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where information lives®

A Guide to

Next-Generation Backup, Recovery, and Archive

Integrated Backup-to-Disk Solutions

File System and E-mail Archiving

Enhancing Tivoli Storage Manager (TSM) Backup Environments

Remote and Branch Office Backup

Automated Information Extraction and Movement

Advanced Services for Backup, Recovery, and Archive

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Next-Generation Backup, Recovery, and Archive with EMC

It's likely that your organization is experiencing dramatic information growth as well as increasing service levels that require you to deliver on the following directives:

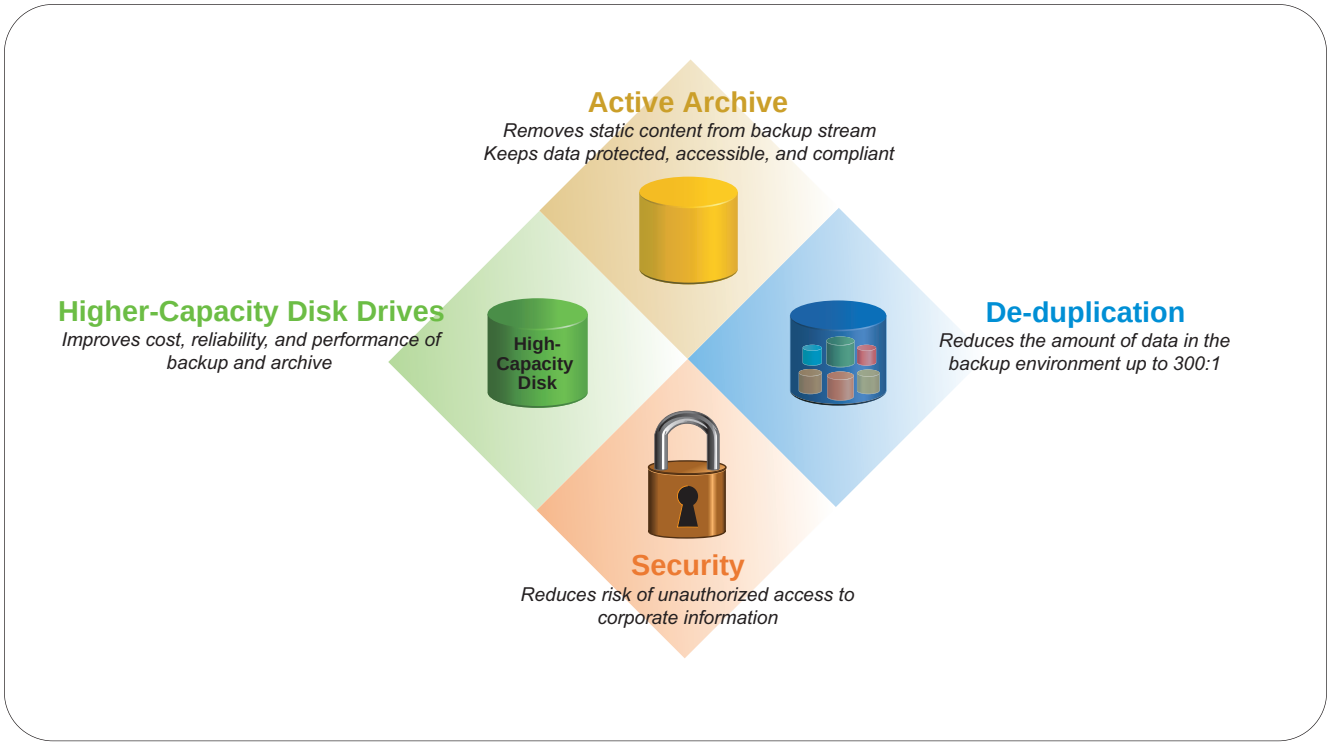
- Remove risk with faster and more consistent backups and restores
- Improve security and reliability by safeguarding vital assets and reducing process errors
- Reduce complexity with policy-based backup tasks and centralized management
- Lower the total cost of ownership with lower-cost storage tiers for inactive data and by eliminating unnecessary redundant data
- Recover applications faster by using more recent backups
- Restore more quickly from database corruption

EMC's Next-Generation Backup, Recovery, and Archive offerings are focused on helping you solve these challenges.

