



SPEC CPU®2017 Floating Point Rate Result

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Fujitsu

SPECrate®2017_fp_base = 38.5

PRIMERGY TX1330 M5, Intel Xeon E-2314, 2.80GHz

SPECrate®2017_fp_peak = Not Run

CPU2017 License: 19

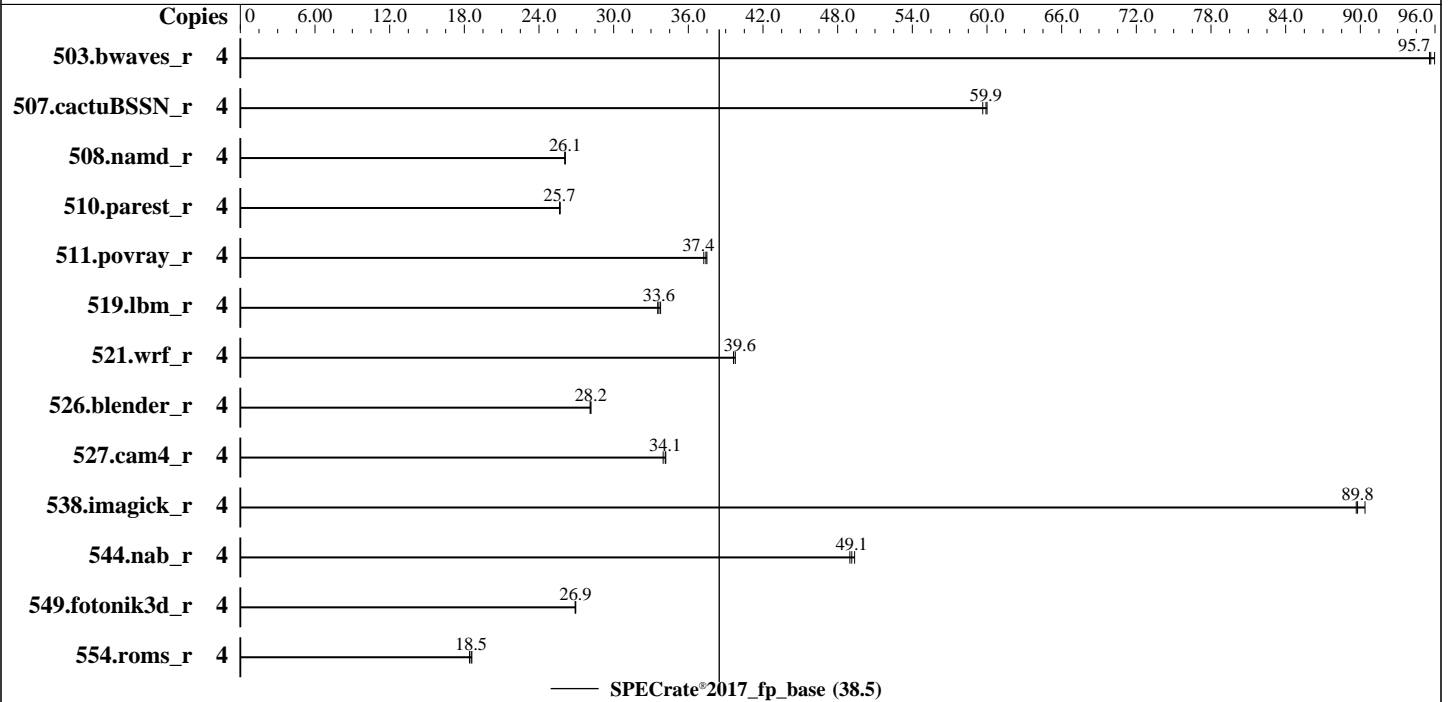
Test Sponsor: Fujitsu

Tested by: Fujitsu

Test Date: Feb-2022

Hardware Availability: Mar-2022

Software Availability: Jun-2021



Hardware

CPU Name: Intel Xeon E-2314
 Max MHz: 4500
 Nominal: 2800
 Enabled: 4 cores, 1 chip
 Orderable: 1 chip
 Cache L1: 32 KB I + 48 KB D on chip per core
 L2: 512 KB I+D on chip per core
 L3: 8 MB I+D on chip per chip
 Other: None
 Memory: 32 GB (2 x 16 GB 2Rx8 PC4-3200AA-E)
 Storage: 1 x SATA M.2 SSD, 240GB
 Other: None

