



Networked attached storage rješenja

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Next-Generation Celerra Innovations: Driving Down Costs



Deduplication

File system deduplication
with compression

Simplified Provisioning

New Celerra Provisioning Wizard

Advanced Connectivity

Cost effective NAS and iSCSI
High-performance MPFS and
Fibre Channel

Increased Capacity

Two-times the previous
generation (960 drives)

Compliance

Compliant file-level
retention for archiving

Flash Drives

Tier 0 storage with 30
times more IOPS



New

Next-Generation Celerra

Up to 22 percent lower TCO than competitive offerings



Deduplication reduces
capacity requirements by
up to 40 percent

Deduplication, Virtual Provisioning,
snaps, and Automated Volume
Manager included at no additional cost

Low-power SATA drives
consume 32 percent
less energy

Why EMC Celerra



#1 in NAS (IDC, Q3 2008)

- No-compromise availability
 - Five 9s (99.999 percent) availability, integrated advanced clustering, managed as a single device
- Advanced functionality at no extra cost
 - Most comprehensive suite of built-in features
- Comprehensive unified storage
 - NAS, iSCSI, Fibre Channel, and patented Celerra Multi-Path File System (MPFS)
- Scalability leadership
 - Up to eight X-Blades on the front-end, up to four arrays on the back-end; Flash drives
- Advanced tiering for unified storage
 - File server consolidation, file virtualization, file archiving, network management, policy-based management

Celerra Family



The Industry-Leading IP Storage Platform



Unified Storage

Dedicated storage
Easy to deploy
Simple to manage



NX4



NS-120



NS-480



NS-960

Gateway

Shared storage
Add NAS, iSCSI to
Fibre Channel SAN
Highest storage usage
Single management



NS40G



NS-G8

Availability	Failover	Failover	Advanced clustering	Advanced clustering	Failover	Advanced clustering
Number of X-Blades	1 or 2	1 or 2	2 or 4	2-8	1 or 2	2-8
Connectivity	NAS, iSCSI, Fibre Channel	NAS, MPFS, iSCSI, Fibre Channel	NAS, MPFS, iSCSI, Fibre Channel	NAS, MPFS, iSCSI, Fibre Channel	NAS, MPFS, iSCSI, Fibre Channel	NAS, MPFS, iSCSI, Fibre Channel
Storage	CLARiiON	CLARiiON	CLARiiON	CLARiiON	CLARiiON, Symmetrix	CLARiiON, Symmetrix
Maximum usable IP storage capacity (X-Blade/system)	16 TB/ 32 TB	32 TB/ 64 TB	64 TB/ 192 TB	128 TB/ 760 TB	64 TB/ 128 TB	128 TB/ 896 TB

Celerra Control Station



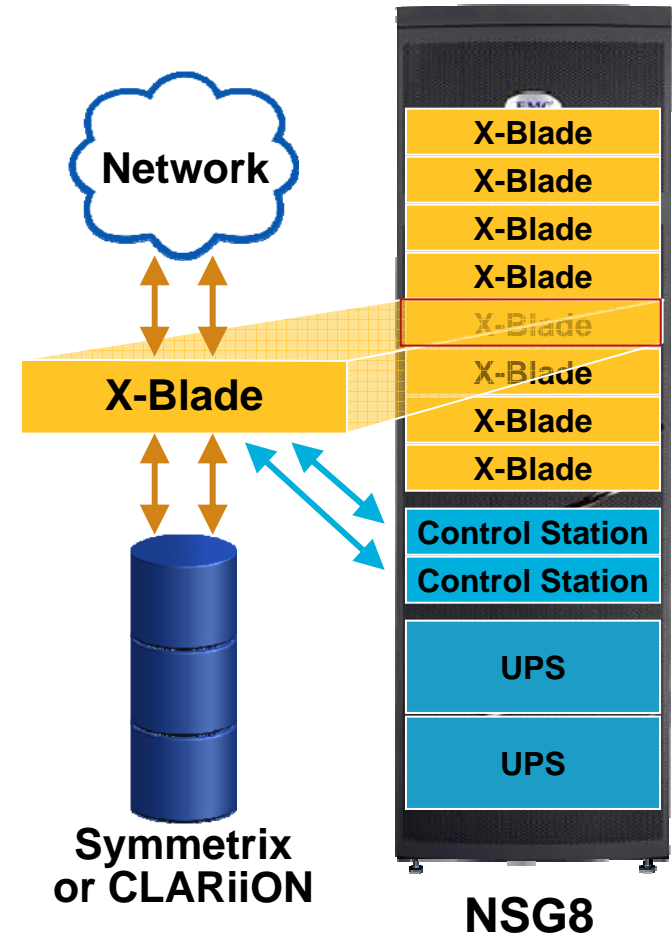
- Installation
- Administration/management
 - Via X-Blade and Storage Processor Ethernet ports
- Configuration changes
- Monitoring and diagnostics
 - Heartbeat pulse of X-Blade
- Monitors and manages X-Blade failover
- Linux-based
- Initiates communications with X-Blades for greater security
- Single point of management/control
- Failover redundancy option



Celerra X-Blades



- Up to eight independent file servers contained in a single system
- Managed as one, high-performance, high-availability server
- Connects data to the network
- DART operating system
 - No performance impact after failover
 - Concurrent Network File System (NFS) and Common Internet File System (CIFS) file access
- Hot-pluggable
- Flexible n-to-1 failover options
- Continues to operate even if Control Station fails
- No internal disks

