



SPEC CPU®2017 Floating Point Rate Result

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Fujitsu

PRIMERGY RX2540 M7, Intel Xeon Platinum 8490H,
1.90GHz

SPECrate®2017_fp_base = 938

SPECrate®2017_fp_energy_base = 910

SPECrate®2017_fp_peak = Not Run

SPECrate®2017_fp_energy_peak = Not Run

CPU2017 License: 19

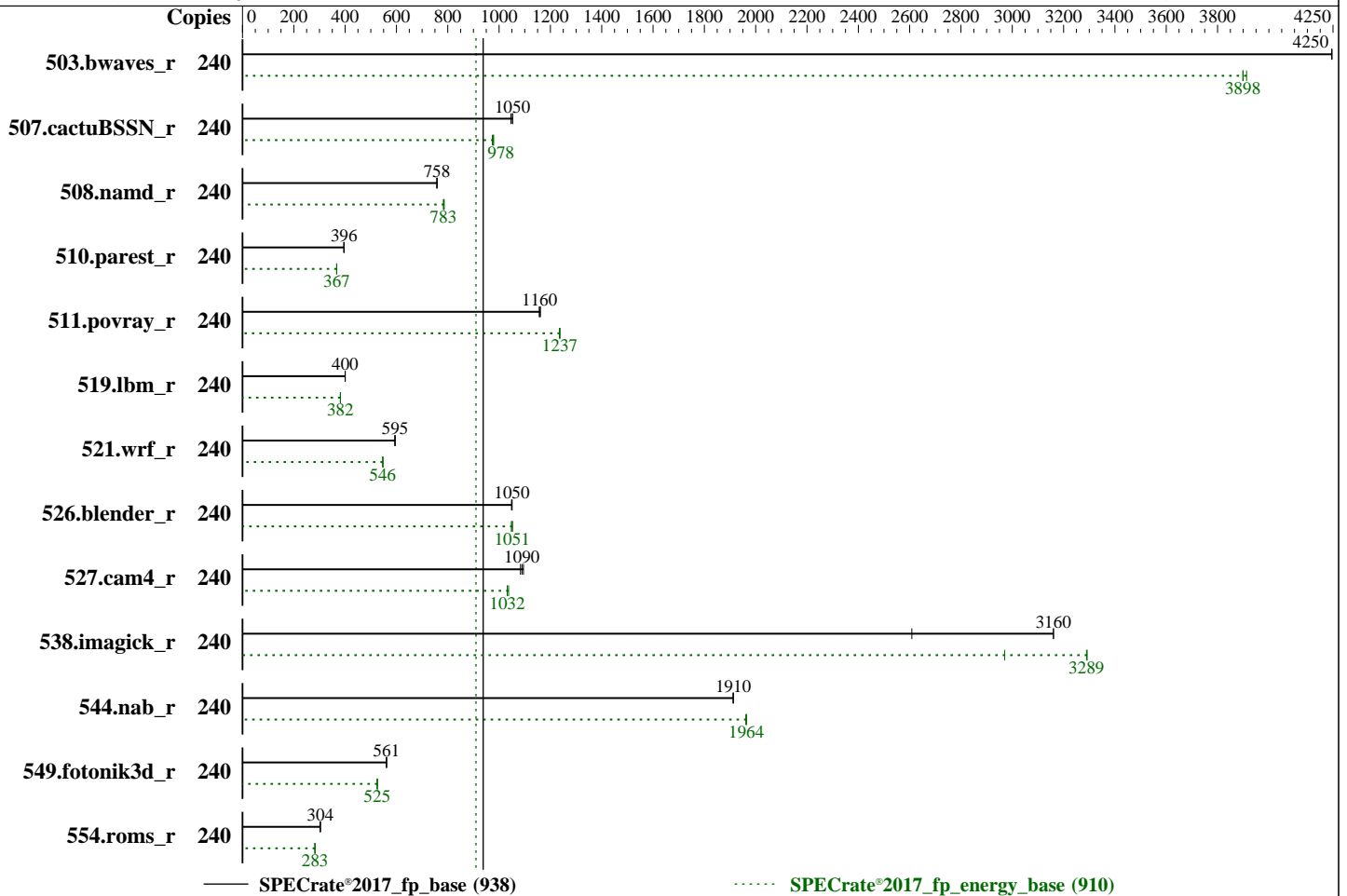
Test Sponsor: Fujitsu

Tested by: Fujitsu

Test Date: Jan-2023

Hardware Availability: Mar-2023

Software Availability: Jun-2022



Hardware

CPU Name: Intel Xeon Platinum 8490H
 Max MHz: 3500
 Nominal: 1900
 Enabled: 120 cores, 2 chips, 2 threads/core
 Orderable: 1,2 chips
 Cache L1: 32 KB I + 48 KB D on chip per core
 L2: 2 MB I+D on chip per core
 L3: 112.5 MB I+D on chip per chip
 Other: None
 Memory: 1 TB (16 x 64 GB 2Rx4 PC5-4800B-R)
 Storage: 1 x SATA SSD, 1.92TB
 Other: None

