



# SPEC CPU®2017 Floating Point Rate Result

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## Supermicro

Hyper SuperServer SYS-221H-TN24R  
(X13DEM , Intel Xeon Gold 6544Y)

SPECrate®2017\_fp\_base = 538

SPECrate®2017\_fp\_peak = 538

CPU2017 License: 001176

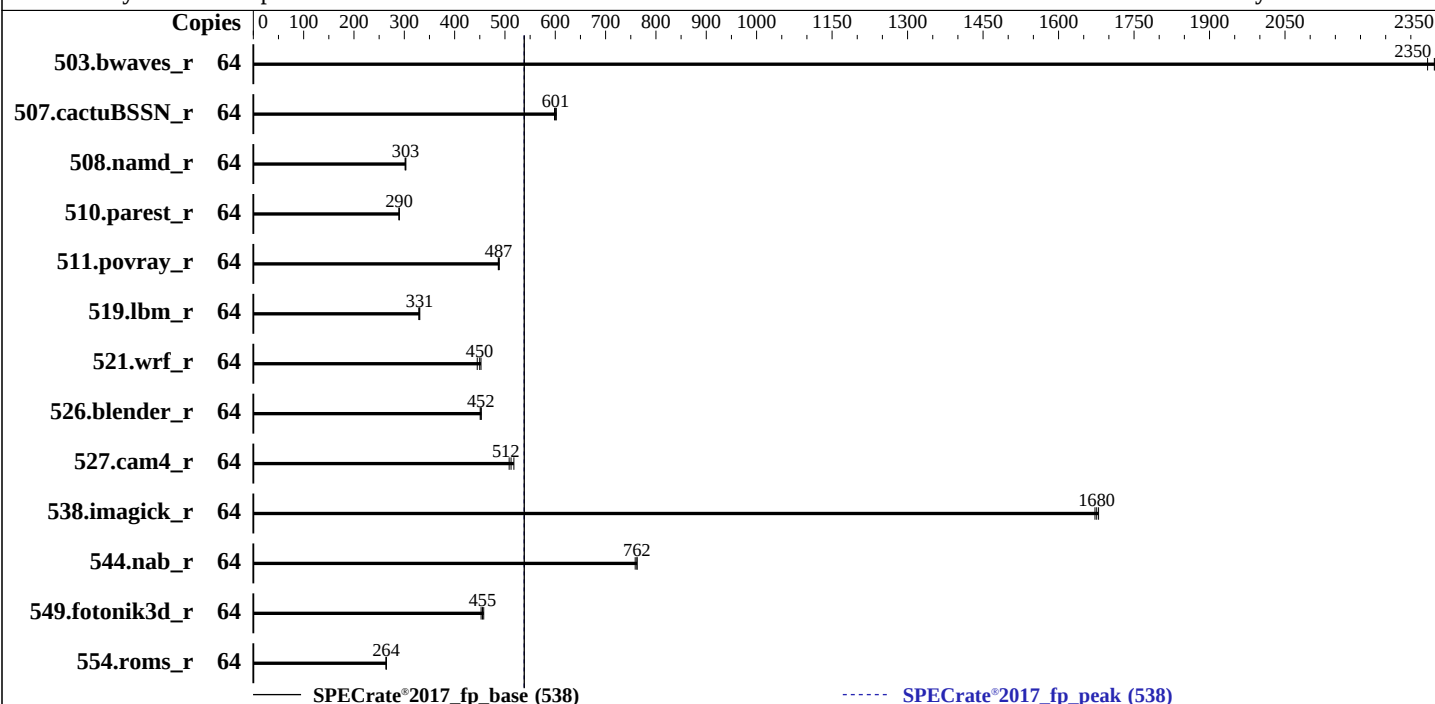
Test Sponsor: Supermicro

Tested by: Supermicro

Test Date: Apr-2025

Hardware Availability: Dec-2023

Software Availability: Jun-2024



### Hardware

CPU Name: Intel Xeon Gold 6544Y  
Max MHz: 4100  
Nominal: 3600  
Enabled: 32 cores, 2 chips, 2 threads/core  
Orderable: 2 chips  
Cache L1: 32 KB I + 48 KB D on chip per core  
L2: 2 MB I+D on chip per core  
L3: 45 MB I+D on chip per chip  
Other: None  
Memory: 1 TB (16 x 64 GB 2Rx4 PC5-5600B-R, running at 5200)  
Storage: 1 x 1.6 TB NVMe SSD  
Other: CPU Cooling: Air