Software

OS: SUSE Linux Enterprise Server 15 SP3 5.3.18-57-default
 Compiler: C/C++: Version 2021.1 of Intel oneAPI DPC++/C++ Compiler Build 20201113 for Linux;
 Fortran: Version 2021.1 of Intel Fortran Compiler Classic Build 20201112 for Linux;
 Parallel: No
 Firmware: Fujitsu BIOS Version V5.0.0.22 R1.31.0 for D3931-A1x. Released Mar-2022 tested as V5.0.0.22 R1.20.0 for D3931-A1x Jan-2022
 File System: xfs
 System State: Run level 3 (multi-user)
 Base Pointers: 64-bit
 Peak Pointers: Not Applicable
 Other: jemalloc memory allocator V5.0.1
 Power Management: BIOS set to prefer performance at the cost of additional power usage



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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	4	<u>419</u>	<u>95.7</u>	418	96.0	420	95.6							
507.cactuBSSN_r	4	84.4	60.0	84.9	59.7	<u>84.5</u>	<u>59.9</u>							
508.namd_r	4	146	26.1	146	26.1	<u>146</u>	<u>26.1</u>							
510.parest_r	4	<u>408</u>	<u>25.7</u>	408	25.6	407	25.7							
511.povray_r	4	249	37.5	251	37.2	<u>250</u>	<u>37.4</u>							
519.lbm_r	4	125	33.8	<u>125</u>	<u>33.6</u>	126	33.5							
521.wrf_r	4	226	39.6	225	39.8	<u>226</u>	<u>39.6</u>							
526.blender_r	4	216	28.2	217	28.1	<u>216</u>	<u>28.2</u>							
527.cam4_r	4	206	34.0	205	34.2	<u>205</u>	<u>34.1</u>							
538.imagick_r	4	<u>111</u>	<u>89.8</u>	111	89.7	110	90.4							
544.nab_r	4	<u>137</u>	<u>49.1</u>	136	49.4	137	49.0							
549.fotonik3d_r	4	579	26.9	578	26.9	<u>579</u>	<u>26.9</u>							
554.roms_r	4	342	18.6	345	18.4	<u>343</u>	<u>18.5</u>							

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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"
echo madvise > /sys/kernel/mm/transparent_hugepage/enabled

Environment Variables Notes

Environment variables set by runcpu before the start of the run:
LD_LIBRARY_PATH =
"/home/Benchmark/speccpu/lib/intel64:/home/Benchmark/speccpu/je5.0.1-64"
MALLOC_CONF = "retain:true"

General Notes

Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB RAM
memory using Red Hat Enterprise Linux 8.1
Transparent Huge Pages enabled by default

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General Notes (Continued)

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>
 NA: 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, a general purpose malloc implementation
 built with the RedHat Enterprise 7.5, and the system compiler gcc 4.8.5
 sources available from jemalloc.net or <https://github.com/jemalloc/jemalloc/releases>

Platform Notes

BIOS configuration:
 C-States Auto Demotion = Disabled
 C-States Un Demotion = Disabled
 DDR Speed Control = Auto
 DMI Gen3 ASPM = ASPM L0s
 Fan Control = Full

Sysinfo program /home/Benchmark/speccpu/bin/sysinfo
 Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acafc64d
 running on localhost Tue Feb 8 16:52:43 2022

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-2314 CPU @ 2.80GHz
 1 "physical id"s (chips)
 4 "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 : 4
 siblings : 4
 physical 0: cores 0 1 2 3

From lscpu from util-linux 2.36.2:
 Architecture: x86_64
 CPU op-mode(s): 32-bit, 64-bit
 Byte Order: Little Endian

