Research Brief

Consolidated Storage for Virtualized Server Environments

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Forget the old cliché, "More is less." When it comes to an organization's core IT operations, more is more.

More information. More complexity. More pressure. More compliance. More diversity of data formats. More security and reliability. And, of course, more storage.

For a growing number of IT organizations, the answer to "more" has been virtualization. A wide variety of statistical and anecdotal evidence points to the great improvements being made through virtualization to help reduce sprawl throughout the data center, as well as get a handle on infrastructure costs.

But with server virtualization comes pressure on storage infrastructure to align with the new server architecture. Deploying storage in a virtualized environment means rethinking how and where critical information is stored, and to align storage management processes and functions with virtual machines. IT organizations have quickly learned that consolidating servers without a commensurate strategy for storage consolidation not only fails to generate all the planned benefits of virtualization, but adds to the complexity and even the cost of storage infrastructure. What's even more of a concern is the potential for storage I/O performance bottlenecks that impact availability to key applications and services, and make organizational requirements such as business continuity, compliance and security more challenging.

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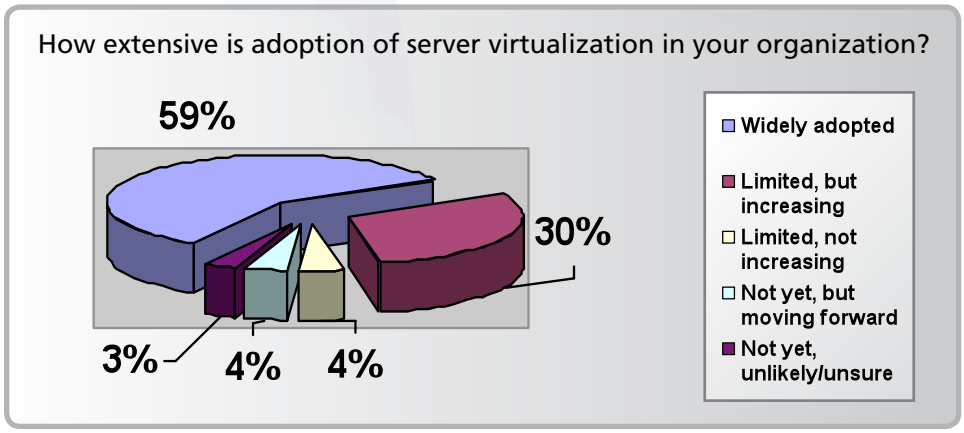
This research brief is based on a recent Tech Target survey with more than 200 storage administrators and IT professionals in mid-sized and enterprise-class companies, and focuses on how these decision-makers view the storage-related challenges that result from server virtualization.

Server Virtualization Continues to Gain Momentum — and the Implications for Storage Infrastructure are Huge.

Not surprisingly, respondents say their organizations are rapidly and emphatically adopting server virtualization throughout their infrastructures. And, many of those that have not yet dived headlong into the pool appear to be readying to do that in the near future.

Nearly six in 10 respondents indicate that server virtualization already is widely adopted throughout their IT infrastructure. Of course, virtualization no longer qualifies as an emerging technology; it's been on the radar long enough to attract a lot of interest and spur a good many trials. But the data bear out the industry's belief that server virtualization has emerged as a key element in organization's attempts to gain more control of server sprawl and contain server acquisition and management costs.

What's equally as impressive is that almost one-third of the respondents say that while they have not yet adopted server virtualization widely throughout their organization, they expect to step up the pace of adoption during the next 12 months. Fewer than 3 percent of the respondents say they have not yet adopted server virtualization and are other unsure about their future plans or unlikely to make the move in the coming year.



Respondents also indicate they have adopted a number of different hypervisors to virtualize their server environments. VMware has been used by a sizeable majority of respondents (88 percent) that have begun to virtualization their server environment, but more than 40 percent of the respondents said they also had experience in using another hypervisor somewhere in their server operations, such as Hyper-V, Oracle Virtual Machine, Sun Solaris Containers and Xen. Since virtualization typically began as a pilot in most organizations, it's not that surprising to see that different parts of a company may have used alternative hypervisors, rather than a company standardizing on one single hypervisor of choice in each instance.

