



# SPEC CPU®2017 Integer Speed Result

Copyright 2017-2024 Standard Performance Evaluation Corporation

## Supermicro

UP SuperServer SYS-511R-M  
(X13SCH-SYS , Intel Xeon E-2488)

SPECspeed®2017\_int\_base = 17.3

SPECspeed®2017\_int\_peak = 17.7

CPU2017 License: 001176

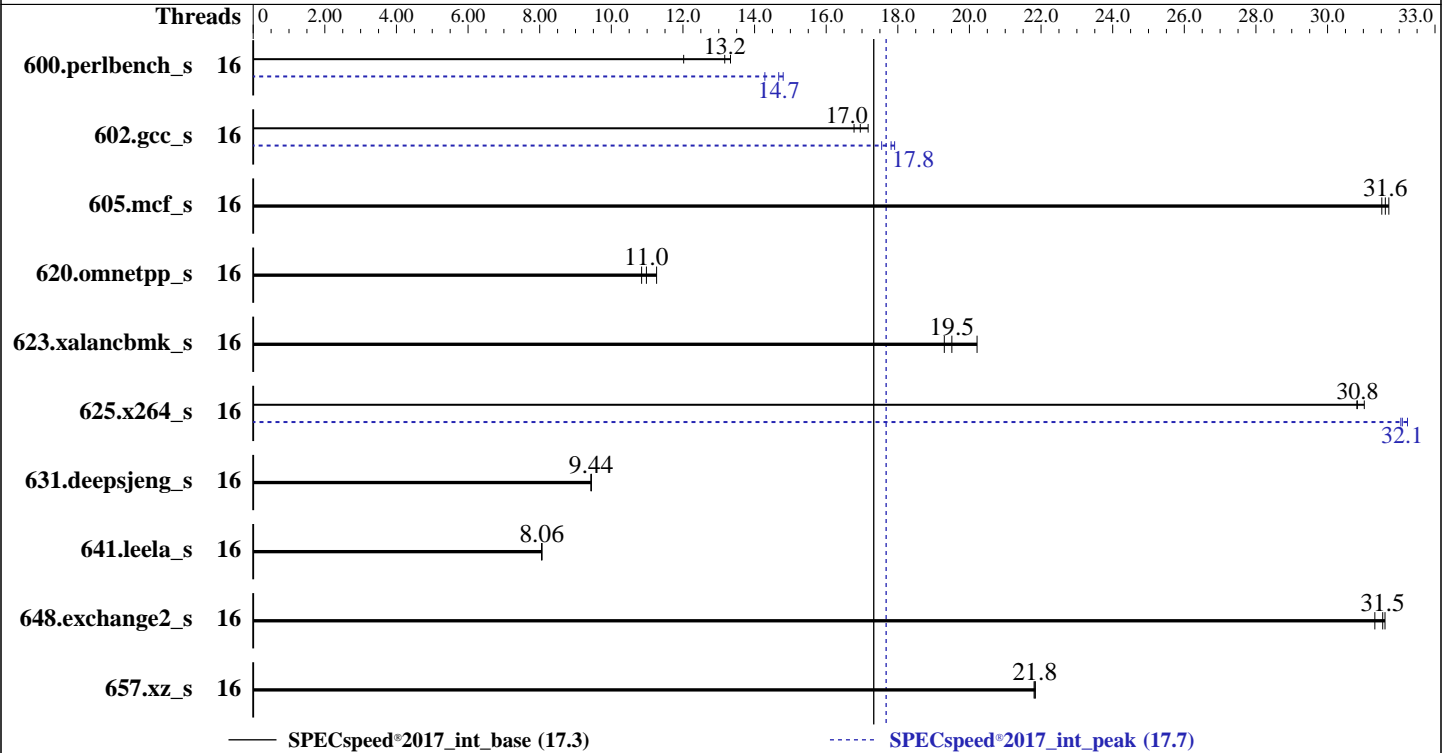
Test Sponsor: Supermicro

Tested by: Supermicro

Test Date: Dec-2023

Hardware Availability: Dec-2023

Software Availability: Dec-2023



### Hardware

CPU Name: Intel Xeon E-2488  
 Max MHz: 5600  
 Nominal: 3200  
 Enabled: 8 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: 24 MB I+D on chip per chip  
 Other: None  
 Memory: 64 GB (2 x 32 GB 2Rx8 PC5-4800B-U, running at 4400)  
 Storage: 1 x 512 GB M.2 NVMe SSD  
 Other: None

### Software

OS: SUSE Linux Enterprise Server 15 SP5  
 Kernel 5.14.21-150500.53-default  
 Compiler: C/C++: Version 2023.2.3 of Intel oneAPI DPC++/C++ Compiler for Linux;  
 Fortran: Version 2023.2.3 of Intel Fortran Compiler for Linux;  
 Parallel: Yes  
 Firmware: Version 1.1 released Dec-2023  
 File System: xfs  
 System State: Run level 3 (multi-user)  
 Base Pointers: 64-bit  
 Peak Pointers: 64-bit  
 Other: jemalloc memory allocator V5.0.1  
 Power Management: Default



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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 | 16      | <b>135</b> | <b>13.2</b> | 148         | 12.0        | 133         | 13.3        | 16      | <b>121</b> | <b>14.7</b> | 124         | 14.3        | 120         | 14.8        |
| 602.gcc_s       | 16      | <b>235</b> | <b>17.0</b> | 232         | 17.2        | 237         | 16.8        | 16      | <b>224</b> | <b>17.8</b> | 227         | 17.5        | 222         | 17.9        |
