

# White Paper

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## **Considerations for Weighing Public Versus Private Clouds to Support Key Microsoft Applications**

*With a Focus on the Capabilities and Advantages of a Private EMC  
Cloud Infrastructure*

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## Microsoft Applications and Storage: Hosting versus Hosted

Making an informed choice is something we all like to do, but it can be tough when there is a strong tide flowing in one direction: The contemporary IT love affair with the public cloud is a prime example. In some circles, the mere suggestion that the public cloud is anything less than a panacea for all IT challenges is tantamount to heresy. The pull is strong: ESG research has found that already 6-7% of all IT budgets (including people, facilities, hardware and software) are already being spent on cloud services, and 50% of respondents expect over 21% of all their IT infrastructure expenditure to be on cloud within the next three years.<sup>1</sup> Going one step further, when certain applications—such as Microsoft’s “four horsemen” of Exchange, SQL Server, SharePoint, and Office<sup>2</sup>—are so broadly deployed and so integral to so many people and organizations, there seems to be a further, almost innate motivation and logic to place them in the public cloud. After all, these are bread-and-butter applications that we all use, that are key foundational elements supporting many organizations, and that are so basic we should treat them like a genuine utility—shouldn’t we?

The logic is intuitively beguiling...and yet there are many reasons to question the easy assertions in the proposal. To adapt a favorite saying, “all that glitters is not cloud”—or, at least, perhaps not the public cloud. The individuals in an organization who are responsible for storage and applications must work together in making a decision about storage structure because of their interrelated stakes in the matter. This paper is intended to inform their choice. *Let’s be very clear: Storage must be actively considered in concert with applications like Exchange, Office, SQL Server, and SharePoint; if not, it is almost certain that costs will rise and the quality of service will decline.* This consideration matters; neither the author of this paper nor EMC are against the public cloud...we simply support an informed choice because choosing infrastructure correctly can lead to better business outcomes.

Encouraging IT organizations to engage in an early, cooperative consideration and decision regarding the intersection of application needs and storage platforms is important for many reasons:

- **Differing management views:** Application owners will think about things like response times and user profiles, while storage managers will tend to focus on capacity and backup needs. Is storage always considered—*really* considered—when key applications such as SQL Server, Office, SharePoint, and Exchange are being implemented and grown? The point is that sound management of infrastructure requires strong storage just as much as strong software.
- **Application specific considerations:** Some users might think their storage decision—indeed a hosting versus hosted decision—for these marquee Microsoft applications matters less when the server environment itself (whether *onsite* or at a public cloud) is being consolidated and virtualized. But the opposite can hold true: Well-integrated storage with advanced functionality can address application challenges; for example, it can provide faster backup, application aware recovery, and better utilization/provisioning.
- **Big-picture considerations:** There are invariably many more moving parts in any organization than just one application and its accompanying storage. For application or storage owners to make this choice in isolation from those *other* aspects is just as bad as making it in ignorance of each other. Furthermore, without this cooperation, it is all too easy for others in an organization to make unilateral policy decisions, so that suddenly, by default, Dropbox and Google Docs (for example) are everywhere. Beyond addressing such challenges, an optimized storage approach can deliver added value both operationally and financially to not only specific applications, but also across the entire IT *infrastructure*. And of course, a public cloud can limit or preclude the ability to use the “latest and greatest” technologies or to customize applications, whereas private infrastructures keep all the options more easily open.

<sup>1</sup> Source: ESG Research Reports, [2013 IT Spending Intentions Survey](#), January 2013 and [2012 IT Spending Intentions Survey](#), January 2012. All other ESG research references and charts come from the 2013 research report unless otherwise noted.

<sup>2</sup> This shorthand term refers to either Office20XX, which is run internally by organizations, or to the hosted version Office365.

## Drivers to Cloud Usage

Before moving to address the various factors that users should consider when choosing an optimal storage approach for their major Microsoft applications, it is worth a reminder of why users turn to an outsourced or hosted model in a general sense. There are—all else being equal—two major reasons:

- **Cost Efficiency** – a belief that the task or application can be done at a lower cost in an outsourced/hosted/cloud model
- **Operational Effectiveness** – a belief that the task or application cannot be done as well, or as flexibly, or at all, by the in-house IT operation

It is easy to assume that both of these are the natural traits of a cloud or hosted approach. Indeed, if either or both of the above apply, then using a cloud model probably bears considering. However, sometimes the existence of advantage in these respects is based upon assumption or perception; and the fact is that “all else is not equal” in many situations. Whether this is because of differences in the level of security, or of erroneously looking at one application in isolation, or perhaps of not considering ROI as well as TCO, many factors need to be taken into consideration.

Additionally, messages coming from Microsoft and others can serve to muddy the waters. For instance, even in 2010, ESG found that 18% of organizations were planning or evaluating the outsourcing of their primary e-mail application—perhaps encouraged by Microsoft’s statement that certain features in Exchange Server 2010 were optimized for a “cloud delivery model.”<sup>3</sup> But, it’s erroneous to assume that a well-implemented private virtual cloud approach cannot serve at least as well...and might conceivably offer additional benefits.

## Overall IT Considerations

Although it may seem obvious, nothing in IT happens in a vacuum; everything has repercussions across the system either in terms of access, integration, cost, or something else. With a general move towards consolidation (via virtualization, convergence, etc.,) and an understandably extreme focus on managing costs (see Figure 2), it is clear that for the majority of users most of the time, it only makes sense to make decisions about how and where to run and support their key Microsoft applications in light of the overall IT strategy and parameters. In light of this topic, two key areas stand out: one IT-focused and one more business-focused.

