

# 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



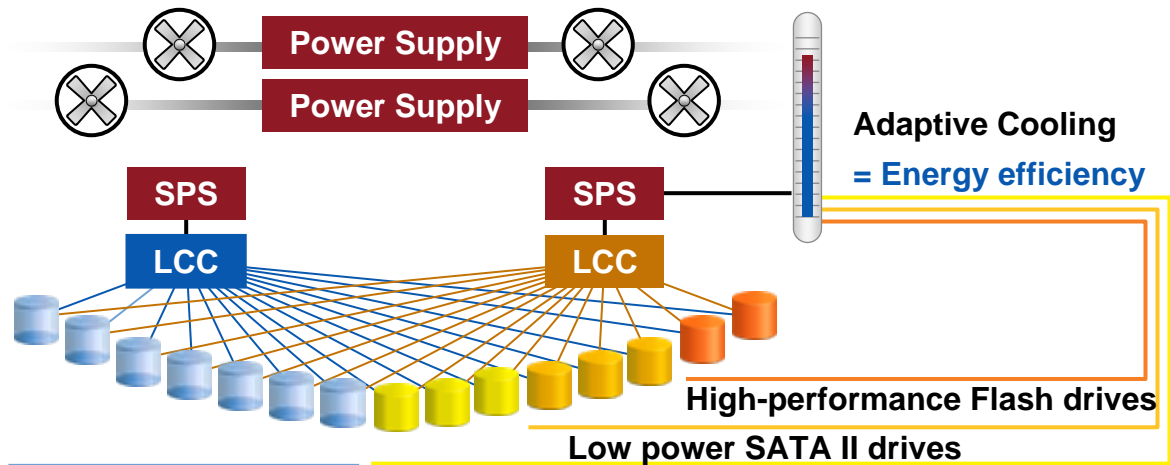
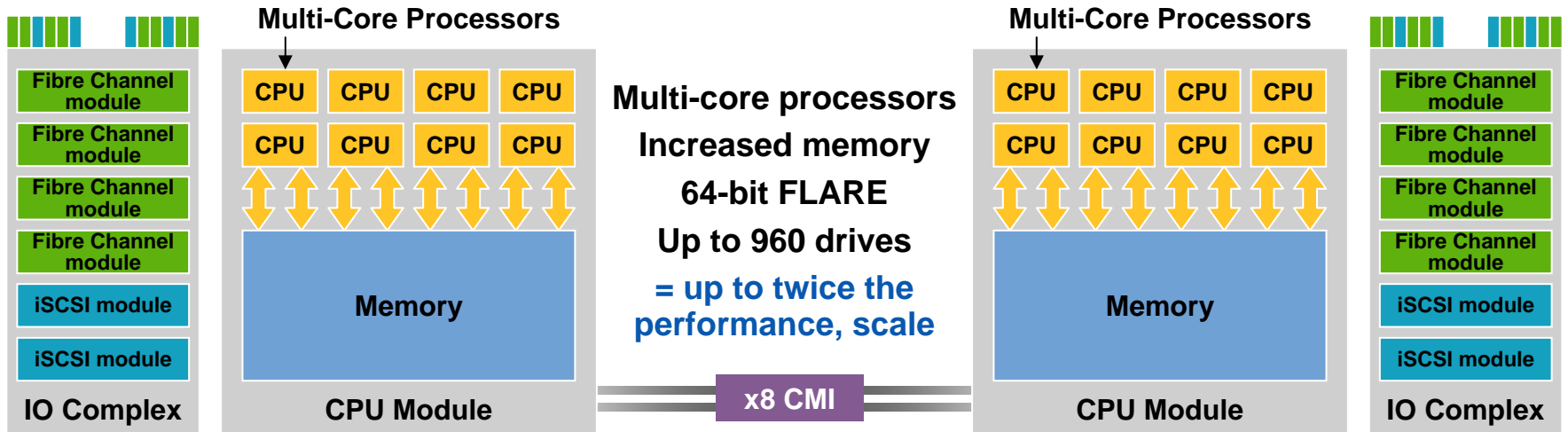
**Navisphere  
Manager**



