# SPEC CPU®2017 Floating Point Rate Result

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## Supermicro
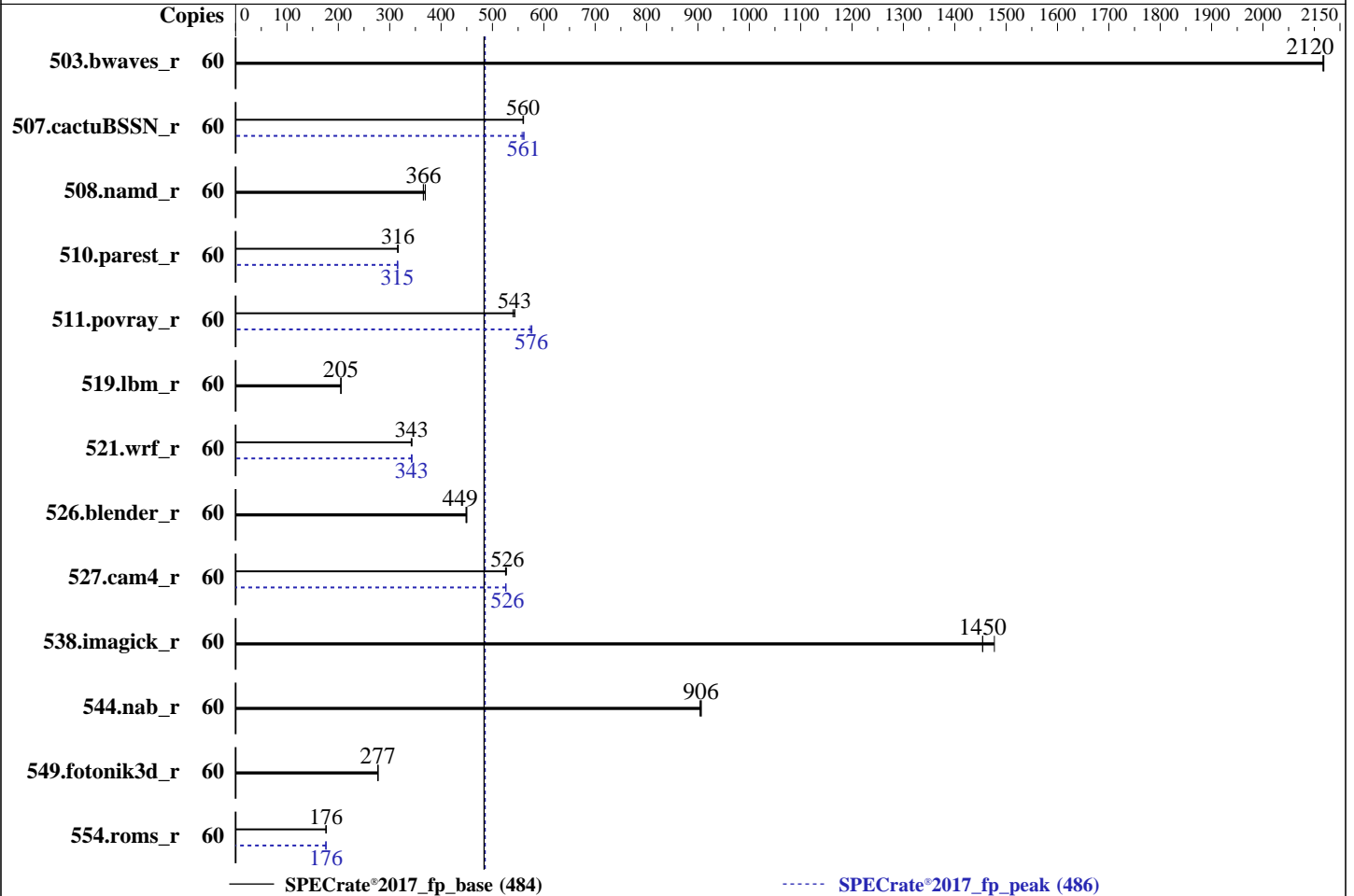
SuperServer SYS-211E-FRDN2T
(X13SEM-TF , Intel Xeon Platinum 8490H)