**Security:** As shown in Figure 1, security is the number one IT priority reported respondents to ESG’s annual spending intentions survey this year. Not only is it a vital overall priority but security concerns are holding back existing cloud users from more pervasive use, and holding back non-cloud users from adoption (see Figure 5). Clearly, this is a higher-level point than merely the outsourcing or hosting of, say, Office365 or SQL Server, but it is nonetheless a crucial overall consideration for how IT should proceed in many organizations. This concern over security in/with the cloud will often be a trump card in decision-making, and drive users to remain private.

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<sup>3</sup> Source: ESG Research Report, [E-mail Archiving Market Trends](#), May 2010.

Figure 1. Most Important IT Priorities 2013



Source: Enterprise Strategy Group, 2013.

**Analytics and Collaboration:** When looking at the business initiatives that impact IT expenditures, the top categories are exactly those that might well be intuitively expected: cost reduction, business improvement, and risk management. But the trend research in Figure 2 reveals a couple of other crucial insights, which are both reliant upon system and application integration and hence not conducive to the piecemeal outsourcing of applications to a cloud hosted model.

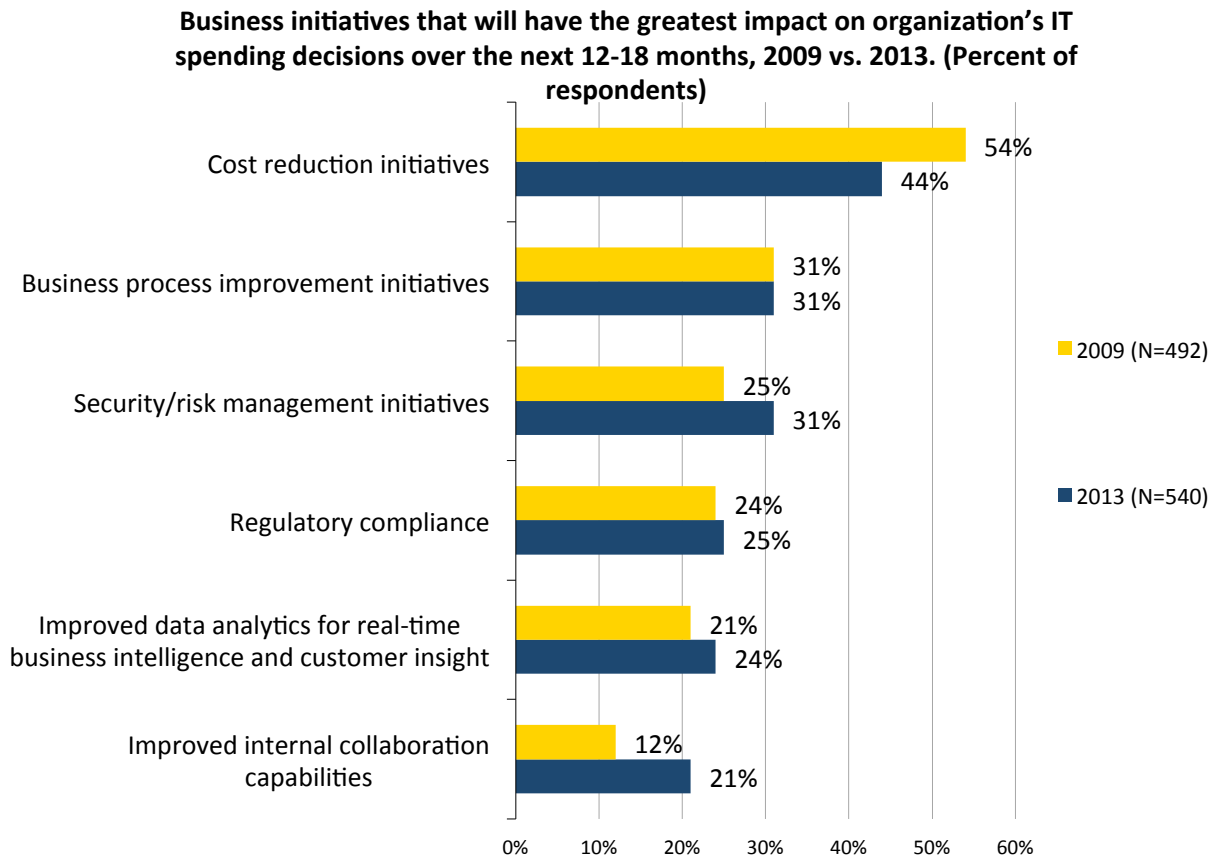
Data analytics has bounced back in importance (multiple ESG research points support this); and improved internal collaboration capabilities have grown steadily—up by 75% in the last four years. Both initiatives are invariably dependent on integrated applications and the ability to share data. Splitting off islands of applications and storage—for instance, SharePoint on one cloud and Exchange on another—is not an easy implementation with which to support analytics and collaboration well, or at all<sup>4</sup>. Of course, cloud storage per se is not ruled out *if* it is *integrated* with the on-premises infrastructure as part of a hybrid approach (but that is a very different model from an outsourced, hosted model).

Indeed, corporate IT organizations have been moving away from distributed processing and storage for a while; the original reasons to adopt a distributed approach (mainly cost and speed) have been addressed by more centralized efficiency and higher utilization levels of consolidated, pooled resources. We like and have retained—indeed, are extending—the distributed *and* mobile consumption, access, and use of data, but we are striving for central control

<sup>4</sup> It is worth noting that Microsoft is moving towards a model where it does not concentrate on individual applications but instead offers a suite of applications that are closely aligned to features and release cycles (for instance, “Wave15” which included Exchange, SharePoint, Office and Lync). This grouping of applications is an additional factor that makes it even more difficult to split off islands of applications so that some are in a public cloud and some are hosted locally.

and sharing of resources (including data). This approach combines the best mix of flexibility and economics—and it is something that cloud-hosted applications promise, but genuinely achieving it via the cloud once the TCO and ROI are investigated alongside higher level IT requirements (such as security and collaboration) may be cutting off your operational nose to spite your IT face.

