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The Virtually Survivable Business

By Mike Healey

If you have server virtualization in place, you have a powerful disaster-recovery tool at your fingertips

ALTHOUGH THE ABILITY to leverage virtualized servers for disaster recovery has always been a core part of enterprise virtualization platforms, until recently it was relegated to the, "oh, by the way" section of most vendors' feature lists in favor of sexier benefits such as reducing server sprawl, cutting capital costs, and, of course, the ever-present green effect. To be clear, we're talking disaster with a capital D—fire, flood, or pestilence, not operational recovery from user error or file deletion. Most of us have daily data protection plans in place. Few have the mandates, funds, and spunky SAS 70 auditors to make sure our disaster-recovery (DR) strategies involve more than leftover hardware, sketchy testing, and a stale run book.

Now, better DR through virtualization has moved front and center. We're seeing specialized offerings from established players, like VMware's Site Recovery Manager. Citrix XenServer Enterprise and Platinum include Live Migration, and our tests of Microsoft Hyper-V show that, given sufficient memory, cutting a virtual machine over to new hardware is relatively painless. Other vendors have launched products or retooled existing applications with an eye to catching the virtualized DR wave. Novell's PlateSpin Forge and DoubleTake Software's eponymous offering are examples.

What wave, you say? A review of our 50 most recent virtualization projects found that nearly 90% of clients that have virtualized their main systems have rolled some level of the technology into their DR plans.

One interesting trend: folks who virtualize their disaster-recovery environments but not their primary networks. Virtualization enthusiasts may scoff, but this

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makes sense on a few levels. It's much less expensive than building a standard DR site. It's a great way to introduce virtualization and build up internal skills without affecting the production network. And it skirts the pesky issue of vendors that don't officially support virtualized versions of their applications.

A midsize private school in Rhode Island took this route. After a disaster befell the institution, IT opted to fill a hole in its DR plan using a virtualization appliance rather than virtualizing the production network. The creator of an accounting application critical to the school doesn't (yet) support running the app in a virtualized environment. We proved that the software would run in a VM and set it up at the DR site. When the vendor eventually adds VM support, the school is a step ahead.

For organizations that already have virtualized their servers, the challenge is deciding on the size of the DR site configuration and setting a failover level. If you've just implemented virtualization, you've likely got a bit of a budget windfall (which will disappear quickly once the CFO figures out what's going on) and some unused but perfectly functional gear. So if your production environment is 275 virtual servers running on 30 physical hosts with 10 TB of data on a SAN, do you need the same capacity for your DR site? Or can you whittle down to fewer servers to save money?

How do you decide? You don't. This is one place IT must get business leaders involved. Push the DR plan back to the CEO and COO for clarification on anticipated usage. That will be a major factor in decisions on bandwidth, host servers, and storage configuration.

Any disaster-recovery plan needs to define mission-critical access parameters. A manufacturing or construction company that relies on IT systems for back-office support may opt to build the DR site to support half the normal usage and workload, giving priority to department heads or critical apps. If you run customer-facing, mission-critical data on your systems, you're going to want matching configuration and associated bandwidth.

What happens if you undersize your DR site? A major benefit of virtualization and SAN usage is the ability to quickly expand the supporting hardware infrastructure. Let's say you have a 10-node host server cluster at the home office. Your DR site holds five servers that would support the main office in the event of a disaster. Your plan can include a provision that if a failover lasts for more than 48 hours, you would add host servers to improve performance and spread the load.

THE IMPOSSIBLE BECOMES POSSIBLE

It doesn't matter if your platform is from Citrix, Microsoft, Sun Microsystems, VMware, or Joe's open source emporium—if you have server virtualization, you've got the basic elements of a cost-effective disaster-recovery plan. Separating physical hardware from logical servers

Impact Assessment: Virtualized Disaster Recovery

	Benefit	Risk
IT organization	Virtualization as a core part of your disaster-recovery strategy opens up new data protection possibilities while maximizing your investment in the technology.	Don't get complacent. Ensure that you tightly manage VM migration and creation, don't neglect DR drills, and don't skimp on bandwidth between sites.
Business organization	Virtualization helps IT create a more robust and flexible DR plan, at a lower cost than traditional alternatives, minimizing fears of unplanned outages.	Minimal risk, especially if you're already on the virtualization path. The main threat is depending on a DR site that's underpowered in terms of server horsepower and bandwidth.
Business competitiveness	By fully leveraging the investment in virtualization and designating existing remote offices as DR sites, the enterprise frees up resources for other, more bottom-line-focused, initiatives.	If IT misses a core legacy or nonvirtualizable system, the business could incur a significant productivity hit. There's no substitute for a complete inventory of assets.

