Hewlett Packard Enterprise  
ProLiant DL580 Gen10  
(2.60 GHz, Intel Xeon Gold 6240L)

<table>
<thead>
<tr>
<th>SPECspeed(^{2017_\text{int_base}})</th>
<th>9.78</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECspeed(^{2017_\text{int_peak}})</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

CPU2017 License: 3  
Test Sponsor: HPE  
Tested by: HPE  
Test Date: Jun-2019  
Hardware Availability: Apr-2019  
Software Availability: Feb-2019

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECs(^{\text{2017_int_base}}) (9.78)</th>
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<tbody>
<tr>
<td>600.perlbench_s 72</td>
<td>6.77</td>
</tr>
<tr>
<td>602.gcc_s 72</td>
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<td>605.mcf_s 72</td>
<td>12.0</td>
</tr>
<tr>
<td>620.omnetpp_s 72</td>
<td>7.22</td>
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<tr>
<td>623.xalancbmk_s 72</td>
<td>12.3</td>
</tr>
<tr>
<td>625.x264_s 72</td>
<td>14.1</td>
</tr>
<tr>
<td>631.deepsjeng_s 72</td>
<td>5.37</td>
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<tr>
<td>641.leela_s 72</td>
<td>4.75</td>
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<tr>
<td>648.exchange2_s 72</td>
<td>14.0</td>
</tr>
<tr>
<td>657.xz_s 72</td>
<td>23.1</td>
</tr>
</tbody>
</table>

**Hardware**
- CPU Name: Intel Xeon Gold 6240L  
- Max MHz: 3900  
- Nominal: 2600  
- Enabled: 72 cores, 4 chips  
- Orderable: 1, 2, 3, 4 chip(s)  
- 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: 768 GB (24 x 32 GB 2Rx8 PC4-2666V-R)  
- Storage: 1 x 960 GB SAS SSD, RAID 0  
- Other: None

**Software**
- OS: SUSE Linux Enterprise Server 15 (x86_64)  
- Kernel 4.12.14-23-default  
- Compiler: 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  
- Parallel: Yes  
- Firmware: HPE BIOS Version U34 05/21/2019 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: --
**SPEC CPU®2017 Integer Speed Result**

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Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL580 Gen10
(2.60 GHz, Intel Xeon Gold 6240L)

**SPECspeed®2017_int_base = 9.78**

**SPECspeed®2017_int_peak = Not Run**

**Results Table**

<table>
<thead>
<tr>
<th>Benchmark</th>
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<th>Seconds</th>
<th>Ratio</th>
<th>Second</th>
<th>Ratio</th>
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<th>Ratio</th>
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<tr>
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<td>6.77</td>
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<tr>
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<td>8.94</td>
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<tr>
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<td>12.0</td>
<td>394</td>
<td>12.0</td>
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<tr>
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<tr>
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<td>12.3</td>
<td>116</td>
<td>12.3</td>
<td>117</td>
<td>12.1</td>
</tr>
<tr>
<td>625.x264_s</td>
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<td>14.1</td>
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<td>5.37</td>
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<td>4.75</td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>72</td>
<td>210</td>
<td>14.0</td>
<td>210</td>
<td>14.0</td>
<td>210</td>
<td>14.0</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>72</td>
<td>267</td>
<td>23.2</td>
<td>267</td>
<td>23.1</td>
<td>268</td>
<td>23.1</td>
</tr>
</tbody>
</table>

**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.
### 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
- Advanced Memory Protection set to Advanced ECC

**Sysinfo program**
```
/home/cpu2017_u2/bin/sysinfo
```

**Rev:** r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9

**running on**
```
linux-sypg Wed Aug 22 10:37:51 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 6240L CPU @ 2.60GHz
  4 "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 : 18
physical 0: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
physical 1: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
physical 2: cores 0 1 2 3 4 8 9 10 11 16 17 18 19 20 24 25 26 27
physical 3: cores 0 1 2 3 4 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:     1
Core(s) per socket:     18
Socket(s):              4
NUMA node(s):           4
Vendor ID:              GenuineIntel
CPU family:             6
Model:                  85
```

