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Hot techs for 2011!

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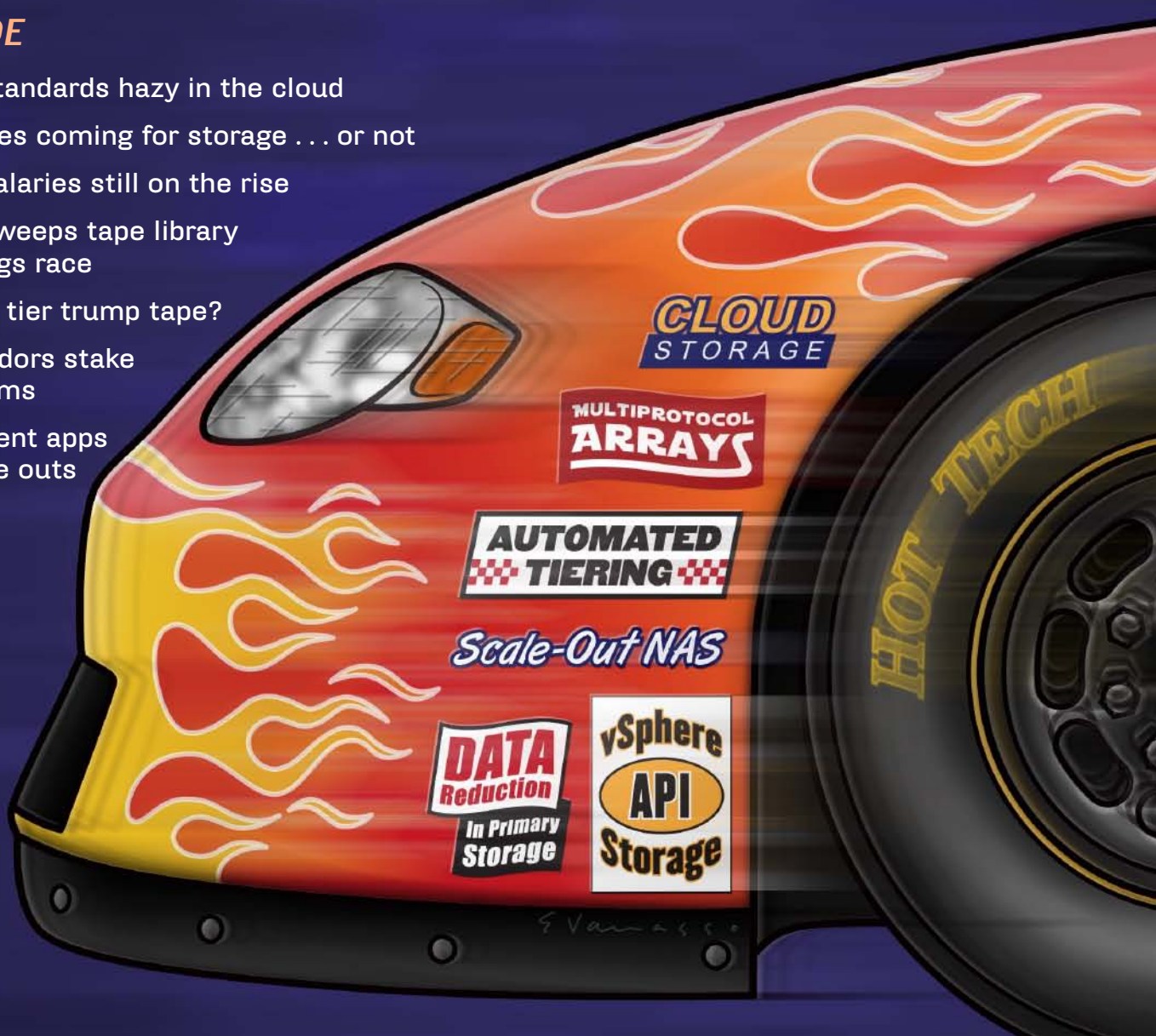

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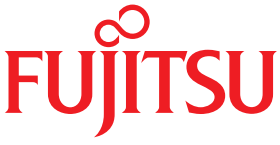

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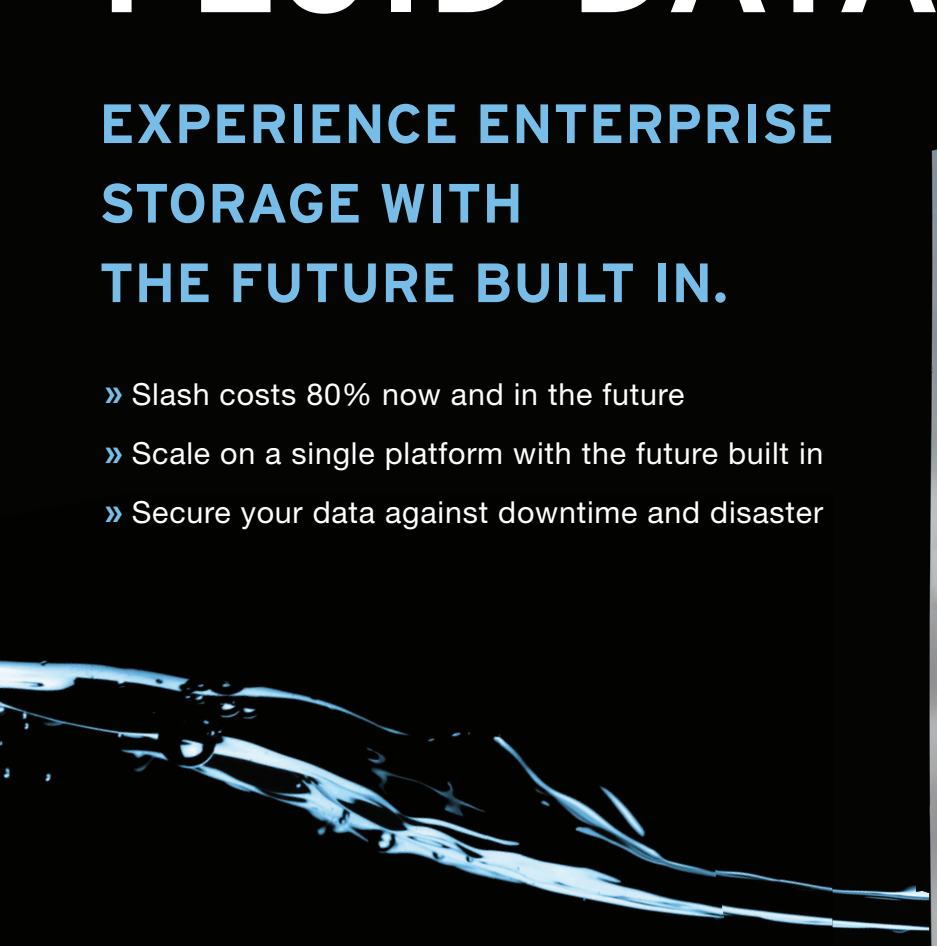

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Storage standards still hazy in the cloud

The standards being batted around that would make cloud storage more usable and attractive to enterprises could also have a profound effect on in-house storage systems.

MANY PEOPLE are pinning their hopes on the promise of cloud storage. And with all the hype it's getting, you would think cloud storage is the remedy for everything that's not quite right in the storage shop. Limitless capacity, on-demand service and ubiquity—all without having to tap into capital budgets for things like hardware or software.

But not so fast; cloud storage vendors first have to figure out how to actually make all those dreams come true. Plenty of them are working at it and have made a lot of progress, but few if any are "all there" yet.

Turning storage into a utility is pretty complicated stuff on a number of fronts, and reheating older technologies like grids and clusters won't completely cut it. We may also need to redefine what we mean by "utility." Our most familiar utilities—electric, water, natural gas—are all one-way streets where we take what we need, when we need it. There's no extended risk on the user's part, and the only concern is whether the service is available when needed.

Turning storage into a utility is pretty complicated stuff on a number of fronts, and reheating older technologies like grids and clusters won't completely cut it.

With cloud storage you have the same concerns about service availability and also take from the service, but you have to put something of your own (like your data) out there. You don't have to worry about things like interfaces to use your electric utility's services; you just plug in and turn on. For cloud storage, the interface isn't so simple because you still have to deal with proprietary "plugs" and "switches." The software (and maybe hardware) you'll need to hook up with a particular cloud storage service isn't likely to work with another cloud service because there aren't adequate standards to define what that interface should look like and how it should act. So if you think you can skip from cloud to cloud and take your data with you, think again.

Of course, a standard set of interfaces is very doable, but I wonder if it will ever get done. I imagine most storage vendors think it's a good idea to

get on the cloud storage standards bandwagon (it looks a lot better to be on it than off), but is standardization truly in their best interests?

But if the interface issue is solved for cloud storage there's no reason why those standard interfaces couldn't be applied to in-house storage systems. Interoperability could go from being a major roadblock to a problem solved. And just as with the cloud, the hardware behind it all (at least whose hardware it is) will be much less important. Data storage becomes more of a software practice, while the hardware behind the code becomes more of a commodity.

Solve the cloud, solve most other storage issues. That sounds great for users who wouldn't have to continue to pay premium prices for what's essentially off-the-shelf hardware in most cases. But it's not so great for vendors.

As with all standards-related matters, vendors have to walk a narrow line between promoting the technology and retaining some unique qualities that make their version more desirable than others. The Storage Networking Industry Association (SNIA) is doing its best to help draw that line and guide its members along.

SNIA's working on several fronts with what it calls its Cloud Storage Initiative. Some of it sounds like standards, but other parts sound more like marketing. On its site, SNIA says the mission of its Cloud Backup and Recovery Special Interest Group (Cloud BUR SIG) is "to further the Cloud BUR industry by educating the marketplace and driving demand for Cloud BUR solutions and services." Maybe they should call it the Cloud BUR *Self* Interest Group.

If the interface issue is solved for cloud storage there's no reason why those standard interfaces couldn't be applied to in-house storage systems.

SNIA often seems to fall back on the "educate the market" thing for its initiatives, but there does seem to be some bona fide standards work going on. SNIA says its Cloud Data Management Interface project will define "the functional interface that applications will use to create, retrieve, update and delete data elements from the Cloud." It's a Web services-like arrangement, with a lingua franca that will let users discover services and manage the data they send to them.

Sounds promising, but don't hold your breath. SNIA's standards might be great, but how well and how completely its members hew to the standards is the iffy part. But storage vendors may feel pressure from shops reluctant to park their data in the cloud until they get the mobility, manageability and standardization the cloud promises. It could completely change storage as we know it now.

Rich Castagna (rcastagna@storagemagazine.com) is editorial director of the Storage Media Group.

* Click here for a sneak peek at what's coming up in the January 2011 issue.

