SPEChpc™ 2021 Medium Result

Copyright 2021-2023 Standard Performance Evaluation Corporation

Lenovo Global Technology

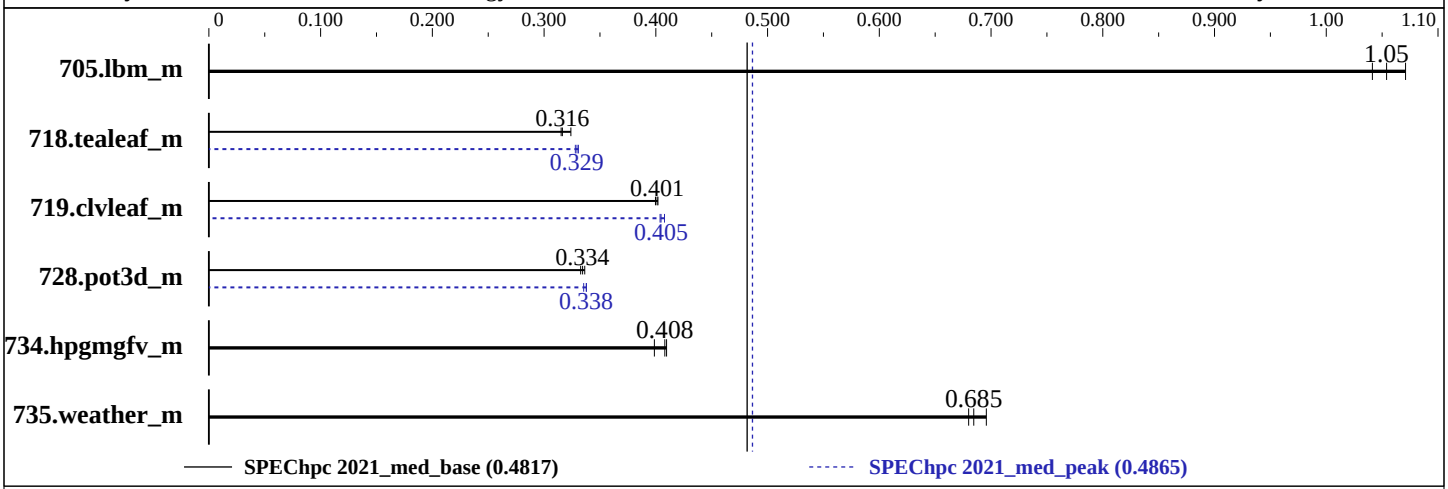
ThinkSystem SR665 V3 (AMD EPYC 9654)

SPEChpc 2021_med_base = 0.4817

SPEChpc 2021_med_peak = 0.4865

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
705.lbm_m	OMP	144	8	1144	1.07	**1162**	**1.05**	1176	1.04	OMP	144	8	1144	1.07	**1162**	**1.05**	1176	1.04
718.tealeaf_m	OMP	144	8	**4267**	**0.316**	4282	0.315	4167	0.324	OMP	288	4	4116	0.328	4082	0.331	**4098**	**0.329**
719.clvleaf_m	OMP	144	8	**4612**	**0.401**	4603	0.402	4629	0.400	OMP	288	4	4537	0.408	**4572**	**0.405**	4582	0.404
728.pot3d_m	OMP	144	8	**5531**	**0.334**	5500	0.336	5560	0.333	OMP	288	4	5515	0.335	5476	0.338	**5477**	**0.338**
734.hpgmgfv_m	OMP	144	8	2508	0.399	2441	0.410	**2451**	**0.408**	OMP	144	8	2508	0.399	2441	0.410	**2451**	**0.408**
735.weather_m	OMP	144	8	3530	0.680	**3506**	**0.685**	3449	0.696	OMP	144	8	3530	0.680	**3506**	**0.685**	3449	0.696

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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 Cluster
Compute Node:	ThinkSystem SR665 V3
Interconnect:	Nvidia Mellanox ConnectX-6 HDR
Compute Nodes Used:	6
Total Chips:	12
Total Cores:	1152
Total Threads:	2304
Total Memory:	9 TB
Max. Peak Threads:	8

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:	144
Base Threads Run:	8
Peak Parallel Models:	OMP
Minimum Peak Ranks:	144
Maximum Peak Ranks:	288
Max. Peak Threads:	8
Min. Peak Threads:	4

Node Description: ThinkSystem SR665 V3

Hardware

Number of nodes:	6
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

(Continued on next page)

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

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 $[top]/6nodes -np ranks -genv OMP_NUM_THREADS=$threads -ppn %{NRNK} $command
```

Compiler Version Notes

```
==============================================================================
 FC  719.clvleaf_m(base, peak) 728.pot3d_m(base, peak) 735.weather_m(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  705.lbm_m(base, peak) 718.tealeaf_m(base, peak) 734.hpgmgfv_m(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`

Fortran benchmarks:
`mpiifort -fc=ifx`

Base Portability Flags

705.lbm_m: `-lstdc++`
718.tealeaf_m: `-lstdc++`
719.clvleaf_m: `-lstdc++`
728.pot3d_m: `-lstdc++`
734.hpgmgfv_m: `-lstdc++`
735.weather_m: `-lstdc++`

Base Optimization Flags

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 (except as noted below):
`-Ispecmpitime`

734.hpgmgfv_m: `-Ispecmpitime`

Fortran benchmarks:

719.clvleaf_m: `-Ispecmpitime`

Peak Compiler Invocation

C benchmarks:
`mpiicc -cc=icx`

Fortran benchmarks:
`mpiifort -fc=ifx`

Peak Portability Flags

`Same as Base Portability Flags`

Peak Optimization Flags

C benchmarks:

705.lbm_m: `basepeak = yes`

718.tealeaf_m: `-Ofast -mprefer-vector-width=512 -march=core-avx2 -ipo -fiopenmp -ansi-alias`

734.hpgmgfv_m: `basepeak = yes`

Fortran benchmarks:

719.clvleaf_m: `-Ofast -mprefer-vector-width=512 -march=core-avx2 -ipo -fiopenmp -nostandard-realloc-lhs -align array64byte`

728.pot3d_m: `Same as 719.clvleaf_m`

735.weather_m: `basepeak = yes`

Peak Other Flags

C benchmarks (except as noted below):
`-Ispecmpitime`

734.hpgmgfv_m: `-Ispecmpitime`

Fortran benchmarks:

(Continued on next page)

Peak Other Flags (Continued)

719.clvleaf_m: `-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`

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 2018-06-22 13:49:32-0400.
Report generated on 2023-02-22 12:26:56 by hpc2021 PS formatter v1.0.3.
Originally published on 2023-02-22.