We can show you how to improve service levels for protection and recovery. And how to reduce costs by automating information movement to lower-cost tier-two or tier-three archiving environments, ultimately giving you better control of all corporate information assets. In addition, EMC provides a range of professional services for assessing, implementing, and managing a backup, recovery, and archive environment. All of these capabilities are integrated with the enterprise applications, file systems, and e-mail applications that run your business today.

Within this guide, you'll find new approaches that can position you at the forefront of the next generation of information management.

Figure 1. Next-Generation Backup, Recovery, and Archive



Improve Enterprise Access with Active Archiving

Are you struggling to meet your backup and recovery service-level requirements in the face of rapid and continuous information growth in your production environment?

A common approach to meeting the backup window as the environment grows is to over-architect a solution that uses multiple backup servers streaming to multiple tape drives. Another approach is to minimize the frequency of full backups. While these approaches will help to improve the speed of the backup, they make the recovery process slower and more cumbersome. This reality compels many to consider a disk-based backup solution.

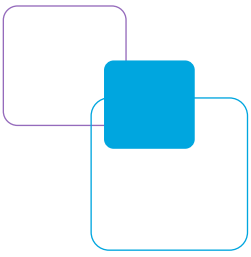
> "How often has the same file or record been backed up, even though the content did not change?"

While disk-based backup will substantially improve the reliability and performance for backup and recovery, it is not the only component that should be considered. It alone cannot address the fundamental cause of backup/recovery headaches: enterprise data growth and accumulation.

As you evaluate new solutions for your backup environment, it is important to start by asking one simple question: "How often has the same file or record been backed up, even though the content did not change?" The fundamental premise behind the power of active archiving is that when a digital asset in the production environment is not actively being updated, it should be seamlessly moved into an online archive. These active archives are self-managed and fully protected. And because they free up production-system space, performance improves, storage costs fall, and backup and recovery processes run faster. (See Figure 2.)

Coupling the benefits of a disk-based backup solution with an active archive leads to a 1+1=3 value proposition. Today there are new choices to consider for backup, recovery, and archive to help you achieve:

- Faster backups and restores
- Better and more consistent performance in the production environment
- Policy-based management of information asset retention and deletion
- Smaller, more efficient, more economical systems
- Simplified management by moving inactive information into an archive
- Reduced acquisition costs from buying fewer servers and tape cartridges
- Improved enterprise access to business information
- Ability to quickly recover from database corruption



Things to Do as You Begin

To set the most appropriate priorities for addressing backup, recovery, and archive issues it's essential to understand your current environment and your business requirements. Here are some ideas about what you should do as you begin to assess your backup, recovery, and archive requirements.

Understand What is Being Protected and the Quality of that Protection

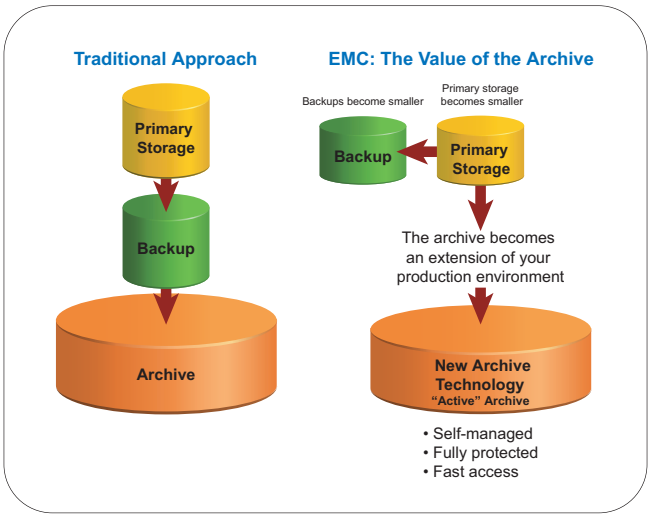
Understand the different kinds of data within your organization including structured data in enterprise applications and unstructured data such as files and user data. Determine the various recovery requirements between applications, e-mail, and user documents.

Examine remote offices and remote locations and compare information protection procedures, costs, and effectiveness at these locations. Determine if your remote locations are receiving adequate information protection.

Ensure that your organization has an adequate and consistent backup between applications within the data center and between the data center and remote locations. How can you establish backup consistency and expedite recovery in all the locations that need information protection?

Determine that you have appropriate quality of information protection. Many recovery requirements call for more speed and better reliability than tape delivers. Can you ensure that your backups are consistent, quickly retrievable, and readable?

