

# LAB VALIDATION REPORT

## **Syncsort Backup Express and NetApp** Advanced Data Protection and Disaster Recovery

**By Brian Garrett**  
With Tony Palmer

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## ESG Lab Reports

The goal of ESG Lab reports is to educate IT professionals about emerging technologies and products in the storage, data management and information security industries. ESG Lab reports are not meant to replace the evaluation process that should be conducted before making purchasing decisions, but rather to provide insight into these emerging technologies. Our objective is to go over some of the more valuable feature/functions of products, show how they can be used to solve real customer problems and identify any areas needing improvement. ESG Lab's expert third-party perspective is based on our own hands-on testing as well as on interviews with customers who use these products in production environments. This ESG Lab report was sponsored by NetApp and Syncsort.

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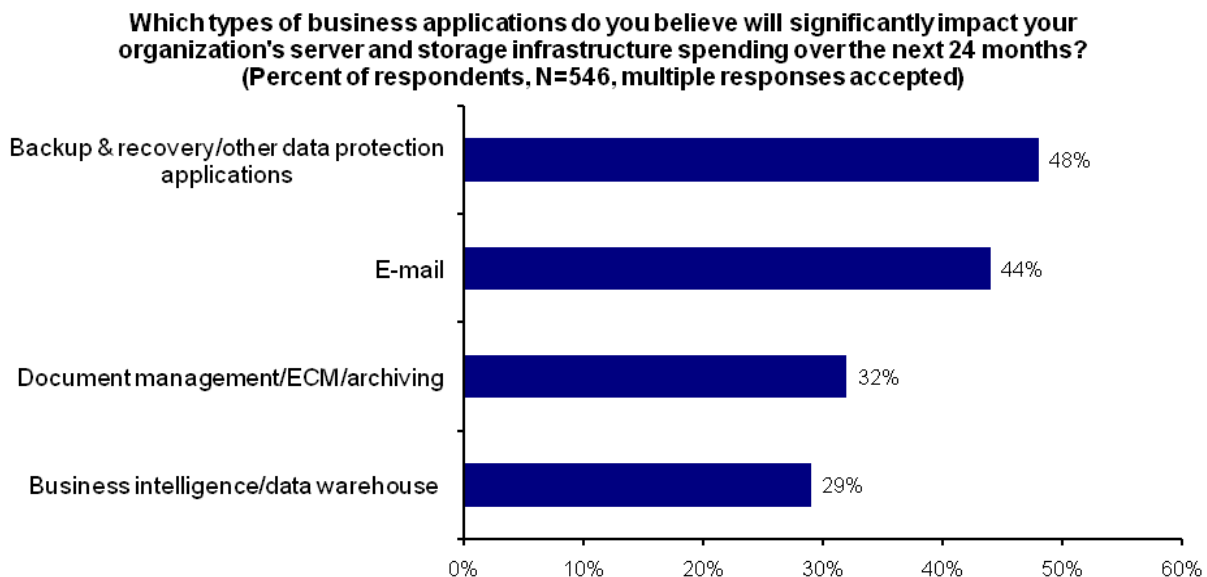
# Introduction

Coupling NetApp's SnapMirror and SnapVault technology with Syncsort's Backup Express (BEX) software has created an integrated disk-based solution for data protection and disaster recovery of mission-critical digital assets. Within minutes of an outage or disaster, applications, databases and users can be accessing data and resuming business. This ESG Lab report focuses on the technologies that make this possible, including transparent integration with NetApp snapshot and replication technology and valuable Syncsort BEX services such as application-independent, source-side data reduction, fast and reliable disk-based data protection, near-instant data recovery and bare metal recovery of both physical and virtual servers.

## Background

ESG recently asked IT professionals which applications they felt would be the biggest drivers of server and storage infrastructure spending over the next 24 months. IT decision makers in medium-size businesses with less than 1,000 employees cited backup, recovery and data protection applications as their top spending priorities. Applications including e-mail, document imaging and business intelligence that create vital information assets—which also need to be backed up and protected—were also cited.<sup>1</sup>

**FIGURE 1. SERVER AND STORAGE INFRASTRUCTURE SPENDING**



IT priorities among medium-size businesses are being significantly shaped by the pressure to reduce costs, the need for improved information security and risk management, demands for better access to information for real-time business analysis and requirements for improved regulatory compliance. As organizations improve their information management infrastructure and processes to help meet these requirements, they are experiencing a number of ongoing storage and storage management challenges, including the need to improve data backup and recovery processes (38%) and reduce storage system costs (33%) while keeping up with data growth (31%) and a shortage of physical data center space (30%).

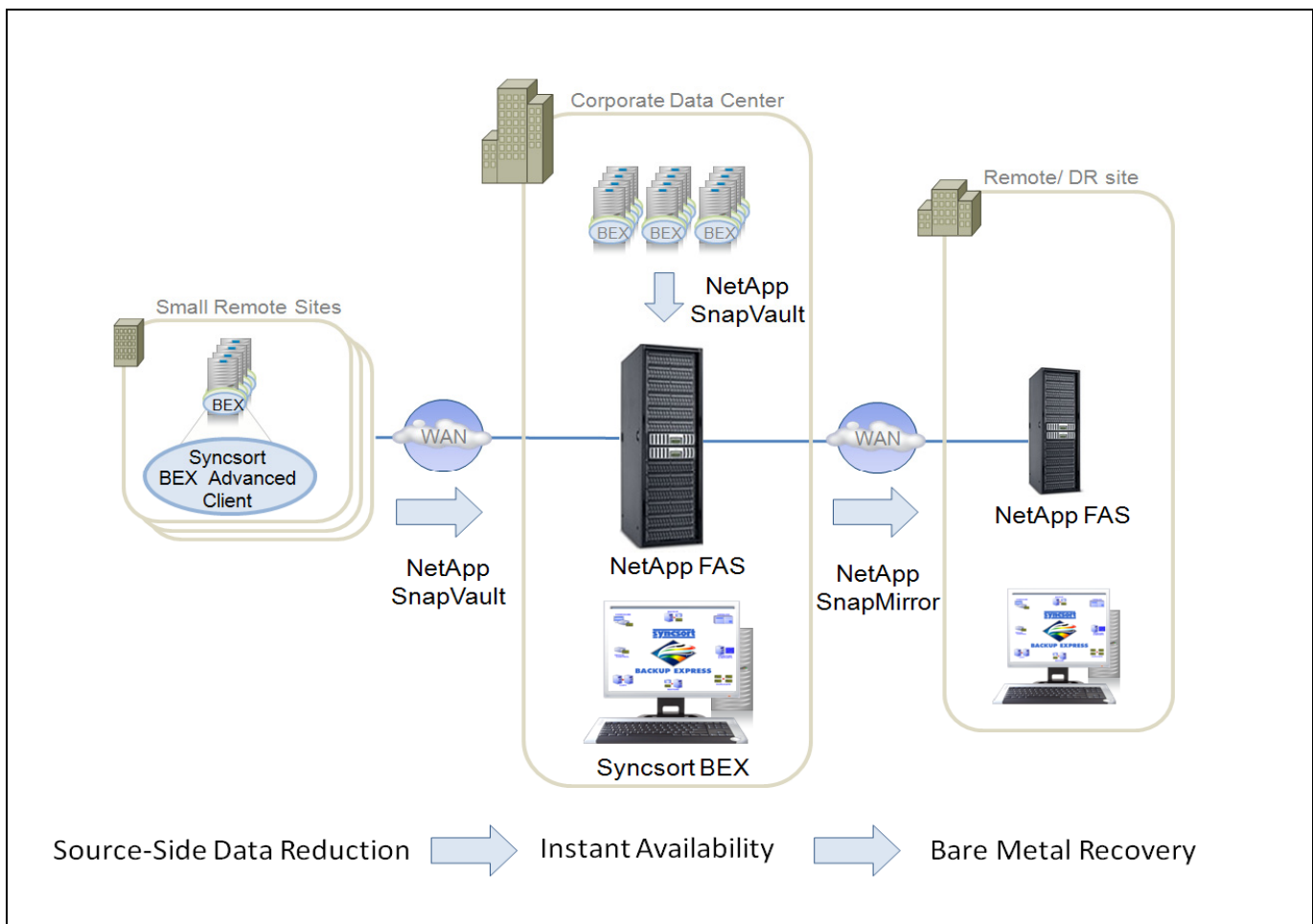
<sup>1</sup> Source: ESG Research Report, *Medium-Size Business Server & Storage Priorities*, June, 2008.

## Syncsort Backup Express and NetApp Data Protection Solution

The combination of Backup Express (BEX) and NetApp technologies delivers a highly scalable data protection solution offering ease of deployment and management as well as reduced operational costs. Disk-based backup and recovery operations for the protection of a wide variety of operating systems, applications, and data types are performed through a centralized management console using an easy-to-use GUI interface.

