

Breve estudio del disco SSD Intel X25-E en entornos de servidores con sistemas RAID y sistemas virtualizados hyper-v usando discos .vhd fijos.



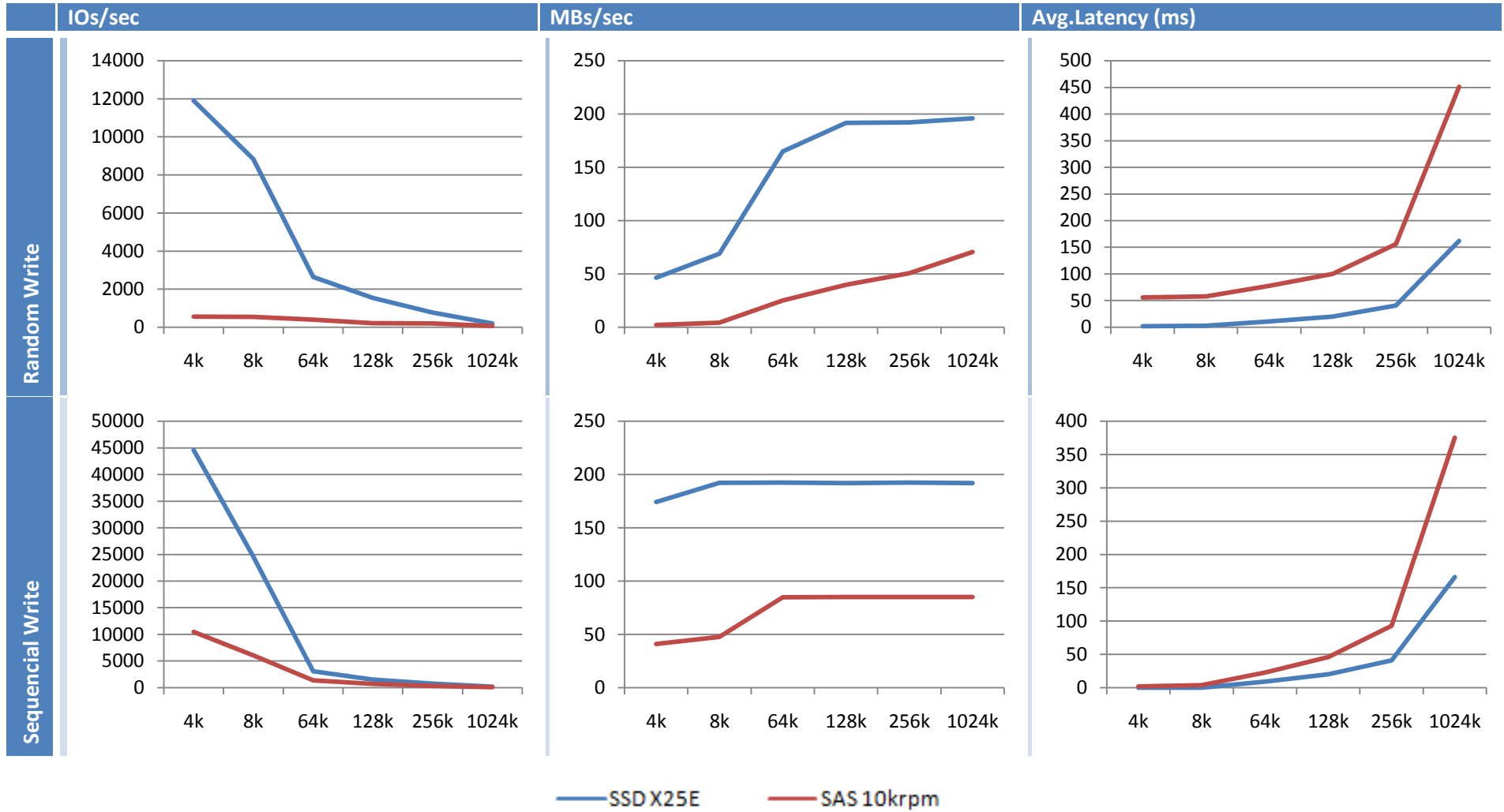
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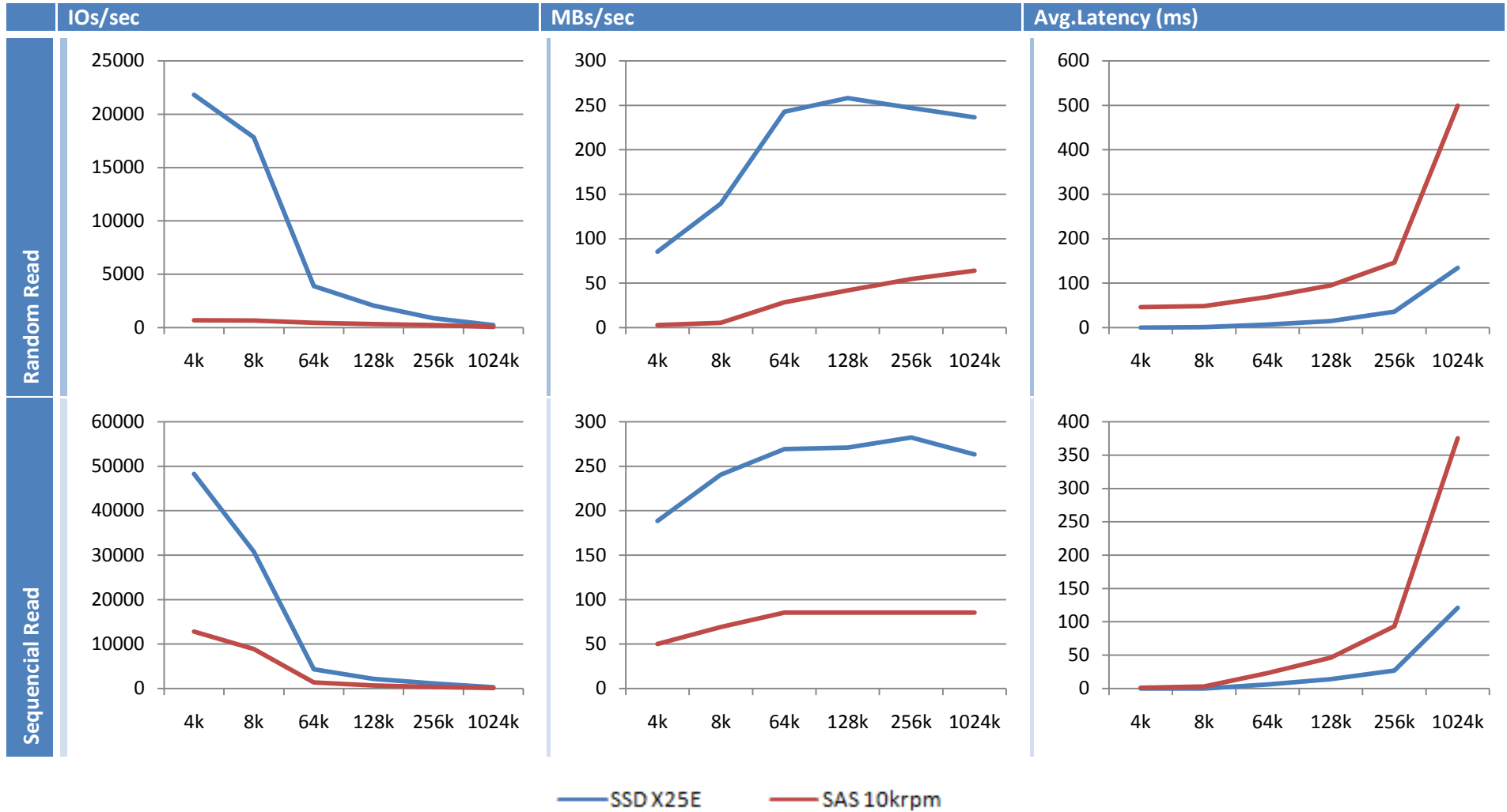
Equipo Usado:

