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0610-vs

2 x Intel Xeon Gold 5220R testing with a HPE ProLiant DL360 Gen10 (U32 BIOS) and Matrox MGA G200eH3 on Ubuntu 18.04 via the Phoronix Test Suite.

Automated Executive Summary

under no load optane 2-2-2 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 optane 2-2-2) was 3.884x the speed of the slowest (under load 90 optane 2nd).

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 + I1tf: 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 IPBP: conditional RSB filling + srbd: 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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under load 90 optane 2-2-2

under no load optane 2-2-2

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: 32 GB + 129408 MB + 32 GB + 129408 MB + 32 GB + 129408 MB + 129408 MB + 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 load 98 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

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 + srbs: Not affected + tsx_async_abort: Mitigation of TSX disabled

under load 90 optane 1-1-1 16g

under noload optane 1:1:1 16g

under load 90 optane 1:1:1 16g

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 + 16384 MB + 16384 MB + 16384 MB + 16384 MB + 129408 MB + 129408 MB + 16384 MB + 16384 MB + 16384 MB + 16384 MB + 129408 MB DDR4-2666MT/s, Disk: 3201GB MO003200KWVUV, Graphics: Matrox MGA G200eH3, Network: 2 x Intel 10G X550T

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Processor Notes: CPU Microcode: 0x5003003

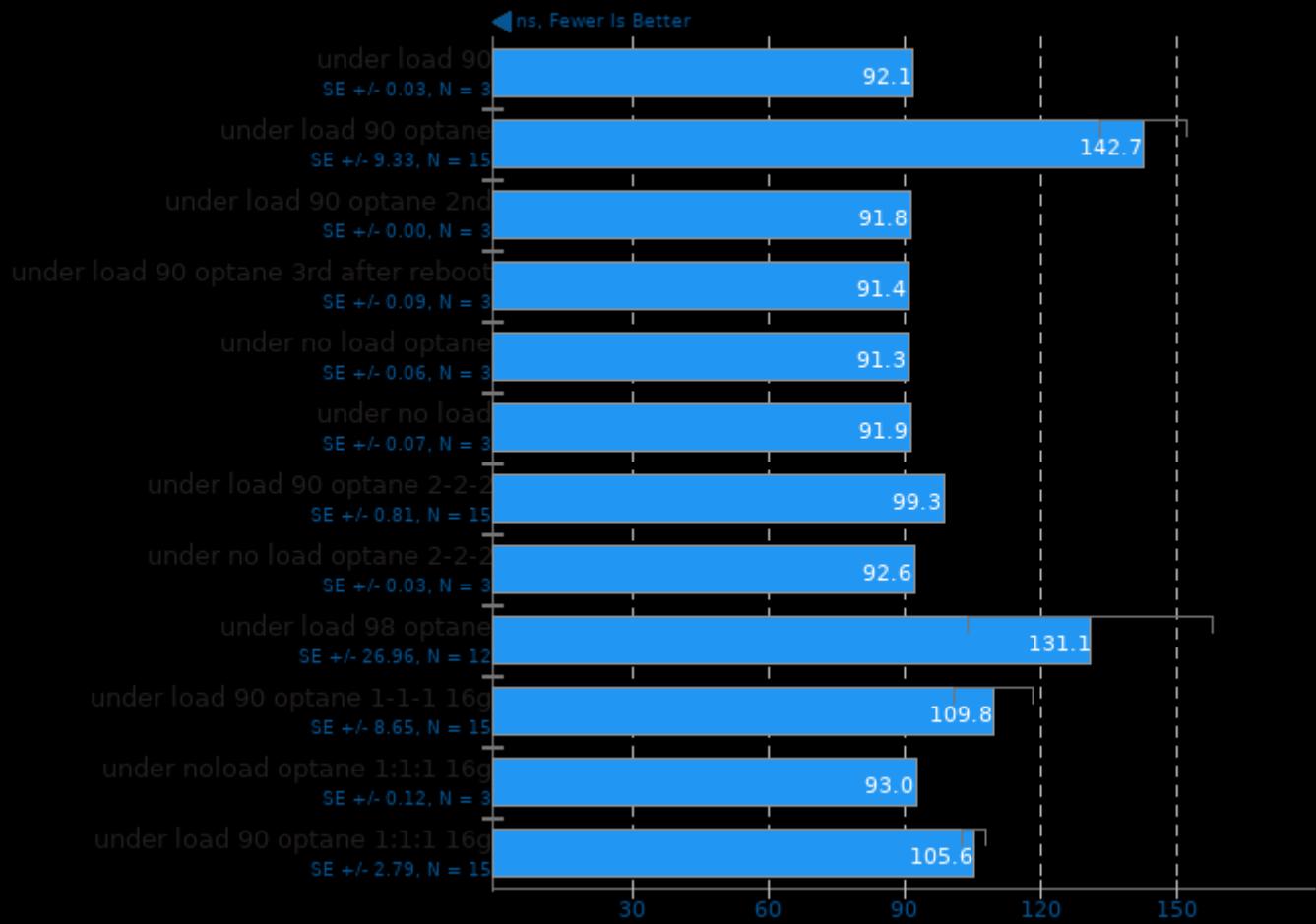
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	under load 90	under load 90 optane	under load 90 2nd	under load 90 optane	under no load optane	under no load 3rd	under load 90 optane	under no load 2-2-2	under load 98 optane	under no load 2-2-2	under load 98 optane	under no load 1-1-1	under load 90 optane	under no load 16g	under load 90 optane	under no load 16g	under load 90 optane
Intel Memory	92.1	142.7	91.8	91.4	91.3	91.9	99.3	92.6	131.1	109.8	93.0	105.6					
Latency Checker																	
- Idle Latency																	
Normalized	99.13%	63.98%	99.46%	99.89%	100%	99.35%	91.94%	98.6%	69.64%	83.15%	98.17%	86.46%					
Standard Deviation	0.1%	25.3%	0%	0.2%	0.1%	0.1%	3.2%	0.1%	71.3%	30.5%	0.2%	10.2%					
Intel Memory	128952	84846	80777	156322	156554	158496	201949	209674	145757	146845	150686	126165					
Latency Checker																	
- Max Bandwidth																	
- All Reads																	
Normalized	61.5%	40.47%	38.52%	74.55%	74.67%	75.59%	96.32%	100%	69.52%	70.03%	71.87%	60.17%					
Standard Deviation	29.4%	35.4%	27.1%	0.3%	0.1%	0.1%	2.3%	0.3%	13.6%	2%	0.1%	0.6%					
Intel Memory	118317	51489	44870	139606	139277	146861	184718	189362	131516	133888	134036	46895					
Latency Checker																	
- Max Bandwidth																	
- 3:1																	
Reads-Writes																	
Normalized	62.48%	27.19%	23.7%	73.72%	73.55%	77.56%	97.55%	100%	69.45%	70.7%	70.78%	24.76%					
Standard Deviation	33.5%	52.4%	7.2%	0.1%	0.1%	0.1%	1.3%	0.1%	18.2%	0.7%	0%	0.5%					
Intel Memory	116346	43505	35671	140084	140064	144798	178492	186231	138745	133011	132288	37666					
Latency Checker																	
- Max Bandwidth																	
- 2:1																	
Reads-Writes																	
Normalized	62.47%	23.36%	19.15%	75.22%	75.21%	77.75%	95.84%	100%	74.5%	71.42%	71.03%	20.23%					
Standard Deviation	34.6%	68.2%	3.5%	0.3%	0.1%	0.1%	1.8%	0.1%	0.6%	0.8%	0.1%	0.5%					
Intel Memory	115668	37411	29061	132861	132600	138992	174997	183202	132009	127873	126765	28612					
Latency Checker																	
- Max Bandwidth																	
- 1:1																	
Reads-Writes																	
Normalized	63.14%	20.42%	15.86%	72.52%	72.38%	75.87%	95.52%	100%	72.06%	69.8%	69.19%	15.62%					
Standard Deviation	35.1%	79.4%	0.3%	0.2%	0%	0.2%	0.1%	0.2%	0.5%	0.3%	0%	0.4%					
Intel Memory	122866	39486	34251	108828	108673	146020	144104	147106	107600	103760	104606	37278					
Latency Checker																	
- Max Bandwidth																	
- Stream-Triad Like (MB/s)																	
Normalized	83.52%	26.84%	23.28%	73.98%	73.87%	99.26%	97.96%	100%	73.14%	70.53%	71.11%	25.34%					
Standard Deviation	31.1%	54.1%	3.9%	0%	0.1%	0.1%	1%	0.2%	0.3%	1.1%	0%	0.7%					