# New Architecture

**Make IT Double**

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

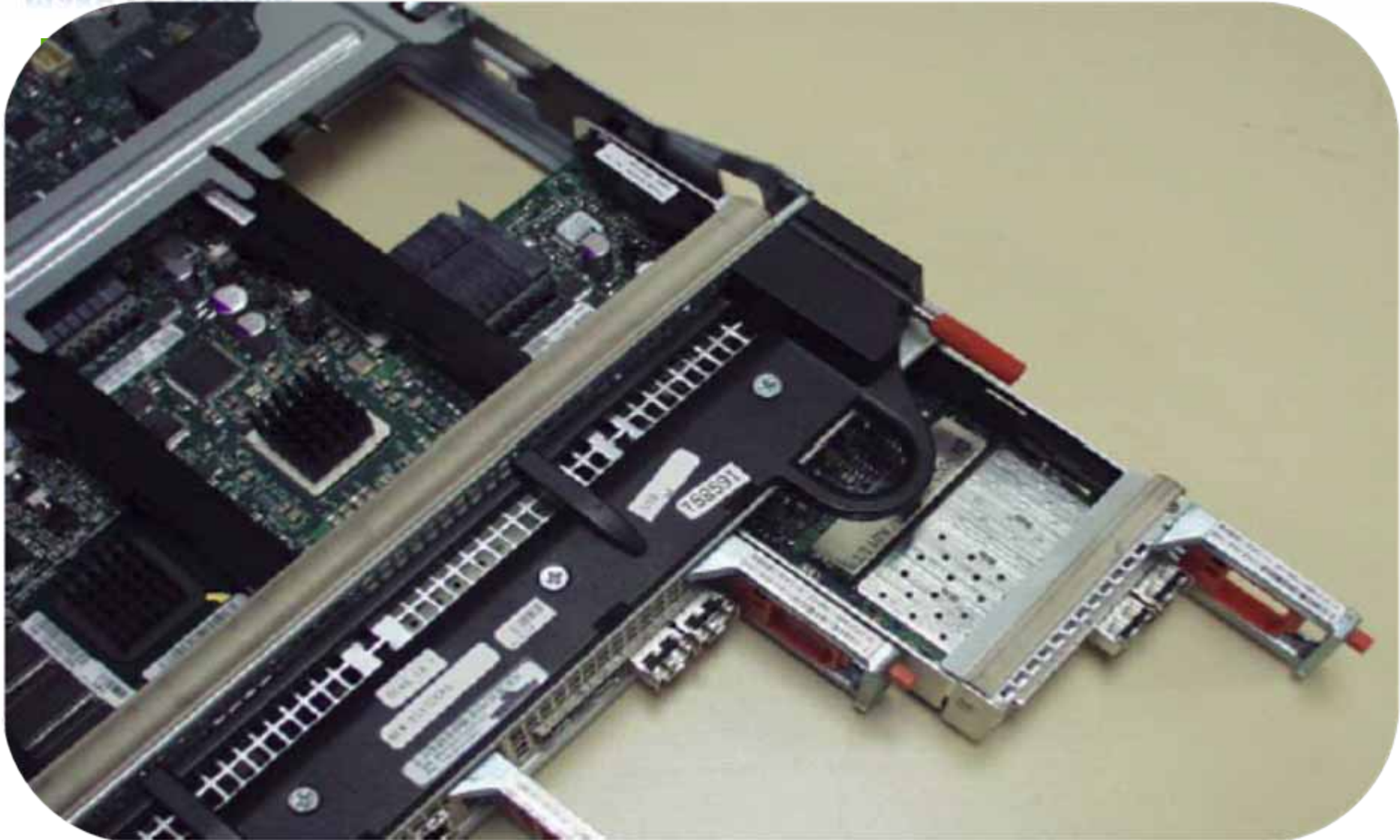


**Virtual Provisioning Spin Down**  
**= Capacity optimization**





# New UltraFlex Technology

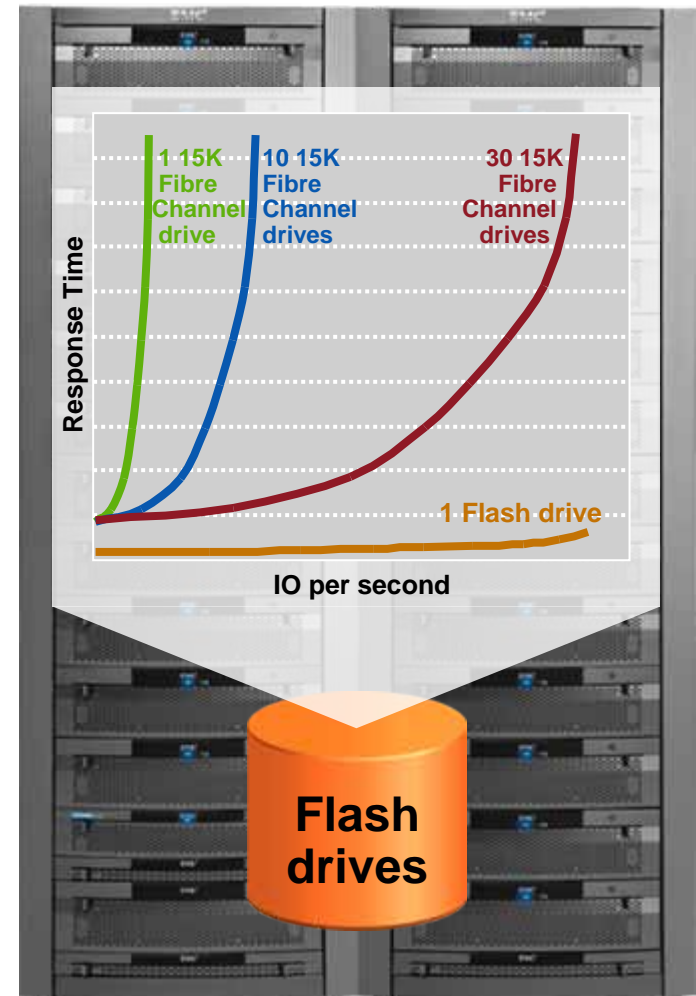




# Flash Drives for Tier “0” Requirements

- 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**

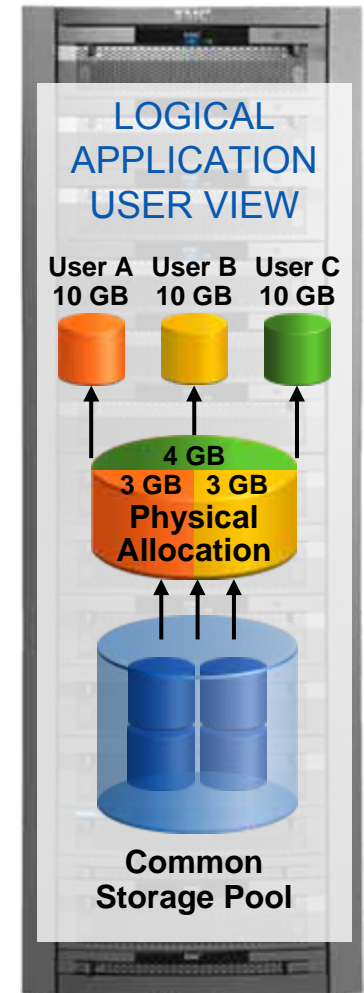