Figure 2. Next Generarion Backup and Archive



Quantify Backup Efficiency

Measure how long it takes to do backups and determine backup's impact on application uptime. What is the maximum time you have to back up each application? Is backup already interfering with your business operations? Can you scale backup to accommodate future information growth? How many times do you back up the same, unchanged files?

Gauge how many IT resources are involved per backed-up GB. How many people are performing backups; checking, tuning, and verifying backup processes; and involved in restoring information?

Determine the operational efficiency of your backup environment. How many different backup applications do you run? Are your backup operations and processes centrally controlled through an enterprise backup application? Do you receive a list of all backup operation successes/failures?

Measure and Align

Measure your ability to recover from a disaster and the length of time it takes to do a recovery. Calculate the probability of recovery success on the first try.

Align backup processes with your business recovery requirements. Determine the recovery service level for each application and if you can restore business operations in an appropriate amount of time.

Anticipate the Use of the Backup

Make a list of the types of situations or circumstances that would require you to use the backup information. There may be a variety of potent reasons that you'll need it for a full or partial recovery, but there may also be other circumstances as well—such as for legal discovery. Try to anticipate the frequency of each occurrence and estimate the amount of time the organization would tolerate to perform each task.

Integrated Backup-to-Disk Solutions

Many organizations continue to depend on traditional tape technology to execute regular backup and recovery processing. The perceived low cost and portability of tape have made it appear to be an attractive medium for storing significant amounts of backup data. Yet, relying on tape for backup and restore in today's business environment presents numerous challenges. Traditional tape-based backup and recovery:

- Can't meet many of today's critical recovery time objectives
- Give no assurance of completeness or accuracy for use in a recovery situation
- Make it difficult to meet shrinking backup windows, affecting application availability
- Require significant manual intervention to administer most tape-related processes

It is clear that organizations require a more efficient and reliable backup and recovery process to meet required service levels, protect critical business data, and improve IT efficiency.

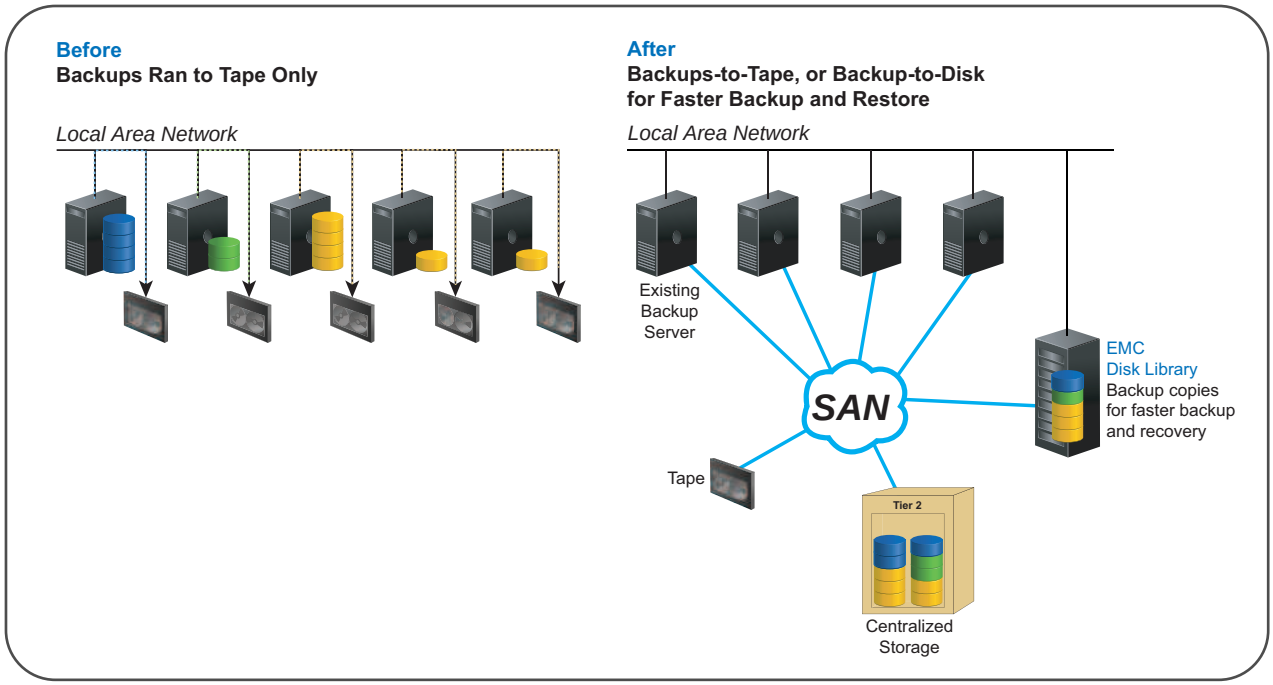
Protect Your Critical Business Data

EMC offers a broad range of backup-to-disk solutions comprising a comprehensive set of hardware products, EMC NetWorker backup software, and professional services. And we offer documented best practices to help size and select the optimal solution for your environment.

