

White Paper

NEC Brings Eye-catching Capabilities to Its Midrange Storage Portfolio

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Enterprise-class Storage for SMBs

The SMB Storage Market: There's an amazing array (pun intended!) of excellent storage systems today—in fact, it's nearly impossible to buy bad storage. The hardware—spinning disks, flash, or tape-based—is invariably functional, and the supporting integrated software is feature- and function-rich. However, how different vendors put these systems together is crucial. NEC is a company that, like most of its Japanese compatriots, produces exceptionally engineered hardware and software in its *storage* systems—something that remains, to many, an unfortunately well-kept secret.

NEC and ROI: No doubt you've heard of [NEC](#)—being the more than century-old company that it is—which has produced everything from PCs to supercomputers. But you may not have known that it also maintains a strong capability in the storage systems arena, and it has done so for a long time. These days, the company is targeting its storage systems at small and midmarket businesses (SMBs). NEC wisely picked the lucrative SMB segment for its latest M-Series family of SAN disk arrays—the Mx10—as opposed to the high-end enterprise space, which is dominated by other two- and three-letter-acronym behemoths. However, the Mx10 Series does offer a surprising degree of scalability that could satisfy the capacity needs of some large enterprises as well. The message is a simple one: SMBs can reduce their operational costs *and* have an extremely reliable storage system at a very attractive price with surprisingly full-functioning capabilities ... at levels not previously available to smaller organizations.

NEC—and, again, this is far from uncommon among Far Eastern vendors—tends to keep a relatively low marketing profile that belies its excellence in engineering, its rock-solid reliability, its cost-effective and enterprise-class functionality, and its highly respected service and support. However, in this age, knowing that one's specifications and capabilities are adequate and placing some information on the web is simply not enough. End-users and channel partners need to know about, and value, the company and its offerings. In addition to producing top-notch technology that is easy to implement and operate, NEC has created complete system capabilities that optimize the technology and set it apart from competitors.

ESG research supports the importance NEC places on providing affordable systems to SMBs. As Figure 1 shows, return on investment (ROI) was the most-cited consideration among respondents for justifying IT investments (38%), while reducing OpEx and business process improvement were very close seconds at 37%.¹ The systems that NEC is deploying that meet these user needs are members of its M-Series product family.

The NEC Mx10 Series: On November 4, 2014, NEC publicly announced the availability of the next-generation NEC “M-Series x10” storage systems—the M110, M310, M510, and M710. They each give cost- and quality-conscious SMBs a vastly expanded and *surprising* range of flexibility and functionality. This family of products should also appeal to SMB channel partners; they may play a pivotal role in advancing the Mx10 Series' adoption and determining its future.

SMB Storage Market Trends

The scale of any business operation doesn't (and shouldn't) inherently determine the range and necessity of the functions it needs. Smaller IT organizations should demand the same types and levels of functional sophistication that the “big dogs” have. However, SMBs also typically need higher levels of ease for implementation, operation, and management.

