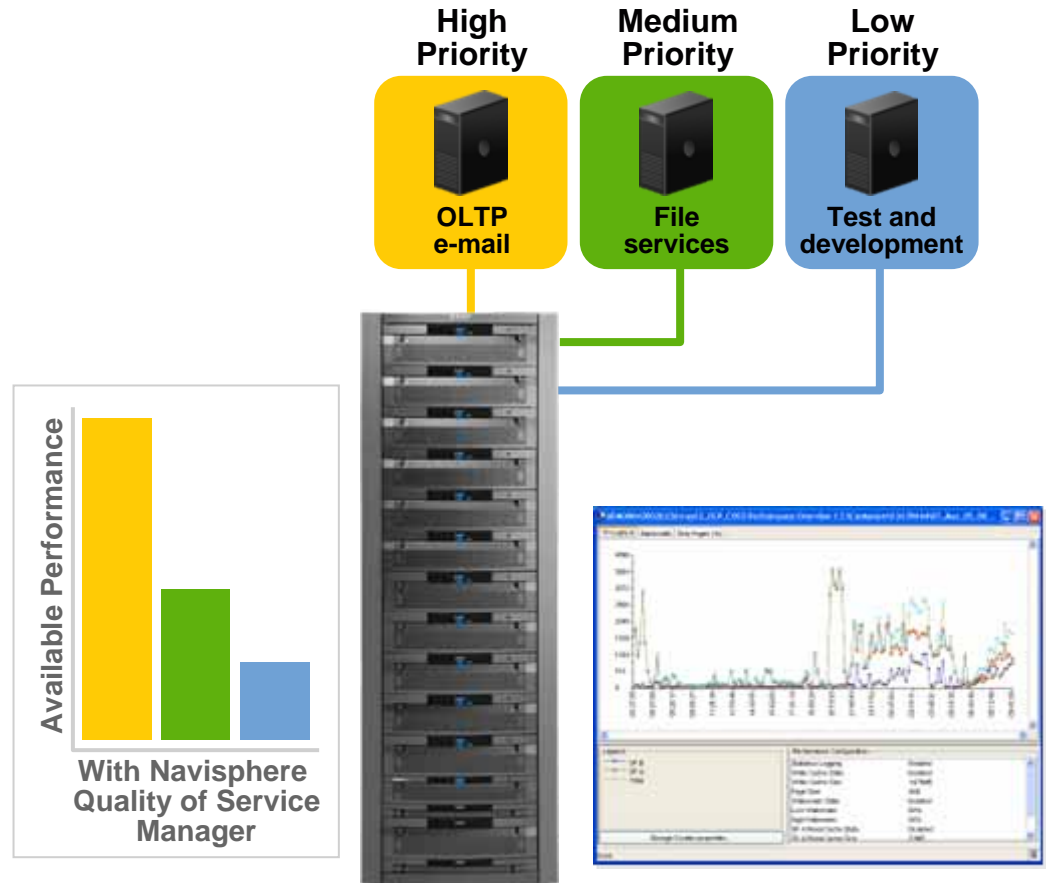
Tier 2 Applications

Navisphere Quality of Service Manager and Navisphere Analyzer

Make IT Double

Manage, Optimize, and Measure Application Service Levels

- Manage CLARiiON resources based on service levels
 - Monitor and tune storage resources based on performance objectives
- Optimize performance based on policy management
 - Set performance goals for critical applications
 - Set limits on lower priority applications
 - Schedule policies to run at different intervals
- Measure and control storage based on different metrics
 - Response time (e.g., Microsoft Exchange)
 - Bandwidth (e.g., backup to disk)
 - Throughput (e.g., OLTP applications)
- Provides real-time and historical CLARiiON performance data
- Pinpoints performance bottlenecks





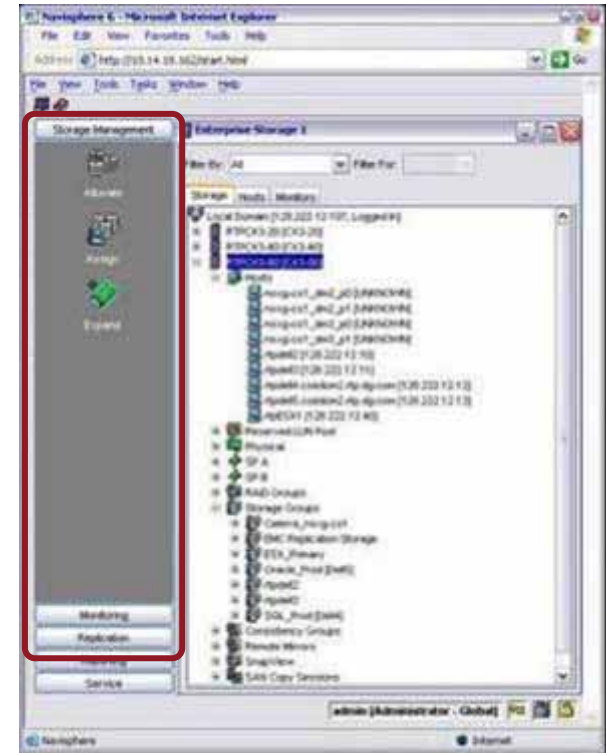
Lowest Cost of Ownership with Navisphere Task Bar

Leverage Simplicity for Common Management Tasks

- New levels of ease of use
 - Simple, wizard-driven management tool
- Provides management and allocation of LUNs and replicas
- Includes new reporting capabilities
- Enhancement included with Navisphere Manager

“The Task Bar wizards take complexity out of managing a storage network. It’s amazing how it can be made to look and feel so easy to manage and use.”