Bottom Line

Virtualization is a great way to implement comprehensive disaster recovery at a significantly reduced cost. However, as with any DR strategy, if you don't commit the resources to plan and test properly, and for staff training, you could face a nasty surprise during a real disaster.

and applications means those ultimate objects of CIO desire, namely tight recovery point objectives (RPOs) and recovery time objectives (RTOs), are finally attainable, and without gutting the budget. Digging in and defining RPOs and RTOs for every major piece of data within your organization will set the stage for your overall DR plan as well as daily backup, replication, and archiving operations. Get consensus on what objectives make sense based on estimated costs of lost time and data. Not only will this exercise sharpen the focus on DR planning, it helps justify the expenditure.

Next, you need a data replication/backup plan that integrates with your virtualized environment. Virtualization is about servers and applications, not specific data. If you've done server virtualization but don't have a SAN, you're missing out on some of the built-in replication and snapshot features that will help flesh out your strategy. Finally, make sure your current backup or continuous data protection software supports virtualization backup, data replication, and remote restores. Major vendors, including CA, Symantec, and Tivoli, have expanded or retooled their product lines to provide better functionality for virtual data protection.

JUST DO IT

Typically, virtualized disaster-recovery environments fall into four categories: cold standby, remote site, hot site, and nonvirtualized office.

Cold standby is the most popular. Saving raw data to tapes and shipping them off-site is simple and is an easy check box on the "in case the building blows up" checklist. Don't stop there, though—if there were a disaster, you'd have to rebuild your infrastructure, restore data, and get everything back online. So rather than saving just data, backup tapes should now include relevant virtual machines. Typically, we see clients take copies of their base virtualized servers, set them up at the DR site, then power down. Changes to databases and data volumes are either replicated or transferred to the site. Failover would involve booting the virtual servers and restoring relevant data from tape or disk.

A midsize distributor in the Northeast made good use of the spare equipment that came as a result of its virtualization project by building cold standby servers. Rather than simply changing tapes, the company set up a smaller version of its entire network, using servers freed up by virtualizing. The gear was configured, loaded with the company's core VMs, then shut down and shipped off-site. Data tapes are still rotated on a regular basis, but the company has added a "refresh" plan for updating server images on a biannual basis. It already had the base servers, so costs were limited to additional memory, configuration effort, and licensing.

Many companies are looking at remote offices as "found" DR sites that make the most of existing infrastructure and telco costs. For example, a New York investment firm we worked with retooled its DR plan based on its virtualization and storage project, which

No Virtualizing Without A License

SAFETY ISN'T FREE. Don't assume you're covered with your licensing when you add a failover host or server. In fact, licensing rules vary widely by vendor, so we asked a specialist, Rob O'Shaughnessy, manager of software licensing at GreenPages, for the lowdown on what an organization needs for a disaster-recovery site.

VMware specifies that if you're using a primary and recovery site, you'll need to be licensed for Virtual Center Manager Server at both locations. You'll also need VMware Infrastructure licenses for any server hosting VMware ESX—whether it's running or powered down.

If you're also using the Site Recovery Manager, you'll need licenses for any direction you have failover. For example, if you're configured to fail over in a single direction only, you need Site Recovery licenses for the primary site. If configured for bidirectional failover, you need to license hosts at both sites.

Citrix Xen has the same rules as VMware around licensing hosts, hot or cold. One difference: Citrix licenses per server, regardless of CPUs, whereas VMware licenses are per CPU.

With Microsoft, not surprisingly, the picture gets a bit fuzzy. If you don't have Microsoft Software Assurance, you need licenses for every server you have running, even cold servers. However, if your organization has purchased Software Assurance, one benefit is complimentary cold backup server licenses for purposes of disaster recovery. Servers must be turned off and used only in the event of a disaster. This applies to all Microsoft products, but it requires that you carry Software Assurance on the OS, application, and those pesky CALs, which can kill a budget surplus faster than a bipartisan vote.

