***SPEC CPU®2017 Floating Point Speed Result***

Supermicro

SuperServer SYS-F511E2-RT
(X13SEFR-A, Intel Xeon Gold 6434)

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**CPU2017 License:** 001176
**Test Sponsor:** Supermicro
**Tested by:** Supermicro

---

**Test Date:** Nov-2022
**Hardware Availability:** Jan-2023
**Software Availability:** Jun-2022

---

**Threads**

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECspeed®2017_fp_base</th>
<th>SPECspeed®2017_fp_peak</th>
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<tbody>
<tr>
<td>603.bwaves_s</td>
<td>8</td>
<td>8</td>
<td>118</td>
</tr>
<tr>
<td>607.cactuBSSN_s</td>
<td>8</td>
<td>8</td>
<td>118</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>8</td>
<td>8</td>
<td>86.7</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>8</td>
<td>8</td>
<td>112</td>
</tr>
<tr>
<td>627.cam4_s</td>
<td>8</td>
<td>8</td>
<td>46.8</td>
</tr>
<tr>
<td>628.pop2_s</td>
<td>8</td>
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<td>112</td>
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<tr>
<td>638.imagick_s</td>
<td>8</td>
<td>8</td>
<td>78.8</td>
</tr>
<tr>
<td>644.nab_s</td>
<td>8</td>
<td>8</td>
<td>171</td>
</tr>
<tr>
<td>649.fotonik3d_s</td>
<td>8</td>
<td>8</td>
<td>60.9</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>8</td>
<td>8</td>
<td>86.9</td>
</tr>
</tbody>
</table>

---

**SPECspeed®2017_fp_base = 104**
**SPECspeed®2017_fp_peak = 104**

---

**Hardware**

- **CPU Name:** Intel Xeon Gold 6434
- **Max MHz:** 4100
- **Nominal:** 3700
- **Enabled:** 8 cores, 1 chip
- **Orderable:** 1 chip
- **Cache L1:** 32 KB I + 48 KB D on chip per core
  - **L2:** 2 MB I+D on chip per core
  - **L3:** 22.5 MB I+D on chip per chip
- **Other:** None
- **Memory:** 256 GB (8 x 32 GB 2Rx8 PC5-4800B-R)
- **Storage:** 1 x 240 GB SATA III SSD
- **Other:** None

---

**Software**

- **OS:** SUSE Linux Enterprise Server 15 SP4
  - Kernel 5.14.21-150400.22-default
- **Compiler:** C/C++: Version 2022.1 of Intel oneAPI DPC++/C++ Compiler for Linux;
  - Fortran: Version 2022.1 of Intel Fortran Compiler for Linux;
- **Parallel:** Yes
- **Firmware:** Version 1.0a released Nov-2022
- **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 set to prefer performance at the cost of additional power usage.
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**SuperServer SYS-F511E2-RT**  
(X13SEFR-A , Intel Xeon Gold 6434)

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### Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<tr>
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<td>607.cactuBSSN_s</td>
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<td>118</td>
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<tr>
<td>619.lbm_s</td>
<td>8</td>
<td>59.4</td>
<td>88.2</td>
<td>60.6</td>
<td>86.5</td>
<td>60.4</td>
<td>86.7</td>
<td>8</td>
<td>59.4</td>
<td>88.2</td>
<td>60.6</td>
<td>86.5</td>
<td>60.4</td>
<td>86.7</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>8</td>
<td>118</td>
<td>112</td>
<td>118</td>
<td>112</td>
<td>118</td>
<td>112</td>
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<td>627.cam4_s</td>
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<td>46.9</td>
<td>189</td>
<td>46.9</td>
</tr>
<tr>
<td>628.pop2_s</td>
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<td>151</td>
<td>78.9</td>
<td>151</td>
<td>78.5</td>
<td>151</td>
<td>78.8</td>
<td>8</td>
<td>151</td>
<td>78.9</td>
<td>151</td>
<td>78.5</td>
<td>151</td>
<td>78.8</td>
</tr>
<tr>
<td>638.imagick_s</td>
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<td>84.3</td>
<td>171</td>
<td>84.0</td>
<td>172</td>
<td>84.3</td>
<td>171</td>
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<td>171</td>
<td>84.0</td>
<td>172</td>
<td>84.3</td>
<td>171</td>
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<tr>
<td>644.nab_s</td>
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<td>145</td>
<td>120</td>
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<tr>
<td>649.fotonik3d_s</td>
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<td>60.5</td>
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<td>60.5</td>
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<td>60.9</td>
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<tr>
<td>654.roms_s</td>
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<td>86.7</td>
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<td>181</td>
<td>86.9</td>
<td>181</td>
<td>87.1</td>
<td>182</td>
<td>86.7</td>
</tr>
</tbody>
</table>

