**Hewlett Packard Enterprise**  
(2.20 GHz, Intel Xeon Silver 4214)

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

---

**Software**

**OS:** SUSE Linux Enterprise Server 15 SP1 (x86_64)  
Kernel 4.12.14-195-default  
**Compiler:** C/C++: Version 19.0.4.227 of Intel C/C++  
Compiler Build 20190416 for Linux;  
Fortran: Version 19.0.4.227 of Intel Fortran  
Compiler Build 20190416 for Linux  
**Parallel:** Yes  
**Firmware:** HPE BIOS Version U31 2.14.09/05/2019 released Nov-2019  
**File System:** xfs  
**System State:** Run level 3 (multi-user)  
**Base Pointers:** 64-bit  
**Peak Pointers:** Not Applicable  
**Other:** None  
**Power Management:** BIOS set to prefer performance at the cost of additional power usage

---

**Hardware**

**CPU Name:** Intel Xeon Silver 4214  
**Max MHz:** 3200  
**Nominal:** 2200  
**Enabled:** 24 cores, 2 chips  
**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:** 16.5 MB I+D on chip per chip  
**Other:** None  
**Memory:** 192 GB (12 x 16 GB 2Rx8 PC4-2933Y-R, running at 2400)  
**Storage:** 6 x 800 GB SAS SSD, RAID 1  
**Other:** None

---

**Threads**

| SPECspeed®2017_fp_base | 92.9 |
| SPECspeed®2017_fp_peak | Not Run |

---

**Test Date:** Feb-2020  
**Hardware Availability:** Nov-2019  
**Software Availability:** Jun-2019  
**Test Sponsor:** HPE  
**Hardware Availability:** Nov-2019  
**Test Date:** Feb-2020  
**Software Availability:** Jun-2019

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**Specbench®**

**603.bwaves_s**  
**607.cactuBSSN_s**  
**619.lbm_s**  
**621.wrf_s**  
**627.cam4_s**  
**628.pop2_s**  
**638.imagick_s**  
**644.nab_s**  
**649.fotonik3d_s**  
**654.roms_s**

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**603.bwaves_s**  
**607.cactuBSSN_s**  
**619.lbm_s**  
**621.wrf_s**  
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**628.pop2_s**  
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**644.nab_s**  
**649.fotonik3d_s**  
**654.roms_s**
SPEC CPU®2017 Floating Point Speed Result

Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL160 Gen10
(2.20 GHz, Intel Xeon Silver 4214)

SPECspeed®2017_fp_base = 92.9
SPECspeed®2017_fp_peak = Not Run

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

Test Date: Feb-2020
Hardware Availability: Nov-2019
Software Availability: Jun-2019

Results Table

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</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

Environment Variables Notes
Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=fine,compact"
LD_LIBRARY_PATH = "/home/cpu2017/lib/intel64"
OMP_STACKSIZE = "192M"

General Notes
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.
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL160 Gen10
(2.20 GHz, Intel Xeon Silver 4214)

**SPEC CPU®2017 Floating Point Speed Result**

**SPECspeed®2017_fp_base** = 92.9

**SPECspeed®2017_fp_peak** = Not Run

<table>
<thead>
<tr>
<th>CPU2017 License: 3</th>
<th>Test Date: Feb-2020</th>
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<tr>
<td>Test Sponsor: HPE</td>
<td>Hardware Availability: Nov-2019</td>
</tr>
<tr>
<td>Tested by: HPE</td>
<td>Software Availability: Jun-2019</td>
</tr>
</tbody>
</table>

**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/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7edble6e46a485a0011
running on linux-u3aj Mon Feb 3 08:46:32 2020

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) Silver 4214 CPU @ 2.20GHz
- 2 "physical id"s (chips)
- 24 "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: 12
  - siblings: 12
  - physical 0: cores 0 1 2 3 4 5 8 9 10 11 12 13
  - physical 1: cores 0 1 2 3 4 5 8 9 10 11 12 13

From lscpu:
- Architecture: x86_64
- CPU op-mode(s): 32-bit, 64-bit
- Byte Order: Little Endian
- Address sizes: 46 bits physical, 48 bits virtual
- CPU(s): 24
- On-line CPU(s) list: 0-23
- Thread(s) per core: 1
- Core(s) per socket: 12
- Socket(s): 2
- NUMA node(s): 2
- Vendor ID: GenuineIntel
- CPU family: 6
- Model: 85
- Model name: Intel(R) Xeon(R) Silver 4214 CPU @ 2.20GHz

(Continued on next page)
Hewlett Packard Enterprise
ProLiant DL160 Gen10
(2.20 GHz, Intel Xeon Silver 4214)

SPECspeed®2017_fp_base = 92.9
SPECspeed®2017_fp_peak = Not Run

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

Test Date: Feb-2020
Hardware Availability: Nov-2019
Software Availability: Jun-2019

