



SPEC CPU®2017 Floating Point Rate Result

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Inspur Corporation

Inspur NF5466M6 (Intel Xeon Gold 6348)

CPU2017 License: 3358

Test Sponsor: Inspur Corporation

Tested by: Inspur Corporation

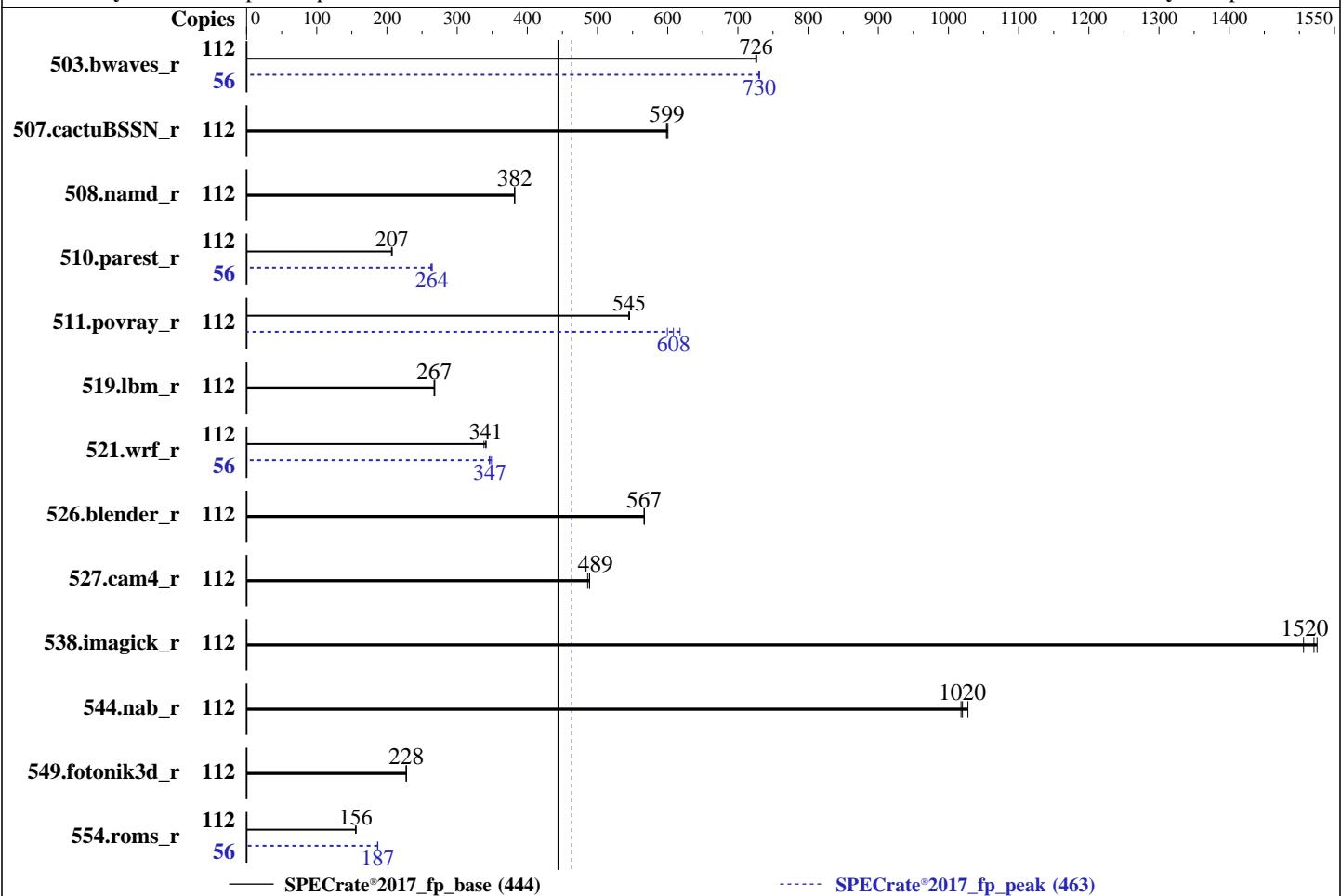
SPECrate®2017_fp_base = 444

SPECrate®2017_fp_peak = 463

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

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:

