

# Lab Validation Report

## NetApp Syncsort Integrated Backup

Advanced Data Protection and Disaster Recovery

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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 Syncsort.

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## Introduction

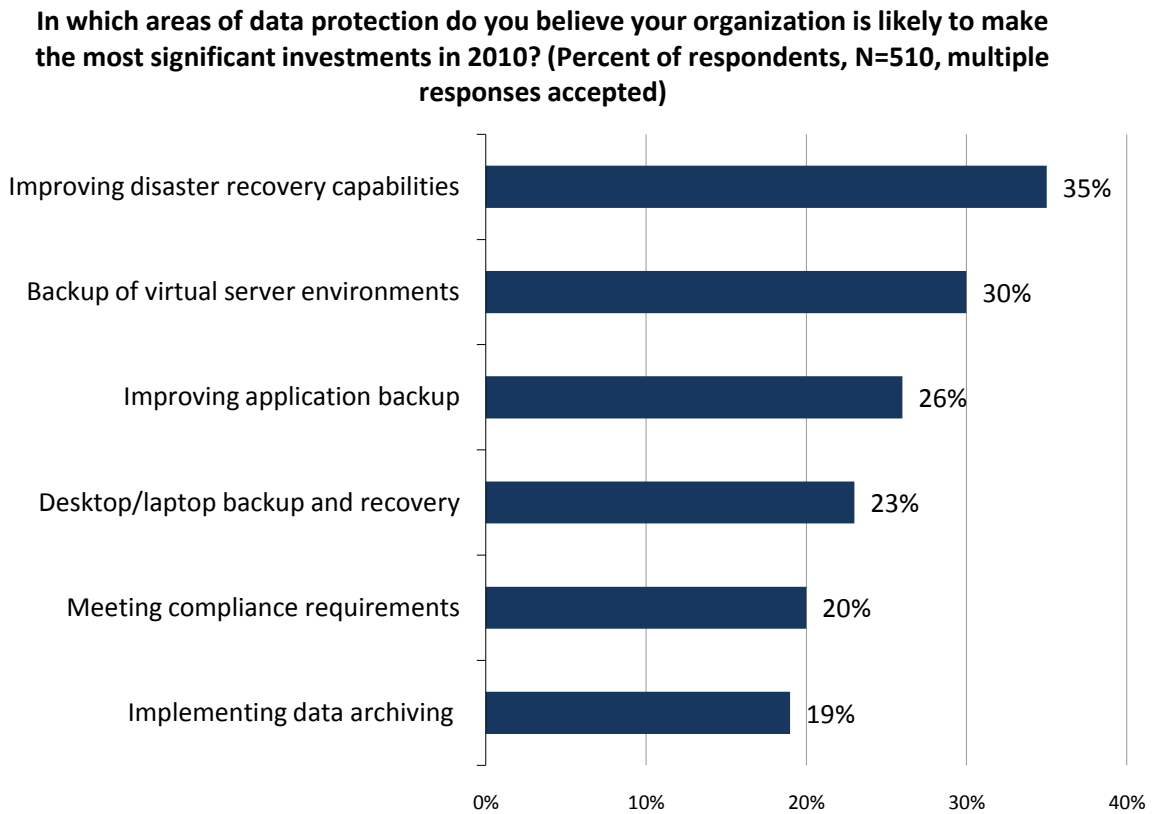
Syncsort’s data protection software has been teamed successfully with NetApp’s SnapMirror and SnapVault technology for some time, creating an integrated disk-based solution for data protection and disaster recovery of mission-critical digital assets. Within minutes of an outage or disaster, applications, 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 technology and valuable Syncsort services such as near-instant virtualization, almost continuous disk-based data protection, near-instant data recovery and bare metal recovery of physical and virtual servers.

## Background

ESG recently asked IT professionals which applications they considered to be their organization’s top priorities for data protection. Databases (46%) easily topped the list, but IT respondents also showed significant concern for protecting email (28%) and financials (22%). All these choices represent business critical data within an IT organization. It’s clear that the challenge for IT to protect an ever growing and business critical infrastructure continues to grow.

Improving disaster recovery (35%) continued to be the top area of data protection in 2010. But, with the proliferation of virtual machines, finding a backup solution for virtual environments (30%) has become a key priority; following close behind was improving application backups (26%). These concerns are compounded by the annual double digit data growth experienced by 84% of IT organizations.<sup>1</sup>

*Figure 1. Top Areas of Data Protection Investment*



Source: Enterprise Strategy Group, 2010.

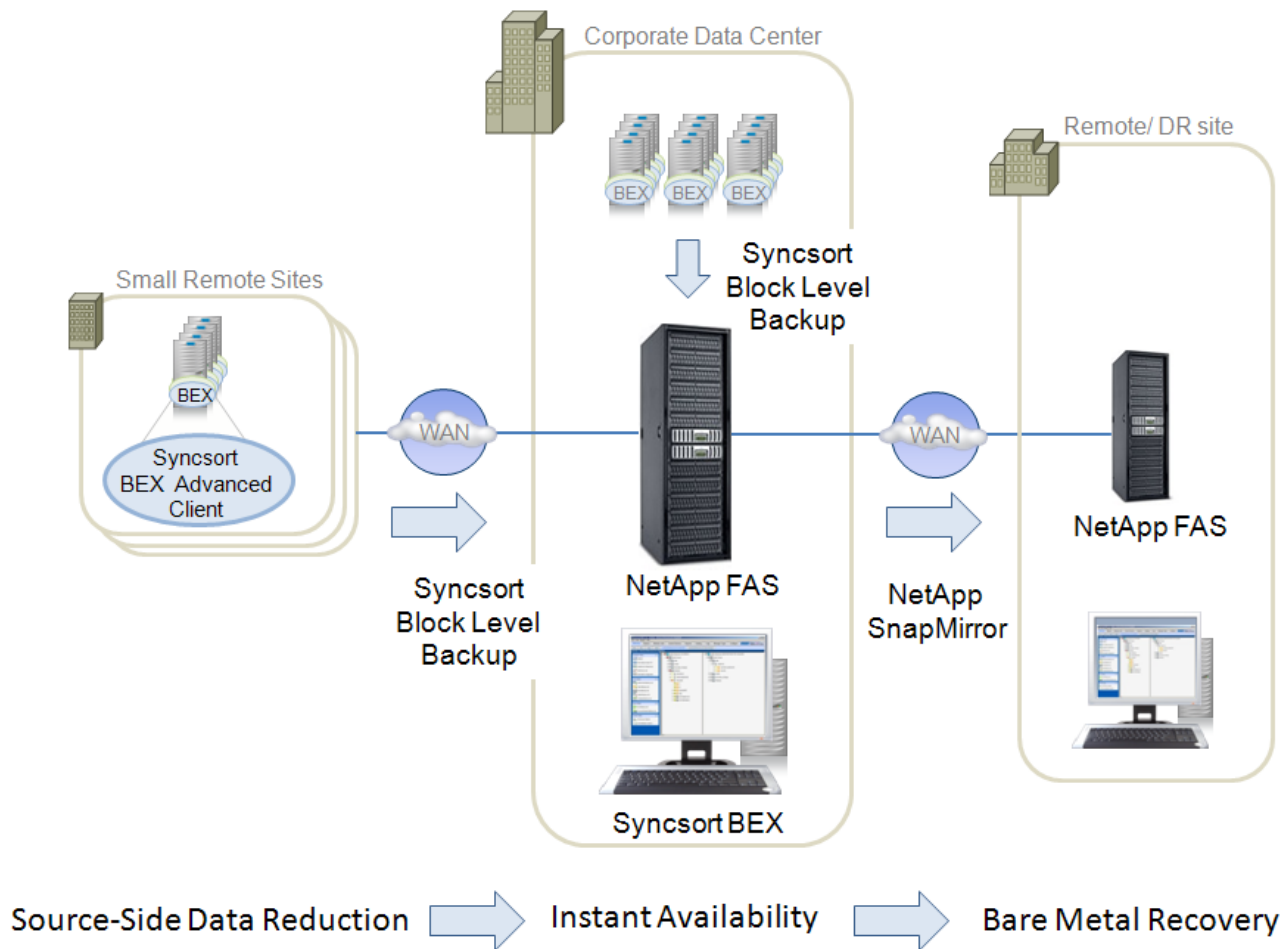
<sup>1</sup> Source: ESG Research Report, [Data Protection Trends](#), April 2010

