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0610-vs

dram

Automated Executive Summary

under no load had the most wins, coming in first place for 90% of the tests.

Based on the geometric mean of all complete results, the fastest (under no load) was 3.19x the speed of the slowest (under load 90 optane 2nd). under load 90 optane 3rd after reboot was 0.925x the speed of under no load, under no load optane was 1x the speed of under load 90 optane 3rd after reboot, under load 90 was 0.984x the speed of under no load optane, under load 90 optane was 0.371x the speed of under load 90, under load 90 optane 2nd was 0.93x the speed of under load 90 optane.

Test Systems:

under load 90

Processor: 2 x Intel Xeon Gold 5220R (48 Cores / 96 Threads), Motherboard: HPE ProLiant DL360 Gen10 (U32 BIOS),

Chipset: Intel Sky Lake-E DMI3 Registers, Memory: 16 x 32 GB DDR4-2666MT/s HPE, Disk: 3201GB MO003200KWVUV, Graphics: Matrox MGA G200eH3, Network: 2 x Intel 10G X550T

OS: Ubuntu 18.04, Kernel: 4.15.0-140-generic (x86_64), Compiler: GCC 7.5.0, File-System: ext4, Screen Resolution: 1024x768

Kernel Notes: nvme_core.multipath=0 - Transparent Huge Pages: madvise
Processor Notes: CPU Microcode: 0x5003003
Security Notes: itlb_multihit: KVM: Mitigation of Split huge pages + l1tf: Not affected + mds: Not affected + meltdown: Not affected + spec_store_bypass: Mitigation of SSB disabled via prctl and seccomp + spectre_v1: Mitigation of usercopy/swapgs barriers and __user pointer sanitization + spectre_v2: Mitigation of Enhanced IBRS IBPB: conditional RSB filling + srbds: Not affected + tsx_async_abort: Mitigation of TSX disabled

under load 90 optane

under load 90 optane 2nd

under load 90 optane 3rd after reboot

under no load optane

Processor: 2 x Intel Xeon Gold 5220R (48 Cores / 96 Threads), Motherboard: HPE ProLiant DL360 Gen10 (U32 BIOS), Chipset: Intel Sky Lake-E DMI3 Registers, Memory: 129408 MB + 32 GB + 32 GB + 32 GB + 32 GB + 129408 MB + 129408 MB + 32 GB + 32 GB + 32 GB + 32 GB + 129408 MB DDR4-2666MT/s, Disk: 3201GB MO003200KWVUV, Graphics: Matrox MGA G200eH3, Network: 2 x Intel 10G X550T

