## SPEC CPU®2017 Integer Rate Result

### Inspur Corporation

**Inspur NF5280M5 (Intel Xeon Gold 5218)**

<table>
<thead>
<tr>
<th>CPU2017 License:</th>
<th>3358</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor:</td>
<td>Inspur Corporation</td>
</tr>
<tr>
<td>Tested by:</td>
<td>Inspur Corporation</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SPECrate®2017_int_base = 194</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate®2017_int_peak = 199</td>
</tr>
</tbody>
</table>

### Hardware

<table>
<thead>
<tr>
<th>CPU Name:</th>
<th>Intel Xeon Gold 5218</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max MHz:</td>
<td>3900</td>
</tr>
<tr>
<td>Nominal:</td>
<td>2300</td>
</tr>
<tr>
<td>Enabled:</td>
<td>32 cores, 2 chips, 2 threads/core</td>
</tr>
<tr>
<td>Orderable:</td>
<td>1.2 chips</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>1 MB I+D on chip per core</td>
</tr>
<tr>
<td>L3:</td>
<td>22 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other:</td>
<td>None</td>
</tr>
<tr>
<td>Memory:</td>
<td>768 GB (24 x 32 GB 2Rx4 PC4-2933Y-R, running at 2666)</td>
</tr>
<tr>
<td>Storage:</td>
<td>1 x 480 GB SATA SSD</td>
</tr>
<tr>
<td>Other:</td>
<td>None</td>
</tr>
</tbody>
</table>

### Software

<table>
<thead>
<tr>
<th>OS:</th>
<th>Red Hat Enterprise Linux release 8.2 (Ootpa)</th>
</tr>
</thead>
<tbody>
<tr>
<td>compiler:</td>
<td>C/C++: Version 2021.1 of Intel oneAPI DPC++/C++</td>
</tr>
<tr>
<td></td>
<td>Compiler Build 20201113 for Linux;</td>
</tr>
<tr>
<td></td>
<td>C/C++: Version 2021.1 of Intel C/C++</td>
</tr>
<tr>
<td></td>
<td>Compiler Classic Build 20201112 for Linux;</td>
</tr>
<tr>
<td></td>
<td>Fortran: Version 2021.1 of Intel Fortran</td>
</tr>
<tr>
<td></td>
<td>Compiler Classic Build 20201112 for Linux</td>
</tr>
<tr>
<td>Parallel:</td>
<td>No</td>
</tr>
<tr>
<td>Firmware:</td>
<td>Version 4.1.14 released Apr-2020</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>BIOS and OS set to prefer performance at the cost of additional power usage.</td>
</tr>
</tbody>
</table>
**SPEC CPU®2017 Integer Rate Result**

**Inspur Corporation**

**Inspur NF5280M5 (Intel Xeon Gold 5218)**

**CPU2017 License:** 3358  
**Test Sponsor:** Inspur Corporation  
**Tested by:** Inspur Corporation  
**Hardware Availability:** Feb-2020  
**Software Availability:** Jan-2021  
**Test Date:** May-2021

### Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<th>Ratio</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>64</td>
<td>769</td>
<td>132</td>
<td>767</td>
<td>133</td>
<td>772</td>
<td>132</td>
<td>64</td>
<td>666</td>
<td>153</td>
<td>666</td>
<td>153</td>
<td>664</td>
<td>153</td>
</tr>
<tr>
<td>502.gcc_r</td>
<td>64</td>
<td>610</td>
<td>148</td>
<td>607</td>
<td>149</td>
<td>611</td>
<td>148</td>
<td>64</td>
<td>532</td>
<td>170</td>
<td>532</td>
<td>170</td>
<td>532</td>
<td>170</td>
</tr>
<tr>
<td>505.mcf_r</td>
<td>64</td>
<td>308</td>
<td>336</td>
<td>306</td>
<td>338</td>
<td>308</td>
<td>336</td>
<td>64</td>
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<td>336</td>
<td>306</td>
<td>338</td>
<td>308</td>
<td>336</td>
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<tr>
<td>520.omnetpp_r</td>
<td>64</td>
<td>689</td>
<td>122</td>
<td>690</td>
<td>122</td>
<td>698</td>
<td>120</td>
<td>64</td>
<td>689</td>
<td>122</td>
<td>690</td>
<td>122</td>
<td>698</td>
<td>120</td>
</tr>
<tr>
<td>523.xalancbmk_r</td>
<td>64</td>
<td>262</td>
<td>258</td>
<td>262</td>
<td>258</td>
<td>260</td>
<td>260</td>
<td>64</td>
<td>262</td>
<td>258</td>
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<tr>
<td>525.x264_r</td>
<td>64</td>
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<td>294</td>
<td>381</td>
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<tr>
<td>531.deepsjeng_r</td>
<td>64</td>
<td>471</td>
<td>156</td>
<td>472</td>
<td>156</td>
<td>472</td>
<td>155</td>
<td>64</td>
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<td>156</td>
<td>472</td>
<td>156</td>
<td>472</td>
<td>155</td>
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<td>541.leela_r</td>
<td>64</td>
<td>725</td>
<td>146</td>
<td>725</td>
<td>146</td>
<td>711</td>
<td>149</td>
<td>64</td>
<td>725</td>
<td>146</td>
<td>725</td>
<td>146</td>
<td>711</td>
<td>149</td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>64</td>
<td>457</td>
<td>367</td>
<td>456</td>
<td>367</td>
<td>456</td>
<td>367</td>
<td>64</td>
<td>457</td>
<td>367</td>
<td>456</td>
<td>367</td>
<td>456</td>
<td>367</td>
</tr>
<tr>
<td>557.xz_r</td>
<td>64</td>
<td>614</td>
<td>113</td>
<td>614</td>
<td>113</td>
<td>615</td>
<td>112</td>
<td>64</td>
<td>608</td>
<td>114</td>
<td>606</td>
<td>114</td>
<td>606</td>
<td>114</td>
</tr>
</tbody>
</table>

**SPECrate®2017_int_base = 194**  
**SPECrate®2017_int_peak = 199**  

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

### Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl 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"  
SCALING_GOVERNOR set to Performance

### 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"

**MALLOC_CONF = "retain:true"

### General Notes

Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB RAM  
memory using Red Hat Enterprise Linux 8.1  
Transparent Huge Pages enabled by default  
Prior to runcpu invocation  
Filesystem page cache synced and cleared with:

(Continued on next page)
Inspur Corporation
Inspur NF5280M5 (Intel Xeon Gold 5218)

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SPECrate®2017_int_base = 194
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CPU2017 License: 3358
Test Sponsor: Inspur Corporation
Tested by: Inspur Corporation

Test Date: May-2021
Hardware Availability: Feb-2020
Software Availability: Jan-2021

General Notes (Continued)

sync; echo 3>/proc/sys/vm/drop_caches
runcpu command invoked through numacl i.e.:
numactl --interleave=all runcpu <etc>

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

jemalloc, a general purpose malloc implementation
built with the RedHat Enterprise 7.5,
and the system compiler gcc 4.8.5;
sources available from jemalloc.net or

Platform Notes

BIOS configuration:
ENERGY_PERF_BIAS_CFG mode set to Performance
Hardware Prefetch set to Disable
VT Support set to Disable
C1E Support set to Disable
Sub NUMA Cluster (SNC) set to Enable
Intel Hyper Threading Technology set to Enable

Sysinfo program /home/CPU2017/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16aca664d
running on localhost.localdomain Wed May  5 22:08:19 2021

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) Gold 5218 CPU @ 2.30GHz
      2 "physical id"s (chips)
      64 "processors"
      cores, siblings (Caution: counting these is hw and system dependent. The following
      excerpts from /proc/cpuinfo might not be reliable. Use with caution.)
        cpu cores : 16
        siblings  : 32
      physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
      physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

(Continued on next page)
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Platform Notes (Continued)

From lscpu from util-linux 2.32.1:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 64
On-line CPU(s) list: 0-63
Thread(s) per core: 2
Core(s) per socket: 16
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 5218 CPU @ 2.30GHz
Stepping: 6
CPU MHz: 2799.998
BogoMIPS: 4600.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 22528K
NUMA node0 CPU(s): 0-3,8-11,32-35,40-43
NUMA node1 CPU(s): 4-7,12-15,36-39,44-47
NUMA node2 CPU(s): 16-19,24-27,56-59
NUMA node3 CPU(s): 20-23,28-31,52-55,60-63
Flags: fpu vme de pse tsc msr pae mca cmov pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp lm constant_tsc arch_perfmon pebs nonstop_tsc cpuid aperfmperf pni pclmulqdq dtes64 aes cpuid cmov ppt shr mmx ext4 sux mmmds ext4 kasadm io limiting

