SPEC CPU®2017 Integer Speed Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL360 Gen10
(2.40 GHz, Intel Xeon Gold 6212U)

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ProLiant DL360 Gen10
(2.40 GHz, Intel Xeon Gold 6212U)

SPECspeed®2017_int_base = 10.0
SPECspeed®2017_int_peak = Not Run

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

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

Threads

600.perlbench_s 48
602.gcc_s 48
605.mcf_s 48
620.omnetpp_s 48
623.xalancbmk_s 48
625.x264_s 48
631.deepsjeng_s 48
641.leela_s 48
648.exchange2_s 48
657.xz_s 48

6.82
9.50
12.7
8.96
12.2
14.3
5.58
4.73
13.9
---

SPECspeed®2017_int_base (10.0)

---

Hardware

CPU Name: Intel Xeon Gold 6212U
Max MHz: 3900
Nominal: 2400
Enabled: 24 cores, 1 chip, 2 threads/core
Orderable: 1 chip
Cache L1: 32 KB I+D on chip per core
L2: 1 MB I+D on chip per core
L3: 35.75 MB I+D on chip per chip
Other: None
Memory: 192 GB (12 x 16 GB 2Rx8 PC4-2666V-R)
Storage: 1 x 400 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 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: --
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Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Base</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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</thead>
<tbody>
<tr>
<td>perlbench_s</td>
<td>48</td>
<td>262</td>
<td>6.78</td>
<td>260</td>
<td>6.82</td>
<td>260</td>
<td>6.83</td>
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<td>gcc_s</td>
<td>48</td>
<td>419</td>
<td>9.50</td>
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<td>9.49</td>
<td>415</td>
<td>9.60</td>
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<td>mcf_s</td>
<td>48</td>
<td>375</td>
<td>12.6</td>
<td>373</td>
<td>12.7</td>
<td>372</td>
<td>12.7</td>
<td></td>
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<td>omnetpp_s</td>
<td>48</td>
<td>182</td>
<td>8.96</td>
<td>182</td>
<td>8.98</td>
<td>185</td>
<td>8.81</td>
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<td></td>
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<tr>
<td>xalancbmk_s</td>
<td>48</td>
<td>117</td>
<td>12.1</td>
<td>116</td>
<td>12.2</td>
<td>116</td>
<td>12.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>x264_s</td>
<td>48</td>
<td>124</td>
<td>14.3</td>
<td>124</td>
<td>14.3</td>
<td>123</td>
<td>14.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>deepsjeng_s</td>
<td>48</td>
<td>257</td>
<td>5.57</td>
<td>257</td>
<td>5.58</td>
<td>257</td>
<td>5.58</td>
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<tr>
<td>leela_s</td>
<td>48</td>
<td>362</td>
<td>4.72</td>
<td>361</td>
<td>4.73</td>
<td>361</td>
<td>4.73</td>
<td></td>
<td></td>
</tr>
<tr>
<td>exchange2_s</td>
<td>48</td>
<td>211</td>
<td>13.9</td>
<td>212</td>
<td>13.9</td>
<td>212</td>
<td>13.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>xz_s</td>
<td>48</td>
<td>288</td>
<td>21.5</td>
<td>288</td>
<td>21.5</td>
<td>288</td>
<td>21.5</td>
<td></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
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: Fri Oct 18 19:44:58 EDT 2019
### General Notes (Continued)

Submission: cpu2017-20190819-16886.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-pe3i Thu Jun 13 04:47:15 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](https://www.spec.org/cpu2017/Docs/config.html#sysinfo)

**From /proc/cpuinfo**

```
model name : Intel(R) Xeon(R) Gold 6212U CPU @ 2.40GHz
  1 "physical id"s (chips)
  48 "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 : 24
siblings : 48
physical 0: cores 0 1 2 3 4 5 6 9 10 11 12 13 16 17 18 19 20 21 24 25 26 27 28 29
```

**From lscpu:**

```
Architecture:          x86_64
CPU op-mode(s):        32-bit, 64-bit
Byte Order:            Little Endian
CPU(s):                48
On-line CPU(s) list:   0-47
Thread(s) per core:    2
Core(s) per socket:    24
Socket(s):             1
NUMA node(s):          1
Vendor ID:             GenuineIntel
CPU family:            6
Model:                 85
```

(Continued on next page)
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SPECSpeed®2017_int_base = **10.0**

SPECSpeed®2017_int_peak = **Not Run**

---

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

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**Platform Notes (Continued)**

- **Model name:** Intel(R) Xeon(R) Gold 6212U CPU @ 2.40GHz  
- **Stepping:** 6  
- **CPU MHz:** 2400.000  
- **BogoMIPS:** 4800.00  
- **Virtualization:** VT-x  
- **L1d cache:** 32K  
- **L1i cache:** 32K  
- **L2 cache:** 1024K  
- **L3 cache:** 36608K  
- **NUMA node0 CPU(s):** 0-47  
- **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 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 3dnowprefetch cpuid_fault epb cat_l3 cdp_l3 invpcid_single intel_pni mba tpr_shadow vmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erm sinvpcid rtm cqm mpx rd罚_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512v1 xsavesopt xsaveopt xsavec xgetbv1 xsavecs cqm_llc cqm_occurs llc cqm_mbm_total cqm_mbm_local ibpb ibrs stibp dtherm ida arat pin pts pkup oskpe avx512_vnni arch_capabilities ssbd

/proc/cpuinfo cache data  
  cache size : 36608 KB

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a physical chip.  
  available: 1 nodes (0)  
  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 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47  
  node 0 size: 193083 MB  
  node 0 free: 192310 MB  
  node distances:  
  node 0  
  0: 10

From /proc/meminfo  
  MemTotal: 197717388 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"

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

```plaintext
ID="sles"
ID_LIKE="suse"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:15"

uname -a:
Linux linux-pe3i 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 13 04:44
SPEC is set to: /home/cpu2017_u2
```

```
<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/sda3</td>
<td>xfs</td>
<td>476G</td>
<td>55G</td>
<td>422G</td>
<td>12%</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 U32 02/02/2019
Memory:
  12x UNKNOWN NOT AVAILABLE
  12x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2666

(End of data from sysinfo program)

## 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)
```

(Continued on next page)
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| SPECspeak®2017_int_base | 10.0  
|-------------------------|-------  
| SPECspeak®2017_int_peak | Not Run  

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

### Compiler Version Notes (Continued)

<table>
<thead>
<tr>
<th>641.leela_s(base)</th>
</tr>
</thead>
</table>
| 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
- 623.xalancmk_s: -DSPEC_LP64 -DSPEC_LINUX
- 625.x264_s: -DSPEC_LP64
- 631.deepsjeng_s: -DSPEC_LP64
- 641.leela_s: -DSPEC_LP64
- 648.exchange2_s: -DSPEC_LP64
- 657.xz_s: -DSPEC_LP64
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ProLiant DL360 Gen10
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SPECspeed®2017_int_base = 10.0
SPECspeed®2017_int_peak = Not Run

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

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/jes5.0.1-64/-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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