## NetApp Syncsort Integrated Backup

The combination of Syncsort and NetApp delivers a highly scalable data and storage management 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, advanced Syncsort client software provides knowledge of applications and data types at a high level and uses NetApp SnapVault engine for bare metal recovery and near instant restores. When coupled with NetApp SnapVault, which provides snapshots services at a low level, the combined solution enables near-instant recovery of files, objects, or entire applications in addition to bare metal restores. This near-instant recovery can also be applied to virtual machines in VMware and Microsoft Hyper-V environments. Integration with NetApp SnapMirror services is used to replicate space-efficient snapshots between sites for disaster recovery.

Figure 2. *NetApp Syncsort Integrated Backup*



As illustrated in the diagram, remote and branch offices protect and backup their data to a corporate data center using Syncsort data protection software and NetApp’s Snapshot and SnapVault technologies. Corporate data centers then utilize NetApp SnapMirror to replicate their snapshots to a remote/DR site for near-instant recovery of systems and applications including bare metal recovery of systems.

## NetApp FAS Features

NetApp Data ONTAP 8G operating system, found in NetApp FAS and V-Series storage systems, is a fully virtualized data management environment that includes data deduplication, thin provisioning, snapshot, and RAID-DP technologies.

NetApp's snapshot technology enables the creation of point-in-time copies of file systems, which can be used to protect data—from a single file to a complete disaster recovery solution. This technology can be used while applications are running, creating snapshot copies in less than a second, regardless of volume size or level of activity on the NetApp system.

NetApp's Snapshots make incremental, data-in-place point-in-time copies of LUNs or volumes with minimal performance impact. This enables users to create frequent, space-efficient backups with no disruption to data traffic.

SnapVault exports Snapshot copies to another NetApp system, providing incremental block-level backups to protect Windows, Linux, UNIX, and VMware systems running on mixed storage. SnapVault integration with OSSV increases performance and enables more frequent data protection by moving and creating backups from changed data blocks, not entire changed files. And since only changed blocks are stored, less capacity is needed.

SnapMirror enables automatic replication of data sets between NetApp systems and/or filers over LAN or WAN, providing high data availability and fast disaster recovery for business critical applications, including Microsoft Exchange, Microsoft SQL Server, and Oracle. By mirroring data to one or more NetApp storage systems and continually updating the mirrored data, data is kept current and can be used in mirroring data for multiple purposes. This provides flexibility and efficiency when mirroring for data distribution and disaster recovery.

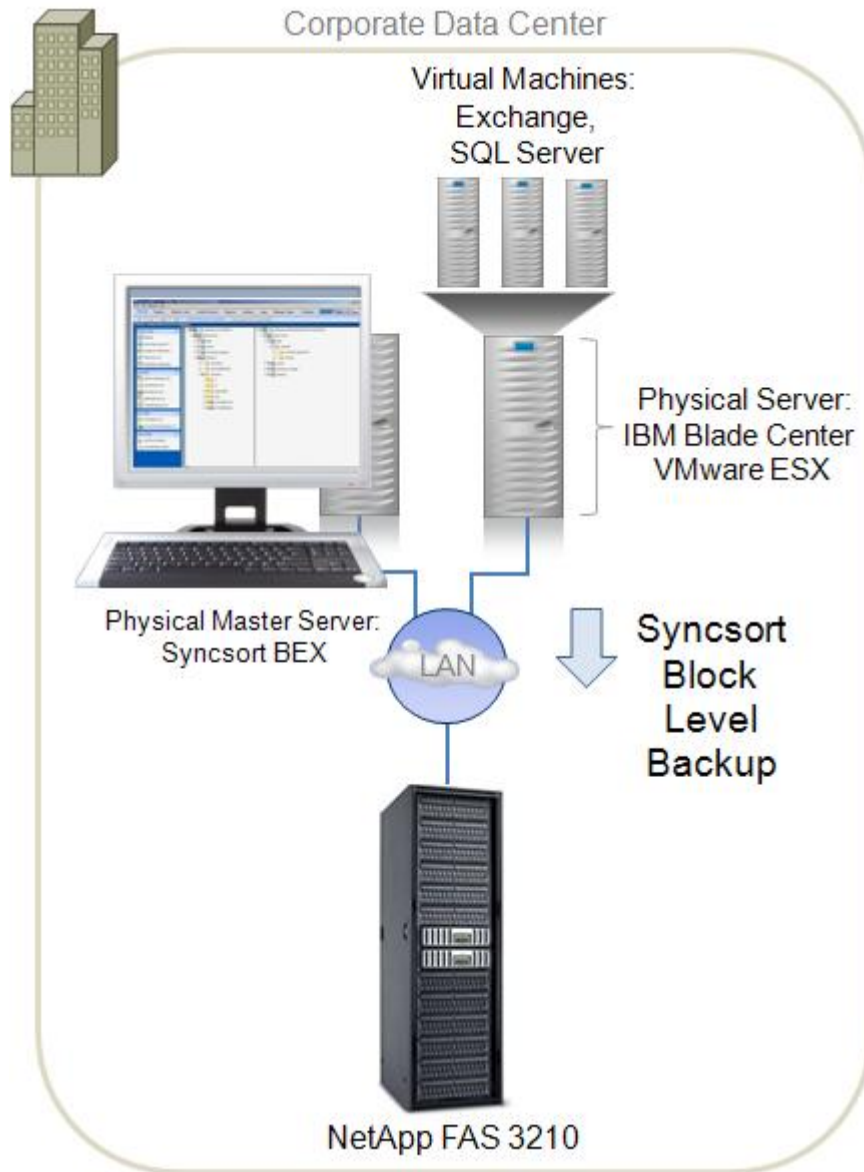
This ESG Lab report examines Syncsort data protection software and NetApp storage working in concert to provide a rich set of services and capabilities including:

- **Syncsort Instant Virtualization™**, which provides data protection and instant recovery of virtual machine images, and also facilitates virtual machine migrations from physical servers.
- **NetApp SnapVault and SnapMirror services**, which provide space-efficient disk-based images of backed up data for quick, reliable restore and recovery operations.
- **Syncsort near-instant recovery**, which enables rapid access to files, objects, and entire applications protected on disk with NetApp SnapVault and SnapMirror services.
- **Syncsort 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 in Figure 3, a corporate data center was simulated using a NetApp FAS 3210 attached via iSCSI to physical and virtual servers. The physical server was running the Syncsort data protection application while the virtual servers, running under the VMware ESX hypervisor on an IBM Blade Center server hosted Microsoft Exchange, Microsoft SQL Server, and Microsoft file services.<sup>2</sup>

Figure 3. ESG Lab Test Bed



<sup>2</sup> Tested hardware and software details are listed in the Appendix.

