SPEChpc™ 2021 Medium Result

Dell Inc.

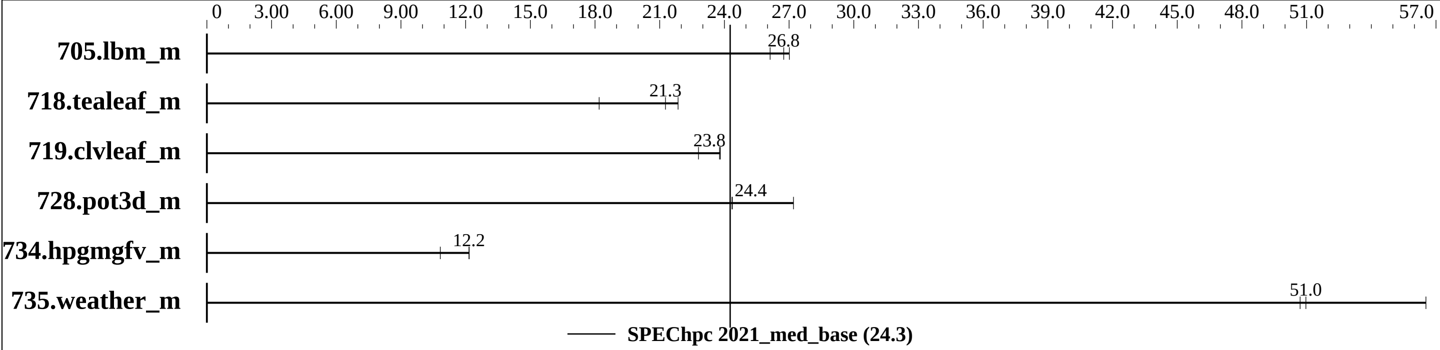
(Test Sponsor: Texas Advanced Computing Center)

Frontera: PowerEdge C6420 (Intel Xeon Platinum 8280)

SPEChpc 2021_med_base = 24.3

SPEChpc 2021_med_peak = Not Run

hpc2021 License:	6340	**Test Date:**	Sep-2021
Test Sponsor:	Texas Advanced Computing Center	**Hardware Availability:**	Jun-2019
Tested by:	Texas Advanced Computing Center	**Software Availability:**	Dec-2020



Results Table

Benchmark	Base Model	Base Ranks	Base Thrds/Rnk	Base Seconds	Base Ratio	Base Seconds	Base Ratio	Base Seconds	Base Ratio	Peak Model	Peak Ranks	Peak Thrds/Rnk	Peak Seconds	Peak Ratio	Peak Seconds	Peak Ratio	Peak Seconds	Peak Ratio
705.lbm_m	OMP	2048	27	46.9	26.1	45.4	27.0	**45.8**	**26.8**									
718.tealeaf_m	OMP	2048	27	61.8	21.9	**63.5**	**21.3**	74.2	18.2									
719.clvleaf_m	OMP	2048	27	**77.8**	**23.8**	77.7	23.8	81.1	22.8									
728.pot3d_m	OMP	2048	27	76.0	24.4	68.0	27.2	**75.9**	**24.4**									
734.hpgmgfv_m	OMP	2048	27	**82.3**	**12.2**	92.4	10.8	82.2	12.2									
735.weather_m	OMP	2048	27	47.3	50.7	42.5	56.5	**47.1**	**51.0**									

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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:	1024
Total Chips:	2048
Total Cores:	57344
Total Threads:	57344
Total Memory:	192 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:	2048
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:	1024
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

(Continued on next page)

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
```

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.
------------------------------------------------------------------------------
```

Base Compiler Invocation

C benchmarks:
`mpiicc`

Fortran benchmarks:
`mpiifort`

Base Portability Flags

705.lbm_m: `-std=gnu11`
718.tealeaf_m: `-std=gnu11`
734.hpgmgfv_m: `-std=gnu11`

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

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

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