

EMC BACKUP AND RECOVERY PRODUCT OVERVIEW

Next-generation backup and recovery

ESSENTIALS

Next-generation Backup and Recovery

- Backup redesign is an imperative to keep pace with data growth and virtualization
- Disk- and network-based infrastructure is rapidly replacing tape

Data Domain Deduplication Storage Systems

- 10 to 30 times average reduction in backup storage required
- Network-efficient and encrypted replication for tape-free disaster recovery (DR) and multisite tape consolidation
- Easy integration with existing environment

Avamar Deduplication Backup Software System

- 90 percent faster backups
- Single-step restores
- Optimized for VMware and Hyper-V
- Multi-streaming to Data Domain systems for application-specific backup

NetWorker Unified Backup Software

- Centralized management across both Data Domain and Avamar
- Enterprise scale and performance

Disk Library for Mainframe

- Tape replacement for all mainframe workloads
- Faster batch, backup, and restores

Data Protection Advisor

- Improve backup operations
- Track performance and capacity growth

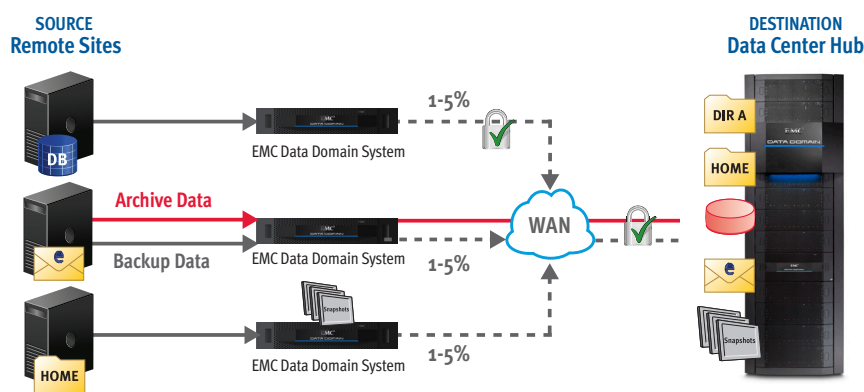
With ever-growing volumes of data, strict service level agreements, compliance regulations, and backup bottlenecks created by the transition to virtualized server environments, many IT organizations are faced with an imperative to redesign their backup infrastructure to one that is disk- and network-based, rather than continuing to pour money and resources into legacy tape-based systems.

Data deduplication is the enabling technology for next-generation backup and recovery solutions. By reducing backup storage required by 10 to 30 times on average, data can be retained on site longer for fast operational restores, and replicated offsite efficiently over existing network links for disaster recovery and multisite tape consolidation.

EMC is the leading provider of disk-based backup and recovery solutions, and also leads the industry in deduplication storage and software. EMC's portfolio of backup and recovery products provide the flexibility and scalability to meet the data protection needs of enterprises of all sizes.

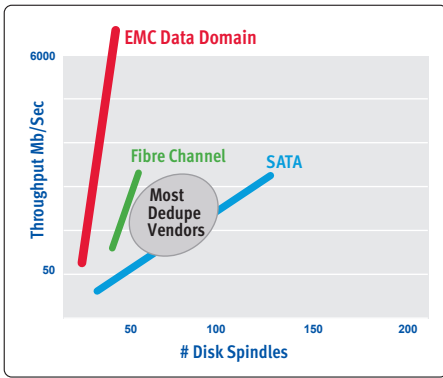
EMC DATA DOMAIN DEDUPLICATION STORAGE SYSTEMS

EMC® Data Domain® deduplication storage systems deduplicate data inline—during the backup and archive process—so that data lands on disk already deduplicated, requiring a fraction of the disk space of the original dataset. Backup and archive data can be retained onsite longer for fast, reliable restores from disk. IT organizations can leverage the existing backup infrastructure to accommodate complementary archive workloads by simply adding expansion storage, thereby consolidating backup and archive data on the same system for a cost-effective solution. Backup and archive data can then be replicated offsite faster with minimal bandwidth for safe, tape-free disaster recovery.



