



# SPEC CPU®2017 Integer Speed Result

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## Supermicro

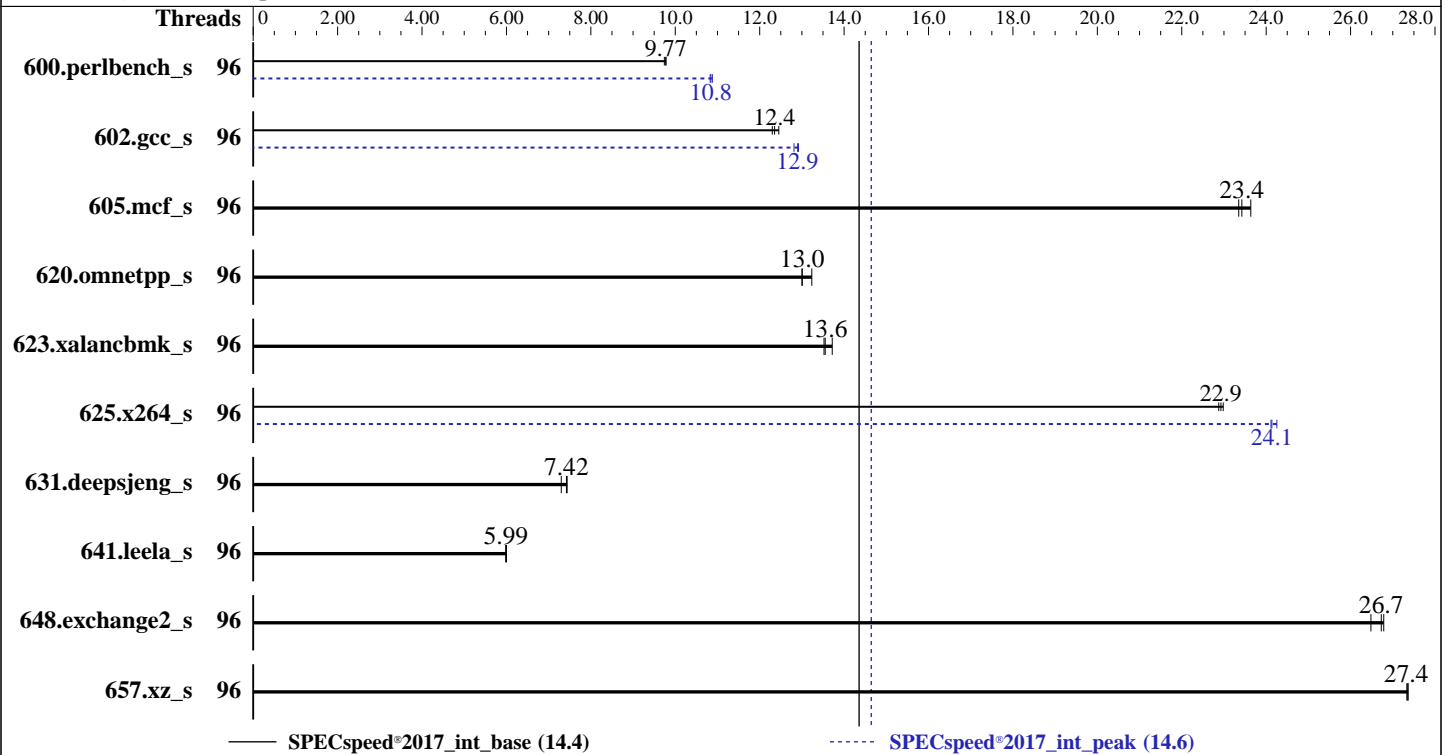
UP SuperServer SYS-521C-NR  
(X13SEDW-F, Intel Xeon Platinum 8558U)

SPECspeed®2017\_int\_base = 14.4

SPECspeed®2017\_int\_peak = 14.6

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

Test Date: Jan-2024  
Hardware Availability: Dec-2023  
Software Availability: Dec-2023



### Hardware

CPU Name: Intel Xeon Platinum 8558U  
Max MHz: 4000  
Nominal: 2000  
Enabled: 48 cores, 1 chip, 2 threads/core  
Orderable: 1 chip  
Cache L1: 32 KB I + 48 KB D on chip per core  
L2: 2 MB I+D on chip per core  
L3: 260 MB I+D on chip per chip  
Other: None  
Memory: 512 GB (8 x 64 GB 2Rx4 PC5-5600B-R, running at 4800)  
Storage: 1 x 240 GB SATA III SSD  
Other: None

### Software

OS: SUSE Linux Enterprise Server 15 SP5  
Kernel 5.14.21-150500.53-default  
Compiler: C/C++: Version 2023.2.3 of Intel oneAPI DPC++/C++ Compiler for Linux;  
Fortran: Version 2023.2.3 of Intel Fortran Compiler for Linux;  
Parallel: Yes  
Firmware: Version 2.1 released Dec-2023  
File System: xfs  
System State: Run level 3 (multi-user)  
Base Pointers: 64-bit  
Peak Pointers: 64-bit  
Other: jemalloc memory allocator V5.0.1  
Power Management: BIOS and OS set to prefer performance at the cost of additional power usage.