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under no load

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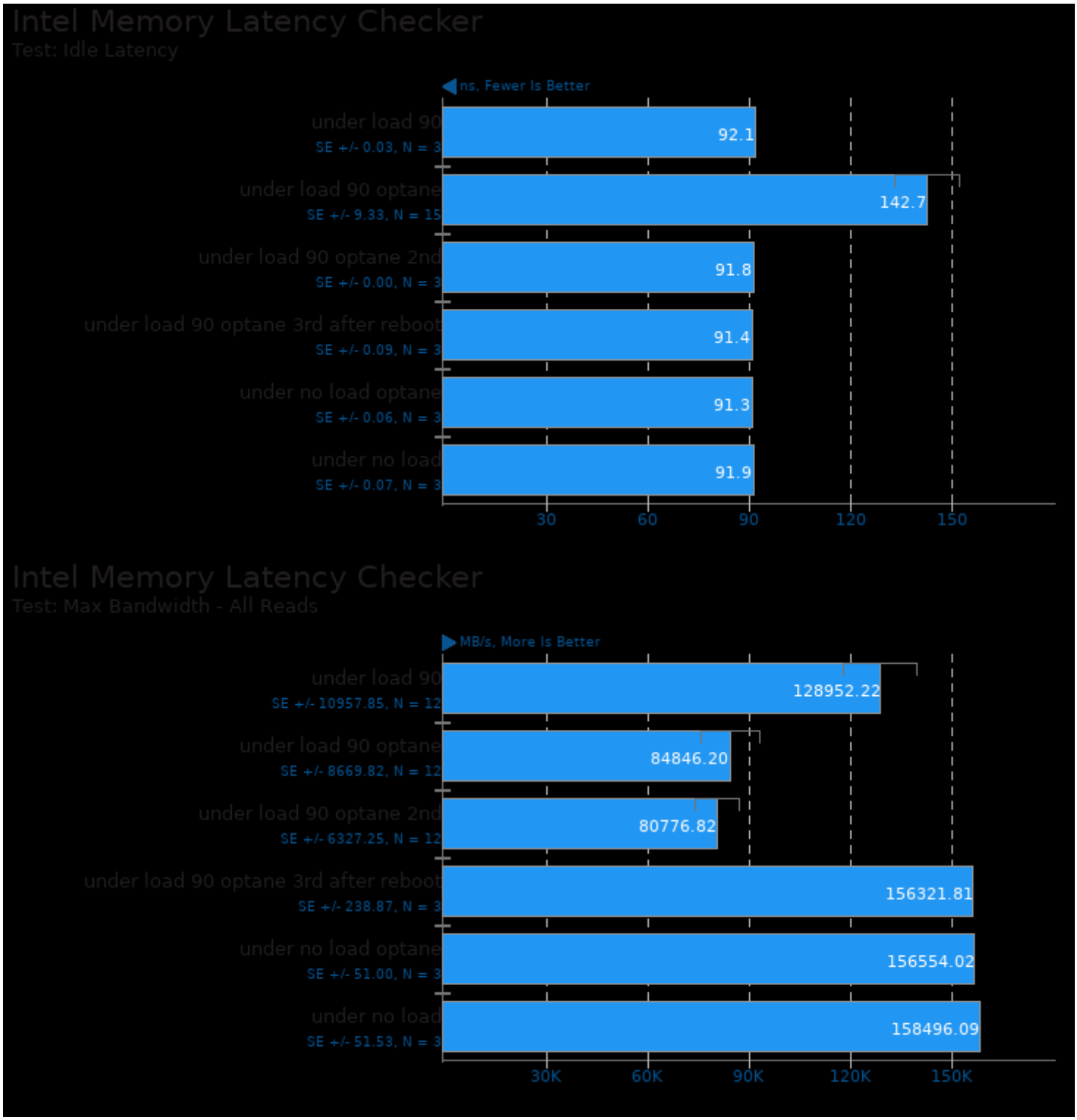
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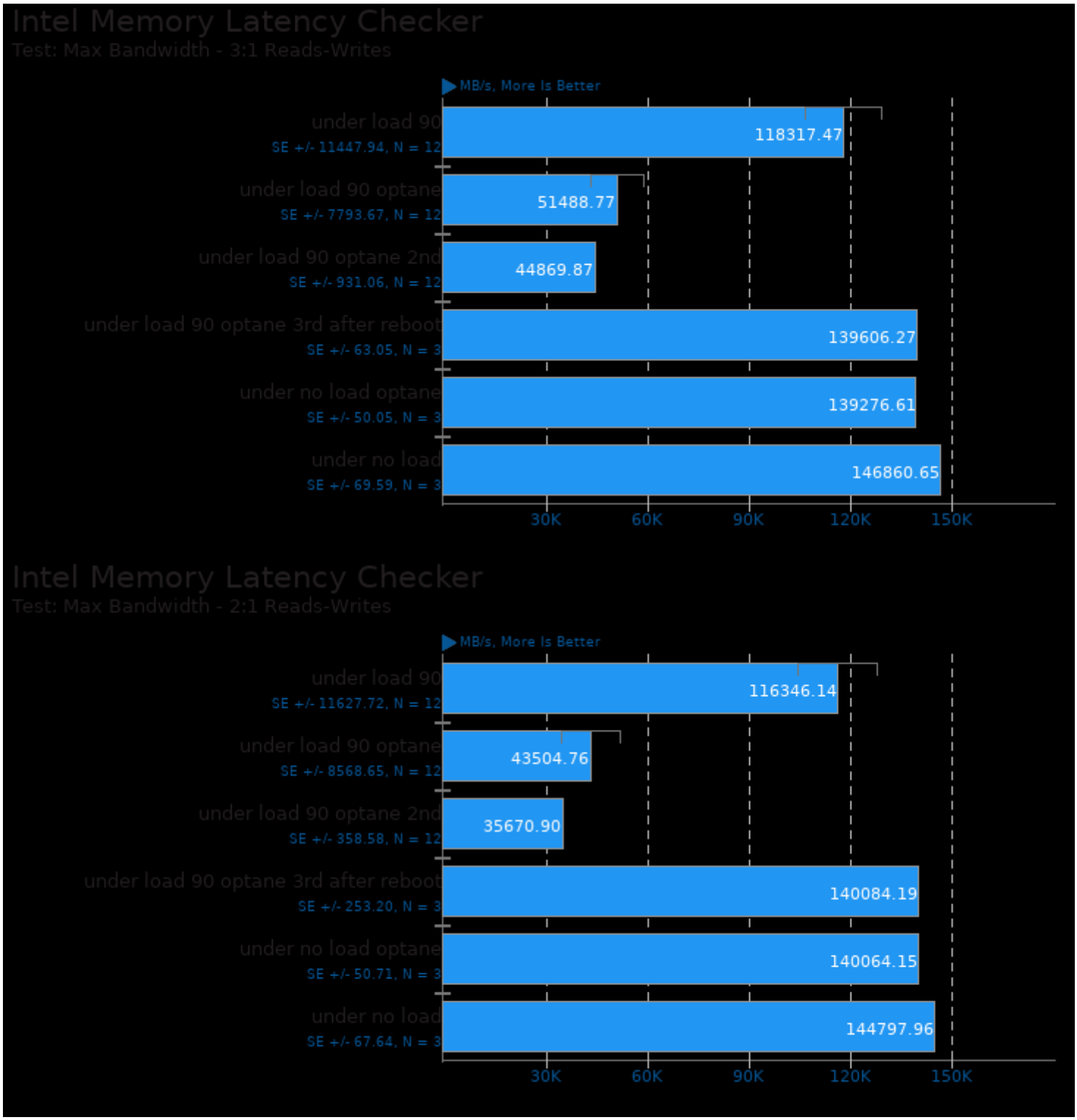
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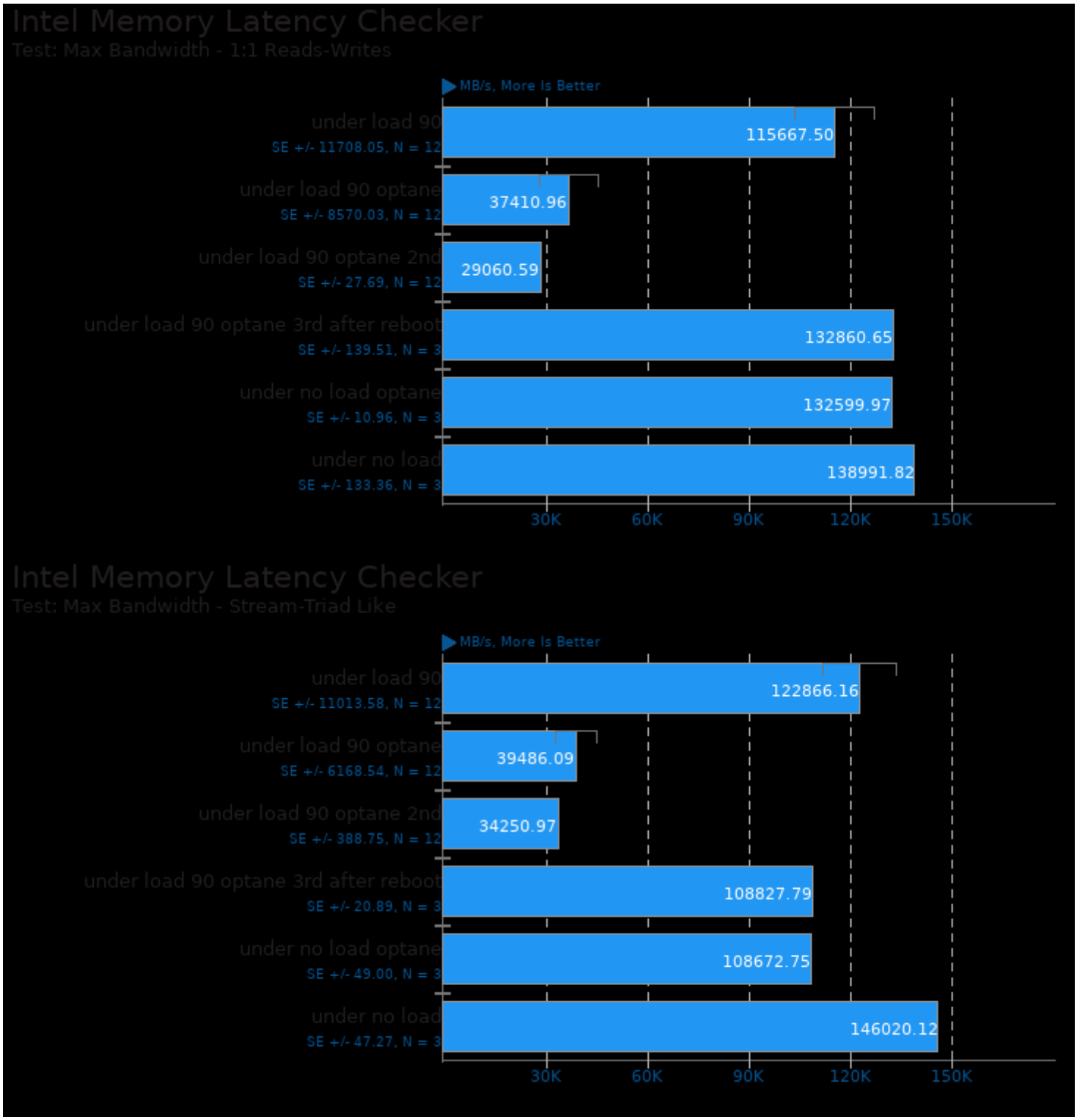
	under load 90	under load 90 optane	under load 90 optane 2nd	under load 90 optane 3rd after reboot	under no load optane	under no load
Intel Memory Latency Checker - Idle Latency (ns)	92.1	142.7	91.8	91.4	91.3	91.9
Normalized	99.13%	63.98%	99.46%	99.89%	100%	99.35%
Standard Deviation	0.1%	25.3%	0%	0.2%	0.1%	0.1%
Intel Memory Latency Checker - Max Bandwidth - All Reads (MB/s)	128952	84846	80777	156322	156554	158496
Normalized	81.36%	53.53%	50.96%	98.63%	98.77%	100%