Software

OS: SUSE Linux Enterprise Server 15 SP4
 5.14.21-150400.22-default
 Compiler: C/C++: Version 2022.1 of Intel oneAPI DPC++/C++ Compiler for Linux;
 Fortran: Version 2022.1 of Intel Fortran Compiler for Linux;
 Parallel: No
 Firmware: Fujitsu BIOS Version V1.0.0.0 R1.10.0 for D3983-A1x. Released Mar-2023 tested as V1.0.0.0 R0.22.1 for D3983-A1x Jan-2023
 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
 (Continued on next page)



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Software (Continued)

Power Management: BIOS set to prefer performance at the cost of additional power usage

Power

Max. Power (W): 1245.4
Idle Power (W): 322.57
Min. Temperature (C): 23.94
Elevation (m): 11
Line Standard: 200 V / 50 Hz / 1 phase / 2 wires
Provisioning: Line-powered

Power Settings

Management FW: Version 2.00u for D3933-A1x of Fujitsu BMC Firmware
Memory Mode: Normal

Power-Relevant Hardware

Power Supply: 1 x 2200 W (non-redundant)
Details: Standard power supply part of base unit S26113-E646-V50-1
Backplane: 12 x 3.5inch HDD back plan
Other Storage: Embedded SATA Controller
Storage Model #s: S26361-F5776-E192
NICs Installed: 1 x Intel I210-T1 @ 1 Gb
NICs Enabled (FW/OS): 1 / 1
NICs Connected/Speed: 1 @ 1 Gb
Other HW Model #s: None

Power Analyzer

Power Analyzer: 10.118.163.191:8888
Hardware Vendor: Hioki
Model: Hioki PW3336:1-Channel
Serial Number: 170213562
Input Connection: USB via USB-Serial CH340
Metrology Institute: NICT
Calibration By: HIOKI E.E. CORPORATION
Calibration Label: H06400088
Calibration Date: 28-Jun-2022
PTDaemon® Version: 1.9.2 (3976349f; 2020-12-08)
Setup Description: Connected to PSU 1
Current Ranges Used: 10A
Voltage Range Used: 300V

Temperature Meter

Temperature Meter: 10.118.163.191:8889
Hardware Vendor: Digi International Inc.
Model: DigiWATCHPORT_H
Serial Number: W 640 45112
Input Connection: USB
PTDaemon Version: 1.9.2 (3976349f; 2020-12-08)
Setup Description: 5 mm in front of SUT main air intake

Base Results Table

| Benchmark | Copies | Seconds | Ratio | Energy (kJ) | Energy Ratio | Average Power | Maximum Power | Seconds | Ratio | Energy (kJ) | Energy Ratio | Average Power | Maximum Power | Seconds | Ratio | Energy (kJ) | Energy Ratio | Average Power | Maximum Power |
|-----------------|--------|------------|-------------|-------------|--------------|---------------|---------------|-------------|-------------|-------------|--------------|---------------|---------------|------------|------------|-------------|--------------|---------------|---------------|
| 503.bwaves_r | 240 | 567 | 4240 | 670 | 3910 | 1180 | 1230 | 567 | 4250 | 673 | 3900 | 1190 | 1230 | 567 | 4250 | 673 | 3900 | 1190 | 1240 |
| 507.cactuBSSN_r | 240 | 289 | 1050 | 341 | 978 | 1180 | 1220 | 290 | 1050 | 343 | 974 | 1180 | 1210 | 289 | 1050 | 341 | 978 | 1180 | 1210 |
| 508.namd_r | 240 | 301 | 758 | 316 | 786 | 1050 | 1120 | 301 | 758 | 317 | 783 | 1060 | 1140 | 301 | 759 | 317 | 785 | 1050 | 1130 |
| 510.parest_r | 240 | 1591 | 395 | 1860 | 367 | 1170 | 1200 | 1586 | 396 | 1860 | 367 | 1170 | 1200 | 1585 | 396 | 1860 | 367 | 1170 | 1200 |
| 511.povray_r | 240 | 484 | 1160 | 492 | 1240 | 1020 | 1080 | 485 | 1160 | 492 | 1230 | 1020 | 1080 | 483 | 1160 | 492 | 1240 | 1020 | 1080 |
| 519.lbm_r | 240 | 632 | 400 | 753 | 382 | 1190 | 1230 | 632 | 400 | 754 | 381 | 1190 | 1250 | 632 | 400 | 753 | 382 | 1190 | 1240 |