**SPECspeed®2017_fp_base = 104**  
**SPECspeed®2017_fp_peak = 104**

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

### 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:  
KMP_AFFINITY = "granularity=fine,compact"  
LD_LIBRARY_PATH = "/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-64"  
MALLOC_CONF = "retain:true"  
OMP_STACKSIZE = "192M"

### General Notes

Binaries compiled on a system with 2x Intel Xeon Platinum 8280M CPU + 384GB 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
```

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

(Continued on next page)
Supermicro
SuperServer SYS-F511E2-RT (X13SEFR-A, Intel Xeon Gold 6434)

SPECspeed®2017_fp_base = 104
SPECspeed®2017_fp_peak = 104

CPU2017 License: 001176
Test Sponsor: Supermicro
Tested by: Supermicro

Test Date: Nov-2022
Hardware Availability: Jan-2023
Software Availability: Jun-2022

General Notes (Continued)
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

Platform Notes

BIOS Settings:
Power Technology = Custom
Power Performance Tuning = BIOS Controls EPB
ENERGY_PERF_BIAS_CFG mode = Performance
DCU Streamer Prefetcher = Disable
Hyper-Threading [ALL] = Disable
LLC Dead Line Alloc = Disable
KTI Prefetch = Enable
Stale AtoS = Disable
Patrol Scrub = Disable

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acafc64d
running on 135-180-132 Mon Nov 28 14:53:13 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 6434
  1 "physical id"s (chips)
    8 "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 : 8
siblings : 8
physical 0: cores 0 1 2 3 4 5 6 7

From lscpu from util-linux 2.37.2:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Address sizes: 46 bits physical, 57 bits virtual
Byte Order: Little Endian
CPU(s): 8
On-line CPU(s) list: 0-7
Vendor ID: GenuineIntel
Model name: Intel(R) Xeon(R) Gold 6434
CPU family: 6
Model: 143
Thread(s) per core: 1

(Continued on next page)
Supermicro SuperServer SYS-F511E2-RT (X13SEFR-A, Intel Xeon Gold 6434)

SPECspeed®2017_fp_base = 104
SPECspeed®2017_fp_peak = 104

CPU2017 License: 001176
Test Sponsor: Supermicro
Tested by: Supermicro
CPU max MHz: 3701.0000
CPU min MHz: 800.0000
BogoMIPS: 7400.00
Fpu: de vm de pse tsc msr pae mce cx8 apic sep mtrr
Mca: cmov pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx
Pdp: pdel1gb rdtsscp lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology
Nonstop_tsc: cpuid aperfmperf tsc_known_freq pni pclmulqdq dtes64 monitor 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 cat_12 cdp_13 invpcid_single cdp_12 ssbd mba ibrs ibpb stibp
Ibrs: Enhanced tu_per_shadow vnni flexpriority upt vpid upt_ad 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
Xsave: xsavec xsaves cqm_llc cqm_occloc_llc cqm_mbb_local
Split: lock: Detect avx_vnni avx512_bf16 wbnoinvvd dtherm ida arat pln pts avx512vbmi
Umip: pku ospke waitpkg avx512_vbmi2 gfnl vaes vpcmullqdq avx512_vnni avx512_bitalg
tme avx512_vpopcntdq la57 rdpid bus: lock: detect coldemote movdiri movdir64b enqcmd
Fsrn: md_clear serialize tsxldtrk pconfig arch_lbr avx512_fp16 amx_tile flush_l1d
Arch_capabilities: VT-x
L1d cache: 384 K1B (8 instances)
L1i cache: 256 K1B (8 instances)
L2 cache: 16 M1B (8 instances)
L3 cache: 22.5 M1B (1 instance)
NUMA node(s): 1
NUMA node0 CPU(s): 0–7
Vulnerability Itlb multihit: Not affected
Vulnerability L1tf: Not affected
Vulnerability Mds: Not affected
Vulnerability Meltdown: Not affected
Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via
prctl and seccomp
Vulnerability Spectre v1: Mitigation; usercopy/swapgs barriers and __user
pointer sanitation
Vulnerability Spectre v2: Mitigation; Enhanced IBRS, IBPB conditional, RSB
filling
Vulnerability Srbd: Not affected
Vulnerability Tsx async abort: Not affected

From lscpu --cache:

<table>
<thead>
<tr>
<th>NAME</th>
<th>ONE-SIZE</th>
<th>ALL-SIZE</th>
<th>WAYS</th>
<th>TYPE</th>
<th>LEVEL</th>
<th>SETS</th>
<th>PHY-LINE</th>
<th>COHERENCY-SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1d</td>
<td>48K</td>
<td>384K</td>
<td>12</td>
<td>Data</td>
<td>1</td>
<td>64</td>
<td>1</td>
<td>64</td>
</tr>
<tr>
<td>L1i</td>
<td>32K</td>
<td>256K</td>
<td>8</td>
<td>Instruction</td>
<td>1</td>
<td>64</td>
<td>1</td>
<td>64</td>
</tr>
</tbody>
</table>

(Continued on next page)
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Platform Notes (Continued)

<table>
<thead>
<tr>
<th></th>
<th>L2</th>
<th>L3</th>
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<tr>
<td></td>
<td>2M</td>
<td>22.5M</td>
</tr>
<tr>
<td></td>
<td>16M</td>
<td>22.5M</td>
</tr>
<tr>
<td></td>
<td>16 Unified</td>
<td>15 Unified</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>64</td>
<td>64</td>
</tr>
<tr>
<td><strong>/proc/cpuinfo cache data</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>cache size : 23040 KB</td>
<td></td>
</tr>
</tbody>
</table>

From numactl --hardware
WARNING: a numactl 'node' might or might not correspond to a physical chip.
available: 1 nodes (0)
node 0 cpus: 0 1 2 3 4 5 6 7
node 0 size: 257445 MB
node 0 free: 250252 MB
node distances:
node 0
0: 10

From /proc/meminfo
MemTotal: 263624528 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

/sys/devices/system/cpu/cpu*/cpufreq/scaling_governor has ondemand

From /etc/*release* /etc/*version*
os-release:
   NAME="SLES"
   VERSION="15-SP4"
   VERSION_ID="15.4"
   PRETTY_NAME="SUSE Linux Enterprise Server 15 SP4"
   ID="sles"
   ID_LIKE="suse"
   ANSI_COLOR="0;32"
   CPE_NAME="cpe:/o:suse:sles:15:sp4"

uname -a:
Linux 135-180-132 5.14.21-150400.22-default #1 SMP PREEMPT_DYNAMIC Wed May 11 06:57:18 UTC 2022 (49db222) 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

(Continued on next page)
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**SPECspeed®2017_fp_base** = 104  
**SPECspeed®2017_fp_peak** = 104

<table>
<thead>
<tr>
<th>CPU2017 License</th>
<th>Test Date</th>
<th>Hardware Availability</th>
<th>Test Sponsor</th>
<th>Tested by</th>
<th>Software Availability</th>
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<tr>
<td>001176</td>
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<td>Jan-2023</td>
<td>Supermicro</td>
<td>Supermicro</td>
<td>Jun-2022</td>
</tr>
</tbody>
</table>

## Platform Notes (Continued)

- **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 Nov 28 11:17

- SPEC is set to: /home/cpu2017

- `/dev/nvme0n1p2 xfs 117G 21G 97G 18% /

- From /sys/devices/virtual/dmi/id
  - Vendor: Supermicro
  - Product: Super Server
  - Product Family: Family
  - Serial: 0123456789

- 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:
  - 8x Samsung M321R4GA3BB6-CQKEG 32 GB 2 rank 4800

- BIOS:
  - BIOS Vendor: American Megatrends International, LLC.
  - BIOS Version: 1.0a
  - BIOS Date: 11/24/2022
  - BIOS Revision: 5.29

(End of data from sysinfo program)

## Compiler Version Notes

