## SPEC CPU®2017 Integer Speed Result

### Hardware

**CPU Name:** Intel Xeon Gold 6240R  
**Max MHz:** 4000  
**Nominal:** 2400  
**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  
**Other:** None  
**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 19.0.4.227 of Intel C/C++ Compiler Build 20190416 for Linux; Fortran: Version 19.0.4.227 of Intel Fortran Compiler Build 20190416 for Linux  
**Parallel:** Yes  
**Firmware:** Version 6102 released Dec-2019  
**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

### Test Results

<table>
<thead>
<tr>
<th>Test</th>
<th>Threads</th>
<th>SPECspeed®2017_int_base</th>
<th>SPECspeed®2017_int_peak</th>
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<tbody>
<tr>
<td>spec</td>
<td>48</td>
<td>10.7</td>
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</table>

**ASUSTeK Computer Inc.**  
ASUS ESC8000 G4(Z11PG-D24) Server System  
(2.40 GHz, Intel Xeon Gold 6240R)  

**CPU2017 License:** 9016  
**Test Sponsor:** ASUSTeK Computer Inc.  
**Tested by:** ASUSTeK Computer Inc.  
**Test Date:** Apr-2020  
**Hardware Availability:** Feb-2020  
**Software Availability:** Jun-2019
## Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<td>25.2</td>
<td>245</td>
<td>25.2</td>
<td>245</td>
<td>25.2</td>
</tr>
</tbody>
</table>

**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 = "/19u4/lib/intel64:/19u4/je5.0.1-64"
- OMP_STACKSIZE = "192M"

**General Notes**

Binaries compiled on a system with 1x Intel Core i9-7900X CPU + 32GB RAM memory using Redhat Enterprise Linux 7.5
- 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.

- The jemalloc library was
SPEC CPU®2017 Integer Speed Result

ASUSTeK Computer Inc.
ASUS ESC8000 G4(Z11PG-D24) Server System
(2.40 GHz, Intel Xeon Gold 6240R)

Copyright 2017-2021 Standard Performance Evaluation Corporation

SPECspeed®2017_int_base = 10.7
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Test Date: Apr-2020
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General Notes (Continued)

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

Platform Notes

BIOS Configuration:
VT-d = Disabled
Patrol Scrub = Disabled
HyperThreading = Disabled
ENERGY_PERF_BIAS_CFG mode = performance
CSM Support = Disabled
Engine Boost = Level3(Max)
Enforce POR = Disable
Memory Frequency = 2933
LLC dead line alloc = Disabled
SR-IOV Support = Disabled

Sysinfo program /19u4/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edbe6e646e485a0011
running on linux-628j Wed Apr 22 10:19:36 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 6240R CPU @ 2.40GHz
  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 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29
physical 1: cores 0 1 2 3 4 5 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

(Continued on next page)
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Platform Notes (Continued)

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 6240R CPU @ 2.40GHz
Stepping: 7
CPU MHz: 2400.000
CPU max MHz: 4000.0000
CPU min MHz: 1000.0000
BogoMIPS: 4800.00
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 cx8 apic sep mtrr pge mca cmov pat
    pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb
dtscp lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology
    nonstop_tsc cpuid aperfforf 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 cdp_l3
    invpcid_single intel_pni ssbd mba ibrs ibpb stibp ibrs_enhanced
    tpr_shadow vmx
    flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms
    invpcid rtm
    cmqmx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt
    avx512cd
    avx512bw avx512vl xsaveopt xsaves xstate xgetbv1 xsaves cqm_llc
cqm_occupa llc cqm_mbb_total
    cqm_mbb_local dtherm ida arat pls hwp hwp_act_window hwp_epp
    hwp_pkg_req pku
    ospke avx512_vnni md_clear flush_l1d arch_capabilities

/proc/cpuinfo cache data
    cache size : 36608 KB

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a
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: 385231 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: 385603 MB
    node distances:

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Platform Notes (Continued)

node  0  1
   0:  10  21
   1:  21  10

From /proc/meminfo
MemTotal:       791194344 kB
HugePages_Total:       0
Hugepagesize:       2048 kB

From /etc/*release* /etc/*version*
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):                 Mitigation: Speculative Store Bypass disabled via prctl and seccomp
CVE-2018-3639 (Speculative Store Bypass): Mitigation: Speculative Store Bypass disabled
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 Apr 21 17:13
SPEC is set to: /19u4

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

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</tbody>
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**Platform Notes (Continued)**

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, peak) 602.gcc_s(base, peak) 605.mcf_s(base, peak) 625.x264_s(base, peak) 657.xz_s(base, peak)
---

Intel(R) C  
Intel(R) 64 Compiler for applications running on Intel(R) 64,  
Version 19.0.4.227 Build 20190416  
Copyright (C) 1985-2019 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++  
Intel(R) 64 Compiler for applications running on Intel(R) 64,  
Version 19.0.4.227 Build 20190416  
Copyright (C) 1985-2019 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 19.0.4.227 Build 20190416  
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
---

**Base Compiler Invocation**

C benchmarks:
icc -m64 -std=c11

C++ benchmarks:
icpc -m64
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Base Compiler Invocation (Continued)

Fortran benchmarks:
ifort -m64

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:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -gopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc

C++ benchmarks:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64
-lqkmalloc

Fortran benchmarks:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-mem-layout-trans=4
-nostandard-realloc-lhs

Peak Compiler Invocation

C benchmarks:
icc -m64 -std=c11

(Continued on next page)
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Peak Compiler Invocation (Continued)

C++ benchmarks:
icpc -m64

Fortran benchmarks:
ifort -m64

Peak Portability Flags

Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:
600.perlbench_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -O2
-xCORE-AVX512 -qopt-mem-layout-trans=4 -ipo -O3
-no-prec-div -DSPEC_SUPPRESS_OPENMP -qopenmp
-DSPEC_OPENMP -fno-strict-overflow
-L/usr/local/je5.0.1-64/lib -ljemalloc

602.gcc_s: basepeak = yes

605.mcf_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo
-xCORE-AVX512 -O3 -no-prec-div -qopt-mem-layout-trans=4
-DSPEC_SUPPRESS_OPENMP -qopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc

625.x264_s: -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc

657.xz_s: basepeak = yes

C++ benchmarks:
620.omnetpp_s: basepeak = yes
623.xalancbmk_s: basepeak = yes
631.deepsjeng_s: basepeak = yes

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Peak Optimization Flags (Continued)

641.leela_s: basepeak = yes

Fortran benchmarks:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-mem-layout-trans=4
-nostandard-realloc-lhs

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:

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