Table continues on next page. Results appear in the order in which they were run. Bold underlined text indicates a median measurement.



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|-----------------|--------|------------|-------------|-------------|--------------|---------------|---------------|-------------|-------------|-------------|--------------|---------------|---------------|-------------|-------------|-------------|--------------|---------------|---------------|
| 521.wrf_r | 240 | 905 | 594 | 1070 | 547 | 1190 | 1230 | 904 | 595 | 1070 | 547 | 1190 | 1240 | 904 | 595 | 1070 | 546 | 1190 | 1240 |
| 526.blender_r | 240 | 349 | 1050 | 378 | 1050 | 1080 | 1190 | 348 | 1050 | 376 | 1050 | 1080 | 1180 | 348 | 1050 | 377 | 1050 | 1080 | 1180 |
| 527.cam4_r | 240 | 385 | 1090 | 443 | 1030 | 1150 | 1190 | 383 | 1090 | 441 | 1040 | 1150 | 1200 | 388 | 1080 | 443 | 1030 | 1140 | 1200 |
| 538.imagick_r | 240 | 189 | 3160 | 196 | 3290 | 1040 | 1180 | 189 | 3160 | 197 | 3290 | 1040 | 1180 | 229 | 2610 | 218 | 2970 | 951 | 1180 |
| 544.nab_r | 240 | 211 | 1910 | 223 | 1960 | 1060 | 1090 | 211 | 1910 | 223 | 1960 | 1060 | 1100 | 219 | 1910 | 223 | 1960 | 1060 | 1110 |
| 549.fotonik3d_r | 240 | 1667 | 561 | 1980 | 526 | 1190 | 1200 | 1666 | 561 | 1980 | 525 | 1190 | 1200 | 1666 | 561 | 1980 | 525 | 1190 | 1200 |
| 554.roms_r | 240 | 1256 | 304 | 1490 | 283 | 1180 | 1200 | 1256 | 304 | 1490 | 283 | 1180 | 1190 | 1263 | 302 | 1490 | 282 | 1180 | 1200 |

SPECrate®2017_fp_base = **938**

SPECrate®2017_fp_energy_base = **910**

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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-1.1.8/lib/intel64:/home/Benchmark/speccpu-1.1.8/je5.0.1-64"

MALLOC_CONF = "retain:true"

General Notes

Binaries compiled on a system with 2x Intel Xeon Platinum 8280M CPU + 384GB RAM memory using Red Hat Enterprise Linux 8.4

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>
```

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.

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General Notes (Continued)

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:

Package C State limit = C0

CPU Performance Boost = Aggressive

SNC (Sub NUMA) = Enable SNC4

FAN Control = Full

Optimized Power Mode = Enable

Sysinfo program /home/Benchmark/speccpu-1.1.8/bin/sysinfo

Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acafc64d

running on localhost Sat Jan 14 06:32:09 2023

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 8490H

2 "physical id"s (chips)

240 "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 : 60

siblings : 120

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
25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52
53 54 55 56 57 58 59

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 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52
53 54 55 56 57 58 59

From lscpu from util-linux 2.37.2:

Architecture: x86_64

CPU op-mode(s): 32-bit, 64-bit

Address sizes: 46 bits physical, 57 bits virtual

Byte Order: Little Endian

CPU(s): 240

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Platform Notes (Continued)