Storage Challenges in Server Virtualization

When organizations begin to virtualize their servers, the storage implications are significant. Critical functions such as backup, archiving, data protection/data recovery and deduplication are just a few issues that IT organizations must contend with as companies move from physical servers to virtual machines; after all, simply understanding on which virtual machine certain key data is stored is a significant and complex task.

Another likely outcome on server virtualization on storage is that IT departments either decide on their own or are pushed to consolidate their storage infrastructure so that better matches the slimlined, more flexible server architecture under virtualization. In fact, one-third of the respondents say their organization is under either very high pressure or high pressure to consolidate its storage infrastructure as a result of server virtualization, and two-thirds indicate that they are under at least moderate pressure to do so.

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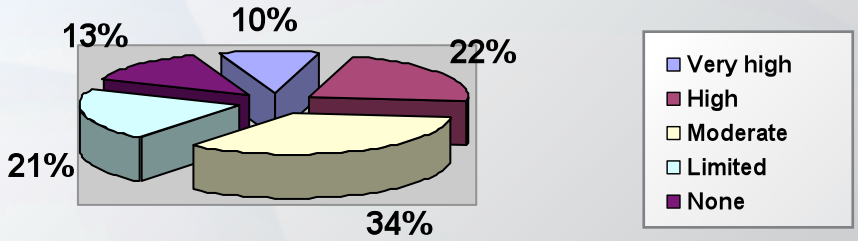
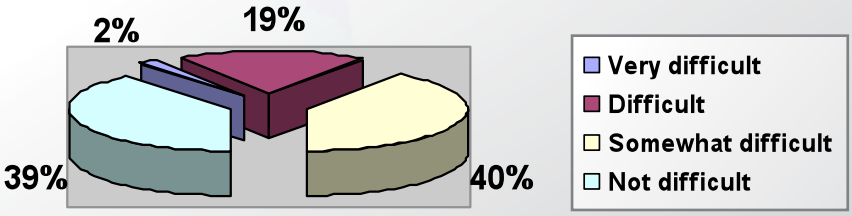
How much pressure is your IT organization feeling to consolidate storage infrastructure as a result of server virtualization?



Although IT respondents to the survey admit that they are under pressure to consolidate their storage as a byproduct of server virtualization, they are reasonably optimistic about their ability to manage that consolidation effort. According to the survey, only 21 percent of the respondents feel the storage consolidation will be very difficult or difficult. However, more than 61 percent feel it will be at least somewhat difficult.

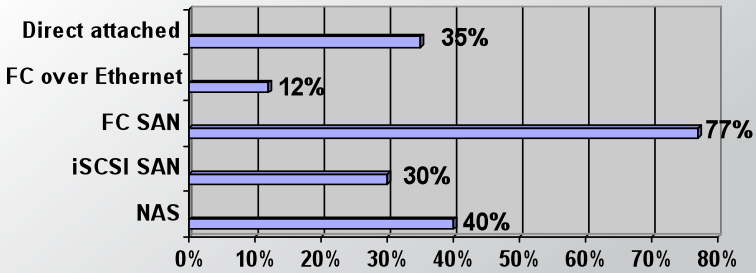
As a result of server virtualization, how difficult will it be for your organization to consolidate its storage infrastructure?



Storage Technologies Comprising Respondents' Infrastructure

Since respondents to this survey worked in mid-sized and large enterprises, there is a diversity of storage technologies that comprise their storage infrastructure. Not surprisingly, many of the respondents are using some form of network storage approach, be it network-attached storage (NAS) appliances or storage-area networks (SANs). But nearly 35 percent of the respondents still have direct-attached storage represented in their storage infrastructure. Fibre Channel storage also is extremely prevalent in the organizations, with more than three-quarters of the respondents indicating they have Fibre Channel-based SANs to handle their storage needs.

Which technologies currently represent more than 20 percent of your current online storage?