Figure 2. Business Initiatives Impacting IT Spending Decisions 2009 vs. 2013



Source: Enterprise Strategy Group, 2013.

## Application Specific Considerations

The nature of an end-user’s implementation of and expectations for an application can have a notable impact on whether or not it is a candidate for cloud hosting. Certain factors might preclude implementing any or all of a user’s applications on anything other than a private infrastructure. At a high level, some key factors are:

- **Customization:** Any customization of an application can lead to issues, especially in a hosted environment. While some applications, such as SQL Server, have some inherent configurability, many users go further and deploy advanced customization via VD Scripts etc., which are hard to support in many clouds.
- **Refined (granular) security:** Adding to the security concerns mentioned earlier, tools such as data masking are even more important in a hosted environment (in a private infrastructure your IP address alone should enable identification and appropriate passing or data removal). But in a cloud hosted scenario, this becomes much trickier; data masking, as an example, tends to be unsophisticated.
- **Integration requirements:** This extends the point regarding analytics and collaboration. Say for instance that an on-prem SAP application determines an event condition that requires an e-mail to be sent: If Exchange is hosted in the cloud, then this might not happen well or at all and could compromise the supply chain. CRM and HR are other examples where data connectivity and integration to and across prime

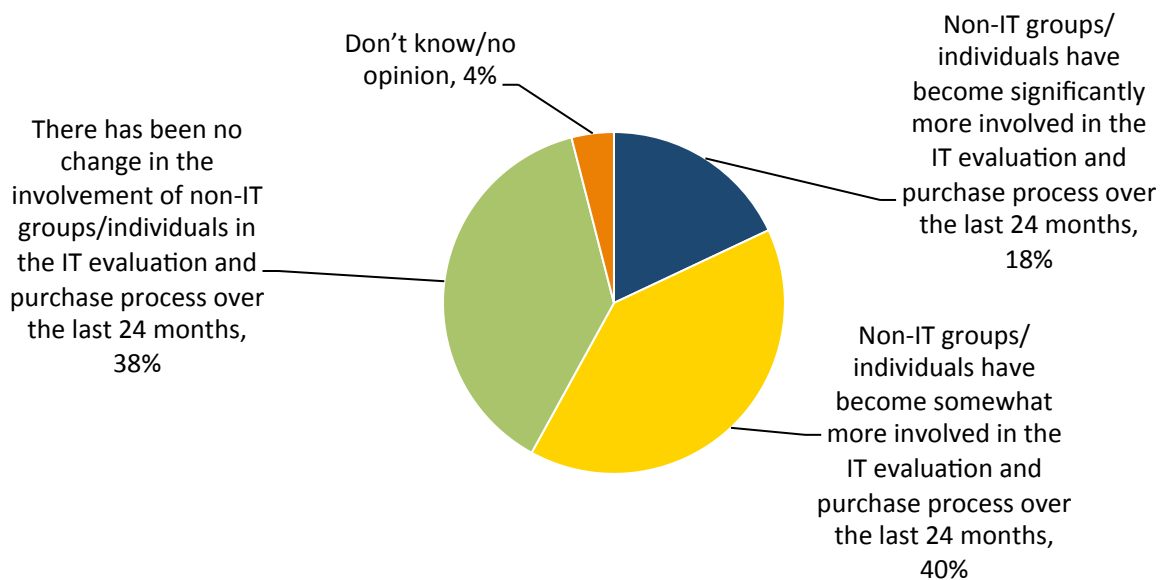
Microsoft applications is vital: No one wants her mission-critical business held hostage to the uncertainty of integration and networks.

- DR, HA, network latency, software upgrades:** All of these can be subject to delay and added difficulty if parsed across clouds. The simple generation of mission-critical executive reports can be compromised. Network vagaries often extend beyond the obvious performance variability to security and HA questionability. And it's naive to think that software upgrades are straightforward in large, complex environments which require testing against multiple (often old or adjusted) code levels.

Another reason for storage and application managers to jointly focus on optimizing the storage structure is to preclude too much unwelcome "advice" from the increasing involvement of non-IT personnel (see Figure 3) in IT decisions.

Figure 3. *The Growing Involvement of Non-IT Personnel in IT Evaluation Processes*

**Which of the following statements pertaining to the involvement of non-IT groups/ individuals (e.g., CFO, line-of-business managers, etc.) in the IT evaluation and purchase process over the last 24 months is accurate? (Percent of respondents)**



Source: Enterprise Strategy Group, 2013.

These non-IT personnel are not only involving themselves where they might be expected (for instance the fact that marketing professionals are involved in website decisions is logical and reasonable) *but* the fact that 46% of the marketing respondents said they had made evaluation and purchase decisions outside the purview of and/or without approval from their IT organizations for website development is no doubt of more concern to storage and application owners alike as it can lead to non-standard and/or sub-optimal outcomes. Even more surprising, 26% of the marketing professional respondents attested to having also made such unilateral decisions for both cloud computing, storage and/or backup and business software (i.e. applications delivered as a cloud computing service). The obvious concerns are of lessening adherence to corporate standards and a lack of appreciation for higher level IT concerns, such as security and collaboration. Clearly the point here for storage and application managers is that they need to make company-wide policy decisions—that are both optimal *and* seen to be optimal—in order to prevent the growth of unsupported cloud applications and/or risk individual departments moving to the cloud in a haphazard fashion, and potentially against the wishes of corporate IT? To quote a well-worn phrase, in this situation the best defense is a good offense!

