SPEC® CPU2017 Integer Rate Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise

(Test Sponsor: HPE)

SPECrate2017_int_base =   361

ProLiant DL580 Gen10
(2.30 GHz, Intel Xeon Gold 5218)

SPECrate2017_int_peak = Not Run

CPU2017 License: 3   **Test Date:** May-2019
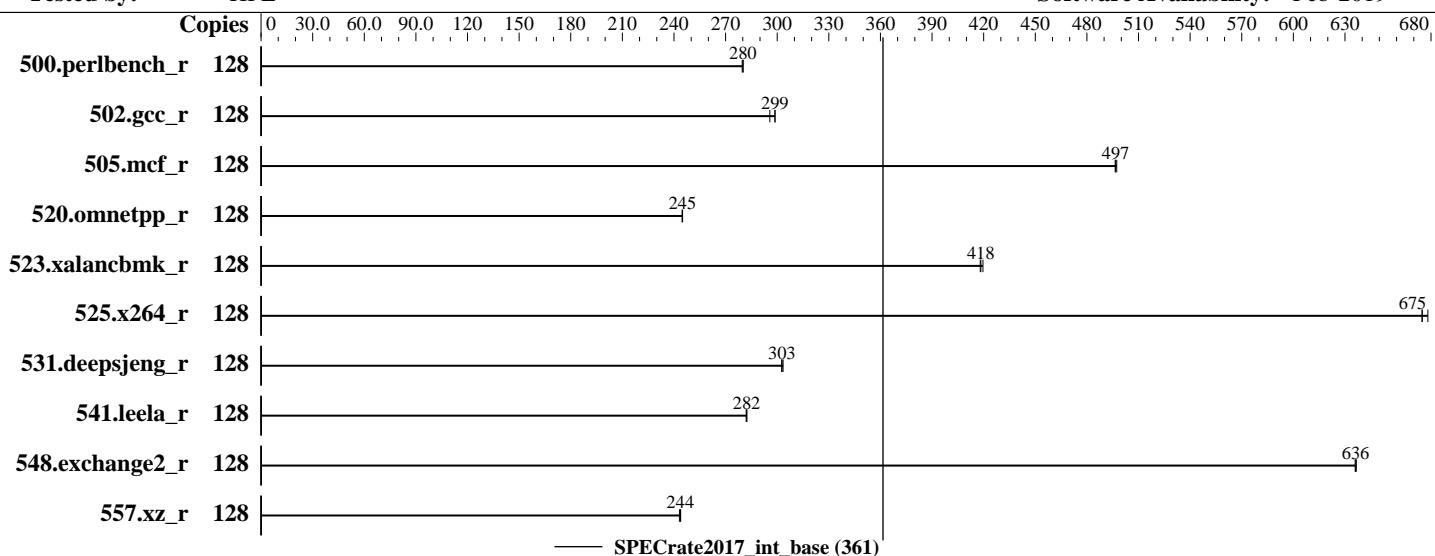**Test Sponsor:** HPE   **Hardware Availability:** Apr-2019
Tested by: HPE   **Software Availability:** Feb-2019

Copies	Value
500.perlbench_r 128	280
502.gcc_r 128	299
505.mcf_r 128	497
520.omnetpp_r 128	245
523.xalancbmk_r 128	418
525.x264_r 128	675
531.deepsjeng_r 128	303
541.leela_r 128	282
548.exchange2_r 128	636
557.xz_r 128	244

——— SPECrate2017_int_base (361)

Hardware

CPU Name: Intel Xeon Gold 5218
 Max MHz.: 3900
 Nominal: 2300
Enabled: 64 cores, 4 chips, 2 threads/core
Orderable: 1, 2, 3, 4 chip(s)
Cache L1: 32 KB I + 32 KB D on chip per core
 L2: 1 MB I+D on chip per core
 L3: 22 MB I+D on chip per chip
 Other: None
Memory: 768 GB (24 x 32 GB 2Rx4 PC4-2666V-R)
Storage: 1 x 400 GB SAS SSD, RAID 0
Other: None

Software

OS: SUSE Linux Enterprise Server 15 (x86_64)
 Kernel 4.12.14-23-default
Compiler: C/C++: Version 19.0.2.187 of Intel C/C++
 Compiler Build 20190117 for Linux;
 Fortran: Version 19.0.2.187 of Intel Fortran
 Compiler Build 20190117 for Linux
Parallel: No
Firmware: HPE BIOS Version U34 02/02/2019 released Apr-2019
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: Not Applicable
Other: None

SPEC CPU2017 Integer Rate Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise
(Test Sponsor: HPE)

SPECrate2017_int_base = 361

ProLiant DL580 Gen10
(2.30 GHz, Intel Xeon Gold 5218)

SPECrate2017_int_peak = Not Run

CPU2017 License: 3

Test Sponsor: HPE

Tested by: HPE

Test Date: May-2019

Hardware Availability: Apr-2019

Software Availability: Feb-2019

Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
500.perlbench_r	128	729	280	727	280	**727**	**280**							
502.gcc_r	128	613	296	**607**	**299**	607	299							
505.mcf_r	128	**416**	**497**	416	497	417	496							
520.omnetpp_r	128	686	245	**686**	**245**	685	245							
523.xalancbmk_r	128	**323**	**418**	323	418	322	420							
525.x264_r	128	330	678	332	675	**332**	**675**							
531.deepsjeng_r	128	483	303	**484**	**303**	485	303							
541.leela_r	128	751	282	**751**	**282**	752	282							
548.exchange2_r	128	527	636	527	637	**527**	**636**							
557.xz_r	128	**567**	**244**	567	244	569	243							
SPECrate2017_int_base =		**361**												
SPECrate2017_int_peak =		**Not Run**												

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

Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor. For details, please see the config file.