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Bracing for change in storage . . . or maybe not

Despite recent acquisitions and rumors of mega-mergers, don't expect the storage landscape to change all that much over the next few years.

AFTER MANY YEARS of meeting with IT professionals and storage vendors, presenting at seminars and trade shows, and conducting research, it's clear to me that storage is still very confusing for users. It's not the complexity of the technology that's hanging them up, but rather which vendors/products to select for their environments. There's no single leader that's the right choice for everyone.

This is certainly true with storage-area network (SAN) storage, which generates the most vendor revenue and has the most competition. Dell, EMC, Hewlett-Packard, Hitachi Data Systems, IBM, LSI, NetApp and Oracle all have multibillion dollar SAN storage revenue. And there are dozens of other vendors—like Compellent, Nexsan, Pillar and Xiotech—that might be making less today but are still having an impact.

I'm going to stick my neck out and predict that for at least the next five years nothing substantial will change in the SAN storage market. The leaders will continue to battle it out with no major innovations that could shift the landscape significantly. It will be competition based on feature creep year after year. SAN storage systems will continue to get better at optimization with better provisioning, replication, dedupe, compression and intelligent tiering, which is all good stuff but just the natural progression of the technology. Market share may swing from one vendor to another, and while the scales will tip here and there, it won't result in a single leader that can boast a 70% market share. There won't be any kind of big bang event that will change the primary SAN storage game.

The leaders will continue to battle it out with no major innovations that could shift the landscape significantly.

For years it's been rumored that Cisco will buy EMC. That's perhaps the only "conceivable" event that could happen within the next five years that would have a major impact on the industry. But I believe the pairing would be devastating for both companies. Their cultures would clash and Cisco would discover that selling storage is very different than anything else it does. And because EMC has become a very complex and diverse company, with a wide range of solutions that are even further afield from Cisco's core competency, it would

cause even greater difficulties. EMC would lose whatever dominance it has in storage and the backlash would stagger Cisco for many years to come.

There are other areas of storage where there's clear leadership. EMC with Data Domain is the leader in disk-to-disk (D2D) backup storage. While there are other players on the field, none of them has the momentum or success of Data Domain. The only thing that can stop Data Domain is another major shift in the industry: an unforeseen approach to backup that will eclipse them in value and simplicity. But something like that would take years to develop and propagate, so they're safe for at least the next five years.

Primary network-attached storage (NAS) also has a clear leader in NetApp. From a mainstream market perspective they have no real competition in primary NAS. In the last few months I've spoken to more than a dozen companies with petabytes of NetApp NAS, and they believe they have no real alternative. What most people don't talk about is that NAS solutions have proprietary file systems, so as your NAS environment grows more complex, it becomes harder to change platforms.

I believe the bough is about to break in the NAS arena. Storing files for the mainstream market had always been considered a necessary burden and a low priority, a storage application that doesn't require the same level of performance, reliability and scalability as other business applications. But now we're at a point of critical mass when the cost and complexity of managing these systems is making them a priority. Leading NAS systems are proprietary, difficult to manage, complex, and expensive to acquire and maintain, which is becoming an untenable situation.

Another variable is cloud storage, but I don't see any evidence that it will be adopted by more than a small percentage of storage users. If cloud storage is going to be a viable alternative, it will need a market leader to pave the way like EqualLogic did for iSCSI.

The multiple players staking out ground in the primary SAN storage market will continue to roll out their less-than-earthshaking innovations. While the server side of the data center is being reinvented, storage will press on with incremental progress but with no major technological leaps on the horizon. ⊙

Tony Asaro is senior analyst and founder of Voices of IT (www.VoicesofIT.com).

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How to Make Snapshot-Only Backups Work

Growing capacities and server virtualization are putting the squeeze on already beleaguered backup windows. Traditional backup apps are reliable, but are they truly the right way to protect virtual machine data? Maybe it's time to consider a new approach to backup. We describe how snapshot technology is not only a viable alternative, but how it could eventually displace traditional backup operations.

Hybrid Storage Clouds: Getting the Best of Both Worlds?

Enterprise storage managers have hundreds of public cloud storage services to choose from, and also have the option of building their own internal storage clouds. But the real cloud storage enterprise solution may be a combination of both of those worlds — hybrid storage clouds that use on-premises equipment but link to public clouds.

Quality Awards V: NAS Systems

In the final installment of round five of the *Storage* magazine/SearchStorage.com Quality Awards, we poll our readers to assess their satisfaction with the service and reliability of their NAS systems. In past surveys, NetApp has won three of four midrange contests, with HP taking honors once. For enterprise NAS products, four different winners have emerged: Hitachi, BlueArc, NetApp and IBM.

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Hot technologies for 2011

If you don't have at least one of these six hot technologies in your 2011 plans, it might be time to go back to the drawing board.

By Andrew Burton, Rich Castagna, Todd Erickson, Megan Kellett, Sonia Lelii, Dave Raffo and Carol Sliwa

EACH TIME WE present our Hot Technologies special coverage, we're quick to point out how our definition of "hot" may differ from others' interpretations. We think of technologies that are mature enough to be real data center alternatives but have yet to make it into the storage mainstream. So whether you consider yourself an early adopter or an inveterate skeptic, our Hot Technologies list has something for you.

Putting efficiency back into storage management has been a mantra at many companies for the last couple of years, and automated storage tiering is poised to be one of the keystone efficiency technologies as it makes quick work of putting data in its proper place. Similarly, multiprotocol storage arrays can be far more cost effective than those one-trick pony single protocol systems that are beginning to seem oh-so old fashioned.

With annual data growth typically at 50% or higher, most companies should be interested in taming their network-attached storage (NAS) sprawl with the new breed of scale-out NAS systems. And capacity-conscious storage managers will look to data reduction for primary storage for some relief in the coming year.

Virtualized servers have been a boon to the systems side of the house, but a bane for storage managers. With VMware in the lead, hypervisors offer new hooks that will make configuring storage for virtual machines (VMs) and backing them up much easier and more reliable.

A new concept has crept into the storage conscious: Why buy when you can rent what you need when you need it? That's the basis of cloud storage services and, if our research proves right, they're ready to take their place as viable alternatives to more traditional data storage infrastructure alternatives.

1 AUTOMATED STORAGE TIERING

With all the major storage vendors offering it, and solid-state storage fueling its need, the conditions are ripe for automated storage tiering to take off in 2011.

Until now, moving data between storage tiers such as Fibre Channel (FC) and SATA disks has largely been a manual or semi-automatic process. A *Storage* magazine poll done earlier this year revealed that 54% of respondents migrated data by manual or only partially automated means, and only 32% used automation tools.

But IT shops that adopt solid-state drives (SSDs) for their I/O-intensive applications might want to roll out the welcome mat for automated tiering. Given their price, ultra-fast SSDs generally make economic sense only for application workloads with the highest performance requirements.

"The increasing usage of SSDs is going to be a big driver for automated tiering," said Arun Taneja, founder and consulting analyst at Taneja Group in Hopkinton, Mass. "The moment you bring in SSD, the power and the performance of that tier is so high relative to Fibre Channel that good usage of that SSD tier is all dependent on auto tiering."

"It was very difficult to be able to afford enough SSD if you were purely going to use it as a static storage device," noted Mark Peters, a senior analyst

at Milford, Mass.-based Enterprise Strategy Group (ESG). “Now that people will be able to combine tiering with a smaller amount of SSD, I think the two go hand in glove.”

IT shops will find plenty of automated storage tiering options that promise to migrate data to the right place at the right time. Some carry a fee; others are built into storage systems. Product differentiators include the level of granularity at which the data moves between tiers, the degree of automation and the extent to which users can define policies.

“Everyone does it differently,” said John Webster, a senior partner at Broomfield, Colo.-based Evaluator Group Inc. “And

> "Now that people will be able to combine tiering with a smaller amount of SSD, I think the two go hand in glove."
>
> –MARK PETERS, senior analyst, Enterprise Strategy Group

REPORT CARD: GRADING OUR 2010 PREDICTIONS

A — Thin Provisioning
Thin provisioning has gone from good idea to basic storage system feature in just a few years. We thought 2010 would see it take its place in the pantheon of storage array must-haves, so we think we’re spot on in calling this one.

A — 8 Gbps Fibre Channel
We might have tossed ourselves a soft ball with this one, but we’ll take the credit anyway. According to our surveys, 8 Gig currently accounts for approximately 25% of Fibre Channel gear, almost double the number of the previous year. Maybe 16 Gig for 2012?

B — Backup for Virtual Servers
If we were graded on how much one of our hot technologies was talked about over the past year, we’d get an A+ for this one. Most of what we heard was a lot of complaining about what a pain it is to back up virtual machines. But the big news—and maybe a future hot technology—came from VMware with its new APIs that will lighten the load for backup apps.

B — Solid-State Storage
We give ourselves a “B” for the buzz around solid-state storage, even though it didn’t take hold as we thought it would. There’s no doubt that solid state moved beyond the early adopter phase, but it’s way short of pervasive. Don’t let anybody fool you; it’s still all about price.

C+ — Data Deduplication for Primary Storage
This is another technology that scored high on hype but failed to make its mark in the mainstream. Last year we noted that only a handful of vendors were in this game, now—with some notable acquisitions—there are even fewer players. We might still be a little early with this one, but we’re dusting it off and reprising it for 2011.

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there's a lot of variability in the way you buy this."

For instance, Compellent Technologies Inc., which in 2005 pioneered block-level automated tiering, can move data in page sizes of 512 KB, 2 MB or 4 MB, depending on the user's needs. Compellent also touts its integration with features such as thin provisioning, boot from storage-area network (SAN), pointer-based snapshots and remote replication.

In 2009, EMC Corp. began shipping its Fully Automated Storage Tiering (FAST) technology for its high-end Symmetrix V-Max, Clariion midrange systems and Celerra NAS boxes. Symmetrix can move data in sub-megabyte chunks, Clariion does it in 1 GB chunks and Celerra performs this task at the individual file level. EMC's future plans include automated tiering capabilities between arrays, rather than simply within arrays, according to Scott Delandy, a senior product manager at EMC.

Hitachi Data Systems (HDS), which began offering volume-based automated tiering in 2006, recently introduced 42 MB page-based automated tiering (known as Hitachi Dynamic Tiering) for its Virtual Storage Platform (VSP). HDS plans to offer page-based automated tiering for external third-party storage early in 2011.

"Thin provisioning two years ago was seen as sort of a risky thing, and now it's almost a de facto requirement especially in virtualized environments. I think you'll see automated tiering is going to be the same thing, in about the same cycle, over the next two years or so."

–RICHARD VILLARS, vice president, storage systems and executive strategies, IDC

"We're in the early stages," said Richard Villars, vice president, storage systems and executive strategies at IDC in Framingham, Mass. "Thin provisioning two years ago was seen as sort of a risky thing, and now it's almost a de facto requirement especially in virtualized environments. I think you'll see automated tiering is going to be the same thing, in about the same cycle, over the next two years or so."

