SPEC® CPU2017 Floating Point Rate Result

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Fujitsu
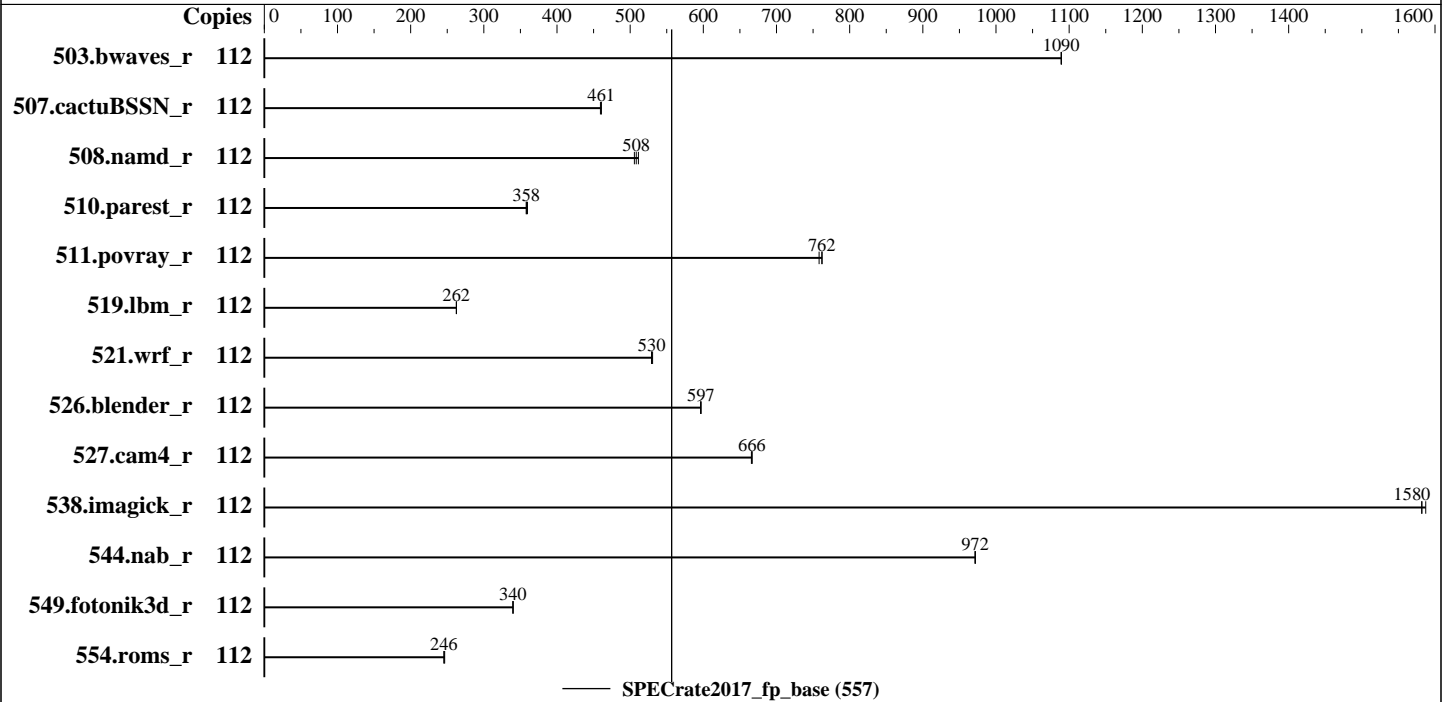
PRIMERGY RX4770 M5, Intel Xeon Platinum 8280L, 2.70GHz

SPECrate2017_fp_base = 557

SPECrate2017_fp_peak = Not Run

CPU2017 License: 19

Test Sponsor: Fujitsu

Tested by: Fujitsu

Test Date: Mar-2019

Hardware Availability: May-2019

Software Availability: Feb-2019

Benchmark	Copies	Result
503.bwaves_r	112	1090
507.cactuBSSN_r	112	461
508.namd_r	112	508
510.parest_r	112	358
511.povray_r	112	762
519.lbm_r	112	262
521.wrf_r	112	530
526.blender_r	112	597
527.cam4_r	112	666
538.imagick_r	112	1580
544.nab_r	112	972
549.fotonik3d_r	112	340
554.roms_r	112	246