Standard Deviation	29.4%	35.4%	27.1%	0.3%	0.1%	0.1%
Intel Memory Latency Checker - Max Bandwidth - 3:1 Reads-Writes (MB/s)	118317	51489	44870	139606	139277	146861
Normalized	80.56%	35.06%	30.55%	95.06%	94.84%	100%
Standard Deviation	33.5%	52.4%	7.2%	0.1%	0.1%	0.1%
Intel Memory Latency Checker - Max Bandwidth - 2:1 Reads-Writes (MB/s)	116346	43505	35671	140084	140064	144798
Normalized	80.35%	30.05%	24.63%	96.74%	96.73%	100%
Standard Deviation	34.6%	68.2%	3.5%	0.3%	0.1%	0.1%
Intel Memory Latency Checker - Max Bandwidth - 1:1 Reads-Writes (MB/s)	115668	37411	29061	132861	132600	138992
Normalized	83.22%	26.92%	20.91%	95.59%	95.4%	100%
Standard Deviation	35.1%	79.4%	0.3%	0.2%	0%	0.2%
Intel Memory Latency Checker - Max Bandwidth - Stream-Triad Like (MB/s)	122866	39486	34251	108828	108673	146020
Normalized	84.14%	27.04%	23.46%	74.53%	74.42%	100%
