Hewlett Packard Enterprise
Synergy 480 Gen10
(2.20 GHz, Intel Xeon Platinum 8276)
SPEC CPU2017 Integer Speed Result
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(Test Sponsor: HPE)
Synergy 480 Gen10
(2.20 GHz, Intel Xeon Platinum 8276)

SPECspeed2017_int_base = 10.3
SPECspeed2017_int_peak = Not Run

Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Base</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td>56</td>
<td>257</td>
<td>6.91</td>
<td>255</td>
<td>6.96</td>
<td>7.00</td>
<td>254</td>
<td></td>
<td></td>
</tr>
<tr>
<td>602.gcc_s</td>
<td>56</td>
<td><strong>415</strong></td>
<td><strong>9.60</strong></td>
<td>415</td>
<td>9.60</td>
<td>407</td>
<td>9.78</td>
<td></td>
<td></td>
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<tr>
<td>605.mcf_s</td>
<td>56</td>
<td>373</td>
<td>12.6</td>
<td>372</td>
<td><strong>12.7</strong></td>
<td></td>
<td>370</td>
<td>12.8</td>
<td></td>
</tr>
<tr>
<td>620.omnetpp_s</td>
<td>56</td>
<td>173</td>
<td>9.43</td>
<td>174</td>
<td><strong>9.37</strong></td>
<td></td>
<td>174</td>
<td><strong>9.37</strong></td>
<td></td>
</tr>
<tr>
<td>623.xalancbmk_s</td>
<td>56</td>
<td>113</td>
<td>12.5</td>
<td>114</td>
<td>12.4</td>
<td></td>
<td>114</td>
<td><strong>12.5</strong></td>
<td></td>
</tr>
<tr>
<td>625.x264_s</td>
<td>56</td>
<td>120</td>
<td>14.7</td>
<td>120</td>
<td>14.7</td>
<td></td>
<td>120</td>
<td>14.7</td>
<td></td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>56</td>
<td>259</td>
<td>5.54</td>
<td>258</td>
<td>5.55</td>
<td></td>
<td>259</td>
<td><strong>5.54</strong></td>
<td></td>
</tr>
<tr>
<td>641.leela_s</td>
<td>56</td>
<td>352</td>
<td>4.85</td>
<td>351</td>
<td><strong>4.86</strong></td>
<td></td>
<td>351</td>
<td>4.86</td>
<td></td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>56</td>
<td>205</td>
<td>14.4</td>
<td>206</td>
<td>14.3</td>
<td></td>
<td>206</td>
<td><strong>14.3</strong></td>
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<tr>
<td>657.xz_s</td>
<td>56</td>
<td>259</td>
<td>23.9</td>
<td>259</td>
<td><strong>23.9</strong></td>
<td></td>
<td>259</td>
<td>23.9</td>
<td></td>
</tr>
</tbody>
</table>

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

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

General Notes

Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=fine,compact"
LD_LIBRARY_PATH = "/home/cpu2017_u2/lib/ia32:/home/cpu2017_u2/lib/intel64:
/home/cpu2017_u2/je5.0.1-32:/home/cpu2017_u2/je5.0.1-64"
OMP_STACKSIZE = "192M"

Binaries compiled on a system with 1x Intel Core i9-7900X CPU + 32GB RAM
memory using Redhat Enterprise Linux 7.5
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

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)
is mitigated in the system as tested and documented.
jemalloc, a general purpose malloc implementation

(Continued on next page)
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SPECspeed2017_int_base = 10.3
SPECspeed2017_int_peak = Not Run

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

General Notes (Continued)
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

Platform Notes

BIOS Configuration:
Hyper-Threading set to Disabled
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 Peak Frequency Compute
Minimum Processor Idle Power Core C-State set to C1E State
Energy/Performance Bias set to Balanced Power
Workload Profile set to Custom
Numa Group Size Optimization set to Flat
Sysinfo program /home/cpu2017_u2/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
running on sy480g10-2 Sat May 11 01:42:38 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) Platinum 8276 CPU @ 2.20GHz
  2 "physical id"s (chips)
  56 "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 : 28
siblings : 28
physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
  28 29 30
physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
  28 29 30

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 56
On-line CPU(s) list: 0-55
Thread(s) per core: 1
Core(s) per socket: 28

(Continued on next page)
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SPECspeed2017_int_base = 10.3
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Platform Notes (Continued)

Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Platinum 8276 CPU @ 2.20GHz
Stepping: 7
CPU MHz: 2200.000
BogoMIPS: 4400.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 39424K
NUMA node0 CPU(s): 0-27
NUMA node1 CPU(s): 28-55
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 rdtsscp
lm constant_tsc arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
aperfmpref tsc_known_freq pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3
sdbg fma cx16 xtpr pdcm pclid 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_pinn mba tpr_shadow vnmi flexpriority ept
dis lane tsc_adjust bts hle avx2 smep bmi1 bmi2 mpx rdt_a
avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl
xsaveopt xsave xsavec xsaveopt xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local
ibpb ibrs stibp dtherm ida arat pln pku ospke avx512_vnni arch_capabilities ssbd

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 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27
node 0 size: 193016 MB
node 0 free: 192353 MB
node 1 cpus: 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52
53 54 55
node 1 size: 193332 MB
node 1 free: 193133 MB
node distances:
node 0 1
  0: 10 21
  1: 21 10

From /proc/meminfo

(Continued on next page)
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*Test Sponsor: HPE*  
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**SPECspeed2017_int_base = 10.3**  
**SPECspeed2017_int_peak = Not Run**

<table>
<thead>
<tr>
<th>CPU2017 License: 3</th>
<th>Test Date: May-2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor: HPE</td>
<td>Hardware Availability: Apr-2019</td>
</tr>
<tr>
<td>Tested by: HPE</td>
<td>Software Availability: Feb-2019</td>
</tr>
</tbody>
</table>

### Platform Notes (Continued)

- **MemTotal:** 395621024 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 May 11 01:40**

**SPEC is set to:** `/home/cpu2017_u2`  
**Filesystem**  
<table>
<thead>
<tr>
<th>Type</th>
<th>Size</th>
<th>Used</th>
<th>Avail</th>
<th>Use%</th>
<th>Mounted on</th>
</tr>
</thead>
<tbody>
<tr>
<td>btrfs</td>
<td>371G</td>
<td>90G</td>
<td>281G</td>
<td>25%</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 I42 02/02/2019**  
**Memory:**  
24x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2933

*(End of data from sysinfo program)*

### Compiler Version Notes

```
CC  600.perlbench_s(base) 602.gcc_s(base) 605.mcf_s(base) 625.x264_s(base)
```

*(Continued on next page)*
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Tested by: HPE

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

Compiler Version Notes (Continued)

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.

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.

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

600.perlbench_s: -DSPEC_LP64 -DSPEC_LINUX_X64
602.gcc_s: -DSPEC_LP64
605.mcf_s: -DSPEC_LP64
620.omnetpp_s: -DSPEC_LP64
623.xalancbmk_s: -DSPEC_LP64 -DSPEC_LINUX
625.x264_s: -DSPEC_LP64

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

631.deepsjeng_s: -DSPEC_LP64
641.leela_s: -DSPEC_LP64
648.exchange2_s: -DSPEC_LP64
657.xz_s: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
-qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-L/home/cpu2017_u2/je5.0.1-64/ -ljemalloc

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:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-mem-layout-trans=4
-nostandard-realloc-lhs

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-revA.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-revA.xml
http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2019-04-03.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 2019-05-11 02:42:38-0400.