



SPEC® CPU2017 Floating Point Rate Result

Copyright 2017-2018 Standard Performance Evaluation Corporation

Fujitsu

PRIMERGY RX2530 M4, Intel Xeon Silver 4116, 2.10GHz

SPECrate2017_fp_base = 120

SPECrate2017_fp_peak = Not Run

CPU2017 License: 19

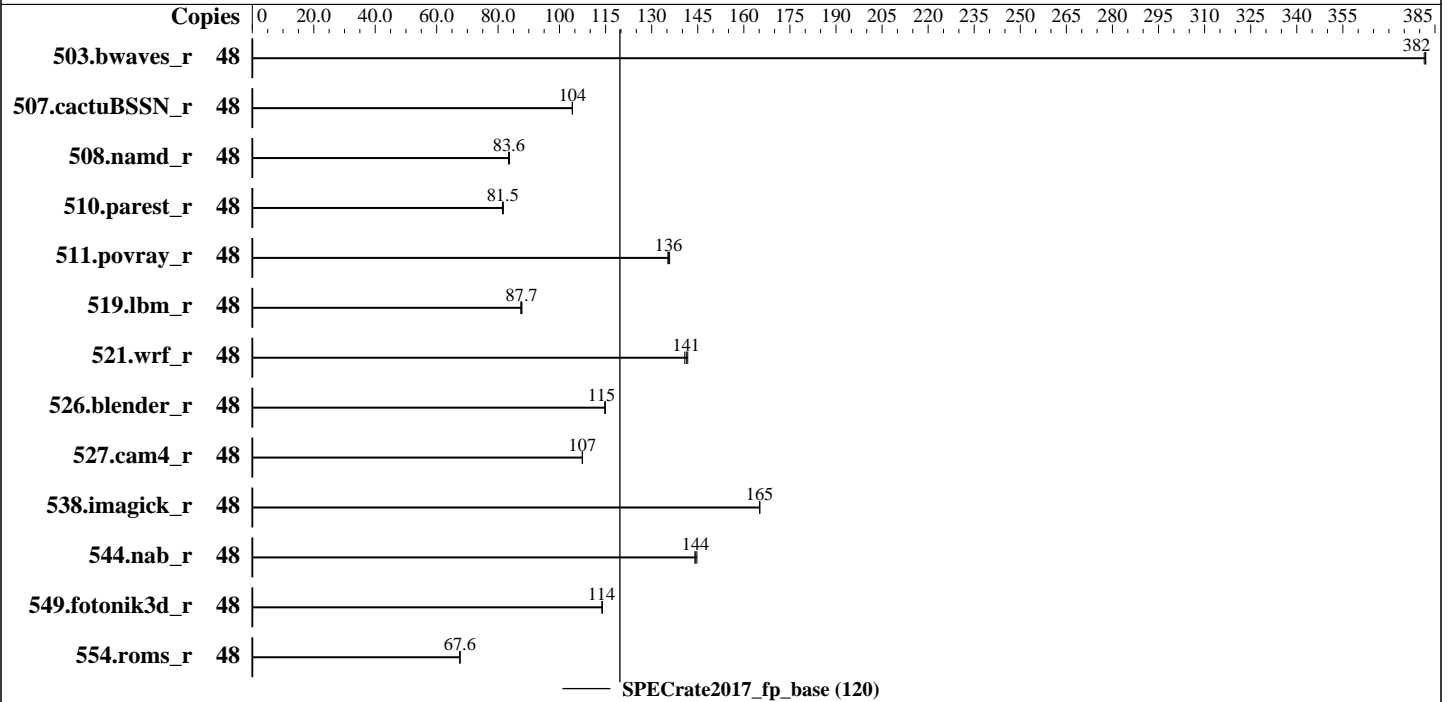
Test Sponsor: Fujitsu

Tested by: Fujitsu

Test Date: Mar-2018

Hardware Availability: Jul-2017

Software Availability: Feb-2018



Hardware

CPU Name: Intel Xeon Silver 4116
 Max MHz.: 3000
 Nominal: 2100
 Enabled: 24 cores, 2 chips, 2 threads/core
 Orderable: 1,2 chips
 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 2Rx4 PC4-2666V-R, running at 2400)
 Storage: 384 GB tmpfs
 Other: 1 x SATA HDD, 1000 GB, 7200 RPM, used for swap