$SPECrate®2017\_fp\_base = 484$

$SPECrate®2017\_fp\_peak = 486$

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

**Test Date:** Feb-2023
**Hardware Availability:** Jan-2023
**Software Availability:** Dec-2022



| Copies | | |
|---|---|---|
| 503.bwaves_r | 60 | 2120 |
| 507.cactuBSSN_r | 60 | 560 / 561 |
| 508.namd_r | 60 | 366 |
| 510.parest_r | 60 | 316 / 315 |
| 511.povray_r | 60 | 543 / 576 |
| 519.lbm_r | 60 | 205 |
| 521.wrf_r | 60 | 343 / 343 |
| 526.blender_r | 60 | 449 |
| 527.cam4_r | 60 | 526 / 526 |
| 538.imagick_r | 60 | 1450 |
| 544.nab_r | 60 | 906 |
| 549.fotonik3d_r | 60 | 277 |
| 554.roms_r | 60 | 176 / 176 |

SPECrate®2017_fp_base (484)        SPECrate®2017_fp_peak (486)

## Hardware

CPU Name: Intel Xeon Platinum 8490H
 Max MHz: 3500
 Nominal: 1900
Enabled: 60 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: 112.5 MB I+D on chip per chip
 Other: None
Memory: 512 GB
 (8 x 64 GB 2Rx4 PC5-4800B-R)
Storage: 1 x 600 GB SATA III SSD
Other: None

## Software

OS: SUSE Linux Enterprise Server 15 SP4
 5.14.21-150400.22-default
Compiler: C/C++: Version 2023.0 of Intel oneAPI DPC++/C++
 Compiler for Linux;
 Fortran: Version 2023.0 of Intel Fortran Compiler
 for Linux;
Parallel: No
Firmware: Version 1.1 released Jan-2023
File System: btrfs
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 |

| Benchmark | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio | Copies | Seconds | Ratio | Seconds | Ratio | Seconds | Ratio |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 503.bwaves_r | 60 | 284 | 2120 | **284** | **2120** | 284 | 2120 | 60 | 284 | 2120 | **284** | **2120** | 284 | 2120 |
| 507.cactuBSSN_r | 60 | **136** | **560** | 136 | 560 | 136 | 561 | 60 | 135 | 561 | **135** | **561** | 136 | 558 |
| 508.namd_r | 60 | 154 | 369 | **156** | **366** | 156 | 365 | 60 | 154 | 369 | **156** | **366** | 156 | 365 |
| 510.parest_r | 60 | 498 | 315 | 496 | 317 | **497** | **316** | 60 | 499 | 315 | **498** | **315** | 497 | 316 |
| 511.povray_r | 60 | **258** | **543** | 258 | 543 | 259 | 540 | 60 | **243** | **576** | 244 | 574 | 243 | 577 |
| 519.lbm_r | 60 | 308 | 205 | 309 | 205 | **309** | **205** | 60 | 308 | 205 | 309 | 205 | **309** | **205** |
| 521.wrf_r | 60 | **392** | **343** | 392 | 343 | 393 | 342 | 60 | **392** | **343** | 393 | 342 | 391 | 343 |
| 526.blender_r | 60 | 203 | 450 | **203** | **449** | 204 | 448 | 60 | 203 | 450 | **203** | **449** | 204 | 448 |
| 527.cam4_r | 60 | **200** | **526** | 200 | 525 | 199 | 527 | 60 | 200 | 526 | 199 | 527 | **200** | **526** |
| 538.imagick_r | 60 | 101 | 1480 | 103 | 1450 | **103** | **1450** | 60 | 101 | 1480 | 103 | 1450 | **103** | **1450** |
| 544.nab_r | 60 | **111** | **906** | 111 | 907 | 112 | 904 | 60 | **111** | **906** | 111 | 907 | 112 | 904 |
| 549.fotonik3d_r | 60 | **844** | **277** | 843 | 277 | 845 | 277 | 60 | **844** | **277** | 843 | 277 | 845 | 277 |
| 554.roms_r | 60 | 540 | 176 | 542 | 176 | **542** | **176** | 60 | 543 | 176 | 542 | 176 | **542** | **176** |

| | | |
|---|---|---|
| SPECrate®2017_fp_base = | **484** | |
| SPECrate®2017_fp_peak = | **486** | |