Servidor	Raid	Discos	Program
Dell PowerEdge EnergySmart 2950III	PERC 6/I 256MB Package: 6.1.1-0047	Discos SSD 32GB: Intel Product ID: SSDSA2SH032G1GN Revision: 8621	Intel IOmeter 64bits
Intel Quad-Core Xeon L5420 2.5GHz/2x6MB 1333FSB	FW Version: 1.21.02-0528 BIOS Version: 2.01.00 CtrlR Version: 1.02-014B	Discos SAS10Krpm2.5' 146GB: SEAGATE Product ID: ST9146802SS Revision: S229	Configuración Pág.
4GB FB 667MHz Memory	Boot Block: 1.00.00.01-0011	Discos SAS15Krpm 3.5' 146GB: FUJITSU Product ID: MBA3147RC Revision: D306	

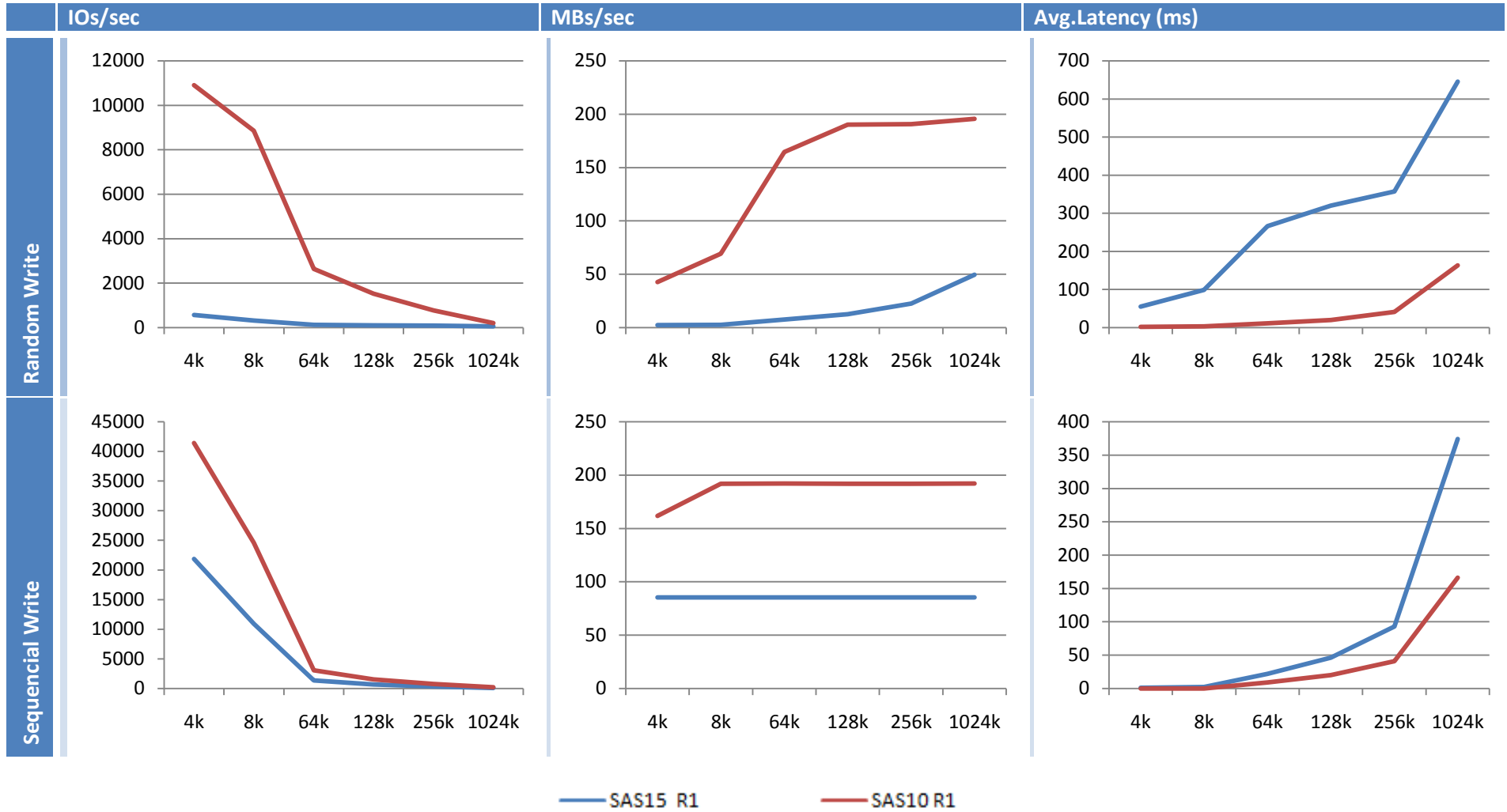
Comparativa escritura Disco SAS 2.5" 10krpm Vs. Disco INTEL SSD X25-E.



