SPEChpc™ 2021 Tiny Result

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Lenovo Global Technology

ThinkSystem SR670 V2 (Intel Xeon Platinum 8380, Nvidia A100-PCIE-40G)

SPEChpc 2021_tny_base = 32.2
SPEChpc 2021_tny_peak = Not Run

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Model</th>
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<th>Thrds/Rnk</th>
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</table>

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.
### Lenovo Global Technology

ThinkSystem SR670 V2 (Intel Xeon Platinum 8380, Nvidia A100-PCIE-40G)

<table>
<thead>
<tr>
<th>hpc2021 License</th>
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</thead>
<tbody>
<tr>
<td>Test Sponsor</td>
<td>Lenovo Global Technology</td>
</tr>
<tr>
<td>Tested by</td>
<td>Lenovo Global Technology</td>
</tr>
</tbody>
</table>

### Hardware Summary

- **Type of System:** Homogenous
- **Compute Node:** ThinkSystem SR670 V2
- **Interconnect:** None
- **File Server Node:** ThinkSystem SR670 V2
- **Compute Nodes Used:** 1
- **Total Chips:** 2
- **Total Cores:** 80
- **Total Threads:** 80
- **Total Memory:** 512 GB
- **Max. Peak Threads:** --

### Software Summary

- **Compiler:** Nvidia HPC SDK 21.5
- **MPI Library:** Open MPI 4.0.5
- **Other MPI Info:** None
- **Other Software:** --
- **Base Parallel Model:** ACC
- **Base Ranks Run:** 5
- **Base Threads Run:** 1
- **Peak Parallel Models:** Not Run
- **Minimum Peak Ranks:** --
- **Maximum Peak Ranks:** --
- **Max. Peak Threads:** --
- **Min. Peak Threads:** --

### Node Description: ThinkSystem SR670 V2

#### Hardware

- **Number of nodes:** 1
- **Uses of the node:** compute
- **Vendor:** Lenovo Global Technology
- **Model:** ThinkSystem SR670 V2
- **CPU Name:** Intel Xeon Platinum 8380
- **CPU(s) orderable:** 2 chips
- **Chips enabled:** 2
- **Cores enabled:** 80
- **Cores per chip:** 40
- **Threads per core:** 1
- **CPU Characteristics:** Intel Turbo Boost Technology up to 3.4 GHz
- **CPU MHz:** 2300
- **Primary Cache:** 32 KB I + 48 KB D on chip per core
- **Secondary Cache:** 1280 KB I+D on chip per core
- **L3 Cache:** 60 MB I+D on chip per chip
- **Other Cache:** None
- **Memory:** 512 GB (16 x 32 GB 2Rx8 PC4-3200A-R)
- **Disk Subsystem:** 1 x 4 TB NVMe SSD
- **Other Hardware:** None
- **Accel Count:** 8
- **Accel Model:** Tesla A100 PCIe 40GB
- **Accel Vendor:** Nvidia Corporation
- **Accel Type:** GPU
- **Accel Connection:** PCIe Gen4 x16
- **Accel ECC enabled:** Yes
- **Accel Description:** Nvidia Tesla A100 PCIe 40GB
- **Adapter:** Mellanox ConnectX-6 HDR
- **Number of Adapters:** 1
- **Slot Type:** PCI-Express 4.0 x16
- **Data Rate:** 200 Gb/s
- **Ports Used:** 1
- **Interconnect Type:** Nvidia Mellanox ConnectX-6 HDR

#### Software

- **Accelerator Driver:** 470.42.01
- **Adapter:** Mellanox ConnectX-6 HDR
- **Adapter Driver:** 5.2-1.0.4
- **Adapter Firmware:** 20.28.1002
- **Operating System:** Red Hat Enterprise Linux Server release 8.3, Kernel 4.18.0-193.el8.x86_64
- **Local File System:** xfs
- **Shared File System:** XFS
- **System State:** Multi-user, run level 3
- **Other Software:** None
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SPEChpc 2021_tny_base = 32.2
SPEChpc 2021_tny_peak = Not Run

ThinkSystem SR670 V2 (Intel Xeon Platinum 8380, Nvidia A100-PCIE-40G)

hpc2021 License: 28
Test Sponsor: Lenovo Global Technology
Tested by: Lenovo Global Technology
Hardware Availability: Aug-2021
Software Availability: Aug-2021