2 DATA REDUCTION IN PRIMARY STORAGE

Primary storage data reduction is back from our 2010 Hot Technologies list, which means we were a year early in our last predictions. But maybe we weren't so far off as it was a hot topic in 2010 for vendors positioning themselves to deliver the technology. In 2011, we'll see a lot more of

primary data reduction in shipping products.

Primary data reduction has taken one large step toward becoming mainstream by going from a technology provided mainly by startups to one dominated by major vendors. In 2010, Dell Inc. acquired primary data deduplication vendor Ocarina Networks and IBM bought primary compression vendor Storwize Inc. EMC delivered block-level compression for its Clariion midrange storage systems and Hewlett-Packard (HP) Co. said it would expand its StoreOnce dedupe software from backup to primary data beginning with its X9000 scale-out NAS product.

Permabit Technology Corp. struck OEM deals for its embedded deduplication software with NAS vendors BlueArc Corp. and Xiotech Corp. Permabit CEO Tom Cook said more partnerships are coming.

"We're seeing a clear objective from all storage vendors to have data optimization products in the market in 2011. We're seeing equal demand from block-storage vendors and file-based vendors. Momentum is increasing."

–TOM COOK, CEO, Permabit

"We're seeing a clear objective from all storage vendors to have data optimization products in the market in 2011," Cook said. "We're seeing equal demand from block-storage vendors and file-based vendors. Momentum is increasing."

We can expect more product jockeying in early 2011 before primary data reduction becomes common in storage systems. Dell and IBM have yet to embed their new reduction technologies in their storage systems, and HP probably won't deliver StoreOnce on any primary storage before mid-2011. NetApp, which has offered primary dedupe since 2007, is expected to address customer requests for increased volume sizes as well as dedupe across volumes. And Hitachi Data Systems, LSI and smaller storage system vendors have yet to declare their data reduction plans.

There's also still a need for education on the types of reduction, and how they work differently on primary data than they do with backup data. Dedupe and compression yield different results depending on the data they're used on, and can even be used in combination.

"Underneath the covers the technology is quite different," said Brian Garrett, vice president, ESG Lab. "One [compression] reduces the size of the data while the other [deduplication] works over redundant chunks. The effects can be different. Deduplication is great for backup and will give you much better reduction if you're storing the same data over time. Compression does a good job on databases and emails. But some data, like video and audio files, is already compressed, so compression's not going to give you a big bang for the buck."

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Greg Schulz, founder and senior analyst at StorageIO Group in Stillwater, Minn., emphasizes that there's no one-size-fits-all approach to data reduction.

"Vendors like EMC with the Clariion and IBM via its Storwize acquisition are demonstrating that effective data footprint reduction includes using different technologies," he said. "They range from archiving to compression to dedupe, along with thin provisioning, RAID and space-saving snapshots to meet various needs across many tiers of storage."

3 VMWARE APIs FOR STORAGE

The VMware vStorage APIs for Data Protection, successor to the much maligned VMware Consolidated Backup (VCB), have had the backup world buzzing since their release in 2009. "VCB was kind of a mess," said Lauren Whitehouse, a senior analyst at ESG. "[VMware] built the hypervisor without thinking about the implication of I/O-intensive applications like backup, and VCB was like a tumor on the hypervisor. It was an afterthought."

"VCB was fairly limited," said Venu Aravamudan, senior director of server product marketing at VMware. "The traditional approach of putting agents in each virtual machine just didn't work and VCB was kind of a stop-gap measure to provide some backup functionality."

The vStorage APIs for Data Protection, however, aren't a standalone product like VCB. Instead, the APIs allow third-party backup applications to directly interface with the VMkernel without the need for scripts or agents. The APIs provide a sort of baseline, and then it's in the hands of each backup vendor to develop functionality around that. With these APIs, VMware essentially stepped aside and let the backup software vendors do what they do best—develop backup products.

"As soon as they started doing VCB and having all of the crazy issues with the vendor partner community, they [VMware] went down the road of trying to build out the APIs," ESG's Whitehouse said. "It was really to make it easier for themselves, easier for their vendors and to drive adoption of their platform. It was a critical problem for them to solve and APIs are the best way to do it."

According to VMware's Aravamudan, while his firm worked closely with third-party software partners in developing the APIs, VMware isn't involved in testing or certifying the third-party products. "There was a ton of joint work leading up to the actual release of vSphere," he said. "However, there's not an actual class of certification for these types of products. Because it's a very clearly defined API set, there are no third-party products that sit in the hypervisor kernel."

Vendor integration, so far, varies. Not surprisingly, backup products designed specifically for virtualized servers were the first to jump on the bandwagon, and others have yet to fully integrate the APIs. "We saw day-one support from CA, Veeam and [Quest], and TSM still hasn't integrated all of the features of the APIs," ESG's Whitehouse said. "I think once users see the increased efficiency that's possible with the APIs, they'll push their vendors to get there."

In addition to the vStorage APIs for Data Protection, vSphere includes vStorage APIs for Array Integration, Multipathing and Site Recovery Manager (SRM). The vStorage APIs for Array Integration improve vSphere efficiency by allowing the storage array to perform tasks such as snapshot and replication. The vStorage APIs for Multipathing allow for array-based multi-pathing, which improves storage I/O throughput. The vStorage APIs for Site Recovery Manager integrate SRM with array-based replication for SAN and NAS. This allows SRM to access and control the array-based replication it relies on.

NOT HOT YET

Fibre Channel over Ethernet (FCoE)

Last year, FCoE was also on our "Not Yet" list, but we're not just picking on this technology—we truly think it's going to heat up one of these days and become the hottest storage network technology around. We just don't think it's going to happen soon. Most of the parts that make up FCoE are here, but storage array support still lags. Fibre Channel networks are the Rodney Dangerfield of storage environments; they don't get a lot of respect and nobody ever relishes a network upgrade.

Virtualized Networks (or Virtualized I/O)

This is one of the coolest new technologies around. It does for HBAs and NICs what VMware did for servers by turning them into shared, and virtual, devices. By adding a layer between your servers and their network hookups, you can share those interfaces and allocate them dynamically or based on policies. With servers and storage virtualized, why ignore the network? We think all I/O virtualization may need is a little boost from one of the big vendors, but we don't see that happening in 2011.

Self-Healing Systems

There's something a little spooky about storage arrays that know more about themselves than you do, but if they can use that knowledge to avoid time-draining disk failures, we're all for it. Although a fair number of array vendors offer systems with some self-healing capabilities, it currently sounds a little more like a science project than the right stuff for your company's data. But it shouldn't be long before the list of self-healing systems grows. It's a win-win deal: You get some peace of mind and the vendor gets some service and support relief.

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January 19: Palo Alto, CA
January 25: Washington, DC

LET'S DO AMAZING

Another feature of vSphere worth mentioning, though it's not specifically part of the APIs for Data Protection, is Changed Block Tracking. This feature tracks the changed blocks of a virtual machine's virtual disk, allowing backup applications to immediately identify changes since the last backup and to copy only those changes, thereby reducing backup time and network traffic. "It's part of the bigger picture of making backup more efficient," ESG's Whitehouse said.

For users, efficiency and reliability are obviously critical. "If you can't have data protection in place without being disruptive or causing issues in the environment, no one is going to roll out production applications in the hypervisor," Whitehouse said. By allowing third-party vendors to interface with the hypervisor directly, the vStorage APIs and other vSphere features go a long way in improving the overall storage and data protection picture for VMware users.

4 SCALE-OUT NAS

Scale-out NAS has been a proven technology waiting for the right problem to solve. That problem has emerged amid a perfect storm of rampant unstructured data growth and the limitations of traditional NAS systems. The technology's ability to scale capacity and performance with relative ease has attracted organizations trying to cope with massive unstructured data storage needs due to the increased use of rich-media digital information and the constraints of regulatory compliance requirements.

According to Jeff Boles, a senior analyst and director of validation services at Taneja Group, scale-out NAS, also often called clustered NAS, can solve a lot of problems. "Scale-out NAS has been out there for a while, and certainly offers the ability to serve a wide range of needs from a single unified repository," Boles said. "You can do the primary NAS just as much as you can do the archive stuff."

While scale-out NAS deployments are certainly increasing, they've yet to span multiple vertical markets. "There are specific use cases [that] drive people to scale-out NAS today—that's still very much the pattern." Boles said. "For [these deployments], we're seeing much wider-spread adoption this year than we ever have in the past."

Those use cases include media and entertainment, telecommunications, cloud services providers, life sciences, and energy exploration and simulation—environments with very large data sets and the need to drive down per-gigabyte storage costs. "Scale-out NAS can do a lot to unify a storage infrastructure," Boles said. "[It can] create one big storage infrastructure

you can manage through a single view or set of tools."

According to StorageIO Group's Schulz, the emergence of scale-out NAS has shifted the industry's perception of near-line storage. Instead of automatically archiving data after 30 days, scale-out NAS allows companies a low-cost alternative. "It's the new near-line," Schulz said. "The new model is to move [data] onto lower cost bulk storage where it's accessible but at a slower speed and lower cost because there's value in having it out there. It might be highly compressed, it might be highly optimized, it might be deduplicated, but it's not tying up prime storage real estate."

> "Scale-out NAS has been out there for a while, and certainly offers the ability to serve a wide range of needs from a single unified repository. You can do the primary NAS just as much as you can do the archive stuff."
>
> –JEFF BOLES, senior analyst and director of validation services, Taneja Group

Some of the leading scale-out NAS products include HP's StorageWorks X9000 storage system, which includes technology gained from the company's July 2009 acquisition of Ibrix Inc.; IBM's Scale Out Network Attached Storage (SONAS), which uses the company's General Parallel File System (GPFS) for high-performance computing; Isilon Systems Inc.'s S-Series and X-Series scale-out storage platforms, which are favored by the media and entertainment industries; and NetApp's Data Ontap 8 storage operating system, which incorporates the scalable file system technology the company acquired when it bought Spinnaker Networks Inc. in 2003. Both Taneja Group's Boles and StorageIO Group's Schulz said it will be interesting to see what Dell does with its EqualLogic product line and the scale-out technology it gained by buying Exanet Inc. in February 2010.

5 MULTIPROTOCOL STORAGE ARRAYS

Multiprotocol storage arrays have been around for quite some time, but this class of storage system has whipped up renewed interest among users who are keen on taking advantage of the technology because of its flexibility and cost effectiveness. The multiprotocol approach lets users consolidate storage systems as they seek new efficiencies in the face of spiraling storage capacity requirements.