Intel Memory	154506	92976	71569	154208	154329	156831	201149	210270	152484	147033	149151	133056
Latency Checker												
- P.I.B - All												
Reads (MB/s)												
Normalized	73.48%	44.22%	34.04%	73.34%	73.4%	74.59%	95.66%	100%	72.52%	69.93%	70.93%	63.28%
Standard Deviation	0%	0.4%	0.3%	0%	0%	0.3%	1.3%	0.1%	0.1%	1.3%	0.1%	11.5%
Intel Memory	145145	44763	42052	139496	139393	146182	186758	189332	138717	135054	133412	88920
Latency Checker												
- P.I.B - 3:1												
Reads-Writes (MB/s)												
Normalized	76.66%	23.64%	22.21%	73.68%	73.62%	77.21%	98.64%	100%	73.27%	71.33%	70.46%	46.96%
Standard Deviation	0.1%	0.4%	0.4%	0%	0.1%	0%	0.4%	0.1%	0%	0%	0.1%	50.9%
Intel Memory	143626	36285	34116	139376	139155	144592	181942	184581	138843	134000	131448	83741
Latency Checker												
- P.I.B - 2:1												
Reads-Writes (MB/s)												
Normalized	77.81%	19.66%	18.48%	75.51%	75.39%	78.34%	98.57%	100%	75.22%	72.6%	71.21%	45.37%
Standard Deviation	0.1%	0.2%	0.1%	0.1%	0.1%	0%	0.6%	0.1%	0.1%	0.2%	0%	58.2%
Intel Memory	138069	29035	28930	132443	132631	138656	176720	182982	132363	128146	126703	77387
Latency Checker												
- P.I.B - 1:1												
Reads-Writes (MB/s)												
Normalized	75.45%	15.87%	15.81%	72.38%	72.48%	75.78%	96.58%	100%	72.34%	70.03%	69.24%	42.29%
Standard Deviation	0.1%	0.2%	0.2%	0.3%	0.1%	0%	0.5%	0.1%	0%	0.2%	0.2%	65.6%
Intel Memory	132067	33719	31370	100105	100045	133036	136827	136958	99496	97603	96710	70374
Latency Checker												
- P.I.B -												
Stream-Triad Like (MB/s)												
Normalized	96.43%	24.62%	22.9%	73.09%	73.05%	97.14%	99.9%	100%	72.65%	71.27%	70.61%	51.38%
Standard Deviation	0.2%	0.2%	0.2%	0%	0.1%	0%	0.5%	0.1%	0%	0%	0%	43.8%

