EXECUTIVE SUMMARY

Firms face significant and material pressures with regard to today’s protection and recovery environments. Innovation across the storage domain has addressed and will continue to address these challenges. This innovation, combined with increasingly stringent expectations from executives and lines of business alike, is bringing about and accelerating transformation of legacy protection and recovery schemas. This paper identifies key protection and recovery challenges as well as the technologies influencing and playing a role in protection and recovery transformation. It then examines how EMC NetWorker is helping firms accelerate their transformation and the features that NetWorker 8.0 introduces to further boost performance, scalability, and ease of use for customer environments.

SITUATION OVERVIEW

Today’s enterprise protection and recovery challenges stem from four fundamental issues. The first issue is the overwhelming growth of data and storage capacity. The volume of data and the multiple petabytes of file content place pressure on a traditional NDMP streamed backup approach. For example, today, a large entertainment company needs six weeks to back up over four petabytes of NAS data. When the company finishes the backup, it starts the process again. Clearly, this approach is not efficient from a time perspective or an infrastructure perspective. Acceleration is needed today while a new approach is considered for the immediate future.

The second issue is virtualization. On average, more than half of all workloads were virtualized at the end of 2010, and we expect nearly two-thirds to be virtualized by the end of 2013. Virtualization brings storage challenges including I/O and network constraints and backup issues. IT professionals need virtual infrastructure–aware protection and recovery, application consistency, and fast and often granular recovery. We also see more backup and recovery functions being done by virtual machine (VM), application, and database administrators, so integration with VMware vCenter and Microsoft management tools is important. In addition, companies want to ensure that movement of virtual machines across the infrastructure does not disrupt an existing protection schema and leave the image and the data vulnerable in terms of recovery.
The third issue stems from the fact that firms have anywhere from five to nine different protection and recovery schemas in place, including backup, continuous data protection (CDP), snapshots, replication, deduplication, archiving, endpoint protection, and cloud backup. These schemas have been put in place to meet differing recovery time objectives (RTOs) and recovery point objectives (RPOs) for different workloads. These differing service-level agreements (SLAs) have brought about the use of different protection and recovery technology at both the logical software level and the storage infrastructure level. In fact, it is not uncommon for a datacenter to have many copies of data for backup, disaster recovery, long-term retention, testing, and the like.

The fourth core issue is the reality of IT budgets today. Budgets and people costs are not scaling at the same rate as data and storage growth. Our research shows that storage is taking up a larger and larger piece of the overall IT or datacenter budget. Clearly, deduplication and other storage efficiencies can help curb storage costs. But reducing only the infrastructure cost is not enough. There must be attention to reducing both capex and opex associated with protection and recovery. One mechanism to address the opex component is to drive consolidation at the front end by reducing the number of software packages and protection schemas used to protect, retain, and recover data.

**KEY TECHNOLOGIES TO ACCELERATE TRANSFORMATION**

There is no single panacea for today’s enterprise protection and recovery challenges, but clearly the significant amount of innovation across the storage industry over the past decade is driving transformation today.

At the infrastructure level, disk as a target for protection offers benefits in terms of meeting more stringent recovery objectives. Combining the use of disk with deduplication and other optimization techniques can make the use of disk for secondary storage workloads much more economical for a broader range of applications requiring protection. Storage virtualization can also introduce a significant benefit in consolidating protection and recovery infrastructure. Without disrupting current protection schemas, the use of storage virtualization can offer a consolidated protection and retention platform for backup, disaster recovery snapshots, and archive data coming from different production systems and curb infrastructure and management costs.

The foundational backup application the industry has known for the past 20 years continues to morph from its traditional role into a data protection control point for a range of different copy mechanisms for both physical infrastructure and virtual infrastructure. This new control point offers not only centralized policy-based control for copy creation mechanisms such as backup but also continuous data protection, snapshots, replication, and archiving. Leveraging a central control point provides management savings in terms of training and skill set requirements needed by the centralized storage administrator but also should enable role-based controls so that discrete application or virtual machine administrators can protect and recover their own data as needed.
The industry has seen the increased use of SAS and SATA, and now price declines in SSDs are changing the game for primary storage. A firm that once used SAS and SATA may now introduce SSDs and use less SAS to offer performance benefits for random I/O applications. The use of SSDs may be a mechanism to boost performance in backing up petabytes of critical information quickly. While we certainly need back-end storage architectures to consolidate, protection storage that has a range of tiers exists today and will continue to evolve to include SSDs and cloud in the future. In addition, more data management, policy, and protection functions could move into the primary storage systems themselves, thus minimizing the number of backup components IT organizations need to manage.

