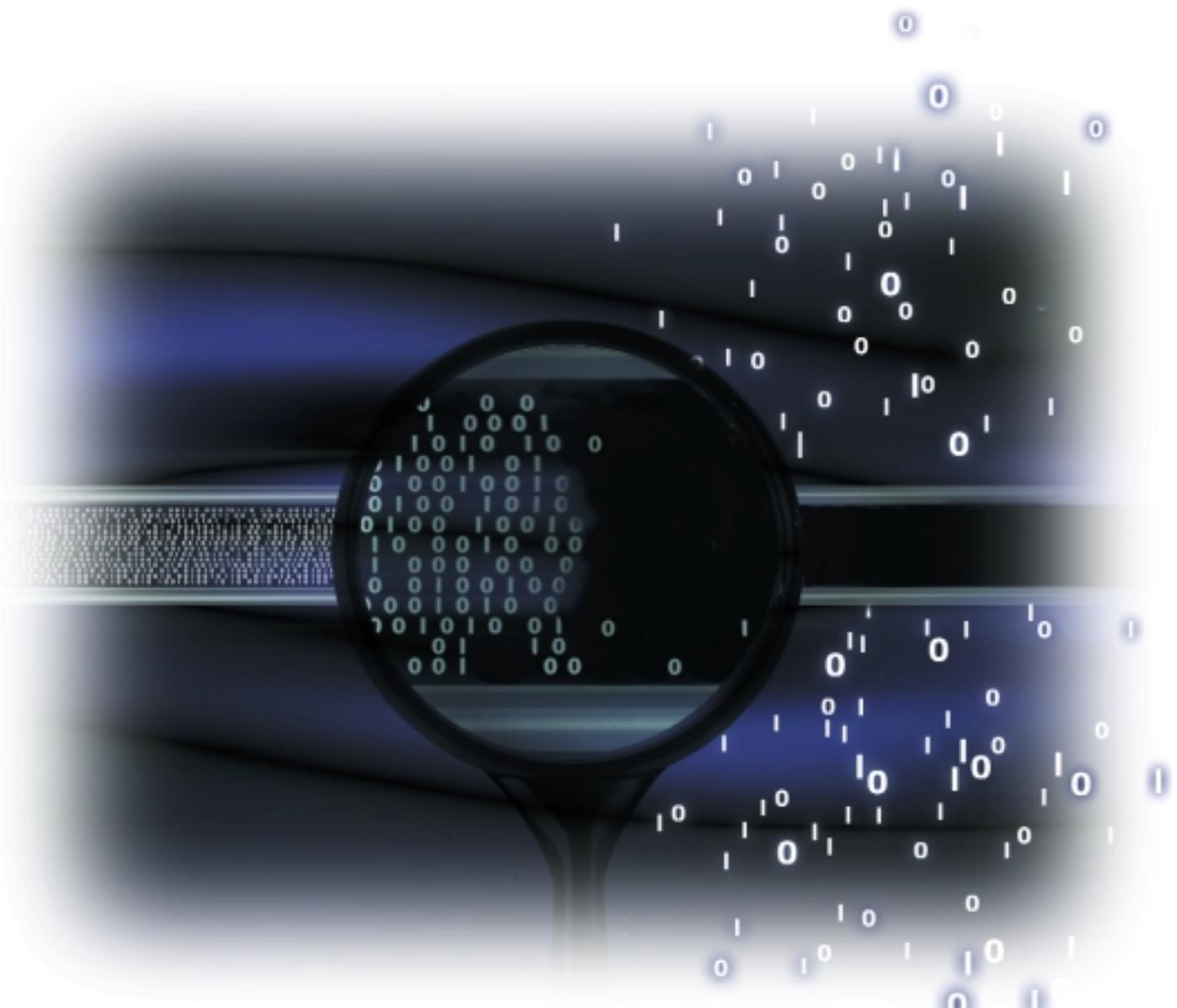


C u s t o m e r FOCUS

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EMC Corporation's Customer Profile Magazine

Spring 2002



Is your business protected?

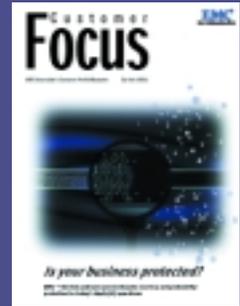
EMC — the first and last name in disaster recovery and productivity protection for today's 24x7x365 operations

Customer FOCUS

Spring 2002

Table of Contents

- 3 We've Got Your Data Covered**
Tested and proven in countless organizations and industries, EMC systems, software, and services deliver productive protection that gives customers what they need to stay ahead of the competition.
- 9 Centralized Management and Automation at Its Best**
Manage more information at a lower cost; boost productivity in an open management environment; provide new capabilities for information replication, protection, and recovery.
- 12 Acer CyberCenter Services**
An EMC information infrastructure enables Acer CyberCenter Services to manage and protect its customers' enterprise information.
- 14 New Horizon System Solutions**
EMC's SRDF disk mirroring solution protects Ontario's newly deregulated power supply for very high availability—99.999 percent.
- 16 Oracle**
Oracle turns to EMC to help seamlessly consolidate its global infrastructure.
- 19 Royal Victoria Hospital**
EMC and MEDITECH support growth and reduce total cost of ownership as RVH opens new facilities.
- 21 VirtualBank**
EMC's productive protection software helps VirtualBank deliver Internet-based financial services and provides continuous access to, and protection of, customer data.
- 23 Citibank**
EMC Professional Services consolidates Citibank's data centers and ensures business continuity with SRDF and TimeFinder software.
- 25 PacifiCorp**
EMC's SRDF and SDMS help PacifiCorp migrate to a new data center while maintaining business continuity.



Find out more about how EMC's customers are using EMC enterprise information storage solutions to solve real-world business challenges by visiting www.EMC.com.

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We've Got Your Data Covered

Whether it's a temporary halt in operations as a result of scheduled maintenance, daily backups, warehouse refreshes, or system upgrades; or an unplanned standstill caused by power outages, natural disasters, or even man-made ones, one thing is for certain—downtime disrupts business. At the very least, downtime can diminish productivity levels. At its most severe, it can cripple or even put a company out of business. For most companies, especially global organizations and those doing business 24 hours a day, even a brief amount of downtime is unacceptable.

EMC understands the importance of maintaining the free flow of mission-critical data across an enterprise. Leading the industry in supporting zero downtime as a core capability, EMC addresses business continuity from all angles. Combining years of expertise in the field with the latest technology, EMC delivers productive protection that goes well beyond where other solutions leave off.

Business continuity solutions from EMC—not just for when the worst happens

Costly investments in traditional data protection strategies involving the deployment and maintenance of tape backup solutions and standby mirrored sites are de rigueur for most disaster recovery initiatives. But what if you could make your data protection investments go further? What if those investments not only safeguarded your company's data from risk, but also made day-to-day operations less costly and more productive?

