Data Storage at Midsized Enterprises

The View from the Front Line

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Introduction

In September, 451 Research conducted a study to examine the priorities, concerns and strategies of midsized enterprises regarding IT infrastructure and data storage. The study was based on a moderated online discussion board, in which IT chiefs exchanged views on a wide range of topics including the relationships between IT and the larger organization, the impact of the COVID-19 pandemic, and the best ways to achieve IT efficiency and agility. The participants were from US-based companies spanning multiple industries with 500-2,000 full-time employees, and data storage capacities ranging from terabytes to multiple petabytes.

Highlights

- Participants in the discussion board rated <u>risk management</u> as their most important priority by a wide margin. Beyond this fundamental goal of securing data and maintaining application availability, the participants' next two priorities were equally ranked: <u>maximizing efficiency and agility</u> and <u>achieving financial flexibility</u>.
- Participants emphasized the need for strong relationships not just within their own businesses, but also with IT suppliers.
- The drive for financial flexibility is closely linked to the need to maximize agility and is causing IT to shift toward consumption-based or opex-style ways of paying for IT infrastructure and storage products.

The 451 Take

Working life for IT chiefs at midsized companies is not easy; they are required to balance contradictory and competing priorities by managing risk while simultaneously maximizing efficiency and agility. In addition, workloads for IT teams never diminish. As fast as IT infrastructures evolve and promise greater efficiency, the goalposts continue to be moved by the constant proliferation of IT business applications and the exponential growth of data. The relentless digitization of business is also driving the need for IT agility because the ability to use IT to rapidly implement new business models is now a major area of competition among businesses. The COVID-19 pandemic has amplified this effect. In addition to creating an unpredictable economic future and forcing almost overnight support for remote working, the pandemic has rapidly increased the number of business activities that are underpinned by IT.

Overall IT Priorities

Participants were asked to rank these issues in order of priority:

- Maximizing efficiency and agility
- Digital pivot
- Managing risk
- Reducing complexity
- Achieving financial flexibility

The overall ranking shown in Figure 1 below was determined using a scoring process in which each issue scored two points when rated by individual participants as their top priority, and one point when selected as number-two priority. Managing risk scored highest by a large margin, while maximizing efficiency and agility and financial flexibility tied for second place.

451 is entirely unsurprised that managing risk scored so highly because IT is now a critical resource for almost all organizations. While all the other candidate priorities on the list are important to overall IT operations and strategy, the board members' enterprises cannot continue business operations unless critical applications are kept running. Risk management also includes data security and the now ever-present threat of ransomware attacks. Data storage systems play their part in the defense against these threats by creating the backups and snapshots that allow data recovery.

The high ranking of financial flexibility would perhaps be a little more surprising if it were not for the COVID-19 pandemic. The uncertainty or even unpredictability of both micro- and macroeconomic conditions caused by the virus is driving businesses to seek flexibility in all forms of spending, including IT and data storage. Equally importantly, financial flexibility also boosts agility and efficiency.