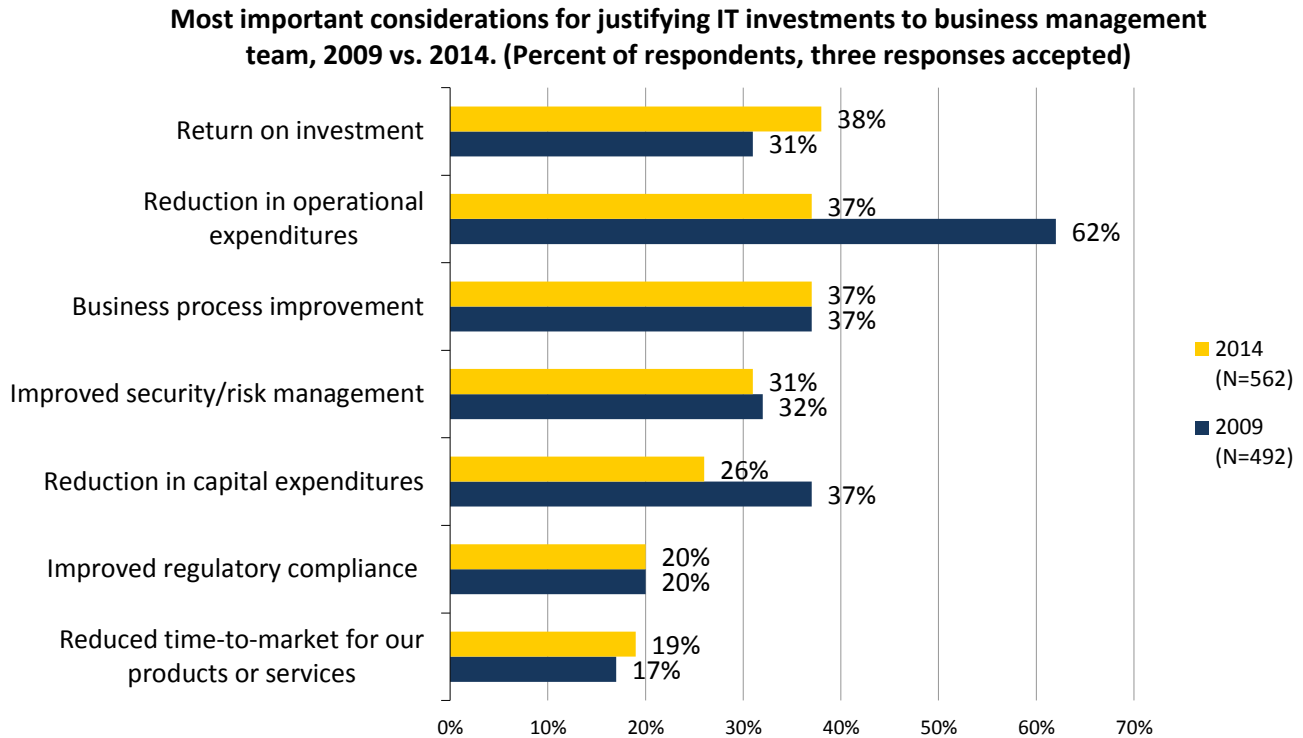
ESG is seeing an increasing amount of what once was “enterprise-class storage functionality” moving across the full hierarchy of product offerings from the major storage vendors—so today, few features and functions aren't available up and down the range of products. Surprisingly enough, NEC has been participating in this movement for a while.

For instance, ESG's 2013 *SMB Storage Market Trends* research report revealed that 76% of organizations were currently using or planning to use data replication; 59% were currently using or planning to use snapshotting, and

¹ Source: ESG Research Report, [2014 IT Spending Intentions Survey](#), February 2014.