EMC is leading the industry in providing customers with a comprehensive approach to business continuity that enables you to:

- Resume business in minutes — not hours or days — after a planned or unplanned outage through dynamic data mirroring solutions
- Dramatically reduce or eliminate backup times ensuring maximum access to information
- Update databases and refresh data warehouses more frequently without disruption — facilitating increased information access for better decision-making
- Provide consistent and synchronized information backups that speed match-ups and data reassembly for faster recovery if an outage occurs
- Automate recovery and limit manual activities such as tape transport and loading
- Manage more of your infrastructure with less manpower — enabling more time for revenue-generating initiatives
- Test new applications concurrently with production operations to speed time-to-market and deploy applications faster

A daily return on EMC business continuity assets

More than just data protection insurance for a rainy day, investing in an EMC enterprise information storage infrastructure helps you dramatically and consistently boost the level of productivity in your operations. By leveraging EMC's highly reliable storage platforms, time-saving management software, replication/mirroring tools, and advanced automation capabilities, you benefit from productive protection that not only keeps you open for business 24x7, but also gives you what you need to get ahead—and stay ahead—of the competition.

Symmetrix and CLARiiON systems—the foundation of productive protection

EMC's commitment to business continuity begins with a solid foundation built upon industry-leading, award-winning, Symmetrix® and CLARiiON®, enterprise storage systems. Tested and proven in the field, these systems offer unbeatable performance, reliability, scalability, and connectivity.

A worldwide following and a reputation for success

EMC Symmetrix

- Recipient of the Product of the Year Award given by *Network Magazine* in April 2001
- Incorporates over a decade of proven technology in its fifth generation of innovation
- Reigns as the industry's best performing, most functional, reliable, scalable, and most open enterprise information storage architecture
- Delivers the world's highest capacity in a single system (69.5 terabytes)
- Offers a quad bus architecture, segmented cache, and leading-edge performance
- Provides the widest range of tested connectivity to 40 operating systems including mainframes, UNIX, Microsoft Windows, Linux, AS/400, and others, as well as over 250 server models and third-party storage systems, 50 cluster configurations, and 145 various network elements (hubs, HBAs, switches, DWDM devices)
- Extends openness through testing and qualification of third-party storage for interoperability in multivendor networked storage environments



“Our success is directly tied to our ability to provide continuous access to, and protection of, customer data. If our intranet goes down, our back room is dead—it’s the equivalent of a bank closing all its branches. Choosing the right storage solution was crucial, and EMC had all the technology to address our needs.”

— John Studdard
Senior Vice President
and CTO
VirtualBank

EMC CLARiiON

- Recipient of the *PC Magazine* Award for Innovation in Infrastructure in May 2001
- Provides powerful, industry-leading performance for time-sensitive, data-intensive applications
- Offers Fibre Channel or IP connectivity for superior information consolidation for highly distributed, critical, standalone server environments
- Features an architecture that can be re-deployed in NAS, SAN, direct-attached, or clustered environments, providing unmatched connectivity options, asset life extension, and infrastructure flexibility
- Delivers up to 19.0 terabytes of fully protected storage with enterprise-class availability
- Provides a superior platform for information sharing, protection, and management
- Offers unprecedented scalability
- EMC replication and mirroring solutions—nobody does data backup and disaster recovery better



“EDM is essential in safeguarding our site for business around the clock. Because our company motto and mission is ‘fanatical customer service,’ we can’t afford to have our mission-critical applications disrupted. EDM gives us the perfect solution for conducting non-disruptive backups.”

— Sean Clough
Vice President of
Marketing
Viking Office Products

Bet your business on EMC’s industry-leading replication and mirroring technologies for Symmetrix and CLARiiON storage system environments and you can rest assured that your mission-critical data will be fully protected against corruption, disruption, and catastrophes large and small.

EMC Data Manager (EDM)



As the industry’s fastest, most reliable backup and restore solution, EMC Data Manager (EDM™) provides a centralized, high-performance backup and restore functionality, optimized for Symmetrix-based and distributed UNIX and Windows NT database environments.

The system can handle the backup and restore needs of the largest enterprise databases, and combines software, hardware, and services to provide a seamless solution that increases productivity and facilitates business continuity.

EMC Data Manager provides:

- High performance and high data availability
- Symmetrix connectivity to offload network traffic
- Centralized management through an intuitive GUI interface
- High scalability in capacity and configuration
- Universal connectivity



SRDF — EMC's premier disaster recovery solution for enterprise computing environments

Symmetrix Remote Data Facility (SRDF™) protects information and provides comprehensive business continuity in the face of both planned and unplanned outages. This online, host-independent, mirrored data solution duplicates your production site data on one or more physically separate target Symmetrix systems.

SRDF offers:

- Data replication using Virtual Private Networks (VPNs) and the Internet Protocol (IP)
- The only solution for mainframe, UNIX, Windows NT, and AS/400 systems
- Host-independent online, realtime data mirroring for one or more local or remote copies
- Data availability in minutes for simple and fast recovery
- Relief from disruptions caused by scheduled outages
- The highest extended-distance performance and communication line efficiencies available through multi-hop capability and SRDF FarPoint™, which supports mirroring across SRDF-supported telecommunications lines, including T1/E1, T3/E3
- GDPS compatibility for transparent integration of SRDF into GDPS environments
- Support for geographically dispersed clusters

In addition, EMC Symmetrix Remote Data Facility/Data Mobility (SRDF/DM) enables you to easily replicate or move data from one Symmetrix system to another without the use of servers. It provides platform-independent capabilities in multiple environments and is designed to assist users in meeting their e-business needs.

EMC TimeFinder

EMC TimeFinder™ enables you to create, in background mode, independently addressable business continuance volumes (BCVs) for mainframe, UNIX, and Windows NT information storage. The BCVs are local mirror images of active production volumes that can be used to run simultaneous tasks in parallel with one another. This parallel processing capability offers workload compression so you can significantly increase efficiency and productivity while maintaining continuous support for the production needs of the enterprise.

TimeFinder lets you:

- Maximize hours of online processing to increase revenue
- Accomplish backups quickly, frequently, and without disruption
- Load or update data warehouses as needed
- Perform application testing with real production data while business continues
- Eliminate job step copies, saving batch processing time

“Once energy is generated, it can't be stored like petroleum, gas, or oil where the price can fluctuate from day to day. It has to be traded in real time. We needed a system that was highly available—99.999 percent—one that would use remote disk mirroring to achieve those results. EMC's SRDF solution was the only one on the market that could offer us the reliability and functionality we needed.”

