NETGEAR®

ReadyNAS® OS 6 Desktop & Rackmount Performance

WHITE PAPER

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READYNAS® OS 6 DESKTOP & RACKMOUNT PERFORMANCE

Data sizes are exponentially growing with the evolution of data from simple to more advanced and more realistic forms, for example, simple 3gp to 4K or 360 video formats, jpeg to detailed high resolution PSD photo formats, 2D video gaming to various virtual reality visual experiences and many more. All these are not only becoming a necessity but there is need for an almost instant access, processing, storage and what not in the today world of ever-growing data-hungry technology. The NETGEAR ReadyNAS Desktop and Rackmount systems present the best in throughput and speed performance to ensure that your business and home are not only catching up with the ever-growing data needs, but also prepared for future advancements.

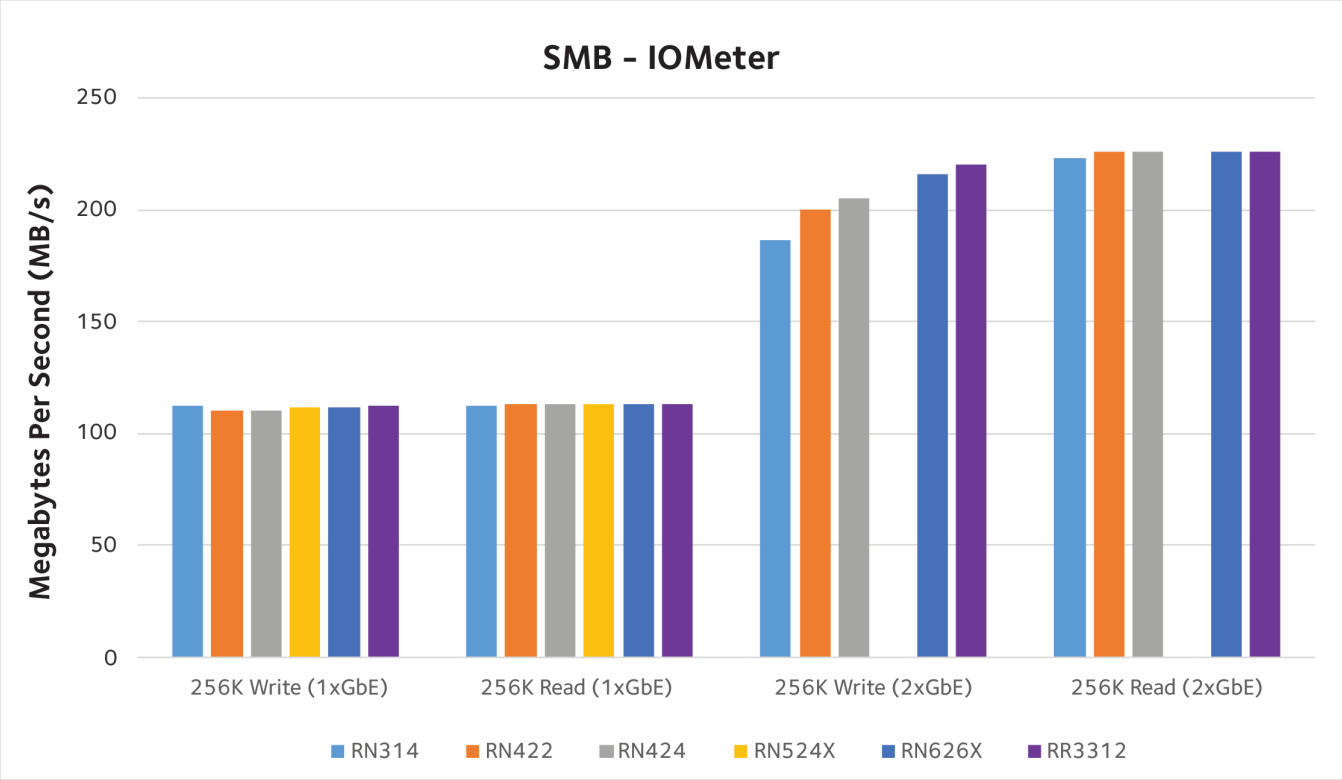
READYNAS OS 6 NAS PERFORMANCE BENCHMARKS

Presented below are performance benchmarks obtained after running tests on most ReadyNAS Desktop and Rackmount systems running OS 6 and above. All benchmarks utilize either a single or a dual Ethernet port on the unit under test. Also Gigabit and or 10 Gigabit Ethernet connections are used for both Samba and internet Small Computer System Interface (iSCSI) test cases. Listed on specifications tables are the ReadyNAS product model numbers, firmware versions, RAID levels, test disks and number of ports with their respective speeds used for testing. Below each graph is a table of the represented data rounded off to two decimal places.

