



SPEChpc™ 2021 Small Result

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Lenovo Global Technology

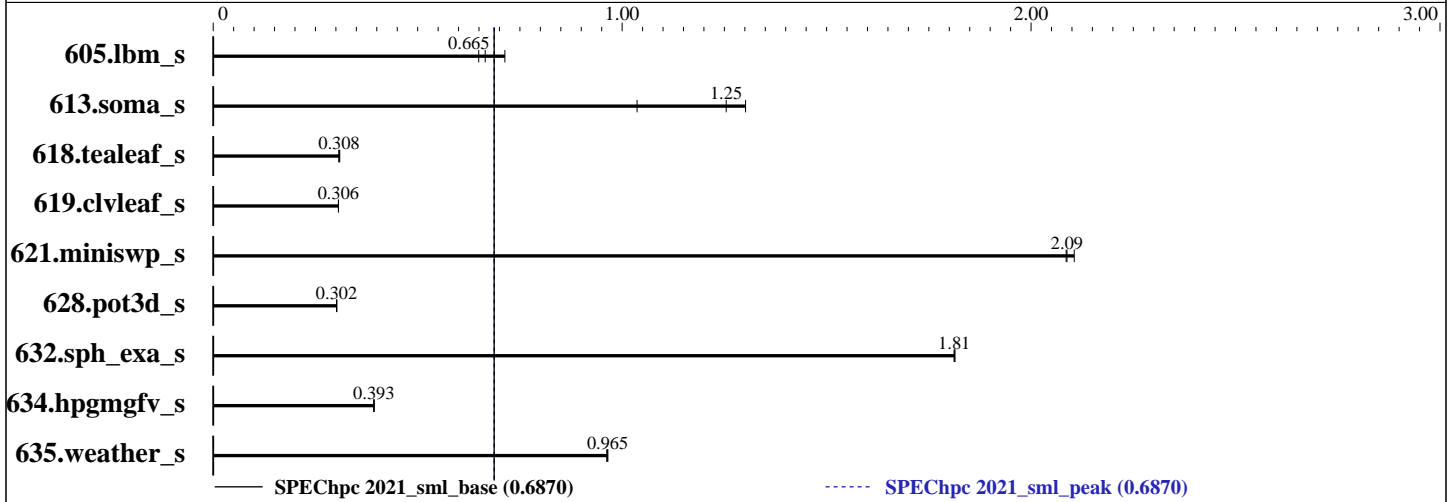
SPEChpc 2021_sml_base = 0.6870

ThinkSystem SR645 (AMD EPYC 7773X)

SPEChpc 2021_sml_peak = 0.6870

hpc2021 License: 28
Test Sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology

Test Date: Feb-2022
Hardware Availability: May-2022
Software Availability: Oct-2020



Results Table

Benchmark	Base								Peak									
	Model	Ranks	Thrds/Rnk	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Model	Ranks	Thrds/Rnk	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
605.lbm_s	OMP	16	8	2330	0.665	2173	0.713	2387	0.649	OMP	16	8	2330	0.665	2173	0.713	2387	0.649
613.soma_s	OMP	16	8	1275	1.25	1544	1.04	1229	1.30	OMP	16	8	1275	1.25	1544	1.04	1229	1.30
618.tealeaf_s	OMP	16	8	6674	0.307	6625	0.309	6656	0.308	OMP	16	8	6674	0.307	6625	0.309	6656	0.308
619.clvleaf_s	OMP	16	8	5387	0.306	5387	0.306	5387	0.306	OMP	16	8	5387	0.306	5387	0.306	5387	0.306
621.miniswp_s	OMP	16	8	527	2.09	527	2.09	522	2.11	OMP	16	8	527	2.09	527	2.09	522	2.11
628.pot3d_s	OMP	16	8	5546	0.302	5549	0.302	5548	0.302	OMP	16	8	5546	0.302	5549	0.302	5548	0.302
632.sph_exa_s	OMP	16	8	1268	1.81	1269	1.81	1269	1.81	OMP	16	8	1268	1.81	1269	1.81	1269	1.81
634.hpgmgfv_s	OMP	16	8	2477	0.394	2480	0.393	2485	0.392	OMP	16	8	2477	0.394	2480	0.393	2485	0.392
635.weather_s	OMP	16	8	2695	0.965	2702	0.962	2695	0.965	OMP	16	8	2695	0.965	2702	0.962	2695	0.965

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Results appear in the order in which they were run. Bold underlined text indicates a median measurement.



