ASUSTeK Computer Inc.
ASUS ESC8000 G4(Z11PG-D24) Server System
(3.00 GHz, Intel Xeon Gold 6248R)

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<td>11.7</td>
<td>11.9</td>
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</tbody>
</table>

CPU2017 License: 9016
Test Sponsor: ASUSTeK Computer Inc.
Test Date: Jun-2020
Hardware Availability: Feb-2020

### Hardware
- **CPU Name:** Intel Xeon Gold 6248R
- **Max MHz:** 4000
- **Nominal:** 3000
- **Enabled:** 48 cores, 2 chips
- **Orderable:** 1, 2 chip(s)
- **Cache L1:** 32 KB I + 32 KB D on chip per core
- **L2:** 1 MB I+D on chip per core
- **L3:** 35.75 MB I+D on chip per chip
- **Memory:** 768 GB (24 x 32 GB 2Rx4 PC4-2933Y-R)
- **Storage:** 1 x 1 TB SATA SSD
- **Other:** None

### Software
- **OS:** SUSE Linux Enterprise Server 15 SP1
- **Kernel:** 4.12.14-195-default
- **Compiler:** C/C++: Version 19.1.1.217 of Intel C/C++ Compiler Build 20200306 for Linux;
  Fortran: Version 19.1.1.217 of Intel Fortran Compiler Build 20200306 for Linux
- **Parallel:** Yes
- **Firmware:** Version 6102 released Dec-2019
- **File System:** xfs
- **System State:** Run level 3 (multi-user)
- **Base Pointers:** 64-bit
- **Peak Pointers:** 64-bit
- **Other:** jemalloc: jemalloc memory allocator library V5.0.1
- **Power Management:** BIOS and OS set to prefer performance at the cost of additional power usage
ASUSTeK Computer Inc.
ASUS ESC8000 G4(Z11PG-D24) Server System
(3.00 GHz, Intel Xeon Gold 6248R)

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds Base</th>
<th>Ratio Base</th>
<th>Seconds Peak</th>
<th>Ratio Peak</th>
<th>Threads</th>
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<th>Seconds Peak</th>
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</tr>
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<tbody>
<tr>
<td>600.perlbench_s</td>
<td>48</td>
<td>257</td>
<td>6.90</td>
<td>259</td>
<td>6.86</td>
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<td>6.92</td>
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<tr>
<td>602.gcc_s</td>
<td>48</td>
<td>364</td>
<td>10.9</td>
<td>366</td>
<td>10.9</td>
<td>360</td>
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<tr>
<td>605.mcf_s</td>
<td>48</td>
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<td>19.5</td>
<td>242</td>
<td>19.5</td>
<td>241</td>
<td>19.6</td>
<td></td>
<td></td>
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<tr>
<td>620.omnetpp_s</td>
<td>48</td>
<td>152</td>
<td>10.7</td>
<td>146</td>
<td>11.2</td>
<td>143</td>
<td>11.4</td>
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<tr>
<td>623.xalanchmk_s</td>
<td>48</td>
<td>101</td>
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<td>102</td>
<td>13.8</td>
<td>101</td>
<td>14.0</td>
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<tr>
<td>625.x264_s</td>
<td>48</td>
<td>106</td>
<td>16.6</td>
<td>106</td>
<td>16.6</td>
<td>106</td>
<td>16.6</td>
<td></td>
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</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>48</td>
<td>240</td>
<td>5.97</td>
<td>240</td>
<td>5.98</td>
<td>240</td>
<td>5.97</td>
<td></td>
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<td>641.leela_s</td>
<td>48</td>
<td>347</td>
<td>4.92</td>
<td>347</td>
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<td>347</td>
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<td>648.exchange2_s</td>
<td>48</td>
<td>174</td>
<td>16.9</td>
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Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

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
The correct version of Fortran compiler is: Version 19.1.1.217 Build 20200306 Compiler for Linux

Operating System Notes
Stack size set to unlimited using "ulimit -s unlimited"
OS set to performance mode via cpupower frequency-set -g performance

Environment Variables Notes
Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=fine,scatter"
LD_LIBRARY_PATH = "/191u1/lib/intel64:/191u1/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:

(Continued on next page)
General Notes (Continued)

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.

