# SPEC CPU®2017 Integer Rate Result

## Inspur Corporation

**Inspur NF5280M5 (Intel Xeon Gold 6246R)**

<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>
<tr>
<td>Test Date:</td>
<td>Jul-2020</td>
</tr>
<tr>
<td>Hardware Availability:</td>
<td>Feb-2020</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Apr-2020</td>
</tr>
</tbody>
</table>

### SPECrate®2017_int_base = 261

### SPECrate®2017_int_peak = 269

### Hardware

<table>
<thead>
<tr>
<th>CPU Name:</th>
<th>Intel Xeon Gold 6246R</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max MHz:</td>
<td>4100</td>
</tr>
<tr>
<td>Nominal:</td>
<td>3400</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>35.75 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)</td>
</tr>
<tr>
<td>Storage:</td>
<td>1 x 2 TB NVME 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 8.0 (Ootpa) 4.18.0-80.el8.x86_64</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parallel:</td>
<td>No</td>
</tr>
<tr>
<td>Firmware:</td>
<td>Version 4.1.7 released Apr-2019</td>
</tr>
<tr>
<td>File System:</td>
<td>xfs</td>
</tr>
<tr>
<td>System State:</td>
<td>Run level 5 (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>

### SPECrate Trends

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<tr>
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<th>SPECrate®2017_int_base</th>
<th>SPECrate®2017_int_peak</th>
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<tr>
<td>502.gcc_r</td>
<td>190</td>
<td>223</td>
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<tr>
<td>505.mcf_r</td>
<td></td>
<td>448</td>
</tr>
<tr>
<td>520.omnetpp_r</td>
<td></td>
<td>144</td>
</tr>
<tr>
<td>523.xalancbmk_r</td>
<td></td>
<td></td>
</tr>
<tr>
<td>525.x264_r</td>
<td></td>
<td></td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td></td>
<td>216</td>
</tr>
<tr>
<td>541.leela_r</td>
<td></td>
<td>207</td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td></td>
<td></td>
</tr>
<tr>
<td>557.xz_r</td>
<td>144</td>
<td></td>
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</table>
### Inspecr Corporation

**Inspur NF5280M5 (Intel Xeon Gold 6246R)**

<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>
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<td>206</td>
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<td><code>520.omnetpp_r</code></td>
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<td><code>541.leela_r</code></td>
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<td>527</td>
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</tr>
<tr>
<td><code>548.exchange2_r</code></td>
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<td>145</td>
<td>479</td>
<td>144</td>
<td><strong>479</strong></td>
<td><strong>144</strong></td>
</tr>
</tbody>
</table>

**Results Table**

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

### Compiler Notes

The inconsistent Compiler version information under Compiler Version section is due to a discrepancy in Intel Compiler. The correct version of C/C++ compiler is: Version 19.1.1.217 Build 20200306 Compiler for Linux

The correct version of Fortran compiler is: Version 19.1.1.217 Build 20200306 Compiler for Linux

### 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/CP2017/lib/intel64:/home/CP2017/lib/ia32:/home/CP2017/je5.0.1-32"

MALLOC_CONF = "retain:true"
Inspur Corporation

Inspur NF5280M5 (Intel Xeon Gold 6246R)

**SPECrate®2017_int_base = 261**

**SPECrate®2017_int_peak = 269**

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<td>Copyright 2017-2020 Standard Performance Evaluation Corporation</td>
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</table>

**CPU2017 License:** 3358

**Test Sponsor:** Inspur Corporation

**Test Date:** Jul-2020

**Tested by:** Inspur Corporation

**Hardware Availability:** Feb-2020

**Software Availability:** Apr-2020

---

### General Notes

Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB RAM
memory using Redhat Enterprise Linux 8.0
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`
runcpu command invoked through numactl 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.


---

### 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
IMC (Integrated memory controller) Interleaving set to 1-way
Sub NUMA Cluster (SNC) set to Enable

Sysinfo program /home/CPU2017/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f808a3d7edbe6e46a485a0011
running on localhost.localdomain Fri Jun 22 07:25:14 2018

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 6246R CPU @ 3.40GHz
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.)
```

(Continued on next page)
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**Platform Notes (Continued)**

```
cpu cores : 16
siblings : 32
  physical 0: cores 1 2 3 12 13 16 17 18 19 20 21 24 26 27 29
  physical 1: cores 0 1 2 3 4 6 8 9 12 13 17 18 19 27 28 29