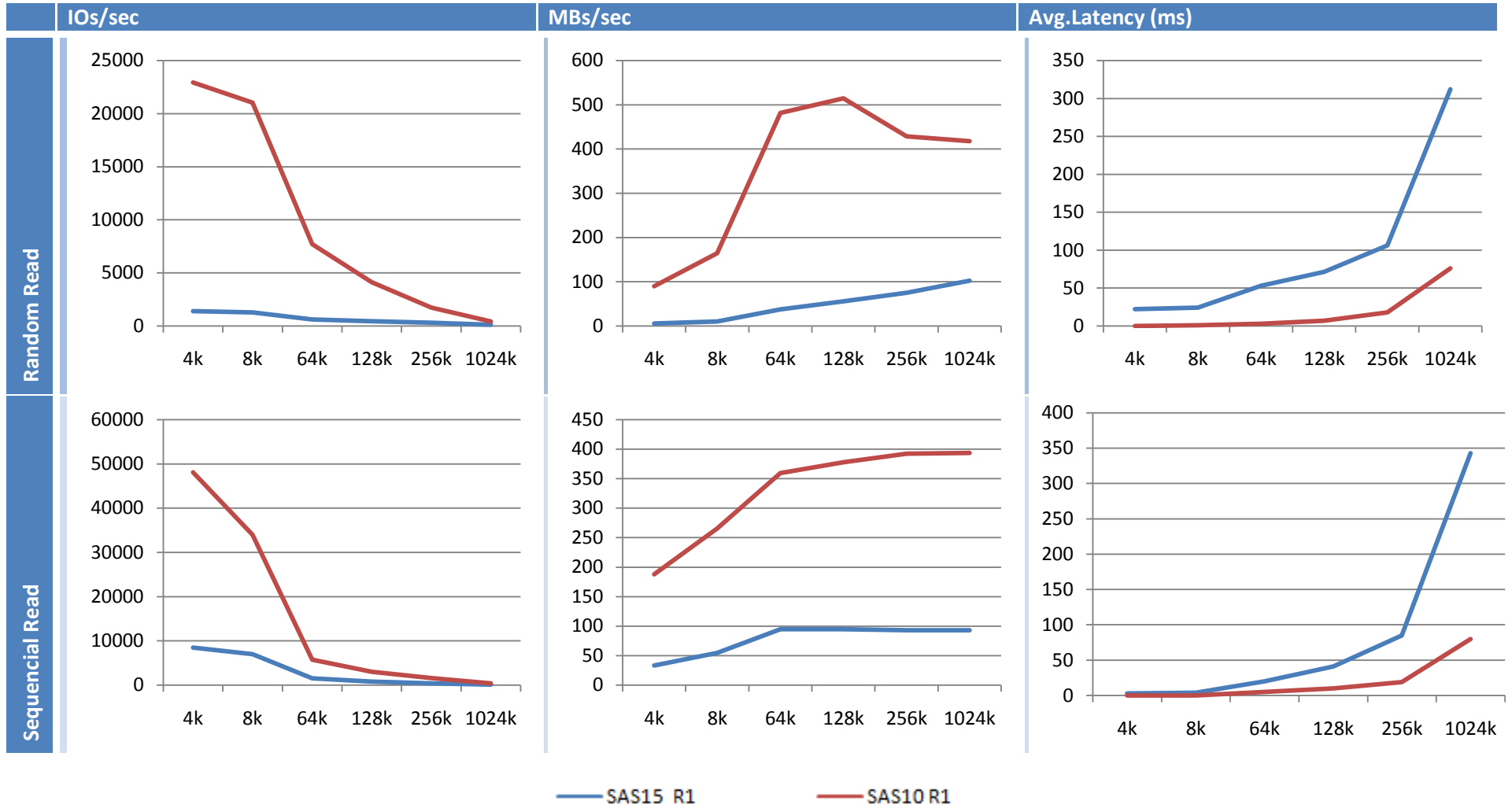
Comparativa lectura Disco SAS 2.5" 10krpm Vs. Disco INTEL SSD X25-E.



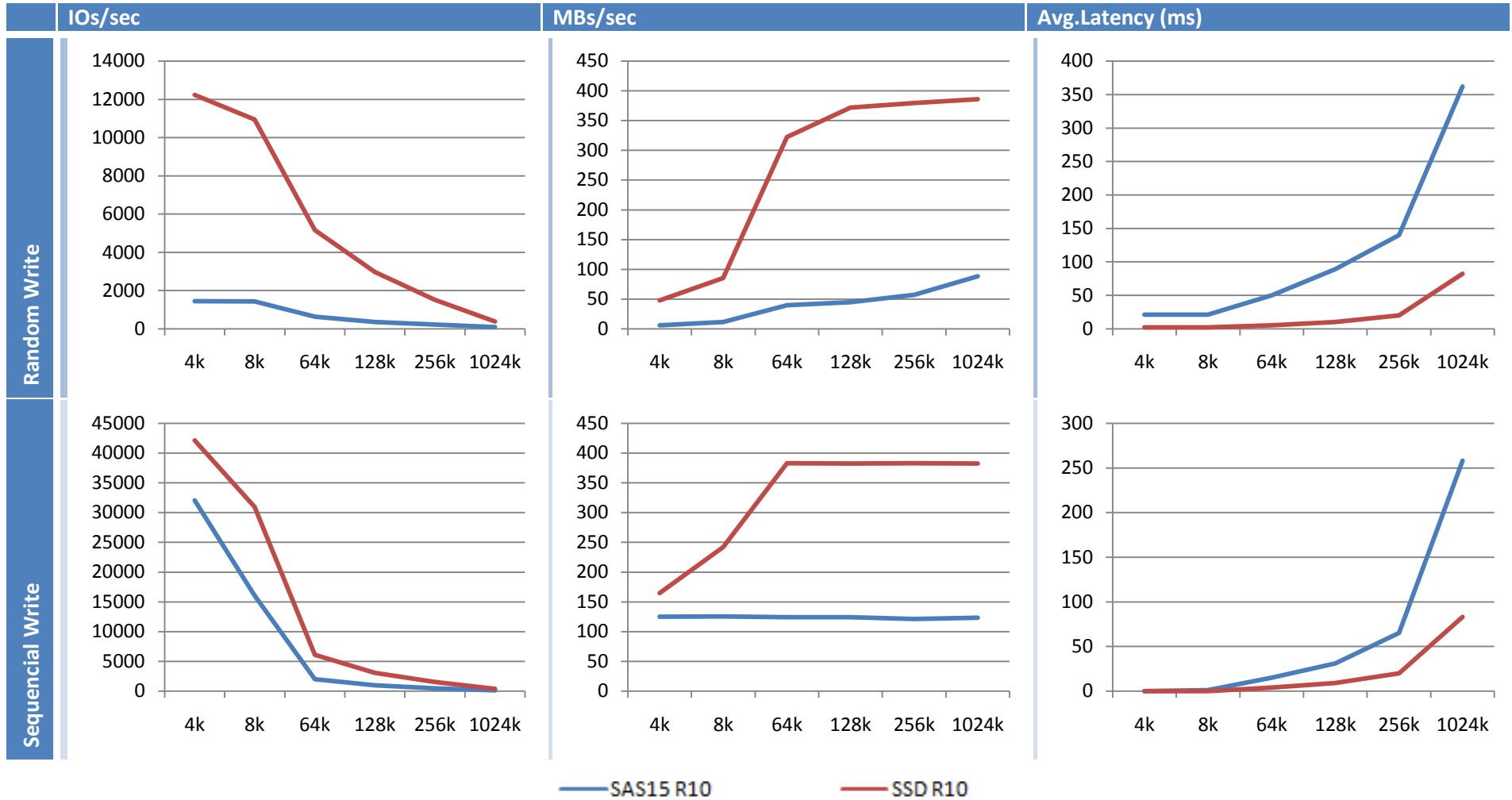
Comparativa Escritura Disco SAS 2.5" 10krpm Vs. Disco INTEL SSD X25-E en Raid 1.