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 =
      "/root/cpu2017-1.1.9-2/lib/intel64:/root/cpu2017-1.1.9-2/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
Transparent Huge Pages enabled by default
Prior to runcpu invocation

**(Continued on next page)**

Standard Performance Evaluation Corporation (info@spec.org)
https://www.spec.org/

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## 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>
```

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.

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.

NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) 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 Settings:
Power Technology = Custom
Power Performance Tuning = BIOS Controls EPB
ENERGY_PERF_BIAS_CFG mode = Maximum Performance
SNC = Enable SNC4 (4-Clusters)
KTI Prefetch = Enable
LLC Dead Line Alloc = Disable
Hyper-Threading [ALL] = Disable

 Sysinfo program /root/cpu2017-1.1.9-2/bin/sysinfo
 Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197
 running on 139-164 Mon Feb  6 03:32:12 2023

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

 -----------------------------------------------------------
 Table of contents
 -----------------------------------------------------------
  1. uname -a
  2. w
  3. Username
  4. ulimit -a
  5. sysinfo process ancestry
  6. /proc/cpuinfo
  7. lscpu
  8. numactl --hardware
  9. /proc/meminfo
 10. who -r
```

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## Platform Notes (Continued)

```
 11. Systemd service manager version: systemd 249 (249.11+suse.124.g2bc0b2c447)
 12. Services, from systemctl list-unit-files
 13. Linux kernel boot-time arguments, from /proc/cmdline
 14. cpupower frequency-info
 15. sysctl
 16. /sys/kernel/mm/transparent_hugepage
 17. /sys/kernel/mm/transparent_hugepage/khugepaged
 18. OS release
 19. Disk information
 20. /sys/devices/virtual/dmi/id
 21. dmidecode
 22. BIOS
    -----------------------------------------------------------


    -----------------------------------------------------------
 1. uname -a
   Linux 139-164 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


    -----------------------------------------------------------
 2. w
    03:32:12 up 1 min,  1 user,  load average: 0.21, 0.11, 0.04
    USER      TTY      FROM             LOGIN@   IDLE   JCPU   PCPU WHAT
    root      tty1     -                03:31    4.00s  1.08s  0.01s -bash


    -----------------------------------------------------------
 3. Username
   From environment variable $USER:  root


    -----------------------------------------------------------
 4. ulimit -a
   core file size          (blocks, -c) unlimited
   data seg size           (kbytes, -d) unlimited
   scheduling priority             (-e) 0
   file size               (blocks, -f) unlimited
   pending signals                 (-i) 2062517
   max locked memory       (kbytes, -l) 64
   max memory size         (kbytes, -m) unlimited
   open files                      (-n) 1024
   pipe size            (512 bytes, -p) 8
   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) 2062517
   virtual memory          (kbytes, -v) unlimited
   file locks                      (-x) unlimited
```

