



**STORAGECRAFT**™  
Technology Corporation

***Leading the Way to Safer Computing***

## **REAL-TIME RECOVERY**

*The next generation, proven, affordable way to  
protect business using disk-based recovery*

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## **Executive Summary**

Business today is bombarded with messages that data must be protected – this is commonly referred to as *backups*. The problem is much, much more complex than is suggested at first glance. The real issue is to first understand the needs of business, and how downtime will affect the business and its profitability. Then to put in place risk-mitigation strategies or solutions that reduce or eliminate the problems associated with traditional backup and help ensure that businesses are able to reduce costs, reduce complexity and improve compliance of their data.

Organizations today are beginning to understand that backup is not the key process; it is the *recovery* of systems and data that is now critical. Traditional tape-based backup products and the associated software simply do not meet the Service Level Agreement (SLA) requirements of today's business. Tape backup products typically focus on the data, not the operating system. But in reality, the fast recovery of the operating system is critical, since the server must be operational before data can be restored. This should be viewed as one process with one proven protection strategy and technology.

Whether it's small business, medium size companies or indeed large corporations and government entities, all should be able to restore key data – such as Exchange servers and SQL databases – in a matter of minutes, not days. This is the new SLA for business today.

All organizations require an SLA-based operating solution that minimizes time to recover operating systems, databases and user data. After all, data is the lifeblood of all organizations – without it, quite simply, businesses will fail.

When you look at the available backup options today, traditional tape backup software vendors are trying to solve customers' backup and recovery problems by integrating older-style technology in an attempt to meet current customer SLA requirements. The problem with this approach is that these solutions are, in reality, disparate technologies loosely integrated together. The result is to push the problem or bottleneck to another area, which increases costs and problems. We believe this is unacceptable. What is required is to utilize Next Generation technology to actually solve the problem.

The next generation solutions are built in response to meet current and future customer requirements; they must be easy to install, use and manage while also reliable and cost effective. They must deliver recovery of systems and data in as short a time frame as possible and as cost effectively as possible.

StorageCraft, now with millions of installations of its core technology (which is used in several third-party products from Symantec and others), has created a Real Time Recovery (RTR) solution using a Disk to Disk imaging to Tape (D2Di2T) methodology that meets this need. This white paper explains this solution and advantage over traditional backup methods.

StorageCraft, with its range of RTR solutions called ShadowProtect, is able to assist most companies in eliminating backup windows, protecting data, operating systems and databases (such as Exchange

and SQL). Using ShadowProtect, RTR backups can be completed every 15 minutes throughout the day, without additional agents and options. In addition, ShadowProtect solutions provide the ability to perform bare metal restoration of a Windows™ server, typically in less than 15 minutes.

### **What is RTR and D2Di2T and how does it compare with other technologies?**

RTR is rapid recovery of systems and data through disk imaging technology. StorageCraft is leading this category with the development of the ShadowProtect line of real time recovery solutions. The core engine (Volume Snapshot Manager) is now used in millions of installations worldwide.

ShadowProtect takes a real time (live), ExactState™ image of data volumes, system volumes and core databases – such as Microsoft Exchange and SQL – and saves the image on disk.

The power of ShadowProtect and RTR is that it enables operating systems, Exchange & SQL databases and data to be protected every 15 minutes, 96 times per day (nearly real-time), seven days per week, with minimal to zero impact on production systems. This eliminates the backup window from most organizations.

By using disk-based recovery, the restore time is extremely rapid in comparison to tape. Remember, while tape is fast, it is a serial technology. You first have to find the tape, load it, catalogue it and then and only then can the file, folder or entire data volume be restored.

With RTR in ShadowProtect, each image (or backup) is compressed, password protected, encrypted and encapsulated. The RTR image can be either a full image, a differential (change from last full image) or an incremental image. Using RTR enables a typical Windows server operating system to be fully restored in (typically) under 15 minutes.

This methodology is called D2Di2T (Disk to Disk imaging to Tape). This means that the server disk is imaged (or backed up if you like) to another disk in variable intervals from 15 minutes or greater, and then selected images are saved to tape for archive purposes, using your preferred tape backup/archival software. This is the real forte of tape – as a long-term archival device which allows off-site removal of media and up to 50 years of storage. But according to Enterprise Storage Group user surveys, 79% of the time, the data needing to be restored was archived within the past seven days. So keep one, two or four weeks of data on-site and on disk and archive weekly or bi-monthly images to tape.

Also be aware that Gartner and others say that 60% or more of tape backups fail due to software or hardware issues, operator error or writing errors. All data written to tape needs to be checked and verified to help ensure its integrity.