Please note that these are benchmark results and actual performance will vary. For reference, the theoretical limit for a Gigabit Ethernet port is 125 MB/sec.

SMB IOMETER TEST 1 GIGABIT ETHERNET LAN READYNAS PERFORMANCE

Product	RN314	RN422	RN424	RN524X	RN626X	RR3312
Firmware	6.5.0-T23	6.7.0	6.7.0	6.6.0	6.5.0	6.6.1
RAID	RAID5	RAID1	RAID5	RAID5	RAID5	RAID6
Test Disk	SM1000DM003	SM1000DM003	SM1000DM003	SM1000DM003	SM1000DM003	ST1000DM003
Number of 1G Ports	2	2	2	1	2	4
Ethernet Speed	1GbE					



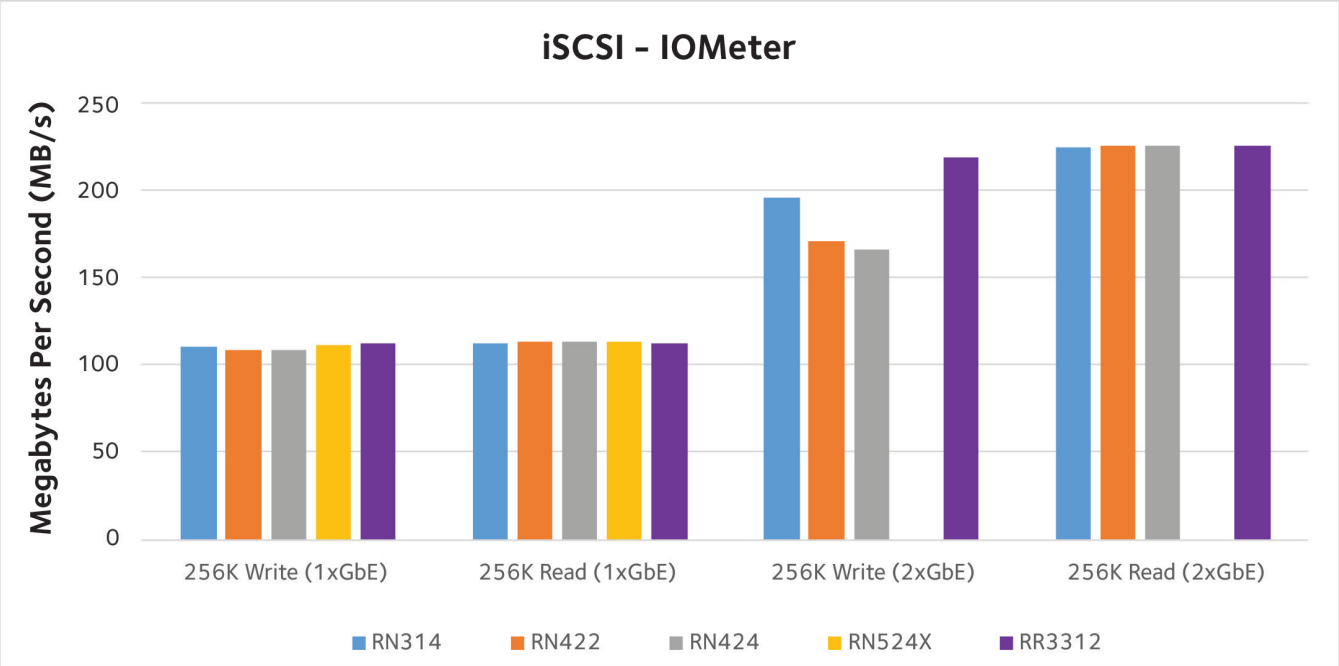
RN526X, RN528X, RN628X, RR4312X, RR4312S have similar performance, once throughput has reached physical Ethernet limit in both single Ethernet connection and dual Ethernet connections

Below is a table with the raw performance data in Megabytes per second (MB/s) used to create the graph above.