By addressing the limitations of traditional tape-based backup and recovery, EMC helps you protect critical business data for applications like Microsoft Exchange, Oracle, and SAP. You will benefit from our extensive experience with disk-based backups to help you realize:

- Faster recovery times: Performing data restoration from disk is significantly faster than performing the same restore from tape.
- Lower business risk: Built-in hardware redundancy, RAID protection, and availability features of disk technology ensure data can be quickly and accurately restored.
- Increased application uptime: Smaller backup windows mean less impact on application and system availability.
- Easier implementation: Tested solution architectures work with your existing environment and accelerate your transition to disk-based backups.

Figure 3. Tape Emulation (Backup-to-Disk)



EMC has a range of backup applications from basic to advanced. Basic backup applications deliver an intuitive interface that facilitates backups and restores to either disk or tape in a cost-effective manner.

Advanced backup applications are for larger, consolidated environments that require the highest performance, are deploying new applications, or are consolidating multiple backup environments.

For application environments that are online 24x7, you should consider array-based replication technology to facilitate backup from a point-in-time copy rather than the production volume.

For basic backup, EMC Retrospect delivers a cost-effective backup application for small businesses. It has an intuitive user interface, is simple to set up and run, and works with either tape or disk media.

For larger organizations requiring advanced backup, EMC NetWorker (Disk Backup Option) delivers the highest-performing backup application that exploits high-performance disk-array capabilities such as simultaneous access to the same media. EMC NetWorker is also an ideal choice for large consolidated environments that have both tape and disk in the backup environment because of its unique capability to provide a single-step restore from either tape or disk. (See Figure 3)

EMC offers a range of solutions to meet any service-level requirement for backup, recovery, or archive including:

- A spectrum of media from tape to ATA storage arrays
- Purpose-built appliances optimized for backup
- Specialized arrays to manage fixed content
- Software and services to automate the processes

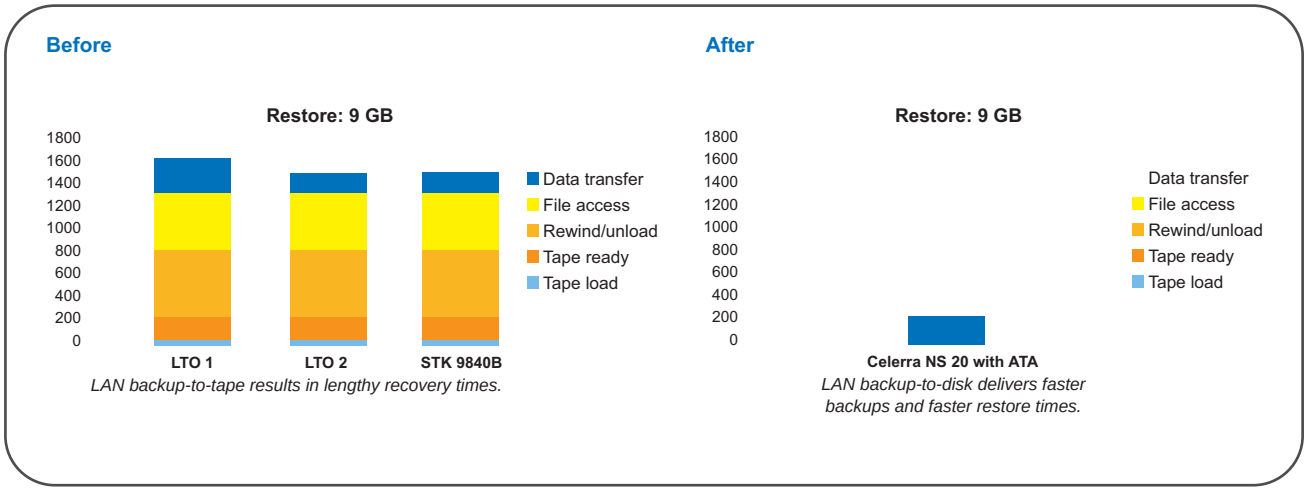
EMC Disk Library: Tape emulation enables a storage array to emulate open systems tape libraries, drives, and cartridges. Tape emulation provides performance and availability benefits you can't get with tape. It integrates into the existing tape environment, including vaulting and management procedures, without changing your existing processes. Tape emulation is a good choice if you want the advantages of disk without changing your existing environment. (See Figure 4)