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
runcpu command invoked through numactl i.e.:
 numactl --interleave=all runcpu <etc>

General Notes

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "/home/cpu2017_u2/lib/ia32:/home/cpu2017_u2/lib/intel64"

 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)

(Continued on next page)

SPEC CPU2017 Integer Rate Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise

(Test Sponsor: HPE)

SPECrate2017_int_base =   361

ProLiant DL580 Gen10
(2.30 GHz, Intel Xeon Gold 5218)

SPECrate2017_int_peak = Not Run

CPU2017 License: 3
Test Sponsor: HPE
Tested by: HPE

Test Date: May-2019
Hardware Availability: Apr-2019
Software Availability: Feb-2019

General Notes (Continued)

is mitigated in the system as tested and documented.

Platform Notes

```
BIOS Configuration:
 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 Throughput Compute
 Workload Profile set to Custom
  Energy/Performance Bias set to Balanced Performance
Sysinfo program /home/cpu2017_u2/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on linux-sypg Wed Jul 11 19:56:19 2018

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 5218 CPU @ 2.30GHz
      4  "physical id"s (chips)
      128 "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 : 16
      siblings  : 32
      physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
      physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
      physical 2: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
      physical 3: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

From lscpu:
     Architecture:        x86_64
     CPU op-mode(s):      32-bit, 64-bit
     Byte Order:          Little Endian
     CPU(s):              128
     On-line CPU(s) list: 0-127
     Thread(s) per core:  2
     Core(s) per socket:  16
     Socket(s):           4
     NUMA node(s):        8
     Vendor ID:           GenuineIntel
     CPU family:          6
```

(Continued on next page)

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL580 Gen10
(2.30 GHz, Intel Xeon Gold 5218)

SPECrate2017_int_base =   361

SPECrate2017_int_peak = Not Run

CPU2017 License: 3

Test Sponsor: HPE

Tested by: HPE

Test Date: May-2019

Hardware Availability: Apr-2019

Software Availability: Feb-2019

Platform Notes (Continued)

```
      Model:                85
      Model name:           Intel(R) Xeon(R) Gold 5218 CPU @ 2.30GHz
      Stepping:             6
      CPU MHz:              2300.000
      BogoMIPS:             4600.00
      Virtualization:       VT-x
      L1d cache:            32K
      L1i cache:            32K
      L2 cache:             1024K
      L3 cache:             22528K
      NUMA node0 CPU(s):    0-7,64-71
      NUMA node1 CPU(s):    8-15,72-79
      NUMA node2 CPU(s):    16-23,80-87
      NUMA node3 CPU(s):    24-31,88-95
      NUMA node4 CPU(s):    32-39,96-103
      NUMA node5 CPU(s):    40-47,104-111
      NUMA node6 CPU(s):    48-55,112-119
      NUMA node7 CPU(s):    56-63,120-127
      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 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 mba 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
    ibpb ibrs stibp dtherm ida arat pln pts pku ospke avx512_vnni arch_capabilities ssbd

 /proc/cpuinfo cache data
    cache size : 22528 KB

 From numactl --hardware  WARNING: a numactl 'node' might or might not correspond to a
 physical chip.
    available: 8 nodes (0-7)
    node 0 cpus: 0 1 2 3 4 5 6 7 64 65 66 67 68 69 70 71
    node 0 size: 96351 MB
    node 0 free: 96109 MB
    node 1 cpus: 8 9 10 11 12 13 14 15 72 73 74 75 76 77 78 79
    node 1 size: 96764 MB
    node 1 free: 96477 MB
    node 2 cpus: 16 17 18 19 20 21 22 23 80 81 82 83 84 85 86 87
    node 2 size: 96764 MB
    node 2 free: 96642 MB
    node 3 cpus: 24 25 26 27 28 29 30 31 88 89 90 91 92 93 94 95
    node 3 size: 96735 MB
```

(Continued on next page)

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL580 Gen10
(2.30 GHz, Intel Xeon Gold 5218)

SPECrate2017_int_base =   361

SPECrate2017_int_peak = Not Run

CPU2017 License: 3	**Test Date:** May-2019
Test Sponsor: HPE	**Hardware Availability:** Apr-2019
Tested by: HPE	**Software Availability:** Feb-2019

