

Baseline®

MANAGING GLOBAL IT: PRICELESS

HEADING UP ONE OF THE WORLD'S LARGEST IT OPERATIONS, MASTERCARD'S ROB REEG MANAGES A VARIETY OF TECHNOLOGIES, INCLUDING VIRTUALIZATION, CONSOLIDATION, STORAGE, MOBILITY, SECURITY AND GREEN INITIATIVES.

Rob Reeg, President,
Global Technology
and Operations,
MasterCard Worldwide

**How to
Build Secure
Applications**

**Creating an online
community for the
travel industry**



“While much of industry is focused on cost containment, MasterCard is at the vanguard of technology and business.”
 —Rob Reeg



CASHLESS SOCIETY MAY BE LIGHT YEARS AWAY, BUT Rob Reeg knows that payment systems are changing at the speed of light. The president of Global Technology and Operations for MasterCard Worldwide is aware that there’s no substitute for agility, flexibility and forward thinking in today’s turbocharged business environment.

“It’s an exciting time, and this is a really exciting place to be,” he says. “While much of industry is focused on cost containment, MasterCard is at the vanguard of technology and business.”

Reeg assumed the technology reins of MasterCard last May, after serving as the firm’s chief technology officer since 2005 and interim president of the IT division since January. He oversees operations in 210 countries and territories, including major processing centers in Brussels, Belgium; Sydney, Australia; and Chennai, India.

In 2007, the company handled more than 18.7 billion transactions valued at \$2.3 trillion. The MasterCard network has the capacity to handle 140 million transactions per hour with a response time of 140 milliseconds and 99.999 percent network availability.

Yet, MasterCard has evolved into far more than a credit card and debit card transaction-processing behemoth. It now supports product purchases at ATMs and e-commerce transactions via the Web; incorporates radio-frequency identification (RFID) chips into cards so they can be used to make contactless payments via its patented PayPass technology; and has developed electronic payment systems for transactions via mobile devices, such as PDAs and phones.

“Our philosophy,” Reeg says, “is that it shouldn’t matter where the transaction originates. We simply need to be able to process the transaction for the cardholder. Our tenet is to be agnostic at the point of interaction.”



MasterCard Worldwide

At a Glance

- Company:** MasterCard Worldwide
- Industry:** Financial services
- Headquarters:** Purchase, N.Y.
- Employees:** Approximately 5,000
- 2007 Sales:** \$4.068 billion
- IT Environment:** IBM Mainframes; Windows and Unix servers (including IBM AIX and Sun Solaris); data center software includes proprietary systems and off-the-shelf applications from BMC, CA, EMC, IBM Tivoli and VMware
- Databases:** Oracle; IBM DB2
- Storage:** NAS, SAN and virtual tape devices from EMC and Hitachi

That’s a simple enough premise but a remarkably complicated task. Managing one of the largest IT operations in the world requires vision, brainpower and muscle. Reeg, and MasterCard, must address and manage a spate of systems, technologies and issues, including virtualization, server consolidation, storage, remote access, security and green initiatives. It’s a task that Reeg is completely comfortable with—along with guiding MasterCard into the 21st century world of electronic payments.

“There are huge opportunities but equally huge challenges,” he points out. “The world is changing quickly, and technology is at the core of successful business practices.”

MAKING TECHNOLOGY PAY

MasterCard has prided itself on being a company that’s in the vanguard of information technology. Serving more than 25,000 member financial institutions worldwide, MasterCard products, including credit and debit cards, are accepted at more than 25 million locations around the globe. The firm’s peak processing power is mind-boggling. At Valentine’s Day, Mother’s Day and the weeks leading up to Christmas, the MasterCard Worldwide Network processes as many as 55 million transactions in a single day for credit alone.



The MasterCard Worldwide Network processes more than 30,000 transactions every minute of every day—about 25 percent of worldwide credit card and debit card spending.

ENTERPRISE TECHNOLOGY

mobile phones, and it has showcased secure over-the-air personalization and payments. It also has developed a mobile reload system, called ePower, which allows consumers to add money to reloadable MasterCard and Maestro branded prepaid cards and accounts.