Product	RN314	RN422	RN424	RN524X	RN626X	RR3312
RAID level	RAID5	RAID1	RAID5	RAID5	RAID5	RAID6
256K Write (1xGbE)	112.35	109.94	110.28	112.03	111.59	112.53
256K Read (1xGbE)	112.39	113.05	113.10	113.05	112.97	113.05
256K Write (2xGbE)	186.33	200.23	205.10	1xGbE only	215.85	220.56
256K Read (2xGbE)	223.51	226.13	226.11	1xGbE only	226.03	226.14

ISCSI IOMETER TEST 1 GIGABIT ETHERNET LAN READYNAS PERFORMANCE

Product	RN314	RN422	RN424	RN524X	RN626X	RR3312
Firmware	6.5.0-T23	6.7.0	6.7.0	6.6.0	6.5.0	6.6.1
RAID	RAID5	RAID1	RAID5	RAID5	RAID5	RAID6
Test Disk	SM1000DM003	SM1000DM003	SM1000DM003	SM1000DM003	SM1000DM003	ST1000DM003
Number of 1G Ports	2	2	2	1	2	4
Ethernet Speed	1GbE					

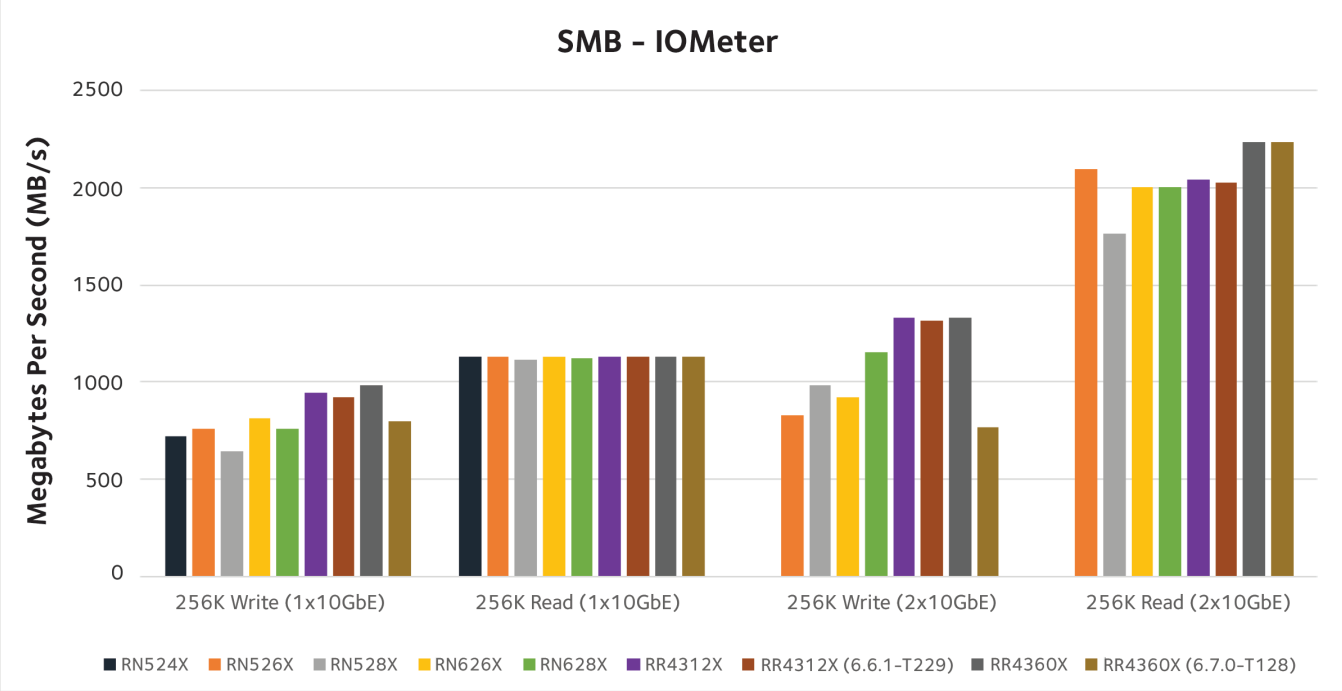


Below is a table of the same figures in Megabytes per Second (MB/s) on the graph above.