**(Continued on next page)**

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## Platform Notes (Continued)

```
   ----------------------------------------------------------
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 --define numcopies=60 -c
   ic2023.0-lin-sapphirerapids-rate-20221201.cfg --define cores=60 --define physicalfirst --define
    invoke_with_interleave --define drop_caches --tune base,peak -o all fprate
 runcpu --nobuild --action validate --define default-platform-flags --define numcopies=60 --configfile
   ic2023.0-lin-sapphirerapids-rate-20221201.cfg --define cores=60 --define physicalfirst --define
    invoke_with_interleave --define drop_caches --tune base,peak --output_format all --nopower --runmode rate
    --tune base:peak --size refrate fprate --nopreenv --note-preenv --logfile
   $SPEC/tmp/CPU2017.005/templogs/preenv.fprate.005.0.log --lognum 005.0 --from_runcpu 2
 specperl $SPEC/bin/sysinfo
 $SPEC = /root/cpu2017-1.1.9-2


   ----------------------------------------------------------
6. /proc/cpuinfo
    model name       : Intel(R) Xeon(R) Platinum 8490H
    vendor_id        : GenuineIntel
    cpu family       : 6
    model            : 143
    stepping         : 6
    microcode        : 0x2b000161
    bugs             : spectre_v1 spectre_v2 spec_store_bypass swapgs
    cpu cores        : 60
    siblings         : 60
    1 physical ids (chips)
    60 processors (hardware threads)
    physical id 0: core ids 0-59
    physical id 0: apicids
   0,2,4,6,8,10,12,14,16,18,20,22,24,26,28,30,32,34,36,38,40,42,44,46,48,50,52,54,56,58,60,62,64,66,68,70,72
     ,74,76,78,80,82,84,86,88,90,92,94,96,98,100,102,104,106,108,110,112,114,116,118
  Caution: /proc/cpuinfo data regarding chips, cores, and threads is not necessarily reliable, especially for
   virtualized systems.  Use the above data carefully.


   ----------------------------------------------------------
7. lscpu

 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):                       60
```

**(Continued on next page)**

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## Platform Notes (Continued)

```
  On-line CPU(s) list:           0-59
  Vendor ID:                     GenuineIntel
  Model name:                    Intel(R) Xeon(R) Platinum 8490H
  CPU family:                    6
  Model:                         143
  Thread(s) per core:            1
  Core(s) per socket:            60
  Socket(s):                     1
  Stepping:                      6
  BogoMIPS:                      3800.00
  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 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 cat_l2 cdp_l3
                                  invpcid_single cdp_l2 ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow
                                  vnmi flexpriority ept vpid ept_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 xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total
                                  cqm_mbm_local split_lock_detect avx_vnni avx512_bf16 wbnoinvd dtherm ida
                                  arat pln pts avx512vbmi umip pku ospke waitpkg avx512_vbmi2 gfni vaes
                                  vpclmulqdq avx512_vnni avx512_bitalg tme avx512_vpopcntdq la57 rdpid
                                 bus_lock_detect cldemote movdiri movdir64b enqcmd fsrm md_clear serialize
                                 tsxldtrk pconfig arch_lbr avx512_fp16 amx_tile flush_l1d arch_capabilities
  Virtualization:                VT-x
  L1d cache:                     2.8 MiB (60 instances)
  L1i cache:                     1.9 MiB (60 instances)
  L2 cache:                      120 MiB (60 instances)
  L3 cache:                      112.5 MiB (1 instance)
  NUMA node(s):                  4
  NUMA node0 CPU(s):             0-14
  NUMA node1 CPU(s):             15-29
  NUMA node2 CPU(s):             30-44
  NUMA node3 CPU(s):             45-59
  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 sanitization
  Vulnerability Spectre v2:      Mitigation; Enhanced IBRS, IBPB conditional, RSB filling
  Vulnerability Srbds:           Not affected
  Vulnerability Tsx async abort: Not affected
```