Figure 1: IT priority rankings

Source: 451 Research's midsized enterprise IT discussion board, September 2020
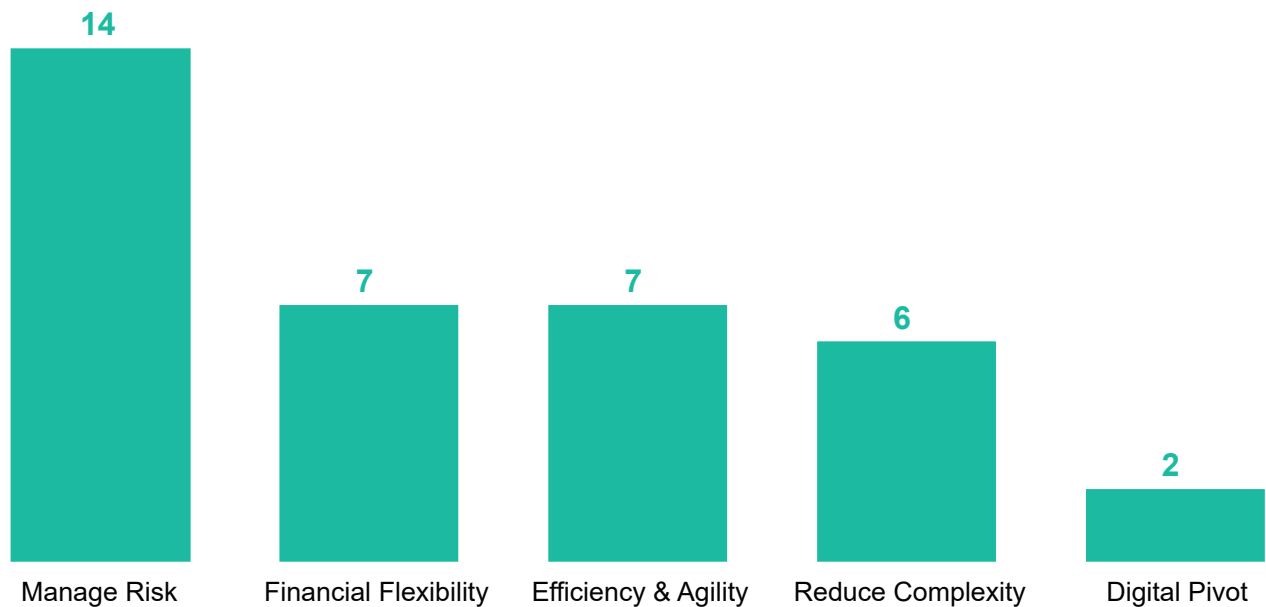
PARTICIPANT QUOTES

"We're expected to and always have our critical systems available, so we need rock-solid storage. At the same time, storage is only one part of the systems we must maintain, so simple operation is also important." –Director of IT, Housing

"In 2019 two powerful quakes were epicentered where we operate, shutting down operations for three months." –Senior IT Manager, Mining

"We moved entirely to an opex model...it gives us enormous flexibility and elasticity. For a number of years, we had petabytes of storage deployed using capex but only used up to 60% [of that capacity.]" –CIO, Semiconductor Design

"We're in an ever-changing environment, and long-term investments in static architectures won't work anymore. We need to be able to deploy quickly and change as needed." –CIO, Financial Services

"We're a small IT team and don't have siloed staff. We all need to be able to troubleshoot any issues, so the less complex the management and troubleshooting of the storage the better." –Director of IT, Civil Engineering

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The IT Impact of COVID-19

Members of the discussion board were asked direct questions about the impact of the COVID-19 pandemic on their IT operations. In addition to responding to these questions, the board members also frequently referred to the pandemic in discussions of other topics. Clearly, COVID-19 has increased the load on IT departments, and not just because of the need to support work-from-home policies, but also because it has forced businesses to find new ways of communicating with their customers. There were no reports of major difficulties supporting remote working, and while this does not mean no problems were encountered, some board members said their organizations were able to handle the task very quickly.

On other fronts, discussion board members said the pandemic has accelerated changes in their IT operations, including the adoption of public cloud services and desktop as a service. The long-term outlook for working from home remains uncertain, as does the location of datacenters for some businesses that expect the scaling back of office space to be long-term.

PARTICIPANT QUOTES

"The need to provide services and to keep people connected is even greater than pre-COVID. Applications and Infrastructures need to withstand this new barrage of data and usage." –Senior Vice President Cloud and Infrastructure, Managed Services

"Post-COVID, we're realizing that it makes more sense financially to invest in opex as much as possible. It makes it easier for budgetary purposes, and we can predict and plan much more effectively when we view our operations in groups of services as opposed to fixed assets within our infrastructure." –VP, IT, Manufacturing

"Our investment in high-quality infrastructure resulted in our ability to easily move over 400 workers from offices to work from home in a week." –Director of IT, Housing

"Our overall investment in a single storage vendor allowed us to reduce the systems staff to one person on-site during the worst part of the pandemic." –Director of IT, Housing

"We're looking to move as many of our paper or traditional office processes to digital platforms, which impacts our storage solutions. Now that we can't simply sit in front of a customer or potential customer, we have to find new ways to get our information in front of them." –VP, IT, Manufacturing

"We're focused on keeping the organization running at ~100% remote; this takes away time from our transformation goals." –EVP, CIO, Financial Services

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Managing Risk

As one participant pointed out, the design of disaster recovery (DR) systems must take into account long-term management requirements and the need to be able to adapt to any changes in IT operations or applications. Another participant warned that in the likely event that businesses implement DR using public clouds, they should store backup data on their own premises to minimize recovery times.