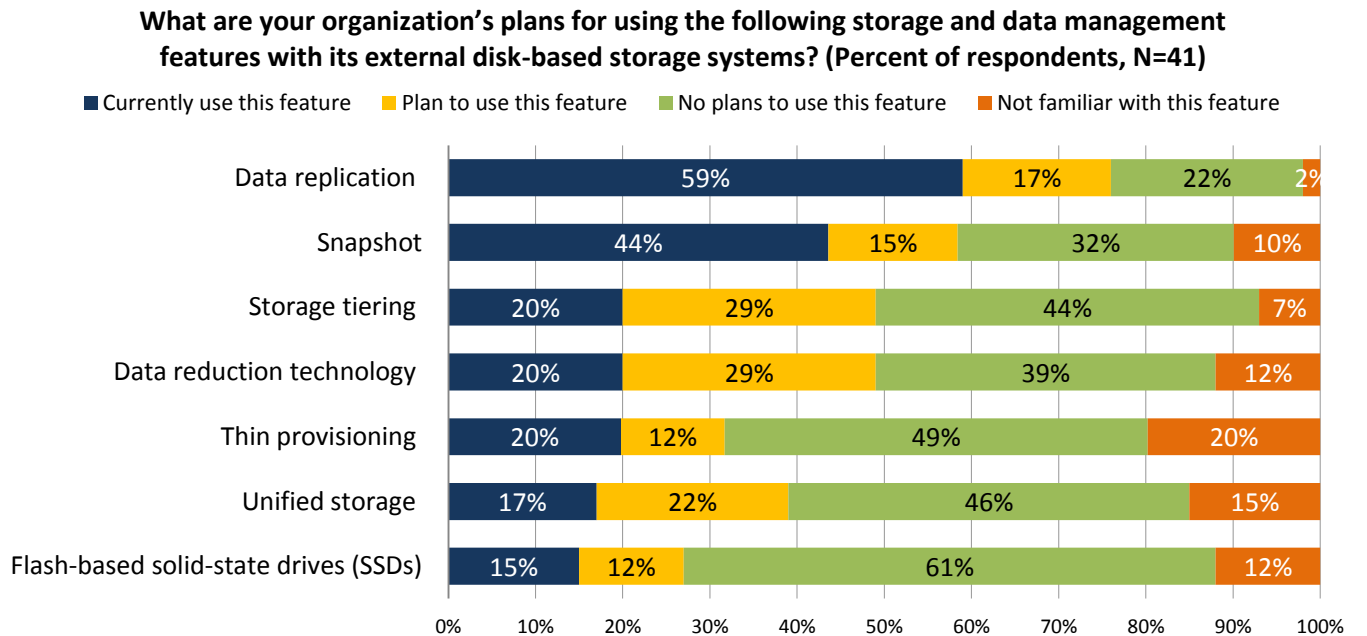
49% were currently using or planning to use storage tiering.² These vitally important SMB storage features—which, not so long ago, were only available at the high end of the storage world—dovetail with NEC’s storage product offerings (see Figures 1 and 2).

Figure 1. Most Important Considerations for Justifying IT Investments, 2009 versus 2014



Source: Enterprise Strategy Group, 2014.

Figure 2. Plans for Usage of Storage and Data Management Features with External Disk-based Storage Systems (IT Respondents)



Source: Enterprise Strategy Group, 2014.

² Source: ESG Research Report, [SMB Storage Market Trends](#), April 2013.

NEC Solutions Review

The new members of the NEC M-Series x10 family of arrays can be used for primary, high-capacity secondary, or efficient tiered storage infrastructures, all of which are becoming competitive requirements for SMBs. The Mx10 Series is powered by Intel's Xeon family of embedded storage processors and is designed to support the most popular operating environments: Windows, Linux, VMware, Hyper-V, HP-UX, KVM, Citrix, AIX, and Solaris.

The Mx10 Series range of products provides an impressive pedigree of functional capabilities:³

- **Data tiering:** A mix of drives can be supported (including SSDs, SAS, and Nearline SAS), and each offers different costs and performance. NEC's tiering ability automatically moves less frequently accessed data to lower-cost/performance devices. This allows workloads requiring high performance to have less competition for high-performing resources and enables users to operate the system in a cost-effective manner. Note that SSDs can be also be used as cache, or volume-allotted cache if desired.
- **Scalability:** The price-competitive and flexible M110 enables small organizations to implement a highly reliable system that is still able to run 90%+ of all Mx10 Series software. Usable capacities across the family start small and range all the way up to 3,033TB, supported by up to 192GB of cache in the M710.
- **Virtualization:** NEC brought together its in-house expertise in servers, storage, and network virtualization to get all layers in the virtualization stack working efficiently together. It has also ensured that LUN locking flawlessly preserves data integrity in hosted environments and similar multi-server access situations. As a result, the Mx10 Series is well suited for use in virtualized data centers, with flexible scaling and support for virtual operating system APIs.
- **Management:** The storage management software included with the Mx10 Series simplifies user configuration and management. Coupling the management software with NEC's performance management software enables users to configure, manage, and expand their systems; it can also be integrated into VMware as a vCenter plug-in. The easy-to-operate-and-learn navigational GUI is functional for both first-time users and seasoned system administrators, allowing them to quickly change replication settings, adjust capacity, and monitor disk loads.
- **Open Stack Block Storage Drivers (Cinder Drivers):** NEC has been an OpenStack Community⁴ Gold Member since April 2011. It has provided no-cost Cinder Drivers (block storage) support beginning with the Icehouse release of OpenStack that will operate with Red Hat Linux 7 Enterprise and Ubuntu 14.04 LTS.
- **Other notable advanced capabilities:**
 - Replication and remote replication—This is a powerful and increasingly sought-after ability.
 - Thin provisioning—Although pretty much a check-box item these days, thin provisioning is one of the easiest capacity-efficiency tools there is.
 - A power conservation capability—The PowerConserver feature provides OpEx savings through power-down of the motor of unused HDDs.