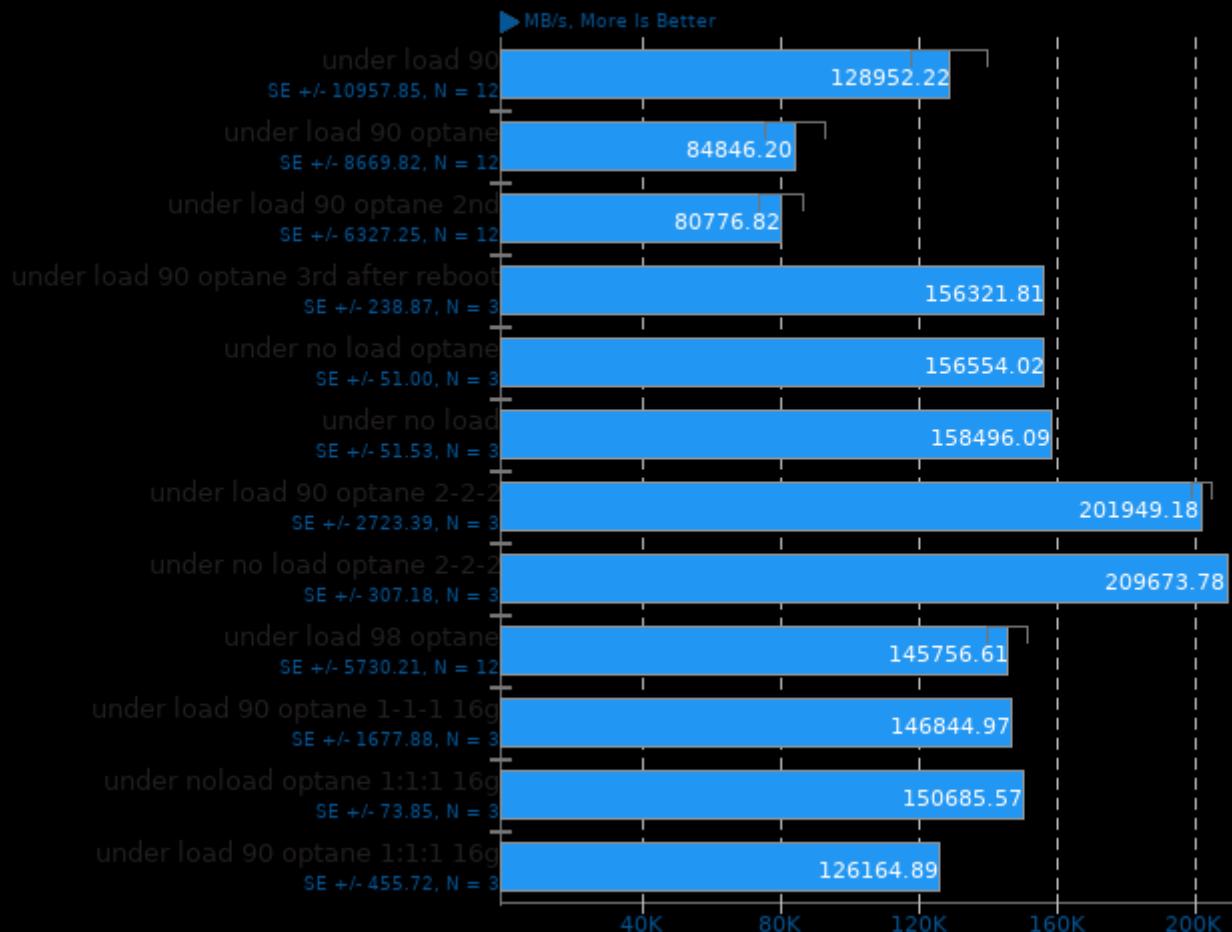
Intel Memory Latency Checker

Test: Idle Latency



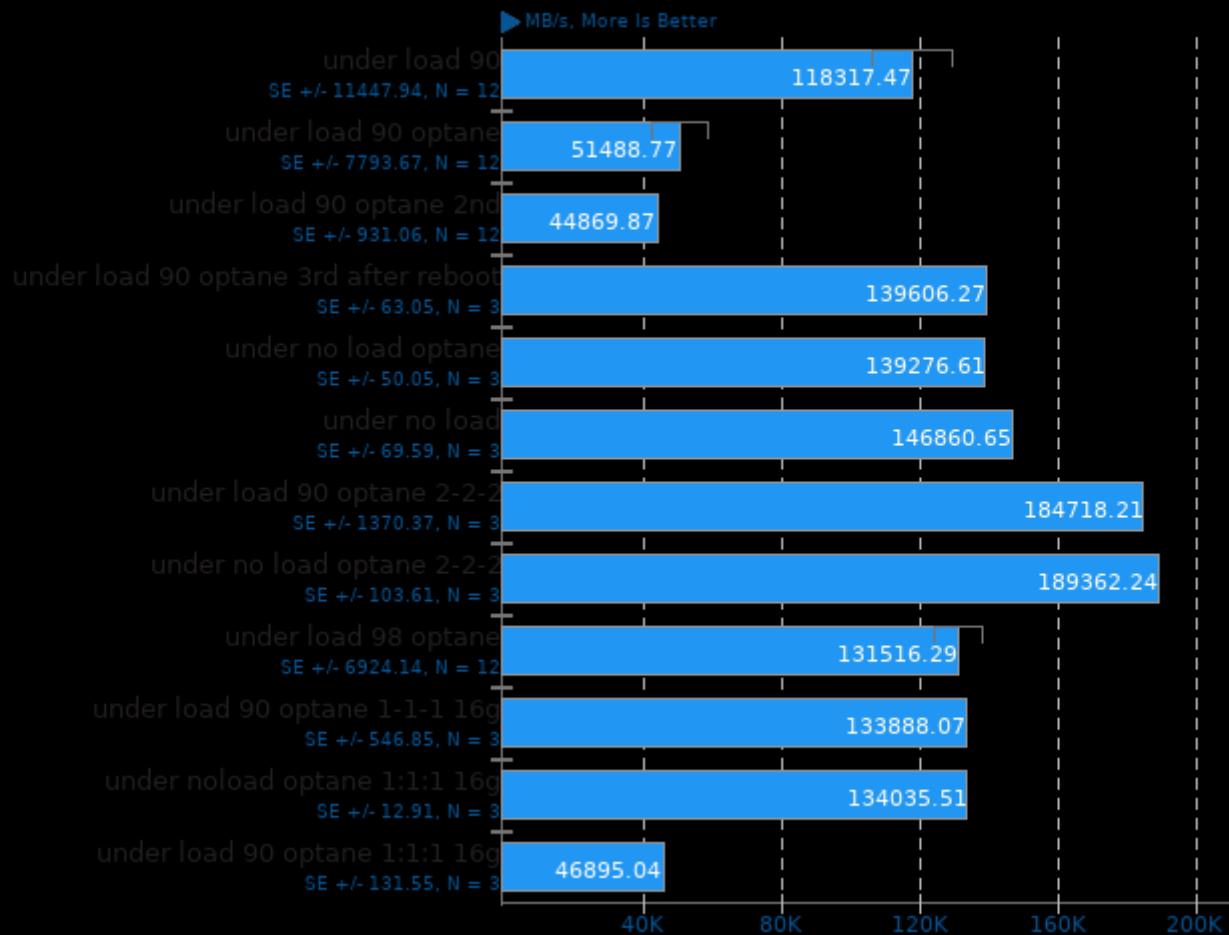
Intel Memory Latency Checker

Test: Max Bandwidth - All Reads



