



# SPEC CPU®2017 Integer Speed Result

Copyright 2017-2022 Standard Performance Evaluation Corporation

## ASUSTeK Computer Inc.

ASUS RS300-E11(P12R-M) Server System  
(2.60 GHz, Intel Xeon E-2378)

SPECspeed®2017\_int\_base = 15.1

SPECspeed®2017\_int\_peak = 15.5

CPU2017 License: 9016

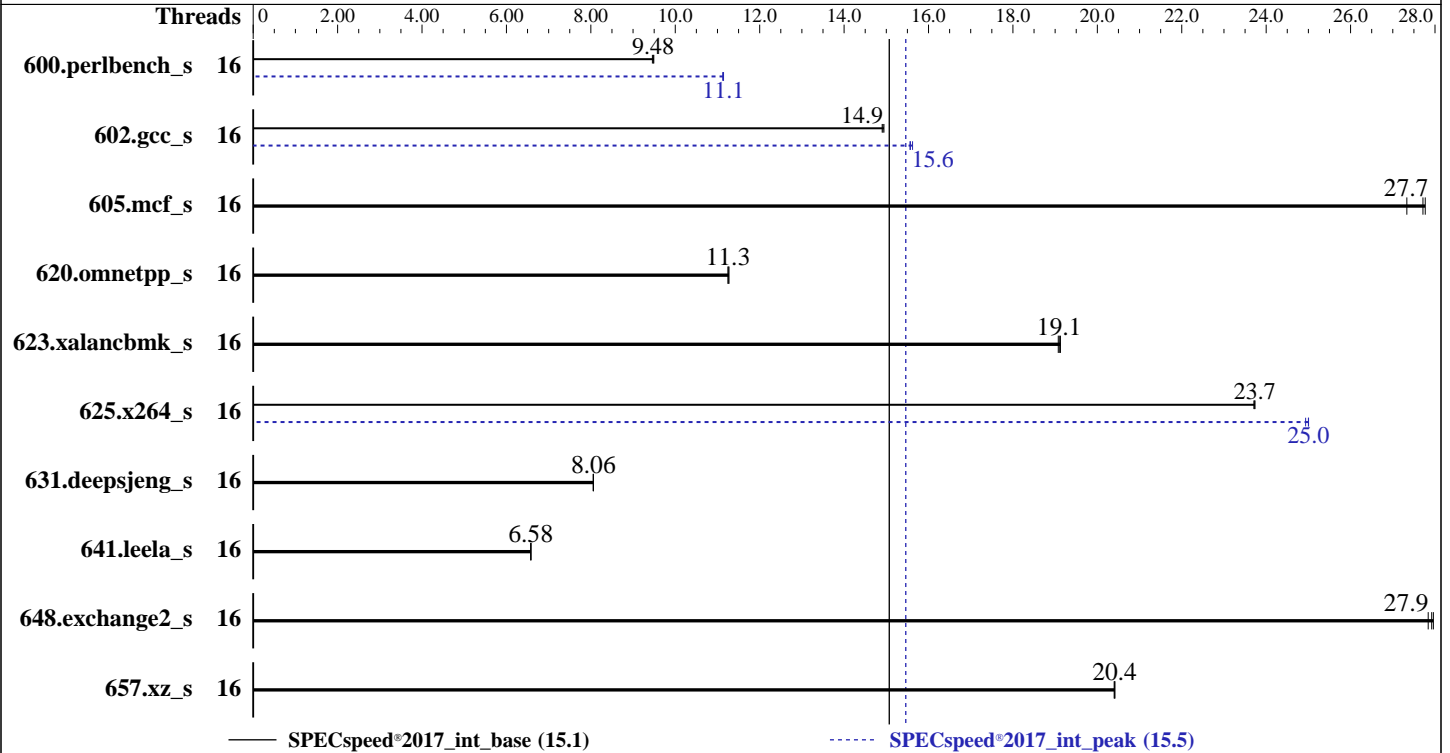
Test Sponsor: ASUSTeK Computer Inc.

Tested by: ASUSTeK Computer Inc.

Test Date: Dec-2021

Hardware Availability: Oct-2021

Software Availability: Sep-2021



### Hardware

CPU Name: Intel Xeon E-2378  
 Max MHz: 4800  
 Nominal: 2600  
 Enabled: 8 cores, 1 chip, 2 threads/core  
 Orderable: 1 chip  
 Cache L1: 32 KB I + 48 KB D on chip per core  
 L2: 512 KB I+D on chip per core  
 L3: 16 MB I+D on chip per chip  
 Other: None  
 Memory: 128 GB (4 x 32 GB 2Rx8 PC4-3200AA-E, running at 2933)  
 Storage: 1 x 960 GB SATA SSD  
 Other: None

### Software

OS: Red Hat Enterprise Linux release 8.4 (Ootpa) 4.18.0-305.19.1.el8\_4.x86\_64  
 Compiler: C/C++: Version 2021.1 of Intel oneAPI DPC++/C++ Compiler Build 20201113 for Linux;  
 Fortran: Version 2021.1 of Intel Fortran Compiler Classic Build 20201112 for Linux;  
 C/C++: Version 2021.1 of Intel C/C++ Compiler Classic Build 20201112 for Linux  
 Parallel: Yes  
 Firmware: Version 0401 released Oct-2021  
 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.