## Instant Virtualization

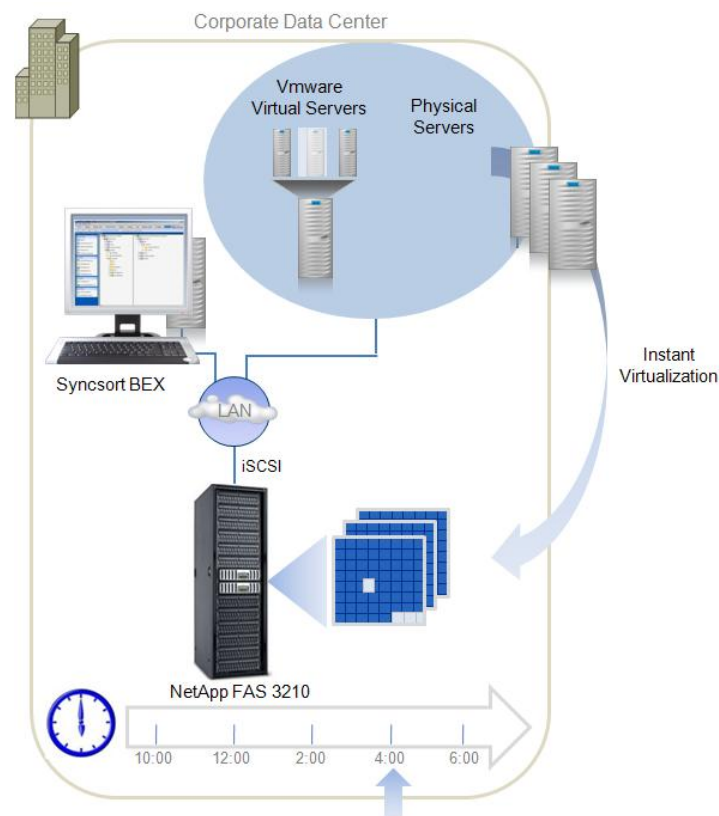
Syncsort has developed integration with VMware API's to deliver a tightly coupled solution for instant virtualization of both physical and virtual servers. Leveraging its integration with NetApp's Snapshot technology, Syncsort is able to deliver a software solution that provides near instant recovery of virtual servers.

Using Syncsort's management console, administrators can choose a snapshot of a virtual machine, restore the image to the same or different ESX server and start the new image. No action is required from the VMware console as the Syncsort integration performs all the required steps in the background to register the virtual machine with the ESX server and boot the image.

Full virtualization creates a virtual machine, vmdk file and vmx from a snapshot of a physical server. Essentially, a snapshot of a physical server can be virtualized without ever bringing down the original server in production. This allows administrators to quickly provision clones of production servers in a virtual environment for such uses as development and QA without the capital expenditure required for physical resources.

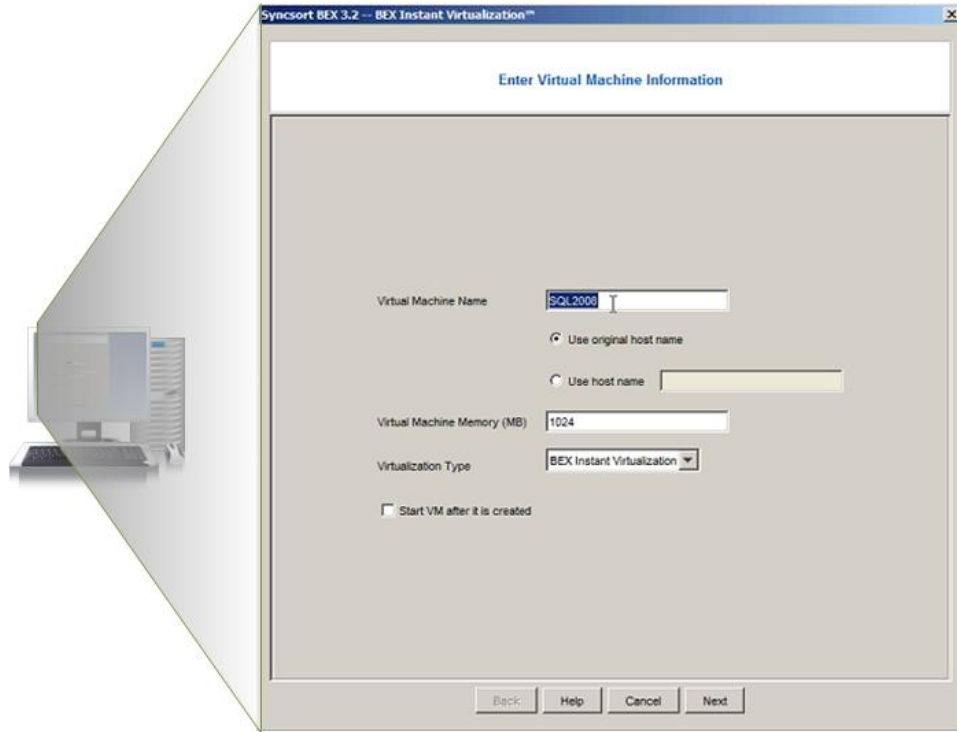
As shown in Figure 4, Syncsort combines integration with NetApp's Snapshot technology and VMware's APIs to provide complete data protection for a virtual infrastructure

*Figure 4. Instant Virtualization*



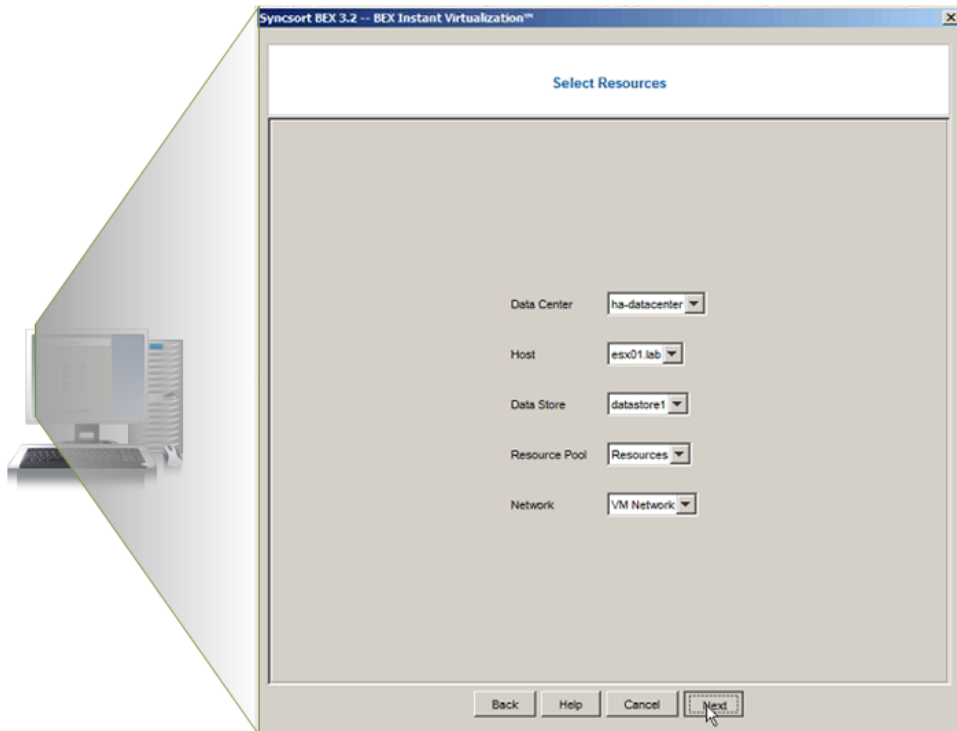
ESG Lab performed a test of instant virtualization of a Windows 2008 server running on an ESX server to examine the ease and speed of recovering a virtual machine and seamless integration with a VMware environment. In the Syncsort administrative console, ESG Lab right-clicked on a snapshot of a Windows server named "SQL2008" and chose the virtualize option. As shown in Figure 5, ESG Lab chose Syncsort "Instant Virtualization" as the virtualization type, which allowed ESG Lab to recover a virtual machine snapshot to another ESX server and/or a new datastore. Since the virtual machine can be restored to the same ESX host location, an option is available to change the virtual machine name. ESG Lab chose to keep the "SQL2008" virtual machine name.

