



# SPEC CPU®2017 Integer Rate Result

Copyright 2017-2022 Standard Performance Evaluation Corporation

## Inspur Corporation

SPECrate®2017\_int\_base = 460

### Inspur NF5180M6 (Intel Xeon Gold 6348)

SPECrate®2017\_int\_peak = 473

CPU2017 License: 3358

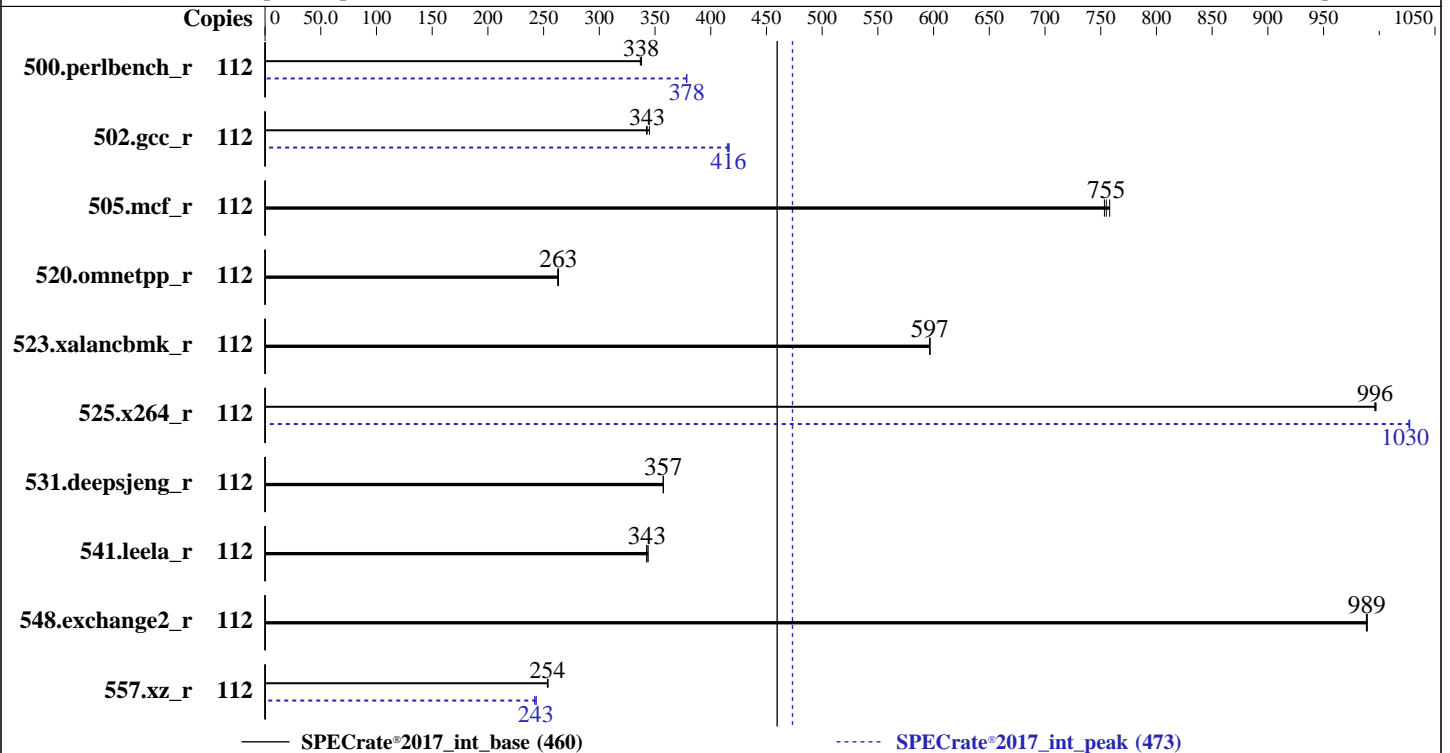
Test Sponsor: Inspur Corporation

Tested by: Inspur Corporation

Test Date: Jul-2022

Hardware Availability: Apr-2021

Software Availability: Sep-2021



### Hardware

CPU Name: Intel Xeon Gold 6348  
 Max MHz: 3500  
 Nominal: 2600  
 Enabled: 56 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: 42 MB I+D on chip per chip  
 Other: None  
 Memory: 1 TB (32 x 32 GB 2Rx8 PC4-3200AA-R)  
 Storage: 1 x 2 TB NVME SSD  
 Other: None

