# SPEC® CPU2017 Integer Rate Result

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## Hewlett Packard Enterprise

(Test Sponsor: HPE)

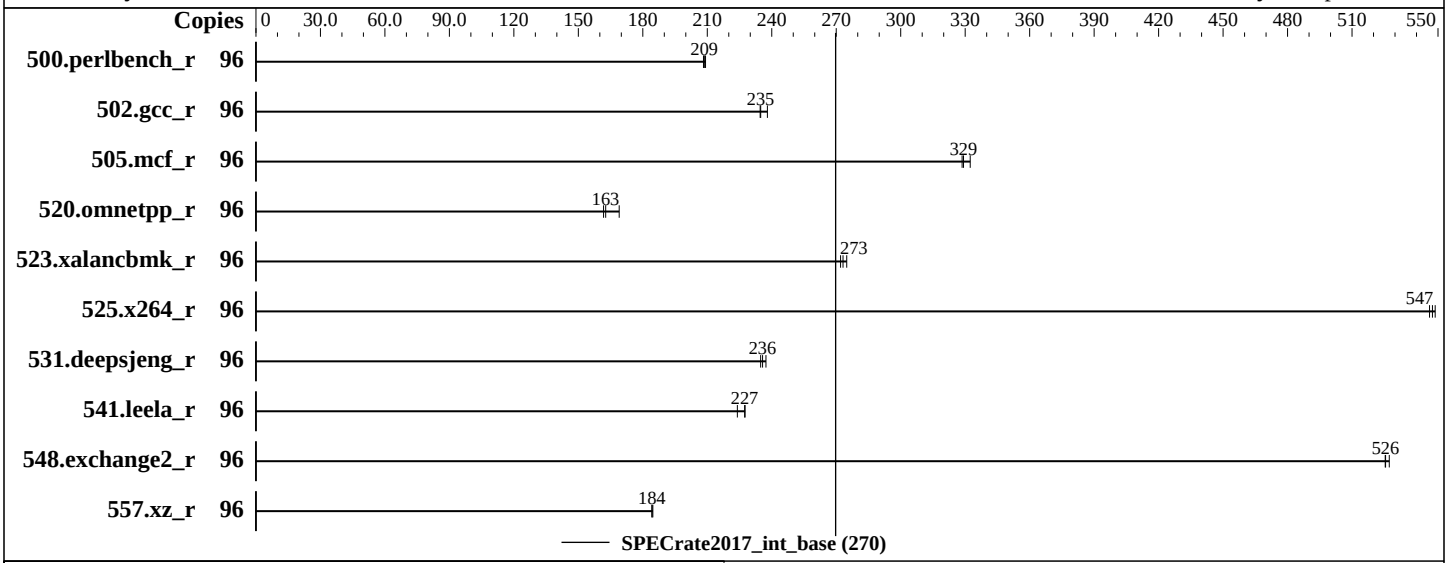
ProLiant DL560 Gen10
(2.60 GHz, Intel Xeon Gold 6126)

SPECrate2017_int_base = 270

SPECrate2017_int_peak = Not Run

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

**Test Date:** Dec-2017
**Hardware Availability:** Oct-2017
**Software Availability:** Sep-2017




### Hardware

| | |
|---|---|
| CPU Name: | Intel Xeon Gold 6126 |
| Max MHz.: | 3700 |
| Nominal: | 2600 |
| Enabled: | 48 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: | 19.25 MB I+D on chip per chip |
| Other: | None |
| Memory: | 384 GB (48 x 8 GB 2Rx8 PC4-2666V-R) |
| Storage: | 1 x 960 GB SATA SSD, RAID 0 |
| Other: | None |

### Software

| | |
|---|---|
| OS: | SUSE Linux Enterprise Server 12 (x86_64) SP2<br>Kernel 4.4.21-68-default |
| Compiler: | C/C++: Version 18.0.0.128 of Intel C/C++ Compiler for Linux;<br>Fortran: Version 18.0.0.128 of Intel Fortran Compiler for Linux |
| Parallel: | No |
| Firmware: | HPE BIOS Version U34 09/29/2017 released Oct-2017 |
| File System: | xfs |
| System State: | Run level 3 (multi-user) |
| Base Pointers: | 64-bit |
| Peak Pointers: | Not Applicable |
| Other: | jemalloc memory allocator library V5.0.1 |

