



V3 Systems Reinvents Virtual Desktop Infrastructure with SanDisk® Powered I/O

Innovative solutions provider marries Fusion ioMemory™ storage with V3's proprietary layer to eliminate performance problems and budgetary guesswork from virtual desktop infrastructure.

Solution Focus

- Virtual Desktop Infrastructure

Summary of Benefits

- Supports 50 to 300 desktops per server
- Virtual desktop performance exceeds that of physical desktops
- Intuitive, centralized V3 appliance management via Vcenter with V3 Management
- Linear scalability
- Predictable total cost of ownership

The Challenge

Gartner reports that for every dollar an organization spends on hardware, it spends an additional \$3.50 to support it over its lifetime.¹ It's easy to see why organizations find virtual desktop infrastructure attractive. Virtual desktop infrastructure promises to help companies reduce total cost of ownership, increase business agility and continuity, enable anywhere access, and improve security and compliance.

However, the challenges of large-scale disk-based virtual desktop infrastructure deployments quickly outweigh these benefits. These challenges are:

1. Performance. The I/O constraints of disk-based systems result in poor performance. If a virtual desktop fails to perform as well or better than a physical desktop, end users complain and productivity suffers. Unfortunately, delivering the performance most enterprises need requires racks of hardware that quickly make virtual desktop infrastructure impractical.
2. High and unpredictable costs. The initial outlay to purchase NAS or SAN systems is enormous. On top of this, system administration, power, cooling, and colocation fees become an ever-increasing operating expense. Even organizations that can afford these expenses face the impossible task of estimating the right I/O for a system that does not scale linearly. Improper I/O sizing could result in performance bottlenecks and I/O storms, which hurt productivity company-wide and lead to additional unexpected costs.

The Solution

Peter Bookman, founder of V3 Systems, realized early that Fusion ioMemory products were a viable solution. Peter told us, "SanDisk's Fusion ioMemory ioDrive® cards allow data to be moved into the server onto a high-performance, high-capacity flash memory tier. This eliminates the problems of slow disk performance and network latency to storage."

Vaulting Virtual Desktop Infrastructure Performance Barriers

Traditional virtual desktop infrastructure solutions support a very limited number of concurrent desktops per server and delivering a good user experience requires a SAN or NAS system to handle high I/O loads.² Even with these complex solutions providing I/O, "login storms" or "boot storms" during peak traffic can slow performance or even bring the system to a halt.

1. Paquet, Why You Need a Storage Department, Gartner Research, June 2004.

2. Workload and idle time patterns make estimating static concurrent desktop counts next to impossible. Vendors recommend between 6 and 25 concurrent users per core depending on usage patterns. SanDisk-powered V3 systems increase performance and concurrent desktop support dramatically under all workloads.

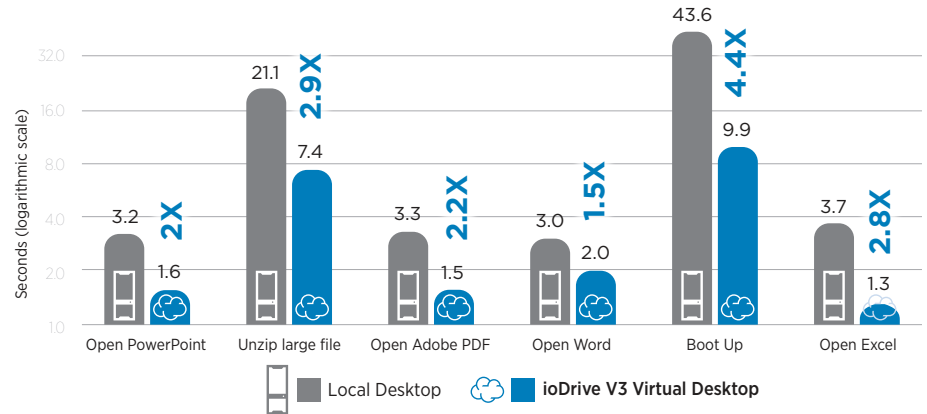
“Our V3 Local Storage Management (LSM) software provides virtual desktop infrastructure intelligent access to SanDisk’s flash, achieving superior performance. Typically, companies test virtual desktop infrastructure on users with the lowest needs. Recently, a law firm tested our product and were so impressed that their executives, IT staff, and power-users were the ones lined up for the first production deployment.”

