# SPEC CPU®2017 Integer Rate Result

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
Synergy 480 Gen10  
(2.70 GHz, Intel Xeon Platinum 8280)

<table>
<thead>
<tr>
<th>CPU2017 License:</th>
<th>3</th>
<th>Test Date:</th>
<th>Mar-2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor:</td>
<td>HPE</td>
<td>Hardware Availability:</td>
<td>Apr-2019</td>
</tr>
<tr>
<td>Tested by:</td>
<td>HPE</td>
<td>Software Availability:</td>
<td>Feb-2019</td>
</tr>
</tbody>
</table>

## Hardware

- **CPU Name:** Intel Xeon Platinum 8280  
- **Max MHz:** 4000  
- **Nominal:** 2700  
- **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  

## 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:** No  
- **Firmware:** HPE BIOS Version I42 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:** None  
- **Power Management:** --

## SPECrate®2017_int_base = 333

- **SPECrate®2017_int_peak = Not Run**

## SPECrate®2017_int_base (333)

<table>
<thead>
<tr>
<th>Test</th>
<th>Copies</th>
<th>SPECrate®2017_int_base</th>
</tr>
</thead>
<tbody>
<tr>
<td>500.perlbench_r</td>
<td>112</td>
<td>267</td>
</tr>
<tr>
<td>502.gcc_r</td>
<td>112</td>
<td>256</td>
</tr>
<tr>
<td>505.mcf_r</td>
<td>112</td>
<td>420</td>
</tr>
<tr>
<td>520.omnetpp_r</td>
<td>112</td>
<td>200</td>
</tr>
<tr>
<td>523.xalancbmk_r</td>
<td>112</td>
<td>336</td>
</tr>
<tr>
<td>525.x264_r</td>
<td>112</td>
<td>727</td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>112</td>
<td>294</td>
</tr>
<tr>
<td>541.leela_r</td>
<td>112</td>
<td>281</td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>112</td>
<td>626</td>
</tr>
<tr>
<td>557.xz_r</td>
<td>112</td>
<td>238</td>
</tr>
</tbody>
</table>
## SPEC CPU®2017 Integer Rate Result

**Hewlett Packard Enterprise**

(Test Sponsor: HPE)

Synergy 480 Gen10

(2.70 GHz, Intel Xeon Platinum 8280)

**SPECrate®2017_int_base = 333**

**SPECrate®2017_int_peak = Not Run**

---

### Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Base</th>
<th></th>
<th>Peak</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Copies</td>
<td>Seconds</td>
<td>Ratio</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>500.perlbench_r</td>
<td>112</td>
<td>669</td>
<td>266</td>
</tr>
<tr>
<td>502.gcc_r</td>
<td>112</td>
<td>623</td>
<td>255</td>
</tr>
<tr>
<td>505.mcf_r</td>
<td>112</td>
<td><strong>431</strong></td>
<td><strong>420</strong></td>
</tr>
<tr>
<td>520.omnetpp_r</td>
<td>112</td>
<td>733</td>
<td>200</td>
</tr>
<tr>
<td>523.xalanbmk_r</td>
<td>112</td>
<td>351</td>
<td>337</td>
</tr>
<tr>
<td>525.x264_r</td>
<td>112</td>
<td>271</td>
<td>724</td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>112</td>
<td><strong>436</strong></td>
<td><strong>294</strong></td>
</tr>
<tr>
<td>541.leela_r</td>
<td>112</td>
<td><strong>661</strong></td>
<td><strong>281</strong></td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>112</td>
<td><strong>469</strong></td>
<td><strong>626</strong></td>
</tr>
<tr>
<td>557.xz_r</td>
<td>112</td>
<td>531</td>
<td>228</td>
</tr>
</tbody>
</table>

---

### Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor. For details, please see the config file.

---

### 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:

```bash
sync; echo 3 > /proc/sys/vm/drop_caches
```

runcpu command invoked through numactl i.e.:

```bash
numactl --interleave=all runcpu <etc>
```

---

### General Notes

Environment variables set by runcpu before the start of the run:

```bash
LD_LIBRARY_PATH = "/home/cpu2017_u2/lib/ia32:/home/cpu2017_u2/lib/intel64"
```

Binaries compiled on a system with 1x Intel Core i9-7900X CPU + 32GB RAM memory using Redhat Enterprise Linux 7.5

Yes: 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.