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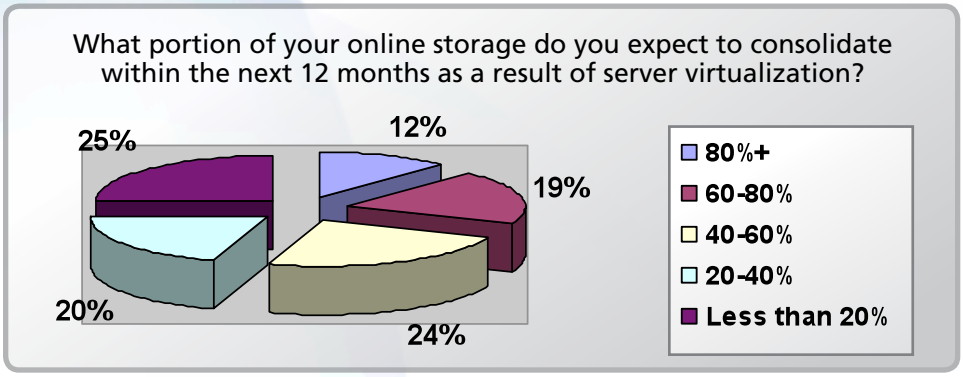
With companies already so heavily invested in storage as a shared resource, it makes sense that they have very aggressive goals when it comes to consolidating storage over the next 12 months. Whether it's driven by virtualization, the rising complexity of storage management or the desire to stop devoting so much of their IT budget to storage, IT decision-makers are planning big in evaluating their storage consolidation efforts in the coming year.

In fact, respondents say that, on average, they hope to consolidate as much as 45 percent of their online storage over the next 12 months. Almost one-third of the respondents say they intend to consolidate at least 60 percent of their online storage in that timeframe, and three-quarters of the respondents indicate they expect to consolidate a minimum of 20 percent of their storage in just the next 12 months.

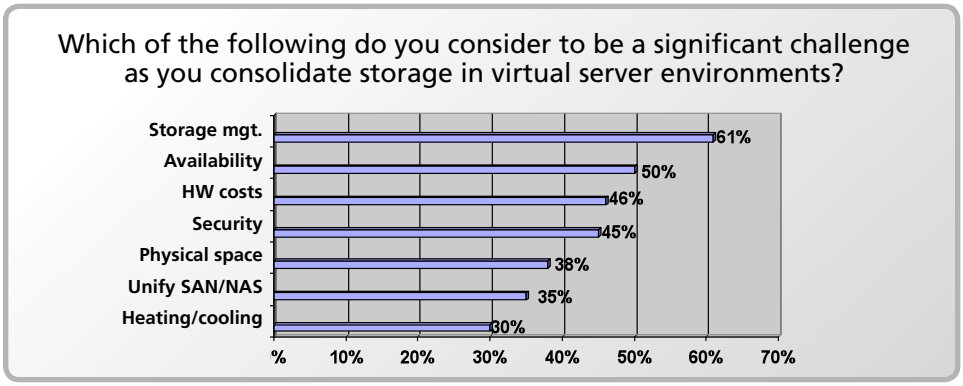


Managing Complexity

There's no question that while virtualization brings many significant benefits to an IT organization's efforts to get better control over their infrastructure, it also adds a layer of complexity to storage operations. Survey respondents were 40 percent more likely to agree with the statement "Server virtualization has significantly increased the complexity of storage in our organization" than they were to disagree with it. Also, respondents were more than three times as likely to strongly agree with that statement about storage complexity than they were to strongly disagree with it.

- Strongly agree 10.5%
- Agree 31.5%
- Neutral 28.2%
- Disagree 26.5%
- Strongly disagree 3.3%

But what about specific aspects of that complexity? What are the storage complexity issues most likely to keep storage administrators and IT leaders up at night during the virtualization process? Several key challenges stand out, although no single type of issue dominates the pain points, giving further credence to the notion that this is a complex, multi-faceted challenge that requires a well-thought-out strategy. Leading the list of issues considered to be a "significant challenge" was "reducing storage management costs and complexity," followed by "improving data and application availability" and "reducing hardware acquisition costs."



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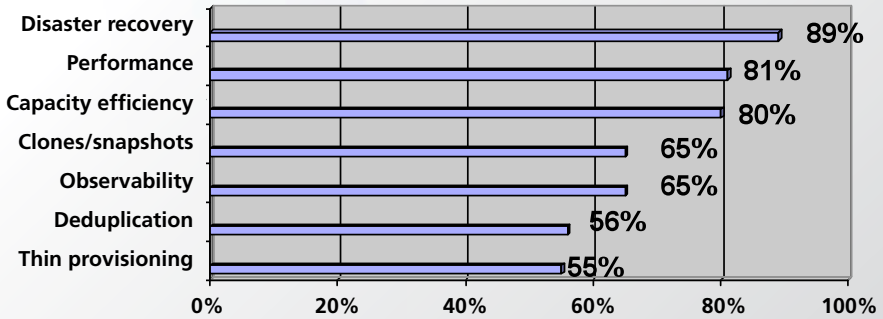
Features and Services

