SPEC® CPU2017 Floating Point Rate Result

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Hewlett Packard Enterprise

(Test Sponsor: HPE)

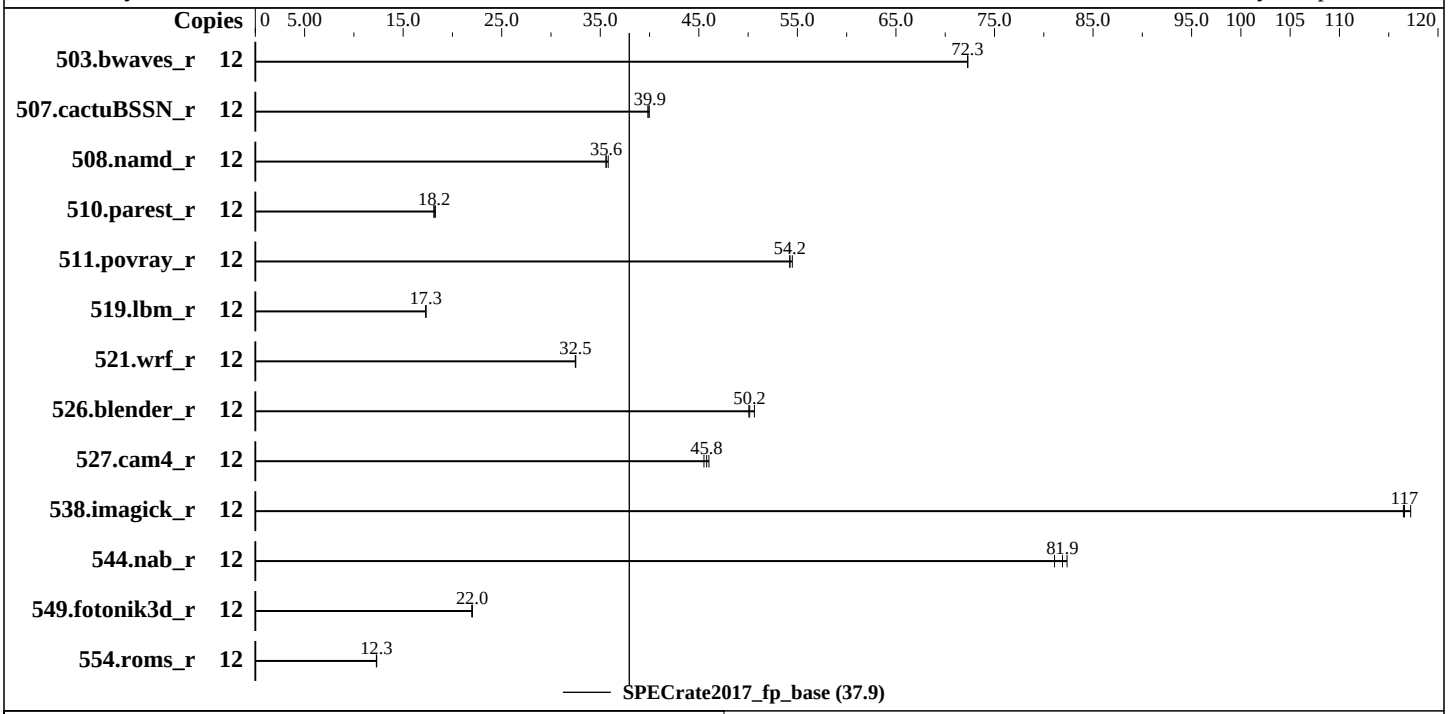
ProLiant DL20 Gen10
(3.80 GHz, Intel Xeon E-2186G)

SPECrate2017_fp_base = 37.9

SPECrate2017_fp_peak = Not Run

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

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



Hardware

CPU Name:	Intel Xeon E-2186G
Max MHz.:	4700
Nominal:	3800
Enabled:	6 cores, 1 chip, 2 threads/core
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 480 GB SATA SSD, RAID 0
Other:	None

Software

OS:	Red Hat Enterprise Linux Server release 7.5 (Maipo) Kernel 3.10.0-862.el7.x86_64
Compiler:	C/C++: Version 18.0.2.199 of Intel C/C++ Compiler for Linux; Fortran: Version 18.0.2.199 of Intel Fortran Compiler for Linux
Parallel:	No
Firmware:	HPE BIOS Version U43 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:	None

Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
503.bwaves_r	12	1665	72.3	**1665**	**72.3**	1664	72.3							
507.cactuBSSN_r	12	380	40.0	381	39.8	**380**	**39.9**							
508.namd_r	12	318	35.8	**320**	**35.6**	320	35.6							
510.parest_r	12	1718	18.3	1733	18.1	**1729**	**18.2**							
511.povray_r	12	517	54.2	**517**	**54.2**	514	54.5							
519.lbm_r	12	732	17.3	731	17.3	**731**	**17.3**							
521.wrf_r	12	827	32.5	828	32.5	**827**	**32.5**							
526.blender_r	12	361	50.6	365	50.1	**364**	**50.2**							
527.cam4_r	12	**458**	**45.8**	461	45.5	456	46.0							
538.imagick_r	12	**256**	**117**	255	117	256	116							
544.nab_r	12	245	82.4	249	81.1	**247**	**81.9**							
549.fotonik3d_r	12	2125	22.0	2127	22.0	**2126**	**22.0**							
554.roms_r	12	1552	12.3	1548	12.3	**1551**	**12.3**							

SPECrate2017_fp_base = 37.9

SPECrate2017_fp_peak = Not Run

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Submit Notes

```
The taskset mechanism was used to bind copies to processors. The config file option 'submit'
was used to generate taskset commands to bind each copy to a specific processor.
For details, please see the config file.
```