— Andrew Waithaka, Network Systems Manager,
St. Louis College of Pharmacy





CLARiiON CX4: Energy Efficiency

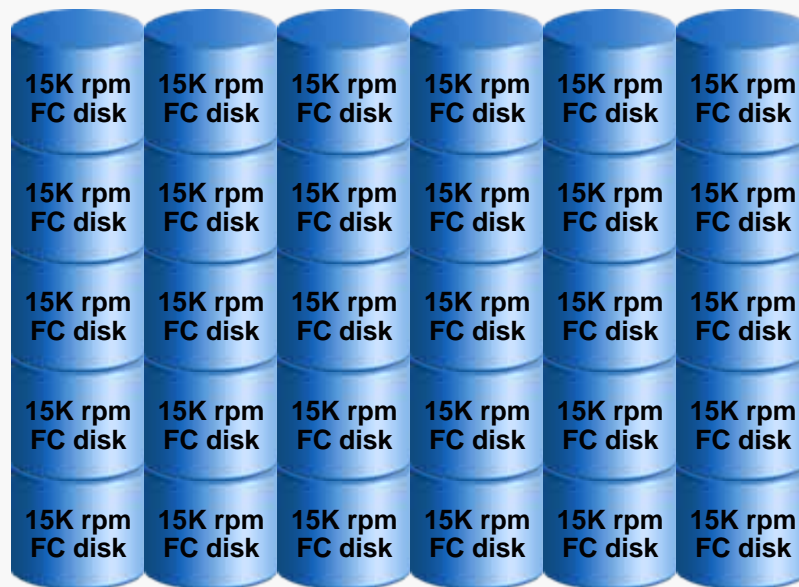
Make IT Double

Reduce Requirements in Performance Configurations



**Flash
drive**

- 38% less energy per terabyte
- 98% less energy per IO
- 58% less weight per terabyte
- More IOPS in less footprint



30 15K rpm Fibre Channel disks

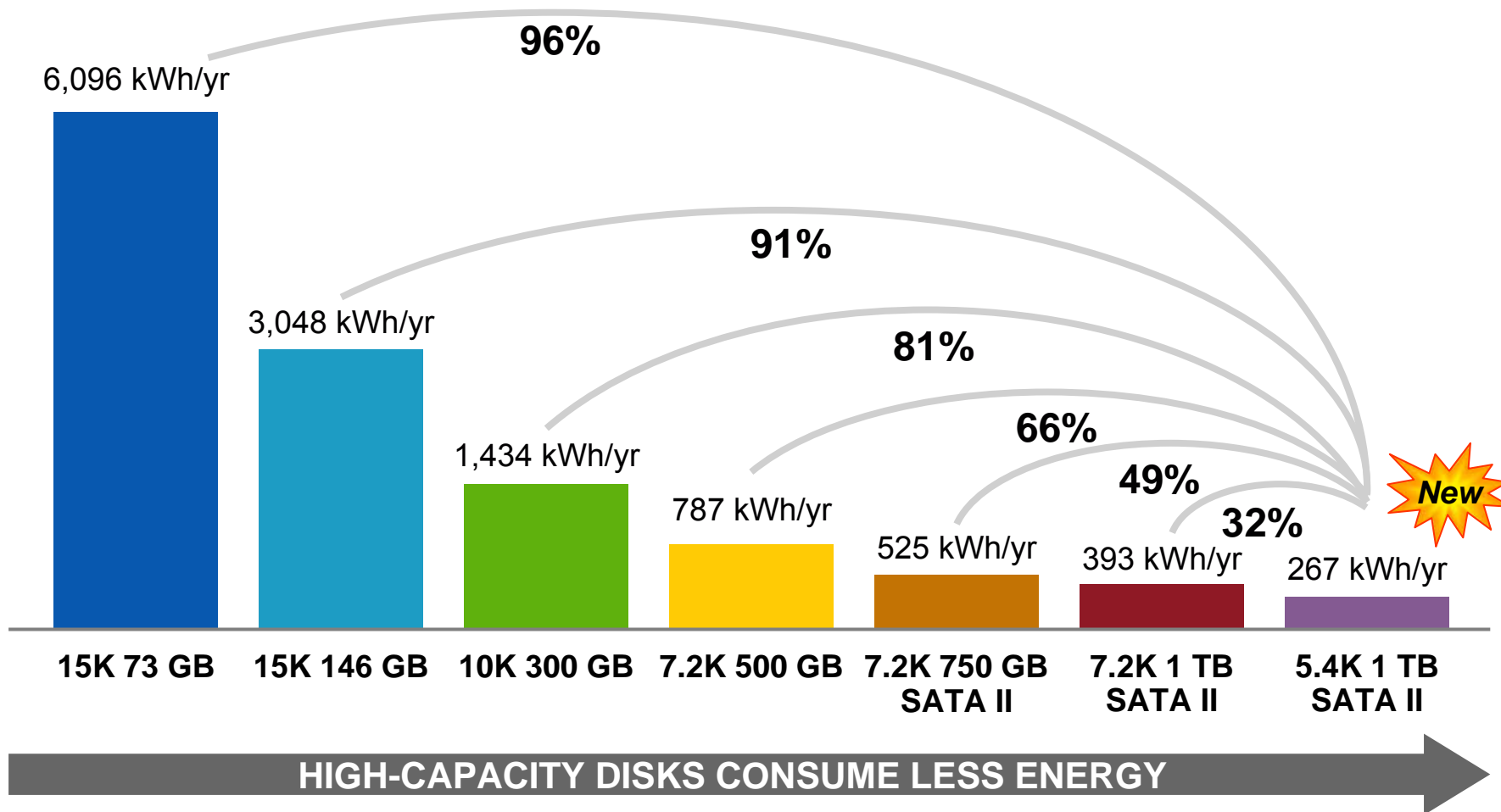
**One Flash drive equals the performance
of 30 15K Fibre Channel disks**



