# SPEC CPU®2017 Integer Rate Result

## Inspur Corporation

**Insapur NF5180M6 (Intel Xeon Silver 4314)**

<table>
<thead>
<tr>
<th>SPECrate®2017_int_base</th>
<th>SPECrate®2017_int_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>236</td>
<td>243</td>
</tr>
</tbody>
</table>

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

## Hardware

**CPU Name:** Intel Xeon Silver 4314  
**Max MHz:** 3400  
**Nominal:** 2400  
**Enabled:** 32 cores, 2 chips, 2 threads/core  
**Orderable:** 1.2 chips  
**Cache L1:** 32 KB I + 48 KB D on chip per core  
**L2:** 1.25 MB I+D on chip per core  
**L3:** 24 MB I+D on chip per chip  
**Other:** None  
**Memory:** 1 TB (32 x 32 GB 2Rx4 PC4-3200AA-R, running at 2666)  
**Storage:** 1 x 1.6 TB NVME SSD  
**Other:** None

## Software

**OS:** Red Hat Enterprise Linux release 8.2 (Ootpa) 4.18.0-193.el8.x86_64  
**Compiler:** C/C++: Version 2021.1 of Intel oneAPI DPC++/C++  
Compiler Build 20201113 for Linux;  
C/C++: Version 2021.1 of Intel C/C++  
Compiler Classic Build 20201112 for Linux;  
Fortran: Version 2021.1 of Intel Fortran  
Compiler Classic Build 20201112 for Linux

**Parallel:** No  
**Firmware:** Version 05.00.02 released May-2021  
**File System:** xfs  
**System State:** Run level 3 (multi-user)  
**Base Pointers:** 64-bit  
**Peak Pointers:** 32/64-bit  
**Other:** jemalloc memory allocator V5.0.1  
**Power Management:** B1OS and OS set to prefer performance at the cost of additional power usage.

---

### SPECrate®2017 Int Results

<table>
<thead>
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<th>Benchmark</th>
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</thead>
<tbody>
<tr>
<td>perlbench</td>
<td>185</td>
<td>201</td>
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<tr>
<td>gcc</td>
<td>228</td>
<td></td>
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<tr>
<td>mcf</td>
<td>155</td>
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<tr>
<td>omnetpp</td>
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<tr>
<td>xalancbmk</td>
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<tr>
<td>x264</td>
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<tr>
<td>deepsjeng</td>
<td></td>
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</tr>
<tr>
<td>leela</td>
<td></td>
<td></td>
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<tr>
<td>exchange2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>xz</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**Copies:**

- perlbench: 64 copies
- gcc: 64 copies
- mcf: 64 copies
- omnetpp: 64 copies
- xalancbmk: 64 copies
- x264: 64 copies
- deepsjeng: 64 copies
- leela: 64 copies
- exchange2: 64 copies
- xz: 64 copies

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**Software:**

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- Peak Pointers: 32/64-bit
- Other: jemalloc memory allocator V5.0.1
- Power Management: B1OS and OS set to prefer performance at the cost of additional power usage.
### Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
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<th>Seconds</th>
<th>Ratio</th>
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<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>647</td>
<td>158</td>
<td>646</td>
<td>158</td>
<td>647</td>
<td>158</td>
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<td>158</td>
<td>645</td>
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<td>64</td>
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<tr>
<td>502.gcc_r</td>
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<td>201</td>
<td>450</td>
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<td>541.leela_r</td>
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<tr>
<td>548.exchange2_r</td>
<td>64</td>
<td>361</td>
<td>465</td>
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<td><strong>358</strong></td>
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<td>469</td>
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</tr>
<tr>
<td>557.xz_r</td>
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<td>131</td>
<td>526</td>
<td>131</td>
<td>526</td>
<td>131</td>
</tr>
</tbody>
</table>

**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 NF5180M6 (Intel Xeon Silver 4314)

SPECrater®2017_int_base = 236
SPECrater®2017_int_peak = 243

General Notes (Continued)

sync; echo 3> /proc/sys/vm/drop_caches
runcpu command invoked through numacl1 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

Sysinfo program /home/CPU2017/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acafc64d
running on localhost.localdomain Fri Aug 27 12:25:59 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) Silver 4314 CPU @ 2.40GHz
  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.)
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

From lscpu from util-linux 2.32.1:

(Continued on next page)
Platform Notes (Continued)

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: 106
Model name: Intel(R) Xeon(R) Silver 4314 CPU @ 2.40GHz
Stepping: 6
CPU MHz: 2900.227
CPU max MHz: 3400.0000
CPU min MHz: 800.0000
BogoMIPS: 4800.00
Virtualization: VT-x
L1d cache: 48K
L1i cache: 32K
L2 cache: 1280K
L3 cache: 24576K
NUMA node0 CPU(s): 0-7,32-39
NUMA node1 CPU(s): 8-15,40-47
NUMA node2 CPU(s): 16-23,48-55
NUMA node3 CPU(s): 24-31,56-63
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 rdtsscp
lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
aperf perf perfv  pembe popcnt tsc_deadline_timer aes xsave avx f16c
rdand lahf_lm abm 3dnowprefetch cpubid_fault epb cat_l3 invpcid_single ssbd mba ibrs
ibp bb ibs enhanced tpr shadow vnni flexpriority etp vpid fsgsbase tsc_adjust
bm1 hle avx2 smep bmi2 erms invpcid rtm cqm rdt_a avx512f avx512dq rdseed adx smap
avx512ifma clflushopt clwb intel_pt avx512cd sha ni avx512bw avx512vl xsavesOPT
xsaves xgetb1 xsavec cqm_llc cqm_occup llc cqm_mbb_total cqm_mbb_local wbnoinvd
dtherm ida arat pin pts avx512vbm1 umip pku ospke avx512_vbmi2 gfi ni vaes vpcm1ldq
avx512vnni avx512_bitalg tme avx512_vpopcntdq 1a57 rdpid md_clear pconfig flush_lld
arch_capabilities

