# SPEC® CPU2017 Integer Rate Result

## Hewlett Packard Enterprise
(Test Sponsor: HPE)
Synergy 480 Gen10
(2.10 GHz, Intel Xeon Gold 6238M)

| SPECrate2017_int_base = | 244 |
| SPECrate2017_int_peak = | Not Run |

### CPU2017 License:
- Copies: 3

### Test Sponsor:
- HPE

### Tested by:
- HPE

### Hardware

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU Name</td>
<td>Intel Xeon Gold 6238M</td>
</tr>
<tr>
<td>Max MHz.</td>
<td>3700</td>
</tr>
<tr>
<td>Nominal</td>
<td>2100</td>
</tr>
<tr>
<td>Enabled</td>
<td>44 cores, 2 chips, 2 threads/core</td>
</tr>
<tr>
<td>Orderable</td>
<td>1, 2 chip(s)</td>
</tr>
<tr>
<td>Cache L1</td>
<td>32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td>Cache L2</td>
<td>1 MB I+D on chip per core</td>
</tr>
<tr>
<td>Cache L3</td>
<td>30.25 MB I+D on chip per chip</td>
</tr>
<tr>
<td>Other</td>
<td>None</td>
</tr>
<tr>
<td>Memory</td>
<td>384 GB (24 x 16 GB 2Rx8 PC4-2933Y-R)</td>
</tr>
<tr>
<td>Storage</td>
<td>1 x 400 GB SAS SSD, RAID 0</td>
</tr>
<tr>
<td>Other</td>
<td>None</td>
</tr>
</tbody>
</table>

### Software

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS</td>
<td>SUSE Linux Enterprise Server 15 (x86_64)</td>
</tr>
<tr>
<td>Kernel</td>
<td>4.12.14-23-default</td>
</tr>
<tr>
<td>Compiler</td>
<td>C/C++: Version 19.0.2.187 of Intel C/C++</td>
</tr>
<tr>
<td></td>
<td>Compiler Build 20190117 for Linux; Fortran: Version 19.0.2.187 of Intel Fortran</td>
</tr>
<tr>
<td></td>
<td>Compiler Build 20190117 for Linux</td>
</tr>
<tr>
<td>Parallel</td>
<td>No</td>
</tr>
<tr>
<td>Firmware</td>
<td>HPE BIOS Version I42 02/02/2019 released Apr-2019</td>
</tr>
<tr>
<td>File System</td>
<td>btrfs</td>
</tr>
<tr>
<td>System State</td>
<td>Run level 3 (multi-user)</td>
</tr>
<tr>
<td>Base Pointers</td>
<td>64-bit</td>
</tr>
<tr>
<td>Peak Pointers</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Other</td>
<td>None</td>
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</tbody>
</table>

### Test Details

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

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>SPECrate2017_int_base (244)</th>
</tr>
</thead>
<tbody>
<tr>
<td>500.perlbench_r</td>
<td>88</td>
<td></td>
</tr>
<tr>
<td>502.gcc_r</td>
<td>88</td>
<td></td>
</tr>
<tr>
<td>505.mcf_r</td>
<td>88</td>
<td></td>
</tr>
<tr>
<td>520.omnetpp_r</td>
<td>88</td>
<td></td>
</tr>
<tr>
<td>523.xalancbmk_r</td>
<td>88</td>
<td></td>
</tr>
<tr>
<td>525.x264_r</td>
<td>88</td>
<td></td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>88</td>
<td></td>
</tr>
<tr>
<td>541.leela_r</td>
<td>88</td>
<td></td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>88</td>
<td></td>
</tr>
<tr>
<td>557.xz_r</td>
<td>88</td>
<td></td>
</tr>
</tbody>
</table>

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Standard Performance Evaluation Corporation (info@spec.org)  
https://www.spec.org/
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Hewlett Packard Enterprise
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SPECrate2017_int_base = 244
SPECrate2017_int_peak = Not Run

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>perlbench_r</td>
<td>88</td>
<td>738</td>
<td>190</td>
<td>740</td>
<td>189</td>
<td>739</td>
<td>190</td>
</tr>
<tr>
<td>gcc_r</td>
<td>88</td>
<td>620</td>
<td>201</td>
<td>622</td>
<td>200</td>
<td>617</td>
<td>202</td>
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<tr>
<td>mcf_r</td>
<td>88</td>
<td>446</td>
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<td>446</td>
<td>319</td>
<td>445</td>
<td>320</td>
</tr>
<tr>
<td>omnetpp_r</td>
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<td>701</td>
<td>165</td>
<td>702</td>
<td>164</td>
<td>702</td>
<td>165</td>
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<tr>
<td>xalanbmk_r</td>
<td>88</td>
<td>351</td>
<td>265</td>
<td>351</td>
<td>265</td>
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<td>x264_r</td>
<td>88</td>
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<td>497</td>
<td>310</td>
<td>497</td>
<td>309</td>
<td>499</td>
</tr>
<tr>
<td>deepsjeng_r</td>
<td>88</td>
<td>487</td>
<td>207</td>
<td>487</td>
<td>207</td>
<td>486</td>
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<tr>
<td>leela_r</td>
<td>88</td>
<td>766</td>
<td>190</td>
<td>760</td>
<td>192</td>
<td>752</td>
<td>194</td>
</tr>
<tr>
<td>exchange2_r</td>
<td>88</td>
<td>528</td>
<td>437</td>
<td>527</td>
<td>437</td>
<td>526</td>
<td>438</td>
</tr>
<tr>
<td>xz_r</td>
<td>88</td>
<td>571</td>
<td>166</td>
<td>571</td>
<td>166</td>
<td>571</td>
<td>167</td>
</tr>
</tbody>
</table>

