

Product Brief

NEC M100: A Flexible, Scalable Data Storage System for Virtualized Environments

Date: October 2011 **Author:** Mark Peters, Senior Analyst

Abstract: A new system from NEC that balances performance, eco-operational, and cloud-centric capabilities, the M100 is an option for small and medium-sized business looking to deploy storage that will grow with them over many years. The result of extensive (yet little publicized) efforts by NEC to help users step off what the company calls an “endless forced-upgrade path for storage,” the M100 is capable of supporting fast-growing Windows, Linux, and VMware environments.

Overview

It is gratifying to see some of the interesting things IT vendors are doing with storage arrays these days. Even the smaller systems being unveiled are so functionally rich and operationally efficient that the pedestrian descriptor, “storage array,” has become arguably inadequate. Now we have a new case in point: the M100, a new entry-level SAN system from NEC.

This product should succeed in building upon the market success and customer base NEC established with its D-Series models. A replacement for NEC D3 and D3i systems, the M100 (powered by Intel’s Jasper Forest processor) is primarily intended for the three [most] popular operating environments: Windows, Linux, and VMware. It has been deliberately designed to support specific target applications, namely:

- Applications running in virtual, clustered, and hosted environments
- Messaging applications, specifically MS Exchange
- File services
- Disk-to-disk backup for disaster recovery and data protection
- Fault-tolerant applications, especially when used with NEC’s Fault Tolerant servers

M100 General Features and Differentiators

1. **Virtual Environment Focus:** Most pertinent with regard to current IT landscape trends, NEC is aiming this system straight at virtualized environments. The company has, for instance, built on over ten years of engineering and field deployments to ensure the system’s LUN locking flawlessly preserves data integrity in hosted environments and similar multi-server access situations.
2. **Scalability:** Users that add drives to a RAID set should see performance scale linearly. NEC’s capacity-related improvements have centered on designing the system to offer up to 96 drives (which is a current capability of 192 TB of total physical capacity based on 2 TB HDDs). Cache size has doubled, too, from 4 GB to 8 GB.
3. **OPEX Enhancements:** Efficiency features include support for massive array of idle disk (MAID) configurations, allowing for autonomous power-down of inactive drives. Energy consumption has greatly improved overall: NEC’s M-Series systems consume 26% less energy than their earlier D-Series counterparts. The M100 is also more flexible than its D-Series predecessors, now supporting multiple interfaces including serial-attached SCSI (SAS) for host connection.
4. **Drive Type and Density:** NEC has equipped the M100 to support multiple drive types, including 2.5-inch drives in their native form factors (for comparison, in the earlier D-Series arrays, these smaller drives were usable only if they were slotted into 3.5-inch drive carriers.) This change is significant because it enables the deployment of

twice as many drives in a given rack and behind a controller. The new system does, however, still support 3.5-inch drives.

5. **Subsystem Performance:** In the disk backplane, an M100 boasts twice the performance of its precursor D-Series systems. Those older systems were limited to a 3 Gbps SAS interface speed; this has now increased to 6 Gbps.

Virtualization and Cloud-centric Characteristics

Like the rest of the storage world, NEC is emphasizing virtualization heavily and the company has explicitly focused this product on supporting VMware environments. Theoretically, the M100 is capable of supporting any virtual environment (NEC has a long, close history with Microsoft's Hyper-V, for example), but with this product, NEC is showcasing support for VMware virtualization. From the time of its initial unveiling, the storage system has supported VMware vStorage APIs for Array Integration (VAAI) and VMware vStorage APIs for Storage Awareness (VASA).

NEC has also designed the M100 with notable cloud-centric capabilities.

1. One involves **storage pools**. If a pool encompasses multiple drives, the cloud provider (or the IT admin managing a virtual storage environment) can "carve" it into multiple subsets of different RAID types. Everything is easily managed as one large storage pool, yet those sub-pools—each with their own characteristics—will properly support the distinct needs of the specific applications relying on them. This is a feature that should keep the M100 on users' buying lists well into the future. The truth is that some customers will wish to use cloud features immediately; others will opt to deploy them over time.
2. The M100's second cloud-centric capability centers on its **support for multi-tenancy environments**. This system can assign a particular client to a particular portion of a cloud environment and keep that status perfectly intact. A solid multi-tenancy capability is very important, and as yet not all storage providers can do it extremely well or even at all.

