## SPEC CPU®2017 Integer Speed Result

**Supermicro**
SuperServer SYS-121H-TNR  
(X13DEM, Intel Xeon Gold 6418H)

<table>
<thead>
<tr>
<th>SPECspeed®2017_int_base</th>
<th>SPECspeed®2017_int_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.1</td>
<td>15.3</td>
</tr>
</tbody>
</table>

### CPU2017 License: 001176  
Test Sponsor: Supermicro  
Tested by: Supermicro  
Test Date: Nov-2022  
Hardware Availability: Jan-2023  
Software Availability: Jun-2022

### Hardware
- **CPU Name:** Intel Xeon Gold 6418H  
  - **Max MHz:** 4000  
  - **Nominal:** 2100  
  - **Enabled:** 48 cores, 2 chips  
  - **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:** 60 MB I+D on chip per chip  
  - **Other:** None  
- **Memory:** 2 TB (32 x 64 GB 2Rx4 PC5-4800B-R, running at 4400)  
- **Storage:** 1 x 960 GB SATA III SSD  
- **Other:** None

### Software
- **OS:** SUSE Linux Enterprise Server 15 SP4  
  - **Kernel:** 5.14.21-150400.22-default  
- **Compiler:** C/C++: Version 2022.1 of Intel oneAPI DPC++/C++ Compiler for Linux;  
  - **Fortran:** Version 2022.1 of Intel Fortran Compiler for Linux;  
- **Parallel:** Yes  
- **Firmware:** Version 1.0a released Nov-2022  
- **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.

### SPECbenchmarks

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECspeed®2017_int_base</th>
<th>SPECspeed®2017_int_peak</th>
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<tbody>
<tr>
<td>perlbench</td>
<td>48</td>
<td>9.69</td>
<td>10.6</td>
</tr>
<tr>
<td>gcc</td>
<td>48</td>
<td>12.0</td>
<td>22.9</td>
</tr>
<tr>
<td>mcf</td>
<td>48</td>
<td>12.6</td>
<td></td>
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<tr>
<td>omnetpp</td>
<td>48</td>
<td></td>
<td></td>
</tr>
<tr>
<td>xalancbmk</td>
<td>48</td>
<td></td>
<td></td>
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<tr>
<td>x264</td>
<td>48</td>
<td></td>
<td></td>
</tr>
<tr>
<td>deepsjeng</td>
<td>48</td>
<td>7.36</td>
<td></td>
</tr>
<tr>
<td>leela</td>
<td>48</td>
<td>5.94</td>
<td></td>
</tr>
<tr>
<td>exchange2</td>
<td>48</td>
<td></td>
<td></td>
</tr>
<tr>
<td>xz</td>
<td>48</td>
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Supermicro
SuperServer SYS-121H-TNR
(X13DEM , Intel Xeon Gold 6418H)

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

SPECspeed®2017_int_base = 15.1
SPECspeed®2017_int_peak = 15.3

Test Date: Nov-2022
Hardware Availability: Jan-2023
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Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td>48</td>
<td>185</td>
<td>9.60</td>
<td>185</td>
<td>9.60</td>
<td>184</td>
<td>9.63</td>
<td>48</td>
<td>167</td>
<td>10.6</td>
<td>167</td>
<td>10.6</td>
<td>167</td>
<td>10.6</td>
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<tr>
<td>602.gcc_s</td>
<td>48</td>
<td>330</td>
<td>12.1</td>
<td>333</td>
<td>12.0</td>
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<td>12.0</td>
<td>48</td>
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<td>12.6</td>
<td>318</td>
<td>12.5</td>
<td>317</td>
<td>12.6</td>
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<tr>
<td>605.mcf_s</td>
<td>48</td>
<td>204</td>
<td>23.1</td>
<td>207</td>
<td>22.8</td>
<td>206</td>
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<td>48</td>
<td>204</td>
<td>23.1</td>
<td>207</td>
<td>22.8</td>
<td>206</td>
<td>22.9</td>
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<tr>
<td>620.omnetpp_s</td>
<td>48</td>
<td>129</td>
<td>12.6</td>
<td>129</td>
<td>12.6</td>
<td>125</td>
<td>13.1</td>
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<td>623.xalanchmk_s</td>
<td>48</td>
<td>49.9</td>
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<td>28.5</td>
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<td>28.5</td>
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<td>22.7</td>
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<td>5.94</td>
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<td>5.94</td>
<td>287</td>
<td>5.95</td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>48</td>
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<td>23.5</td>
<td>125</td>
<td>23.5</td>
<td>125</td>
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<td>48</td>
<td>125</td>
<td>23.5</td>
<td>125</td>
<td>23.5</td>
<td>125</td>
<td>23.5</td>
</tr>
</tbody>
</table>