### Software

OS: SUSE Linux Enterprise Server 15 SP6  
Kernel 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 2.5 released Feb-2025  
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 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              |
| 503.bwaves_r    | 64     | 273               | 2350              | <b><u>273</u></b> | <b><u>2350</u></b> | 275                | 2330               | 64     | 273               | 2350              | <b><u>273</u></b> | <b><u>2350</u></b> | 275                | 2330               |
| 507.cactuBSSN_r | 64     | 135               | 602               | 135               | 598                | <b><u>135</u></b>  | <b><u>601</u></b>  | 64     | 135               | 602               | 135               | 598                | <b><u>135</u></b>  | <b><u>601</u></b>  |
| 508.namd_r      | 64     | 202               | 302               | 201               | 303                | <b><u>201</u></b>  | <b><u>303</u></b>  | 64     | 202               | 302               | 201               | 303                | <b><u>201</u></b>  | <b><u>303</u></b>  |
| 510.parest_r    | 64     | 578               | 290               | 578               | 290                | <b><u>578</u></b>  | <b><u>290</u></b>  | 64     | 578               | 290               | 578               | 290                | <b><u>578</u></b>  | <b><u>290</u></b>  |
| 511.povray_r    | 64     | 307               | 487               | 306               | 489                | <b><u>307</u></b>  | <b><u>487</u></b>  | 64     | 307               | 487               | 306               | 489                | <b><u>307</u></b>  | <b><u>487</u></b>  |
| 519.lbm_r       | 64     | 204               | 331               | 205               | 329                | <b><u>204</u></b>  | <b><u>331</u></b>  | 64     | 204               | 331               | 205               | 329                | <b><u>204</u></b>  | <b><u>331</u></b>  |
| 521.wrf_r       | 64     | 317               | 452               | <b><u>319</u></b> | <b><u>450</u></b>  | 322                | 445                | 64     | 317               | 452               | <b><u>319</u></b> | <b><u>450</u></b>  | 322                | 445                |
| 526.blender_r   | 64     | <b><u>216</u></b> | <b><u>452</u></b> | 215               | 453                | 216                | 451                | 64     | <b><u>216</u></b> | <b><u>452</u></b> | 215               | 453                | 216                | 451                |
| 527.cam4_r      | 64     | 220               | 508               | <b><u>219</u></b> | <b><u>512</u></b>  | 216                | 518                | 64     | 220               | 508               | <b><u>219</u></b> | <b><u>512</u></b>  | 216                | 518                |
| 538.imagick_r   | 64     | 94.8              | 1680              | 95.2              | 1670               | <b><u>95.0</u></b> | <b><u>1680</u></b> | 64     | 94.8              | 1680              | 95.2              | 1670               | <b><u>95.0</u></b> | <b><u>1680</u></b> |
| 544.nab_r       | 64     | <b><u>141</u></b> | <b><u>762</u></b> | 141               | 762                | 142                | 759                | 64     | <b><u>141</u></b> | <b><u>762</u></b> | 141               | 762                | 142                | 759                |
| 549.fotonik3d_r | 64     | 545               | 458               | <b><u>548</u></b> | <b><u>455</u></b>  | 551                | 453                | 64     | 545               | 458               | <b><u>548</u></b> | <b><u>455</u></b>  | 551                | 453                |
| 554.roms_r      | 64     | 385               | 264               | 386               | 264                | <b><u>385</u></b>  | <b><u>264</u></b>  | 64     | 385               | 264               | 386               | 264                | <b><u>385</u></b>  | <b><u>264</u></b>  |