As you move up the application stack, things get trickier. For example, you can have an Oracle Enterprise server license running on a failover server, but only if it accesses the same databases as the production server and is never on for more than 10 days—we kid you not.

As part of a DR plan, we highly recommend compiling a full software list and reviewing it with licensing vendors to ensure that you're compliant and not paying for licenses you don't need. **—MIKE HEALEY**

employed CA's XO Soft replication app in the VMware environment for servers and replicated core data using an EqualLogic SAN array. The result?

"We were able to create a complete failover configuration without having to move toward a hosted site," says the firm's IT director. "This included replicating all core data and building redundancy into our Domino mail system."

DIG DEEPER

VIRTUAL STANDSTILL Don't drive too far into server virtualization without considering its impact on your storage infrastructure. Download this *InformationWeek* Report at:

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One concern if you're pursuing this strategy is bandwidth. The financial firm has a 100-Mbps link between offices that are open only during normal business hours. This gives IT plenty of time for replication and updates. If you've got a small pipe between sites, don't expect to replicate gigabytes of data overnight. In theory, a clean T1 can push 550 MB to 650 MB per hour, but that's best case and leaves scant room for error when moving differential data of 40 GB or more a night.

Hot sites generally are maintained only by publicly traded companies, especially financial firms, and those who are truly paranoid and flush with cash. Determining capacity of a hot DR site ties back to RPO and RTO mandates. If your recovery point is zero data loss and recovery time is less than 10 minutes, you're looking at a major investment at all levels, including bandwidth (fiber is a must) and replication (specialized failover, plus data replication, plus database and mail-specific specialty apps). At this level, we're seeing a strong interest in VMware's Site Recovery Manager. Introduced late last year, SRM essentially scripts the entire process you'd go through when failing over a site. It's not a replication system—you'd still need to use your SAN's replication utility or a third-party product like CA's XO Soft or Double-Take. But SRM takes over whenever there's a major outage, essentially managing the cutover of your servers between locations. The system even has a neat feature to print out a DR run book outlining your plan—auditors love that stuff.

There are a few gotchas: virtualized VMware servers only, of course, plus there's currently no support for replication of raw data LUNs on a SAN.

START SMALL

For organizations that aren't virtualized yet but want to use virtualization technology for DR, several vendors offer appliances that leverage virtualization and inexpensive storage to build out a cost-effective DR system. One example is PlateSpin's Forge product, which has grown in popularity as an appliance alternative to building a mirrored (or smaller version) of your production environment. The system is built on VMware's virtualization engine and leverages PlateSpin's conversion and recovery software. Replication is configured based on bandwidth and desired recovery windows. The boxes come in two sizes with the ability to support 10 or 25 servers. The $50,000 price for the 25-server edition seems steep, but not when you consider that it comes with 2.5 TB of storage and 16 GB of RAM, includes all virtualization licensing, and supports virtualized and nonvirtualized boxes. Nonvirtualized servers must be configured with PlateSpin's converter and will require some tweaking of images and settings.

A few caveats: At press time, the devices supported Windows servers only. However, given PlateSpin's recent acquisition by Novell, we expect Linux support in short order, maybe even a physical-to-virtual utility for NetWare servers. In addition, your investment doesn't buy bandwidth enhancements or speed improvements versus replication between servers, and finally, PlateSpin doesn't address all SAN storage or database replication. Zenith Infotech offers a similar appliance, built on Sun virtualization technology, with similar OS and SAN support limitations.

MAKE YOUR CASE

Money talks, so we ran some numbers comparing the cost to set up virtualized and standard DR sites for a network with 30 servers and 4 TB of storage capacity, assuming the main production network isn't virtualized. The lion's share of savings comes from server hardware. In a standard setup, mirrored configuration of the main facility, requiring like-for-like hardware, would run $150,000. In a virtual scenario, we'd use larger servers with additional memory and processors. Target consolidation is 10-to-1 at a cost of $30,000, for a net savings of $120,000. We tallied software licensing costs at $100,000 for the standard site and $120,000 for the virtualized site, to account for core licenses plus virtualization and associated backup software. Storage capacity is a wash. We assumed standard site engineering at $40,000, then doubled that for the virtualized site to account for the additional work required to perform physical-to-virtual conversions and create an update plan. Even without the long-term utility and other savings represented by maintaining fewer physical servers, in our example scenario we find the virtual setup costs $60,000 less than the standard site.

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