Hewlett Packard Enterprise  
ProLiant DL360 Gen10 Plus  
(2.60 GHz, Intel Xeon Platinum 8358)  

Test Sponsor: HPE  
Hardware Availability: Jun-2021

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

** SPECspeed®2017_fp_base = 223 **  
** SPECspeed®2017_fp_peak = 226 **

**CPU2017 License:** 3  
**Test Date:** May-2021  
**Software Availability:** Dec-2020

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**Software**

**OS:** Red Hat Enterprise Linux 8.3 (Ootpa)  
**Kernel:** 4.18.0-240.el8.x86_64  
**Compiler:**  
C/C++: Version 2021.1 of Intel oneAPI DPC++/C++  
Fortran: Version 2021.1 of Intel Fortran Compiler

**Parallel:** Yes
**Firmware:** HPE BIOS Version U46 v1.42 05/16/2021 released May-2021
**File System:** xfs  
**System State:** Run level 3 (multi-user)

**Base Pointers:** 64-bit  
**Peak Pointers:** 64-bit  
**Power Management:** BIOS set to prefer performance at the cost of additional power usage

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**Hardware**

**CPU Name:** Intel Xeon Platinum 8358  
**Max MHz:** 3400  
**Nominal:** 2600  
**Enabled:** 64 cores, 2 chips  
**Orderable:** 1, 2 chip(s)

**Cache L1:** 32 KB I + 48 KB D on chip per core
**L2:** 1.25 MB I+D on chip per core
**L3:** 48 MB I+D on chip per chip  
**Other:** None  
**Memory:** 2 TB (32 x 64 GB 2Rx4 PC4-3200AA-R)  
**Storage:** 1 x 400 GB SAS SSD, RAID 0  
**Other:** None

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**Threads**  

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<tr>
<th>SPECspeed®2017_fp_base (223)</th>
<th>SPECspeed®2017_fp_peak (226)</th>
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<tr>
<td>603.bwaves_s 64</td>
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<tr>
<td>607.cactuBSSN_s 64</td>
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<tr>
<td>619.lbm_s 64</td>
<td>142</td>
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<td>621.wrf_s 64</td>
<td>222</td>
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<tr>
<td>627.cam4_s 64</td>
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<tr>
<td>628.pop2_s 64</td>
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<tr>
<td>638.imagick_s 64</td>
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<td>644.nab_s 64</td>
<td>441</td>
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<td>649.fotonik3d_s 64</td>
<td>505</td>
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<td>654.roms_s 64</td>
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**Results Table**

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<tr>
<th>Benchmark</th>
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<th>Base Seconds</th>
<th>Base Ratio</th>
<th>Peak Seconds</th>
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<td>654.roms_s</td>
<td>64</td>
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<td>284</td>
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<td>285</td>
<td>55.1</td>
<td>286</td>
<td>55.4</td>
<td>284</td>
</tr>
</tbody>
</table>

**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_1.1.8/lib/intel64:/home/cpu2017_1.1.8/je5.0.1-64"
MALLOCONF = "retain:true"
OMP_STACKSIZE = "192M"

**General Notes**

Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB RAM
memory using Redhat Enterprise Linux 8.0
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

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

built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5

Submitted by: "Bhatnagar, Prateek" <prateek.bhatnagar@hpe.com>
Submitted: Mon Jun 7 11:55:54 EDT 2021
Submission: cpu2017-20210607-26899.sub

## Platform Notes

The system ROM used for this result contains Intel microcode version 0xd0002a0 for
the Intel Xeon Platinum 8358 processor

BIOS Configuration:
- Workload Profile set to General Peak Frequency Compute
- Intel Hyper-Threading set to Disabled
- Thermal Configuration set to Maximum Cooling
- Memory Patrol Scrubbing set to Disabled
- Advanced Memory Protection set to Advanced ECC
- Last Level Cache (LLC) Prefetch set to Enabled
- Last Level Cache (LLC) Dead Line Allocation set to Disabled
- Enhanced Processor Performance set to Enabled
- Workload Profile set to Custom
  - Energy/Performance Bias set to Balanced Power
  - DCU Stream Prefetcher set to Disabled
  - Adjacent Sector Prefetch set to Disabled
  - Minimum Processor Idle Power Package C-State set to No Package State
  - Numa Group Size Optimization set to Flat

Sysinfo program /home/cpu2017_1.1.8/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16aca64d4
running on localhost.localdomain Wed May 26 14:12:42 2021