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## Results Table

Benchmark	Base							Peak						
	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Threads	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
600.perlbench_s	96	<b>182</b>	<b>9.77</b>	182	9.74	181	9.78	96	<b>164</b>	<b>10.8</b>	163	10.9	164	10.8
602.gcc_s	96	324	12.3	<b>322</b>	<b>12.4</b>	320	12.5	96	<b>309</b>	<b>12.9</b>	308	12.9	311	12.8
605.mcf_s	96	202	23.4	<b>202</b>	<b>23.4</b>	200	23.6	96	202	23.4	<b>202</b>	<b>23.4</b>	200	23.6
620.omnetpp_s	96	125	13.0	<b>125</b>	<b>13.0</b>	123	13.2	96	125	13.0	<b>125</b>	<b>13.0</b>	123	13.2
623.xalancbmk_s	96	105	13.5	<b>105</b>	<b>13.6</b>	103	13.7	96	105	13.5	<b>105</b>	<b>13.6</b>	103	13.7
625.x264_s	96	<b>76.9</b>	<b>22.9</b>	77.1	22.9	76.8	23.0	96	72.7	24.3	73.2	24.1	<b>73.1</b>	<b>24.1</b>
631.deepsjeng_s	96	<b>193</b>	<b>7.42</b>	196	7.30	193	7.44	96	<b>193</b>	<b>7.42</b>	196	7.30	193	7.44
641.leela_s	96	284	6.00	285	5.98	<b>285</b>	<b>5.99</b>	96	284	6.00	285	5.98	<b>285</b>	<b>5.99</b>
648.exchange2_s	96	111	26.5	110	26.8	<b>110</b>	<b>26.7</b>	96	111	26.5	110	26.8	<b>110</b>	<b>26.7</b>
657.xz_s	96	226	27.3	<b>226</b>	<b>27.4</b>	226	27.4	96	226	27.3	<b>226</b>	<b>27.4</b>	226	27.4

SPECspeed®2017\_int\_base = **14.4**

SPECspeed®2017\_int\_peak = **14.6**

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

## Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"

## Environment Variables Notes

Environment variables set by runcpu before the start of the run:  
KMP\_AFFINITY = "granularity=fine,scatter"  
LD\_LIBRARY\_PATH = "/home/cpu2017/lib/intel64:/home/cpu2017/lib/ia32:/home/cpu2017/je5.0.1-64"  
MALLOC\_CONF = "retain:true"  
OMP\_STACKSIZE = "192M"

## General Notes

Binaries compiled on a system with 2x Intel Xeon Platinum 8280M CPU + 384GB RAM  
memory using Redhat Enterprise Linux 8.0  
Transparent Huge Pages enabled by default  
Prior to runcpu invocation  
Filesystem page cache synced and cleared with:  
sync; echo 3> /proc/sys/vm/drop\_caches

NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.  
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5753 (Spectre variant 1) is mitigated in the system as tested and documented.  
Yes: The test sponsor attests, as of date of publication, that CVE-2017-5715 (Spectre variant 2) is mitigated in the system as tested and documented.  
jemalloc, a general purpose malloc implementation  
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>



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## Platform Notes

### BIOS Settings:

Power Technology = Custom  
Power Performance Tuning = BIOS Controls EPB  
ENERGY\_PERF\_BIAS\_CFG mode = Performance  
DCU Streamer Prefetcher = Disable  
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 135-175-25 Wed Jan 10 09:48:35 2024

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 249 (249.16+suse.171.gdad0071f15)
12. Services, from systemctl list-unit-files
13. Linux kernel boot-time arguments, from /proc/cmdline
14. cpupower frequency-info
15. sysctl
16. /sys/kernel/mm/transparent\_hugepage
17. /sys/kernel/mm/transparent\_hugepage/khugepaged
18. OS release
19. Disk information
20. /sys/devices/virtual/dmi/id
21. dmidecode
22. BIOS

