## SPEC CPU®2017 Floating Point Speed Result

**Supermicro**

UP SuperServer SYS-511R-ML
(X13SCH-SYS, Intel Xeon E-2436)

<table>
<thead>
<tr>
<th>SPECspeed®2017_fp_base</th>
<th>SPECspeed®2017_fp_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>71.7</td>
<td>71.7</td>
</tr>
</tbody>
</table>

**CPU2017 License:** 001176  
**Test Sponsor:** Supermicro  
**Tested by:** Supermicro  
**Test Date:** Dec-2023  
**Hardware Availability:** Dec-2023  
**Software Availability:** Dec-2023

### Hardware

- **CPU Name:** Intel Xeon E-2436  
- **Max MHz:** 5000  
- **Nominal:** 2900  
- **Enabled:** 6 cores, 1 chip, 2 threads/core  
- **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:** 18 MB I+D on chip per chip  
- **Other:** None  
- **Memory:** 64 GB (2 x 32 GB 2Rx8 PC5-4800B-U, running at 4400)  
- **Storage:** 1 x 512 GB M.2 NVMe SSD  
- **Other:** None

### Software

- **OS:** SUSE Linux Enterprise Server 15 SP5  
- **Kernel:** 5.14.21-150500.53-default  
- **Compiler:** C/C++, Version 2023.2.3 of Intel oneAPI DPC++/C++ Compiler for Linux; Fortran: Version 2023.2.3 of Intel Fortran Compiler for Linux
- **Parallel:** Yes
- **Firmware:** Version 1.1 released Dec-2023
- **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:** Default

<table>
<thead>
<tr>
<th>Threads</th>
<th>603.bwaves_s</th>
<th>607.cactuBSSN_s</th>
<th>619.lbm_s</th>
<th>621.wrf_s</th>
<th>627.cam4_s</th>
<th>628.pop2_s</th>
<th>638.imagick_s</th>
<th>644.nab_s</th>
<th>649.fotonik3d_s</th>
<th>654.roms_s</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>93.6</td>
<td></td>
<td>45.4</td>
<td></td>
<td>39.8</td>
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<td>90.2</td>
<td>32.5</td>
<td>47.1</td>
</tr>
<tr>
<td>151</td>
<td></td>
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</table>

---

**Threads:**

- **603.bwaves_s**
- **607.cactuBSSN_s**
- **619.lbm_s**
- **621.wrf_s**
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Tested by: Supermicro

SPECspeed®2017_fp_base = 71.7
SPECspeed®2017_fp_peak = 71.7

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
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<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
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<th>Ratio</th>
<th>Seconds</th>
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<th>Ratio</th>
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<tbody>
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<tr>
<td>607.cactuBSSN_s</td>
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<tr>
<td>628.pop2_s</td>
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<td>69.1</td>
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<td>638.imagick_s</td>
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<td>90.2</td>
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<td>90.2</td>
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<tr>
<td>649.fotonik3d_s</td>
<td>6</td>
<td>281</td>
<td>32.5</td>
<td>281</td>
<td>32.5</td>
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<td>32.5</td>
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<tr>
<td>654.roms_s</td>
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<td>47.1</td>
<td>334</td>
<td>47.1</td>
<td>334</td>
<td>47.1</td>
</tr>
</tbody>
</table>

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,1,0"
LD_LIBRARY_PATH = "/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-64"
MALLOCONF = "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.
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SPECspeed®2017_fp_peak = 71.7

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

Test Date: Dec-2023
Hardware Availability: Dec-2023
Software Availability: Dec-2023

Platform Notes

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
running on 135-172-248 Fri Dec 22 10:13:48 2023

SUT (System Under Test) info as seen by some common utilities.

