When Terabytes Rule:

The Future of Data Management and Storage for SMBs

By Anne Rawland Gabriel

Photographs by Diana Watters

As anyone who uses a computer no doubt knows, the Terabyte Age is closing in—and for some people it's already here. ■ If your company is like most small or mid-sized businesses (SMBs), your network servers probably contain multi-gigabyte hard drives (called direct attached storage, or DAS) and you could well be paying someone to back up each server, individually, onto a dedicated tape drive. But the closer you come to the big terabyte (TB, shorthand for 1,000 gigabytes), the more serious the hidden costs.

For example, the ubiquitous system patches, security fixes, and application upgrades are increasingly labor-intensive, says Don Himsl, IT director for CNS Inc., the Eden Prairie-based developer of Breathe Right nasal strips and other consumer health products. "You must be able to back out when a fix doesn't work properly," he notes. "Since restoring from tape can take hours, even the simplest upgrade can take all weekend."

Even routine accidents, such as deleting a report, may be eroding your bottom line. "Let's say I have 40 incremental backup tapes," says Darin Troftgruben, systems administrator for JH Larson Co., a Plymouth-based parts distributor. "Pieces of a document could be distributed across tapes four,

11, 19, 24, 32, and 38. Not only could I spend all day retrieving one document, if tapes one through 20 are being stored off-site I have to go get them first."

And, the consequences of antiquated or insufficient data practices are real. According to the Bureau of Labor Statistics, 93 percent of companies that experience a significant data loss are gone within five years.

ENTER THE SAN

Enterprises solved such dilemmas in the mid-1990s with the introduction of Storage Area Networks (SANs). Essentially, SANs are real-time backup networks that actively store and recover massive quantities of information as efficiently as opening a spreadsheet on your desktop.

Functionally, SANs pool storage resources to minimize waste. "For example, you might have an e-mail server that's using 20 percent of available storage, a customer database server that's using 50 percent, and a business application server that's maxed out," says David Payne, chief technologist for Bloomington-based system integrator Xcedex. "The full server can't borrow from the others, so even a small software patch could mean buying an entire hard drive. With a SAN, all three servers share a single device, driving up overall utilization to 80-90 percent. Plus, you purchase storage hardware as it's required, instead of estimating your ultimate needs up front."

In addition, SANs improve performance by liberating LANs to concentrate on processing chores. "By splitting the processor and storage functions, we maximize both," says Himsl.

Not surprisingly, SANs also free up human resources. "Before getting a SAN, I shuffled resources throughout the day to keep something simple like a print job from bringing us down," says Carla Hedding, manager of network administration for Wolf Etter and Co., a Mankato-based accounting firm. "Now, it's days before I check system resources because we're moving around in a big bathtub instead of juggling lots of buckets."

As a result, the 100-employee CPA firm gains a day of Hedding's expertise every week. "Even during tax season I can devote time to other projects," says Hedding, a one-woman IT department responsible for "anything that plugs in" at her company's three locations.

SANS FOR SMBS

Both CNS and Wolf Etter deployed their SANs within the past year as technology advances brought the systems within reach. "A confluence of factors, including hardware interoperability, ease of use, and price, are creating SMB-appropriate SANs," says Bob Fine, product manager for Compellent, an Eden Prairie-based SAN provider. "And we see these trends accelerating."