Data Domain in the Distributed Enterprise

Deduplicated data can be stored onsite for immediate restores and longer-term retention on disk and replicated over the WAN to a remote site for disaster recovery operations—eliminating the need for tape-based backups—or for consolidating tape backups to a central location. Data Domain systems



CPU-Centric Storage

Data Domain Stream-Informed Segment Layout (SISL™) scaling architecture takes the pressure off of disk I/O as a bottleneck, so the remaining system design is CPU-centric. Other deduplication methods require more disks to increase their throughput speeds.

“EMC Data Domain systems provide superb reliability. We know that when we back up, we can quickly and easily restore. We never had that sense of certainty before when we used tape systems.”

Terry Knapton Service
Delivery Manager for Data Management
Ordnance Survey

provide flexible replication topologies to optimize your backups such as selective, bi-directional, many-to-one, one-to-many, cascaded, and full system mirroring.

Data Domain systems integrate easily into your existing environment, so you can leverage the benefits of deduplication across workloads, infrastructure, and backup and archiving applications. A single Data Domain system can be used for backup and recovery, protection of enterprise applications (Oracle, Microsoft® Exchange, VMware®, and others), archiving, and online reference storage.

Data Domain systems provide network-efficient replication for disaster recovery, remote office data protection, and multisite tape consolidation. Data Domain replicates only the deduplicated data over the wide area network (WAN), making network-based replication fast, reliable, and cost-effective.

ULTRA-SAFE STORAGE FOR RELIABLE RECOVERY

The EMC Data Domain Data Invulnerability Architecture provides the industry’s best defense against data integrity issues. Inline write and read verification protects against, and automatically recovers from, data integrity issues during data ingest and retrieval. Capturing and correcting I/O errors inline during the backup process eliminates the need to repeat backup jobs, ensuring backups complete on time and satisfy service-level agreements. Unlike other enterprise arrays or file systems, continuous fault detection and self-healing features protect data throughout its lifecycle on all Data Domain systems.

EMC DATA DOMAIN SOFTWARE

Software options provide data protection enhancements for your environment.

EMC Data Domain Replicator software is an automated, policy-based, network-efficient replication software solution for disaster recovery, remote office data protection, and multisite tape consolidation. DD Replicator software vaults (asynchronously replicates) only the compressed, deduplicated data over the WAN during the backup process, making network-based replication fast, reliable, and cost-effective. Tape backups can be eliminated or consolidated to a central site. If confidentiality is required, deduplicated and compressed data can be encrypted in-flight when being replicated between Data Domain systems, independent of the replication topology used.

EMC Data Domain Virtual Tape Library (VTL) software emulates multiple tape libraries over a Fibre Channel interface, providing deduplication storage for open systems and IBM i environments, complementing the default NAS interfaces. Data Domain VTL software

Data Domain System Specifications

| | DD160 | DD620 | DD640 ³ | DD670 ³ | DD860 ³ | DD890 ³ | DD990 ³ |
|--|-------------|------------------------|------------------------|------------------------|--|------------------------|--|
| Logical Capacity ^{1,2} | 40 - 195 TB | 83 - 415 TB | .32 – 1.6 PB | 0.6-2.7 PB | 1.4 - 7.1 PB 5.7 - 28.5 PB ⁷ | 2.9-14.2 PB | 5.7 - 28.5 PB 13 - 65 PB ⁷ |
| Max. Throughput (Other) | 667 GB/hr | 1.1 TB/hr ⁴ | 2.3 TB/hr ⁸ | 3.6 TB/hr ⁵ | 5.1 TB/hr ⁵ | 8.1 TB/hr ⁶ | 15.0 TB/hr ⁵ |
| Max. Throughput (DD Boost) | 1.1 TB/hr | 2.4 TB/hr | 3.4 TB/hr | 5.4 TB/hr | 9.8 TB/hr | 14.7 TB/hr | 31.0 TB/hr |

- Mix of typical enterprise backup data (file systems, databases, email, developer files). The low end of capacity range represents a full backup weekly or monthly, incremental backup daily or weekly, to system capacity. The top end of the range represents full backup daily, to system capacity.
- Capacity values are calculated using Base10 (i.e., 1 TB = 1,000,000,000,000 bytes) and the maximum capacity configuration.
- Includes support for add-on shelves, available separately.
- Maximum throughput achieved using VTL interface and 4 Gbps Fibre Channel.
- Maximum throughput achieved using Symantec OpenStorage and 10 Gb Ethernet.
- Maximum throughput achieved using NFS and 1 Gb Ethernet.
- Requires DD Extended Retention software option.
- Maximum throughput achieved using NFS and 10 Gb Ethernet.

eliminates tape-related failures by emulating multiple tape libraries and tape drives with up to 64,000 virtual slots across an unlimited number of virtual cartridges.