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.xalanchmk_r / 623.xalanchmk_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), 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"
MALLOCONF = "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

(Continued on next page)
General Notes (Continued)

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

Platform Notes

BIOS Settings:
Power Technology = Custom
Power Performance Tuning = BIOS Controls EPB
ENERGY_PERF_BIAS_CFG mode = Performance
DCU Streamer Prefetcher = Disable
Hyper-Threading [ALL] = Disable
LLC Dead Line Alloc = Disable
KTI Prefetch = Enable
Stale AtoS = Disable
Patrol Scrub = Disable

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acafc64d
running on localhost Fri Nov 25 06:05:57 2022

SUT (System Under Test) info as seen by some common utilities.
For more information on this section, see
https://www.spec.org/cpu2017/Docs/config.html#sysinfo

From /proc/cpuinfo
  model name : Intel(R) Xeon(R) Gold 6418H
  2 "physical id"s (chips)
  48 "processors"
  cores, siblings (Caution: counting these is hw and system dependent. The following
  excerpts from /proc/cpuinfo might not be reliable. Use with caution.)
  cpu cores : 24
  siblings : 24
  physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
  physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23

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): 48
  On-line CPU(s) list: 0-47
  Vendor ID: GenuineIntel
  Model name: Intel(R) Xeon(R) Gold 6418H
  CPU family: 6
  Model: 143
  Thread(s) per core: 1
  Core(s) per socket: 24
  Socket(s): 2

(Continued on next page)
### Platform Notes (Continued)

- **Stepping:** 8
- **Frequency boost:** enabled
- **CPU max MHz:** 2101.0000
- **CPU min MHz:** 800.0000
- **BogoMIPS:** 4200.00
- **Flags:**
  - fpu
  - vme
  - de
  - pse
  - tsc
  - mce
  - cx8
  - apic
  - sep
  - mtrr
  - pge
  - mca
  - cmov
  - pat
  - pse36
  - clflush
  - dts
  - acpi
  - mmx
  - fxsr
  - sse
  - sse2
  - ssse3
  - sse4_1
  - sse4_2
  - x2apic
  - movbe
  - popcnt
  - tsc_deadline_timer
  - aes
  - x86_64
- **CPU max MHz:** 2101.0000
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  - sse2
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  - sse4_2
  - x2apic
  - movbe
  - popcnt
  - tsc_deadline_timer
  - aes
  - x86_64

### CPU2017 License:
- **001176**

### Test Date:
- **Nov-2022**

### Test Sponsor:
- **Supermicro**

### Hardware Availability:
- **Jan-2023**

### Software Availability:
- **Jun-2022**

### Platform Notes (Continued)

- **Vulnerability Itlb multihit:** Not affected
- **Vulnerability L1tbf:** 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 sanitation
- **Vulnerability Spectre v2:** Mitigation; Enhanced IBRS, IBPB conditional, RSB filling
- **Vulnerability Srbds:** Not affected
- **Vulnerability Tax async abort:** Not affected
Supermicro
SuperServer SYS-121H-TNR (X13DEM, Intel Xeon Gold 6418H)  SPECspeed®2017_int_base = 15.1
SPECspeed®2017_int_peak = 15.3

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Platform Notes (Continued)

node 1 free: 1031084 MB
node distances:
node 0 1
 0: 10 21
 1: 21 10

From /proc/meminfo
MemTotal: 2113490296 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

