SPEC CPU®2017 Integer Speed Result

Supermicro

SuperWorkstation 5039C-T (X11SCA , Intel Xeon E-2288G)

$SPECspeed®2017\_int\_base = 12.0$

$SPECspeed®2017\_int\_peak = 12.3$

CPU2017 License: 001176

Test Sponsor: Supermicro

Tested by: Supermicro

Test Date: Oct-2019

Hardware Availability: May-2019

Software Availability: May-2019

Threads

Benchmark	Threads	base	peak
600.perlbench_s	16	8.47	9.94
602.gcc_s	16	12.9	13.2
605.mcf_s	16	16.7	
620.omnetpp_s	16	7.49	7.70
623.xalancbmk_s	16	16.3	16.3
625.x264_s	16	18.7	
631.deepsjeng_s	16	6.93	6.94
641.leela_s	16	6.00	6.01
648.exchange2_s	16	21.9	21.9
657.xz_s	16	16.4	16.7

SPECspeed®2017_int_base (12.0)   SPECspeed®2017_int_peak (12.3)

Hardware

CPU Name: Intel Xeon E-2288G
 Max MHz: 5000
 Nominal: 3700
Enabled: 8 cores, 1 chip, 2 threads/core
Orderable: 1 chip
Cache L1: 32 KB I + 32 KB D on chip per core
 L2: 256 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 PC4-2666V-E)
Storage: 1 x 200 GB SATA III SSD
Other: None

Software

OS: SUSE Linux Enterprise Server 12 SP4 (x86_64)
 Kernel 4.12.14-94.41-default
Compiler: C/C++: Version 19.0.4.227 of Intel C/C++ Compiler for Linux;
 Fortran: Version 19.0.4.227 of Intel Fortran Compiler for Linux
Parallel: Yes
Firmware: Version 1.1 released Aug-2019
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: --

Standard Performance Evaluation Corporation (info@spec.org)

https://www.spec.org/

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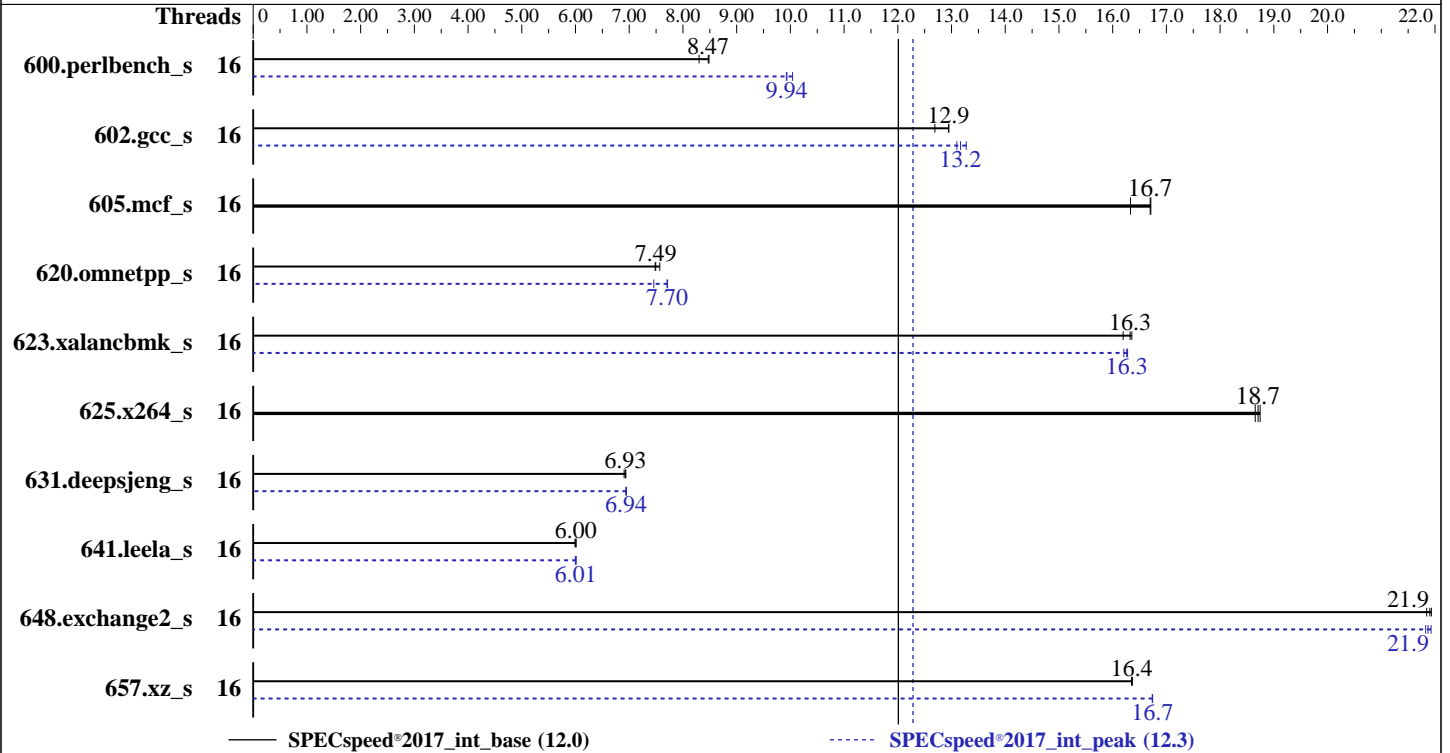Copyright 2017-2019 Standard Performance Evaluation Corporation