**EMC NETWORKER ENABLES PROTECTION AND RECOVERY TRANSFORMATION**

EMC NetWorker is helping firms enable transformation today. The architecture of NetWorker has continued to evolve with the changes in market adoption around new technologies and continues to provide enterprise-class, high-performance backup and recovery, whether the customer is still employing tape-based solutions, traditional disk-based backup, disk-based backup with deduplication, or disk-based archive, or all of these technologies.

The combination of NetWorker and Data Domain provides firms with a comprehensive solution to address the complexity of their data protection challenges. Continued advancements in the integration of NetWorker and Data Domain as well as enhancements to NetWorker's overall management platform are helping accelerate customers' choices. NetWorker sales year over year have experienced double-digit growth, while Data Domain systems continue to have a strong position in the purpose-built backup appliance (PBBA) market. Though Data Domain systems support many backup management platforms, NetWorker is best positioned to provide a highly optimized and tightly integrated unified management storage solution.

But what makes firms deploy NetWorker over other protection and recovery solutions?

- **Deduplication.** NetWorker can manage deduplicated backup data to EMC's leading Avamar or Data Domain deduplication storage systems. This enables NetWorker to control deduplication at the optimal location in the backup path based on the characteristics of the workload. For example, VMs, databases, and NAS backup could all be treated differently based on factors such as data change rate and bandwidth requirements. NetWorker also offers integration with Data Domain via EMC Data Domain Boost software. Data Domain Boost enables NetWorker to execute parts of the deduplication process on the client or storage node. This increases throughput speeds, minimizes backup LAN load, improves backup server utilization, reduces backup times, and enables NetWorker to control Data Domain replication.

- **Consolidation.** NetWorker can provide centralized management and control for different protection mechanisms. It can serve as the centralized policy-driven control point for processes such as streamed backup, bare metal recovery, array-based snapshots, endpoint protection, and CDP, although it still provides a sophisticated media management component to support tape, which most large enterprises need.
 Enterprise grade. NetWorker is really an enterprise-grade, datacenter-level application in terms of clients supported, applications and databases, tape automation support, out-of-the-box reporting, and so on. NetWorker also has an enterprise-class architecture for scalability in terms of thousands of clients to a backup server; millions of jobs multiplexed and cataloged; and physical, virtual, tape, and disk support.

EMC leads in the PBBA market and also understands the importance of a powerful enterprise backup and recovery management platform. NetWorker has a very large and dedicated installed base and is a key pillar in the overall EMC backup and recovery portfolio. In the new release of NetWorker, EMC optimized the underlying architecture through continued expansion of Data Domain integration and enhancements to NetWorker's backup-to-disk features and by strengthening the overall manageability with an emphasis on performance, efficiency, scale, security, and ease of use.

EMC NETWORKER 8.0 AND ITS GAME-CHANGING CAPABILITIES

EMC has announced NetWorker 8.0, its next-generation unified backup and recovery management software that provides new levels of performance, scale, and usability that can help customers accelerate their IT transformation. New developments are discussed in the following sections.

Deeper Data Domain Integrations

NetWorker integration with Data Domain Boost cuts backup times, reduces LAN bandwidth requirements, and simplifies backup workflows. New integration with Data Domain Boost offers faster, more efficient protection for Microsoft SQL (both Volume Shadow Copy Service [VSS] and, now, Virtual Disk Interface [VDI]), Hyper-V, as well as file system data. According to EMC, deeper integration of NetWorker with Data Domain Boost — in combination with the new NetWorker Client Direct feature, which enables the removal of the storage node from the data path, thus enabling backup directly to the storage target — can reduce backup times by as much as 50% or more for application clients, file system clients, and VMware proxies. Due to the integration and deduplication of data on the client, the network bandwidth requirements are reduced by up to 90%.