For security, participants emphasized the need to take a 360-degree view of the IT environment, including the sometimes-problematic relationship between data storage and security. Others said the presence of skilled staff is key to reducing risk, while one participant commented that the taking of calculated and limited risks can be a way to explore potentially beneficial options.

PARTICIPANT QUOTES

"Make sure that as you architect the new storage solution, you implement a very robust DR solution with a solid blueprint of how to manage it long-term." –VP, IT, Manufacturing

"Don't be afraid to take calculated risks. Don't put all your eggs in an unproven technology, but not all data is equal. You can take smaller datasets and try out different products." –CIO, Financial Services

"For security, you have to figure out what the capabilities of the storage solution are and how they can best be interwoven with whatever you decide to use from a security perspective. Unfortunately, the latter is usually selected before the former, which makes it difficult if you are left with a round peg in a square hole." –VP, IT, Manufacturing

"For DR and business continuity, I'd suggest a hybrid approach. Having the critical data on-premises is also key. You have quick access to the data without waiting for it to be downloaded or for an appliance to be shipped from the cloud provider." –Director of IT, Civil Engineering

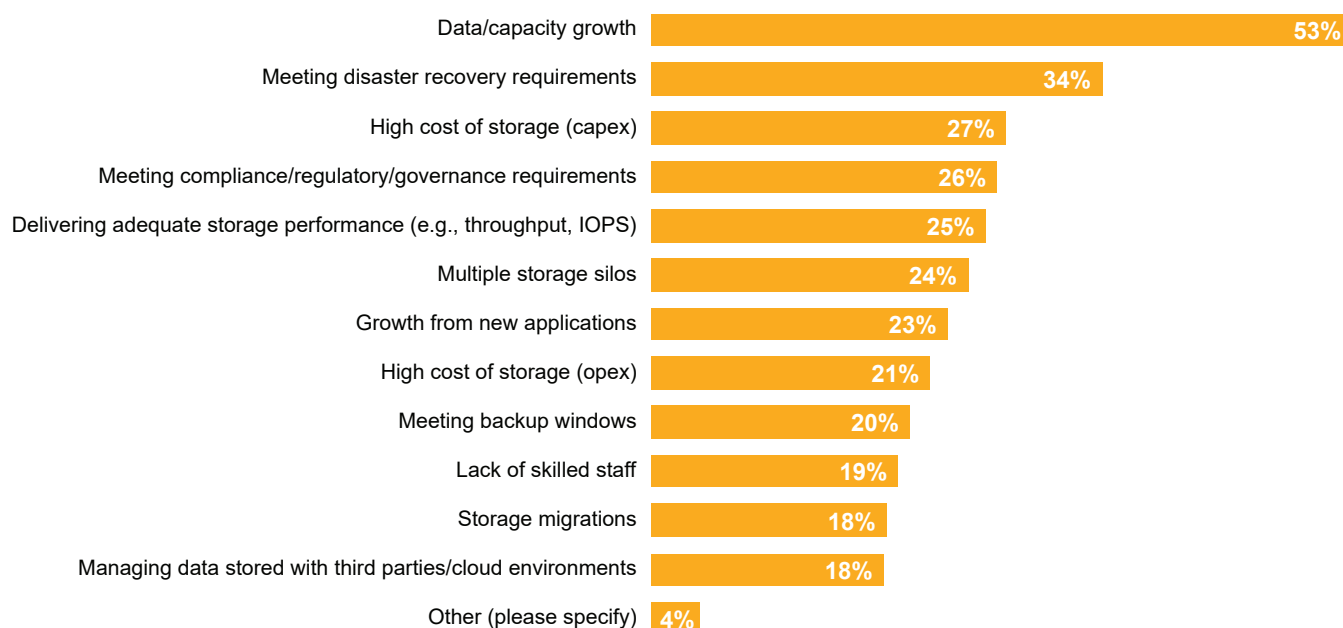# Achieving Efficiency and Agility

Alongside financial flexibility, the discussion board participants rated maximizing efficiency and agility as the second-highest priority after risk management, and they discussed multiple aspects of the topic. Not surprisingly, they consider fast storage provisioning, scalability and rapid deployment as major contributors to efficiency and agility. These views mirror separate 451 Research findings about the pain points suffered by enterprises with respect to data storage. Figure 2 shows the results of a 451 Research Voice of the Enterprise survey of infrastructure and storage chiefs, which identified rapid data growth – and, therefore, the need to increase storage capacity – as by far the bigger storage challenge faced by IT organizations. While standardization on a limited number of storage systems or products helps by reducing complexity (see the discussion of complexity below), IT organizations sometimes cannot avoid deploying diverse products.

Figure 2: Enterprise storage pain points
Source: 451 Research's Voice of the Enterprise: Storage, Budgets and Outlook 2020
Q: What are your organization's top pain points from a storage perspective? Please select all that apply.
Base: All respondents (n=451)

Pain point	%
Data/capacity growth	53%
Meeting disaster recovery requirements	34%
High cost of storage (capex)	27%
Meeting compliance/regulatory/governance requirements	26%