### Software

OS: Red Hat Enterprise Linux release 8.3 (Ootpa) 4.18.0-240.el8.x86\_64  
 Compiler: C/C++: Version 2021.4.0 of Intel oneAPI DPC++/C++ Compiler Build 20210924 for Linux;  
 Fortran: Version 2021.4.0 of Intel Fortran Compiler Classic Build 20210910 for Linux;  
 C/C++: Version 2021.4.0 of Intel C/C++ Compiler Classic Build 20210910 for Linux;  
 Parallel: No  
 Firmware: Version 04.12.02 released Apr-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: BIOS and OS set to prefer performance at the cost of additional power usage.



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### Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
500.perlbench_r	112	528	338	<b>528</b>	<b>338</b>	529	337	112	471	378	<b>471</b>	<b>378</b>	472	378
502.gcc_r	112	460	345	<b>462</b>	<b>343</b>	463	342	112	<b>381</b>	<b>416</b>	382	415	381	416
505.mcf_r	112	239	758	240	753	<b>240</b>	<b>755</b>	112	239	758	240	753	<b>240</b>	<b>755</b>
520.omnetpp_r	112	<b>558</b>	<b>263</b>	560	263	558	263	112	<b>558</b>	<b>263</b>	560	263	558	263
523.xalancbmk_r	112	198	597	198	597	<b>198</b>	<b>597</b>	112	198	597	198	597	<b>198</b>	<b>597</b>
525.x264_r	112	197	997	<b>197</b>	<b>996</b>	197	996	112	191	1030	191	1030	<b>191</b>	<b>1030</b>
531.deepsjeng_r	112	<b>359</b>	<b>357</b>	359	357	359	357	112	<b>359</b>	<b>357</b>	359	357	359	357
541.leela_r	112	542	342	<b>541</b>	<b>343</b>	539	344	112	542	342	<b>541</b>	<b>343</b>	539	344
548.exchange2_r	112	297	989	<b>297</b>	<b>989</b>	297	988	112	297	989	<b>297</b>	<b>989</b>	297	988
557.xz_r	112	476	254	<b>477</b>	<b>254</b>	477	253	112	<b>497</b>	<b>243</b>	500	242	497	243

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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"

### 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 2x Intel Xeon Platinum 8280M CPU + 384GB RAM memory using Red Hat Enterprise Linux 8.4  
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

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## General Notes (Continued)

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  
<https://github.com/jemalloc/jemalloc/releases>

## Platform Notes

BIOS and OS configuration:

ENERGY\_PERF\_BIAS\_CFG mode set to Performance

Hardware Prefetch set to Disable

VT Support set to Disable

Sub NUMA Cluster (SNC) set to Enable

Scaling\_Governor set to Performance

Sysinfo program /home/cpu2017/bin/sysinfo

Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acafc64d

running on localhost.localdomain Tue Jul 12 09:25:34 2022

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 6348 CPU @ 2.60GHz

2 "physical id"s (chips)

112 "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 : 28

siblings : 56

physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24  
25 26 27

physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24  
25 26 27

From lscpu from util-linux 2.32.1:

Architecture: x86\_64

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### Platform Notes (Continued)

```

CPU op-mode(s):      32-bit, 64-bit
Byte Order:          Little Endian
CPU(s):              112
On-line CPU(s) list: 0-111
Thread(s) per core:  2
Core(s) per socket: 28
Socket(s):           2
NUMA node(s):        8
Vendor ID:           GenuineIntel
CPU family:           6
Model:               106
Model name:          Intel(R) Xeon(R) Gold 6348 CPU @ 2.60GHz
Stepping:            6
CPU MHz:             3400.000
CPU max MHz:         3500.0000
CPU min MHz:         800.0000
BogoMIPS:            5200.00
Virtualization:      VT-x
L1d cache:           48K
L1i cache:           32K
L2 cache:            1280K
L3 cache:            43008K
NUMA node0 CPU(s):  0-6,56-62
NUMA node1 CPU(s):  7-13,63-69
NUMA node2 CPU(s):  14-20,70-76
NUMA node3 CPU(s):  21-27,77-83
NUMA node4 CPU(s):  28-34,84-90
NUMA node5 CPU(s):  35-41,91-97
NUMA node6 CPU(s):  42-48,98-104
NUMA node7 CPU(s):  49-55,105-111