As shown in Figure 2, Syncsort BEX Advanced Recovery software provides knowledge of applications and data types at a high level as NetApp technology (SnapVault and SnapMirror) creates disk-based recovery images at a low level for fast and reliable restore operations (Instant Availability) and the ability to rebuild a server from scratch after a disaster (Bare Metal Recovery). Syncsort BEX Advanced Client software, running in remote sites and the corporate data center, uses the NetApp SnapVault interface to provide disk-based snapshot services at a low level on the destination NetApp system. The combined solution provides source-side data reduction which virtually eliminates disk, network and CPU overhead as it enables near-instant recovery of files, objects or entire applications—in addition to bare metal restores. Integration with NetApp SnapMirror is used to replicate space-efficient snapshots between sites for disaster recovery.<sup>2</sup>

**FIGURE 2. SYNCSORT BACKUP EXPRESS AND NETAPP**



<sup>2</sup> In addition to the configuration shown in Figure 2, one or more servers at the remote/DR site can be protected using SnapVault to integrate with the NetApp FAS system at the remote/DR site and SnapMirror to replicate to the corporate data center. In this use case, the NetApp SnapMirror arrow would point in both directions.

## Powered by NetApp ONTAP 7G

The NetApp Data ONTAP 7G operating system, found in NetApp FAS and V-Series storage systems, is a fully virtualized data management environment that supports a rich set of valuable storage services including snapshots, remote mirroring, thin provisioning (FlexVol), protection from a dual drive failure in a RAID group (RAID-DP) and data deduplication.

NetApp has a rich heritage of innovation and leadership in the development of fast and reliable snapshot and data recovery services. Snapshot services are built into the foundation of the Data ONTAP 7G operating system. NetApp uses a flexible and efficient method to keep track of snapshots. This method, commonly referred to in the industry as “redirect on write,” avoids the performance overhead of traditional “copy on write” methods. You can use this technology while applications are running to create snapshot copies in less than a second, regardless of volume size or level of activity on a NetApp system.

NetApp has promoted the use of snapshots for fast and reliable data protection for more than a decade. NetApp snapshot services benefit from years of deep integration with operating systems, applications and partners. NetApp snapshot support has been expanded beyond the confines of a unified NetApp storage platform to run on servers using the SnapVault protocol. Syncsort BEX software uses the SnapVault protocol to create quick and efficient disk-based backup images.

SnapMirror is a simple, flexible and cost-effective replication solution that has been deployed by more than 12,000 NetApp customers. SnapMirror makes low-impact copies of snapshots between NetApp FAS systems. Copies can be made between any NetApp storage systems. Mirroring over FC and IP networks is supported. Mirroring from enterprise-class Fibre Channel drives to more affordable SATA drives is supported. SyncSort BEX software uses NetApp SnapMirror to provide advanced disaster recovery services.

This ESG Lab report examines Syncsort BEX technology and NetApp storage working in concert to provide a rich set of backup and recovery services with a focus on:

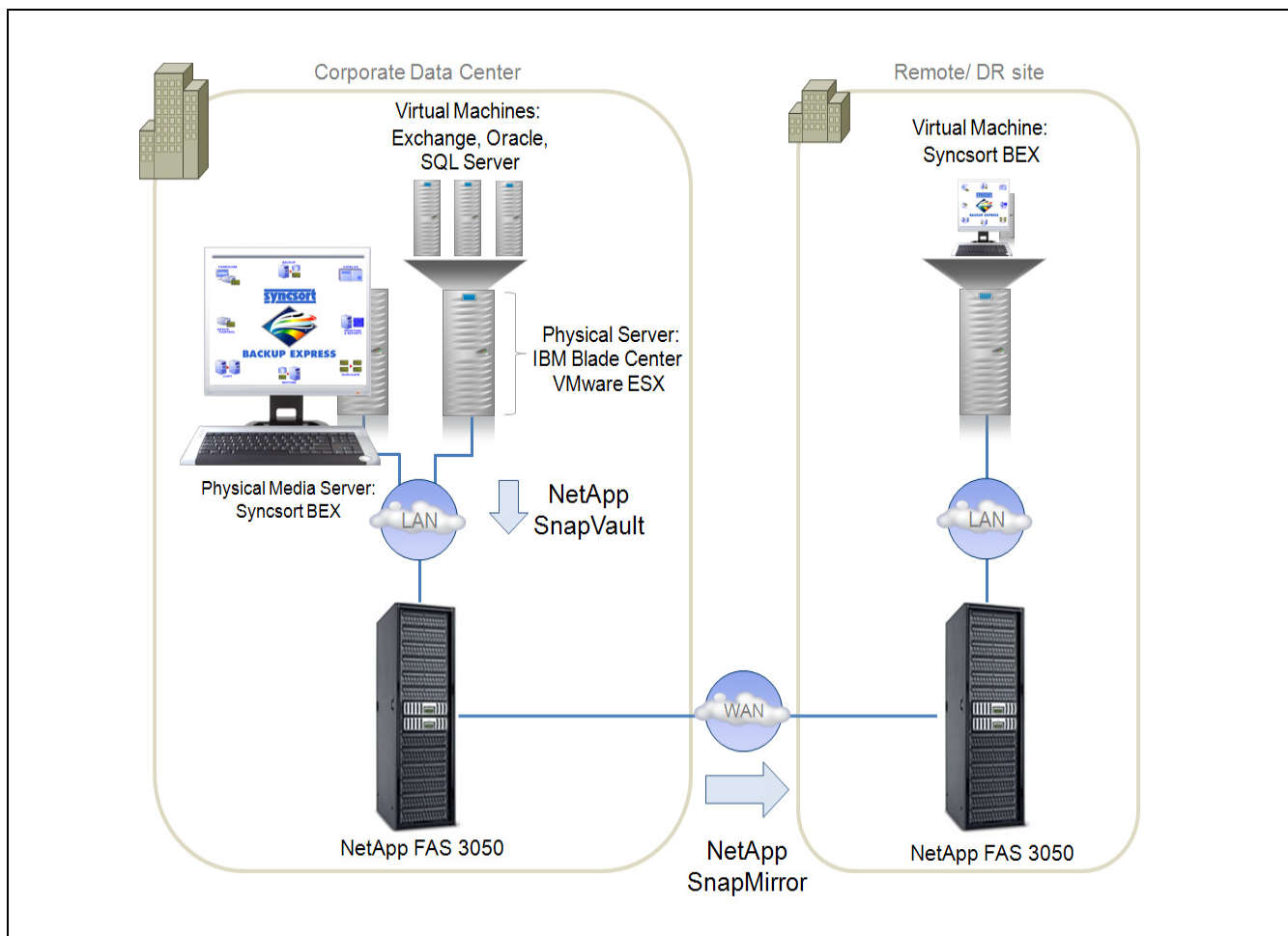
- **NetApp SnapVault** which provides space-efficient disk-based data images for quick and easy file level recovery. SnapVault can be used to keep multiple versions of a file for long term retention and recoverability.
- **NetApp SnapMirror** replicates the contents of a NetApp disk array between locations for fast and reliable off-site data recovery. Continuously mirroring the contents of a NetApp disk array with SnapMirror reduces the amount of data, time—and ultimately money—that may be lost after a disaster at a primary data center.
- **Source-side Data Reduction**, which transfers only changed blocks as it provides LAN-, WAN- and capacity-efficient disk-based data protection services with minimal impact on the network or server.
- **Instant Availability**, which enables rapid access to files, objects and entire applications protected on disk with NetApp SnapVault and SnapMirror services.
- **Bare Metal Recovery**, which can be used to rebuild a system from scratch using disk-based backup images stored on a NetApp FAS system.
- **Centralized Management**, which provides a single platform for the protection and recovery of all of an organization’s servers (physical and virtual), operating systems and applications.

# ESG Lab Validation

ESG Lab performed hands-on evaluation and testing at a NetApp facility located in Research Triangle Park, North Carolina. Testing began with a look at the test bed. As seen Figure 3, a corporate data center was simulated using a NetApp FAS 3050 attached via iSCSI to physical and virtual servers. The physical server was running the Syncsort Backup Express application while the virtual servers, running under the VMware ESX hypervisor on an IBM Blade Center server, ran Oracle 10g, Microsoft Exchange 2003, Microsoft SQL Server 2003 and Microsoft file services.

A remote DR site was simulated at a second location with a second NetApp FAS 3050 attached to a single server. A WAN connection between the two sites was emulated using a shared Gigabit Ethernet network.<sup>3</sup>

**FIGURE 3. ESG LAB TEST BED**



<sup>3</sup> Tested hardware and software details are listed in the Appendix.