**(Continued on next page)**

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## Platform Notes (Continued)

```
From lscpu --cache:
    NAME ONE-SIZE ALL-SIZE WAYS TYPE        LEVEL    SETS PHY-LINE COHERENCY-SIZE
    L1d       48K     2.8M  12 Data          1      64       1               64
    L1i       32K     1.9M   8 Instruction   1      64       1               64
    L2         2M     120M  16 Unified       2    2048       1               64
    L3     112.5M   112.5M  15 Unified       3  122880       1               64


----------------------------------------------------------------
8. numactl --hardware
NOTE: a numactl 'node' might or might not correspond to a physical chip.
  available: 4 nodes (0-3)
  node 0 cpus: 0-14
  node 0 size: 128622 MB
  node 0 free: 127909 MB
  node 1 cpus: 15-29
  node 1 size: 129020 MB
  node 1 free: 128447 MB
  node 2 cpus: 30-44
  node 2 size: 129020 MB
  node 2 free: 128703 MB
  node 3 cpus: 45-59
  node 3 size: 128991 MB
  node 3 free: 128704 MB
  node distances:
  node   0   1   2   3
    0:  10  12  12  12
    1:  12  10  12  12
    2:  12  12  10  12
    3:  12  12  12  10


----------------------------------------------------------------
9. /proc/meminfo
   MemTotal:      528029328 kB


----------------------------------------------------------------
10. who -r
  run-level 3 Feb 6 03:31


----------------------------------------------------------------
11. Systemd service manager version: systemd 249 (249.11+suse.124.g2bc0b2c447)
   Default Target  Status
   multi-user      running


----------------------------------------------------------------
12. Services, from systemctl list-unit-files
   STATE            UNIT FILES
  enabled         YaST2-Firstboot YaST2-Second-Stage auditd cron display-manager getty@ haveged irqbalance
```

**(Continued on next page)**

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## Platform Notes (Continued)

```
               issue-generator kbdsettings klog lvm2-monitor nscd postfix purge-kernels rollback rsyslog
                    smartd sshd wicked wickedd-auto4 wickedd-dhcp4 wickedd-dhcp6 wickedd-nanny
  enabled-runtime  systemd-remount-fs
  disabled         apparmor autofs autoyast-initscripts blk-availability boot-sysctl ca-certificates
                    chrony-wait chronyd console-getty cups cups-browsed debug-shell ebtables
                    exchange-bmc-os-info firewalld gpm grub2-once haveged-switch-root ipmi ipmievd
                    issue-add-ssh-keys kexec-load lunmask man-db-create multipathd munge nfs nfs-blkmap
                    ntp-wait ntpd rdisc rpcbind rpmconfigcheck rsyncd salt-minion serial-getty@ slurmd
                    smartd_generate_opts snmpd snmptrapd svnserve systemd-boot-check-no-failures
                    systemd-network-generator systemd-sysext systemd-time-wait-sync systemd-timesyncd udisks2
                    ypbind
  indirect         wickedd


  -----------------------------------------------------------
  13. Linux kernel boot-time arguments, from /proc/cmdline
     BOOT_IMAGE=/boot/vmlinuz-5.14.21-150400.22-default
     root=UUID=2d678d2d-7c7c-4447-9a76-01d4d4bc98fa
     splash=silent
     mitigations=auto
     quiet
     security=apparmor


  -----------------------------------------------------------
  14. cpupower frequency-info
     analyzing CPU 0:
       Unable to determine current policy
       boost state support:
         Supported: yes
         Active: yes


  -----------------------------------------------------------
  15. sysctl
     kernel.numa_balancing              1
     kernel.randomize_va_space          2
     vm.compaction_proactiveness        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       500
     vm.dirtytime_expire_seconds        43200
     vm.extfrag_threshold               500
     vm.min_unmapped_ratio              1
     vm.nr_hugepages                    0
     vm.nr_hugepages_mempolicy          0
     vm.nr_overcommit_hugepages         0
```

**(Continued on next page)**

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## Platform Notes (Continued)

```
  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/khugepaged
  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 SP4


  ----------------------------------------------------------
19. Disk information
SPEC is set to: /root/cpu2017-1.1.9-2
  Filesystem      Type    Size  Used Avail Use% Mounted on
  /dev/sda2       btrfs  559G  418G  141G  75% /root


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


  ----------------------------------------------------------
21. dmidecode
  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:
```

**(Continued on next page)**

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## Platform Notes (Continued)

```
    8x Micron Technology MTC40F2046S1RC48BA1 64 GB 2 rank 4800


    ---------------------------------------------------------------
    22. BIOS
    (This section combines info from /sys/devices and dmidecode.)
      BIOS Vendor:        American Megatrends International, LLC.
      BIOS Version:       1.1
      BIOS Date:          01/20/2023
      BIOS Revision:      5.29
```