```

```

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 pbs bts rep_good nopl xtopology nonstop_tsc cpuid
aperfperf pni pclmulqdq dtes64 ds_cpl vmx 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
rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3 cdp_l3 invpcid_single
intel_ppin ssbd mba ibrs ibpb stibp ibrs_enhanced fsgsbase tsc_adjust bmi1 hle avx2
smep bmi2 erms invpcid cqm rdt_a avx512f avx512dq rdseed adx smap avx512ifma
clflushopt clwb intel_pt avx512cd sha_ni avx512bw avx512vl xsaveopt xsavec xgetbv1
xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local split_lock_detect wbnoinvd
dtherm ida arat pln pts avx512vbmi umip pku ospke avx512_vbmi2 gfni vaes vpclmulqdq
avx512_vnni avx512_bitalg tme avx512_vpopcntdq la57 rdpid md_clear pconfig flush_l1d
arch_capabilities

```

```

/proc/cpuinfo cache data
cache size : 43008 KB

```

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### Platform Notes (Continued)

```

From numactl --hardware
WARNING: a numactl 'node' might or might not correspond to a physical chip.
  available: 8 nodes (0-7)
  node 0 cpus: 0 1 2 3 4 5 6 56 57 58 59 60 61 62
  node 0 size: 127928 MB
  node 0 free: 124506 MB
  node 1 cpus: 7 8 9 10 11 12 13 63 64 65 66 67 68 69
  node 1 size: 127530 MB
  node 1 free: 125825 MB
  node 2 cpus: 14 15 16 17 18 19 20 70 71 72 73 74 75 76
  node 2 size: 127821 MB
  node 2 free: 126199 MB
  node 3 cpus: 21 22 23 24 25 26 27 77 78 79 80 81 82 83
  node 3 size: 127794 MB
  node 3 free: 126275 MB
  node 4 cpus: 28 29 30 31 32 33 34 84 85 86 87 88 89 90
  node 4 size: 127878 MB
  node 4 free: 126270 MB
  node 5 cpus: 35 36 37 38 39 40 41 91 92 93 94 95 96 97
  node 5 size: 127898 MB
  node 5 free: 126273 MB
  node 6 cpus: 42 43 44 45 46 47 48 98 99 100 101 102 103 104
  node 6 size: 127700 MB
  node 6 free: 126263 MB
  node 7 cpus: 49 50 51 52 53 54 55 105 106 107 108 109 110 111
  node 7 size: 127682 MB
  node 7 free: 126253 MB
  node distances:
  node   0   1   2   3   4   5   6   7
    0:  10  20  20  20  20  20  20  20
    1:  20  10  20  20  20  20  20  20
    2:  20  20  10  20  20  20  20  20
    3:  20  20  20  10  20  20  20  20
    4:  20  20  20  20  10  20  20  20
    5:  20  20  20  20  20  10  20  20
    6:  20  20  20  20  20  20  10  20
    7:  20  20  20  20  20  20  20  10

```

```

From /proc/meminfo
MemTotal:      1056481100 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

```

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### Platform Notes (Continued)

performance

From /etc/\*release\* /etc/\*version\*

os-release:

NAME="Red Hat Enterprise Linux"

VERSION="8.3 (Ootpa)"

ID="rhel"

ID\_LIKE="fedora"

VERSION\_ID="8.3"

PLATFORM\_ID="platform:el8"

PRETTY\_NAME="Red Hat Enterprise Linux 8.3 (Ootpa)"

ANSI\_COLOR="0;31"

redhat-release: Red Hat Enterprise Linux release 8.3 (Ootpa)

system-release: Red Hat Enterprise Linux release 8.3 (Ootpa)

system-release-cpe: cpe:/o:redhat:enterprise\_linux:8.3:ga

uname -a:

Linux localhost.localdomain 4.18.0-240.el8.x86\_64 #1 SMP Wed Sep 23 05:13:10 EDT 2020  
x86\_64 x86\_64 x86\_64 GNU/Linux

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):