-----  
1. uname -a  
Linux 135-175-25 5.14.21-150500.53-default #1 SMP PREEMPT\_DYNAMIC Wed May 10 07:56:26 UTC 2023 (b630043)  
x86\_64 x86\_64 x86\_64 GNU/Linux  
-----

-----  
2. w  
09:48:35 up 18:31, 2 users, load average: 12.49, 46.12, 70.57  
USER TTY FROM LOGIN@ IDLE JCPU PCPU WHAT  
root tty1 - Tue15 16:00m 0.99s 0.00s -bash  
root tty2 - Tue16 17:26m 0.03s 0.03s -bash  
-----

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

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### Platform Notes (Continued)

```

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) 2062513
   max locked memory      (kbytes, -l) 64
   max memory size        (kbytes, -m) unlimited
   open files             (-n) 1024
   pipe size              (512 bytes, -p) 8
   POSIX message queues   (bytes, -q) 819200
   real-time priority     (-r) 0
   stack size             (kbytes, -s) unlimited
   cpu time               (seconds, -t) unlimited
   max user processes     (-u) 2062513
   virtual memory         (kbytes, -v) unlimited
   file locks            (-x) unlimited

```

```

5. sysinfo process ancestry
   /usr/lib/systemd/systemd --switched-root --system --deserialize 30
   login -- root
   -bash
   -bash
   runcpu --nobuild --action validate --define default-platform-flags -c
     ic2023.2.3-lin-core-avx512-speed-20231121.cfg --define cores=48 --tune base,peak -o all --define
     intspeedaffinity --define smt-on --define drop_caches intspeed
   runcpu --nobuild --action validate --define default-platform-flags --configfile
     ic2023.2.3-lin-core-avx512-speed-20231121.cfg --define cores=48 --tune base,peak --output_format all
     --define intspeedaffinity --define smt-on --define drop_caches --nopower --runmode speed --tune base:peak
     --size refspeed intspeed --nopreenv --note-preenv --logfile
     $SPEC/tmp/CPU2017.003/templogs/preenv.intspeed.003.0.log --lognum 003.0 --from_runcpu 2
   specperl $SPEC/bin/sysinfo
   $SPEC = /home/cpu2017

```

```

6. /proc/cpuinfo
   model name      : INTEL(R) XEON(R) PLATINUM 8558U
   vendor_id      : GenuineIntel
   cpu family     : 6
   model          : 207
   stepping       : 2
   microcode      : 0x21000200
   bugs           : spectre_v1 spectre_v2 spec_store_bypass swapgs eibrs_pbrsb
   cpu cores      : 48
   siblings       : 96
   1 physical ids (chips)
   96 processors (hardware threads)
   physical id 0: core ids 0-47
   physical id 0: apicids 0-95
   Caution: /proc/cpuinfo data regarding chips, cores, and threads is not necessarily reliable, especially for
   virtualized systems. Use the above data carefully.

```

```

7. lscpu

From lscpu from util-linux 2.37.4:
Architecture:          x86_64
CPU op-mode(s):        32-bit, 64-bit
Address sizes:         46 bits physical, 57 bits virtual

```

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### Platform Notes (Continued)

```

Byte Order:                Little Endian
CPU(s):                    96
On-line CPU(s) list:      0-95
Vendor ID:                 GenuineIntel
Model name:               INTEL(R) XEON(R) PLATINUM 8558U
CPU family:               6
Model:                    207
Thread(s) per core:      2
Core(s) per socket:      48
Socket(s):                1
Stepping:                 2
Frequency boost:         enabled
CPU max MHz:              2001.0000
CPU min MHz:              800.0000
BogoMIPS:                 4000.00
Flags:                    fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36
                          clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp
                          lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology
                          nonstop_tsc cpuid aperfmperf tsc_known_freq pni pclmulqdq dtes64 monitor
                          ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtpr pdcm pcid dca sse4_1
                          sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand
                          lahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3 cat_l2 cdp_l3
                          invpcid_single cdp_l2 ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow
                          vnmi flexpriority ept vpid ept_ad fsgsbase tsc_adjust bmi1 hle avx2 smep
                          bmi2 erms invpcid rtm cqm rdt_a avx512f avx512dq rdseed adx smap
                          avx512ifma clflushopt clwb intel_pt avx512cd sha_ni avx512bw avx512vl
                          xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total
                          cqm_mbm_local avx_vnni avx512_bf16 wbnoinvd dtherm ida arat pln pts hfi
                          avx512vbmi unip pku ospke waitpkg avx512_vbmi2 gfni vaes vpclmulqdq
                          avx512_vnni avx512_bitalg tme avx512_vpopcntdq la57 rdpid bus_lock_detect
                          cldemote movdiri movdir64b enqcmd fsrm md_clear serialize tsxldtrk pconfig
                          arch_lbr avx512_fp16 amx_tile flush_lld arch_capabilities

Virtualization:           VT-x
L1d cache:                2.3 MiB (48 instances)
L1i cache:                1.5 MiB (48 instances)
L2 cache:                 96 MiB (48 instances)
L3 cache:                 260 MiB (1 instance)
NUMA node(s):            2
NUMA node0 CPU(s):       0-23,48-71
NUMA node1 CPU(s):       24-47,72-95
Vulnerability Itlb multihit: Not affected
Vulnerability L1tf:       Not affected
Vulnerability Mds:        Not affected
Vulnerability Meltdown:   Not affected
Vulnerability Mmio stale data: Not affected
Vulnerability Retbleed:   Not affected
Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl and seccomp
Vulnerability Spectre v1:  Mitigation; usercopy/swaps barriers and __user pointer sanitization
Vulnerability Spectre v2:  Mitigation; Enhanced IBRS, IBPB conditional, RSB filling, PBRBSB-eIBRS SW
                          sequence
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      2.3M   12 Data          1      64     1         64
L1i   32K      1.5M   8 Instruction    1      64     1         64
L2    2M       96M   16 Unified       2     2048    1         64
L3   260M     260M  20 Unified       3  21292    1         64