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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	214	8.30	209	8.49	**210**	**8.47**	16	**179**	**9.94**	179	9.93	177	10.0
602.gcc_s	16	314	12.7	307	13.0	**308**	**12.9**	16	304	13.1	**302**	**13.2**	300	13.3
605.mcf_s	16	**283**	**16.7**	283	16.7	289	16.3	16	**283**	**16.7**	283	16.7	289	16.3
620.omnetpp_s	16	215	7.57	218	7.48	**218**	**7.49**	16	219	7.46	**212**	**7.70**	211	7.71
623.xalancbmk_s	16	86.6	16.4	**86.8**	**16.3**	87.5	16.2	16	87.4	16.2	87.1	16.3	**87.1**	**16.3**
625.x264_s	16	94.1	18.7	**94.3**	**18.7**	94.6	18.7	16	94.1	18.7	**94.3**	**18.7**	94.6	18.7
631.deepsjeng_s	16	207	6.94	**207**	**6.93**	208	6.91	16	207	6.94	**206**	**6.94**	206	6.95
641.leela_s	16	285	5.99	**284**	**6.00**	284	6.01	16	285	6.00	284	6.01	**284**	**6.01**
648.exchange2_s	16	135	21.8	134	21.9	**134**	**21.9**	16	**134**	**21.9**	135	21.8	134	21.9
657.xz_s	16	**378**	**16.4**	378	16.4	378	16.4	16	369	16.7	369	16.7	**369**	**16.7**
SPECspeed®2017_int_base =				**12.0**										
SPECspeed®2017_int_peak =				**12.3**										

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"
```

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"
OMP_STACKSIZE = "192M"
```

General Notes

```
Binaries compiled on a system with 1x Intel Core i9-799X 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.
jemalloc, a general purpose malloc implementation
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5
```

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CPU2017 License:	001176	**Test Date:**	Oct-2019
Test Sponsor:	Supermicro	**Hardware Availability:**	May-2019
Tested by:	Supermicro	**Software Availability:**	May-2019

General Notes (Continued)

sources available from jemalloc.net or https://github.com/jemalloc/jemalloc/releases

Platform Notes

```
Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edb1e6e46a485a0011
running on 135-175-3 Sat Oct 26 21:00:44 2019

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-2288G CPU @ 3.70GHz
      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:
     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
     CPU family:            6
     Model:                 158
     Model name:            Intel(R) Xeon(R) E-2288G CPU @ 3.70GHz
     Stepping:              13
     CPU MHz:               3700.000
     CPU max MHz:           5000.0000
     CPU min MHz:           800.0000
     BogoMIPS:              7392.00
     Virtualization:        VT-x
     L1d cache:             32K
     L1i cache:             32K
     L2 cache:              256K
```

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$SPECspeed®2017\_int\_base = 12.0$

$SPECspeed®2017\_int\_peak = 12.3$

Platform Notes (Continued)

```
      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
   aperfmperf 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
   aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb invpcid_single
   ssbd ibrs ibpb stibp tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1
   hle avx2 smep bmi2 erms invpcid rtm mpx rdseed adx smap clflushopt intel_pt xsaveopt
   xsavec xgetbv1 xsaves dtherm ida arat pln pts hwp hwp_notify hwp_act_window hwp_epp
   flush_l1d 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: 128770 MB
   node 0 free: 109011 MB
   node distances:
   node   0
     0:  10

 From /proc/meminfo
    MemTotal:       131861376 kB
    HugePages_Total:        0
    Hugepagesize:        2048 kB

 From /etc/*release* /etc/*version*
    SuSE-release:
       SUSE Linux Enterprise Server 12 (x86_64)
       VERSION = 12
       PATCHLEVEL = 4
       # This file is deprecated and will be removed in a future service pack or release.
       # Please check /etc/os-release for details about this release.
    os-release:
       NAME="SLES"
       VERSION="12-SP4"
       VERSION_ID="12.4"
       PRETTY_NAME="SUSE Linux Enterprise Server 12 SP4"
       ID="sles"
       ANSI_COLOR="0;32"
       CPE_NAME="cpe:/o:suse:sles:12:sp4"
```