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
503.bwaves_r	112	1547	726	1548	726	1546	727	56	770	730	769	730	768	731
507.cactusBSSN_r	112	236	600	237	598	237	599	112	236	600	237	598	237	599
508.namd_r	112	279	382	279	382	279	382	112	279	382	279	382	279	382
510.parest_r	112	1413	207	1419	206	1415	207	56	554	264	554	264	558	263
511.povray_r	112	479	546	480	545	480	545	112	436	600	430	608	423	618
519.lbm_r	112	441	267	440	268	442	267	112	441	267	440	268	442	267
521.wrf_r	112	742	338	736	341	735	341	56	360	349	363	346	362	347
526.blender_r	112	301	567	301	567	301	566	112	301	567	301	567	301	566
527.cam4_r	112	403	486	401	489	401	489	112	403	486	401	489	401	489
538.imagick_r	112	183	1520	185	1510	183	1530	112	183	1520	185	1510	183	1530
544.nab_r	112	185	1020	185	1020	183	1030	112	185	1020	185	1020	183	1030
549.fotonik3d_r	112	1917	228	1919	227	1918	228	112	1917	228	1919	227	1918	228
554.roms_r	112	1146	155	1144	156	1141	156	56	476	187	476	187	477	186

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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"

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/je5.0.1-64"
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

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General Notes (Continued)

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) 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 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

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acafc64d
running on localhost.localdomain Fri Jul 15 12:19:09 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

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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):                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 pebs bts rep_good nopl xtopology nonstop_tsc cpuid
                       aperfmpf perf_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_13 cdp_13 invpcid_single
                       intel_ppin ssbd mba ibrs ibpb stibp ibrs_enhanced fsgsbase tsc_adjust bmi1 hle avx2
                       smep bmi2 erms invpcid cqmq rdt_a avx512f avx512dq rdseed adx smap avx512ifma
                       clflushopt clwb intel_pt avx512cd sha_ni avx512bw avx512vl xsaveopt xsavec xgetbv1
                       xsaves cqmq_llc cqmq_occu_llc cqmq_mbm_total cqmq_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_vpocntdq la57 rdpid md_clear pconfig flush_lld
                       arch_capabilities
```

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Platform Notes (Continued)

```
/proc/cpuinfo cache data  
cache size : 43008 KB
```

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: 127816 MB  
node 0 free: 120974 MB  
node 1 cpus: 7 8 9 10 11 12 13 63 64 65 66 67 68 69  
node 1 size: 127536 MB  
node 1 free: 122894 MB  
node 2 cpus: 14 15 16 17 18 19 20 70 71 72 73 74 75 76  
node 2 size: 127865 MB  
node 2 free: 123297 MB  
node 3 cpus: 21 22 23 24 25 26 27 77 78 79 80 81 82 83  
node 3 size: 127916 MB  
node 3 free: 123249 MB  
node 4 cpus: 28 29 30 31 32 33 34 84 85 86 87 88 89 90  
node 4 size: 127966 MB  
node 4 free: 123322 MB  
node 5 cpus: 35 36 37 38 39 40 41 91 92 93 94 95 96 97  
node 5 size: 127976 MB  
node 5 free: 123348 MB  
node 6 cpus: 42 43 44 45 46 47 48 98 99 100 101 102 103 104  
node 6 size: 127874 MB  
node 6 free: 123350 MB  
node 7 cpus: 49 50 51 52 53 54 55 105 106 107 108 109 110 111  
node 7 size: 127794 MB  
node 7 free: 123272 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: 1056481104 kB  
HugePages_Total: 0  
Hugepagesize: 2048 kB
```

/sbin/tuned-adm active

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Platform Notes (Continued)

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="8.3 (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/swaps 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 15 05:38
```

```
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
```

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Platform Notes (Continued)

Vendor: Inspur
Product: NF5466M6
Product Family: Family
Serial: 380983478

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 | 519.lbm_r(base, peak) 538.imagick_r(base, peak)
| 544.nab_r(base, peak)

=====

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2021.4.0 Build 20210924
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=====

C++ | 508.namd_r(base, peak) 510.parest_r(base, peak)

=====

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=====

C++, C | 511.povray_r(peak)

=====

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Intel(R) 64, Version 2021.4.0 Build 20210910_000000
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Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R)

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Compiler Version Notes (Continued)

64, Version 2021.4.0 Build 20210910_000000

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=====

C++, C | 511.povray_r(base) 526.blender_r(base, peak)

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=====

C++, C | 511.povray_r(peak)

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Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R)
64, Version 2021.4.0 Build 20210910_000000

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=====

C++, C | 511.povray_r(base) 526.blender_r(base, peak)

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=====

C++, C, Fortran | 507.cactusBSSN_r(base, peak)

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Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on

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Compiler Version Notes (Continued)

Intel(R) 64, Version 2021.4.0 Build 20210910_000000

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=====

Fortran | 503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak)
| 554.roms_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

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=====

Fortran, C | 521.wrf_r(peak)

=====

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Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R)
64, Version 2021.4.0 Build 20210910_000000

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=====

Fortran, C | 521.wrf_r(base) 527.cam4_r(base, peak)

=====

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=====

Fortran, C | 521.wrf_r(peak)

=====

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Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R)
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Compiler Version Notes (Continued)

Fortran, C | 521.wrf_r(base) 527.cam4_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

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Base Compiler Invocation

C benchmarks:

icx

C++ benchmarks:

icpx

Fortran benchmarks:

ifort

Benchmarks using both Fortran and C:

ifort icx

Benchmarks using both C and C++:

icpx icx

Benchmarks using Fortran, C, and C++:

icpx icx ifort

Base Portability Flags

503.bwaves_r: -DSPEC_LP64
507.cactuBSSN_r: -DSPEC_LP64
508.namd_r: -DSPEC_LP64
510.parest_r: -DSPEC_LP64
511.povray_r: -DSPEC_LP64
519.lbm_r: -DSPEC_LP64
521.wrf_r: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
526.blender_r: -DSPEC_LP64 -DSPEC_LINUX -funsigned-char
527.cam4_r: -DSPEC_LP64 -DSPEC_CASE_FLAG
538.imagick_r: -DSPEC_LP64
544.nab_r: -DSPEC_LP64

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Base Portability Flags (Continued)

549.fotonik3d_r: -DSPEC_LP64
554.roms_r: -DSPEC_LP64

Base Optimization Flags

C benchmarks;