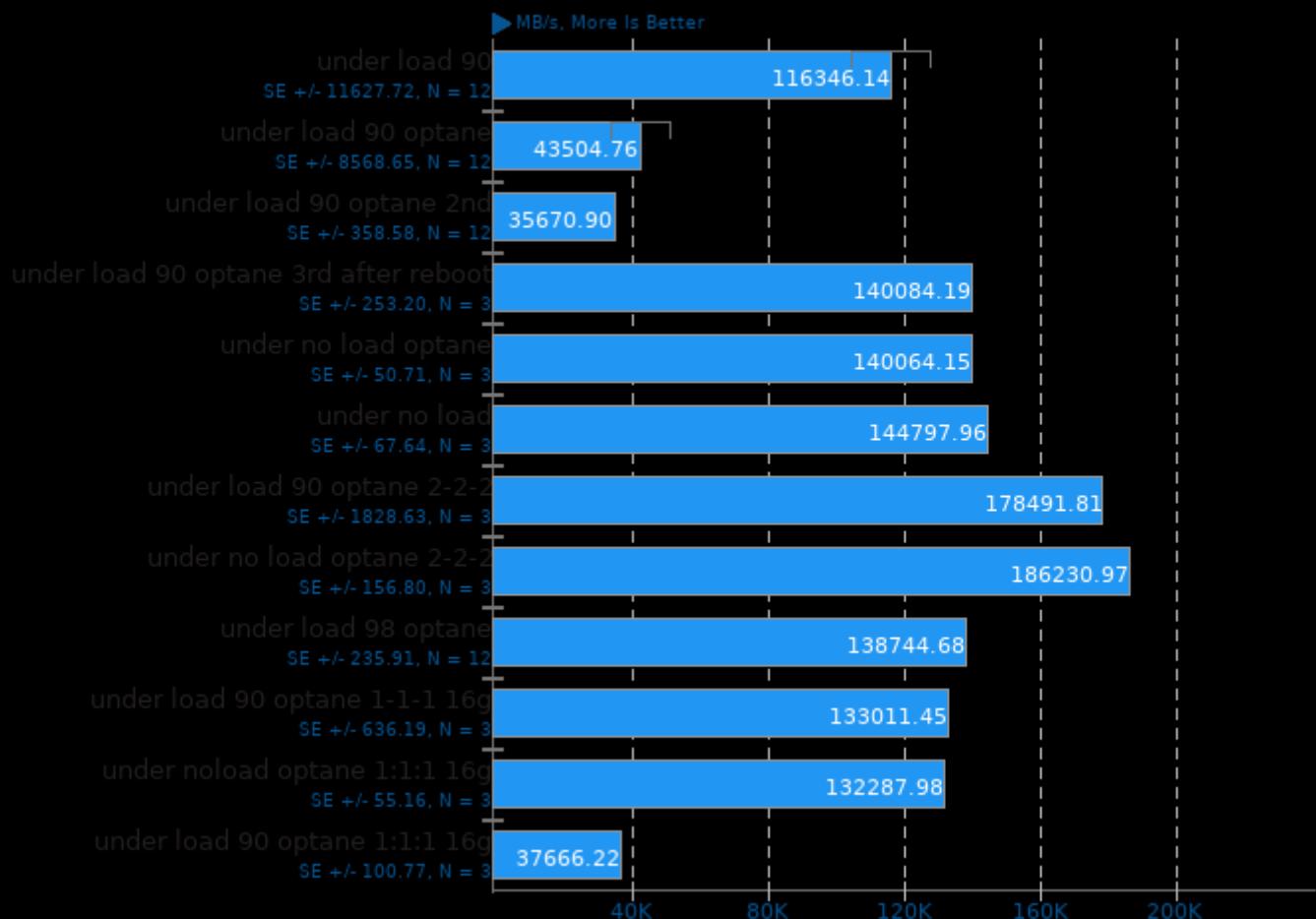
Intel Memory Latency Checker

Test: Max Bandwidth - 3:1 Reads-Writes



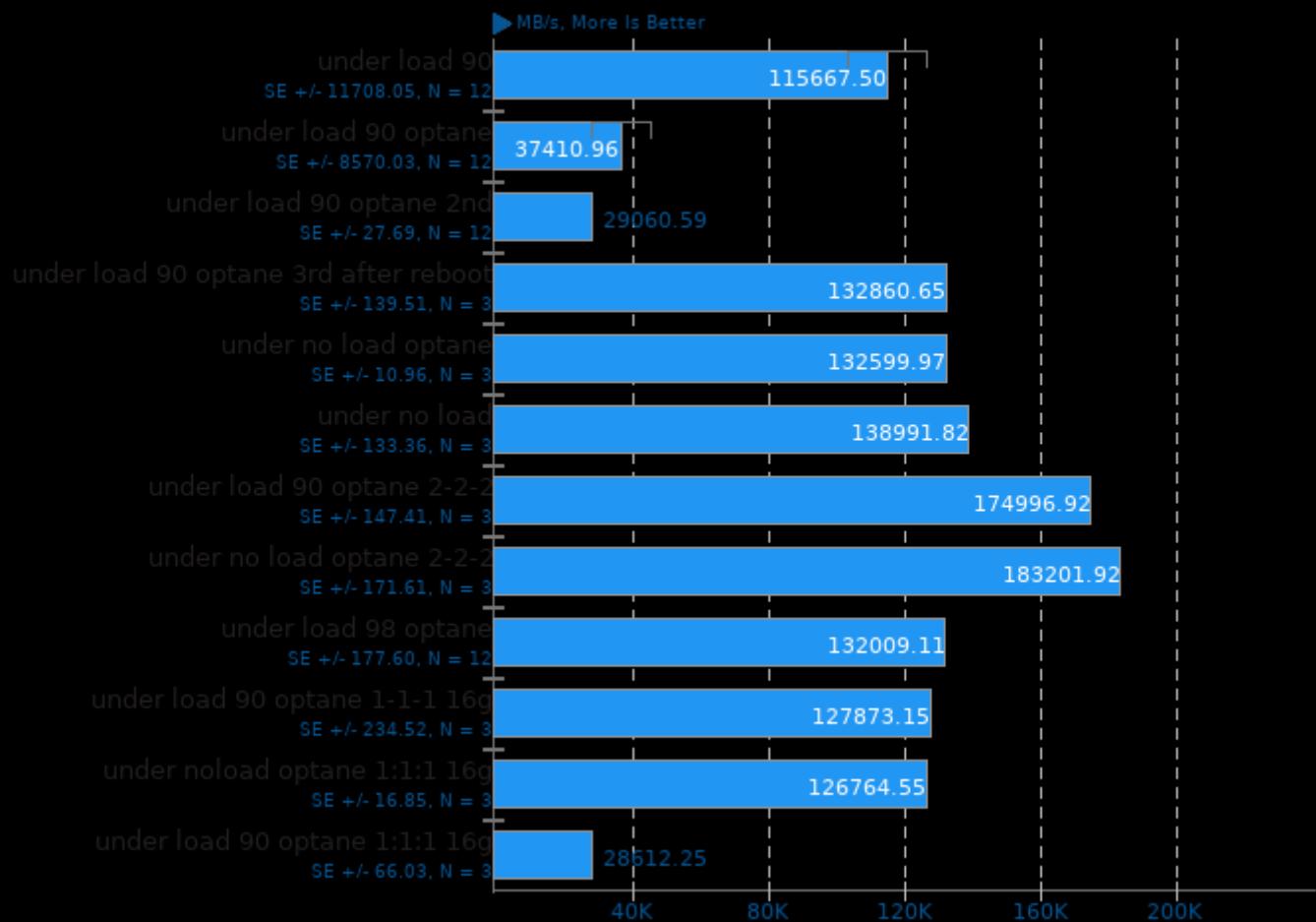
Intel Memory Latency Checker

Test: Max Bandwidth - 2:1 Reads-Writes