Product	RN314	RN422	RN424	RN524X	RR3312
RAID level	RAID5	RAID1	RAID5	RAID5	RAID6
256K Write (1xGbE)	110.74	108.38	109.08	111.01	112.92
256K Read (1xGbE)	112.88	112.94	112.94	112.94	112.92
256K Write (2xGbE)	196.29	170.97	166.41	1xGbE only	219.45
256K Read (2xGbE)	224.38	225.89	225.91	1xGbE only	225.91

SMB IOMETER TEST 10 GIGABIT ETHERNET LAN READYNAS PERFORMANCE

Platform	X86								
Product	RN524X	RN526X	RN528X	RN626X	RN628X	RR4312X	RR4312X	RR4360X	RR4360X
Firmware	6.6.2	6.6.2	6.6.0	6.6.2	6.6.1	6.6.0	6.6.1	6.7.0	6.7.0
RAID	RAID5	RAID5	RAID6	RAID5	RAID6	RAID6	RAID6	RAID6	RAID60
Test Disk	SM1000DM003	SM1000DM003	SM1000DM003	SM1000DM003	SM1000DM003	ST3000DM001	ST3000DM001	ST3000DM001	ST3000DM001
Number of 10G Ports	1	2	2	2	2	2	2	2	2
Ethernet Speed	10GbE								

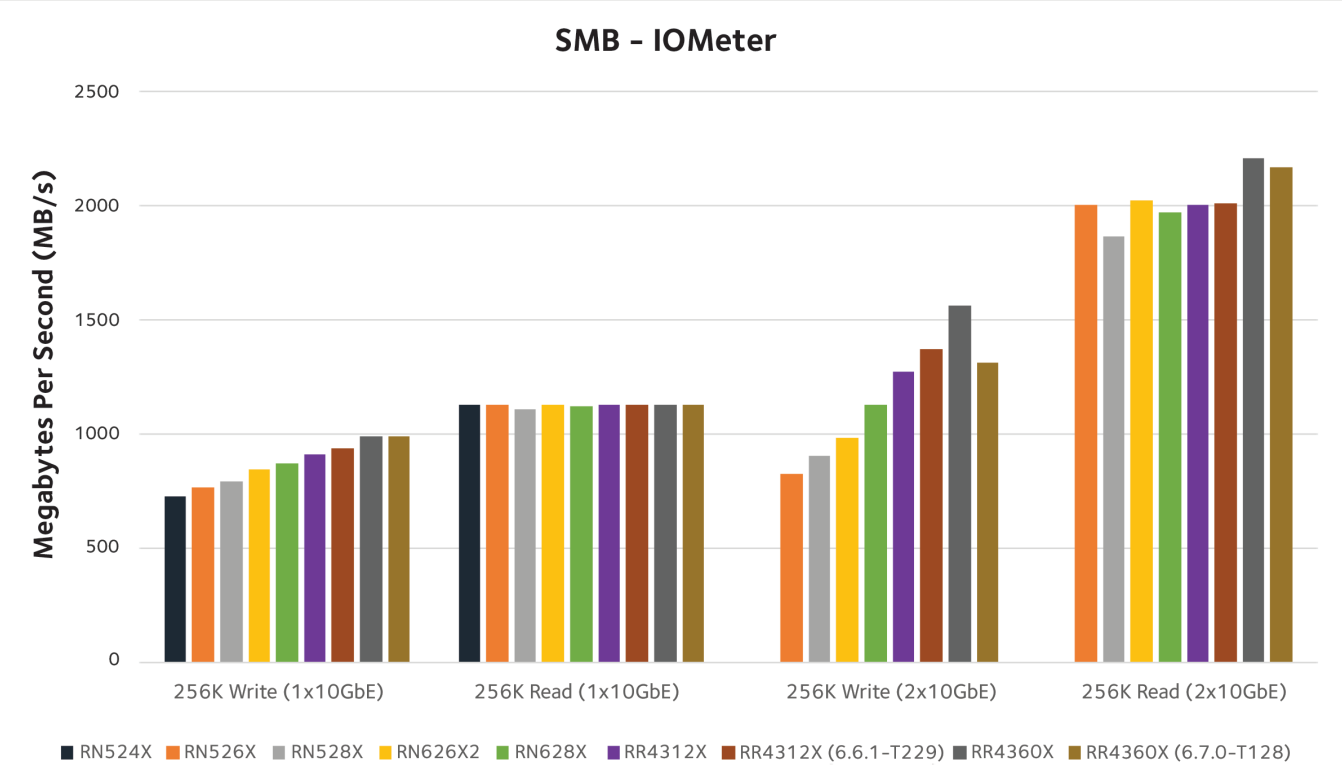


Below is a table of the same figures in Megabytes per Second (MB/s) on the graph above.