# CLARiiON Virtual Provisioning

- 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

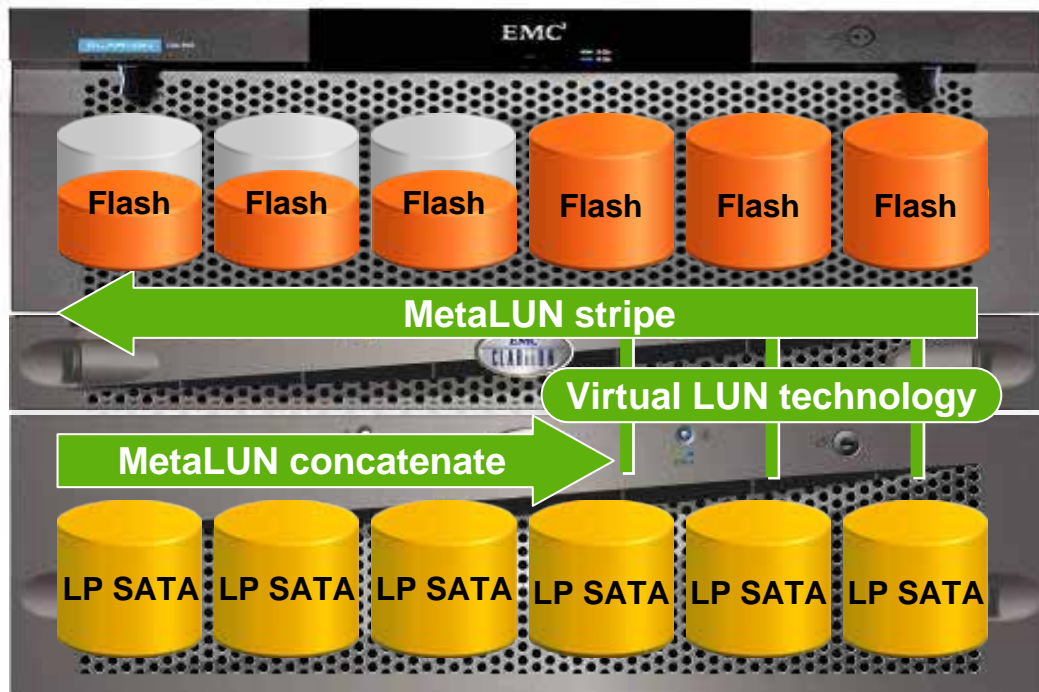
## Virtual LUN Technology

- 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



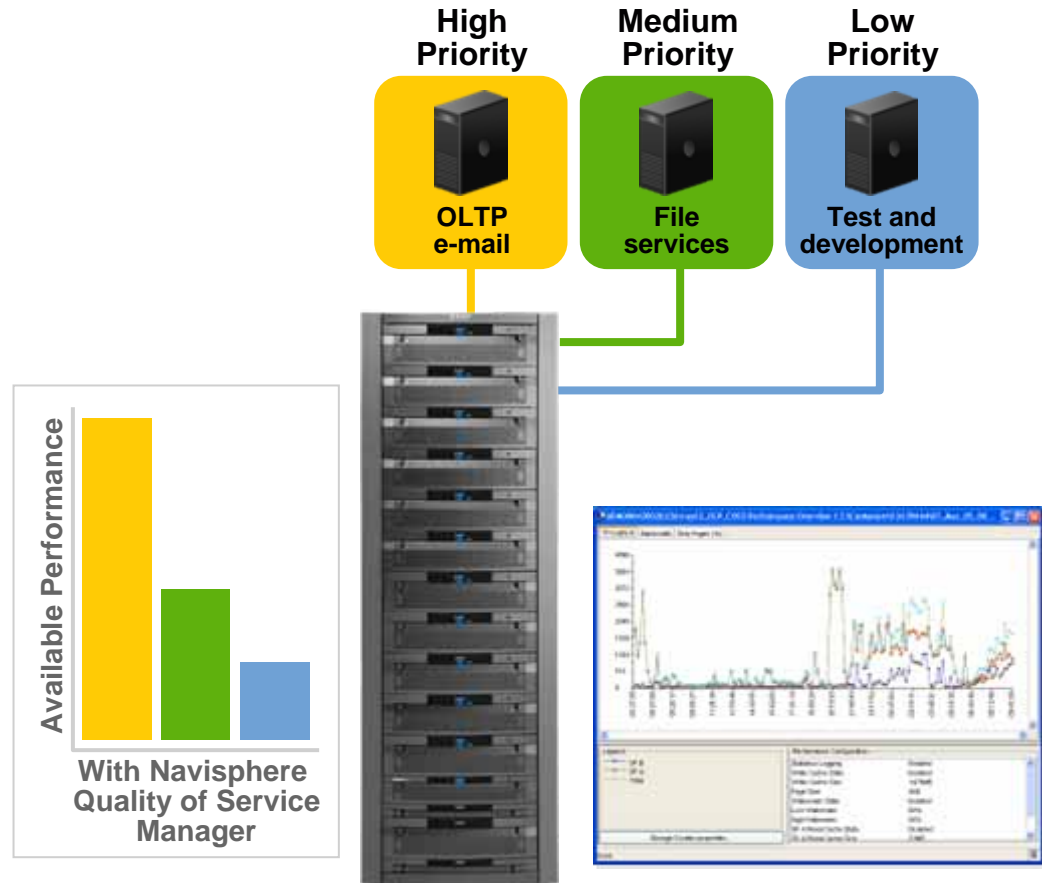
## Tier 2 Applications

# 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



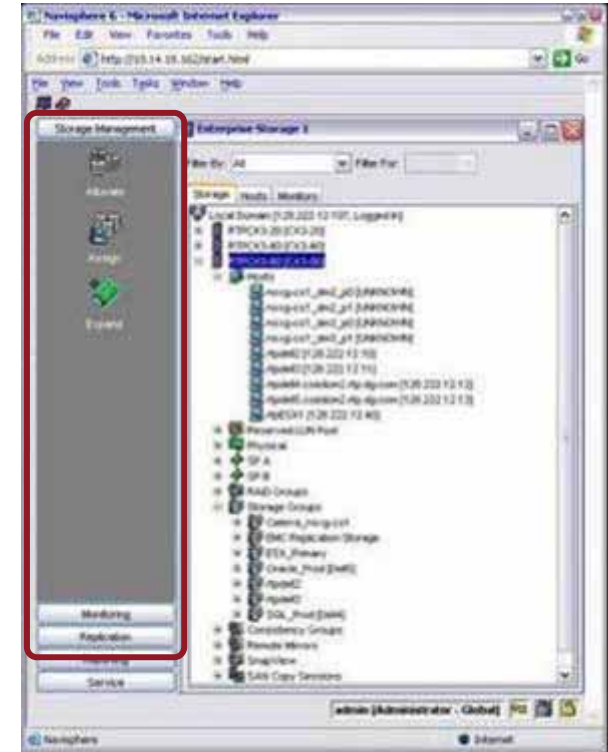


