



# SPEC CPU®2017 Integer Speed Result

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## Supermicro

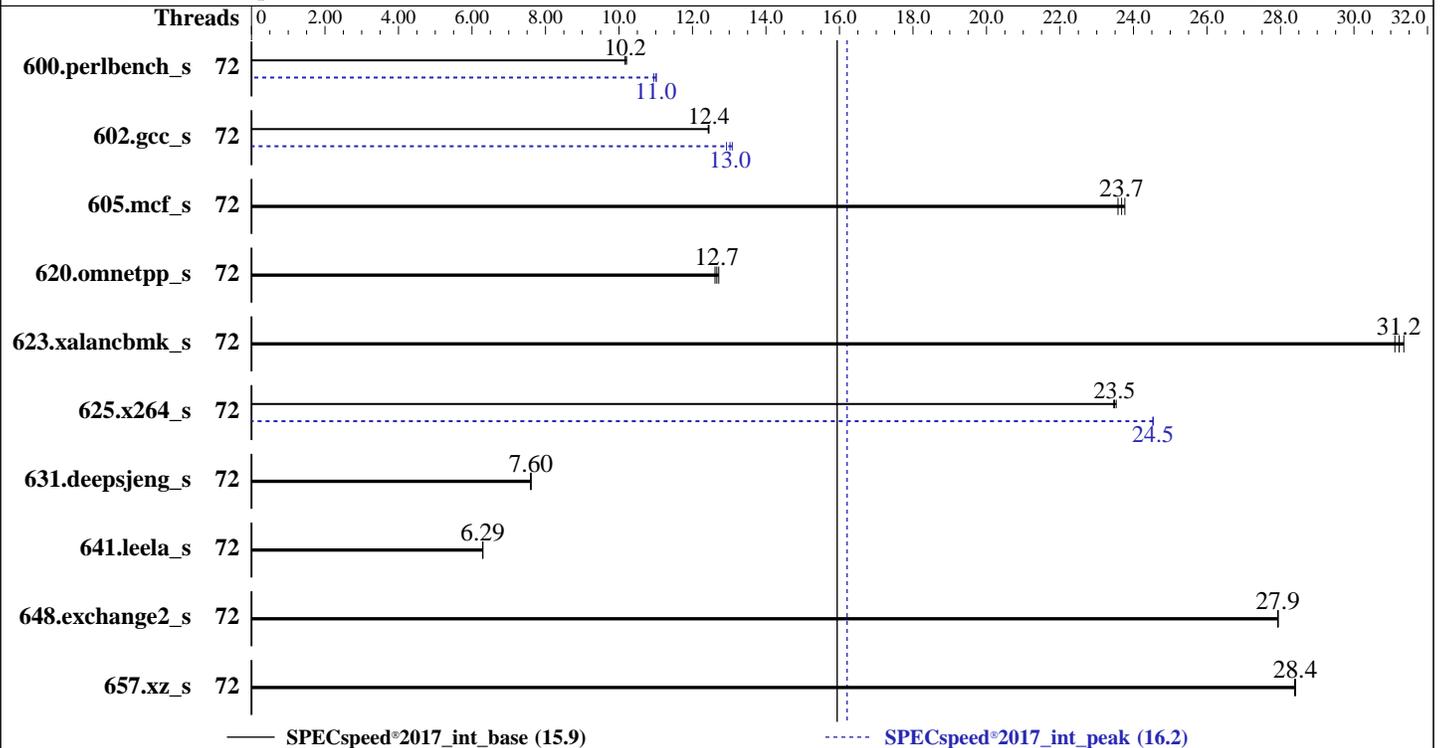
SuperServer SYS-241H-TNRTTP  
(X13QEH+ , Intel Xeon Gold 6416H)

SPECspeed®2017\_int\_base = 15.9

SPECspeed®2017\_int\_peak = 16.2

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

Test Date: Mar-2023  
Hardware Availability: Mar-2023  
Software Availability: Jun-2022



### Hardware

CPU Name: Intel Xeon Gold 6416H  
Max MHz: 4200  
Nominal: 2200  
Enabled: 72 cores, 4 chips  
Orderable: 4 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 (32 x 32 GB 2Rx8 PC5-4800B-R)  
Storage: 1 x 1.90 TB NVMe SSD  
Other: None

