



SPEC® CPU2017 Integer Rate Result

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Hewlett Packard Enterprise

(Test Sponsor: HPE)

ProLiant DL560 Gen10

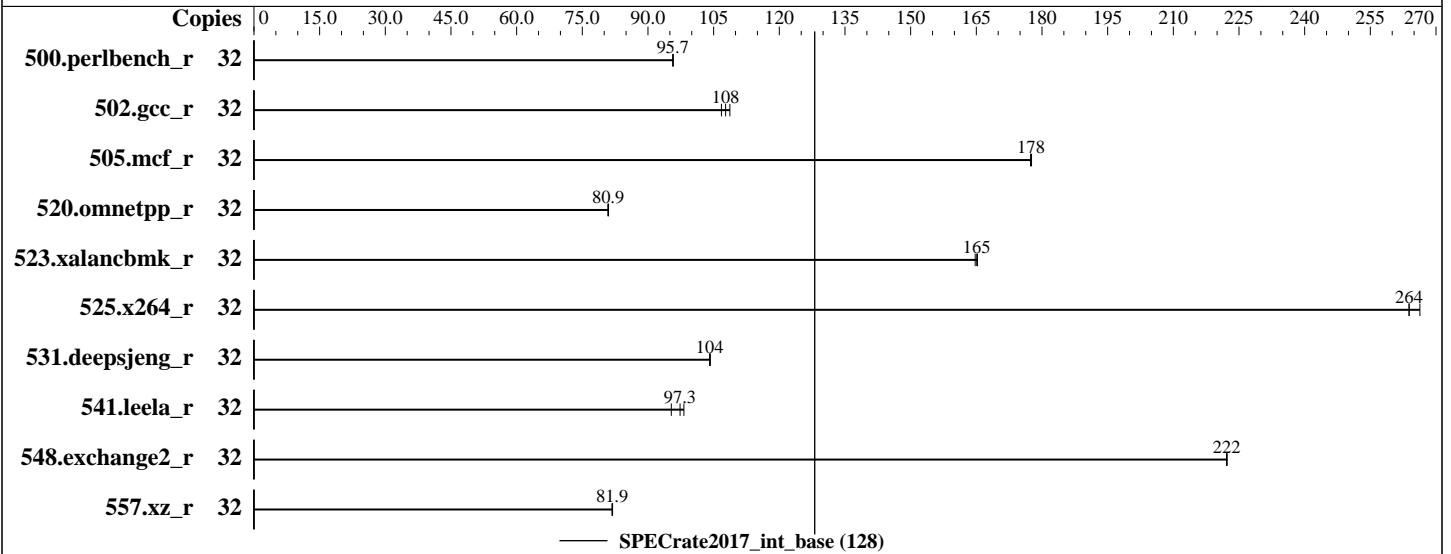
(3.80 GHz, Intel Xeon Gold 5222)

SPECrate2017_int_base = 128

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 5222
Max MHz.: 3900
Nominal: 3800
Enabled: 16 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: 16.5 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



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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	32	532	95.8	532	95.7	<u>532</u>	<u>95.7</u>							
502.gcc_r	32	424	107	421	108	417	109							
505.mcf_r	32	292	177	291	178	<u>291</u>	<u>178</u>							
520.omnetpp_r	32	519	80.9	518	81.0	<u>519</u>	<u>80.9</u>							
523.xalancbmk_r	32	205	165	205	165	204	165							
525.x264_r	32	212	264	210	266	<u>212</u>	<u>264</u>							
531.deepsjeng_r	32	352	104	352	104	<u>352</u>	<u>104</u>							
541.leela_r	32	544	97.3	556	95.3	540	98.2							
548.exchange2_r	32	<u>377</u>	<u>222</u>	377	222	377	222							
557.xz_r	32	423	81.8	422	81.9	422	81.9							

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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"
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)

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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-erfc Fri Apr 26 18:02:31 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 5222 CPU @ 3.80GHz
 4 "physical id"s (chips)
32 "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 : 4
siblings : 8
physical 0: cores 2 5 9 13
physical 1: cores 1 2 5 13
physical 2: cores 0 5 9 13
physical 3: cores 5 8 9 13
```

From lscpu:

```
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 32
On-line CPU(s) list: 0-31
Thread(s) per core: 2
Core(s) per socket: 4
Socket(s): 4
NUMA node(s): 8
Vendor ID: GenuineIntel
```

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Platform Notes (Continued)

```

CPU family:           6
Model:                85
Model name:           Intel(R) Xeon(R) Gold 5222 CPU @ 3.80GHz
Stepping:             7
CPU MHz:              3800.000
BogoMIPS:             7600.00
Virtualization:      VT-x
L1d cache:           32K
L1i cache:           32K
L2 cache:             1024K
L3 cache:            16896K
NUMA node0 CPU(s):   0,1,16,17
NUMA node1 CPU(s):   2,3,18,19
NUMA node2 CPU(s):   4,5,20,21
NUMA node3 CPU(s):   6,7,22,23
NUMA node4 CPU(s):   8,9,24,25
NUMA node5 CPU(s):   10,11,26,27
NUMA node6 CPU(s):   14,15,30,31
NUMA node7 CPU(s):   12,13,28,29
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 sse3
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 bmil 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 : 16896 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 16 17
node 0 size: 96352 MB
node 0 free: 96154 MB
node 1 cpus: 2 3 18 19
node 1 size: 96767 MB
node 1 free: 96648 MB
node 2 cpus: 4 5 20 21
node 2 size: 96767 MB
node 2 free: 96668 MB
node 3 cpus: 6 7 22 23

```

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Platform Notes (Continued)

```

node 3 size: 96767 MB
node 3 free: 96669 MB
node 4 cpus: 8 9 24 25
node 4 size: 96767 MB
node 4 free: 96644 MB
node 5 cpus: 10 11 26 27
node 5 size: 96767 MB
node 5 free: 96653 MB
node 6 cpus: 14 15 30 31
node 6 size: 96737 MB
node 6 free: 96648 MB
node 7 cpus: 12 13 28 29
node 7 size: 96767 MB
node 7 free: 96677 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:      792261504 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-erfc 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:

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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 26 18:00

SPEC is set to: /home/cpu2017_u2

Filesystem	Type	Size	Used	Avail	Use%	Mounted on
/dev/sda2	btrfs	371G	103G	267G	28%	/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)

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Compiler Version Notes (Continued)

64, Version 19.0.2.187 Build 20190117
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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

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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>

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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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