



# SPEC CPU®2017 Floating Point Rate Result

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## Supermicro

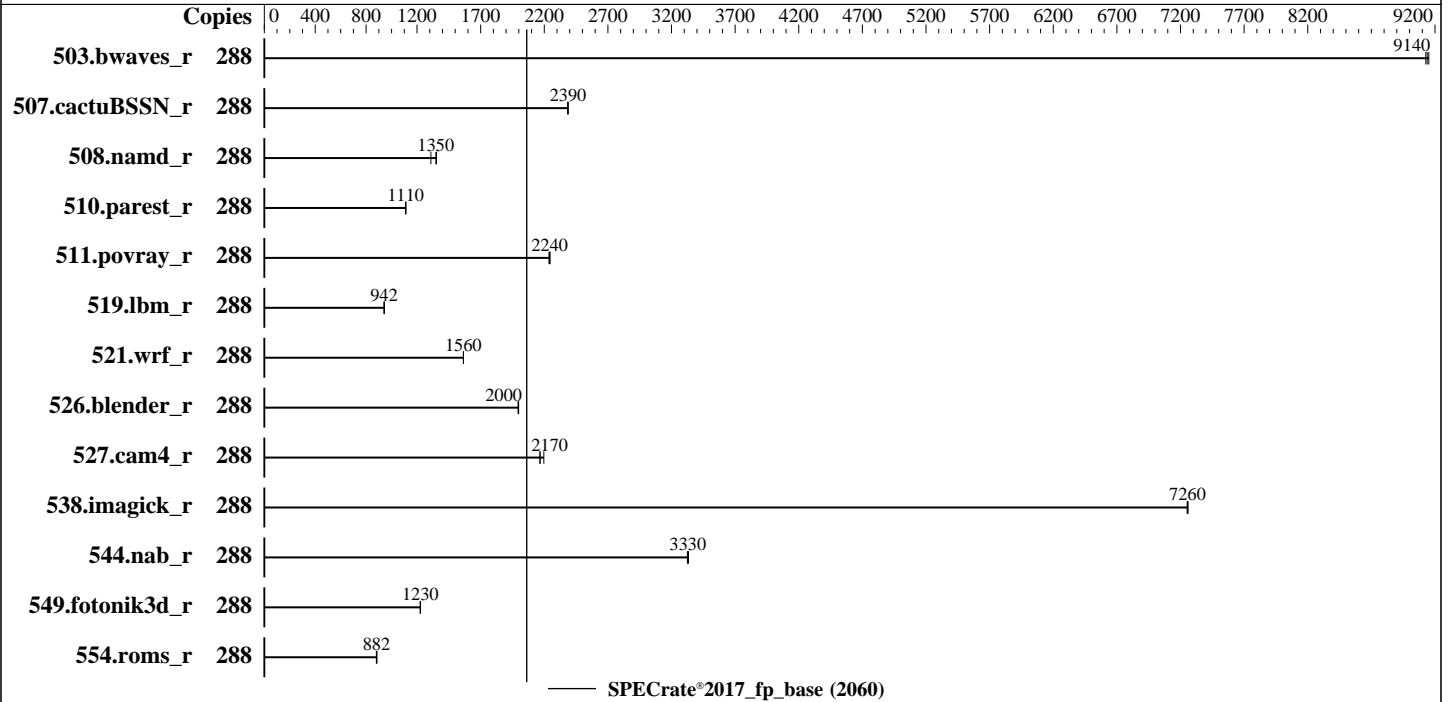
SuperServer SYS-122HA-TN-LCC  
(X14DBM-APL , Intel Xeon 6960P)

SPECrate®2017\_fp\_base = 2060

SPECrate®2017\_fp\_peak = Not Run

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

Test Date: Feb-2025  
Hardware Availability: Feb-2025  
Software Availability: Jun-2024