Figure 5. New Virtual Machine Creation



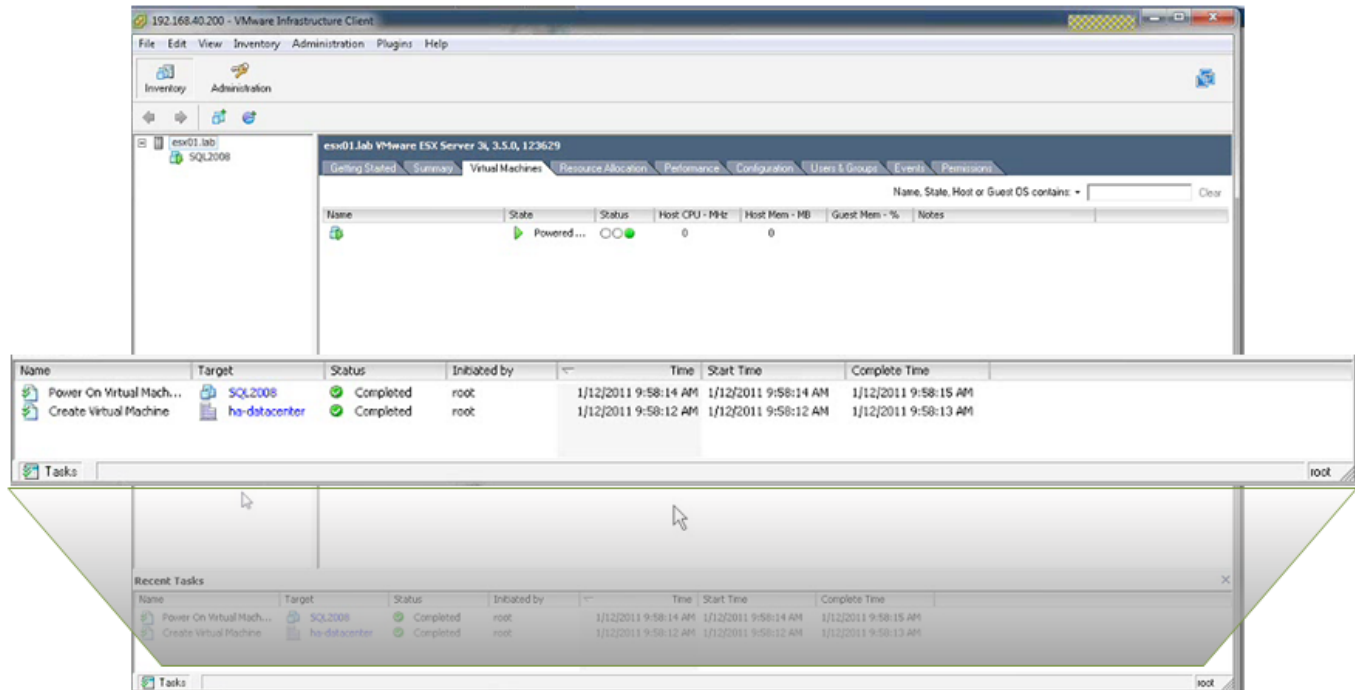
ESG Lab was able to select the host controller for the ESX virtual infrastructure and log in as a root user. Providing root credentials allowed ESG Lab to access API's to create the virtual machine within the ESX host. The "Select Resources" window shown in Figure 6 allows an administrator to provide all the parameters required by VMware to create a virtual machine. ESG Lab chose "ha-datacenter" to restore the virtual image with "esx01.lab" as the host.

Figure 6. New Virtual Machine Location



After the recovery job started ESG Lab observed virtual machine creation using a VMware Infrastructure client. As shown in Figure 7, the SQL2008 server was created on the “ha-datacenter” target and powered on automatically. No action was required by ESG Lab to create the virtual machine using the VMware client.

Figure 7. Startup of Recovered Virtual Machine



Based on results of ESG Lab testing, ESG is confident that the combination of Syncsort data protection software, NetApp Snapshot technology, and VMware can provide a rapid backup and recovery solution for any organization’s virtual server infrastructure.

## Why This Matters

Virtualization has proliferated in almost all IT organizations, moving from development and QA environments to production.

Online virtual machine migrations and the ability to recover virtual machines quickly have become key requirements for data protection software. Almost three-quarters of IT organizations surveyed by ESG perform online migrations of virtual machines in which virtual machines are moved from one physical resource to another while applications remain available to users.<sup>3</sup> Minimal downtime during these operations ensures that users are back online and productive in minutes.

Syncsort, combined with snapshot technology from NetApp, handles both instant recovery of virtual machines and online migrations quickly, allowing for not only rapid disaster recovery but efficient repurposing of virtual servers as resources for development and QA environments.