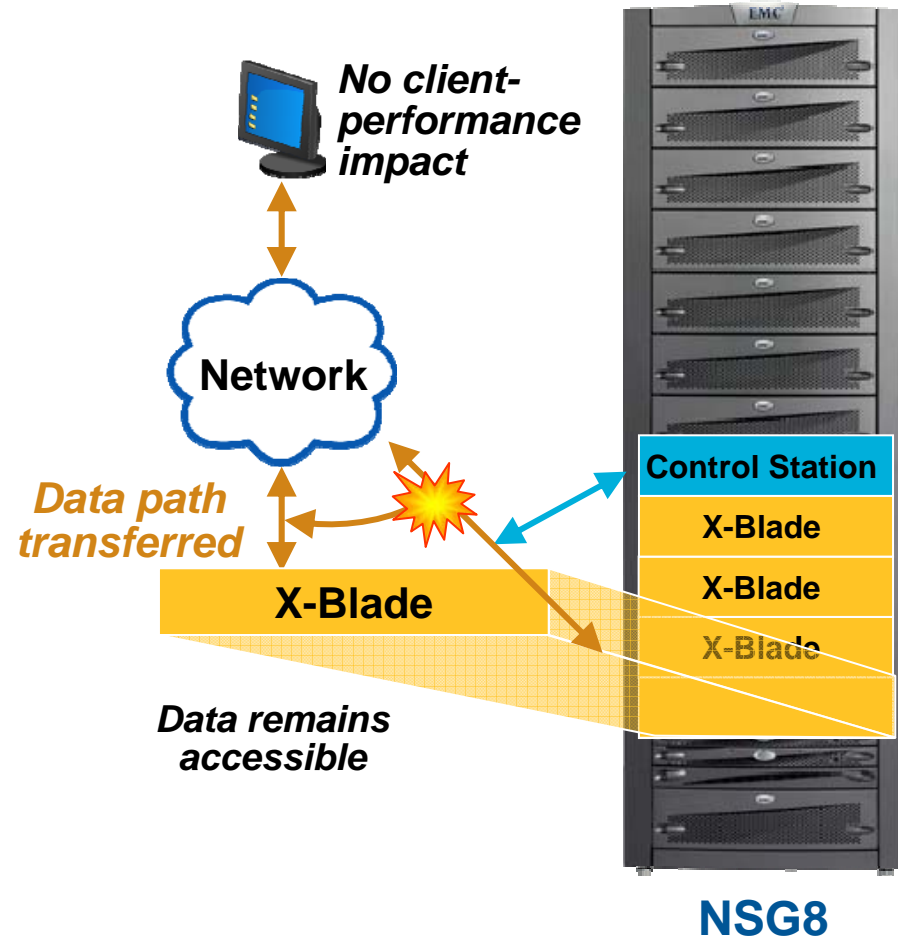


Run the world's most mature NAS operating system

Celerra Failover



- Configurable X-Blade failover options
 - N-to-1
 - Automatic, manual, none
- Failover triggers:
 - Software panic or hang
 - Internal network failure
 - Power failure
 - Memory error
 - Non-responding X-Blade
- Failed X-Blade shut down to avoid “split-brain syndrome”
- IP, MAC, and VLAN addresses are transferred
- Automatic call-home of event
- No performance impact after failover
- Automatic Control Station failover

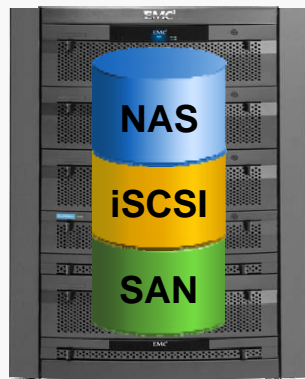


Celerra: Unified Storage vs. Gateway



UNIFIED STORAGE

- Dedicated storage
- Integrated NAS, iSCSI, and Fibre Channel
- Easy to deploy, simple to manage
- Scale capacity