| 605.mcf_s       | 16      | 149        | 31.7        | <b>149</b>  | <b>31.6</b> | 150         | 31.5        | 16      | 149        | 31.7        | <b>149</b>  | <b>31.6</b> | 150         | 31.5        |
| 620.omnetpp_s   | 16      | 145        | 11.3        | <b>149</b>  | <b>11.0</b> | 150         | 10.8        | 16      | 145        | 11.3        | <b>149</b>  | <b>11.0</b> | 150         | 10.8        |
| 623.xalancbmk_s | 16      | 70.1       | 20.2        | <b>72.6</b> | <b>19.5</b> | 73.4        | 19.3        | 16      | 70.1       | 20.2        | <b>72.6</b> | <b>19.5</b> | 73.4        | 19.3        |
| 625.x264_s      | 16      | 57.2       | 30.8        | 56.9        | 31.0        | <b>57.2</b> | <b>30.8</b> | 16      | 55.0       | 32.0        | <b>55.0</b> | <b>32.1</b> | 54.7        | 32.2        |
| 631.deepsjeng_s | 16      | 152        | 9.43        | <b>152</b>  | <b>9.44</b> | 152         | 9.44        | 16      | 152        | 9.43        | <b>152</b>  | <b>9.44</b> | 152         | 9.44        |
| 641.leela_s     | 16      | <b>212</b> | <b>8.06</b> | 212         | 8.05        | 212         | 8.06        | 16      | <b>212</b> | <b>8.06</b> | 212         | 8.05        | 212         | 8.06        |
| 648.exchange2_s | 16      | 93.0       | 31.6        | 93.9        | 31.3        | <b>93.2</b> | <b>31.5</b> | 16      | 93.0       | 31.6        | 93.9        | 31.3        | <b>93.2</b> | <b>31.5</b> |
| 657.xz_s        | 16      | 283        | 21.8        | 284         | 21.8        | <b>283</b>  | <b>21.8</b> | 16      | 283        | 21.8        | 284         | 21.8        | <b>283</b>  | <b>21.8</b> |

SPECspeed®2017\_int\_base = **17.3**

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

## Platform Notes

sysinfo program /home/cpu2017/bin/sysinfo  
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197  
running on 135-172-248 Thu Dec 21 07:18:51 2023

