Fujitsu
PRIMERGY RX2540 M6, Intel Xeon Gold 6348, 2.60GHz

**CPU2017 License:** 19  
**Test Sponsor:** Fujitsu  
**Tested by:** Fujitsu

**Test Date:** Apr-2021  
**Hardware Availability:** Jun-2021  
**Software Availability:** Feb-2021

---

<table>
<thead>
<tr>
<th>SPECrate®2017_fp_base</th>
<th>393</th>
</tr>
</thead>
</table>

**SPECrate®2017_fp_peak = Not Run**

---

### Hardware

- **CPU Name:** Intel Xeon Gold 6348
- **Max MHz:** 3500
- **Nominal:** 2600
- **Enabled:** 56 cores, 2 chips
- **Orderable:** 1,2 chips
- **Cache L1:** 32 KB I + 48 KB D on chip per core
- **Cache L2:** 1.25 MB I+D on chip per core
- **Cache L3:** 42 MB I+D on chip per chip
- **Other:** None
- **Memory:** 1 TB (32 x 32 GB 2Rx4 PC4-3200AA-R)
- **Storage:** 1 x SATA M.2 SSD, 480GB
- **Other:** None

---

### Software

- **OS:** SUSE Linux Enterprise Server 15 SP2 5.3.18-22-default
- **Compiler:**  
  - C/C++: Version 2021.1 of Intel oneAPI DPC++/C++
  - Compiler Build 20201113 for Linux;
  - C/C++: Version 2021.1 of Intel C/C++
  - Compiler Classic Build 20201112 for Linux;
  - Fortran: Version 2021.1 of Intel Fortran
  - Compiler Classic Build 20201112 for Linux
- **Parallel:** No
- **Firmware:** Fujitsu BIOS Version V1.0.0.0 R1.6.0 for D3891-A1x. Released Jun-2021  
  tested as V1.0.0.0 R1.2.0 for D3891-A1x Apr-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
### Results Table

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Copies</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<tr>
<td>503.bwaves_r</td>
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<td>187</td>
</tr>
</tbody>
</table>

**SPECrate®2017_fp_base = 393**

**SPECrate®2017_fp_peak = Not Run**

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"

### Environment Variables Notes

Environment variables set by runcpu before the start of the run:

```
LD_LIBRARY_PATH = 
    "/home/Benchmark/speccpu-1.1.5_fprate/lib/intel64:/home/Benchmark/speccpu-1.1.5_fprate/lib/intel64:/home/Benchmark/speccpu-1.1.5_fprate/je5.0.1-64"
MALLOC_CONF = "retain:true"
```

### General Notes

Binaries compiled on a system with 1x Intel Core i9-7940X CPU + 64GB RAM memory using openSUSE Leap 15.2

Transparent Huge Pages enabled by default

(Continued on next page)
Fujitsu
PRIMERGY RX2540 M6, Intel Xeon Gold 6348, 2.60GHz

SPEC CPU®2017 Floating Point Rate Result
Copyright 2017-2021 Standard Performance Evaluation Corporation

SPECrate®2017_fp_base = 393
SPECrate®2017_fp_peak = Not Run

CPU2017 License: 19
Test Date: Apr-2021
Test Sponsor: Fujitsu
Hardware Availability: Jun-2021
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Software Availability: Feb-2021

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

Platform Notes

BIOS configuration:
Hyper Threading = Disabled
Adjacent Cache Line Prefetch = Disabled
DCU Streamer Prefetcher = Disabled
Intel Virtualization Technology = Disabled
Override OS Energy Performance = Enabled
Energy Performance = Performance
CPU C1E Support = Disabled
Patrol Scrub = Enabled
SNC = Enable SNC2
FAN Control = Full

Sysinfo program /home/Benchmark/speccpu-1.1.5_fprate/bin/sysinfo
Rev: r6538 of 2020-09-24 e8664e66d2d7080afeaa89d4b38e2f1c
running on localhost Mon Apr 26 13:10:42 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) Gold 6348 CPU @ 2.60GHz
    2 "physical id"s (chips)
    56 "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 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

(Continued on next page)
SPEC CPU®2017 Floating Point Rate Result

Fujitsu
PRIMERGY RX2540 M6, Intel Xeon Gold 6348, 2.60GHz

SPECrade®2017_fp_base = 393
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CPU2017 License: 19
Test Sponsor: Fujitsu
Tested by: Fujitsu

Platform Notes (Continued)