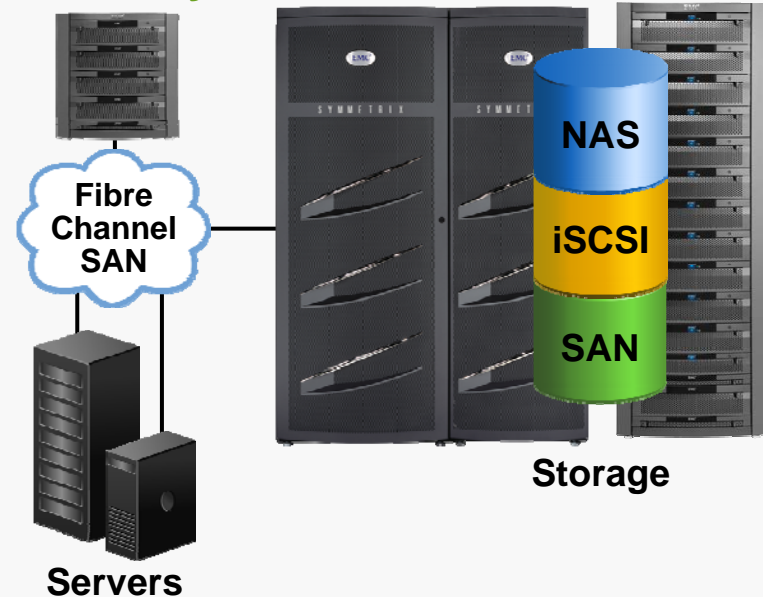


Unified Storage

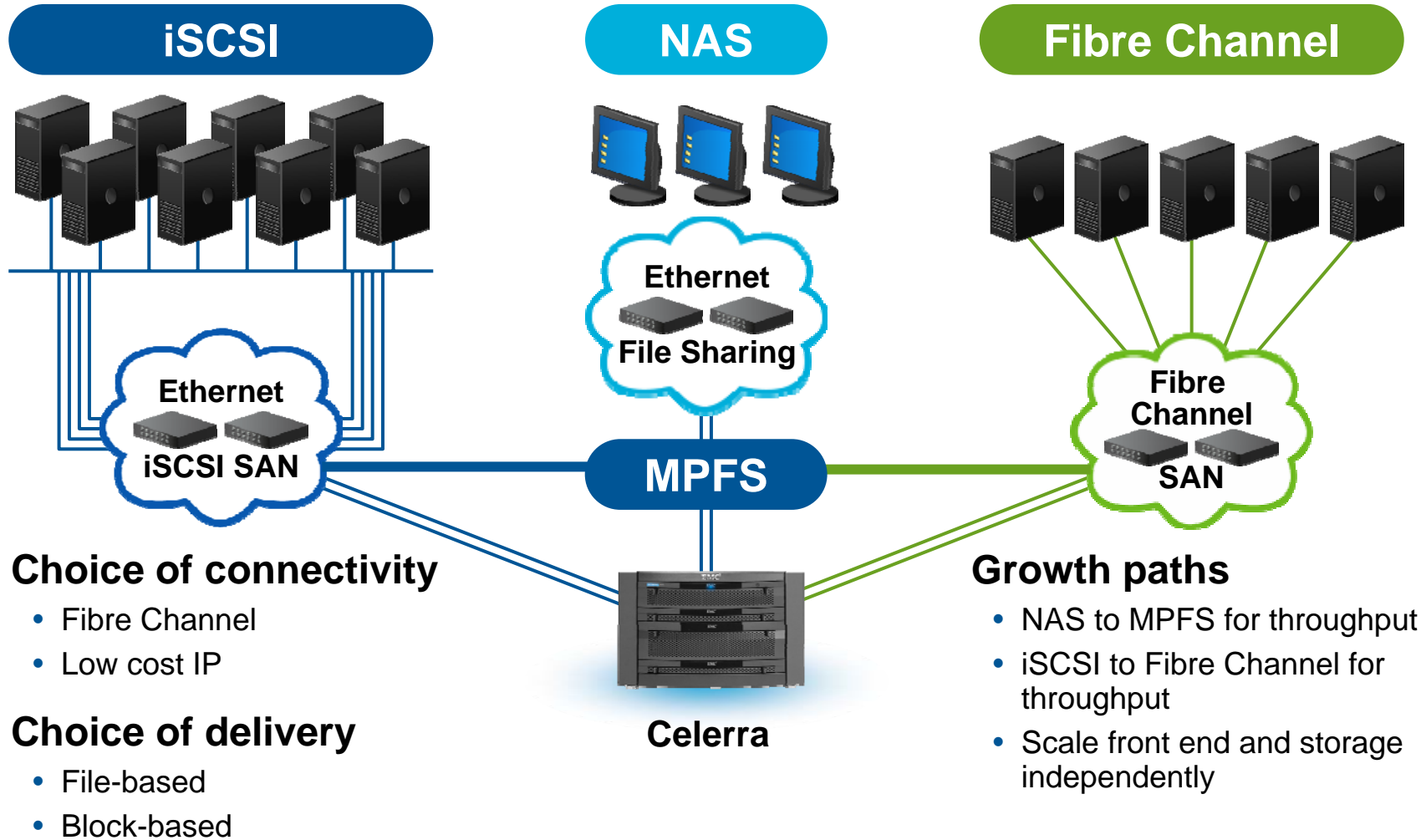
GATEWAY

- Shared storage
- Add NAS and iSCSI to Fibre Channel SAN
- Highest storage usage
- Scale performance and capacity

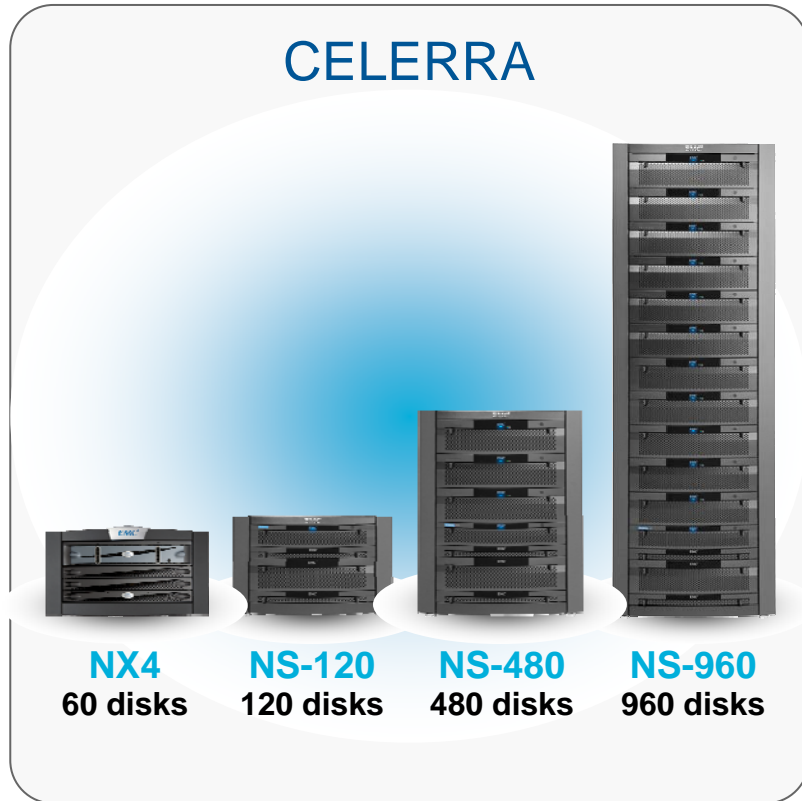
Gateway



Celerra Unified Storage



Celerra Unified Storage: NX4, NS-120, NS-480, and NS-960



- Operating modes
 - NX4, NS-120
 - Single X-Blade
 - Online upgrade to dual
 - Dual X-Blades
 - Automatic failover, or primary/primary
 - NS-480: Two or four X-Blades
 - Advanced clustering
 - NS-960: Two to eight X-Blades
 - Advanced clustering
 - Dual Control Station option
- Maximum usable IP storage capacity (X-Blade/system)
 - **NX4**: 16 TB/32 TB
 - **NS-120**: 32 TB/64 TB
 - **NS-480**: 64 TB/192 TB
 - **NS-960**: 128 TB/760 TB

Celerra Gateways: NS40G, NS-G8 Connects to Symmetrix and CLARiiON



NS40G

- Operating modes
 - Single X-Blade
 - Online upgrade to dual
 - Dual X-Blades
 - Automatic failover, or primary/primary
- Maximum usable IP storage capacity
 - 64 TB per X-Blade
 - 128 TB per system

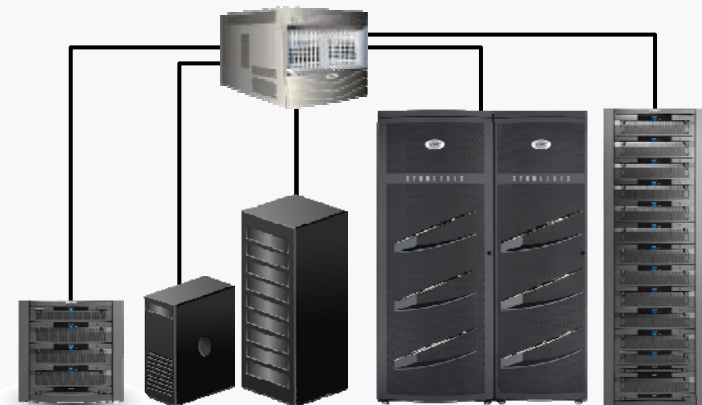


NS40G

NS-G8

- Two to eight X-Blades
- Configurable failover options
- Automatic Control Station failover with dual Control Station option
- Maximum usable IP storage capacity
 - 128 TB per X-Blade
 - 896 TB per system