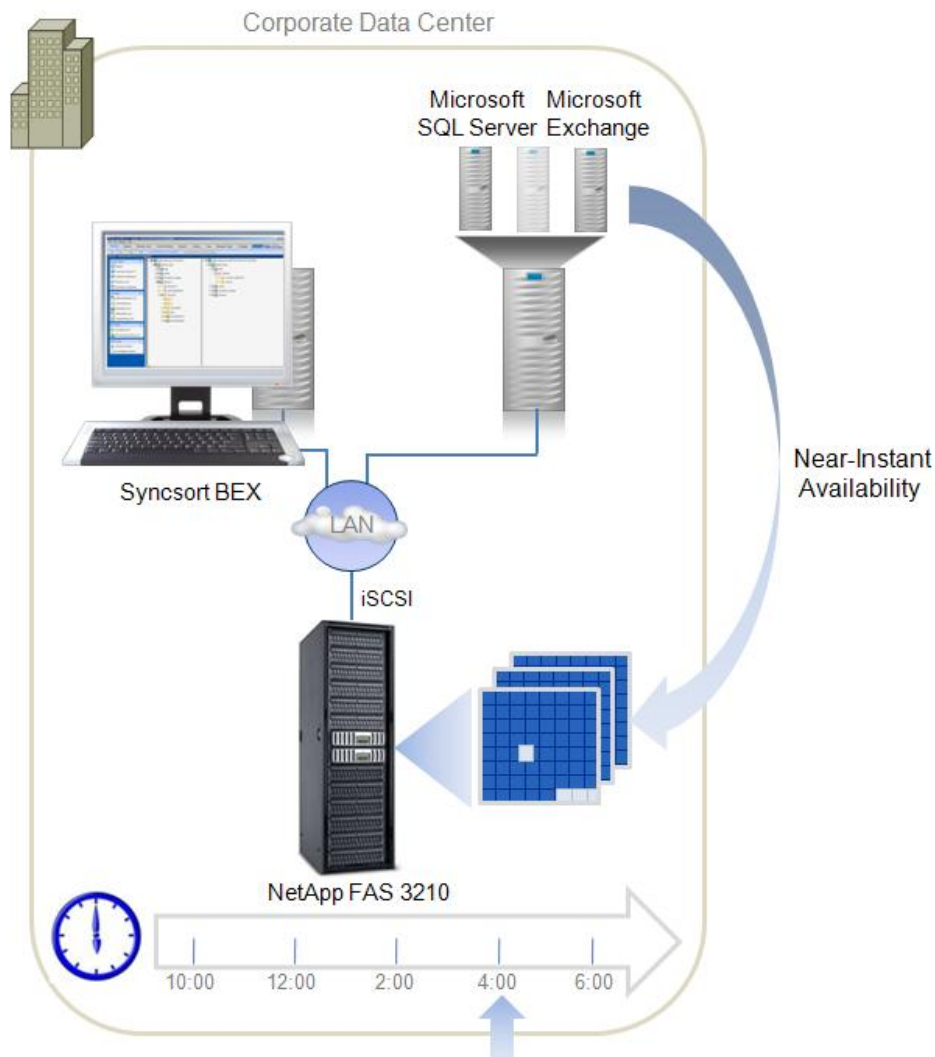
ESG Lab tested the instant virtualization option with an existing SQL Server snapshot and successfully created a new virtual image that loaded in the ESX environment in minutes.

<sup>3</sup> Source: ESG Research Report, [The Evolution of Server Virtualization](#), November 2010

## Instant Availability

Syncsort 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 8.

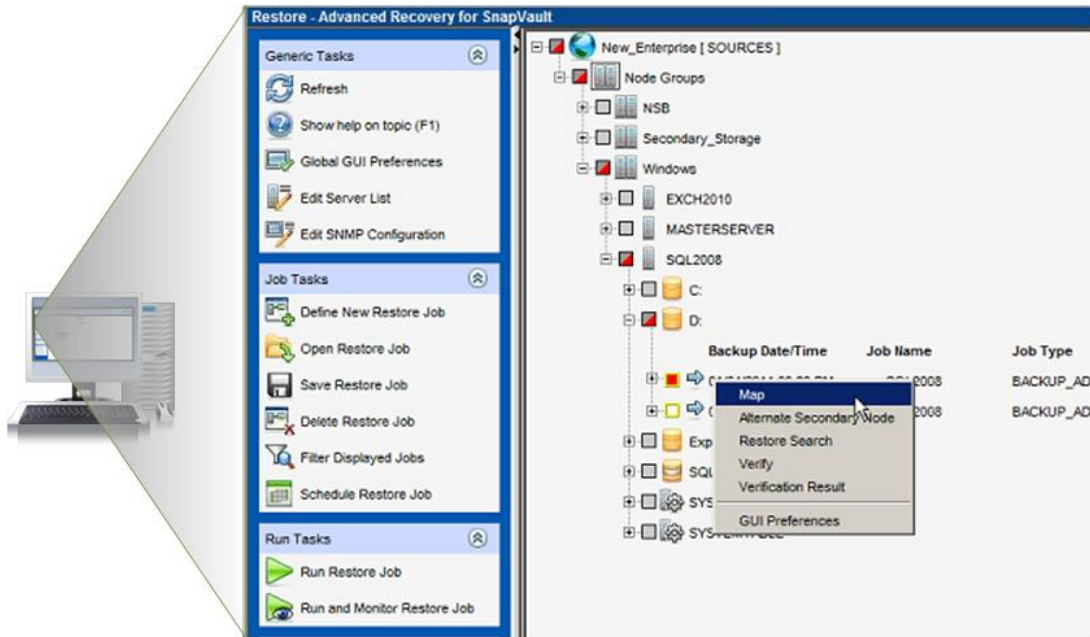
Figure 8. Instant Availability – No Data Transfer



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, and then the D: drive on the SQL server in the test bed was deleted and un-mounted, which effectively destroyed the SQL database and logs.

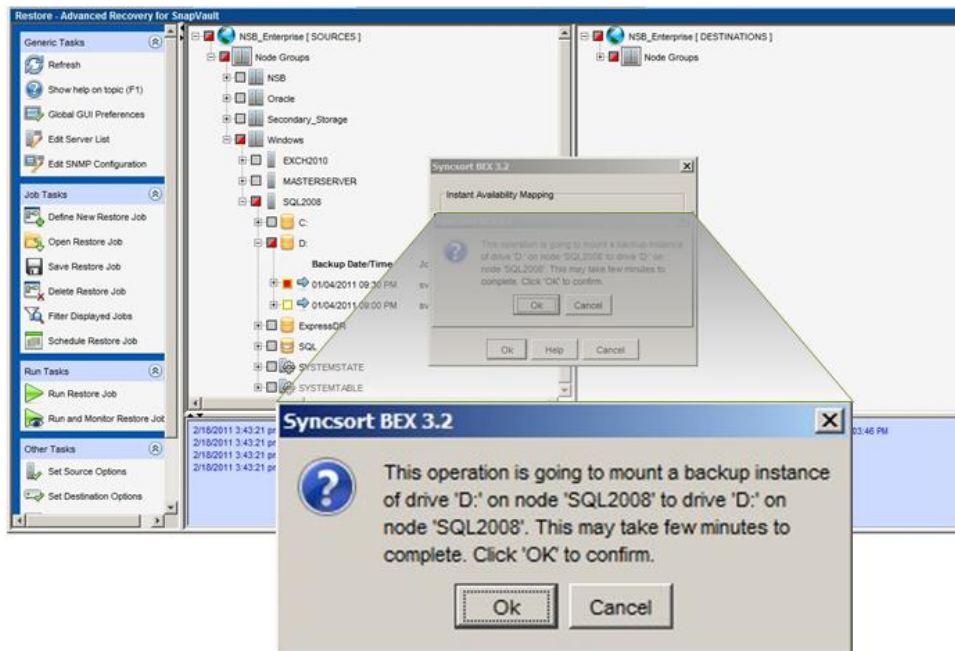
Next, a backup instance (snapshot) was selected from the SnapVault Restore window in the Syncsort GUI. ESG lab right-clicked on the backup instance created at 9:30 PM and selected "Map" as seen in Figure 9.

Figure 9. Instant Availability - Selecting a Backup Instance



As illustrated in Figure 10, the “SQL2008” server was selected first, then the D: drive was selected as the mount point for the SQL instance.