Much as overall IT considerations and the demands of applications matter, we now turn to another crucial element in this review: the ability of the public cloud to support mission-critical applications.

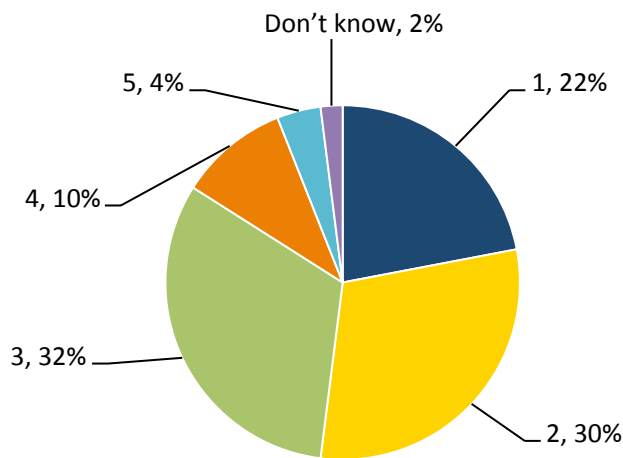
## Public Cloud Considerations

Because the public cloud encompasses so many providers and abilities, and there are plenty of obvious concerns (e.g., price, security, CSP viability, etc.), this paper will raise some of the less obvious, but still crucial considerations. The first of these is that using a hosted service for one, or some, applications creates an **operational silo**. It is a well-accepted notion in IT that avoiding such silos is beneficial—not only operationally (integration, collaboration) but also financially (consolidation, utilization).

That’s why networked storage is so well used, and why DAS is less popular as a prime storage approach; as the world becomes more virtualized and dynamic, so this trend will most likely continue. And yet, ironically in many respects the outsourced hosting of an application has more in common with DAS (perhaps Direct Attached Application (DAA) would be a better term!): It creates an IT silo. Worse, the likelihood is multiple silos because public cloud users tend to use more than one provider (see Figure 4).

Figure 4. *The Use of Multiple Public Cloud Providers*

**Approximately how many unique public cloud service providers does your organization currently use? (Percent of respondents, N=50)**



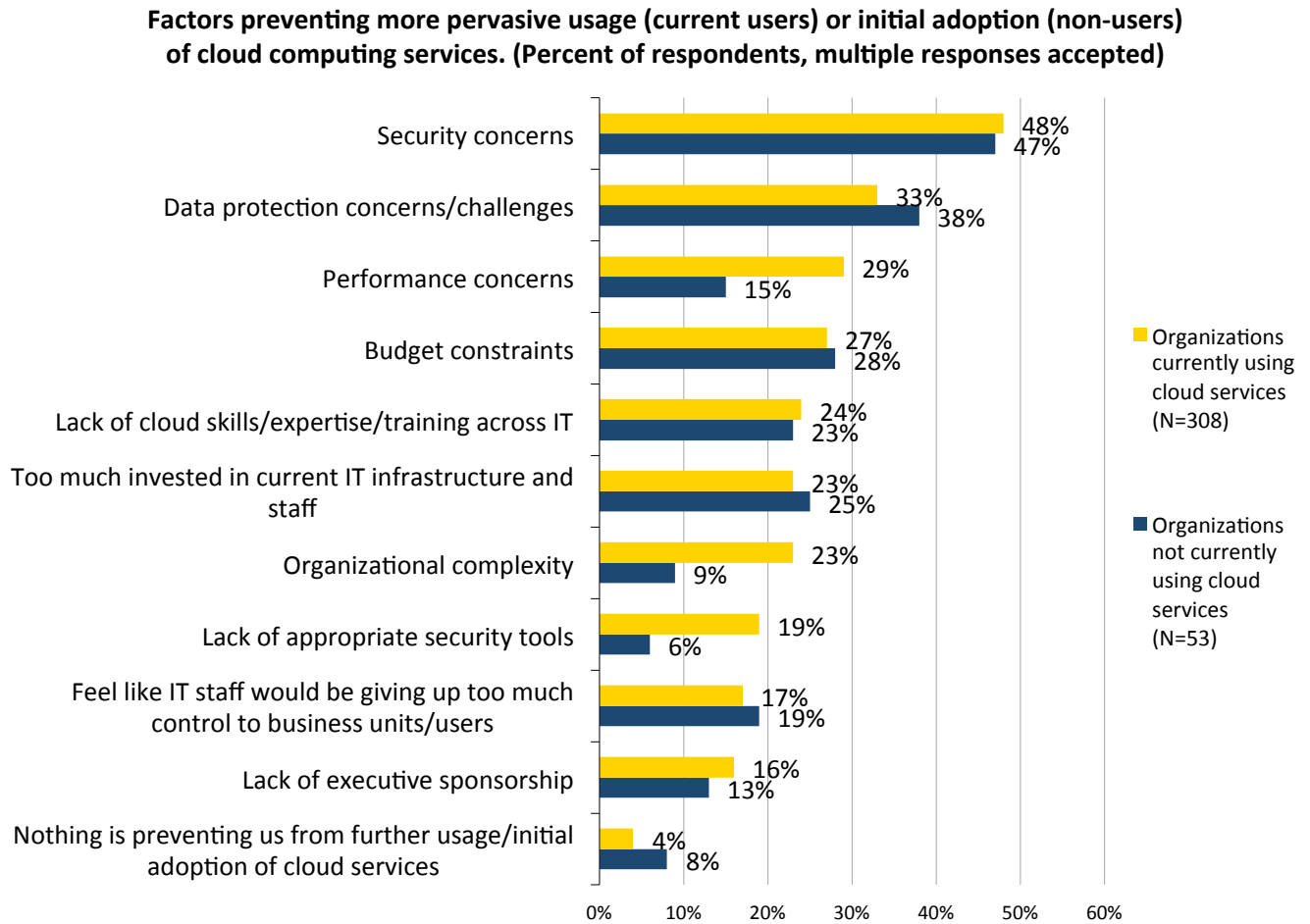
Source: Enterprise Strategy Group, 2013.