— Liz Reid
CIO
New Horizon System
Solutions

EMC InfoMover

EMC InfoMover™ combines flexible information transfer and sharing capabilities, enabling open access to information within the data center. InfoMover transfers files bi-directionally between any combination of mainframe, UNIX, or Windows NT systems using the Symmetrix system and existing I/O channel connections instead of the network. InfoMover also enables UNIX systems to read MVS files directly, eliminating the need to move data, thereby saving valuable file transfer time.

With InfoMover you can:

- Accelerate information delivery within the data center
- Shorten data warehouse refresh times
- Relieve batch scheduling constraints
- Speed the creation of new applications or implementation of large-scale integration projects for quicker ROI, faster time-to-market, and better profitability

EMC CopyCross

EMC's CopyCross™ software extends enterprise business continuity benefits to tape-based applications. It lets you copy mainframe tape data to Symmetrix disk storage for enhanced information availability and protection. Once your tape data has crossed over to Symmetrix storage, you can leverage the powerful mirroring capabilities of TimeFinder and SRDF to achieve:

- Workload compression for increased productivity
- Easy and frequent backups—locally or remotely
- Quick disaster recovery for critical business systems
- Optimized IT processes

EMC CopyPoint

With EMC CopyPoint™ you can bring the advantages of an EMC enterprise information infrastructure to AS/400 environments. CopyPoint delivers virtually uninterrupted 24x7 production-level support for your enterprise while enabling backup protection and other operational background functions—all with minimal disruption.

CopyPoint lets you easily:

- Maximize application availability by reducing backup and batch windows from hours to minutes
- Create concurrent application test environments
- Enhance business continuity/disaster recovery strategies
- Enhance data availability and integrity

EMC CopyPoint can be combined with TimeFinder software to allow operational tasks, such as backups and batch processing runs, to be off-loaded to a secondary AS/400. It also works with SRDF to enhance disaster recovery functionality.

“TimeFinder reinforces our mission to provide the highest-quality, most cost-efficient healthcare possible by ensuring our information is protected and always available across our entire enterprise. Now anything we test or change on our systems can be done without changing the performance of the systems or impacting the end users.”

— Joe Adams
Manager of LAN Group
Tufts Health Plan

A terrific trio

Some customers who use TimeFinder, SRDF, and EDM have commented that the three together provide a superior framework for shrinking or even eliminating backup and recovery times, leading to increased revenue and productivity gains.

“Our customer and product data are our most powerful assets. EMC’s unmatched portfolio of robust software, and the virtually unlimited knowledge base among its customer support and technical consultants, have allowed us to make huge strides in protecting our information. The importance of safeguarding our data is increasing dramatically as more people tap into our networks more frequently.”

— Rich Malone
Chief Information Officer
Edward Jones

The GeoSpan family

The GeoSpan™ family provides the simple, automated, and open management of local and wide area high-availability solutions. Through the integration of SRDF and clusters, you get high-availability and disaster recovery, as well as a first-class infrastructure to support the demands of your mission-critical applications.

GeoSpan offers:

- More from your Symmetrix and SRDF investments through multiple cluster support
- Automated application failover/failback and application migration
- Increased data availability
- Extended geographical reach of high-availability clusters
- Integrated high-availability clustering with simplified disaster recovery/restart

In addition, for unsurpassed business continuity and disaster-recovery functionality in a Microsoft Cluster Server (MSCS) high-availability environment, EMC offers GeoSpan for Microsoft Cluster Server. By combining SRDF and MSCS, EMC provides superior disaster-tolerant cluster functionality by making it possible for cluster operations to continue following a site disaster. For VERITAS Cluster Server high-availability environments, EMC offers disaster recovery and disaster restart functionality through GeoSpan for VERITAS Cluster Server (VCS).

EMC MirrorView

EMC MirrorView™ provides highly available data storage across a campus environment. By maintaining synchronous data mirroring between EMC CLARiiON FC4700 arrays, MirrorView ensures data availability of byte-for-byte mirrored images. MirrorView is array-based, so there is no impact on hosts, and it is easily managed from within CLARiiON Navisphere® management software.

MirrorView supports:

- Synchronous mirroring of critical data between two CLARiiON FC4700 systems
- Faster disaster recovery by enabling failover to a secondary site
- Continuous data integrity during disasters via write intent and fracture logs
- The management of recovery through EMC Navisphere software

MirrorView can be integrated with SnapView™ for point-in-time snapshot images.

EMC SnapView

EMC SnapView is a storage array-based software product that captures up to eight point-in-time snapshot images of a file system and retains them independent of subsequent changes to the files. SnapView runs on the EMC CLARiiON FC4700, EMC's versatile storage system that can be deployed in a SAN or NAS environment.

SnapView images can be used to make remotely mounted shared files available to another server or direct-connect backup device for backups, decision support, or testing while production work continues uninterrupted.

With SnapView you can:

- Create point-in-time snapshot images of production data in seconds
- Accomplish backups quickly, frequently, and nondisruptively
- Gain operational efficiencies by enabling multiple clients to access snapshot data
- Make production application data available to secondary hosts for read and write analysis

Centralized management and automation at its best



Centralized management and automation contribute to business continuance by simplifying the management of your information infrastructure enabling you to:

- Manage more information at a lower cost than ever before
- Boost productivity through better collaboration in an open management environment
- Provide new capabilities for information replication, protection, and recovery

EMC ControlCenter Replication Manager

EMC ControlCenter™ Replication Manager is an open systems, client/server application that operates in combination with replication technologies, like EMC TimeFinder, to streamline the management and use of local disk-based replications. It eliminates complex scripting and mapping through an intuitive and easy-to-use graphical user interface, and allows the creation of multiple copies of information in less time, with fewer resources, and at reduced operational costs.

EMC ControlCenter SRDF/TimeFinder Manager and ControlCenter Symmetrix Data Mobility Manager

EMC ControlCenter SRDF/TimeFinder Manager and ControlCenter Symmetrix Data Mobility Manager (SDMM) simplify the monitoring, provision, and automation of TimeFinder and SRDF replication processes.

EMC ControlCenter Navisphere

The EMC ControlCenter Navisphere family of products simplifies CLARiiON array management and optimizes staff resources. Designed to support secure CLARiiON array management from work or home, the Navisphere family of products enables you to discover, monitor, provision, and report on CLARiiON storage systems from an easy-to-use, browser-based graphical user interface.

Navisphere products are ideal for use in collecting and displaying performance statistics to pinpoint problems and focus I/O tuning and configuration, or to upgrade enhancements where they will be most beneficial. Navisphere functionality also allows for the management and control of EMC SnapView and EMC MirrorView operations for maximum protection and utilization of your critical data.