```
-w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math  
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4  
-mbranches-within-32B-boundaries -ljemalloc  
-L/usr/local/jemalloc64-5.0.1/lib
```

C++ benchmarks:

```
-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math -fno-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4  
-mbranches-within-32B-boundaries -ljemalloc  
-L/usr/local/jemalloc64-5.0.1/lib
```

Fortran benchmarks:

```
-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ipo -no-prec-div  
-qopt-prefetch -ffinite-math-only  
-qopt-multiple-gather-scatter-by-shuffles -qopt-mem-layout-trans=4  
-nostandard-realloc-lhs -align array32byte -auto  
-mbranches-within-32B-boundaries -ljemalloc  
-L/usr/local/jemalloc64-5.0.1/lib
```

Benchmarks using both Fortran and C:

```
-w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math  
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -O3 -ipo  
-no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-multiple-gather-scatter-by-shuffles  
-mbranches-within-32B-boundaries -nostandard-realloc-lhs  
-align array32byte -auto -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib
```

Benchmarks using both C and C++:

```
-w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math  
-fno-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4  
-mbranches-within-32B-boundaries -ljemalloc  
-L/usr/local/jemalloc64-5.0.1/lib
```

Benchmarks using Fortran, C, and C++:

```
-w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math  
-fno-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -O3  
-no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-multiple-gather-scatter-by-shuffles
```

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SPEC CPU®2017 Floating Point Rate Result

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Inspur Corporation

SPECrate®2017_fp_base = 444

Inspur NF5466M6 (Intel Xeon Gold 6348)

SPECrate®2017_fp_peak = 463

CPU2017 License: 3358

Test Date: Jul-2022

Test Sponsor: Inspur Corporation

Hardware Availability: Apr-2021

Tested by: Inspur Corporation

Software Availability: Sep-2021

Base Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++ (continued):

```
-mbranches-within-32B-boundaries -nostandard-realloc-lhs  
-align array32byte -auto -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib
```

Peak Compiler Invocation

C benchmarks:

icx

C++ benchmarks:

icpx

Fortran benchmarks:

ifort

Benchmarks using both Fortran and C:

521.wrf_r: ifort icc

527.cam4_r: ifort icx

Benchmarks using both C and C++:

511.povray_r: icpcicc

526.blender_r: icpx icx

Benchmarks using Fortran, C, and C++:

icpx icx ifort

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:

519.lbm_r: basepeak = yes

(Continued on next page)



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Peak Optimization Flags (Continued)

538.imagick_r: basepeak = yes

544.nab_r: basepeak = yes

C++ benchmarks:

508.namd_r: basepeak = yes

510.parest_r: -w -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries
-ljemalloc -L/usr/local/jemalloc64-5.0.1/lib

Fortran benchmarks:

503.bwaves_r: -w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ipo
-no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-multiple-gather-scatter-by-shuffles
-qopt-mem-layout-trans=4 -nostandard-realloc-lhs
-align array32byte -auto -mbranches-within-32B-boundaries
-ljemalloc -L/usr/local/jemalloc64-5.0.1/lib

549.fotonik3d_r: basepeak = yes

554.roms_r: Same as 503.bwaves_r

Benchmarks using both Fortran and C:

521.wrf_r: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512 -O3
-ipo -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-multiple-gather-scatter-by-shuffles
-qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries
-nostandard-realloc-lhs -align array32byte -auto
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

527.cam4_r: basepeak = yes

Benchmarks using both C and C++:

511.povray_r: -prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512 -O3
-ipo -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-multiple-gather-scatter-by-shuffles
-qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

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Peak Optimization Flags (Continued)

526.blender_r: basepeak = yes

Benchmarks using Fortran, C, and C++:

507.cactusBSSN_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/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/Inspur-Platform-Settings-V2.5.xml>

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