Node Description: ThinkSystem SR670 V2

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CPU Characteristics: Turbo up to 3.4 GHz
CPU MHz: 2300
Primary Cache: 32 KB I + 48 KB D on chip per core
Secondary Cache: 1280 KB I+D on chip per core
L3 Cache: 60 MB I+D on chip per chip
Other Cache: None
Memory: 512 GB (16 x 32 GB 2Rx8 PC4-3200A-R)
Disk Subsystem: 1 x 4 TB NVMe SSD
Other Hardware: None
Accel Count: 8
Accel Model: Tesla A100 PCIe 40GB
Accel Vendor: Nvidia
Accel Type: GPU
Accel Connection: Nvidia Tesla A100 PCIe 40GB
Accel ECC enabled: Yes
Accel Description: Nvidia Tesla A100 PCIe 40GB
Adapter: Mellanox ConnectX-6 HDR
Number of Adapters: 1
Slot Type: PCI-Express 4.0 x16
Data Rate: 200 Gb/s
Ports Used: 1
Interconnect Type: Nvidia Mellanox ConnectX-6 HDR

Interconnect Description: None

Vendor: None
Model: None
Switch Model: None
Number of Switches: 0
Number of Ports: 0
Data Rate: None
Firmware: None
Topology: None

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# SPEChpc™ 2021 Tiny Result

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## Interconnect Description: None

## Submit Notes

Individual Ranks were bound to the CPU cores on the same NUMA node as the GPU using `numactl` within the following "bind.pl" perl script:

```perl
---- Start bind.pl -----
my %bind;
$bind{0} = "1-3";
$bind{1} = "4-7";
$bind{2} = "8-10";
$bind{3} = "11-14";
$bind{4} = "41-43";
$bind{5} = "44-47";
$bind{6} = "61-63";
$bind{7} = "64-67";
my $rank = $ENV{OMPI_COMM_WORLD_LOCAL_RANK};
my $cmd = "taskset -c $bind{$rank} ";
while (my $arg = shift) {
    $cmd .= "$arg ";
}
my $rc = system($cmd);
exit($rc);
---- End bind.pl -----
```

The config file option 'submit' was used.

```
submit = mpirun --allow-run-as-root -x UCX_MEMTYPE_CACHE=n -host localhost:8 -np $ranks perl ${top}/bind.pl $command
```

## General Notes

Environment variables set by runhpc before the start of the run:

- `UCX_MEMTYPE_CACHE = "n"`
- `UCX_TLS = "self,shm,cuda_copy"`

## Compiler Version Notes

```
CC  505.lbm_t(base) 513.soma_t(base) 518.tealeaf_t(base) 521.miniswp_t(base) 534.hpgmgfv_t(base)
```

NVIDIA Compilers and Tools

(Continued on next page)
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Compiler Version Notes (Continued)

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------------------------------------------------------------------------------
CXXC 532.sph_exa_t (base)
------------------------------------------------------------------------------
nvc++ 21.5-0 LLVM 64-bit target on x86-64 Linux -tp skylake
NVIDIA Compilers and Tools
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------------------------------------------------------------------------------
==============================================================================
FC 519.clvleaf_t (base) 528.pot3d_t (base) 535.weather_t (base)
------------------------------------------------------------------------------
nvfortran 21.5-0 LLVM 64-bit target on x86-64 Linux -tp skylake
NVIDIA Compilers and Tools
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==============================================================================

Base Compiler Invocation

C benchmarks:
mpicc

C++ benchmarks:
mpicxx

Fortran benchmarks:
mpif90

Base Portability Flags

532.sph_exa_t: --c++17

Base Optimization Flags

C benchmarks:
-Mfprelaxed -Mnouniform -Mstack_arrays -fast -acc=gpu
-DSPEC_ACCEL_AWARE_MPI

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Base Optimization Flags (Continued)

C++ benchmarks:
- -Mfprelaxed -Mnouniform -Mstack_arrays -fast -acc=gpu
- -DSPEC_ACCEL_AWARE_MPI

Fortran benchmarks:
- -DSPEC_ACCEL_AWARE_MPI -Mfprelaxed -Mnouniform -Mstack_arrays -fast
- -acc=gpu

Base Other Flags

C benchmarks:
- -w

C++ benchmarks:
- -w

Fortran benchmarks:
- -w

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

You can also download the XML flags source by saving the following link:
http://www.spec.org/hpc2021/flags/nv2021_flags.xml

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