Operating System Notes

```
Stack size set to unlimited using "ulimit -s unlimited"
IRQ balance service was stopped using "service irqbalance stop"
Tuned-adm profile was set to Throughput-Performance using "tuned-adm profile throughput-performance"
VM Dirty ratio was set to 40 using  "echo 40 > /proc/sys/vm/dirty_ratio"
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:
LD_LIBRARY_PATH = "/home/cpu2017/lib/ia32:/home/cpu2017/lib/intel64:/home/cpu2017/je5.0.1-32:/home/cpu2017/je5.0.1-64"

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

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General Notes (Continued)

```
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.
```

Platform Notes

```
BIOS Configuration:
Thermal Configuration set to Maximum Cooling
LLC Prefetch set to Enabled
LLC Dead Line Allocation set to Disabled
Workload Profile set to General Throughput Compute
Minimum Processor Idle Power Core C-State set to C1E State
Workload Profile set to Custom
Dynamic Power Saving Mode is Enabled
 Sysinfo program /home/cpu2017/bin/sysinfo
 Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
 running on DL20-Gen10-hs Tue Aug 28 16:49:20 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-2186G CPU @ 3.80GHz
       1  "physical id"s (chips)
       12 "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  : 12
       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):                12
      On-line CPU(s) list:   0-11
      Thread(s) per core:    2
      Core(s) per socket:    6
      Socket(s):             1
      NUMA node(s):          1
      Vendor ID:             GenuineIntel
```

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Platform Notes (Continued)

```
      CPU family:            6
      Model:                 158
      Model name:            Intel(R) Xeon(R) E-2186G CPU @ 3.80GHz
      Stepping:              10
      CPU MHz:               3800.000
      BogoMIPS:              7584.00
      Virtualization:        VT-x
      L1d cache:             32K
      L1i cache:             32K
      L2 cache:              256K
      L3 cache:              12288K
      NUMA node0 CPU(s):     0-11
      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
      aperfmperf eagerfpu pni pclmulqdq dtes64 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 3dnowprefetch epb intel_pt tpr_shadow vnmi
      flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm
      mpx rdseed adx smap clflushopt xsaveopt xsavec xgetbv1 ibpb ibrs stibp dtherm ida
      arat pln pts spec_ctrl intel_stibp

  /proc/cpuinfo cache data
     cache size : 12288 KB

  From numactl --hardware  WARNING: a numactl 'node' might or might not correspond to a
  physical chip.
    available: 1 nodes (0)
    node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11
    node 0 size: 65385 MB
    node 0 free: 57717 MB
    node distances:
    node   0
      0:  10

  From /proc/meminfo
     MemTotal:       65654036 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"
```

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Platform Notes (Continued)

```
      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 DL20-Gen10-hs 3.10.0-862.el7.x86_64 #1 SMP Wed Mar 21 18:14:51 EDT 2018 x86_64
   x86_64 x86_64 GNU/Linux

 run-level 3 Aug 28 12:55

 SPEC is set to: /home/cpu2017
   Filesystem            Type  Size  Used Avail Use% Mounted on
   /dev/mapper/rhel-home xfs   365G   51G  314G  14% /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 U43 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  519.lbm_r(base) 538.imagick_r(base) 544.nab_r(base)
------------------------------------------------------------------------------
icc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------

==============================================================================
 CXXC 508.namd_r(base) 510.parest_r(base)
------------------------------------------------------------------------------
icpc (ICC) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------

==============================================================================
 CC  511.povray_r(base) 526.blender_r(base)
------------------------------------------------------------------------------
```

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Compiler Version Notes (Continued)

```
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.
------------------------------------------------------------------------------

==============================================================================
 FC  507.cactuBSSN_r(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.
------------------------------------------------------------------------------

==============================================================================
 FC  503.bwaves_r(base) 549.fotonik3d_r(base) 554.roms_r(base)
------------------------------------------------------------------------------
ifort (IFORT) 18.0.2 20180210
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------

==============================================================================
 CC  521.wrf_r(base) 527.cam4_r(base)
------------------------------------------------------------------------------
ifort (IFORT) 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.
------------------------------------------------------------------------------
```

Base Compiler Invocation

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

C++ benchmarks:
`icpc -m64`

Fortran benchmarks:
`ifort -m64`

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

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Base Compiler Invocation (Continued)

Benchmarks using both C and C++:
icpc -m64 icc -m64 -std=c11

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

Base Portability Flags

503.bwaves_r: -DSPEC_LP64
507.cactuBSSN_r: -DSPEC_LP64
508.namd_r: -DSPEC_LP64
510.parest_r: -DSPEC_LP64
511.povray_r: -DSPEC_LP64
519.lbm_r: -DSPEC_LP64
521.wrf_r: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
526.blender_r: -DSPEC_LP64 -DSPEC_LINUX -funsigned-char
527.cam4_r: -DSPEC_LP64 -DSPEC_CASE_FLAG
538.imagick_r: -DSPEC_LP64
544.nab_r: -DSPEC_LP64
549.fotonik3d_r: -DSPEC_LP64
554.roms_r: -DSPEC_LP64

Base Optimization Flags

C benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3

C++ benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3

Fortran benchmarks:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs

Benchmarks using both Fortran and C:
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -auto -nostandard-realloc-lhs

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Base Optimization Flags (Continued)

Benchmarks using both C and C++:
`-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3`

Benchmarks using Fortran, C, and C++:
`-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only -qopt-mem-layout-trans=3 -auto -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-SKX-revJ.html`
`http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2017-12-21.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-revJ.xml`
`http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2017-12-21.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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