The jemalloc library was configured and built at default for 32bit (i686) and 64bit (x86_64) targets; 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 Configuration:
VT-d = Disabled
Patrol Scrub = Disabled
ENERGY_PERF_BIAS_CFG mode = performance
HyperThreading = Disabled
CSM Support = Disabled
Engine Boost = Level3(Max)
Enforce POR = Disable
Memory Frequency = 2933
LLC dead line allc = Disabled
SR-IOV Support = Disabled

Sysinfo program /191u1/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edble6e46a485a0011 running on linux-628j Tue Jun 23 05:20:26 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 6248R CPU @ 3.00GHz
    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

(Continued on next page)
**SPEC CPU®2017 Integer Speed Result**

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CPU2017 License: 9016
Test Sponsor: ASUSTeK Computer Inc.
Tested by: ASUSTeK Computer Inc.

Test Date: Jun-2020
Hardware Availability: Feb-2020
Software Availability: Apr-2020

**Platform Notes (Continued)**

physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 25 26 27 28 29
physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 25 26 27 28 29

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
Address sizes: 46 bits physical, 48 bits virtual
CPU(s): 48
On-line CPU(s) list: 0-47
Thread(s) per core: 1
Core(s) per socket: 24
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 6248R CPU @ 3.00GHz
Stepping: 7
CPU MHz: 3000.000
CPU max MHz: 4000.0000
CPU min MHz: 1200.0000
BogoMIPS: 6000.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 36608K
NUMA node0 CPU(s): 0-23
NUMA node1 CPU(s): 24-47
Flags:
   fpu vme de pse tsc msr pae mce cmov 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 pbe bts rep_good nopl xtopology nonstop_tsc cpuid aperfmperf pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xprtl 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 cdp_l3 invpcid_single intel_pni ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 irls invpcid rdmsky cmip mpx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsavec xsaveopt xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbb_local dtherm ida arat pln pts hwp hwp_act_window hwp_epp hwp_pkg_req pku ospke avx512_vnni md_clear flush_lld arch_capabilities

/proc/cpuinfo cache data
   cache size: 36608 KB

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a
SPEC CPU®2017 Integer Speed Result

ASUSTeK Computer Inc.
ASUS ESC8000 G4(Z11PG-D24) Server System
(3.00 GHz, Intel Xeon Gold 6248R)

SPECspeed®2017_int_base = 11.7
SPECspeed®2017_int_peak = 11.9

CPU2017 License: 9016
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Tested by: ASUSTeK Computer Inc.

Test Date: Jun-2020
Hardware Availability: Feb-2020
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Platform Notes (Continued)

physical chip.
available: 2 nodes (0-1)
node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
node 0 size: 385613 MB
node 0 free: 384900 MB
node 1 cpus: 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47
node 1 size: 387036 MB
node 1 free: 385934 MB
node distances:
node 0 1
0: 10 21
1: 21 10

From /proc/meminfo
MemTotal: 791194356 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
os-release:
NAME="SLES"
VERSION="15-SP1"
VERSION_ID="15.1"
PRETTY_NAME="SUSE Linux Enterprise Server 15 SP1"
ID="sles"
ID_LIKE="suse"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:15:sp1"

uname -a:
Linux linux-628j 4.12.14-195-default #1 SMP Tue May 7 10:55:11 UTC 2019 (8fba516)
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 via prctl and seccomp
CVE-2017-5753 (Spectre variant 1): Mitigation: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling

run-level 3 Jun 22 21:29
SPEC is set to: /191u1

(Continued on next page)
SPEC CPU®2017 Integer Speed Result

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CPU2017 License: 9016
Test Sponsor: ASUSTeK Computer Inc.
Tested by: ASUSTeK Computer Inc.

Platform Notes (Continued)

Filesystem     Type  Size  Used  Avail  Use%  Mounted on
/dev/sda4      xfs   932G   27G  905G   3%  /

From /sys/devices/virtual/dmi/id
BIOS: American Megatrends Inc. 6102 12/19/2019
Vendor: ASUSTeK COMPUTER INC.
Product: Z11PG-D24 Series
Product Family: Server
Serial: System Serial Number

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:
24x Samsung M393A4K40CB2-CVF 32 GB 2 rank 2933