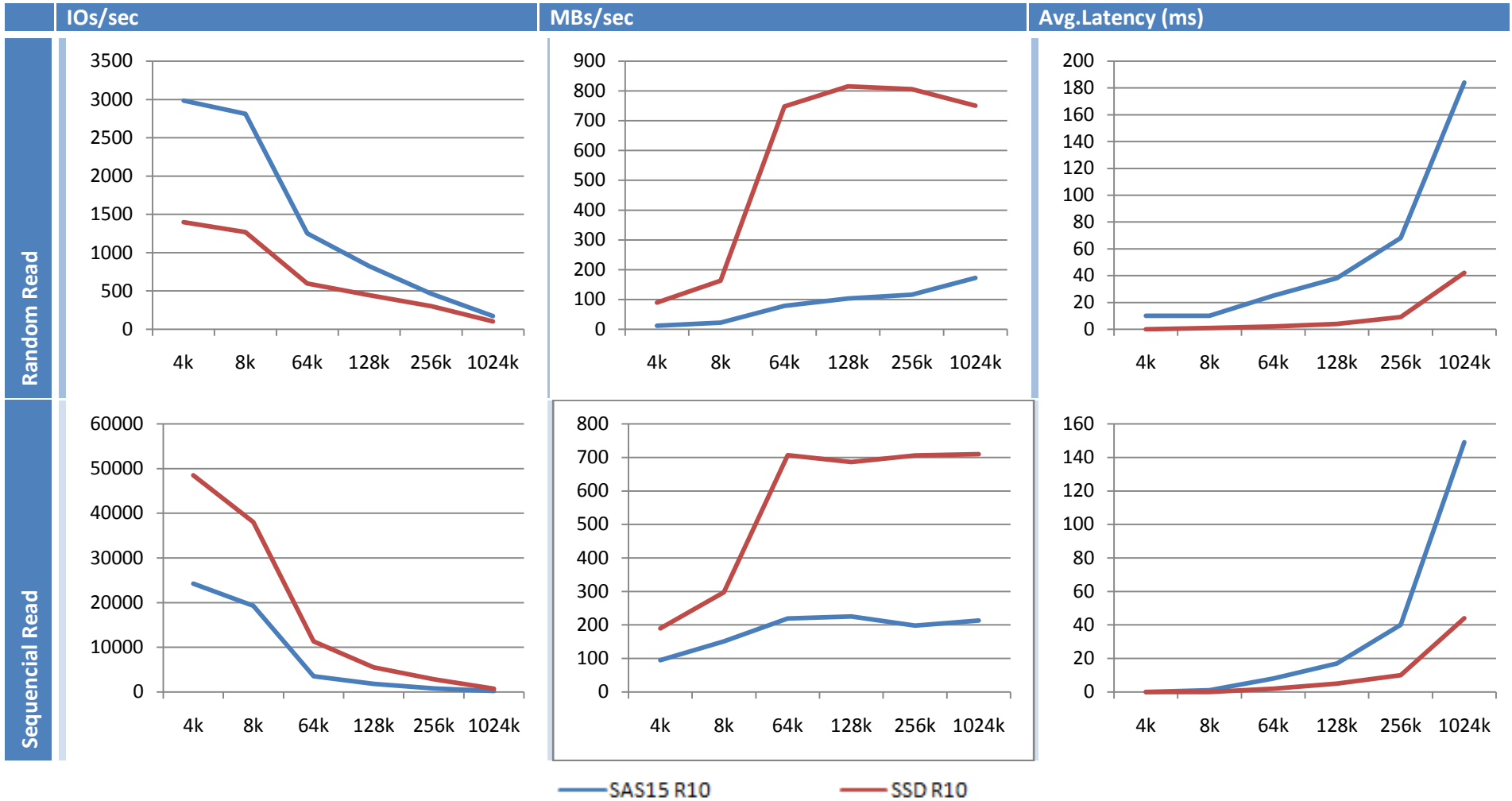
Comparativa Lectura Disco SAS 2.5" 10krpm Vs. Disco INTEL SSD X25-E en Raid 1.