# Lowest Cost of Ownership with Navisphere Task Bar

**Make IT Double**

## 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

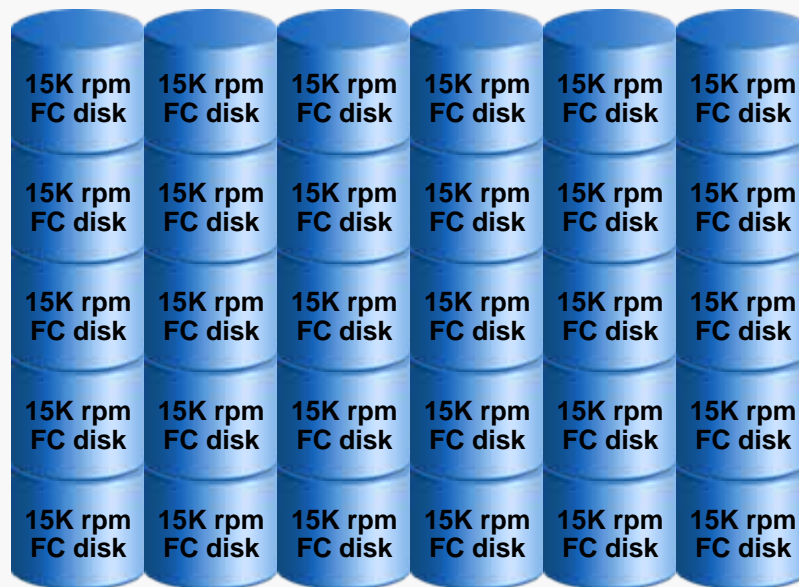
**Make IT Double**

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



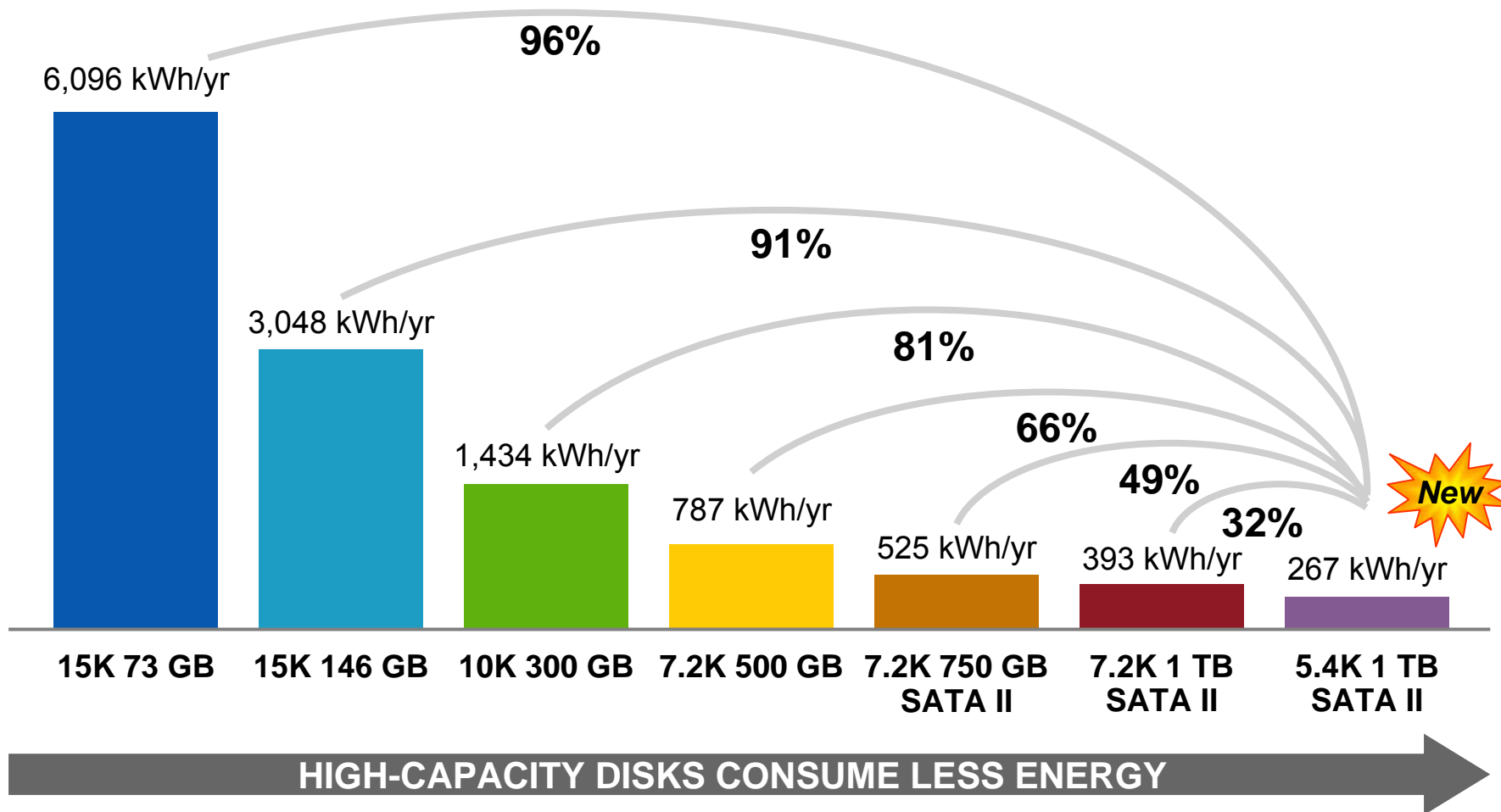
**30 15K rpm Fibre Channel disks**

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



# New Low-Power Drives

## 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



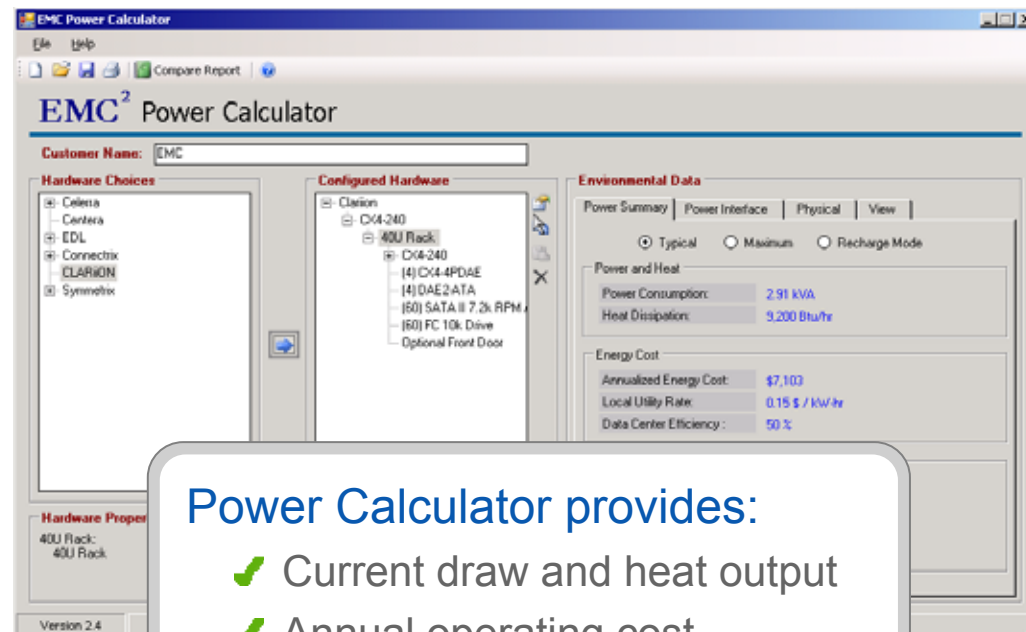