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CPU2017 License: 001176		**Test Date:**	Oct-2019
Test Sponsor:	Supermicro	**Hardware Availability:**	May-2019
Tested by:	Supermicro	**Software Availability:**	May-2019

Platform Notes (Continued)

```
uname -a:
   Linux 135-175-3 4.12.14-94.41-default #1 SMP Wed Oct 31 12:25:04 UTC 2018 (3090901)
   x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2018-3620 (L1 Terminal Fault):        Not affected
Microarchitectural Data Sampling:         No status reported
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: Indirect Branch Restricted
                                          Speculation, IBPB, IBRS_FW

run-level 3 Oct 25 15:18

SPEC is set to: /home/cpu2017
   Filesystem      Type  Size  Used Avail Use% Mounted on
   /dev/sda3       xfs   145G   21G  124G  15% /home

From /sys/devices/virtual/dmi/id
    BIOS:    American Megatrends Inc. 1.1 08/14/2019
    Vendor:  Supermicro
    Product: Super Server
    Serial:  0123456789

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:
    4x Samsung M391A4G43MB1-CTD 32 GB 2 rank 2667

(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.
------------------------------------------------------------------------------
```

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$SPECspeed®2017\_int\_base = 12.0$

$SPECspeed®2017\_int\_peak = 12.3$

Compiler Version Notes (Continued)

```
==============================================================================
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`

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`

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Base Optimization Flags

C benchmarks:

```
-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-L/usr/local/je5.0.1-64/lib -ljemalloc
```

C++ benchmarks:

```
-Wl,-z,muldefs -xCORE-AVX2 -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-AVX2 -ipo -O3 -no-prec-div -qopt-mem-layout-trans=4
-nostandard-realloc-lhs
```

Peak Compiler Invocation

C benchmarks:
```
icc -m64 -std=c11
```

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-AVX2 -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
```

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Test Date: Oct-2019
Hardware Availability: May-2019
Software Availability: May-2019

Peak Optimization Flags (Continued)

602.gcc_s: `-Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -O2`
`-xCORE-AVX2 -qopt-mem-layout-trans=4 -ipo -O3`
`-no-prec-div -DSPEC_SUPPRESS_OPENMP`
`-L/usr/local/je5.0.1-64/lib -ljemalloc`

605.mcf_s: `basepeak = yes`

625.x264_s: `basepeak = yes`

657.xz_s: `-Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -O2`
`-xCORE-AVX2 -qopt-mem-layout-trans=4 -ipo -O3`
`-no-prec-div -DSPEC_SUPPRESS_OPENMP -qopenmp`
`-DSPEC_OPENMP -L/usr/local/je5.0.1-64/lib -ljemalloc`

C++ benchmarks:

620.omnetpp_s: `-Wl,-z,muldefs -prof-gen(pass 1) -prof-use(pass 2) -ipo`
`-xCORE-AVX2 -O3 -no-prec-div -qopt-mem-layout-trans=4`
`-DSPEC_SUPPRESS_OPENMP`
`-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.4.227/linux/compiler/lib/intel64`
`-lqkmalloc`

623.xalancbmk_s: `-Wl,-z,muldefs -xCORE-AVX2 -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`

631.deepsjeng_s: `Same as 623.xalancbmk_s`

641.leela_s: `Same as 623.xalancbmk_s`

Fortran benchmarks:
`-xCORE-AVX2 -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
http://www.spec.org/cpu2017/flags/Intel-ic19.0u1-official-linux64.2019-07-09.html
http://www.spec.org/cpu2017/flags/Default-Platform-Flags.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic19.0u1-official-linux64.2019-07-09.xml
http://www.spec.org/cpu2017/flags/Default-Platform-Flags.xml

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Test Sponsor: Supermicro   **Hardware Availability:** May-2019
Tested by: Supermicro   **Software Availability:** May-2019

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

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