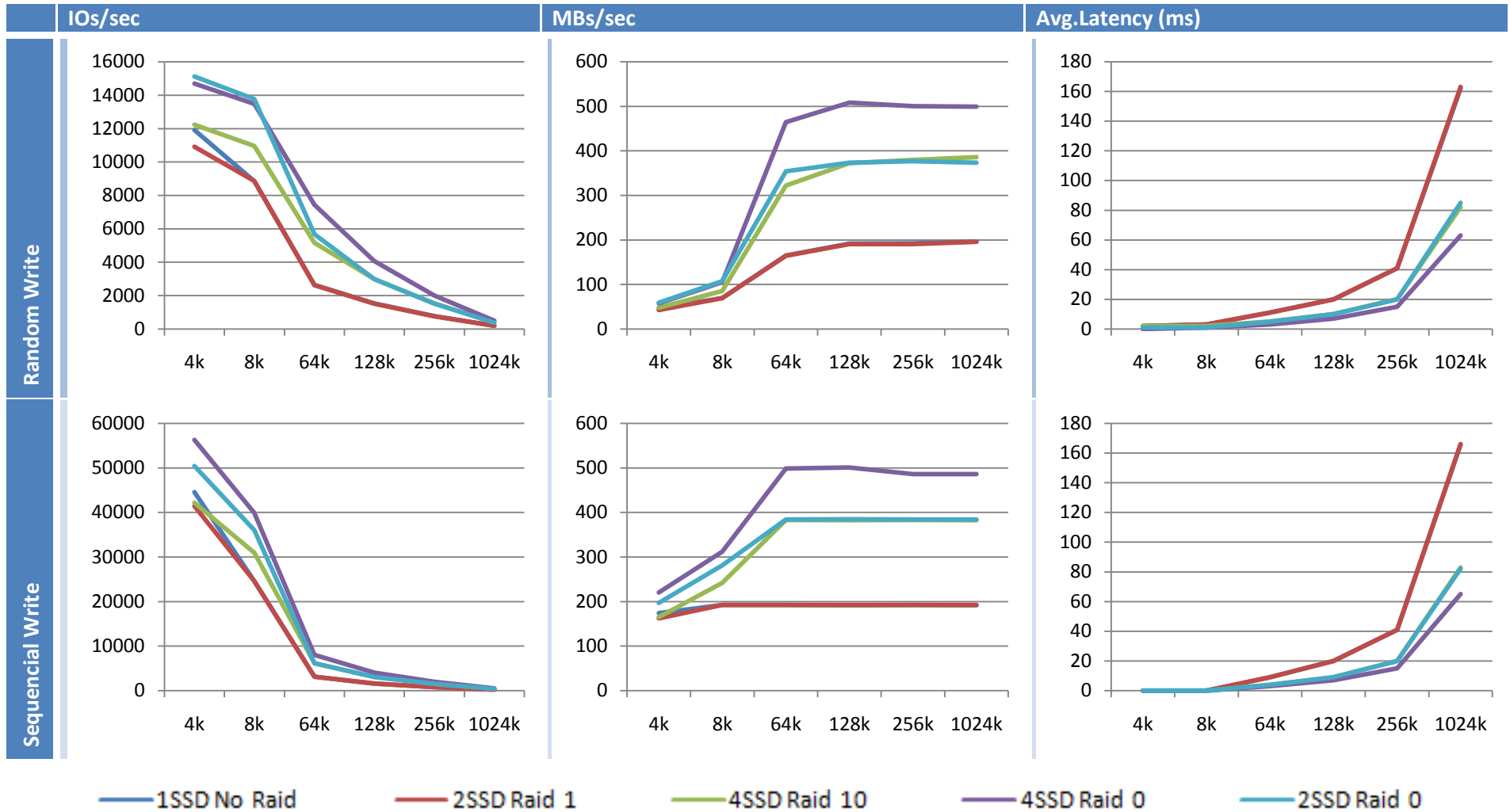
Comparativa Escritura Disco SAS 2.5" 15krpm Vs. Disco INTEL SSD X25-E en Raid 10.



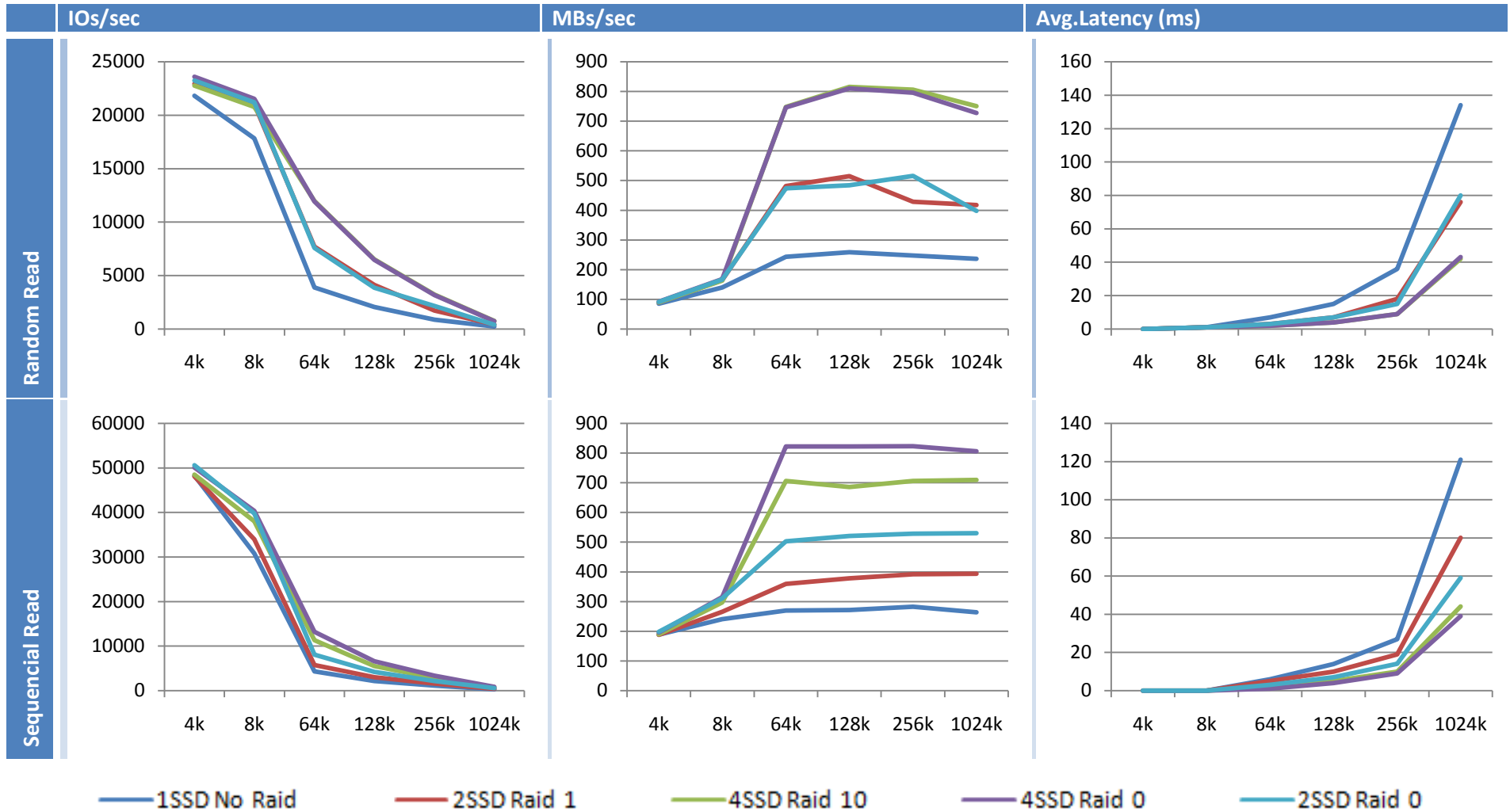
Comparativa Lectura Disco SAS 2.5" 15krpm Vs. Disco INTEL SSD X25-E en Raid 10.