## 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 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------


==============================================================================
C++                  | 508.namd_r(base, peak) 510.parest_r(base, peak)
------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
  Version 2023.0.0 Build 20221201
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------------------------------------------------------------------------------


==============================================================================
C++, C               | 511.povray_r(base, peak) 526.blender_r(base, peak)
------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
  Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
  Version 2023.0.0 Build 20221201
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------------------------------------------------------------------------------


==============================================================================
C++, C, Fortran | 507.cactuBSSN_r(base, peak)
------------------------------------------------------------------------------
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
  Version 2023.0.0 Build 20221201
```

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# SPEC CPU®2017 Floating Point Rate Result

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## Supermicro

SuperServer SYS-211E-FRDN2T
(X13SEM-TF , Intel Xeon Platinum 8490H)

SPECrate®2017_fp_base = 484

SPECrate®2017_fp_peak = 486

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

**Test Date:** Feb-2023
**Hardware Availability:** Jan-2023
**Software Availability:** Dec-2022

## Compiler Version Notes (Continued)

```
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
  Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version
  2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
------------------------------------------------------------------------


==============================================================================
Fortran        | 503.bwaves_r(base, peak) 549.fotonik3d_r(base, peak)
               | 554.roms_r(base, peak)
------------------------------------------------------------------------
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version
  2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
------------------------------------------------------------------------


==============================================================================
Fortran, C     | 521.wrf_r(base, peak) 527.cam4_r(base, peak)
------------------------------------------------------------------------
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version
  2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
  Version 2023.0.0 Build 20221201
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
------------------------------------------------------------------------
```

## Base Compiler Invocation

C benchmarks:
`icx`

C++ benchmarks:
`icpx`

Fortran benchmarks:
`ifx`

Benchmarks using both Fortran and C:
`ifx icx`

Benchmarks using both C and C++:
`icpx icx`

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Standard Performance Evaluation Corporation (info@spec.org)
https://www.spec.org/

# SPEC CPU®2017 Floating Point Rate Result

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## Supermicro

SuperServer SYS-211E-FRDN2T
(X13SEM-TF , Intel Xeon Platinum 8490H)

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**SPECrate®2017_fp_peak = 486**

## Base Compiler Invocation (Continued)

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

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

## Base Optimization Flags

C benchmarks:
`-w -std=c11 -m64 -Wl,-z,muldefs -xsapphirerapids -Ofast -ffast-math`
`-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4`
`-Wno-implicit-int -mprefer-vector-width=512 -ljemalloc`
`-L/usr/local/jemalloc64-5.0.1/lib`

C++ benchmarks:
`-w -std=c++14 -m64 -Wl,-z,muldefs -xsapphirerapids -Ofast`
`-ffast-math -flto -mfpmath=sse -funroll-loops`
`-qopt-mem-layout-trans=4 -mprefer-vector-width=512 -ljemalloc`
`-L/usr/local/jemalloc64-5.0.1/lib`

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

Benchmarks using both Fortran and C:
`-w -m64 -std=c11 -Wl,-z,muldefs -xsapphirerapids -Ofast -ffast-math`
`-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4`

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## Supermicro

SuperServer SYS-211E-FRDN2T
(X13SEM-TF , Intel Xeon Platinum 8490H)

SPECrate®2017_fp_base = 484

SPECrate®2017_fp_peak = 486

**CPU2017 License:** 001176

**Test Sponsor:** Supermicro

**Tested by:** Supermicro

**Test Date:** Feb-2023

**Hardware Availability:** Jan-2023

**Software Availability:** Dec-2022

# Base Optimization Flags (Continued)

Benchmarks using both Fortran and C (continued):
```
-Wno-implicit-int -mprefer-vector-width=512 -nostandard-realloc-lhs
-align array32byte -auto -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib
```

Benchmarks using both C and C++:
```
-w -std=c++14 -m64 -std=c11 -Wl,-z,muldefs -xsapphirerapids -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -Wno-implicit-int -mprefer-vector-width=512
-ljemalloc -L/usr/local/jemalloc64-5.0.1/lib
```

Benchmarks using Fortran, C, and C++:
```
-w -m64 -std=c++14 -std=c11 -Wl,-z,muldefs -xsapphirerapids -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -Wno-implicit-int -mprefer-vector-width=512
-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:
```
ifx
```