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Hardware Summary

Type of System: Homogenous
Compute Node: ThinkSystem SR645
Interconnect: Nvidia Mellanox ConnectX-6 HDR
File Server Node: ThinkSystem SR645
Compute Nodes Used: 1
Total Chips: 2
Total Cores: 128
Total Threads: 128
Total Memory: 1 TB
Max. Peak Threads: 8

Software Summary

Compiler: Intel C/C++/Fortran Compiler 2021.5.0
MPI Library: Intel MPI 2021.5
Other MPI Info: --
Other Software: --
Base Parallel Model: OMP
Base Ranks Run: 16
Base Threads Run: 8
Peak Parallel Models: OMP
Minimum Peak Ranks: 16
Maximum Peak Ranks: 16
Max. Peak Threads: 8
Min. Peak Threads: 8

Node Description: ThinkSystem SR645

Hardware

Number of nodes: 1
Uses of the node: Compute
Vendor: Lenovo Global Technology
Model: ThinkSystem SR645
CPU Name: AMD EPYC 7773X
CPU(s) orderable: 1,2 chips
Chips enabled: 2
Cores enabled: 128
Cores per chip: 64
Threads per core: 1
CPU Characteristics: Max Boost Clock up to 3.5 GHz
CPU MHz: 2200
Primary Cache: 32 KB I + 32 KB D on chip per core
Secondary Cache: 512 KB I+D on chip per core
L3 Cache: 768 MB I+D on chip per chip
96 MB shared / 8 cores
Other Cache: None
Memory: 1 TB (16 x 64 GB 2Rx4 PC4-3200A-R)
Disk Subsystem: 1 x 7.68 TB 2.5" SSD
Other Hardware: None
Accel Count: --
Accel Model: --
Accel Vendor: --
Accel Type: --
Accel Connection: --
Accel ECC enabled: --
Accel Description: --
Adapter: Mellanox ConnectX-6 HDR
Number of Adapters: 1
Slot Type: PCI-Express 4.0 x16
Data Rate: 200 Gb/s
Ports Used: 1

Software

Accelerator Driver: --
Adapter: Mellanox ConnectX-6 HDR
Adapter Driver: 5.2-1.0.4
Adapter Firmware: 20.28.1002
Operating System: Red Hat Enterprise Linux Server release 8.3,
Kernel 4.18.0-193.el8.x86_64
Local File System: xfs
Shared File System: NFS
System State: Multi-user, run level 3
Other Software: None

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Node Description: ThinkSystem SR645

Hardware (Continued)

Interconnect Type: Nvidia Mellanox ConnectX-6 HDR

Node Description: ThinkSystem SR645

Hardware

Number of nodes: 1
Uses of the node: Fileserver
Vendor: Lenovo Global Technology
Model: ThinkSystem SR645
CPU Name: AMD EPYC 7773X
CPU(s) orderable: 1,2 chips
Chips enabled: 2
Cores enabled: 128
Cores per chip: 64
Threads per core: 1
CPU Characteristics: Max Boost Clock up to 3.5 GHz
CPU MHz: 2200
Primary Cache: 32 KB I + 32 KB D on chip per core
Secondary Cache: 512 KB I+D on chip per core
L3 Cache: 768 MB I+D on chip per chip
96 MB shared / 8 cores
Other Cache: None
Memory: 1 TB (16 x 64 GB 2Rx4 PC4-3200A-R)
Disk Subsystem: 1 x 7.68 TB 2.5" SSD
Other Hardware: None
Accel Count: --
Accel Model: --
Accel Vendor: --
Accel Type: --
Accel Connection: --
Accel ECC enabled: --
Accel Description: --
Adapter: Mellanox ConnectX-6 HDR
Number of Adapters: 1
Slot Type: PCI-Express 4.0 x16
Data Rate: 200 Gb/s
Ports Used: 1
Interconnect Type: Nvidia Mellanox ConnectX-6 HDR

Software

Accelerator Driver: --
Adapter: Mellanox ConnectX-6 HDR
Adapter Driver: 5.2-1.0.4
Adapter Firmware: 20.28.1002
Operating System: Red Hat Enterprise Linux Server release 8.3
Local File System: xfs
Shared File System: N/A
System State: Multi-User, run level 3
Other Software: None



