## SPEC CPU®2017 Integer Rate Result

**Supermicro**

SuperWorkstation 5039C-T (X11SCA, Intel Xeon E-2288G)

### Test Results

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>SPECrate®2017_int_base</th>
<th>SPECrate®2017_int_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>56.6</td>
<td>59.7</td>
</tr>
</tbody>
</table>

### Hardware

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name</td>
<td>Intel Xeon E-2288G</td>
</tr>
<tr>
<td>Max MHz</td>
<td>5000</td>
</tr>
<tr>
<td>Nominal</td>
<td>3700</td>
</tr>
<tr>
<td>Enabled</td>
<td>8 cores, 1 chip, 2 threads/core</td>
</tr>
<tr>
<td>Orderable</td>
<td>1 chip</td>
</tr>
<tr>
<td>Cache L1</td>
<td>32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td>L2</td>
<td>256 KB I+D on chip per core</td>
</tr>
<tr>
<td>L3</td>
<td>16 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other</td>
<td>None</td>
</tr>
<tr>
<td>Memory</td>
<td>128 GB (4 x 32 GB 2Rx8 PC4-2666V-E)</td>
</tr>
<tr>
<td>Storage</td>
<td>1 x 200 GB SATA III SSD</td>
</tr>
<tr>
<td>Other</td>
<td>None</td>
</tr>
</tbody>
</table>

### Software

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS</td>
<td>SUSE Linux Enterprise Server 12 SP4 (x86_64)</td>
</tr>
<tr>
<td>Compiler</td>
<td>C/C++: Version 19.0.4.227 of Intel C/C++ Compiler for Linux;</td>
</tr>
<tr>
<td></td>
<td>Fortran: Version 19.0.4.227 of Intel Fortran Compiler for Linux</td>
</tr>
<tr>
<td>Parallel</td>
<td>No</td>
</tr>
<tr>
<td>Firmware</td>
<td>Version 1.1 released Aug-2019</td>
</tr>
<tr>
<td>File System</td>
<td>xfs</td>
</tr>
<tr>
<td>System State</td>
<td>Run level 3 (multi-user)</td>
</tr>
<tr>
<td>Base Pointers</td>
<td>64-bit</td>
</tr>
<tr>
<td>Peak Pointers</td>
<td>32/64-bit</td>
</tr>
<tr>
<td>Other</td>
<td>jemalloc memory allocator V5.0.1</td>
</tr>
<tr>
<td>Power Management</td>
<td>--</td>
</tr>
</tbody>
</table>

### Test Information

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU2017 License</td>
<td>001176</td>
</tr>
<tr>
<td>Test Sponsor</td>
<td>Supermicro</td>
</tr>
<tr>
<td>Tested by</td>
<td>Supermicro</td>
</tr>
<tr>
<td>Test Date</td>
<td>Oct-2019</td>
</tr>
<tr>
<td>Hardware Availability</td>
<td>May-2019</td>
</tr>
<tr>
<td>Software Availability</td>
<td>May-2019</td>
</tr>
</tbody>
</table>

### SPECbench Results

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Specrate®2017_int_base</th>
<th>Specrate®2017_int_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>perlbench_r</td>
<td>51.9</td>
<td>59.6</td>
</tr>
<tr>
<td>gcc_r</td>
<td>42.9</td>
<td>53.7</td>
</tr>
<tr>
<td>mcf_r</td>
<td>61.3</td>
<td>61.4</td>
</tr>
<tr>
<td>omnetpp_r</td>
<td>21.6</td>
<td>21.6</td>
</tr>
<tr>
<td>xalancbmk_r</td>
<td>60.2</td>
<td>67.3</td>
</tr>
<tr>
<td>x264_r</td>
<td>146</td>
<td>135</td>
</tr>
<tr>
<td>deepsjeng_r</td>
<td>56.0</td>
<td>56.0</td>
</tr>
<tr>
<td>leela_r</td>
<td>53.0</td>
<td>53.0</td>
</tr>
<tr>
<td>exchange2_r</td>
<td>144</td>
<td>144</td>
</tr>
<tr>
<td>xz_r</td>
<td>30.8</td>
<td>30.8</td>
</tr>
</tbody>
</table>
### SPEC CPU®2017 Integer Rate Result

**Supermicro**

SuperWorkstation 5039C-T (X11SCA , Intel Xeon E-2288G)

<table>
<thead>
<tr>
<th>SPECrate®2017_int_base = 56.6</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate®2017_int_peak = 59.7</td>
</tr>
</tbody>
</table>

