Hewlett Packard Enterprise
ProLiant ML350 Gen10
(2.30 GHz, Intel Xeon Gold 6140)

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

Test Date: Aug-2018
Hardware Availability: Jun-2018
Software Availability: May-2018

SPECrate2017_int_base = 96.1
SPECrate2017_int_peak = Not Run

Hardware
CPU Name: Intel Xeon Gold 6140
Max MHz.: 3700
Nominal: 2300
Enabled: 18 cores, 1 chip, 2 threads/core
Orderable: 1 chip
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: 96 GB (12 x 8 GB 2Rx8 PC4-2666V-R)
Storage: 1 x 480 GB SATA SSD
Other: None

Software
OS: SUSE Linux Enterprise Server 12 (x86_64) SP3
Kernel 4.4.131-94.25-default
Compiler: C/C++: Version 18.0.2.199 of Intel C/C++
Compiler for Linux;
Fortran: Version 18.0.2.199 of Intel Fortran
Compiler for Linux
Parallel: No
Firmware: HPE BIOS Version U41 06/15/2018 released Jun-2018
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: Not Applicable
Other: jemalloc general purpose malloc implementation v5.0.1
SPECCPU2017 Integer Rate Result

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SPECrates2017_int_base = 96.1
SPECrates2017_int_peak = Not Run

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
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<th>Seconds</th>
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<td>500.perlbench_r</td>
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<tr>
<td>531.deepsjeng_r</td>
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<td>487</td>
<td>84.7</td>
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<td>84.7</td>
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<tr>
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<td>742</td>
<td>80.4</td>
<td>753</td>
<td>79.2</td>
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<td>557.xz_r</td>
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<td>585</td>
<td>66.5</td>
<td>586</td>
<td>66.4</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"
IRQ balance service was stopped using "service irqbalance stop"
Tuned-adm profile was set to Throughput-Performance using "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"
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.:
umactl --interleave=all runcpu <etc>"

General Notes

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "/home/cpu2017/lib/ia32:/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-32:/home/cpu2017/je5.0.1-64"

Binaries compiled on a system with 1x Intel Core i7-6700K CPU + 32GB RAM memory using Redhat Enterprise Linux 7.5

(Continued on next page)
General Notes (Continued)

Yes: 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) is mitigated in the system as tested and documented.


Platform Notes

BIOS Configuration:
Workload Profile set to General Throughput Compute
Memory Patrol Scrubbing set to Disabled
LLC Prefetch set to Enabled
LLC Dead Line Allocation set to Disabled
Stale A to S set to Disabled
Minimum Processor Idle Power Core C-State set to C1E State
Thermal Configuration set to Maximum Cooling
Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on linux-02jc Tue Aug  7 17:30:14 2018

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 6140 CPU @ 2.30GHz
  1 "physical id"s (chips)
   36 "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

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 36
On–line CPU(s) list: 0-35
Thread(s) per core: 2
Core(s) per socket: 18

(Continued on next page)
SPEC CPU2017 Integer Rate Result

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<table>
<thead>
<tr>
<th>SPECrate2017_int_base</th>
<th>96.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECrate2017_int_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

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

Socket(s): 1
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Gold 6140 CPU @ 2.30GHz
Stepping: 4
CPU MHz: 2294.635
BogoMIPS: 4589.27
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 25344K
NUMA node0 CPU(s): 0-8,18-26
NUMA node1 CPU(s): 9-17,27-35
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 aperfmpref eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtrcm 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 invpcid_single pln pts dtherm intel_pt rsb_ctxsw spec_ctrl stibp retpoline kaiser tpr_shadow vmx flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cmp mpx avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd avx512bw avx512vl xsaveopt xsave xsetbv1 cqm_llc cqm_occump_llc pku ospke

/platforminfo cache data
  cache size: 25344 KB

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a physical chip.
  available: 2 nodes (0-1)
  node 0 cpus: 0 1 2 3 4 5 6 7 8 18 19 20 21 22 23 24 25 26
  node 0 size: 47882 MB
  node 0 free: 47533 MB
  node 1 cpus: 9 10 11 12 13 14 15 16 17 27 28 29 30 31 32 33 34 35
  node 1 size: 48262 MB
  node 1 free: 47912 MB
  node distances:
    node 0 1
    0: 10 21
    1: 21 10