Product	RN524X	RN526X	RN528X	RN626X	RN628X	RR4312X	RR4312X	RR4360X	RR4360X
RAID	RAID5	RAID5	RAID6	RAID5	RAID6	RAID6	RAID6	RAID6	RAID60
256K Write (1x10GbE)	723.39	755.90	640.74	811.13	762.76	948.65	924.52	980.19	799.71
256K Read (1x10GbE)	1127.59	1130.82	1116.83	1130.66	1126.01	1130.83	1130.75	1130.83	1130.18
256K Write (2x10GbE)	1x10GbE only	827.24	981.61	923.75	1153.93	1330.18	1314.26	1335.06	770.31
256K Read (2 x10GbE)	1x10GbE only	2095.48	1766.07	2004.84	2001.66	2040.23	2025.39	2233.58	2238.88

ISCSI IOMETER TEST 10 GIGABIT ETHERNET LAN READYNAS PERFORMANCE

Platform	X86								
Product	RN524X	RN526X	RN528X	RN626X	RN628X	RR4312X	RR4312X	RR4360X	RR4360X
Firmware	6.6.2	6.6.2	6.6.0	6.6.2	6.6.1	6.6.0	6.6.1	6.7.0	6.7.0
RAID	RAID5	RAID5	RAID6	RAID5	RAID6	RAID6	RAID6	RAID6	RAID60
Test Disk	SM1000DM003	SM1000DM003	SM1000DM003	SM1000DM003	SM1000DM003	ST3000DM001	ST3000DM001	ST3000DM001	ST3000DM001
Number of 10G Ports	1	2	2	2	2	2	2	2	2
Ethernet Speed	10GbE								

