**Hewlett Packard Enterprise**
(Test Sponsor: HPE)
ProLiant ML350 Gen10
(3.10 GHz, Intel Xeon Gold 6254)

<table>
<thead>
<tr>
<th>SPECrate2017_int_base = 255</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate2017_int_peak = Not Run</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Hardware</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CPU Name:</strong> Intel Xeon Gold 6254</td>
</tr>
<tr>
<td><strong>Max MHz.:</strong> 4000</td>
</tr>
<tr>
<td><strong>Nominal:</strong> 3100</td>
</tr>
<tr>
<td><strong>Enabled:</strong> 36 cores, 2 chips, 2 threads/core</td>
</tr>
<tr>
<td><strong>Orderable:</strong> 1,2 chip(s)</td>
</tr>
<tr>
<td><strong>Cache L1:</strong> 32 KB I + 32 KB D on chip per core</td>
</tr>
<tr>
<td><strong>L2:</strong> 1 MB I+D on chip per core</td>
</tr>
<tr>
<td><strong>L3:</strong> 24.75 MB I+D on chip per chip</td>
</tr>
<tr>
<td><strong>Other:</strong> None</td>
</tr>
<tr>
<td><strong>Memory:</strong> 384 GB (24 x 16 GB 2Rx8 PC4-2933Y-R)</td>
</tr>
<tr>
<td><strong>Storage:</strong> 1 x 400 GB SAS SSD, RAID 0</td>
</tr>
<tr>
<td><strong>Other:</strong> None</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Software</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OS:</strong> SUSE Linux Enterprise Server 15 (x86_64)</td>
</tr>
<tr>
<td><strong>Kernel:</strong> 4.12.14-23-default</td>
</tr>
<tr>
<td><strong>Compiler:</strong> 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</td>
</tr>
<tr>
<td><strong>Parallel:</strong> No</td>
</tr>
<tr>
<td><strong>Firmware:</strong> HPE BIOS Version U41 05/21/2019 released May-2019</td>
</tr>
<tr>
<td><strong>File System:</strong> xfs</td>
</tr>
<tr>
<td><strong>System State:</strong> Run level 3 (multi-user)</td>
</tr>
<tr>
<td><strong>Base Pointers:</strong> 64-bit</td>
</tr>
<tr>
<td><strong>Peak Pointers:</strong> Not Applicable</td>
</tr>
<tr>
<td><strong>Other:</strong> None</td>
</tr>
</tbody>
</table>
SPEC CPU2017 Integer Rate Result

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SPECrate2017_int_base = 255
SPECrate2017_int_peak = Not Run

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Base Copies</th>
<th>Base Seconds</th>
<th>Base Ratio</th>
<th>Peak Copies</th>
<th>Peak Seconds</th>
<th>Peak Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>500.perlbench_r</td>
<td>72</td>
<td>576</td>
<td>199</td>
<td>571</td>
<td>201</td>
<td>569</td>
</tr>
<tr>
<td>502.gcc_r</td>
<td>72</td>
<td>514</td>
<td>198</td>
<td>516</td>
<td>198</td>
<td>520</td>
</tr>
<tr>
<td>505.mcf_r</td>
<td>72</td>
<td>347</td>
<td>336</td>
<td>346</td>
<td>336</td>
<td>345</td>
</tr>
<tr>
<td>520.omnetpp_r</td>
<td>72</td>
<td>603</td>
<td>157</td>
<td>603</td>
<td>157</td>
<td>603</td>
</tr>
<tr>
<td>523.xalanbmk_r</td>
<td>72</td>
<td>281</td>
<td>271</td>
<td>279</td>
<td>272</td>
<td>282</td>
</tr>
<tr>
<td>525.x264_r</td>
<td>72</td>
<td>232</td>
<td>543</td>
<td>233</td>
<td>540</td>
<td>232</td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>72</td>
<td>369</td>
<td>223</td>
<td>369</td>
<td>224</td>
<td>369</td>
</tr>
<tr>
<td>541.leela_r</td>
<td>72</td>
<td>555</td>
<td>215</td>
<td>555</td>
<td>215</td>
<td>562</td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>72</td>
<td>397</td>
<td>476</td>
<td>397</td>
<td>475</td>
<td>396</td>
</tr>
<tr>
<td>557.xz_r</td>
<td>72</td>
<td>466</td>
<td>167</td>
<td>467</td>
<td>167</td>
<td>466</td>
</tr>
</tbody>
</table>

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

Test Date: Jun-2019
Hardware Availability: May-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 9bd8f2999c33d61f64985e45859ea9

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 6254 CPU @ 3.10GHz
2 "physical id"s (chips)
72 "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 : 18
siblings : 36
physical 0: cores 0 1 2 3 8 9 10 11 16 17 18 19 20 24 25 26 27
physical 1: cores 0 1 2 3 8 9 10 11 16 17 18 19 20 24 25 26 27

From lscpu:
Architecture:        x86_64
CPU op-mode(s):      32-bit, 64-bit
Byte Order:          Little Endian
CPU(s):              72
On-line CPU(s) list: 0-71
Thread(s) per core:  2
Core(s) per socket:  18
Socket(s):           2
NUMA node(s):        4
Vendor ID:           GenuineIntel
CPU family:          6
Model:               85
Model name:          Intel(R) Xeon(R) Gold 6254 CPU @ 3.10GHz

(Continued on next page)
Hewlett Packard Enterprise

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SPECratenode0 CPU(s): 0-8,36-44
SPECratenode1 CPU(s): 9-17,45-53
SPECratenode2 CPU(s): 18-26,54-62
SPECratenode3 CPU(s): 27-35,63-71

Flags: fpu vme de pse tsc msr pae mca cx8 apic sep mtrr pge mca cmov
pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb dts cpuid
lm constant_tsc arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
aperfperf tsc_known_freq pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3
sdbg fma cx16 xtrpx pdcm pcd dca sse4_1 sse4_2 x2apic movbe popcnt

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a
physical chip.

node 0 cpus: 0 1 2 3 4 5 6 7 8 36 37 38 39 40 41 42 43 44
node 0 size: 96350 MB
node 0 free: 95861 MB
node 1 cpus: 9 10 11 12 13 14 15 16 17 45 46 47 48 49 50 51 52 53
node 1 size: 96735 MB
node 1 free: 96551 MB
node 2 cpus: 18 19 20 21 22 23 24 25 26 54 55 56 57 58 59 60 61 62
node 2 size: 96764 MB
node 2 free: 96604 MB
node 3 cpus: 27 28 29 30 31 32 33 34 35 63 64 65 66 67 68 69 70 71
node 3 size: 96763 MB
node 3 free: 96610 MB
node distances:
node 0 1 2 3
0: 10 21 31 31
1: 21 10 31 31
2: 31 31 10 21

(Continued on next page)
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Platform Notes (Continued)

3: 31 31 21 10

From /proc/meminfo
   MemTotal: 395892536 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 ml350-sles15-utpal 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 26 20:26

SPEC is set to: /home/cpu2017_u2
   Filesystem Type Size Used Avail Use% Mounted on
   /dev/sda3 xfs 407G 48G 360G 12% /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 U41 05/21/2019
   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.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)
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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CPU2017 License: 3
Test Sponsor: HPE
Tested by: HPE

Base Portability Flags (Continued)

523.xalancbmk_r:  -DSPEC_LP64  -DSPEC_LINUX
525.x264_r:  -DSPEC_LP64
531.deepsjeng_r:  -DSPEC_LP64
541.leea_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
-lqkmalloc

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
-lqkmalloc

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/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 2019-06-26 10:59:09-0400.