Hewlett Packard Enterprise  
(Test Sponsor: HPE)  
ProLiant ML30 Gen10  
(3.70 GHz, Intel Xeon E-2176G)  

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

Test Date: Oct-2018  
Hardware Availability: Nov-2018  
Software Availability: Apr-2018  

SPECspeed2017_fp_base = 29.6  
SPECspeed2017_fp_peak = Not Run  

--- SPECspeed2017_fp_base (29.6) ---

**Hardware**

- **CPU Name:** Intel Xeon E-2176G  
- **Max MHz.:** 4700  
- **Nominal:** 3700  
- **Enabled:** 6 cores, 1 chip  
- **Orderable:** 1 chip  
- **Cache L1:** 32 KB I + 32 KB D on chip per core  
- **L2:** 256 KB I+D on chip per core  
- **L3:** 12 MB I+D on chip per chip  
- **Other:** None  
- **Memory:** 64 GB (4 x 16 GB 2Rx8 PC4-2666V-E)  
- **Storage:** 1 x 960 GB SATA SSD, RAID 0  
- **Other:** None

**Software**

- **OS:** Red Hat Enterprise Linux Server release 7.5 (Maipo)  
- **Compiler:** C/C++: Version 18.0.2.199 of Intel C/C++  
- **Compiler:** Fortran: Version 18.0.2.199 of Intel Fortran  
- **Firmware:** HPE BIOS Version U44 08/15/2018 released Aug-2018  
- **File System:** xfs  
- **System State:** Run level 3 (multi-user)  
- **Base Pointers:** 64-bit  
- **Peak Pointers:** Not Applicable  
- **Other:** jemalloc memory allocator library V5.0.1
SPEC CPU2017 Floating Point Speed Result

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Results Table

<table>
<thead>
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<th>Benchmark</th>
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</table>

SPECspeed2017_fp_base = 29.6
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
IRQ balance service was stopped using "systemctl stop irqbalance.service"
Tuned-adm profile was set to Throughput-Performance using "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 i7-6700K 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.
jemalloc: configured and built at default for 32bit (i686) and 64bit (x86_64) targets; built with RedHat Enterprise 7.5, and the system compiler gcc 4.8.5;
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(Test Sponsor: HPE)  
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(3.70 GHz, Intel Xeon E-2176G)  

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Test Sponsor: HPE  
Tested by: HPE

| SPECspeed2017_fp_base = | 29.6 |
| SPECspeed2017_fp_peak = | Not Run |
| Test Date: | Oct-2018 |
| Hardware Availability: | Nov-2018 |
| Software Availability: | Apr-2018 |

Platform Notes

BIOS Configuration:  
Hyper Threading set to Disabled  
Thermal Configuration set to Maximum Cooling  
LLC Prefetch set to Enabled  
LLC Dead Line Allocation set to Disabled  
Workload Profile set to General Peak Frequency Compute  
Workload Profile set to Custom  
Sysinfo program /home/cpu2017/bin/sysinfo  
Rev: r5974 of 2018-05-19 9bce8f29999c33d61f64985e45859ea9  
running on ml30-rhel7.5-mk Wed Oct 3 07:53:18 2018

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) E-2176G CPU @ 3.70GHz  
  - 1 "physical id"s (chips)  
  - 6 "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: 6  
  - siblings: 6  
  - physical 0: cores 0 1 2 3 4 5

From lscpu:  
- Architecture: x86_64  
- CPU op-mode(s): 32-bit, 64-bit  
- Byte Order: Little Endian  
- CPU(s): 6  
- On-line CPU(s) list: 0-5  
- Thread(s) per core: 1  
- Core(s) per socket: 6  
- Socket(s): 1  
- NUMA node(s): 1  
- Vendor ID: GenuineIntel  
- CPU family: 6  
- Model: 158  
- Model name: Intel(R) Xeon(R) E-2176G CPU @ 3.70GHz  
- Stepping: 10  
- CPU MHz: 3700.000  
- BogoMIPS: 7392.00  
- Virtualization: VT-x  
- L1d cache: 32K  
- L1i cache: 32K  
- L2 cache: 256K  
- L3 cache: 12288K

(Continued on next page)
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Platform Notes (Continued)

NUMA node0 CPU(s): 0-5
Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov
pat pse36 clfflush 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
aperfmperf eagerfpu nni pclmulqdq dtel64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg
fma cx16 xtpr pdcm pcid sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes
xsave avx f16c rdrand lahf_lm abm 3nowprefetch epb intel_pt tpr_shadow vnmi
flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 ibrm invpcid rtm
mpx rdseed adx svm cldflushopt xsaveopt xsavec xgetbv1 ibpb ibrs stibp dtherm ida
arat pln pts spec_ctrl intel_stibp rds

From proc/cpuinfo cache data
    cache size : 12288 KB

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a
physical chip.