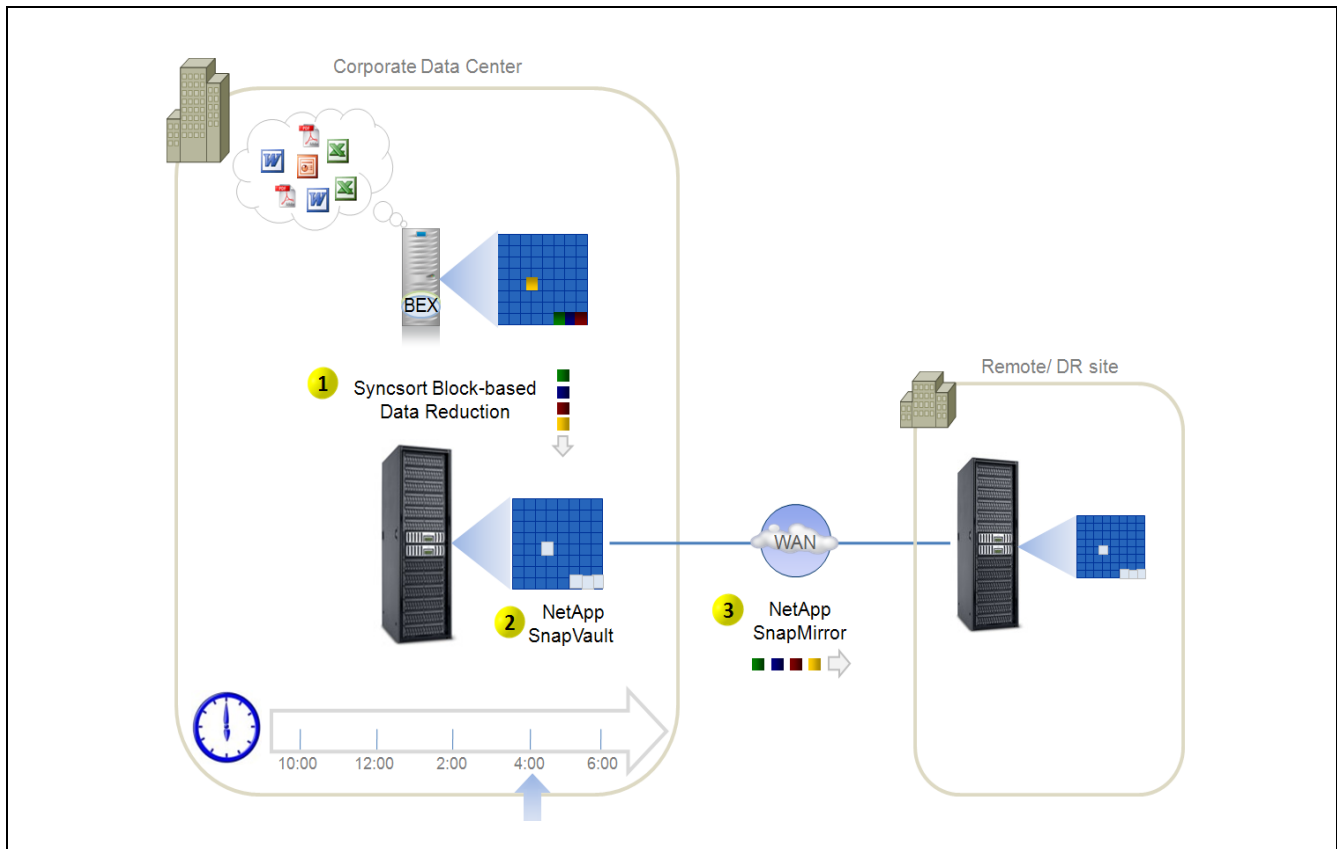
## Source-Side Data Reduction

Backup Express (BEX) Advanced Recovery provides block-level incremental (BLI) technology integrated with NetApp SnapVault for protection of Windows, Linux and Solaris systems. BEX identifies blocks that have changed between backups and then transfers only those changed blocks to secondary storage. After an initial base backup, only blocks that have changed since the previous backup are transferred using NetApp snapshots (SnapVault). Advanced Recovery accesses the changed blocks directly, providing virtual full backups while drastically reducing the amount of data sent over the network and stored on disk. As a result there is virtually no server CPU or network traffic impact during restore operations.

To better understand the data reduction capability of Syncsort BLI technology, consider a PowerPoint presentation created by an end-user. When the user modifies a slide in the presentation and re-saves it to disk, the BEX client will only transmit the blocks of the PowerPoint file that have changed. With traditional file-based backup, the entire file would be flagged as changed and backed up in its entirety—again.

As shown in Figure 4, BEX Advanced Client software running within the server to be protected takes a block-level snapshot of the source volume at 4 PM and sends only the changed blocks to the NetApp disk array. Syncsort BEX manages and keeps track of snapshots using NetApp SnapVault services. This enables the snapshots to be constructed as base backup images, eliminating the need to aggregate backups for point-in-time restores. Additionally, NetApp SnapMirror can be used to replicate only the changed blocks to a remote site for quick and reliable disaster recovery.

**FIGURE 4. BLOCK-LEVEL INCREMENTAL BACKUPS**



NetApp snapshot technology eliminates the issues and delays associated with using one or more incremental backup images during a restore because Syncsort and NetApp provide the equivalent of daily (or more frequent) full backups that can be immediately recovered in a single step. Space-efficient, logically complete backups also eliminate the need to periodically perform full backups.

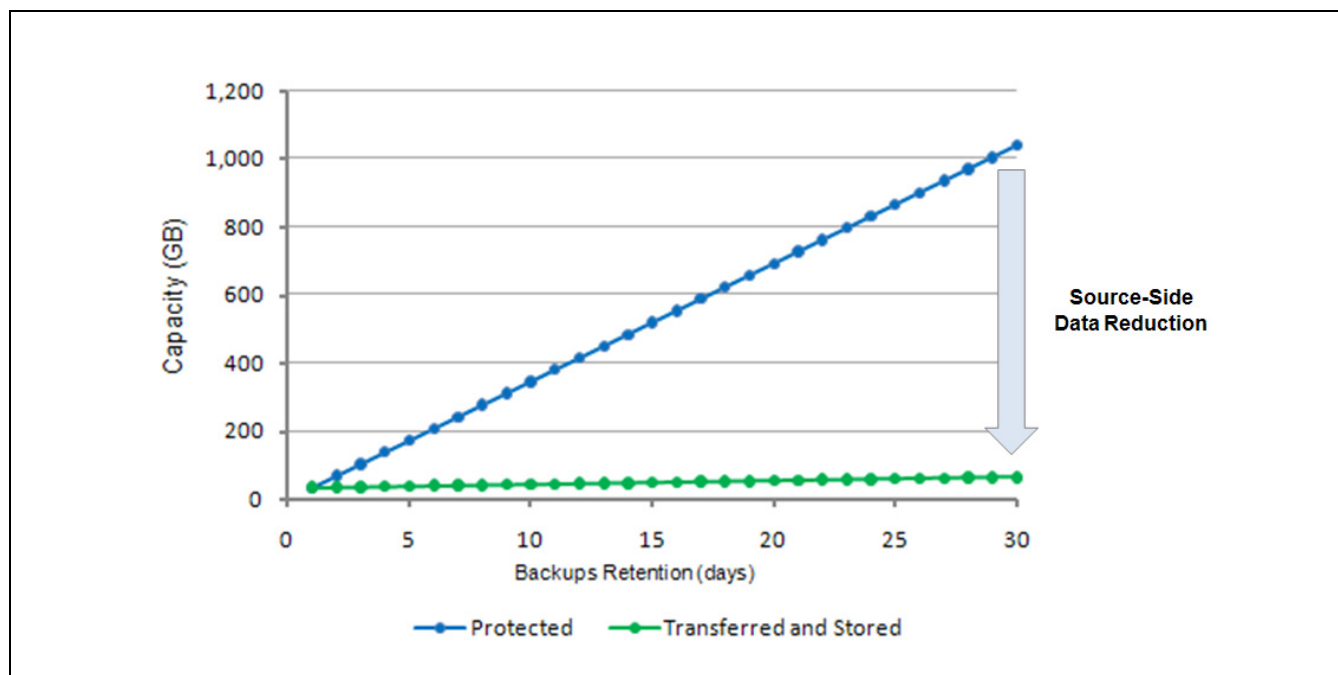
ESG Lab performed hands-on tests and audited historical production backup data to validate the capacity and bandwidth efficiency of the Syncsort-NetApp solution. Backups were run against three data sets: an NTFS file system, Microsoft Exchange 2003 and Oracle 10g. Syncsort BEX logs were audited after the backup of each application. The statistics presented in Syncsort backup reports were used to calculate the data reduction rates shown in Table 1.

