



# SPEChpc™ 2021 Medium Result

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## Intel

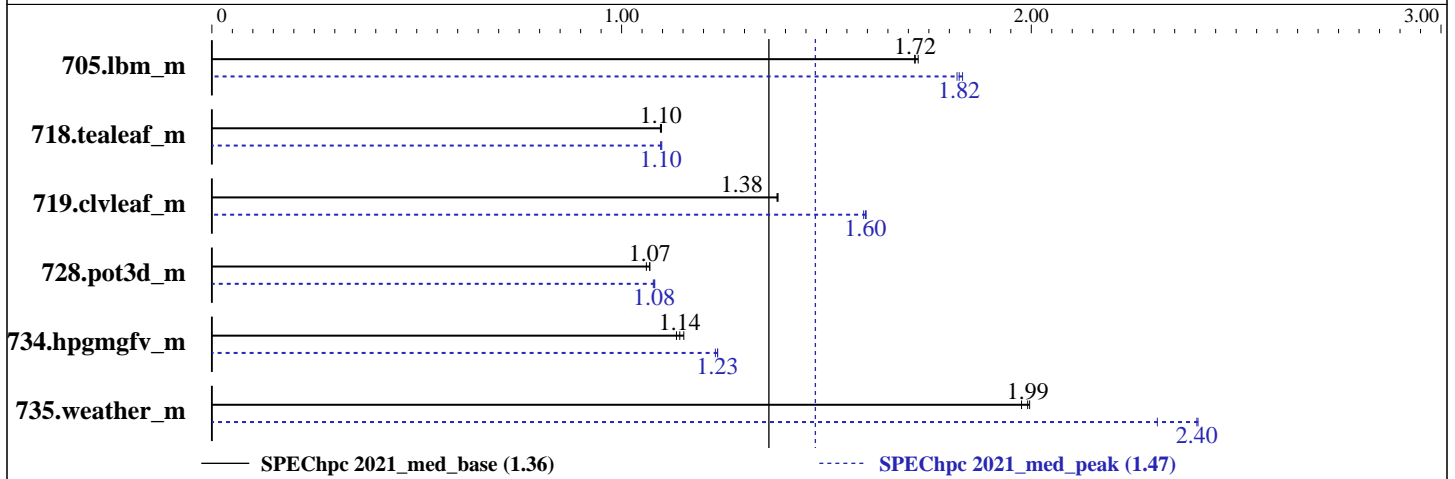
SPEChpc 2021\_med\_base = 1.36

SPEChpc 2021\_med\_peak = 1.47

Endeavour: Intel Server M50CYP2UR208 (Intel Xeon Platinum 8360Y)

hpc2021 License: 13  
Test Sponsor: Intel  
Tested by: Intel

Test Date: Sep-2021  
Hardware Availability: Jul-2021  
Software Availability: Jul-2021



## Results Table

Benchmark	Base								Peak									
	Model	Ranks	Thrds/Rnk	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Model	Ranks	Thrds/Rnk	Seconds	Ratio	Seconds	Ratio		
705.lbm_m	OMP	256	9	714	1.72	<b>714</b>	<b>1.72</b>	711	1.72	OMP	128	36	674	1.82	669	1.83	<b>672</b>	<b>1.82</b>
718.tealeaf_m	OMP	256	9	<b>1232</b>	<b>1.10</b>	1230	1.10	1233	1.09	OMP	256	9	1229	1.10	1232	1.10	<b>1232</b>	<b>1.10</b>
719.clvleaf_m	OMP	256	9	<b>1339</b>	<b>1.38</b>	1341	1.38	1339	1.38	OMP	384	6	<b>1160</b>	<b>1.60</b>	1163	1.59	1158	1.60
728.pot3d_m	OMP	256	9	<b>1731</b>	<b>1.07</b>	1731	1.07	1744	1.06	OMP	1152	2	1711	1.08	<b>1714</b>	<b>1.08</b>	1717	1.08
734.hpgmgfv_m	OMP	256	9	868	1.15	882	1.13	<b>876</b>	<b>1.14</b>	OMP	256	18	<b>810</b>	<b>1.23</b>	810	1.23	814	1.23
735.weather_m	OMP	256	9	1202	2.00	<b>1205</b>	<b>1.99</b>	1214	1.98	OMP	576	4	1040	2.31	997	2.41	<b>998</b>	<b>2.40</b>