### Hardware

CPU Name: Intel Xeon 6960P  
Max MHz: 3900  
Nominal: 2700  
Enabled: 144 cores, 2 chips, 2 threads/core  
Orderable: 1, 2 chips  
Cache L1: 64 KB I + 48 KB D on chip per core  
L2: 2 MB I+D on chip per core  
L3: 432 MB I+D on chip per chip  
Other: None  
Memory: 1536 GB (24 x 64 GB 2Rx4 PC5-8800B-R)  
Storage: 1 x 1.6TB NVMe SSD  
Other: CPU Cooling: DLC

### Software

OS: SUSE Linux Enterprise Server 15 SP6  
6.4.0-150600.21-default  
Compiler: C/C++: Version 2024.1 of Intel oneAPI DPC++/C++  
Compiler for Linux;  
Fortran: Version 2024.1 of Intel Fortran Compiler  
for Linux;  
Parallel: No  
Firmware: Version 1.2 released Jan-2025  
File System: btrfs  
System State: Run level 3 (multi-user)  
Base Pointers: 64-bit  
Peak Pointers: Not Applicable  
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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## Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
503.bwaves_r	288	<b>316</b>	<b>9140</b>	316	9150	316	9130							
507.cactuBSSN_r	288	<b>153</b>	<b>2390</b>	153	2390	153	2380							
508.namd_r	288	202	1350	<b>203</b>	<b>1350</b>	209	1310							
510.parest_r	288	<b>678</b>	<b>1110</b>	678	1110	678	1110							
511.povray_r	288	301	2240	299	2250	<b>300</b>	<b>2240</b>							
519.lbm_r	288	322	942	322	942	<b>322</b>	<b>942</b>							
521.wrf_r	288	<b>412</b>	<b>1560</b>	412	1560	412	1570							
526.blender_r	288	219	2000	220	2000	<b>220</b>	<b>2000</b>							
527.cam4_r	288	233	2170	<b>232</b>	<b>2170</b>	229	2200							
538.imagick_r	288	98.7	7260	98.8	7250	<b>98.7</b>	<b>7260</b>							
544.nab_r	288	<b>146</b>	<b>3330</b>	145	3330	146	3320							
549.fotonik3d_r	288	914	1230	<b>915</b>	<b>1230</b>	917	1220							
554.roms_r	288	<b>519</b>	<b>882</b>	517	885	520	880							

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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"

## 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  
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  
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)

(Continued on next page)



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## General Notes (Continued)

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 Settings:

Power Performance Tuning = BIOS Controls EPB  
ENERGY\_PERF\_BIAS\_CFG mode = Extreme Performance  
KTI Prefetch = Enable  
DCU Streamer Prefetcher = Disable  
LLC Dead Line Alloc = Disable  
Stale AtoS = Disable

Sysinfo program /home/cpu2017/bin/sysinfo  
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197  
running on 181-170 Mon Mar 10 11:24:33 2025

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
  11. Systemd service manager version: systemd 254 (254.10+suse.84.ge8d77af424)
  12. Failed units, from systemctl list-units --state=failed
  13. Services, from systemctl list-unit-files
  14. Linux kernel boot-time arguments, from /proc/cmdline
  15. cpupower frequency-info
  16. sysctl
  17. /sys/kernel/mm/transparent\_hugepage
  18. /sys/kernel/mm/transparent\_hugepage/khugepaged
  19. OS release
  20. Disk information
  21. /sys/devices/virtual/dmi/id
  22. dmidecode
  23. BIOS
- 
1. uname -a  
Linux 181-170 6.4.0-150600.21-default #1 SMP PREEMPT\_DYNAMIC Thu May 16 11:09:22 UTC 2024 (36c1e09) x86\_64  
x86\_64 x86\_64 GNU/Linux

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### Platform Notes (Continued)

```

2. w
   11:24:33 up 1 min,  1 user,  load average: 6.82, 3.15, 1.17
USER      TTY      FROM            LOGIN@   IDLE   JCPU   PCPU   WHAT
root      tty2    -                11:24   9.00s  0.91s  0.02s  -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) 6188528
   max locked memory       (kbytes, -l) 8192
   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) 6188528
   virtual memory          (kbytes, -v) unlimited
   file locks              (-x) unlimited