### Software

OS: SUSE Linux Enterprise Server 15 SP4  
5.14.21-150400.22-default  
Compiler: C/C++: Version 2023.0 of Intel oneAPI DPC++/C++  
Compiler for Linux;  
Fortran: Version 2023.0 of Intel Fortran Compiler  
for Linux;  
C/C++: Version 2023.0 of Intel C/C++ Compiler  
for Linux  
Parallel: Yes  
Firmware: Version 1.2 released Mar-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 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	72	<b>174</b>	<b>10.2</b>	175	10.2	174	10.2	72	162	10.9	161	11.0	<b>161</b>	<b>11.0</b>
602.gcc_s	72	320	12.4	<b>320</b>	<b>12.4</b>	320	12.4	72	308	12.9	<b>306</b>	<b>13.0</b>	304	13.1
605.mcf_s	72	199	23.8	200	23.6	<b>199</b>	<b>23.7</b>	72	199	23.8	200	23.6	<b>199</b>	<b>23.7</b>
620.omnetpp_s	72	<b>129</b>	<b>12.7</b>	128	12.7	129	12.6	72	<b>129</b>	<b>12.7</b>	128	12.7	129	12.6
623.xalancbmk_s	72	<b>45.4</b>	<b>31.2</b>	45.2	31.4	45.5	31.1	72	<b>45.4</b>	<b>31.2</b>	45.2	31.4	45.5	31.1
625.x264_s	72	75.2	23.5	<b>75.1</b>	<b>23.5</b>	75.0	23.5	72	71.9	24.5	71.9	24.5	<b>71.9</b>	<b>24.5</b>
631.deepsjeng_s	72	188	7.61	189	7.59	<b>188</b>	<b>7.60</b>	72	188	7.61	189	7.59	<b>188</b>	<b>7.60</b>
641.leela_s	72	<b>271</b>	<b>6.29</b>	271	6.29	271	6.29	72	<b>271</b>	<b>6.29</b>	271	6.29	271	6.29
648.exchange2_s	72	<b>105</b>	<b>27.9</b>	105	27.9	105	27.9	72	<b>105</b>	<b>27.9</b>	105	27.9	105	27.9
657.xz_s	72	218	28.4	218	28.4	<b>218</b>	<b>28.4</b>	72	218	28.4	218	28.4	<b>218</b>	<b>28.4</b>

SPECspeed®2017\_int\_base = **15.9**

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

## Compiler Notes

SPEC has ruled that the compiler used for this result was performing a compilation that specifically improves the performance of the 523.xalancbmk\_r / 623.xalancbmk\_s benchmarks using a priori knowledge of the SPEC code and dataset to perform a transformation that has narrow applicability.

In order to encourage optimizations that have wide applicability (see rule 1.4 [https://www.spec.org/cpu2017/Docs/runrules.html#rule\\_1.4](https://www.spec.org/cpu2017/Docs/runrules.html#rule_1.4)), SPEC will no longer publish results using this optimization.

This result is left in the SPEC results database for historical reference.

## 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/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

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## General Notes (Continued)

Filesystem page cache synced and cleared with:  
sync; echo 3> /proc/sys/vm/drop\_caches  
runcpu command invoked through numactl i.e.:  
numactl --interleave=all runcpu <etc>

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>

## Platform Notes

BIOS Settings:  
Hyper-Threading [ALL] = Disable  
Power Technology = Custom  
Power Performance Tuning = BIOS Controls EPB  
ENERGY\_PERF\_BIAS\_CFG mode = Extreme Performance

Sysinfo program /home/cpu2017/bin/sysinfo  
Rev: r6732 of 2022-11-07 fe91c89b7ed5c36ae2c92cc097bec197  
running on 160-115 Thu Mar 23 22:19:51 2023