**Results Table**

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>500.perlbench_r</td>
<td>16</td>
<td>490</td>
<td>52.0</td>
<td>491</td>
<td>51.9</td>
<td>491</td>
<td>51.9</td>
</tr>
<tr>
<td>502.gcc_r</td>
<td>16</td>
<td>528</td>
<td>42.9</td>
<td>529</td>
<td>42.9</td>
<td>530</td>
<td>42.8</td>
</tr>
<tr>
<td>505.mcf_r</td>
<td>16</td>
<td>422</td>
<td>61.3</td>
<td>422</td>
<td>61.3</td>
<td>422</td>
<td>61.3</td>
</tr>
<tr>
<td>520.omnetpp_r</td>
<td>16</td>
<td>972</td>
<td>21.6</td>
<td>971</td>
<td>21.6</td>
<td>971</td>
<td>21.6</td>
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<tr>
<td>523.xalancbmk_r</td>
<td>16</td>
<td>278</td>
<td>60.8</td>
<td>281</td>
<td>60.2</td>
<td>283</td>
<td>59.8</td>
</tr>
<tr>
<td>525.x264_r</td>
<td>16</td>
<td>192</td>
<td>146</td>
<td>192</td>
<td>146</td>
<td>189</td>
<td>149</td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>16</td>
<td>327</td>
<td>56.0</td>
<td>328</td>
<td>56.0</td>
<td>328</td>
<td>55.9</td>
</tr>
<tr>
<td>541.leela_r</td>
<td>16</td>
<td>500</td>
<td>53.0</td>
<td>502</td>
<td>52.8</td>
<td>496</td>
<td>53.4</td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>16</td>
<td>291</td>
<td>144</td>
<td>291</td>
<td>144</td>
<td>292</td>
<td>143</td>
</tr>
<tr>
<td>557.xz_r</td>
<td>16</td>
<td>563</td>
<td>30.7</td>
<td>560</td>
<td>30.8</td>
<td>562</td>
<td>30.8</td>
</tr>
</tbody>
</table>

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

**Submit Notes**

The taskset mechanism was used to bind copies to processors. The config file option 'submit' was used to generate taskset commands to bind each copy to a specific processor. For details, please see the config file.

**Operating System Notes**

Stack size set to unlimited using "ulimit -s unlimited"

**Environment Variables Notes**

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

```
LD_LIBRARY_PATH = 
"/home/cpu2017/lib/intel64:/home/cpu2017/lib/ia32:/home/cpu2017/je5.0.1-32"
```

**General Notes**

Binaries compiled on a system with 1x Intel Core i9-799X CPU + 32GB RAM memory using Redhat Enterprise Linux 7.5

Transparent Huge Pages enabled by default

Prior to runcpu invocation

Filesystem page cache synced and cleared with:

```
sync; echo 3>/proc/sys/vm/drop_caches
```

NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown)

(Continued on next page)
General Notes (Continued)

is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5753 (Spectre variant 1) is mitigated in the system as tested and documented.
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5715 (Spectre variant 2) is mitigated in the system as tested and documented.

Platform Notes

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edble6e46a485a0011
running on 135-175-3 Fri Oct 25 16:07:01 2019

SUT (System Under Test) info as seen by some common utilities.
For more information on this section, see https://www.spec.org/cpu2017/Docs/config.html#sysinfo

From /proc/cpuinfo
   model name : Intel(R) Xeon(R) E-2288G CPU @ 3.70GHz
     1 "physical id"s (chips)
     16 "processors"
core, siblings (Caution: counting these is hw and system dependent. The following excerpts from /proc/cpuinfo might not be reliable. Use with caution.)
cpu cores : 8
siblings : 16
physical 0: cores 0 1 2 3 4 5 6 7

From lscpu:
   Architecture: x86_64
   CPU op-mode(s): 32-bit, 64-bit
   Byte Order: Little Endian
   CPU(s): 16
   On-line CPU(s) list: 0-15
   Thread(s) per core: 2
   Core(s) per socket: 8
   Socket(s): 1
   NUMA node(s): 1
   Vendor ID: GenuineIntel
   CPU family: 6
   Model: 158
   Model name: Intel(R) Xeon(R) E-2288G CPU @ 3.70GHz
   Stepping: 13
   CPU MHz: 3700.000

(Continued on next page)
Supermicro
SuperWorkstation 5039C-T (X11SCA, Intel Xeon E-2288G)