Indeed, 76% of the respondents were using two or more cloud service providers, with nearly half at three or more.

The research in Figure 5 reinforces the idea that **security concerns** are the number one reason that current cloud users don’t extend their usage, and also the number one reason that others have not yet adopted the cloud. But the data is also interesting from another perspective, and probably even more concerning for public cloud providers in the long term. When looking at the **performance concerns, organizational complexity, and lack of appropriate security tools, organizations actually using cloud services have more concerns than non-users.** In other words, these factors, which combined represent **quality of service (QoS) question marks**, are bigger obstacles to more cloud usage for those already familiar with the public cloud. A reasonable interpretation is that these aspects of the cloud are not as good as users had expected or wanted.



Figure 5. Factors Preventing the More Pervasive Usage/Initial Adoption of Cloud Computing Services



Source: Enterprise Strategy Group, 2013.

Other ESG research (and common sense) confirms that security, performance, and ease-of-use are all important desires for key applications and the underlying storage. Indeed, ESG also found that the most important message a storage vendor can provide is that of offering the highest performance.<sup>5</sup> Since storage performance is such an important capability/message in general (i.e., in traditional, onsite storage environments) it is therefore logically a table stakes consideration for cloud offerings. If cloud is not living up to performance expectations, then putting mission-critical and/or performance sensitive applications in the cloud starts looking questionable. The Microsoft applications covered in this report—Exchange, SharePoint, Office (20XX or Office 365), and SQL Server—are very often mission-critical.

Finally, there is the issue of **compensation** and **guarantees**; the Microsoft applications in this paper are the bedrock of many organizations. Cloud QoS offerings are often simply not sufficiently robust. What is the real long-term reliability? How do differing clients get to share availability and performance? What is the compensation?

## Storage Specific Considerations

If there are concerns over using the nascent public cloud, then application and storage owners will want to ensure that their bedrock Microsoft applications run on a storage foundation that is both suitable and solid. Getting effective results for any application—but especially a data-intensive application—depends on the careful selection and marriage of software and hardware. While there are bound to be many application-focused IT professionals who believe that Microsoft is hitting the ball out of the park with the latest versions of SQL Server 2012, Office,

<sup>5</sup> Source: ESG Research Report, [2012 Storage Market Survey](#), November 2012.

SharePoint, and Exchange, some of those same people may be very disappointed if they provision these best-of-breed applications with sub-optimal or limited storage systems.

## Cost Efficiency

A key concern is the economic efficiency of storage. In the real world, there are precious few instances where ultimate performance must be achieved regardless of cost. In the vast majority of cases, performance must be balanced with cost. Of course, QoS also matters and this forms the other leg of the stool: Storage matters for applications because it can determine, and hopefully enhance, the business results, efficiency, and cost-effectiveness achieved by those applications. However QoS is measured—be it response, availability, data integrity, carbon footprint, lack of downtime, cost per query, or whatever—the strength of the overall application experience is only as strong as its weakest link. Having detailed conversations about the needs, expectations, and planned growth of the underlying storage system supporting these central Microsoft applications is crucial to preclude it being that weak link.

Moreover, few if any users run just these four Microsoft applications and nothing else. In other words, whatever storage a user chooses should “play well in the overall IT sandbox,” especially as workloads are increasingly virtualized and thus required to share server and storage resources. Both for the specific needs of these applications and for the general needs of a data center, when it comes to storage, users should be looking for choice, flexibility, and advanced features.<sup>6</sup>

## Operational Effectiveness

That said, some of the Microsoft applications almost paint a picture of what they need in terms of storage. For instance, SQL Server 2012 effectively demands resilience and clustered high performance to support its “Always On” (a phrase that really means HA) ability; further, it needs a storage system that can cope with both scale and the I/O stress that results from the self-service Business Intelligence that SQL Server 2012 enables; and finally, it needs flexibility and integration with its own private-cloud-like approach and its virtualization of physical database servers. All these requirements demand a sophisticated networked storage solution, of the type EMC offers (see next section). By contrast, a DAS approach has limitations in terms of HA and data protection, can lead to data trapped on storage islands, and often achieves lower utilization levels so that its attractions of efficiency and economy are often a mirage. As already explained, an application in the cloud can be equally trapped.

Whatever your eventual choice of (presumably non-public cloud) storage, you must be cognizant of both your operational necessities and desired functional abilities. For example, when ESG asked users to indicate the length of downtime their organizations’ data analytics platform could tolerate before their organization experienced significant revenue loss or other adverse business impact, over half (53%) said three hours or less (and more than half of those (27% of the total) said less than an hour or no time at all. Moreover, 37% said they would pay a premium for HA in a data analytic platform.<sup>7</sup> This is important for two reasons: First, it confirms that much of the public cloud is not a suitable place for data analytics; second, such data analytics tools are likely to require integration with other applications, so the issue could be the same or compounded if key contributing applications (such as SQL Server) were to be on a hosted platform.

