Hewlett Packard Enterprise (Test Sponsor: HPE)
ProLiant DL380 Gen10 (1.70 GHz, Intel Xeon Bronze 3106)

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

Threads

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Threads</th>
<th>SPECspeed®2017_fp_base</th>
<th>SPECspeed®2017_fp_peak</th>
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<tr>
<td>603.bwaves_s</td>
<td>16</td>
<td>57.9</td>
<td>59.2</td>
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<tr>
<td>607.cactuBSSN_s</td>
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<td>29.7</td>
<td>30.2</td>
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<td>619.lbm_s</td>
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<td>29.7</td>
<td>34.1</td>
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<td>621.wrf_s</td>
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<td>34.2</td>
<td>35.4</td>
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<td>628.pop2_s</td>
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<td>638.imagick_s</td>
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<tr>
<td>644.nab_s</td>
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<td>649.fotonik3d_s</td>
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<tr>
<td>654.roms_s</td>
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<td>58.0</td>
<td>58.0</td>
</tr>
</tbody>
</table>

Hardware
CPU Name: Intel Xeon Bronze 3106
Max MHz: 1700
Nominal: 1700
Enabled: 16 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: 11 MB I+D on chip per chip
Other: None
Memory: 192 GB (24 x 8 GB 2Rx8 PC4-2666V-R, running at 2133)
Storage: 1 x 960 GB SATA SSD, RAID 0
Other: None

Software
OS: SUSE Linux Enterprise Server 12 (x86_64) SP3
Kernel 4.4.73-5-default
Compiler: C/C++: Version 18.0.0.128 of Intel C/C++ Compiler for Linux;
Fortran: Version 18.0.0.128 of Intel Fortran Compiler for Linux
Parallel: Yes
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 64-bit
Other: None
Power Management: --
Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL380 Gen10
(1.70 GHz, Intel Xeon Bronze 3106)

CPU2017 License: 3
Test Sponsor: HPE
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Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
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<th>Base</th>
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<th>Seconds</th>
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<td>0.91</td>
<td>272</td>
<td>0.91</td>
</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
Filesystem page cache cleared with:

shell invocation of 'sync; echo 3 > /proc/sys/vm/drop_caches' prior to run

irqbalance disabled with "systemctl stop irqbalance"
tuned profile set with "tuned-adm profile throughput-performance"

General Notes

Environment variables set by runcpu before the start of the run:
KMP_AFFINITY = "granularity=core,compact"
LD_LIBRARY_PATH = "/home/cpu2017/lib/ia32:/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-32:/home/cpu2017/je5.0.1-64"
OMP_STACKSIZE = "192M"

Binaries compiled on a system with 1x Intel Core i7-4790K CPU + 32GB RAM
memory using Redhat Enterprise Linux 7.4

Platform Notes

BIOS Configuration:
Thermal Configuration set to Maximum Cooling
LLC Prefetch set to Enabled
LLC Dead Line Allocation set to Disabled
Memory Patrol Scrubbing set to Disabled
Workload Profile set to General Peak Frequency Compute
Energy/Performance Bias set to Maximum Performance
Workload Profile set to Custom

(Continued on next page)
Hewlett Packard Enterprise
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SPECspeed®2017_fp_base = 46.6
SPECspeed®2017_fp_peak = 47.2

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Test Sponsor: HPE
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Platform Notes (Continued)

NUMA Group Size Optimization set to Flat
Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618b0c91c0f
running on linux-b7s1 Thu Nov 16 21:10:31 2017

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) Bronze 3106 CPU @ 1.70GHz
  2 "physical id"s (chips)
  16 "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 : 8
siblings : 8
physical 0: cores 0 1 2 3 4 5 6 7
physical 1: cores 0 1 2 3 4 5 6 7

