# Case Study

# 33% Savings in Backup Time
# of VMware Environment

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## Town of Castle Rock, Colorado

Castle Rock, Colorado is a town of 50,000 people located in the foothills of the Rocky Mountains, about 30 miles south of Denver. The town's IT department supports a full range of municipal government applications in support of public safety, utilities, public works, fire, police and finance. The IT environment largely runs on VMware with 8 ESXi hosts and 50 virtual machines in a combination of Windows 2003, Windows 2008 and Windows 2008R2 servers. The server population is comprised of SQL servers, application servers, file servers and file shares. The bulk of the servers are application servers and the backing storage for the virtual servers is a NetApp FAS2040 SAN.

## The Problem: Backing Up 7 TB+ of Data and System I/O Issues

The Castle Rock IT team has a mandate to do weekly full system backups of its 7+terabytes of data. The team uses a state-of-the-art CommVault enterprise backup platform that has 4 drives totaling 10TB of storage. Due to the town's backup retention requirements, the backups are done in a disk-to-disk-to-tape sequence. The problem was that the backups were taking over 72 hours to complete, with a negative impact on system performance and user response time. With backup times this long, there was no margin for error in the backup process; the IT staff could not afford restarts. Furthermore, as data volume increased, the problem was only going to get worse.

The IT staff looked at all the usual areas that are considered when I/O issues arise. The backup system was tweaked and optimized according to specifications. The network, always a suspect when bottlenecks are an issue, was analyzed and adjustments were made. There were meetings with HP to troubleshoot the disk drives; and while all of these adjustments did provide some improvement, it just wasn't enough. Despite all the team's efforts, backups that were starting at 5pm on Friday were still completing on Monday or Tuesday. Something had to be done.

## The Culprit: Fragmented Thin-Provisioned Virtual Servers & Backup Disks

John Kilman, Castle Rock's Server Administrator, did some research and came across an article that indicated file and free space fragmentation can affect system performance. John wondered if file and free space fragmentation might be part of the backup problem. After all, it takes longer to read and

write a fragmented file, and backup is a read/write-intensive process. John went looking for an enterprise defragmentation solution and determined that PerfectDisk was the best solution.

First, John used PerfectDisk Server to analyze the disks on the backup system and found they were 85% fragmented. When file fragmentation is this bad, the free space fragmentation on the disks is usually a mess too. After defragmenting the drives on the backup system, the backup time was reduced by 12 hours. John realized he was on to something.

A PerfectDisk vSphere analysis of the virtual servers showed that, on average, they were 30-50% fragmented. Given the improvements seen with the backup system, John was eager to see if defragmenting the virtual servers saved more time. After each of the thin-provisioned virtual servers was defragmented, the backup times were reduced by another 12 hours. Defragmenting the backup system and the virtual machines reduced the total backup times by over 24 hours and got backups back to an acceptable timeframe.

"Getting rid of fragmentation on our virtual servers and on the target disks in our backup system was the key to getting our backups done over the weekend," said Kilman. Castle Rock looked at other enterprise defragmentation solutions but "PerfectDisk delivered what we needed at a price that was acceptable to a municipal government budget."

## The Results: Organized, Optimized I/O and Weekend-Only Backups

PerfectDisk vSphere has kept the virtual servers in good shape, with contiguous files and free space. With consolidated free space, these systems are slow to re-fragment. In addition, PerfectDisk's OptiWrite™ technology prevents up to 99% of new fragmentation from happening. The write-intensive backup system is often 20% fragmented after a backup, so Kilman keeps that system in shape with scheduled defragmentation passes that fit the department's mode of operation. "Free space consolidation is really important," noted Castle Rock's Kilman. "When the file system can't find contiguous free space, file fragmentation increases, and you need to address both elements." With PerfectDisk in place, the backup problem is solved. End users now have better system response and the IT organization has better management of its virtual and physical IT resources.

Best of all, the Town of Castle Rock completes its backups over the weekend. When you're near the mountains, there are better things to do with your time than worry about backup overruns. "After all the tweaking of the hardware, it was the Windows file system that was killing us," Kilman noted. "PerfectDisk now keeps everything organized and I/O rates are much better. I would say it was an investment that helps us get the most from our hardware and our virtual environment."