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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: Intel Server M50CYP2UR208 (Xeon 8360Y)  
Interconnect: Mellanox HDR  
File Server Node: LustreFS  
Compute Nodes Used: 32  
Total Chips: 64  
Total Cores: 2304  
Total Threads: 4608  
Total Memory: 8 TB  
Max. Peak Threads: 36

### Software Summary

Compiler: Intel oneAPI Compiler 2021.3.0  
MPI Library: Intel MPI Library for Linux\* OS, Version 2021.2 Build 20210302  
Other MPI Info: None  
Other Software: None  
Base Parallel Model: OMP  
Base Ranks Run: 256  
Base Threads Run: 9  
Peak Parallel Models: OMP  
Minimum Peak Ranks: 128  
Maximum Peak Ranks: 1152  
Max. Peak Threads: 36  
Min. Peak Threads: 2

### Node Description: Intel Server M50CYP2UR208 (Xeon 8360Y)

#### Hardware

Number of nodes: 32  
Uses of the node: Compute  
Vendor: Intel  
Model: Intel Server M50CYP2UR208 (Xeon 8360Y)  
CPU Name: Intel Xeon Platinum 8360Y  
CPU(s) orderable: 1, 2 chips  
Chips enabled: 2  
Cores enabled: 72  
Cores per chip: 36  
Threads per core: 2  
CPU Characteristics: Turbo Boost Technology up to 3.5 GHz  
CPU MHz: 2400  
Primary Cache: 32 KB I + 48 KB D on chip per core  
Secondary Cache: 1536 KB I+D on chip per core  
L3 Cache: 54 MB I+D on chip per chip  
Other Cache: None  
Memory: 256 GB (16 x 16 GB 2Rx8 PC4-3200R)  
Disk Subsystem: 1 x 960 GB SATA 2.5" SSD  
Other Hardware: None  
Accel Count: None  
Accel Model: --  
Accel Vendor: None  
Accel Type: None  
Accel Connection: None  
Accel ECC enabled: None  
Accel Description: None  
Adapter: Mellanox ConnectX-6 HDR  
Number of Adapters: 1  
Slot Type: PCI-Express 4.0 x16  
Data Rate: 200Gbit/s  
Ports Used: 1

#### Software

Accelerator Driver: --  
Adapter: Mellanox ConnectX-6 HDR  
Adapter Driver: 5.1-2.5.8.0  
Adapter Firmware: 20.29.2002  
Operating System: CentOS Linux release 8.4.2105  
4.18.0-240.22.1.el8\_3.crt2.x86\_64  
Local File System: NFS  
Shared File System: Lustre FS  
System State: Multi-user  
Other Software: --

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### Node Description: Intel Server M50CYP2UR208 (Xeon 8360Y)

#### Hardware (Continued)

Interconnect Type: Mellanox HDR

### Node Description: LustreFS

#### Hardware

Number of nodes: 1  
Uses of the node: Fileserver  
Vendor: Intel  
Model: Inspur NF5280M5  
CPU Name: Intel Xeon Gold 6244  
CPU(s) orderable: 1-2 chips  
Chips enabled: 2  
Cores enabled: 16  
Cores per chip: 8  
Threads per core: 2  
CPU Characteristics: Intel Xeon Gold  
CPU MHz: 3600  
Primary Cache: 32 KB I + 32 KB D on chip per core  
Secondary Cache: 512 KB I+D on chip per core  
L3 Cache: 25344 KB I+D on chip per chip  
Other Cache: None  
Memory: 192 GB (12 x 16 GB 2Rx8 PC4-2666R)  
Disk Subsystem: 1 x 1 TB 12 Gbps SAS 2.5" SSD  
Other Hardware: None  
Accel Count: --  
Accel Model: --  
Accel Vendor: --  
Accel Type: --  
Accel Connection: --  
Accel ECC enabled: --  
Accel Description: --  
Adapter: Mellanox ConnectX-4 EDR  
Number of Adapters: 1  
Slot Type: PCI-Express 4.0 x16  
Data Rate: 100 Gb/s  
Ports Used: 2  
Interconnect Type: Mellanox EDR

