



# SPEC® CPU2017 Integer Rate Result

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**Hewlett Packard Enterprise**

(Test Sponsor: HPE)

ProLiant DL560 Gen10

(3.00 GHz, Intel Xeon Gold 6136)

SPECrate2017\_int\_base = 301

SPECrate2017\_int\_peak = Not Run

CPU2017 License: 3

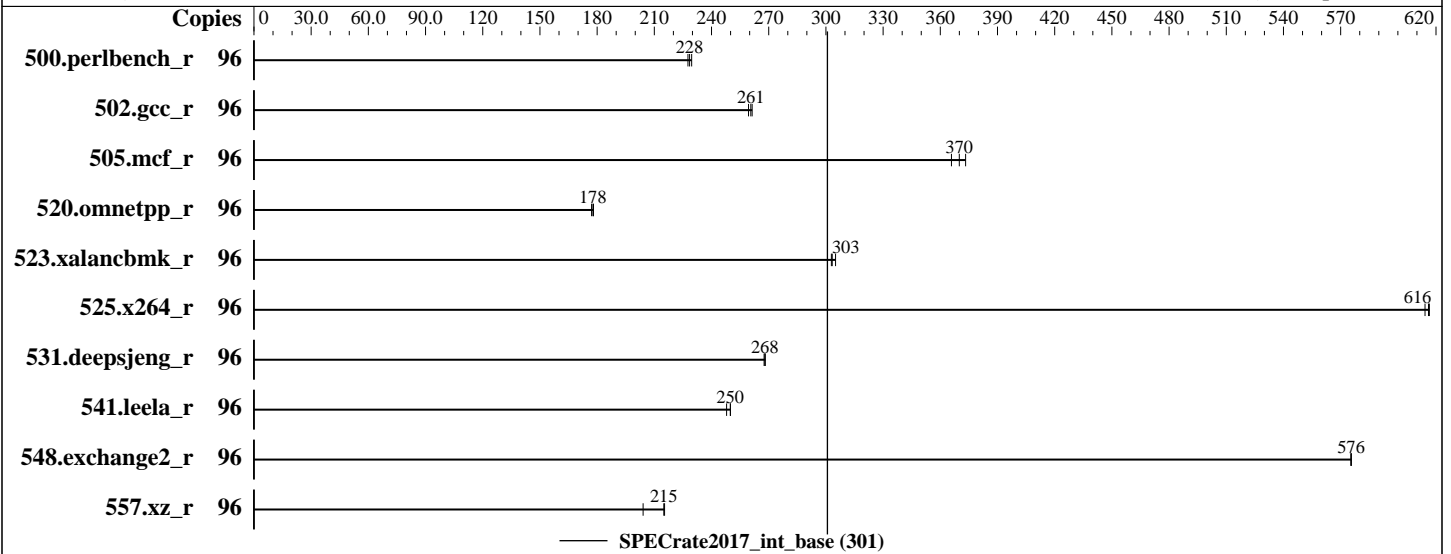
Test Sponsor: HPE

Tested by: HPE

Test Date: Dec-2017

Hardware Availability: Oct-2017

Software Availability: Sep-2017



## Hardware

CPU Name: Intel Xeon Gold 6136  
 Max MHz.: 3700  
 Nominal: 3000  
 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: 24.75 MB I+D on chip per chip  
 Other: None  
 Memory: 768 GB (48 x 16 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  
 Kernel 4.4.21-69-default  
 Compiler: C/C++: Version 18.0.0.128 of Intel C/C++ Compiler for Linux;  
 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	<b>669</b>	<b>228</b>	666	230	671	228							
502.gcc_r	96	<b>522</b>	<b>261</b>	520	261	524	259							
505.mcf_r	96	<b>419</b>	<b>370</b>	416	373	424	366							
520.omnetpp_r	96	<b>709</b>	<b>178</b>	711	177	707	178							
523.xalancbmk_r	96	335	303	<b>334</b>	<b>303</b>	332	305							
525.x264_r	96	<b>273</b>	<b>616</b>	273	617	274	614							
531.deepsjeng_r	96	410	268	411	268	<b>411</b>	<b>268</b>							
541.leela_r	96	641	248	<b>636</b>	<b>250</b>	636	250							
548.exchange2_r	96	437	576	437	575	<b>437</b>	<b>576</b>							
557.xz_r	96	481	215	<b>482</b>	<b>215</b>	508	204							

