Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant ML350 Gen10
(2.20 GHz, Intel Xeon Silver 4214)

SPECspeed2017_fp_base = 95.1
SPECspeed2017_fp_peak = Not Run

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

Threads

<table>
<thead>
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<th>Benchmark</th>
<th>Threads</th>
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<tr>
<td>603.bwaves_s</td>
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<tr>
<td>607.cactuBSSN_s</td>
<td>24</td>
</tr>
<tr>
<td>619.lbm_s</td>
<td>24</td>
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<tr>
<td>621.wrf_s</td>
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<tr>
<td>627.cam4_s</td>
<td>24</td>
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<tr>
<td>628.pop2_s</td>
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</tr>
<tr>
<td>638.imagick_s</td>
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<tr>
<td>644.nab_s</td>
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<tr>
<td>649.fotonik3d_s</td>
<td>24</td>
</tr>
<tr>
<td>654.roms_s</td>
<td>24</td>
</tr>
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</table>

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: 384 GB (24 x 16 GB 2Rx8 PC4-2666V-R, running at 2400)
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 05/21/2019 released May-2019
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: Not Applicable
Other: None
SPEC CPU2017 Floating Point Speed Result

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Results Table

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</tbody>
</table>

SPECspeed2017_fp_base = 95.1
SPECspeed2017_fp_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,compact"
LD_LIBRARY_PATH = "/home/cpu2017_u2/lib/ia32:/home/cpu2017_u2/lib/intel64"
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.

Platform Notes

BIOS Configuration:
  Hyper-Threading set to Disabled
  Thermal Configuration set to Maximum Cooling

(Continued on next page)
SPEC CPU2017 Floating Point Speed Result

Hewlett Packard Enterprise
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SPECspeed2017_fp_base = 95.1
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Platform Notes (Continued)

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
  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-utpal Thu Jun 20 15:34:00 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) 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
  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
  Stepping: 6
  CPU MHz: 2200.000
  BogoMIPS: 4400.00
  Virtualization: VT-x
  L1d cache: 32K
  L1i cache: 32K

(Continued on next page)
Hewlett Packard Enterprise  
ProLiant ML350 Gen10  
(2.20 GHz, Intel Xeon Silver 4214)

**SPEC CPU2017 Floating Point Speed Result**

**Test Sponsor:** HPE  
*Copyright 2017-2019 Standard Performance Evaluation Corporation*

**SPECspeed2017_fp_peak = Not Run**  
**SPECspeed2017_fp_base = 95.1**

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

**Platform Notes (Continued)**

- L2 cache: 1024K  
- L3 cache: 16896K  
- NUMA node0 CPU(s): 0-11  
- NUMA node1 CPU(s): 12-23

**Flags:**

```plaintext
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  rdtsscp  lm  constant_tsc  art  arch_perfmon
pebs  bts  rep_good
nopl  xtopology
nonstop_tsc
cpuid
aperf
perf_event
tsc
known_freq
pni
pclmulqdq
dtes64
monitor
ds_cpl
vmx
smx
est
tm2
sse3
sdbg
fma
x16
xtpr
dpmc
pcid
dca
sse4_1
sse4_2
x2apic
movbe
popcnt
tsc_deadline_timer
aes
xsave
avx
f16c
rdrand
lahf
lm
abm
3dnowprefetch
cpuid_fault
ebf
ct
13
cdp
13
invpcid_single
intel
ppin
mba
tpr_shadow
vmni
flexpriority
ept
vpid
fsgsb
base
tsc
adjust
bmi1
hle
avx2
smep
bmi2
erms
invpcid
rtm
cq
mxp
rdt_a
avx512f
avx512dq
rdseed
adx
smap
clflushopt
clwb
intel_pt
avx512cd
avx512bw
avx512vl
xsaveopt
xsave
xgetbv1
xsavec
cq
llc
cq
_occup_llc
 cq
_mb_total
 cq
_mb_local
ibpb
ibrs
stibp
dtherm
ida
arat
pl
pts
pk
ospke
avx512
vnni
arch_capabilities
ssbd
```

**From numactl --hardware**

```plaintext
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: 193120 MB  
- node 0 free: 192766 MB  
- node 1 cpus: 12 13 14 15 16 17 18 19 20 21 22 23  
- node 1 size: 193504 MB  
- node 1 free: 193161 MB

**node distances:**

```plaintext
node 0 1
0: 10 21
1: 21 10
```

From /proc/meminfo

```plaintext
MemTotal: 395903448 kB  
HugePages_Total: 0  
Hugepagesize: 2048 kB
```

From /etc/*release* /etc/*version*

```plaintext
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"
```

(Continued on next page)
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Platform Notes (Continued)

CPE_NAME="cpe:/o:suse:sles:15"

uname -a:
    Linux ml350-sles15-utpal 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 Jun 20 15:31

SPEC is set to: /home/cpu2017_u2
    Filesystem Type Size  Used Avail Use% Mounted on
    /dev/sda3   xfs  407G  43G  364G  11% /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 05/21/2019
    Memory:
        24x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2666, configured at 2400

(End of data from sysinfo program)

Compiler Version Notes

==============================================================================
CC  619.lbm_s(base) 638.imagick_s(base) 644.nab_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  607.cactuBSSN_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.
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
(Continued on next page)
Hewlett Packard Enterprise
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Test Sponsor: HPE
Tested by: HPE

---

Compiler Version Notes (Continued)

Version 19.0.2.187 Build 20190117
Copyright (C) 1985-2019 Intel Corporation. All rights reserved.
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

Fortran benchmarks:
ifort -m64

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

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

Base Portability Flags

603.bwaves_s: -DSPEC_LP64

(Continued on next page)
SPEC CPU2017 Floating Point Speed Result

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Base Portability Flags (Continued)

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

Base Optimization Flags

C benchmarks:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-qopt-prefetch-issue-excl-hint -ansi-alias -complex-limited-range

Fortran benchmarks:
-DSPEC_OPENMP -xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp
-qopt-prefetch-issue-excl-hint -ansi-alias -complex-limited-range
   -nostandard-realloc-lhs

Benchmarks using both Fortran and C:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-qopt-prefetch-issue-excl-hint -ansi-alias -complex-limited-range
   -nostandard-realloc-lhs

Benchmarks using Fortran, C, and C++:
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=4 -qopenmp -DSPEC_OPENMP
-qopt-prefetch-issue-excl-hint -ansi-alias -complex-limited-range
   -nostandard-realloc-lhs

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/HPE-ic19.0u1-flags-linux64.html
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-ic19.0u1-flags-linux64.xml
http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-V1.2-CLX-revB.xml
### SPEC CPU2017 Floating Point Speed Result

**SPECspeed2017_fp_base = 95.1**

| SPECspeed2017_fp_peak | Not Run |

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

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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 2019-06-20 06:03:59-0400.  