



# Practical Backup and Disaster Recovery for SMBs Implementing Server Virtualization

A White Paper by  
Technology Strategy Research

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## INTRODUCTION

Server virtualization is firmly embedded in the mainstream of enterprise IT. The efficiencies and flexibility of virtualizing server operations have been demonstrated time and again in large enterprises: server virtualization makes it possible to increase server utilization, reduce power consumption, simplify IT workload, and rapidly adapt to changing business needs. Specifically, rather than dedicate enterprise applications to one or more servers, server virtualization enables the organization to run these applications on any qualified server based on availability and need. That is, IT administrators can shift around applications to take best advantage of hardware and other resources, while improving the availability and performance of those applications.

Enterprises with large IT staffs and specialized expertise make virtualization look easier than it really is. Planning for virtualization, partitioning applications across servers, and managing hardware and software all require careful decision-making and skilled execution.

Small and mid-sized businesses (SMBs) (often defined as businesses with up to a thousand employees) are now seeking to achieve many of the same advantages of server virtualization as large enterprises. But there are significant challenges in planning, implementing, and managing a virtualized IT infrastructure with a smaller and less specialized IT staff.

Virtualized server backup and recovery in particular remain key hurdles for SMBs for several reasons. First, SMBs typically lack large amounts of storage for backups and extra bandwidth for processing large backups. These resources are typically adequate for normal business operations, but not for extraordinary activities such as backup and recovery.

Backup and recovery require different approaches in a virtualized environment, but most SMBs protect data in virtual machines the same as if they are working with physical systems: they deploy backup agents into the virtual machines and use them to back up and recover the files from the VM. They do little or nothing to protect the image itself.

The solution is an integrated set of tools designed specifically for use in SMBs. These tools need to be easy to install and use, have high performance backup and restore capabilities, and relatively low requirements for bandwidth and storage. They also must focus on image-based, rather than physical, backup and recovery. Rather than force the IT staff to learn specialized skills that they lack the time and resources to apply, this integrated toolset would provide fundamental features and advantages targeted to both the IT skill sets and the operational environment.

### The Challenges of Server Virtualization for SMBs

Large enterprises have a significant advantage in deploying new IT technologies such as server virtualization. Enterprise IT typically has separate teams of specialists for different aspects of

IT architecture, implementation, and operations. These groups have the resources, specialized skills, and budgets necessary to implement comprehensive solutions specifically designed for the virtualized environment.

Enterprise IT groups also have the ability to assess the quality of their operations on an ongoing basis. These organizations have the tools to collect and analyze performance and availability data on an ongoing basis, and feed that data back into the documented processes to produce incremental improvements.

### The Challenges SMBs Face

SMB IT staff members tend to be generalists who are able to perform multiple roles in the IT structure. This is driven by the small numbers of IT staff members at the SMB; it is simply not possible for smaller organizations to employ the same number of IT staff as large enterprises. Even in organizations with a few hundred employees, there are only a handful of IT staff members who must handle everything from the help desk to network and server implementation and operations.

Therefore, SMBs tend to have a reactive approach to IT operations, which leads to challenges when implementing and maintaining virtualized servers:

- **Lack of planning**—IT staff at SMBs tend to be highly competent identifying and resolving technical issues, but lack the resources to plan extensively for them; they often implement new technologies without extensive planning and worst-case scenarios.
- **Inability to implement specialized solutions**—In addition, they may lack the specialized training and expertise needed to implement sophisticated solutions in any particular area of virtualization. For example, backup and recovery are significantly different in a virtualized application environment. Most generalist IT staff members would have to spend a significant amount of time to learn the best practices and available technologies—time they simply do not have.
- **Lack of standardized, documented processes**—IT staff at SMBs also frequently lack the resources and expertise to define and document their IT processes; instead, they often have a “just keep the lights on” philosophy that precludes taking the time to employ standardized IT processes, collect data on the effectiveness of those processes, and so on.
- **Focus on Windows environments**—Finally, many SMBs employ primarily a Windows environment, especially their internal applications and virtual machines. Experience with Windows Server and other Windows-oriented technologies is valuable and easily transferrable, but is based on a specific type of systems management approach that does not apply to all virtual operations.

It's important to note that the reactive approach to IT operations at SMBs doesn't reflect the abilities of the staff members, who are by all accounts as dedicated and capable as those in larger

enterprises. There is simply no time or opportunity for the type of planning that is typically performed with large, multi-departmental IT staffs in enterprises with tens or hundreds of thousands of employees. For normal day-to-day operations, the smaller staffs and reactive nature of operations at SMBs are satisfactory. However, when there are issues, as there invariably are, there can be a poor or incomplete response. Many of these issues revolve around backup and recovery.

For example, a regional health care center recently experienced a hardware failure on a VMware server running the organization's electronic medical records software. While the IT staff had used regular backups and off-site storage of tapes, there were no virtual machine images. Therefore, recovery took several days of dedicated effort, and still there were data losses.

Examples like this illustrate the need for simplified and cost-effective backup and disaster for SMBs that want to take advantage of the benefits of virtualization without the resources and specialized skills available at the enterprise level.