Software

OS: SUSE Linux Enterprise Server 12 SP2 4.4.114-92.64-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: No
 Firmware: Fujitsu BIOS Version V5.0.0.12 R1.17.0 for D3383-A1x. Released Feb-2018
 File System: tmpfs
 System State: Run level 3 (multi-user)
 Base Pointers: 64-bit
 Peak Pointers: Not Applicable
 Other: None



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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	48	<u>1260</u>	<u>382</u>	1262	381	1260	382							
507.cactuBSSN_r	48	583	104	<u>583</u>	<u>104</u>	583	104							
508.namd_r	48	<u>546</u>	<u>83.6</u>	545	83.7	547	83.4							
510.parest_r	48	1537	81.7	1542	81.4	<u>1540</u>	<u>81.5</u>							
511.povray_r	48	829	135	<u>827</u>	<u>136</u>	825	136							
519.lbm_r	48	577	87.7	<u>577</u>	<u>87.7</u>	579	87.4							
521.wrf_r	48	759	142	<u>761</u>	<u>141</u>	764	141							
526.blender_r	48	636	115	637	115	<u>637</u>	<u>115</u>							
527.cam4_r	48	<u>781</u>	<u>107</u>	782	107	781	107							
538.imagick_r	48	723	165	<u>723</u>	<u>165</u>	723	165							
544.nab_r	48	561	144	558	145	<u>560</u>	<u>144</u>							
549.fotonik3d_r	48	<u>1642</u>	<u>114</u>	1643	114	1642	114							
554.roms_r	48	1128	67.6	<u>1128</u>	<u>67.6</u>	1129	67.5							

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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"
Set Kernel Boot Parameter: nohz_full=1-47
Set CPU frequency governor to maximum performance with:
cpupower -c all frequency-set -g performance
Set tmpfs filesystem with:
mkdir /home/memory
mount -t tmpfs -o size=384g,rw tmpfs /home/memory
Process tuning settings:
cpu idle state set with:
cpupower idle-set -d 1
```

General Notes

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH = "/home/memory/speccpu/lib/ia32:/home/memory/speccpu/lib/intel64"
LD_LIBRARY_PATH = "\$LD_LIBRARY_PATH:/home/memory/speccpu/je5.0.1-32:/home/memory/speccpu/je5.0.1-64"

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General Notes (Continued)

Binaries compiled on a system with 1x Intel Core i7-4790 CPU + 32GB RAM
memory using Redhat Enterprise Linux 7.4
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.:
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:
DCU Streamer Prefetcher = Disabled
Override OS Energy Performance = Enabled
Energy Performance = Performance
Package C State limit = C0
LLC Dead Line Alloc = Disabled
Stale AtoS = Enabled
Sub NUMA Clustering = Enabled
IMC Interleaving = 1-way
Fan Control = Full
Sysinfo program /home/memory/speccpu/bin/sysinfo
Rev: r5797 of 2017-06-14 96c45e4568ad54c135fd618bcc091c0f
running on RX2530M4 Tue Mar 27 10:01:00 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) Silver 4116 CPU @ 2.10GHz
2 "physical id"s (chips)
48 "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 : 24
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

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Platform Notes (Continued)

From lscpu:

```

Architecture:          x86_64
CPU op-mode(s):       32-bit, 64-bit
Byte Order:           Little Endian
CPU(s):                48
On-line CPU(s) list:  0-47
Thread(s) per core:   2
Core(s) per socket:   12
Socket(s):             2
NUMA node(s):         4
Vendor ID:             GenuineIntel
CPU family:            6
Model:                 85
Model name:            Intel(R) Xeon(R) Silver 4116 CPU @ 2.10GHz
Stepping:              4
CPU MHz:               2428.396
CPU max MHz:           3000.0000
CPU min MHz:           800.0000
BogoMIPS:              4190.13
Virtualization:       VT-x
L1d cache:             32K
L1i cache:             32K
L2 cache:              1024K
L3 cache:              16896K
NUMA node0 CPU(s):    0-2,6-8,24-26,30-32
NUMA node1 CPU(s):    3-5,9-11,27-29,33-35
NUMA node2 CPU(s):    12-14,18-20,36-38,42-44
NUMA node3 CPU(s):    15-17,21-23,39-41,45-47

```

```

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
aperfperf eagerfpu 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 ida arat epb invpcid_single pln pts
dtherm hwp hwp_act_window hwp_epp hwp_pkg_req intel_pt rsb_ctxsw spec_ctrl retpoline
kaiser tpr_shadow vnmi flexpriority ept vpid fsgsbase tsc_adjust bmi1 hle avx2 smep
bmi2 erms invpcid rtm cqm mpx avx512f avx512dq rdseed adx smap clflushopt clwb
avx512cd avx512bw avx512vl xsaveopt xsavec xgetbv1 cqm_llc cqm_occup_llc

```

/proc/cpuinfo cache data
cache size : 16896 KB

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a physical chip.
available: 4 nodes (0-3)
node 0 cpus: 0 1 2 6 7 8 24 25 26 30 31 32

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Platform Notes (Continued)