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
C       | 600.perlbench_s(base) 602.gcc_s(base, peak) 605.mcf_s(base, peak)
         | 625.x264_s(base, peak) 657.xz_s(base, peak)
------------------------------------------------------------------------------
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       | 600.perlbench_s(peak)
------------------------------------------------------------------------------
Intel(R) C 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.
------------------------------------------------------------------------------

C       | 600.perlbench_s(base) 602.gcc_s(base, peak) 605.mcf_s(base, peak)
         | 625.x264_s(base, peak) 657.xz_s(base, peak)
------------------------------------------------------------------------------
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)
# SPEC CPU®2017 Integer Speed Result

**ASUSTeK Computer Inc.**

ASUS ESC8000 G4(Z11PG-D24) Server System

(3.00 GHz, Intel Xeon Gold 6248R)

| SPECspeed®2017_int_base = 11.7 |
| SPECspeed®2017_int_peak = 11.9 |

**CPU2017 License:** 9016

**Test Sponsor:** ASUSTeK Computer Inc.

**Tested by:** ASUSTeK Computer Inc.

**Test Date:** Jun-2020

**Hardware Availability:** Feb-2020

**Software Availability:** Apr-2020

## Compiler Version Notes (Continued)

| C | 600.perlbench_s(peak) |
|---------------------------------|
| Intel(R) C 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. |

| C++ | 620.omnetpp_s(base, peak) 623.xalancbmk_s(base, peak) 631.deepsjeng_s(base, peak) 641.leela_s(base, peak) |
|---------------------------------|
| 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. |

| Fortran | 648.exchange2_s(base, peak) |
|---------------------------------|
| 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

- 600.perlbench_s: -DSPEC_LP64 -DSPEC_LINUX_X64
- 602.gcc_s: -DSPEC_LP64
- 605.mcf_s: -DSPEC_LP64
- 620.omnetpp_s: -DSPEC_LP64

(Continued on next page)
Base Portability Flags (Continued)

623.xalancbmk_s: -DSPEC_LP64 -DSPEC_LINUX
625.x264_s: -DSPEC_LP64
631.deepsjeng_s: -DSPEC_LP64
641.leea_s: -DSPEC_LP64
648.exchange2_s: -DSPEC_LP64
657.xz_s: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-\texttt{-m64 -qnextgen -std=c11}
-\texttt{-Wl,-plugin-opt=-x86-branches-within-32B-boundaries -Wl,-z,muldefs}
-\texttt{-xCORE-AVX512 -O3 -ffast-math -flto -mfpmath=sse -funroll-loops}
-\texttt{-fuse-ld=gold -qopt-mem-layout-trans=4 -fopenmp -DSPEC_OPENMP}
-\texttt{-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc}

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

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

Peak Compiler Invocation

C benchmarks:
\texttt{icc}

C++ benchmarks:
\texttt{icpc}

Fortran benchmarks:
\texttt{ifort}
Peak Portability Flags

600.perlbench_s: -DSPEC_LP64 -DSPEC_LINUX_X64
602.gcc_s: -DSPEC_LP64(*) -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

(*) Indicates a portability flag that was found in a non-portability variable.

Peak Optimization Flags

C benchmarks:

600.perlbench_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2)
-xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -fno-strict-overflow
-mbranches-within-32B-boundaries
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

602.gcc_s: -m64 -qnextgen -std=c11 -fuse-ld=gold
-Wl,-plugin-opt=-x86-branches-within-32B-boundaries
-Wl,-z,muldefs -fprofile-generate(pass 1)
-fprofile-use=default.profdatalpass 2) -xCORE-AVX512 -flto
-Ofast(pass 1) -O3 -ffast-math -qopt-mem-layout-trans=4
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

605.mcf_s: basepeak = yes

625.x264_s: -m64 -qnextgen -std=c11
-Wl,-plugin-opt=-x86-branches-within-32B-boundaries
-Wl,-z,muldefs -xCORE-AVX512 -flto -O3 -ffast-math
-ffuse-ld=gold -qopt-mem-layout-trans=4 -fno-alias
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

657.xz_s: basepeak = yes

C++ benchmarks:

620.omnetpp_s: basepeak = yes

(Continued on next page)
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SPECspeed®2017_int_base = 11.7
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ASUSTeK Computer Inc.
(3.00 GHz, Intel Xeon Gold 6248R)

Peak Optimization Flags (Continued)

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

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic19.1u1-official-linux64_revA.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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