From numactl --hardware
WARNING: a numactl 'node' might or might not correspond to a physical chip.
available: 4 nodes (0-3)
node 0 cpus: 0 1 2 3 8 9 10 11 32 33 34 35 40 41 42 43
node 0 size: 192106 MB

(Continued on next page)
Platform Notes (Continued)

node 0 free: 191871 MB
node 1 cpus: 4 5 6 7 12 13 14 15 36 37 38 39 44 45 46 47
node 1 size: 193504 MB
node 1 free: 193195 MB
node 2 cpus: 16 17 18 19 24 25 26 27 48 49 50 51 56 57 58 59
node 2 size: 193284 MB
node 2 free: 193284 MB
node 3 cpus: 20 21 22 23 28 29 30 31 52 53 54 55 60 61 62 63
node 3 size: 193531 MB
node 3 free: 193329 MB
node distances:
  node 0   1   2   3
  0:  10  11  21  21
  1:  11  10  21  21
  2:  21  21  10  11
  3:  21  21  11  10

From /proc/meminfo
MemTotal:       791219100 kB
HugePages_Total:       0
Hugepagesize:       2048 kB

/sbin/tuned-adm active
It seems that tuned daemon is not running, preset profile is not activated.
Preset profile: throughput-performance

From /etc/*release* /etc/*version*
os-release:
  NAME="Red Hat Enterprise Linux"
  VERSION="8.2 (Ootpa)"
  ID="rhel"
  ID_LIKE="fedora"
  VERSION_ID="8.2"
  PLATFORM_ID="platform:el8"
  PRETTY_NAME="Red Hat Enterprise Linux 8.2 (Ootpa)"
  ANSI_COLOR="0;31"
redhat-release: Red Hat Enterprise Linux release 8.2 (Ootpa)
system-release: Red Hat Enterprise Linux release 8.2 (Ootpa)
system-release-cpe: cpe:/o:redhat:enterprise_linux:8.2:ga

uname -a:
  Linux localhost.localdomain 4.18.0-193.el8.x86_64 #1 SMP Fri Mar 27 14:35:58 UTC 2020
  x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:
CVE-2018-12207 (iTLB Multihit):
  KVM: Vulnerable

(Continued on next page)
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<table>
<thead>
<tr>
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**Platform Notes (Continued)**

- CVE-2018-3620 (L1 Terminal Fault): Not affected
- Microarchitectural Data Sampling: Not affected
- CVE-2017-5754 (Meltdown): Mitigation: Speculative Store Bypass disabled via prctl and seccomp
- CVE-2018-3639 (Speculative Store Bypass): Mitigation: usercopy/swapsgs barriers and __user pointer sanitization
- CVE-2017-5753 (Spectre variant 1): Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling
- CVE-2017-5715 (Spectre variant 2): Mitigation: Clear CPU buffers; SMT vulnerable
- CVE-2020-0543 (Special Register Buffer Data Sampling): No status reported
- CVE-2019-11135 (TSX Asynchronous Abort): Mitigation: Clear CPU buffers; SMT vulnerable

**run-level 3 May 5 22:07**

**SPEC is set to: /home/CPU2017**

<table>
<thead>
<tr>
<th>Filesystem</th>
<th>Type</th>
<th>Size</th>
<th>Used</th>
<th>Avail</th>
<th>Use%</th>
<th>Mounted on</th>
</tr>
</thead>
<tbody>
<tr>
<td>/dev/mapper/rhel-home</td>
<td>xfs</td>
<td>392G</td>
<td>47G</td>
<td>346G</td>
<td>12%</td>
<td>/home</td>
</tr>
</tbody>
</table>

**From /sys/devices/virtual/dmi/id**

- **Vendor:** Inspur
- **Product:** NF5280M5
- **Serial:** 217453240

**Additional information from dmidecode 3.2 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:**

- 24x Micron 18ASF4G72PZ-2G9E1 32 GB 1 rank 2933, configured at 2666

**BIOS:**

- **BIOS Vendor:** American Megatrends Inc.
- **BIOS Version:** 4.1.14
- **BIOS Date:** 04/15/2020
- **BIOS Revision:** 5.14