/sys/devices/system/cpu/cpu*/cpufreq/scaling_governor has ondemand

From /etc/*release* /etc/*version*
NAME="SLES"
VERSION="15-SP4"
VERSION_ID="15.4"
PRETTY_NAME="SUSE Linux Enterprise Server 15 SP4"
ID="sles"
ID_LIKE="suse"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:15:sp4"

uname -a:
Linux localhost 5.14.21-150400.22-default #1 SMP PREEMPT_DYNAMIC Wed May 11 06:57:18 UTC 2022 (49db222) x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2018-12207 (iTLB Multihit): Not affected
CVE-2018-3620 (L1 Terminal Fault): Not affected
Microarchitectural Data Sampling: Not affected
CVE-2017-5754 (Meldown): Not affected
CVE-2018-3639 (Speculative Store Bypass): Mitigation: Speculative Store Bypass disabled via prctl and seccomp
CVE-2017-5753 (Spectre variant 1): Mitigation: usercopy/swapgs barriers and __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling
CVE-2020-0543 (Special Register Buffer Data Sampling): Not affected
CVE-2019-11135 (TSX Asynchronous Abort): Not affected

run-level 3 Nov 25 06:02

SPEC is set to: /home/cpu2017
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda2 xfs 892G 8.4G 883G 1% /

From /sys/devices/virtual/dmi/id
Vendor: Supermicro
Product: Super Server
Product Family: Family
Serial: 0123456789

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
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SuperServer SYS-121H-TNR
(X13DEM, Intel Xeon Gold 6418H)

SPECspeed®2017_int_base = 15.1
SPECspeed®2017_int_peak = 15.3

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

Platform Notes (Continued)
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:
28x SK Hynix HMCG94MEBRA109N 64 GB 2 rank 4800, configured at 4400
4x SK Hynix HMCG94MEBRA124N 64 GB 2 rank 4800, configured at 4400

BIOS:
BIOS Vendor: American Megatrends International, LLC.
BIOS Version: 1.0a
BIOS Date: 11/18/2022
BIOS Revision: 5.29

(End of data from sysinfo program)

Compiler Version Notes

<table>
<thead>
<tr>
<th>C</th>
<th>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)</th>
</tr>
</thead>
</table>

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

<table>
<thead>
<tr>
<th>C++</th>
<th>620.omnetpp_s(base, peak) 623.xalancbmk_s(base, peak) 631.deepsjeng_s(base, peak) 641.leela_s(base, peak)</th>
</tr>
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</table>

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2022.1.0 Build 20220316
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<table>
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<tr>
<th>Fortran</th>
<th>648.exchange2_s(base, peak)</th>
</tr>
</thead>
</table>

Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version 2022.1.0 Build 20220316
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Base Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

Fortran benchmarks:
ifx
**SPEC CPU®2017 Integer Speed Result**

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<td>Software Availability:</td>
<td>Jun-2022</td>
</tr>
</tbody>
</table>

### 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  -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:**
-m64  -Wl,-z,muldefs  -xcORE-AVX512  -O3  -ffast-math  -flto  
-mfpmath=sse  -funroll-loops  -qopt-mem-layout-trans=4  
-FL/usr/local/jemalloc64-5.0.1/lib -ljemalloc

**Fortran benchmarks:**
-m64  -Wl,-z,muldefs  -xcORE-AVX512  -O3  -ffast-math  -flto  
-mfpmath=sse  -funroll-loops  -qopt-mem-layout-trans=4  
-nostandard-realloc-lhs  -align array32byte  
-FL/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-use=default.profdata(pass 2) -xCORE-AVX512 -O3
-ffast-math -flto -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: -m64 -std=c11 -Wl,-z,muldefs -fprofile-use=default.profdata(pass 2) -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

605.mcf_s: basepeak = yes

625.x264_s: -m64 -std=c11 -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:

648.exchange2_s: basepeak = yes
Supermicro
SuperServer SYS-121H-TNR
(X13DEM, Intel Xeon Gold 6418H)

SPECspeed\textsuperscript{\textregistered}2017\textunderscore int\textunderscore base = 15.1
SPECspeed\textsuperscript{\textregistered}2017\textunderscore int\textunderscore peak = 15.3

\begin{tabular}{|l|l|}
\hline
CPU2017 License: & 001176 \\
Test Sponsor: & Supermicro \\
Tested by: & Supermicro \\
\hline
Test Date: & Nov-2022 \\
Hardware Availability: & Jan-2023 \\
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\hline
\end{tabular}

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

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Supermicro-Platform-Settings-V1.2-SPR-revC.xml

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For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

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