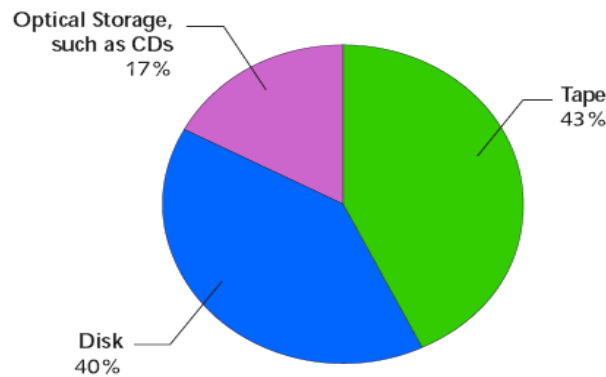
Other DR or Business Continuity methods such as CDP (Continuous Data Protection), Replication and VTL (Virtual Tape Libraries) are all imperfect solutions. Replication is good DR practice but you should be replicating the RTR images which have been checked, otherwise you will just be copying

errors, viruses or corruptions to off-site locations and spreading the problem. Snapshots and CDP are similar to RTR, but typically exclude system volumes. Without system volumes, the data is useless and often eats up enormous amounts of disk space. The StorageCraft RTR solution helps minimize excessive disk consumption, helping to ensure it is one of the most cost effective and resource effective solutions in the industry.

### **Where does tape fit in to today's backup and recovery operations?**

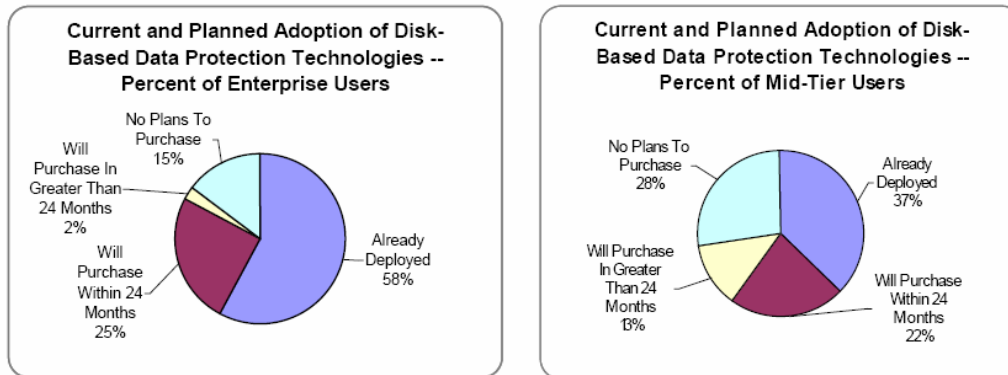
Tape is rapidly becoming a long-term, off-site archival product. Most industry analysts agree that backups and recoveries should happen disk-to-disk for minimal impact to systems and recovery time. Tape is no longer considered best practice for backup and recovery.

**What storage medium do you plan to deploy in the next year in support of your backup and recovery plan?**



**Source: Yankee Group/Sunbelt Software 2004 SMB Storage Survey**

Figure 4. Current and Planned Adoption of Disk-Based Data Protection Technologies



By implementing Disk to Disk imaging (D2Di) for backup and recovery operations, customers are able to fully leverage disk-to-disk speeds and reliability. By using the Next Generation D2Di technology such as StorageCraft RTR solutions, additional features such as password protection, encryption, image encapsulation, splitting and combining images are delivered as standard features

**Cost, Complexity and Compliance – the business drivers for RTR**

Reducing costs, reducing complexity and adhering to industry and corporate compliance are major concerns for most organizations today. When you look at the backup and recovery options available today, traditional vendors are attempting to combine multiple original (older) technologies together to meet today’s customer SLA requirements. The result: disparate products that are loosely integrated and simply push the problem, or bottleneck, to another area. This increases the cost and complexity of backup and recovery.

RTR delivers reduced costs by being a purpose built technology, from the ground up, designed to meet the stringent SLAs that organizations of all sizes are looking for and now demanding for recovering data, operating systems and databases. Reduced complexity is achieved by using one proven, reliable and easy-to-use and implement technology for backup and recovery operations and real-time protection of data and databases.

RTR delivers compliance by preparing data for archival and off-site storage. With traditional tape-based backup products failing regularly, they should not and cannot be relied on to adhere to corporate compliance. By implementing RTR, an organization can prepare data ready for off-site archival. A key feature of RTR is the ability with two clicks of the mouse to ensure that the entire image is intact, and in fact, backed up correctly. Because the RTR image is encapsulated, opening one file verifies the integrity of the entire image.

## **Why tape fails to achieve compliance**

With tape-based backup, how can you know with 100% confidence that the entire data volume or database has been correctly backed up? The only way is by doing a complete restore. It is impractical today to do a complete restore every day. The issues associated with tape-based backup products, specifically the time it takes to move data from production systems to a backup server and then onto a tape device, creates the problem of backup windows.

