SPEC CPU®2017 Floating Point Rate Result

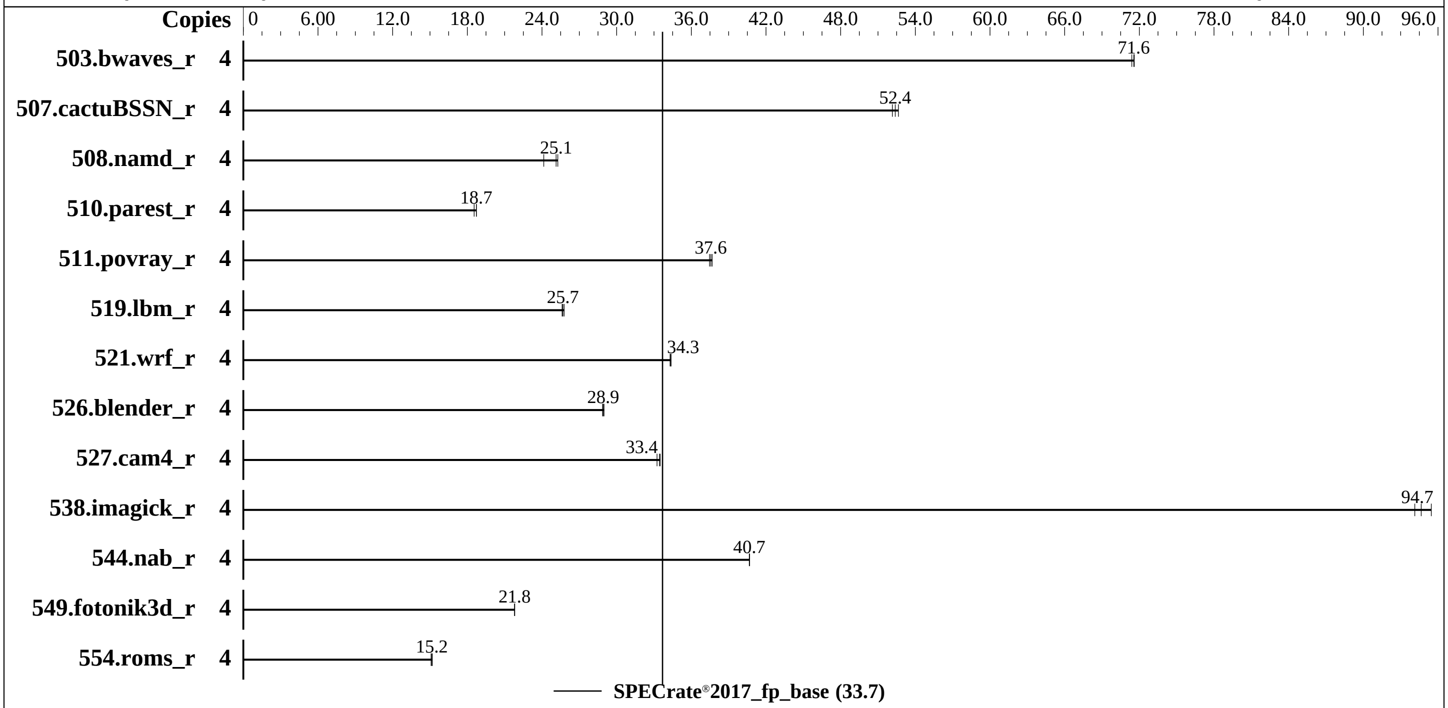
Fujitsu

PRIMERGY TX1320 M4, Intel Xeon E-2134, 3.50GHz

SPECrate®2017_fp_base = 33.7

SPECrate®2017_fp_peak = Not Run

CPU2017 License:	19	**Test Date:**	Dec-2021
Test Sponsor:	Fujitsu	**Hardware Availability:**	Nov-2018
Tested by:	Fujitsu	**Software Availability:**	Jun-2021



Hardware

CPU Name:	Intel Xeon E-2134
Max MHz:	4500
Nominal:	3500
Enabled:	4 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:	8 MB I+D on chip per chip
Other:	None
Memory:	128 GB (4 x 32 GB 2Rx8 PC4-2666V-E)
Storage:	1 x SATA M.2 SSD, 480GB
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 V5.0.0.13 R1.18.0 for D3673-A1x. Released Jul-2021
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

	Base							Peak						
Benchmark	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
503.bwaves_r	4	562	71.4	**561**	**71.6**	560	71.6							
507.cactuBSSN_r	4	96.2	52.6	97.1	52.2	**96.7**	**52.4**							
508.namd_r	4	**151**	**25.1**	157	24.1	150	25.3							
510.parest_r	4	**559**	**18.7**	559	18.7	564	18.5							
511.povray_r	4	249	37.5	**249**	**37.6**	248	37.7							
519.lbm_r	4	165	25.6	164	25.8	**164**	**25.7**							
521.wrf_r	4	261	34.3	261	34.4	**261**	**34.3**							
526.blender_r	4	211	28.9	**211**	**28.9**	210	29.0							
527.cam4_r	4	**209**	**33.4**	209	33.5	210	33.2							
538.imagick_r	4	**105**	**94.7**	106	94.1	104	95.5							
544.nab_r	4	165	40.7	166	40.7	**166**	**40.7**							
549.fotonik3d_r	4	**715**	**21.8**	715	21.8	715	21.8							
554.roms_r	4	421	15.1	**419**	**15.2**	419	15.2							

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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"
```

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
Prior to runcpu invocation
```

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Hardware Availability: Nov-2018
Software Availability: Jun-2021

