SPEC CPU®2017 Integer Speed Result

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Hewlett Packard Enterprise

(Test Sponsor: HPE)

Synergy 480 Gen10
(2.10 GHz, Intel Xeon Gold 6230R)

$SPECspeed®2017\_int\_base = 10.2$
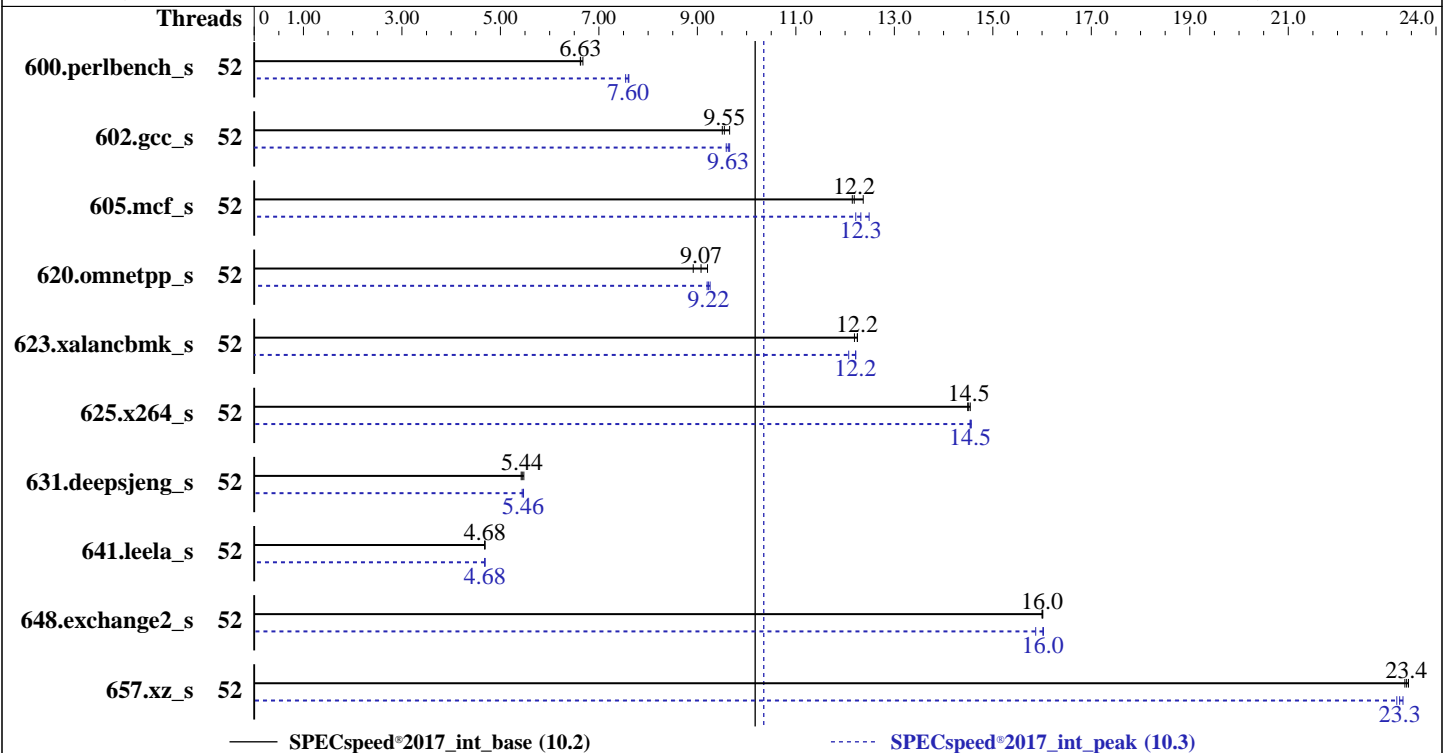
$SPECspeed®2017\_int\_peak = 10.3$

CPU2017 License: 3

Test Sponsor: HPE

Tested by: HPE

Test Date: Mar-2020

Hardware Availability: Feb-2020

Software Availability: Jun-2019

Threads

Benchmark	Threads	base	peak
600.perlbench_s	52	6.63	7.60
602.gcc_s	52	9.55	9.63
605.mcf_s	52	12.2	12.3
620.omnetpp_s	52	9.07	9.22
623.xalancbmk_s	52	12.2	12.2
625.x264_s	52	14.5	14.5
631.deepsjeng_s	52	5.44	5.46
641.leela_s	52	4.68	4.68
648.exchange2_s	52	16.0	16.0
657.xz_s	52	23.4	23.3

SPECspeed®2017_int_base (10.2) SPECspeed®2017_int_peak (10.3)

Hardware

CPU Name: Intel Xeon Gold 6230R

Max MHz: 4000

Nominal: 2100

Enabled: 52 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: 384 GB (24 x 16 GB 2Rx8 PC4-2933Y-R)

Storage: 1 x 400 GB SAS SSD, RAID 0

Other: None

Software

OS: SUSE Linux Enterprise Server 15 SP1 (x86_64)
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: HPE BIOS Version I42 v2.22 (11/13/2019) released Feb-2020

File System: btrfs

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 set to prefer performance at the cost of additional power usage