Research from the Enterprise Strategy Group has revealed that multiprotocol storage adoption is growing. Of the more than 300 respondents to an ESG

survey, almost 50% are planning a deployment, while nearly 25% have already deployed multiprotocol storage. Similar research done by ESG in 2008 showed that only 18% of those surveyed had gone the multiprotocol route.

Vendors such as EMC and NetApp prominently feature multiprotocol storage in their product lines. And according to Terri McClure, a senior analyst at ESG, multiprotocol storage is more of a "checkbox" item than an exotic option these days. "It's becoming more and more of an expectation, mostly driven by NetApp's push for unified storage," McClure said. "And when you look at where NetApp's headed and where EMC talks about going with their Clariion platform, I think users are planning their storage requirements holistically rather than [saying] 'I need *x* for block and *x* for file, and I'll pay a significant penalty if I guess wrong.'"

Although multiprotocol storage has the potential to simplify a data storage environment of any size, smaller businesses may be more attracted to this technology than larger environments that often have well-established (and distinct) block and file storage infrastructures. "Instead of going out to buy a block device or a NAS device, [SMBs] can buy one storage system that gives them that capability," StorageIO Group's Schulz said. "And with these systems coming down in price and increasing in functionality that, in turn, is aligning with the smaller environments and growing with their needs."

"Instead of going out to buy a block device or a NAS device, [SMBs] can buy one storage system that gives them that capability. And with these systems coming down in price and increasing in functionality that, in turn, is aligning with the smaller environments and growing with their needs."

–GREG SCHULZ , senior analyst and founder, StorageIO Group

Elvis Cernjul, vice president of IT at fashion retailer Spiegel, currently uses unified storage to consolidate eight different devices. Along with not having to deal with managing these systems, Cernjul said he has "more storage space and triple redundancy on his data."

Kevin Fitzpatrick, IT director at San Diego-based ROEL Construction Co., doesn't use multiprotocol storage in his environment, but he's interested in it. His cloud storage provider decided to switch to a unified storage system from NetApp, and since that change he has "seen some great improvements in storage functionality." Impressed by those performance results, Fitzpatrick said he will consider a multiprotocol storage system when he needs to upgrade his storage capacity.

Multiprotocol storage is definitely a hot technology, but you'll still have to gauge just how much sizzle your company can expect. "If it makes sense . . . or allows you to leverage your dollars more effectively, absolutely take a

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look at it," StorageIO Group's Schulz said. "But first and foremost, make sure it can do something for your business. In other words, let the technology work for you instead of you having to work for the technology."

6 CLOUD STORAGE SERVICES

If you need any evidence that cloud storage is a hot technology, just look at the number of companies rushing to market with some type of offering or strategy. But even as technology giants like Amazon, Google, Iron Mountain, Microsoft and numerous hosting service providers are in the process of a massive build-out in this area, to date cloud storage has been more of an emerging technology as users test the waters by moving some of their backup applications into the cloud.

"Customers worry about security," said Ashar Baig, senior director of product marketing at Asigra Inc. "Adoption of the cloud has been slow. It could be much faster."

One reason behind the slow pace of adoption is that there's still much discussion about what types of data would be suitable for cloud storage. For now, it's mainly unstructured data that's being moved to the cloud, and the majority of users have chosen backup for their initial foray into cloud storage because there's less perceived risk than using the cloud for primary storage.

But as users become more willing to test the cloud, startups are offering cloud gateways—devices that act as cloud access points for non-backup data. Some of the vendors offering these primary storage cloud gateways include Cirtas Systems Inc., Nasuni Corp., Panzura, StorSimple Inc. and TwinStrata Inc.; all have launched either hardware or virtual appliances in the past year.

Furthermore, *Storage* magazine research shows growing interest in the technology, with more users planning to deploy non-backup cloud services. Although the numbers are still modest, the gains are significant: Almost 10% of respondents to a fall 2010 survey use the cloud for data center primary storage vs. just 4% six months earlier. And another 10% said they plan to start using cloud services for near-line data.

In addition, industry experts say that compliance, and reference and archived data are other obvious choices for cloud storage.

Iron Mountain has built a good part of its cloud strategy around data protection, governance and archiving. "Cloud makes it cheaper for keeping information that needs to be preserved for a long time," said T.M Ravi, chief marketing officer at Iron Mountain Digital. "The next step in the evolution of

cloud storage is infrastructure as a service."

Staci Cross, CIO for the City of Bradenton, Fla., found cloud storage services to be a good fit for her organization's needs. With a small IT staff and limited expertise, the City of Bradenton looked to the cloud to handle several storage functions. It has been using cloud provider Yotta280 to handle its backups for approximately a year, and Elephant Outlook to manage email for more than two years. Plus, the city has been migrating public data from its document management system to cloud service provider SpringCM.

"We've had no issue with performance and security," Cross said. "We have had continuing constraints in budgets and staff, and they have economies of scale that I don't have." ⊙

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Storage salaries edge up in lean times

Storage salaries are higher than last year, but not by much. Still, on-the-job training and new technologies are good enough reasons to love your job in tight times.

By Ellen O'Brien

THE RESULTS of our eighth annual *Storage* magazine/SearchStorage.com Salary Survey reflect a larger economic trend of tightly strapped salaries that loosened by only a few inches in 2010, and spending that's limited to projects with tangible ROI. This year, our 326 respondents said they earned an average annual salary of $96,554 vs. $96,425 in 2009, less than a 1% increase.

That's a much smaller year-over-year increase than we've seen in our pre-

vious surveys; in 2009, respondents reported a 3.5% year-over-year salary jump while our 2008 survey sample reported a 6% rise over 2007.

Still, our 2010 survey respondents earned a good chunk more than our 2009 group of 363 respondents; the average salary reported by last year's respondents was $85,869.

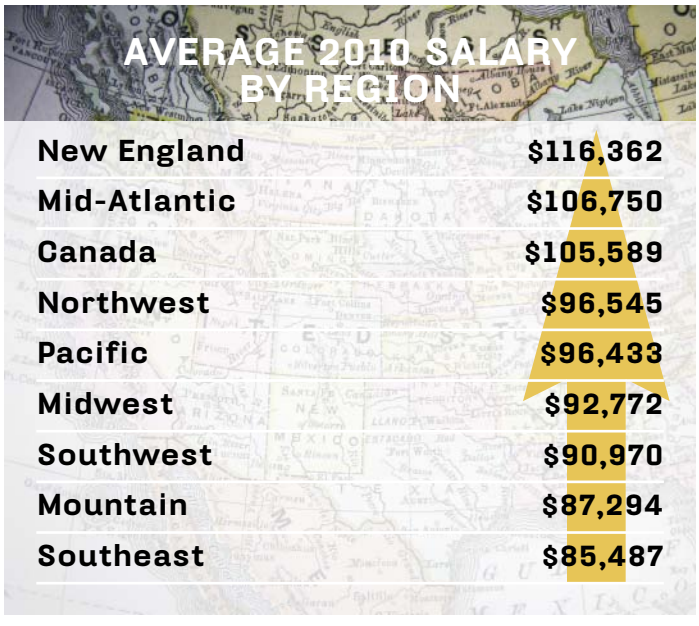
ECONOMY STILL A DRAG

Headed into 2011, and looking at an economic picture too hazy for anyone to predict with confidence, this year's Salary Survey respondents are apparently hunkering down and expecting budgets and salaries to stay locked down. Indeed, they estimate their compensation will drop in 2011 to $95,087, representing a 1.5% decrease from 2009.

As perhaps another indication of an intimidating economy, approximately 33% of this year's respondents stated they were in "maintenance mode," or, as one respondent wrote: "Very much in maintenance mode. The current economic climate will not allow for much more."

> Many of those surveyed reported taking on the sort of ambitious data storage projects that lean times demand.

However, many of those surveyed reported taking on the sort of ambitious data storage projects that lean times demand—ones designed to eventually cut costs and increase efficiency. Newly virtualized environments, implementing archiving tiers and consolidating data centers are all projects that ranked as priorities in our survey and follow-up interviews.



For Eric Hall, IT infrastructure engineer at a San Francisco-based multimedia company, virtualization and data deduplication projects completed in 2010 were a success. But, he added, "we still struggle to keep up with the demand." Like most storage admins, Hall noted, his shop has "capacity issues."

"We buy a couple of terabytes of backup, and then the storage is out of control," Hall said, echoing a sentiment familiar to plenty of our survey takers. And while stress and workloads seem to increase with the size of data stores, so do salaries,

SMART BOSSES, SOFT BENEFITS GO LONG WAY IN TOUGH TIMES

IN 2010, plenty of respondents report that they're paying more for some benefits, like healthcare, than in 2009. Nearly 30% saw their benefits reduced in 2010, and 57% said they remained unchanged; however, 12.6% were lucky enough to see benefits improve.

So how much do benefits matter? Well, it's true that more than 48% of those surveyed said benefits were the least important factor when choosing a new job. But when it came to naming reasons for liking their current jobs, soft benefits such as short commutes, domestic partner healthcare coverage and fitness centers were all cited as reasons respondents are satisfied at their current jobs.

Check out the following list to find out seven reasons why storage pros love to go to work—or not.

BEST THING ABOUT WORK

"That I have a job. Also, that I have some choice in what IT initiative I push for."

"Ability to influence management decisions on data management strategies."

"Working from home!"

"Researching and reporting only storage-related issues."

"Close to the mission. Medium-sized shop allows everyone access to new technologies."

"My coworkers."

"Opportunity for professional development."

WORST THING ABOUT WORK

"Poor planning, with regard to project management."

"Politics."

"Lack of IT consultation on a corporate decision."

"I'm occasionally accountable for areas over which I do not have authority."

"No overtime pay; have worked 20 weekends in 2010."

"Stress level and constant layoffs."

"All the diversions—paperwork, ad-hoc application reports—all non-storage issues."

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AVERAGE 2010 SALARY BY INDUSTRY

Financial Services	$122,040
Healthcare/ Pharmaceuticals	$107,100
IT Services	$104,631
Media/Publishing	$101,825
Construction	$94,625
Wholesale/Retail	$92,444
Manufacturing	$89,369
Transportation/ Travel and Hospitality	$87,071
Other	$86,711
Utilities	$85,615
Government/Non-profit	$85,339
Education	$71,185

according to our results. Those managing less than 1 TB averaged $73,156, while those managing between 100 TB and 500 TB earned an average of $123,681.

NEW ENGLAND REGION AND FINANCIAL SERVICES TOP SALARY CHARTS

In California, Hall's annual salary of $112,000 is higher than the $96,433 average reported by his Pacific region peers. The Pacific region ranked fourth among the eight U.S. regions represented in this year's survey. New England respondents topped the salary chart this year with an average annual paycheck of $116,362.