From /proc/meminfo
    MemTotal:       65822752 kB
    HugePages_Total:       0
    Hugepagesize:       2048 kB

From /etc/*release*/ /etc/*version*
    os-release:
        NAME="Red Hat Enterprise Linux Server"
        VERSION="7.5 (Maipo)"
        ID="rhel"
        ID_LIKE="fedora"
        VARIANT="Server"
        VARIANT_ID="server"
        VERSION_ID="7.5"
        PRETTY_NAME="Red Hat Enterprise Linux Server 7.5 (Maipo)"
    redhat-release: Red Hat Enterprise Linux Server release 7.5 (Maipo)
    system-release: Red Hat Enterprise Linux Server release 7.5 (Maipo)
    system-release-cpe: cpe:/o:redhat:enterprise_linux:7.5:ga:server

uname -a:
    Linux ml30-rhel7.5-mk 3.10.0-875.el7.rhel7_ssb_jcm7.x86_64 #1 SMP Mon May 7 08:58:00
    EDT 2018 x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:
CVE-2017-5754 (Meltdown): Mitigation: PTI
CVE-2017-5753 (Spectre variant 1): Mitigation: Load fences
CVE-2017-5715 (Spectre variant 2): Mitigation: IBRS (kernel)
run-level 3 Oct 3 05:17

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Platform Notes (Continued)

SPEC is set to: /home/cpu2017
Filesistem                           Type  Size  Used Avail Use% Mounted on
/dev/mapper/rhel_ml30--2176--mk-home xfs  812G  9.0G  803G   2% /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 U44 08/15/2018
Memory:
4x UNKNOWN NOT AVAILABLE 16 GB 2 rank 2666, configured at 2667

*(End of data from sysinfo program)*

Compiler Version Notes

==============================================================================
CC  619.lbm_s(base) 638.imagick_s(base) 644.nab_s(base)
------------------------------------------------------------------------------
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------
==============================================================================
FC  607.cactuBSSN_s(base)
------------------------------------------------------------------------------
icpc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------
==============================================================================
CC  621.wrf_s(base) 627.cam4_s(base) 628.pop2_s(base)
------------------------------------------------------------------------------
ifort (IFORT) 18.0.2 20180210

*(Continued on next page)*
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**Compiler Version Notes (Continued)**

Copyright (C) 1985-2018 Intel Corporation. All rights reserved.
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation. All rights reserved.

**Base Compiler Invocation**

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

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**

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

**Base Optimization Flags**

C benchmarks:
```bash
-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP -L/usr/local/je5.0.1-64/lib -ljemalloc
```
# SPEC CPU2017 Floating Point Speed Result

## Hewlett Packard Enterprise

(3.70 GHz, Intel Xeon E-2176G)

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### Base Optimization Flags (Continued)

Fortran benchmarks:
- `-Wl,-z,muldefs -DSPEC_OPENMP -xCORE-AVX2 -ipo -O3 -no-prec-div`
- `-qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp`
- `-nostandard-realloc-lhs -L/usr/local/je5.0.1-64/lib -ljemalloc`

Benchmarks using both Fortran and C:
- `-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch`
- `-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP`
- `-nostandard-realloc-lhs -L/usr/local/je5.0.1-64/lib -ljemalloc`

Benchmarks using Fortran, C, and C++:
- `-Wl,-z,muldefs -xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch`
- `-ffinite-math-only -qopt-mem-layout-trans=3 -qopenmp -DSPEC_OPENMP`
- `-nostandard-realloc-lhs -L/usr/local/je5.0.1-64/lib -ljemalloc`

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-revH.html](http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-V1.2-SKX-revH.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-revH.xml](http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-Intel-V1.2-SKX-revH.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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