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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 | 96 | **733** | **209** | 734 | 208 | 731 | 209 | | | | | | | |
| 502.gcc_r | 96 | 571 | 238 | 579 | 235 | **579** | **235** | | | | | | | |
| 505.mcf_r | 96 | 467 | 332 | **471** | **329** | 472 | 329 | | | | | | | |
| 520.omnetpp_r | 96 | 745 | 169 | 779 | 162 | **774** | **163** | | | | | | | |
| 523.xalancbmk_r | 96 | 369 | 275 | **371** | **273** | 373 | 272 | | | | | | | |
| 525.x264_r | 96 | 308 | 546 | 306 | 549 | **307** | **547** | | | | | | | |
| 531.deepsjeng_r | 96 | 464 | 237 | **467** | **236** | 468 | 235 | | | | | | | |
| 541.leela_r | 96 | 699 | 228 | 710 | 224 | **699** | **227** | | | | | | | |
| 548.exchange2_r | 96 | 479 | 525 | 477 | 527 | **479** | **526** | | | | | | | |
| 557.xz_r | 96 | **563** | **184** | 563 | 184 | 561 | 185 | | | | | | | |

**SPECrate2017_int_base = 270**

**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"
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>
irqbalance disabled with "service irqbalance stop"
tuned profile set wtih "tuned-adm profile throughput-performance"
VM Dirty ratio was set to 40 using "echo 40 > /proc/sys/vm/dirty_ratio"
Numa balancing was disabled using "echo 0 > /proc/sys/kernel/numa_balancing"
```

## 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"

 Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM
 memory using Redhat Enterprise Linux 7.4

No: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown)
```

**(Continued on next page)**

## General Notes (Continued)

```
is mitigated in the system as tested and documented.
No: 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.
No: 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.

This benchmark result is intended to provide perspective on
past performance using the historical hardware and/or
software described on this result page.

The system as described on this result page was formerly
generally available. At the time of this publication, it may
not be shipping, and/or may not be supported, and/or may fail
to meet other tests of General Availability described in the
SPEC OSG Policy document, http://wwww.spec.org/osg/policy.htm.

This measured result may not be representative of the result
that would be measured were this benchmark run with hardware
and software available as of the publication date.

jemalloc: configured and built at default for 32bit (i686) and 64bit (x86_64) targets;
built with RedHat Enterprise 7.4, 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 Enabled
  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: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
 running on linux-mcua Fri Dec 15 02:24:03 2017

 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 6126 CPU @ 2.60GHz
       4  "physical id"s (chips)
       96 "processors"
```

**(Continued on next page)**

## Platform Notes (Continued)

```
    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 : 12
       siblings  : 24
       physical 0: cores 0 2 3 4 5 8 9 10 11 12 13 14
       physical 1: cores 0 1 3 5 6 8 9 10 11 12 13 14
       physical 2: cores 0 1 3 4 5 6 8 9 10 11 12 13
       physical 3: cores 0 1 3 4 5 6 8 9 10 11 12 13

  From lscpu:
       Architecture:          x86_64
       CPU op-mode(s):        32-bit, 64-bit
       Byte Order:            Little Endian
       CPU(s):                96
       On-line CPU(s) list:   0-95
       Thread(s) per core:    2
       Core(s) per socket:    12
       Socket(s):             4
       NUMA node(s):          8
       Vendor ID:             GenuineIntel
       CPU family:            6
       Model:                 85
       Model name:            Intel(R) Xeon(R) Gold 6126 CPU @ 2.60GHz
       Stepping:              4
       CPU MHz:               2593.904
       BogoMIPS:              5187.80
       Virtualization:        VT-x
       L1d cache:             32K
       L1i cache:             32K
       L2 cache:              1024K
       L3 cache:              19712K
       NUMA node0 CPU(s):     0-5,48-53
       NUMA node1 CPU(s):     6-11,54-59
       NUMA node2 CPU(s):     12-17,60-65
       NUMA node3 CPU(s):     18-23,66-71
       NUMA node4 CPU(s):     24-29,72-77
       NUMA node5 CPU(s):     30-35,78-83
       NUMA node6 CPU(s):     36-41,84-89
       NUMA node7 CPU(s):     42-47,90-95
       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 pln pts dtherm intel_pt
       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
```