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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	16	187	9.49	<b><u>187</u></b>	<b><u>9.48</u></b>	188	9.46	16	<b><u>159</u></b>	<b><u>11.1</u></b>	160	11.1	159	11.1
602.gcc_s	16	<b><u>267</u></b>	<b><u>14.9</u></b>	267	14.9	266	14.9	16	256	15.6	<b><u>256</u></b>	<b><u>15.6</u></b>	255	15.6
605.mcf_s	16	<b><u>170</u></b>	<b><u>27.7</u></b>	170	27.8	173	27.3	16	<b><u>170</u></b>	<b><u>27.7</u></b>	170	27.8	173	27.3
620.omnetpp_s	16	145	11.3	145	11.3	<b><u>145</u></b>	<b><u>11.3</u></b>	16	145	11.3	145	11.3	<b><u>145</u></b>	<b><u>11.3</u></b>
623.xalancbmk_s	16	74.1	19.1	<b><u>74.2</u></b>	<b><u>19.1</u></b>	74.3	19.1	16	74.1	19.1	<b><u>74.2</u></b>	<b><u>19.1</u></b>	74.3	19.1
625.x264_s	16	74.3	23.7	<b><u>74.3</u></b>	<b><u>23.7</u></b>	74.4	23.7	16	<b><u>70.6</u></b>	<b><u>25.0</u></b>	70.5	25.0	70.7	24.9
631.deepsjeng_s	16	178	8.06	178	8.05	<b><u>178</u></b>	<b><u>8.06</u></b>	16	178	8.06	178	8.05	<b><u>178</u></b>	<b><u>8.06</u></b>
641.leela_s	16	259	6.58	259	6.58	<b><u>259</u></b>	<b><u>6.58</u></b>	16	259	6.58	259	6.58	<b><u>259</u></b>	<b><u>6.58</u></b>
648.exchange2_s	16	106	27.8	105	28.0	<b><u>105</u></b>	<b><u>27.9</u></b>	16	106	27.8	105	28.0	<b><u>105</u></b>	<b><u>27.9</u></b>
657.xz_s	16	303	20.4	303	20.4	<b><u>303</u></b>	<b><u>20.4</u></b>	16	303	20.4	303	20.4	<b><u>303</u></b>	<b><u>20.4</u></b>

SPECspeed®2017\_int\_base = **15.1**

SPECspeed®2017\_int\_peak = **15.5**

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

## 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 = "/home/cpull8/lib/intel64:/home/cpull8/je5.0.1-64"  
MALLOC\_CONF = "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) 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.

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### General Notes (Continued)

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 Configuration:

VT-d = Disabled

AES = Disabled

Intel Speed Shift Technology = Native Mode

Engine Boost = Level3(Max)

Sysinfo program /home/cpull8/bin/sysinfo

Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acafc64d

running on localhost.localdomain Wed Jan 12 16:04:13 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) E-2378 CPU @ 2.60GHz

1 "physical id"s (chips)

16 "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 : 8

siblings : 16

physical 0: cores 0 1 2 3 4 5 6 7

From lscpu from util-linux 2.32.1:

Architecture: x86\_64

CPU op-mode(s): 32-bit, 64-bit

Byte Order: Little Endian

CPU(s): 16

On-line CPU(s) list: 0-15

Thread(s) per core: 2

Core(s) per socket: 8

Socket(s): 1

NUMA node(s): 1

Vendor ID: GenuineIntel

BIOS Vendor ID: Intel(R) Corporation

CPU family: 6

Model: 167

Model name: Intel(R) Xeon(R) E-2378 CPU @ 2.60GHz

BIOS Model name: Intel(R) Xeon(R) E-2378 CPU @ 2.60GHz

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### Platform Notes (Continued)

```
Stepping: 1
CPU MHz: 4554.135
CPU max MHz: 4800.0000
CPU min MHz: 800.0000
BogoMIPS: 5184.00
Virtualization: VT-x
L1d cache: 48K
L1i cache: 32K
L2 cache: 512K
L3 cache: 16384K
NUMA node0 CPU(s): 0-15
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
aperfperf tsc_known_freq pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3
sdbg fma cx16 xtpr pdcm pcid sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer
xsave avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb invpcid_single ssbd
ibrs ibpb stibp ibrs_enhanced tpr_shadow vnmi flexpriority ept vpid ept_ad fsgsbase
tsc_adjust bmil avx2 smep bmi2 erms invpcid mpx avx512f avx512dq rdseed adx smap
avx512ifma clflushopt intel_pt avx512cd sha_ni avx512bw avx512vl xsaveopt xsavec
xgetbv1 xsaves dtherm ida arat pln pts hwp hwp_notify hwp_act_window hwp_epp
hwp_pkg_req avx512vbmi umip pku ospke avx512_vbmi2 gfni vpclmulqdq avx512_vnni
avx512_bitalg avx512_vpopcntdq rdpid fsrm md_clear flush_lld arch_capabilities
```

```
/proc/cpuinfo cache data
cache size : 16384 KB
```

```
From numactl --hardware
WARNING: a numactl 'node' might or might not correspond to a physical chip.
available: 1 nodes (0)
node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
node 0 size: 128709 MB
node 0 free: 127091 MB
node distances:
node 0
0: 10
```

```
From /proc/meminfo
MemTotal: 131798720 kB
HugePages_Total: 0
Hugepagesize: 2048 kB
```

```
/sbin/tuned-adm active
Current active profile: throughput-performance
```

```
/sys/devices/system/cpu/cpu*/cpufreq/scaling_governor has
performance
```