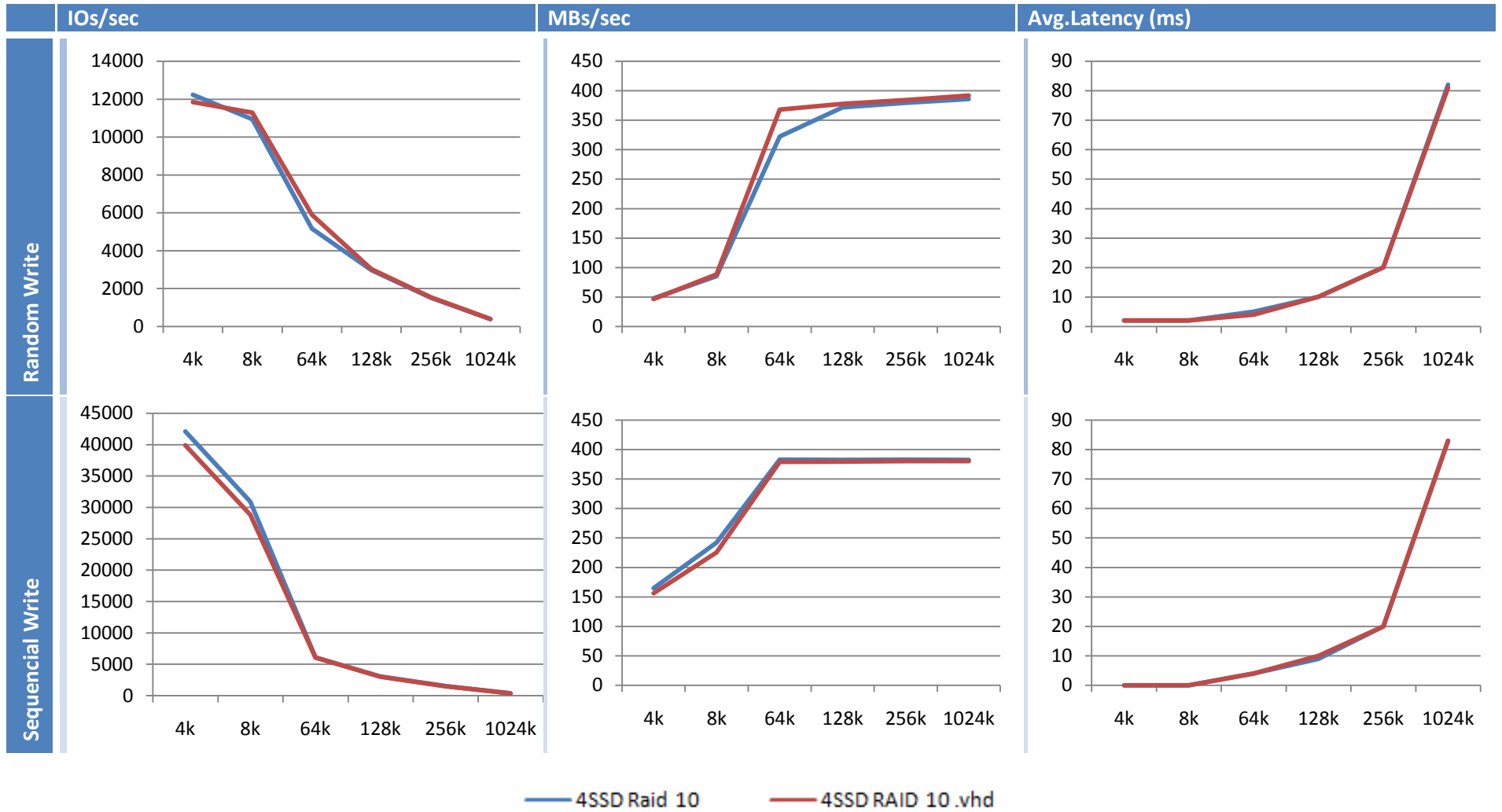
Comparativa Escritura Disco INTEL SSD X25-E en varias arquitecturas Raid.



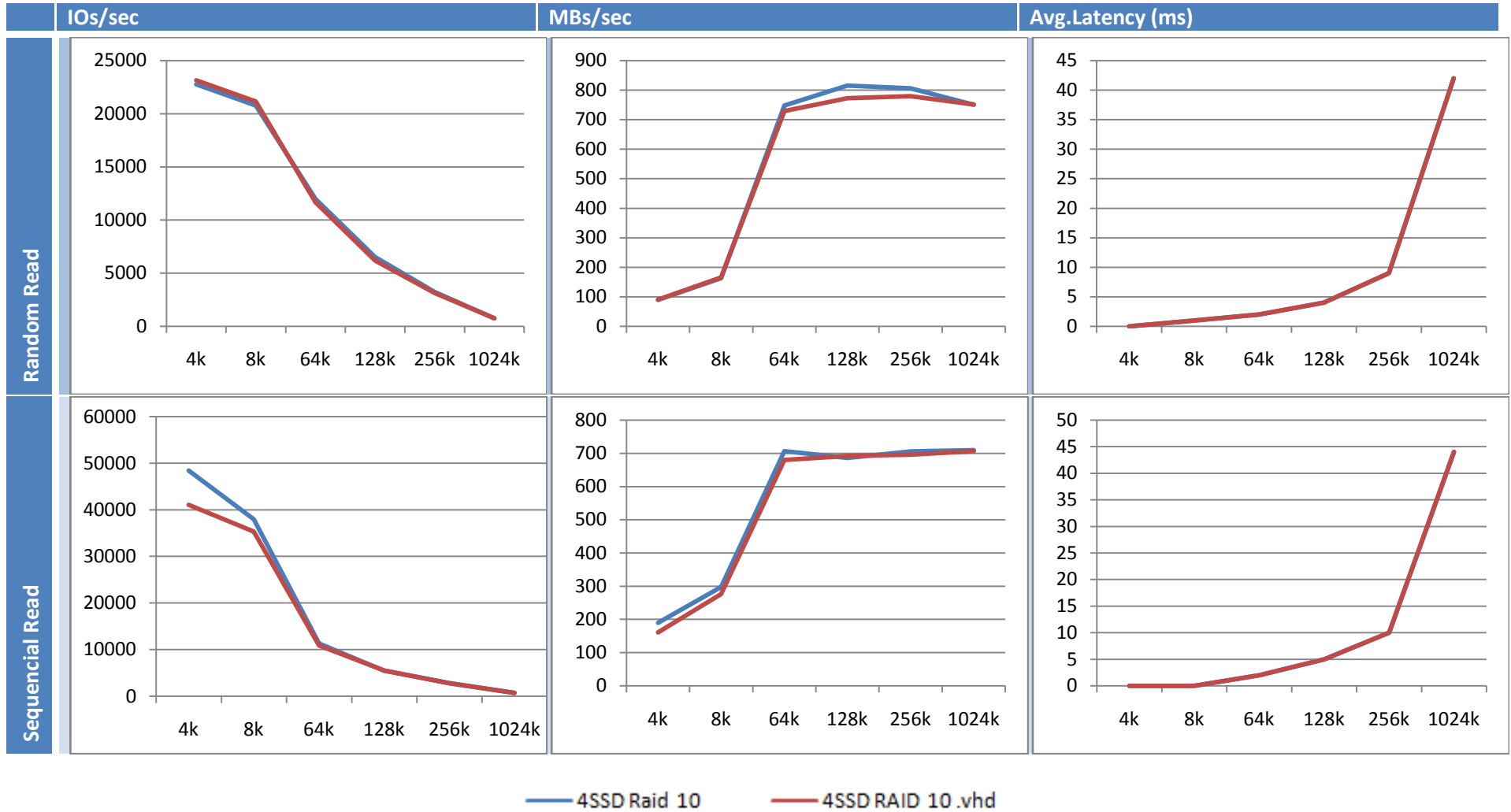
Comparativa Lectura Disco INTEL SSD X25-E en varias arquitecturas Raid.



