

# NetApp Syncsort Integrated Backup

## Ten Minute P2V Migration

### Ten Minute Physical-to-Virtual Migration with NetApp Syncsort Integrated Backup (NSB)

Server virtualization has become one of the most vital technologies in IT departments today because it reduces operational and capital expenditure through consolidation of servers, rapid application deployment and cost-effective disaster recovery. But the path to server virtualization is not always smooth. Many organizations face challenges, including:

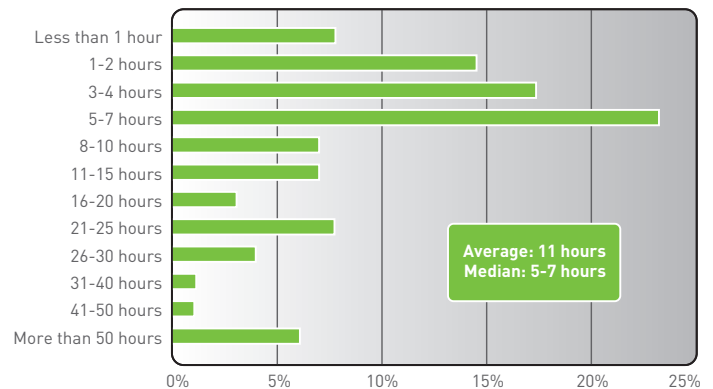
- Migrating servers takes too long
- Post-migration performance is not what was expected
- After migration, backup impact limits virtual machine density

### Time Needed to Migrate Servers

To understand the time required to migrate servers, Syncsort commissioned Ziff Davis Media to conduct a survey around end-user experiences with migrating physical servers to virtual machines (referred to as P2V migration). One hundred-thirty-seven eWEEK.com site visitors were asked to quantify their experiences in a blind survey. All the respondents were involved in server virtualization.

Based on the survey data, the time varies tremendously across organizations. Results ranged from less than 1 hour to more than 50 hours. The median response was 5-7 hours, selected by 24% of respondents. Fully 30% of respondents replied that migrations take 11 hours or more. For the majority of respondents, server migrations incur significant periods of downtime. This would especially impact migrating Tier 1 systems that normally require 24x7 access.

Figure 1. Hours to Migrate from Physical to Virtual Machines



The large disparity in migration times can be attributed to the wide range of tools and techniques used. Some users take a very manual approach to the process, creating virtual machines, installing applications, then copying data sets or restoring them from backup images. Others use tools that partially automate the process yet still require significant downtime, especially during the data copy process.

### KEY FEATURES

- Ten minute physical-to-virtual migration leveraging unique, patented technology
- Reduces application downtime from hours to minutes
- Automatic storage alignment eliminates disk-based performance problems after migration
- Tools included for simple transfer of virtual applications back to physical systems if needed
- Lowest impact VM data protection after migration

### **NSB Delivers Ten Minute P2V Migration**

A median migration time of 5 to 7 hours is far from optimal, and with NSB you can easily avoid it. Using unique patented technology, NSB dramatically reduces migration times from multiple hours to as little as ten minutes.

NSB begins with a backup data image from a physical server. The backup is stored on a NetApp FAS device in the form of a snapshot (the primary storage can be from any vendor).

With standard migration tools, a new VMware VMDK file is created and the data from the physical system copied into it. With NSB, rather than copying the data, the Instant Virtualization™ function creates a new VM and maps it to the snapshot using NetApp FlexClone technology to create a read/write image. The result is that the virtual machine can boot off the snapshot in about ten minutes (there is some variation based on server and network performance).

This means that in about ten minutes the physical application is up and running as a fully functioning virtual machine. However, the VMDK still needs to be created to complete the migration process. To achieve this, NSB opens a fast, block-level copy function in the background, taking the data from the physical system and moving it to the new primary storage location for the virtual machine. This process can take some time depending on the size of the data, but meanwhile the VM is running.

When the background migration completes, a final sync is done with any newly accumulated data. NSB then automatically calls on the Storage Vmotion process to switch active disk access from the snapshot image to the newly created VMDK. This switch-over occurs without any application interruption. The end result is a completed P2V migration with only ten minutes of application downtime.

### **Post-Migration Performance Problems**

With many tools, even when a migration process is successful the end result can be disappointing when the migrated application does not perform at the expected level. Often this occurs because when data is migrated to

VMware, there is a problem created with data alignment. Blocks at the file system layer may no longer align with blocks on the actual storage disk. Instead, the blocks overlap, resulting in additional disk read or write I/Os which causes a drag on performance. It is especially noticeable in high I/O, transactional applications. What used to require one block to be accessed (read or write) may now require two or even three blocks to be accessed.

The standard cure is to shut down the application and run a post-migration utility to re-align the storage, a process that can take hours. Again, this is not very optimal.

### **NSB Eliminates Alignment Overhead**

To avoid disk alignment performance problems, NSB is designed to properly compensate for the disk alignment before the migration takes place. This means that when migration is complete, all the blocks are aligned for optimal disk performance. There is no need to run a utility or bring down the machines.