NEC Storage, Powered by Intel Processors



NEC has capitalized on its longstanding relationship with Intel by employing the Xeon processor E5 family of embedded storage processors. Up to eight cores power the Mx10 Series I/O controllers, supporting Fibre Channel, iSCSI, and SAS protocols. NEC reports that it will be working to incorporate new families of Intel processors into its Mx10 Series controllers as features and functions are added to the storage family. The new processors, coupled with increased cache and back-end speed, deliver up to four times better performance (based on internal NEC testing).

³ Elements of this paper were adapted from the ESG Brief, [NEC M100: A Flexible, Scalable Data Storage System for Virtualized Environments](#), October 2011.

⁴ For more information on OpenStack, go to <http://www.openstack.org/software/openstack-storage/>.

- SuperPhoenix—This is an efficient self-healing technology that has been carried forward to all the systems since it first appeared in the NEC M100 in October 2011. It dramatically slashes the number of drive rebuilds and increases the useful life of disk drives.
- Advanced cache management—This feature enables users to dedicate a portion of cache to a particular pool and share the rest.
- Secure Erase Technology—This tool provides an intriguing ability to completely erase all the array's data (should it ever be required) using methods defined by the U.S. Department of Defense (regarding scrubbing user data from a disk array per U.S. Department of Defense DoD5220.22-M). The tool provides users with added security, reducing the risk of data leakage resulting from a failure to properly erase information on a hard disk drive.
- VMware capabilities—These capabilities include the new "single-pane-of-glass" management of both server and storage (NEC's new software).
- New flow-control capabilities—These capabilities allow for setting minimum/maximum thresholds to protect priority logical disk performance in shared virtual or consolidated environments.

On top of all that, SMB organizations can benefit from the same essential unified software and management across all Mx10 Series arrays, which enables users to start small and expand seamlessly up the product line.

Channel Partner Experience: National Storage Specialist SI

According to the president of a national U.S. specialist storage systems integrator, "We are storage-agnostic implementation experts. We will use any storage product that will meet and solve customers' problems and needs. We emphasize federal government contracts, and their needs vary widely. We have dealt with NEC since 2008 and find its M-Series to be a great product in multiple situations. For instance, we use it as a cost-effective offsite replication or standby system, but we also enhance and virtualize it in order to use it as primary enterprise-level storage. Our customers have been very pleased with the NEC product, and just about every organization where we have implemented NEC storage has gone on to expand their M-Series footprint. We handle all first-level support and diagnostic calls, but when we need support, NEC has always been there and is both easy to work with and offers more-than-competent support."

Close-up: Mx10 Series Family Members

As a family, the Mx10 Series offers a high degree of consistency across its models (see Table 1 for an at-a-glance comparative model summary). From a hardware perspective, all models feature both iSCSI (available for M510 and M710 in Q2 2015) and Fibre Channel host interfaces, 8Gbps or 16Gbps Fibre Channel, 10Gbps iSCSI, and a unified adapter, which supports both Fibre Channel and iSCSI on a single controller, together with 12Gbps SAS connectivity (M110 only). Either 3.5-inch or 2.5-inch drives can be intermixed to satisfy a balance of performance/capacity and power/space consumption goals. The Mx10 Series can simultaneously support SAS HDD, Nearline SAS HDD, and SSD in the same enclosure.