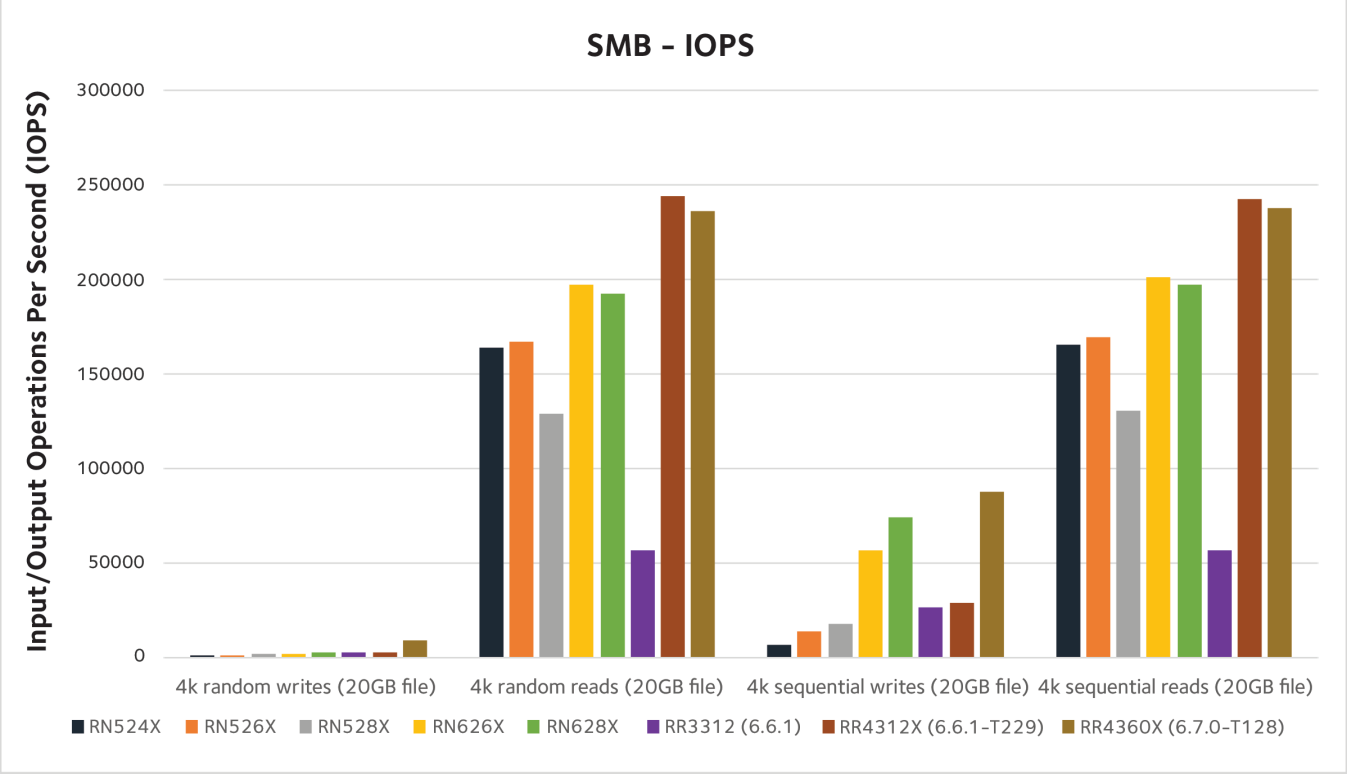


Below is a table of the same figures in Megabytes per Second (MB/s) on the graph above.

Product	RN524X	RN526X	RN528X	RN626X	RN628X	RR4312X	RR4312X	RR4360X	RR4360X
RAID	RAID5	RAID5	RAID5	RAID6	RAID6	RAID6	RAID6	RAID6	RAID60
256K Write (1x10GbE)	726.60	764.33	843.65	792.82	868.94	910.04	937.29	989.85	991.55
256K Read (1x10GbE)	1127.33	1126.96	1128.11	1107.76	1118.84	1129.70	1129.73	1125.33	1129.14
256K Write (2x10GbE)	1x10GbE only	823.03	981.49	902.60	1128.00	1275.22	1368.75	1559.97	1314.73
256K Read (2x10GbE)	1x10GbE only	2007.64	2027.48	1866.73	1972.28	2003.32	2009.89	2205.93	2170.69

SMB TEST INPUT/OUTPUT OPERATIONS PER SECOND (IOPS) 10 GIGABIT ETHERNET LAN READYNAS PERFORMANCE

Platform	X86							
Product	RN524X	RN526X	RN528X	RN626X	RN628X	RR3312	RR4312X	RR4360X
Firmware	6.6.2	6.6.2	6.6.0	6.6.2	6.6.1	6.6.1	6.6.0	6.7.0
RAID	RAID5	RAID5	RAID6	RAID5	RAID6	RAID6	RAID6	RAID60
Test Disk	SM1000DM003	SM1000DM003	SM1000DM003	SM1000DM003	SM1000DM003	ST3000DM001	ST3000DM001	ST3000DM001
Number of 10G Ports	1	2	2	2	2	4 (1G ports)	2	2
Ethernet Speed	10GbE							

