



SPEChpc™ 2021 Small Result

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Lenovo Global Technology

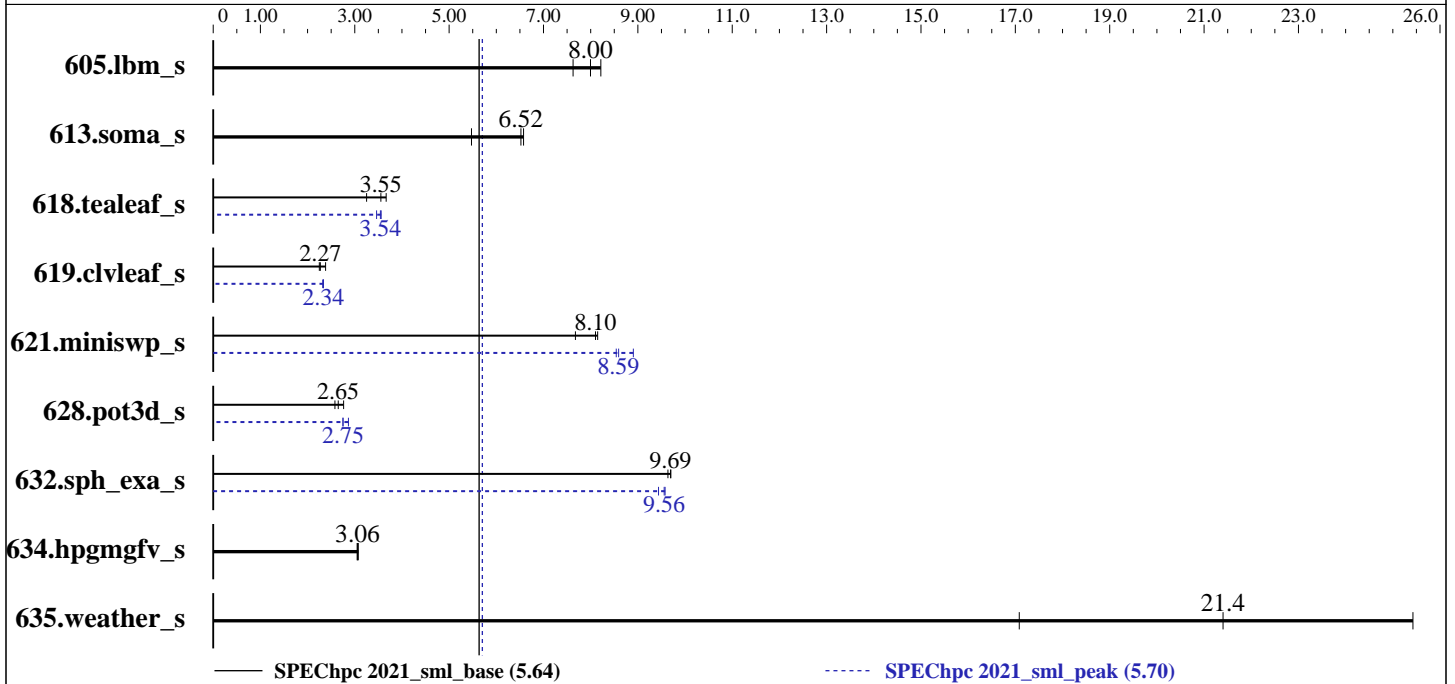
SPEChpc 2021_sml_base = 5.64

ThinkSystem SR665 V3 (AMD EPYC 9654)

SPEChpc 2021_sml_peak = 5.70

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

Test Date: Jan-2023
Hardware Availability: Nov-2022
Software Availability: Nov-2022