Part of the allure of server virtualization is the ability to improve flexibility and agility in an overall IT architecture, hopefully helping IT get out in front to provide more features and services to stakeholders without overly burdening the overall infrastructure and resource load. Survey respondents have a pretty extensive wish list of storage features they want to support as part of server virtualization. In fact, given the fact that most respondents said all seven suggested storage features were either important or very important, it's clear that storage administrators want it all in a virtual server environment.

Heading the list, not surprisingly, is disaster recovery — for obvious reasons. Just ask any IT executive what happens in the event of an unplanned service interruption, and you'll understand why. But at the same time, IT is under tremendous pressure to ensure high availability of applications and data, so I/O performance is the second-most-cited feature they need to account for. Third on the list is improving capacity utilization, another intended benefit of virtualization in order to get a better handle on the rapid, "no-end-in-sight" increases in capacity requirements.

How important is each of the following storage features in a virtual server environment? (Percentage calling each feature "important" or "very important")



When it comes to storage-related services, respondents are just as demanding. They clearly expect their storage hardware to support a wide range of services — but they're also realistic about the challenge involved. In fact, they readily admit a high level of concern over their storage hardware's ability to concurrently run multiple data services without performance bottlenecks. In fact, most respondents say they are either "concerned" or "very concerned" about potential performance bottlenecks in delivering key services, and the vast majority of respondents — more than 82 percent — indicate that have at least about moderate level of concern about this issue.

Which of the following services are very important for your storage hardware to support?

Replication	70%
RAID	69%
Mirroring	54%
Deduplication/compression of backup storage	50%
Database/application integration	47%
Deduplication of primary storage	45%
Real-time storage analytics	43%
Concurrent NAS/SAN	40%
High-resolution error correction	34%
Virtualized APIs	32%
Compression of primary storage	26%

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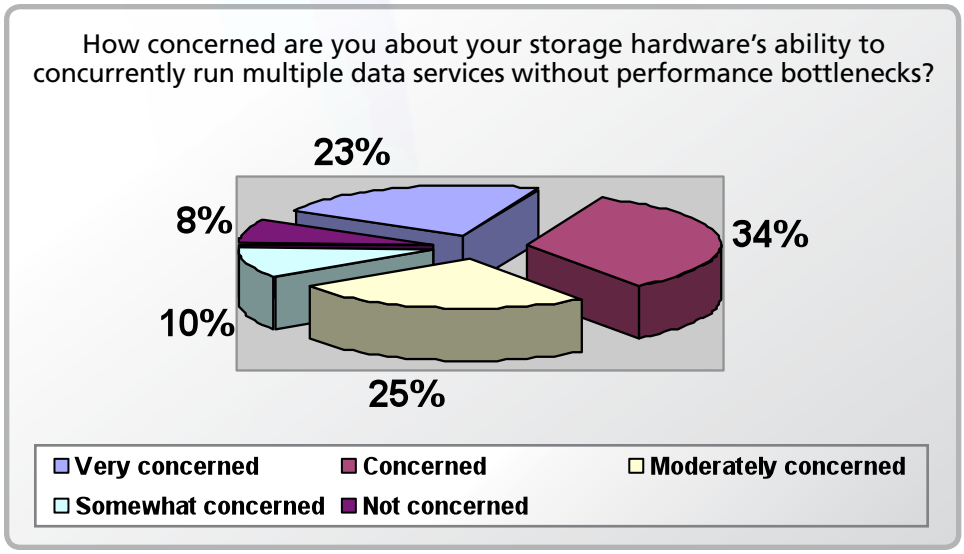
And it's reasonable for many of them to express that concern, given how more and more enterprise applications are defined as I/O-intensive, such as transaction processing, business intelligence, data warehousing, predictive analysis and the like. This means that storage administrators need to keep in mind that hardware — specifically, processor technology — continues to make a big difference in delivering critical data in real time. The right processor inside a unified storage appliance — particularly multi-threaded, high-performance processors — will help a customer run multiple data services in parallel, such as deduplication, compression, mirroring and high-resolution error correction without impacting performance.