Platform Notes (Continued)

```
  node 3 free: 96616 MB
  node 4 cpus: 32 33 34 35 36 37 38 39 96 97 98 99 100 101 102 103
  node 4 size: 96764 MB
  node 4 free: 96428 MB
  node 5 cpus: 40 41 42 43 44 45 46 47 104 105 106 107 108 109 110 111
  node 5 size: 96764 MB
  node 5 free: 96651 MB
  node 6 cpus: 48 49 50 51 52 53 54 55 112 113 114 115 116 117 118 119
  node 6 size: 96764 MB
  node 6 free: 96650 MB
  node 7 cpus: 56 57 58 59 60 61 62 63 120 121 122 123 124 125 126 127
  node 7 size: 96763 MB
  node 7 free: 96652 MB
  node distances:
  node   0   1   2   3   4   5   6   7
    0:  10  21  31  31  31  31  31  31
    1:  21  10  31  31  31  31  31  31
    2:  31  31  10  21  31  31  31  31
    3:  31  31  21  10  31  31  31  31
    4:  31  31  31  31  10  21  31  31
    5:  31  31  31  31  21  10  31  31
    6:  31  31  31  31  31  31  10  21
    7:  31  31  31  31  31  31  21  10

 From /proc/meminfo
    MemTotal:       792242800 kB
    HugePages_Total:        0
    Hugepagesize:        2048 kB

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

 uname -a:
    Linux linux-sypg 4.12.14-23-default #1 SMP Tue May 29 21:04:44 UTC 2018 (cd0437b)
    x86_64 x86_64 x86_64 GNU/Linux

 Kernel self-reported vulnerability status:

 CVE-2017-5754 (Meltdown):         Not affected
```

(Continued on next page)

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL580 Gen10
(2.30 GHz, Intel Xeon Gold 5218)

SPECrate2017_int_base =   361

SPECrate2017_int_peak = Not Run

CPU2017 License: 3
Test Sponsor: HPE
Tested by: HPE

Test Date: May-2019
Hardware Availability: Apr-2019
Software Availability: Feb-2019

Platform Notes (Continued)

```
 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 Jul 11 19:54

 SPEC is set to: /home/cpu2017_u2
    Filesystem     Type  Size  Used Avail Use% Mounted on
    /dev/sda1      xfs   894G   38G  857G   5% /home

 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.
   BIOS HPE U34 02/02/2019
   Memory:
    24x UNKNOWN NOT AVAILABLE
    24x UNKNOWN NOT AVAILABLE 32 GB 2 rank 2666

 (End of data from sysinfo program)
```

Compiler Version Notes

```
==============================================================================
 CC   500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base) 525.x264_r(base)
      557.xz_r(base)
------------------------------------------------------------------------------
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.2.187 Build 20190117
Copyright (C) 1985-2019 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------


==============================================================================
 CXXC 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base)
      541.leela_r(base)
------------------------------------------------------------------------------
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.2.187 Build 20190117
Copyright (C) 1985-2019 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------


==============================================================================
 FC   548.exchange2_r(base)
------------------------------------------------------------------------------
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
  64, Version 19.0.2.187 Build 20190117
```

(Continued on next page)

SPEC CPU2017 Integer Rate Result

Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL580 Gen10
(2.30 GHz, Intel Xeon Gold 5218)

SPECrate2017_int_base =   361

SPECrate2017_int_peak =   Not Run

CPU2017 License: 3	**Test Date:**	May-2019
Test Sponsor: HPE	**Hardware Availability:**	Apr-2019
Tested by: HPE	**Software Availability:**	Feb-2019

Compiler Version Notes (Continued)

```
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

500.perlbench_r: `-DSPEC_LP64 -DSPEC_LINUX_X64`
502.gcc_r: `-DSPEC_LP64`
505.mcf_r: `-DSPEC_LP64`
520.omnetpp_r: `-DSPEC_LP64`
523.xalancbmk_r: `-DSPEC_LP64 -DSPEC_LINUX`
525.x264_r: `-DSPEC_LP64`
531.deepsjeng_r: `-DSPEC_LP64`
541.leela_r: `-DSPEC_LP64`
548.exchange2_r: `-DSPEC_LP64`
557.xz_r: `-DSPEC_LP64`

Base Optimization Flags

C benchmarks:
```
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64
-lqkmalloc
```

C++ benchmarks:
```
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64
-lqkmalloc
```

(Continued on next page)

Standard Performance Evaluation Corporation (info@spec.org)   https://www.spec.org/

Hewlett Packard Enterprise
(Test Sponsor: HPE)

SPECrate2017_int_base =   361

ProLiant DL580 Gen10
(2.30 GHz, Intel Xeon Gold 5218)

SPECrate2017_int_peak = Not Run

CPU2017 License: 3

Test Sponsor: HPE

Tested by: HPE

Test Date: May-2019

Hardware Availability: Apr-2019

Software Availability: Feb-2019

Base Optimization Flags (Continued)

Fortran benchmarks:

```
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64
-lqkmalloc
```

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-revA.html
http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2019-04-03.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-revA.xml
http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2019-04-03.xml

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

Tested with SPEC CPU2017 v1.0.5 on 2018-07-11 19:56:18-0400.
Report generated on 2019-06-11 17:14:01 by CPU2017 PDF formatter v6067.
Originally published on 2019-06-11.