Those located in the Southeast region held up the bottom rung at $85,487. In Canada, data storage professionals earned an average salary of $105,589, ranking behind just two of the U.S. regions.

When broken down by industry, the financial services sector topped all others with an average salary of $122,040. This was followed by the healthcare/pharmaceuticals industry with $107,100.

In our 2009 survey, we spoke with several storage professionals who were headed to government jobs or non-profit organizations as a way of landing safely outside of companies impacted by Wall Street quakes. In 2010, respondents with jobs in the government/nonprofit sector reported average annual salaries of $85,339; those working in education ranked last with $71,185.

When it came to anticipated 2010 bonuses, IT services was the most optimistic among our industry verticals: respondents in this category ranked fourth with 2010 average salaries of $104,631 but estimated a 2010 bonus of $11,756. Financial services sector respondents predicted their end-of-year checks would include an average bonus of $8,750.

NEW CHALLENGES, PROMOTIONS ARE KEY TO JOB SATISFACTION

Regardless of industry or geographic location, our Salary Survey respondents agreed that income was the chief priority when considering a job in data storage management. Career advancement was next, followed by job responsibilities.

AVERAGE 2010 SALARY BASED ON TERABYTES MANAGED	
None	$86,000
Less than 1 TB	$73,156
1 TB to 9 TB	$78,302
10 TB to 99 TB	$92,546
100 TB to 500 TB	$123,681
More than 500 TB	$110,971

Again and again, survey takers told us that new IT challenges, a growing skill set, and the opportunity to architect new systems and meet the demands of a growing business were chief contributors to overall job satisfaction.

"I've stayed so long because it's been a really great growth opportunity," the 36-year-old Hall said. "We've all been here a long time and we're a great team. We have developed, for the most part, a real intimate working relationship with the business."

Another respondent, a senior IT director at a national industry trade association, said he's stayed in the same job for nearly two decades due to the internal career advancement and recognition he has received. "I've been promoted several times and there are good opportunities for education," he said, such as workshops, seminars and conferences. Of course, a dearth of training time and money usually has the reverse effect, and several respondents cited those factors as what they like least about their current jobs. As one respondent told us: "Untold hours of personal unpaid time [spent] learning emerging technologies" was sinking his current job satisfaction level.

A senior IT director at a national industry trade association said he has stayed in the same job for nearly two decades due to the internal career advancement and recognition he has received.

Another wrote that his current job was characterized by a "lack of training and qualified staff to support the growing demands of storage." And one spelled out his complaint in more detail, saying his job was hard to like because of "the horribly long, necessary, uncompensated hours due to our woeful staffing (two people to support 600 PCs, 40 servers, 40 switches and 2,500 users)."

Despite other similar scenarios, approximately 50% of our respondents plan to continue to work in storage; the others said they were more likely to leverage their data storage experience in another area of IT. Some, like Hall, believe their future might lie in managed services.

In a lot of shops, Hall said, "internal IT growth is negative. So I'll probably end up at a cloud provider somewhere." From his perspective, that's where "the market is going."

"I'd love to be a techie guy, and continue to architect large hardware and

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storage arrays—but it's difficult because so much is going to service providers," he noted.

Hall said that more than half of the 60-person global IT team at his firm is expecting to be laid off in 2011. "It's very tough. It's hard for companies to justify the cost of additional IT staff when managed service providers can deliver" the projects for less, he said.

EXPERIENCE, DIPLOMAS PAY OFF

Having a dedicated storage group is one way that many organizations formally recognize the importance of storage, and our annual survey showed that dedicated storage groups were in place at 60.7% of companies with more than $10 billion in revenue. That figure dropped to a little more than 51% at firms with between $1.1 billion and $10 billion in revenue.

In general, we found that salaries among our survey respondents rose according to company revenue. At the top end of the scale, data storage professionals working at companies with revenue greater than $10 billion earned an average of $133,509, while firms with revenue lower than $100 million paid their storage pros an average of just under $75,000.

At a time when so many new storage technologies are coming onto the scene with promises of providing new efficiencies and value, companies are apparently willing to pay for knowledge, whether it was acquired in the classroom on or the ground. Salaries rose steadily for respondents as their years of experience stacked up. For rookies with one to five years of experience, the average annual rate of pay was $55,625; with six to 10 years of experience, salaries jumped to $77,242; those with 11 to 15 years of experience earned an average of $80,849; 16 to 20 years garnered an average of $95,830—and veterans with 20-plus years of experience averaged $118,455.

There was a fairly direct line between education and salary this year; in the past, our annual surveys have offered a glimpse into the real-world scenarios where companies are far more concerned with paying for skills than diplomas. While that may often be the case, this year's survey showed salaries climbing steadily alongside the number of school years. (The one exception was junior college. Junior college graduates didn't fare better than those who chose not to return to the classroom after high school.)

AVERAGE 2010 SALARY AS IT RELATES TO EDUCATION

Graduate School (Master's degree, Ph.D.)	**$117,140**
College Graduate	**$94,259**
Some College	**$91,902**
Junior College	**$77,778**
High School	**$79,136**

The average rate of pay among respondents holding high school diplomas was $79,136,

while college graduates earned $94,259. And the cost of completing some college coursework but not receiving a full four-year degree also looks like a good investment; those who had some college experience averaged a bit less at $91,902. As they do every year, advanced degrees proved their worth: $117,140 was the annual average salary for those holding a Master's or Ph.D. degree.

When storage experience is combined with advanced degrees, the payoff is significant. A Master's degree combined with more than a decade of storage-specific experience yielded an annual average salary of $172,990.

The average rate of pay among those holding high school diplomas was $79,136.

One respondent, a storage administrator for a New England university with approximately 30 TB of data storage, said he started out as a desktop administrator, and was promoted through the ranks to become a server administrator before working on storage the last three years. "The big thing for us right now is tiering," he said. "We use NetApp storage and we don't have a good way to move the data around based on its usage, so we wind up with some disks that are really busy and some that aren't." Understanding and redesigning storage systems is work experience that he knows will be valuable in his current job and possibly others.

"I'm pretty new to the field," he explained, "so I might be at the low end of the salary range, but I'm looking at this like a great experience." ⊙

Ellen O'Brien is the site editor for SearchStorage.com.

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Spectra Logic Reigns Supreme

Spectra Logic tops both the midrange and enterprise tape library categories in the latest Storage magazine/ SearchStorage.com Quality Awards service and reliability survey.

By Rich Castagna

WHEN SPECTRA LOGIC CORP. shows up for the *Storage* magazine/ SearchStorage.com Quality Awards for tape libraries, it doesn't fool around. Leading the field for both midrange and enterprise-class libraries by substantial margins, Spectra Logic adds a couple of new notches to its belt to complement its two previous wins in the midrange group, as well as a win and a second-place finish for enterprise products. In all other cases—three enterprise and two midrange surveys—Spectra failed to tally enough responses to be among the finalists.

If they're in it, they win it . . . or just miss, as with Spectra's second-place overall ranking in the last enterprise tape libraries survey. This time, Spectra's overall score bested its nearest competitor in the enterprise group by nearly a full point: 7.40 to IBM's 6.47. Quantum Corp. (6.39), Hewlett-Packard (HP) Co. (6.24) and Oracle Corp. (6.16) rounded out the list of five finalists. It should be noted that all the scores were very good, and any of them would have been high enough to take top honors on at least one our past surveys.

In the midrange group, Spectra made it back to the winner's podium after missing the finalist cut in our previous two tape library surveys (but finishing first in the first two surveys). Its overall score of 6.84 was a bit less impressive than its enterprise ranking, but it was more than enough to once again beat IBM, which notched a fine score of 6.43; filling out the midrange field were Dell Inc. (6.33), HP (6.25) and Sony (5.46).

One respondent referred to Spectra as "the most overlooked tape vendor in the market." If there's any truth to that distinction, it's bound to change soon.

One respondent referred to Spectra as "the most overlooked tape vendor in the market." If there's any truth to that distinction, it's bound to change soon.

The "steady and solid" award (if we had one) would have to go to IBM. Over the course of the five surveys we've fielded in the past five years, the company has snagged just one enterprise win but perennially finishes second or third in both tape library categories—a demonstration of consistency unmatched by other library vendors and rare among any of our Quality Award product categories.

ABOUT THE SURVEY

The *Storage* magazine/SearchStorage.com Quality Awards are designed to identify and recognize products that have proven their quality and reliability in actual use. Results are derived from a survey of qualified readers who assess products in five main categories: sales-force competence, initial product quality, product features, product reliability and technical support. Our methodology incorporates statistically valid polling that eliminates market share as a factor. Indeed, our objective is to identify the most reliable products on the market regardless of vendor name, reputation or size. Products are rated on a scale of 1.00 to 8.00, where 8.00 is the best score. A total of 331 respondents provided 372 midrange and enterprise-class tape library evaluations.

MAKING THE BUY

With tape being relegated to a more limited and specialized data protection role in most shops, it would seem to be harder than ever for a tape library salesperson to get their foot in the door. Nonetheless, they seem to be doing a pretty good job of determining a customer's needs and delivering. For midrange libraries, Spectra Logic's 6.78 led the pack in the sales-force competence

section of our survey; IBM and HP tied for second with a score of 6.26. Spectra's 7.25 for the statement "The vendor's sales support team is knowledgeable" was the highest, and only 7.00-plus, mark, propelling it to the highest rankings for all the statements in the rating category.

In the enterprise tape library division, Spectra Logic again swept, but with scores above 7.00 for all statements on the way to a 7.36 category rating—an astonishing feat when you consider that the highest score we had seen previously in this category was a 6.53, which Spectra earned on the last survey. The keys for Spectra, again, were a knowledgeable sales support team (7.61)

PRODUCTS IN THE SURVEY

The following vendors/model lines of midrange and enterprise-class tape libraries were included in this Quality Awards survey. The total number of responses for each finalist is included in parentheses after the product names.

MIDRANGE TAPE LIBRARIES

- Dell Inc. PowerVault 124T/114T, TL4000/TL2000 or ML6000 Series (76)
- Hewlett-Packard (HP) Co. StorageWorks MSL Series (25)
- IBM System Storage TS3100/TS3200/TS3310 (29)
- Oracle Corp. (Sun) StorageTek SL24 or SL48*
- Overland Storage Inc. NEO 200s/400s or NEO 2000E/4000E Series*
- Qualstar Corp. TLS or XLS Series*
- Quantum Corp. M Series, PX502, Scalar i40/i80 or Scalar 24/50*
- Sony (All models) (13)
- Spectra Logic Corp. 20K/T24/T50 (17)
- Tandberg Data StorageLibrary T24/T40/T80/T120/T160 or StorageLoader Series*

ENTERPRISE TAPE LIBRARIES

- Hewlett-Packard StorageWorks ESL/EML Series (22)
- IBM System Storage TS3400/TS3500 (49)
- Oracle (Sun) StorageTek SL500/SL3000/SL8500 (38)
- Overland Storage NEO 8000 Series*
- Qualstar RLS Series*
- Quantum Scalar i500/i2000/i6000 or PX720 (36)
- Spectra Logic 64K/T120/T200/T380/T680/T950 or T-Finity (19)

* Received too few responses to be included among finalists

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and a 7.50 rating for "My sales rep is knowledgeable about my industry."

