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## Benchmarking Citrix XenDesktop on Kaminario's K2 All-Flash Storage Array

Virtual Desktop Infrastructure, or VDI, brings the benefits of virtualization to end-user computing. It has the potential of enabling enterprise IT groups to easily provision and manage desktop computing while better utilizing IT resources of compute and storage. However, virtualized desktop operating systems and applications generate a random blend of I/O requests with periodic storms from boot, login, and shutdown heavily stressing both VDI servers and their storage infrastructure. Kaminario's K2 all-flash array combines advanced availability and high performance with a very low price per GB using inline global deduplication, enabling your VDI deployment to satisfy both demanding users and limited budgets.

### K2 Benefits for Citrix XenDesktop Virtual Desktops:

- **Lowest Costs** – Deployment and operating costs can be two-thirds of legacy or hybrid storage arrays – after deduplication effective costs can be below \$1 per GB or under \$20/desktop.
- **Simple to Deploy / Manage** – Integration with VMware and vCenter plug-in plus the browser based K2 GUI speed deployments, letting you manage your virtual desktops from anywhere.
- **Latency / Throughput** – Performance ensures virtual desktops remain responsive even under extreme peak workloads.
- **No Single Point of Failure** – Shared nothing architecture ensures that desktops are still available even if up to two SSDs fail at once in a single shelf.
- **High-Efficiency RAID** – K2's dual-protected K-RAID™ is highly available with 87.5% efficiency.
- **Non-Disruptive Operations** – Upgrades and expansions done online with no user downtime and no loss of virtual desktop responsiveness.
- **Efficient Data Reduction** – K2's native inline deduplication reduces desktop capacity needs by 90% or more, reducing costs and speeding deployment.
- **Advanced Features** – Consolidated writes, adaptive block sizes and writeable native snapshots simplify management, optimize performance and save virtual desktop capacity.

### Benchmark Results:

#### Provision 750 Desktops w/PVD

- 750 desktops created in 1 hour
- Average latency under 1ms

#### Boot 750 Desktops w/PVD

- 750 desktops booted in 5 minutes
- 1,500 MB/s average throughput

#### Data Reduction

- Gain up to 17X data reduction

#### Log-off 750 Desktops

- Completed within 90 seconds
- Latency average of 0.86ms

#### Login VSI Performance Test

- Industry standard benchmark
- Real end-user behavior
- VSI<sub>max</sub> was never reached with 750 desktops



### Test System Configurations:

K2 Storage	Single K-Block K2 to host 750 XenDesktop VMs
Citrix Software	XenDesktop 7.6
Virtual Desktops	<ul style="list-style-type: none"> <li>• Windows 7 with 2,048MB vMemory</li> <li>• 30GB base disk / 3GB Personal vDisk</li> </ul>
Server Hardware	16 ESX 5.5U2 hosts running 750 XenDesktop VMs

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