EMC Data Domain Boost software extends the optimization capabilities of Data Domain solutions. DD Boost significantly increases performance by distributing part of the deduplication process to the backup server or application clients, and serves as a solid foundation for additional integration between applications and Data Domain systems.

EMC Data Domain Retention Lock software allows you to meet secure data retention and immutability requirements driven by either internal governance policies or by strict regulatory compliance standards. Use DD Retention Lock Governance edition to meet your internal governance policies on archive data. For the strictest data retention requirements, use DD Retention Lock Compliance option to ensure that all file/email archive data in a locked state cannot be deleted or overwritten under any circumstances other than deliberate physical destruction.

EMC Data Domain Encryption software provides organizations with enhanced security for data that resides on their Data Domain systems using industry-standard RSA® BSAFE FIPS 140-2 validated cryptographic libraries. Using this software option, backup and archive data is stored on a Data Domain system with encryption and compression performed inline—before the data is written to disk. Centralized encryption key lifecycle management is optionally available with the RSA Data Protection Manager to deliver a robust, encryption key lifecycle management solution for the entire enterprise.

EMC Data Domain Extended Retention software extends the scalability of a Data Domain system to enable cost-effective, long-term backup retention on deduplicated disk. Using DD Extended Retention software, customers can leverage Data Domain systems for long-term backup retention, and minimize reliance on tape infrastructure in the data center.



EMC Avamar Data Store
Never back up the same data twice.

Revolutionize your backup by moving less data to solve your toughest VMware, NAS, and remote office backup challenges.

“EMC Avamar provides a huge time and cost savings for backup of multiple virtual machines.”

Curtis Damhof
Senior Network Administrator
St. Peter’s Hospital

EMC AVAMAR: DEDUPLICATION BACKUP SOFTWARE AND SYSTEM

EMC Avamar® deduplication backup software and system performs variable-length deduplication at the client, so backup data is reduced before moving across crowded networks (LAN or WAN). Avamar identifies duplicate data segments and sends only unique segments across the network to the purpose-built backup appliance. This means shorter backup windows, less backup storage consumed, and maximum leverage of available bandwidth.

With Avamar, you can transform your backup processes and solve your toughest virtual, NAS, remote office, and desktop/laptop backup and recovery challenges.

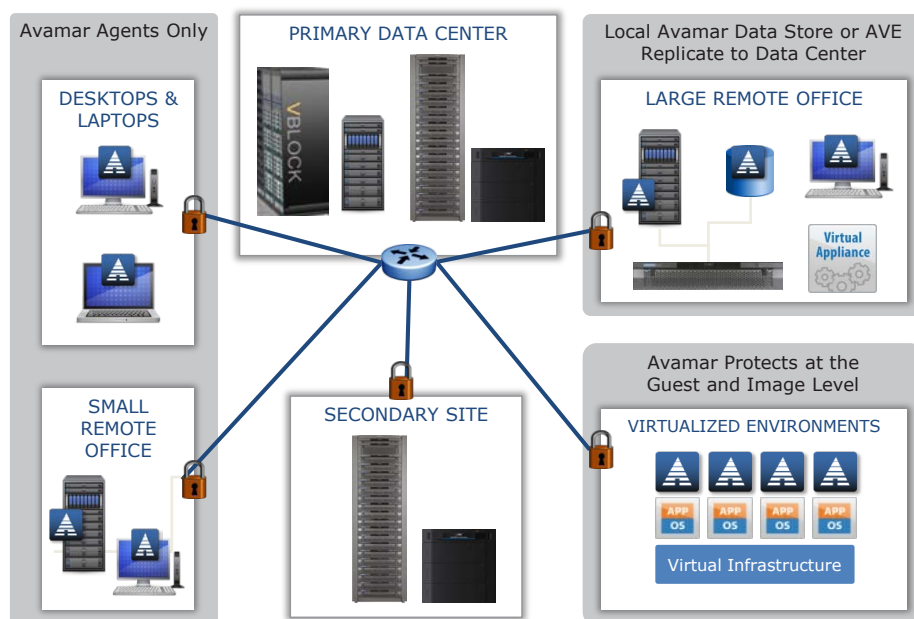
- **90 percent faster virtual backups**—Consolidate up to 50 percent more servers to virtual infrastructure.
- **Full NDMP backup at incremental speeds**—Back up NAS devices at speeds faster than that of incremental or “changes-only” backup, while always maintaining single step recovery.
- **Remote office and desktop/laptop protection**—Move data from remote offices and desktops/laptops to a central data center over existing bandwidth.