From /proc/meminfo
MemTotal: 98451836 kB
HugePages_Total: 0

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

**Hewlett Packard Enterprise**  
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| SPECrate2017_int_base | 96.1  
|----------------------|-------  
| SPECrate2017_int_peak | Not Run |  

**CPU2017 License:** 3  
**Test Date:** Aug-2018  
**Test Sponsor:** HPE  
**Tested by:** HPE  
**Hardware Availability:** Jun-2018  
**Software Availability:** May-2018

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**Platform Notes (Continued)**

Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*

SuSE-release:
- SUSE Linux Enterprise Server 12 (x86_64)
  - VERSION = 12
  - PATCHLEVEL = 3

  # 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-SP3"
- VERSION_ID="12.3"
- PRETTY_NAME="SUSE Linux Enterprise Server 12 SP3"
- ID="sles"
- ANSI_COLOR="0;32"
- CPE_NAME="cpe:/o:suse:sles:12:sp3"

uname -a:
- Linux linux-02jc 4.4.131-94.25-default #1 SMP Mon May 7 11:22:19 UTC 2018 (9700bac)
  - x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

- CVE-2017-5754 (Meltdown): Mitigation: PTI
- CVE-2017-5753 (Spectre variant 1): Mitigation: __user pointer sanitization
- CVE-2017-5715 (Spectre variant 2): Mitigation: IBRS+IBPB

run-level 3 Aug 7 15:53

SPEC is set to: /home/cpu2017

<table>
<thead>
<tr>
<th>Filesystem</th>
<th>Type</th>
<th>Size</th>
<th>Used</th>
<th>Avail</th>
<th>Use%</th>
<th>Mounted on</th>
</tr>
</thead>
<tbody>
<tr>
<td>/dev/sda4</td>
<td>xfs</td>
<td>405G</td>
<td>14G</td>
<td>391G</td>
<td>4%</td>
<td>/home</td>
</tr>
</tbody>
</table>

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 06/15/2018

Memory:
- 12x UNKNOWN NOT AVAILABLE
- 12x UNKNOWN NOT AVAILABLE 8 GB 2 rank 2666

%(End of data from sysinfo program)

Regarding the sysinfo display about the memory installed, the correct amount of memory is 96 GB and the dmidecode description should have one line reading as: 12x UNKNOWN NOT AVAILABLE 8 GB 2 rank 2666
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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)
------------------------------------------------------------------------------
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

------------------------------------------------------------------------------
CXXC 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base)
     541.leela_r(base)
------------------------------------------------------------------------------
icpc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

------------------------------------------------------------------------------
FC  548.exchange2_r(base)
------------------------------------------------------------------------------
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

(Continued on next page)

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.xalancbmkr: -DSPEC_LP64 -DSPEC_LINUX
525.x264_r: -DSPEC_LP64
531.deepsjeng_r: -DSPEC_LP64

(Continued on next page)
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**Hardware Availability:** Jun-2018  
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**Software Availability:** May-2018  
**CPU2017 License:** 3

Base Portability Flags (Continued)

- `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`  
- `-no-prec-div`  
- `-qopt-mem-layout-trans=3`  
- `-L/usr/local/je5.0.1-64/lib`  
- `-ljemalloc`

**C++ benchmarks:**

- `-Wl,-z,muldefs`  
- `-xCORE-AVX512`  
- `-ipo`  
- `-no-prec-div`  
- `-qopt-mem-layout-trans=3`  
- `-L/usr/local/je5.0.1-64/lib`  
- `-ljemalloc`

**Fortran benchmarks:**

- `-Wl,-z,muldefs`  
- `-xCORE-AVX512`  
- `-ipo`  
- `-no-prec-div`  
- `-qopt-mem-layout-trans=3`  
- `-nostandard-realloc-lhs`  
- `-L/usr/local/je5.0.1-64/lib`  
- `-ljemalloc`

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-SKX-revH.html](http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-V1.2-SKX-revH.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-SKX-revH.xml](http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-V1.2-SKX-revH.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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