While some equipment manufacturers are simply rebranding their enterprise products, others are changing course. "We're unlearning a lot of things, says Rob Davis, vice president of advanced technology at Qlogic, an Eden Prairie-based storage backbone developer. "For enterprise systems, our engineer's mindset was performance. For SMBs, it's simplicity and cost."
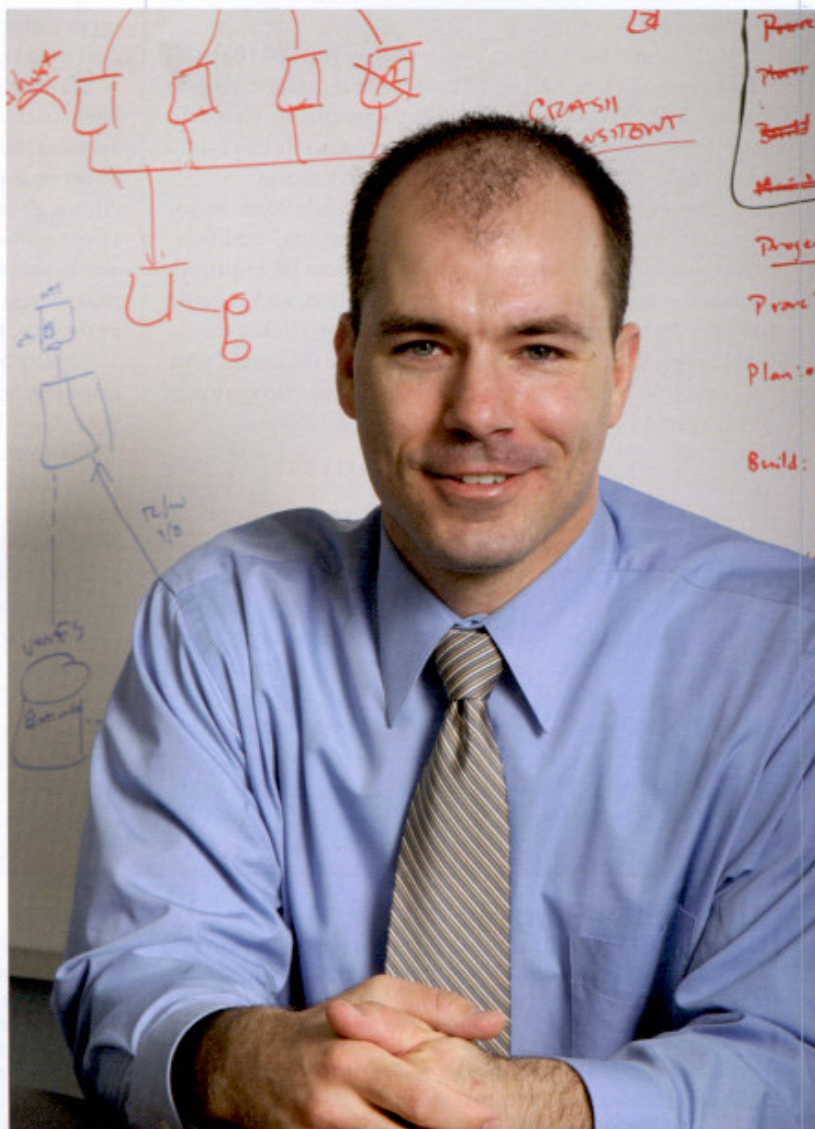
David Payne, chief technologist, Xcedex

POINTS TO PONDER

Regardless of vendor, beware of hidden speed or capacity penalties when mixing and matching storage devices. For example, some offerings marketed to SMBs can limit device capacity to the lowest common denominator. That can be a deal-breaker because SMBs must typically redeploy existing hardware to reap sufficient rewards.

Key software features to watch for include booting from SAN and so-called "snapshots." Booting your entire system from a SAN centralizes software installation and manage-

ment, allowing deployments and recoveries to occur while you conduct business as usual. Snapshots permit rolling back to a previous configuration, reducing restores to minutes instead of hours or days.

And, expect the learning curve to be tight. "SMBs can't afford to send their staffers to two-week training classes to become SAN experts," emphasizes Compellent's Fine. "To get the necessary return, data management tools can't only be robust and affordable. They must be easy to use."

If there's a SAN downside, it's cost. While some major players have introduced sub-$15,000 "starter kits," additional hardware and software components may be required. Depending on the complexity of your situation, a SAN could run into six figures. But don't get stopped by sticker shock. SAN users stress efficiency gains can balance the costs. "Our SAN's software capabilities made it almost like we were getting the hardware for free," says Himsl of CNS.

EXPLORING THE ALTERNATIVES

Although ideal for many, SANs aren't your only option. One alternative: Web-based service providers, which offer backup and off-site storage rolled into one. A reasonable solution for data minimalists, 2GB of Web-based data storage runs about $15 per month. Drawbacks include potentially poochy restores and data lock-out if either your PC or Internet connection is down.

Outsourcing to a local managed storage provider can reduce equipment and staff expense. But for the price, you'll want to consider either Network Attached Storage (NAS) or a data protection appliance. Just as it name implies, a NAS device attaches to your network rather than directly to a server. Beefy hard drives with modest brains, NAS devices provide file sharing and backup to all network users. Their disadvantages include limited or nonexistent data management and backup software. Also, true data security requires backing up each NAS unit to tape. And, expanding businesses may outgrow NAS before recouping their costs. Still, NAS has its place with 250 GB starter models for five to 10 users currently running $500 to $750. At a couple dozen users, you could step up to a mid-range NAS unit. But for the price, consider the new breed of all-in-one data protection appliances.

Developed specifically for SMBs, the appliances are intelligent backup and security devices with integrated data management tools. Capable of handling dozens of users and about 25 servers, appliance capacities range up to several terabytes. Although an appliance manages tape archiving, some human effort and additional hardware are involved. Appliances are also less sophisticated and scalable than SANs, but they are the next closest choice. Plus, they essentially plug and play out of the box, starting at $1,500 for 240 GB.

"Many SMBs don't have the staffing or infrastructure resources to devote to complex data protection solutions," notes Gary Doan, CEO of Intradyn, an Eagan-based backup appliance pioneer. "An all-in-one appliance provides an efficient, cost-effective solution that doesn't take any IT experience to use." (For more on appliances, see "JH Larson Plugs In," below.)

Depending on your time horizon, some technology leaps may affect which solutions you choose. For disk drives, an industry-wide downsizing began when Seagate recently shipped the first 10,000 rpm "enterprise class" 2.5-inch drive. "Compared to traditional 3.5-inch technology, 2.5-inch significantly reduces space, heat, and power demands—important shifts for developing affordable SMB products," says Randy Lee, the company's senior vice president of global sales.