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 8358 CPU @ 2.60GHz
- 2 "physical id"'s (chips)
- 64 "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 : 32
  - siblings : 32
  - physical 0: cores 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
  - physical 1: cores 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

(Continued on next page)
SPEC CPU®2017 Floating Point Speed Result
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SPECspeed®2017_fp_peak = 226

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<th>Test Date: May-2021</th>
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<td>Test Sponsor: HPE</td>
<td>Hardware Availability: Jun-2021</td>
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<tr>
<td>Tested by: HPE</td>
<td>Software Availability: Dec-2020</td>
</tr>
</tbody>
</table>

Platform Notes (Continued)

25 26 27 28 29 30 31

From lscpu from util-linux 2.32.1:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 64
On-line CPU(s) list: 0-63
Thread(s) per core: 1
Core(s) per socket: 32
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 106
Model name: Intel(R) Xeon(R) Platinum 8358 CPU @ 2.60GHz
Stepping: 6
CPU MHz: 2719.424
BogoMIPS: 5200.00
Virtualization: VT-x
L1d cache: 48K
L1i cache: 32K
L2 cache: 1280K
L3 cache: 49152K
NUMA node0 CPU(s): 0-31
NUMA node1 CPU(s): 32-63
Flags: fpu vme de pse tsc msr pae mce cmov pat pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpe1gb rdtscp lm constant_tsc arch_perfmon pebs bts rep_good nopl xtopology nonstop_tsc cpuid aperfmperf pni pclmulqdq dtes64monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16 xtpr pdcm 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 invpcid_single ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vmx flexpriority ept pni vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erts invpcid cmqm rdt_a avx512f avx512dq rdseed adx smap avx512kfma clflushopt clwb intel_pt avx512cd sha ni avx512bw avx512vl xsaveopt xsavec xgetbv1 xsaveas cmqm_llc cmqm_occup_llc cmqm_mbb_total cmqm_mbb_local split_lock_detect wbinvd dtherm ida arat pin pts avx512vmbmi umip pku ospke avx512_vbmi2 gfni vaes vpclmulqdq avx512_vnni avx512_bitalg tme avx512_vpopcntdq la57 rdpid md_clear pconfig flush_l1d arch_capabilities

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 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27

(Continued on next page)
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Platform Notes (Continued)

28 29 30 31
node 0 size: 974370 MB	node 0 free: 1028799 MB
node 1 cpus: 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56
57 58 59 60 61 62 63
node 1 size: 976121 MB	node 1 free: 1026891 MB
node distances:
node 0 1
0: 10 20
1: 20 10

From /proc/meminfo
MemTotal: 2113489016 kB
HugePages_Total: 0
Hugepagesize: 2048 kB

/sbin/tuned-adm active
Current active profile: throughput-performance

From /etc/*release*/etc/*version*
os-release:
NAME="Red Hat Enterprise Linux"
VERSION="8.3 (Ootpa)"
ID="rhel"
ID_LIKE="fedora"
VERSION_ID="8.3"
PLATFORM_ID="platform:el8"
PRETTY_NAME="Red Hat Enterprise Linux 8.3 (Ootpa)"
ANSI_COLOR="0;31"
redhat-release: Red Hat Enterprise Linux release 8.3 (Ootpa)
system-release: Red Hat Enterprise Linux release 8.3 (Ootpa)
system-release-cpe: cpe:/o:redhat:enterprise_linux:8.3:ga

uname -a:
Linux localhost.localdomain 4.18.0-240.el8.x86_64 #1 SMP Wed Sep 23 05:13:10 EDT 2020
x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2018-12207 (iTLB Multihit): Not affected
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

(Continued on next page)
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**SPECspeed®2017_fp_base = 223**  
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**Platform Notes (Continued)**

CVE-2017-5753 (Spectre variant 1):  
Mitigation: usercopy/swapgs barriers and __user pointer sanitization

CVE-2017-5715 (Spectre variant 2):  
Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling

CVE-2020-0543 (Special Register Buffer Data Sampling):  
Not affected

CVE-2019-11135 (TSX Asynchronous Abort):  
Not affected

run-level 3 May 26 10:11

SPEC is set to: /home/cpu2017_1.1.8

Filesystem       Type     Size  Used  Avail  Use%  Mounted on
/dev/mapper/rhel00-home  xfs    372G  180G  192G  49%  /home

From /sys/devices/virtual/dmi/id

Vendor:        HPE
Product:       ProLiant DL360 Gen10 Plus
Product Family: ProLiant
Serial:        CN701108CQ