FLEXIBLE DEPLOYMENT MODELS TO FIT YOUR EXACT NEEDS

Avamar offers flexibility in solution deployments, depending on the specific use case and recovery requirements. EMC Avamar Data Store, a RAIN grid, is a turnkey backup and recovery solution that integrates Avamar software with EMC-certified hardware for streamlined deployment. A replicated Avamar Data Store single-node is ideal for smaller businesses or remote offices with strict SLAs.

For environments that have standardized on VMware virtual infrastructure, EMC offers a virtualized deployment option: the Avamar Virtual Edition.

For high-performance application-specific backup, Avamar uses Data Domain Boost software to send enterprise application data (Oracle; Microsoft SQL[®], SharePoint[®], Exchange; Hyper-V; VMware Image, SAP, Sybase, and IBM DB2) directly to a Data Domain system.



FLEXIBLE SOLUTIONS FOR REMOTE OFFICES

For smaller remote offices, lightweight, efficient Avamar software agents can be deployed on the systems to be protected with no additional remote hardware required. This enables data to be backed up directly over existing WAN connections to a central Avamar Data Store at the data center, eliminating the need for local tape backup and the risk associated with offsite tape shipments.

OPTIMIZED PROTECTION FOR VMWARE INFRASTRUCTURE

Avamar deduplicates backup data globally, across both physical and virtual servers. For virtualized environments, flexible backup options include guest- or image-level backups, leveraging the latest VMware vStorage APIs for Data Protection. Avamar can quickly and efficiently protect virtual machines as if they were physical servers, or provide bare-metal recovery at the virtual machine level by backing up VMDK files. Avamar integrates tightly with VMware vCenter[™] for simplified management of rapidly expanding VMware environments.

EMC AVAMAR FOR NAS STORAGE

Avamar supports NDMP backup via the Avamar NDMP Accelerator Node to provide reliable, high performance backup and recovery for NAS filers (for example, EMC Celerra[®] and NetApp filers). Avamar provides fast, daily full backups for filers while requesting only a level-one (incremental) daily dump of data from the filer itself, dramatically reducing backup times and network utilization.

EXTENDED RETENTION

Avamar helps companies meet compliance regulations that require extended retention of data. Avamar provides extended retention by sending backup data to a media access node which then places the data on a VTL or tape.

| Avamar Feature | Avamar Benefit |
|---|--|
| Global, client-side deduplication | Backup data reduced at the client and globally; reduces daily full backup times by up to 10x, network bandwidth for backup by up to 99 percent, and cumulative backup disk storage by up to 95 percent |
| Secure, efficient use of existing LAN/WAN links | RAIN architecture for fault tolerance across Avamar nodes; no single point of failure |
| Server health and data recoverability | Avamar server integrity and backup data recoverability verified daily |
| Fast, single-step recovery | Recovers data (whole backups, files, or directories) immediately; no need to restore last good full and incremental backups |
| Export deduplicated data to tape | Lowers the cost of tape storage while providing a searchable, easy-to-manage interface |
| VMware Hyper-V infrastructure backups | Fast, efficient, daily full backups for VM guests and images |
| Physical and virtual Avamar deployment options | Best-in-class solutions to meet specific needs; same easy-to-manage interface |
| Integrated with Data Domain systems | High-performance application-specific backup and recovery |

EMC NETWORKER: UNIFIED BACKUP SOFTWARE

EMC NetWorker® backup software unifies backup and recovery by bringing together a variety of data protection capabilities from backup-to-disk, to replication, to tape—all under a common management interface—to reduce cost and complexity. Seamlessly integrate next-generation backup capabilities with Avamar and Data Domain to fully optimize the benefits of deduplication within your environment.