New Low-Power Drives

Make IT Double

1 TB Data on Different Capacity/Performance Drives



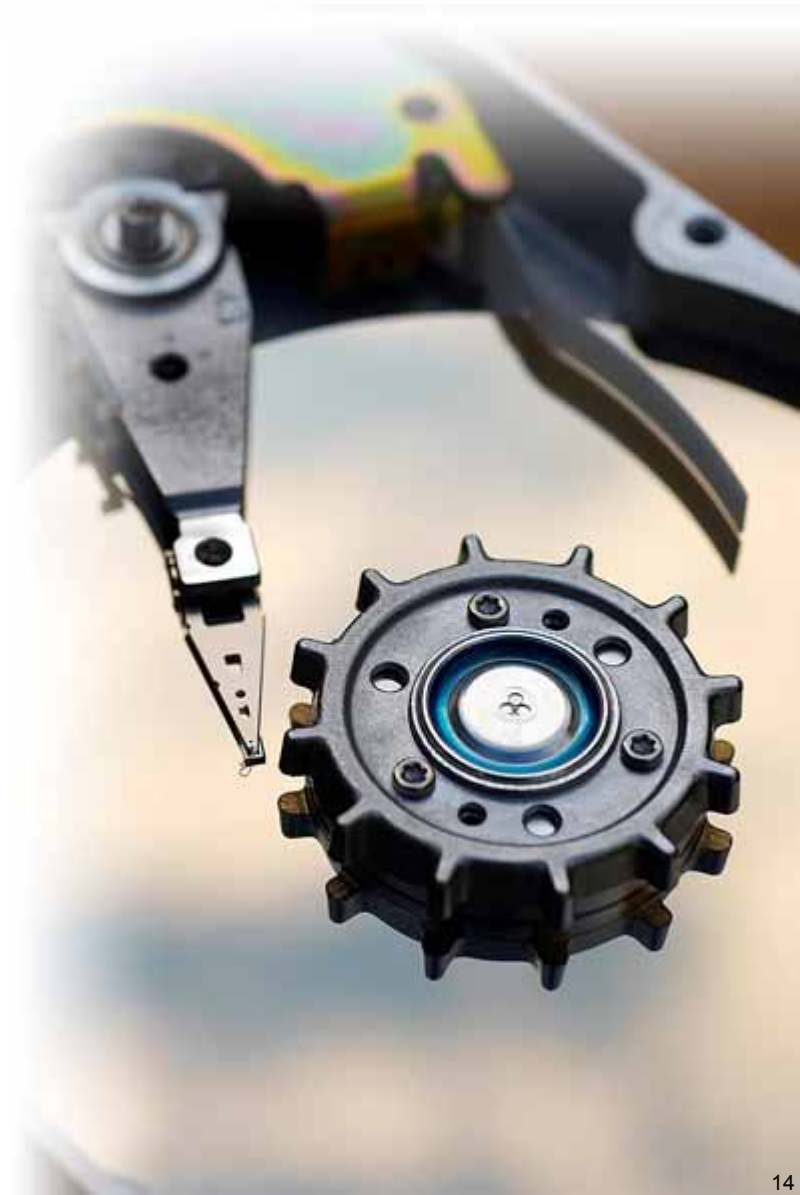


Drive Spin Down

- Inactive disks are placed in sleep mode; disks spin up on demand
- Leverages robust array capabilities to maintain drive quality
- Array-wide flexibility: ability to support a mix of disparate applications—some that utilize Spin Down, others that do not

Spin Down Use Cases

- Backup to disk
- Disk-based archiving
- Test and development
- Selective applications



