



The Infrastructure That Supports The Infrastructure



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By

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E-mail arrives day and night. The World Wide Web never closes. You're always on and you're always open. Your window to close out the day and begin anew is shrinking faster and faster.

Your clients want information whenever they choose in the format they prefer. From their phone, PC, via fax or handheld computer; even when your office is closed; even if you have a disruption that affects your business operations. Information and people are the lifeblood of your organization—they are the only irreplaceable assets. And the ability to use that information, secure it, and share it inside and outside your daily operation can make or break the company. You must protect that data to ensure continuity or your company can be exposed to risks as never before imagined.

Since information is your business, you need a system to mitigate or even prevent damage that can be caused by both planned and unplanned events. Information availability and integrity are susceptible to human error, severe weather or disruptions of electrical or communications networks. In addition, the events of Sept. 11 and the anthrax attacks that followed have raised the concern of terrorism to new levels.

Case Studies

MasterCard
International –
O'Fallon, MO

KeySpan Energy Corp.
– Brooklyn, NY

CareGroup
Healthcare System –
Boston, MA

Centers for Disease
Control – Atlanta, GA

Ensuring that your company can remain in operation is what business continuity is all about. The integrity of your information is the core of any solid business continuity strategy. People, structures and strategies that fuel your company all depend on this information. Exploring and creating ways to unleash this information can move your company from a reactive, passive disaster recovery state to a proactive, productive continuous operation.

In the past, companies viewed disaster recovery plans as a necessary evil with little financial benefit. Instead of treating such plans as an insurance policy—that costs money but pays no dividends until a catastrophe occurs—companies today are identifying ways to create a more complete business continuity solution. The concept is simple but powerful. By establishing a foundation centered on information currency and accessibility, organizations can turn their information into an active asset.

Storage technology such as EMC Corporation's Symmetrix and CLARiiON products, coupled with their data mirroring software (Symmetrix Remote Data Facility and MirrorView) offer protection but also facilitate new services and products that yield new profit sources. Thousands of companies have realized the benefits of using full copies of production data sets. With no risk to the primary data sources, destructive testing can eliminate the potential failure of new, customer-facing applications that could dramatically affect the company's brand, customer responsiveness and reputation.

The definition of 'always on' means different things to different companies. Some industries have regulatory standards that require duplicate systems that work best with mirrored data and mirrored applications. Other companies have off-site facilities where employees go in case of emergency. The key in each case is having a solid, information infrastructure on which to build a flexible, adaptable and scalable business continuity program.

"Fast growing companies may not recognize the need for consolidation, standardization and integration," says Stephen Higgins, global marketing manager for business continuity at EMC Corp. "Having a resilient computing platform can free up resources that, up to now, have been saved for the proverbial 'rainy day' or enable entirely new capabilities that hadn't been possible before."

Conventional wisdom used to be that tape backup copies were sufficient protection in case of emergency. The proliferation of client and supplier data has quickly outstripped the ability of many backup systems to store, archive, retrieve and restore operations data. Some of the lessons learned from September 11th demonstrated the problem in the worst possible way—although companies expected to recover within 24 hours using tapes, many operations required extra hours or days. Because companies backed up their data at different points during nightly backup cycles, information was out of sync and it took significantly more time to reassemble it in a coherent manner. If it takes a full day to recover from a blackout, hurri-



cane, flood, or physical attack, that single day can affect thousands of customers and, in turn, a larger network of their downstream clients, suppliers and others.

Restart, Instead of Recovery

When trouble arises, companies need to resume operations from the moment of interruption. Making it happen requires more than just the IT staff. In fact, companies and people have come to expect certain industries to provide essential core services. Whether it's financial services, electric utility, a phone company, or government agency, there is a critical infrastructure that cannot shut down. These industries offer insights when considering a sustainable business continuity strategy.

Hospitals have to operate around-the-clock; financial services now are on-call for cash or credit 24 hours a day; electricity for business is as critical as oxygen to the human body, and government agencies operate without interruption.

Any business continuity plan assumes that all these resources are available.

Emergency plans may duplicate the physical assets of your company, with redundant office space, telephone switches and other equipment. But as companies grow, this option gets more expensive and less useful. There are simply too many people, too many phone lines, too many PCs, and too many unknowns to consider. For every question you can answer, there are others you may have overlooked.

If the power goes out in your office, there may be generators or fuel cells to run the computer network. But has enough alternate capacity been installed to run heating, ventilation, and air conditioning systems to cool workers and equipment within the data center? If weather prevents people from getting to your office, are there contingency plans for diverting data or people to places that are accessible?

Worrying about how a business can be interrupted is not as critical as exploring how the operations will be affected—both internally across departments and externally to outside constituencies.

GartnerGroup Dataquest estimates that two out of five companies that experience a disaster go out of business within five years. Their projection that by 2005 the market for storage management will more than double means the issues will only get more complex. As the amount of data businesses need expands exponentially and as systems that address global customers must operate 7x24x365, more companies are recognizing the need for quicker backup and data recovery. The kinds of data considered vital are changing to include e-mail, intellectual capital, CRM (customer relationship management), ERP, eBusiness, eCommerce, supply-chain and transaction records that are outside the normal production systems.