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17. /sys/kernel/mm/transparent_hugepage/khugepaged
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Platform Notes (Continued)

POSIX message queues (bytes, -q) 819200
real-time priority (-r) 0
stack size (kbytes, -s) unlimited
cpu time (seconds, -t) unlimited
max user processes (-u) unlimited
virtual memory (kbytes, -v) unlimited
file locks (-x) unlimited

5. sysinfo process ancestry
/usr/lib/systemd/systemd --switched-root --system --deserialize 30
login -- root
-bash
-bash
runcpu --nobuild --action validate --define default-platform-flags -c
ic2023.2.3-lin-core-avx2-speed-20231122.cfg --define cores=6 --tune base,peak -o all --define smt-on
--define drop_caches fpspeed
runcpu --nobuild --action validate --define default-platform-flags --configfile
ic2023.2.3-lin-core-avx2-speed-20231122.cfg --define cores=6 --tune base,peak --output_format all --define
smt-on --define drop_caches --nopower --runmode speed --tune base:peak --size refspeed fpspeed --nopreenv
--note-preenv --logfile $SPEC/tmp/CPU2017.004/templogs/preenv.fpspeed.004.0.log --lognum 004.0
--from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /home/cpu2017

6. /proc/cpuinfo

From lscpu from util-linux 2.37.4:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Address sizes: 42 bits physical, 48 bits virtual
Byte Order: Little Endian
CPU(s): 12
On-line CPU(s) list: 0-11
Vendor ID: GenuineIntel
Model name: Intel(R) Xeon(R) E E-2436
CPU family: 6
Model: 183
Thread(s) per core: 2
Core(s) per socket: 6
Socket(s): 1

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<tr>
<td>SPECactivity®2017_fp_peak</td>
<td>71.7</td>
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</tbody>
</table>

### Platform Notes (Continued)

<table>
<thead>
<tr>
<th>Stepping:</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency boost:</td>
<td>enabled</td>
</tr>
<tr>
<td>CPU max MHz:</td>
<td>2901.0000</td>
</tr>
<tr>
<td>CPU min MHz:</td>
<td>800.0000</td>
</tr>
<tr>
<td>BogoMIPS:</td>
<td>5836.80</td>
</tr>
</tbody>
</table>
| 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 aperfmperf tsc_known_freq pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtpr pdcm pcid sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault ebx invpcid_single ssbd ibrs ibpb stibp ibrs_enabled tpr_shadow vmmi flexpriority ept vpid ept_ad fsgsbase tsc_adjust bmi1 avx2 smep bmi2 erms invpcid rdsb clflushopt clwb intel_pt sha_ni xsaveopt xsavec xgetbv1 xsaves split_lock_detect avx_vnni dt有色 ida arat pln pts hfi umip pku ospke waitpkg gfni vaes vpclmulqdq tme rpdp movdir movdir64b fsrms md_clear serialize pconfig arch_iabr flush_llld arch_capabilities
| Virtualization:               | VT-x |
| L1d cache:                    | 288 KiB (6 instances) |
| L1i cache:                    | 192 KiB (6 instances) |
| L2 cache:                     | 12 MiB (6 instances) |
| L3 cache:                     | 18 MiB (1 instance) |
| NUMA node(s):                 | 1 |
| NUMA node0 CPU(s):            | 0-11 |
| Vulnerability Itlb multihit:  | Not affected |
| Vulnerability Ltlb:           | Not affected |
| Vulnerability Mds:            | Not affected |
| Vulnerability Meltdown:       | Not affected |
| Vulnerability Mmio stale data:| Not affected |
| Vulnerability Retbleed:       | 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 sanitization |
| Vulnerability Spectre v2:     | Mitigation; Enhanced IBRS, IBPB conditional, RSB filling, PBRSB-eIBRS SW sequence |
| Vulnerability Srbds:          | Not affected |
| Vulnerability Tsz 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>
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<tbody>
<tr>
<td>L1d</td>
<td>48K</td>
<td>288K</td>
<td>12</td>
<td>Data</td>
<td>1</td>
<td>64</td>
<td>1</td>
<td>64</td>
</tr>
<tr>
<td>L1s</td>
<td>32K</td>
<td>192K</td>
<td>8</td>
<td>Instruction</td>
<td>1</td>
<td>64</td>
<td>1</td>
<td>64</td>
</tr>
<tr>
<td>L2</td>
<td>2M</td>
<td>12M</td>
<td>16</td>
<td>Unified</td>
<td>2</td>
<td>2048</td>
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<td>64</td>
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<tr>
<td>L3</td>
<td>18M</td>
<td>18M</td>
<td>9</td>
<td>Unified</td>
<td>3</td>
<td>32768</td>
<td>1</td>
<td>64</td>
</tr>
</tbody>
</table>