Standard solutions can be implemented in 30 business days once the physical environment is readied (including telecommunications lines, hardware, and available resources). The implementation duration may be adjusted depending on the complexity of the environment and the volume of data involved.

Give us 30 business days...

As the industry's only productive protection solution, EMC's Business Continuity Rapid Results program is the quickest way to combine state-of-the-art information protection with new capabilities that are designed to help your business perform better, cheaper, and more efficiently than ever before.

The Rapid Results program delivers:

- Information protection through realtime remote data mirroring using the industry's highest-performing, host-independent solution
- Proven expertise via industry-renowned EMC Professional Services
- Strategic planning including assessment and evaluation of critical business systems, information flows, and recovery requirements
- A customized solution designed to meet your business continuity and productivity needs
- Streamlined physical implementation of hardware, software, and communications, including configuration, integration, testing, and documentation
- EMC partner support including leading telecommunications providers, network equipment manufacturers, independent software vendors, and facilities providers
- A single point of contact to coordinate schedules and resources, and facilitate superior project risk management

EMC put to the test

Statistics reveal that over 40 percent of companies subjected to information-related disasters never recover.

In the wake of the September 11 terrorist attacks, disaster recovery has become even more of a focal point as companies seek ways to reduce their risk. Here is how one company with offices 300 feet from the World Trade Center towers faced the unthinkable.

“...Until a few months before the tragedy, Commerzbank had been relying on tape libraries for its technology backup. But tape needs to be stored and then moved from one place to another. To assure quicker backups of data, Commerzbank began using EMC Corp.’s Symmetrix storage hardware and Symmetrix Remote Data Facility (SRDF) software. The Symmetrix system lets a company copy data while a system is up and running; it isn’t cheap, but it’s regarded as the gold standard of data replication.

Even at the cost of a few million dollars, the investment paid for itself on Sept. 11. “On tape, we would’ve been looking at least 20 hours” to retrieve data says Gene Batan, VP and North American manager of systems and IT. That would have been unacceptable, because the bank’s U.S. operation moves \$30 billion daily in money transfers. Without the Symmetrix system in place, “we wouldn’t have known our position that day. Even with it, the bank lost four hours, but that time was spent making sure employees were safe and wrestling with which data would be moved to Commerzbank’s backup system.”

“...EMC’s Rapid Results offering suggests the company is both well aware of the complexities of business continuity and well prepared to move ahead. In particular, we are interested in EMC’s notion of creating “active” disaster recovery installations that can be utilized for application development and other processes, helping to mitigate the costs and increase efficiency.”

— Charles King
Excerpt from Market Roundup
The Sageza Group

Is your business protected?

**See Lessons Learned:
September 11th in IT Perspective**
<http://www.emc.com/continuity/index.jsp>

Acer CyberCenter Services

Managing and protecting customers' enterprise information with an EMC E-Infostructure

The goal of Acer CyberCenter Services, Inc. (ACCSI) is to become the best data center in Taiwan and the Greater China region and to offer a world-class Internet data center while safeguarding customers' mission-critical information. The company, a wholly owned subsidiary of Acer Group headquartered in Aspire Park, Taiwan, offers a wide range of e-services for its customers.

To meet the demands of handling explosive information growth and the diverse need for enterprise applications, ACCSI relies on EMC enterprise information storage solutions. A robust EMC E-Infostructure™ enables ACCSI to provide its customers with the reliability, scalability, and 24/7/forever availability to keep pace with its customers' increasing requirements for mission-critical data storage.

“As the region's leading Internet data center, ACCSI partners with only the leading international players,” says Jerry C. Huang, associate vice president of Product Design and Service. “EMC, the proven and trusted information storage infrastructure provider, was the best choice for our company. With the satisfactory experience in Acer Group, EMC proved to be the best partner and offered the best hardware, software, and services.”

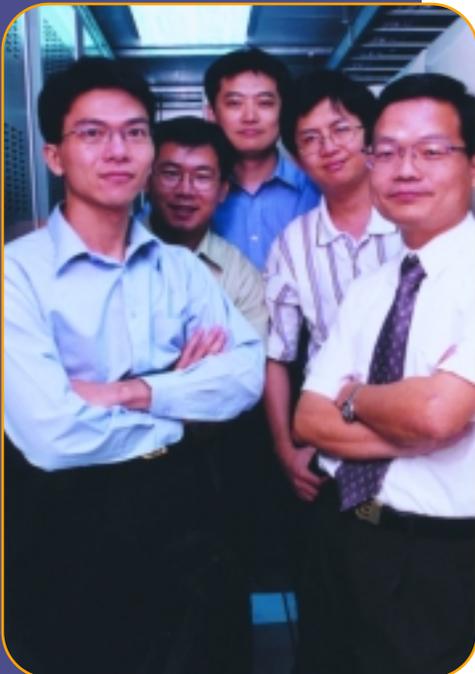
First EMC Proven Tier 5 member in Greater China

As an information management service provider, ACCSI adopted most of EMC's enterprise storage solutions including Symmetrix®, Connectrix™, Volume Logix™, Symmetrix Remote Data Facility (SRDF™), TimeFinder™, PowerPath™, ControlCenter™, and EMC Professional Services. ACCSI is also the first service provider in the Greater China region to obtain EMC Proven™ Tier 5, the highest level of certification in the program.

“With EMC Proven Tier 5 certification, ACCSI can provide customers with the highest service level agreement commitment,” says Huang.

Because of the variety of applications and servers of their customers, ACCSI needs information storage with high interoperability.

“EMC is at the center of our IT infrastructure and connects to heterogeneous mainframes, UNIX, and NT platforms.” says Huang. “EMC provides the most robust information storage so our customers can run their applications on their servers without limitation.”



Centralizing and managing customer information with EMC networked storage solutions

Equipped with a high-speed network trunk, ACCSI integrated a networked storage solution from EMC to provide centralized control of customers' information.

"EMC had the only networked storage solution that could help us manage and protect the massive amount of information from our customers," says Huang. "With EMC, we can quickly and efficiently scale our storage capacity and scope of service to keep pace with our customers' needs."

To achieve even greater control over customers' information assets, ACCSI is using EMC Connectrix Manager software to provide a centralized overview of the entire networked storage infrastructure and monitor and control it all from a single location.

With EMC TimeFinder software, ACCSI can create business continuance volumes (BCVs) for customers' non-disruptive backup and testing purposes while still keeping the systems online.

"Our customers in banking and insurance need to deal with a huge amount of financial data at the end of each month and quarter," says Huang. "By creating point-in-time copies, TimeFinder can better protect customers' critical information assets with increased efficiency and productivity while keeping production systems continuously online."

EMC PowerPath software also improved information availability. "With PowerPath, ACCSI can transparently increase I/O from the host to the storage solution so customers receive faster access to information and better reliability," says Huang.