Connectrix SAN



NS-G8

Servers

Symmetrix CLARiiON

Celerra Ease-of-Use Capabilities



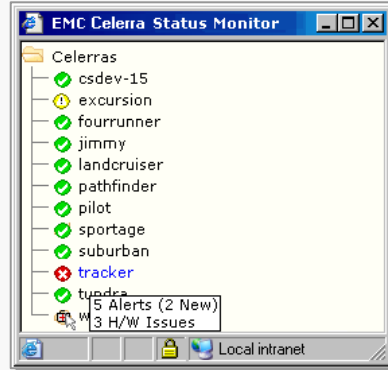
CELERRA STARTUP ASSISTANT



Installation

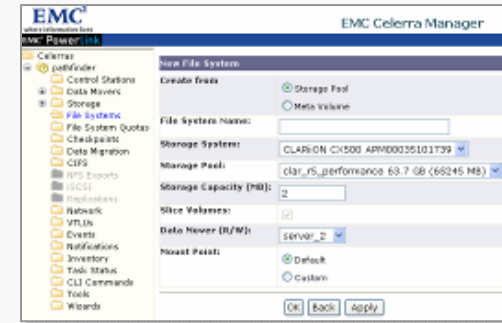
15 minutes power-up to production

CELERRA MANAGER



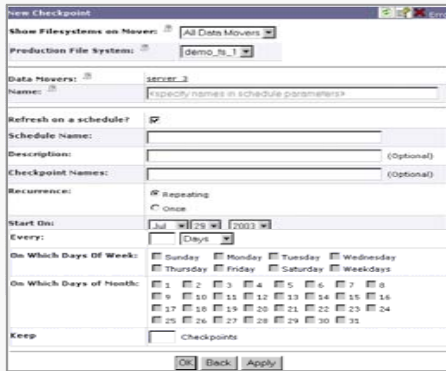
Intuitive Web-based management

AUTOMATED VOLUME MANAGEMENT



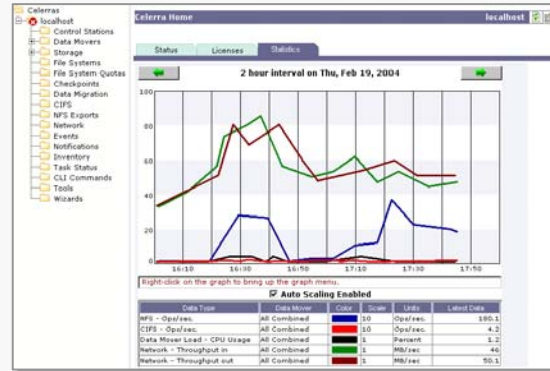
Provision file systems in four clicks

CELERRA SNAPSURE



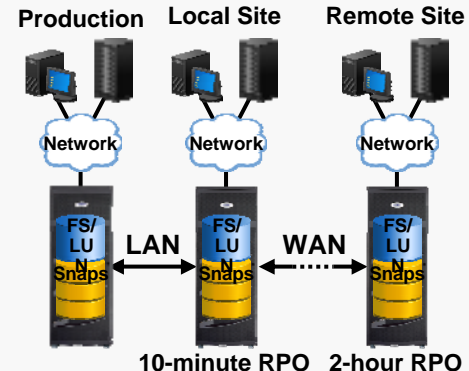
Simple snaps

CELERRA MONITORING



At-a-glance system status

CELERRA REPLICATOR

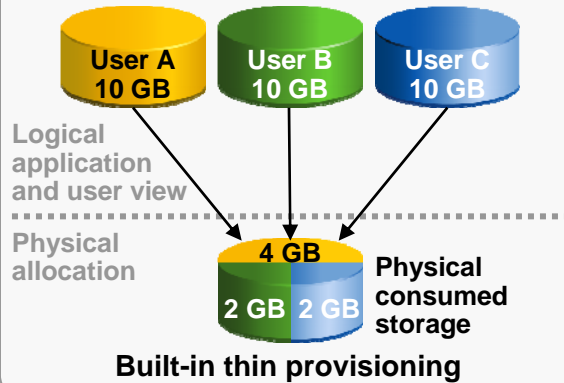


Simple Business Rule RPO

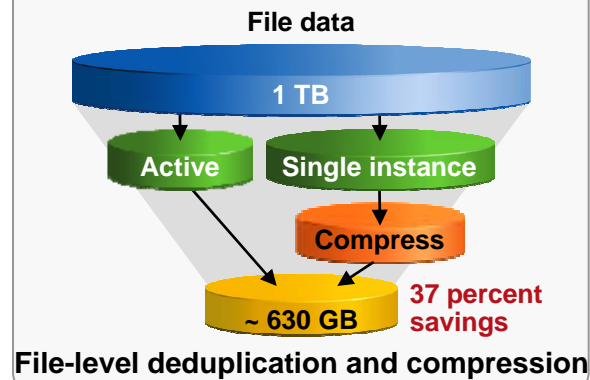
Celerra DART: Built-in Advanced Functionality