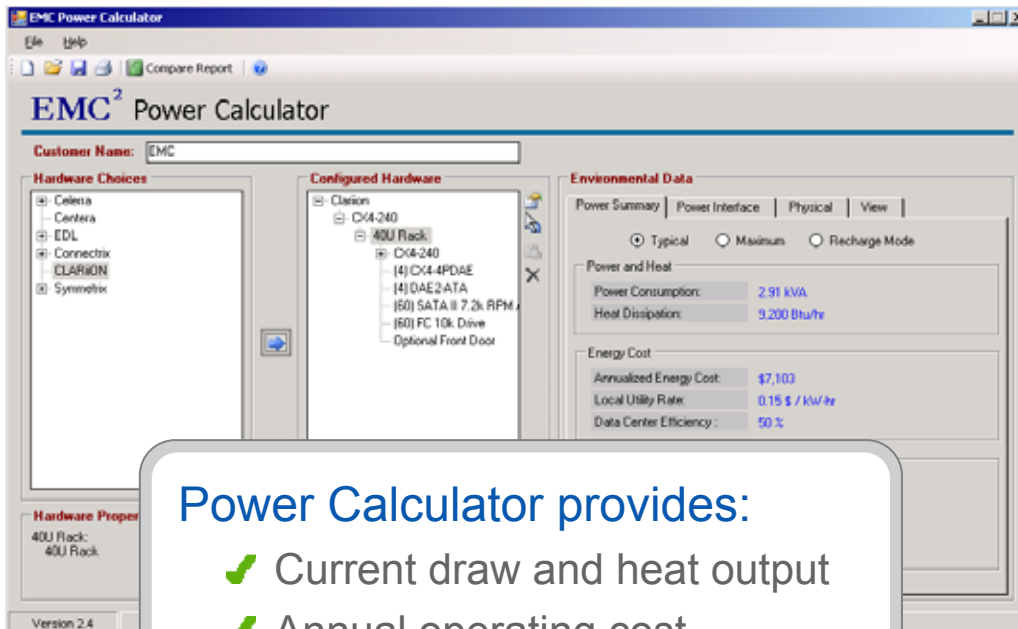


CLARiiON CX4: Energy Efficiency

Consume Less Power and Cooling Resources

- Flash drive technology
 - 98 percent better efficiency per IO compared to 15K Fibre Channel disks
- Low power SATA II drives
 - Consume 32 percent less energy compared to 7.2K SATA drives
- Policy-based drive Spin Down
 - Reduce energy for inactive drives while maintaining online access
- Adaptive Cooling
 - Dynamically adjust cooling based on system activity

EMC Power Calculator to accurately determine energy requirements

A screenshot of the EMC Power Calculator software interface. The window title is 'EMC Power Calculator'. The interface is divided into several sections: 'Customer Name' (EMC), 'Hardware Choices' (listing Celerra, Centera, EDL, Connectix, CLARiiON, Symmetrix), 'Configured Hardware' (listing Clariion, Cx4-240, 40U Rack, Cx4-240, 4) Cx4-4PD&E, 4) DAE2-ATA, 16) SATA II 7.2k RPM, 16) FC 10k Drive, Optional Front Door), 'Environmental Data' (with tabs for Power Summary, Power Interface, Physical, View), 'Power and Heat' (showing Power Consumption: 2.91 kVA, Heat Dissipation: 9,200 Btu/hr), and 'Energy Cost' (showing Annualized Energy Cost: \$7,103, Local Utility Rate: 0.15 \$ / kW-hr, Data Center Efficiency: 50%). The version number 'Version 2.4' is visible at the bottom left.

Power Calculator provides:

- ✓ Current draw and heat output
- ✓ Annual operating cost
- ✓ Weight and floor space
- ✓ Sound levels
- ✓ Power drops required



RecoverPoint/SE Concurrent Local and Remote (CLR) Replication



Make IT Double

One Solution for Data Protection, Replication, and Disaster Recovery

- Easy to deploy
 - RecoverPoint splitter built into FLARE
 - Protection for Fibre Channel and iSCSI environments
 - Optimizes bandwidth up to 10 times
- Simple to manage
 - One product for local and remote replication
 - Supports all major applications and operating systems
 - Integrated with VMware Site Recovery Manager



Delivering Next-Generation Protection...Today

- ✔ Concurrent local and remote replication
- ✔ Up to 2,048 LUNs per array
- ✔ Any-point-in-time roll-back
- ✔ Bandwidth reduction—up to 10 times



**RecoverPoint
appliance**

**Supports virtual and
physical environments**



CLARiiON CX4 Series Business Impact



Lowest Cost of Ownership

Availability and Protection

Energy Efficiency

Optimized for Virtualized Environments



Next-generation CX4 architecture

Flash drives for Tier "0" • Virtual Provisioning • UltraFlex technology • drive Spin Down • low power SATA • concurrent local and remote replication



Consolidate More, Provision Less, and Extend Useful Life With CLARiiON CX4 Series

Make IT Double

Lowest Cost of Ownership

- Consolidate workloads
 - New CLARiiON CX4 architecture with up to twice the scale and performance
 - Consolidate connectivity via multi-protocol support across all CLARiiON CX4 systems
- Reduce/defer capacity requirements
 - CLARiiON Virtual Provisioning for efficient capacity allocation and increases utilization
- Protect technology investments
 - UltraFlex technology for online expansion and future-ready connectivity

Do more with less...