The strong requirement for HA is not just for data analytics, however—it was a clear leader when ESG asked users about their “must have” features when purchasing a storage system (see Figure 6). There is no reason to assume that this list would vary much by application—and certainly there is every reason to assume that crucial applications such as SQL Server, Office, SharePoint, and Exchange would need much or all of the features listed in Figure 6. Clearly, the need is for a range of broadly capable storage systems.<sup>8</sup>

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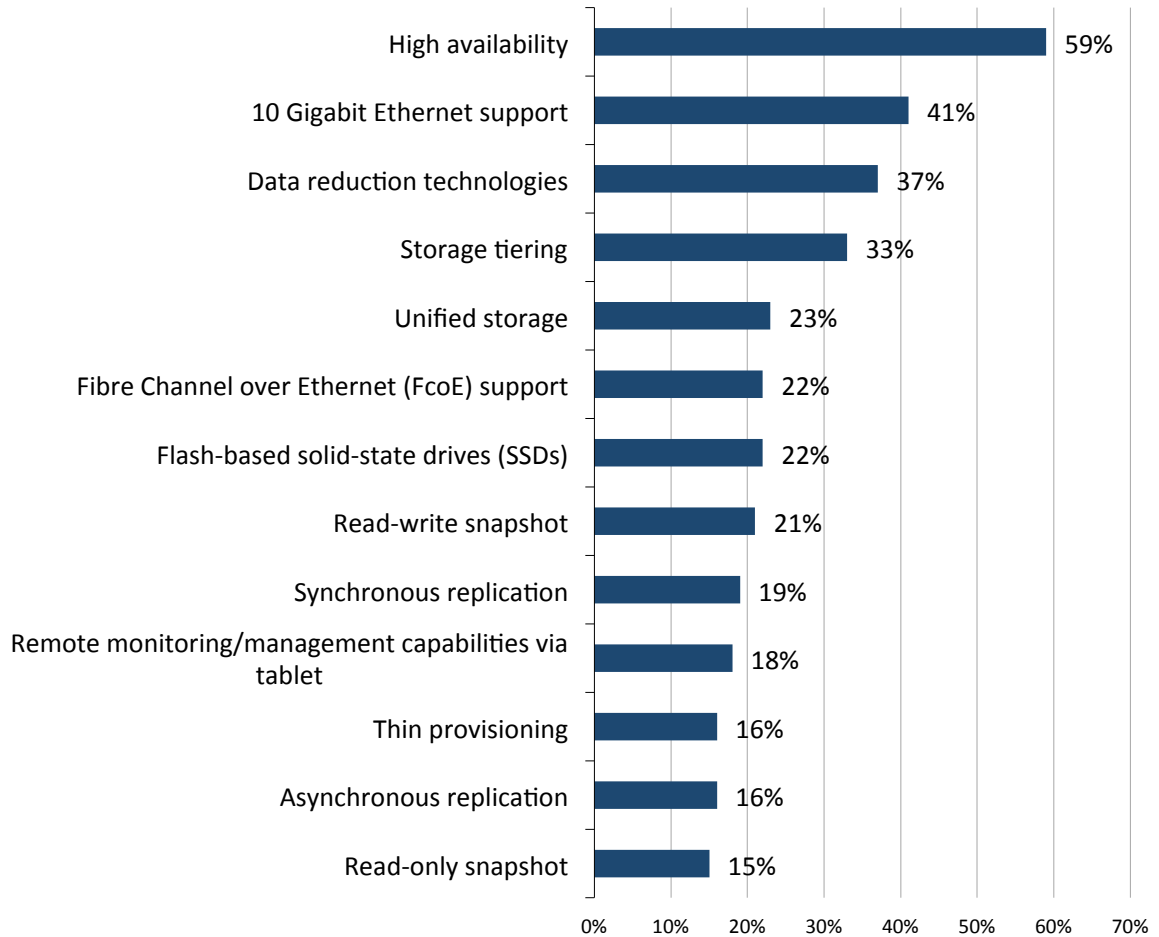
<sup>6</sup> The preceding two paragraphs are edited and adapted from a previous ESG White Paper, *Why the Correct Information Infrastructure Is a Crucial Consideration for SQL Server 2012 Implementations* March 2012.

<sup>7</sup> Source: ESG Research Report, [The Convergence of Big Data Processing and Integrated Infrastructure](#), July 2012.

<sup>8</sup> Source: ESG Research Report, [2012 Storage Market Survey](#), November 2012.

Figure 6. 'Must Have' Storage System Features

Which of the following features would you consider to be "must have" when it comes to purchasing storage systems? (Percent of respondents, N=418, five responses accepted)



Source: Enterprise Strategy Group, 2013.

## EMC Storage Portfolio: Private Virtual Clouds

EMC offers a comprehensive range of products and services that are ideally suited to meet the heavy and complex demands of Microsoft's flagship applications, in terms of security, HA, share-ability, scalability, hybrid-media, and flexibility. Because EMC's products can (but do not have to) be constructed as a virtualized and private cloud, they enable such things as consolidation, tiering, and immense flexibility in virtualized server environments...all of which can help to deliver excellent business outcomes in terms of both operational effectiveness (getting the job done) and cost efficiency (getting the job done using as few resources as possible). Not only can EMC storage solve the issues that a cloud implementation would otherwise present, but it can add specific value.

### EMC Optimizes Microsoft Applications<sup>9</sup>

Once you have weighed the public cloud against the private and come down in favor of the latter, you will find that EMC not only has a range of products thoroughly tested to operate with key Microsoft applications, but also that these products can integrate with and complement those applications and thereby optimize your investments. Just

<sup>9</sup> Elements of this section are edited and adapted from another ESG White Paper: *Why the Correct Information Infrastructure is a Crucial Consideration for SQL Server 2012 Implementations* – March 2012

as crucial as the joint technologies is the cumulative, long-term investment in consulting services and integrated support made by both EMC and Microsoft.