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CPU2017 License: 3	**Test Date:** Mar-2020
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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	52	**268**	**6.63**	266	6.68	268	6.62	52	235	7.54	233	7.61	**234**	**7.60**
602.gcc_s	52	412	9.66	419	9.51	**417**	**9.55**	52	412	9.66	415	9.59	**414**	**9.63**
605.mcf_s	52	**387**	**12.2**	389	12.1	382	12.4	52	386	12.2	378	12.5	**383**	**12.3**
620.omnetpp_s	52	177	9.21	**180**	**9.07**	183	8.92	52	177	9.20	176	9.26	**177**	**9.22**
623.xalancbmk_s	52	**116**	**12.2**	116	12.3	116	12.2	52	117	12.1	**116**	**12.2**	116	12.2
625.x264_s	52	121	14.5	122	14.5	**122**	**14.5**	52	**121**	**14.5**	121	14.5	121	14.6
631.deepsjeng_s	52	**263**	**5.44**	262	5.48	264	5.42	52	**262**	**5.46**	262	5.47	263	5.44
641.leela_s	52	364	4.69	**364**	**4.68**	364	4.68	52	364	4.69	364	4.68	**364**	**4.68**
648.exchange2_s	52	184	16.0	**184**	**16.0**	184	16.0	52	183	16.0	**184**	**16.0**	185	15.9
657.xz_s	52	**264**	**23.4**	264	23.4	265	23.4	52	266	23.2	**266**	**23.3**	265	23.3
SPECspeed®2017_int_base =		**10.2**												
SPECspeed®2017_int_peak =		**10.3**												

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"
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
```

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 i9-7900X CPU + 32GB RAM
 memory using Redhat Enterprise Linux 7.5
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
 sources available from jemalloc.net or https://github.com/jemalloc/jemalloc/releases
```

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CPU2017 License:	3	**Test Date:**	Mar-2020
Test Sponsor:	HPE	**Hardware Availability:**	Feb-2020
Tested by:	HPE	**Software Availability:**	Jun-2019

Platform Notes

```
BIOS Configuration:
 Hyper-Threading set to Disabled
 Thermal Configuration set to Maximum Cooling
 Memory Patrol Scrubbing set to Disabled
 LLC Prefetch set to Enabled
 LLC Dead Line Allocation set to Disabled
 Enhanced Processor Performance set to Enabled
 Workload Profile set to General Peak Frequency Compute
  Energy/Performance Bias set to Balanced Power
 Workload Profile set to Custom
  Numa Group Size Optimization set to Flat
  Intel UPI Link Power Management set to Enabled


 Sysinfo program /home/cpu2017/bin/sysinfo
 Rev: r6365 of 2019-08-21 295195f888a3d7edb1e6e46a485a0011
 running on sy480-sys1 Fri Mar  6 10:54:32 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 6230R CPU @ 2.10GHz
       2  "physical id"s (chips)
       52 "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 : 26
       siblings  : 26
       physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 16 17 18 19 20 21 22 24 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 22 24 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):              52
      On-line CPU(s) list: 0-51
      Thread(s) per core:  1
      Core(s) per socket:  26
      Socket(s):           2
      NUMA node(s):        2
      Vendor ID:           GenuineIntel
      CPU family:          6
```

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CPU2017 License: 3

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Tested by: HPE

Test Date: Mar-2020

Hardware Availability: Feb-2020

Software Availability: Jun-2019

Platform Notes (Continued)

```
      Model:                 85
      Model name:            Intel(R) Xeon(R) Gold 6230R CPU @ 2.10GHz
      Stepping:              7
      CPU MHz:               2100.000
      BogoMIPS:              4200.00
      Virtualization:        VT-x
      L1d cache:             32K
      L1i cache:             32K
      L2 cache:              1024K
      L3 cache:              36608K
      NUMA node0 CPU(s):     0-25
      NUMA node1 CPU(s):     26-51
      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 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_ppin ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vnmi
   flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm
   cqm mpx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd
   avx512bw avx512vl xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total
   cqm_mbm_local dtherm ida arat pln pts 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 24 25
   node 0 size: 193023 MB
   node 0 free: 192551 MB
   node 1 cpus: 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50
   51
   node 1 size: 193333 MB
   node 1 free: 192947 MB
   node distances:
   node   0   1
     0:  10  21
     1:  21  10

 From /proc/meminfo
   MemTotal:       395630516 kB
   HugePages_Total:        0
   Hugepagesize:        2048 kB
```

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Test Date: Mar-2020
Hardware Availability: Feb-2020
Software Availability: Jun-2019

Platform Notes (Continued)

```
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 sy480-sys1 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 Mar 6 10:52

SPEC is set to: /home/cpu2017
   Filesystem      Type   Size  Used Avail Use% Mounted on
   /dev/sda2       btrfs  371G   89G  282G  24% /home

From /sys/devices/virtual/dmi/id
   BIOS:    HPE I42 11/13/2019
   Vendor:  HPE
   Product: Synergy 480 Gen10
   Product Family: Synergy
   Serial:  MXQ7380505


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 UNKNOWN NOT AVAILABLE 16 GB 2 rank 2933
```

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Test Sponsor: HPE
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Test Date: Mar-2020
Hardware Availability: Feb-2020
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Platform Notes (Continued)

```
 (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
```

Fortran benchmarks:
```
ifort -m64
```

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Tested by:	HPE	**Software Availability:**	Jun-2019

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 -qopenmp -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

C++ benchmarks:
icpc -m64

Fortran benchmarks:
ifort -m64

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Tested by: HPE		**Software Availability:**	Jun-2019

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: `-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`
`-L/usr/local/je5.0.1-64/lib` `-ljemalloc`

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: `-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` `-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-AVX512` `-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-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`

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Peak Optimization Flags (Continued)

631.deepsjeng_s: `Same as 623.xalancbmk_s`

641.leela_s: `Same as 623.xalancbmk_s`

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
http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-V1.2-CLX-revB.html
http://www.spec.org/cpu2017/flags/Intel-ic19.0u1-official-linux64.2019-07-09.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-V1.2-CLX-revB.xml
http://www.spec.org/cpu2017/flags/Intel-ic19.0u1-official-linux64.2019-07-09.xml

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

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