**TABLE 1. SOURCE-SIDE DATA REDUCTION IN ACTION**

Backup History (measured)							
	Backup 1	Backup 2		Backup 3		Backup 4	
	Capacity (GB)	Changed (GB)	Change Rate	Changed (GB)	Change Rate	Changed (GB)	Change Rate
File Data	46.89	.226	.48%	1.5	3.18%	.222	.46%
Exchange	21.96	.577	2.63%	5.2	23.07%	2.3	8.29%
Oracle	33.64	.678	2.02%	.695	2.03%	.612	1.75%
Source-Side Data Reduction (projected after 30 backups)							
	Total Data Protected (GB)		Total Data moved to Secondary Storage (GB)		Cumulative Data Reduction		
File Data	1,436		76		95%		
Exchange	687		51		93%		
Oracle	1,038		63		94%		

Figure 5 plots the projected data reduction for the Oracle data set over 30 backups. ESG Lab projections indicate that an organization would be able to retain thirty days of full backups, representing more than 1 TB of protected data, using only 63 GB of disk capacity.

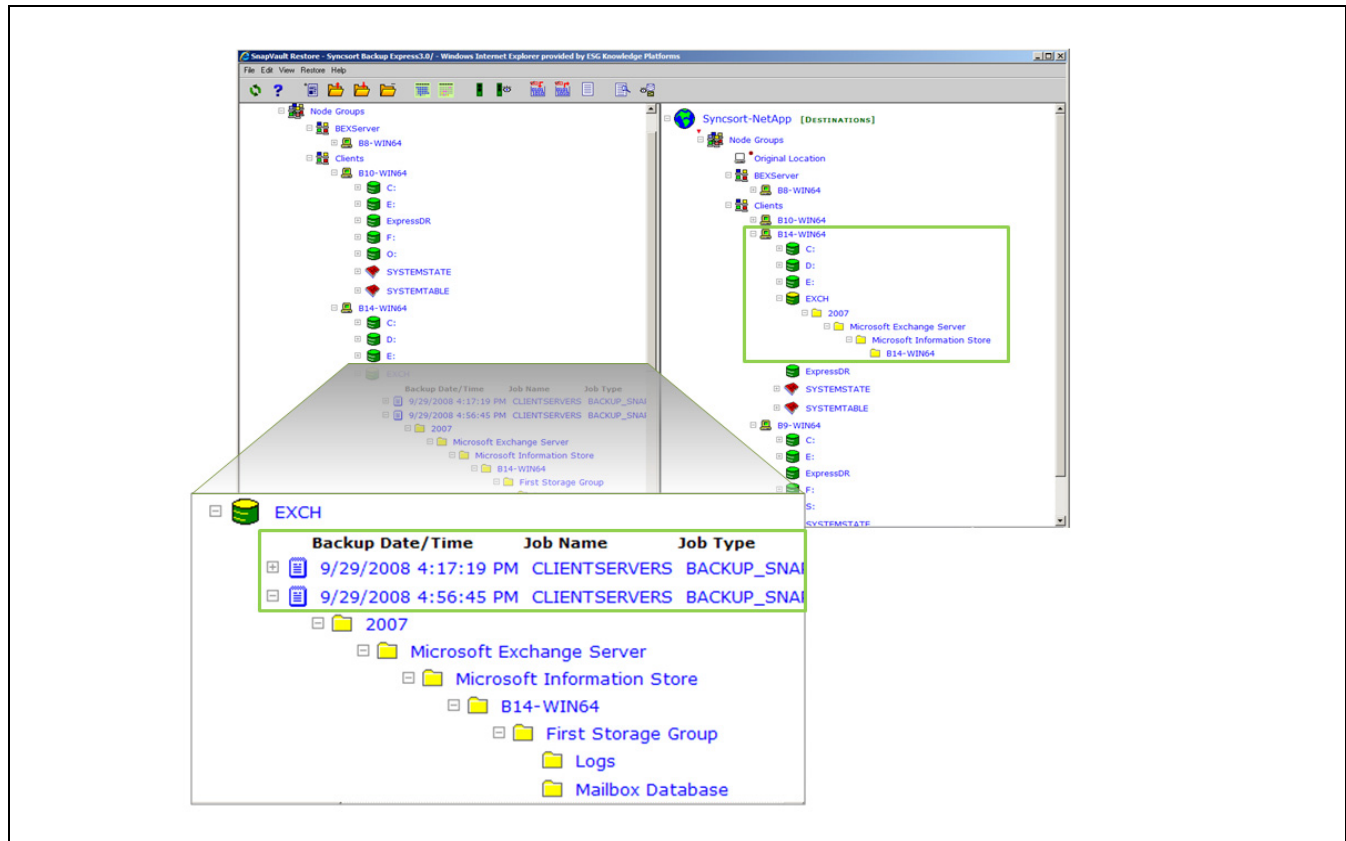
**FIGURE 5. ORACLE SOURCE-SIDE DATA REDUCTION SAVINGS OVER TIME**





After two backups had completed, ESG Lab examined the Backup Express GUI and noted the available recovery options. Figure shows the administrator's view of the first two block-level snapshots created. ESG Lab was able to drill down into the backup and select any or all elements of the Exchange system to restore, just as if it were a full backup.

**FIGURE 6. SYNCSORT RESTORE SCREEN**



Based on the results of ESG Lab hands-on testing and an audit of Syncsort backup logs, ESG is confident that customers can use Syncsort Backup Express in combination with NetApp storage to construct daily full backups from periodic block-level incremental snapshots and achieve a daily data reduction factor in the 90-98% range, enabling cost-effective retention of more full backups on disk.

## Why This Matters

Capital costs of disk systems, as well as operating costs of wide area network connectivity, are major factors when considering a disk-based solution to augment tape for both primary backup and offsite duty. As a matter of fact, ESG research indicates that cost is the leading obstacle to disk-based backup deployment.<sup>4</sup> Data reduction changes the economics of backup to disk and remote replication by reducing the amount of data retained on disk and transmitted across the WAN.

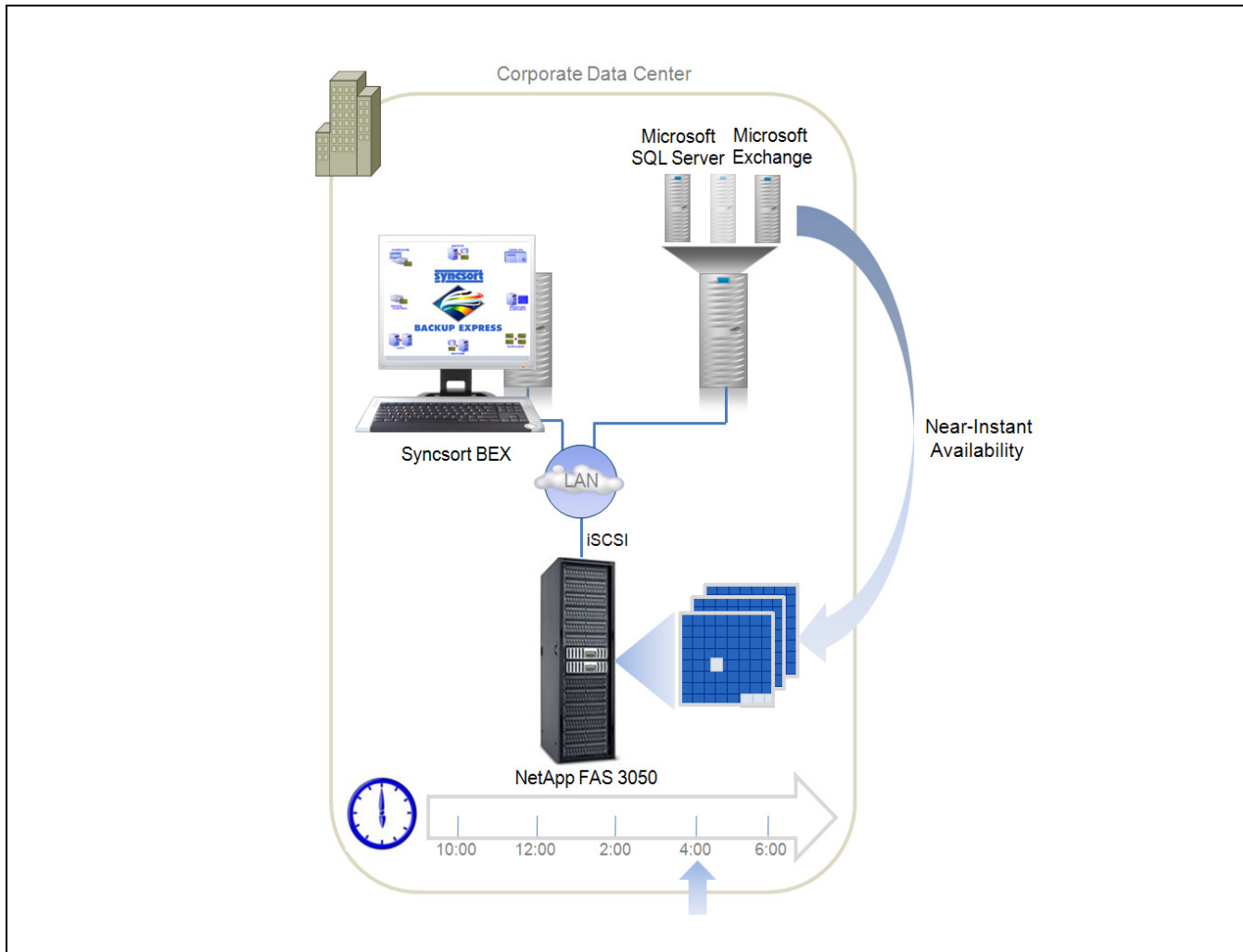
ESG Lab has confirmed that Syncsort Backup Express source-side data reduction can be used to significantly decrease the amount of data sent to a backup target, reducing network traffic and CPU impact. It enables fast, frequent, more reliable virtual full backups centrally managed from a corporate data center using the intuitive Backup Express management console.