General Notes (Continued)

```
 Filesystem page cache synced and cleared with:
 sync; echo 3>       /proc/sys/vm/drop_caches
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, 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:
 Hyper-Threading = Disabled
 Fan Control = Full
 Race To Halt (RTH) = Disabled
 Energy Efficient Turbo = Disabled
 Package C-State Un-demotion = Enabled
 DMI Link ASPM Control = Disabled
 Native PCIE Enable = Disabled

 Sysinfo program /home/benchmark/speccpu/bin/sysinfo
 Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acafc64d
 running on localhost Mon Dec 20 19:23:56 2021

 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-2134 CPU @ 3.50GHz
       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
      Address sizes:                   39 bits physical, 48 bits virtual
```

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Platform Notes (Continued)

```
     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:                           158
     Model name:                      Intel(R) Xeon(R) E-2134 CPU @ 3.50GHz
     Stepping:                        10
     CPU MHz:                         3528.284
     CPU max MHz:                     4500.0000
     CPU min MHz:                     800.0000
     BogoMIPS:                        6999.82
     Virtualization:                  VT-x
     L1d cache:                       128 KiB
     L1i cache:                       128 KiB
     L2 cache:                        1 MiB
     L3 cache:                        8 MiB
     NUMA node0 CPU(s):               0-3
     Vulnerability Itlb multihit:     KVM: Mitigation: VMX disabled
     Vulnerability L1tf:              Mitigation; PTE Inversion; VMX conditional cache
     flushes, SMT disabled
     Vulnerability Mds:               Mitigation; Clear CPU buffers; SMT disabled
     Vulnerability Meltdown:          Mitigation; PTI
     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; Full generic retpoline, IBPB
     conditional, IBRS_FW, RSB filling
     Vulnerability Srbds:             Mitigation; Microcode
     Vulnerability Tsx async abort:   Mitigation; Clear CPU buffers; SMT disabled
     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 sse4_1 sse4_2 x2apic movbe popcnt
     tsc_deadline_timer aes xsave avx f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault
     epb invpcid_single pti ssbd ibrs ibpb stibp tpr_shadow vnmi flexpriority ept vpid
     ept_ad fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 erms invpcid rtm mpx rdseed adx
     smap clflushopt intel_pt xsaveopt xsavec xgetbv1 xsaves dtherm ida arat pln pts hwp
     hwp_notify hwp_act_window hwp_epp md_clear flush_l1d

 From lscpu --cache:
     NAME ONE-SIZE ALL-SIZE WAYS TYPE        LEVEL SETS PHY-LINE COHERENCY-SIZE
```

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Platform Notes (Continued)

```
      L1d       32K     128K     8 Data            1    64        1              64
      L1i       32K     128K     8 Instruction     1    64        1              64
      L2       256K       1M     4 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: 128304 MB
   node 0 free: 127640 MB
   node distances:
   node   0
     0:  10

 From /proc/meminfo
    MemTotal:       131383968 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):                       KVM: Mitigation: VMX disabled
 CVE-2018-3620 (L1 Terminal Fault):                    Mitigation: PTE Inversion; VMX:
                                                       conditional cache flushes, SMT
                                                       disabled
```

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Platform Notes (Continued)

```
Microarchitectural Data Sampling:                          Mitigation: Clear CPU buffers; SMT
                                                             disabled
CVE-2017-5754 (Meltdown):                                    Mitigation: PTI
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: Full generic
                                                             retpoline, IBPB: conditional,
                                                             IBRS_FW, RSB filling
CVE-2020-0543 (Special Register Buffer Data Sampling): Mitigation: Microcode
CVE-2019-11135 (TSX Asynchronous Abort):                   Mitigation: Clear CPU buffers; SMT
                                                             disabled

run-level 3 Dec 20 19:13

SPEC is set to: /home/benchmark/speccpu
   Filesystem     Type  Size  Used Avail Use% Mounted on
   /dev/sda8      xfs   121G   19G  103G  16% /home

From /sys/devices/virtual/dmi/id
    Vendor:         FUJITSU
    Product:        PRIMERGY TX1320 M4
    Product Family: SERVER
    Serial:         YMJKXXXXXX

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:
    4x Samsung M391A4G43MB1-CTD 32 GB 2 rank 2667

BIOS:
   BIOS Vendor:       FUJITSU // American Megatrends Inc.
   BIOS Version:      V5.0.0.13 R1.18.0 for D3673-A1x
   BIOS Date:         07/12/2021
   BIOS Revision:     1.18

(End of data from sysinfo program)
```

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Test Date: Dec-2021
Hardware Availability: Nov-2018
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Compiler Version Notes

```
==============================================================================
C               | 519.lbm_r(base) 538.imagick_r(base) 544.nab_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++             | 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
Copyright (C) 1985-2020 Intel Corporation.  All rights reserved.
```

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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,
  Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
------------------------------------------------------------------------------
```

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`

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Base Portability Flags (Continued)

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:
-w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX2 -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-AVX2 -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-AVX2 -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-AVX2 -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-AVX2 -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-AVX2 -Ofast -ffast-math

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Base Optimization Flags (Continued)

Benchmarks using Fortran, C, and C++ (continued):
-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
-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/Intel-ic2021-official-linux64_revA.html
http://www.spec.org/cpu2017/flags/Fujitsu-Platform-Settings-V1.0.2-CFL-RevD.html

You can also download the XML flags sources by saving the following links:
http://www.spec.org/cpu2017/flags/Intel-ic2021-official-linux64_revA.xml
http://www.spec.org/cpu2017/flags/Fujitsu-Platform-Settings-V1.0.2-CFL-RevD.xml

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

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