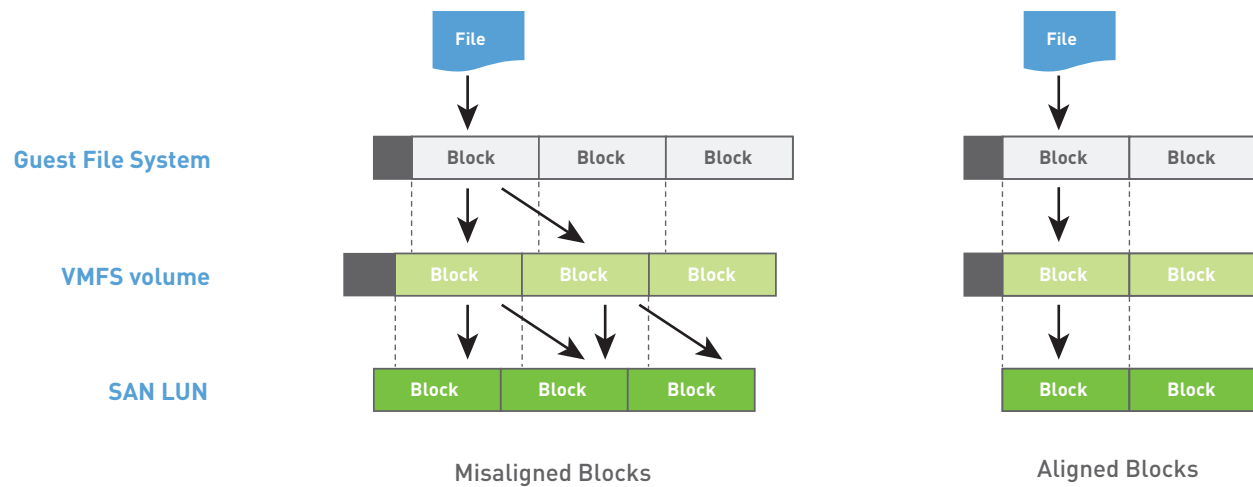
Even with proper alignment, there may be cases where an application does not perform as expected after being virtualized. For these cases, NSB also provides a means to easily bring the virtual machine back to a physical server (either the original server or a different hardware platform). Many P2V migration tools provide little or no support for reversing the process, but with NSB it is included as part of the solution.

### **Backup Problems After Migration**

A final area to consider is the impact of protecting virtual machines after they are created. As many users are discovering, “traditional” file based backup methods do not always work well in a virtual environment. This is because file-based backup was designed for physical servers and exploited the excess system resources typically available on physical servers (such as CPU and memory capacity, as well as disk and network I/O bandwidth).

This excess compute power was also the driving force behind server virtualization. Expensive resources were being wasted when only one application (typically) was

Figure 2. Storage Alignment



When data blocks are misaligned after a P2V migration it results in significant disk I/O overhead. As shown on the left, one data block read or written at the layer of the guest file system (at the top) may end up touching as many as three blocks on the storage system because of the way the blocks are misaligned. When properly aligned, as on the right, only a single disk block is accessed.

run on a server. By consolidating multiple applications on hardware via virtualization, much greater use was made of the available compute power, memory and storage. However, this took away the excess system resources that file-based backup relied on. In addition, users are now faced with running multiple backups from a single system, producing tremendous strain on already limited disk and network resources.

The result is that backup processing often constrains the number of virtual machines that can be hosted per physical server (this is referred to as “virtual machine density”). Limited density results in decreased return-on investment, as more physical servers are needed to run VMs.

One key thing to note is that this problem may not arise immediately. Up to a point, traditional backups will work. But systems quickly reach a tipping point where the backup demands are greater than the resource supply, which often creates a cascade of failures.

### NSB Eliminates Backup Overhead

NetApp Syncsort Integrated Backup uses a low-impact backup methodology uniquely suited to virtual machines. Rather than a traditional file-level backup, NSB monitors

block-level data changes below the file system, reading and moving each new block only once. This greatly reduces the amount of data moved, as well as eliminating the need to scan through numerous files looking for changes. The end result is a backup system that has close to zero impact on CPU and memory resources, while reducing network and disk I/O by 90% or more. By nearly eliminating the impact of backup, NSB allows you to maximize virtual machine density to fully realize the value of your server hardware investments.

### Conclusion

As server virtualization continues its growth in data centers everywhere, end users are facing challenges with the time required for the migration process, with application performance afterwards, and in successfully protecting virtual machines. These challenges can be easily met by using NSB to speed and simplify P2V migration, to ensure proper performance of newly migrated system, and by providing the lowest-impact data protection going forward. NSB is the one tool that handles all your physical-to-virtual migration and protection needs.

## About NetApp

NetApp creates innovative storage and data management solutions that deliver outstanding cost efficiency and accelerate business breakthroughs. NetApp's passion for simplicity, innovation, and customer success helps companies around the world go further, faster. To learn more about NetApp please visit [netapp.com](http://netapp.com).

## About Syncsort

Syncsort is a global software company that helps the world's most successful organizations rethink the economics of data. Syncsort provides record-setting performance and rapid time to value through easy to use data integration acceleration and data protection solutions. With over 15,000 deployments, Syncsort has transformed decision making and delivered more profitable results to thousands of customers worldwide. For more information visit: [www.syncsort.com](http://www.syncsort.com).



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