

StarWind Deduplication vs Nexenta Deduplication

May 2012

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CONFIGURATION

Configuration StarWind	Configuration Nexenta
Storage server: Windows 2008R2 Enterprise SP1 + StarWind 5,8 Intel Core(TM)2 Quad CPU Q9400 2.66Ghz RAM 8GB Intel(R) PRO/1000 PT Server Adapter HDD (system) ST3250318AS ATA Device HDD (storage) ST3160813AS ATA Device Client: Windows 2008R2 Enterprise SP1/vSphere 5.0 Intel Core(TM)2 Quad CPU Q9400 2.66Ghz RAM 2GB Intel(R) PRO/1000 PT Server Adapter	Storage server: NexentaStor Enterprise 3.1.1 Intel Core(TM)2 Quad CPU Q9400 2.66Ghz RAM 8GB Intel(R) PRO/1000 PT Server Adapter HDD (system) ST3250318AS ATA Device HDD (storage) ST3160813AS ATA Device Client: Windows 2008R2 Enterprise SP1/vSphere 5.0 Intel Core(TM)2 Quad CPU Q9400 2.66Ghz RAM 2GB Intel(R) PRO/1000 PT Server Adapter

TEST INSTALLATION OF MS WINDOWS 2008 R2 ON VIRTUAL MACHINE

OS Install Test (Hyper-V VM)	StarWind Image File			StarWind DD 4K			Nexenta 4K		
	VM1	VM2	VM3	VM1	VM2	VM3	VM1	VM2	VM3
VM OS installation time, min:sec	17:10	17:23	17:18	24:17	25:13	25:53	23:28	33:46	34:27
VM Size, GB	6,57	6,57	6,57	6,54	6,54	6,57	6,57	6,54	6,59
Total VMs size, GB	6,57	13,14	19,71	6,54	13,08	19,65	6,57	13,11	19,7
Total VMs size (deduplicated), GB	6,57	13,14	19,71	6,93	12,5	17,4	6	11,1	15,6
Dedupe ratio	1	1	1	0,943723	1,0464	1,12931	1,095	1,181081	1,262821
CPU,%	1-5	1-5	1-5	10-30	10-30	10-30	10-25	10-25	10-25
Memory, MB	6	6	6	232	232	232	7150	7360	7501

OS Install Test (Hyper-V VM)	StarWind Image File			StarWind DD 64K			Nexenta 64K		
	VM1	VM2	VM3	VM1	VM2	VM3	VM1	VM2	VM3
VM OS installation time, min:sec	17:10	17:23	17:18	26:07	25:37	25:45	18:31	25:37	26:09
VM Size, GB	6,57	6,57	6,57	6,57	6,57	6,57	6,54	6,57	6,57
Total VMs size, GB	6,57	13,14	19,71	6,57	13,14	19,71	6,54	13,11	19,68
Total VMs size (deduplicated), GB	6,57	13,14	19,71	10,6	20,2	29,1	6,49	11,5	16
Dedupe ratio	1	1	1	0,619811	0,650495	0,67732	1,007704	1,14	1,23
CPU,%	1-5	1-5	1-5	5-15	5-15	5-15	5-15	5-15	5-15
Memory, MB	6	6	6	90	90	90	6150	7150	7177

OS Install Test (ESX VM) formatted with 1MB block	StarWind Image File (VMFS 3)			StarWind DD 4K (VMFS 3)			Nexenta 4K (VMFS 3)		
	VM1	VM2	VM3	VM1	VM2	VM3	VM1	VM2	VM3
VM OS installation time, min:sec	16:05	15:21	14:58	14:57	15:15	15:24	17:13	21:30	17:35
VM Size, GB	6,59	6,59	6,6	6,58	6,59	6,58	6,6	6,59	6,59
Total VMs size, GB	6,59	13,18	19,78	6,58	13,17	19,75	6,6	13,19	19,78
Total VMs size (deduplicated), GB	6,59	13,18	19,78	5,7	6,72	7,72	5,01	5,44	5,79
Dedupe ratio	1	1	1	1,154386	1,959821	2,55829	1,317365	2,424632	3,416235
CPU,%	1-3	1-3	1-3	20-35	20-35	20-35	10-25	10-25	10-25
Memory, MB	10,8-12,7	12-13,5	12,5-14	191-192,2	191,7-192,5	191,9-192,7	7405	7335	7350