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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"  
MALLOCONF = "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)

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Hardware Availability: Dec-2023

Software Availability: Jun-2024

## 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 Configuration:

Workload Profile = HPC

SNC = Enable SNC2 (2-clusters)

LLC Dead Line Alloc = Disable

KTI Prefetch = Enable

Stale AtoS = Disable

Patrol Scrub = Disable

Sysinfo program /home/cpu2017/bin/sysinfo

Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197

running on localhost Wed Apr 2 04:29:26 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. Services, from systemctl list-unit-files
  13. Linux kernel boot-time arguments, from /proc/cmdline
  14. cpupower frequency-info
  15. tuned-adm active
  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 localhost 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
04:29:26 up 4:53, 1 user, load average: 47.82, 60.24, 62.66
USER      TTY      FROM          LOGIN@   IDLE   JCPU   PCPU WHAT
root      tty1      -             23:36    4:35m  0.96s  0.08s -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) 4126899
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) 4126899
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=64 -c
ic2024.1-lin-core-avx512-rate-20240308.cfg --define smt-on --define cores=32 --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=64 --configfile
ic2024.1-lin-core-avx512-rate-20240308.cfg --define smt-on --define cores=32 --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/CPU2017.002/templots/preenv.fprate.002.0.log --lognum 002.0 --from_runcpu 2
specperl $SPEC/bin/sysinfo
$SPEC = /home/cpu2017
```