# CLARiiON CX4: Energy Efficiency

## 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



**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

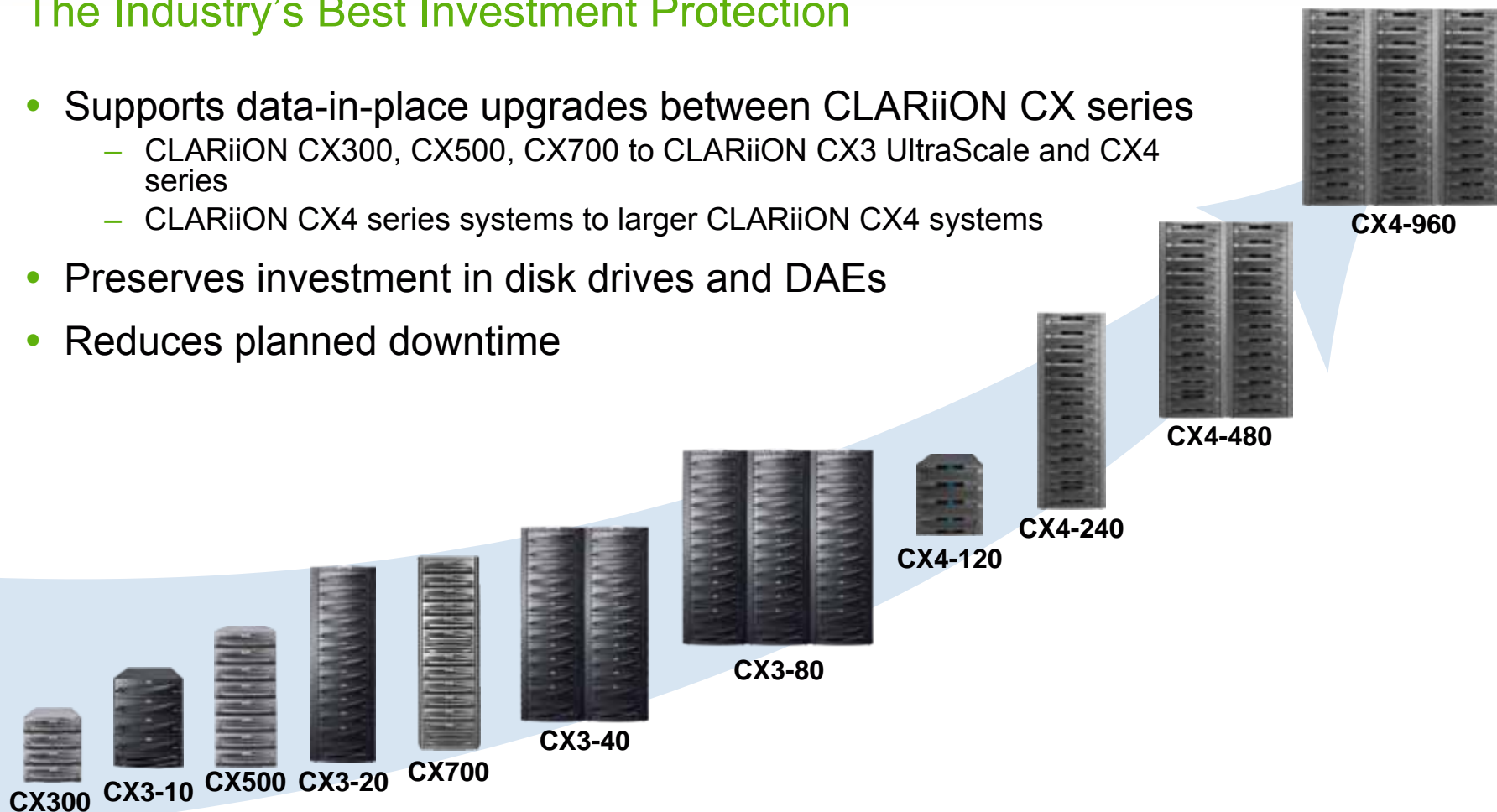
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Make IT Double

## 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

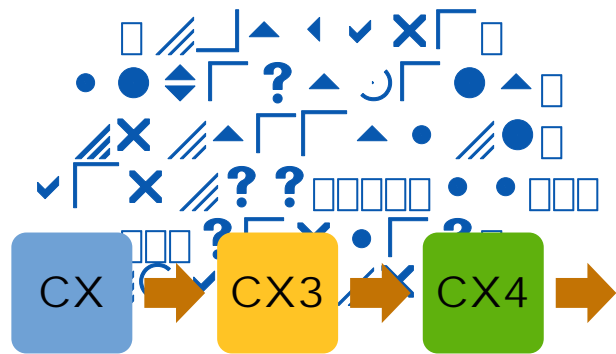