Without having this paper become a lengthy diatribe on every EMC feature and capability, here is a selection of some relevant EMC offerings that can specifically address the needs of major Microsoft applications such as Exchange, SQL Server, SharePoint, and Office:

- **Symmetrix VMAX and VMAXe:** These are two of EMC's major storage platforms, and both offer multi-controller scale-out architecture. The Symmetrix family provides high levels of reliability and scalability with a modular architecture (that can provide seamless growth for Microsoft application environments, which is crucial for Exchange and SQL Server that drive enormous data volumes) and greater than five-nines availability guarantees (even when upgrading a controller), which maximizes the QoS. After the initial setup, VMAX/e uses virtual provisioning, which allows another TB of data to be provisioned in only about four minutes, providing extremely cloud-like flexibility. Data is automatically moved to the right level of storage (flash, SATA, FC drives) using FAST VP, which, according to EMC's figures, can yield up to 40% performance improvement with 40% lower cost (while the precise statistical interpretation of these numbers can vary, the point is that significant efficiency gains are to be expected). This is the product family for large, complex, mission-critical Microsoft application environments.
- **VNX and VNXe:** The EMC VNX family consists of a range of unified storage systems that work well in virtualized environments by offering a good balance of performance, simplicity, and efficiency. Where needed, they can be combined with FAST Cache—which extends the system memory with flash drives for real-time performance improvements—and FAST VP. Microsoft workloads can be set up quickly—in up to 80% less time—using the automatic tuning and configuration available with the VNX(e) platforms (it's worth noting that the VNX platform and the associated EMC configuration tools are included in Microsoft's Reference Architectures).
- **FAST VP, FAST Cache, XtremSW Cache<sup>10</sup>:** Helping improve Microsoft applications' performance and reduce costs, these three innovative technologies from EMC leverage flash technology to improve TPM, IOPS, and response time, while minimizing the performance-tuning efforts required of Microsoft application administrators: EMC's XtremSW Cache is a server flash caching solution. It uses intelligent caching software and PCIe flash technology to reduce latency and increase throughput to improve application performance. The caching optimization within XtremSW Cache automatically adapts to changing workloads by determining what data is most frequently referenced and promoting it to the server flash cache. The result is that the "hottest" data automatically resides on the PCIe card in the server, providing significantly faster response time to the request from the various Microsoft applications. While XtremSW Cache optimizes performance for latency-sensitive Microsoft workloads on the server, EMC FAST VP can be utilized on EMC VMAX or VNX platforms to allow Microsoft administrators to set storage tiering policies across applications and move workloads across FC, SATA, and flash drives to balance performance and cost as workloads change. Storage rebalancing and tuning occurs with applications online and—according to EMC's own numbers—can take 80% less time than traditional storage provisioning methods. The result is a higher QoS for Microsoft administrators, which is transparently delivered through the intelligent use of storage tiering and flash technologies.
- **More Backup Options:** Beyond the basic platforms mentioned, EMC has tools such as Data Domain, which is a deduplicated, disk-based backup system that integrates with all today's common backup tools. With huge available capacity, Data Domain systems can integrate directly with major Microsoft applications as a disk backup target or through backup software, including EMC Avamar or EMC NetWorker. EMC Avamar is a deduplication backup software and system optimized to back up virtual machines, remote offices, NAS systems, and laptops. Avamar integrates into the Microsoft applications by using an Avamar agent on the server, which ensures application-consistent backups and recoveries. EMC NetWorker is EMC's unified backup and recovery software that leverages Microsoft's Volume Shadow Copy Service (VSS) framework to

<sup>10</sup> Originally called EMC VFCache.

provide protection for all Microsoft applications. NetWorker is tightly integrated with Avamar and Data Domain, while it also supports long-term retention requirements with backup to tape. Across all these tools, it is important to note that the level of integration means that the Microsoft administrator can actually take control.

- **From Faster Recovery to Active-active Availability:** With the four major Microsoft applications becoming pervasive, ensuring fast recovery is a key requirement for most IT organizations. Most Microsoft application environments today operate on a model of active-passive standby systems, locally or remotely, for recovery. This can pose a challenge in terms of time-to-recovery as well as with the granularity of recovery of Microsoft applications. EMC offers advanced recovery solutions that permit active-active availability.
  - EMC RecoverPoint provides industrial-strength application protection in both physical and virtual deployments. It provides intelligent, dynamic synchronous and asynchronous replication for maximum availability and has advanced bandwidth-reduction technology—and integrated WAN deduplication—to make the most of the available bandwidth. RecoverPoint provides “DVR-like” recovery of replicated data to any point in time—and automated recovery of Microsoft applications to any event in time.
  - VPLEX: Many Microsoft users are global organizations. Optimizing the utilization of IT resources is crucial, yet traditional options—such as migrating applications—are labor-intensive and fraught with risk (lost productivity, data, or even revenue). VPLEX is a federation tool that enables HA and continuous availability across distance and heterogeneous storage platforms. Neither data center walls nor vendor choices need to be limitations to providing seamless uptime and transactional integrity as applications move or are accessed across infrastructure, time zones, or data centers.
- **Faster Provisioning of New Microsoft Applications:** The EMC Storage Integrator is built on Microsoft’s framework and allows for easy and fast Windows storage provisioning for non-storage experts via a familiar and agent-less Microsoft Management Console snap-in. Within the Microsoft Windows storage stack, ESI understands block and file, as well as physical and virtual; it provides reporting/mapping of volumes down to the storage arrays, which is very valuable in complex virtual environments. It can help as an inspection and management tool whether one of the Microsoft applications is storage savvy or not (SQL Server has little concept of storage for instance, while ESI’s application awareness maintains storage best practices for SharePoint).
  - There is further integration with Windows Server 2012—for example, Offloaded Data Transfer (ODX) that can move data among HyperV hosts without using host resources as long as the data is on a shared EMC storage array.
- **EMC Consulting:** Something of a hidden gem, EMC Consulting helps organizations manage their complex issues of information management by providing not only business insights and guidance, but also custom code development when needed, data warehousing advice and services, and analytics. EMC Consulting can also provide assistance to customers migrating to Microsoft (for example, to SQL Server 2012 from Oracle, DB2, Sybase, or previous versions of Microsoft SQL Server). Naturally, EMC Consulting can also recommend optimal uses for EMC’s wide range of capabilities. Perhaps this could mean taking advantage of Accelerated Microsoft Data Protection (EMC offers tools for advanced non-disruptive business continuity and disaster recovery across virtual machines, be they VMware or Hyper-V environments). Or it might be implementing snapshots optimally to produce clones of Microsoft workloads and enable easy, fast copies of real-world data that application administrators can use in a variety of ways, such as testing and development.
- **EMC and Microsoft:** The extent and depth of inter-company relationships (especially with industry giants like Microsoft and EMC) can sometimes be taken for granted. But it should not be overlooked. While everyone claims to be a friend of popular partners such as Microsoft, the facts and numbers do the talking better than mere assertions. EMC is a Global Alliance Partner of Microsoft. It has more than 19 Microsoft Gold and Silver Certified Partner Competencies. And it has been recognized as Microsoft “Partner of the Year” 21 times. Naturally, many EMC consultants are certified as Microsoft MVPs, MCPs, and Certified