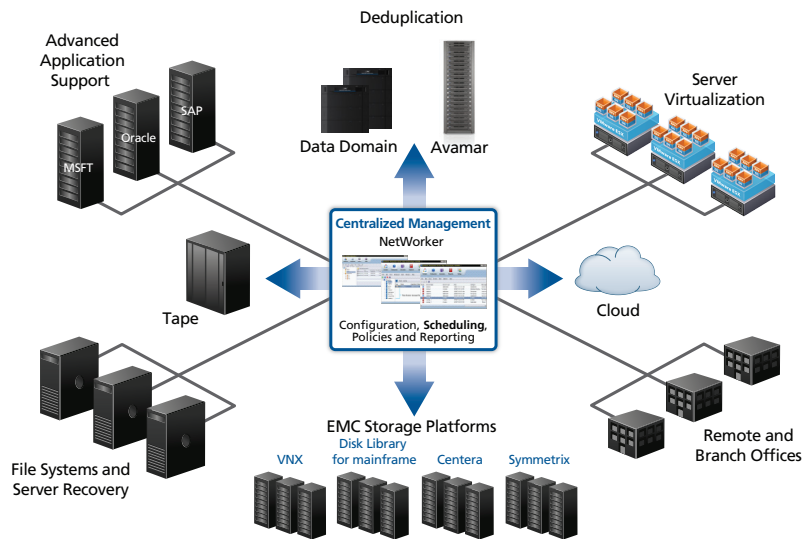
With EMC NetWorker, you get:

Centralized management—Manage your entire infrastructure through the NetWorker Management Console including deduplication, backup to disk, snapshots, replication, and tape.

Broad data protection support—Protect your entire environment—from critical business applications such as Microsoft, Oracle, SAP, and others to virtual topologies including VMware and Microsoft HyperV™.

Flexibility, scale, and performance—Address a wide range of data protection requirements from small business environments to the largest of data centers. NetWorker Fast Start is the ideal choice for small to mid-size customers who want simplified deployment and management but do not want to sacrifice enterprise capabilities.

Leading deduplication support—Bring together market leading data deduplication solutions under one framework. Integration with Avamar software and Data Domain Boost improves backup performance and simplifies management. Leverage both Avamar and Data Domain within NetWorker workflows and policies to get the greatest benefit based on use case and business need.



EMC NetWorker Centralized Management

Manage EMC Avamar and EMC Data Domain systems within NetWorker workflows and policies for optimized deduplication storage efficiencies per use case or business need.

EMC DISK LIBRARY FOR MAINFRAME: TAPE REPLACEMENT FOR ALL MAINFRAME WORKLOADS

The EMC Disk Library for mainframe series addresses the challenges of the mainframe data center and delivers industry-leading scalability, performance, and availability to tape operations while working seamlessly with the current host systems and applications. Disk Library for mainframe combines low-cost SAS and SATA drives, RAID 6 protection, hot-standby disks, tape emulation, hardware compression, and the functionality necessary to provide enterprises with a high-capacity mainframe tape replacement solution that delivers increased application availability.

The EMC Disk Library for mainframe is available in three configurations. The EMC DLM6000 is the EMC flagship mainframe solution in terms of scalability and performance. The EMC DLM2000 is designed for users who have less of a need for massive scalability, or who do not require deduplication storage. The EMC DLM1000 is a gateway product providing mainframe connectivity to Data Domain storage systems. The DLM6000 offers deduplication storage (Data Domain® DD890) and/or primary storage (VNX7500™) in a single, manageable platform. The DLM2000 offers primary storage only and is designed for smaller mainframe tape environments. The DLM1000 offers deduplication storage only and is also designed for smaller mainframe tape environments. All models are based on the same platform and software and provide similar benefits to users.