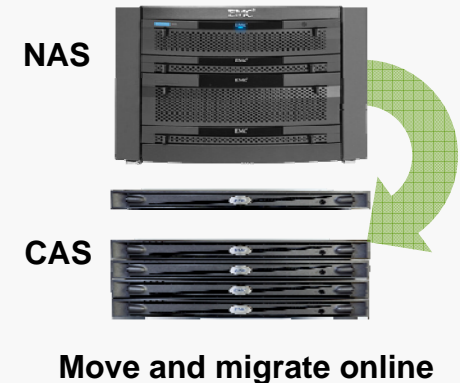
CELERRA VIRTUAL PROVISIONING



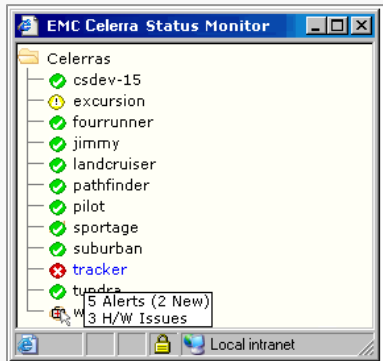
CELERRA DATA DEDUPLICATION



CELERRA FILEMOVE

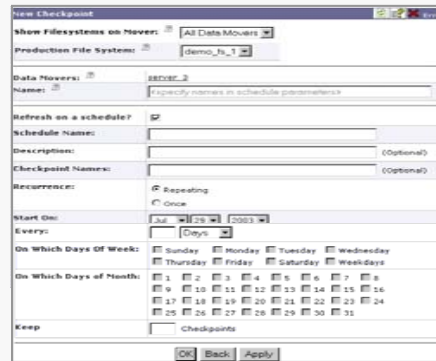


CELERRA MANAGER



Intuitive Web-based management

CELERRA SNAPSURE



Simple snaps

CELERRA MONITORING



At-a-glance system status

Celerra DART: Optional Advanced Functionality

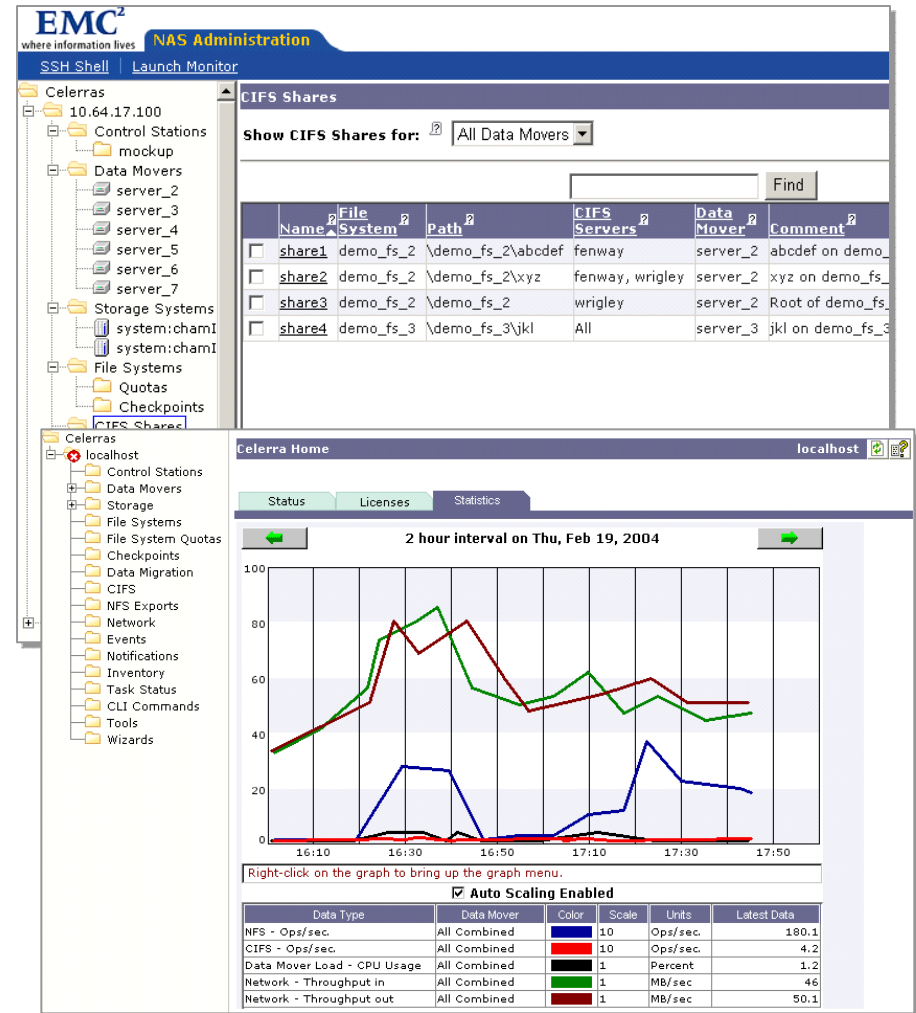


- File-Level Retention
 - Disk-based WORM
- Celerra Manager Advanced Edition
 - Web-based, Wizard-driven, intuitive
- Celerra MPFS
- Celerra Replicator
 - High-performance file system integrating NAS and SAN
 - Asynchronous point-in-time NAS file system and iSCSI LUN copies on a local or remote site
- Celerra Event Enabler
 - Celerra Anti-Virus Support
 - Celerra Event Publishing Agent

Celerra IP Storage Management



- Simple Web-based management
 - Celerra Manager Basic Edition (included)
 - Celerra Manager Advanced Edition
- Enterprise framework integration
 - EMC ControlCenter 5.1 and higher
 - Microsoft Windows Management Console (MMC)
 - EMC VisualSRM
- Advanced functionality
 - Automated Volume Management
 - Celerra Virtual Provisioning
 - Proactive alerting and reporting
 - Snapshot restore and scheduling
 - Celerra FileMover API
 - iSCSI wizards
 - Hard and soft quotas

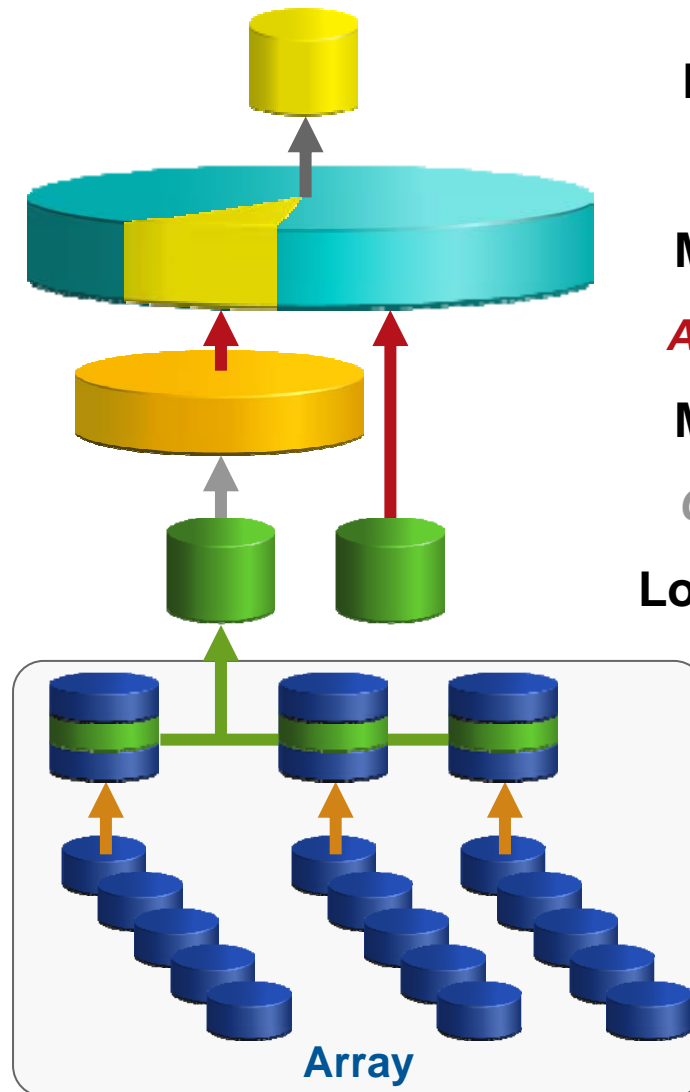


Flexible Volume Management



- Fully leverages advanced array functionality
 - Load-balancing
 - Availability
 - Disk type
 - RAID type
- Striping for improved performance
- Metavolume concatenation with auto-expansion for high capacity
- Slicing for optimal usage

And these powerful capabilities can be automated...