```

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### Platform Notes (Continued)

8. numactl --hardware

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

```
available: 2 nodes (0-1)
node 0 cpus: 0-23,48-71
node 0 size: 257643 MB
node 0 free: 225794 MB
node 1 cpus: 24-47,72-95
node 1 size: 258015 MB
node 1 free: 231365 MB
node distances:
node  0  1
  0:  10  12
  1:  12  10
```

9. /proc/meminfo

```
MemTotal:      528034076 kB
```

10. who -r

```
run-level 3 Jan 9 15:18
```

11. Systemd service manager version: systemd 249 (249.16+suse.171.gdad0071f15)

```
Default Target Status
multi-user      running
```

12. Services, from systemctl list-unit-files

```
STATE UNIT FILES
enabled YaST2-Firstboot YaST2-Second-Stage apparmor auditd cron display-manager getty@ irqbalance
issue-generator kbdsettings klog lvm2-monitor nscd postfix purge-kernels rollback rsyslog
smartd sshd systemd-pstore wicked wickedd-auto4 wickedd-dhcp4 wickedd-dhcp6 wickedd-nanny

enabled-runtime systemd-remount-fs
disabled autofd autoyast-initscripts blk-availability boot-sysctl ca-certificates chrony-wait
chronyd console-getty cups cups-browsed debug-shell ebttables exchange-bmc-os-info
firewalld gpm grub2-once haveged haveged-switch-root ipmi ipmievd 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-network-generator systemd-sysexit systemd-time-wait-sync systemd-timesyncd udisks2
vncserver@
indirect wickedd
```

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

```
BOOT_IMAGE=/boot/vmlinuz-5.14.21-150500.53-default
root=UUID=72565a43-6e2d-4580-bfa9-6df7225e0661
splash=silent
mitigations=auto
quiet
security=apparmor
```

14. cpupower frequency-info

```
analyzing CPU 0:
current policy: frequency should be within 800 MHz and 2.00 GHz.
The governor "ondemand" may decide which speed to use
within this range.

boost state support:
```

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### Platform Notes (Continued)

Supported: yes  
Active: yes

```

-----
15. sysctl
kernel.numa_balancing          1
kernel.randomize_va_space      2
vm.compaction_proactiveness    20
vm.dirty_background_bytes      0
vm.dirty_background_ratio      10
vm.dirty_bytes                  0
vm.dirty_expire_centisecs      3000
vm.dirty_ratio                  20
vm.dirty_writeback_centisecs    500
vm.dirtytime_expire_seconds    43200
vm.extfrag_threshold            500
vm.min_unmapped_ratio          1
vm.nr_hugepages                 0
vm.nr_hugepages_mempolicy      0
vm.nr_overcommit_hugepages     0
vm.swappiness                    60
vm.watermark_boost_factor      15000
vm.watermark_scale_factor      10
vm.zone_reclaim_mode           0

```

```

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

```

```

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

```

```

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

```

```

-----
19. Disk information
SPEC is set to: /home/cpu2017
Filesystem  Type  Size  Used Avail Use% Mounted on
/dev/sda2   xfs   221G  90G  131G  41% /

```

```

-----
20. /sys/devices/virtual/dmi/id
Vendor:      PM_202207070954
Product:     PPM_202207070954
Product Family: Family
Serial:      PS_202207070954

```

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## Platform Notes (Continued)

### 21. dmidecode

Additional information from dmidecode 3.4 follows. **WARNING:** Use caution when you interpret this section. The 'dmidecode' program reads system data which is "intended to allow hardware to be accurately determined", but the intent may not be met, as there are frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.