OS Install Test (ESX VM) formatted with 1MB block	StarWind Image File (VMFS 3)			StarWind DD 64K (VMFS 3)			Nexenta 64K (VMFS 3)		
	VM1	VM2	VM3	VM1	VM2	VM3	VM1	VM2	VM3
VM OS installation time, min:sec	16:05	15:21	14:58	16:33	17:40	18:18	13:19	16:30	18:52
VM Size, GB	6,59	6,59	6,6	6,58	6,59	6,59	6,59	6,59	6,59
Total VMs size, GB	6,59	13,18	19,78	6,58	13,17	19,76	6,59	13,2	19,8
Total VMs size (deduplicated), GB	6,59	13,18	19,78	8,95	17,1	25,2	6,43	12,4	17,7
Dedupe ratio	1	1	1	0,735196	0,770175	0,784	1,024883	1,064516	1,118644
CPU,%	1-3	1-3	1-3	5-10	5-10	5-10	15-30	10-25	10-25
Memory, MB	10,8-12,7	12-13,5	12,5-14	97,3-98,1	97,4-98,4	88	6785	6825	6860

OS Install Test (ESX VM)	StarWind Image File (VMFS 5)			StarWind DD 4K (VMFS 5)			Nexenta 4K (VMFS 5)		
Formatted with 1MB block	VM1	VM2	VM3	VM1	VM2	VM3	VM1	VM2	VM3
VM OS installation time, min:sec	16:56	15:27	15:44	15:32	15:45	16:30	Test was not completed because installation of the second VM hung constantly		
VM Size, GB	6,58	6,6	6,59	6,59	6,59	6,59			
Total VMs size, GB	6,58	13,18	19,77	6,59	13,18	19,77			
Total VMs size (deduplicated), GB	6,58	13,18	19,77	5,74	6,75	7,78			
Dedupe ratio	1	1	1	1,148084	1,952593	2,541131			
CPU,%	1-3	1-3	1-3	10-35	10-35	10-35			
Memory, MB	9	10	11	193	193	193			

OS Install Test (ESX VM)	StarWind Image File (VMFS 5)			StarWind DD 64K (VMFS 5)			Nexenta 64K (VMFS 5)		
Formatted with 1MB block	VM1	VM2	VM3	VM1	VM2	VM3	VM1	VM2	VM3
VM OS installation time, min:sec	16:56	15:27	15:44	16:10	17:23	17:07	12:04	14:31	17:51
VM Size, GB	6,58	6,6	6,59	6,59	6,59	6,59	6,58	6,58	6,59
Total VMs size, GB	6,58	13,18	19,77	6,59	13,18	19,77	6,58	13,16	19,75
Total VMs size (deduplicated), GB	6,58	13,18	19,77	8,96	12,1	20,4	6,41	12,4	14,6
Dedupe ratio	1	1	1	0,735491	1,089256	0,969118	1,026521	1,06129	1,35274
CPU,%	1-3	1-3	1-3	3-15	3-10	3-10	15-30	10-25	10-25
Memory, MB	9	10	11	87	88	88	6775	6815	6860