Updated business continuity plans with a state-of-the-art storage infrastructure can offer a more effective redeployment of people and resources yielding savings that pay for the entire plan within a few budget-cycles.



Information architectures using disk-based storage can free staff for more productive projects and cut the time for reviving critical business functions. Instead of waiting as long as two weeks to reload data, operations resume within hours or even minutes if designed properly.

Delays that used to be blamed on maintenance or necessary ‘down time’ can be eliminated to create non-stop operations. That can pay off for your company and help to keep your customers more satisfied. For one well-known U.S. catalogue retailer, each hour needed to restore its order entry data meant losing \$100,000 in sales, nearly \$2.5 million in a single day. That one instance prompted a switch from a batched back-up process to a real-time disk-based storage infrastructure from EMC. With a data center located 20 miles from headquarters, data was secured instantly for each transaction, reclaiming hours of productive selling time and creating a bulletproof continuity solution that caused no interruption for customers.

Who’s depending on your company? For every supplier, client, employee and partner, there are dozens more you’ve never seen in a network more complex than you’d ever imagine.

What information is mission-critical? All of it.

In the case studies, we explore how the key industries that you rely on are approaching and solving these mission-critical business continuity issues.

Case Studies

MasterCard International O’Fallon, MO

At MasterCard International, business continuity is part of everyday operations and has been since 1990. Twice a year, MasterCard exercises recovery plans by shifting its people and workload to backup sites as if a disruption had occurred. That prepares the company for anything—such as the 1997 frame relay failure by its telecom provider, followed by a tornado and power outage—with no disruption to its worldwide audience.

MasterCard uses redundant sites and a peer-to-peer network to ensure that no single site or failure jeopardizes the millions of companies and individuals that rely on MasterCard every day.

The company is owned by its 20,000 member banks, connected to 22 million merchants that accept its cards and to countless customers who use its credit, debit, Maestro and Mondex cards. In 2000, more than \$850 billion in transactions were handled—a 21 percent increase over 1999. On a busy day, MasterCard processes as many as 30 million transactions in 179 currencies worldwide.

Getting the right tools for those complex tasks led the company to select EMC Corporation and its hardware and suite of SRDF (Symmetrix Remote Data Facility) data mirroring software solutions, says Brian Lock, MasterCard’s vice president for technology and architecture services.

“We don’t sell widgets. We sell transactions. So if customers can’t make transactions, it’s a problem for them, for our members and for us,” Lock adds. “We aim to be the global payments leader—available anywhere, any time, every time.”

That reliability is priceless to its members and customers. So MasterCard’s data



infrastructure has to be flawless. And when the time came to open a new data center outside St. Louis, more than 60 terabytes of UNIX, mainframe and Windows NT data had to be switched over to the new site. Using SRDF and EMC's TimeFinder software, files were migrated to the new site without interruption to merchants worldwide. Now, equipped with 130 terabytes of EMC disk-based storage, the facility saves MasterCard both time and money. For example, the daily backup of its Oracle financial database used to take 18 hours— now it takes 30 minutes, with complete system availability and expanded levels of service.

“As the demand for information grows, we continually look for innovative ways to transform transaction data into valuable information for our members. Information infrastructure isn't supporting our business—it is our business,” says Lock.

KeySpan Energy Corp. Brooklyn, NY

KeySpan is the largest distributor of natural gas in the Northeast, with 2.4 million gas customers and more than 13,000 employees. KeySpan also delivers electricity to 1.1 million customers throughout New York and manages a portfolio of service companies for homes and businesses, some of which are located as far away as Canada.

Consumers take electricity for granted, unwilling to accept a surprise if they flip a switch and nothing happens. That means KeySpan takes no chances. When millions of people rely on your company, there are no excuses. So the Brooklyn, N.Y. company has a unique perspective on reliability and the importance of connectivity.

“Obviously we take our responsibility to the energy-using public very seriously and we've taken pains to design and implement our computing infrastructure to be as

responsive and reliable as possible,” says William Rachmiel, the company's director of technology planning and integration.

A high-speed fiber network links two major data centers on Long Island, allowing KeySpan to maintain a ready disaster recovery site with one data center backing up/mirroring the other. Additionally, the network can exploit excess processing power in a load-sharing arrangement during periods of extraordinary demand.

Fulfilling the data recovery requirement, data from critical corporate applications is stored at the primary site and copied synchronously to identical files at the backup site. These fully redundant records provide an instant back-up and satisfy the business continuity requirement. More than five terabytes of mainframe data and nearly three terabytes of open-systems data are at stake.

“Storage and mirroring technology, using EMC hardware and software, lets us recover storage for critical applications in an hour or less,” Rachmiel says. “Our data centers are both production facilities, but sufficient spare processing capacity exists at either site to enable the critical load to be switched over in the event of an emergency. Non-critical work loads are temporarily suspended or curtailed.”