---

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

Hewlett Packard Enterprise
(Test Sponsor: HPE)
Synergy 480 Gen10
(2.70 GHz, Intel Xeon Platinum 8280)

SPECRate®2017_int_base = 333
SPECRate®2017_int_peak = Not Run

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

General Notes (Continued)
is mitigated in the system as tested and documented.

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 Throughput Compute
Workload Profile set to Custom
Energy/Performance Bias set to Balanced Performance
Sysinfo program /home/cpu2017_u2/bin/sysinfo
Rev: r5974 of 2018-05-19 9bcd08f2999c33d61f644985e45859ea9
running on sy480g10-2 Tue Mar  5 05:38:16 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 8280 CPU @ 2.70GHz
  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 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 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): 4
Vendor ID: GenuineIntel
CPU family: 6

(Continued on next page)
Platform Notes (Continued)

Model: 85
Model name: Intel(R) Xeon(R) Platinum 8280 CPU @ 2.70GHz
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): 0-13, 56-69
NUMA node1 CPU(s): 28-41, 84-97
NUMA node2 CPU(s): 42-55, 98-111
NUMA node3 CPU(s): 14-27, 70-83
NUMA node0 CPU(s): 14-27, 70-83
NUMA node1 CPU(s): 14-27, 70-83
NUMA node2 CPU(s): 14-27, 70-83
NUMA node3 CPU(s): 14-27, 70-83

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 pdelgb 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 ssse3 sdbg fma cx16 xtrm pdcms pldm xsave pdcm pdm cmov vptp smm vt-d vpx dmb l1d tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb cat_13 cpdp_13 invpcid_single intel_pmov mbp pr_shadow vmmi flexpriority ept vpid fsgsbase tsc_adjust mb1 lhe avx2 smep bmid ems invpcid rtm cqm mpx rdt_a
avx512f avx512dq rdseed adx smp clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsxaveopt xsaveopt xavesav xgetb1 xsave xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local ibpb ibrs stib dtherm ida arat pln pts pku ospke avx512_vnni arch_capabilities ssbd

/proc/cpuinfo cache data
  cache size : 39424 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 56 57 58 59 60 61 62 63 64 65 66 67 68 69
  node 0 size: 96277 MB
  node 0 free: 95934 MB
  node 1 cpus: 14 15 16 17 18 19 20 21 22 23 24 25 26 27 70 71 72 73 74 75 76 77 78 79 80
  node 1 size: 96762 MB
  node 1 free: 96564 MB
  node 2 cpus: 28 29 30 31 32 33 34 35 36 37 38 39 40 41 84 85 86 87 88 89 90 91 92 93 94
  node 2 size: 96733 MB
  node 2 free: 96563 MB
  node 3 cpus: 42 43 44 45 46 47 48 49 50 51 52 53 54 55 98 99 100 101 102 103 104 105
  node 3 size: 96564 MB
  node 3 free: 96280 MB

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

<table>
<thead>
<tr>
<th>Hewlett Packard Enterprise</th>
<th>SPECrate®2017_int_base = 333</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Test Sponsor: HPE)</td>
<td>SPECrate®2017_int_peak = Not Run</td>
</tr>
<tr>
<td>Synergy 480 Gen10</td>
<td></td>
</tr>
<tr>
<td>(2.70 GHz, Intel Xeon Platinum 8280)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>CPU2017 License: 3</td>
</tr>
<tr>
<td></td>
<td>Test Date: Mar-2019</td>
</tr>
<tr>
<td></td>
<td>Hardware Availability: Apr-2019</td>
</tr>
<tr>
<td></td>
<td>Tested by: HPE</td>
</tr>
<tr>
<td></td>
<td>Software Availability: Feb-2019</td>
</tr>
</tbody>
</table>

| Platform Notes (Continued) |

node distances:

<table>
<thead>
<tr>
<th>node</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>0:</td>
<td>10</td>
<td>21</td>
<td>31</td>
<td>31</td>
</tr>
<tr>
<td>1:</td>
<td>21</td>
<td>10</td>
<td>31</td>
<td>31</td>
</tr>
<tr>
<td>2:</td>
<td>31</td>
<td>31</td>
<td>10</td>
<td>21</td>
</tr>
<tr>
<td>3:</td>
<td>31</td>
<td>31</td>
<td>21</td>
<td>10</td>
</tr>
</tbody>
</table>

From /proc/meminfo

- MemTotal: 395609628 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 sy480g10-2 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 Mar 5 05:35

SPEC is set to: /home/cpu2017_u2

Filesystem Type Size Used Avail Use% Mounted on
/dev/sdb2 btrfs 371G 76G 294G 21% /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 I42 02/02/2019
- Memory:
  - 24x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2933

(Continued on next page)
SPEC CPU®2017 Integer Rate Result
Copyright 2017-2023 Standard Performance Evaluation Corporation

Hewlett Packard Enterprise
(Test Sponsor: HPE)
Synergy 480 Gen10
(2.70 GHz, Intel Xeon Platinum 8280)

SPECrate®2017_int_base = 333
SPECrate®2017_int_peak = Not Run

Platform Notes (Continued)
(End of data from sysinfo program)

Compiler Version Notes
==============================================================================
C       | 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base)
 | 525.x264_r(base) 557.xz_r(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++     | 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base)
 | 541.leela_r(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 | 548.exchange2_r(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
## SPEC CPU®2017 Integer Rate Result

**Hewlett Packard Enterprise**
(Test Sponsor: HPE)  
Synergy 480 Gen10  
(2.70 GHz, Intel Xeon Platinum 8280)  

**SPECrate®2017_int_base** = 333  
**SPECrate®2017_int_peak** = Not Run

<table>
<thead>
<tr>
<th>CPU2017 License: 3</th>
<th>Test Date: Mar-2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor: HPE</td>
<td>Hardware Availability: Apr-2019</td>
</tr>
<tr>
<td>Tested by: HPE</td>
<td>Software Availability: Feb-2019</td>
</tr>
</tbody>
</table>

### Base Portability Flags

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Flags</th>
</tr>
</thead>
<tbody>
<tr>
<td>500.perlbench_r</td>
<td>-DSPEC_LP64 -DSPEC_LINUX_X64</td>
</tr>
<tr>
<td>502.gcc_r</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>505.mcf_r</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>520.omnetpp_r</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>523.xalancbmk_r</td>
<td>-DSPEC_LP64 -DSPEC_LINUX</td>
</tr>
<tr>
<td>525.x264_r</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>531.deepsjeng_r</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>541.leela_r</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>548.exchange2_r</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>557.xz_r</td>
<td>-DSPEC_LP64</td>
</tr>
</tbody>
</table>

### Base Optimization Flags

**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`

**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:**
- `-Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div`  
- `-qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte`  
- `-L/usr/local/IntelCompiler19/compilers_and_libraries_2019.1.144/linux/compiler/lib/intel64 -lqkmalloc`

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)  
<table>
<thead>
<tr>
<th>SPEC CPU®2017 Integer Rate Result</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hewlett Packard Enterprise</strong></td>
</tr>
<tr>
<td>(Test Sponsor: HPE)</td>
</tr>
<tr>
<td><strong>Synergy 480 Gen10</strong></td>
</tr>
<tr>
<td>(2.70 GHz, Intel Xeon Platinum 8280)</td>
</tr>
<tr>
<td><strong>SPECrate®2017_int_base = 333</strong></td>
</tr>
<tr>
<td><strong>SPECrate®2017_int_peak = Not Run</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CPU2017 License: 3</th>
<th>Test Date: Mar-2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Sponsor: HPE</td>
<td>Hardware Availability: Apr-2019</td>
</tr>
<tr>
<td>Tested by: HPE</td>
<td>Software Availability: Feb-2019</td>
</tr>
</tbody>
</table>

SPEC CPU and SPECrate are registered trademarks of the Standard Performance Evaluation Corporation. All other brand and product names appearing in this result are trademarks or registered trademarks of their respective holders.

For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

Tested with SPEC CPU®2017 v1.0.5 on 2019-03-05 06:38:16-0500.
Report generated on 2023-03-23 14:02:24 by CPU2017 PDF formatter v6442.
Originally published on 2019-04-03.