File systems

Slicing

Metavolumes

Auto-expansion

Metavolumes

Concatenation

Logical volumes

Striping

LUNs

RAID

Drives

Automated Volume Management

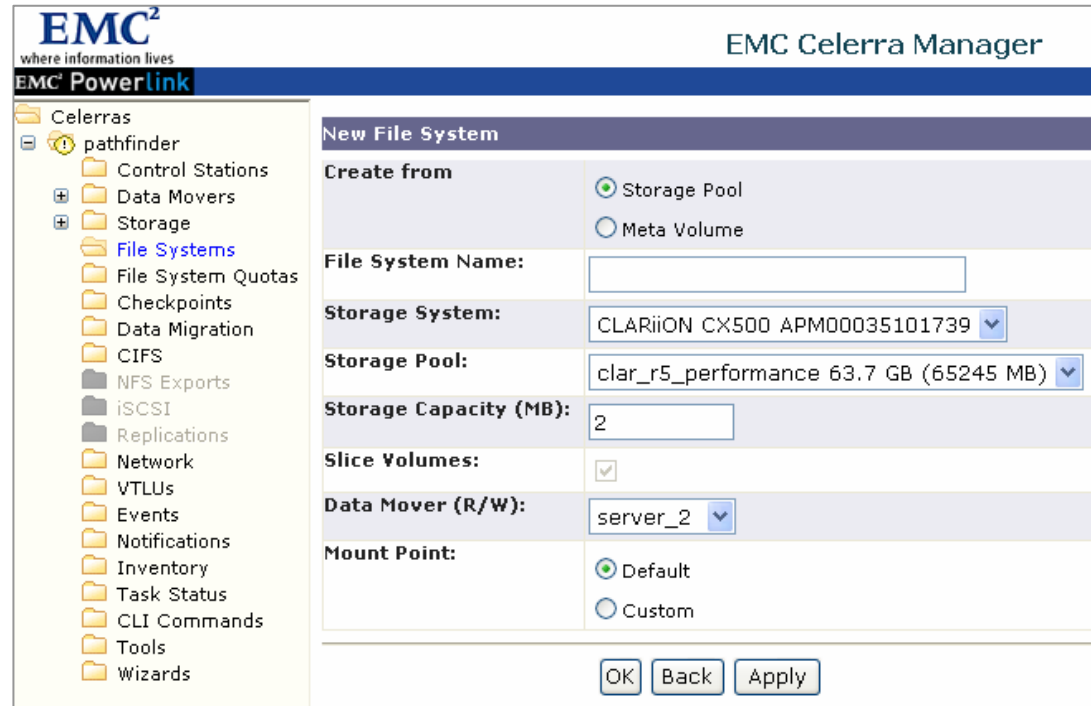


Celerra Manager Basic Edition

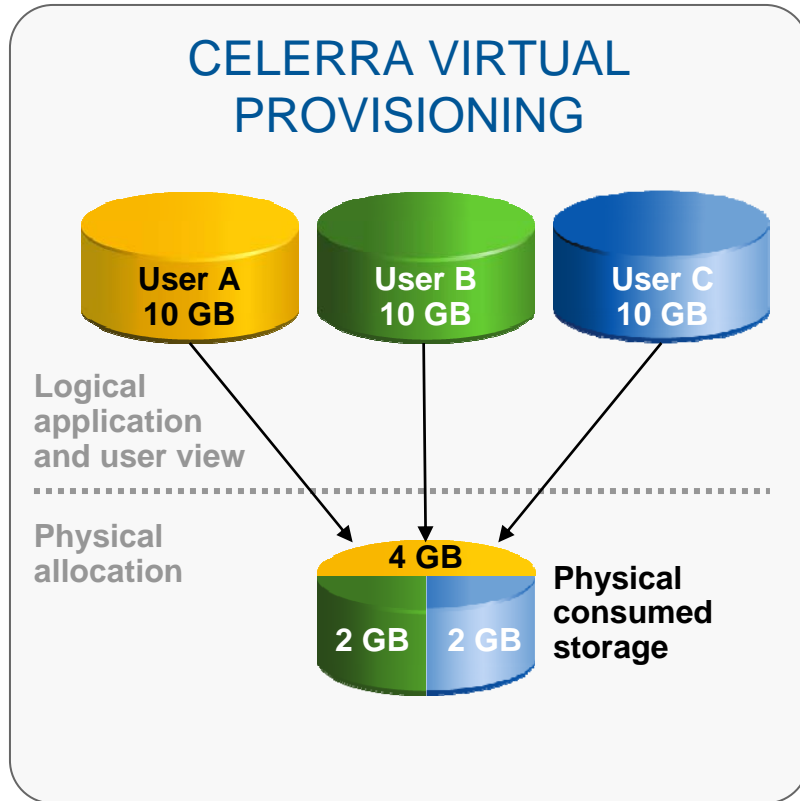
- 1 Select workload type
 - Performance
 - Capacity
 - Archive
- 2 Specify file-system size

Automated Volume Management manages:

- RAID type
- Array load balancing
- Striping
- Metavolume auto-extension
- Slicing
- Celerra volume creation

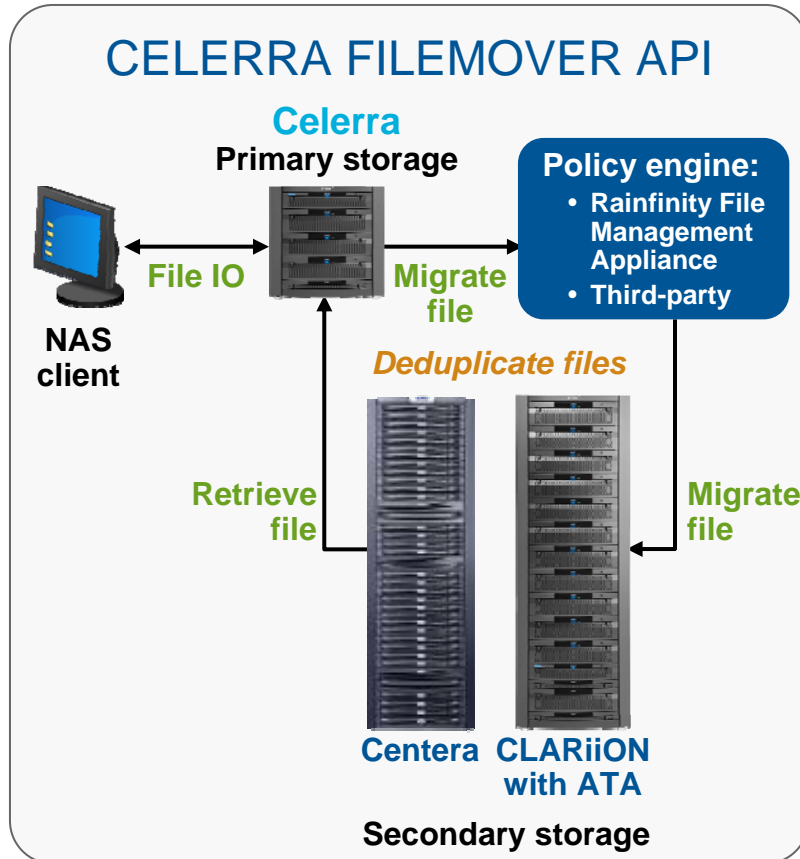


Celerra Virtual Provisioning



- Capacity oversubscription
 - File systems
 - iSCSI LUNs
 - Logical size greater than physical size
- Physical allocation in real time to logical size
- Virtual Provisioning safeguards
- Automatic File System Extension past logical size
- iSCSI Dynamic LUN Extension past logical size