Today's Choices for Backup, Recovery, and Archive

EMC CLARiiON CX, CLARiiON AX, and Celerra NS Series: Storage array technology with ATA disks can be used as a backup target for open systems to connect to either a SAN or IP network. These solutions are a good choice if you need faster recovery times and want to use a disk array for both production and backup. (See Figure 6)

ADIC Scalar Tape Libraries: These libraries provide tape-based solutions for open systems backup/restore or for environments that do not have aggressive recovery-time objectives and are looking for the lowest possible acquisition cost.

Figure 4. Tape Emulation (Backup-to-Disk)

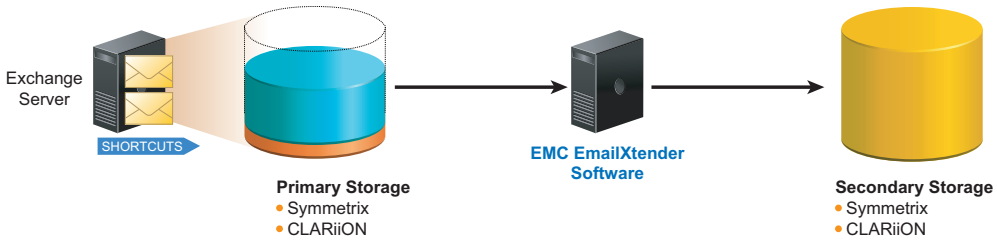


File System and E-mail Archiving

Today, the fastest growing environments for most companies are e-mail and file servers. Growth is usually managed by constantly adding more servers, storage, and backup infrastructure. This approach is no longer feasible because SLAs for backup, recovery, and accessibility of information are continually on the rise. Add to this the additional pressures of:

- Criticality and cost of downtime for e-mail servers
- A company's inability to manage, automate, and enforce retention policies
- Difficulty in retrieving messages and/or files from backup tapes
- Uncertainty and risk around the reliability of relevant content retrieval from backup tapes
- High cost of offsite vaulting, with potential risks if tapes are lost
- Unintended consequences of restrictive mailbox quotas forcing users to create personal archives that pose risk and waste file server capacity/backup resources

Figure 5. Simplified Management of the Storage Infrastructure



By combining EMC EmailXtender archiving software with EMC storage, messages can be automatically moved to different tiers of storage based on policy, drastically reducing primary storage requirements.

Reduce the Amount of Data to be Backed Up

EMC comes to the table with fully tested and proven archiving solutions. Combining hardware, software, and design and implementation services, they help optimize backup and recovery operations in your e-mail and file system environment. An integrated e-mail or file system archiving solution is designed to:

- Improve operational efficiency
- Reduce backup windows
- Help meet retention requirements
- Provide online access to archived content
- Manage primary storage utilization to effectively reduce TCO

EMC offers end-to-end solutions to help you address your file system and e-mail growth challenges. The foundation of the solution is EMC Centera, a purpose-built archiving platform supporting content-addressed storage (CAS).

EMC has thousands of customers that use our e-mail archiving and file system archiving solutions. this experience has enabled us to develop a non-intrusive assessment methodology to gauge your potential savings and provide the appropriate archive solution to resolve your backup and archive challenges.

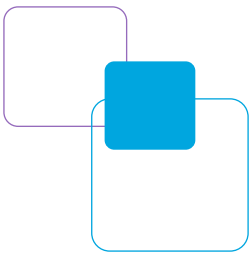
File System Archiving solution: Improve file-server management and increase storage efficiency by leveraging a tiered-storage infrastructure. EMC's File System Archiving solution reduces costs and optimizes your backup and recovery operations.

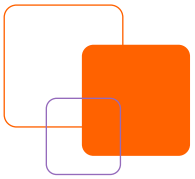
The EMC DiskXtender family delivers policy-based, file-system-centric solutions to move information automatically and transparently from primary storage to secondary storage. Content is migrated to the more cost-effective EMC Centera, a self-healing, self-configuring, and self-managing archive platform.