NEC's "Undercover" Optimization Efforts Come to Fruition

One of the most noteworthy aspects of the M100 is its LUN locking technology. Why do NEC storage arrays do such a good job of maintaining lock stability in virtualized environments while other vendors sometimes struggle to achieve that result? It's simply the outcome of good engineering work that NEC has, for years, carried out with virtually (excuse the pun) no fanfare. This is no doubt partly due to the inherently low-key nature of its OEM go-to-market model and also a certain "Well, you wouldn't expect anything less, would you?" attitude that is common among Japanese vendors.

To get a little more specific on some of the functional values and use that the M100 delivers:

- With this array, a unique **database tracks all data-related transactions**. This database is constantly updated with profiles of client devices and the HBA. If any vagaries in client behavior crop up, quick disconnection prevents an open or indeterminate state that otherwise might damage data integrity or result in data being served to an incorrect client device. With almost no "trumpeting," NEC has invested a decade's worth of time, energy, and money to ensure its storage systems maintain a stable bus state.
- Another feature exemplifying NEC's underground engineering efforts is the **"SuperPhoenix" self-healing technology** embedded in M100 systems. The original Phoenix, introduced by NEC in 2007, reduced drive rebuilds by about 50%. With the SuperPhoenix extension, NEC increases that reduction rate further to roughly 80% below industry average. This is significant from both a cost and an operational expediency standpoint; after all, transient drive errors (Windows NTFS errors in particular) are very inconvenient: swap drives must be installed, "bad" drives must be sent away for diagnosis, and, if the failure can't be reproduced, the user will have incurred an operational interruption for nothing.
- When a drive in an M100 reports a problem, the system takes the drive offline, reroutes workloads to the rest of the RAID set, and reboots the drive to assess before-and-after read/write performance. If that evaluation reveals that the issue was simply a nonreproducible anomaly, the drive returns to service. No user intervention is needed.

- Another optimization effort relates to **formatting**, an often-lengthy process for big drives during initial system deployment. M100 systems can start handling write operations before formatting operations finish. As a result, large-capacity drives come online faster. NEC doesn't go "behind the curtain" in terms of how it ensures the reliability of the write-while-formatting operation, but, in any case, it is one more instance in which the company has quietly gone about engineering a better balance of large capacity, economy, and good performance for its customers.

Easy to Deploy and Scale

The M100's deployment process doesn't appear likely to cause undue strain, and the system offers a fairly no-fuss ongoing management environment. With the embedded iSM storage management software, expanding a RAID set or implementing thin provisioning (which comes as a standard feature on M100s) should be easily doable. Additionally, the system handles many routine processes on its own in the background.

NEC's testing indicates that the system should also scale very well. Capacity-addition tests caused no sudden slowdowns or gradually deteriorating incremental performance lags. In fact, NEC is trying to put its customers on a path to expand *all* M100 capabilities relatively easily. For example, in the area of virtualization, NEC has brought together its own combined in-house expertise in servers, storage, and network virtualization to get all layers in the virtualization stack working efficiently together.

NEC has told ESG that it is committed to offering customers a seven- to ten-year array deployment cycle. The company refers to this as "helping customers stop their forced-upgrade march." It is a smart move by NEC, one that is tied realistically to storage buyers' preferences even if their behavior is forced into other modes by vendors that change everything frequently. All users want to deploy storage quickly *and* have reliable, longer-term ways to resolve the issues tied to scalability, economics, and manageability that inevitably apply over time.

The Bigger Truth

The M100 achieved GA status in June 2011. But NEC did not make it available immediately in North America; instead, the company spent three months verifying M100 performance/reliability metrics, training support staff, and working with the NEC team in Japan to ensure commands and prompts would be clear to English-speaking users. At this point, NEC's OEMs and users have tested the system thoroughly, and they believe this product is ready to perform.

With the M100, NEC has focused almost all of its efforts on three operating environments that it believes can return the greatest value for both itself and its customers. The company is forthright in admitting that it is focusing on core applications running under Windows, Linux, and VMware. NEC understands data protection in these environments very well. It knows DR. It knows file services. It knows e-mail/messaging environments. And, in the coming months, it appears NEC will enhance support for data migration as well. The M100 is emblematic of NEC's efforts—almost silently, certainly impressively—to make the most of features that will offer customers the best possible value proposition and over extended timeframes.