/proc/cpuinfo cache data
cache size : 24576 KB

From numactl --hardware
WARNING: a numactl 'node' might or might not correspond to a physical chip.
available: 4 nodes (0-3)
**SPEC CPU®2017 Integer Rate Result**  
Copyright 2017-2021 Standard Performance Evaluation Corporation

**Inspur Corporation**

**Inspur NF5180M6 (Intel Xeon Silver 4314)**

<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>Aug-2021</td>
</tr>
<tr>
<td>Hardware Availability:</td>
<td>May-2021</td>
</tr>
<tr>
<td>Software Availability:</td>
<td>Dec-2020</td>
</tr>
</tbody>
</table>

**SPECrate®2017_int_base = 236**  
**SPECrate®2017_int_peak = 243**

**Platform Notes (Continued)**

node 0 cpus: 0 1 2 3 4 5 6 7 32 33 34 35 36 37 38 39  
node 0 size: 257637 MB  
node 0 free: 257360 MB  
node 1 cpus: 8 9 10 11 12 13 14 15 40 41 42 43 44 45 46 47  
node 1 size: 258044 MB  
node 1 free: 257682 MB  
node 2 cpus: 16 17 18 19 20 21 22 23 48 49 50 51 52 53 54 55  
node 2 size: 258044 MB  
node 2 free: 257746 MB  
node 3 cpus: 24 25 26 27 28 29 30 31 56 57 58 59 60 61 62 63  
node 3 size: 258014 MB  
node 3 free: 257737 MB  
node distances:  
node 0 1 2 3  
0: 10 11 20 20  
1: 11 10 20 20  
2: 20 20 10 11  
3: 20 20 11 10  

From /proc/meminfo  
MemTotal: 1056501424 kB  
HugePages_Total: 0  
Hugepagesize: 2048 kB  

/sbin/tuned-adm active  
Current active profile: throughput-performance  
/sys/devices/system/cpu/cpu*/cpufreq/scaling_governor has 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  

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

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<td>Software Availability</td>
<td>Dec-2020</td>
</tr>
</tbody>
</table>

**SPECrate®2017_int_base = 236**

**SPECrate®2017_int_peak = 243**

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**Platform Notes (Continued)**

Kernel self-reported vulnerability status:

- **CVE-2018-12207 (iTLB Multihit):** Not affected
- **CVE-2018-3620 (L1 Terminal Fault):** Not affected
- Microarchitectural Data Sampling: Not affected
- **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: usercopy/swapgs barriers and __user pointer sanitization
- **CVE-2017-5715 (Spectre variant 2):** Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling
- **CVE-2020-0543 (Special Register Buffer Data Sampling):** No status reported
- **CVE-2019-11135 (TSX Asynchronous Abort):** Not affected

run-level 3 Aug 27 12:17

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>1.5T</td>
<td>86G</td>
<td>1.4T</td>
<td>6%</td>
<td>/home</td>
</tr>
</tbody>
</table>

From /sys/devices/virtual/dmi/id

- **Vendor:** Inspur
- **Product:** NF5180M6
- **Product Family:** Family
- **Serial:** 380827124

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:

- 32x Micron 18ASF4G72PDZ-3G2E1 32 GB 2 rank 3200, configured at 2666

**BIOS:**

- **BIOS Vendor:** American Megatrends Inc.
- **BIOS Version:** 05.00.02
- **BIOS Date:** 05/22/2021
- **BIOS Revision:** 5.22

(End of data from sysinfo program)
Compiler Version Notes

==============================================================================
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
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==============================================================================
C      | 500.perlbench_r(peak) 557.xz_r(peak)
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C      | 502.gcc_r(peak)
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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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Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.1 Build 20201113
(Continued on next page)
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**CPU2017 License:** 3358

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**Tested by:** Inspur Corporation

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**Compiler Version Notes (Continued)**

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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, peak)
---

Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000

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Inspur Corporation

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CPU2017 License: 3358
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Test Date: Aug-2021
Tested by: Inspur Corporation
Hardware Availability: May-2021
Software Availability: Dec-2020

Base Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

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.xalancbk_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:
-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

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

**Inspur Corporation**

**Inspur NF5180M6 (Intel Xeon Silver 4314)**

<table>
<thead>
<tr>
<th>SPECrate®2017_int_base = 236</th>
<th>SPECrate®2017_int_peak = 243</th>
</tr>
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</table>

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

## Base Optimization Flags (Continued)

Fortran benchmarks (continued):

```bash
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin  
-lqkmalloc
```

## Peak Compiler Invocation

C benchmarks (except as noted below):

```bash
icx
500.perlbench_r:icc
557.xz_r:icc
```

C++ benchmarks:

```bash
icpx
```

Fortran benchmarks:

```bash
ifort
```

## Peak Portability Flags

```bash
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:

```bash
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
```

(Continued on next page)
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### Peak Optimization Flags (Continued)

500.perlbench_r (continued):

- `-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin`
- `-lqkmalloc`

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`

- `-O3 -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`
- `-lqkmalloc`

557.xz_r: `-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -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`
- `-lqkmalloc`

**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:

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