```
-----
6. /proc/cpuinfo
model name      : INTEL(R) XEON(R) GOLD 6544Y
vendor_id      : GenuineIntel
cpu family     : 6
model          : 207
stepping       : 2
microcode      : 0x21000291
bugs           : spectre_v1 spectre_v2 spec_store_bypass swapgs eibrs_pbrsb bhi
cpu cores      : 16
siblings       : 32
2 physical ids (chips)
64 processors (hardware threads)
physical id 0: core ids 0-15
```

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## Platform Notes (Continued)

physical id 1: core ids 0-15  
physical id 0: apicids 0-31  
physical id 1: apicids 128-159

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:                      | 46 bits physical, 57 bits virtual                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Byte Order:                         | Little Endian                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| CPU(s):                             | 64                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| On-line CPU(s) list:                | 0-63                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Vendor ID:                          | GenuineIntel                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| BIOS Vendor ID:                     | Intel(R) Corporation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Model name:                         | INTEL(R) XEON(R) GOLD 6544Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| BIOS Model name:                    | INTEL(R) XEON(R) GOLD 6544Y CPU @ 3.6GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| BIOS CPU family:                    | 179                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| CPU family:                         | 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Model:                              | 207                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Thread(s) per core:                 | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Core(s) per socket:                 | 16                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Socket(s):                          | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Stepping:                           | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| BogoMIPS:                           | 7200.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Flags:                              | fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat<br>pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx<br>pdpe1gb rdtscp lm constant_tsc art arch_perfmon pebs bts rep_good<br>nopl xtopology nonstop_tsc cpuid aperfmperf tsc_known_freq pni<br>pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16<br>xtpr pcdm pcid dca sse4_1 sse4_2 x2apic movbe popcnt<br>tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm<br>3dnowprefetch cpuid_fault epb cat_l3 cat_l2 cdp_l3 intel_ppin cdp_l2<br>ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow flexpriority ept<br>vpid ept_ad fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid<br>rtm cqm rdt_a avx512f avx512dq rdseed adx smap avx512ifma clflushopt<br>clwb intel_pt avx512cd sha_ni avx512bw avx512vl xsaveopt xsavec<br>xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local<br>split_lock_detect user_shstk avx_vnni avx512_bf16 wbnoinvd dtherm ida<br>arat pln pts hfi vnmi avx512vbmi umip pku ospke waitpkg avx512_vbmi2<br>gfni vaes vpclmulqdq avx512_vnni avx512_bitalg tme avx512_vpopcntdq<br>la57 rdpid bus_lock_detect cldemote movdiri movdir64b enqcmd fsrm<br>md_clear serialize tsxldtrk pconfig arch_lbr ibt amx_bf16 avx512_fp16<br>amx_tile amx_int8 flush_l1d arch_capabilities |
| Virtualization:                     | VT-x                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| L1d cache:                          | 1.5 MiB (32 instances)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| L1i cache:                          | 1 MiB (32 instances)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| L2 cache:                           | 64 MiB (32 instances)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| L3 cache:                           | 90 MiB (2 instances)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| NUMA node(s):                       | 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| NUMA node0 CPU(s):                  | 0-7,32-39                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| NUMA node1 CPU(s):                  | 8-15,40-47                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| NUMA node2 CPU(s):                  | 16-23,48-55                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| NUMA node3 CPU(s):                  | 24-31,56-63                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Vulnerability Gather data sampling: | Not affected                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Vulnerability Itlb multihit:        | Not affected                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Vulnerability L1tf:                 | Not affected                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

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### Platform Notes (Continued)

|                                       |                                                                                                              |
|---------------------------------------|--------------------------------------------------------------------------------------------------------------|
| 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/swaps barriers and __user pointer sanitization                                          |
| Vulnerability Spectre v2:             | Mitigation; Enhanced / Automatic IBRS; IBPB conditional; RSB filling; PBRBS-eIBRS SW sequence; 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      | 1.5M     | 12   | Data        | 1     | 64    | 1        | 64             |
| L1i  | 32K      | 1M       | 8    | Instruction | 1     | 64    | 1        | 64             |
| L2   | 2M       | 64M      | 16   | Unified     | 2     | 2048  | 1        | 64             |
| L3   | 45M      | 90M      | 15   | Unified     | 3     | 49152 | 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: 0-7,32-39
node 0 size: 257680 MB
node 0 free: 246100 MB
node 1 cpus: 8-15,40-47
node 1 size: 258005 MB
node 1 free: 250904 MB
node 2 cpus: 16-23,48-55
node 2 size: 258043 MB
node 2 free: 250960 MB
node 3 cpus: 24-31,56-63
node 3 size: 258022 MB
node 3 free: 250959 MB
node distances:
node  0  1  2  3
0:  10  12  21  21
1:  12  10  21  21
2:  21  21  10  12
3:  21  21  12  10
```

9. /proc/meminfo

MemTotal: 1056513328 kB

10. who -r

run-level 3 Apr 1 23:36

11. Systemd service manager version: systemd 254 (254.10+suse.84.ge8d77af424)

|                |         |
|----------------|---------|
| 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 |

(Continued on next page)



# SPEC CPU®2017 Floating Point Rate Result

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## Supermicro

Hyper SuperServer SYS-221H-TN24R  
(X13DEM , Intel Xeon Gold 6544Y)

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CPU2017 License: 001176

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Tested by: Supermicro

Test Date: Apr-2025

Hardware Availability: Dec-2023

Software Availability: Jun-2024

### Platform Notes (Continued)

enabled-runtime  
disabled

issue-generator kbdsettings klog lvm2-monitor nscd nvme-fc-boot-connections  
nvme-fc-autoconnect postfix purge-kernel rollback rsyslog smartd sshd systemd-pstore tuned  
wicked wickedd-auto4 wickedd-dhcp4 wickedd-dhcp6 wickedd-nanny  
systemd-remount-fs  
autofs autostart-initscripts blk-availability boot-sysctl ca-certificates chrony-wait  
chronyd console-getty cups cups-browsed debug-shell ebttables exchange-bmc-os-info  
firewalld fsidd gpm grub2-once haveged hwloc-dump-hwdata ipmi ipmievdev issue-add-ssh-keys  
kexec-load lunmask man-db-create multipathd nfs nfs-blkmap rpcbind rpmconfigcheck rsyncd  
serial-getty@ smartd-generate\_opts snmpd snmptrapd systemd-boot-check-no-failures  
systemd-confext systemd-network-generator systemd-sysext systemd-time-wait-sync  
systemd-timesyncd udisks2 vncserver@  
indirect  
systemd-userdbd wickedd