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Interconnect Description: Nvidia Mellanox ConnectX-6 HDR

Hardware

Software

Vendor: Nvidia : --
Model: Nvidia Mellanox ConnectX-6 HDR
Switch Model: QM8700 Series
Number of Switches: 1
Number of Ports: 40
Data Rate: 200 Gb/s
Firmware: 3.9.0606
Topology: Mesh
Primary Use: MPI Traffic, NFS Access

Submit Notes

The config file option 'submit' was used.
submit = mpirun -host localhost -genv coll_hcoll_enable 1
-genv HCOLL_MAIN_IB=mlx5_0:1 -genv UCX_TLS=sm
-genv pml ucx --map-by numa -np 16

General Notes

Environment variables set by runhpc before the start of the run:
UCX_MEMTYPE_CACHE = "n"
UCX_TLS = "self,shm,cuda_copy"
Numa Information:
available: 16 nodes (0-15)
node 0 cpus: 0 1 2 3 4 5 6 7
node 1 cpus: 8 9 10 11 12 13 14 15
node 2 cpus: 16 17 18 19 20 21 22 23
node 3 cpus: 24 25 26 27 28 29 30 31
node 4 cpus: 32 33 34 35 36 37 38 39
node 5 cpus: 40 41 42 43 44 45 46 47
node 6 cpus: 48 49 50 51 52 53 54 55
node 7 cpus: 56 57 58 59 60 61 62 63
node 8 cpus: 64 65 66 67 68 69 70 71
node 9 cpus: 72 73 74 75 76 77 78 79
node 10 cpus: 80 81 82 83 84 85 86 87
node 11 cpus: 88 89 90 91 92 93 94 95
node 12 cpus: 96 97 98 99 100 101 102 103
node 13 cpus: 104 105 106 107 108 109 110 111
node 14 cpus: 112 113 114 115 116 117 118 119
node 15 cpus: 120 121 122 123 124 125 126 127



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Compiler Version Notes

=====
CC 605.lbm_s(base) 613.soma_s(base) 618.tealeaf_s(base) 621.miniswp_s(base)
634.hpgmgfv_s(base)
=====

Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R)
64, Version 2021.5.0 Build 20211109_000000
Copyright (C) 1985-2021 Intel Corporation. All rights reserved.
=====

=====
CXXC 632.sph_exa_s(base)
=====

Intel(R) C++ Intel(R) 64 Compiler Classic for applications running on
Intel(R) 64, Version 2021.5.0 Build 20211109_000000
Copyright (C) 1985-2021 Intel Corporation. All rights reserved.
=====

=====
FC 619.clvleaf_s(base) 628.pot3d_s(base) 635.weather_s(base)
=====

Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on
Intel(R) 64, Version 2021.5.0 Build 20211109_000000
Copyright (C) 1985-2021 Intel Corporation. All rights reserved.
=====

Base Compiler Invocation

C benchmarks:
mpiicc

C++ benchmarks:
mpicpc

Fortran benchmarks:
mpiifort

Base Portability Flags

613.soma_s: -DSPEC_NO_VAR_ARRAY_REDUCE
621.miniswp_s: -DUSE_KBA -DUSE_ACCELDIR
632.sph_exa_s: -DSPEC_USE_LT_IN_KERNELS



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Base Optimization Flags

C benchmarks:

-Ofast -no-prec-div -march=core-avx2 -ipo -qopenmp -ansi-alias

C++ benchmarks:

-Ofast -no-prec-div -march=core-avx2 -ipo -qopenmp -ansi-alias

Fortran benchmarks:

-Ofast -no-prec-div -march=core-avx2 -ipo -qopenmp

Peak Optimization Flags

C benchmarks:

605.lbm_s: basepeak = yes

613.soma_s: basepeak = yes

618.tealeaf_s: basepeak = yes

621.miniswp_s: basepeak = yes

634.hpgmgfv_s: basepeak = yes

C++ benchmarks:

632.sph_exa_s: basepeak = yes

Fortran benchmarks:

619.clvleaf_s: basepeak = yes

628.pot3d_s: basepeak = yes

635.weather_s: basepeak = yes

The flags file that was used to format this result can be browsed at

http://www.spec.org/hpc2021/flags/Intel_compiler_flags.2021-10-20.html

You can also download the XML flags source by saving the following link:

http://www.spec.org/hpc2021/flags/Intel_compiler_flags.2021-10-20.xml



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For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

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