```

```

5. sysinfo process ancestry
   /usr/lib/systemd/systemd --switched-root --system --deserialize=42
   login -- root
   -bash
   -bash
   runcpu --nobuild --action validate --define default-platform-flags --define numcopies=288 -c
   ic2024.1-lin-core-avx512-rate-20240308.cfg --define smt-on --define cores=144 --define physicalfirst
   --define invoke_with_interleave --define drop_caches --tune base -o all fprate
   runcpu --nobuild --action validate --define default-platform-flags --define numcopies=288 --configfile
   ic2024.1-lin-core-avx512-rate-20240308.cfg --define smt-on --define cores=144 --define physicalfirst
   --define invoke_with_interleave --define drop_caches --tune base --output_format all --nopower --runmode
   rate --tune base --size refrate fprate --nopreenv --note-preenv --logfile
   $SPEC/tmp/CPU2017.012/tempslogs/preenv.fprate.012.0.log --lognum 012.0 --from_runcpu 2
   specperl $SPEC/bin/sysinfo
   $SPEC = /home/cpu2017

```

```

6. /proc/cpuinfo
   model name      : Intel(R) Xeon(R) 6960P
   vendor_id      : GenuineIntel
   cpu family     : 6
   model          : 173
   stepping       : 1
   microcode      : 0x1000380
   bugs           : spectre_v1 spectre_v2 spec_store_bypass swapgs bhi
   cpu cores      : 72
   siblings       : 144
   2 physical ids (chips)
   288 processors (hardware threads)
   physical id 0 : core ids 0-23,64-87,128-151

```

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### Platform Notes (Continued)

physical id 1: core ids 0-23,64-87,128-151  
physical id 0: apicids 0-47,128-175,256-303  
physical id 1: apicids 512-559,640-687,768-815  
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 2.39.3:

```

Architecture:                x86_64
CPU op-mode(s):              32-bit, 64-bit
Address sizes:               52 bits physical, 57 bits virtual
Byte Order:                  Little Endian
CPU(s):                      288
On-line CPU(s) list:        0-287
Vendor ID:                   GenuineIntel
BIOS Vendor ID:              Intel(R) Corporation
Model name:                   Intel(R) Xeon(R) 6960P
BIOS Model name:             Intel(R) Xeon(R) 6960P  CPU @ 2.7GHz
BIOS CPU family:             179
CPU family:                   6
Model:                       173
Thread(s) per core:          2
Core(s) per socket:          72
Socket(s):                   2
Stepping:                    1
BogoMIPS:                    5400.00
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 intel_ppin cdp_l2
                             ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow 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 user_shstk avx_vnni avx512_bf16 wbnoinvd dtherm ida
                             arat pln pts hfi vnmi 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 ibt amx_bf16 avx512_fp16
                             amx_tile amx_int8 flush_lld arch_capabilities

Virtualization:              VT-x
L1d cache:                   6.8 MiB (144 instances)
L1i cache:                   9 MiB (144 instances)
L2 cache:                    288 MiB (144 instances)
L3 cache:                    864 MiB (2 instances)
NUMA node(s):                6
NUMA node0 CPU(s):           0-23,144-167
NUMA node1 CPU(s):           24-47,168-191
NUMA node2 CPU(s):           48-71,192-215
NUMA node3 CPU(s):           72-95,216-239
NUMA node4 CPU(s):           96-119,240-263
NUMA node5 CPU(s):           120-143,264-287
Vulnerability Gather data sampling: Not affected

```

(Continued on next page)



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### Platform Notes (Continued)

Vulnerability Itlb multihit: Not affected  
 Vulnerability Lltf: Not affected  
 Vulnerability Mds: Not affected  
 Vulnerability Meltdown: Not affected  
 Vulnerability Mmio stale data: Not affected  
 Vulnerability Reg file data sampling: Not affected  
 Vulnerability Retbleed: Not affected  
 Vulnerability Spec rstack overflow: Not affected  
 Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl  
 Vulnerability Spectre v1: Mitigation; usercopy/swapgs barriers and \_\_user pointer sanitization  
 Vulnerability Spectre v2: Mitigation; Enhanced / Automatic IBRS; IBPB conditional; RSB filling; PRSB-eIBRS Not affected; BHI BHI\_DIS\_S  
 Vulnerability Srbds: Not affected  
 Vulnerability Tsx async abort: Not affected