E-mail Archiving solution: Improve your e-mail environment's storage management and operational efficiency with centrally defined content management and e-mail archiving policies. At the same time, reduce the cost and risk of legal discovery and automate e-mail retention and disposition policies to meet regulatory and corporate governance requirements. EMC's E-mail Archiving solution unites assessment, design, and implementation services with e-mail archiving functionality and tiered storage platforms.

EMC EmailXtender reduces e-mail server stress and bottlenecks by seamlessly migrating e-mail message stores to secondary storage. Then, EMC DiskXtender moves content to EMC Centera systems, providing an integrated solution and a simple, seamless user experience. (See Figure 5)

EMC also offers Express Solutions for Archiving. EMC Express Solutions for Midsize Enterprises are complete, integrated storage solutions comprising the hardware, software, and services you need to meet your most important business and IT challenges.





Enhancing Tivoli Storage Manager (TSM) Backup Environments

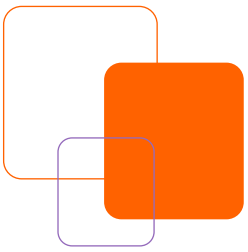
Companies that use IBM Tivoli Storage Manager (TSM) as their backup application can sometime have significant issues that are tied to the performance of tape backup including:

- Slow data copy rates
- Slow data recovery
- Expensive investments in additional tape infrastructure
- Staff workloads

TSM users often have difficulty maintaining their "daily schedule" (the operations required to maintain a healthy TSM environment) due to data growth and native TSM limitations.

Application recovery within a TSM environment frequently extends far beyond SLAs due to the "incremental forever" feature of TSM ("incremental forever means recover forever" is a common belief in TSM shops).

Infrastructure in support of a TSM environment is difficult to scale efficiently. This leads to purchasing disks for caching; a higher-than-average number of tape drives, and larger-than-required libraries, all to enable operations within TSM requirements.



Disk Speed and Reliability in a Tape Environment

Many TSM users have turned to EMC to improve their backup operations and information recovery speed. EMC evaluates the entire TSM backup environment, identifies the constraints within the system, and designs a superior backup and recovery solution.

By implementing an EMC Disk Library solution, the TSM issues associated with tape performance and reliability are eliminated. EMC Disk Library provides the speed and reliability of disk while emulating the original tape library so integration into the TSM environment is simple and straightforward.

By implementing an EMC Disk Library solution, the TSM issues associated with tape performance and reliability are eliminated.

Remote and Branch Office Backup

Information critical to the success and efficiency of your organization is not just found in your data center. It also resides at your remote and branch offices. Ensuring that a consistent and comprehensive backup-and-recovery process adequately protects all vital information is a challenge to most organizations.

Protecting remote and branch office data using traditional backup solutions is risky. All too often, remote and branch offices rely on untrained staff to perform complex, manual backup operations using failure-prone tape devices. The lack of centralized control means that every office performs backup differently—if at all. As a result, many offices are leaving critical data unprotected.

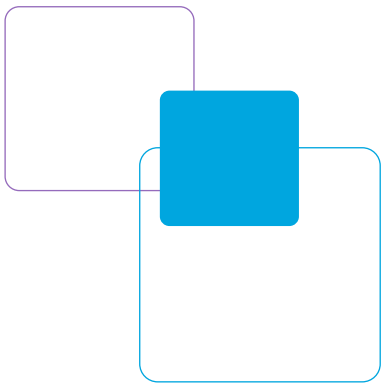
Not all centralized backup solutions for remote offices are effictive. They backup duplicate files that are stored across hundreds of systems company-wide. When combined with traditional daily incremental and weekly full backup schedules, the impact of duplicate data is staggering.

Organizations often move more than 200 percent of their primary storage data every week. As a result, WAN-based backup has not been an option due to the sheer volume of backup data, limited network bandwidth, and short backup windows. What's more, the extra capacity required to store duplicate data increases total storage costs as data is retained for many months or years.

Organizations with remote and branch offices need to:

- Reduce backup times dramatically
- Realize "tape economics" with disk performance and reliability
- Centrally manage remote operations
- Perform data protection across existing IP WANs
- Mitigate tape's challenges around reliability and risk

EMC Avamar utilizes patented global data de-duplication technology to identify redundant data at the source, minimizing backup data before it is sent over the LAN or WAN. With this de-duplication technology, Avamar enables fast, secure backup and recovery for your remote offices, data center LANs, and VMware environments. Furthermore, Avamar reduces the amount of time required for backups, the growth of secondary storage, and network utilization.