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

### Table of contents

1. uname -a
2. w
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4. ulimit -a
5. sysinfo process ancestry
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12. Services, from systemctl list-unit-files
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17. /sys/kernel/mm/transparent\_hugepage/khugepaged
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19. Disk information
20. /sys/devices/virtual/dmi/id
21. dmidecode
22. BIOS

```
1. uname -a
Linux 135-172-248 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
07:18:51 up 12:34, 1 user, load average: 2.23, 8.26, 11.95
USER  TTY      FROM          LOGIN@   IDLE   JCPU   PCPU   WHAT
root  ttyl    -              Wed18    11:49m 0.71s  0.00s  -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) 256559
max locked memory       (kbytes, -l) 64
max memory size         (kbytes, -m) unlimited
open files               (-n) 1024
pipe size                (512 bytes, -p) 8
```

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### Platform Notes (Continued)

```

POSIX message queues      (bytes, -q) 819200
real-time priority        (-r) 0
stack size                (kbytes, -s) unlimited
cpu time                  (seconds, -t) unlimited
max user processes        (-u) 256559
virtual memory            (kbytes, -v) unlimited
file locks                (-x) unlimited

```

```

-----
5. sysinfo process ancestry
/usr/lib/systemd/systemd --switched-root --system --deserialize 30
login -- root
-bash
-bash
runcpu --nobuild --action validate --define default-platform-flags -c
  ic2023.2.3-lin-core-avx2-speed-20231121.cfg --define cores=8 --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-avx2-speed-20231121.cfg --define cores=8 --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) E E-2488
vendor_id      : GenuineIntel
cpu family     : 6
model          : 183
stepping       : 1
microcode      : 0x11f
bugs           : spectre_v1 spectre_v2 spec_store_bypass swapgs eibrs_pbrsb
cpu cores      : 8
siblings       : 16
1 physical ids (chips)
16 processors (hardware threads)
physical id 0: core ids 0-7
physical id 0: apicids 0-15
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:         42 bits physical, 48 bits virtual
Byte Order:            Little Endian
CPU(s):                16
On-line CPU(s) list:  0-15
Vendor ID:             GenuineIntel
Model name:            Intel(R) Xeon(R) E E-2488
CPU family:            6
Model:                183
Thread(s) per core:   2
Core(s) per socket:   8
Socket(s):             1

```

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### Platform Notes (Continued)

```
Stepping: 1
Frequency boost: enabled
CPU max MHz: 3201.0000
CPU min MHz: 800.0000
BogoMIPS: 6374.40
Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36
clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp
lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology
nonstop_tsc cpuid aperfmperf tsc_known_freq pni pclmulqdq dtes64 monitor
ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtpr pdcm pcid sse4_1 sse4_2
x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm
abm 3dnowprefetch cpuid_fault epb invpcid_single ssbd ibrs ibpb stibp
ibrs_enhanced tpr_shadow vnmi flexpriority ept vpid ept_ad fsgsbase
tsc_adjust bmil avx2 smep bmi2 erms invpcid rdseed adx smap clflushopt
clwb intel_pt sha_ni xsaveopt xsavec xgetbv1 xsaves split_lock_detect
avx_vnni dtherm ida arat pln pts hfi umip pku ospke waitpkg gfni vaes
vpclmulqdq tme rdpid movdiri movdir64b fsrm md_clear serialize pconfig
arch_lbr flush_lld arch_capabilities

Virtualization: VT-x
L1d cache: 384 KiB (8 instances)
L1i cache: 256 KiB (8 instances)
L2 cache: 16 MiB (8 instances)
L3 cache: 24 MiB (1 instance)
NUMA node(s): 1
NUMA node0 CPU(s): 0-15
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, PBR SB-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      | 384K     | 12   | Data        | 1     | 64    | 1        | 64             |
| L1i  | 32K      | 256K     | 8    | Instruction | 1     | 64    | 1        | 64             |
| L2   | 2M       | 16M      | 16   | Unified     | 2     | 2048  | 1        | 64             |
| L3   | 24M      | 24M      | 12   | Unified     | 3     | 32768 | 1        | 64             |

8. numactl --hardware

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