Benchmarks using both Fortran and C:
```
ifx icx
```

Benchmarks using both C and C++:
```
icpx icx
```

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

# Peak Portability Flags

```
Same as Base Portability Flags
```

# SPEC CPU®2017 Floating Point Rate Result

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## Supermicro

SuperServer SYS-211E-FRDN2T
(X13SEM-TF , Intel Xeon Platinum 8490H)

SPECrate®2017_fp_base = 484

SPECrate®2017_fp_peak = 486

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

**Test Date:** Feb-2023
**Hardware Availability:** Jan-2023
**Software Availability:** Dec-2022

# Peak Optimization Flags

C benchmarks:

519.lbm_r: `basepeak = yes`

538.imagick_r: `basepeak = yes`

544.nab_r: `basepeak = yes`

C++ benchmarks:

508.namd_r: `basepeak = yes`

510.parest_r: `-w -std=c++14 -m64 -Wl,-z,muldefs -xsapphirerapids`
`-Ofast -ffast-math -flto -mfpmath=sse -funroll-loops`
`-qopt-mem-layout-trans=4 -mprefer-vector-width=512`
`-ljemalloc -L/usr/local/jemalloc64-5.0.1/lib`

Fortran benchmarks:

503.bwaves_r: `basepeak = yes`

549.fotonik3d_r: `basepeak = yes`

554.roms_r: `-w -m64 -Wl,-z,muldefs -xsapphirerapids -Ofast`
`-ffast-math -flto -mfpmath=sse -funroll-loops`
`-qopt-mem-layout-trans=4 -nostandard-realloc-lhs`
`-align array32byte -auto -ljemalloc`
`-L/usr/local/jemalloc64-5.0.1/lib`

Benchmarks using both Fortran and C:
`-w -m64 -std=c11 -Wl,-z,muldefs -xsapphirerapids -Ofast -ffast-math`
`-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4`
`-Wno-implicit-int -mprefer-vector-width=512 -nostandard-realloc-lhs`
`-align array32byte -auto -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib`

Benchmarks using both C and C++:

511.povray_r: `-w -std=c++14 -m64 -std=c11 -Wl,-z,muldefs`
`-fprofile-generate(pass 1)`
`-fprofile-use=default.profdata(pass 2) -xCORE-AVX2(pass 1)`
`-flto -Ofast -xCORE-AVX512 -ffast-math -mfpmath=sse`
`-funroll-loops -qopt-mem-layout-trans=4 -Wno-implicit-int`
`-mprefer-vector-width=512 -ljemalloc`
`-L/usr/local/jemalloc64-5.0.1/lib`

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## Supermicro

SuperServer SYS-211E-FRDN2T
(X13SEM-TF , Intel Xeon Platinum 8490H)

SPECrate®2017_fp_base = 484

SPECrate®2017_fp_peak = 486

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

**Test Date:** Feb-2023
**Hardware Availability:** Jan-2023
**Software Availability:** Dec-2022

# Peak Optimization Flags (Continued)

526.blender_r: basepeak = yes

Benchmarks using Fortran, C, and C++:
```
-w -m64 -std=c++14 -std=c11 -Wl,-z,muldefs -xsapphirerapids -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -Wno-implicit-int -mprefer-vector-width=512
-nostandard-realloc-lhs -align array32byte -auto -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib
```

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/Intel-ic2023-official-linux64.html
http://www.spec.org/cpu2017/flags/Supermicro-Platform-Settings-V1.2-SPR-revC.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic2023-official-linux64.xml
http://www.spec.org/cpu2017/flags/Supermicro-Platform-Settings-V1.2-SPR-revC.xml

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

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