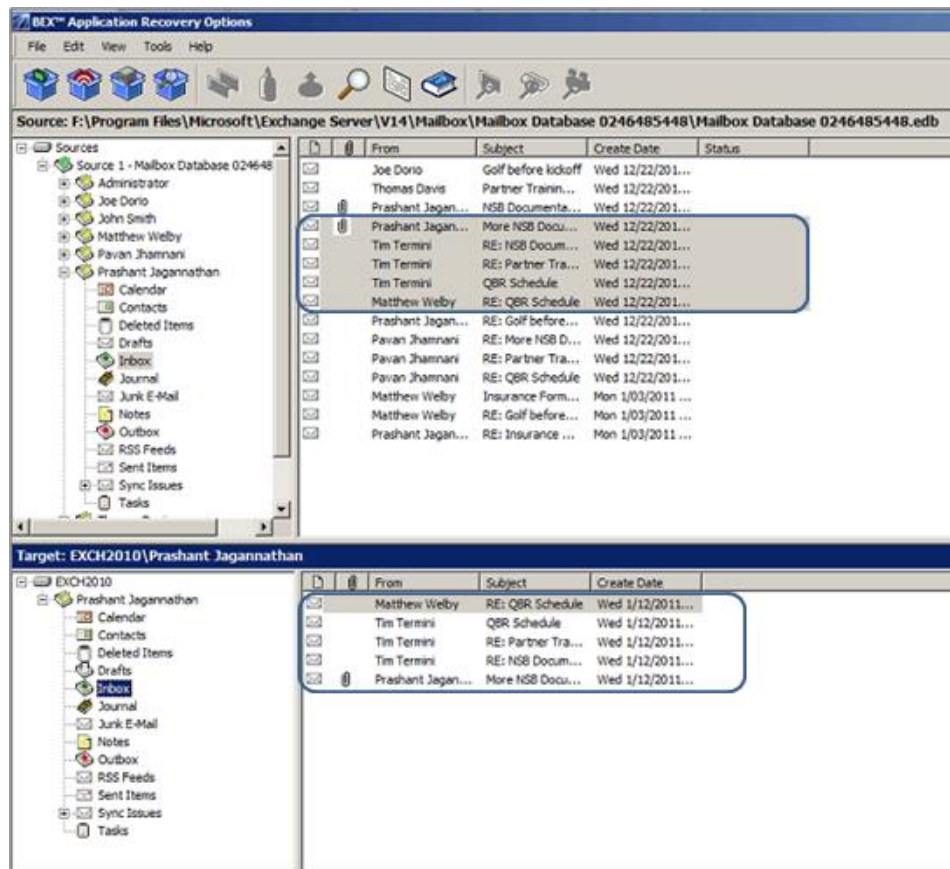
Figure 10. Instant Availability - Mapping a Backup to a Drive Letter



The time measured between clicking “OK” and volume mapping completion on the server was one minute. Syncsort handled everything on the target server and no administrator actions were required. SQL services were restarted on the server “SQL2008” 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 mailbox items from a 250 GB Microsoft Exchange database. 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. As shown in Figure 11, ESG Lab used the Syncsort web-based GUI to search for five mail items in a single mailbox, and was able to successfully restore all items in less than two minutes. ESG Lab verified the restore by opening the same user mailbox via the Outlook web-based client and observed the five email items in the user's inbox.

Figure 11. Mailbox-level Search and Restore



## Why This Matters

ESG research indicates that more than half (53%) of respondents indicated that downtime for their tier-1 data cannot exceed more than an hour without causing adverse business impact.<sup>4</sup> In fact, nearly one-fifth (18%) of respondents indicated that downtime is not acceptable for their tier-1 data. 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 application to operation 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. Syncsort 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>4</sup> Source: ESG Research Report, [Data Protection Trends](#), 2010

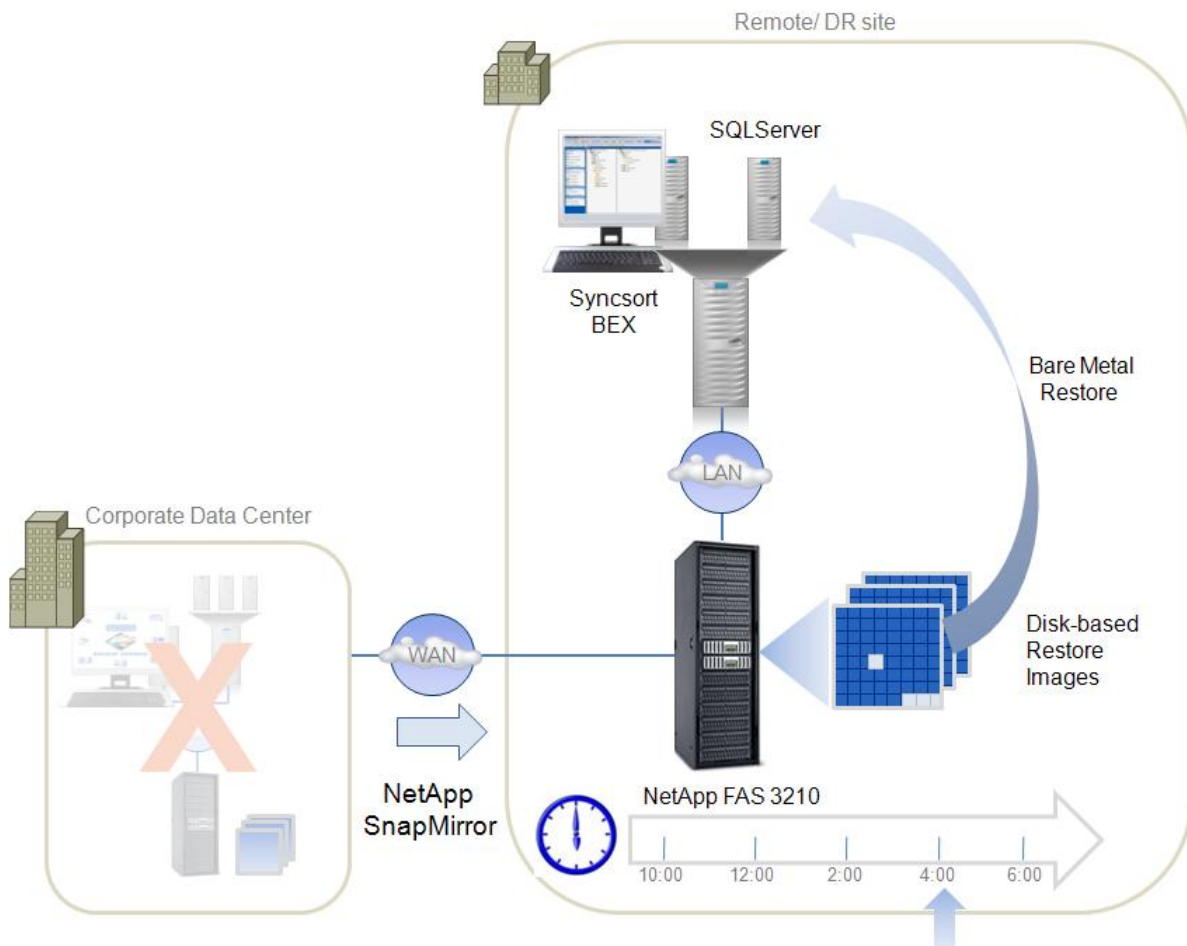
## Bare Metal Recovery

Syncsort Bare Metal Recovery eliminates the need to manually reinstall the operating system and application executables as it streamlines the recovery process and significantly reduces down time. Depending on recovery needs, Bare Metal Recovery can restore an entire or partial system. Operating system, 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 12, ESG performed a bare metal restore of a virtual server running SQLServer 2008, including the Windows operating system, the root volume (C:), and the application volume (D:) from a backup image stored on the NetApp FAS system. The entire restore process was managed by the Syncsort media server using the web-based Syncsort management console and utilizing NetApp’s SnapMirror snapshots.