Delivering adequate storage performance (e.g., throughput, IOPS)	25%
Multiple storage silos	24%
Growth from new applications	23%
High cost of storage (opex)	21%
Meeting backup windows	20%
Lack of skilled staff	19%
Storage migrations	18%
Managing data stored with third parties/cloud environments	18%
Other (please specify)	4%

"One of the main items we look for in efficiency and agility is around the provisioning of the storage and the ability to expand as necessary to meet user demand. It helps in controlling expenses while at the same time allowing the flexibility to deploy rapidly." –Senior Vice President Cloud and Infrastructure, Managed Services

"We are a growing company and looking at acquisition-type scenarios, so the ability to rapidly deploy a standard solution and scale up is critical for us. We don't have a large team, so it's very important that we can quickly develop our solution, document it and then deploy it out iteratively for any future situations." –VP, IT, Manufacturing

"We are challenged with selecting single solutions which meet efficiency and agility requirements. Our goal is to standardize our solutions as much as possible, but when what has been selected doesn't hit those marks, we have to look at increasing the solution count. We're trying to avoid that at all costs, but it has been difficult to ramp up our capabilities and do it quickly while using a single vendor." –VP, IT, Manufacturing

"Digital pivot is the reason we need IT flexibility. Like so many companies, we are working on a digital transformation journey which all our investments must support." –CIO, Financial Services

"We have accelerated some of our digital enhancements due to COVID-19. This means systems have to be ready for us to change quickly." –CIO, Financial Services

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Relationships with Business

Clearly, the role of IT teams is to serve their parent organizations. Discussion board participants made it clear that while this fact is top of mind for them, navigating it is not always easy. Problems that participants brought up include changes in data storage requirements given to IT departments at very short notice, and a lack of disclosure about business plans.

One way to address these problems is to establish closer relationships with business units, but comments made by participants suggest that there is much progress to be made on this front. Those comments reinforced previous 451 Research findings. Figure 3 shows the results from a 451 Voice of the Enterprise survey, which found that only 28% of respondents could strongly agree that their teams were closely aligned with their parent organizations.

Figure 3: Enterprise to IT to business alignment
Source: 451 Research's Voice of the Enterprise: Digital Pulse, Organizational Dynamics 2020
Q: Do you agree that alignment between IT and business functions is strong at your organization?
Base: All respondents (n=516)