SPECrate2017_fp_base (557)

Hardware

CPU Name: Intel Xeon Platinum 8280L

 Max MHz.: 4000

 Nominal: 2700

Enabled: 112 cores, 4 chips

Orderable: 2,4 chips

Cache L1: 32 KB I + 32 KB D on chip per core

 L2: 1 MB I+D on chip per core

 L3: 38.5 MB I+D on chip per chip

 Other: None

Memory: 1536 GB (48 x 32 GB 2Rx4 PC4-2933Y-R)

Storage: 1 x SATA M.2 SSD, 480GB

Other: None

Software

OS: SUSE Linux Enterprise Server 15
4.12.14-25.28-default

Compiler: C/C++: Version 19.0.0.117 of Intel C/C++
Compiler for Linux;
Fortran: Version 19.0.0.117 of Intel Fortran
Compiler for Linux

Parallel: No

Firmware: Fujitsu BIOS Version V5.0.0.14 R1.8.0 for D3753-C1x. Released Jun-2019 tested as V5.0.0.14 R1.3.0 for D3753-C1x Mar-2019

File System: xfs

System State: Run level 3 (multi-user)

Base Pointers: 64-bit

Peak Pointers: Not Applicable

Other: None

Standard Performance Evaluation Corporation (info@spec.org)

https://www.spec.org/

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Results Table

Benchmark	Base							Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
503.bwaves_r	112	1031	1090	1031	1090	**1031**	**1090**							
507.cactuBSSN_r	112	**308**	**461**	308	461	309	459							
508.namd_r	112	208	511	210	506	**209**	**508**							
510.parest_r	112	815	360	**818**	**358**	818	358							
511.povray_r	112	345	758	343	762	**343**	**762**							
519.lbm_r	112	450	262	**450**	**262**	450	263							
521.wrf_r	112	473	531	**474**	**530**	474	529							
526.blender_r	112	**286**	**597**	286	597	286	596							
527.cam4_r	112	294	666	**294**	**666**	294	667							
538.imagick_r	112	**176**	**1580**	175	1590	176	1580							
544.nab_r	112	194	972	**194**	**972**	194	971							
549.fotonik3d_r	112	1284	340	1285	340	**1284**	**340**							
554.roms_r	112	725	246	722	246	**725**	**246**							

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

Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl 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"
Kernel Boot Parameter set with : nohz_full=1-111
Process tuning settings:
echo 10000000 > /proc/sys/kernel/sched_min_granularity_ns

General Notes

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "/home/Benchmark/speccpu2017-fp/lib/ia32:/home/Benchmark/speccpu2017-fp/lib/intel64"

Binaries compiled on a system with 1x Intel Core i9-799X CPU + 32GB RAM
memory using Redhat Enterprise Linux 7.5
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
runcpu command invoked through numactl i.e.:

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General Notes (Continued)

```
 numactl --interleave=all runcpu <etc>
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:
 HWPM = Native Mode with no legacy
 Hyper Threading = Disabled
 Local/Remote Threshold = Disable
 Patrol Scrub  = Disabled
 Uncore Frequency Override = Power Balanced
 WR CRC feature Control = Disabled
 Fan Control = Full
 Sysinfo program /home/Benchmark/speccpu2017-fp/bin/sysinfo
 Rev: r5974 of 2018-05-19 9bcde8f2999c33d61f64985e45859ea9
 running on RX4770M5 Tue Mar 19 03:03:59 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) Platinum 8280L CPU @ 2.70GHz
       4  "physical id"s (chips)
       112 "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 : 28
       siblings  : 28
       physical 0: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
       28 29 30
       physical 1: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
       28 29 30
       physical 2: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
       28 29 30
       physical 3: cores 0 1 2 3 4 5 6 8 9 10 11 12 13 14 16 17 18 19 20 21 22 24 25 26 27
       28 29 30

 From lscpu:
     Architecture:        x86_64
     CPU op-mode(s):      32-bit, 64-bit
```