Comparativa Escritura Disco INTEL SSD X25-E Raid 10. Nativo Vs. Hyper-V.



Comparativa Lectura Disco INTEL SSD X25-E Raid 10. Nativo Vs. Hyper-V.



Datos Random Write.

IOs/sec	1SSD	1SAS10	4SAS15 R10	2SAS15 R1	2SAS10 R1	2SSD R1	4SSD R10	4SSD R0	2SSD R0	4SSD R10 .vhd
4k	11902	557,75	1442,45	417,57	567,82	10906,39	12222,47	14679,93	15107,05	11837,26
8k	8834,06	539,89	1426,14	363,31	319,71	8856,57	10940,96	13469,78	13751,43	11284,54
64k	2639,41	402,83	627	164,42	119,28	2629,31	5156,86	7429,41	5664,18	5882,75
128k	1533,47	218,16	356	95,73	99,26	1521,05	2975,31	4066,77	2985,99	3019,48
256k	768,7	203,27	227,39	65,92	89,14	762,55	1518,16	2000,98	1507,28	1535,42
1024k	196	70,7	88,1	20,64	49,43	195,5	385,8	499,14	373,55	391,59

MBs/sec	1SSD	1SAS10	4SAS15 R10	2SAS15 R1	2SAS10 R1	2SSD R1	4SSD R10	4SSD R0	2SSD R0	4SSD R10 .vhd
4k	46,49	2,17	5,63	1,63	2,21	42,6	47,74	57,34	59,01	46,23
8k	69,01	4,21	11,14	2,83	2,49	69,19	85,47	105,23	107,43	88,16
64k	164,96	25,17	39,18	10,27	7,45	164,33	322,3	464,33	354,01	367,67
128k	191,68	39,77	44,5	11,96	12,4	190,13	371,91	508,34	373,24	377,43
256k	192,17	50,81	56,84	16,48	22,28	190,63	379,54	500,24	376,82	383,85
1024k	196	70,7	88,1	20,64	49,43	195,5	385,8	499,14	373,55	391,59

Avg. Latency (ms)	1SSD	1SAS10	4SAS15 R10	2SAS15 R1	2SAS10 R1	2SSD R1	4SSD R10	4SSD R0	2SSD R0	4SSD R10 .vhd
4k	2	56	21	75	55	2	2	0	1	2
8k	3	58	21	87	99	3	2	1	1	2
64k	11	78	50	193	266	11	5	3	5	4
128k	20	100	89	333	320	20	10	7	10	10
256k	41	156	140	484	357	41	20	15	20	20
1024k	162	451	362	1545	645	163	82	63	85	81

Datos Sequential Write.

IOs/sec	1SSD	1SAS10	4SAS15 R10	2SAS15 R1	2SAS10 R1	2SSD R1	4SSD R10	4SSD R0	2SSD R0	4SSD R10 .vhd
4k	44560,38	10483,87	32054,97	6511,69	21853,37	41407,82	42130,02	56288,68	50417,67	39903,29
8k	24579,32	6078,32	16065,77	3308,98	10930,42	24567,04	30932,42	39889,2	36003,58	28847,39
64k	3076,79	1357,63	1988,03	383,82	1366,39	3073,49	6122,35	7975,53	6141,14	6068,47
128k	1535,09	679,31	992,29	188,81	682,91	1535,56	3057,02	4004,15	3074,91	3035,88
256k	768,95	340,01	485,05	106,25	341,33	767,28	1530,31	1943,48	1535,21	1520,95
1024k	191,79	85,01	123,29	24,24	85,31	191,98	382,28	485,65	383,75	380,41

MBs/sec	1SSD	1SAS10	4SAS15 R10	2SAS15 R1	2SAS10 R1	2SSD R1	4SSD R10	4SSD R0	2SSD R0	4SSD R10 .vhd
4k	174,06	40,95	125,21	25,43	85,36	161,74	164,57	219,87	196,94	155,87
8k	192,02	47,48	125,51	25,85	85,39	191,93	241,65	311,53	281,27	225,37
64k	192,29	84,85	124,25	23,98	85,39	192,09	382,64	498,47	383,82	379,27
128k	191,88	84,91	124,03	23,6	85,36	191,94	382,12	500,51	384,36	379,48
256k	192,23	85	121,26	26,56	85,33	191,82	382,57	485,87	383,8	380,23
1024k	191,79	85,01	123,29	24,24	85,31	191,98	382,28	485,65	383,75	380,41

Avg Latency (ms)	1SSD	1SAS10	4SAS15 R10	2SAS15 R1	2SAS10 R1	2SSD R1	4SSD R10	4SSD R0	2SSD R0	4SSD R10 .vhd
4k	0	2	0	4	1	0	0	0	0	0
8k	0	4	1	9	2	0	0	0	0	0
64k	9	23	15	82	22	9	4	3	4	4
128k	20	46	31	168	46	20	9	7	9	10
256k	41	93	65	300	93	41	20	15	20	20
1024k	166	375	258	1317	374	166	83	65	82	83

Datos Random Read.