- Strongly agree
- Somewhat agree
- Somewhat disagree
- Strongly disagree
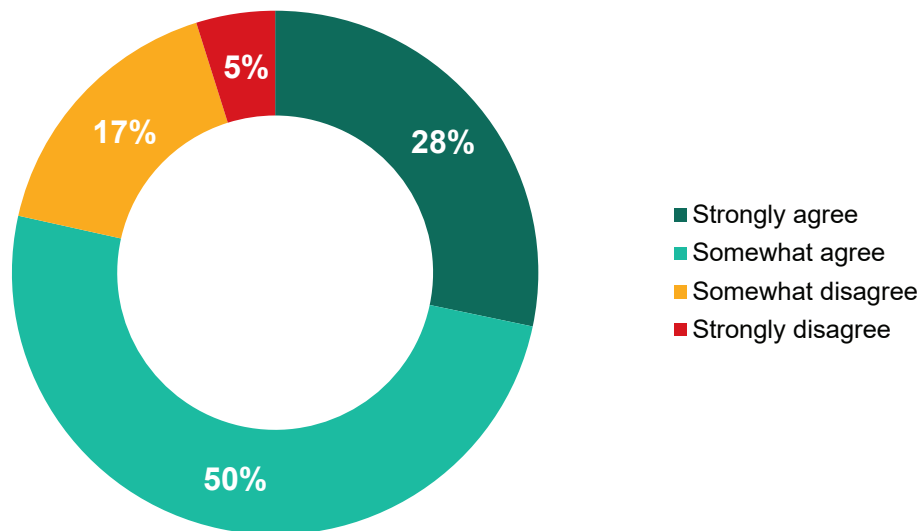
"My job, as it relates to storage, becomes harder when data custodianship is ill-defined, mission critical is ill-defined, and compliance strategy is lacking; being prevented adding efficiency to capacity." –Senior IT Manager, Mining

"My job, as it relates to storage, becomes harder when users decide to capture data using a new method without involving the IT department." –Director of IT, Civil Engineering

"My job, as it relates to storage, becomes harder when business units change requirements without notice (i.e., policy updates to retain six months of videos instead of 60 days)." –CIO, Financial Services

"I cannot stress this enough – have conversations with business stakeholders and upper management about future business plans. Far too often, you'll learn about departmental endeavors and projects after the fact, and you'll be reacting to new requirements after significant storage investments." –Senior IT Manager, Mining

"Gain acceptance early from the organization about what their requirements are for storage and get their buy-in to make sure they take ownership of their data, or else you will own all of the data and be responsible for keeping everything indefinitely." –VP, IT, Manufacturing

Dealing with Complexity

Complexity is closely related to efficiency and agility, as the enemy of the latter. The management of complex systems not only requires elevated skill levels, but also consumes more time and administrator resources. One way that participants said they attempt to address this problem is by using documentation to speed the acquisition of new skills. Attention to data management also helps address the issue because as one participant commented, simply throwing files into a figurative bucket creates complexity and hence administrative work.

PARTICIPANT QUOTES

"Reducing complexity can also be a game changer. The ability to not have to reskill whenever a platform is changed is valuable to any company." –Senior Vice President Cloud and Infrastructure, Managed Services

"We are heavy on documentation, SOPs and work instructions. This helps makes it easy to streamline our processes, especially if we need to onboard a new staff member." –IT Manager, Healthcare and Education Consulting

"Reducing complexity: fewer platforms with standard, near current versions is key here combined with staff training and surgical outside consulting resources to accelerate learning/best practices." –CTO, Cloud Hosting

"Simply throwing files into shares over the network is not sustainable any longer, and we've looked into tying data in more meaningful ways to other things like meetings and people with associations." –VP, IT, Manufacturing

"Bad data structure can cause datacenter design problems, bad policy documents, sizing and capacity issues, etc." –Senior Vice President Cloud and Infrastructure, Managed Services

Financial Flexibility

Even before the COVID-19 pandemic, IT organizations of all sizes were showing a change in their preferred way of paying for on-premises IT products and were moving from traditional capital expenditure (capex) purchases to operating expenses (opex) or consumption-based payments for IT products. The increasing use of public cloud services was a major catalyst for this trend because the opex schemes used to pay for those services underpinned their flexibility. The COVID-19 pandemic has only made that flexibility more attractive by making the economic environment unpredictable. However, not every IT organization wants to switch from capex to opex. Decisions about payment methods are often made outside of IT by chief financial officers, and preferences vary according to the financial background of different industries or vertical market sectors.