IBM had another strong showing in sales-force competence with a total score of 6.34 highlighted by a 6.62 for the knowledgeable sales support team statement. Quantum rode three 6.00-plus and three high-5.00 ratings to a solid 6.09 third-place finish.

OUT OF THE BOX

It's been said there's nothing in a data center with more moving parts than a tape library. If any of those parts fails to mesh properly or misses its mark, a poor first impression is inevitable. The initial product quality section of our survey measures how quickly and easily a tape library got up and running and in production. The good news is that tape library vendors have risen to the occasion despite the mechanical nature of their products; when averaging all ratings for all vendors, this survey's roster of vendors received the highest scores ever for initial product quality in both the midrange and enterprise tape library categories.

Continuing its tour de force, Spectra Logic topped both groups with an even 7.00 in the midrange group and another eye-popping 7.50 to lead its enterprise peers. In the midrange group, Dell's very impressive 6.70 placed it second followed by another outstanding score of 6.61 from IBM. In the enterprise sector, HP's 6.52 earned second place, with Quantum just behind at 6.45—scores that could have been category winners in the past.

In the enterprise sector, HP's 6.52 earned second place, with Quantum just behind at 6.45—scores that could have been category winners in the past.

For enterprise tape libraries, respondents registered their particular satisfaction with high scores across the board for "I am satisfied with the level of professional services this product requires," "The product requires very little daily intervention" and "This product is easy to use." Midrange users gave their highest scores to the statements related to easy installation and configuration, as well as ease of use.

FEATURES AND FUNCTIONS

What a library can—and can't—do is the bottom line, and modern tape libraries are far from the one-trick ponies of yesteryear. Here again, Spectra Logic led a very strong group of product lines to some of the best scores yet in the product features rating category, with a midrange score of 6.82 and an enterprise score of 7.42.

For enterprise tape libraries, Quantum nosed out IBM for second (6.65 vs. 6.59), with HP (6.43) and Oracle (6.29) not far behind. Midrange scores were also striking; IBM's 6.59 trailed only Spectra, while Dell (6.38) and HP (6.36) were in a virtual tie for third.

Statements related to good design, scalability and management features were among the highest scorers for all vendors, but the blanket "Overall, this product's features meet my needs" statement came out on top for enterprise tape libraries. Spectra dominated with the only 7.00-plus scores, ranging from 7.00 to 7.63 for the eight statements in the category.

Midrange users were also pleased with overall feature sets, and rated design and management features highly. In a rare occurrence for these survey results, Spectra failed to sweep the features statements, thwarted by IBM's 6.52 for "This product loads and ejects tape efficiently."

STEADY PERFORMERS

There's no test like time when measuring the reliability of a product, and our survey results indicate that tape libraries are doing a better job than ever at the daily grind of data center operations. For our enterprise tape libraries, the average of all scores is the highest yet on the five surveys we've conducted, and the midrange group's score was second to only one previous survey.

There's no test like time when measuring the reliability of a product, and our survey results indicate that tape libraries are doing a better job than ever at the daily grind of data center operations.

Spectra's 7.26 score in the product reliability category led the enterprise pack by a substantial margin (IBM was second with a 6.34 followed by Quantum's 6.18). While the midrange group was a little more competitive, Spectra's 6.67 placed it in front of IBM and Dell.

The enterprise-class tape libraries seem to be a step ahead of their more modest brethren in the product reliability ratings. All the enterprise vendors' product lines scored well across all eight statements in this category, with the top scores generally given for "This product requires very few unplanned patches/updates" and "The product meets my service-level requirement." For all products and all statements, there were only five sub-6.00 scores.

With a narrower margin of victory than in other categories, Spectra Logic's midrange entries scored highest on six of the statements, ceding to IBM for "This product is rarely the cause of backup failures" and to Dell for "This product experiences very few bugs."

SAFETY NET

One product may have a great feature list and be easy to get up and running and manage, but the day it decides to hiccup—and that day will come—the most important part of the product is likely to be how well it's supported. Most users can easily overlook minor problems if they're resolved quickly and effectively, but if they have to jump through hoops or search for missing manuals,

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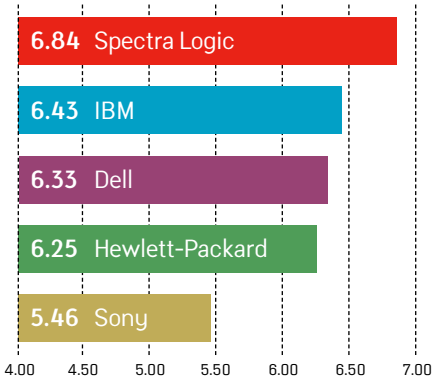
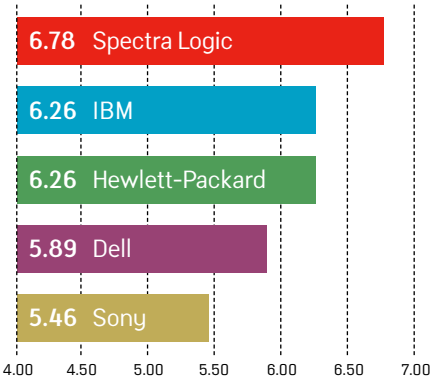
MIDRANGE

- Dell Inc. PowerVault 124T/114T, TL4000/TL2000 or ML6000 Series
- Hewlett-Packard (HP) Co. StorageWorks MSL Series
- IBM System Storage TS3100/TS3200/TS3310
- Sony (All models)
- Spectra Logic Corp. 20K/T24/T50

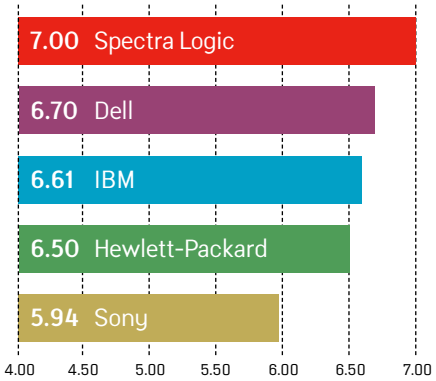
OVERALL RANKINGS



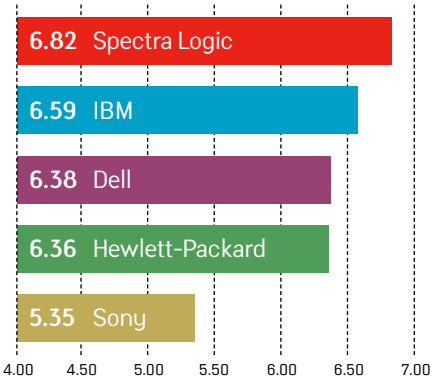
SALES-FORCE COMPETENCE



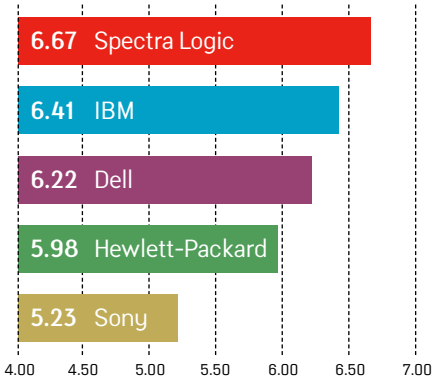
INITIAL PRODUCT QUALITY



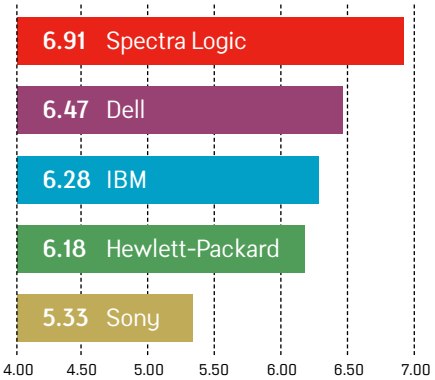
PRODUCT FEATURES



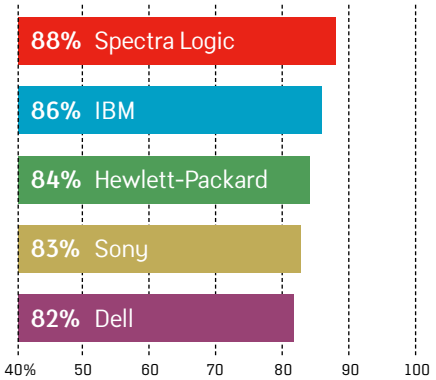
PRODUCT RELIABILITY



TECHNICAL SUPPORT



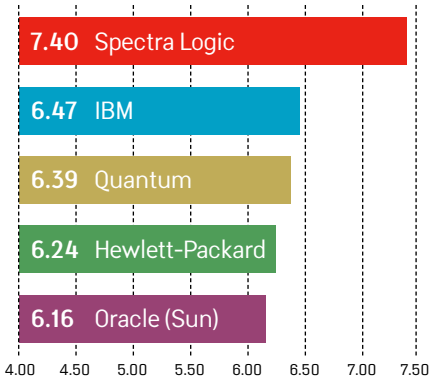
WOULD YOU BUY THIS TAPE LIBRARY AGAIN?