A single CLARiiON CX4 system can deliver the scale and performance of multiple arrays





CLARiiON: Hardware Platform Upgrade Path

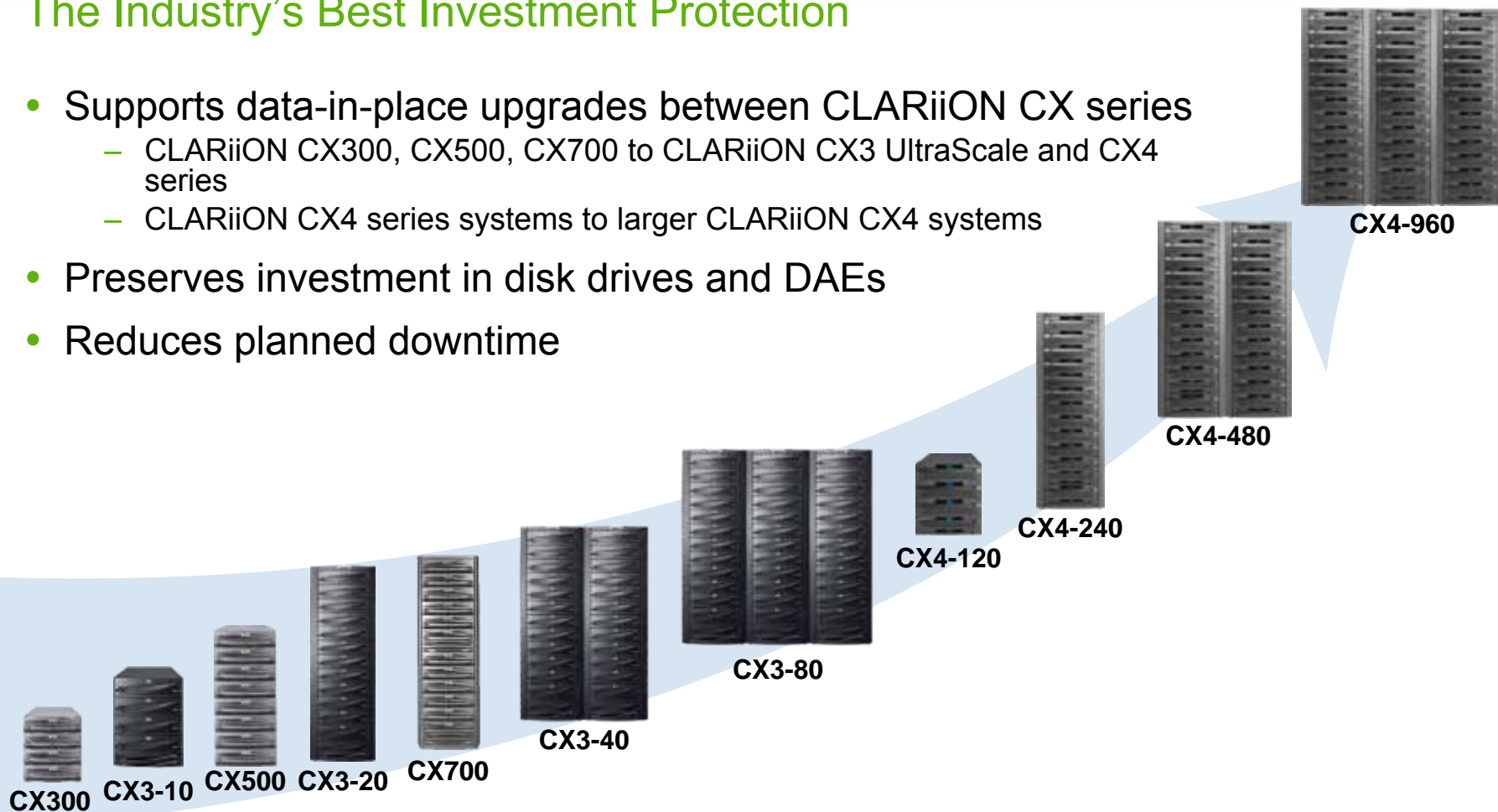
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Make IT Double

The Industry's Best Investment Protection

- Supports data-in-place upgrades between CLARiiON CX series
 - CLARiiON CX300, CX500, CX700 to CLARiiON CX3 UltraScale and CX4 series
 - CLARiiON CX4 series systems to larger CLARiiON CX4 systems
- Preserves investment in disk drives and DAEs
- Reduces planned downtime

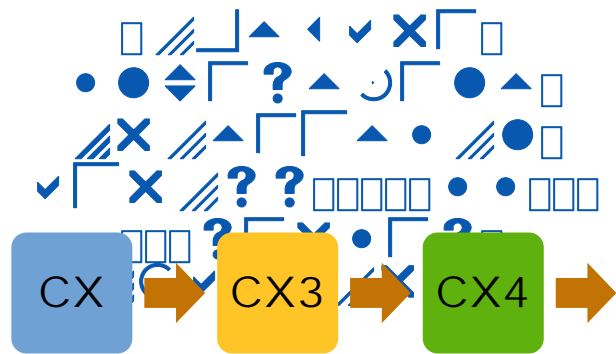


Investment protection for three generations of CLARiiON CX customers



Make IT Double

The Industry's Best Investment Protection



- Virtual Provisioning 
- Virtual LUN technology
- Navisphere Quality of Service Manager
- RecoverPoint
- Replication Manager
- SAN Copy
- SnapView
- MirrorView



- **Navisphere Manager** for Web-based centralized management
- **CLARiiON Virtual Provisioning** to simplify allocation of storage capacity across storage tiers
- **Virtual LUN technology** for nondisruptive data mobility
- **Navisphere Quality of Service Manager** for application service-level management
- **RecoverPoint** for concurrent local and remote data protection with any-point-in-time recovery
- **Replication Manager** for integration with Microsoft Exchange, Microsoft SQL Server, and Oracle
- **SAN Copy** for the ability to migrate data between EMC and other vendors' array
- **MirrorView** and **SnapView** for array-based snapshot and replication