PARTICIPANT QUOTES

"Having a good flexible model that allows you to expand or contract at will is important. Yes, storage vendors see this as a problem as it's still their job to sell hardware; however, with things like cloud and 'as a service,' they need to change how they think and charge." –Senior Vice President Cloud and Infrastructure, Managed Services

"Our CFO has no strong preference either way between capex and opex. He's more concerned with total cost of ownership." –CIO, Financial Services

"Given our company's EBITDA focus, we lean more towards 'owning' than 'renting.'" –CTO, Cloud Hosting

"Moving to operating expense has made some C-level executives [less] concerned about any downturn in the economy. We're interested in consumption models…The days of being stuck with technology and replacing storage is something we prefer not to [re]visit anytime soon." –Senior Director, IT Infrastructure, Biotech and Pharmaceuticals

Storage Systems Attributes

Given that the discussion board participants identified risk management as their biggest collective priority, it is not surprising that they expressed strong desires for storage systems with robust monitoring and diagnostic tools. However, the discussion about what participants look for in storage systems touched on a lot of other topics. Storage systems are multifaceted products, and the operating and ownership experience is affected by multiple aspects of the systems, which will have different impacts on different customers. Another clear message from participants was that they want storage products that help reduce complexity and require fewer tools to complete tasks.

PARTICIPANT QUOTES

"In my daily tasks, I wish there was a process that gave me real-time visibility into performance or task inefficiencies, whether procedural or system." –Senior IT Manager, Mining

"My job, as it relates to storage, becomes harder when simple tasks require multiple tools to complete." –Director of IT, Housing

"Becoming more complex wasn't something we specifically set out to accomplish. However, our newer products have done just this by default." –CIO, Financial Services

"Focus on products with strong analytics and flexibility; you'll thank yourself for every bit of versatility and visibility." –Senior IT Manager, Mining

"As we add more and more cloud or self-hosted systems, our staff is spread thinner and thinner. Also, salaries are going up as we need to grow or replace workers. We need to ensure our management systems are easy to use, easy to monitor and do not require multiple management servers or tools to complete tasks." –Director of IT, Housing

"I'd add the ability to integrate, tier and act as backup for DR with various cloud providers as a high priority." –Director of IT, Civil Engineering

"Look at the support model and truly identify how much it will cost from a training and ongoing support perspective to manage the storage." –VP, IT, Manufacturing

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Vendor Attributes

Different IT organizations have different needs, but one clear conclusion from the discussion board is that the quality and commitment of storage vendors' technical support services is just as important as the quality of their products. Suppliers' involvement with customers' IT operations often begins before any sales have been made, during system design and product selection, and extends through implementation into technical support during the service life of a product in a customer's datacenter. Customers' vulnerability to poor technical support is demonstrated by the fact that more than one board participant emphasized the need to develop good relationships with vendors in order to improve the speed and quality of their help during a crisis.

PARTICIPANT QUOTES

"I've learned that certain brands and vendors are consistently reliable, and although they might be more expensive, they are far better in the long haul than other, less-expensive options." –EVP, CIO, Financial Services

"Be on the cutting edge, not the bleeding edge. The bleeding edge will get you in trouble." –Senior Vice President Cloud and Infrastructure, Managed Services

"My job, as it relates to storage, becomes harder when vendors are always pushing the Cadillac when a Chevrolet will suffice." –Senior Vice President Cloud and Infrastructure, Managed Services

"In a lot of cases, vendors don't [help address storage challenges.] During the sales cycle, they are front and center, but after the sale, it seems some fall off the map." –Senior Vice President Cloud and Infrastructure, Managed Services

"Some vendor support is better than others. Relationships do matter… your relationship with your vendor will change over time. It starts out kind of like a bad marriage. You start out in the lovey mode, but you soon find out it's not at all what you thought it was." –Senior Vice President Cloud and Infrastructure, Managed Services

"Good relations with storage vendor executives are critical for timely resolution and escalation paths, so you're not stuck in the support system." –CIO, Semiconductor Design

Treat vendors, even prospective ones, like partners… be a good human and avoid playing games as karma is a b**ch. Create relationships with key, senior personnel at vendors, as it's easier to call in favors during an incident or negotiation if you have a foundational relationship." –CTO, Cloud Hosting

"Understand your needs thoroughly before engaging a vendor. Vendors are skilled telling you your needs and could obscure your decision process, dazzling you with features you may not need." –Senior IT Manager, Mining

Capacity Planning

Capacity planning has long been a major challenge for all aspects of IT infrastructure, and not just for storage. The difficulties of capacity planning are one reason to strive for storage flexibility and the ability to scale easily. Overspending on infrastructure can be wasteful and financially damaging, but underspending can risk even more serious penalties if enterprises find themselves unexpectedly unable to meet data storage requirements. Board participants shared a range of attitudes on the issues of capacity planning, but all emphasized the need for rigorous forecasting, and the penalties of getting it wrong. Involvement and even close interrogation of business units is key to the process. Capacity planning requires knowledge not just of expected data growth and future projects, but also the protection levels and retention policies that business units expect to apply to data.