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Platform Notes (Continued)

```
        Byte Order:          Little Endian
        CPU(s):              112
        On-line CPU(s) list: 0-111
        Thread(s) per core:  1
        Core(s) per socket:  28
        Socket(s):           4
        NUMA node(s):        8
        Vendor ID:           GenuineIntel
        CPU family:          6
        Model:               85
        Model name:          Intel(R) Xeon(R) Platinum 8280L CPU @ 2.70GHz
        Stepping:            6
        CPU MHz:             2700.000
        CPU max MHz:         4000.0000
        CPU min MHz:         1000.0000
        BogoMIPS:            5400.00
        Virtualization:      VT-x
        L1d cache:           32K
        L1i cache:           32K
        L2 cache:            1024K
        L3 cache:            39424K
        NUMA node0 CPU(s):   0-3,7-9,14-17,21-23
        NUMA node1 CPU(s):   4-6,10-13,18-20,24-27
        NUMA node2 CPU(s):   28-31,35-37,42-45,49-51
        NUMA node3 CPU(s):   32-34,38-41,46-48,52-55
        NUMA node4 CPU(s):   56-59,63-65,70-73,77-79
        NUMA node5 CPU(s):   60-62,66-69,74-76,80-83
        NUMA node6 CPU(s):   84-87,91-93,98-101,105-107
        NUMA node7 CPU(s):   88-90,94-97,102-104,108-111
        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 cpuid
    aperfmperf pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16
    xtpr pdcm pcid 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 cdp_l3
    invpcid_single ssbd mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vnmi flexpriority
    ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm cqm mpx rdt_a
    avx512f avx512dq rdseed adx smap clflushopt clwb intel_pt avx512cd avx512bw avx512vl
    xsaveopt xsavec xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local
    dtherm ida arat pln pts hwp hwp_act_window hwp_epp hwp_pkg_req pku ospke avx512_vnni
    flush_l1d arch_capabilities


  /proc/cpuinfo cache data
     cache size : 39424 KB


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

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Platform Notes (Continued)

```
    available: 8 nodes (0-7)
    node 0 cpus: 0 1 2 3 7 8 9 14 15 16 17 21 22 23
    node 0 size: 191963 MB
    node 0 free: 191702 MB
    node 1 cpus: 4 5 6 10 11 12 13 18 19 20 24 25 26 27
    node 1 size: 193503 MB
    node 1 free: 193207 MB
    node 2 cpus: 28 29 30 31 35 36 37 42 43 44 45 49 50 51
    node 2 size: 193533 MB
    node 2 free: 193343 MB
    node 3 cpus: 32 33 34 38 39 40 41 46 47 48 52 53 54 55
    node 3 size: 193533 MB
    node 3 free: 193366 MB
    node 4 cpus: 56 57 58 59 63 64 65 70 71 72 73 77 78 79
    node 4 size: 193533 MB
    node 4 free: 193379 MB
    node 5 cpus: 60 61 62 66 67 68 69 74 75 76 80 81 82 83
    node 5 size: 193533 MB
    node 5 free: 193375 MB
    node 6 cpus: 84 85 86 87 91 92 93 98 99 100 101 105 106 107
    node 6 size: 193533 MB
    node 6 free: 193374 MB
    node 7 cpus: 88 89 90 94 95 96 97 102 103 104 108 109 110 111
    node 7 size: 193360 MB
    node 7 free: 193215 MB
    node distances:
    node   0   1   2   3   4   5   6   7
      0:  10  11  21  21  21  21  21  21
      1:  11  10  21  21  21  21  21  21
      2:  21  21  10  11  21  21  21  21
      3:  21  21  11  10  21  21  21  21
      4:  21  21  21  21  10  11  21  21
      5:  21  21  21  21  11  10  21  21
      6:  21  21  21  21  21  21  10  11
      7:  21  21  21  21  21  21  11  10