8. numactl --hardware

**NOTE:** a numactl 'node' might or might not correspond to a physical chip.

- available: 1 nodes (0)
  - node 0 cpus: 0-11
  - node 0 size: 64171 MB
  - node 0 free: 40865 MB
  - node distances:
    - node 0
    - 0: 10

9. /proc/meminfo

| MemTotal | 65711764 kB |

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Software Availability: Dec-2023

Platform Notes (Continued)

10. who --r
   run-level 3 Dec 21 19:23

11. Systemd service manager version: systemd 249 (249.16+suse.171.gdad0071f15)
    Default Target Status
    multi-user running

12. Services, from systemctl list-unit-files
    STATE UNIT FILES
    enabled YaST2-Firstboot YaST2-Second-Stage apparmor auditd cron display-manager getty@ irqbalance
    issue-generator kbdsettings klog lvm2-monitor nscd nm-connection-manager postfix
    purge-kernels rollback rsyslog systemd systemd-patrole wicked wicked-udevd-auto4
    wicked-dhcp4 wicked-dhcp6 wicked-nanny
    enabled-runtime systemd-remount-fs
    disabled autofs autofs-initscripts blk-availability boot-sysctl ca-certificates chrony-wait
    chrony chronyd console-getty cups cups-browsed debug-shell ebtables exchange-bmc-os-info
    firewall-lld gpm grub2-once haged haged-switch-root ipmi ipmiev dump issue-add-ash-keys
    kexec-load-lvm mask man-db-create multipathd nfts nfts-blkmap nvmf-automount rpcbind
    runc randomcheck rsyncd serial-getty@ systemctl.service systemd-pstore wicked wickedd-auto4
    wickedd-dhcp4 wickedd-dhcp6 wicked-dhcp7 wicked-nanny
    indirect wicked

13. Linux kernel boot-time arguments, from /proc/cmdline
    BOOT_IMAGE=/boot/vmlinuz-5.14.21-150500.53-default
    root=UUID=9de9855c-b179-4e5b-8330-3746dedc18b2
    splash=silent
    mitigations=auto
    quiet
    security=apparmor

14. cpupower frequency-info
    analyzing CPU 0:
    current policy: frequency should be within 800 MHz and 2.90 GHz.
    The governor "ondemand" may decide which speed to use within this range.
    supported state support:
    Supported: yes
    Active: yes

15. sysctl
    kernel.numa_balancing 0
    kernel.randomize_va_space 2
    vm.cheap_migrate_processes 20
    vm.dirty_background_bytes 0
    vm.dirty_background_ratio 10
    vm.dirty_bytes 0
    vm.dirty_expire_centisecs 3000
    vm.dirty_ratio 20
    vm.dirty_writeback_centisecs 50
    vm.dirtytime_expire_seconds 43200
    vm.extralq_threshold 50
    vm.min_unmapped_ratio 1
    vm.nr_hugepages 0

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Platform Notes (Continued)

vm.nr_hugepages_mempolicy 0
vm.nr_overcommit_hugepages 0
vm.swappiness 60
vm.watermark_boost_factor 15000
vm.watermark_scale_factor 10
vm.zone_reclaim_mode 0

-----------------------------------------------
16. /sys/kernel/mm/transparent_hugepage
defrag always defer defer+madvise [madvise] never
enabled [always] madvise never
hpage_pmd_size 2097152
shmem_enabled always within_size advise [never] deny force

-----------------------------------------------
17. /sys/kernel/mm/transparent_hugepage/kruegaged
alloc_sleep_millisecs 60000
defrag 1
max_ptes_none 511
max_ptes_shared 256
max_ptes_swap 64
pages_to_scan 4096
scan_sleep_millisecs 10000

-----------------------------------------------
18. OS release
From /etc/*-release /etc/*-version
os-release SUSE Linux Enterprise Server 15 SP5