PARTICIPANT QUOTES

"Our most problematic storage administration task? Capacity planning." –CTO, Cloud Hosting

"You want to balance how much you spend without over- or underspending, but then face the repercussions if plans change, requiring more storage, and in a worst-case scenario, forcing you to upgrade hardware." –VP, IT, Manufacturing

"People assume they need a lot more data storage than they actually do. They don't understand compression or deduplication. Ask multiple questions about how long they need data for and then ask again and again...the answers will change. People think they need things indefinitely, but more often than not, they need it for as long as a project lasts." –VP, IT, Manufacturing

"Purchases always feel like you are rolling the dice, but easily scalable solutions help minimize the risk." –Director of IT, Civil Engineering

"Capacity management isn't something one person or even one group can answer. It needs involvement from all areas of the business and all levels of leadership. It takes a lot of time and a lot of discussions with open honest conversations." –VP, IT, Manufacturing

"For me, it is 100% about being in the know for all company initiatives to make sure they are properly accounted for." –CIO, Financial Services

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Conclusions

The discussion board revealed there are both major differences and commonalities among IT organizations at midsized enterprises.

Differences included:

- The impact of the COVID-19 pandemic has varied across IT departments, and while some participants said the pandemic has accelerated the implementation of previously planned IT developments, others said it had caused plans to be delayed.
- Beyond the immediate effects of the pandemic, the discussion board also revealed clear differences in strategies for the management of IT infrastructure and data storage. For example, some participants declared that attempting to reduce expenses when purchasing storage systems leads to greater costs in the long run, while others warned that some vendors may attempt to sell unnecessarily advanced and expensive products.

The board members agreed strongly on some issues.

- The participants collectively identified the management of risk as their biggest priority by far. 451 Research is confident that this view of risk management as the over-arching priority for IT is shared by businesses of all sizes, not just midsized organizations.
- Joint second place for overall priorities was shared by the achievement of financial flexibility, and the maximization of efficiency and agility. The desire for financial flexibility was already becoming a greater priority for IT organizations before the COVID-19 pandemic; now that the pandemic is creating such an uncertain economic outlook, that demand has increased.
- The pandemic has also boosted IT organizations' focus on efficiency and agility. Those two qualities have long been important goals for IT leaders, and they will remain so. Efficiency is desirable in any human activity. For IT, efficiency is also closely tied to the management of risk. Excepting interruptions to power supply that are beyond the control of IT teams at midsized enterprises, human error is the biggest cause of IT outages or reductions in service levels. Efficient operations reduce the likelihood of human error.

These issues of efficiency and agility were also implicitly referred to when participants discussed complexity and expressed the desire for storage systems that require fewer tools to complete tasks.

451's take is that storage system vendors recognize all of these interrelated issues, from risk management to efficiency and agility, and as a result have focused on boosting the level of automation of administrative tasks while developing a range of machine-learning-enhanced diagnostic and predictive maintenance tools, but there is clearly still much work to be done.

Methodology

The online discussion board was held over the three days – September 29 through October 1, 2020. The participants are employed at various US-based companies with 500-2,000 full-time employees. The table below shows the participants' job titles and industry sectors.

Midrange IT and Storage Discussion Board, Participant Job Titles and Industries

SENIOR VP, CLOUD AND INFRASTRUCTURE	Managed services
EVP, CIO	Financial services
SENIOR IT MANAGER	Mining
DIRECTOR OF IT	Housing
GLOBAL DIRECTOR OF IT	Biomedicine and social science research
CTO	Cloud hosting
DIRECTOR OF IT	Civil engineering
SENIOR DIRECTOR, IT INFRASTRUCTURE	Biotech and pharmaceuticals
CIO	Semiconductor design
CIO	Financial services
VP, IT	Manufacturing
IT MANAGER	Healthcare and education consulting

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