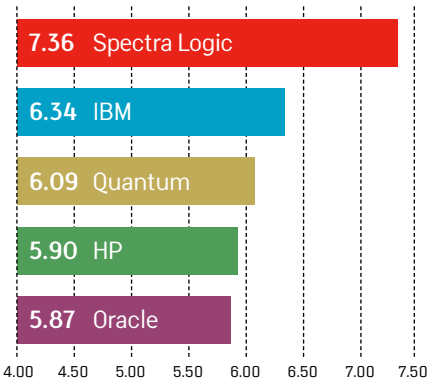
Based on a 1.00-8.00 scoring scale

- Hewlett-Packard (HP) Co. ESL/EML Series
- IBM TS3400 or TS3500
- Oracle Corp. (Sun) StorageTek SL500/SL3000/SL8500
- Quantum Corp. Scalar i500/i2000/ i6000 or PX720
- Spectra Logic Corp. 64K/T120/ T200/T380/T680/T950 or T-Finity

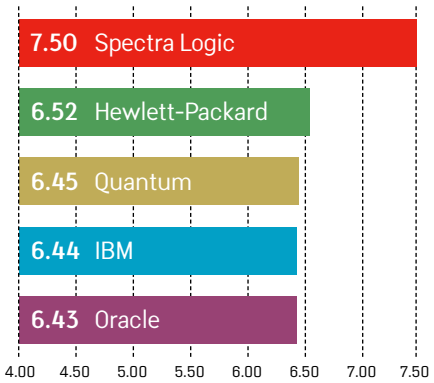
OVERALL RANKINGS



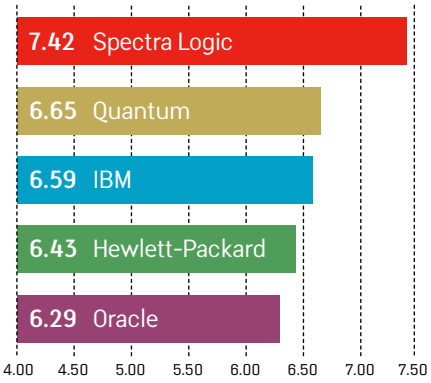
SALES-FORCE COMPETENCE



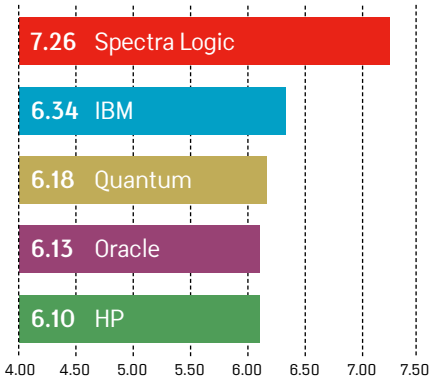
INITIAL PRODUCT QUALITY



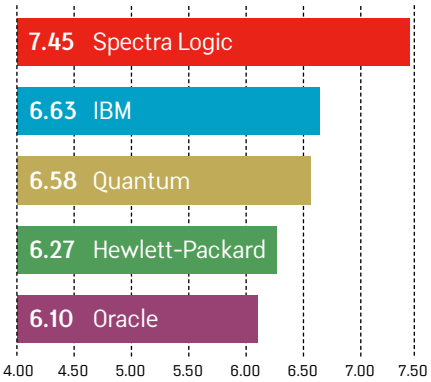
PRODUCT FEATURES



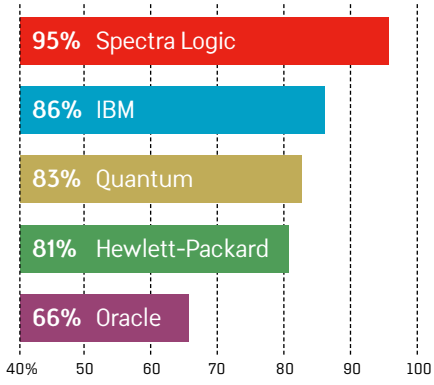
PRODUCT RELIABILITY



TECHNICAL SUPPORT



WOULD YOU BUY THIS TAPE LIBRARY AGAIN?



Based on a 1.00-8.00 scoring scale

ENTERPRISE

HEAVY HITTERS

Average number of terabytes backed up each week using these tape libraries.

MIDRANGE TAPE LIBRARIES	TB
Spectra Logic 20K/T24/T50	58
IBM System Storage TS3100/TS3200/TS3310	33
Hewlett-Packard StorageWorks MSL Series	30
Dell PowerVault 124T/114T, TL4000/TL2000 or ML6000 Series	26
Sony (all models)	13

ENTERPRISE-CLASS TAPE LIBRARIES	TB
Spectra Logic 64K/T120/T200/ T380/T680/T950 or T-Finity	106
Oracle (Sun) StorageTek SL500/SL3000/SL8500	77
Quantum Scalar i500/i2000/i6000 or PX720	66
IBM System Storage TS3400/TS3500	55
Hewlett-Packard StorageWorks ESL/EML Series	35

even an otherwise exemplary product can quickly go south.

In the technical support category, Spectra Logic locked up its clean sweep in both the midrange and enterprise groups, resoundingly so, with the highest scores recorded to date for tape libraries. Its 7.45 anchored a strong overall showing in the enterprise group, followed by IBM's solid 6.63 and Quantum just a hair behind with a 6.58 rating. Spectra topped 7.00 for eight statements in the category, with its highest marks for "This product is easy to service" and "Vendor's support personnel are knowledgeable." All vendors netted high ratings for having knowledgeable support personnel, punctuated by Quantum's 6.97 and IBM's 6.83 for that statement.

We found midrange tape library users to be almost as satisfied with the support their vendors provide. Dell posted a 6.47 as overall runner-up to Spectra Logic's 6.91, and tied Spectra with a 6.67 rating for the "Problems are resolved in a timely manner" statement.

REPEAT PERFORMANCE

In all our Quality Awards surveys we ask if respondents, armed with the knowledge they have now, would buy the same product again. Sometimes, these "buy again" results run counter to the overall survey scoring, suggesting that even if somewhat disappointing, the familiar is preferable to the unknown.

But this time the percentage of users who said they would make a repeat purchase hews closely to the rating category scores. In the enterprise group, 95% of Spectra Logic users said they would buy another tape library from that vendor—hardly surprising given the other results. But IBM (86%), Quantum (83%) and HP (81%) also earned loyalty points among their users. Oracle was the laggard at 66%, perhaps reflecting some confusion over the management handoffs from StorageTek to Sun to Oracle over the past few years.

For midrange tape libraries, the level of satisfaction was equally encouraging for vendors, with Spectra Logic (88%) leading a tightly bunched group with scores all in the range of 82% to 88%. ⊙

Rich Castagna (rcastagna@storagemagazine.com) is editorial director of the Storage Media Group.

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Could cloud be the new tape?

Applying disk to backup hasn't necessarily eliminated tape; but, for some organizations, the cloud could be the answer.

TODAY, ONLY 20% of ESG research respondents rely exclusively on tape (disk-to-tape or D2T) for their on-site backup process. For on-site backup, 80% of the companies surveyed by ESG have made the transition to a disk-assisted (disk-to-disk-to-tape or D2D2T) or disk-based (disk-to-disk or D2D) backup strategy. And among those using on-site disk, 60% eventually move data to tape for long-term retention or to facilitate disaster recovery.*

Though off-site storage media today is dominated by tape, ESG expects this to change in the years ahead. By 2012, the average volume of data stored on off-site disk and third-party cloud storage is predicted to grow and become increasingly used as an alternative to off-site tape. The volume of data kept in third-party cloud storage is expected to increase nearly fourfold in the next two years, while off-site tape is expected to decrease by one-third by 2012.*

DISK AND DEDUPLICATION DRIVING CLOUD ADOPTION

Never-ending data growth has been forcing the use of disk in the backup data path to relieve pressure on the limited time available to execute larger and larger backup jobs. The adoption of disk is also being fueled by data storage efficiency technologies, such as data deduplication. So how do these trends impact the interest in cloud?

As IT organizations adopt disk for backup and decrease their reliance on tape media, interest in vaulting data electronically is on the rise. This is especially true for those employing deduplication to optimize network bandwidth and storage capacity. Maintaining data in its optimized state and electronically transferring it within and between sites creates new levels of efficiency. Provided adequate WAN bandwidth, transferring copies off-site is appealing for many companies. That's where the cloud comes in.

THE CLOUD TIER

There's a lot of hype (and some confusion) about the cloud. It can play a big role in data protection strategies, but there are slight nuances to its use in these situations. In each case, a copy of data is stored in a cloud container

**Source: ESG Research Report,* Data Protection Market Trends, *April 2010.*

and can be retrieved to facilitate recovery.

- Backup software as a service (SaaS) is when a service provider offers a web-based backup application and cloud-based storage for backup processes. Backup SaaS can leverage pure cloud resources or it can take a hybrid approach and combine some on-premises storage with storage in the cloud.
- Cloud storage services provide a third-party cloud-based tier of storage for on-premises backup and archive solutions. On-premises, licensed backup products integrate with cloud storage providers' APIs to enable the seamless transfer of data into the cloud tier.
- Cloud-based disaster recovery combines cloud compute and cloud storage services to enable failover to a cloud-based instance of an on-premises server.

RISKS AND REWARDS

Organizations adopting a cloud tier see it as a tier of storage, unlimited in size, that doesn't have to be directly managed and may provide a more predictable cost model than acquiring, installing, configuring, maintaining and provisioning on-premises backup storage. A cloud tier is also a way to maintain remote copies of data for disaster recovery and may provide a better aggregation point for remote office and branch-office backup data than the corporate data center.

Organizations wary of leveraging a cloud tier often cite concerns about data security, access and control.

Organizations wary of leveraging a cloud tier often cite concerns about data security, access and control. Once corporate data leaves the physical security of a corporate location, protecting the privacy of the data becomes tantamount. IT administrators therefore need reassurance that accessibility to data stored in a cloud tier—likely defined in a service-level agreement (SLA)—meets the expectations of IT as well as those of their business constituents.

There's likely a big recovery time objective (RTO) improvement when recovering individual files or small data sets from the cloud because they can be directly recalled and streamed over the network. The alternative of recalling tape media, and recovering from tape, can take more time. Concerns about meeting RTOs when performing a "bulk" recovery of data are well founded. The time it would take to transfer data for a whole server or site jeopardizes any chance of meeting even the most lax RTOs.

EASING INTO THE CLOUD

Taking advantage of on-demand cloud storage doesn't have to be complicated or disruptive. Many popular backup applications provide integration with cloud storage services today, including CommVault, EMC, Microsoft, Symantec and Zmanda. It's as easy as combining current on-premises backup software and bandwidth with a subscription to a supported cloud storage service, and

modifying backup policies to direct a copy to a cloud target. But getting that first full backup copy to the cloud could be clumsy. For example, the size of the backup set may be too large to transfer over a low bandwidth connection in a reasonable amount of time. That's why most cloud storage service providers offer a "seeding" service that allows data to be uploaded into the cloud via portable media instead.

The easiest use case to trial cloud storage services is remote office and branch-office data. The typical volume of data at remote and branch offices is well-suited to this approach; it's usually transported off site anyway and there's great potential to eliminate on-premises hardware. ⊙

Lauren Whitehouse is an analyst focusing on backup and recovery software and replication solutions at Enterprise Strategy Group, Milford, Mass.

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STORAGE HAS LONG been ruled by bigger and faster. On the selling side, a lot of sales reps think the easiest way to sell a piece of hardware is to differentiate their product using a lot of firepower in the form of eyeball-grabbing specs like controller throughput, backplane bandwidth, IOPS, MBps, data deduplication ratios, terabytes per rack and other impressive metrics.