Additional information from dmidecode 3.2 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:  
32x Micron 36ASF8G72PZ-3G2B2 64 GB 2 rank 3200

BIOS:  
BIOS Vendor:    HPE
BIOS Version:   U46
BIOS Date:      05/16/2021
BIOS Revision:  1.42
Firmware Revision: 2.40

(End of data from sysinfo program)

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**Compiler Version Notes**

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**C**  
619.lbm_s(base, peak) 638.imagick_s(base, peak)  
644.nab_s(base)

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Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R)  
64, Version 2021.1 Build 20201112_000000  
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

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Hardware Availability: Jun-2021
Software Availability: Dec-2020

Compiler Version Notes (Continued)

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## Compiler Version Notes (Continued)

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| Fortran, C | 621.wrf_s(base, peak), 627.cam4_s(base, peak), 628.pop2_s(base, peak) |
| Intel(R) fortran Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000 |
| Intel(R) C Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000 |

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## Base Compiler Invocation

**C benchmarks:**
- `icc`

**Fortran benchmarks:**
- `ifort`

**Benchmarks using both Fortran and C:**
- `ifort icc`

**Benchmarks using Fortran, C, and C++:**
- `icpc icc ifort`

## Base Portability Flags

- `603.bwaves_s: -DSPEC_LP64`
- `607.cactuBSSN_s: -DSPEC_LP64`
- `619.lbm_s: -DSPEC_LP64`
- `621.wrf_s: -DSPEC_LP64, -DSPEC_CASE_FLAG -convert big_endian`
- `627.cam4_s: -DSPEC_LP64, -DSPEC_CASE_FLAG`
- `628.pop2_s: -DSPEC_LP64, -DSPEC_CASE_FLAG -convert big_endian -assume byterecl`
- `638.imagick_s: -DSPEC_LP64`
- `644.nab_s: -DSPEC_LP64`
- `649.fotonik3d_s: -DSPEC_LP64`
- `654.roms_s: -DSPEC_LP64`
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| Hardware Availability: | Jun-2021 |
| Software Availability: | Dec-2020 |

Base Optimization Flags

C benchmarks:
- m64 -std=c11 -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
- ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
- mbranches-within-32B-boundaries

Fortran benchmarks:
- m64 -Wl,-z,muldefs -DSPEC_OPENMP -xCORE-AVX512 -ipo -O3
- no-prec-div -qopt-prefetch -ffinite-math-only
- qopt-mem-layout-trans=4 -qopenmp -nostandard-realloc-lhs
- mbranches-within-32B-boundaries -L/usr/local/jemalloc64-5.0.1/lib
  -ljemalloc

Benchmarks using both Fortran and C:
- m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
- qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp
- DSPEC_OPENMP -mbranches-within-32B-boundaries -nostandard-realloc-lhs
- L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Benchmarks using Fortran, C, and C++:
- m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -ipo -O3 -no-prec-div
- qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp
- DSPEC_OPENMP -mbranches-within-32B-boundaries -nostandard-realloc-lhs
- L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Peak Compiler Invocation

C benchmarks (except as noted below):
icc

644.nab_s: icx

Fortran benchmarks:
ifort

Benchmarks using both Fortran and C:
ifort icc

Benchmarks using Fortran, C, and C++:
icpc icc ifort
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Peak Portability Flags
Same as Base Portability Flags

Peak Optimization Flags

C benchmarks:
619.lbm_s: basepeak = yes
638.imagick_s: basepeak = yes
644.nab_s: -m64 -Wl, -z, muldefs -xCORE-AVX512 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -fiopenmp
-DSPEC_OPENMP -qopt-mem-layout-trans=4
-fimf-accuracy-bits=14:sqrt
-mbranches-within-32B-boundaries
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc

Fortran benchmarks:
603.bwaves_s: basepeak = yes
649.fotonik3d_s: basepeak = yes
654.roms_s: basepeak = yes

Benchmarks using both Fortran and C:
621.wrf_s: basepeak = yes
627.cam4_s: basepeak = yes
628.pop2_s: basepeak = yes

Benchmarks using Fortran, C, and C++:
607.cactuBSSN_s: basepeak = yes

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-V1.0-ICX-revE.html
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL360 Gen10 Plus
(2.60 GHz, Intel Xeon Platinum 8358)

SPECspeed®2017_fp_base = 223
SPECspeed®2017_fp_peak = 226

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic2021-official-linux64_revA.xml
http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-V1.0-ICX-revE.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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