NEC also promotes the Mx10 Series for its green credentials, including reduced power consumption, which can be utilized without having to give up performance or reliability. This is accomplished through the use of a power-efficient processor with a thermal design power (TDP) of 30W that enables the autonomous and cost-effective control of the system's operating mode. Additionally, the PowerConserver feature reduces power consumption by powering down unused HDDs until they are needed, and then they are powered up and put into use nondisruptively.

Key Enhancements

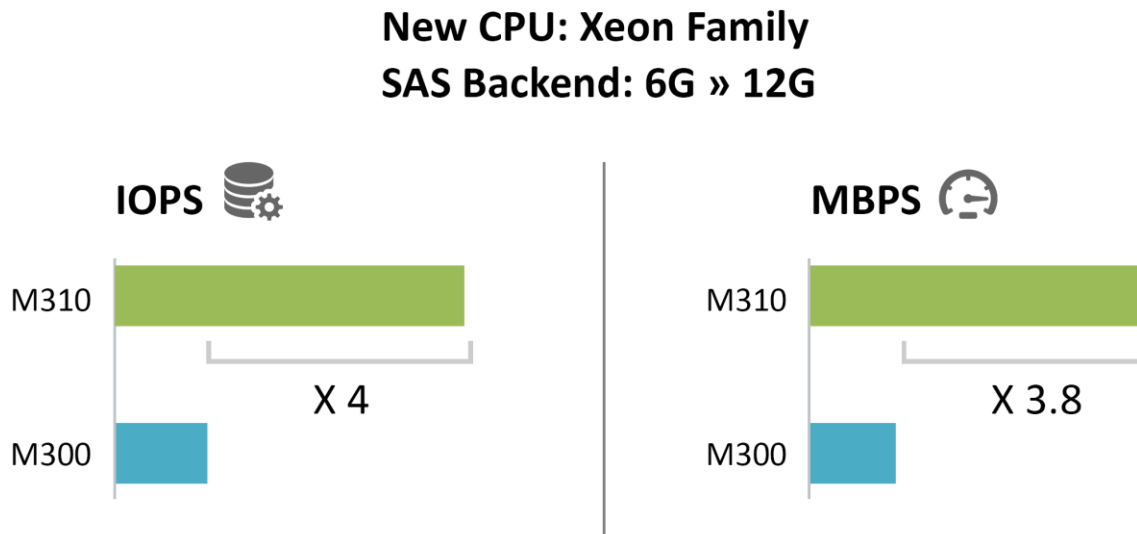
From a hardware perspective, the key enhancements to the Mx10 Series center on:

- Increasing back-end performance from 6Gb to 12Gb.
- Implementing 16Gb Fibre Channel across the front end.

- Implementing a new generation of Intel Xeon server processors.
- Making enhancements to capacity—increasing the number of HDDs by a factor of 2.5x to 3x.
- Adding a 1.6TB flash drive, which should allow users to exploit flash-related capabilities (such as data tiering and cache management) in larger environments.