Centralized Backup of Remote Locations

Remote and branch office backup from EMC is designed to help you centralize backup of remote locations using minimal bandwidth, giving you a centralized daily backup copy.

EMC offers you a unique solution to solve remote and branch office data-protection challenges. Using de-duplication technology you can efficiently centralize server backups in remote and branch offices using minimal bandwidth and very limited administrative overhead. EMC Avamar remote and branch office backup is simple, safe, and manageable and can:

- Reduce LAN/WAN traffic during backup
- Eliminate distributed tape management and infrastructure
- Mitigate risk involved with manually shipping tapes

By filtering out redundant data segments at the source before transferring data, EMC Avamar reduces the required network bandwidth and backup storage by up to 300:1. This enables daily full backups via existing networks. Central management simplifies remote backup, reducing reliance on non-IT staff and local tape devices. Data is encrypted during transfer across the WAN eliminating the need to ship tapes offsite.

Remote Office Data Protection with EMC RepliStor is an out-of-the-box software technology that provides data recovery and protection for Microsoft Windows. RepliStor increases data availability by delivering realtime replicas to one or many locations, regardless of location. You can use data for offline backup protection, disaster recovery, and data distribution.

Remote Office Data Mobility with EMC OnCourse enables secure, reliable, automated distribution of files between heterogeneous systems across IP networks. With OnCourse, data can be moved and replicated between two or more systems, aggregated from many systems to a central node, or distributed to many nodes from a central system.

Remote Office Tiered Storage and Consolidation: EMC offers IP storage solutions to meet your consolidation requirements—from the data center to the branch office. Our IP storage systems support NFS, CIFS, and iSCSI protocols, making it easy to consolidate file servers and direct-attached storage on a single platform. Global file virtualization solutions help you identify and eliminate bottlenecks in the network, optimize file server utilization, and boost performance while simplifying migrations and IP storage management.

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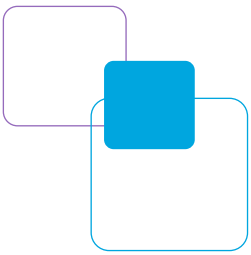


Automated Information Extraction and Movement

The value of information changes over time. When information is first acquired, it is likely to be transactional in nature and accessed and modified frequently. As information ages, it becomes inactive or static and should be moved to more economical, online storage platforms. Automatically extracting and moving static information from primary storage platforms delivers the following benefits:

- Streamlined application performance
- Reduced overhead of daily backups
- Increased speed of disaster recovery
- Reduced total cost of storage
- Increased length of time that information is accessible online

Efficiently Manage Growth

Automated information extraction and movement allows you to efficiently manage growth by moving inactive data off primary storage, thus saving money in production storage and server resources. These efficiencies, in turn, save money by reducing infrastructure requirements for replication and backup. Archiving also frees up product cycles, improves application performance, and simplifies the management of the production environment.

EMC offers seamless, automated information extraction and movement between storage tiers for files and file systems, e-mail environments, ERP environments, as well as cross-application archiving environments.

For files and file systems, the EMC DiskXtender family of products delivers policy-based, file-system-centric solutions. These solutions enable the automatic movement of information from primary storage to secondary storage while maintaining transparent access to data.