```
C                  | 619.lbm_s(base, peak) 638.imagick_s(base, peak)
| 644.nab_s(base, peak)
```

Intel(R) oneAPI DPC+/C++ Compiler for applications running on Intel(R) 64, Version 2022.1.0 Build 20220316  
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Compiler Version Notes (Continued)

C++, C, Fortran | 607.cactuBSSN_s(base, peak)

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

Fortran | 603.bwaves_s(base, peak) 649.fotonik3d_s(base, peak)
         | 654.roms_s(base, peak)

Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

Fortran, C | 621.wrf_s(base, peak) 627.cam4_s(base, peak)
           | 628.pop2_s(base, peak)

Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

Base Compiler Invocation

C benchmarks:
icx

Fortran benchmarks:
ifx

Benchmarks using both Fortran and C:
ifx icx
Supermicro
SuperServer SYS-F511E2-RT (X13SEFR-A, Intel Xeon Gold 6434)

| SPECspeed®2017_fp_base = 104 |
| SPECspeed®2017_fp_peak = 104 |

CPU2017 License: 001176
Test Sponsor: Supermicro
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Base Compiler Invocation (Continued)

Benchmarks using Fortran, C, and C++:
icpx icx ifx

Base Portability Flags

603.bwaves_s: -DSPEC_LP64
607.cactuBSSN_s: -DSPEC_LP64
619.lbm_s: -DSPEC_LP64
621.wrf_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
627.cam4_s: -DSPEC_LP64 -DSPEC_CASE_FLAG
628.pop2_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
-assume byterecl
638.imagick_s: -DSPEC_LP64
644.nab_s: -DSPEC_LP64
649.fotonik3d_s: -DSPEC_LP64
654.roms_s: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-std=c11 -Wl,-z,muldefs -xcORE-AVX512 -Ofast -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -fiopenmp
-DSPEC_OPENMP -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Fortran benchmarks:
-m64 -Wl,-z,muldefs -DSPEC_OPENMP -xcORE-AVX512 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -fiopenmp
-nostandard-realloc-lhs -align array32byte -auto
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Benchmarks using both Fortran and C:
-m64 -std=c11 -Wl,-z,muldefs -xcORE-AVX512 -Ofast -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -fiopenmp
-DSPEC_OPENMP -nostandard-realloc-lhs -align array32byte -auto
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Benchmarks using Fortran, C, and C++:
-m64 -std=c11 -Wl,-z,muldefs -xcORE-AVX512 -Ofast -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -fiopenmp
-DSPEC_OPENMP -nostandard-realloc-lhs -align array32byte -auto

(Continued on next page)
Supermicro
SuperServer SYS-F511E2-RT
(X13SEFR-A, Intel Xeon Gold 6434)

SPECspeed®2017_fp_base = 104
SPECspeed®2017_fp_peak = 104

CPU2017 License: 001176
Test Date: Nov-2022
Test Sponsor: Supermicro
Hardware Availability: Jan-2023
Tested by: Supermicro
Software Availability: Jun-2022

Base Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++ (continued):
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Peak Compiler Invocation

C benchmarks:
icx
Fortran benchmarks:
ifx

Benchmarks using both Fortran and C:
ifx icx

Benchmarks using Fortran, C, and C++:
icpx icx ifx

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:
619.lbm_s: basepeak = yes
638.imagick_s: basepeak = yes
644.nab_s: basepeak = yes

Fortran benchmarks:
603.bwaves_s: -m64 -Wl,-z,muldefs -DSPEC_OPENMP -xCORE-AVX512 -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -fiopenmp -nostandard-realloc-lhs
-align array32byte -auto -L/usr/local/jemalloc64-5.0.1/lib
-ljemalloc

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

649.fotonik3d_s: basepeak = yes

654.roms_s: basepeak = yes

Benchmarks using both Fortran and C:

621.wrf_s: basepeak = yes

627.cam4_s: -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -fiopenmp -DSPEC_OPENMP
-nostandard-realloc-lhs -align array32byte -auto
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

628.pop2_s: basepeak = yes

Benchmarks using Fortran, C, and C++:

607.cactuBSSN_s: 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/Supermicro-Platform-Settings-V1.2-SPR-revC.xml

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For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

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