From lscpu:
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): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 6246R CPU @ 3.40GHz
Stepping: 7
CPU MHz: 4000.031
CPU max MHz: 4100.0000
CPU min MHz: 1200.0000
BogoMIPS: 6800.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 36608K
NUMA node0 CPU(s): 0-15, 32-47
NUMA node1 CPU(s): 16-31, 48-63
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 arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
aperfmon perfctr pni pclmulqdq dtes64 mpx smx est tm2 ssse3 sdbg fma cx16 xtpr pdcm
pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c
rdseed lahf_lm abm 3dmnowprefetch cpuid_fault epb cat_13 cdpl_13 invpcid_single ssbd
msr ibrs ibpb stibp ibrs_enhanced tpr_shadow vmmi flexpriority ept vpid fsgsbase
loadtsc_adjust bm1 hle avx2 smep bmi2 erm64 invpcid rtm cqm mpx rdt_a avx512f avx512dq
derseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsavec
xgetbv1 xsavec cqm_llc cqm_occuup_llc cqm_mbb_total cqm_mbb_local dtherm ida arat pln
pts pku ospke avx512_vnni flush_l1d arch_capabilities
```

From numactl --hardware **WARNING**: a numactl 'node' might or might not correspond to a

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

## Inspecr Corporation

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<tr>
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<tbody>
<tr>
<td>SPECrate®2017 int_peak = 269</td>
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</tbody>
</table>

**CPU2017 License:** 3358  
**Test Sponsor:** Inspur Corporation  
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**Test Date:** Jul-2020  
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---

### Platform Notes (Continued)

- **physical chip.**
  - available: 2 nodes (0-1)
  - node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47
  - node 0 size: 385355 MB
  - node 0 free: 384829 MB
  - node 1 cpus: 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63
  - node 1 size: 387065 MB
  - node 1 free: 386439 MB
  - node distances:
    - node 0: 10 21
    - node 1: 21 10

- From /proc/meminfo
  - MemTotal: 790958672 kB
  - HugePages_Total: 0
  - Hugepagesize: 2048 kB

- From /etc/*release* /etc/*version*
  - os-release:
    - NAME="Red Hat Enterprise Linux"
    - VERSION="8.0 (Ootpa)"
    - ID="rhel"
    - ID_LIKE="fedora"
    - VERSION_ID="8.0"
    - PLATFORM_ID="platform:el8"
    - PRETTY_NAME="Red Hat Enterprise Linux 8.0 (Ootpa)"
    - ANSI_COLOR="0;31"
    - redhat-release: Red Hat Enterprise Linux release 8.0 (Ootpa)
    - system-release: Red Hat Enterprise Linux release 8.0 (Ootpa)
    - system-release-cpe: cpe:/o:redhat:enterprise_linux:8.0:ga

- `uname -a`:
  - Linux localhost.localdomain 4.18.0-80.el8.x86_64 #1 SMP Wed Mar 13 12:02:46 UTC 2019
  - 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: Enhanced IBRS, IBPB: conditional,

(Continued on next page)
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Platform Notes (Continued)

RSB filling

run-level 5 Jun 22 07:11

SPEC is set to: /home/CPU2017

Filesystem Type Size Used Avail Use% Mounted on
/dev/mapper/rhel-home xfs 1.8T 60G 1.8T 4% /home

From /sys/devices/virtual/dmi/id
BIOS: American Megatrends Inc. 4.1.7 04/19/2019
Vendor: Inspur
Product: NF5280M5
Serial: 217453240

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: 24x Hynix HMAA4GR7AJR8N-WM 32 GB 2 rank 2933

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
C    | 502.gcc_r(peak)
Intel(R) C Compiler for applications running on IA-32, Version 2021.1 NextGen Build 20200304
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) C Compiler for applications running on Intel(R) 64, Version 2021.1 NextGen Build 20200304
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
==============================================================================

==============================================================================
C    | 500.perlbench_r(peak) 557.xz_r(peak)
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,

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

Version 19.1.1.217 Build 20200306
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

==============================================================================
| C       | 502.gcc_r(peak) |
---|------------------|
Intel(R) C Compiler for applications running on IA-32, Version 2021.1 NextGen Build 20200304
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==============================================================================
| C       | 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base, peak) 525.x264_r(base, peak) 557.xz_r(base) |
---|--------------------------------------------------|
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==============================================================================
| C       | 500.perlbench_r(peak) 557.xz_r(peak) |