CLARiiON CX4: Availability and Protection from Planned and Unplanned Outages

Make IT Double

System-Level Availability

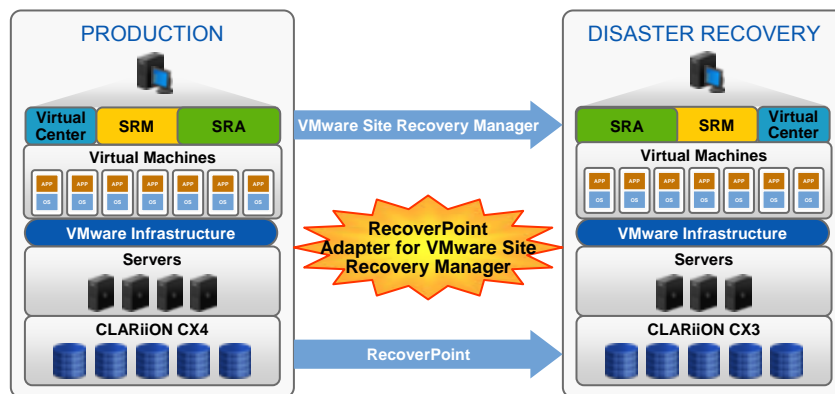
- Persistent cache for improved performance through an SP failure
- Enhanced signal integrity for increase resiliency and simplify serviceability
- Advanced fault detection, isolation, error-correcting for increased resiliency

Site-Level Protection

- Integrated CLARiiON splitter for RecoverPoint to simplify deployments
- Supports all major applications and operating systems
- Protects both physical and virtual environments



The only proven Five 9s mid-tier storage platform



Integrated with VMware Site Recovery Manager



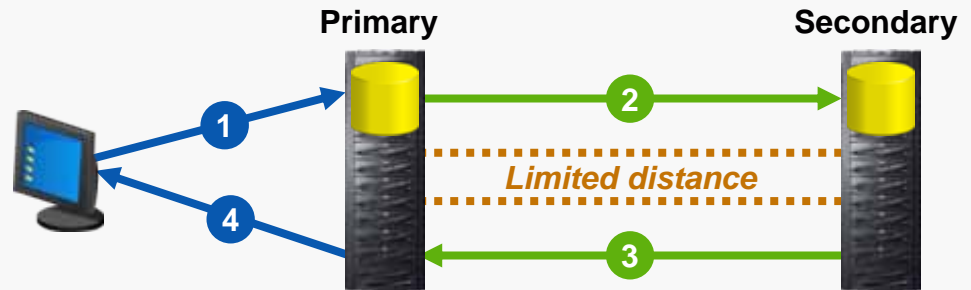
CLARiiON's Array-Based Remote Replication Software



MirrorView/Synchronous

RPO: Zero seconds

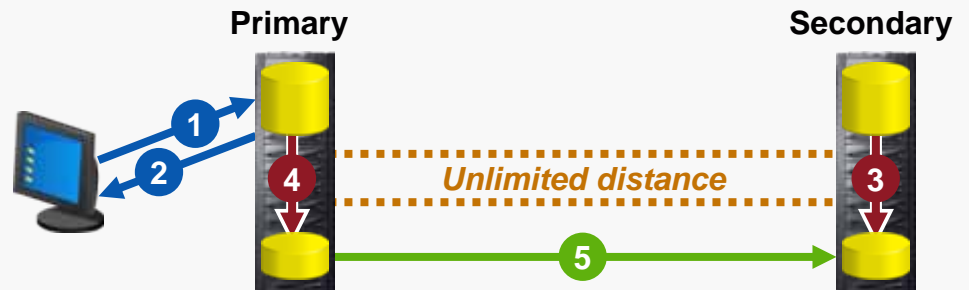
- Both images identical
- Limited distance
- High network bandwidth
- One primary to one or two secondaries



MirrorView/Asynchronous

RPO: 30 minutes to hours

- Target updated periodically
- Unlimited distance
- Restartable copy on secondary if session fails
- Optimized for low network bandwidth (consumes 100 Mb/s maximum)
- One primary to one secondary