In addition, the company has developed a worldwide money transfer and domestic peer-to-peer payment system that it plans to pilot this year. The service will allow consumers to exchange money electronically with friends and family through mobile

phones and PDAs. Finally, MasterCard continues to leverage its transaction-processing expertise to gain entry into the emerging m-commerce arena, which includes games, music and ring tones.

BUILDING A BETTER NETWORK

Make no mistake: The credit card business is continuing to evolve. From its humble origins and simple plastic card in 1952, magnetic strips, microchips and electronic systems have continued to redefine the industry. Along the way, the constants have been the need for innovation and vision. Following close on their heels is an ongoing investment in IT systems.

MasterCard certainly understands the importance of IT. At the beginning of the decade, it spent \$160 million for a complete IT overhaul that ushered in a component-based architecture. Today, the company is reaping the rewards of that investment, while also benefiting from a society that increasingly eschews cash in favor of plastic.

Ponder a few numbers: MasterCard's network now processes more than 30,000 transactions every minute of every day. In fact, the company's transaction volume now exceeds 25 percent of the more than \$5 trillion in worldwide credit card and debit card spending.

Red Gillen, an analyst with New York-based research and consulting firm Celent, has stated that MasterCard occupies one "of the sweetest spots in banking imaginable." Financial services holding firm Raymond James Financial, with headquarters in St. Petersburg, Fla., predicts that MasterCard will continue to grow by more than 25 percent over the next several years.

To ensure that the IT operation keeps pace with business growth, Reeg is intent on building the most robust and agile IT environment possible. "It's an environment where you really don't know what that next innovation is going to look like or what the next technology or consumer trend is going to be," he says. "You don't know how payments will evolve and what specific form they will take. So it's important to build a scalable and highly flexible IT environment. Our objective is to make sure we've enabled our processing platform before the business need occurs."

So far, Reeg has done a solid job of ensuring that MasterCard is in the vanguard of IT. He was instrumental in reworking and rewriting the company's IT systems five years ago in order to approach the marketplace in a more agnostic way.

The network operates under a bandwidth-on-demand model that's designed to handle any volume thrown its way. Even so, Reeg recognizes the urgency of tweaking, adapting and improving the network—and a variety of other IT processes—on an ongoing basis.

"The primary objective is to enable payment processing from anywhere in the world," he explains. "The goal is to continue to build out the technology platform that supports the global consumer and business environment. Today, we are seeing a [seismic] shift toward electronic payments and transactions."

One of MasterCard's biggest consumer-facing IT initiatives has been the rollout of PayPass, a system that uses embedded RFID chips in credit and debit cards to provide contactless payment solutions. This is a particularly attractive option for convenience stores, movie theaters, gas stations, sporting events, drug stores and other purchase points where fast transaction processing is paramount.

This system benefits consumers by reducing the lines of people waiting to pay for their purchases, and it helps merchants reduce the number of labor-intensive cash transactions. During the first quarter of 2008, more than 28 million PayPass cards and devices were in use, according to MasterCard, and more than 109,000 merchants in 24 countries have adopted the system.

Another key initiative has been the April launch of a new debit-processing platform, MasterCard Integrated Processing Solutions (IPS). The platform offers financial institutions a processing solution that works across multiple banking channels and systems. It allows next-generation ATM networks to integrate with other market channels, enabling banks to promote products, better manage transactions, conduct marketing and promotions, and collect data about cardholder preferences. The system—which is designed to work across countries and continents—also offers more-flexible reporting and analytics without the need to hard-code data.

Mobile commerce has emerged as another area of intense focus. With more than 3 billion handsets in use worldwide, the foundation for future m-commerce capabilities is squarely in place, and Reeg recognizes that person-to-person payments and mobile commerce are inevitable. According to Portio Research, an independent United Kingdom-based research company, the m-commerce market will reach \$86.6 billion by 2011.