Peter Bookman
Founder, V3 Systems

V3 appliances leverage Fusion ioMemory to decentralize process-critical virtual desktop infrastructure data, putting as much virtual data as possible very close to the virtual server CPU. Each V3 appliance elegantly handles traffic spikes and can support 50 to 300 desktops depending on user workload type.

In addition to serving a high number of virtual desktops, V3 appliances with V3 Certified Fusion ioMemory devices leverage enterprise server processors to do more than outperform a SAN-based virtual desktop infrastructure system. Desktop performance on V3 often exceeds the performance of physical desktops.

The chart below shows tests run by V3 that compare virtual desktop performance to that of a high-end workstation for a variety of common tasks.³



Peter said, “SanDisk’s ioDrive cards eliminate the I/O bottleneck and RAM constraints to allow each appliance to host hundreds of desktops. Our V3 Local Storage Management (LSM) software provides virtual desktop infrastructure intelligent access to SanDisk’s flash, achieving superior performance. Typically, companies test virtual desktop infrastructure on users with the lowest needs. Recently, a law firm tested our product and were so impressed that their executives, IT staff, and power-users were the ones lined up for the first production deployment.”

Delivering the Lowest and Most Predictable Total Cost of Ownership

The primary cost of traditional, disk-based virtual desktop infrastructure solutions is I/O, but because adding performance is incremental and far from linear, estimating system cost is next to impossible. Most organizations end up over-provisioning, which wastes resources, or they mistakenly under-provision, which harms the user experience and sends organizations scrambling to add more performance and extend budgets.

V3’s SanDisk-powered appliances require far less hardware than traditional solutions, which greatly reduces virtual desktop infrastructure’s total cost of ownership, including lower up-front costs and lower costs to maintain, house, power, and cool servers down the line. Equally important, with simple test deployments to measure the load of different performance profiles, V3 states their solutions scale at a predictable 50 to 300 desktops per server, making it easy to budget growth.

“CIOs and other decision makers want to know ahead of time how much a new technology will cost,” Peter said. “A short test deployment with V3’s monitoring capabilities quickly allows organizations to know the number of desktops each server can support in their environment. This cost will be far less, upfront and into the future, than any virtual desktop infrastructure solution currently on the market.”

3. V3 virtual desktops each had two virtual CPUs, 2GB RAM, and ioDrive datastore with the V3 Certified Storage Hardware layer. Physical workstation was an Alienware system with an Intel Core i7, 1.87 GHz Quad core processor with 8GB RAM and 500GB hard drive. The test was a script that emulated a 50 desktop, power-user load.

Making Desktop Management Simple

Another advantage the Fusion ioMemory system offers is its Virtual Storage Layer (VSL) API. V3 has leveraged this API with its V3 Local Storage Management (LSM) framework to enhance performance and add management software to its solution.

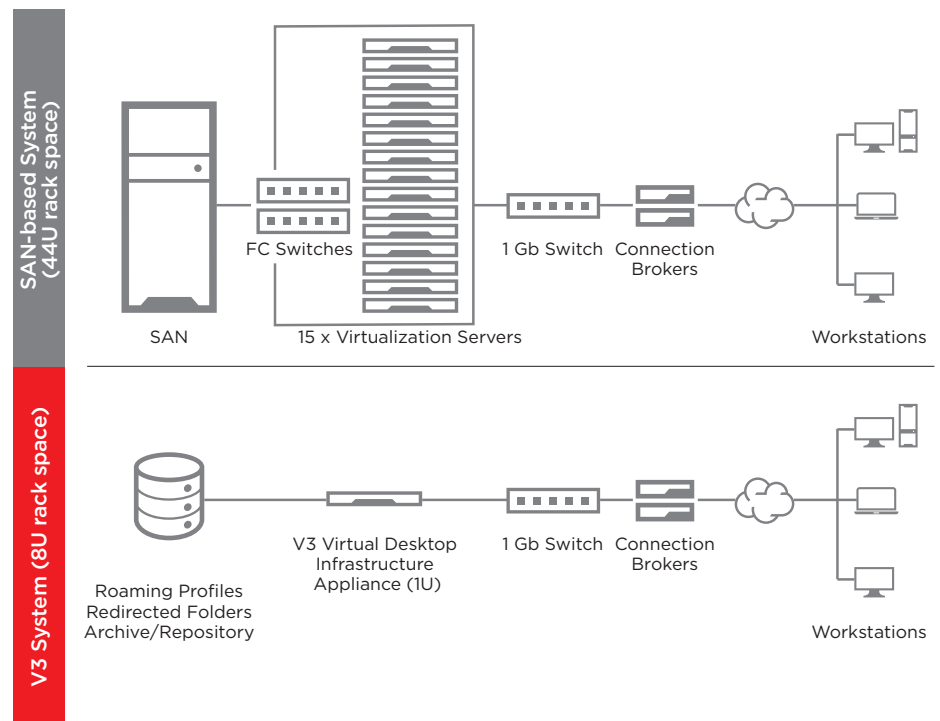
Peter told us, “SanDisk’s approach to flash as a memory tier instead of as a conventional SSD is the reason we created our V3 Optimized Technology Framework on ioDrive cards. This framework includes the V3 Local Storage Management Framework, which optimizes storage communications and data transfer from V3 Certified Storage or SanDisk devices to a management and monitoring environment. The V3 Manager provides a centralized virtual desktop management interface that offers customers visibility and reporting into the flash in ways that simply isn’t possible with competing flash devices.”