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 16
On-line CPU(s) list: 0-15
Thread(s) per core: 1
Core(s) per socket: 8
Socket(s): 2
NUMA node(s): 2
Vendor ID: GenuineIntel
CPU family: 6
Model: 85
Model name: Intel(R) Xeon(R) Bronze 3106 CPU @ 1.70GHz
Stepping: 4
CPU MHz: 1696.027
BogoMIPS: 3392.05
Virtualization: VT-x
L1d cache: 32K
L1i cache: 32K
L2 cache: 1024K
L3 cache: 11264K
NUMA node0 CPU(s): 0-3,8-11
NUMA node1 CPU(s): 4-7,12-15
Flags: fpu vme de pse ts cmip pmtr 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

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SPEC CPU®2017 Floating Point Speed Result

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SPECspeed®2017_fp_base = 46.6
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Test Sponsor: HPE
Tested by: HPE

Test Date: Nov-2017
Hardware Availability: Oct-2017
Software Availability: Sep-2017

Platform Notes (Continued)

aperfmerf eagerfpu pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg
fma cx16 xtrp pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes
xsave avx f16c rdrand lahf_lm abm 3dnowprefetch arat epb pni pts dtc msi intel_pt
tpr_shadow vmx flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2
erms invpcid rtm cmov avx512f avx512dq rdseed adx smap clflushopt clwb avx512cd
avx512bw avx512vl xsaveopt xsaves opt xgetbv1 cqm_llc cqm_occup_llc pku ospke
/proclcpuinfo cache data
  cache size : 11264 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 8 9 10 11
  node 0 size: 96349 MB
  node 0 free: 90536 MB
  node 1 cpus: 4 5 6 7 12 13 14 15
  node 1 size: 96766 MB
  node 1 free: 92739 MB
  node distances:
    node  0   1
    0:  10 21
    1:  21 10

From /proc/meminfo
  MemTotal: 197750952 kB
  HugePages_Total: 0
  Hugepagesize: 2048 kB
/usr/bin/lsb_release -d
  SUSE Linux Enterprise Server 12 SP3

From /etc/*release* /etc/*version*
  SuSE-release:
    SUSE Linux Enterprise Server 12 (x86_64)
    VERSION = 12
    PATCHLEVEL = 3
    # This file is deprecated and will be removed in a future service pack or release.
    # Please check /etc/os-release for details about this release.
  os-release:
    NAME="SLES"
    VERSION="12-SP3"
    VERSION_ID="12.3"
    PRETTY_NAME="SUSE Linux Enterprise Server 12 SP3"
    ID="sles"
    ANSI_COLOR="0;32"
    CPE_NAME="cpe:/o:suse:sles:12:sp3"

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Hewlett Packard Enterprise  
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**SPEC CPU®2017 Floating Point Speed Result**

<table>
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<th>SPECspeed®2017_fp_base = 46.6</th>
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</tr>
</tbody>
</table>

**Platform Notes (Continued)**

```
uname -a:
    Linux linux-b7s1 4.4.73-5-default #1 SMP Tue Jul 4 15:33:39 UTC 2017 (b7ce4e4) x86_64
    x86_64 x86_64 GNU/Linux
```

```
run-level 3 Nov 16 10:43
```

```
SPEC is set to: /home/cpu2017
    Filesystem  Type Size  Used Avail Use% Mounted on
    /dev/sda4   xfs  852G   49G  803G   6%  /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 U30 10/11/2017**

**Memory:**
24x UNKNOWN NOT AVAILABLE 8 GB 2 rank 2666, configured at 2133

(End of data from sysinfo program)

**Compiler Version Notes**

```
==============================================================================
C               | 619.lbm_s(base, peak) 638.imagick_s(base, peak) 644.nab_s(base, peak)
==============================================================================
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
==============================================================================
```