Standard Deviation	31.1%	54.1%	3.9%	0%	0.1%	0.1%
Intel Memory Latency Checker - P.I.B - All Reads	154506	92976	71569	154208	154329	156831
Normalized	98.52%	59.28%	45.63%	98.33%	98.4%	100%
Standard Deviation	0%	0.4%	0.3%	0%	0%	0.3%
Intel Memory Latency Checker - P.I.B - 3:1 Reads-Writes (MB/s)	145145	44763	42052	139496	139393	146182
Normalized	99.29%	30.62%	28.77%	95.43%	95.36%	100%
Standard Deviation	0.1%	0.4%	0.4%	0%	0.1%	0%
Intel Memory Latency Checker - P.I.B - 2:1 Reads-Writes (MB/s)	143626	36285	34116	139376	139155	144592
Normalized	99.33%	25.09%	23.59%	96.39%	96.24%	100%
Standard Deviation	0.1%	0.2%	0.1%	0.1%	0.1%	0%
Intel Memory Latency Checker - P.I.B - 1:1 Reads-Writes (MB/s)	138069	29035	28930	132443	132631	138656
Normalized	99.58%	20.94%	20.86%	95.52%	95.65%	100%
Standard Deviation	0.1%	0.2%	0.2%	0.3%	0.1%	0%

