**SPEC® CPU2017 Integer Speed Result**

Hewlett Packard Enterprise  
(Test Sponsor: HPE)  
ProLiant ML350 Gen10  
(3.80 GHz, Intel Xeon Platinum 8256)

**SPECspeed2017_int_base = 9.20**

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

<table>
<thead>
<tr>
<th>Threads</th>
<th>SPECspeed2017_int_base (9.20)</th>
</tr>
</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td>6.69</td>
</tr>
<tr>
<td>602.gcc_s</td>
<td>8.97</td>
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<tr>
<td>605.mcf_s</td>
<td>12.5</td>
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<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>
<td>14.2</td>
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<tr>
<td>631.deepsjeng_s</td>
<td>5.49</td>
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<tr>
<td>641.leela_s</td>
<td>4.76</td>
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<td>648.exchange2_s</td>
<td>14.0</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>14.0</td>
</tr>
</tbody>
</table>

**Hardware**

- **CPU Name:** Intel Xeon Platinum 8256  
- **Max MHz.:** 3900  
- **Nominal:** 3800  
- **Enabled:** 8 cores, 2 chips  
- **Orderable:** 1, 2 chip(s)  
- **Cache L1:** 32 KB I + 32 KB D on chip per core  
- **Cache L2:** 1 MB I+D on chip per core  
- **Cache L3:** 16.5 MB I+D on chip per chip  
- **Order:** None  
- **Memory:** 384 GB (24 x 16 GB 2Rx8 PC4-2933Y-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 U41 02/02/2019 released Apr-2019  
- **File System:** btrfs  
- **System State:** Run level 3 (multi-user)  
- **Base Pointers:** 64-bit  
- **Peak Pointers:** Not Applicable  
- **Other:** jemalloc memory allocator V5.0.1
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CPU2017 License: 3
Test Sponsor: HPE
Tested by: HPE

SPECspeed2017_int_base = 9.20
SPECspeed2017_int_peak = Not Run

Results Table

<table>
<thead>
<tr>
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<th>Ratio</th>
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</table>

SPECspeed2017_int_base = 9.20
SPECspeed2017_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,scatter"
   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
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## Hewlett Packard Enterprise

*Test Sponsor: HPE*

ProLiant ML350 Gen10 (3.80 GHz, Intel Xeon Platinum 8256)

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

## 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 ml350-sles15 Thu Apr 18 00:59:35 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`

```bash
model name : Intel(R) Xeon(R) Platinum 8256 CPU @ 3.80GHz
 2 "physical id"'s (chips)
 8 "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 : 4
siblings : 4
physical 0: cores 5 8 9 13
physical 1: cores 2 5 9 13
```

From `lscpu`

```bash
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 8
On−line CPU(s) list: 0−7
Thread(s) per core: 1
Core(s) per socket: 4
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Platinum 8256 CPU @ 3.80GHz
Stepping: 6
CPU MHz: 3800.000
```

(Continued on next page)
Platform Notes (Continued)

BogoMIPS: 7600.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 16896K
NUMA node0 CPU(s): 0-3
NUMA node1 CPU(s): 4-7
Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clflush dtls 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
sdqm fma cx16 xtpre pcid 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_13 cdps_l3 invpcid_single intel_ppin mba tpr_shadow vmxifl exalted priority ept
vpid fsgsbase tsc_adjust bmi1 hle avx2 smap bmi2 erms invpcid rtm cqm mpx rdt_a
avx512f avx512dq avx512bw avx512vl xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local
ibpb ibrs dtherm ida arat pin pts pkup ospke avx512_vnni arch_capabilities ssbd

/proc/cpuinfo cache data
  cache size: 16896 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
  node 0 size: 193121 MB
  node 0 free: 192768 MB
  node 1 cpus: 4 5 6 7
  node 1 size: 193505 MB
  node 1 free: 193228 MB
  node distances:
    node 0 1
    0: 10 21
    1: 21 10

From /proc/meminfo
  MemTotal: 395906488 KB
  MemFree: 193121 MB
  MemAvailable: 0
  HugePages_Total: 0
  Hugepagesize: 2048 KB

From /etc/*release* /etc/*version*
ois-release:
  NAME="SLES"
  VERSION="15"
  VERSION_ID="15"

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

PRETTY_NAME="SUSE Linux Enterpise Server 15"  
ID="sles"  
ID_LIKE="suse"  
ANSI_COLOR="0;32"  
CPE_NAME="cpe:/o:suse:sles:15"

```bash
uname -a:
  Linux ml350-sles15 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 Apr 18 00:55**

**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/sdb2</td>
<td>btrfs</td>
<td>371G</td>
<td>209G</td>
<td>161G</td>
<td>57%</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 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) 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. |
**==============================================================================**

**==============================================================================**
| CXXC 620.omnetpp_s(base) 623.xalancbmk_s(base) 631.deepsjeng_s(base) |
**==============================================================================**

(Continued on next page)
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CPU2017 License: 3  
Test Sponsor: HPE  
Tested by: HPE

**Compiler Version Notes (Continued)**

```plaintext
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.
------------------------------------------------------------------

==============================================================================
FC 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**

```plaintext
600.perlbmk_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
631.deepsjeng_s: -DSPEC_LP64
641.leela_s: -DSPEC_LP64
648.exchange2_s: -DSPEC_LP64
657.xz_s: -DSPEC_LP64
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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 2019-04-17 15:29:34-0400.