



SPEChpc™ 2021 Medium Result

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Dell Inc.

(Test Sponsor: Texas Advanced Computing Center)

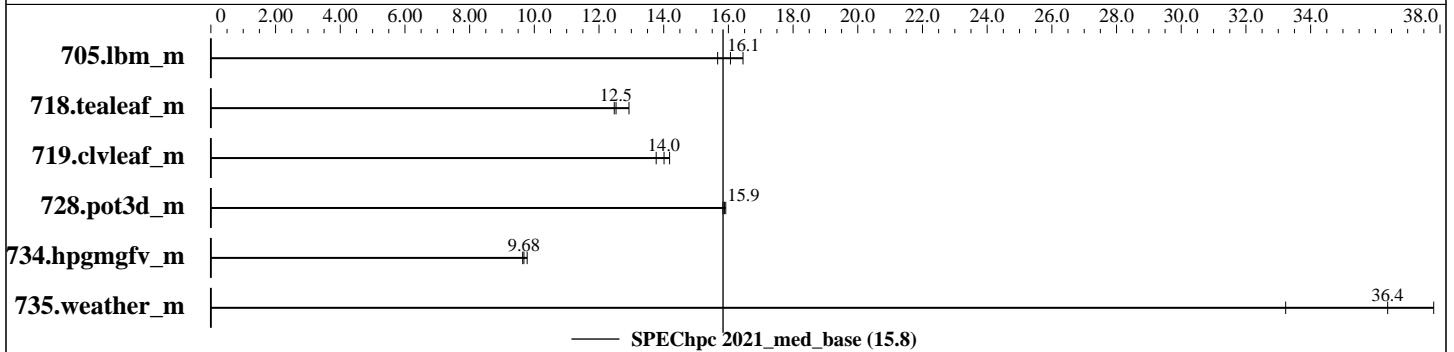
SPEChpc 2021_med_base = 15.8

Frontera: PowerEdge C6420 (Intel Xeon Platinum 8280)

SPEChpc 2021_med_peak = Not Run

hpc2021 License: 6340
Test Sponsor: Texas Advanced Computing Center
Tested by: Texas Advanced Computing Center

Test Date: Sep-2021
Hardware Availability: Jun-2019
Software Availability: Dec-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
705.lbm_m	OMP	1024	27	74.5	16.5	78.2	15.7	76.3	16.1									
718.tealeaf_m	OMP	1024	27	108	12.5	108	12.5	104	12.9									
719.clvleaf_m	OMP	1024	27	130	14.2	134	13.8	132	14.0									
728.pot3d_m	OMP	1024	27	117	15.9	117	15.8	116	15.9									
734.hpgmgfv_m	OMP	1024	27	104	9.64	103	9.68	102	9.78									
735.weather_m	OMP	1024	27	63.5	37.8	72.2	33.2	66.0	36.4									

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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: Homogenous Cluster
Compute Node: PowerEdge C6420
Interconnect: InfiniBand
Compute Nodes Used: 512
Total Chips: 1024
Total Cores: 28672
Total Threads: 28672
Total Memory: 96 TB
Max. Peak Threads: --

Software Summary

Compiler: C/C++/Fortran: Version 2020 Update 4 of Intel Compilers for Linux
MPI Library: Intel MPI Library 2019 Update 9 for Linux
Other MPI Info: None
Other Software: None
Base Parallel Model: OMP
Base Ranks Run: 1024
Base Threads Run: 27
Peak Parallel Models: Not Run
Minimum Peak Ranks: --
Maximum Peak Ranks: --
Max. Peak Threads: --
Min. Peak Threads: --

Node Description: PowerEdge C6420

Hardware

Number of nodes: 512
Uses of the node: compute
Vendor: Dell Inc.
Model: PowerEdge C6420
CPU Name: Intel Xeon Platinum 8280
CPU(s) orderable: 1 chips
Chips enabled: 2
Cores enabled: 56
Cores per chip: 28
Threads per core: 1
CPU Characteristics: Turbo up to 4.0 GHz
CPU MHz: 2700
Primary Cache: 32 KB I + 32 KB D on chip per core
Secondary Cache: 1 MB I+D on chip per core
L3 Cache: 38.5 MB I+D on chip per chip
Other Cache: None
Memory: 192 GB (12 x 16 GB 2Rx8 PC4-2933Y-R)
Disk Subsystem: 1x 240GB SATA SSD
Other Hardware: None
Accel Count: --
Accel Model: --
Accel Vendor: --
Accel Type: --
Accel Connection: --
Accel ECC enabled: --
Accel Description: --
Adapter: NVIDIA ConnectX-6 VPI Infiniband Adapter Card
Number of Adapters: 1
Slot Type: PCIe 3.0 x16
Data Rate: 100Gb/s
Ports Used: 1

Software

Accelerator Driver: --
Adapter: NVIDIA ConnectX-6 VPI Infiniband Adapter Card
Adapter Driver: 5.1-2.5.8.0
Adapter Firmware: 20.25.7020
Operating System: CentOS Linux release 7.8.2003
3.10.0-1127.19.1.el7.x86_64
Local File System: xfs
Shared File System: 10.6 PB Lustre (DDN SFA18K) over Infiniband HDR100
System State: Multi-user, run level 3
Other Software: None

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Node Description: PowerEdge C6420

Hardware (Continued)

Interconnect Type: Infiniband HDR100

Interconnect Description: InfiniBand

Hardware

Vendor: NVIDIA
Model: NVIDIA Infiniband HDR
Switch Model: Quantum CS8500 HDR Modular Switch
Number of Switches: 6
Number of Ports: 600
Data Rate: 200 Gb/s
Firmware: 27.2000.1386
Switch Model: Quantum QM8790 HDR Edge Switch
Number of Switches: 202
Number of Ports: 40
Data Rate: 200 Gb/s
Firmware: 27.2008.2102
Topology: Fat Tree (blocking factor 22:18)
Primary Use: MPI traffic and Lustre access

Software

: --

General Notes

Full HDR connectivity between switches and HDR100 connectivity to the compute nodes. Half of nodes in a rack (44) connect to 22 downlinks of a chassis switch as pairs of HDR100 links into HDR200 ports of the chassis switch. The other 18 ports are uplinks to the six central switches.

Submit Notes

The config file option 'submit' was used.
mpirun -np \$ranks -ppn 2 \$command

General Notes

Environment settings:
ulimit -s unlimited



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Compiler Version Notes

```

=====
CC 705.lbm_m(base) 718.tealeaf_m(base) 734.hpgmgfv_m(base)
-----
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.1.3.304 Build 20200925_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
-----

=====
FC 719.clvleaf_m(base) 728.pot3d_m(base) 735.weather_m(base)
-----
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
64, Version 19.1.3.304 Build 20200925_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
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```

Base Compiler Invocation

C benchmarks:
mpiicc

Fortran benchmarks:
mpiifort

Base Portability Flags

705.lbm_m: -std=gnull
718.tealeaf_m: -std=gnull
734.hpgmgfv_m: -std=gnull

Base Optimization Flags

C benchmarks:
-O3 -no-prec-div -fp-model fast=2 -xCORE-AVX512 -ipo -qopenmp
-ansi-alias

Fortran benchmarks:
-O3 -no-prec-div -fp-model fast=2 -xCORE-AVX512 -ipo -qopenmp



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The flags file that was used to format this result can be browsed at
http://www.spec.org/hpc2021/flags/Intel-ic2021-official-linux64_revA.html

You can also download the XML flags source by saving the following link:
http://www.spec.org/hpc2021/flags/Intel-ic2021-official-linux64_revA.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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