SPEC CPU®2017 Integer Rate Result

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Hewlett Packard Enterprise

(Test Sponsor: HPE)
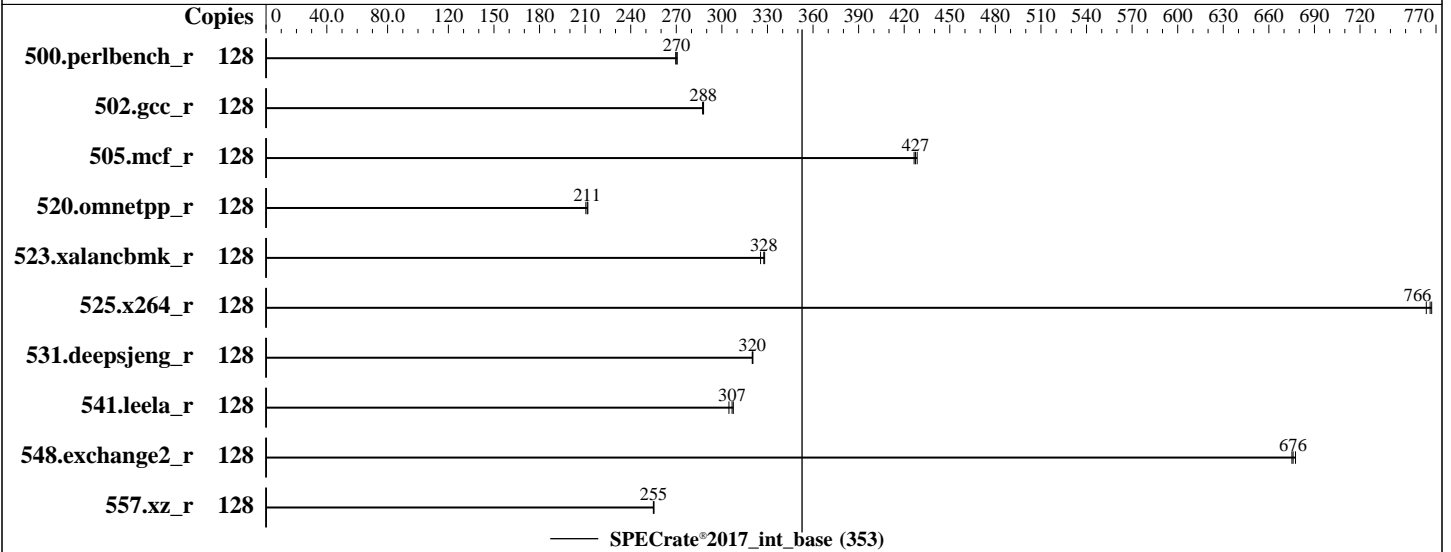
ProLiant DL580 Gen10
(2.60 GHz, Intel Xeon Gold 6142)

$SPECrate®2017_int_base = $ **353**

$SPECrate®2017_int_peak = $ Not Run

CPU2017 License: 3	**Test Date:** Jan-2019
Test Sponsor: HPE	**Hardware Availability:** Dec-2018
Tested by: HPE	**Software Availability:** Sep-2018

Copies

Benchmark	Copies	Value
500.perlbench_r	128	270
502.gcc_r	128	288
505.mcf_r	128	427
520.omnetpp_r	128	211
523.xalancbmk_r	128	328
525.x264_r	128	766
531.deepsjeng_r	128	320
541.leela_r	128	307
548.exchange2_r	128	676
557.xz_r	128	255

SPECrate®2017_int_base (353)

Hardware

CPU Name: Intel Xeon Gold 6142
 Max MHz: 3700
 Nominal: 2600
Enabled: 64 cores, 4 chips, 2 threads/core
Orderable: 1, 2, 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: 1536 GB (48 x 32 GB 2Rx4 PC4-2666V-R)
Storage: 1 x 960 GB SATA SSD, RAID 0
Other: None

Software

OS: SUSE Linux Enterprise Server 12 (x86_64) SP3
 Kernel 4.4.131-94.25-default
Compiler: C/C++: Version 19.0.0.117 of Intel C/C++
 Compiler for Linux;
 Fortran: Version 19.0.0.117 of Intel Fortran
 Compiler for Linux
Parallel: No
Firmware: HPE BIOS Version U34 12/17/2018 released Dec-2018
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: Not Applicable
Other: jemalloc memory allocator V5.0.1
Power Management: --

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

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Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
500.perlbench_r	128	753	271	756	270	**754**	**270**							
502.gcc_r	128	631	287	629	288	**630**	**288**							
505.mcf_r	128	485	427	483	429	**484**	**427**							
520.omnetpp_r	128	798	210	793	212	**794**	**211**							
523.xalancbmk_r	128	415	325	412	328	**413**	**328**							
525.x264_r	128	292	767	294	764	**293**	**766**							
531.deepsjeng_r	128	**458**	**320**	458	320	458	320							
541.leela_r	128	696	305	689	308	**691**	**307**							
548.exchange2_r	128	495	678	**496**	**676**	497	675							
557.xz_r	128	542	255	**542**	**255**	541	255							
SPECrate®2017_int_base =	**353**													
SPECrate®2017_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>
IRQ balance service was stopped using "systemctl stop irqbalance.service"
Tuned-adm profile was set to Throughput-Performance using "tuned-adm profile throughput-performance"
Numa Balancing disabled using "echo 0 > /proc/sys/kernel/numa_balancing"
VM Dirty ratio was set to 40 using "echo 40 > /proc/sys/vm/dirty_ratio"