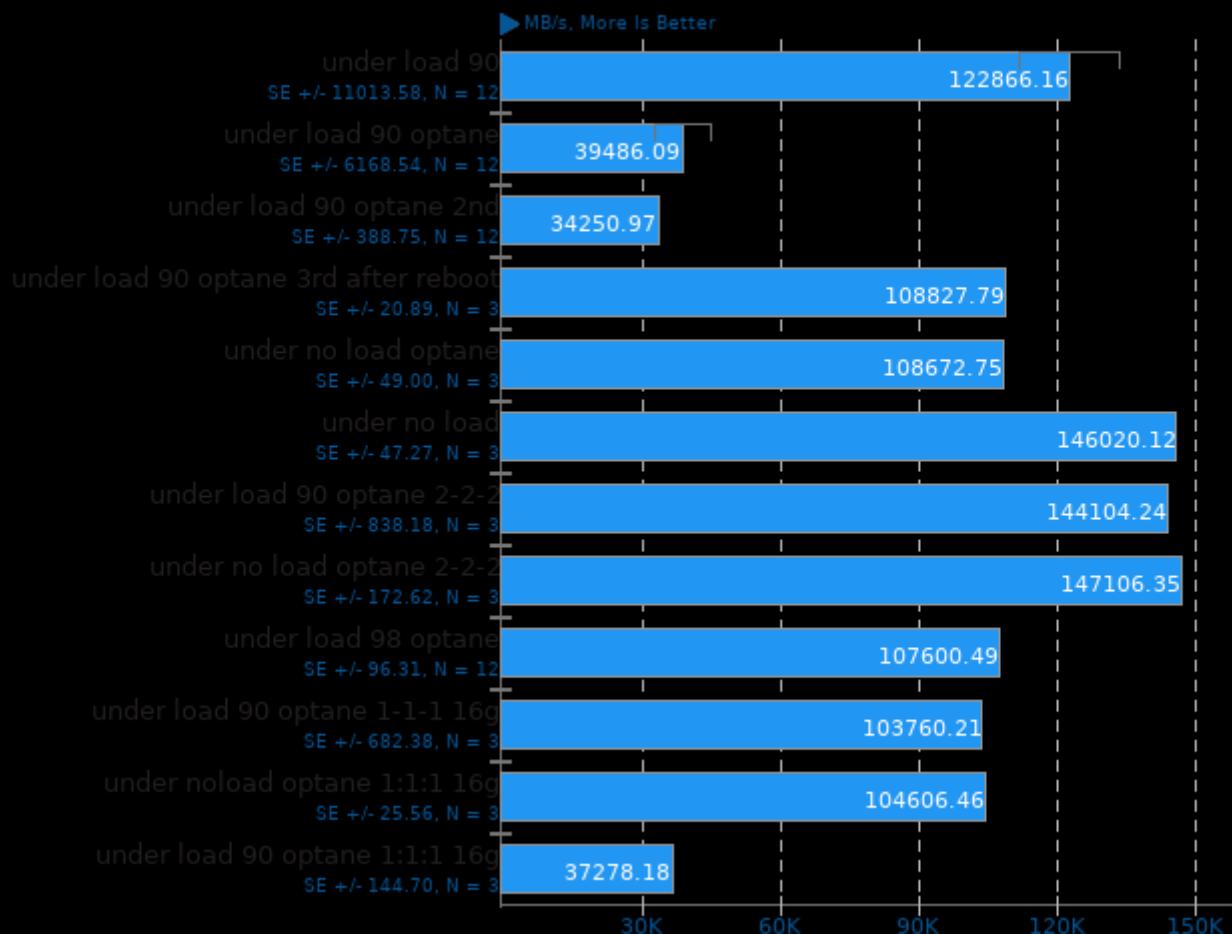
Intel Memory Latency Checker

Test: Max Bandwidth - 1:1 Reads-Writes



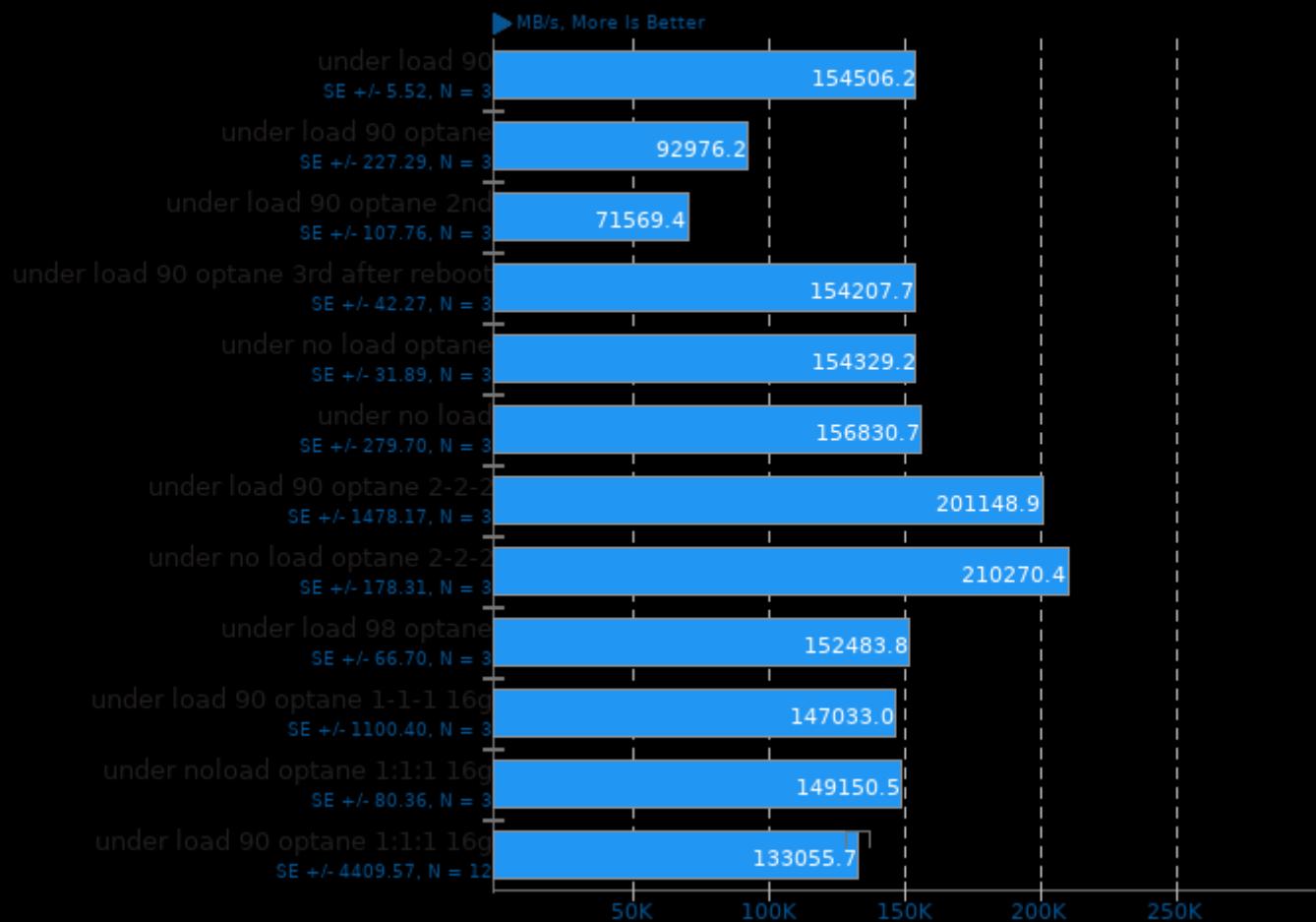
Intel Memory Latency Checker

Test: Max Bandwidth - Stream-Triad Like