Investment protection for three generations of CLARiiON CX customers



**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**

- **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

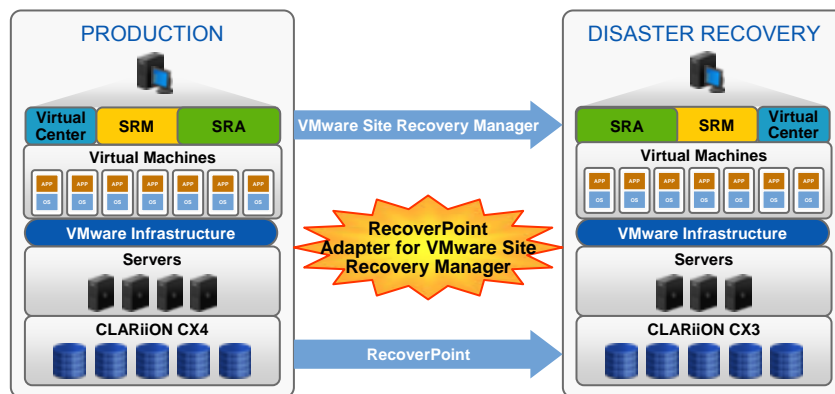
- Persistent cache for improved performance through an SP failure
- Enhanced signal integrity for increase resiliency and simplify serviceability
- Advanced fault detection, isolation, error-correcting for increased resiliency