In order to alleviate the age-old problem of backup windows, organizations (and vendors) provide a series of add-on technologies to help reduce the backup windows. These can range from differential or incremental backups, to replication, iSCSI, SANs, and so forth. The reality is that with RTR, the backup window can be eliminated and tape archival can run 24 hours per day with absolutely no impact on production systems, users or networks. Organizations can reduce the time pressure of tape archival.

Using RTR with D2Di2T, StorageCraft ShadowProtect provides real-time data, operating system and database protection, encapsulating the backup image(s) for fast simple verification of data integrity. Then, organizations can archive to tape using the preferred tape archival/backup product.

## **Downtime costs money and reputation**

While systems are down, your business is not as productive. Even worse, you are losing money or your reputation is starting to suffer. Often storage management vendors will ask companies to identify their critical applications and data so that non-critical applications and data can be taken offline for a time. But realistically, SMB, SME and enterprise customers don't have data and applications that are non-critical. They need everything!

## **What is more important—backups or restores?**

Historically, many companies looking at backup and restore strategies focus their attention on the backup process, implementation and training, when what is critical, is the restore processes. How easy, how fast and how reliably can you restore data back to your production systems after a crash or failure? These are the questions that customers *should* be asking. At StorageCraft, our focus is on RESTORE. Of course, our backup processes have been designed to be easy and intuitive, with little or no training required, but it is when you come to restoring data that you will find we excel.

There is no point in spending hours backing up data if there is a concern that the restore may not work. After all, the only reason you backup data is to restore it at some point in the future. Backup is an insurance policy – and in reality, who wants an insurance policy that does not deliver on expectations? Or worse, a policy that does not provide you with coverage when you need it most – after a problem or disaster?

We can deal with the problems of traditional tape-based backup software – it is slow, tedious, cumbersome, complex and expensive. But the unreliability of tape-based backup (and more importantly, restores) is the real plague of customers. After all, what is the point of backing up your data if your restoration process is problematic?

**The StorageCraft ShadowProtect RTR family of solutions is designed to ensure that you are able to receive both FAST BACKUPS and FAST RESTORES, without performance compromise, at an exceptionally affordable investment.**

### **Data restores vs. system restores—or both**

Today, most vendors selling backup and recovery solutions focus on the data in your organization, and quite rightly, data is the lifeblood of your company. It is irreplaceable and costs money, or even your entire business, if it is lost.

One of the greatest challenges companies face is when a server crashes. How do you get that server up and running as quickly as possible and then restore data as quickly as possible? A typical manual system rebuilding process takes four to eight hours and often substantially longer if a database is involved. While the system is down, no data can be restored until after the system volume is put back into production state – and that includes all the service packs, security updates, tweaks, scripts, applications and so forth. Once this is completed, the data then needs to be restored. In best-case scenarios, if data restores work flawlessly, it takes approximately the same time to restore data as it did to back it up. That means, if it takes six hours to backup your data, it will take you typically four to eight hours to restore your system volume, then an additional six hours to restore your data.

During this time, users who rely on the system that is down do not have access to it! This is often a major pain point in most companies. Imagine, your Exchange server crashes, and no one has access to sending or receiving e-mails for 10, 15 or 24 hours. What will that cost you in lost productivity? What if it happens to be your SQL server doing order processing, or a key application server? What if that server is your backup server? It's all about Business Continuity, not backup.

**ShadowProtect RTR enables organizations to perform a Bare Metal Restore of a typical system volume in less than 15 minutes! Compare that to the many hours or days needed to restore a server from tape. Data loss can also be limited to 15 minutes instead of an entire day's worth of data when compared to traditional tape-based backup technology.**

### **Disaster Recovery, an add-on option to data backup or an integrated solution?**

Historically, backup vendors charge a premium for providing (typically) limited operating system recovery capabilities for Windows™ servers. StorageCraft believes that customers are looking for and

starting to demand a truly integrated solution instead of different point products with different interfaces and training requirements.

Since the data cannot be recovered until after the system volume is rebuilt, it makes common sense to have the two recovery products (data and system) integrated and using a common engine and interface which facilitates fast recovery of the entire system. This enables companies to return to work faster, reducing downtime and minimizing lost productivity while helping to ensure maximum customer relations.

**ShadowProtect RTR delivers a COMBINED solution for protecting your data AND system volume through StorageCraft real-time incremental and differential imaging technology. Data is restored at disk-to-disk speeds, and our Volume Snapshot imaging engine typically enables you to perform a Bare Metal Restore of the System Volume in less than 15 minutes – start to finish!**

### **Database backup, an add-on or an integrated solution**

Historically, backup software vendors have made a big issue of the various agents, options and add-ons that you require to backup your corporate databases. Most tape backup vendors have additional agents and options for Microsoft Exchange™ or Microsoft SQL™. In the past, with older style Microsoft™ databases, such as SQL 2000™ or Exchange 2000™ these expensive modules were required in order to perform online backups of databases. Now with the latest versions of Microsoft Exchange and SQL, the latest generation of Business Continuity solutions, such as ShadowProtect RTR, provide seamless integration into these databases using Microsoft VSS (Volume Shadow Copy Services™). This eliminates the need and requirement for these expensive and complex agents and options. ShadowProtect is a certified VSS provider.