One critical application to be switched over in an emergency would be CARES—Computer Aided Restoration of Electrical Services. CARES registers trouble reports from calls placed by energy customers. During storms, these reports are displayed spatially on a Geographic Information System, or GIS, platform revealing probable failure points in the distribution network. As a result, restoration work can be optimized, allowing more customers to be brought back online quickly.

Restoring a tape backup could take as long as five days with the system used by some business units. No customer would



wait that long for power to be turned back on. The mirroring solution developed by EMC is tested regularly when a controlled “failover” is simulated and production is switched from one data center to the other.

Thanks to KeySpan’s mirrored storage solution, operational recovery is as easy as flipping a switch—the same convenience their customers expect, with the same reliability.

CareGroup Healthcare System Boston, MA

When six hospitals formed CareGroup in 1996, the Internet era was just dawning. In the past five years, Web-based applications have become a vital resource for its one million patients and 3,000 doctors throughout eastern Massachusetts. In its new state-of-the-art emergency room at the Beth Israel Deaconess Medical Center, the boundaries of medicine and technology are yielding to faster, wireless, instantly updated records. The days of paper charts and clipboards are numbered.

Chief Medical Information Officer Dr. John Halamka oversees this enterprise and has been the primary architect of a Web-based link for clinical information that connects doctor offices, insurance companies and hospitals across a 500-square-mile territory. In all, the group has more than 13,000 employees and 3,000 medical staff across Mount Auburn Hospital in Cambridge, New England Baptist Hospital in Boston, Deaconess-Glover Hospital in Needham, Deaconess-Waltham Hospital in Waltham, and Deaconess-Nashoba Hospital in Ayer.

Using disk-based storage databases for application development is just one ongoing capability. Dr. Halamka’s vision has been to make data as available and secure as possible, capitalizing on handheld computers, wireless 802.11(b) networks and

instantly updated information—called the patient dashboard—avoiding the need for doctors and nurses to synch laptops or handhelds with a cradle or docking station.

Patient lab test results are immediately added electronically to patient charts, avoiding delays for treating physicians and allowing more complete data to be shared faster. At a major trauma center hospital, there is no down time. And when storing patient records, there is no margin for error.

A new Web-based order-entry system allows doctors to place prescription requests electronically and is linked to patient medical records, warning medical staff of possible drug interactions or past allergies, he says. This crucial data is supported by EMC disk-based, mirrored storage to ensure its speed and reliability. The system reduces errors that are prevalent with handwritten prescriptions—since doctors are known for poor penmanship. The change eliminated 90 percent of medication errors on just one floor of the flagship Boston hospital.

“We mirror about five terabytes of mission-critical data across 150 server platforms,” Halamka says. “Mainframes for billing and general finance systems; 14 UNIX systems for clinical care and administrative systems, and 135 Intel/Windows NT systems for data warehousing, decision support, e-mail and office productivity. Since September 11 we’ve moved our backup data to an offsite location on a daily basis—previously we moved it offsite two or three times a week.”

Centers for Disease Control Atlanta, GA

Another day at work is hardly routine at the Centers for Disease Control. As a lead federal agency for protecting the health and safety of people at home and abroad, this organization is charged with providing



credible information to enhance health decisions. Scientists collect data, perform tests and share results with labs and public health workers around the world. More than 8,500 employees throughout the United States frequently need to communicate vital information to local public health partners, its clinical partners, remote offices, the press and the public.

The fast-moving investigation into anthrax-contaminated mail in Fall 2001 tested the agency's ability to share updated information, even with the most modern tools such as the agency's website. Delivering information to frontline clinicians during investigations of multiple anthrax cases was critical. And it meant millions of increased visits to its website; from 3.6 million daily in August to 9.1 million after the first cases were announced October 4. In November, Web traffic remained high, but declined to 5.25 million unique daily visitors.

Public health involves tight cooperation between many different organizations, but frequently, the CDC does definitive tests.

"During the anthrax activity, our number of Web visits went up dramatically," said Dr. John Loonsk, the CDC's Associate Director for Informatics and manager for the central IT organization. "It showed us the need for enhanced emergency capabilities. One of the important things is getting information out and our website is increasingly important."

CDC wanted redundant backup for its Microsoft Exchange and SQL Server operations to ensure quicker, more efficient knowledge/information management and critical infrastructure protection. The Centers' partners and collaborators require a 7x24x365 environment. Disease management allows near-immediate notification of outbreaks and minute-by-minute monitoring of possible cases.

A storage network infrastructure, using EMC's CLARiiON disk-based hardware and software, allows doctors and health officials to communicate quickly, securely, and without delay while safeguarding internal data and patient information.

In the business world, costs are reduced when core administrative and scientific operating cycles are reduced. For the CDC, efficiencies in send-receive-confirm cycles allow faster information transfer among health agencies—leading to quicker communication of test results and more complete Web data posted by the Centers. The CDC required a mirrored back-up environment in a remote location to maintain business continuance.

"Our people are knowledge workers and it's critical to have an infrastructure for them that's reliable and always available," Dr. Loonsk says. "We've had adequate bandwidth and system performance up to now, but there's a heightened awareness on continuity. The emergency activity and the anthrax situation have run 7-by-24 and that's put additional pressure on our IT support."



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