25 26 27
physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
Address sizes: 46 bits physical, 57 bits virtual
CPU(s): 56
On-line CPU(s) list: 0-55
Thread(s) per core: 1
Core(s) per socket: 28
Socket(s): 2
NUMA node(s): 4
Vendor ID: GenuineIntel
CPU family: 6
Model: 106
Model name: Intel(R) Xeon(R) Gold 6348 CPU @ 2.60GHz
Stepping: 6
CPU MHz: 800.016
CPU max MHz: 3500.0000
CPU min MHz: 800.0000
BogoMIPS: 5200.00
Virtualization: VT-x
L1d cache: 48K
L1i cache: 32K
L2 cache: 1280K
L3 cache: 43008K
NUMA node0 CPU(s): 0-13
NUMA node1 CPU(s): 14-27
NUMA node2 CPU(s): 28-41
NUMA node3 CPU(s): 42-55

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
erpmperf pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16
xptr 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 invpd_single ssbd
mba ibrs ibrd ibrs_enhanced tpr_shadow vmx flexpriority ept vpid ept_ad
fsgsbase tsc_adjust bmi1 hle avx2 smep bmi2 ets emms invpcid rtm cqm rdt_a avx512f
avx512dq rdseed adx smap avx512ifma clflushopt clwb intel_pt avx512cd sha_ni
avx512bw avx512vl xsavesopt xsaveopt xsave xsaveopt xgetbv1 xsaves cqm_llc cqm_occmap_llc
cqm_mbb_total cqm_mbb_local wbinvd dtherm ida arat pln pts hwp hwp_act_window hwp_epp
hwp_kpg_req avx512vmbi umip pku ospke avx512_vmbi2 gfn vaes vpcmldqd avx512_vnni
avx512_bitalg tme avx512_vpopover dq 1a57 rdrpid md_clear pconfig flush_lid
arch_capabilities

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SPECrate®2017_fp_base = 393
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Test Date: Apr-2021
Hardware Availability: Jun-2021
Software Availability: Feb-2021

Platform Notes (Continued)

/proc/cpuinfo cache data
  cache size : 43008 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 3 4 5 6 7 8 9 10 11 12 13
  node 0 size: 257616 MB
  node 0 free: 257293 MB
  node 1 cpus: 14 15 16 17 18 19 20 21 22 23 24 25 26 27
  node 1 size: 258044 MB
  node 1 free: 257760 MB
  node 2 cpus: 28 29 30 31 32 33 34 35 36 37 38 39 40 41
  node 2 size: 258044 MB
  node 2 free: 257670 MB
  node 3 cpus: 42 43 44 45 46 47 48 49 50 51 52 53 54 55
  node 3 size: 257816 MB
  node 3 free: 257492 MB
  node distances:
    node 0  1  2  3
    0:  10 11 20 20
    1:  11 10 20 20
    2:  20 20 10 11
    3:  20 20 11 10

From /proc/meminfo
  MemTotal:       1056277852 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-SP2"
    VERSION_ID="15.2"
    PRETTY_NAME="SUSE Linux Enterprise Server 15 SP2"
    ID="sles"
    ID_LIKE="suse"
    ANSI_COLOR="0;32"
    CPE_NAME=cpe:/o:suse:sles:15:sp2"

  uname -a:
    Linux localhost 5.3.18-22-default #1 SMP Wed Jun 3 12:16:43 UTC 2020 (720aeba) x86_64

(Continued on next page)
Platform Notes (Continued)

x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

CVE-2018-12207 (iTLB Multihit): Not affected
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 Apr 26 04:56

SPEC is set to: /home/Benchmark/speccpu-1.1.5_fprate
Filesystem Type Size Used Avail Use% Mounted on
/dev/sda3 xfs 376G 149G 228G 40% /home

From /sys/devices/virtual/dmi/id
Vendor: FUJITSU
Product: PRIMERGY RX2540 M6
Product Family: SERVER
Serial: EWAAxxxxxx

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.
Memory:
32x Samsung M393A4K40DB3-CWE 32 GB 2 rank 3200

BIOS:
BIOS Vendor: FUJITSU
BIOS Version: V1.0.0.0 R1.2.0 for D3891-A1x
BIOS Date: 04/01/2021
BIOS Revision: 1.2
Firmware Revision: 3.20

(End of data from sysinfo program)
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SPECrater®2017_fp_base = 393
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CPU2017 License: 19
Test Sponsor: Fujitsu
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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,
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Copyright (C) 1985-2020 Intel Corporation. All rights reserved.
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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 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 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
543.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-AVX512 -Ofast -ffast-math
-fflto -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
-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
-fflto -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 -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
-fflto -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

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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 -ljemalloc -L/usr/local/jemalloc64-5.0.1/lib`

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


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