SYNTHETIC TEST

StarWind, Nexenta: Size of the used disk is 30 GB

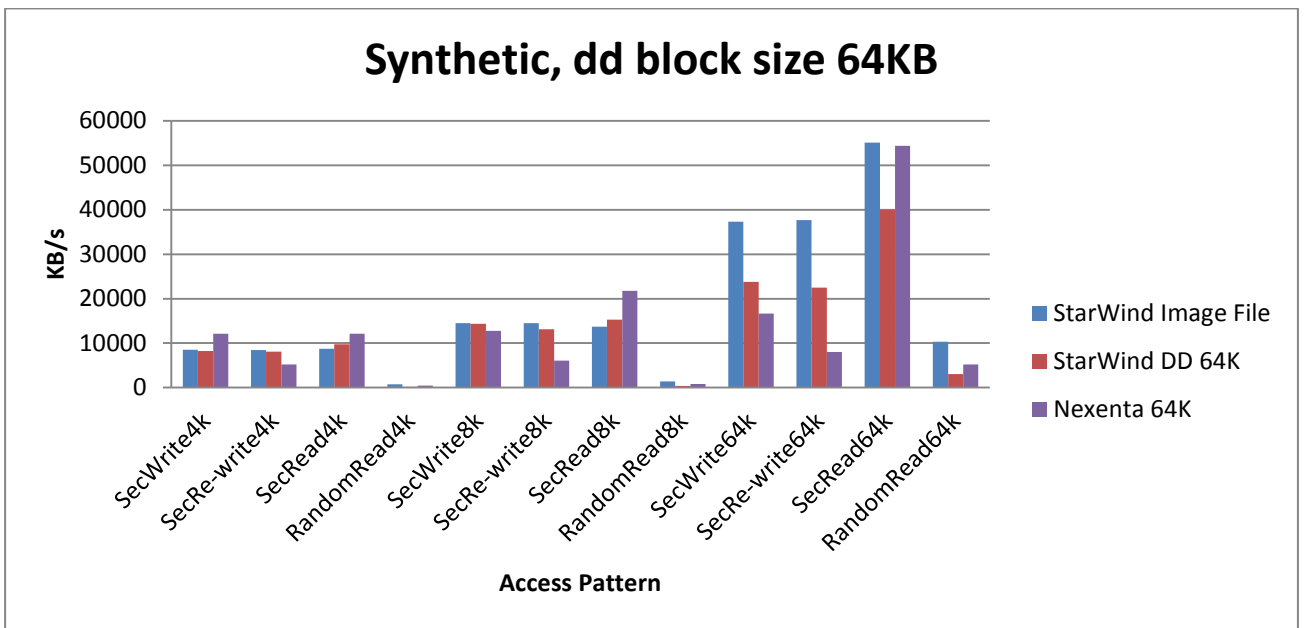
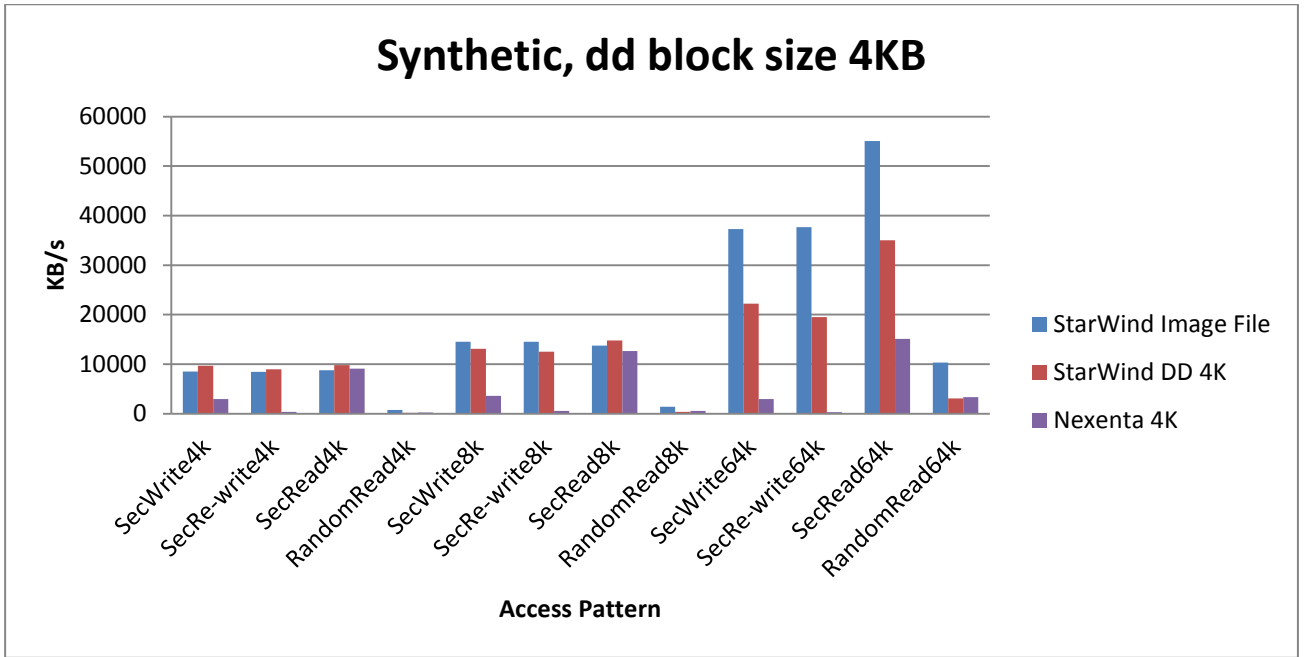
* For tests with 4K deduplication block size, the volume on the client was formatted with 4K NTFS cluster size.