## 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



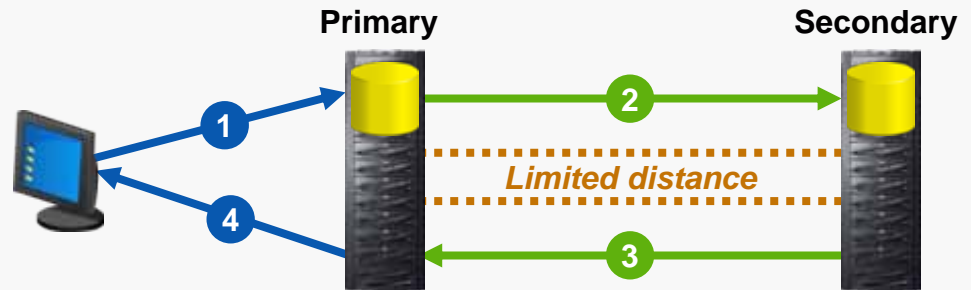
# CLARiiON's Array-Based Remote Replication Software



## MirrorView/Synchronous

RPO: Zero seconds

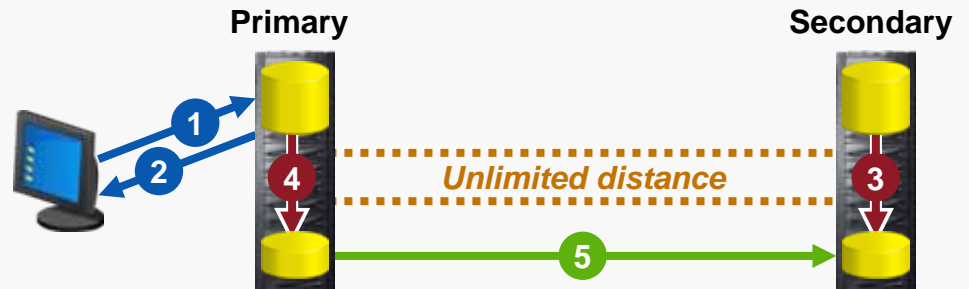
- Both images identical
- Limited distance
- High network bandwidth
- One primary to one or two secondaries



## 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

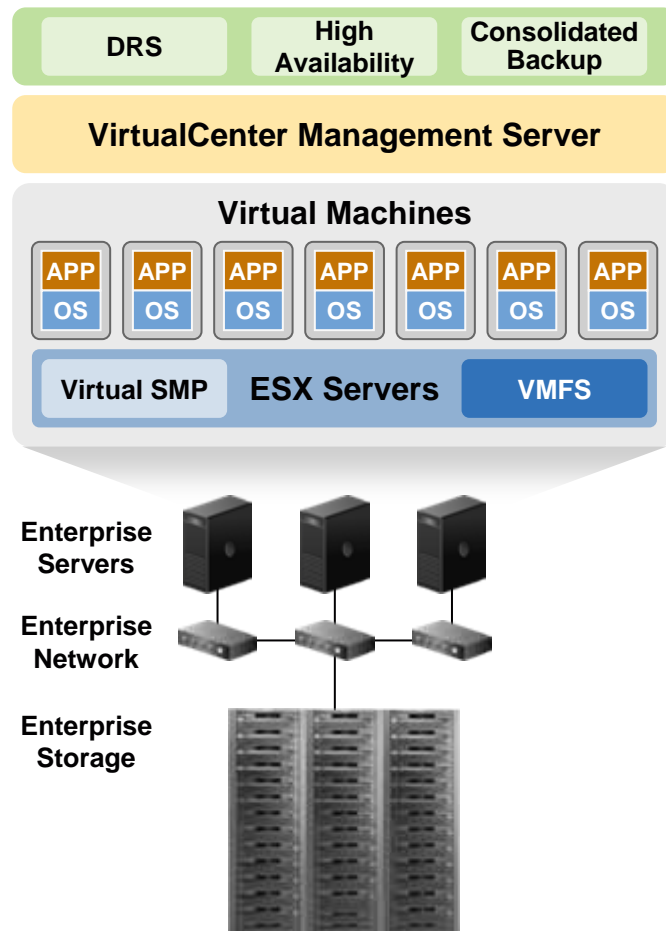
Disaster recovery that is rapid, reliable, manageable, automated