SPEC®2017 Integer Rate Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

SPECRate®2017_int_base = 56.6
SPECRate®2017_int_peak = 59.7

CPU2017 License: 001176
Test Sponsor: Supermicro
Test Date: Oct-2019
CPU2017 License: 001176
Tested by: Supermicro
Hardware Availability: May-2019
Software Availability: May-2019

Platform Notes (Continued)

CPU max MHz: 5000.0000
CPU min MHz: 800.0000
BogoMIPS: 7392.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 256K
L3 cache: 16384K
NUMA node0 CPU(s): 0-15

Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp
lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
aperfmpref tsc_known_freq pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3
sdbg fma cx16 xpr tpm pep pcpd cmov stp dtes64 cmp x86te xtpr pdcm pcid sse4_1 sse4_2 x2apic movbe popcnt
lwc3 tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb invpcid_single
ssbd ibrs ibp stibp tpr_shadow vmmi flexpriority ept vpid fsgsbase tsc_adjust bmi1
hle avx2 smep bmi2 ets invpcid rtm mxs ase smap clflushopt intel_pt xsaveopt
xsave xgetbv1 xsave xpgs dtherm ida arat pln pts hwp hwp_notify hwp_act_window hwp_epp
flush_l1d arch_capabilities

 cache size : 16384 KB

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a
physical chip.
 available: 1 nodes (0)
 node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
 node 0 size: 128770 MB
 node 0 free: 128113 MB
 node distances:
 node 0
 0: 10

From /proc/meminfo
MemTotal: 131861376 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release*/etc/*version*
SuSE-release:
 SUSE Linux Enterprise Server 12 (x86_64)
 VERSION = 12
 PATCHLEVEL = 4
 # This file is deprecated and will be removed in a future service pack or release.
 # Please check /etc/os-release for details about this release.
 os-release:
 NAME="SLES"

(Continued on next page)
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Tested by: Supermicro

Test Date: Oct-2019
Hardware Availability: May-2019
Software Availability: May-2019

Platform Notes (Continued)

VERSION="12-SP4"
VERSION_ID="12.4"
PRETTY_NAME="SUSE Linux Enterprise Server 12 SP4"
ID="sles"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:12:sp4"

uname -a:
x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:
CVE-2018-3620 (L1 Terminal Fault): Not affected
Microarchitectural Data Sampling: No status reported
CVE-2017-5754 (Meltdown): Not affected
CVE-2018-3639 (Speculative Store Bypass):
Mitigation: Speculative Store Bypass disabled via prctl and seccomp
CVE-2017-5753 (Spectre variant 1):
Mitigation: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2):
Mitigation: Indirect Branch Restricted Speculation, IBPB, IBRS_FW

run-level 3 Oct 25 15:18
SPEC is set to: /home/cpu2017

Filesystem Type Size Used Avail Use% Mounted on
/dev/sda3 xfs 145G 4.0G 141G 3% /home

From /sys/devices/virtual/dmi/id
BIOS: American Megatrends Inc. 1.1 08/14/2019
Vendor: Supermicro
Product: Super Server
Serial: 0123456789

Additional information from dmidecode follows. WARNING: Use caution when you interpret this section. The 'dmidecode' program reads system data which is "intended to allow hardware to be accurately determined", but the intent may not be met, as there are frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.

Memory:
4x Samsung M391A4G43MB1-CTD 32 GB 2 rank 2667

(End of data from sysinfo program)
Supermicro
SuperWorkstation 5039C-T (X11SCA, Intel Xeon E-2288G)

SPEC CPU®2017 Integer Rate Result

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CPU2017 License: 001176
Test Sponsor: Supermicro
Tested by: Supermicro

Test Date: Oct-2019
Hardware Availability: May-2019
Software Availability: May-2019

Compiler Version Notes

==============================================================================
C       | 502.gcc_r(peak)
-----------------------------------------------------------------------------
Intel(R) C Intel(R) 64 Compiler for applications running on IA-32, Version
19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
-----------------------------------------------------------------------------
C       | 500.perlbench_r(base, peak) 502.gcc_r(base) 505.mcf_r(base, peak)
| 525.x264_r(base, peak) 557.xz_r(base, peak)
-----------------------------------------------------------------------------
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
==============================================================================
C       | 502.gcc_r(peak)
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| 525.x264_r(base, peak) 557.xz_r(base, peak)
-----------------------------------------------------------------------------
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
==============================================================================
C++     | 523.xalanckbmk_r(peak)
-----------------------------------------------------------------------------
Intel(R) C++ Intel(R) 64 Compiler for applications running on IA-32, Version
19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
-----------------------------------------------------------------------------
C++     | 520.omnetpp_r(base, peak) 523.xalanckbmk_r(base)
| 531.deepsjeng_r(base, peak) 541.leela_r(base, peak)
-----------------------------------------------------------------------------
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
(Continued on next page)
Supermicro
SuperWorkstation 5039C-T (X11SCA , Intel Xeon E-2288G)

