Hewlett Packard Enterprise  
(Revised Sponsor: HPE)  
ProLiant DL360 Gen10  
(2.20 GHz, Intel Xeon Platinum 8276)  

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

<table>
<thead>
<tr>
<th>SPECspeed®2017_int_base</th>
<th>SPECspeed®2017_int_peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.2</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

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

CPU Name: Intel Xeon Platinum 8276  
Max MHz: 4000  
Nominal: 2200  
Enabled: 56 cores, 2 chips, 2 threads/core  
Orderable: 1, 2 chip(s)  
Cache L1: 32 KB I + 32 KB D on chip per core  
L2: 1 MB I+D on chip per core  
L3: 38.5 MB I+D on chip per chip  
Other: None  
Memory: 384 GB (24 x 16 GB 2Rx8 PC4-2933Y-R)  
Storage: 1 x 400 GB SAS SSD, RAID 0  
Other: None

OS: SUSE Linux Enterprise Server 15 (x86_64)  
Kernel 4.12.14-23-default  
Compiler: 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: Yes  
Firmware: HPE BIOS Version U32 02/02/2019 released Apr-2019  
File System: xfs  
System State: Run level 3 (multi-user)  
Base Pointers: 64-bit  
Peak Pointers: Not Applicable  
Other: jemalloc memory allocator V5.0.1  
Power Management: --

<table>
<thead>
<tr>
<th>SPECspeed®2017_int_base (10.2)</th>
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<tbody>
<tr>
<td>Threads</td>
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<tr>
<td>---------</td>
</tr>
<tr>
<td>600.perbench_s</td>
</tr>
<tr>
<td>602.gcc_s</td>
</tr>
<tr>
<td>605.mcf_s</td>
</tr>
<tr>
<td>620.omnetpp_s</td>
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<tr>
<td>623.xalancbmk_s</td>
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<tr>
<td>625.x264_s</td>
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<tr>
<td>631.deepsjeng_s</td>
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<tr>
<td>641.leela_s</td>
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<tr>
<td>648.exchange2_s</td>
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<tr>
<td>657.xz_s</td>
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Standard Performance Evaluation Corporation (info@spec.org)  
https://www.spec.org/
SPEC CPU®2017 Integer Speed Result

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ProLiant DL360 Gen10
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SPECspeed®2017_int_base = 10.2
SPECspeed®2017_int_peak = Not Run

Results Table

<table>
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<tr>
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<th>Threads</th>
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</tbody>
</table>

SPECspeed®2017_int_base = 10.2
SPECspeed®2017_int_peak = Not Run

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
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
built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

Submitted by: "Bucek, James" <james.bucek@hpe.com>
Submitted: Tue Oct 15 17:05:54 EDT 2019

(Continued on next page)
SPEC CPU®2017 Integer Speed Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL360 Gen10
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SPECspeed®2017_int_base = 10.2
SPECspeed®2017_int_peak = Not Run

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

General Notes (Continued)
Submission: cpu2017-20190819-16839.sub

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 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 linux-nub3 Sun Jun 16 17:11:10 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)
  112 "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 : 56
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): 112
On-line CPU(s) list: 0-111
Thread(s) per core: 2
Core(s) per socket: 28
Socket(s): 2
NUMA node(s): 2

(Continued on next page)
# SPEC CPU®2017 Integer Speed Result

## Hewlett Packard Enterprise

**Test Sponsor:** HPE  
**ProLiant DL360 Gen10**  
**HPE (2.20 GHz, Intel Xeon Platinum 8276)**

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

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## Platform Notes (Continued)

| 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):

| 0-27,56-83 |

### NUMA node0 CPU(s):

| 28-55,84-111 |

### 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 pdelgbd rdtscp
lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid
aperfmpref tsc_known_freq pni pclmulqdq dt滔64 monitor ds_cpl vmx smx est tm2 ssse3
sdbg fma cx16 xtpr pdcm pcd dca sse4_1 sse4_2 x2apic movbe popcnt
tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault
epb cat_13 cdp_13 invpcid_single intel_pinn mba tpr_shadow vnmi flexpriority ept
vpid fsgrbase tsc_adjust bmi1 hle avx2 smep bmi2 erno invpcid rtm cqm mpx rdt_a
avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl
xsaveopt xsavec xgetbv1 xsavees cqm_llc cqm_occup_llc cqm_mbb_total cqm_mbb_local
ibpb ibrs stibp dtherm ida arat pln pts pkup ospe 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 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 |

From /proc/cpuinto cache data

| cache size: | 39424 KB |

From /proc/meminfo

| node distances: |
| node 0: | 10 21 |
| node 1: | 21 10 |

---

(Continued on next page)
## Platform Notes (Continued)

MemTotal: 395885456 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-nub3 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 16 17:09

SPEC is set to: /home/cpu2017_u2  
    Filesystem  Type  Size  Used Avail Use% Mounted on  
    /dev/sda1 xfs 373G 129G 244G 35% /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 U32 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 (Continued)

<table>
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<tr>
<th>625.x264_s(base) 657.xz_s(base)</th>
</tr>
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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.

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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.

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<thead>
<tr>
<th>648.exchange2_s(base)</th>
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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.

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### Base Compiler Invocation

**C benchmarks:**  
```bash  
icc -m64 -std=c11  
```

**C++ benchmarks:**  
```bash  
icpc -m64  
```

**Fortran benchmarks:**  
```bash  
ifort -m64  
```

---

### Base Portability Flags

```bash  
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-ic19.0u1-flags-linux64-revB.html
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-ic19.0u1-flags-linux64-revB.xml
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.

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