<sup>4</sup> Source: ESG Research Report, *Data Protection Market Trends*, February, 2008.

## Instant Availability

Syncsort BEX and NetApp work together to provide Instant Availability for near-instant recovery of critical applications—without the need to transfer data. In the event of data corruption or hardware failure, Instant Availability can restore access to data and applications in minutes, instead of hours, by allowing the application to directly access a NetApp snapshot image as seen in Figure 7.

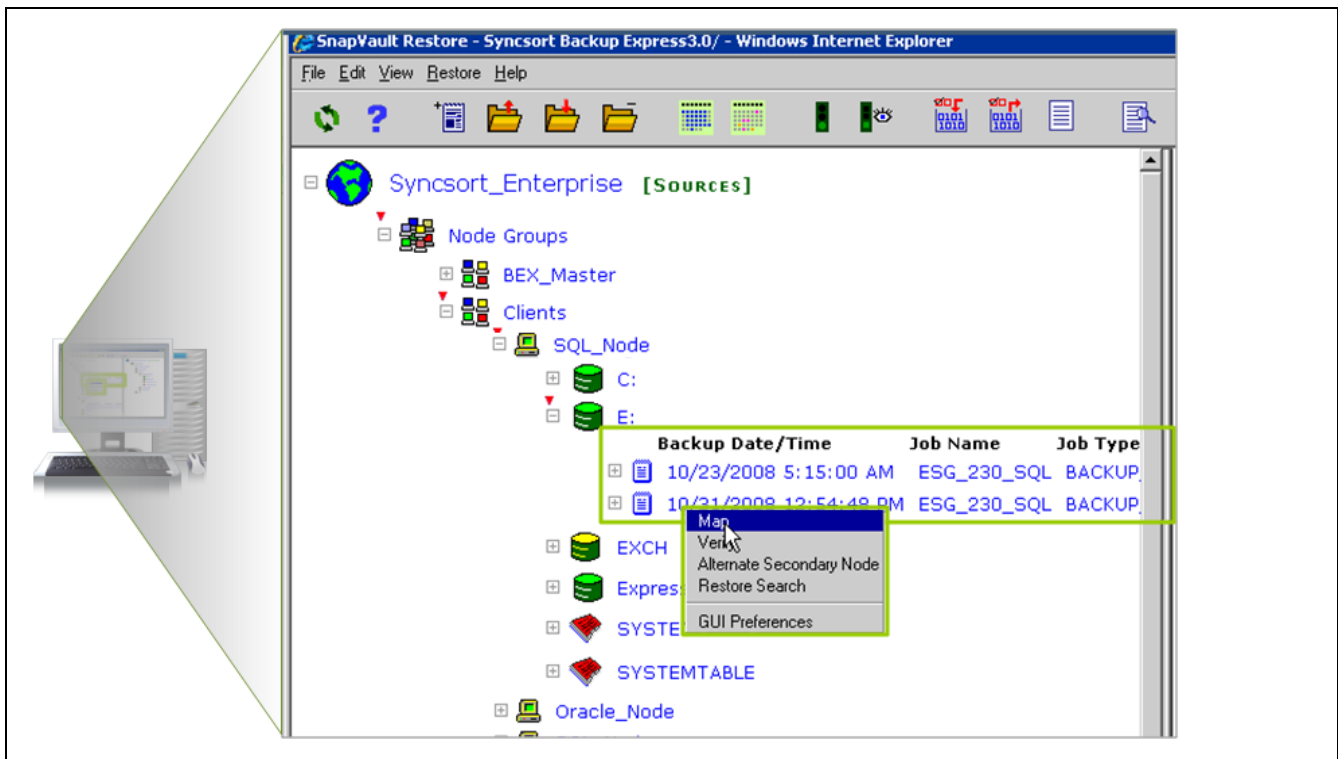
**FIGURE 7. INSTANT AVAILABILITY – NO DATA TRANSFER**



ESG Lab tested Instant Availability by simulating a primary storage failure on a virtual machine running Microsoft SQL Server. First, SQL services were shut down, then the X: drive on the SQL server in the test bed was deleted and un-mounted, which effectively destroyed the SQL database and logs.

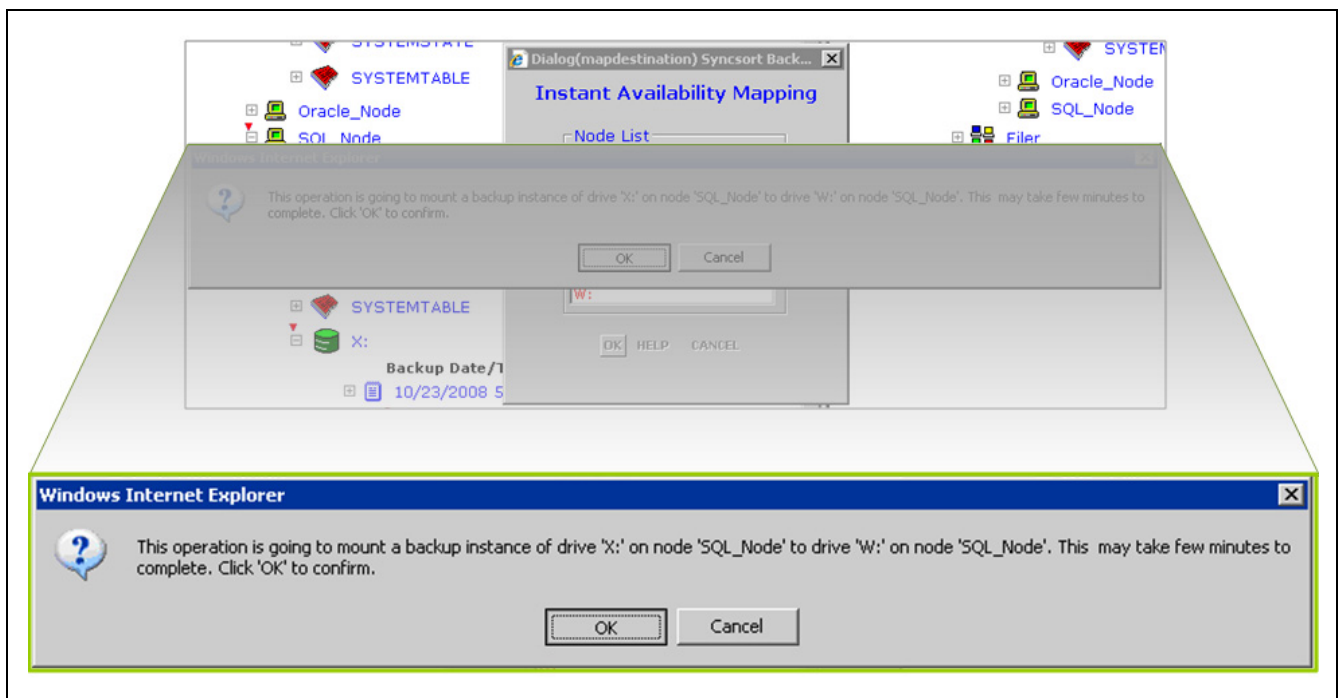
Next, a backup instance (snapshot) was selected from the SnapVault Restore window in the Syncsort Backup Express GUI. ESG Lab right-clicked on the backup instance created at 12:54 PM and selected 'Map' as seen in Figure 8.

**FIGURE 8. INSTANT AVAILABILITY - SELECTING A BACKUP INSTANCE**



As illustrated in Figure 9, the 'SQL\_Node' was selected first, then the W: drive was selected as the mount point for the SQL instance.