```

node 0 size: 95023 MB
node 0 free: 94285 MB
node 1 cpus: 3 4 5 9 10 11 27 28 29 33 34 35
node 1 size: 96760 MB
node 1 free: 88892 MB
node 2 cpus: 12 13 14 18 19 20 36 37 38 42 43 44
node 2 size: 96760 MB
node 2 free: 96578 MB
node 3 cpus: 15 16 17 21 22 23 39 40 41 45 46 47
node 3 size: 96628 MB
node 3 free: 95448 MB
node distances:
node  0  1  2  3
  0:  10  11  21  21
  1:  11  10  21  21
  2:  21  21  10  11
  3:  21  21  11  10

```

From /proc/meminfo

```

MemTotal:      394416720 kB
HugePages_Total:      0
Hugepagesize:    2048 kB

```

/usr/bin/lsb_release -d

SUSE Linux Enterprise Server 12 SP2

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

```

SuSE-release:
  SUSE Linux Enterprise Server 12 (x86_64)
  VERSION = 12
  PATCHLEVEL = 2
  # 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-SP2"
  VERSION_ID="12.2"
  PRETTY_NAME="SUSE Linux Enterprise Server 12 SP2"
  ID="sles"
  ANSI_COLOR="0;32"
  CPE_NAME="cpe:/o:suse:sles:12:sp2"

```

uname -a:

```

Linux RX2530M4 4.4.114-92.64-default #1 SMP Thu Feb 1 19:18:19 UTC 2018 (c6ce5db)
x86_64 x86_64 x86_64 GNU/Linux

```

run-level 3 Mar 27 03:47

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Platform Notes (Continued)

SPEC is set to: /home/memory/speccpu

Filesystem	Type	Size	Used	Avail	Use%	Mounted on
tmpfs	tmpfs	384G	8.8G	376G	3%	/home/memory

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. V5.0.0.12 R1.17.0 for D3383-A1x
02/08/2018

Memory:

24x Hynix HMA42GR7BJR4N-VK 16 GB 2 rank 2666, configured at 2400

(End of data from sysinfo program)

Compiler Version Notes

=====
CC 519.lbm_r(base) 538.imagick_r(base) 544.nab_r(base)

icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

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

icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

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

icpc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.
icc (ICC) 18.0.0 20170811
Copyright (C) 1985-2017 Intel Corporation. All rights reserved.

=====
FC 507.cactuBSSN_r(base)

icpc (ICC) 18.0.0 20170811
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Compiler Version Notes (Continued)

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

=====
FC 503.bwaves_r(base) 549.fotonik3d_r(base) 554.roms_r(base)
=====

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

=====
CC 521.wrf_r(base) 527.cam4_r(base)
=====

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

Base Compiler Invocation

C benchmarks:

icc

C++ benchmarks:

icpc

Fortran benchmarks:

ifort

Benchmarks using both Fortran and C:

ifort icc

Benchmarks using both C and C++:

icpc icc

Benchmarks using Fortran, C, and C++:

icpc icc ifort



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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 -nostandard-realloc-lhs -align array32byte
```

Benchmarks using both Fortran and C:

```
-xCORE-AVX2 -ipo -O3 -no-prec-div -qopt-prefetch -ffinite-math-only
-qopt-mem-layout-trans=3 -nostandard-realloc-lhs -align array32byte
```

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 -nostandard-realloc-lhs -align array32byte
```




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Base Other Flags

C benchmarks:

-m64 -std=c11

C++ benchmarks:

-m64

Fortran benchmarks:

-m64

Benchmarks using both Fortran and C:

-m64 -std=c11

Benchmarks using both C 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/Intel-ic18.0-official-linux64.2017-10-19.html>

<http://www.spec.org/cpu2017/flags/Fujitsu-Platform-Settings-V1.2-SKL-RevE.html>

You can also download the XML flags sources by saving the following links:

<http://www.spec.org/cpu2017/flags/Intel-ic18.0-official-linux64.2017-10-19.xml>

<http://www.spec.org/cpu2017/flags/Fujitsu-Platform-Settings-V1.2-SKL-RevE.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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