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Platform Notes (Continued)

```

Address sizes:                39 bits physical, 48 bits virtual
CPU(s):                        4
On-line CPU(s) list:         0-3
Thread(s) per core:          1
Core(s) per socket:          4
Socket(s):                     1
NUMA node(s):                 1
Vendor ID:                    GenuineIntel
CPU family:                    6
Model:                         167
Model name:                   Intel(R) Xeon(R) E-2314 CPU @ 2.80GHz
Stepping:                      1
CPU MHz:                       1482.854
CPU max MHz:                   4500.0000
CPU min MHz:                   800.0000
BogoMIPS:                      5616.00
Virtualization:               VT-x
L1d cache:                     192 KiB
L1i cache:                     128 KiB
L2 cache:                       2 MiB
L3 cache:                       8 MiB
NUMA node0 CPU(s):            0-3
Vulnerability Itlb multihit:   Not affected
Vulnerability L1tf:           Not affected
Vulnerability Mds:            Not affected
Vulnerability Meltdown:       Not affected
Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl and seccomp
Vulnerability Spectre v1:      Mitigation; usercopy/swapgs barriers and __user pointer sanitization
Vulnerability Spectre v2:      Mitigation; Enhanced IBRS, IBPB conditional, RSB filling
Vulnerability Srbds:           Not affected
Vulnerability Tsx async abort: Not affected
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
pdpelgb rdtscp lm constant_tsc art arch_perfmon pebs bts rep_good nopl xtopology
nonstop_tsc cpuid aperfmperf tsc_known_freq 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 cpuid_fault
epb invpcid_single ssbd ibrs ibpb stibp ibrs_enhanced tpr_shadow vnmi flexpriority
ept vpid ept_ad fsgsbase tsc_adjust bmi1 avx2 smep bmi2 erms invpcid mpx avx512f
avx512dq rdseed adx smap avx512ifma clflushopt intel_pt avx512cd sha_ni avx512bw
avx512vl xsaveopt xsavec xgetbv1 xsaves dtherm ida arat pln pts hwp hwp_notify
hwp_act_window hwp_epp hwp_pkg_req avx512vbmi umip pku ospke avx512_vbmi2 gfni vaes
vpclmulqdq avx512_vnni avx512_bitalg avx512_vpopcntdq rdpid fsrm md_clear flush_l1d
arch_capabilities

```

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Platform Notes (Continued)

From lscpu --cache:

NAME	ONE-SIZE	ALL-SIZE	WAYS	TYPE	LEVEL	SETS	PHY-LINE	COHERENCY-SIZE
L1d	48K	192K	12	Data	1	64	1	64
L1i	32K	128K	8	Instruction	1	64	1	64
L2	512K	2M	8	Unified	2	1024	1	64
L3	8M	8M	16	Unified	3	8192	1	64

/proc/cpuinfo cache data
cache size : 8192 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
 node 0 size: 31584 MB
 node 0 free: 31155 MB
 node distances:
 node 0
 0: 10

From /proc/meminfo

MemTotal: 32342948 kB
 HugePages_Total: 0
 Hugepagesize: 2048 kB

/sys/devices/system/cpu/cpu*/cpufreq/scaling_governor has powersave

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

os-release:
 NAME="SLES"
 VERSION="15-SP3"
 VERSION_ID="15.3"
 PRETTY_NAME="SUSE Linux Enterprise Server 15 SP3"
 ID="sles"
 ID_LIKE="suse"
 ANSI_COLOR="0;32"
 CPE_NAME="cpe:/o:suse:sles:15:sp3"

uname -a:

Linux localhost 5.3.18-57-default #1 SMP Wed Apr 28 10:54:41 UTC 2021
 (ba3c2e9/lp-5d9e8aa) x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2018-12207 (iTLB Multihit): Not affected

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Platform Notes (Continued)

CVE-2018-3620 (L1 Terminal Fault):	Not affected
Microarchitectural Data Sampling:	Not affected
CVE-2017-5754 (Meltdown):	Not affected
CVE-2018-3639 (Speculative Store Bypass):	Mitigation: Speculative Store Bypass disabled via prctl and seccomp
CVE-2017-5753 (Spectre variant 1):	Mitigation: usercopy/swapgs barriers and __user pointer sanitization
CVE-2017-5715 (Spectre variant 2):	Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling
CVE-2020-0543 (Special Register Buffer Data Sampling):	Not affected
CVE-2019-11135 (TSX Asynchronous Abort):	Not affected

run-level 3 Feb 8 16:52

```
SPEC is set to: /home/Benchmark/speccpu
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sda4        xfs   180G   44G  137G   24% /home
```

```
From /sys/devices/virtual/dmi/id
Vendor:          FUJITSU
Product:         PRIMERGY TX1330 M5
Product Family: SERVER
Serial:          EWBUxxxxxx
```