**FIGURE 9. INSTANT AVAILABILITY - MAPPING A BACKUP TO A DRIVE LETTER**



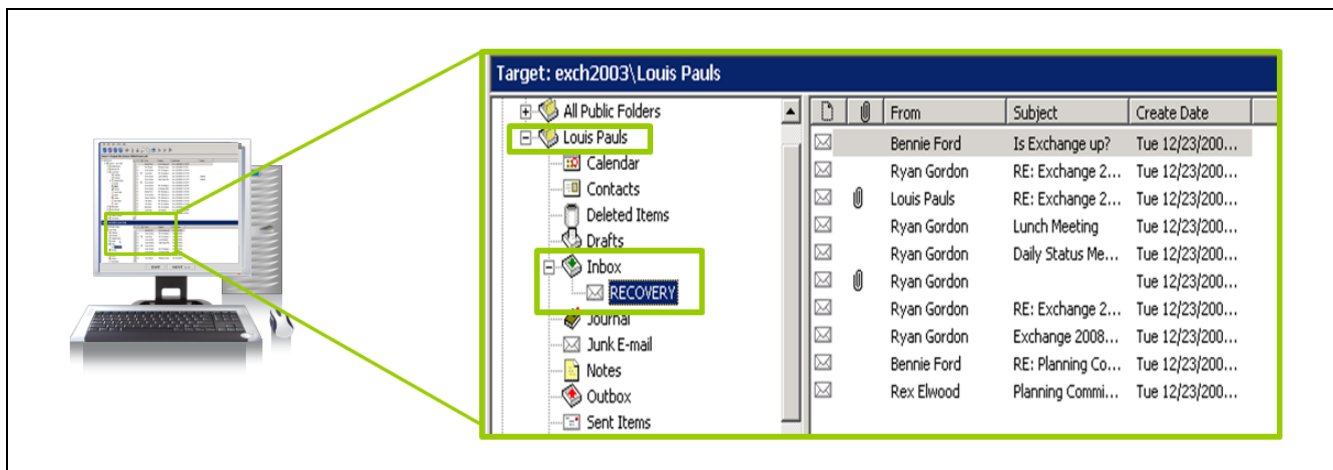
The time measured between clicking 'OK' and volume mapping completion on the server was one minute. Backup Express handled everything on the target server and no administrator actions were required.

SQL services were restarted on the server 'SQL\_Node' and ESG Lab ran a verify operation on the SQL database which confirmed that the database was up and running with no errors.

A similar Instant Availability test was performed to restore a 250 GB Microsoft Exchange database. As in the SQL Server test, a full restore of an entire Exchange instance completed in less than two minutes. ESG Lab noted that Instant Availability can not only be used to restore an entire Exchange database, it can also be used to restore a mailbox or an individual e-mail in a matter of minutes.

The BEX Exchange Mailbox Recovery tool was used to mount and browse a recovery image during ESG Lab testing. ESG Lab noted that an Exchange store can be accessed, browsed and searched in a matter of seconds. Individual e-mails or an entire mailbox were exported to a Microsoft Outlook PST file and a text file. A restore of selected e-mails was performed to a live Exchange database. As shown in Figure 10, a selection of e-mails belonging to user "Louis Pauls" became instantly available within a recovery folder within an existing inbox.

**FIGURE 10. MAILBOX-LEVEL INSTANT AVAILABILITY**



## Why This Matters

ESG research indicates that a majority of IT organizations can't tolerate more than four hours of downtime for their most mission-critical applications before experiencing a significant impact to their businesses.<sup>5</sup> In fact, 5% of respondents indicated that zero downtime has been mandated for mission- and business-critical applications. Given the volume of data associated with most mission-critical applications, traditional disk- or tape-based restore methods fall short of meeting these strict service level agreements.

Syncsort and NetApp enabled ESG Lab to restore a 239 GB SQL Server database in four mouse clicks and only one minute of elapsed time. Instant Availability provided on-demand access to a backup image as a mountable volume with zero effort on the application server—and no data movement required. ESG Lab also confirmed that the BEX Exchange Mailbox Recovery utility provides fast, intuitive instant availability for individual Microsoft Exchange e-mails. Backup Express hid all the complexity as it integrated NetApp snapshot services at a low level and provided intuitive application-specific catalogue and recovery services at a high level.

<sup>5</sup> Source: ESG Research Report, *Data Protection Survey*, 2007

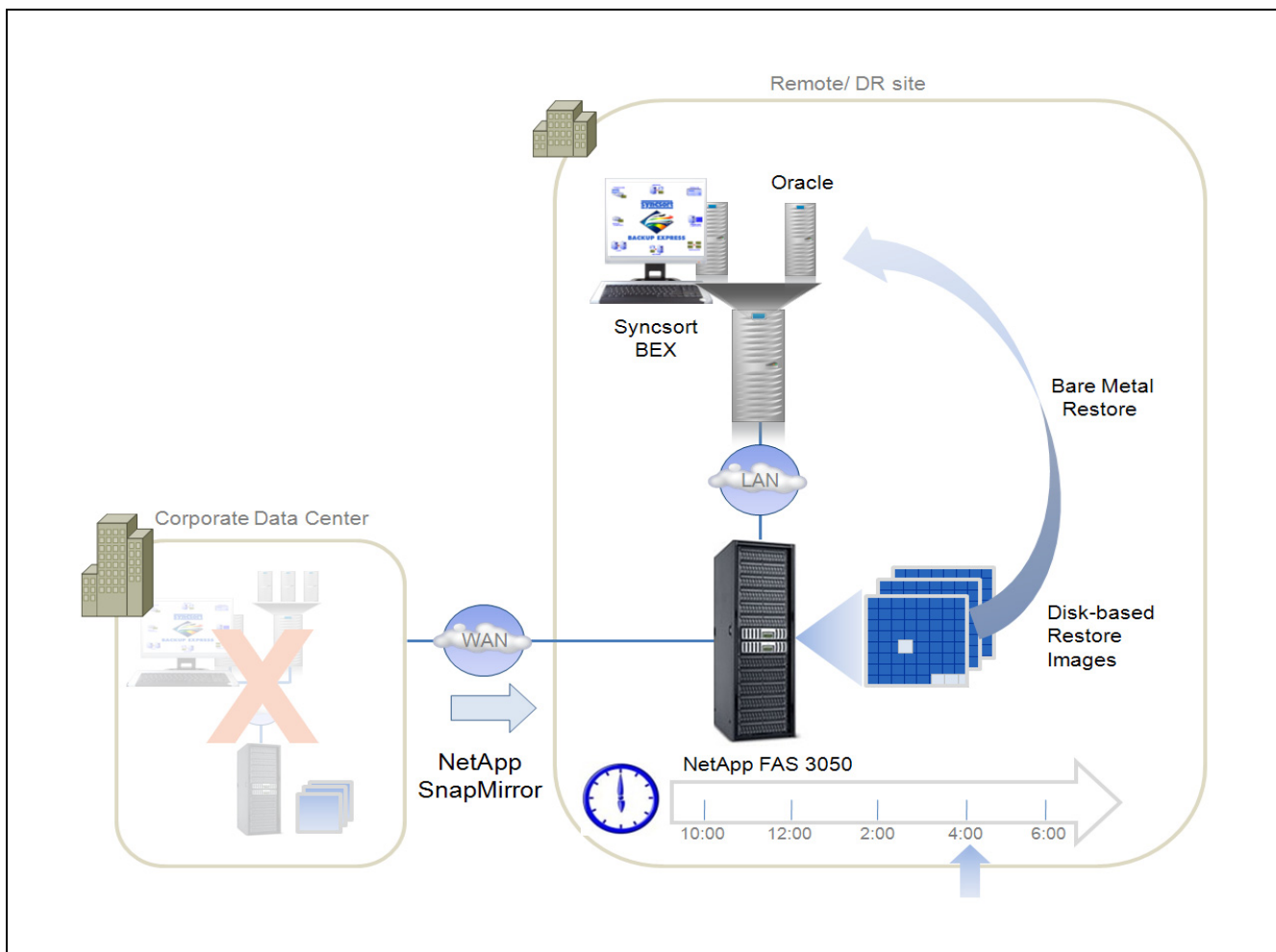
## Bare Metal Recovery

Syncsort Backup Express (BEX) Bare Metal Recovery eliminates the need to manually reinstall the operating system and application executables as it streamlines the recovery process and significantly reduces downtime. Depending on recovery needs, Bare Metal Recovery can restore an entire or partial system. Operating systems, system settings, partition information, applications or data can be recovered in any combination—all in a fraction of the time required by manual methods.