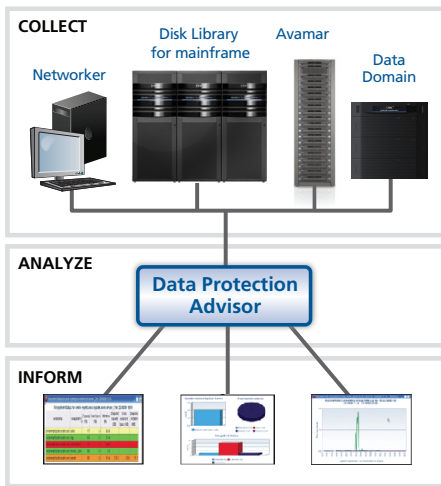
The DLM6000 is the only mainframe virtual tape library that offers this combination of storage types, providing users with the best of both worlds to help meet their specific requirements. For backup and archive workloads, deduplication storage systems allow DLM6000 users to leverage longer onsite retention, optimize replication, and lower overall disk storage costs. For other workloads, such as HSM migration, fixed-content archival or temporary work files, the primary storage provides DLM6000 users high-speed access and improved data protection of their tape data.

EMC Disk Library for mainframe works seamlessly with mainframe applications and connects directly to the mainframe host using FICON channels, appearing as 3480/3490/3590 tape drives to the mainframe operating system. All tape commands are supported by the Disk Library for mainframe and respond as real tape drives, so existing processes, tape management systems, and applications can run without any modifications.

EMC Disk Library for mainframe delivers:

EMC Disk Library for mainframe





EMC Data Protection Advisor

Manage multiple locations, cross-platform environments, and a variety of protection products with a single solution. By consolidating enterprise-wide information into a single management interface, administrative costs are reduced, resulting in faster issue resolution, easy planning, and complete reporting.

CONTACT US

To learn more about how EMC products, services, and solutions can help solve your business and IT challenges, contact your local representative or authorized reseller—or visit us at www.EMC.com.

Performance—Benefit from faster batch, backups, and restores. Disk Library for mainframe eliminates physical tape mounts, robotic movements, tape rewinds, and drive contention. Batch and backup operations that took hours can now finish in minutes.

Recoverability—Leverage remote replication for better recoverability. With Disk Library for mainframe remote replication, you can copy all or part of your tape information to up to two remote sites, ensuring you can recover your information in case of a primary site shutdown.

Enhanced DR testing—Leveraging snapshot technology found in the Disk Library for mainframe, you can perform simple and reliable end-to-end Disaster Recovery testing with read/write capabilities on all tape data at the target site. Data replication continues uninterrupted during testing, so your DR readiness is never compromised. This enables you to have 100 percent confidence in your ability to recover from a disaster.

Manageability—There are several ways to manage your Disk Library for mainframe. You can easily submit commands to the EMC Disk Library for mainframe and retrieve information about your system to your mainframe host. Disk Library for mainframe provides the option of sending an SNMP alert to an external monitoring tool. You can log in securely to the Disk Library for mainframe system and manage, monitor, and query the system online.

EMC DATA PROTECTION ADVISOR: IMPROVING BACKUP THROUGH AUTOMATION

Data Protection Advisor (DPA) provides the realtime monitoring and reporting you need to stay on top of your ever-changing data protection environment. DPA collects and analyzes information from your entire data protection infrastructure—physical/virtual, backup, and replication—to help you make quick, informed decisions, solve problems faster, and measure your service levels. Leverage Data Protection Advisor to increase operational efficiency while meeting compliance requirements, reducing complexity, and dramatically accelerating audit and business reporting.

Comprehensive backup support—DPA has more complete support for backup applications and supporting infrastructure than any product on the market. With support for eleven backup solutions, multiple target devices, hosts, networks, and deduplication systems, DPA provides the support needed to analyze your backup environment from end to end.

VMware support—DPA can highlight unprotected systems quickly, as well as other conditions that cause performance degradation or production impact. With the vCenter plug-in, VMware users have access to all of this data without leaving their familiar interface.

Automation—The collection, analysis, and reporting of data protection detail is automated through DPA. It streamlines operations, allowing staff to manage more—moving the business forward, and providing the equivalent of a 24x7 IT expert.

Report to all levels of your organization—DPA provides the right level of detail for the CIO, operations staff, and system administrators. DPA provides just the data they need to understand how data is protected, if it's recoverable, and whether SLAs are being achieved.

Reduce audit time by 90 percent—Through DPA, actionable data is at your finger tips, so report generation takes minutes not days, reducing the completion of audits to hours not weeks. The same access to information speeds problem resolution, capacity planning, and chargeback as examples.

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