MasterCard has already adapted PayPass to work with

“We decided to be far more open about the ability to accept transactions in a format defined by the ISO [International Organization for Standardization], so that anyone could connect to our systems,” he explains. That initiative sent ripples throughout MasterCard and beyond. It shaped the way the company approached software development and guided IT along a path of developing systems that “put intelligence at the edge of the network.”

Instead of simply routing transactions directly into central processing facilities, MasterCard has built a hub-and-spoke IT environment that directs transactions to the point at which they can be processed most efficiently. This rules-based architecture, which uses both mainframes and PC-based servers (along with proprietary software), monitors performance in real time, thereby avoiding slowdowns and other network bottlenecks, while steering clear of local bandwidth limitations and fluctuations. “This best-of-breed approach gives us the best of both worlds,” Reeg points out.

MasterCard was the first card issuer to implement VPN technology, which it still uses widely. However, Reeg is now

and consolidation strategy. In 2003, the company began deploying VMware in the data center and across its network. “We’ve been able to shut down a lot of inactive computers and become more green,” Reeg says. Virtualization has also helped reduce administrative complexity and trim energy costs.

The flexibility of the IT environment allows managers and business analysts to build data marts quickly and make all the information accessible through a client-server architecture on the front end of the business. Such flexibility and agility are essential, Reeg notes.

MasterCard analysts can examine current trends, patterns and changes at any given moment, enabling the company to adapt quickly to changing business conditions. It also continues to develop more advanced scoring models, algorithms and real-time risk products by putting its data to work in new and sophisticated ways.

LEADING THE CHARGE

Despite its success, MasterCard faces some business and IT challenges. For one thing, it faces stiff competition from Visa International, the world’s largest issuer of credit cards, which went public with an initial public stock offering in February 2008. That milestone instantly moved MasterCard into the second spot among publicly traded card and payment processors. (MasterCard went public in May 2006.)

The firm also has faced legal challenges from rival American Express over alleged monopolistic practices. In addition, it must cope with potential regulation in Europe, where officials have clamored to cut the company’s

commissions on transactions.

However, Reeg believes that the biggest roadblock to future success is the shortage of IT talent and the growing difficulty of filling certain positions. On the upside, “MasterCard is a global organization, and we are able to leverage IT talent all around the world,” he observes. “But there’s no question that the goal of landing top IT talent is becoming tougher every year. We also see fewer and fewer minorities and women filling technology-related positions—a trend that cannot continue indefinitely.”

Nevertheless, MasterCard is charging forward and redefining the future of payments, transactions and interactions. Reeg knows that it’s essential to build out and maintain an IT framework that allows the company to stay ahead of its competitors, including Visa, American Express and Discover. More importantly, MasterCard must ready itself for ongoing change and the whims of a fast-moving marketplace.

“The industry is undergoing a remarkable transition,” Reeg concludes, “and it’s up to us to use IT to take advantage of this opportunity.” ◀



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The world is changing quickly, and technology is at the core of successful business practices.

steering the company toward the next generations of secure transaction processing by turning to Multiprotocol Label Switching. He expects the technology to simplify data center management by reducing the number of physical hubs the firm operates—all while incorporating more sophisticated risk-scoring algorithms. At the same time, Reeg is embracing a service-oriented architecture to simplify the management of software assets and build a more agile IT environment.

The firm’s 25,000-square-foot global technology operations center, located in O’Fallon, Mo., is a model for state-of-the-art systems, including several z/OS IBM mainframes and hundreds of IBM AIX, Sun Solaris and Microsoft Windows servers. The data center currently holds more than 100 terabytes of data, using both Oracle and IBM DB2 databases, with more than 1.8 petabytes available overall.

MasterCard uses IBM Tivoli systems management software, along with applications from BMC, CA and EMC to manage the environment. It also relies on network-attached storage and storage area networks—as well as virtual tape devices from EMC, Hitachi Data Systems and others—to provide business continuity and disaster recovery.

Not surprisingly, the enormous size of the data center, along with the growing demand for processing power, has prompted MasterCard to aggressively pursue a virtualization