JH Larson Plugs In

Take 20 servers powering 130 computers, spread them across seven locations in three states, add a small headquarters IT staff and what do you get? A 200-employee business with a data storage problem.

"None of our branches were backing up their documents or e-mails because tape-based systems are very tedious and too difficult to manage remotely," says Darin Troftgruben, systems administrator for JH Larson Co. of Plymouth. "We knew it was just luck that nothing mission-critical had ever been lost."

Larson's situation is disturbingly common. Some say up to half of SMBs lack appropriate data storage strategies.

So, the regional parts distributor began searching for a solution, starting with SANs (storage area networks). "But, we kept getting stuck at the per-PC cost of site licenses," says Troftgruben.

Then Troftgruben found Intradyn's RocketVault, an all-in-one, plug-and-play data protection appliance.

Starting at $1,500 for 240 GB, RocketVault backs up an unlimited number of servers and workstations. In Larson's case, each branch needed a 240 GB unit with a 2.4 TB unit at HQ.

After a one-time setup is completed, RocketVault churns through backups unattended. Then, to ensure off-site storage, the appliance replicates backups to another unit, or a server. And on a user-defined basis, say, quarterly, RocketVault automatically encrypts information and readies it for archiving to tape.

RocketVault's data-moving capability also achieves other efficiencies, notes Troftgruben. "When there's a 20 MB software update, RocketVault can transmit it to all locations," he says. "This means I don't have to spend weekends updating each branch anymore."

For routine restores, a "snapshot" feature returns systems to a previous configuration, permitting quick undos. Disaster-related tape restores can require some human assistance, but RocketVault's software manages the process.

"While speed is important, the biggest plus is that RocketVault is easy," says Troftgruben. "All our data can be protected without hiring new employees or adding responsibilities to existing staff. And, there's virtually no training because no IT expertise is required." —A.R.G.

The coming year will usher in a much-heralded switch from longitudinal to perpendicular recording on hard drives. Like standing dominos on end instead of laying them side-by-side, perpendicular recording will push areal densities to 1 Tbsi (terabits per square inch) over the next five years. Longitudinal recording is now in the 100-200 Gbpsi range. According to Seagate, upon reaching 1 Tbsi, new technologies will take over and could eventually extend areal densities to 50 Tbpsi. In layman's terms, all of that means a lot more room for storage.

Finally, via SAN, NAS, DAS, or appliance, the ultimate archive will continue to be tape. "Automated tape jukeboxes are eliminating the process of feeding tapes by hand," says Saurin Shah, executive director of R&D at Oakdale-based Imation. "We expect cartridge capacity to reach 1 TB within the next two to three years. By then, tape drives will process data at 80-100 Mbps (megabytes per second)—almost twice today's top speed."

Most of these milestones, along with advances in the backbone world of adaptors, routers, and switches, will be introduced at the enterprise level. "But remember, everything trickles down to the SMBs," says QLogic's Davis.

Meanwhile, software improvements will permit Lone Ranger IT shops to round up herds of terabytes and corral them anywhere. "For instance, 100 TB of customer ordering trends could be stored where it's cheap, like North Dakota," says Compellent's Fine. "But it'll be as transparent to users as if it's somewhere onsite."

Bob Fine, product manager, Compellent

MORE DATA, LESS MONEY

Of course, networks aren't the only place where SMBs store stuff. Count on removable media to provide more for less. Users can already jam presentations with eye-popping stills and full-motion demos using Seagate's 1-inch camera and video disk drives to store 6 GB of high-definition images and sound. Miniature drive technology is also spawning a 6 GB "pocket hard drive" that's only 3 inches in diameter, including its retractable USB cord. Look for perpendicular recording to increase mini drive capacities to around 10 GB.

Predictably, flash and optical media are also evolving. "In two years you'll see USB flash drives with 16-20 GB of storage, versus today's 2-4 GB," says Imation's Shah. "Blu-ray technology [an optical disc format] will create high-definition DVDs, or HD-DVDs, with about 25 GB per disc."

As for CDs and DVDs, new archival-quality discs will resist scratching and retain data for decades—whether banished to a damp basement or tossed onto a sun-scorched dashboard. While that may seem like overkill, Himsl says no. "It's common for our sales presentations to be 500 MB," he notes. "It wouldn't surprise me to see presentations top 1 GB within six months."

HOW DO I DECIDE?

If your head's now spinning faster than a next-generation disc, you're not alone. "It's hard to sift through all the offerings," says Xcedex's Payne. "In our experience, the biggest inhibitor to implementing beneficial new technologies isn't money, it's education."

That said, you don't necessarily have to become a storage savant. "Go to your IT partner and say, 'Here are our needs and our budget,'" Payne adds. "Let them sort through the options and present you with two or three that could fit."

A good systems integrator will know the score, echoes Compellent's Fine. "Their whole job is to investigate and implement innovations," he says. "Trust them to help you navigate the process." ∎

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