Platform Notes (Continued)

Stepping: 6
CPU MHz: 2200.000
BogoMIPS: 4400.00
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 16896K
NUMA node0 CPU(s): 0-11
NUMA node1 CPU(s): 12-23
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 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 ssbd mba ibrs ibpb ibrs_enabled tpr_shadow vmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 ibrm invpcid rtm cqm mpx rdrt_a avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl xsaveopt xsavec xsavec xsaveopt xsaves cqm_llc cqm_ocap_llc cqm_mbb_total cqm_mbb_local dtherm ida arat pfn pt pku ospke avx512_vnni md_clear flush_l1d arch_capabilities

/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 4 5 6 7 8 9 10 11
    node 0 size: 96351 MB
    node 0 free: 95973 MB
    node 1 cpus: 12 13 14 15 16 17 18 19 20 21 22 23
    node 1 size: 96735 MB
    node 1 free: 92375 MB
    node distances:
        node 0 1
        0: 10 21
        1: 21 10

From /proc/meminfo
   MemTotal: 197721456 kB
   HugePages_Total: 0
   Hugepagesize: 2048 kB

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

(Continued on next page)
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL160 Gen10
(2.20 GHz, Intel Xeon Silver 4214)

SPECspeed®2017_fp_base = 92.9
SPECspeed®2017_fp_peak = Not Run

Platform Notes (Continued)

NAME="SLES"
VERSION="15-SP1"
VERSION_ID="15.1"
PRETTY_NAME="SUSE Linux Enterprise Server 15 SP1"
ID="sles"
ID_LIKE="suse"
ANSI_COLOR="0;32"
CPE_NAME="cpe:/o:suse:sles:15:sp1"

uname -a:
Linux linux-u3aj 4.12.14-195-default #1 SMP Tue May 7 10:55:11 UTC 2019 (8fba516)
x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:
CVE-2018-3620 (L1 Terminal Fault): Not affected
Microarchitectural Data Sampling: Not affected
CVE-2017-5754 (Meltdown): Not affected
CVE-2018-3639 (Speculative Store Bypass): Mitigation: Speculative Store Bypass disabled via prctl and seccomp
CVE-2017-5753 (Spectre variant 1): Mitigation: __user pointer sanitization
CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling

run-level 3 Feb 3 05:57

SPEC is set to: /home/cpu2017
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda3 xfs 517G 48G 469G 10% /home

From /sys/devices/virtual/dmi/id
BIOS: HPE U31 09/05/2019
Vendor: HPE
Product: ProLiant DL160 Gen10
Product Family: ProLiant
Serial: 2M295206LJ

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.
Memory:
4x UNKNOWN NOT AVAILABLE
12x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2933

(End of data from sysinfo program)
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL160 Gen10
(2.20 GHz, Intel Xeon Silver 4214)

SPECSpeed®2017_fp_base = 92.9
SPECSpeed®2017_fp_peak = Not Run

Compiler Version Notes

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<td>1985-2019 Intel Corporation. All rights reserved.</td>
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Base Compiler Invocation

C benchmarks:
icc -m64 -std=c11

(Continued on next page)
### Base Compiler Invocation (Continued)

Fortran benchmarks:
```bash
ifort -m64
```

Benchmarks using both Fortran and C:
```bash
ifort -m64 icc -m64 -std=c11
```

Benchmarks using Fortran, C, and C++:
```bash
icpc -m64 icc -m64 -std=c11 ifort -m64
```

### Base Portability Flags

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<td>607.cactusBSSN_s</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>-DSPEC_LP64</td>
</tr>
<tr>
<td>621.wrf_s</td>
<td>-DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian</td>
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<tr>
<td>627.cam4_s</td>
<td>-DSPEC_LP64 -DSPEC_CASE_FLAG</td>
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<tr>
<td>628.pop2_s</td>
<td>-DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian -assume byterecl</td>
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<tr>
<td>638.imagick_s</td>
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### Base Optimization Flags

**C benchmarks:**
```bash
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
```

**Fortran benchmarks:**
```bash
-DSPEC_OPENMP -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -nostandard-realloc-lhs
```

**Benchmarks using both Fortran and C:**
```bash
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -nostandard-realloc-lhs
```

**Benchmarks using Fortran, C, and C++:**
```bash
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
```

(Continued on next page)
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL160 Gen10
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SPECspeed®2017_fp_peak = Not Run

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Test Date: Feb-2020
Hardware Availability: Nov-2019
Software Availability: Jun-2019

Base Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++ (continued):
- 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-revB.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-revB.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 CPU®2017 v1.1.0 on 2020-02-03 08:46:32-0500.
Report generated on 2020-03-17 16:14:13 by CPU2017 PDF formatter v6255.
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