Architects. The two vendors have been jointly engineering and testing their products for years (including interoperability, management links, and certifications of EMC hardware, software, and support services for all major Microsoft applications).

## Choosing an EMC Private Cloud Over the Public Cloud

The bottom line is that Microsoft's flagship applications can be aggressive applications when it comes to the demands they place upon storage. EMC's abilities—and its suitability—for the Microsoft world are centered in its breadth (both in terms of scalable products and varied, advanced features) and its depth (in terms of support and consulting capabilities, and the corporate relationship with Microsoft).

That said, many users still turn to Microsoft (as one of a few strategic vendors in many organizations) for advice on multiple topics, including storage. Sometimes that advice can lead to uncertainty: For example, Microsoft's take on storage would seem to be that if you decide against, say, Office 365 on its own Azure cloud platform, then you might want to consider DAS for certain applications and, after that, pretty much buy anything. For all its reliance on storage and the greater interest it is showing, it is far from a storage-centric vendor. When you take an all-encompassing look at storage (from performance to HA, and from security to collaboration), there are many reasons for a large swathe of organizations to eschew both DAS and the public cloud...at least for now and for mission-critical applications.

Microsoft is invariably highly pragmatic about users' choice of infrastructure: After all, it would certainly prefer that you use key Microsoft applications—whether you are using Office 20XX or Office 365 instead of Lotus or Google Apps doesn't really matter to Microsoft, as long as you are operating SQL Server instead of other databases, which matters more to it than your storage choice.

## Considerations Checklist

Storage and application managers need to think—early, often, and broadly—about what their storage needs are, both in terms of specific applications as well as with regard to the umbrella IT aims and needs in their organization. It can be challenging to recast your mind, and especially to potentially swim against the tide of contemporary trends. As the eminent scholar J.K. Galbraith put it: *"Faced with the choice of changing one's mind and proving that there is no need to do so, almost everybody gets busy on the proof."* However, once you run through a checklist it, may be an easier task to eschew the obvious and trendy, for the optimum and valuable.

- Consider high-level organizational business and IT needs.
  - Remember storage is bought for multiple purposes and applications.
- Ensure collaboration between application and storage specialists.
  - What are the QoS needs?
  - Make no decisions in isolation (or without IT involvement).
- Review application needs in detail, such as integration, customization, and collaboration.
  - If an application must be HA, highly responsive, etc., then so must the underlying storage.
- Verify the precise capabilities of any potential public cloud adoption, especially with regard to security, performance, HA, and organizational ease/complexity.
- Thoroughly review the private/internal alternatives, such as those from EMC, especially the advanced functions and integration.
  - Do not assume that internal models are more complex or expensive.
- Align measurement and reward systems to encourage optimal behaviors.
  - People and processes can be as significant to an optimal outcome as technologies.



## The Bigger Truth

“The real act of discovery does not consist in finding new lands, but seeing with new eyes” - Marcel Proust

The bottom line here is to ensure that you are thinking early, often, and broadly about the intersection of storage and applications, as well as about the intersection of IT with the business. Looking again at these two things with an objective review of private versus public cloud approaches may lead to the ability to “see with new eyes.” Storage cannot be an afterthought.

Weighing the options will not always lead to one outcome; however, the more sophisticated the scale and range of an IT operation, the less likely it is that a cloud “island” of storage is going to be optimal for mission-critical applications such as SQL Server, Exchange, Office, and SharePoint, which cannot live in a vacuum and must operate free from concerns about security, variable performance, and questionable HA. These applications are foundational for many organizations and will deliver optimal value when their storage infrastructure has the flexibility and advanced functions to adequately support their dynamic needs.

EMC offers a range of technologies, products, services, consulting, and support that not only can support these key Microsoft applications, but can also help them to deliver enhanced value in terms of quality of service and economic efficiency.

The overall proposition is this: Good storage (such as that which EMC can provide) that is knowledgeably implemented can optimize application and business outcomes as well as cost. You have to start from what you need, and not from the latest buzz and trends. The best cloud storage you use might just be that which you build for yourself.



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