  From /proc/meminfo
    MemTotal:       1583610184 kB
    HugePages_Total:        0
    Hugepagesize:        2048 kB

  From /etc/*release* /etc/*version*
    os-release:
        NAME="SLES"
        VERSION="15"
        VERSION_ID="15"
        PRETTY_NAME="SUSE Linux Enterprise Server 15"
```

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Platform Notes (Continued)

```
      ID="sles"
      ID_LIKE="suse"
      ANSI_COLOR="0;32"
      CPE_NAME="cpe:/o:suse:sles:15"

uname -a:
   Linux RX4770M5 4.12.14-25.28-default #1 SMP Wed Jan 16 20:00:47 UTC 2019 (dd6077c)
   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: Enhanced IBRS, IBPB: conditional, RSB
filling

run-level 3 Mar 19 02:59

SPEC is set to: /home/Benchmark/speccpu2017-fp
   Filesystem      Type  Size  Used Avail Use% Mounted on
   /dev/sda5       xfs   343G   28G  315G   9% /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 FUJITSU // American Megatrends Inc. V5.0.0.14 R1.3.0 for D3753-C1x
     03/15/2019
  Memory:
   48x Micron 36ASF4G72PZ-2G9E2 32 GB 2 rank 2933, configured at 2934

(End of data from sysinfo program)
```

Compiler Version Notes

```
==============================================================================
 CC  519.lbm_r(base) 538.imagick_r(base) 544.nab_r(base)
------------------------------------------------------------------------------
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.0.117 Build 20180804
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------


==============================================================================
 CXXC 508.namd_r(base) 510.parest_r(base)
------------------------------------------------------------------------------
```

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Compiler Version Notes (Continued)

```
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.0.117 Build 20180804
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------


==============================================================================
  CC  511.povray_r(base) 526.blender_r(base)
------------------------------------------------------------------------------
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.0.117 Build 20180804
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.0.117 Build 20180804
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------


==============================================================================
  FC  507.cactuBSSN_r(base)
------------------------------------------------------------------------------
Intel(R) C++ Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.0.117 Build 20180804
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
  Version 19.0.0.117 Build 20180804
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
  64, Version 19.0.0.117 Build 20180804
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------


==============================================================================
  FC  503.bwaves_r(base) 549.fotonik3d_r(base) 554.roms_r(base)
------------------------------------------------------------------------------
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
  64, Version 19.0.0.117 Build 20180804
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
------------------------------------------------------------------------------


==============================================================================
  CC  521.wrf_r(base) 527.cam4_r(base)
------------------------------------------------------------------------------
Intel(R) Fortran Intel(R) 64 Compiler for applications running on Intel(R)
  64, Version 19.0.0.117 Build 20180804
Copyright (C) 1985-2018 Intel Corporation.  All rights reserved.
Intel(R) C Intel(R) 64 Compiler for applications running on Intel(R) 64,
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```

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Compiler Version Notes (Continued)

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`

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`

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Base Optimization Flags

C benchmarks:
```
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3
```

C++ benchmarks:
```
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3
```

Fortran benchmarks:
```
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -auto
-nostandard-realloc-lhs -align array32byte
```

Benchmarks using both Fortran and C:
```
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -auto
-nostandard-realloc-lhs -align array32byte
```

Benchmarks using both C and C++:
```
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3
```

Benchmarks using Fortran, C, and C++:
```
-xCORE-AVX512 -ipo -O3 -no-prec-div -qopt-prefetch
-ffinite-math-only -qopt-mem-layout-trans=3 -auto
-nostandard-realloc-lhs -align array32byte
```

The flags files that were used to format this result can be browsed at
http://www.spec.org/cpu2017/flags/Intel-ic19.0-official-linux64.2019-01-15.html
http://www.spec.org/cpu2017/flags/Fujitsu-Platform-Settings-V1.0-CSL-RevA.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic19.0-official-linux64.2019-01-15.xml
http://www.spec.org/cpu2017/flags/Fujitsu-Platform-Settings-V1.0-CSL-RevA.xml

For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

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