Insipur Corporation

**Inspur NF5468M6 (Intel Xeon Gold 6348)**

<table>
<thead>
<tr>
<th>Software</th>
<th>SPECrate(^{\text{\textregistered}2017_fp_peak} = 406)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU2017 License:</td>
<td>3358</td>
</tr>
<tr>
<td>Test Sponsor:</td>
<td>Insipur Corporation</td>
</tr>
<tr>
<td>Tested by:</td>
<td>Insipur Corporation</td>
</tr>
<tr>
<td>Test Date:</td>
<td>Jun-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>

**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 2Rx4 PC4-3200AA-R) |
| Storage: | 1 x 600 GB SAS HDD, 7.2K RPM |
| Other: | None |

| Power Management: | BIOS and OS set to prefer performance at the cost of additional power usage. |

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**Copies**

<table>
<thead>
<tr>
<th>SPECrate(^{\text{\textregistered}2017_fp_base} = 389)</th>
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<tr>
<td>503.bwaves_r</td>
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<tr>
<td>549.fotonik3d_r</td>
</tr>
<tr>
<td>554.roms_r</td>
</tr>
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</table>

---

**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 |
| Firmware: | No |
| 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 |

---

**Test Sponsor:** Insipur Corporation

**Hardware Availability:** May-2021

**Software Availability:** Dec-2020
SPEC CPU®2017 Floating Point Rate Result

Inspur Corporation

Inspur NF5468M6 (Intel Xeon Gold 6348)

SPECrade®2017_fp_base = 389
SPECrade®2017_fp_peak = 406

CPU2017 License: 3358
Test Sponsor: Inspur Corporation
Tested by: Inspur Corporation

Results Table

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SPECrade®2017_fp_base = 389
SPECrade®2017_fp_peak = 406

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 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

(Continued on next page)
General Notes (Continued)

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
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 982a61ec0915b55891ef0e16aca6f64d
running on localhost.localdomain Thu Jun 24 00:54:13 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 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
```

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

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
- **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):** 4
- **Vendor ID:** GenuineIntel
- **CPU family:** 6
- **Model:** 106
- **Model name:** Intel(R) Xeon(R) Gold 6348 CPU @ 2.60GHz
- **Stepping:** 6
- **CPU MHz:** 3400.153
- **CPU max MHz:** 3500.0000
- **CPU min MHz:** 800.0000
- **BogoMIPS:** 5200.00
- **Virtualization:** VT-x
- **L1d cache:** 48K
- **L1i cache:** 32K
- **L2 cache:** 128K
- **L3 cache:** 43008K
- **NUMA node0 CPU(s):** 0-13, 56-69
- **NUMA node1 CPU(s):** 14-27, 70-83
- **NUMA node2 CPU(s):** 28-41, 84-97
- **NUMA node3 CPU(s):** 42-55, 98-111
- **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 arch_perfmon pbe bts rep_good nopl xtopology nonstop_tsc cpuid
- **aperfperf pn ipclmulqdq 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 invpcid_single ssbd mba ibrs
- **ibpb stibp enhanced tpr_shadow vnni flexpriority ept vpid fsgsbase tsc_adjust
- **bmi1 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 xsaveopt
- **xsaves xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local wbinvd
- **dtherm ida arat pln pts avx512vbm1 umip pkum ospke avx512_vbmi2 gfnl vaes vpcmldqd
- **avx512_vnni avx512_bitalg tme avx512_vpdcntdq la57 rdpid md_clear pconfug flush_l1d
- **arch_capabilities

/proc/cpuinfo cache data
- **cache size:** 43008 KB

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

**Inspur Corporation**

Inspur NF5468M6 (Intel Xeon Gold 6348)

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<thead>
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<th>SPECrate®2017_fp_base</th>
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**CPU2017 License:** 3358  
**Test Sponsor:** Inspur Corporation  
**Test Date:** Jun-2021  
**Hardware Availability:** May-2021  
**Tested by:** Inspur Corporation  
**Software Availability:** Dec-2020

---

**Platform Notes (Continued)**