Enabling Smarter, Low-Latency Architectures

Traditional virtual desktop infrastructure solutions, which require SAN or NAS systems, are so expensive that organizations must centralize much of their infrastructure. This adds network latency to any desktops accessed outside the local network, degrading performance and increasing the cost of distributed desktop infrastructure. The V3 appliances’ low cost compared to centralized storage makes it possible to decentralize process-critical data and infrastructure, and distribute appliances locally, thus eliminating the dependency on higher-latency network connections.

The chart below compares the infrastructure for a SanDisk-powered 300-desktop V3 system to a 300-desktop SAN-based system.⁴

System Comparison

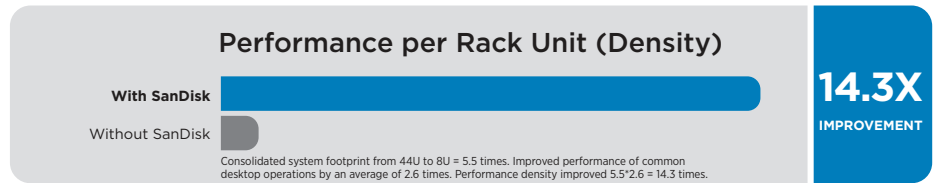


SAN-based System

- SAN (6U)
- 15 x 2U servers
 - 15 Fibre Channel HBAs
- 2 x 2U Fibre Channel switches
- 2 x 2U connection brokers (primary and failover)

V3 System

- Only user/archival data on central storage
- 1 x 2U V3 V-32
- 1 x 2U 10GbE switch
- 2 x 2U connection brokers (primary and failover)
- Vcenter with V3 Management



Summary

Implementing Fusion ioMemory solutions gave V3 Systems the following benefits:

- Supports 50 to 300 desktops per server
- Virtual desktop performance exceeds that of physical desktops
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“SanDisk has the best technology on the market. Its performance and scalability are unmatched, and its Virtual Storage Layer allows us to greatly increase the value of our solution,” Peter said. “As SanDisk increases the capacity of its devices, we are positioned to allow our customers to host many more desktops per appliance and to easily manage these desktops, enterprise wide.”

About the Company

V3 Systems produces virtual desktop infrastructure appliances that deliver unsurpassed virtual desktop performance at significantly lower up-front costs and dramatically lower ongoing costs. The V3 solutions also deliver greater price/performance results than traditional systems or offerings from other virtual desktop infrastructure vendors.

V3 Systems unveiled its first virtual desktop infrastructure system at VMworld 2010, where virtual computing pundit Brian Madden declared V3 Systems the most “exciting” and “coolest” virtual desktop infrastructure company at the show.

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At SanDisk, we’re expanding the possibilities of data storage. For more than 25 years, SanDisk’s ideas have helped transform the industry, delivering next generation storage solutions for consumers and businesses around the globe.

The performance results discussed herein are based on internal V3 testing and use of Fusion ioMemory products. Results and performance may vary according to configurations and systems, including drive capacity, system architecture and applications.

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