SPECrate2017_int_base = 244
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)
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CPU2017 License: 3
Test Sponsor: HPE
Tested by: HPE

Test Date: Jun-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

Sysinfo program /home/cpu2017_u2/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on sy480g10-2 Mon Jun  3 17:57:23 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 6238M CPU @ 2.10GHz
  2 "physical id"s (chips)
  88 "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 : 22
  siblings : 44
  physical 0: cores 0 1 2 3 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27 28
  physical 1: cores 0 1 2 3 8 9 10 11 12 16 17 18 19 20 21 24 25 26 27 28

From lscpu:

- Architecture: x86_64
- CPU op-mode(s): 32-bit, 64-bit
- Byte Order: Little Endian
- CPU(s): 88
- On-line CPU(s) list: 0-87
- Thread(s) per core: 2
- Core(s) per socket: 22
- Socket(s): 2
- NUMA node(s): 4
- Vendor ID: GenuineIntel
- CPU family: 6
- Model: 85
- Model name: Intel(R) Xeon(R) Gold 6238M CPU @ 2.10GHz

(Continued on next page)
**SPEC CPU2017 Integer Rate Result**

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

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**Platform Notes (Continued)**

Stepping: 7  
CPU MHz: 2100.000  
BogoMIPS: 4200.00  
Virtualization: VT-x  
L1d cache: 32K  
L1i cache: 32K  
L2 cache: 1024K  
L3 cache: 30976K  
NUMA node0 CPU(s): 0-10,44-54  
NUMA node1 CPU(s): 11-21,55-65  
NUMA node2 CPU(s): 22-32,66-76  
NUMA node3 CPU(s): 33-43,77-87  
Flags:          
                  fpu vme de pse tsc msr pae mca cmov 
                  pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp 
                  lm constant_tsc arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid 
                  aperfmperf 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_pni mba tpr_shadow vmmx flexpriority ept 
                  vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 ersed msr sinvcmtd rtm cqm mpx rdtd_a 
                  avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl 
                  xsaveopt xsavec xsavec_1lrcq cqm_occup_llc cqm_mbm_total cqm_mbm_local 
                  ibpb ibrs stibp dtherm ida arat pln pts pku ospke avx512_vnni arch_capabilities ssbd 

From numactl --hardware  
WARNING: a numactl 'node' might or might not correspond to a physical chip.  
available: 4 nodes (0-3)  
node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 44 45 46 47 48 49 50 51 52 53 54  
node 0 size: 96249 MB  
node 0 free: 95809 MB  
node 1 cpus: 11 12 13 14 15 16 17 18 19 20 21 55 56 57 58 59 60 61 62 63 64 65  
node 1 size: 96763 MB  
node 1 free: 96555 MB  
node 2 cpus: 22 23 24 25 26 27 28 29 30 31 32 66 67 68 69 70 71 72 73 74 75 76  
node 2 size: 96763 MB  
node 2 free: 96605 MB  
node 3 cpus: 33 34 35 36 37 38 39 40 41 42 43 77 78 79 80 81 82 83 84 85 86 87  
node 3 size: 96565 MB  
node 3 free: 96401 MB  
node distances:  
node 0: 10 21 31 31  
0: 10 21 31 31  
1: 21 10 31 31  
2: 31 31 10 21

(Continued on next page)
Platform Notes (Continued)

3: 31 31 21 10

From /proc/meminfo
MemTotal: 395614148 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 sy480g10-2 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:
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 Jun 3 17:55

SPEC is set to: /home/cpu2017_u2
Filesystem Type Size Used Avail Use% Mounted on
/dev/sdb2 btrfs 371G 92G 279G 25% /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 I42 02/02/2019
Memory:
24x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2933

(End of data from sysinfo program)
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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.xalanchmk_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)
  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

(Continued on next page)
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Base Portability Flags (Continued)

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
-gopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64
-lqkmalloc

C++ benchmarks:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-gopt-mem-layout-trans=4
-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64
-lqkmalloc

Fortran benchmarks:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-gopt-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/HPE-Platform-Flags-Intel-V1.2-CLX-revB.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-CLX-revB.xml

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

Tested with SPEC CPU2017 v1.0.5 on 2019-06-03 18:57:23-0400.