IOs/sec	1SSD	1SAS10	4SAS15 R10	2SAS15 R1	2SAS10 R1	2SSD R1	4SSD R10	4SSD R0	2SSD R0	4SSD R10 .vhd
4k	21806,87	679,29	2983,66	1437,06	1395,53	22922,47	22757,96	23594,75	23244,29	23139,84
8k	17836,06	651,6	2811,2	1326,49	1266,98	21030,17	20766,06	21527,42	21211,95	21153,77
64k	3884,85	454,41	1251,97	590,85	596,93	7698,99	11960,76	11932,89	7580,49	11668,3
128k	2064,73	334,78	824,09	395,01	443,9	4113,94	6519,77	6479,18	3870,77	6182,23
256k	866,48	218,12	463,69	229,8	299,51	1712,14	3223,13	3181,83	2161,1	3116,91
1024k	236,34	64,01	172,47	69,82	102,13	417,21	750,13	727,46	397,34	751,19

MBs/sec	1SSD	1SAS10	4SAS15 R10	2SAS15 R1	2SAS10 R1	2SSD R1	4SSD R10	4SSD R0	2SSD R0	4SSD R10 .vhd
4k	85,18	2,65	11,65	5,61	5,45	89,54	88,89	92,16	90,79	90,39
8k	139,34	5,09	21,96	10,36	9,89	164,29	162,23	168,18	165,71	165,26
64k	242,8	28,4	78,24	36,92	37,3	481,18	747,54	745,8	473,78	729,26
128k	258,09	41,84	103,01	49,37	55,48	514,24	814,97	809,89	483,84	772,77
256k	247,06	54,53	115,92	57,45	74,87	428,03	805,78	795,45	515,27	779,22
1024k	236,34	64,01	172,47	69,82	102,13	417,21	750,13	727,46	397,34	751,19

Avg Latency (ms)	1SSD	1SAS10	4SAS15 R10	2SAS15 R1	2SAS10 R1	2SSD R1	4SSD R10	4SSD R0	2SSD R0	4SSD R10 .vhd
4k	0	46	10	21	22	0	0	0	0	0
8k	1	48	10	23	24	1	1	1	1	1
64k	7	69	25	53	53	3	2	2	3	2
128k	15	95	38	80	71	7	4	4	7	4
256k	36	146	68	138	106	18	9	9	15	9
1024k	134	499	184	457	312	76	42	43	80	42

Datos Sequential Read.

IOs/sec	1SSD	1SAS10	4SAS15 R10	2SAS15 R1	2SAS10 R1	2SSD R1	4SSD R10	4SSD R0	2SSD R0	4SSD R10 .vhd
4k	48228,33	12760,19	24236,66	11029,9	8430,1	48091,4	48449,02	50056,45	50576,92	41079,82
8k	30764,19	8840,59	19291,22	8464,76	6977,42	33973,55	37995,04	40316,22	39762,21	35330,61
64k	4306,52	1363,08	3501,48	1298,12	1514,18	5748,61	11294,12	13151,75	8042,41	10873,3
128k	2167,1	681,41	1800,06	645,42	756,03	3023,29	5482,81	6574,96	4165,88	5536,47
256k	1128,56	340,5	789,77	317,5	370,86	1569,1	2821,21	3291,59	2112,69	2783,26
1024k	263,22	85,14	213,22	83,26	92,89	393,65	708,97	805,8	529,7	706,34

MBs/sec	1SSD	1SAS10	4SAS15 R10	2SAS15 R1	2SAS10 R1	2SSD R1	4SSD R10	4SSD R0	2SSD R0	4SSD R10 .vhd
4k	188,39	49,84	94,67	43,08	32,93	187,85	189,25	195,53	197,56	160,46
8k	240,34	69,06	150,71	66,13	54,51	265,41	296,83	314,97	310,64	276,02
64k	269,15	85,19	218,84	81,13	94,63	359,28	705,88	821,98	502,65	679,58
128k	270,88	85,17	225	80,67	94,5	377,91	685,35	821,87	520,73	692,05
256k	282,14	85,12	197,44	79,37	92,71	392,27	705,3	822,89	528,17	695,81
1024k	263,22	85,14	213,22	83,26	92,89	393,65	708,97	805,8	529,7	706,34

Avg Latency (ms)	1SSD	1SAS10	4SAS15 R10	2SAS15 R1	2SAS10 R1	2SSD R1	4SSD R10	4SSD R0	2SSD R0	4SSD R10 .vhd
4k	0	1	0	2	3	0	0	0	0	0
8k	0	3	1	3	4	0	0	0	0	0
64k	6	23	8	24	20	5	2	1	3	2
128k	14	46	17	49	41	10	5	4	7	5
256k	27	93	40	100	85	19	10	9	14	10
1024k	121	375	149	383	343	80	44	39	59	44

Configuración SQLIO.

SQLIO.bat:

<pre>echo start random write sqlio -kW -s360 -frandom -o8 -b4 -LS - Fparam.txt timeout /T 60 sqlio -kW -s360 -frandom -o8 -b8 -LS - Fparam.txt timeout /T 60 sqlio -kW -s360 -frandom -o8 -b64 -LS - Fparam.txt timeout /T 60 sqlio -kW -s360 -frandom -o8 -b128 -LS - Fparam.txt timeout /T 60 sqlio -kW -s360 -frandom -o8 -b256 -LS - Fparam.txt timeout /T 60 sqlio -kW -s360 -frandom -o8 -b1024 -LS - Fparam.txt timeout /T 60</pre>	<pre>echo start sequential write sqlio -kW -s360 -fsequential -o8 -b4 -LS - Fparam.txt timeout /T 60 sqlio -kW -s360 -fsequential -o8 -b8 -LS - Fparam.txt timeout /T 60 sqlio -kW -s360 -fsequential -o8 -b64 -LS - Fparam.txt timeout /T 60 sqlio -kW -s360 -fsequential -o8 -b128 -LS - Fparam.txt timeout /T 60 sqlio -kW -s360 -fsequential -o8 -b256 -LS - Fparam.txt timeout /T 60 sqlio -kW -s360 -fsequential -o8 -b1024 -LS - Fparam.txt timeout /T 60</pre>	<pre>echo start random read sqlio -kR -s360 -frandom -o8 -b4 -LS - Fparam.txt timeout /T 60 sqlio -kR -s360 -frandom -o8 -b8 -LS - Fparam.txt timeout /T 60 sqlio -kR -s360 -frandom -o8 -b64 -LS - Fparam.txt timeout /T 60 sqlio -kR -s360 -frandom -o8 -b128 -LS - Fparam.txt timeout /T 60 sqlio -kR -s360 -frandom -o8 -b256 -LS - Fparam.txt timeout /T 60 sqlio -kR -s360 -frandom -o8 -b1024 -LS - Fparam.txt timeout /T 60</pre>	<pre>echo start sequential read sqlio -kR -s360 -fsequential -o8 -b4 -LS - Fparam.txt timeout /T 60 sqlio -kR -s360 -fsequential -o8 -b8 -LS - Fparam.txt timeout /T 60 sqlio -kR -s360 -fsequential -o8 -b64 -LS - Fparam.txt timeout /T 60 sqlio -kR -s360 -fsequential -o8 -b128 -LS - Fparam.txt timeout /T 60 sqlio -kR -s360 -fsequential -o8 -b256 -LS - Fparam.txt timeout /T 60 sqlio -kR -s360 -fsequential -o8 -b1024 -LS - Fparam.txt</pre>
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Param.txt:

i:\testfile.dat 4 0x0 8192