#### Software

Accelerator Driver: --  
Adapter: Mellanox ConnectX-4 EDR  
Adapter Driver: 5.1-2.5.8.0  
Adapter Firmware: 20.29.2002  
Operating System: CentOS Linux release 7.8.2003  
4.18.0-240.22.1.el8\_3.crt2.x86\_64  
Local File System: None  
Shared File System: Lustre FS  
System State: Multi-User  
Other Software: None



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## Interconnect Description: Mellanox HDR

### Hardware

### Software

Vendor: Mellanox  
Model: Mellanox HDR  
Switch Model: Mellanox QM8790-HS2F Quantum HDR InfiniBand Switch  
Number of Switches: 18  
Number of Ports: 40  
Data Rate: 200 Gbit/s  
Firmware: 20.29.2002  
Topology: Fat-tree  
Primary Use: MPI Traffic

: --

## Submit Notes

The config file option 'submit' was used.

## Compiler Version Notes

```
=====  
CC 705.lbm_m(base, peak) 718.tealeaf_m(base, peak) 734.hpgmgfv_m(base,  
peak)  
-----
```

```
Intel(R) oneAPI DPC++/C++ Compiler 2021.3.0 (2021.3.0.20210619)  
Target: x86_64-unknown-linux-gnu  
Thread model: posix  
InstalledDir:  
/global/panfs01/admin/opt/intel/oneAPI/2021.3.0.3219/compiler/2021.3.0/linux/bin  
-----
```

```
=====  
FC 719.clvleaf_m(base, peak) 728.pot3d_m(base, peak) 735.weather_m(base,  
peak)  
-----
```

```
ifx (IFORT) 2021.3.0 Beta 20210619  
Copyright (C) 1985-2021 Intel Corporation. All rights reserved.  
-----
```

## Base Compiler Invocation

C benchmarks:  
mpicc -cc=icx -lstdc++(\*)

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## Base Compiler Invocation (Continued)

Fortran benchmarks:

```
mpiifort -fc=ifx -lstdc++(*)
```

(\*) Indicates a compiler flag that was found in a non-compiler variable.

## Base Optimization Flags

C benchmarks:

```
-Ofast -ipo -xCORE-AVX512 -mprefer-vector-width=512 -fiopenmp  
-ansi-alias
```

Fortran benchmarks:

```
-Ofast -ipo -xCORE-AVX512 -mprefer-vector-width=512 -fiopenmp  
-nostandard-realloc-lhs -align array64byte
```

## Peak Compiler Invocation

C benchmarks:

```
mpiicc -cc=icx -lstdc++(*)
```

Fortran benchmarks:

```
mpiifort -fc=ifx -lstdc++(*)
```

(\*) Indicates a compiler flag that was found in a non-compiler variable.

## Peak Optimization Flags

C benchmarks:

```
705.lbm_m: -Ofast -ipo -xCORE-AVX512 -mprefer-vector-width=512  
-fiopenmp -ansi-alias
```

```
718.tealeaf_m: Same as 705.lbm_m
```

```
734.hpgmgfv_m: -Ofast -ipo -fiopenmp -ansi-alias
```

Fortran benchmarks:

```
719.clvleaf_m: -Ofast -ipo -xCORE-AVX512  
-mllvm -hir-nontemporal-cacheline-count=0 -fiopenmp
```

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## Peak Optimization Flags (Continued)

719.clvleaf\_m (continued):

-nostandard-realloc-lhs -align array64byte

728.pot3d\_m: -Ofast -ipo -xCORE-AVX512 -mprefer-vector-width=512

-fiopenmp -nostandard-realloc-lhs -align array64byte

735.weather\_m: Same as 719.clvleaf\_m

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

<http://www.spec.org/hpc2021/flags/Intel-oneAPI-icx2021-official-linux64.html>

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

<http://www.spec.org/hpc2021/flags/Intel-oneAPI-icx2021-official-linux64.xml>

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For questions about this result, please contact the tester. For other inquiries, please contact [info@spec.org](mailto:info@spec.org).

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