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 | 120 | 8 | 189 | 8.21 | 203 | 7.63 | 194 | 8.00 | OMP | 120 | 8 | 189 | 8.21 | 203 | 7.63 | 194 | 8.00 |
| 613.soma_s | OMP | 120 | 8 | 292 | 5.47 | 243 | 6.58 | 245 | 6.52 | OMP | 120 | 8 | 292 | 5.47 | 243 | 6.58 | 245 | 6.52 |
| 618.tealeaf_s | OMP | 120 | 8 | 577 | 3.55 | 631 | 3.25 | 559 | 3.67 | OMP | 240 | 4 | 592 | 3.46 | 576 | 3.56 | 579 | 3.54 |
| 619.civleaf_s | OMP | 120 | 8 | 734 | 2.25 | 693 | 2.38 | 727 | 2.27 | OMP | 240 | 4 | 711 | 2.32 | 706 | 2.34 | 706 | 2.34 |
| 621.miniswp_s | OMP | 120 | 8 | 143 | 7.68 | 135 | 8.15 | 136 | 8.10 | OMP | 10 | 96 | 128 | 8.59 | 124 | 8.90 | 129 | 8.54 |
| 628.pot3d_s | OMP | 120 | 8 | 649 | 2.58 | 632 | 2.65 | 606 | 2.76 | OMP | 240 | 4 | 609 | 2.75 | 609 | 2.75 | 584 | 2.87 |
| 632.sph_exa_s | OMP | 120 | 8 | 239 | 9.64 | 237 | 9.69 | 237 | 9.70 | OMP | 120 | 8 | 240 | 9.58 | 244 | 9.44 | 241 | 9.56 |
| 634.hpgmgfv_s | OMP | 120 | 8 | 317 | 3.07 | 320 | 3.05 | 319 | 3.06 | OMP | 120 | 8 | 317 | 3.07 | 320 | 3.05 | 319 | 3.06 |
| 635.weather_s | OMP | 120 | 8 | 152 | 17.1 | 121 | 21.4 | 102 | 25.4 | OMP | 120 | 8 | 152 | 17.1 | 121 | 21.4 | 102 | 25.4 |

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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: Homogeneous Cluster
Compute Node: ThinkSystem SR665 V3
Interconnect: Nvidia Mellanox ConnectX-6 HDR
Compute Nodes Used: 5
Total Chips: 10
Total Cores: 960
Total Threads: 1920
Total Memory: 7680 GB
Max. Peak Threads: 96

Software Summary

Compiler: Intel oneAPI Compiler 2022.1.0
MPI Library: Intel MPI Library for Linux OS, Build 20220227
Other MPI Info: --
Other Software: --
Base Parallel Model: OMP
Base Ranks Run: 120
Base Threads Run: 8
Peak Parallel Models: OMP
Minimum Peak Ranks: 10
Maximum Peak Ranks: 240
Max. Peak Threads: 96
Min. Peak Threads: 4

Node Description: ThinkSystem SR665 V3

Hardware

Number of nodes: 5
Uses of the node: Compute
Vendor: Lenovo Global Technology
Model: ThinkSystem SR665 V3
CPU Name: AMD EPYC 9654
CPU(s) orderable: 1,2 chips
Chips enabled: 2
Cores enabled: 192
Cores per chip: 96
Threads per core: 2
CPU Characteristics: Max Boost Clock up to 3.7 GHz
CPU MHz: 2400
Primary Cache: 32 KB I + 32 KB D on chip per core
Secondary Cache: 1 MB I+D on chip per core
L3 Cache: 384 MB I+D on chip per chip
32 MB shared / 8 cores
Other Cache: None
Memory: 1536 GB (24 x 64 GB 2Rx4 PC5-4800B-R)
Disk Subsystem: 1x ThinkSystem 2.5" 5300 480GB SSD
Other Hardware: None
Accel Count: --
Accel Model: --
Accel Vendor: --
Accel Type: --
Accel Connection: --
Accel ECC enabled: --
Accel Description: --
Adapter: Nvidia 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: Nvidia Mellanox ConnectX-6 HDR
Adapter Driver: 5.7-1.0.2
Adapter Firmware: 20.28.1002
Operating System: Red Hat Enterprise Linux Server release 8.6,
Kernel 4.18.0-372.9.1.el8.x86_64
Local File System: xfs
Shared File System: None
System State: Multi-user, run level 3
Other Software: None

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Node Description: ThinkSystem SR665 V3

Hardware (Continued)