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

### Table of contents

1. uname -a
  2. w
  3. Username
  4. ulimit -a
  5. sysinfo process ancestry
  6. /proc/cpuinfo
  7. lscpu
  8. numactl --hardware
  9. /proc/meminfo
  10. who -r
  11. Systemd service manager version: systemd 249 (249.11+suse.124.g2bc0b2c447)
  12. Services, from systemctl list-unit-files
  13. Linux kernel boot-time arguments, from /proc/cmdline
  14. cpupower frequency-info
  15. sysctl
  16. /sys/kernel/mm/transparent\_hugepage
  17. /sys/kernel/mm/transparent\_hugepage/khugepaged
  18. OS release
  19. Disk information
  20. /sys/devices/virtual/dmi/id
  21. dmidecode
  22. BIOS
- 
1. uname -a  
Linux 160-115 5.14.21-150400.22-default #1 SMP PREEMPT\_DYNAMIC Wed May 11 06:57:18 UTC 2022 (49db222)

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### Platform Notes (Continued)

x86\_64 x86\_64 x86\_64 GNU/Linux

```
-----
2. w
  22:19:51 up 9 min,  1 user,  load average: 0.00, 0.10, 0.10
USER      TTY      FROM            LOGIN@   IDLE   JCPU   PCPU   WHAT
root      tty1     -                22:14   6.00s  0.84s  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) 4125382
  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) 4125382
  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
  ic2023.0-lin-sapphirerapids-speed-20221201.cfg --define cores=72 --tune base,peak -o all --define
  intspeedaffinity --define drop_caches intspeed
  runcpu --nobuild --action validate --define default-platform-flags --configfile
  ic2023.0-lin-sapphirerapids-speed-20221201.cfg --define cores=72 --tune base,peak --output_format all
  --define intspeedaffinity --define drop_caches --nopower --runmode speed --tune base:peak --size refspeed
  intspeed --nopreenv --note-preenv --logfile $SPEC/tmp/CPU2017.007/templogs/preenv.intspeed.007.0.log
  --lognum 007.0 --from_runcpu 2
  specperl $SPEC/bin/sysinfo
  $SPEC = /home/cpu2017
```

```
-----
6. /proc/cpuinfo
  model name      : Intel(R) Xeon(R) Gold 6416H
  vendor_id      : GenuineIntel
  cpu family     : 6
  model          : 143
  stepping       : 7
  microcode      : 0x2b0001b0
  bugs           : spectre_v1 spectre_v2 spec_store_bypass swapgs
  cpu cores      : 18
  siblings       : 18
  4 physical ids (chips)
```

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### Platform Notes (Continued)

72 processors (hardware threads)  
physical id 0: core ids 0-17  
physical id 1: core ids 0-17  
physical id 2: core ids 0-17  
physical id 3: core ids 0-17  
physical id 0: apicids 0,2,4,6,8,10,12,14,16,18,20,22,24,26,28,30,32,34  
physical id 1: apicids 128,130,132,134,136,138,140,142,144,146,148,150,152,154,156,158,160,162  
physical id 2: apicids 256,258,260,262,264,266,268,270,272,274,276,278,280,282,284,286,288,290  
physical id 3: apicids 384,386,388,390,392,394,396,398,400,402,404,406,408,410,412,414,416,418  
Caution: /proc/cpuinfo data regarding chips, cores, and threads is not necessarily reliable, especially for virtualized systems. Use the above data carefully.