**ShadowProtect RTR delivers an integrated solution for protecting Microsoft VSS™ (Volume Shadow Copy Services™) databases, including Microsoft Exchange™ and Microsoft SQL™. No additional agents or options are required, providing an exceptionally cost-effective total solution. In addition, with the built-in disaster recovery or bare metal restore capabilities, the entire Exchange or SQL operating system can be rebuilt in minutes – not hours or days – after a crash or corruption.**

### **Full, Incremental or Differential backups**

**Backups:** With traditional tape-based backup systems, customers had to look at what was more important – fast backups or fast restores. Many companies have implemented differential or incremental backup routines in order to reduce the backup window and to ensure that backups finish before users start work in the morning – otherwise, production systems become slow and unresponsive due to the data backups still flowing across the production network. This strategy speeds up the backup process, but often creates issues on restores (see below).

**Restores:** A major challenge is presented to Storage Administrators if incremental or differential backups are used in an organization to reduce the backup window. For example, in order to restore a file, you must first find the correct (off-site?) tape(s), load the full backup, and all the incremental or differential backups in the correct order before having access to a single file that needs to be restored. This makes restores very problematic, slow and tedious. (Some tape software vendors and products have overcome this limitation.)

**Now you do not have to decide between fast backups or fast restores, you can have both.**

The StorageCraft ShadowProtect range of solutions are designed to ensure you are able to get fast incremental backups, or images as we prefer to call them, even every 15 minutes throughout the day. You are also able to get fast file, folder or volume restores – at disk-to-disk speeds, not tape-to-disk speeds. To ensure that data recoveries are as fast as possible, ShadowProtect provides the ability to automatically mount a day's worth of data in a virtual volume and either assign it a drive letter or NTFS share. (For example, you can call it "Monday Backup.") When users need to restore files, they simply go to the Monday Backup Share and browse all their files and restore the files that are needed without involving backup administrators or the help desk! All mounted volumes should be mounted as Read Only to ensure the integrity of the backup job. In addition, due to the way in which StorageCraft ShadowProtect operates, all NTFS permissions and settings are retained, ensuring that users can only view their own documents. This helps provide a high degree of security for your data.

**StorageCraft and the ShadowProtect RTR range of solutions are able to deliver incremental data, systems volume and certain database images every 15 minutes, 96 times per day, helping to minimize data loss in the event of a crash. In addition, due to the way in which ShadowProtect operates, you simply click on the point-in-time incremental image that you require, and ShadowProtect automatically mounts the precise ExactState™ of the disk and data at that point in time, making restores a snap!**

### **Remote Site backups—Incremental Imaging vs. Replication**

More and more companies are looking at replication as a method of protecting data at remote sites. On the face of it, replication offers some major advantages over traditional tape backup, including no tapes required at the remote site and no operator involvement at the remote site.

But let's look at the practicality of remote sites and potential problems:

1. What happens if you need to rebuild a system volume remotely?
2. What happens if you need to restore 5GB or 20GB of data over a poor bandwidth LAN connection? How long will it take?
3. What happens if a virus occurs at the remote site? Will the replication tool automatically replicate the virus or worm back to your office?

4. What happens if a data volume gets corrupted? Will the replication tool replicate the corruption back to your office, and therefore compromise your data?
5. The cost of replication products across all remote servers.

In reality, most replication tools today are similar to the problems companies have faced for years regarding the use of incremental backups (for FAST backups, but SLOW recoveries) as explained above.

### **One solution, one company**

The evolution of the “Super Vendors” has not ended the problems of interoperability. These super vendors have acquired leading or good point products and then tried to integrate these new products into existing products to increase the functionality of the core product. The challenge here is that few of the backup software vendors have had the time to completely rewrite their products using the technology that they have acquired. More often, they develop a common user interface which hooks into all the various technologies and products. On the face of it, this is an adequate strategy, but the product often quickly becomes cumbersome, complex and with multiple points of failure and simply pushes the pain points or bottle necks to other areas in the backup and restore process.

**ShadowProtect RTR provides an ideal solution for remote sites. Create and store the backup images locally in the remote site, then replicate this data back to your office during off hours. By doing this, the remote system volume can be restored in minutes, data is available locally to users, a copy of the replicated data is stored at your office, and the data is ARCHIVED to tape at your convenience.**

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