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Hardware Availability: May-2019
Tested by: Supermicro
Software Availability: May-2019

Compiler Version Notes (Continued)

Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

C++     | 523.xalancbmk_r(peak)
Intel(R) C++ Intel(R) 64 Compiler for applications running on IA-32, Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

C++     | 520.omnetpp_r(base, peak) 523.xalancbmk_r(base)
531.deepsjeng_r(base, peak) 541.leela_r(base, peak)

Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

Fortran | 548.exchange2_r(base, peak)

Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64,
Version 19.0.4.227 Build 20190416
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.

Base Compiler Invocation

C benchmarks:
icc -m64 -std=c11

C++ benchmarks:
icpc -m64

Fortran benchmarks:
ifort -m64

Base Portability Flags

500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64

(Continued on next page)
SPEC CPU®2017 Integer Rate Result

Supermicro
SuperWorkstation 5039C-T (X11SCA , Intel Xeon E-2288G) SPECrate®2017_int_base = 56.6
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Table:
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- Test Sponsor: Supermicro
- Tested by: Supermicro
- Test Date: Oct-2019
- Hardware Availability: May-2019
- Software Availability: May-2019

Base Portability Flags (Continued)

502.gcc_r: -DSPEC_LP64
505.mc_f: -DSPEC_LP64
520.omnia2pp_r: -DSPEC_LP64
523.xalancbmk_r: -DSPEC_LP64 -DSPEC_LINUX
525.x264_r: -DSPEC_LP64
531.deepsjeng_r: -DSPEC_LP64
541.leela_r: -DSPEC_LP64
548.exchange2_r: -DSPEC_LP64
557.xz_r: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
-lqkmalloc

C++ benchmarks:
-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
-lqkmalloc

Fortran benchmarks:
-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
-lqkmalloc

Peak Compiler Invocation

C benchmarks (except as noted below):
icc -m64 -std=c11

C++ benchmarks (except as noted below):
icpc -m64
523.xalancbmk_r: icpc -m32 -L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/ia32_lin

(Continued on next page)
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CPU2017 License: 001176
Test Sponsor: Supermicro
Tested by: Supermicro

Test Date: Oct-2019
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Peak Compiler Invocation (Continued)

Fortran benchmarks:
ifort -m64

Peak Portability Flags

500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64
502.gcc_r: -D_FILE_OFFSET_BITS=64
505.mcf_r: -DSPEC_LP64
520.omnetpp_r: -DSPEC_LP64
523.xalancbmk_r: -D_FILE_OFFSET_BITS=64 -DSPEC_LINUX
525.x264_r: -DSPEC_LP64
531.deepsjeng_r: -DSPEC_LP64
541.leela_r: -DSPEC_LP64
548.exchange2_r: -DSPEC_LP64
557.xz_r: -DSPEC_LP64

Peak Optimization Flags

C benchmarks:

500.perlbench_r: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX2 -O3 -no-prec-div -qopt-mem-layout-trans=4
-fno-strict-overflow
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
-lqkmalloc

502.gcc_r: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX2 -O3 -no-prec-div -qopt-mem-layout-trans=4
-L/usr/local/je5.0.1-32/lib -ljemalloc

505.mcf_r: -Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
-lqkmalloc

525.x264_r: -Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -fno-alias
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
-lqkmalloc

557.xz_r: Same as 505.mcf_r

(Continued on next page)
Supermicro
SuperWorkstation 5039C-T (X11SCA , Intel Xeon E-2288G)

SPECCpu®2017 Integer Rate Result

<table>
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<th>Test Date</th>
<th>Test Sponsor</th>
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</table>

SPECRate®2017_int_base = 56.6
SPECRate®2017_int_peak = 59.7

Peak Optimization Flags (Continued)

C++ benchmarks:

520.omnetpp_r: -Wl, -z, muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
-lqkmalloc

523.xalancbmk_r: -Wl, -z, muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX2 -O3 -no-prec-div -qopt-mem-layout-trans=4
-L/usr/local/jie5.0.1-32/lib -ljemalloc

531.deepsjeng_r: Same as 520.omnetpp_r

541.leela_r: basepeak = yes

Fortran benchmarks:
-Wl, -z, muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
-lqkmalloc

The flags files that were used to format this result can be browsed at

You can also download the XML flags sources by saving the following links:

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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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