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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 with "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/SPEC CPU2017/lib/ia32:/home/SPEC CPU2017/lib/intel64:/home/SPEC CPU2017/je5.0.1-32"  
LD\_LIBRARY\_PATH = "\$LD\_LIBRARY\_PATH:/home/SPEC 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)

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## 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://www.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](http://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/SPEC CPU2017/bin/sysinfo  
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f  
running on linux-smfo Mon Dec 11 15:58:39 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 6136 CPU @ 3.00GHz  
4 "physical id"s (chips)  
96 "processors"

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## 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 1 2 3 4 9 10 16 18 19 25 26
physical 1: cores 0 1 2 3 4 9 10 16 18 19 25 26
physical 2: cores 0 1 2 3 4 8 9 11 17 18 19 20
physical 3: cores 0 1 2 3 4 8 9 11 17 18 19 20

```

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 6136 CPU @ 3.00GHz
Stepping:               4
CPU MHz:                2992.958
BogoMIPS:               5985.91
Virtualization:        VT-x
L1d cache:              32K
L1i cache:              32K
L2 cache:               1024K
L3 cache:               25344K
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
aperfmpperf 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)



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## Platform Notes (Continued)

avx512bw avx512vl xsaveopt xsavec xgetbv1 cqm\_llc cqm\_occup\_llc

```
/proc/cpuinfo cache data
cache size : 25344 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: 96348 MB
node 0 free: 95941 MB
node 1 cpus: 6 7 8 9 10 11 54 55 56 57 58 59
node 1 size: 96766 MB
node 1 free: 96420 MB
node 2 cpus: 12 13 14 15 16 17 60 61 62 63 64 65
node 2 size: 96766 MB
node 2 free: 96391 MB
node 3 cpus: 18 19 20 21 22 23 66 67 68 69 70 71
node 3 size: 96766 MB
node 3 free: 96514 MB
node 4 cpus: 24 25 26 27 28 29 72 73 74 75 76 77
node 4 size: 96766 MB
node 4 free: 96519 MB
node 5 cpus: 30 31 32 33 34 35 78 79 80 81 82 83
node 5 size: 96766 MB
node 5 free: 96515 MB
node 6 cpus: 36 37 38 39 40 41 84 85 86 87 88 89
node 6 size: 96766 MB
node 6 free: 96478 MB
node 7 cpus: 42 43 44 45 46 47 90 91 92 93 94 95
node 7 size: 96764 MB
node 7 free: 96485 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: 792278832 kB
HugePages_Total: 0
Hugepagesize: 2048 kB
```

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## Platform Notes (Continued)

```
/usr/bin/lsb_release -d
SUSE Linux Enterprise Server 12 SP2
```

```
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-smfo 4.4.21-69-default #1 SMP Tue Oct 25 10:58:20 UTC 2016 (9464f67)
x86_64 x86_64 x86_64 GNU/Linux
```

```
run-level 3 Dec 11 15:58
```

```
SPEC is set to: /home/SPECCPU2017
```

```
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sda4        xfs   852G  167G  685G  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 16 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)
=====
```

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## Compiler Version Notes (Continued)

icc (ICC) 18.0.0 20170811

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-----

=====

CXXC 520.omnetpp\_r(base) 523.xalancbmk\_r(base) 531.deepsjeng\_r(base)  
541.leela\_r(base)

-----

icpc (ICC) 18.0.0 20170811

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-----

=====

FC 548.exchange2\_r(base)

-----

ifort (IFORT) 18.0.0 20170811

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## 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



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## Base Optimization Flags

C benchmarks:

```
-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div  
-gopt-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  
-gopt-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  
-gopt-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](mailto:info@spec.org).

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