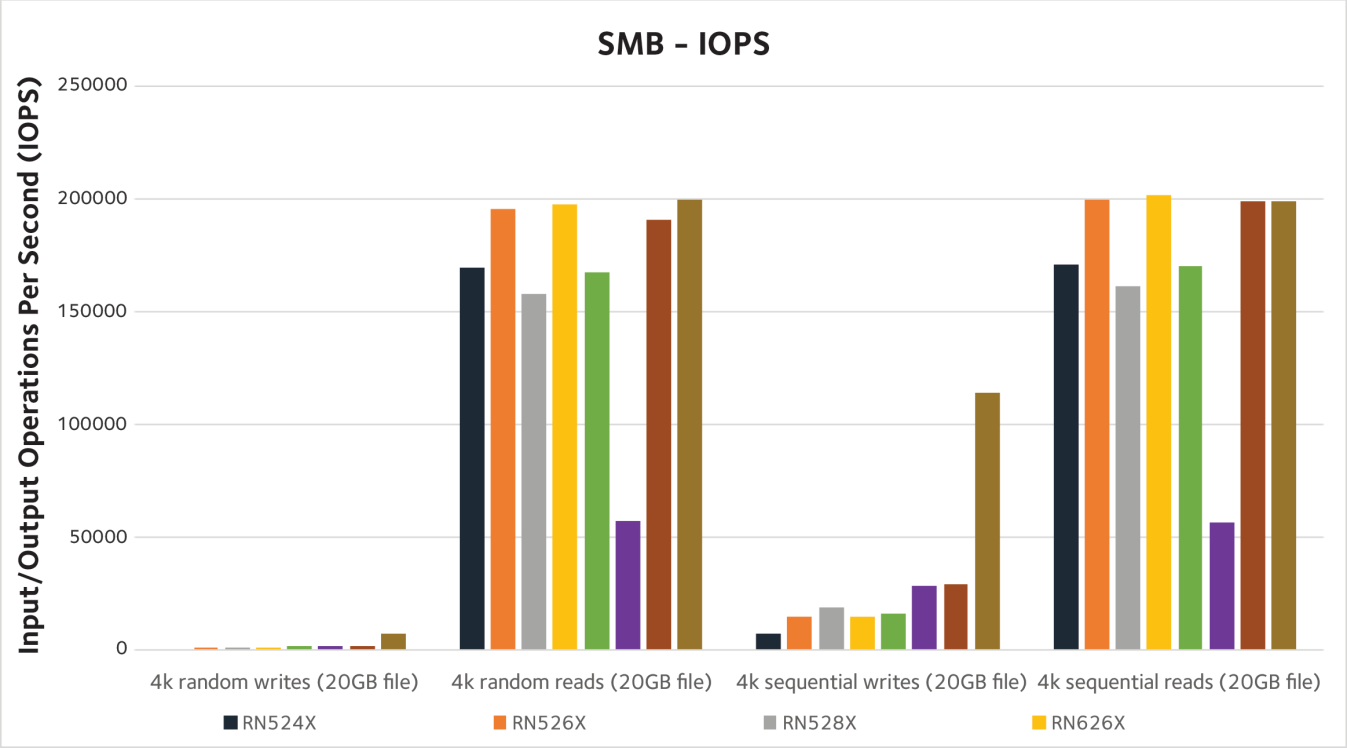


Below is a table of the same figures in Input/Output operations per second (IOPS) on the graph above.

Product	RN524X	RN526X	RN528X	RN626X	RN628X	RR3312	RR4312X	RR4360X
RAID	RAID5	RAID5	RAID6	RAID5	RAID6	RAID6	RAID6	RAID60
4k random writes (20GB file)	1262.62	1324.20	1811.57	1774.85	2543.59	2187.34	2333.26	8703.16
4k random reads (20GB file)	163705.94	167460.50	129299.96	197657.47	192605.96	56553.06	244590.22	236589.87
4k sequential writes (20GB file)	6323.13	13984.81	17936.51	56874.28	74439.65	26132.61	28466.13	87269.93
4k sequential reads (20GB file)	165540.43	169825.77	130185.12	201189.32	197621.99	56553.11	242372.08	237865.66

ISCSI TEST INPUT/OUTPUT OPERATIONS PER SECOND (IOPS) 10 GIGABIT ETHERNET LAN READYNAS PERFORMANCE

Platform	X86							
Product	RN524X	RN526X	RN528X	RN626X	RN628X	RR3312	RR4312X	RR4360X
Firmware	6.6.2	6.6.2	6.6.0	6.6.2	6.6.1	6.6.1	6.6.0	6.7.0
RAID	RAID5	RAID5	RAID6	RAID5	RAID6	RAID6	RAID6	RAID60
Test Disk	SM1000DM003	SM1000DM003	SM1000DM003	SM1000DM003	SM1000DM003	ST3000DM001	ST3000DM001	ST3000DM001
Number of 10G Ports	1	2	2	2	2	4 (1G ports)	2	2
Ethernet Speed	10GbE							

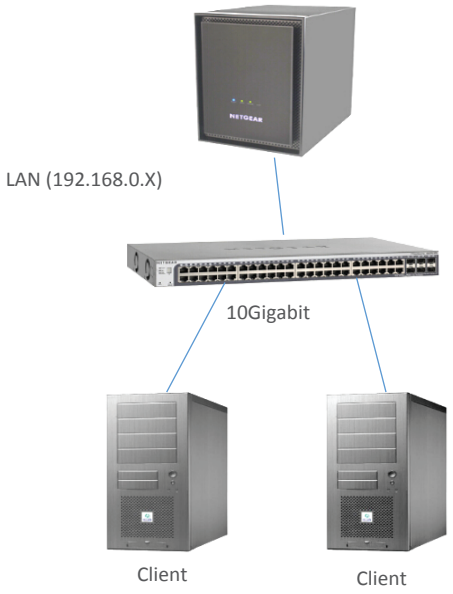


Below is a table of the same figures in Input/Output operations per second (IOPS) on the graph above.