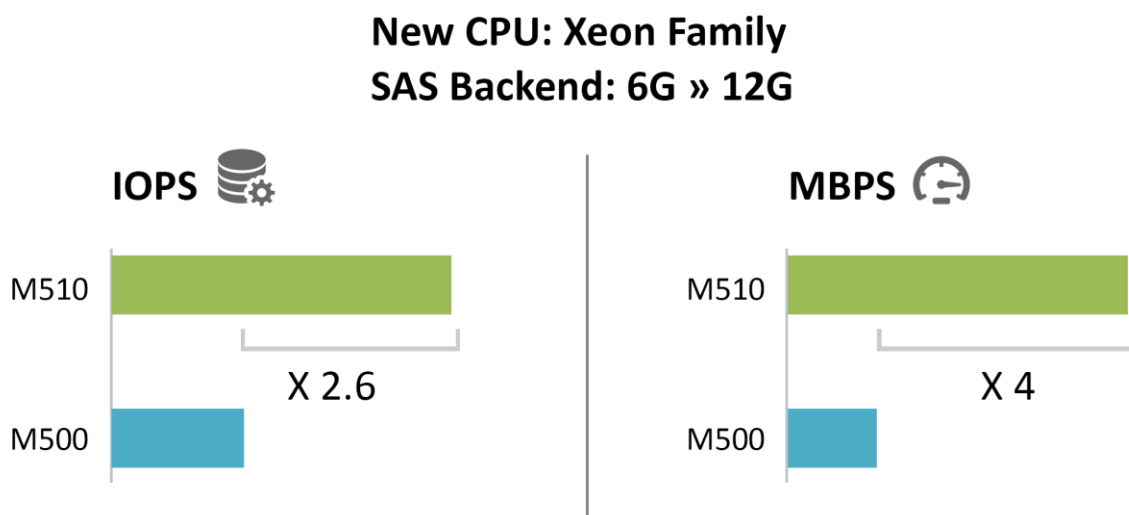
The enhancements also include **major performance boosts** (see Figures 3 and 4). Particularly with the M310 model, internal testing by NEC in Japan is showing a 400% increase in throughput. Even taking into account that this is an NEC-internal test, the improvements are significant.

Figure 3. M310 Performance versus the Earlier M300 Model



Source: Enterprise Strategy Group, from material supplied by NEC, 2014.

Figure 4. M510 Performance versus the Earlier M500 Model



Source: Enterprise Strategy Group, from material supplied by NEC, 2014.

Cloud Benefits

The “speeds-and-feeds” improvements to the NEC Mx10 family are impressive. But the picture gets much more interesting when one begins considering the ramifications the improvements might have.

For instance, consider cloud deployments. Organizations and service providers who maintain highly consolidated, virtualized environments could benefit greatly by adding a moderately priced midrange system that is flexible enough to enable scale out to a *much* larger configuration over time. Once the organization or service provider has the single controller, it would almost certainly be able to add more storage less expensively later on.

In the old M-Series world, one would need three M300 systems to do what can now be done quite comfortably with one M310. So, instead of having to own and manage three controllers, the organization owns and manages just one—that’s helpful from hardware-cost and OpEx perspectives alike.

And it does appear that when it comes to leveraging the systems in cloud deployments, the new M-Series family will be just as useful for smaller, regional cloud service providers as for private cloud implementations.

Software Enhancements

In terms of software enhancements, NEC has added a new VMware vCenter plug-in that is manageable via a single pane of glass, enabling an IT organization to examine the performance of servers and storage together. This upgrade, too, brings a business-related benefit—it gives IT admins a much clearer view into the environment and improves their ability to take action quickly, as necessary.

QoS Capability

NEC has also implemented a quality of service (QoS) capability. This capability enables IT to set minimum and maximum levels of logical disks used. As a result, the organization can start to stabilize performance for disk that supports the most important applications, while throttling disk that supports other, less-important apps (if they really don’t need to get much). The QoS capability also lets an organization “guarantee” allocation of a minimum level of IOPs to the important application, letting other apps fight for what’s left.

Implementing QoS in this manner to ensure that the important application’s end-users always see excellent performance is vital to the job of supporting the smooth operation of multiple VMs that all utilize the same shared storage subsystem.

Making Strong Statements

In general, NEC is trying to make a much stronger set of statements about its ability to provide help to:

- Regional cloud environments.
- Organizations engaged in private cloud deployments.
- Organizations that are consolidating (or virtualizing) many servers.

A Note on Disaster Recovery

For the M510 and M710 models, disaster recovery (DR) is based on the needs of the workload as opposed to the physical storage system. DR functions are able to create a group of volume pairs referred to as an Atomic Group (ATgroup), which requires consistency. When several DR pairs are registered to an ATgroup, data can be copied from the master volume (MV) to a replication volume (RV) in the order in which each volume is updated. Preserving that order enables the consistency of data maintained in the RV to be used for recovery. For example, when using a database for business tasks, consistency must be maintained among the volumes that comprise the database. Accordingly, all pairs in the volume that comprise a database are registered to ATgroups. When an ATgroup is created for each business task and each pair is registered, data consistency can be maintained in the RV for each business task. In addition, because ATgroups can be used to manage the state of individual groups, state displays and operations are enabled on a per-group basis, which means that the usability of RV data after a disaster can be determined on a per-group basis.