The result, as tested, used kernel 4.4.131-94.25-default of SLES12 SP3. This is a pre-production kernel
 which should be representative of the production kernel 4.4.131-94.29.1 for SLES12 SP3.
```

General Notes

```
Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "/home/cpu2017/lib/ia32:/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-32:/home/cpu2017/je5.0.1-64"
```

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General Notes (Continued)

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

Yes: 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
```

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
  Stale A to S set to Disabled
  Workload Profile set to General Throughput Compute
   Minimum Processor Idle Power Core C-State set to C1E State
 Sysinfo program /home/cpu2017/bin/sysinfo
 Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
 running on linux-hefb Fri Jan 18 02:11:27 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) Gold 6142 CPU @ 2.60GHz
       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
```

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Platform Notes (Continued)

```
        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
        Model:                 85
        Model name:            Intel(R) Xeon(R) Gold 6142 CPU @ 2.60GHz
        Stepping:              4
        CPU MHz:               2593.921
        BogoMIPS:              5187.84
        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
    aperfmperf eagerfpu 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 ida arat epb invpcid_single pln pts
    dtherm intel_pt rsb_ctxsw spec_ctrl stibp rds retpoline kaiser tpr_shadow vnmi
    flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm
    cqm mpx avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl
    xsaveopt xsavec xgetbv1 cqm_llc cqm_occup_llc pku ospke

 /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: 193104 MB
```

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Hardware Availability: Dec-2018

Software Availability: Sep-2018

Platform Notes (Continued)

```
   node 0 free: 192805 MB
   node 1 cpus: 8 9 10 11 12 13 14 15 72 73 74 75 76 77 78 79
   node 1 size: 193533 MB
   node 1 free: 193322 MB
   node 2 cpus: 16 17 18 19 20 21 22 23 80 81 82 83 84 85 86 87
   node 2 size: 193533 MB
   node 2 free: 193419 MB
   node 3 cpus: 24 25 26 27 28 29 30 31 88 89 90 91 92 93 94 95
   node 3 size: 193533 MB
   node 3 free: 193408 MB
   node 4 cpus: 32 33 34 35 36 37 38 39 96 97 98 99 100 101 102 103
   node 4 size: 193533 MB
   node 4 free: 193410 MB
   node 5 cpus: 40 41 42 43 44 45 46 47 104 105 106 107 108 109 110 111
   node 5 size: 193533 MB
   node 5 free: 193408 MB
   node 6 cpus: 48 49 50 51 52 53 54 55 112 113 114 115 116 117 118 119
   node 6 size: 193533 MB
   node 6 free: 193416 MB
   node 7 cpus: 56 57 58 59 60 61 62 63 120 121 122 123 124 125 126 127
   node 7 size: 193531 MB
   node 7 free: 193420 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:       1584985496 kB
    HugePages_Total:        0
    Hugepagesize:        2048 kB

 From /etc/*release* /etc/*version*
    SuSE-release:
       SUSE Linux Enterprise Server 12 (x86_64)
       VERSION = 12
       PATCHLEVEL = 3
       # 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"
```

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Platform Notes (Continued)

```
      VERSION="12-SP3"
      VERSION_ID="12.3"
      PRETTY_NAME="SUSE Linux Enterprise Server 12 SP3"
      ID="sles"
      ANSI_COLOR="0;32"
      CPE_NAME="cpe:/o:suse:sles:12:sp3"

 uname -a:
    Linux linux-hefb 4.4.131-94.25-default #1 SMP Mon May 7 11:22:19 UTC 2018 (9700bac)
    x86_64 x86_64 x86_64 GNU/Linux

 Kernel self-reported vulnerability status:

 CVE-2017-5754 (Meltdown):         Mitigation: PTI
 CVE-2017-5753 (Spectre variant 1): Mitigation: __user pointer sanitization
 CVE-2017-5715 (Spectre variant 2): Mitigation: IBRS+IBPB

 run-level 3 Jan 18 02:06

 SPEC is set to: /home/cpu2017
    Filesystem      Type  Size  Used Avail Use% Mounted on
    /dev/sda4       xfs   852G  198G  654G  24% /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 12/17/2018
   Memory:
    4x HPE 840758-091 32 GB 2 rank 2666
    44x UNKNOWN NOT AVAILABLE 32 GB 2 rank 2666

 (End of data from sysinfo program)
```

Compiler Version Notes

```
==============================================================================
C      | 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 19.0.0.117 Build 20180804
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------


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

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Compiler Version Notes (Continued)

```
C++      | 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 19.0.0.117 Build 20180804
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------


========================================================================
Fortran | 548.exchange2_r(base)
------------------------------------------------------------------------
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
  64, Version 19.0.0.117 Build 20180804
Copyright (C) 1985-2018 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`

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Base Optimization Flags

C benchmarks:

```
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -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=3 -L/usr/local/je5.0.1-64/lib -ljemalloc
```

Fortran benchmarks:

```
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte
-L/usr/local/je5.0.1-64/lib -ljemalloc
```

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-SKX-revJ.html
http://www.spec.org/cpu2017/flags/Intel-ic19.0-official-linux64.2019-01-15.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-SKX-revJ.xml
http://www.spec.org/cpu2017/flags/Intel-ic19.0-official-linux64.2019-01-15.xml

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

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