From lscpu --cache:

NAME	ONE-SIZE	ALL-SIZE	WAYS	TYPE	LEVEL	SETS	PHY-LINE	COHERENCY-SIZE
L1d	48K	6.8M	12	Data	1	64	1	64
L1i	64K	9M	16	Instruction	1	64	1	64
L2	2M	288M	16	Unified	2	2048	1	64
L3	432M	864M	16	Unified	3	442368	1	64

8. numactl --hardware

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

```

available: 6 nodes (0-5)
node 0 cpus: 0-23,144-167
node 0 size: 257469 MB
node 0 free: 256624 MB
node 1 cpus: 24-47,168-191
node 1 size: 258035 MB
node 1 free: 257402 MB
node 2 cpus: 48-71,192-215
node 2 size: 258035 MB
node 2 free: 257123 MB
node 3 cpus: 72-95,216-239
node 3 size: 258035 MB
node 3 free: 256788 MB
node 4 cpus: 96-119,240-263
node 4 size: 258035 MB
node 4 free: 257325 MB
node 5 cpus: 120-143,264-287
node 5 size: 257550 MB
node 5 free: 256884 MB
node distances:
node  0  1  2  3  4  5
0:  10 12 12 21 21 21
1:  12 10 12 21 21 21
2:  12 12 10 21 21 21
3:  21 21 21 10 12 12
4:  21 21 21 12 10 12
5:  21 21 21 12 12 10

```

9. /proc/meminfo

MemTotal: 1584293084 kB

10. who -r

run-level 3 Mar 10 11:24 last=5

(Continued on next page)



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### Platform Notes (Continued)

-----  
11. Systemd service manager version: systemd 254 (254.10+suse.84.ge8d77af424)  
Default Target Status  
graphical degraded

-----  
12. Failed units, from systemctl list-units --state=failed  
UNIT LOAD ACTIVE SUB DESCRIPTION  
\* udisks2.service loaded failed failed Disk Manager

-----  
13. Services, from systemctl list-unit-files  
STATE UNIT FILES  
enabled YaST2-Firstboot YaST2-Second-Stage apparmor appstream-sync-cache auditd bluetooth cron  
display-manager firewalld getty@ irqbalance issue-generator kbdsettings kdump kdump-early  
kdump-notify klog lvm2-monitor nscd nvme-fc-boot-connections nvmmf-autoconnect postfix  
purge-kernels rollback rsyslog smartd sshd systemd-pstore wicked wickedd-auto4  
wickedd-dhcp4 wickedd-dhcp6 wickedd-nanny  
enabled-runtime systemd-remount-fs  
disabled accounts-daemon autofsd autoyast-initscripts blk-availability bluetooth-mesh boot-sysctl  
ca-certificates chrony-wait chronyd console-getty cups cups-browsed debug-shell ebttables  
exchange-bmc-os-info fsidd gpm grub2-once haveged ipmi ipmievd issue-add-ssh-keys  
kexec-load lunmask man-db-create multipathd nfs nfs-blkmap nmb ostree-remount rpcbind  
rpmconfigcheck rsyncd rtkit-daemon serial-getty@ smartd-generate\_opts smb snmpd snmptrapd  
speech-dispatcherd systemd-boot-check-no-failures systemd-confext  
systemd-network-generator systemd-sysext systemd-time-wait-sync systemd-timesyncd udisks2  
update-system-flatpaks upower vncserver@  
indirect systemd-userdbd wickedd

-----  
14. Linux kernel boot-time arguments, from /proc/cmdline  
BOOT\_IMAGE=/boot/vmlinuz-6.4.0-150600.21-default  
root=UUID=d1a687ce-0a78-499c-9181-4e82ae083016  
splash=silent  
mitigations=auto  
quiet  
security=apparmor  
crashkernel=365M,high  
crashkernel=72M,low