(Continued on next page)
**Hewlett Packard Enterprise**

*Test Sponsor: HPE*

ProLiant DL580 Gen10  
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**CPU2017 License:** 3  
**Test Date:** Jun-2019  
**Test Sponsor:** HPE  
**Hardware Availability:** Apr-2019  
**Tested by:** HPE  
**Software Availability:** Feb-2019

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**Platform Notes (Continued)**

- **Model name:** Intel(R) Xeon(R) Gold 6240L CPU @ 2.60GHz  
- **Stepping:** 7  
- **CPU MHz:** 2600.000  
- **BogoMIPS:** 5200.00

**Virtualization:** VT-x

**L1d cache:** 32K  
**L1i cache:** 32K  
**L2 cache:** 1024K  
**L3 cache:** 25344K

**NUMA node0 CPU(s):** 0-17  
**NUMA node1 CPU(s):** 18-35  
**NUMA node2 CPU(s):** 36-53  
**NUMA node3 CPU(s):** 54-71

**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 art 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 3nowprefetch cpuid_fault ebт cat_13 cdp_l3 invpcid_single intel_pni mba tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2  
**ems invpcid rtm cqm mpx rdt_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local ibpb ibrs stibp dtherm ida pln pts pku ospke avx512_vnni arch_capabilities ssbd

/procr/cpuinfo cache data

- **cache size:** 25344 KB

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 11 12 13 14 15 16 17  
  - node 0 size: 193117 MB  
  - node 0 free: 192817 MB  
  - node 1 cpus: 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35  
  - node 1 size: 193532 MB  
  - node 1 free: 193198 MB  
  - node 2 cpus: 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53  
  - node 2 size: 193532 MB  
  - node 2 free: 193147 MB  
  - node 3 cpus: 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71  
  - node 3 size: 193502 MB  
  - node 3 free: 193287 MB  
  - node distances:
    - node 0: 1 2 3  
    - 0: 10 21 21 21  
    - 1: 21 10 21 21

(Continued on next page)
Platform Notes (Continued)

From /proc/meminfo
  MemTotal: 792253000 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-sypg 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 Aug 22 10:36

SPEC is set to: /home/cpu2017_u2
  Filesystem Type Size Used Avail Use% Mounted on
  /dev/sda1 xfs 894G 80G 814G 9% /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 U34 05/21/2019
  Memory:
    24x UNKNOWN NOT AVAILABLE
    24x UNKNOWN NOT AVAILABLE 32 GB 2 rank 2666

(End of data from sysinfo program)
SPEC CPU®2017 Integer Speed Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
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CPU2017 License: 3
Test Sponsor: HPE
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Compiler Version Notes

==============================================================================
| C       | 600.perlbench_s(base) 602.gcc_s(base) 605.mcf_s(base)                   |
|         | 625.x264_s(base) 657.xz_s(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.

==============================================================================
| C++     | 620.omnetpp_s(base) 623.xalancbmk_s(base) 631.deepsjeng_s(base)         |
|         | 641.leela_s(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.

==============================================================================
| Fortran | 648.exchange2_s(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

600.perlbench_s: -DSPEC_LP64 -DSPEC_LINUX_X64
602.gcc_s: -DSPEC_LP64
605.mcf_s: -DSPEC_LP64
620.omnetpp_s: -DSPEC_LP64

(Continued on next page)
Hewlett Packard Enterprise
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Test Date: Jun-2019
Hardware Availability: Apr-2019
Software Availability: Feb-2019

Base Portability Flags (Continued)

623.xalancbmk_s: -DSPEC_LP64 -DSPEC_LINUX
625.x264_s: -DSPEC_LP64
631.deepsjeng_s: -DSPEC_LP64
641.leea_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-linux64.2019-12-10.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-linux64.2019-12-10.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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