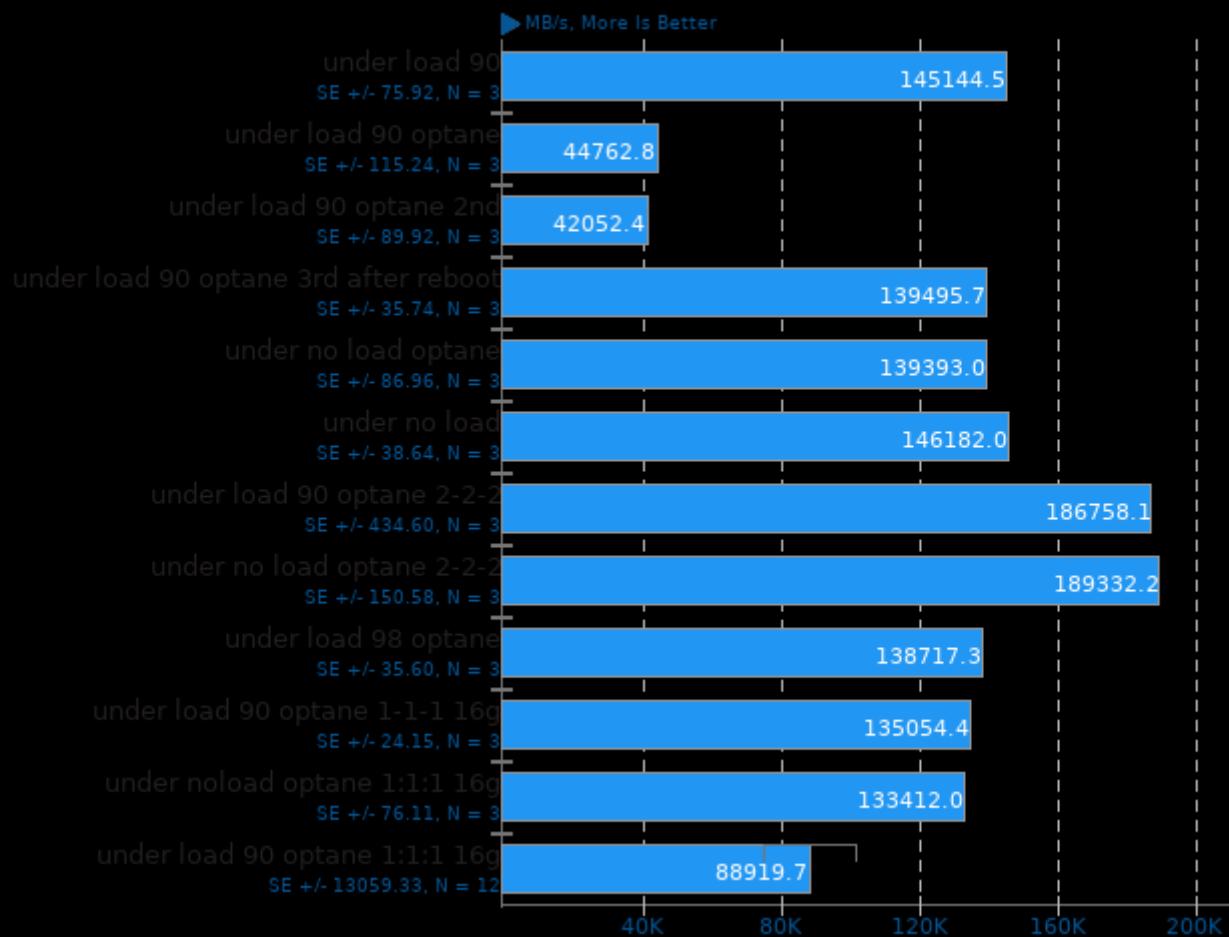
Intel Memory Latency Checker

Test: Peak Injection Bandwidth - All Reads



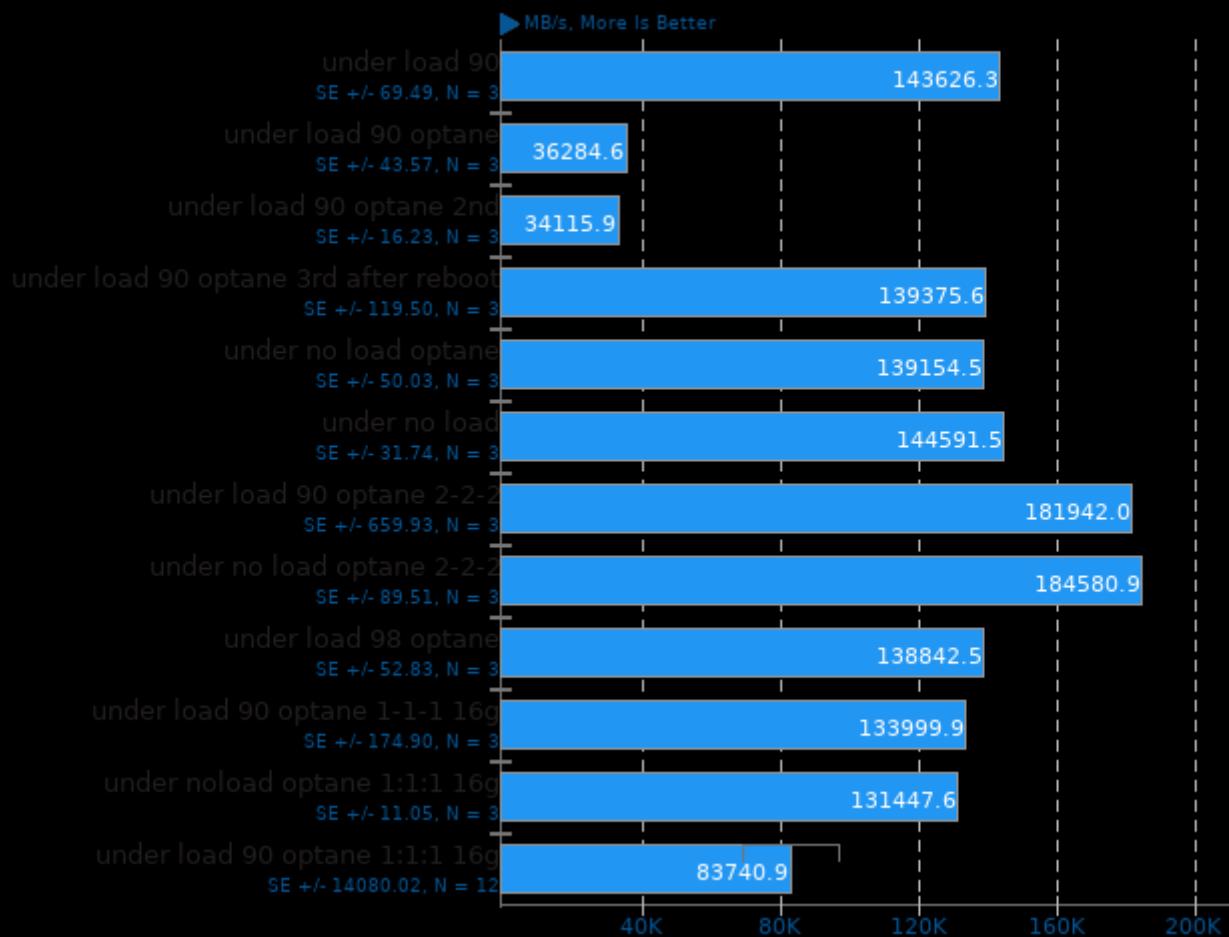
Intel Memory Latency Checker