Interconnect Type: ConnectX-6 HDR

Interconnect Description: Nvidia Mellanox ConnectX-6 HDR

Hardware

Vendor: Nvidia
Model: Nvidia Mellanox ConnectX-6 HDR
Switch Model: QM8700
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

Software

: --

Submit Notes

The config file option 'submit' was used.

```
submit = mpiexec -hostfile ${top}/4nodes -np ranks -genv OMP_NUM_THREADS=$threads -ppn % {NRNK} $command
```

Compiler Version Notes

```
=====
FC 619.clvleaf_s(base, peak) 628.pot3d_s(base, peak) 635.weather_s(base,
peak)
-----
```

```
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version
2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
ifx: command line error: no files specified; for help type "ifx -help"
-----
```

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

```
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
clang: warning: -Z-reserved-lib-stdc++: 'linker' input unused
[-Wunused-command-line-argument]
-----
```

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Compiler Version Notes (Continued)

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

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
clang: warning: -Z-reserved-lib-stdc++: 'linker' input unused
[-Wunused-command-line-argument]
=====

Base Compiler Invocation

C benchmarks:
mpiicc -cc=icx

C++ benchmarks:
mpiicpc -cxx=icx

Fortran benchmarks:
mpiifort -fc=ifx

Base Portability Flags

605.lbm_s: -lstdc++
613.soma_s: -lstdc++ -DSPEC_NO_VAR_ARRAY_REDUCE
618.tealeaf_s: -lstdc++
619.cvlleaf_s: -lstdc++
621.miniswp_s: -lstdc++
628.pot3d_s: -lstdc++
632.sph_exa_s: -lstdc++
634.hpgmgfv_s: -lstdc++
635.weather_s: -lstdc++

Base Optimization Flags

C benchmarks:
-Ofast -mprefer-vector-width=512 -march=core-avx2 -ipo -fiopenmp
-ansi-alias

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Base Optimization Flags (Continued)

C++ benchmarks:

-Ofast -mprefer-vector-width=512 -march=core-avx2 -ipo -fiopenmp
-ansi-alias

Fortran benchmarks:

-Ofast -mprefer-vector-width=512 -march=core-avx2 -ipo -fiopenmp
-nostandard-realloc-lhs -align array64byte

Base Other Flags

C benchmarks:

-Ispecmpitime

C++ benchmarks:

-Ispecmpitime

Fortran benchmarks:

619.clvleaf_s: -Ispecmpitime

Peak Compiler Invocation

C benchmarks:

mpiicc -cc=icx

C++ benchmarks:

mpiicpc -cxx=icx

Fortran benchmarks:

mpiifort -fc=ifx

Peak Portability Flags

Same as Base Portability Flags



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Peak Optimization Flags

C benchmarks:

605.lbm_s: basepeak = yes

613.soma_s: basepeak = yes

618.tealeaf_s: -Ofast -mprefer-vector-width=512 -march=core-avx2 -ipo
-fiopenmp -ansi-alias

621.miniswp_s: Same as 618.tealeaf_s

634.hpgmgfv_s: basepeak = yes

C++ benchmarks:

-Ofast -mprefer-vector-width=512 -march=core-avx2 -ipo -fiopenmp
-ansi-alias

Fortran benchmarks:

619.clvleaf_s: -Ofast -mprefer-vector-width=512 -march=core-avx2 -ipo
-fiopenmp -nostandard-realloc-lhs -align array64byte

628.pot3d_s: Same as 619.clvleaf_s

635.weather_s: basepeak = yes

Peak Other Flags

C benchmarks:

-Ispecmpitime

C++ benchmarks:

-Ispecmpitime

Fortran benchmarks:

619.clvleaf_s: -Ispecmpitime

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

http://www.spec.org/hpc2021/flags/Intel_compiler_flags.2022-11-10.html



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You can also download the XML flags source by saving the following link:
http://www.spec.org/hpc2021/flags/Intel_compiler_flags.2022-11-10.xml

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

Tested with SPEChpc2021 v1.1.7 on 2018-06-23 22:23:22-0400.
Report generated on 2023-02-22 12:26:33 by hpc2021 PDF formatter v1.0.3.
Originally published on 2023-02-22.