**Memory:**

8x Micron Technology MTC40F2046S1RC56BD1 64 GB 2 rank 5600, configured at 4800

### 22. BIOS

(This section combines info from /sys/devices and dmidecode.)

BIOS Vendor: American Megatrends International, LLC.  
BIOS Version: 2.1  
BIOS Date: 12/06/2023  
BIOS Revision: 5.32

## Compiler Version Notes

=====  
C | 600.perlbench\_s(base, peak) 602.gcc\_s(base, peak) 605.mcf\_s(base, peak) 625.x264\_s(base, peak)  
| 657.xz\_s(base, peak)  
=====

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x  
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.

=====  
C++ | 620.omnetpp\_s(base, peak) 623.xalancbmk\_s(base, peak) 631.deepsjeng\_s(base, peak)  
| 641.leela\_s(base, peak)  
=====

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x  
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.

=====  
Fortran | 648.exchange2\_s(base, peak)  
=====

Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.2.3 Build x  
Copyright (C) 1985-2023 Intel Corporation. All rights reserved.

## Base Compiler Invocation

**C benchmarks:**

icx

**C++ benchmarks:**

icpx

**Fortran benchmarks:**

ifx





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## Base Portability Flags

```
600.perlbench_s: -DSPEC_LP64 -DSPEC_LINUX_X64
602.gcc_s: -DSPEC_LP64
605.mcf_s: -DSPEC_LP64
620.omnetpp_s: -DSPEC_LP64
623.xalancbmk_s: -DSPEC_LP64 -DSPEC_LINUX
625.x264_s: -DSPEC_LP64
631.deepsjeng_s: -DSPEC_LP64
641.leela_s: -DSPEC_LP64
648.exchange2_s: -DSPEC_LP64
657.xz_s: -DSPEC_LP64
```

## Base Optimization Flags

### C benchmarks:

```
-w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -fiopenmp
-DSPEC_OPENMP -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

### C++ benchmarks:

```
-w -std=c++14 -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

### Fortran benchmarks:

```
-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

## Peak Compiler Invocation

### C benchmarks:

icx

### C++ benchmarks:

icpx

### Fortran benchmarks:

ifx



# SPEC CPU®2017 Integer Speed Result

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## Supermicro

UP SuperServer SYS-521C-NR  
(X13SEDW-F, Intel Xeon Platinum 8558U)

SPECspeed®2017\_int\_base = 14.4

SPECspeed®2017\_int\_peak = 14.6

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

**Test Date:** Jan-2024  
**Hardware Availability:** Dec-2023  
**Software Availability:** Dec-2023

## Peak Portability Flags

Same as Base Portability Flags

## Peak Optimization Flags

C benchmarks:

```
600.perlbench_s: -w -m64 -std=c11 -Wl,-z,muldefs
-fprofile-generate(pass 1)
-fprofile-use=default.profdata(pass 2) -xCORE-AVX2(pass 1)
-flto -Ofast(pass 1) -xCORE-AVX512 -O3 -ffast-math
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-fiopenmp -DSPEC_OPENMP -fno-strict-overflow
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

602.gcc_s: -w -m64 -std=c11 -Wl,-z,muldefs
-fprofile-generate(pass 1)
-fprofile-use=default.profdata(pass 2) -xCORE-AVX2(pass 1)
-flto -Ofast(pass 1) -xCORE-AVX512 -O3 -ffast-math
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-fiopenmp -DSPEC_OPENMP -L/usr/local/jemalloc64-5.0.1/lib
-ljemalloc

605.mcf_s: basepeak = yes

625.x264_s: -w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3
-ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -fiopenmp -DSPEC_OPENMP
-fno-alias -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

657.xz_s: basepeak = yes
```

C++ benchmarks:

```
620.omnetpp_s: basepeak = yes

623.xalancbmk_s: basepeak = yes

631.deepsjeng_s: basepeak = yes

641.leela_s: basepeak = yes
```

Fortran benchmarks:

(Continued on next page)



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## Peak Optimization Flags (Continued)

648.exchange2\_s:basepeak = yes

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

<http://www.spec.org/cpu2017/flags/Intel-ic2023p2-official-linux64.html>

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

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

<http://www.spec.org/cpu2017/flags/Intel-ic2023p2-official-linux64.xml>

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

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