Supermicro
SuperServer 2049U-TR4

**SPEC CPU®2017 Integer Speed Result**

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed®2017_int_base = 10.9</th>
</tr>
</thead>
<tbody>
<tr>
<td>600.perlbench_s 80</td>
<td>6.70</td>
</tr>
<tr>
<td>602.gcc_s 80</td>
<td>9.96</td>
</tr>
<tr>
<td>605.mcf_s 80</td>
<td>16.9</td>
</tr>
<tr>
<td>620.omnetpp_s 80</td>
<td>9.44</td>
</tr>
<tr>
<td>623.xalancbk_s 80</td>
<td>13.5</td>
</tr>
<tr>
<td>625.x264_s 80</td>
<td>15.8</td>
</tr>
<tr>
<td>631.deepsjeng_s 80</td>
<td>5.64</td>
</tr>
<tr>
<td>641.leela_s 80</td>
<td>4.78</td>
</tr>
<tr>
<td>648.exchange2_s 80</td>
<td>16.5</td>
</tr>
<tr>
<td>657.xz_s 80</td>
<td></td>
</tr>
</tbody>
</table>

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**Hardware**

- **CPU Name:** Intel Xeon Gold 6230
- **Max MHz:** 3900
- **Nominal:** 2100
- **Enabled:** 80 cores, 4 chips
- **Orderable:** 1,2,4 chips
- **Cache L1:** 32 KB I + 32 KB D on chip per core
- **Cache L2:** 1 MB I+D on chip per core
- **Cache L3:** 27.5 MB I+D on chip per chip
- **Memory:** 3 TB (48 x 64 GB 2Rx4 PC4-2933Y-R)
- **Storage:** 800 GB SATA 3 SSD
- **Other:** None

**Software**

- **OS:** Red Hat Enterprise Linux release 8.1
  4.18.0-147.el8.x86_64
- **Compiler:** C/C++: Version 19.1.1.217 of Intel C/C++ Compiler for Linux;
  Fortran: Version 19.1.1.217 of Intel Fortran Compiler for Linux
- **Parallel:** Yes
- **Firmware:** Version 3.3 released Feb-2020
- **File System:** xfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** Not Applicable
- **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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<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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<tbody>
<tr>
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<td>15.8</td>
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<td>631.deepsjeng_s</td>
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<td>5.63</td>
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<td>4.78</td>
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<td>648.exchange2_s</td>
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<td>16.5</td>
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<td>16.2</td>
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<td>657.xz_s</td>
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<td>271</td>
<td>22.8</td>
<td>270</td>
<td>22.9</td>
</tr>
</tbody>
</table>

Results Table

Compiler Notes
The inconsistent Compiler version information under Compiler Version section is due to a discrepancy in Intel Compiler. The correct version of C/C++ compiler is: Version 19.1.1.217 Build 20200306 Compiler for Linux

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 1x Intel Core i9-7980XE CPU + 64GB 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)
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

Platform Notes

BIOS Settings:
Hyper-Threading = Disable
Intel Virtualization Technology = Disable
Power Technology = Custom
Power Performance Tuning = BIOS Controls EPB
Energy Performance BIAS Setting = Performance
Super Performance Mode = Enable
Enhanced Halt State (C1E) = Disable
Stale Atos = Enable
LLC Dead Line Alloc = Disable
IMC Interleaving = 1-way Interleave
Patrol Scrub = Disable

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7ed1b6e46a485a0011
running on 174-45.pnet Fri Jun 19 10:18:35 2020

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 6230 CPU @ 2.10GHz
        4 "physical id"s (chips)
        80 "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 : 20
siblings : 20
physical 0: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28
physical 1: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28
physical 2: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28
physical 3: cores 0 1 2 3 4 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28

From lscpu:
Platform Notes (Continued)

Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 80
On-line CPU(s) list: 0-79
Thread(s) per core: 1
Core(s) per socket: 20
Socket(s): 4
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 6230 CPU @ 2.10GHz
Stepping: 7
CPU MHz: 895.418
CPU max MHz: 3900.0000
CPU min MHz: 800.0000
BogoMIPS: 4200.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 28160K
NUMA node0 CPU(s): 0-19
NUMA node1 CPU(s): 20-39
NUMA node2 CPU(s): 40-59
NUMA node3 CPU(s): 60-79
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 arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
aperfmpref fpi pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16
xtrr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes xsave
avx f16c rdrand lahf_lm abm 3nowprefetch cpuid_fault epb cat_l3 cdp_l3
invpcid_single intel_ppin ssbd mba ibpb stibp ibrs_enhanced tpr_shadow vmni
flexpriority ept vpid fsgbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm
cqm mpx rdtd_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd
avx512bw avx512vl xsavesopt xsaves xgetbv1 xsaves cqm_llc cqm_occupy_llc cqm_mbb_total
cqm_mbb_local dtherm ida arat pln pts pku ospke avx512_vnni md_clear flush_l1d
arch_capabilities

/proc/cpuinfo cache data
cache size: 28160 KB

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a
physical chip.
available: 4 nodes (0-3)
node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19