* For tests with 64K deduplication block size, the volume on the client was formatted with 64K NTFS cluster size.

1) Seq Write (DD for Windows) 2) Seq ReWrite (DD for Windows) 3) Seq Read (DD for Windows)	StarWind Image File			StarWind DD 4K			Nexenta 4K		
	KB/s	lops	Tool	KB/s	lops	Tool	KB/s	lops	Tool
4) Random Read (Iometer)									
SecWrite4k	8495		dd for windows	9691,7		dd for windows	2934,4		dd for windows
SecRe-write4k	8442,6		dd for windows	8982,9		dd for windows	343,4		dd for windows
SecRead4k	8743		dd for windows	9793,7		dd for windows	9094,3		dd for windows
RandomRead4k	721,7	180,4265	lometer	196,3	49,076719	lometer	264,6	66,14976	lometer
SecWrite8k	14496,4		dd for windows	13096,3		dd for windows	3615		dd for windows
SecRe-write8k	14523,2		dd for windows	12532,8		dd for windows	555,3		dd for windows
SecRead8k	13718,8		dd for windows	14782,6		dd for windows	12632,3		dd for windows

	StarWind Image File			StarWind DD 4K			Nexenta 4K		
RandomRead8k	1430,2	178,7778	lometer	391,9	48,989278	lometer	555,1	69,38691	lometer
SecWrite64k	37305,2		dd for windows	22200		dd for windows	2973		dd for windows
SecRe-write64k	37661,7		dd for windows	19526,6		dd for windows	297,9		dd for windows
SecRead64k	55091,6		dd for windows	34991,4		dd for windows	15087,4		dd for windows
RandomRead64k	10339,7	161,5573	lometer	3068	47,936532	lometer	3351	49.934865	lometer

1) Seq Write (DD for Windows) 2) Seq ReWrite (DD for Windows) 3) Seq Read (DD for Windows) 4) Random Read (lometer)	StarWind Image File			StarWind DD 64K			Nexenta 64K		
	KB/s	lops	Tool	KB/s	lops	Tool	KB/s	lops	Tool
SecWrite4k	8495		dd for windows	8209		dd for windows	12094,3		dd for windows
SecRe-write4k	8442,6		dd for windows	8128,5		dd for windows	5248,1		dd for windows
SecRead4k	8743		dd for windows	9745		dd for windows	12089,65		dd for windows
RandomRead4k	721,7	180,4265	lometer	195,5	48,88373	lometer	456,5	108,8383	lometer
SecWrite8k	14496,4		dd for windows	14364		dd for windows	12787,5		dd for windows
SecRe-write8k	14523,2		dd for windows	13145,5		dd for windows	6065,8		dd for windows
SecRead8k	13718,8		dd for windows	15285,4		dd for windows	21799,9		dd for windows
RandomRead8k	1430,2	178,7778	lometer	391,8	48,97991	lometer	851,3	106,4111	lometer
SecWrite64k	37305,2		dd for windows	23813,2		dd for windows	16679,4		dd for windows
SecRe-write64k	37661,7		dd for windows	22453,4		dd for windows	8047,4		dd for windows
SecRead64k	55091,6		dd for windows	39971,1		dd for windows	54330,4		dd for windows
RandomRead64k	10339,7	161,5573	lometer	3026,4	47,28821	lometer	5202,8	81,29418	lometer