```plaintext
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 4 5 6 7 8 9 10 11 12 13 56 57 58 59 60 61 62 63 64 65 66 67 68 69
node 0 free: 240439 MB
node 1 cpus: 14 15 16 17 18 19 20 21 22 23 24 25 26 27 70 71 72 73 74 75 76 77 78 79 80
        81 82 83
node 1 size: 258041 MB
node 1 free: 244418 MB
node 2 cpus: 28 29 30 31 32 33 34 35 36 37 38 39 40 41 84 85 86 87 88 89 90 91 92 93 94
        95 96 97
node 2 size: 258041 MB
node 2 free: 247342 MB
node 3 cpus: 42 43 44 45 46 47 48 49 50 51 52 53 54 55 98 99 100 101 102 103 104 105
        106 107 108 109 110 111
node 3 size: 258011 MB
node 3 free: 247310 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:       1056491644 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*

NAME="Red Hat Enterprise Linux"
VERSION="8.2 (Ootpa)"
ID="rhel"
ID_LIKE="fedora"
PLATFORM_ID="platform:el8"
PRETTY_NAME="Red Hat Enterprise Linux 8.2 (Ootpa)"
ANSI_COLOR="0;31"
```

(Continued on next page)
**Inspur Corporation**

Inspur NF5468M6 (Intel Xeon Gold 6348)  

**Platform Notes (Continued)**

- 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): 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
  - Mitigation: usercopy/swapgs barriers and __user pointer sanitization
- CVE-2017-5753 (Spectre variant 1): Not affected
- 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 Jun 23 17:26**