#### 13. Linux kernel boot-time arguments, from /proc/cmdline

BOOT\_IMAGE=/boot/vmlinuz-6.4.0-150600.21-default  
root=UUID=b0d9e489-9c66-4e23-9436-b80e6238f84b  
splash=silent  
mitigations=auto  
quiet  
security=apparmor  
nomodeset

#### 14. cpupower frequency-info

analyzing CPU 11:  
Unable to determine current policy  
boost state support:  
Supported: yes  
Active: yes

#### 15. tuned-adm active

Current active profile: throughput-performance

#### 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   |
| 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                | 10    |
| vm.watermark_boost_factor    | 15000 |
| vm.watermark_scale_factor    | 10    |
| vm.zone_reclaim_mode         | 0     |

#### 17. /sys/kernel/mm/transparent\_hugepage

defrag always defer defer+madvice [madvice] never

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### Platform Notes (Continued)

enabled [always] madvise 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/nvme0n1p2 xfs 1.5T 66G 1.4T 5% /  
-----

-----  
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:  
8x Micron Technology MTC40F2046S1RC56BD1 64 GB 2 rank 5600, configured at 5200  
8x Micron Technology MTC40F2046S1RC56BD1 QMCC 64 GB 2 rank 5600, configured at 5200  
-----

-----  
23. BIOS  
(This section combines info from /sys/devices and dmidecode.)  
BIOS Vendor: American Megatrends International, LLC.  
BIOS Version: 2.5  
BIOS Date: 02/05/2025  
BIOS Revision: 5.32  
-----

### Compiler Version Notes

=====

|   |                                                                       |
|---|-----------------------------------------------------------------------|
| C | 519.lbm_r(base, peak) 538.imagick_r(base, peak) 544.nab_r(base, peak) |
|---|-----------------------------------------------------------------------|

-----

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## Compiler Version Notes (Continued)

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

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-----

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

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-----

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

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Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2024.1.0 Build 20240308  
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-----

=====  
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 2024.1.0 Build 20240308  
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-----

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

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-----

## Base Compiler Invocation

C benchmarks:  
icx

C++ benchmarks:  
icpx

Fortran benchmarks:  
ifx

(Continued on next page)



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## Base Compiler Invocation (Continued)

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

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

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Software Availability: Jun-2024

## Base Optimization Flags (Continued)

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
```

## 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



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Tested by: Supermicro

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Hardware Availability: Dec-2023

Software Availability: Jun-2024

## Peak Portability Flags

Same as Base Portability Flags

## Peak Optimization Flags

C benchmarks:

519.lbm\_r: basepeak = yes

538.imagick\_r: basepeak = yes

544.nab\_r: basepeak = yes

C++ benchmarks:

508.namd\_r: basepeak = yes

510.parest\_r: basepeak = yes

Fortran benchmarks:

503.bwaves\_r: basepeak = yes

549.fotonik3d\_r: basepeak = yes

554.roms\_r: basepeak = yes

Benchmarks using both Fortran and C:

521.wrf\_r: basepeak = yes

527.cam4\_r: basepeak = yes

Benchmarks using both C and C++:

511.povray\_r: basepeak = yes

526.blender\_r: basepeak = yes

Benchmarks using Fortran, C, and C++:

507.cactuBSSN\_r: basepeak = yes



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

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

<http://www.spec.org/cpu2017/flags/Supermicro-Platform-Settings-V1.2-EMR-revF.html>

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

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

<http://www.spec.org/cpu2017/flags/Supermicro-Platform-Settings-V1.2-EMR-revF.xml>

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