```
Fortran         | 603.bwaves_s(base, peak) 649.fotonik3d_s(base, peak) 654.roms_s(base, peak)
```

(Continued on next page)
**SPEC CPU®2017 Floating Point Speed Result**

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**SPECspeed®2017_fp_base = 46.6**

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### Compiler Version Notes (Continued)

ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985–2017 Intel Corporation. All rights reserved.

-------------------------------------------------

Fortran, C  | 621.wrf_s(base, peak) 627.cam4_s(base, peak)
            | 628.pop2_s(base, peak)
-------------------------------------------------

ifort (IFORT) 18.0.0 20170811
Copyright (C) 1985–2017 Intel Corporation. All rights reserved.

### 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
SPEC CPU®2017 Floating Point Speed Result

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SPECspeed®2017_fp_base = 46.6
SPECspeed®2017_fp_peak = 47.2

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

Base Optimization Flags

C benchmarks:
-xCORE-AVX2 -ipo -03 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -qopenmp -DSPEC/OpenMP

Fortran benchmarks:
-DSPEC/OpenMP -xCORE-AVX2 -ipo -03 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp
-nostandard-realloc-lhs -align array32byte

Benchmarks using both Fortran and C:
-xCORE-AVX2 -ipo -03 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -qopenmp -DSPEC/OpenMP
-nostandard-realloc-lhs -align array32byte

Benchmarks using Fortran, C, and C++:
-xCORE-AVX2 -ipo -03 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -qopenmp -DSPEC/OpenMP
-nostandard-realloc-lhs -align array32byte

Base Other Flags

C benchmarks:
-m64 -std=c11

Fortran benchmarks:
-m64

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

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

Peak Compiler Invocation

C benchmarks:
icc

Fortran benchmarks:
ifort

(Continued on next page)
Hewlett Packard Enterprise  
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**CPU2017 License:** 3  
**Test Sponsor:** HPE  
**Test Date:** Nov-2017  
**Tested by:** HPE

**Peak Compiler Invocation (Continued)**

Benchmarks using both Fortran and C:

- ifort icc

Benchmarks using Fortran, C, and C++:

- icpc icc ifort

**Peak Portability Flags**

Same as Base Portability Flags

**Peak Optimization Flags**

C benchmarks:

- 619.lbm_s: -prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX2  
  -qopt-prefetch -ipo -O3 -ffinite-math-only -no-prec-div  
  -qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP -qopenmp  
  -DSPEC_OPENMP

- 638.imagick_s: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch  
  -ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp  
  -DSPEC_OPENMP

- 644.nab_s: Same as 638.imagick_s

Fortran benchmarks:

- -prof-gen(pass 1) -prof-use(pass 2) -DSPEC_SUPPRESS_OPENMP  
- -DSPEC_OPENMP -O2 -xCORE-AVX2 -qopt-prefetch -ipo -O3  
- -ffinite-math-only -no-prec-div -qopt-mem-layout-trans=3 -qopenmp  
- -nostandard-realloc-lhs -align array32byte

Benchmarks using both Fortran and C:

- 621.wrf_s: -prof-gen(pass 1) -prof-use(pass 2) -O2 -xCORE-AVX2  
  -qopt-prefetch -ipo -O3 -ffinite-math-only -no-prec-div  
  -qopt-mem-layout-trans=3 -DSPEC_SUPPRESS_OPENMP -qopenmp  
  -DSPEC_OPENMP -nostandard-realloc-lhs -align array32byte

- 627.cam4_s: -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch  
  -ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp  
  -DSPEC_OPENMP -nostandard-realloc-lhs -align array32byte

(Continued on next page)
**SPEC CPU®2017 Floating Point Speed Result**

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

---

### Peak Optimization Flags (Continued)

628.pop2_s: Same as 621.wrf_s

Benchmarks using Fortran, C, and C++:
- `prof-gen(pass 1)` - `prof-use(pass 2)` - `O2` - `CORE-AVX2` - `qopt-prefetch`
  - `ipo` - `O3` - `ffinite-math-only` - `no-prec-div` - `qopt-mem-layout-trans=3`
  - `DSPEC_SUPPRESS_OPENMP` - `qopenmp` - `DSPEC_OPENMP` - `nostandard-realloc-lhs`
  - `align array32byte`

### Peak Other Flags

C benchmarks:
- `-m64` - `-std=c11`

Fortran benchmarks:
- `-m64`

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

Benchmarks using Fortran, C, and C++:
- `-m64` - `-std=c11`

---

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-SKX-revG.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-SKX-revG.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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