The vendor has unleashed enhancements tied to QoS and has simplified management with a single pane of glass—and it has provided the performance and scalability resources to do it all well. For example, NEC has added a 1.6TB flash drive, a level of capacity that was not available before. The SSD enables NEC to extend its ability to provide second-level cache, which is a layer of cache living between “primary” cache and a data service/store (such as a relational database) to optimize read operations on the service/store.

The end-to-end improvements overcome many earlier bottlenecks, and NEC believes that it is presently positioned as the leader in performance, thanks to the new enhancements.

In sum, NEC doubled the back end; it significantly increased the front-end host interface, and it increased the processor power. Essentially, it has “fixed” all the former bottleneck areas by a factor of 2x or more. So for now (until everybody else does it), NEC is likely justified in believing it can boast of having the performance lead. Table 1 displays a fuller list of specs and features for each new model in the M-Series family.

Table 1. Mx10 Series Features by Model

Feature	M110	M310	M510	M710
Maximum Usable Capacity With all 2.5" drives (top) and with all 3.5" drives (bottom).	113.2TB	453.1TB	725TB	906.3TB
	379.1TB	758.2TB	2,426.4TB	3,033TB
Number of Disk Drives The minimum and maximum HDDs supported.	3-120 (either 3.5" or 2.5")	3-240 (all 3.5") or 3-480 (all 2.5")	3-768 (either 3.5" or 2.5")	3-960 (either 3.5" or 2.5")
Cache Memory	16GB	24 or 48GB	48 or 96GB	96 or 192GB
Thin Provisioning Uses actual capacity efficiently to reduce operational expense.	X	X	X	X
Virtual Cache Partitions Provide stability in virtual environments by setting limits in the cache memory for each tenant to secure the I/O bandwidth.		X	X	X
Path Manager Used for redundant access paths and dynamic load balancing.	X	X	X	X
Storage Power Conserver Spins down inactive disk drives to reduce running costs.	X	X	X	X
Dynamic Data Replication (DDR) DDR provides replication and snapshots <i>within</i> the array.	X	X	X	X
Remote Data Replication (RDR)/Disaster Recovery (DR) RDR (on all M-Series systems) provides replication <i>between</i> arrays. DR (M510 and 710 only) enhances RDR to ensure coherency of multiple replication volumes by grouping multiple master volumes and replication volumes.	X	X	X	X
PerforOptimizer NEC's tiering automatically relocates data (LUNs or blocks) to optimal locations to use the disk array efficiently.	X	X	X	X
PerforCache Improves disk array response speeds by using SSDs as a secondary cache.	X	X	X	X

Feature	M110	M310	M510	M710
Solid-state Drives Enhance PerforCache and PerforOptimizer features.	X	X	X	X
960 x 4TB Nearline SAS Disk Drives Provide up to 3,033TB of usable capacity.				X
Encrypted HDDs Aid in data security.	X	X	X	X

Source: Enterprise Strategy Group, constructed from NEC data, 2014.

Market Relevance and Commentary

The Mx10 Series family of SAN storage arrays is surprisingly robust and complete. It offers a broad range of functionality, and therefore it has a broad market applicability—not to mention notable scale, since up to 3,033TB is hardly small! That being said, NEC knows its place. It has smartly pursued the SMB market because that is where it can most likely gain success. Until NEC has an even greater portfolio and, more importantly, more market traction, it would be “tilting at windmills” to aim at the very high-end of the storage market.