Celerra FileMover API



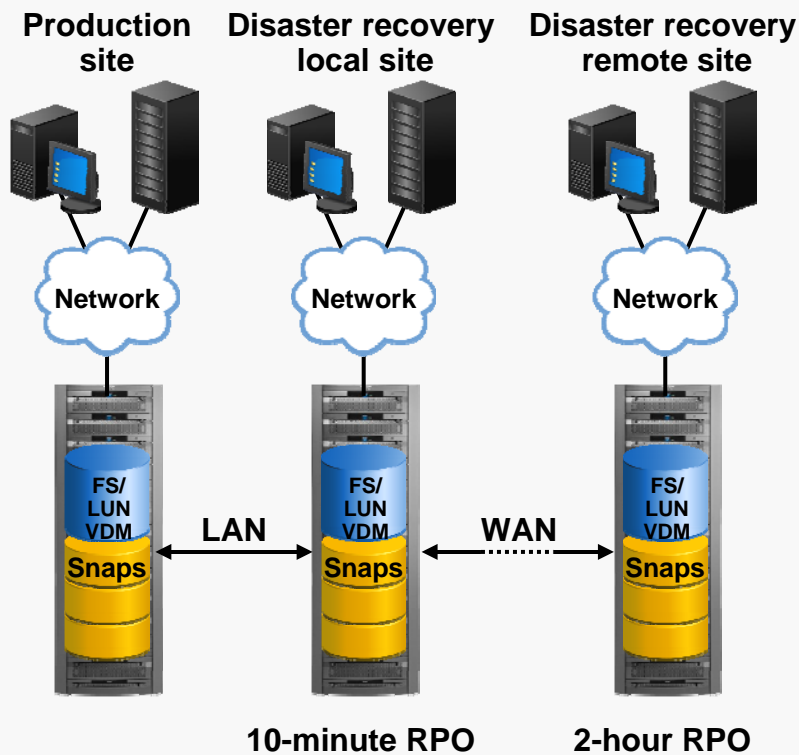
- 1 Policy engine migrates data from Celerra to secondary storage
 - EMC Centera or Celerra deduplicates archive
- 2 Celerra replaces file contents with a stub file
 - Metadata remains
 - Retention coordination with Centera
- 3 When client reads migrated file, Celerra retrieves data according to policy
 - Pass through
 - Migrate back

Open API for automated, transparent data movement between tiers of storage

Celerra Replicator



CASCADING REPLICATION

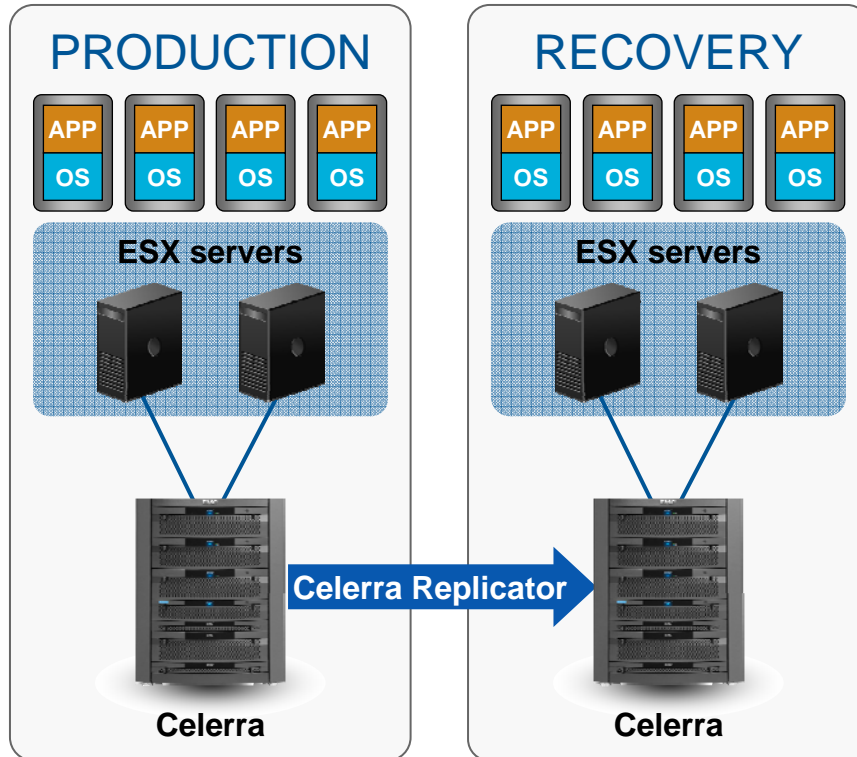


Easily specify replication RPO and interconnect Quality of Service

Point-in-Time Asynchronous File System and iSCSI LUN Replication

- Production data available during replication
- Asynchronous data recovery
 - Read/write copies
 - Playback changes
- Scalability
 - Transmits only changed data
 - Up to 1,024 replication sessions
- Service-level enhancements
 - Automated, business-oriented policy definitions for recovery point objectives (RPOs)
 - Set interconnect Quality of Service by scheduled bandwidth throttling
- Advanced functionality
 - Data distribution—1 to N replication
 - Multi-site disaster recovery—Cascading Replication