CLARION CX4 Series. Optimized for Virtualized Environments

Make IT Double

Shared storage

The right connectivity, availability, and performance at the right cost

VMware VMotion • UltraFlex technology • Flash drives • Five 9s

Backup and recovery

Making backup-to-disk more affordable and energy efficient

VMware Consolidated Backup (VCB) • low power SATA • drive Spin Down

Replication

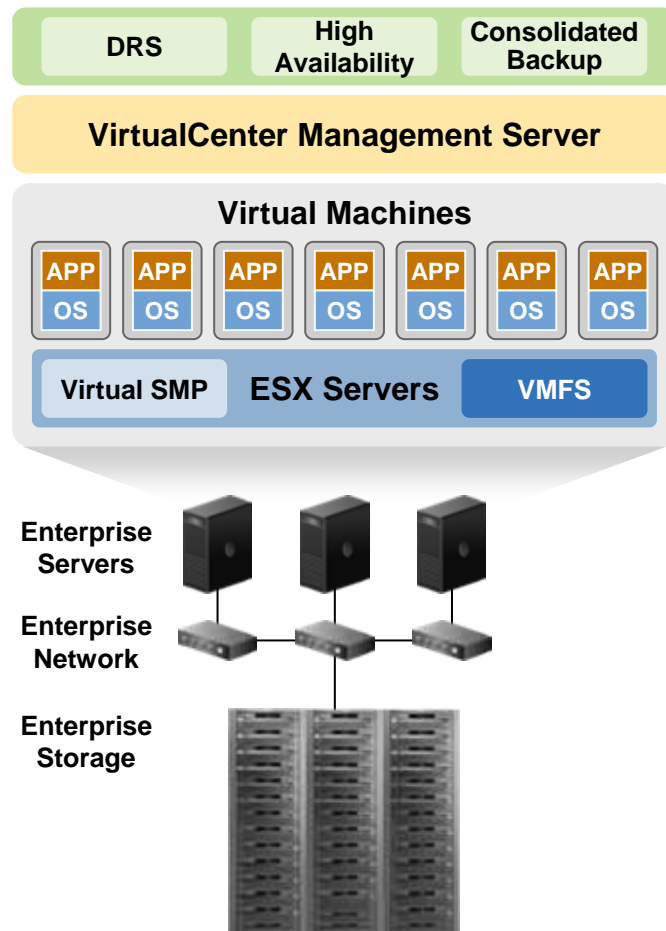
Disaster recovery that is rapid, reliable, manageable, automated

VMware Site Recovery Manager (SRM) • RecoverPoint • MirrorView/S

Resource management

Efficiently meet service levels with end-to-end quality of service

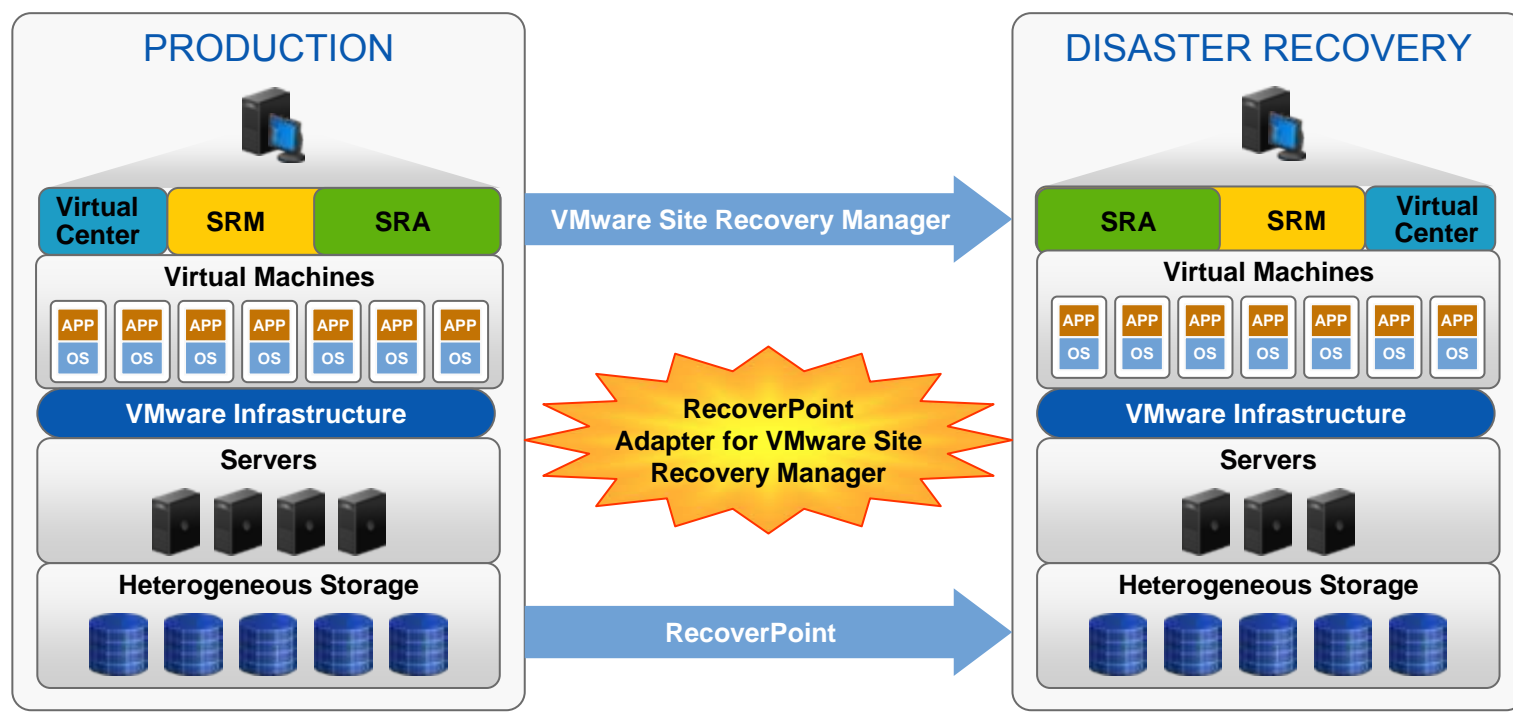
VMware Distributed Resource Scheduler (DRS) • Navisphere Quality of Service Manager • Virtual Provisioning • Virtual LUN