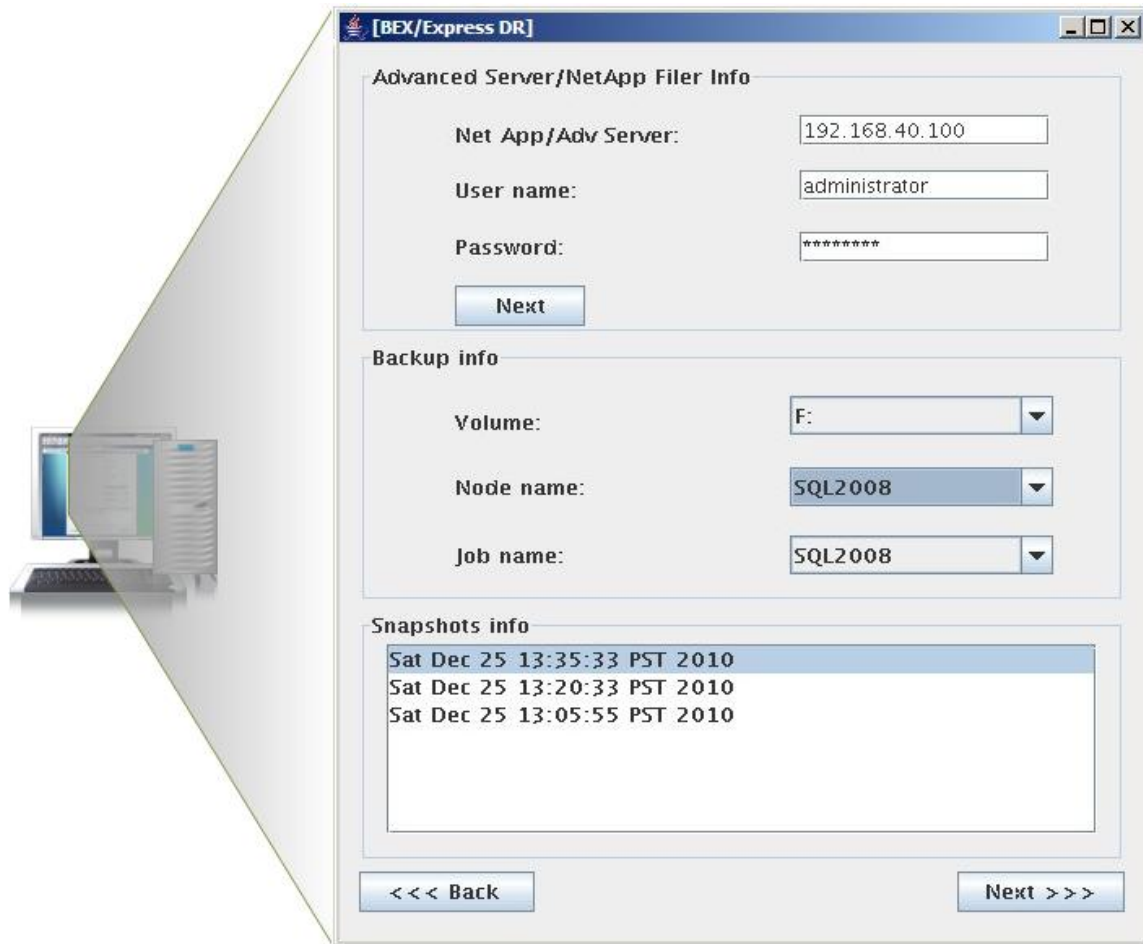
*Figure 12. Virtual Server Bare Metal Restore*



SnapMirror was used to replicate data sets between a simulated corporate data center and a remote/DR site. By using NetApp’s SnapMirror at the remote/DR site, local snapshot was used to perform a bare metal restore of a server including applications and system state.

The process began with powering on a virtual machine within an existing ESX server located at the remote site. Syncsort was then used to browse the NetApp SnapVault images containing the ExpressDR backups as shown in Figure 13. A backup image from SQL2008 taken on Saturday, December 25 at 13:35 PM was selected for bare metal recovery.

Figure 13. Selected Bare Metal Restore Source

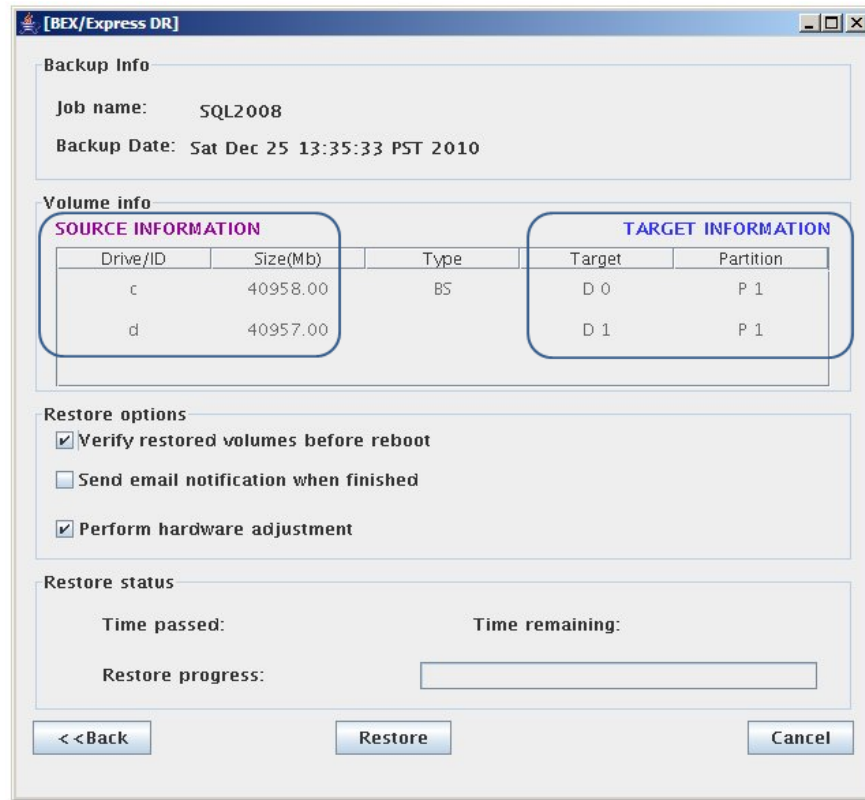


After clicking “next,” the destination server and target volumes were selected. The process of identifying, selecting, and starting the restore operation, including a system reboot, was completed in just under ten minutes. The process of restoring 80 GB of combined SQLServer data on the bare virtual server over a shared Gigabit Ethernet took 1 hour and 45 minutes to complete.<sup>5</sup>

The bare metal restore summary, shown in Figure 14, summarizes the steps ESG Lab performed and the source and destination volumes as well as restore status for all three volumes.

<sup>5</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.

Figure 14. Bare Metal Restore Summary



Once both volumes were completely restored, the virtual server was rebooted and the server and application (SQLServer 2008) 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.

