

The Depository Trust & Clearing Corporation



Major financial services firm sets new standards with automated data replication across 1,000-mile region

SOLUTION SNAPSHOT

DTCC has replicated core and business-support applications across multiple data centers spanning a 1,000-mile region in the U.S.

- **Applications:** DTCC proprietary settlement and clearing applications, Lotus Notes, Sybase, file-and-print, and file sharing
- **EMC Software:** SRDF[®], SRDF/A, SRDF/AR, TimeFinder[®], MirrorView[™], SAN Copy[™], EMC OnCourse[™], EMC ControlCenter[™] (SAN Manager[™]), and VMware[®]
- **Storage Infrastructure:** 175 terabytes EMC storage, including Symmetrix[®], CLARiiON[®], and Celerra[®]
- **Production Environment:** IBM mainframes, 800 Dell, Sun, and IBM servers running Windows, UNIX, Solaris, and AIX

Profile: The Depository Trust & Clearing Corporation (DTCC) is the largest financial services post-trade infrastructure organization in the world, processing and clearing millions of transactions daily for virtually all U.S. financial markets and exchanges.

Challenge: Post-9/11, DTCC needed to ensure secure, uninterrupted trade processing and minimal loss of data in the case of catastrophic events. To do this, it needed to design and implement a complex of primary and remote data centers providing failsafe business continuity.

Business value: With EMC business continuity software, storage, and services, DTCC achieved:

- Multi-hop replication of data every 30 minutes—or less—across regional and geographically remote data centers spanning a 1,000-mile region.
- Ability to resume production processing within two hours at any data center.
- Uniform, point-in-time recovery across multiple applications and sites, ensuring data consistency and efficient, reliable restoration procedures.
- Automated long-distance data replication and restart initiated with minimal manual intervention, thereby increasing data availability, cost-efficiency, and IT productivity.
- Lower operational costs and more value from IT investments through a sophisticated ILM environment that tiers applications according to cost and business continuity requirements.
- Granular, intensive testing of applications in the new business continuity environment without disrupting production operations and ensuring DTCC could go into failover mode at any time.

Very few companies can say their operations are truly critical to the health of the U.S. economy. The Depository Trust & Clearing Corporation (DTCC) is one of them. As the largest post-trade infrastructure organization in the world, New York-based DTCC clears and settles millions of transactions every day for virtually all U.S. financial markets and exchanges.

The importance of DTCC's business continuity came into especially sharp focus on 9/11. While its data centers and business continuity plans performed flawlessly throughout the catastrophe, DTCC realized it needed an even more geographically dispersed environment to ensure disasters would not disrupt the operation of increasingly global, interconnected securities markets. To meet that goal, DTCC turned to EMC software, storage, and services.

"EMC helped us do something technically very challenging—create multi-site, multi-tiered business continuity," says George Perretti, managing director, Corporate Infrastructure Contingency Planning. "We achieved fast, accurate data replication over more than 1,000 miles—a much greater distance than was previously thought possible. If one of our regional sites goes down, we can seamlessly resume data processing operations from an alternate site. And, if we lose all our New York regional data centers, we can resume our operations at one of the remote sites within two hours with virtually no data loss. Plus, we completed this project in just over one year. Many people said it couldn't be done at all, let alone in the tight timeframe required."

In fact, in recognition of its achievement, DTCC won the prestigious 2004 Computerworld Honors 21st Century Achievement Award "for visionary use of information technology."

"EMC's array of proven, advanced replication software was critical to our success," notes Perretti. "Not only did we accomplish multi-hop data replication, but we also implemented business continuity across multiple tiers of EMC's advanced and proven software and storage—each with distinct data value and cost requirements. EMC Services' expertise in replication helped us complete this project ahead of schedule and satisfied our requirements. They were the best choice because EMC offered the greatest depth of business continuity software and hands-on experience."

Multi-hop data replication reduces data recovery window to two hours

The most basic requirement of DTCC's multiple data center model was that all sites—and the constantly changing data within—had to be in synch at all times. With a synchronous link between their regional data centers in continuous, simultaneous operation, the challenge was to set up the asynchronous multi-hop mirroring to additional locations.

"The biggest technological hurdle was implementing automated multi-hop data mirroring between our existing data centers and remote sites," says Bella Zgut, vice president of Information Technology. "The key to achieving this was EMC SRDF/AR software. It allows us to mirror data across unusually long distances very quickly—in this case, over 1,000 miles—and do so every 30 minutes or less. In fact, our goal is to mirror data every couple of minutes or less."

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George Perretti

Managing Director, Corporate Infrastructure Contingency Planning

If a major data center disruption occurs, EMC Symmetrix Remote Data Facility/Automated Replication (SRDF/AR) software has allowed DTCC to provide recovery capabilities across its regional and remote data centers. In this expanded business continuity environment, DTCC has gained the ability to completely recover at the remote locations within two hours.

“When we first implemented data replication to the remote sites, restarting replication demanded manual intervention,” says Zgut. “We would have to put processing on hold, identify the problem, determine which step was abandoned, do verifications, and then go through the complex restart procedure. Now, all of this happens automatically. Not only has this automation provided improved business continuity, but it also has made the entire recovery process more efficient and less draining on IT resources.”