Celerra with VMware for Disaster Recovery



Makes disaster recovery rapid, reliable, manageable, affordable

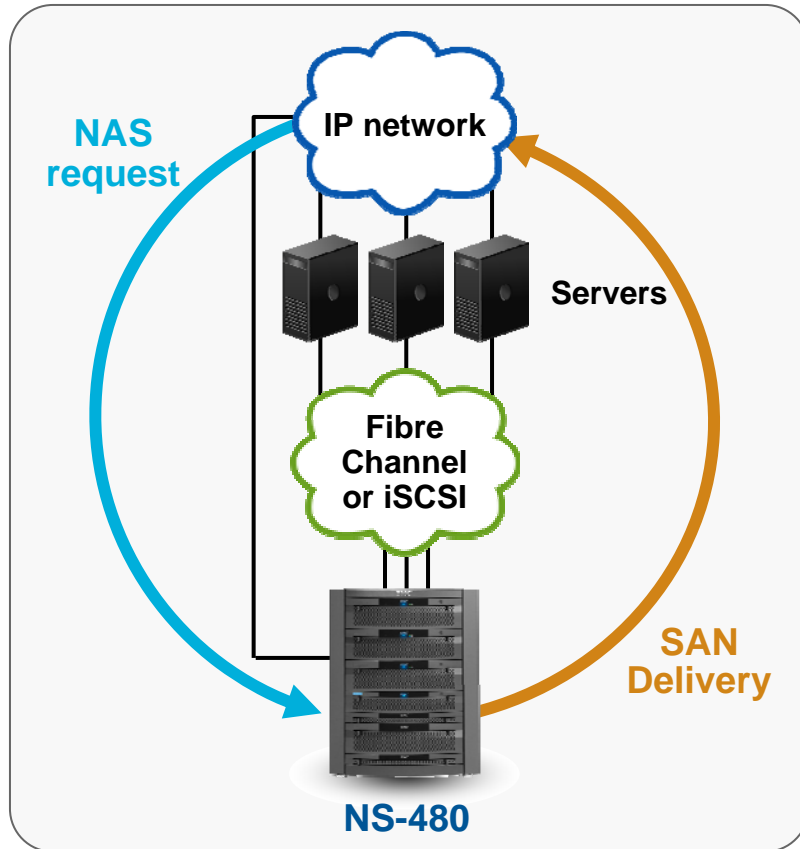
Celerra and VMware Site Recovery Manager (SRM) Integration

- Celerra Replicator controlled by VMware SRM
- Define Celerra and VMware business continuity/disaster recovery workflows for discovery, testing, and failover

Benefits

- Simplifies and automates disaster recovery
- Make disaster recovery a property of the virtual machine
- Provides central management of recovery plans from VMware VirtualCenter
- Turns manual recovery processes into automated recovery plans

Celerra MPFS Integrates NAS and SAN



Patented MPFS Combines iSCSI or Fibre Channel with File Serving

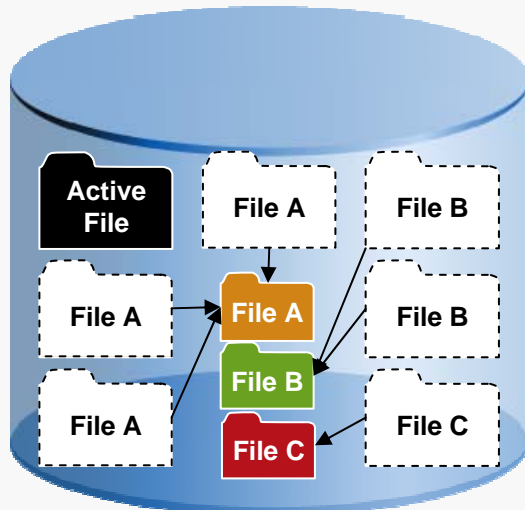
- Delivers improved performance
- Supports file sharing
- Enterprise functionality
- Leverages existing network infrastructure
- Entry-level NS-120 to high-end NS-G8
- Scales to a large number of clients
- Transparent to applications

Celerra Data Deduplication **New**



BASED ON INTEGRATION OF KEY EMC TECHNOLOGIES

EMC Avamar, RecoverPoint



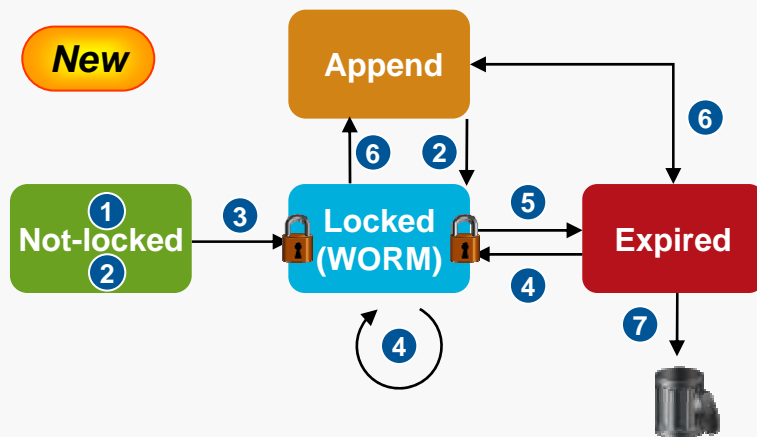
30–40 percent storage savings for typical unstructured file share datasets

- Increased primary storage efficiency
 - 30-40 percent savings
 - Built in compression
 - Single instance files to remove duplicates
- Intelligent data selection
 - Targets inactive data
- Unobtrusive processing
 - Background processing with throttling
- Supports full Celerra functionality
 - Celerra Manager
 - Celerra SnapSure
 - Celerra Replicator
 - Celerra NDMP Backup
 - Celerra FileMover
- Easy to install and manage
 - One-click GUI enablement
 - Hands-off policy-driven

Celerra File-Level Retention



FILE-LEVEL RETENTION WORKFLOW



- 1 Non-File-Level Retention-enabled files
- 2 Set retention periods—enable File-Level Retention
- 3 Committed to “WORM” state
- 4 Retention period extended
- 5 Retention period expires
- 6 Empty or expired files
- 7 File deleted

Providing Disk-Based WORM Functionality

- Celerra File-Level Retention Enterprise (FLR-E) option
 - Enables adherence to good organizational best practices
 - Provides for retention periods per file
 - Authorized file system deletion
- Celerra File-Level Retention Compliance (FLR-C) option
 - Meets compliance requirement “SEC Rule 17a-4(f)”
 - Prevents file systems deletions
 - “Hard” default retention periods
 - Write verification
 - Retention periods cannot be modified
 - File systems cannot be deleted

EMC Celerra and Microsoft Compatibility



Client, Application, and Management

- DART operating system compatibility
 - Client integration with Celerra SnapSure
 - Windows 2008 support (SMB2, Hyper-V)
 - Interoperability with future Windows releases
- Windows logo-certified iSCSI
 - Volume Shadow Copy Service (VSS) Provider
 - Microsoft Exchange and SQL Server support
 - Snap and replication integration via EMC Replication Manager
- Native Microsoft management tools
 - Managed as a Windows server
 - Distributed File System (DFS) support
 - Active Directory integration

Celerra Summary



CELERRA IP Storage Leadership



Enterprise IP Storage Features

- Transparent access to the same files by UNIX (NFS) and Windows (CIFS) clients
- Windows iSCSI logo-certified
- Integrated models for unified storage
- Gateway models for existing SANs
- Industry-leading price/performance
- DART: Industry-leading availability and performance
- FLARE: Industry-leading data integrity and performance
- CLARiiON or Symmetrix: Industry-leading storage
- Industry-leading service and support

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