**All backed by EMC-qualified Reference Architectures, best practices,
and supporting technical validation documents**



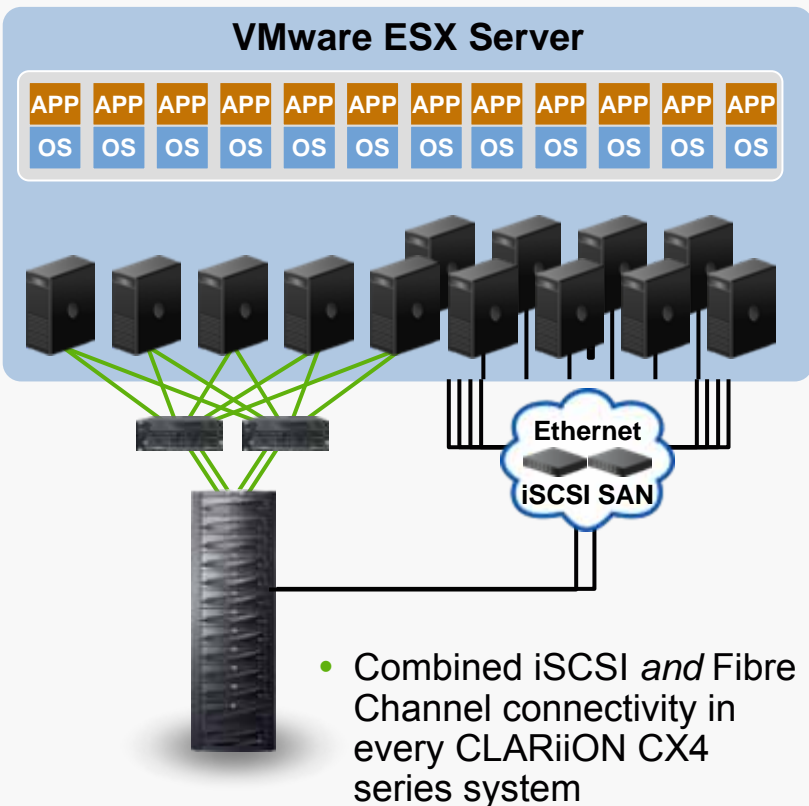
- Replicate VMware VMFS (Virtual Machine File System)
- Compress data, optimize bandwidth (up to 10 times)
- Protect and recover a single virtual machine or the entire VMware ESX Server
- Protect virtual environments with local and/or remote point-in-time recovery





CLARiiON CX4 Series and VMware in Action

LEVERAGE ULTRAFLEX TECHNOLOGY TO ACHIEVE THE ULTIMATE IN FLEXIBLE CONNECTIVITY



COMBINE NATIVE VMWARE AND CLARiiON CX4 SERIES QUALITY OF SERVICE FUNCTIONALITY

VMware ESX Server
Distributed Resource Scheduler
CPU/Memory

CLARiiON CX4 Series
Navisphere Quality of Service Manager
Storage Processor

- Manage environment resources based on service levels
- Optimize predictable performance based on application service levels

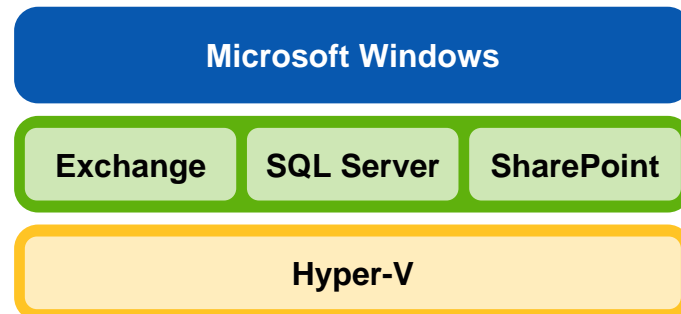


CLARiiON CX4 Series and Microsoft

Make IT Double

CLARiiON Delivers One Way to Protect, Manage, and Scale—at Lowest TCO

- ✔ **High performance:** Support critical SQL Server databases and allow Windows server consolidation
- ✔ **Scalability:** Manage rapid growth across applications
- ✔ **CLARiiON Virtual Provisioning:** Add the flexibility to storage that Hyper-V adds to Windows Servers
- ✔ **Tiered storage:** Use Flash drives to ATA for information lifecycle management
- ✔ **Advanced backup:** LAN-free, VSS-based snaps
- ✔ **Disaster recovery:** Flexible options for recovery point objectives (RPO) and recovery time objectives (RTO)
- ✔ **Flexibility:** Start with iSCSI, move to Fibre Channel



CLARiiON CX4

Consolidated infrastructure
for Microsoft environments



CLARiiON CX4—The EMC Impact

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Lowest Cost of Ownership

- UltraFlex IO modules
- 64-bit FLARE plus multi-core processors
- Up to twice the performance and scale
- CLARiiON Virtual Provisioning
- Leading capacity utilization
- Data-in-place upgrades

Availability and Protection

- Persistent cache
- Concurrent local and remote data protection with RecoverPoint
- Customer replaceable units
- Enhanced Fault Isolation/Correction

Energy Efficiency

- Flash drives
- Low power SATA II drives
- Policy-based drive Spin Down
- Adaptive Cooling

Optimized for Virtualized Environments

- Replication integration with VMware Site Recovery Manager
- VMware Distributed Resource Scheduler integration with Navisphere Quality of Service Manager
- CLARiiON Virtual Provisioning
- Virtual LUNs and metaLUNs



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