-----  
15. cpupower frequency-info  
analyzing CPU 115:  
Unable to determine current policy  
boost state support:  
Supported: yes  
Active: yes

-----  
16. 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

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### Platform Notes (Continued)

```

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

```

```

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

```

```

-----
18. /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

```

```

-----
19. OS release
From /etc/*-release /etc/*-version
os-release SUSE Linux Enterprise Server 15 SP6

```

```

-----
20. Disk information
SPEC is set to: /home/cpu2017
Filesystem  Type  Size  Used Avail Use% Mounted on
/dev/nvme0n1p3 btrfs 1.5T 138G 1.4T 10% /home

```

```

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

```

```

-----
22. 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:
  24x Micron Technology MTC40F2046S1HC88XD1 WCCCC 64 GB 2 rank 8800

```

```

-----
23. BIOS
(This section combines info from /sys/devices and dmidecode.)
BIOS Vendor:      American Megatrends International, LLC.

```

(Continued on next page)





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### Platform Notes (Continued)

BIOS Version: 1.2  
BIOS Date: 01/24/2025  
BIOS Revision: 5.35

### Compiler Version Notes

=====  
C | 519.lbm\_r(base) 538.imagick\_r(base) 544.nab\_r(base)  
=====

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2024.1.0 Build 20240308  
Copyright (C) 1985-2024 Intel Corporation. All rights reserved.  
=====

=====  
C++ | 508.namd\_r(base) 510.parest\_r(base)  
=====

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2024.1.0 Build 20240308  
Copyright (C) 1985-2024 Intel Corporation. All rights reserved.  
=====

=====  
C++, C | 511.povray\_r(base) 526.blender\_r(base)  
=====

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2024.1.0 Build 20240308  
Copyright (C) 1985-2024 Intel Corporation. All rights reserved.  
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2024.1.0 Build 20240308  
Copyright (C) 1985-2024 Intel Corporation. All rights reserved.  
=====

=====  
C++, C, Fortran | 507.cactuBSSN\_r(base)  
=====

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2024.1.0 Build 20240308  
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=====

=====  
Fortran | 503.bwaves\_r(base) 549.fotonik3d\_r(base) 554.roms\_r(base)  
=====

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=====

=====  
Fortran, C | 521.wrf\_r(base) 527.cam4\_r(base)  
=====

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# SPEC CPU®2017 Floating Point Rate Result

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## Supermicro

SuperServer SYS-122HA-TN-LCC  
(X14DBM-APL , Intel Xeon 6960P)

SPECrate®2017\_fp\_base = 2060

SPECrate®2017\_fp\_peak = Not Run

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

**Test Date:** Feb-2025  
**Hardware Availability:** Feb-2025  
**Software Availability:** Jun-2024

## 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

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 -xCORE-AVX512 -Ofast -ffast-math  
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4  
-Wno-implicit-int -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib

(Continued on next page)



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

**Test Date:** Feb-2025  
**Hardware Availability:** Feb-2025  
**Software Availability:** Jun-2024

## Base Optimization Flags (Continued)

### C++ benchmarks:

```
-w -std=c++14 -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib
```

### Fortran benchmarks:

```
-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -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 -xCORE-AVX512 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-Wno-implicit-int -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 -xCORE-AVX512 -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -Wno-implicit-int -ljemalloc
-L/usr/local/jemalloc64-5.0.1/lib
```

### Benchmarks using Fortran, C, and C++:

```
-w -std=c++14 -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -Wno-implicit-int -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/Supermicro-Platform-Settings-V1.2-SPR-revG.html>  
<http://www.spec.org/cpu2017/flags/Intel-ic2024-official-linux64.html>

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-revG.xml>  
<http://www.spec.org/cpu2017/flags/Intel-ic2024-official-linux64.xml>

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For questions about this result, please contact the tester. For other inquiries, please contact [info@spec.org](mailto:info@spec.org).

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