# SPEC® CPU2017 Integer Speed Result

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
ProLiant ML350 Gen10  
(2.70 GHz, Intel Xeon Platinum 8280M)

<table>
<thead>
<tr>
<th>SPECspeed2017_int_base</th>
<th>10.4</th>
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<tbody>
<tr>
<td>SPECspeed2017_int_peak</td>
<td>Not Run</td>
</tr>
</tbody>
</table>

## CPU2017 License:
3

### Test Date:
May-2019

### Hardware Availability:
Apr-2019

### Software Availability:
Feb-2019

### CPU2017 License:
3

### Test Sponsor:
HPE

### Tested by:
HPE

### Test Date:
May-2019

### Hardware Availability:
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Feb-2019

### CPU Name:
Intel Xeon Platinum 8280M

### Max MHz.:
4000

### Nominal:
2700

### Enabled:
56 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:
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/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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Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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</thead>
<tbody>
<tr>
<td>600.perlbench_s</td>
<td>56</td>
<td>256</td>
<td>6.92</td>
<td>255</td>
<td>6.97</td>
<td>253</td>
<td>7.01</td>
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<td>602.gcc_s</td>
<td>56</td>
<td>400</td>
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<td>411</td>
<td>9.68</td>
<td>407</td>
<td>9.79</td>
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<td>605.mcf_s</td>
<td>56</td>
<td>373</td>
<td>12.6</td>
<td>365</td>
<td>12.9</td>
<td>364</td>
<td>13.0</td>
</tr>
<tr>
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<td>56</td>
<td>173</td>
<td>9.42</td>
<td>171</td>
<td>9.54</td>
<td>170</td>
<td>9.58</td>
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<tr>
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<td>112</td>
<td>12.7</td>
<td>112</td>
<td>12.6</td>
<td>112</td>
<td>12.6</td>
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<tr>
<td>625.x264_s</td>
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<td>120</td>
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<td>14.8</td>
<td>120</td>
<td>14.7</td>
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<tr>
<td>631.deepsjeng_s</td>
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<td>5.61</td>
<td>256</td>
<td>5.60</td>
<td>255</td>
<td>5.62</td>
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<td>641.leela_s</td>
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<td>4.86</td>
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<tr>
<td>648.exchange2_s</td>
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<td>205</td>
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<td>205</td>
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<td>205</td>
<td>14.4</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>56</td>
<td>253</td>
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<td>252</td>
<td>24.5</td>
<td>252</td>
<td>24.5</td>
</tr>
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SPECspeed2017_int_base = 10.4
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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

Test Date: May-2019
Hardware Availability: Apr-2019
Software Availability: Feb-2019
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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 Tue May 21 21:41:08 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 8280M CPU @ 2.70GHz
  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
  Socket(s): 2
  NUMA node(s): 2
  Vendor ID: GenuineIntel
  CPU family: 6
  Model: 85
  Model name: Intel(R) Xeon(R) Platinum 8280M CPU @ 2.70GHz

(Continued on next page)
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Platform Notes (Continued)

Stepping: 6
CPU MHz: 2700.000
BogoMIPS: 5400.00
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 rdtscp
lm constant_tsc art 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 sse3
sdkg fma cx16 xtpg pdcm pcdm dca sse4_1 sse4_2 x2apic movbe popcnt
tsc_deadline_timer aes xsave avx16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault
epb cat_l3 cdp_l3 invpcid_single intel_puin mba tpr_shadow vmmi flexpriority ept
vpid fsxasbase tsc_adjust bml hle avx2 smep bmi2 erms invpcid rtm cqm mpx rdt_a
avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl
xsasveopt xsavc xgetbv1 xsaves cqm_llc cqm_occur_llc cqm_mbm_total cqm_mbm_local
ibpb ibrs stibp dtherm ida arat pin pts pkup osppke avx512_vnni arch_capabilities ssbd

From /proc/cpuinfo cache data
  cache size : 39424 KB

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a
differential 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: 193087 MB
  node 0 free: 192781 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: 193529 MB
  node 1 free: 192985 MB
  node distances:
    node 0 1
    0: 10 21
    1: 21 10

From /proc/meminfo
  MemTotal: 395896420 kB
  HugePages_Total: 0
  Hugepagesize: 2048 kB

From /etc/*release* /etc/*version*
  os-release:

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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 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 May 21 21:37

SPEC is set to: /home/cpu2017_u2
    Filesystem     Type   Size  Used Avail Use% Mounted on
    /dev/sdc2      btrfs  371G  234G  136G  64% /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 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
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#### Compiler Version Notes (Continued)

```
CXXC  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.  
```

```
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

- `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`
- `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`
- `-L/home/cpu2017_u2/je5.0.1-64/`  
- `-ljemalloc`

**C++ benchmarks:**
- `-Wl,-z,muldefs`  
- `-xCORE-AVX512`  
- `-ipo`  
- `-O3`  
- `-no-prec-div`
- `-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64`  
- `-lqkmalloc`

**Fortran benchmarks:**
- `-xCORE-AVX512`  
- `-ipo`  
- `-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](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/HPE-Platform-Flags-Intel-V1.2-CLX-revA.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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