```
SPEC is set to: /home/CPU2017
Filesystem    Type Size Used Avail Use% Mounted on
/dev/mapper/rhel-home xfs  503G  53G  451G  11% /home
```

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

- Vendor: Inspur
- Product: NF5468M6
- Product Family: Family
- Serial: 0000000000

**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 36ASF4G72PZ-3G2R1 32 GB 2 rank 3200

**BIOS:**

- BIOS Vendor: American Megatrends Inc.
- BIOS Version: 05.00.01

(Continued on next page)
SPEC CPU®2017 Floating Point Rate Result

Inspur Corporation
Inspur NF5468M6 (Intel Xeon Gold 6348)

SPECrate®2017_fp_base = 389
SPECrate®2017_fp_peak = 406

CPU2017 License: 3358
Test Sponsor: Inspur Corporation
Tested by: Inspur Corporation

Test Date: Jun-2021
Hardware Availability: May-2021
Software Availability: Dec-2020

Platform Notes (Continued)

BIOS Date: 06/10/2021
BIOS Revision: 5.22

(End of data from sysinfo program)

Compiler Version Notes

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Compiler Version Notes (Continued)

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

==============================================================================
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 2021.1 Build 20201112_000000
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Compiler Version Notes (Continued)

==============================================================================
Fortran, C      | 521.wrf_r(peak)
(Continued on next page)
Inspur Corporation
Inspur NF5468M6 (Intel Xeon Gold 6348)

SPECrater®2017_fp_base = 389
SPECrater®2017_fp_peak = 406

CPU2017 License: 3358
Test Sponsor: Inspur Corporation
Tested by: Inspur Corporation

Test Date: Jun-2021
Hardware Availability: May-2021
Software Availability: Dec-2020

Compiler Version Notes (Continued)

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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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==============================================================================
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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==============================================================================
Fortran, C      | 521.wrf_r(base) 527.cam4_r(base, peak)
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Version 2021.1 Build 20201113
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Base Compiler Invocation

C benchmarks:
icx
## Base Compiler Invocation (Continued)

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

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Flags</th>
</tr>
</thead>
<tbody>
<tr>
<td>bwaves_r</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>cactuBSSN_r</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>namd_r</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>parest_r</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>povray_r</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>lbm_r</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>wrf_r</td>
<td>-DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian</td>
</tr>
<tr>
<td>blender_r</td>
<td>-DSPEC_LP64 -DSPEC_LINUX -funsigned-char</td>
</tr>
<tr>
<td>cam4_r</td>
<td>-DSPEC_LP64 -DSPEC_CASE_FLAG</td>
</tr>
<tr>
<td>imagick_r</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>nab_r</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>fotonik3d_r</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>roms_r</td>
<td>-DSPEC_LP64</td>
</tr>
</tbody>
</table>

## Base Optimization Flags

<table>
<thead>
<tr>
<th>C benchmarks</th>
<th>Optimization Flags</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math</td>
</tr>
<tr>
<td></td>
<td>-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4</td>
</tr>
<tr>
<td></td>
<td>-mbranches-within-32B-boundaries -ljemalloc</td>
</tr>
<tr>
<td></td>
<td>-L/usr/local/jemalloc64-5.0.1/lib</td>
</tr>
</tbody>
</table>

(Continued on next page)
SPEC CPU®2017 Floating Point Rate Result

Inspur Corporation

Inspur NF5468M6 (Intel Xeon Gold 6348)

SPECrate®2017_fp_base = 389
SPECrate®2017_fp_peak = 406

CPU2017 License: 3358
Test Sponsor: Inspur Corporation
 Tested by: Inspur Corporation

Test Date: Jun-2021
Hardware Availability: May-2021
Software Availability: Dec-2020

C++ benchmarks:
- 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:
- 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
- flto -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
- flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -O3
- 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

Peak Compiler Invocation
C benchmarks:
icx
C++ benchmarks:
icpx

(Continued on next page)
Peak Compiler Invocation (Continued)

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: icpc icc
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
538.imagick_r: basepeak = yes

544.nab_r: -w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -flto
-Ofast -qopt-mem-layout-trans=4
-fimf-accuracy-bits=14:sqrt
-mbranches-within-32B-boundaries -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib

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

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

510.parest_r (continued):
-\texttt{-qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries}
-\texttt{-ljemalloc -L/usr/local/jemalloc64-5.0.1/lib}

Fortran benchmarks:

503.bwaves_r: \texttt{-w -m64 -W1,-z,muldefs -xCORE-AVX512 -O3 -ipo}
-\texttt{-no-prec-div -qopt-prefetch -ffinite-math-only}
-\texttt{-qopt-multiple-gather-scatter-by-shuffles}
-\texttt{-qopt-mem-layout-trans=4 -nostandard-realloc-lhs}
-\texttt{-align array32byte -auto -mbranches-within-32B-boundaries}
-\texttt{-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: \texttt{-prof-gen(pass 1) -prof-use(pass 2) -xCORE-AVX512 -O3}
-\texttt{-ipo -no-prec-div -qopt-prefetch -ffinite-math-only}
-\texttt{-qopt-multiple-gather-scatter-by-shuffles}
-\texttt{-qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries}
-\texttt{-nostandard-realloc-lhs -align array32byte -auto}
-\texttt{-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc}

527.cam4_r: basepeak = yes

Benchmarks using both C and C++:

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

526.blender_r: basepeak = yes

Benchmarks using Fortran, C, and C++:

507.cactuBSSN_r: basepeak = yes

The flags files that were used to format this result can be browsed at

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
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**CPU2017 License:** 3358  
**Test Sponsor:** Inspur Corporation  
**Tested by:** Inspur Corporation  
**Test Date:** Jun-2021  
**Hardware Availability:** May-2021  
**Software Availability:** Dec-2020

You can also download the XML flags sources by saving the following links:

- [Intel-ic2021-official-linux64_revA.xml](http://www.spec.org/cpu2017/flags/Intel-ic2021-official-linux64_revA.xml)
- [Inspur-Platform-Settings-V2.0.xml](http://www.spec.org/cpu2017/flags/Inspur-Platform-Settings-V2.0.xml)

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