Prospective buyers may be somewhat wary because they may not have heard of NEC storage, *but* they will know NEC the company as a vendor with a strong reputation for quality and service. From a product perspective, NEC has put itself in a position to be able to carve out a worthwhile chunk of the SMB storage market among discerning companies that value not only engineering excellence, but also NEC’s strong support, its foundational relationship with Intel, and its business acumen overall.

In an ESG survey of 412 IT and business professionals working at small (99 or fewer employees) and midmarket (100 to 250 employees) organizations in North America, 63% of IT respondents said service/support was one of their top five most important criteria when selecting a data storage solution or vendor.⁵ Other top criteria were operational cost (48%), ease of implementation (48%), total cost of ownership (47%), ease of operation/management (41%), and acquisition cost (36%), affirming many of the things we have already discussed as being important to the SMB market.

Support clearly matters to NEC’s target market, and both of the channel partners interviewed by ESG for this paper complimented NEC’s ability to satisfy that need beyond simply having a sound product offering.⁶

On balance, NEC still has a few areas to focus on to strengthen its product offering. For example, its customers could benefit from having an integrated NAS capability even though today, users can get around the limitation with software (for example, Microsoft NAS software).

Deduplication is another area that warrants focus in the future; although it is hardly a common feature in other SMB-focused disk-based or hybrid systems yet, it is an area that will increasingly be of interest to users, and it would be good if NEC had it at some point in the future.

But overall, the Mx10 Series is surprisingly complete and should be a very good storage package for the SMB user.

Channel Partner Experience:

NetServe365

Justin Cameron is EVP and COO of NetServe365, a managed services provider (MSP) that has been deploying NEC storage for nearly four years, since one of its customers found NEC when searching the web. It turns out to have been a lucky break. According to Cameron, the attribute of NEC storage that his company values most highly is reliability. In his words, NEC storage is a “rock-solid platform” with plenty of redundancy that even includes an active-active model—something that is not typical in this class of product. While he notes the user interface could be improved, Cameron reports that the quality and availability of support—if it is ever needed—is top-notch. As an MSP, NetServe365 deals with a wide range of storage vendors, yet Cameron unhesitatingly describes NEC as “absolutely our best vendor.”

⁵ Source: ESG Research Report, [SMB Storage Market Trends](#), April 2013.

⁶ Both channel partners quoted in this paper were interviewed by the author specifically for this paper in late April 2014.

The Bigger Truth

It is remarkable for any company to have been around for more than a century. It is, therefore, a tad ironic that such a company suffers from a lack of awareness about some of its key products—as is the case with NEC and its data storage arrays. Getting the word out is, of course, largely a function of marketing, but the message means more when it is passed along as word of mouth from one satisfied customer or partner to another. Regardless of the delivery mechanism, a better-known NEC and Mx10 Series stand to gain additional distribution, awareness, and traction in the SMB marketplace.

NEC storage provides noticeably robust and economically attractive storage systems, with enterprise-class functionality, bona fide credibility, and rock-solid reliability. *And just because you've heard this kind of description before does not diminish its value and necessity when applied to a new potential source.* NEC enjoys an inherent degree of credibility in its engineering and its business value because it has spent a century developing a quality brand. Additionally, it has the size, financial resources, stability, and manpower to support its operations and provide high-caliber technical support. Like its storage products, NEC itself is rock-solid.

In an earlier ESG brief that analyzed the initial M-Series product, ESG reported on what NEC was claiming it would be doing in its near-term storage future.⁷ It is encouraging to see that it has actually done what it said it would do, by expanding to a broad range of function, scale, and usability. NEC's Mx10 Series storage portfolio is a credible offering and worthy of consideration.

The M-Series is growing up—going beyond being just a good “alternative” multi-purpose/general-purpose storage family to something that has real value pertinent to major trends that are driving the industry today, such as the need for consolidation, the appeal of cloud deployments, and the usefulness of/need for QoS.

It is interesting to note that although most companies talk the talk before they walk the walk, NEC has already nailed the walk—it just needs the world to know.

⁷ Source: ESG Brief, [NEC M100: A Flexible, Scalable Data Storage System for Virtualized Environments](#), October 2011.



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