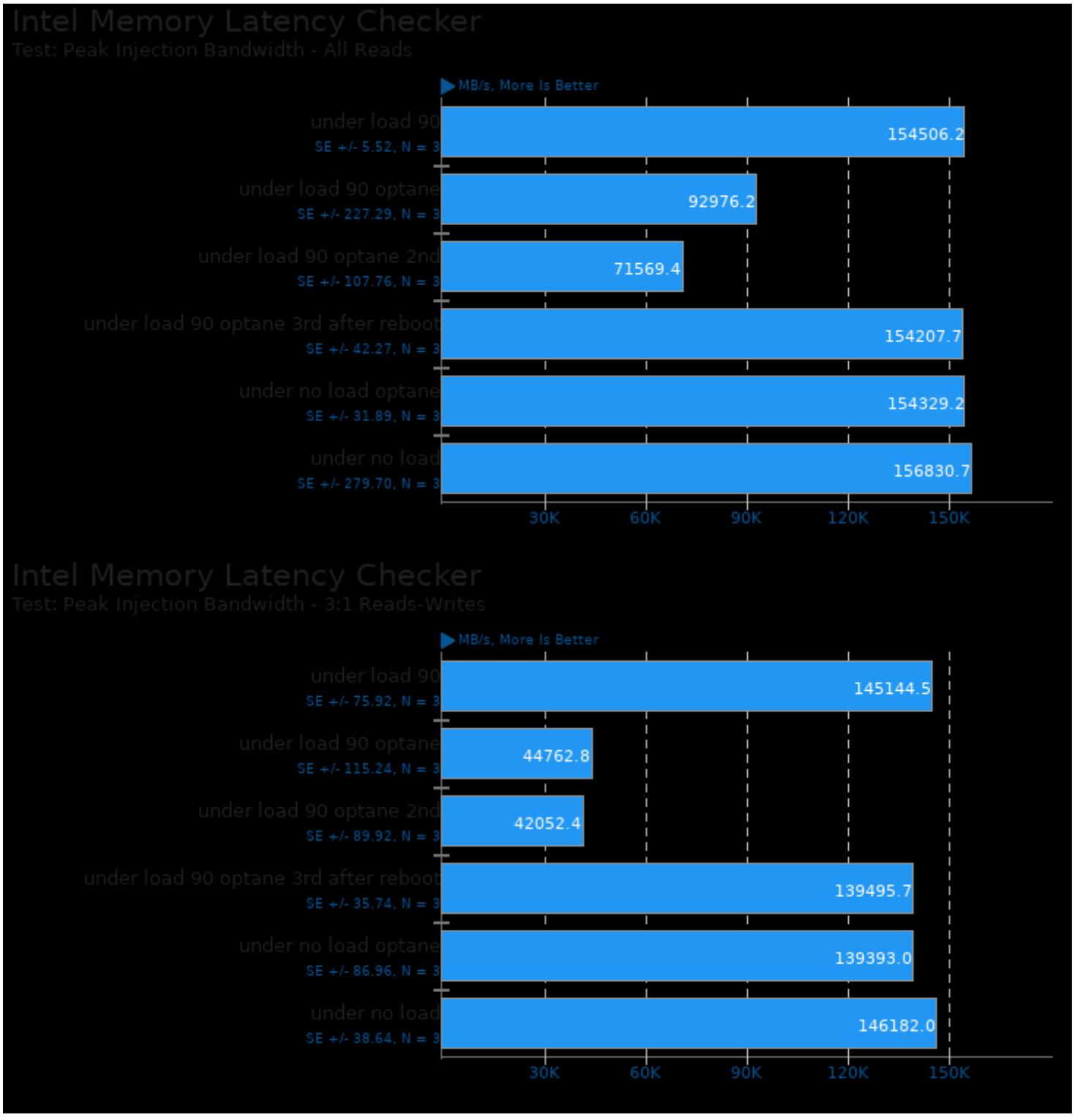
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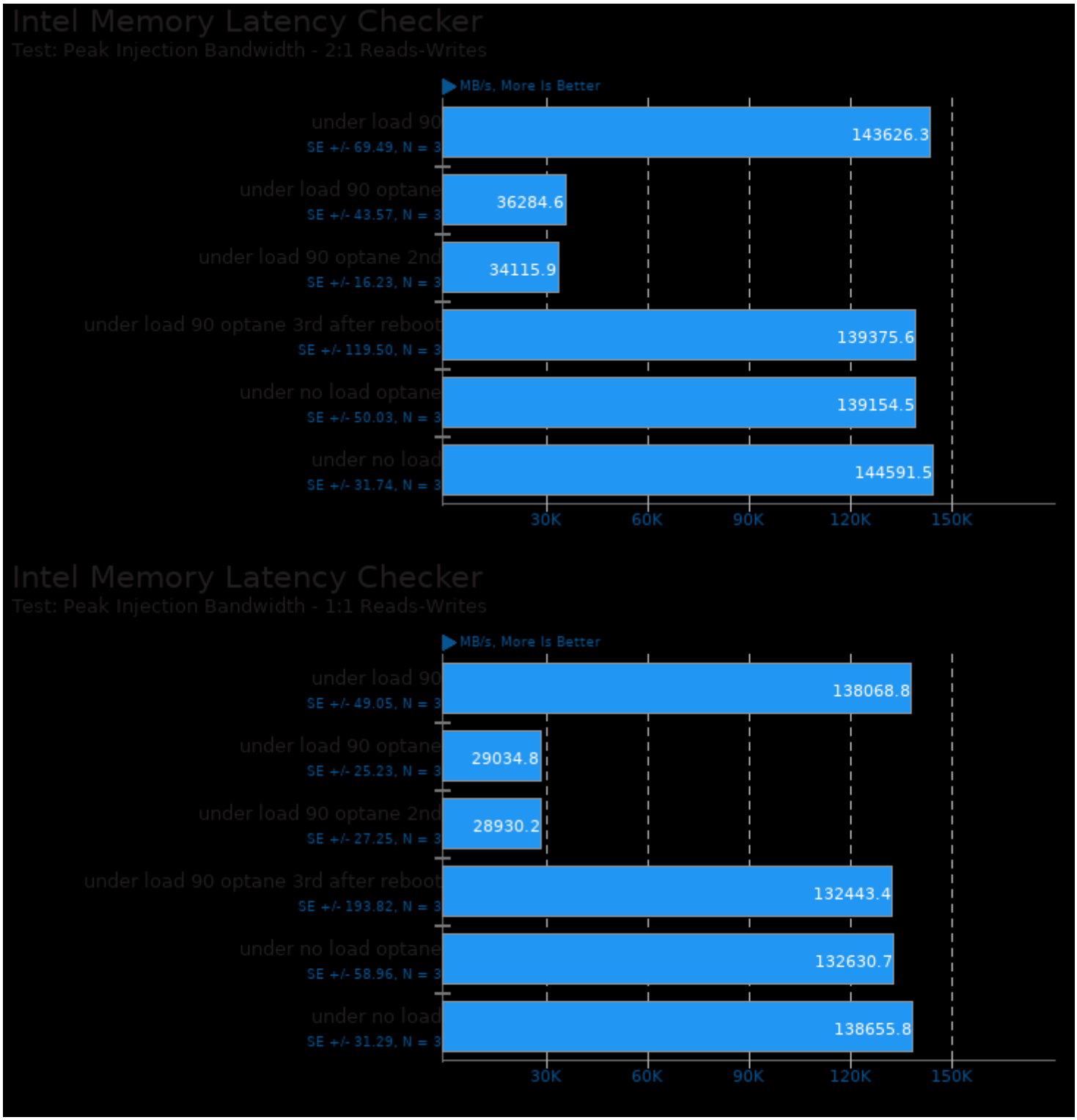
Intel Memory Latency Checker - P.I.B - Stream-Triad Like (MB/s)	132067	33719	**31370**	100105	100045	**133036**
Normalized	99.27%	25.35%	23.58%	75.25%	75.2%	100%
Standard Deviation	0.2%	0.2%	0.2%	0%	0.1%	0%