## Planning for Backup and Disaster Recovery

Every server virtualization project must plan for backup and disaster recovery to minimize the risk of loss of essential business information. Unfortunately, time and resource constraints may cause SMB IT staff to consider only the most probable scenarios that result in data loss: hardware failure or natural disaster. This isn't so much a blind spot for these teams as it is a recognition that only so much can be done given available resources.

Adequate planning for backup and disaster recovery involves the following steps:

### Step 1: Formalize Operational Requirements

The first step is to formalize the operational requirements for backup and recovery, including size and number of virtual machines, the applications they will be running, and their standard and maximum data requirements. The team also has to understand any live migration technologies and how their virtual machines typically behave on the servers.

### Step 2: Determine System, Storage, and Network Requirements

From these requirements, the team must then determine the system, storage, and network requirements of its backup and recovery process. It can then scope the size of the effort, while also retaining the flexibility to consider different types of solutions.

Different approaches are likely to have different system, storage, and network requirements, so staff should create a range of possibilities. This technique will enable them to evaluate alternative solutions against the benchmark requirements established in step 1.

### Step 3: Evaluate Solutions

The next step is for the IT team to consider solutions. SMBs implementing server virtualization typically list three major considerations for a backup and recovery solution:

- Ease of installation and use
- Speed of backup and recovery
- Backup size and bandwidth consumption

Note that sophistication and number of features are not on the list. SMBs are unlikely to have significant interest in multiple features because they often lack the time to learn and apply them. In addition, many sophisticated backup and recovery features are useful primarily in large and complex data centers, rather than the smaller facilities typically found in SMBs.

The most useful solutions make use of image-based backup and recovery, which is significantly faster than file-based approaches. Overhead is minimized by directly reading the disk, and empty blocks in the image are skipped. The result is smaller backup copy than would be created with traditional approaches; it can be transmitted more quickly and stored using fewer blocks, and will meet the performance and storage requirements of many SMBs.

### Ease of Installation and Use

Many IT tools require significant time and specialized expertise to install and operate. SMBs often lack both time and the required expertise, so an approach that can be done quickly, efficiently and with little or no specialized expertise is best. Further, because the expertise of many IT professionals in SMBs is Windows-oriented, a Windows solution with a comprehensive graphical user interface is very helpful. That's not to say that IT professionals in these organizations don't ever use a command line, but given their resource limitations and generalist skills, they are more likely to choose a Windows user interface, rather than memorize command-line instructions.

### Speed of Backup and Recovery

IT operations staffs often have a small window for creating backups. There is no overnight staff in charge of this type of chore, and if an automated script doesn't execute as planned, there is little time to address the problem.

Moreover, the shared resource model of virtualization makes scheduling backup jobs difficult or even impossible. IT staff members need to analyze the host servers, which can change quickly because of live migration, to ensure only a certain number of backup jobs run at one time on any host server.

Recoveries are even more challenging. Data lost at a smaller organization is just as critical as in a large enterprise. The IT staff has to be prepared to diagnose and replace any hardware faults, as well as determine the latest data and processing state availability, and load that into an appropriate virtual machine for use.

A solution should provide for fast backups, both incremental and full, as well as recoveries that can be done during business hours, rather than requiring overnight downtime or a period of several days to find and replace the lost data. These activities need to be fast and straightforward for the IT staff, who have multiple responsibilities and limited time for data recovery operations.

### **Backup Size and Bandwidth Consumption**

IT computing and network resources in many SMBs are adequate for normal operations, but there is little excess capacity for creating, transferring and storing backup files. These organizations are often reluctant to purchase or lease more capacity because it is an ongoing cost not generally associated with business success. Most will do some level of preparation for data loss, but perhaps not have either the network bandwidth or the storage capacity for the backups required by multiple virtual machines.

Backup and disaster recovery toolsets should offer SMBs the ability to limit backup sizes using both incremental backups and a high level of compression. These features will also reduce bandwidth consumption for backup and recovery processes, enabling teams to produce and restore backups in a shorter period of time.

## **CONCLUSION**

SMBs have increasingly been implementing virtualization in order to take advantage of the benefits and flexibility of the technology. But IT groups supporting SMBs tend to have only a few staff members, most of whom are generalists with no specific expertise in server virtualization. This lack of resources and expertise leads to particular challenges, especially in backup and disaster recovery. Backup and disaster recovery for virtualized systems require specialized skills, significant excess capacity in bandwidth and storage, and the time to perform significant regular backups—all of which can be lacking at SMBs.

Therefore, SMBs need a backup and disaster recovery toolset that meets their needs in terms of features, skills, and resource utilization. Specifically, the solution need be an image-based approach that is easy to use (which often means a Windows-based solution), provides fast backup and recovery, and minimizes backup size and bandwidth consumption. With the right tools, SMBs can enjoy the same benefits that server virtualization brings to enterprise organizations: increased server utilization, reduced power consumption, simplified IT workload, and flexibility to rapidly adapt to changing business needs.

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