```
available: 1 nodes (0)
node 0 cpus: 0-15
node 0 size: 64170 MB
node 0 free: 45181 MB
node distances:
node 0
0: 10
```

9. /proc/meminfo

MemTotal: 65710780 kB

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### Platform Notes (Continued)

10. who -r  
run-level 3 Dec 20 18:45

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 nvme-fc-boot-connections postfix purge-kernels rollback rsyslog smartd sshd systemd-pstore wicked wickedd-auto4 wickedd-dhcp4 wickedd-dhcp6 wickedd-nanny   |
| enabled-runtime | systemd-remount-fs   |
| disabled        | autofs autoyast-initscripts blk-availability boot-sysctl ca-certificates chrony-wait chronyd console-getty cups cups-browsed debug-shell ebttables exchange-bmc-os-info firewallld gpm grub2-once haveged haveged-switch-root ipmi ipmievd issue-add-ssh-keys kexec-load lunmask man-db-create multipathd nfs nfs-blkmap nvme-autoconnect rpcbind rpmconfigcheck rsyncd serial-getty@ smartd-generate_opts snmpd snmptrapd systemd-boot-check-no-failures systemd-network-generator systemd-sysext 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=9de9855c-b179-4e5b-8330-3742dedc18b2  
splash=silent  
mitigations=auto  
quiet  
security=apparmor

14. cpupower frequency-info  
analyzing CPU 0:  
current policy: frequency should be within 800 MHz and 3.20 GHz.  
The governor "ondemand" may decide which speed to use within this range.  
boost state support:  
Supported: yes  
Active: yes

15. sysctl

|                              |       |
|------------------------------|-------|
| kernel.numa_balancing        | 0     |
| 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     |

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### Platform Notes (Continued)

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

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

```
-----
17. /sys/kernel/mm/transparent_hugepage/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/nvme0n1p2  xfs   475G  40G  435G   9% /
-----
```

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

```
-----
21. dmidecode
Additional information from dmidecode 3.4 follows.  WARNING: Use caution when you interpret this section.
The 'dmidecode' program reads system data which is "intended to allow hardware to be accurately
determined", but the intent may not be met, as there are frequent changes to hardware, firmware, and the
"DMTF SMBIOS" standard.
Memory:
  2x Micron Technology MTC16C2085S1UC48BA1 32 GB 2 rank 4800, configured at 4400
-----
```

```
-----
22. BIOS
(This section combines info from /sys/devices and dmidecode.)
BIOS Vendor:      American Megatrends International, LLC.
BIOS Version:     1.1
BIOS Date:        12/08/2023
BIOS Revision:    5.27
-----
```



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## 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

## 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





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## Base Optimization Flags

C benchmarks:

```
-w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX2 -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-AVX2 -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-AVX2 -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

## 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.profddata(pass 2) -xCORE-AVX2 -flto
-Ofast(pass 1) -O3 -ffast-math -mfpmath=sse
-funroll-loops -qopt-mem-layout-trans=4 -fiopenmp
```

(Continued on next page)



# SPEC CPU®2017 Integer Speed Result

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## Supermicro

UP SuperServer SYS-511R-M  
(X13SCH-SYS , Intel Xeon E-2488)

SPECspeed®2017\_int\_base = 17.3

SPECspeed®2017\_int\_peak = 17.7

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

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

## Peak Optimization Flags (Continued)

600.perlbench\_s (continued):

```
-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.profddata(pass 2) -xCORE-AVX2 -flto  
-Ofast(pass 1) -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-AVX2 -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:

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-RKL-revB.html>

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

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

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



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