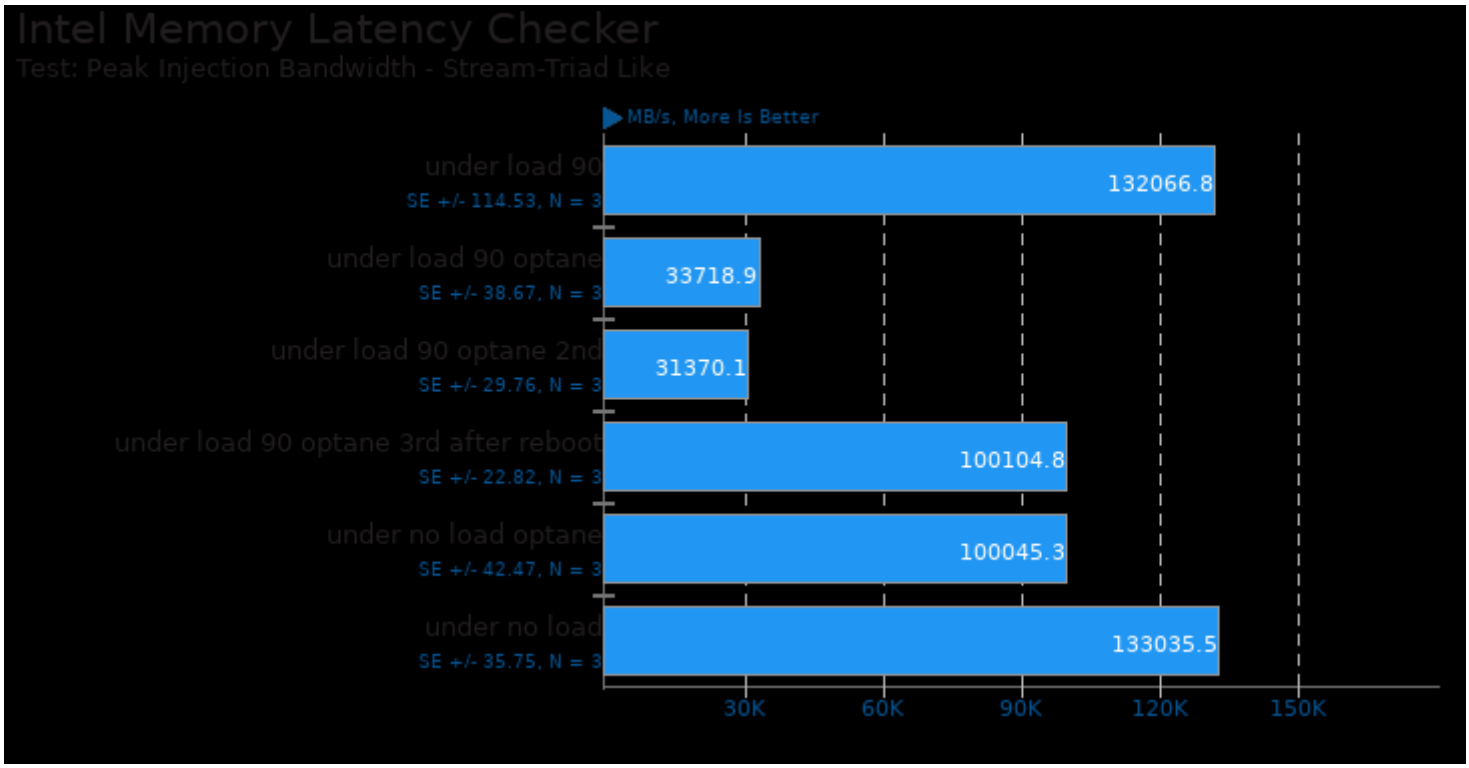

Intel Memory Latency Checker
Test: Idle Latency
ns, Fewer Is Better
under load 90
SE +/- 0.03, N = 3
92.1
under load 90 optane
SE +/- 9.33, N = 15
142.7
under load 90 optane 2nd
SE +/- 0.00, N = 3
91.8
under load 90 optane 3rd after reboot
SE +/- 0.09, N = 3
91.4
under no load optane
SE +/- 0.06, N = 3
91.3
under no load
SE +/- 0.07, N = 3
91.9
30
60
90
120
150
Intel Memory Latency Checker
Test: Max Bandwidth - All Reads
MB/s, More Is Better
under load 90
SE +/- 10957.85, N = 12
128952.22
under load 90 optane
SE +/- 8669.82, N = 12
84846.20
under load 90 optane 2nd
SE +/- 6327.25, N = 12
80776.82
under load 90 optane 3rd after reboot
SE +/- 238.87, N = 3
156321.81
under no load optane
SE +/- 51.00, N = 3
156554.02
under no load
SE +/- 51.53, N = 3
158496.09
30K
60K
90K
120K
150K


