



# SPEC® CPU2017 Integer Rate Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

## Hewlett Packard Enterprise

(Test Sponsor: HPE)

### ProLiant DL560 Gen10

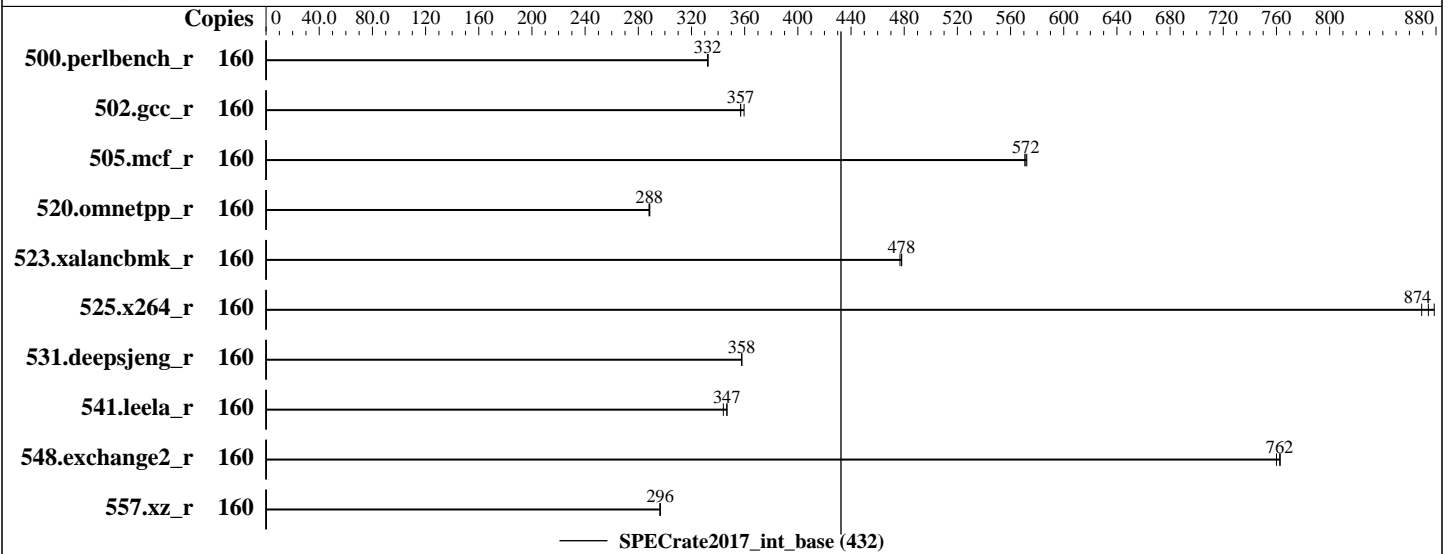
(2.10 GHz, Intel Xeon Gold 6230)

SPECrate2017\_int\_base = 432

SPECrate2017\_int\_peak = Not Run

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

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



### Hardware

CPU Name: Intel Xeon Gold 6230  
Max MHz.: 3900  
Nominal: 2100  
Enabled: 80 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: 27.5 MB I+D on chip per chip  
Other: None  
Memory: 768 GB (24 x 32 GB 2Rx4 PC4-2933Y-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: btrfs  
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)

ProLiant DL560 Gen10

(2.10 GHz, Intel Xeon Gold 6230)

SPECrate2017\_int\_base = 432

SPECrate2017\_int\_peak = Not Run

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

Test Date: Apr-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	160	767	332	766	333	<b><u>767</u></b>	<b><u>332</u></b>							
502.gcc_r	160	630	360	<b><u>635</u></b>	<b><u>357</u></b>	635	357							
505.mcf_r	160	452	572	453	571	<b><u>452</u></b>	<b><u>572</u></b>							
520.omnetpp_r	160	729	288	<b><u>728</u></b>	<b><u>288</u></b>	727	289							
523.xalancbmk_r	160	354	477	353	478	<b><u>353</u></b>	<b><u>478</u></b>							
525.x264_r	160	322	869	319	879	<b><u>320</u></b>	<b><u>874</u></b>							
531.deepsjeng_r	160	512	358	513	358	<b><u>513</u></b>	<b><u>358</u></b>							
541.leela_r	160	764	347	770	344	<b><u>765</u></b>	<b><u>347</u></b>							
548.exchange2_r	160	550	763	552	760	<b><u>550</u></b>	<b><u>762</u></b>							
557.xz_r	160	<b><u>583</u></b>	<b><u>296</u></b>	583	297	583	296							

SPECrate2017\_int\_base = 432

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)

**ProLiant DL560 Gen10**

(2.10 GHz, Intel Xeon Gold 6230)

SPECrate2017\_int\_base = 432

SPECrate2017\_int\_peak = Not Run

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

**Test Date:** Apr-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  
Advanced Memory Protection set to Advanced ECC

Sysinfo program /home/cpu2017\_u2/bin/sysinfo  
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9  
running on linux-vqdi Tue Apr 23 22:09:35 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 6230 CPU @ 2.10GHz
 4 "physical id"s (chips)
160 "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 : 20
siblings  : 40
physical 0: cores 0 1 2 3 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28
physical 1: cores 0 1 2 3 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28
physical 2: cores 0 1 2 3 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28
physical 3: cores 0 1 2 3 8 9 10 11 12 16 17 18 19 20 24 25 26 27 28
```

### From lscpu:

```
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 160
On-line CPU(s) list: 0-159
Thread(s) per core: 2
Core(s) per socket: 20
Socket(s): 4
NUMA node(s): 8
Vendor ID: GenuineIntel
```

(Continued on next page)



# SPEC CPU2017 Integer Rate Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

**Hewlett Packard Enterprise**

(Test Sponsor: HPE)

**ProLiant DL560 Gen10**

(2.10 GHz, Intel Xeon Gold 6230)

SPECrate2017\_int\_base = 432

SPECrate2017\_int\_peak = Not Run

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

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

## Platform Notes (Continued)

```

CPU family:           6
Model:                85
Model name:           Intel(R) Xeon(R) Gold 6230 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:            28160K
NUMA node0 CPU(s):   0-9,80-89
NUMA node1 CPU(s):   10-19,90-99
NUMA node2 CPU(s):   20-29,100-109
NUMA node3 CPU(s):   30-39,110-119
NUMA node4 CPU(s):   40-49,120-129
NUMA node5 CPU(s):   50-59,130-139
NUMA node6 CPU(s):   60-69,140-149
NUMA node7 CPU(s):   70-79,150-159
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
aperfmpperf 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 : 28160 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 8 9 80 81 82 83 84 85 86 87 88 89
node 0 size: 96349 MB
node 0 free: 96003 MB
node 1 cpus: 10 11 12 13 14 15 16 17 18 19 90 91 92 93 94 95 96 97 98 99
node 1 size: 96764 MB
node 1 free: 96448 MB
node 2 cpus: 20 21 22 23 24 25 26 27 28 29 100 101 102 103 104 105 106 107 108 109
node 2 size: 96764 MB
node 2 free: 96643 MB
node 3 cpus: 30 31 32 33 34 35 36 37 38 39 110 111 112 113 114 115 116 117 118 119

```

(Continued on next page)



# SPEC CPU2017 Integer Rate Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

**Hewlett Packard Enterprise**

(Test Sponsor: HPE)

ProLiant DL560 Gen10

(2.10 GHz, Intel Xeon Gold 6230)

SPECrate2017\_int\_base = 432

SPECrate2017\_int\_peak = Not Run

CPU2017 License: 3

Test Sponsor: HPE

Tested by: HPE

Test Date: Apr-2019

Hardware Availability: Apr-2019

Software Availability: Feb-2019

## Platform Notes (Continued)

```

node 3 size: 96735 MB
node 3 free: 96615 MB
node 4 cpus: 40 41 42 43 44 45 46 47 48 49 120 121 122 123 124 125 126 127 128 129
node 4 size: 96764 MB
node 4 free: 96641 MB
node 5 cpus: 50 51 52 53 54 55 56 57 58 59 130 131 132 133 134 135 136 137 138 139
node 5 size: 96764 MB
node 5 free: 96651 MB
node 6 cpus: 60 61 62 63 64 65 66 67 68 69 140 141 142 143 144 145 146 147 148 149
node 6 size: 96764 MB
node 6 free: 96640 MB
node 7 cpus: 70 71 72 73 74 75 76 77 78 79 150 151 152 153 154 155 156 157 158 159
node 7 size: 96762 MB
node 7 free: 96635 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:          792235776 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-vqdi 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:

(Continued on next page)



# SPEC CPU2017 Integer Rate Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

**Hewlett Packard Enterprise**

(Test Sponsor: HPE)

**ProLiant DL560 Gen10**

(2.10 GHz, Intel Xeon Gold 6230)

SPECrate2017\_int\_base = 432

SPECrate2017\_int\_peak = Not Run

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

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

## Platform Notes (Continued)

CVE-2017-5754 (Meltdown): Not affected  
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 Apr 23 22:08

SPEC is set to: /home/cpu2017\_u2

Filesystem	Type	Size	Used	Avail	Use%	Mounted on
/dev/sda2	btrfs	371G	337G	33G	92%	/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 2933

(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)

(Continued on next page)



# SPEC CPU2017 Integer Rate Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

**Hewlett Packard Enterprise**

(Test Sponsor: HPE)

ProLiant DL560 Gen10

(2.10 GHz, Intel Xeon Gold 6230)

SPECrate2017\_int\_base = 432

SPECrate2017\_int\_peak = Not Run

**CPU2017 License:** 3

**Test Sponsor:** HPE

**Tested by:** HPE

**Test Date:** Apr-2019

**Hardware Availability:** Apr-2019

**Software Availability:** Feb-2019

## Compiler Version Notes (Continued)

64, Version 19.0.2.187 Build 20190117  
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  
-lqkmallo

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  
-lqkmallo

(Continued on next page)



# SPEC CPU2017 Integer Rate Result

Copyright 2017-2019 Standard Performance Evaluation Corporation

**Hewlett Packard Enterprise**

(Test Sponsor: HPE)

ProLiant DL560 Gen10

(2.10 GHz, Intel Xeon Gold 6230)

SPECrate2017\_int\_base = 432

SPECrate2017\_int\_peak = Not Run

**CPU2017 License:** 3

**Test Sponsor:** HPE

**Tested by:** HPE

**Test Date:** Apr-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/Intel-ic18.0-official-linux64.2019-04-03.html>

<http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-V1.2-CLX-revA.html>

You can also download the XML flags sources by saving the following links:

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

<http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-V1.2-CLX-revA.xml>

SPEC is a registered trademark of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

For questions about this result, please contact the tester. For other inquiries, please contact [info@spec.org](mailto:info@spec.org).

Tested with SPEC CPU2017 v1.0.5 on 2019-04-23 12:39:34-0400.

Report generated on 2019-05-30 13:37:46 by CPU2017 PDF formatter v6067.

Originally published on 2019-05-30.