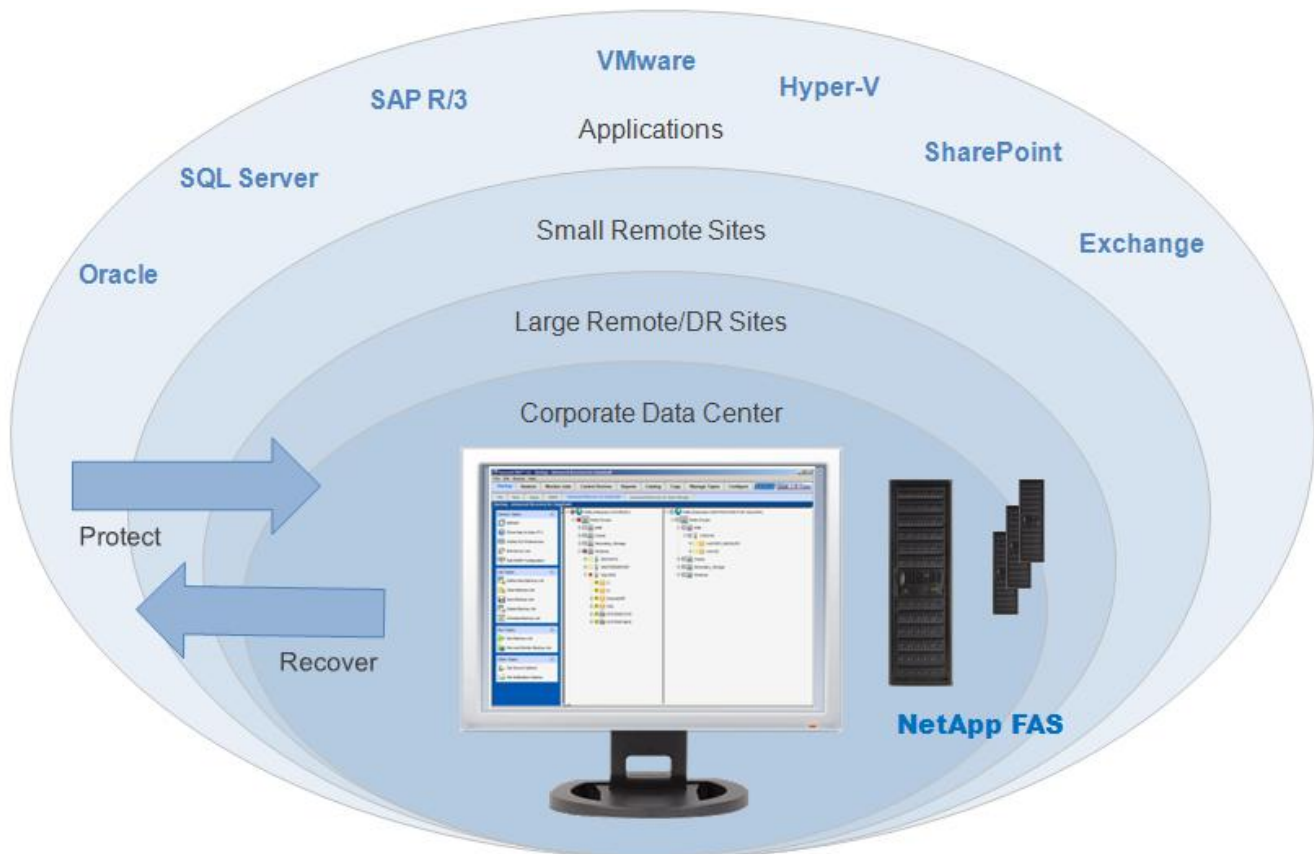
Leveraging tight integration with NetApp SnapVault, Syncsort Bare Metal Recovery provides a simple process for recovering an entire application serve by eliminating the need to manually reinstall the operating system and applications. Bare Metal Recovery can also be used to deploy a complete system image to multiple machines, including virtual servers. ESG Lab recovered an 80 GB SQLServer database server including system settings, partition information, applications, and data in less than two hours.

## Centralized Management

Figure 15 illustrates the centralized management concept employed by Syncsort. From a web browser, backup administrators manage local corporate data centers and remote and secondary/DR sites. Applications located locally and remotely can all be protected and recovered from the Syncsort console.

During the ESG Lab testing presented in this report, a single Syncsort console was used to protect and recover physical and virtual servers running applications including Exchange, SQL Server, and file services. ESG Lab noted that Syncsort data protection software supports a number of additional applications including Microsoft SharePoint and Oracle.

Figure 15. 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 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 provides a single management interface for advanced data protection and recovery.

## ESG Lab Validation Highlights

- ☑ Syncsort Instant Virtualization recovered a VMware virtual machine to a data center target, and created and started the virtual image in minutes.
- ☑ 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 a Microsoft SQL application running in a Windows virtual machine under VMware ESX virtual server. The SQL application was restored and available on a bare machine after less than 15 minutes of user intervention and two 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 management console (VMware ESX, Microsoft Windows, Exchange, SQL Server, and NTFS file systems).

## 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 and NetApp technologies presented in this report can be used to dramatically improve RPO and RTO, for organizations 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 current 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. Using SnapMirror to local tape or disk, then shipping the media to the remote site for initial baseline is recommended.

## The Bigger Truth

According to a recent ESG survey of IT spending intentions for 2011, improving backup and recovery continues to be in the top five spending priorities for the next 12 to 18 months.<sup>6</sup> This is no surprise since the growth of data in shows no signs of slowing: 86% of both mid-size and enterprise IT organizations expect annual data growth in the double digits.<sup>7</sup>

Server virtualization has also trended upward over the last few years. ESG research has found that not only are more IT organizations planning to virtualize their server infrastructures, but more of these new virtual servers will be run in production environments. On average, the percentage of VMs run in production will increase from 39% today to 58% within two years.<sup>8</sup> Requirements for software that can not only protect virtual environments, but provide a methodology for migrating physical servers to virtual, will be a high priority.

These data protection challenges are motivating IT to turn to vendors that can provide both protection and instant recovery from outages and data loss - especially in a growing virtual environment. The combination of Syncsort data protection software and NetApp FAS storage systems delivers a highly scalable data and storage management 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 synthesized 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.

Syncsort Instant Virtualization was able to restore an entire virtual machine and create and start it in a new ESX host in a manner of minutes. 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. 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 Syncsort user interface was used to manage backup and recovery operations for physical and virtual servers running a variety of applications including Microsoft Exchange and Microsoft SQL server.

Syncsort's simple to use management interface and integration with both NetApp and VMware provides a seamless solution for managing both physical and virtual data protection environments. Low level functions associated with snapshots and creating virtual machines are hidden from the administrator, making creating and maintaining backups and restores an intuitive task.

With Instant Virtualization for rapid recovery of growing virtual environments, 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 integration of Syncsort with NetApp and VMware provides advanced data protection services that are fast, flexible, and reliable.

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<sup>6</sup> Source: ESG Research Report, [2011 IT Spending Intentions Survey](#), January 2011.

<sup>7</sup> Source: ESG Research Report, [Data Protection Trends](#), April 2010.

<sup>8</sup> Source: ESG Research Report, [The Evolution of Server Virtualization](#), November 2010.

## Appendix

**Table 1. Test Environment Details**

NetApp/Syncsort	
NetApp FAS 3210, ONTAP 8.0	Syncsort BEX, Version 3.4
Servers, Virtualization, Operating System, Applications	
IBM Blade Server H	Windows 2008 R2
VMware ESX, version 4	SQL Server 2008
	Exchange Server 2008



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