To further enhance information protection and business recovery during planned or unplanned outages, ACCSI used SRDF to provide realtime remote mirroring.

"There have been a couple of unplanned events like earthquakes, fires, and electricity outages in Taiwan," says Huang. "EMC helps us provide high-end remote mirroring service to our customers. Many domestic enterprises realize their need for remote mirroring service after experiencing the unplanned events. With EMC's solutions, our customers get a wide range of highly available business recovery solutions."

To design and build its information infrastructure quickly and cost effectively, ACCSI worked closely with EMC's Professional Services consultants.

"EMC Professional Services helped us speed implementation of our information storage infrastructure, which helped us re-deploy IT resources and achieve faster time-to-market," says Huang. "Strategic assessment, planning, and design services helped ACCSI identify and explore key areas of concern for our business. EMC helped us accomplish our business goal flawlessly."



"EMC is at the center of our IT infrastructure and connects to heterogenous mainframes, UNIX, and NT platforms."

— Jerry C. Huang,
Associate Vice President
of Product Design and
Service

New Horizon System Solutions

EMC disaster recovery solution helps protect Ontario's newly deregulated electric supply

When the Ontario government decided to deregulate the electricity market and allow competition, Ontario Power Generation (OPG), the primary energy provider, had to “decontrol” its assets to reduce its monopoly power. To initiate compliance, OPG leased the Bruce Nuclear Power Plant, a large nuclear power station in Tiverton, Ontario, to Bruce Power. This change in plant control necessitated the split of all information technology (IT) systems to provide Bruce Power with IT services required to support a standalone enterprise.

Offering a state-of-the-art data center and expertise in IT applications for the utility and energy sector, New Horizon System Solutions (NHSS) was brought in to quickly find a reliable, instantaneous, and scalable disaster recovery infrastructure for these two major clients. The plan was to create one primary site for each customer, with each site acting as the disaster recovery site for the other. Providing the means for remote disk mirroring of critical systems, EMC's Symmetrix® Remote Data Facility (SRDF™) software was identified as a key component in making that happen.

“Once energy is generated, it can't be stored like petroleum, gas, or oil where the price can fluctuate from day to day. It has to be traded in real time,” says

Liz Reid, CIO at NHSS. “We needed a system that was highly available—99.999 percent—one that would use remote disk mirroring to achieve those results. SRDF was the only solution on the market that could offer us the reliability and functionality we needed.”

Maximizing uptime

Power plants differ from regular business models in that the online systems for managing a power plant are most critical when the plant shuts down for maintenance work. The plant relies on these critical information systems to ensure that the proper work maintenance orders are scheduled and completed during the “outage.” If the system used for planning and scheduling is not available during a plant outage for any reason,



the length of the maintenance window could be extended—a situation unacceptable to customers.

In March 2001, NHSS installed EMC's SRDF software and split OPG's environment into two mirrored sites—one for the decontrolled OPG and one for Bruce Power. The migration, involving 1.5 terabytes of data, was completed in just six hours on the actual closing day of the OPG/Bruce Power transaction—something that could never have been achieved with traditional tape solutions.

“Had we used tape, the migration of OPG critical systems to the Bruce Power equivalents would have taken a minimum of three days,” says Tom Cole, manager, Enterprise Servers and Storage at NHSS. “In that time, Bruce Power would have had to operate without its critical information management systems until the migration was complete. It was a huge undertaking to move and replicate a large number of systems in a very short period of time. SRDF enabled NHSS staff to reduce the business impact to both OPG and Bruce Power.”

Prior to using EMC's software, NHSS's IT/IS team often spent 24 to 36 hours completing software upgrades. With SRDF in place, the team now conducts major upgrades on the mirrored sites within an hour or two, further eliminating long maintenance outages.

Today, SRDF is operational on NHSS's IBM OS/390 mainframe environment, which runs INDUS Passport, on HP-UX running PeopleSoft and SAP, and on Windows 2000 running SAP. That totals to 10 terabytes of data available at both customer sites and mirrored to each disaster recovery site.

Storage capacity on demand with SAN technology

NHSS is in the midst of deploying a network information storage strategy. The company is developing a complete storage area network (SAN) environment and has turned to EMC once again for its highly available information storage and management solutions.

“EMC's networked storage solutions will offer reserve storage capacity,” says Cole. “Capacity on demand will allow for growth and change, offering our utility customers true flexibility.”

EMC continues to provide NHSS with a range of services, including data center best practices, disaster recovery consulting services, and infrastructure solutions. EMC also assists NHSS in forecasting its capacity growth for each system and provides trend and analysis reporting, help desk capabilities, and telecom network services.

“We keep returning to EMC because of the quality of service,” says Reid. “The EMC software and systems are reliable, and whenever we need to reconfigure one or move something around, EMC's technicians respond immediately. The quality of their work is excellent.”

“We needed a system that was highly available—99.999 percent—one that would use remote disk mirroring to achieve those results. SRDF was the only solution on the market that could offer us the reliability and functionality we needed.”

— Liz Reid
CIO

Oracle

Consolidation of Oracle's global infrastructure proves seamless with EMC

Oracle Corporation is recognized as the world's leading provider of database management software and applications for all major e-business infrastructures today. Despite phenomenal growth and success at the end of fiscal year 1999, Oracle realized that profit margins were 40 percent lower in comparison with other companies in their peer group. In part, this was as a result of maintaining a distributed, client/server-based IT model.

Under this model, Oracle had built a huge distributed worldwide infrastructure, consisting of 60 disparate financial databases, operating in 60 different countries, all running across multiple, heterogeneous server platforms and server-based storage. Oracle was spending over \$600M annually on global IT operating costs and the support of over 1,500 IT employees. The result was eroded profit margins.

With the need to gain control of skyrocketing IT costs and to simplify the maintenance of IT business operations, Oracle embarked on one of the most aggressive consolidation efforts in high-tech history. When completed, Oracle's new e-business infrastructure will serve as one of the largest global implementations, supporting over 43,000 users worldwide.

Upon completion of the project, Oracle will have consolidated its 43 worldwide data centers into a dual data center environment located in Colorado Springs, Colorado and at Oracle corporate headquarters in Redwood Shores, California. Together, these data centers will serve over 43,000 employees in 145 countries. The new model, which is 100-percent Internet based, will leverage Oracle's own E-Business Suite of applications. It will also support Oracle's own private network to allow customers and employees global access to information from a single instance database infrastructure through an Internet browser.

Crucial to the success of this consolidation project is eliminating the



downtime historically associated with disk-related failures of the older storage systems used in the data centers.