### ESG Lab Testing

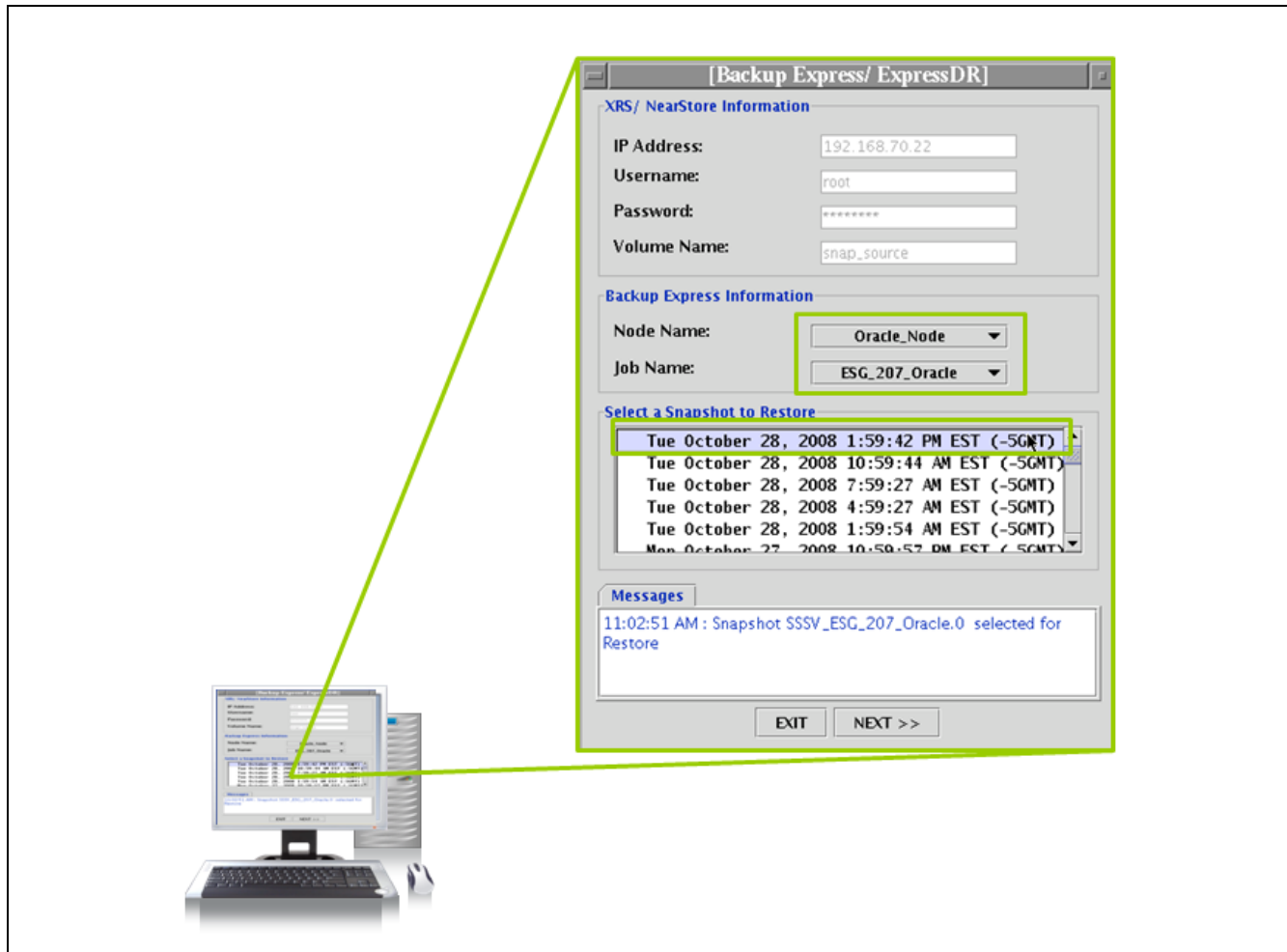
As illustrated in Figure 11, ESG performed a bare metal restore of a virtual server running Oracle 10g, including the Windows operating system, the root volume (C:) and the application volume (E:). The production Oracle server was backed up using BEX software at a simulated corporate data center. Syncsort BEX software used NetApp SnapVault and SnapMirror technology to maintain a series of disk-based restore images at a remote disaster recovery site. SyncSort BEX software was used to perform a bare metal restore of the Oracle server after a simulated disaster at the corporate data center.

**FIGURE 11. VIRTUAL SERVER BARE METAL RESTORE**



The process began with powering on a virtual machine within an existing ESX server located at the remote site. Backup Express was then used to browse the NetApp SnapVault images containing the ExpressDR backups, as shown in Figure 12. A backup image from Oracle\_Node taken on Tuesday, October 28 at 1:59 PM was selected for bare metal recovery.

**FIGURE 12. SELECTED BARE METAL RESTORE SOURCE**



After clicking 'next,' the destination server and target volumes were selected. The process of identifying, selecting and starting the restore operation, including a system reboot, was completed in ten minutes. The process of restoring 280 GB of combined Oracle data on the bare virtual server over a shared Gigabit Ethernet took 3 hours and 45 minutes to complete.<sup>6</sup>

ESG Lab noted that faster times can be achieved by using Instant Availability to map the data directly to the drive at the remote site. For example, in the scenario tested by ESG Lab, the time required to recover the Oracle data drive (E:\) could be reduced to a few minutes by mapping the new server to an existing backup image. This method can be used to rebuild a server from scratch—including its associated applications and data—in 30 minutes or less.

<sup>6</sup> Syncsort guidance indicates that a restore rate of 1 GB per minute is typically used for planning the time required to perform a bare metal restore over a traditional Gigabit Ethernet network. Best practices that can be used to speed bare metal restore times include the use of trunking and dedicated backup networks.

The bare metal restore summary, shown in Figure 13, summarizes the steps ESG Lab performed and shows the source and destination volumes as well as restore status (Completed) for all three volumes.

**FIGURE 13. BARE METAL RESTORE SUMMARY**

The screenshot shows the Backup Express/ ExpressDR window. The 'Backup Information' section displays 'Jobname: ESG\_207\_Oracle' and 'Backup Date: Wed October 22, 2008 10:14:29 PM EDT (-5GMT)'. Below this are two tables: 'SOURCE INFORMATION' and 'TARGET INFORMATION'. The 'SOURCE INFORMATION' table has columns 'Drive/ID', 'Size (MB)', and 'Type'. The 'TARGET INFORMATION' table has columns 'Disk' and 'Partition'. At the bottom, the 'Restore Status' section shows three restore operations, all marked as 'Restore Completed'. Buttons for 'EXIT', 'RESTORE', and 'CANCEL' are at the bottom.

SOURCE INFORMATION			TARGET INFORMATION	
Drive/ID	Size (MB)	Type	Disk	Partition
HIDDEN	54		D 0	P 1
C	145000	B/S	D 0	P 2
E	141039		D 0	P 3

Restore	Status
Restore 0:	Restore Completed
Restore 1:	Restore Completed
Restore 2:	Restore Completed

Once all three volumes were completely restored, the virtual server was rebooted and the server and application (Oracle 10g) was accessing data in less than five minutes.

## Why This Matters

Traditional methods for system recovery are complex, manual processes requiring highly skilled staff. Often, system configuration changes are not backed up regularly, which results in unsuccessful system restores. This often prevents IT and the business from meeting service level requirements.

Leveraging tight integration with NetApp SnapVault, Syncsort Bare Metal Recovery provides a simple process for recovering an entire application server? by eliminating the need to manually reinstall the operating system and applications. Bare Metal Recovery can also be used to deploy a complete system image to multiple machines, including virtual servers.