(Continued on next page)
SPEC®CPU2017 Integer Speed Result

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SPECSpeed®2017_int_base = 10.9
SPECSpeed®2017_int_peak = Not Run

CPU2017 License: 001176
Test Sponsor: Supermicro
Test Date: Jun-2020
Tested by: Supermicro
Hardware Availability: Apr-2019
Software Availability: Apr-2020

Platform Notes (Continued)

node 0 size: 773642 MB
node 0 free: 773229 MB
node 1 size: 774139 MB
node 1 free: 773685 MB
node 2 size: 774139 MB
node 2 free: 773392 MB
node 3 size: 774138 MB
node 3 free: 773711 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

From /proc/meminfo
MemTotal:       3170365480 kB
HugePages_Total:       0
Hugepagesize:       2048 kB

From /etc/*release* /etc/*version*

os-release:
  NAME="Red Hat Enterprise Linux"
  VERSION="8.1 (Ootpa)"
  ID="rhel"
  ID_LIKE="fedora"
  VERSION_ID="8.1"
  PLATFORM_ID="platform:el8"
  PRETTY_NAME="Red Hat Enterprise Linux 8.1 (Ootpa)"
  ANSI_COLOR="0;31"
redhat-release: Red Hat Enterprise Linux release 8.1 (Ootpa)
system-release: Red Hat Enterprise Linux release 8.1 (Ootpa)
system-release-cpe: cpe:/o:redhat:enterprise_linux:8.1:ga

uname -a:
Linux 174-45.pnet 4.18.0-147.el8.x86_64 #1 SMP Thu Sep 26 15:52:44 UTC 2019 x86_64
   x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2018-3620 (L1 Terminal Fault): Not affected
Microarchitectural Data Sampling: Not affected
CVE-2017-5754 (Meltdown): Not affected
CVE-2018-3639 (Speculative Store Bypass): Mitigation: Speculative Store Bypass disabled

(Continued on next page)
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Test Date: Jun-2020
Hardware Availability: Apr-2019
Software Availability: Apr-2020

Platform Notes (Continued)

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

run-level 3 Jun 19 10:18

SPEC is set to: /home/cpu2017

Filesystem Type Size Used Avail Use% Mounted on
/dev/mapper/rhel-home xfs 690G 12G 678G 2% /home

From /sys/devices/virtual/dmi/id
BIOS: American Megatrends Inc. 3.3 02/25/2020
Vendor: Supermicro
Product: X11QPH+
Product Family: SMC X11
Serial: 123456789

Additional information from dmidecode 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:
48x Samsung M393A8G40MB2-CVF 64 GB 2 rank 2933

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
C     | 600.perlbench_s(base) 602.gcc_s(base) 605.mcf_s(base)
     | 625.x264_s(base) 657.xz_s(base)
==============================================================================

Intel(R) C Compiler for applications running on Intel(R) 64, Version 2021.1
NextGen Build 20200304
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

==============================================================================
C++   | 620.omnetpp_s(base) 623.xalancbmk_s(base) 631.deepsjeng_s(base)
     | 641.leela_s(base)
==============================================================================

Intel(R) C++ Compiler for applications running on Intel(R) 64, Version 2021.1
NextGen Build 20200304
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

(Continued on next page)
**Compiler Version Notes (Continued)**

```plaintext
Fortran | 648.exchange2_s(base)
```

```
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R) 64, Version 19.1.1.217 Build 20200306
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
```

---

**Base Compiler Invocation**

**C benchmarks:**

- icc

**C++ benchmarks:**

- icpc

**Fortran benchmarks:**

- ifort

---

**Base Portability Flags**

```plaintext
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 -qnextgen -std=c11
- -Wl, -plugin-opt = -x86-branches-within-32B-boundsaries -Wl, -z, muldefs
- -xCORE-AVX512 -O3 -ffast-math -flto -mfpmath=sse -funroll-loops
- -fuse-ld=gold -qopt-mem-layout-trans=4 -fopenmp -DSPEC_OPENMP

(Continued on next page)
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**CPU2017 License:** 001176  
**Test Sponsor:** Supermicro  
**Test Date:** Jun-2020  
**Hardware Availability:** Apr-2019  
**Tested by:** Supermicro  
**Software Availability:** Apr-2020

### Base Optimization Flags (Continued)

C benchmarks (continued):
- `-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc`

C++ benchmarks:
- `-m64 -qnextgen -Wl,-plugin-opt=-x86-branches-within-32B-boundaries`
- `-Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto -mfpmath=sse`
- `-funroll-loops -fuse-ld=gold -qopt-mem-layout-trans=4`
- `-L/usr/local/IntelCompiler19/compilers_and_libraries_2020.1.217/linux/compiler/lib/intel64_lin -lqmkmalloc`

Fortran benchmarks:
- `-m64 -Wl,-plugin-opt=-x86-branches-within-32B-boundaries -xCORE-AVX512`
- `-O3 -ipo -no-prec-div -qopt-mem-layout-trans=4`
- `-nostandard-realloc-lhs -align array32byte`
- `-mbranches-within-32B-boundaries`

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-CLX-revH.xml](http://www.spec.org/cpu2017/flags/Supermicro-Platform-Settings-V1.2-CLX-revH.xml)

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