To mitigate this risk, Oracle leveraged the EMC E-Infostructure™ not only to enable a seamless consolidation of the data centers, but also to power many of its own mission-critical applications, including:

- Stress testing and staging for corporate CRM, ERP, and Financial applications
- Production for CRM, ERP, and Financial applications as well as approximately 60 terabytes of global e-mail
- Oracle Worldwide Support test and diagnosis applications

In addition, all core Internet and extranet applications are powered by EMC, including:

- Sales.oracle.com, offering online free Sales Force Automation applications to over 15,000 companies and 150,000 users worldwide
- Support.oracle.com, offering browser-based access to end-to-end customer support from initial problem tracking through resolution

“We needed a way to simplify our operations and improve data center efficiency while significantly reducing operating costs,” says Gary Roberts, senior vice president of global information technology. “EMC’s technology gave us the flexibility we needed in a multi-server environment, while making it possible to cascade older generation EMC systems into other environments and applications using JBOD technology, further extending the assets’ useful life. With EMC, information storage-related downtime has become a thing of the past.”

EMC solutions increase uptime, improve performance, and reduce cost

Today, Oracle has standardized on over 240 terabytes of an EMC networked storage solution, software, and Global Services supporting both Sun and HP platforms. Leveraging an integrated storage infrastructure as part of Oracle’s global consolidation effort has reaped many benefits in terms of improved availability, IT resource efficiency, and reduced cost.

Since consolidating server storage to EMC Symmetrix® systems, Oracle has eliminated recurring storage-related downtime and core business applications are continuously available, including www.Oracle.com.

EMC Connectrix™ delivers a continuously available, dedicated storage area network (SAN) infrastructure for stress testing and staging of Oracle ERP, CRM and Financial applications, enabling rapid production deployment of new releases. EMC Celerra™ File Server improves IT resource efficiency through enabling collaborative file sharing over network attached storage (NAS) for both Oracle Worldwide Support testing and diagnosis applications.

EMC TimeFinder™ software is used as part of Oracle’s backup strategy to conduct non-disruptive, point-in-time backups of all core production applications.

“We regard EMC as a global partner and vendor as they have helped us succeed in improving our IT operations, which in turn has helped Oracle’s bottom line.”

— Michael Rocha
Senior Vice President
Platform Technologies
Division

To boost performance and availability Oracle also uses EMC PowerPath™, which integrates multiple path I/O capabilities, automatic load balancing, and path failover functions into one comprehensive package for use on open server platforms connected to the Symmetrix systems.

Centralizing server storage onto the Symmetrix systems enabled Oracle to reduce both power consumption and floor space by 30 percent and achieve an 80 percent reduction in leased space for computer operations.

From a financial perspective, leveraging EMC's networked storage solution, software, and Global Services has helped Oracle achieve its milestone objective of cutting costs by over \$1 billion for fiscal year 2000.

"For over five years, Oracle and EMC have been strategically aligned on multiple levels to meet the demands of our over 9,000 mutual customers," says Michael Rocha, senior vice president, Platform Technologies Division, Oracle Corporation. "We regard EMC as a global partner and vendor as they have helped us succeed in improving our IT operations, which in turn has helped Oracle's bottom line."

The ECOstructure Initiative

As one of the largest worldwide vendors of e-business solutions, Oracle runs its own e-business strategy and supporting products. Through undergoing a project of this nature, Oracle has much experience to offer the industry on the transformation to an e-business and its effect on an IT organization.

As partners driving joint product development and engineering integration, EMC and Oracle have combined to better serve over 9,000 of the world's largest mutual installations. Today, this combined knowledge and expertise is made generally available to customers of all sizes, in the form of online blueprints through a joint alliance with Cisco Systems called the ECOstructure initiative.



Royal Victoria Hospital

EMC and MEDITECH support growth and reduce TCO

When it opened a new facility in 1997, Royal Victoria Hospital (RVH) adopted a state-of-the-art MEDITECH client/server solution supported by EMC CLARiiON® storage to meet the health-care needs of one of Canada's fastest-growing communities.

Within three years, unforeseen population growth, advances in digital medical technology, and increasingly complex information requirements for issues such as privacy and regulatory compliance, generated cost and performance pressures on the system. In 2000, RVH had over 70,000 emergency room visits, more than 2,200 births, and over one million laboratory patient test samples. And, plans called for the addition of a cancer center, almost double the number of patient beds, the introduction of new digital technologies such as a picture archiving communications system (PACS), and providing data center services to five additional hospitals in the region.

The existing architecture of server-centric data storage in approximately 30 stand-alone "disk storage islands," created excessive operational management requirements. Also, it did not support the sharing of unused storage, offer flexibility for rapid growth or programmatic changes, and provided only limited disaster recovery capabilities.

Deploying a new infrastructure for improved information management and lower costs

To meet the hospital's future needs, a new information infrastructure was needed that would help reduce total cost of ownership and manage the rapid deployment of resources—and storage had clearly become a mission-critical issue. It also needed to support improved data protection, sharing, distribution, backup, and restore capabilities, and provide Web-based access and seamless connections between healthcare information system (HCIS) applications and PACS.

A dual fiber path EMC storage area network (SAN) was a proven solution that uniquely met RVH's criterion of a single data vault. EMC's solution consists of a Symmetrix® 8830 with dual attached connection to 25 servers through redundant switches. Software includes ESN Manager, TimeFinder™, EMC ControlCenter™ Symmetrix Manager, and Resource View. This configuration would also support MEDITECH software, and the PACS vendors being evaluated by RVH.

"For a solid, reliable, highly available, and highly scalable storage infrastructure for our MEDITECH HCIS modules, PACS, and our entire enterprise, an EMC solution was the clear choice on all fronts."

— Rick Salcak
Director of IT
Royal Victoria Hospital



“For a solid, reliable, highly available, and highly scalable storage infrastructure for our MEDITECH HCIS modules, PACS, and our entire enterprise, an EMC solution was the clear choice on all fronts,” says Rick Salcak, RVH’s Director of IT.

The EMC enterprise information storage infrastructure is delivering mission-critical information resources efficiently throughout RVH’s network—enabling the hospital to respond rapidly to changing business requirements. The system has allowed RVH to simplify operations while simultaneously providing maximum protection, delivery, and secure sharing of all electronic information, including diagnostic images.

Operational efficiency and reduced costs

EMC PowerPath™ enhances PACS performance and reliability by providing servers with redundant pathways to the images and delivering optimal load balancing. The time for the mirroring backup process for the MEDITECH application modules has been cut in half. Superior diagnostic and monitoring tools averted a potential disaster, alerting staff to an SQL database problem that was corrected instantly without any downtime.

The Symmetrix solution also has reduced total cost of ownership. Replacement and disaster recovery server costs have been cut, as have implementation and testing times. The useful life of disks has increased at least threefold. Through the system’s “just in time storage” functionality, the need for constant new disk purchases has dropped, as have computer room space requirements.