#### 7. lscpu

From lscpu from util-linux 2.37.2:

```
Architecture:          x86_64
CPU op-mode(s):       32-bit, 64-bit
Address sizes:        46 bits physical, 57 bits virtual
Byte Order:           Little Endian
CPU(s):               72
On-line CPU(s) list:  0-71
Vendor ID:            GenuineIntel
Model name:           Intel(R) Xeon(R) Gold 6416H
CPU family:           6
Model:                143
Thread(s) per core:  1
Core(s) per socket:  18
Socket(s):            4
Stepping:             7
Frequency boost:      enabled
CPU max MHz:          2201.0000
CPU min MHz:          800.0000
BogoMIPS:             4400.00
Flags:                fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36
                    clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp
                    lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology
                    nonstop_tsc cpuid aperfmperf tsc_known_freq pni pclmulqdq dtes64 monitor
                    ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtpr pdcm pcid dca sse4_1
                    sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave avx f16c rdrand
                    lahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3 cat_l2 cdp_l3
                    invpcid_single cdp_l2 ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow
                    vnmi flexpriority ept vpid ept_ad fsgsbase tsc_adjust bmi1 hle avx2 smep
                    bmi2 erms invpcid rtm cqm rdt_a avx512f avx512dq rdseed adx smap
                    avx512ifma clflushopt clwb intel_pt avx512cd sha_ni avx512bw avx512vl
                    xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total
                    cqm_mbm_local split_lock_detect avx_vnni avx512_bf16 wbnoinvd dtherm ida
                    arat pln pts avx512vbmi umip pku ospke waitpkg avx512_vbmi2 gfni vaes
                    vpclmulqdq avx512_vnni avx512_bitalg tme avx512_vpopcntdq la57 rdpid
                    bus_lock_detect cldemote movdiri movdir64b enqcmd fsrm md_clear serialize
                    tsxldtrk pconfig arch_lbr avx512_fp16 amx_tile flush_l1d arch_capabilities
Virtualization:       VT-x
L1d cache:            3.4 MiB (72 instances)
L1i cache:            2.3 MiB (72 instances)
L2 cache:             144 MiB (72 instances)
L3 cache:             180 MiB (4 instances)
NUMA node(s):        4
NUMA node0 CPU(s):   0-17
NUMA node1 CPU(s):   18-35
NUMA node2 CPU(s):   36-53
```

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### Platform Notes (Continued)

```

NUMA node3 CPU(s):          54-71
Vulnerability Itlb multihit: Not affected
Vulnerability Lltf:         Not affected
Vulnerability Mds:          Not affected
Vulnerability Meltdown:     Not affected
Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl and seccomp
Vulnerability Spectre v1:   Mitigation; usercopy/swapgs barriers and __user pointer sanitization
Vulnerability Spectre v2:   Mitigation; Enhanced IBRS, IBPB conditional, RSB filling
Vulnerability Srbds:        Not affected
Vulnerability Tsx async abort: Not affected

```

From lscpu --cache:

NAME	ONE-SIZE	ALL-SIZE	WAYS	TYPE	LEVEL	SETS	PHY-LINE	COHERENCY-SIZE
L1d	48K	3.4M	12	Data	1	64	1	64
L1i	32K	2.3M	8	Instruction	1	64	1	64
L2	2M	144M	16	Unified	2	2048	1	64
L3	45M	180M	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: 0-17
node 0 size: 257589 MB
node 0 free: 255053 MB
node 1 cpus: 18-35
node 1 size: 258043 MB
node 1 free: 254646 MB
node 2 cpus: 36-53
node 2 size: 258043 MB
node 2 free: 257679 MB
node 3 cpus: 54-71
node 3 size: 257693 MB
node 3 free: 257446 MB
node distances:
node  0  1  2  3
0:  10  21  21  21
1:  21  10  21  21
2:  21  21  10  21
3:  21  21  21  10

```

9. /proc/meminfo

MemTotal: 1056122728 kB

10. who -r

run-level 3 Mar 23 22:11

11. Systemd service manager version: systemd 249 (249.11+suse.124.g2bc0b2c447)

```

Default Target Status
multi-user      running

```

12. Services, from systemctl list-unit-files

```

STATE UNIT FILES
enabled YaST2-Firstboot YaST2-Second-Stage apparmor auditd bluetooth cron display-manager
firewalld getty@ haveged irqbalance iscsi issue-generator kbdsettings kdump kdump-early
klog lvm2-monitor nsd nvme-fc-boot-connections postfix purge-kernels rollback rsyslog

```

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### Platform Notes (Continued)

```

enabled-runtime smartd sshd wicked wickedd-auto4 wickedd-dhcp4 wickedd-dhcp6 wickedd-nanny
disabled         systemd-remount-fs
                 accounts-daemon appstream-sync-cache autofs autoyast-initscripts blk-availability
                 bluetooth-mesh boot-sysctl ca-certificates chrony-wait chronyd console-getty cups
                 cups-browsed debug-shell ebttables exchange-bmc-os-info gpm grub2-once haveged-switch-root
                 ipmi ipmievd iscsi-init iscsid iscsiuiio issue-add-ssh-keys kexec-load lunmask
                 man-db-create multipathd nfs nfs-blkmap nmb nvme-autoconnect ostree-remount rdisc rpchind
                 rpmconfigcheck rsyncd rtkit-daemon serial-getty@ smartd_generate_opts smb snmpd snmptrapd
                 speech-dispatcherd systemd-boot-check-no-failures systemd-network-generator systemd-sysext
                 systemd-time-wait-sync systemd-timesyncd udisks2 upower
indirect         wickedd

```