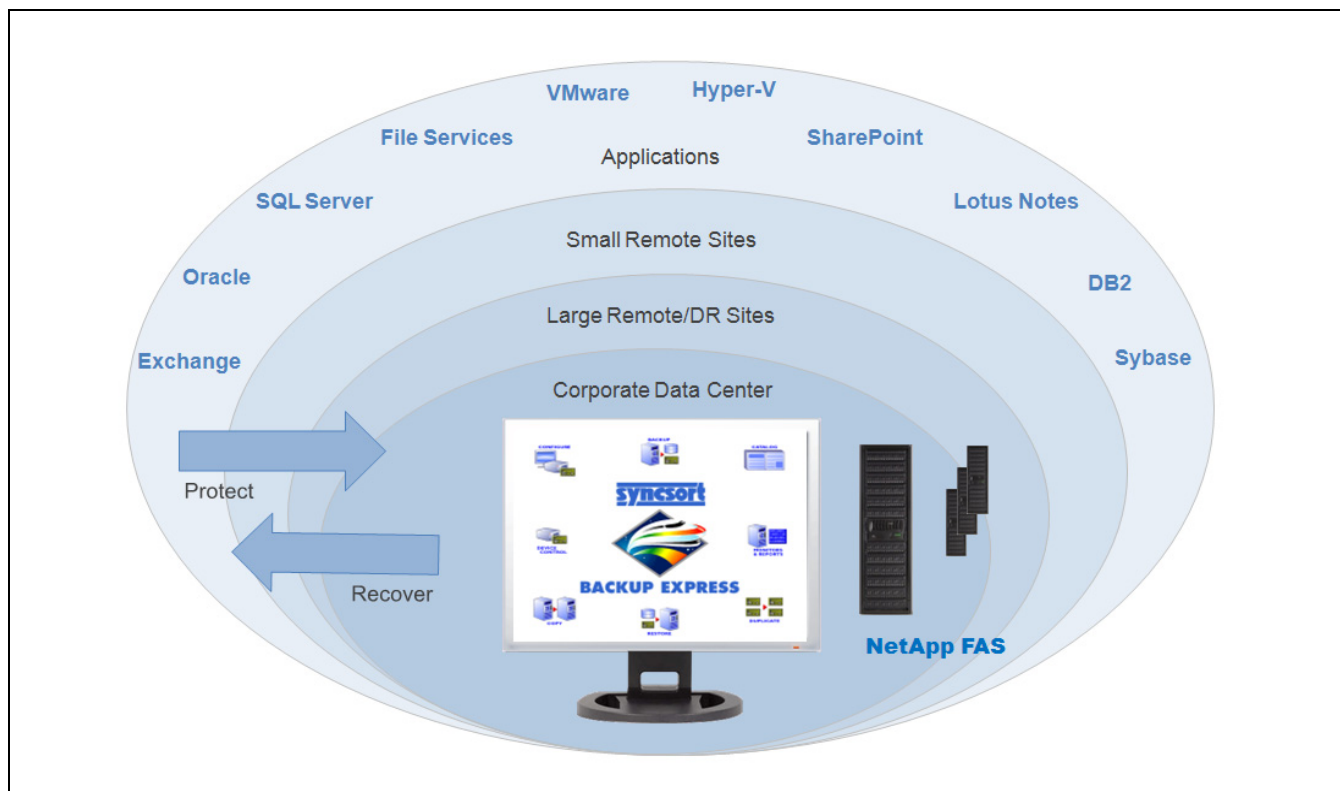


## Centralized Management

Figure 14 illustrates the centralized management concept employed by Syncsort. From a web browser, backup administrators manage local corporate data centers as well as remote and secondary/DR sites. Applications located locally and remotely can all be protected and recovered from the Backup Express console.

During the ESG Lab validation presented in this report, a single BEX console was used to protect and recover physical and virtual servers running applications including Exchange, Oracle, SQL Server and file services. ESG Lab noted that BEX supports a number of additional applications including Microsoft SharePoint, IBM Lotus Notes and Sybase.

**FIGURE 14. CENTRALIZED MANAGEMENT**



## Why This Matters

Keeping up with explosive data growth and the proliferation of new applications is straining the limits of budgets and staff within most IT organizations. A common, centralized method is needed to simplify the protection and recoverability of data throughout the organization.

ESG Lab has confirmed that Syncsort BEX and NetApp can be used to provide simplified centralized management for a wide variety of operating systems and applications throughout the organization. From the data center to remote offices and DR sites, Syncsort BEX provides a single management interface for advanced data protection and recovery.



## ESG Lab Validation Highlights

- ☑ Syncsort Advanced Recovery with Source-Side Data Reduction was used to dramatically reduce disk, network and server CPU resources over a series of four logical full backups. Using NetApp snapshot technology for fast and reliable disk-based restores, ESG Lab has confirmed that disk and network requirements can be reduced by 94% for a mix of application-level backups (Oracle, Exchange and files) retained over 30 days.
- ☑ Syncsort Instant Availability provided on-demand access to a 239 GB SQL database backup image as a mountable volume with zero reconfiguration of the application server—in one minute with no data movement.
- ☑ Syncsort Bare Metal Recovery provided an easy to use process for recovering an Oracle application running in a Windows virtual machine under VMware ESX virtual server. The Oracle application was restored and available on a bare machine after less than 15 minutes of user intervention and three hours of data transfer over a shared Gigabit Ethernet network.
- ☑ ESG Lab was able to manage storage policies, perform backups, and recover files for a variety of operating systems and applications from a single Syncsort BEX management console (VMware ESX, Microsoft Windows, Exchange, SQL Server, NTFS file systems and Oracle).

## Issues to Consider

- ☑ ESG Lab tested disk-to-disk backup integration with NetApp snapshots for disk-based local and remote recovery. D2D2T is supported but was not tested. Contact Syncsort for advice on how to leverage existing investments in tape while improving Recovery Point Objectives (RPO) and Recovery Time Objectives (RTO) with a disk-based strategy.
- ☑ While ESG Lab is confident that the benefits of the Syncsort BEX and NetApp technologies presented in this report can be used to dramatically improve RPO and RTO, for those organizations that are looking to improve the protection of mission-critical applications, the cost of new Syncsort/NetApp software, hardware and training needs to be considered when moving from a legacy infrastructure based on any of the currently market-leading backup and recovery software solutions.
- ☑ While subsequent backups are exceptionally fast because only blocks changed since the previous snapshot are transferred, special planning should be considered for the initial first backup, especially when backing up to a remote/secondary site over a WAN with limited bandwidth. SnapMirror to a local tape or disk, then shipping the mirror to a remote site for initial baseline is recommended.

## ESG Lab's View

Despite the many new data protection technologies that have come to market in recent years, backup and recovery remains an enduring problem for many organizations. The need to improve backup and recovery processes is driving increased interest in technologies such as disk-to-disk backup systems, remote backup solutions and data reduction. With increasingly complex data protection environments, many organizations express interest in turning to one vendor for all of their data protection needs, but also recognize that they may need to select best-of-breed products to fully address their requirements.

The combination of Syncsort Backup Express software and NetApp FAS storage systems and software address this dichotomy, delivering a highly scalable data protection solution that is easy to deploy, scale and manage as it reduces operational costs. Syncsort integration with NetApp SnapVault technology enables block-level snapshots to be constructed as base backup images, enabling granular, near-instant point-in-time restores of critical applications and files without transferring data. Syncsort bare metal recovery, integrated with disk-based NetApp snapshot images, provides simple, robust one-step recovery after a disaster. A centralized management console manages local and remote installation through a simple to use web-based browser.

ESG Lab testing has confirmed that Syncsort BEX source-side data reduction can be used to reduce disk, network and server CPU resources by a factor of 96% for enterprise application backups retained for 30 days. Syncsort Instant Availability was used to provide read/write access to a 239 GB SQL database backup image in a little more than one minute without transferring data. Instant Availability was also used to browse, search and restore individual Microsoft Exchange e-mails and mailboxes. ESG Lab performed all the steps necessary for a bare metal recovery of a Windows virtual server in less than fifteen minutes. Integration with NetApp SnapVault and SnapMirror services was transparent as the centralized Backup Express user interface was used to manage backup and recovery operations for physical and virtual servers running a variety of applications including Microsoft Exchange, Microsoft SQL server and Oracle.

Backup and IT managers are constantly looking for solutions to address data protection and disaster recovery challenges while still meeting increasingly aggressive RTO and RPO requirements and reducing the complexity of managing data protection for the entire organization. With the Syncsort/NetApp solution, all data protection operations are performed through a centralized console to manage, protect and recover applications and operating systems—simply and efficiently. A single backup image protects and recovers files, applications, servers and sites while reducing the amount of data to be protected.

While other solutions can use snapshots for fast and reliable data protection and near-instant recovery, ESG Lab is impressed with the Syncsort/NetApp solution because it hides all the complexity of managing snapshots as it supports a wide array of applications. Integration of snapshots at a low level and knowledge of applications and data types at the high level are handled transparently, while a complete and browse-able backup catalogue is maintained for near-instant recovery of files, objects or entire applications, as well as bare metal restores.

With source-side data reduction for backups that complete in minutes, disk-based snapshots for near-instant disk-based recoveries and bare metal restores for a rich and varied set of popular applications, ESG Lab has confirmed that the deep integration and breadth of a Syncsort BEX and NetApp solution provides advanced data protection services that are fast, flexible and reliable.

# Appendix

**TABLE 2. TEST ENVIRONMENT DETAILS**

NetApp/Syncsort	
NetApp FAS 3050, ONTAP 7.2.4	Syncsort Backup Express, Version 3.01
Servers, Virtualization, Operating System, Applications	
IBM Blade Server H VMware ESX, version 3	Oracle 10G Server Windows 2003 (x64)
SQL Server Windows 2003	Exchange Server Windows 2003 Enterprise Edition (SP-2)



20 Asylum Street  
Milford, MA 01757  
Tel: 508-482-0188  
Fax: 508-482-0218

[www.enterprisestrategygroup.com](http://www.enterprisestrategygroup.com)