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Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.1.1.217 Build 20200306
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| C       | 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base, peak) 525.x264_r(base, peak) 557.xz_r(base) |
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Compiler Version Notes (Continued)

C       | 500.perlbench_r(peak) 557.xz_r(peak)
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Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
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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) C++ Compiler for applications running on Intel(R) 64, Version 2021.1
    NextGen Build 20200304
Copyright (C) 1985-2020 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 19.1.1.217 Build 20200306
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

Base Compiler Invocation

C benchmarks:
icc

C++ benchmarks:
icpc

Fortran benchmarks:
ifort

Base Portability Flags

500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64
502.gcc_r: -DSPEC_LP64
505.mcf_r: -DSPEC_LP64
520.omnetpp_r: -DSPEC_LP64
523.xalancbmk_r: -DSPEC_LP64 -DSPEC_LINUX
525.x264_r: -DSPEC_LP64

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<td>Hardware Availability: Feb-2020</td>
</tr>
<tr>
<td>Tested by: Inspur Corporation</td>
<td>Software Availability: Apr-2020</td>
</tr>
</tbody>
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### Base Portability Flags (Continued)

- 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:**
- `-m64` `-m64` `-qnextgen` `-std=c11`
- `-Wl,-plugin-opt=-x86-branches-within-32B-boundaries` `-Wl,-z,muldefs`
- `-xCORE-AVX512` `-O3` `-ffast-math` `-flto` `-mfpmath=sse` `-funroll-loops`
- `-fuse-ld=gold` `-qopt-mem-layout-trans=4`
- `-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin`
- `-lqkmalloc`

**C++ benchmarks:**
- `-m64` `-m64` `-Wl,-plugin-opt=-x86-branches-within-32B-boundaries`
- `-Wl,-z,muldefs` `-xCORE-AVX512` `-O3` `-ffast-math` `-flto` `-mfpmath=sse`
- `-funroll-loops` `-fuse-ld=gold` `-qopt-mem-layout-trans=4`
- `-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin`
- `-lqkmalloc`

**Fortran benchmarks:**
- `-m64` `-Wl,-plugin-opt=-x86-branches-within-32B-boundaries` `-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/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin`
- `-lqkmalloc`

### Peak Compiler Invocation

**C benchmarks:**
- `icc`

**C++ benchmarks:**
- `icpc`

**Fortran benchmarks:**
- `ifort`
Inspur Corporation

Inspur NF5280M5 (Intel Xeon Gold 6246R)

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<th>SPECrate®2017_int_base = 261</th>
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<td>SPECrate®2017_int_peak = 269</td>
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CPU2017 License: 3358
Test Sponsor: Inspur Corporation
Tested by: Inspur Corporation

Test Date: Jul-2020
Hardware Availability: Feb-2020
Software Availability: Apr-2020

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:

- 500.perlbench_r: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2)
  -xCORE-AVX512 -ipo -O3 -no-prec-div
  -qopt-mem-layout-trans=4 -fno-strict-overflow
  -mbranches-within-32B-boundaries
  -L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin
  -lqkmalloc

- 502.gcc_r: -m32
  -L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/ia32_lin
  -std=gnu89
  -Wl,-plugin-opt=-x86-branches-within-32B-boundaries
  -Wl,-z,muldefs -fprofile-generate(pass 1)
  -fprofile-use=default.profdata(pass 2) -xCORE-AVX512 -flto
  -Ofast(pass 1) -O3 -ffast-math -qnextgen -fuse-ld=gold
  -qopt-mem-layout-trans=4 -L/usr/local/jemalloc32-5.0.1/lib
  -ljemalloc

- 505.mcf_r: basepeak = yes

- 525.x264_r: -m64 -qnextgen -std=c11
  -Wl,-plugin-opt=-x86-branches-within-32B-boundaries
  -Wl,-z,muldefs -xCORE-AVX512 -flto -O3 -ffast-math
  -fuse=ld=gold -qopt-mem-layout-trans=4 -fno-alias
  -L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin
  -lqkmalloc

- 557.xz_r: -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
  -qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries
  -L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin

(Continued on next page)
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Inspur NF5280M5 (Intel Xeon Gold 6246R)

SPEC CPU®2017 Integer Rate Result

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SPECrate®2017_int_base = 261
SPECrate®2017_int_peak = 269

CPU2017 License: 3358
Test Sponsor: Inspur Corporation
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Peak Optimization Flags (Continued)

557.xz_r (continued):
-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-ic19.1u1-official-linux64_revA.xml
http://www.spec.org/cpu2017/flags/Inspur-Platform-Settings-V1.9.xml

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