The strategic partnership of EMC and MEDITECH enabled Royal Victoria Hospital to efficiently migrate more than 100 applications, including the entire suite of new MEDITECH healthcare information modules. EMC’s enterprise information storage infrastructure solution provides support for 2,500 users and can easily expand. A complete, single view of patients, and 99.999 percent data availability will raise the quality of service delivery, enhancing satisfaction levels for patients and staff.

“MEDITECH is the leader in HCIS software and EMC is the leader in storage technology,” says Alan Goldstein, Director of Marketing, MEDITECH. “Together we can provide our customers with the advanced and reliable solutions they are looking for.”

VirtualBank

VirtualBank delivers Internet-based financial services with an EMC E-Infostructure

Offering its customers a full range of traditional banking and investment services in a non-traditional setting, VirtualBank of Palm Beach Gardens, Florida caters to the wired world. Internet-based financial services mean there are no banker's hours for the rapidly growing company, which is open for business 24x7.

With continuous operations being the order of the day, every day, the integrity and performance of VirtualBank's IT infrastructure is of vital importance to the success of the business. Instead of vaults with cash, VirtualBank's assets are entrusted to an information storage infrastructure. So when operations quickly maxed out the direct-drive configurations on existing servers, the company needed to find a highly reliable, scalable networked storage solution to keep pace with a vigorously growing customer base.

"Our success is directly tied to our ability to provide continuous access to, and protection of, customer data," says John Studdard, VirtualBank's senior vice president and CTO. "If our intranet goes down, our back room is dead—it's the equivalent of a bank closing all its branches. Choosing the right storage solution was crucial, and EMC had all the technology to address our needs."

Working within a Windows 2000 shop

Of key importance to VirtualBank was the fact that EMC solutions are highly effective and easily integrated into a Compaq server-based, Microsoft Windows 2000 and SQL Server environment, which VirtualBank has had since its inception.

EMC also solved the company's disaster recovery problems. "As a bank, we must have a rock-solid disaster recovery plan," says Studdard. "With a distributed Windows 2000 environment, it's a very complex process to restore our system. We felt that the best solution was to have a mirror system up and running in another location. EMC addressed this need by providing a replication solution that synchronizes both systems, even though they are physically far apart."

In addition, EMC gives VirtualBank the scalability to meet its growing needs. With 450 gigabytes of data center storage, all mirrored, and business continuance volumes that replicate to Atlanta, the entire EMC infrastructure currently supports 1,350 gigabytes of data.



“We can double or triple our infrastructure in days instead of months because we can just add servers, plug them into our scalable EMC networked storage solution, and we’re up and running,” says Studdard.

Blueprint for a rock-solid data center

VirtualBank’s EMC solution consists of Symmetrix® and Connectrix™ systems supported by Symmetrix Remote Data Facility (SRDF™), TimeFinder™, PowerPath™, Volume Logix™ and EMC ControlCenter™ software.

“I had a lot of interaction with the people from EMC’s Internet Services Group,” says Studdard. “In short, they provided me with a blueprint on how to build a rock-solid data center.”

Today, the EMC enterprise information infrastructure provides VirtualBank with the benefits of increased uptime and a significant performance increase—30 to 50 percent—over the previous direct-attached configurations on existing servers.

VirtualBank also was pleased with support from EMC’s Global Services

“EMC Professional Services not only assisted with the scripting, procedures, planning, and implementation of the new disaster recovery infrastructure, but fully supported us during a recent data center move,” says Studdard. “We have not had to call Customer Service once about any problems—we’re pretty much on auto-pilot. They just call if something is wrong and tell us what needs to be done. We give the go ahead, and it’s done.”

A new business opportunity

VirtualBank is one of three companies under the 1st Virtual, Inc., holding company umbrella. There is also a wealth management company in Washington, D.C., and most recently, First Virtual Technology Corporation, which evolved from the leading-edge products developed through VirtualBank’s IT department.

Today, First Virtual Technology handles the IT needs of all three companies and plans are underway to provide VirtualBank’s same successful EMC E-Infostructure™ to outside brokerage, insurance, and financial institutions.

“EMC has essentially greased the wheels for our plans because we can take an entire infrastructure and easily double, triple, or quadruple it because the complexities of dealing with direct-attached configurations don’t exist,” says Studdard. “As for the integrity of the new business, an EMC information infrastructure provides intangible benefits. When we talk to Fortune 500 companies in the insurance and financial industry, we have instant credibility that we have a serious infrastructure. When we bring EMC, Microsoft, and Compaq to the table it’s a strong trio. That’s huge. Nobody can argue with that.”

EMC Professional Services consolidates Citibank's data centers and ensures business continuity with SRDF and TimeFinder

EMC's Professional Services assisted in a comprehensive assessment, design, and implementation for the data center relocation and consolidation project. The data movement and handover was completed seamlessly within the scheduled outage planned over the weekend.

Twenty-four hours of downtime at Citibank in Singapore's Corporate Bank can cost the company in excess of \$24 million

When Citibank's Asia-Pacific Processing Center (APPC) discovered that their estimated disaster recovery time was 24 hours at a minimum, the bank decided to explore EMC's Symmetrix Remote Data Facility (SRDF™) software, which enables fast, non-disruptive data consolidation between sites. SRDF also supports mirroring of data centers and reallocates work loads, provides information protection, and ensures continuity of business for scheduled and unscheduled outages.

Although Citibank officials approved the SRDF implementation and believed that it could eliminate the high costs of a data center outage, the project almost fell through due to lack of EMC-specific expertise and a shortage of resources.

"The value of an enterprise storage-based infrastructure was difficult to justify to management without SRDF," says Frans van der Lee, Director of Citibank's APPC. "Our management challenged us to relocate the entire Corporate Bank's data center without disrupting the business. EMC's Professional Services and our team creatively exploited the SRDF infrastructure to meet our relocation goals."

In just three months, EMC's Professional Services managed the assessment, integrated SRDF and EMC TimeFinder™ on the Corporate Bank's data center, and delivered a pilot within budget and on schedule. SRDF, software that provides full mirroring of data between the source and target Symmetrix® systems, synchronously mirrors the data to the contingency site so that it is ready for a quick recovery if a disaster occurs. With TimeFinder, Citibank maintains business continuance, compressed batch streams, performs point-in-time backups, and manages more timely data refreshes.

Citibank subsequently appointed a dedicated resource to continue the SRDF roll outs and implementation. They also authorized a second pilot to address the midrange open systems environment.



"We didn't have the technical capability internally to implement SRDF. EMC's Professional Services added tremendous value. We adopted SRDF very quickly and use it throughout our mainframe and midrange platforms."

