



## CASE STUDY

# Virtual Machine Data Recovery on RAID, SAN and SSD

## Lost! State School District's Centralized Storage System

Twelve virtual machines running on an enterprise class SAN with multiple redundant layers should not have failed—but did.

### Data Loss Situation

The centralized storage system for an entire state school district was only four years old and huge—70 hard disk drives, twelve virtual machines stored on fourteen RAID 5 systems running ESX 4 servers clustered in a SAN storage environment that distributed all the school district's data.

During a power surge, the enterprise system lost six of its drives in staggered failures. Normally, this failure would have been sustainable in a degraded state, but there were additional complications. Two failed drives were located in the same RAID 5, corrupting the metadata, causing a cascading effect. The SAN was down. Every school in the district was down. No student data. No administrative files. No payroll records. Students couldn't access term papers—teachers couldn't be paid. This data loss had wiped out everything.

### Data Recovery Solution

The 70 drives were shipped to DriveSavers in two large crates. Before the recovery on the virtual machines could begin, the physically failed drives had to first be analyzed in our Certified ISO Class 5 Cleanroom, then cloned to new working drives. The corrupted data on the SAN network had to be restored and the RAID arrays rebuilt. No small feat considering that the arrays used their own special algorithms to store the data randomly across the drives.

"This was as complex a recovery as it gets," said Mike Cobb, Director of Engineering at DriveSavers. "On top of everything else, the original manufacturer had embedded a proprietary encrypted file system into the virtual machines." After significant engineering efforts, the SAN was functional, the cluster was rebuilt and twelve individual recoveries were performed to verify the data on each of the virtual machines. Within a remarkable two-day time span, all of the school district's data was recovered.

### We can save it!

DriveSavers leads the field in recovering data from virtual infrastructures, servers, file systems and workstations. DriveSavers engineers have unprecedented relationships with leading enterprise storage manufacturers and work closely with their escalation and development engineering teams. This enables DriveSavers to analyze, understand and resolve the complex data loss issues that can occur in virtualized data storage environments.



*"Virtualization is a boon to organizations who want to increase their storage efficiency and agility. But storing all your data in one location leaves it extremely vulnerable if you are not prepared for system failure"*

-Mike Cobb, DriveSavers  
Director of Engineering

# SSD, RAID and Virtual Machine Data Recovery Experts

## Virtual Infrastructures

- VMware vSphere®
- VMware vCloud®
- Microsoft Hyper-V®

## Virtual Servers

- VMware Server™
- VMware ESX®
- Microsoft Hyper-V®
- Citrix XenServer

## Virtual Workstations

- VMware Workstation™ (all versions)
- VMware Fusion®
- Citrix XenDesktop

High performance virtualized systems use enterprise-grade storage devices built on hard disk drives (HDD) or solid-state drives (SSD).

DriveSavers proprietary recovery tools and technology, developed through trusted alliances with leading SSD and NAND flash-based storage device manufacturers, enables our enterprise engineers to overcome unique, one-of-a-kind data loss scenarios from solid-state storage devices.

Complex failures can include SSD controller issues, encryption and encoding variations, NAND flash chip failure and customized wear-leveling algorithms.

As a result, DriveSavers has successfully completed more data recoveries on solid-state based devices, including mSATA, RAID and PCI-e formats, than any other data recovery service provider in the industry. No other data recovery company in the industry can make this claim.

DriveSavers routinely recovers mission-critical data for organizations of all sizes, from both traditional and virtualized storage environments. Clients like Bank of America, NASA, Google, Harvard University, the Smithsonian Institution, Amazon, eBay, Lawrence Livermore National Laboratory and many others have entrusted DriveSavers with their critical data.

## Fast, Reliable, Certified Secure Data Recovery

DriveSavers is the only data recovery service provider in the industry to post proof of certifications and audit results.

- **SOC 2 Type II Annual Audit**  
Verifies our qualifications to support customers who must comply with data privacy and data security regulations such as:
  - HIPAA
  - FERPA
  - SOX
  - GLBA
  - NIST 800.34 Rev. 1
- **Annual Network Security Audit**
- **Certified ISO Class 5 Cleanroom**
- **Engineers Certified by Leading Encryption Providers**
- **Manufacturer Authorized**
- **eDiscovery and Digital Forensic Services**

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We can save it!®