Not affected

CVE-2019-11135 (TSX Asynchronous Abort):

Not affected

run-level 3 Jul 12 07:12

SPEC is set to: /home/cpu2017

Filesystem	Type	Size	Used	Avail	Use%	Mounted on
/dev/mapper/rhel-home	xfs	1.4T	104G	1.3T	8%	/home

From /sys/devices/virtual/dmi/id

Vendor: Inspur

Product: NF5180M6

Product Family: Family

(Continued on next page)



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### Platform Notes (Continued)

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

BIOS:  
BIOS Vendor: American Megatrends Inc.  
BIOS Version: 04.12.02  
BIOS Date: 04/02/2021  
BIOS Revision: 5.21

(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 2021.4.0 Build 20210910\_000000  
Copyright (C) 1985-2021 Intel Corporation. All rights reserved.

=====  
C | 502.gcc\_r(peak)  
=====

Intel(R) oneAPI DPC++/C++ Compiler for applications running on IA-32, Version 2021.4.0 Build 20210924  
Copyright (C) 1985-2021 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 2021.4.0 Build 20210924  
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=====  
C | 500.perlbench\_r(peak) 557.xz\_r(peak)  
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### Compiler Version Notes (Continued)

```
-----
Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R)
 64, Version 2021.4.0 Build 20210910_000000
Copyright (C) 1985-2021 Intel Corporation. All rights reserved.
-----
```

```
=====
C      | 502.gcc_r(peak)
-----
```

```
Intel(R) oneAPI DPC++/C++ Compiler for applications running on IA-32, Version
2021.4.0 Build 20210924
Copyright (C) 1985-2021 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 2021.4.0 Build 20210924
Copyright (C) 1985-2021 Intel Corporation. All rights reserved.
-----
```

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

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-----
```

```
=====
C      | 502.gcc_r(peak)
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```

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Copyright (C) 1985-2021 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,
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## Compiler Version Notes (Continued)

```

=====
C++      | 520.omnetpp_r(base, peak) 523.xalanbmk_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 2021.4.0 Build 20210924
Copyright (C) 1985-2021 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 2021.4.0 Build 20210910_000000
Copyright (C) 1985-2021 Intel Corporation. All rights reserved.
=====

```

## 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.xalanbmk_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

```



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## 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/usr/local/intel/compiler/2021.4.0/linux/compiler/lib/intel64_lin
-lqkmallocc
```

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/usr/local/intel/compiler/2021.4.0/linux/compiler/lib/intel64_lin
-lqkmallocc
```

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/usr/local/intel/compiler/2021.4.0/linux/compiler/lib/intel64_lin
-lqkmallocc
```

## 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

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## Peak Portability Flags (Continued)

```
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/intel/compiler/2021.4.0/linux/compiler/lib/intel64_lin
-lqkmalloc
```

```
502.gcc_r: -m32
-L/usr/local/intel/compiler/2021.4.0/linux/compiler/lib/ia32_lin
-std=gnu89 -Wl,-z,muldefs -fprofile-generate(pass 1)
-fprofile-use=default.profddata(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/usr/local/intel/compiler/2021.4.0/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/intel/compiler/2021.4.0/linux/compiler/lib/intel64_lin
-lqkmalloc
```

C++ benchmarks:

```
520.omnetpp_r: basepeak = yes
```

(Continued on next page)



# SPEC CPU®2017 Integer Rate Result

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Inspur Corporation

SPECrate®2017\_int\_base = 460

Inspur NF5180M6 (Intel Xeon Gold 6348)

SPECrate®2017\_int\_peak = 473

CPU2017 License: 3358

Test Sponsor: Inspur Corporation

Tested by: Inspur Corporation

Test Date: Jul-2022

Hardware Availability: Apr-2021

Software Availability: Sep-2021

## Peak Optimization Flags (Continued)

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

[http://www.spec.org/cpu2017/flags/Intel-ic2021-official-linux64\\_revA.html](http://www.spec.org/cpu2017/flags/Intel-ic2021-official-linux64_revA.html)

<http://www.spec.org/cpu2017/flags/Inspur-Platform-Settings-V2.5.html>

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/Intel-ic2021-official-linux64_revA.xml)

<http://www.spec.org/cpu2017/flags/Inspur-Platform-Settings-V2.5.xml>

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