– Frans van der Lee
Director of Citibank's
Asia-Pacific Processing
Center



With the success of SRDF at the Corporate Bank, the Retail Bank Operation asked EMC Professional Services to oversee and implement a project to expand the bank's use of SRDF for business continuance and provide enhanced user services.

"We implemented SRDF and TimeFinder primarily to address our business continuity requirements, but while we were conducting the pilot, we were

also relocating the data center as part of our convergence strategy," says Ramon Karingal, vice president of APPC. "We asked EMC if they could help us relocate the data in just 12 hours without disrupting our business."

The answer was "yes" and EMC's Professional Services assisted in a comprehensive assessment, design, and implementation for data movement and business continuance for the data center relocation and consolidation project. The data movement and handover was completed seamlessly within the scheduled outage planned over the weekend.

"Without EMC and SRDF we wouldn't have been able to implement this relocation because of our inability to move terabytes of information so quickly," says Karingal. "We relied heavily on EMC's Professional Services because they had the much-needed capability and commitment that we required. They helped us immediately resolve any problem we encountered so that it wouldn't affect our continuity of business. They convinced us that EMC's focus on customer service is of strategic importance to Citibank's success."

"We didn't have the technical capability internally to implement SRDF," says van der Lee. "EMC's Professional Services added tremendous value. We adopted SRDF quickly and used it throughout our mainframe and midrange platforms. With SRDF, we replicated our data in three data centers. Consolidation was as easy as switching off the old data center. We now operate out of the new one, which completes our goal to have only two hardware centers controlled by a central command center which is in a separate building."

Van der Lee believes SRDF's most important benefit is being able to meet rigid service availability requirements by the bank's clearinghouses. The inability to meet these service levels can result in problems with local regulatory authorities.

"With EMC, we can meet the most stringent regulatory requirements," he says. "With SRDF, we are up within two hours, which gives us a tremendous business advantage."



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— Ramon Karingal
APPC Vice President

PacifiCorp

EMC's SRDF and SDMS help PacifiCorp migrate to a new data center while maintaining business continuity

When PacifiCorp, a utility company based in Portland, Oregon, relocated to a facility on the other side of the Willamette River, the data center move went so smoothly that users didn't notice it.

To migrate the data, PacifiCorp's IT professionals originally were facing a 'tape shuffle' expected to take at least 72 hours.

"We were going to have to take our information, back it up to tape, and try to do a restore from tape," says Rodger Young, manager of Infrastructure Services.

In addition to the risks inherent in backing up and reloading a large database by hand, the manual process would mean the IT staff would have to wait days for their data sets to become available. Development work would halt.

With the combined help of EMC information storage solutions and EMC's Professional Services organization, the entire move took under 20 hours. Instead of mounting and loading 7,000 tapes by hand, PacifiCorp used EMC Symmetrix® Remote Data Facility (SRDF™) software to create mirrored volumes of production data onto Symmetrix storage. SRDF enabled fast switchover to the duplicate data once the volumes were in their new home. To accomplish a non-disruptive migration from the mainframe to the Symmetrix units, PacifiCorp used Symmetrix Data Migration Services (SDMS™), EMC's package of hardware, software, and professional services.

"EMC's service personnel helped plan and implement a trouble-free solution," says Young. "They knew exactly what was going on at every step, and they were friendly, competent, and informative."

Business continuance pays off

Two terabytes of data representing 85 percent of the company's business was duplicated, moved, and brought up in the new location. The data included customer service applications, customer billing, accounting,



material management, PacifiCorp's server and desktop applications, and the development work that keeps the utility's business side operating.

"We saved almost \$100,000," says Terry Payne, director of Infrastructure Services. "EMC's solution enabled us to be online—business as usual—on Monday morning. Our systems are mission-critical and EMC provided the best option of moving our data with the least amount of risk and at the shortest outage window."

The switch to Symmetrix storage also addressed other issues. PacifiCorp, like every electricity provider, is gearing up to compete in a tougher, deregulated environment. Payne is looking to flexible, enterprise-wide storage to help PacifiCorp drive down IT costs—both capital equipment costs and the ongoing costs of manpower and software.

"With EMC we have storage that can support multiple platforms," says Payne. "This high performance means you don't have to involve the cycle time, which may help us delay new computer purchases. We also expect to improve data backups and disaster recovery with EMC storage and software."

"Instead of stranding these capital investments in S/390 storage, we can migrate them over to new open systems technology," says Payne. "This flexibility is important because it helps us respond to the market appropriately."

PacifiCorp is currently rolling out SAP R/3, an enterprise resource planning system it will deliver on a distributed platform. Using EMC software, PacifiCorp can interface its storage with Sun platforms and with the company's NT and Novell servers.

In an industry where consumers choose their electricity provider, EMC has helped PacifiCorp increase its competitive edge.

"We will have to deliver more service to our customers," says Payne. "PacifiCorp will compete by distinguishing itself on the basis of service and price. With the EMC solution, we'll have the ability to move with the technology and take advantage of new opportunities that can deliver better service to our customers."

Reduced processing time means better service

PacifiCorp's IT group has already improved service to its users by providing better performance and higher data availability. After installing EMC's storage, PacifiCorp's batch cycle was cut from six to four hours, resulting in a 37 percent increase in productivity.

"We were pushing against a batch window in the morning hours," says CIO Tim Meier. "After EMC came in, they told us they could guarantee us better performance and shrink that window, and they did."

EMC improved the customer billing system's performance and helped customer service representatives field calls from customers. Building a more responsive customer service system will help the company as it adds customers from multiple

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— Terry Payne
Director of
Infrastructure Services

time zones around the globe. In addition, a more efficient billing system means greater cash flow.

“Every day that customers don’t get our bill in the mail is a lost opportunity in payments for us,” says Meier.

Meier says that the company’s IT strategy will focus on the basics as it plans ahead. “Running a utility is the same as running any business,” he says. “What counts are low costs and satisfying customers. We chose EMC because it has a reputation in the industry for providing a good technology solution that is backed by good service and support. We’re looking for solutions that would work in any bottom-line oriented business.”

If you're considering business continuity, talk to the company that invented it.

In 1994, EMC Corporation understood that protecting your information was nothing less than a make-or-break proposition.

US Patent 5,544,347 brought our vision to the world in the form of the world's first business continuity software, SRDF™.

Today, SRDF is part of our comprehensive offering of patented technologies, focused partnerships, and extensive expertise that helps keep your information available in the event of a disaster—and makes your business more productive every day of the year.

To see how the business landscape has changed, read *Lessons Learned: September 11 in IT Perspective*, a free appraisal offering practical insights on the lessons learned and how they apply to your business.

www.EMC.com/lessonslearned

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