-----------------------------------------------
19. Disk information
SPEC is set to: /home/cpu2017
Filesystem Type Size Used Avail Use% Mounted on
/dev/nvme0n1p2 xfs   475G   44G  431G  10% /

-----------------------------------------------
20. /sys/devices/virtual/dmi/id
Vendor: Supermicro
Product: Super Server
Serial: 0123456789

-----------------------------------------------
21. dmidecode
Additional information from dmidecode 3.4 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:
2x Micron Technology MTC16C2085S1UC48BA1 32 GB 2 rank 4800, configured at 4400

-----------------------------------------------
22. BIOS
(This section combines info from /sys/devices and dmidecode.)
BIOS Vendor: American Megatrends International, LLC.
BIOS Version: 1.1
BIOS Date: 12/08/2023
BIOS Revision: 5.27
Supermicro
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(X13SCH-SYS , Intel Xeon E-2436)

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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 2023.2.3 Build x |
| Copyright (C) 1985-2023 Intel Corporation. All rights reserved. |

| C++, C, Fortran | 607.cactuBSSN_s(base, peak) |
|-------------------|
| Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x |
| Copyright (C) 1985-2023 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 2023.2.3 Build x |
| Copyright (C) 1985-2023 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 2023.2.3 Build x |
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Base 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
Supermicro
UP SuperServer SYS-511R-ML
(X13SCH-SYS , Intel Xeon E-2436)

SPECspeed®2017_fp_base = 71.7
SPECspeed®2017_fp_peak = 71.7

CPU2017 License: 001176
Test Sponsor: Supermicro
Tested by: Supermicro
Test Date: Dec-2023
Hardware Availability: Dec-2023
Software Availability: Dec-2023

Base Portability Flags

603.bwaves_s: -DSPEC_LP64
607.cactuBSSN_s: -DSPEC_LP64
619.ibm_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:
-w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX2 -Ofast -ffast-math
-fflt -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -fiopenmp
-DSPEC_OPENMP -Wno-implicit-int -L/usr/local/jemalloc64-5.0.1/lib
-ljemalloc

Fortran benchmarks:
-w -m64 -Wl,-z,muldefs -DSPEC_OPENMP -xCORE-AVX2 -Ofast -ffast-math
-fflt -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:
-w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX2 -Ofast -ffast-math
-fflt -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -fiopenmp
-DSPEC_OPENMP -Wno-implicit-int -nostandard-realloc-lhs
-align array32byte -auto -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Benchmarks using Fortran, C, and C++:
-w -std=c++14 -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX2 -Ofast
-ffast-math -fflt -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -fiopenmp -DSPEC_OPENMP -Wno-implicit-int
-nostandard-realloc-lhs -align array32byte -auto
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
Supermicro
UP SuperServer SYS-511R-ML (X13SCH-SYS, Intel Xeon E-2436)

SPECspeed®2017_fp_base = 71.7
SPECspeed®2017_fp_peak = 71.7

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

Test Date: Dec-2023
Hardware Availability: Dec-2023
Software Availability: Dec-2023

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:
  649.fotonik3d_s: basepeak = yes
  654.roms_s: basepeak = yes

Benchmarks using both Fortran and C:
  621.wrf_s: basepeak = yes

(Continued on next page)
Supermicro
UP SuperServer SYS-511R-ML
(X13SCH-SYS, Intel Xeon E-2436)

SPECspeed®2017_fp_base = 71.7
SPECspeed®2017_fp_peak = 71.7

Peak Optimization Flags (Continued)

627.cam4_s: -w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX2 -Ofast
-ffast-math -flto -mpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -fiopenmp -DSPEC_OPENMP
-Wno-implicit-int -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
http://www.spec.org/cpu2017/flags/Intel-ic2023p2-official-linux64.html
http://www.spec.org/cpu2017/flags/Supermicro-Platform-Settings-V1.2-RKL-revB.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic2023p2-official-linux64.xml
http://www.spec.org/cpu2017/flags/Supermicro-Platform-Settings-V1.2-RKL-revB.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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