



When Buying Storage, Application and Host Integration Matters

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Management Summary

When enterprises buy storage, they want to know about performance, reliability, and scalability. They want to know about advanced software features. They also want to test the system. In other words, they want to know if a storage system will be a good match for their business needs. After all, business is going to depend on it.

An important storage capability to consider in this process is *application and host server integration*. **While this may not be top of mind, it addresses a relevant issue. How well does a storage system interact with heterogeneous hosts and applications?** Storage does not act in isolation; it has to work with and support other members of the IT environment. Integration makes this interaction happen and eases deployment and management. This is increasingly important for enterprise storage. At the same time, integration is a fuzzy concept whose value is not always appreciated or understood.

As an analogy, picture a water purification plant in a metropolitan area. The plant generates large volumes of clean water that homes and businesses need for drinking, bathing, and so forth. No one could go a day without this valuable resource. However, it is of little use without an easy way for people to access it. First, the water needs to be pumped through a distribution system to individual buildings. Then, internal plumbing draws the water to faucets and spigots – where it eventually flows out!

A storage platform is like the water purification plant. It is a valuable, shared resource. It stores large amounts of data and provides advanced data management and protection capabilities, such as snapshot copies, data migration, and remote mirroring. However, it is of little use without a way for hosts and applications to access it. First, the storage needs to be connected to servers and storage over a SAN, which is like the water distribution system. Next, it needs to be integrated at the operating system and application level, which is like the buildings' internal plumbing.

Integration is the final and necessary step to make a central reservoir of storage and data management available to the devices that consume it. It offers numerous benefits to a business, though not all integration is the same. Some approaches and solutions are more valuable than others. Read on for details.

IN THIS ISSUE

› Inorganic IT	2
› Making Storage Whole Through Integration	2
› Conclusion	3

Inorganic IT

You have probably seen organic produce in a grocery store and even organic coffee in a coffee shop. It is a growing trend. Aside from the technical aspects of farming, what does the notion of *organic* bring to mind? Something that is harmonious, whole, and consistent with the environment. Healthy – not artificial, unnatural, or risky.

By this definition, we would have to conclude that the modern IT environment is *inorganic*. It is an amalgamation of devices and components from heterogeneous sources and of many different types – computing, networks, storage, and applications. As such, it is not necessarily harmonious or consistent and certainly not without risk. To technology professionals falls the burden of stitching it together and hoping that when they flip the switch, everything works without hiccups or sputters.

Making Storage Whole Through Integration

Vendor integration has taken a prominent and necessary role in overcoming the challenges of heterogeneous IT. Integration ensures the pieces work together and, from the perspective of administrators, and are easier to configure and manage.

With the broad adoption of consolidated, networked storage (i.e., SAN and NAS), the integration of storage with host servers and applications has risen in importance. Integration occurs at three levels.

Basic Integration

Basic integration answers the question: Are devices interoperable at a minimal level? In other words, can they communicate and work with each other to perform the basic functions expected of them. Storage systems must be interoperable with the following.

- **Host operating systems** – e.g., Windows, Linux, Solaris, HP-UX, AIX
- **Network connectivity** – e.g., Fibre Channel, Ethernet/iSCSI
- **Network equipment** – e.g., switches from Brocade, McData, Cisco

This level of integration is largely based on standard interfaces, though it may also require customization. Testing is always necessary to ensure there are no unexpected problems or incompatibilities. Integration even at this level involves a commitment of time and resources, so vendors strategically choose the matrix of

products they will support.

The benefit of basic integration is the ability to deploy networked storage, whether SAN or NAS, Fibre Channel or IP. While direct-attached storage is dedicated to and owned by each host, networked storage is a consolidated, shared resource that servers multiple hosts and applications. It offers higher utilization, easier of management, and ultimately a lower total cost of ownership – all worthwhile business benefits.¹

Advanced Functional Integration

Advanced functional integration answers the question: Can host servers and applications leverage the advanced capabilities of a storage system? Beyond storing blocks of data in a RAID scheme, many storage systems can offer a wealth of data protection and management capabilities, such as:

- **Volume management** – The ability to provision volumes over a network and expand them online (to avoid disruptions) may require integration with the host operating system.
- **Snapshot copies** – These are useful for non-disruptive backup, fast recovery to a previous point in time, and repurposing data for testing, development, and loading data warehouses. Integration at the application level is required to avoid disruption and to ensure data consistency for fast recovery.
- **Redundant data paths** – Multiple paths with failover can improve both availability and performance. This capability requires special software or host integration.
- **Data recovery** – The ability to restore data quickly to a previous point in time requires integration with the application, especially if the recovery is at a granular level of individual records, files, mailboxes, or messages.
- **Server clustering** – Though clustering is a host capability, it may require integration with the storage system to function properly and support failover. This is certainly true when clustering over long distances and leveraging a storage system's remote mirroring capability.

Advanced capabilities like these improve the service levels of enterprise applications. For instance, online volume expansion and non-

¹ For more details, see **The Clipper Group Explorer** dated November 18, 2005, entitled *Networked Storage – Evaluation Criteria* and available at <http://www.clipper.com/research/TCG2005074.pdf>.

disruptive snapshots and backup increase the availability of applications, so users can stay productive. Redundant data paths and server clustering improve both availability and performance. Snapshot copies and granular restores allow applications to come back online more quickly and precisely, so users can get back to doing productive work.

With advanced functional integration, enterprises can uniquely apply these features to each application, according to business and service level requirements.

Management Integration

Beyond basic and advanced functional integration is management integration. It answers the question: Is it easy or even automatic for system administrators to leverage the capabilities of a storage system? It is one thing for storage administrators to manage a storage system using device managers or other tools. It is another for system administrators to be able to manage storage simply and intuitively within a host and application environment. The latter goes the extra mile to provide application and host integration at the management level.

Examples of management integration include doing the following within application or host management consoles².

- Provision and manage networked volumes virtually, as if they were local drives.
- Schedule non-disruptive snapshots and perform fast restores, even granular restores of individual files, messages, or records.
- Migrate data.
- Accelerate application upgrades.
- Establish redundant data paths.
- Establish server cluster on a networked storage volume.

System administrators are the skilled personnel who manage applications, databases, and host servers. Many also manage the storage associated with their application or, in a consolidated storage environment, at least specify requirements. They are the primary persons responsible for delivering the application as a service to the business. Management integration lets system administrators handle the storage

aspects of their applications expeditiously and with a measure of independence. It liberates storage administrators to manage the central resource, setting policies and limits without becoming a bottleneck in day-to-day tasks. In short, management integration promotes a healthy division of labor and overall ease of administration.

Conclusion

When considering storage systems, compare the obvious characteristics, like scalability and performance, but remember also to look closely at application and host integration. How well does the storage system interact with them? This makes a big difference in application service levels, ease of use, and long-run management costs.

Moreover, not all integration is the same. **Basic integration may be the necessary ante, but advanced functional and management integration deliver tremendous additional value.**



² That is, storage and data management interfaces are embedded in standard management tools and/or are graphical and wizard-driven, so there the learning curve is minimized.

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