High data consistency ensures rapid, effective resumption of operations

A key benefit of DTCC’s new business continuity environment is consistency of recovered data across its multiple applications and data centers.

“There were many business continuity solutions that restored data, but EMC was the only one that provided a uniform, point-in-time recovery of data across multiple applications and multiple sites,” says Zgut. “With data consistency, the quality of our recovered data passes the highest standards. And it takes our staff much less time to get our applications up and running again.”

Using EMC TimeFinder software, DTCC creates point-in-time copies—business continuance volumes (BCVs)—of production data across multiple applications inside the EMC Symmetrix storage systems, even as the production operations run. SRDF/AR takes these point-in-time copies and mirrors them to Symmetrix systems at alternative sites. Because of the multi-hop mirroring, DTCC can ensure data consistency across multiple sites as well.

“Without multi-hop, data mirroring would be accomplished on a site-by-site basis, with data traveling from our primary data center to the first remote data center, and then to the second remote site and so on,” says Zgut. “The problem with this approach is that there is a slight delay between each consecutive mirroring, creating inconsistent point-in-time snapshots of data among the different data centers. SRDF/AR software, on the other hand, provides data consistency and mirrors only changed data from the secondary site to corresponding remote data centers.”

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Bella Zgut

Vice President of Information Technology

Lowering the costs of data replication with information lifecycle management

DTCC has proactively tiered its applications and matched them with different replication environments as part of an overall information lifecycle management (ILM) strategy aimed at improving operational efficiency.

“EMC’s breadth of business continuity software makes it possible to get the full benefit of ILM—cost-efficient and secure management of different grades of stored data based on

their business criticality,” says Perretti. “For example, our core clearance and settlement applications require the high-level business continuity that only SRDF and TimeFinder software provide. Through ILM, we get more value from our IT investments and reduce operating costs, which is especially important in a business continuity endeavor of this scale.”

DTCC’s 175 terabyte EMC storage environment is allocated across multiple applications and replicated at different sites, based on criticality. To support core trading, DTCC uses SRDF/AR and TimeFinder software to replicate data stored on Symmetrix DMX™ systems for critical clearing and settlement applications. For business support, EMC MirrorView software provides long-distance replication of DTCC’s mid-tier applications, such as Lotus Notes, Sybase, and file-and-print, which are stored on EMC CLARiiON networked storage. DTCC is implementing EMC SAN Copy software to seamlessly exchange data between its CLARiiON and Symmetrix systems without affecting production operations. In addition, EMC OnCourse software provides policy-based file distribution and replication for its EMC Celerra NS600 network-attached storage.

Extensive, behind-the-scenes testing ensures a safe, secure production environment

With security of its infrastructure a primary concern, the IT team had to keep the entire project highly confidential. The development activities could in no way impact DTCC’s production systems and had to be totally transparent to end-users.

EMC’s SRDF function is critical to maintain data synchronization within the regional data centers. The DTCC staff adopted a methodology for developing and testing multi-hop replication using local storage and distance simulators. All components of the multi-hop, hardware and software solution were implemented on the production system incrementally. Although more time-consuming, this granular approach protected the production environment and sustained its ability to go into disaster recovery mode at any time.

And, given the need for total data security, the DTCC team had to test every possible combination of failures that could affect the DTCC functions. As a result, the number of disaster recovery tests they had to perform steadily grew during the year of project development.

Last August, the most severe blackout in U.S. history provided a realtime opportunity for DTCC to test continuity procedures. While the New York facilities had backup power and were unaffected by the blackout, DTCC designated one of the remote operating centers to assume processing on August 15. With an appropriate safety net, DTCC demonstrated its resiliency in seamlessly switching the base of operations, and EMC-supported data replication to the remote centers continued to perform flawlessly. DTCC experienced no interruption of service, proving the capabilities and value of the new business continuity strategy.

Success—one month ahead of schedule

After little more than one year of intensive effort, DTCC now has unparalleled disaster recovery backup and recovery capability. An additional point of pride for DTCC’s IT staff is that the entire project was delivered one month ahead of schedule and without adding any new IT staff during implementation. The development process brought together people from many different DTCC departments to work together in a smooth, coordinated effort. As a result, the DTCC business continuity infrastructure serves as a model for other organizations, showing that this level of remote replication is possible and how it can be done.

“At DTCC, business continuity is our highest priority,” says Perretti. “It isn’t just our company and customers that rely on secure, uninterrupted trade processing and data management. We must ensure the continuity and certainty of our support for the U.S. financial markets. EMC business continuity software and storage help ensure we are prepared and protected against an event that could threaten our business operations. At the same time, our EMC ILM strategy allows us to efficiently and cost-effectively manage our constantly growing data storage and compliance needs—from the most critical, realtime trade data to long-term, large-scale archiving. In short, EMC helps us achieve our data storage and recovery challenges, not just today, but for years to come.”



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Produced in the USA. 8/04

Customer Focus
H1329