Architectural Innovation

NetWorker 8.0 enables increased performance, efficiency, and scale to speed up backup and recovery. The new release ensures that customer environments continue to scale into the future with architectural improvements for better device management and a new database for faster server performance and more detailed reporting. Architectural enhancements offload the NetWorker backup server, which frees up processing power, reduces I/O, and enables more scalability. NetWorker backup-to-disk improvements enable concurrent operations and thus greater performance through the ability to perform operations such as backup, cloning, and recovery simultaneously. The new Client Direct feature is also available for Advanced File Type Devices (AFTD), exclusive of Data Domain Boost, enabling faster backup through fewer hops to any supported storage target.
Enhanced Management and Security

New management features include multi-tenancy for isolation of backup information between users, role-based authorization, and full LDAP v3 and Active Directory support. The new Multi-Tenancy Facility enables isolation of client backup data for cloud and service providers. Enhanced authentication and role-based authorization increase security, flexibility, and ease of use. NDMP checkpoint restart has been added for NetApp, which maintains backup process integrity through an interruption, thus reducing backup time in the event of an issue. Backup windows are further reduced and recovery times improved with support for synthetic full backups for both disk and tape.

Expanded Support for Microsoft Applications

Enhancements in support of Microsoft application protection include item-level Granular Level Recoveries (GLR) for Exchange, SharePoint, and Hyper-V. Also introduced were new configuration wizards for Exchange, SQL Server, and SharePoint, rounding out earlier support for NetWorker clients, database applications, and SAP. Enhanced Microsoft SQL Server support now includes SQL Server 2012. Support of SQL AlwaysOn Availability Groups for backup from either the primary or the secondary servers is unique to NetWorker and enables backup without impact to the production server. SQL Server VDI support for transaction log-based backups and any point-in-time recovery is now merged in the NetWorker Module for Microsoft Applications, thus simplifying licensing and management. New Hyper-V support includes Federated Cluster Shared Volumes (CSV) for live migration to any server in the cluster where the VM may move, with recovery to any alternate Hyper-V server in the CSV.

NetWorker is a unified backup and recovery solution that effectively and efficiently addresses the data protection management issues of backup and archive to tape, backup to disk, disaster recovery, NDMP backups, virtualization, replication, deduplication, and application-specific challenges such as those presented by databases, electronic mail and productivity solutions, and enterprise software. EMC continues to aggressively address the issues surrounding high-performance, easy-to-manage, and cost-effective protection of growing business-critical data stores through comprehensive leadership backup and recovery solutions that further the integration between NetWorker and EMC’s backup appliances and provide measurable benefits to customers.

Challenges

Innovation from suppliers and firms undergoing a transformation in their protection and recovery approaches does not mean that no challenges remain. The transformation does not happen overnight. At a more simplistic level, consolidation of front-end applications may mean training existing and new IT users. It involves centralized policy development and timing infrastructure consolidation with technology refresh cycles. Leveraging new common back-end architectures such as object storage or cloud may mean infrastructure and or security vetting. The challenges discussed in this document must be met with new approaches to backup and
recovery that extend beyond traditional tape backup. EMC is one supplier that recognizes the issues as well as the opportunities to help IT organizations make protection and recovery much more intelligent, integrated, and efficient. EMC's NetWorker next-generation unified backup and recovery management software provides new levels of performance, scale, and usability that can help customers accelerate the IT transformations that will occur over the next decade.

**CONCLUSION**

Firms that want to remain competitive and mitigate risk and vulnerabilities with backup and recovery must look to transform their legacy approaches. Innovation across the storage domain has addressed and will continue to address these challenges. EMC has responded by continuing to offer innovation with NetWorker, Avamar, and Data Domain that enables its customers to meet increasingly stringent SLAs and at the same time accelerate transformation of legacy protection and recovery schemas. The new features in NetWorker 8.0 enable firms to further boost performance, scalability, and ease of use.