**(Continued on next page)**

## Platform Notes (Continued)

```
      avx512bw avx512vl xsaveopt xsavec xgetbv1 cqm_llc cqm_occup_llc

  /proc/cpuinfo cache data
     cache size : 19712 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 48 49 50 51 52 53
    node 0 size: 47965 MB
    node 0 free: 41043 MB
    node 1 cpus: 6 7 8 9 10 11 54 55 56 57 58 59
    node 1 size: 48382 MB
    node 1 free: 41521 MB
    node 2 cpus: 12 13 14 15 16 17 60 61 62 63 64 65
    node 2 size: 48382 MB
    node 2 free: 41576 MB
    node 3 cpus: 18 19 20 21 22 23 66 67 68 69 70 71
    node 3 size: 48382 MB
    node 3 free: 41585 MB
    node 4 cpus: 24 25 26 27 28 29 72 73 74 75 76 77
    node 4 size: 48382 MB
    node 4 free: 41580 MB
    node 5 cpus: 30 31 32 33 34 35 78 79 80 81 82 83
    node 5 size: 48382 MB
    node 5 free: 41585 MB
    node 6 cpus: 36 37 38 39 40 41 84 85 86 87 88 89
    node 6 size: 48382 MB
    node 6 free: 41574 MB
    node 7 cpus: 42 43 44 45 46 47 90 91 92 93 94 95
    node 7 size: 48380 MB
    node 7 free: 41583 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:       395918104 kB
     HugePages_Total:       0
     Hugepagesize:       2048 kB
```

**(Continued on next page)**

## Platform Notes (Continued)

```
 From /etc/*release* /etc/*version*
    SuSE-release:
       SUSE Linux Enterprise Server 12 (x86_64)
       VERSION = 12
       PATCHLEVEL = 2
       # 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-SP2"
       VERSION_ID="12.2"
       PRETTY_NAME="SUSE Linux Enterprise Server 12 SP2"
       ID="sles"
       ANSI_COLOR="0;32"
       CPE_NAME="cpe:/o:suse:sles:12:sp2"

 uname -a:
    Linux linux-mcua 4.4.21-68-default #1 SMP Tue Oct 18 18:19:37 UTC 2016 (63cf368)
    x86_64 x86_64 x86_64 GNU/Linux

 run-level 3 Dec 14 14:08

 SPEC is set to: /home/cpu2017
    Filesystem     Type  Size  Used Avail Use% Mounted on
    /dev/sdb4      xfs   852G  165G  688G  20% /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 09/29/2017
   Memory:
    48x UNKNOWN NOT AVAILABLE 8 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)
------------------------------------------------------------------------------
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------
```

**(Continued on next page)**

## Compiler Version Notes (Continued)

```
==============================================================================
 CXXC 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base)
      541.leela_r(base)
------------------------------------------------------------------------------
icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------

==============================================================================
 FC  548.exchange2_r(base)
------------------------------------------------------------------------------
ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------
```

## Base Compiler Invocation

C benchmarks:
icc

C++ benchmarks:
icpc

Fortran benchmarks:
ifort

## 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-AVX2 -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-AVX2 -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-AVX2 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte
-L/usr/local/je5.0.1-64/lib -ljemalloc

## Base Other Flags

C benchmarks:
-m64 -std=c11

C++ benchmarks:
-m64

Fortran benchmarks:
-m64

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2017-10-19.html
http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-V1.2-SKX-revG.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2017-10-19.xml
http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-V1.2-SKX-revG.xml


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

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