```

-----
13. Linux kernel boot-time arguments, from /proc/cmdline
BOOT_IMAGE=/boot/vmlinuz-5.14.21-150400.22-default
root=UUID=5b6b6b32-dc73-42a4-85d6-fdb51d3a1038
splash=silent
resume=/dev/disk/by-uuid/259ec5e7-1889-4b82-bca7-ab7cae8034d3
mitigations=auto
quiet
security=apparmor
crashkernel=321M,high
crashkernel=72M,low

```

```

-----
14. cpupower frequency-info
analyzing CPU 0:
  current policy: frequency should be within 800 MHz and 2.20 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          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

```

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### Platform Notes (Continued)

hpage\_pmd\_size 2097152  
shmem\_enabled always within\_size advise [never] deny force

-----  
17. /sys/kernel/mm/transparent\_hugepage/khugepaged  
alloc\_sleep\_millisecs 60000  
defrag 1  
max\_ptes\_none 511  
max\_ptes\_shared 256  
max\_ptes\_swap 64  
pages\_to\_scan 4096  
scan\_sleep\_millisecs 10000

-----  
18. OS release  
From /etc/\*-release /etc/\*-version  
os-release SUSE Linux Enterprise Server 15 SP4

-----  
19. Disk information  
SPEC is set to: /home/cpu2017  
Filesystem Type Size Used Avail Use% Mounted on  
/dev/nvme0n1p3 xfs 804G 491G 314G 62% /home

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

-----  
21. dmidecode  
Additional information from dmidecode 3.2 follows. WARNING: Use caution when you interpret this section. The 'dmidecode' program reads system data which is "intended to allow hardware to be accurately determined", but the intent may not be met, as there are frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.  
Memory:  
32x Samsung M321R4GA3BB6-CQKMG 32 GB 2 rank 4800

-----  
22. BIOS  
(This section combines info from /sys/devices and dmidecode.)  
BIOS Vendor: American Megatrends International, LLC.  
BIOS Version: 1.2  
BIOS Date: 03/17/2023  
BIOS Revision: 5.29

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

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 2023.0.0 Build 20221201  
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=====  
Fortran | 648.exchange2\_s(base, peak)

-----  
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2023.0.0 Build 20221201  
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### 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

### Base Optimization Flags

C benchmarks:

-m64 -std=c11 -Wl,-z,muldefs -xsapphirerapids -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

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# SPEC CPU®2017 Integer Speed Result

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## Supermicro

SuperServer SYS-241H-TNRTTP  
(X13QEH+ , Intel Xeon Gold 6416H)

SPECspeed®2017\_int\_base = 15.9

SPECspeed®2017\_int\_peak = 16.2

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

**Test Date:** Mar-2023  
**Hardware Availability:** Mar-2023  
**Software Availability:** Jun-2022

## Base Optimization Flags (Continued)

C++ benchmarks:

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

Fortran benchmarks:

```
-m64 -Wl,-z,muldefs -xsapphirerapids -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: -m64 -std=c11 -Wl,-z,muldefs -fprofile-generate(pass 1)
-fprofile-use=default.profddata(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
```

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# SPEC CPU®2017 Integer Speed Result

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## Supermicro

SuperServer SYS-241H-TNRTTP  
(X13QEH+ , Intel Xeon Gold 6416H)

SPECspeed®2017\_int\_base = 15.9

SPECspeed®2017\_int\_peak = 16.2

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

**Test Date:** Mar-2023  
**Hardware Availability:** Mar-2023  
**Software Availability:** Jun-2022

## Peak Optimization Flags (Continued)

```
602.gcc_s: -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: -m64 -std=c11 -Wl,-z,muldefs -xsapphirerapids -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-ic2023-official-linux64.html>

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

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

<http://www.spec.org/cpu2017/flags/Intel-ic2023-official-linux64.xml>

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

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