Additional information from dmidecode 3.2 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.

```
Memory:
  2x Samsung M391A2K43DB1-CWE 16 GB 2 rank 3200
```

```
BIOS:
  BIOS Vendor:      FUJITSU // American Megatrends International, LLC.
  BIOS Version:     V5.0.0.22 R1.20.0 for D3931-A1x
  BIOS Date:        01/11/2022
  BIOS Revision:    1.20
```

(End of data from sysinfo program)

Compiler Version Notes

```
=====
C          | 519.lbm_r(base) 538.imagick_r(base) 544.nab_r(base)
=====
```

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Compiler Version Notes (Continued)

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

=====
C++ | 508.namd_r(base) 510.parest_r(base)
=====

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

=====
C++, C | 511.povray_r(base) 526.blender_r(base)
=====

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

=====
C++, C, Fortran | 507.cactuBSSN_r(base)
=====

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on
Intel(R) 64, Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

=====
Fortran | 503.bwaves_r(base) 549.fotonik3d_r(base) 554.roms_r(base)
=====

Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on
Intel(R) 64, Version 2021.1 Build 20201112_000000
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Compiler Version Notes (Continued)

Fortran, C | 521.wrf_r(base) 527.cam4_r(base)

Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on
Intel(R) 64, Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
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Base Compiler Invocation

C benchmarks:
icx

C++ benchmarks:
icpx

Fortran benchmarks:
ifort

Benchmarks using both Fortran and C:
ifort icx

Benchmarks using both C and C++:
icpx icx

Benchmarks using Fortran, C, and C++:
icpx icx ifort

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

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Base Portability Flags (Continued)

549.fotonik3d_r: -DSPEC_LP64

554.roms_r: -DSPEC_LP64

Base Optimization Flags

C benchmarks:

```
-w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math  
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4  
-mbranches-within-32B-boundaries -ljemalloc  
-L/usr/local/jemalloc64-5.0.1/lib
```

C++ benchmarks:

```
-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math -flto  
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4  
-mbranches-within-32B-boundaries -ljemalloc  
-L/usr/local/jemalloc64-5.0.1/lib
```

Fortran benchmarks:

```
-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ipo -no-prec-div  
-qopt-prefetch -ffinite-math-only  
-qopt-multiple-gather-scatter-by-shuffles -qopt-mem-layout-trans=4  
-nostandard-realloc-lhs -align array32byte -auto  
-mbranches-within-32B-boundaries -ljemalloc  
-L/usr/local/jemalloc64-5.0.1/lib
```

Benchmarks using both Fortran and C:

```
-w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math  
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -O3 -ipo  
-no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-multiple-gather-scatter-by-shuffles  
-mbranches-within-32B-boundaries -nostandard-realloc-lhs  
-align array32byte -auto -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib
```

Benchmarks using both C and C++:

```
-w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math  
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4  
-mbranches-within-32B-boundaries -ljemalloc  
-L/usr/local/jemalloc64-5.0.1/lib
```

Benchmarks using Fortran, C, and C++:

```
-w -m64 -std=c11 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math  
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -O3  
-no-prec-div -qopt-prefetch -ffinite-math-only  
-qopt-multiple-gather-scatter-by-shuffles
```

(Continued on next page)



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Base Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++ (continued):

```
-mbranches-within-32B-boundaries -nostandard-realloc-lhs  
-align array32byte -auto -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib
```

The flags files that were used to format this result can be browsed at

<http://www.spec.org/cpu2017/flags/Fujitsu-Platform-Settings-V1.0-RKL-RevD.html>
http://www.spec.org/cpu2017/flags/Intel-ic2021-official-linux64_revA.html

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

<http://www.spec.org/cpu2017/flags/Fujitsu-Platform-Settings-V1.0-RKL-RevD.xml>
http://www.spec.org/cpu2017/flags/Intel-ic2021-official-linux64_revA.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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