*(End of data from sysinfo program)*

**Compiler Version Notes**

```
C      | 500.perlbench_r(peak) 557.xz_r(peak)
```

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

<table>
<thead>
<tr>
<th>C</th>
<th>502.gcc_r(peak)</th>
</tr>
</thead>
</table>
| Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000  
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.  |
|---------|----------------|
| Intel(R) oneAPI DPC++/C++ Compiler for applications running on IA-32, Version 2021.1 Build 20201113  
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.  |
|---------|----------------|
| Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000  
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.  |
|---------|----------------|
| Intel(R) oneAPI DPC++/C++ Compiler for applications running on IA-32, Version 2021.1 Build 20201113  
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.  |
|---------|----------------|
| Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000  
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Compiler Version Notes (Continued)

C | 500.perlbench_r(peak) 557.xz_r(peak)

Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

C | 502.gcc_r(peak)

Intel(R) oneAPI DPC++/C++ Compiler for applications running on IA-32, Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

C | 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base, peak) 525.x264_r(base, peak) 557.xz_r(base)

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

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

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

Fortran | 548.exchange2_r(base)

Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

Base Compiler Invocation

C benchmarks:
icx

(Continued on next page)
## Base Compiler Invocation (Continued)

C++ benchmarks:
- icpx

Fortran benchmarks:
- ifort

## Base Portability Flags

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Flags</th>
</tr>
</thead>
<tbody>
<tr>
<td>500.perlbench_r</td>
<td>-DSPEC_LP64 -DSPEC_LINUX_X64</td>
</tr>
<tr>
<td>502.gcc_r</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>505.mcf_r</td>
<td>-DSPEC_LP64</td>
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<td>520.omnetpp_r</td>
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<td>-DSPEC_LP64</td>
</tr>
</tbody>
</table>

## Base Optimization Flags

### C benchmarks:
- `-w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math`
- `-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4`
- `-mbranches-within-32B-boundaries`
- `-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin`
- `-lqkmalloc`

### C++ benchmarks:
- `-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto`
- `-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4`
- `-mbranches-within-32B-boundaries`
- `-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin`
- `-lqkmalloc`

### Fortran benchmarks:
- `-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ipo -no-prec-div`
- `-qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte`
- `-auto -mbranches-within-32B-boundaries`
- `-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin`

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

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<th>SPECrate®2017_int_base = 194</th>
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CPU2017 License: 3358
Test Sponsor: Inspur Corporation
Test Date: May-2021
Hardware Availability: Feb-2020
Tested by: Inspur Corporation
Software Availability: Jan-2021

### Base Optimization Flags (Continued)

Fortran benchmarks (continued):
- `-lqkmalloc`

### Peak Compiler Invocation

C benchmarks (except as noted below):
- `icx`
- `500.perlbench_r: icc`
- `557.xz_r: icc`

C++ benchmarks:
- `icpx`

Fortran benchmarks:
- `ifort`

### 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: -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`

### Peak Optimization Flags

C benchmarks:

(Continued on next page)
Inspur Corporation

Inspur NF5280M5 (Intel Xeon Gold 5218)

Spec®2017 Integer Rate Result

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Peak Optimization Flags (Continued)

500.perlbench_r (continued):
-1qkmalloc

502.gcc_r: -m32
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/ia32_lin
-std=gnu89 -Wl,-z,muldefs -fprofile-generate(pass 1)
-fprofile-use=default.profdata(pass 2) -xCORE-AVX512 -flto
-ofast(pass 1) -O3 -ffast-math -qopt-mem-layout-trans=4
-mbranches-within-32B-boundaries
-L/usr/local/jemalloc32-5.0.1/lib -ljemalloc

505.mcf_r: basepeak = yes

525.x264_r: -w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -flto
-03 -ffast-math -qopt-mem-layout-trans=4 -fno-alias
-mbranches-within-32B-boundaries
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin
-1qkmalloc

557.xz_r: -Wl,-z,muldefs -xCORE-AVX512 -ipo -03 -no-prec-div
-qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin
-1qkmalloc

C++ benchmarks:

520.omnetpp_r: basepeak = yes

523.xalancbmk_r: basepeak = yes

531.deepsjeng_r: basepeak = yes

541.leela_r: basepeak = yes

Fortran benchmarks:

548.exchange2_r: basepeak = yes

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:
http://www.spec.org/cpu2017/flags/Intel-ic2021-official-linux64_revA.xml
http://www.spec.org/cpu2017/flags/Inspur-Platform-Settings-V1.9.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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