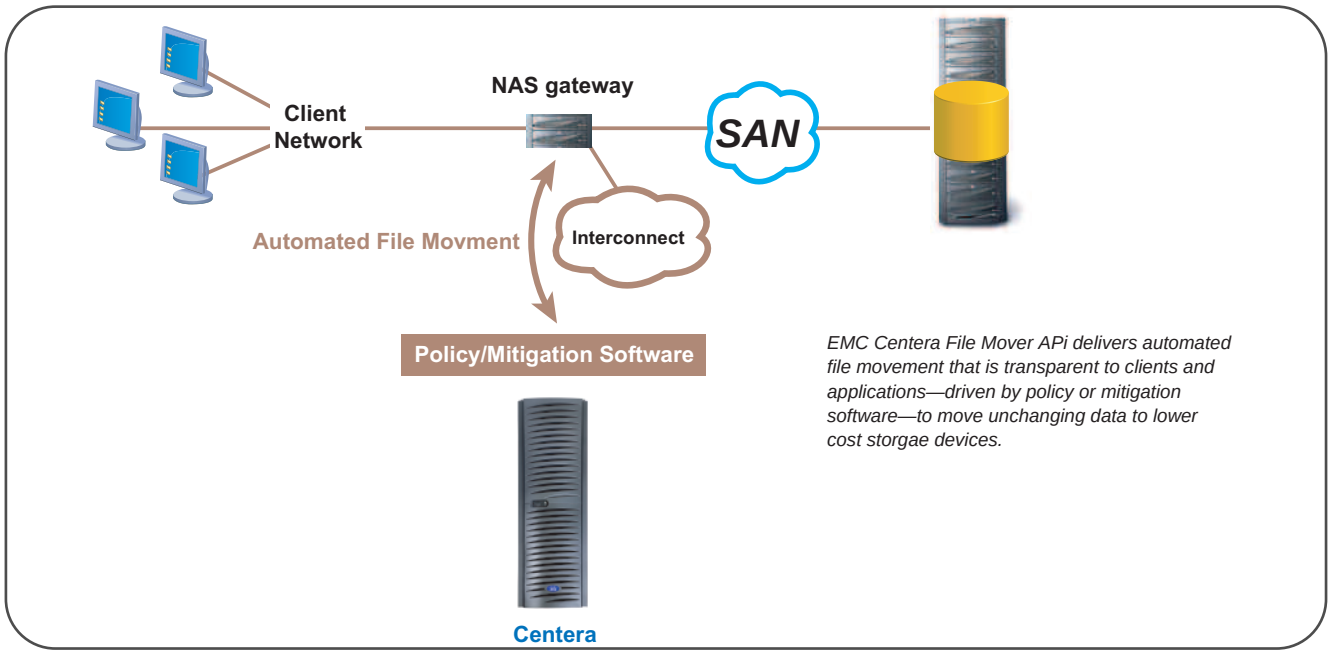
EMC Centera FileArchiver offers an effective light-weight policy engine for file-level archiving to move static content from high-performance EMC Celerra NAS to EMC Centera CAS systems.

For e-mail environments, EMC EmailXtender reduces e-mail server stress and bottlenecks by seamlessly migrating e-mail message stores into lower cost devices.

For cross-application archiving environments, EMC Documentum Content Storage Services add metadata intelligence to content. This eases data movement between tiered storage platforms, ensuring that the right information resides on the right storage platform to deliver the required service level as the value of the information changes.

Celerra File Mover API facilitates the movement of files between multiple tiers of storage enabling clients on an IP network transparent access to information. (See Figure 6)

Figure 6. EMC Centera File Archiver



Advanced Services for Backup, Recovery, and Archiving

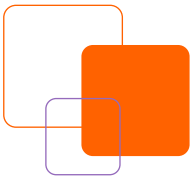
Even with the compelling business and economic reasons to improve backup, recovery and archive, some organizations may still struggle with the task of planning, building, and integrating the information-protection solutions they need. That's why EMC offers a comprehensive set of services to meet your required service levels at the right price.

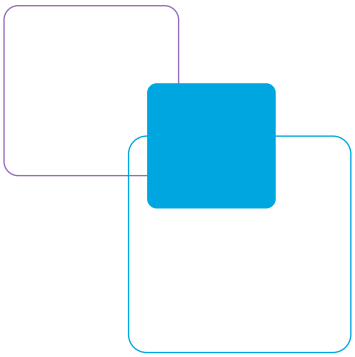
Backup and Archiving Assessment Service provides detailed information on the amount of fixed content that can be moved out of the production environment and onto tiered storage. It also identifies opportunities to speed backup and recovery through suggested and justified changes in process and/or technology.

Backup Assessment Service presents an analysis of your existing environment and delivers the financial, operational, and process information you need to plan and implement change.

EMC Data Profiling for File System and Exchange Servers captures and provides detailed information such as server storage utilization, file system data growth rates, server PST files, e-mail message and attachment aging, and e-mail store growth rates.

EMC Implementation Services fine tunes your infrastructure for maximum immediate value and helps you develop best practices to ensure the best possible performance levels in the future.





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Take the Next Step

For more information on specific ways EMC can improve the operation of your information infrastructure, contact your EMC sales representative, call 1-866-464-7381, or visit our website at www.EMC.com.

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