Intel Memory Latency Checker
Test: Max Bandwidth - 3:1 Reads-Writes
MB/s, More Is Better
under load 90
SE +/- 11447.94, N = 12
118317.47
under load 90 optane
SE +/- 7793.67, N = 12
51488.77
under load 90 optane 2nd
SE +/- 931.06, N = 12
44869.87
under load 90 optane 3rd after reboot
SE +/- 63.05, N = 3
139606.27
under no load optane
SE +/- 50.05, N = 3
139276.61
under no load
SE +/- 69.59, N = 3
146860.65
30K
60K
90K
120K
150K
Intel Memory Latency Checker
Test: Max Bandwidth - 2:1 Reads-Writes
MB/s, More Is Better
under load 90
SE +/- 11627.72, N = 12
116346.14
under load 90 optane
SE +/- 8568.65, N = 12
43504.76
under load 90 optane 2nd
SE +/- 358.58, N = 12
35670.90
under load 90 optane 3rd after reboot
SE +/- 253.20, N = 3
140084.19
under no load optane
SE +/- 50.71, N = 3
140064.15
under no load
SE +/- 67.64, N = 3
144797.96
30K
60K
90K
120K
150K


Intel Memory Latency Checker
Test: Max Bandwidth - 1:1 Reads-Writes
MB/s, More Is Better
under load 90
SE +/- 11708.05, N = 12
115667.50
under load 90 optane
SE +/- 8570.03, N = 12
37410.96
under load 90 optane 2nd
SE +/- 27.69, N = 12
29060.59
under load 90 optane 3rd after reboot
SE +/- 139.51, N = 3
132860.65
under no load optane
SE +/- 10.96, N = 3
132599.97
under no load
SE +/- 133.36, N = 3
138991.82
30K
60K
90K
120K
150K
Intel Memory Latency Checker
Test: Max Bandwidth - Stream-Triad Like
MB/s, More Is Better
under load 90
SE +/- 11013.58, N = 12
122866.16
under load 90 optane
SE +/- 6168.54, N = 12
39486.09
under load 90 optane 2nd
SE +/- 388.75, N = 12
34250.97
under load 90 optane 3rd after reboot
SE +/- 20.89, N = 3
108827.79
under no load optane
SE +/- 49.00, N = 3
108672.75
under no load
SE +/- 47.27, N = 3
146020.12
30K
60K
90K
120K
150K


Intel Memory Latency Checker
Test: Peak Injection Bandwidth - All Reads
MB/s, More Is Better
under load 90
SE +/- 5.52, N = 3
154506.2
under load 90 optane
SE +/- 227.29, N = 3
92976.2
under load 90 optane 2nd
SE +/- 107.76, N = 3
71569.4
under load 90 optane 3rd after reboot
SE +/- 42.27, N = 3
154207.7
under no load optane
SE +/- 31.89, N = 3
154329.2
under no load
SE +/- 279.70, N = 3
156830.7
30K
60K
90K
120K
150K
Intel Memory Latency Checker
Test: Peak Injection Bandwidth - 3:1 Reads-Writes
MB/s, More Is Better
under load 90
SE +/- 75.92, N = 3
145144.5
under load 90 optane
SE +/- 115.24, N = 3
44762.8
under load 90 optane 2nd
SE +/- 89.92, N = 3
42052.4
under load 90 optane 3rd after reboot
SE +/- 35.74, N = 3
139495.7
under no load optane
SE +/- 86.96, N = 3
139393.0
under no load
SE +/- 38.64, N = 3
146182.0
30K
60K
90K
120K
150K


Intel Memory Latency Checker
Test: Peak Injection Bandwidth - 2:1 Reads-Writes
MB/s, More Is Better
under load 90
SE +/- 69.49, N = 3
143626.3
under load 90 optane
SE +/- 43.57, N = 3
36284.6
under load 90 optane 2nd
SE +/- 16.23, N = 3
34115.9
under load 90 optane 3rd after reboot
SE +/- 119.50, N = 3
139375.6
under no load optane
SE +/- 50.03, N = 3
139154.5
under no load
SE +/- 31.74, N = 3
144591.5
30K
60K
90K
120K
150K
Intel Memory Latency Checker
Test: Peak Injection Bandwidth - 1:1 Reads-Writes
MB/s, More Is Better
under load 90
SE +/- 49.05, N = 3
138068.8
under load 90 optane
SE +/- 25.23, N = 3
29034.8
under load 90 optane 2nd
SE +/- 27.25, N = 3
28930.2
under load 90 optane 3rd after reboot
SE +/- 193.82, N = 3
132443.4
under no load optane
SE +/- 58.96, N = 3
132630.7
under no load
SE +/- 31.29, N = 3
138655.8
30K
60K
90K
120K
150K



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