Product	RN524X	RN526X	RN528X	RN626X	RN628X	RR3312	RR4312X	RR4360X
RAID	RAID5	RAID5	RAID6	RAID5	RAID6	RAID6	RAID6	RAID60
4k random writes (20GB file)	763.54	1386.10	1498.58	1425.35	1695.26	1835.69	1802.03	7483.41
4k random reads (20GB file)	169866.51	195284.64	157688.53	197725.32	167506.08	57101.84	190939.20	199828.24
4k sequential writes (20GB file)	7410.66	14762.54	19017.76	15273.9	16493.00	28519.77	29080.75	114133.65
4k sequential reads (20GB file)	170842.02	199427.56	161668.56	201867.35	169955.54	56968.49	199115.90	199133.46

TEST ENVIRONMENT

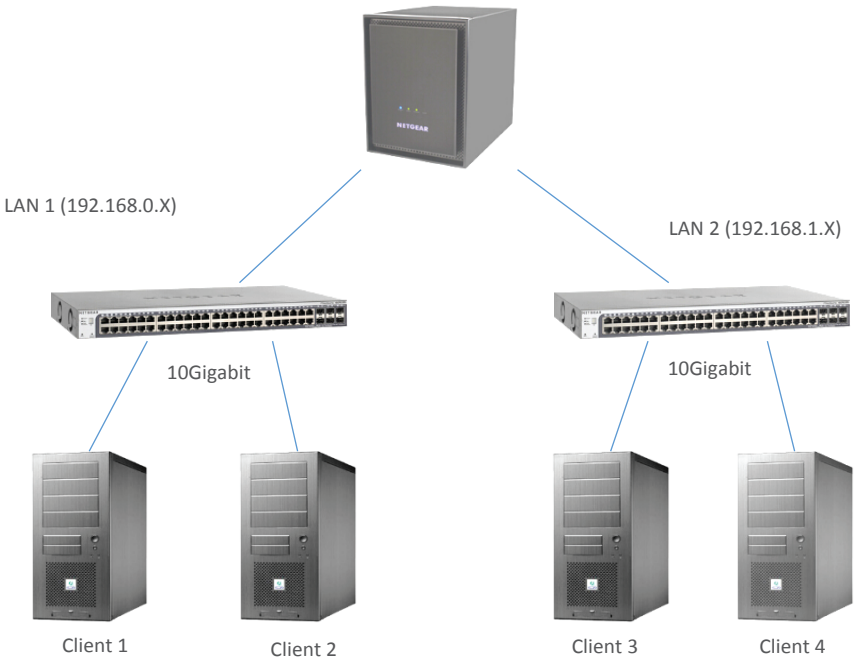
One Gigabit/10 Gigabit Ethernet port



Client 1 Specifications:
Windows 10 Enterprise 64bit, Intel E5-1620 v2 @ 3.7GHz, 32GB RAM (24GB used as RAM disk)

Client 2 Specifications:
Windows 10 Enterprise 64bit, Intel i7-4770 @ 3.4GHz, 32GB RAM (24GB used as RAM disk)

Two Gigabit/10 Gigabit Ethernet ports



Client 1 Specifications:
Windows 10 Enterprise 64bit, Intel E5-1620 v2 @ 3.7GHz, 32GB RAM (24GB used as RAM disk)

Client 2 Specifications:
Windows 10 Enterprise 64bit, Intel i7-2600 @ 3.4GHz, 16GB RAM (11GB used as RAM disk)

Client 3 Specifications:
Windows 10 Enterprise 64bit, Intel i7-4770 @ 3.4GHz, 32GB RAM (24GB used as RAM disk)

Client 4 Specifications:
Windows 10 Enterprise 64bit, Intel i7-2600 @ 3.4GHz, 16GB RAM (11GB used as RAM disk)

FOR MORE INFORMATION

- NETGEAR website www.netgear.com/readynas
- Community Forum www.readynas.com/forum
- NETGEAR support site www.support.netgear.com

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