VM COPY TEST

Configuration StarWind	Configuration Nexenta
<p>Storage server: Windows 2008R2 Enterprise SP1 + StarWind 5,8 Intel Core(TM)2 Quad CPU Q9400 2.66Ghz RAM 8GB Intel(R) PRO/1000 PT Server Adapter HDD (system) WD20EARS-00MVW ATA Device HDD (storage) WD20EARS-00MVW ATA Device</p> <p>Client: vSphere 5.0 Intel Core(TM)2 Quad CPU Q9400 2.66Ghz HDD (storage) WD20EARS-00MVW ATA Device RAM 2GB Intel(R) PRO/1000 PT Server Adapter</p>	<p>Storage server: NexentaStor Enterprise 3.1.1 Intel Core(TM)2 Quad CPU Q9400 2.66Ghz RAM 8GB Intel(R) PRO/1000 PT Server Adapter HDD (system) WD20EARS-00MVW ATA Device HDD (storage) WD20EARS-00MVW ATA Device</p> <p>Client: Windows 2008R2 Enterprise SP1/vSphere 5.0 Intel Core(TM)2 Quad CPU Q9400 2.66Ghz HDD (storage) WD20EARS-00MVW ATA Device RAM 2GB Intel(R) PRO/1000 PT Server Adapter</p>

LOCAL HDD TEST

Access Specification Name	IOps	MBps
4K; 100% Read; 0% random	17487,87	68,311990
4K; 50% Read; 0% random	793,8179	3,100851
4K; 0% Read; 0% random	20659,79	80,70229
4K; 100% Read; 100% random	97,66742	0,381513
4K; 50% Read; 100% random	62,70272	0,244933
4K; 0% Read; 100% random	49,64279	0,193917
8K; 100% Read; 0% random	13851,04	108,2112
8K; 50% Read; 0% random	497,9651	3,890352
8K; 0% Read; 0% random	14540,91	113,6008
8K; 100% Read; 100% random	97,04329	0,758151
8K; 50% Read; 100% random	61,57026	0,481018
8K; 0% Read; 100% random	48,84722	0,381619
64K; 100% Read; 0% random	1837,505	114,844
64K; 50% Read; 0% random	253,3885	15,83678
64K; 0% Read; 0% random	1836,937	114,8086
64K; 100% Read; 100% random	91,43821	5,714888
64K; 50% Read; 100% random	57,99761	3,624851
64K; 0% Read; 100% random	46,09999	2,881249
256K; 100% Read; 0% random	460,7359	115,184
256K; 50% Read; 0% random	182,3186	45,57965
256K; 0% Read; 0% random	460,1042	115,026
256K; 100% Read; 100% random	72,23284	18,05821
256K; 50% Read; 100% random	47,46509	11,86627
256K; 0% Read; 100% random	39,79321	9,948302

Copy VM Test (ESX)	StarWind DD 4K (VMFS 5)			Nexenta 4K (VMFS 3, VMFS 5)		
	VM-SQL	Exchange	AD+IIS	VM-SQL	Exchange	AD+IIS
Formatted with 1MB block						
VM copy time, min:sec	11:47	19:17	4:42	The test was not completed because the VM copy process was constantly broken.		
VM size, GB	18,16	12,4	7,26			
Total VMs size, GB	18,16	30,56	37,9			
Total VMs size (deduplicated), GB	14,5	18,3	19,1			
Dedupe ratio	1,252414	1,669945	1,984293			
CPU,%	30-45	25-40	30-45			
Memory, MB	416	416	416			

Copy VM Test (ESX)	StarWind DD 64K (VMFS 5)			Nexenta 64K (VMFS 5)		
	VM-SQL	Exchange	AD+IIS	VM-SQL	Exchange	AD+IIS
Formatted with 1MB block						
VM copy time, min:sec	8:16	16:44	3:42	20:12	22:45	07:13
VM size, GB	18,16	12,4	7,26	18,16	12,4	7,26
Total VMs size, GB	18,16	30,56	37,82	18,16	30,56	37,82
Total VMs size (deduplicated), GB	18	29	35,3	17,9	26	31,5
Dedupe ratio	1,008889	1,053793	1,071388	1,014525	1,175385	1,200635
CPU,%	18-25	17-25	16-23	10-30	15-40	5-25
Memory, MB	102	102	102	7475	7500	6530

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