All too often, that kind of bravado and one-upmanship will overshadow what some of the real storage innovators have to offer. Those are the vendors trying to avoid speed traps while pursuing elements that make storage "better" or "more efficient"—the kinds of things that tend to have more impact on business capabilities and costs. That's not to say innovators haven't had some notable successes. The exceptions have indeed brought better and more efficient storage to market, often being the first with technologies like snapshots, thin provisioning, performance and capacity optimization, and more. But most of the innovators are small compared to the storage behemoths. Those big guys seem to find it easier to slug it out for bigger and faster until they're forced to react to the smaller vendors and their disruptive innovations.

But the game is changing in a serious and permanent way in the consumption of IT services. It's integral to the evolution taking place under the banner of "cloud," and once again it's being helped along by small, innovating storage companies. Let's look at a few examples that illustrate the change.

3PAR

Ten years after its beginning and about to embark on life as part of Hewlett-Packard (HP) Co., 3PAR is still a remarkable illustration of next-generation array technology. The firm's products are about ease of use, performance and scalability, and in each dimension they still offer significant differentiation. But 3PAR has a take on flexible consumption that's markedly revolutionary, at least for the storage industry: 3PAR Cloud Agile.

3PAR storage has long been favored by service providers seeking a utility storage foundation. 3PAR Cloud Agile turns service providers into a channel through which 3PAR customers have choices and flexibility in consuming additional 3PAR storage services. On a pay-as-you-go (PAYG) basis, 3PAR Cloud Agile storage can be a remote system for disaster recovery (DR) data replication.

It can also be a secure, partitioned virtual array with the look and feel of a local array, but hosted in the cloud for bursty workloads. It's the same storage you already made a decision to pay big bucks for, now available on demand and ready to extend the capabilities of your existing systems.

ACTIFIO INC.

Actifio overlays a storage infrastructure to enhance storage capabilities in specific areas: data protection, DR and business continuity (via simplified VMware SRM). Using an assortment of storage virtualization and continuous data protection (CDP)-type technologies, Actifio can change the capabilities of a data storage infrastructure, providing greater flexibility with more ease of use.

CIRTAS SYSTEMS

The Cirtas BlueJet Cloud Storage Controller turns cloud storage such as EMC Atmos or Amazon Simple Storage Service (Amazon S3) into a local iSCSI storage array, and transforms RESTful object storage into a secure, dispersed, protected repository for "unlosable" data.

Cirtas is delivering flexible consumption by repackaging a cloud storage service into a different form (iSCSI) so it can be consumed as primary storage, at lower costs and with enhanced capabilities (scalability, protection, disaster tolerance).

INTERMEDIATION AND FLEXIBLE CONSUMPTION

Abstraction in the data center through technologies like server virtualization has helped IT pros become more receptive to solutions that better "intermediate" their storage connection. Users are desperate for intermediation that better connects virtual workloads to storage, and that addresses I/O and protection challenges in the consolidating data center. Intermediation is the path through which flexible consumption will be delivered in a cloudy world.

Abstraction in the data center through technologies like server virtualization has helped IT pros become more receptive to solutions that better "intermediate" their storage connection.

The technology strides of the past few decades were based on providing more flexibility for the way technology is consumed. The change in consumption today is about both capabilities and cost. Past attempts, like ASPs and hosted storage, didn't offer a compelling mix of capability and cost.

Today's innovators understand that cloud/virtualization/consolidation technologies are changing consumption, regardless of how the solutions are delivered. To build a large-scale, multi-tenancy, self-service infrastructure,

the infrastructure must be "dis-intermediated." That means plain vanilla services that can be used by many tenants, a structure based on a building block style and easy management regardless of scale.

INTERMEDIATION: THE COUNTER-STACK

In pursuit of large-scale, multi-tenancy, self-service infrastructures, companies like Cisco Systems Inc., EMC/VMware, HP and Oracle Corp. are assembling complete solution "stacks" that look increasingly monolithic and proprietary. "Stacks" seems suspiciously like a new twist on the old "bigger and faster" approach, and not more than a little out of place in the cloud era of computing.

But whether stacks succeed or fail, value from the next generation of IT will come from more diverse and easier to create intermediation layers—apps, software and devices that change the consumption of storage and compute from large-scale cloud infrastructures.

BE A FLEXIBLE CONSUMER

Why is all of this important to you? It's time to consider how consuming storage in a different way may guide your strategic decisions. If you see this shift as a significant and lasting trend, then it will significantly alter your infrastructure.

Done right, flexible consumption of services will deliver faster and easier integration of more capable services, with more choices for where they're applied and managed. Note how quickly some of the crop of startup cloud vendors—like Cirtas, CTERA Networks Ltd., Nasuni Corp., StorSimple Inc., TwinStrata Inc. and others—have brought their products to market. And look at how easily these solutions can be deployed; perfect for a business unit or remote office.

For the enterprise architect, the change in the way storage services will be delivered through your infrastructure merits attention in your infrastructure planning. Are you consolidating with extensibility in mind? Are you selecting services that can flexibly meet the needs of multiple tenants? Who will manage those services? The list goes on and will grow. Watch this space as the market develops. ⊙

Jeff Boles is a senior analyst at Taneja Group. He can be reached at jeff@tanejagroup.com.

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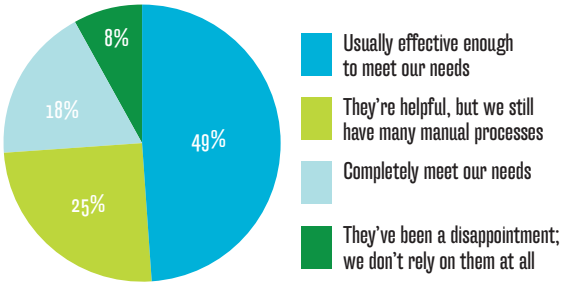
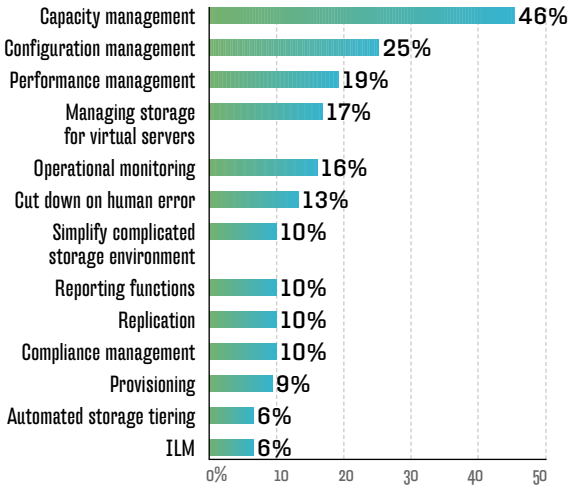
Management apps still get a chilly reception

Maybe it isn't so surprising that with growing capacities, shrinking backup windows and virtual servers gobbling all the disk in sight, data storage managers aren't very keen on adding a new application even if it might help them manage the whole mess. The overarching storage resource management (SRM) tool, once thought to be a sort of Holy Grail for storage shops, is being used by only 15% of the respondents in our latest Snapshot survey. Another 22% have opted for more specialized management products that address specific issues, but most are content to use whatever came with their hardware, Excel spreadsheets or homegrown management apps. Whatever their tool of choice is, it seems to be adequate; 49% said their tools are usually effective enough and 25% called them "helpful" but not able to replace all their manual processes. Eighteen percent said their management tools met their needs completely, while 8% said their apps were so disappointing they don't rely on them at all. Among the shops not using any management tools, 53% felt their setups weren't complex enough to warrant special apps, and 18% cited cost as the reason for their reluctance. Twenty percent of our respondents admitted to the classic failed-SRM scenario: they purchased the management software but never used it. *—Rich Castagna*

How would you rate the effectiveness of the management tools you're using?



What are the key capabilities that you require in your storage management tools?*



*Respondents were asked to select the two most important capabilities

Why don't you plan to implement storage management software?

53%	Don't have the complexity to warrant using it
18%	Tools are too expensive
12%	Storage management software doesn't work very well in a heterogeneous storage environment
6%	Added work for storage employees
6%	My array's management tools do a good enough job
6%	Don't like to deploy agents

27%

Don't use any storage management tools

"We have developed a number of in-house tools and applications over the years . . . These tend to be far more platform-agnostic and customizable than anything a single storage vendor can produce."

—Survey respondent

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- White Paper: Fluid Data Storage: Driving Flexibility in the Data Center
- Customer Story: Credit Market Analysis

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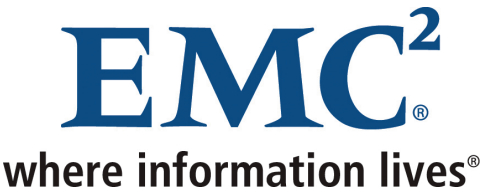
- **Let Us Prove It to You**
- **Maximize Midrange Storage Performance: Solid State Solutions in the Fibre Channel SAN**



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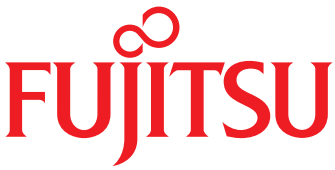
- **E-Guide: Best Practices for Data Protection and Recovery in Virtual Environments**
- **E-Guide: How Dedupe and Virtualization work together**



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- **Fujitsu ETERNUS CS800 deduplication of data for backup operations reduces bandwidth traffic by 20X**

- A guide to understanding what Vmware backup method is best for your environment
- HP StoreOnce Deduplication Software: Technology Fueling the Next Phase of Storage Optimization

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- HP's Game-changing Data Deduplication Resource Center - whitepapers, case studies, demos and videos
- HP Business Risk Mitigation Solutions with disaster recovery guide

- IBM Easy Tier Enables DS8700 and Storwize V7000 Users to Profit from Solid State Drives
- IBM Easy Tier Enables Storwize V7000 Users to Get the Most Out of Solid State Drives

IBM Real-time Compression

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- **IBM Real-time Compression - Storage Optimization Solutions**
- **IBM Real-time Compression - Compress data by up to 80%**

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- **DCIG 2010 Midrange Array Buyer's Guide**

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- New White Paper: How to Avoid the Seven Sins of Storage
- New White Paper: Leveraging Flash and Cutting-Edge Architecture to Deliver a Storage Breakthrough
- New Webinar: "Mr. Backup" W. Curtis Preston Presents Tips and Tricks for Effective Data Protection

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- Special Report: Top Ranked Midrange Array Storage Controllers
- Gartner Webinar: "A New Approach to Designing a Modern Storage Infrastructure"

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- Why Choose Quantum for Deduplication?
- DXi disk-based deduplication from Quantum improves protection and reduces costs

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- Does Tape Still Make Sense?
- Tape Storage TCO

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- Thin Provisioning: Using Intelligent Storage Virtualization Technology for More Efficient Use of Storage Assets
- Put Data Growth in Its Place