Test: Peak Injection Bandwidth - 3:1 Reads-Writes



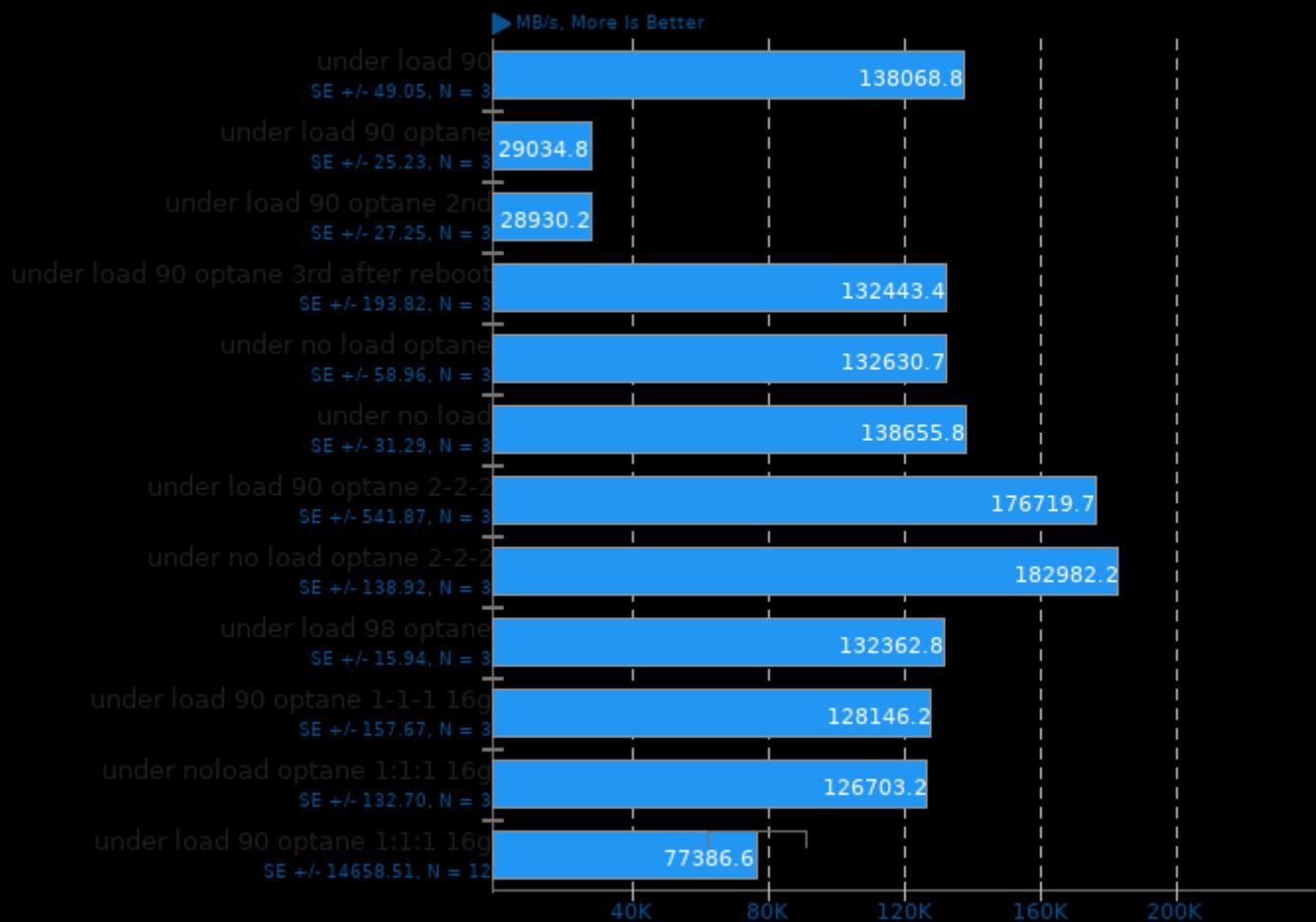
Intel Memory Latency Checker

Test: Peak Injection Bandwidth - 2:1 Reads-Writes



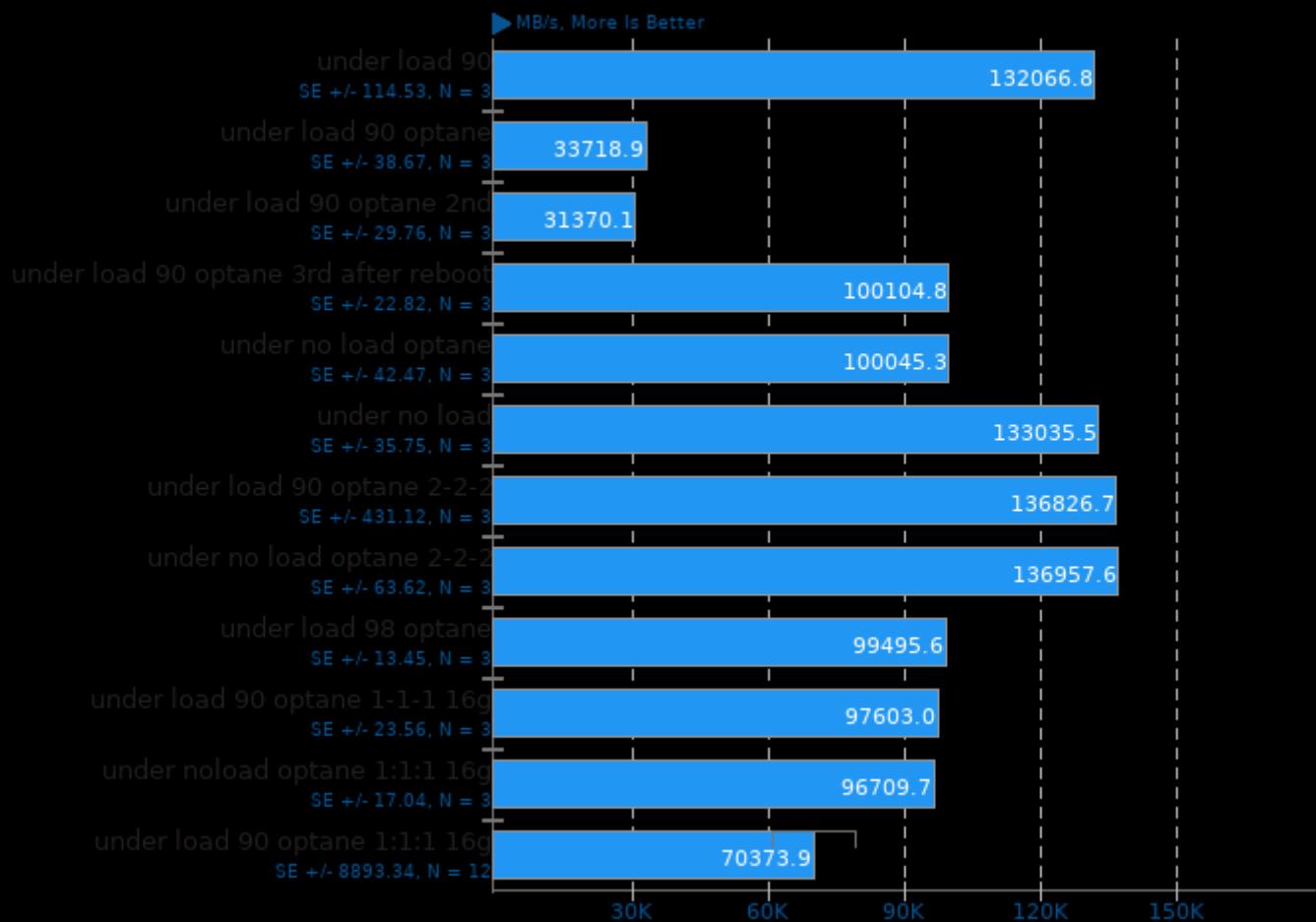
Intel Memory Latency Checker

Test: Peak Injection Bandwidth - 1:1 Reads-Writes



Intel Memory Latency Checker

Test: Peak Injection Bandwidth - Stream-Triad Like



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