And, in case you're wondering how likely that scenario may be for your organization, consider a typical example of a midsized hotel. Accessing data from their LAN-based storage appliance, the hotel's sales department might access customer data on ancillary services purchased during their stay, while the marketing department looks to extract information about which of those customers took advantage of customized marketing programs that enticed them to use those services. Of course, at the same time the finance department would be running individualized reports detailing the profitability of each part of the hotel — rooms, restaurants, boutiques, health spa, etc. — and housekeeping would pull down an updated report of new arrivals so they could ready each room for new guests. Of course, all the while, IT would be monitoring network traffic and performance to spot potential bottlenecks; email attachments were being properly deduplicated to free up storage capacity; ensure that best practices for identity management were being followed, and all daily transactions were being backed up and archived for that night's business continuity readiness dry run.



Storage Vendor Selection Criteria

Against the backdrop of the complexity of delivering key storage services and features in a virtualized server environment, selecting a storage vendor is a key decision. Most IT organizations have worked with multiple storage vendors over the years and have developed different levels of confidence and trust in those vendors' ability to deliver cutting-edge technology, world-class service and support, and cost-effective solutions. What matters most to IT decision-makers when selecting a potential storage systems vendor for virtual server environments?

As often is the case, reliability is on the top of the wish list when it comes to vendor selection, followed by product performance (defined as I/O performance) and service/support policies. The fact that these three sit atop the key vendor selection criteria is logical, given what IT organizations must confront as they virtualize their server infrastructure: Absolute, fail-safe operations, always-available resources and quick, expert problem resolution.

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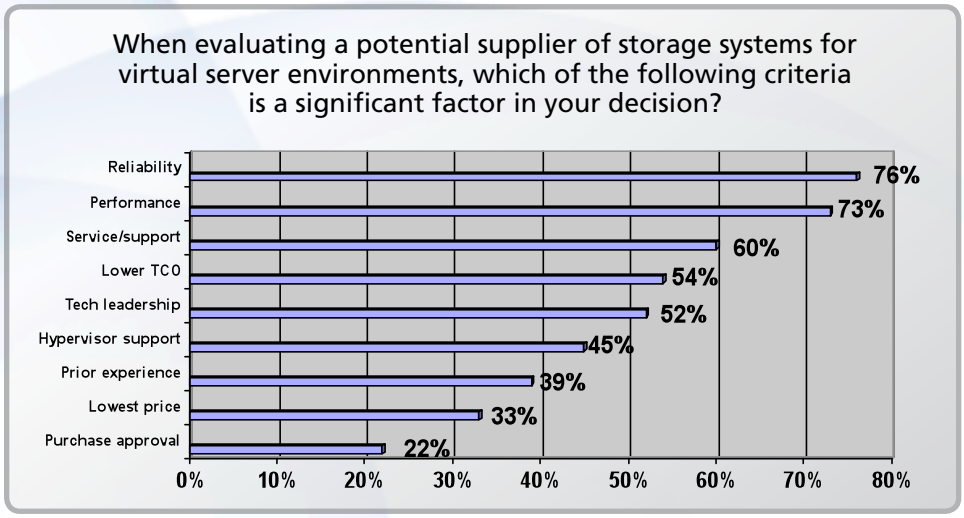

Summary

Server virtualization's amazing growth in adoption makes a lot of sense when you consider the many benefits it has already begun to provide to under-resourced, over-pressured IT organizations to do more with less. But moving to a virtual environment has a ripple effect on other parts of the IT infrastructure, specifically storage.

Without question, IT decision-makers feel server virtualization makes storage more challenges and creates new pain points that must be addressed before virtualization achieves optimum rewards and faster return on investment. While storage administrators surveyed for this research are generally confident in their ability to manage the attendant storage complexity caused by virtualization, they still have some significant concerns over performance bottlenecks that may arise in their efforts to give stakeholders access to more features and services provided by the virtualization effort.

Getting that done, especially in the face of budget pressure, staff cuts and competing business priorities, will require even more of a partnership between IT organizations and their storage systems providers. Those partnerships will need to be stronger than ever, because success will be defined by a vendor's ability to deliver not just on superior technology, excellent support or attractive cost efficiencies, but on all of those capabilities — and more.

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About Intel

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