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### Platform Notes (Continued)

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

os-release:

NAME="Red Hat Enterprise Linux"

VERSION="8.4 (Ootpa)"

ID="rhel"

ID\_LIKE="fedora"

VERSION\_ID="8.4"

PLATFORM\_ID="platform:el8"

PRETTY\_NAME="Red Hat Enterprise Linux 8.4 (Ootpa)"

ANSI\_COLOR="0;31"

redhat-release: Red Hat Enterprise Linux release 8.4 (Ootpa)

system-release: Red Hat Enterprise Linux release 8.4 (Ootpa)

system-release-cpe: cpe:/o:redhat:enterprise\_linux:8.4:ga

uname -a:

Linux localhost.localdomain 4.18.0-305.19.1.el8\_4.x86\_64 #1 SMP Tue Sep 7 07:07:31 EDT 2021 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 (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: usercopy/swappgs 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 Jan 12 12:57

SPEC is set to: /home/cpull8

Filesystem	Type	Size	Used	Avail	Use%	Mounted on
/dev/mapper/rhel-home	xfs	807G	11G	797G	2%	/home

From /sys/devices/virtual/dmi/id

Product Family: Server

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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### 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:

4x Apacer Technology D33.27306S.003 32 GB 2 rank 3200, configured at 2933

BIOS:

BIOS Vendor: American Megatrends Inc.

BIOS Version: 0401

BIOS Date: 10/26/2021

BIOS Revision: 4.1

(End of data from sysinfo program)

### Compiler Version Notes

=====  
C | 600.perlbench\_s(peak)  
-----

Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112\_000000  
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) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.1 Build 20201113  
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.  
-----

=====  
C | 600.perlbench\_s(peak)  
-----

Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112\_000000  
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-----

=====  
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### Compiler Version Notes (Continued)

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```

=====
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 2021.1 Build 20201113

Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

```

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

```

Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112\_000000

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### Base Compiler Invocation

C benchmarks:

icx

C++ benchmarks:

icpx

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

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



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## Base Optimization Flags

C benchmarks:

```
-DSPEC_OPENMP -std=c11 -m64 -fiopenmp -Wl,-z,muldefs -xCORE-AVX2
-O3 -ffast-math -flto -mfpmath=sse -funroll-loops
-qopt-mem-layout-trans=4 -mbranches-within-32B-boundaries
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

C++ benchmarks:

```
-DSPEC_OPENMP -m64 -Wl,-z,muldefs -xCORE-AVX2 -O3 -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-mbranches-within-32B-boundaries
-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin/
-lqkmalloc
```

Fortran benchmarks:

```
-m64 -xCORE-AVX2 -O3 -ipo -no-prec-div -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte -auto
-mbranches-within-32B-boundaries
```

## Peak Compiler Invocation

C benchmarks (except as noted below):

icx

600.perlbench\_s: icc

C++ benchmarks:

icpx

Fortran benchmarks:

ifort

## Peak Portability Flags

Same as Base Portability Flags

## Peak Optimization Flags

C benchmarks:

(Continued on next page)





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## Peak Optimization Flags (Continued)

600.perlbench\_s: -Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2)  
-xCORE-AVX2 -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 -std=c11 -Wl,-z,muldefs -fprofile-generate(pass 1)  
-fprofile-use=default.profddata(pass 2) -xCORE-AVX2 -flto  
-Ofast(pass 1) -O3 -ffast-math -qopt-mem-layout-trans=4  
-mbranches-within-32B-boundaries  
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

605.mcf\_s: basepeak = yes

625.x264\_s: -DSPEC\_OPENMP -fiopenmp -std=c11 -m64 -Wl,-z,muldefs  
-xCORE-AVX2 -flto -O3 -ffast-math  
-qopt-mem-layout-trans=4 -fno-alias  
-mbranches-within-32B-boundaries  
-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/ASUSTekPlatform-Settings-p12-V1.2.html>

[http://www.spec.org/cpu2017/flags/Intel-ic2021-official-linux64\\_revA.html](http://www.spec.org/cpu2017/flags/Intel-ic2021-official-linux64_revA.html)

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

<http://www.spec.org/cpu2017/flags/ASUSTekPlatform-Settings-p12-V1.2.xml>

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For questions about this result, please contact the tester. For other inquiries, please contact [info@spec.org](mailto:info@spec.org).

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