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

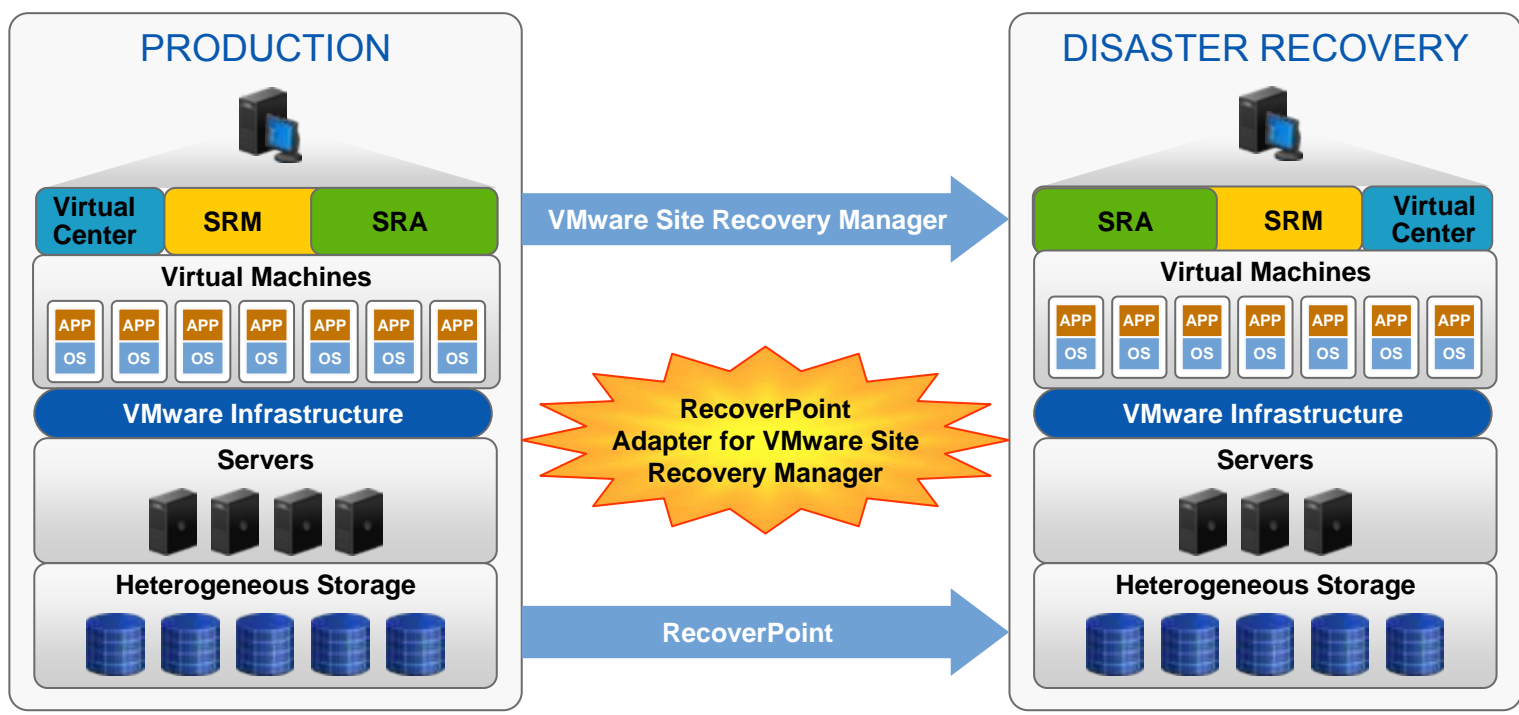


**All backed by EMC-qualified Reference Architectures, best practices,  
and supporting technical validation documents**

# RecoverPoint with VMware Site Recovery Manager

Make IT Double

- 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



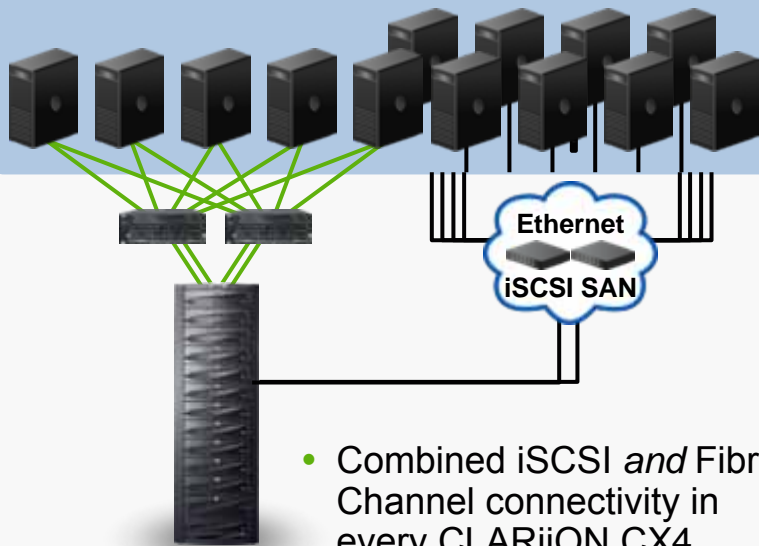
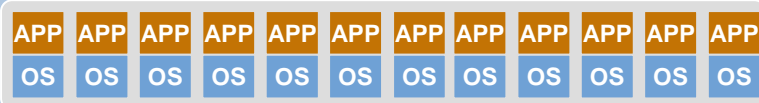




# CLARiiON CX4 Series and VMware in Action

## LEVERAGE ULTRAFLEX TECHNOLOGY TO ACHIEVE THE ULTIMATE IN FLEXIBLE CONNECTIVITY

### VMware ESX Server



- Combined iSCSI *and* Fibre Channel connectivity in every CLARiiON CX4 series system

## 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

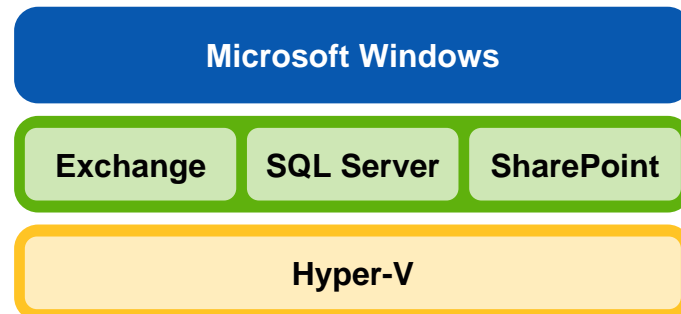


# CLARiiON CX4 Series and Microsoft

## 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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