```

On-line CPU(s) list:          0-239
Vendor ID:                    GenuineIntel
Model name:                   Intel(R) Xeon(R) Platinum 8490H
CPU family:                   6
Model:                        143
Thread(s) per core:          2
Core(s) per socket:          60
Socket(s):                    2
Stepping:                     8
CPU max MHz:                  3500.0000
CPU min MHz:                  800.0000
BogoMIPS:                     3800.00
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 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 cat_l2 cdp_l3 invpcid_single intel_ppin cdp_l2 ssbd mba ibrs ibpb stibp
ibrs_enhanced tpr_shadow vnmi flexpriority ept vpid ept_ad fsgsbase tsc_adjust bml
hle avx2 smep bmi2 erms invpcid rtm cqm rdt_a avx512f avx512dq rdseed adx smap
avx512ifma clflushopt clwb intel_pt avx512cd sha_ni avx512bw avx512vl xsaveopt
xsaves xgetbv1 xsaves cqm_llc cqm_occup_llc cqm_mbm_total cqm_mbm_local
split_lock_detect avx_vnni avx512_bf16 wbnoinvd dtherm ida arat pln pts hwp
hwp_act_window hwp_epp hwp_pkg_req avx512vbmi umip pku ospke waitpkg avx512_vbmi2
gfni vaes vpclmulqdq avx512_vnni avx512_bitalg tme avx512_vpopcntdq la57 rdpid
bus_lock_detect cldemote movdiri movdir64b enqcmd fstrm md_clear serialize tsxldtrk
pconfig arch_lbr avx512_fp16 amx_tile flush_lld arch_capabilities
Virtualization:              VT-x
L1d cache:                   5.6 MiB (120 instances)
L1i cache:                   3.8 MiB (120 instances)
L2 cache:                    240 MiB (120 instances)
L3 cache:                    225 MiB (2 instances)
NUMA node(s):                8
NUMA node0 CPU(s):           0-14,120-134
NUMA node1 CPU(s):           15-29,135-149
NUMA node2 CPU(s):           30-44,150-164
NUMA node3 CPU(s):           45-59,165-179
NUMA node4 CPU(s):           60-74,180-194
NUMA node5 CPU(s):           75-89,195-209
NUMA node6 CPU(s):           90-104,210-224
NUMA node7 CPU(s):           105-119,225-239
Vulnerability Itlb multihit: Not affected
Vulnerability L1tf:          Not affected
Vulnerability Mds:           Not affected

```

(Continued on next page)



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Platform Notes (Continued)

Vulnerability Meltdown: Not affected
 Vulnerability Spec store bypass: Mitigation; Speculative Store Bypass disabled via prctl and seccomp
 Vulnerability Spectre v1: Mitigation; usercopy/swaps 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

From lscpu --cache:

| NAME | ONE-SIZE | ALL-SIZE | WAYS | TYPE | LEVEL | SETS | PHY-LINE | COHERENCY-SIZE |
|------|----------|----------|------|-------------|-------|--------|----------|----------------|
| L1d | 48K | 5.6M | 12 | Data | 1 | 64 | 1 | 64 |
| L1i | 32K | 3.8M | 8 | Instruction | 1 | 64 | 1 | 64 |
| L2 | 2M | 240M | 16 | Unified | 2 | 2048 | 1 | 64 |
| L3 | 112.5M | 225M | 15 | Unified | 3 | 122880 | 1 | 64 |

/proc/cpuinfo cache data
cache size : 115200 KB

From numactl --hardware

WARNING: a numactl 'node' might or might not correspond to a physical chip.

available: 8 nodes (0-7)

node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 120 121 122 123 124 125 126 127 128 129
130 131 132 133 134

node 0 size: 128597 MB

node 0 free: 127641 MB

node 1 cpus: 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 135 136 137 138 139 140 141
142 143 144 145 146 147 148 149

node 1 size: 129016 MB

node 1 free: 128571 MB

node 2 cpus: 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 150 151 152 153 154 155 156
157 158 159 160 161 162 163 164

node 2 size: 128981 MB

node 2 free: 128208 MB

node 3 cpus: 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 165 166 167 168 169 170 171
172 173 174 175 176 177 178 179

node 3 size: 129016 MB

node 3 free: 128587 MB

node 4 cpus: 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 180 181 182 183 184 185 186
187 188 189 190 191 192 193 194

node 4 size: 129016 MB

node 4 free: 128625 MB

node 5 cpus: 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 195 196 197 198 199 200 201
202 203 204 205 206 207 208 209

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Platform Notes (Continued)

```

node 5 size: 129016 MB
node 5 free: 128708 MB
node 6 cpus: 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 210 211 212 213 214 215
216 217 218 219 220 221 222 223 224
node 6 size: 129016 MB
node 6 free: 128604 MB
node 7 cpus: 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 225 226 227
228 229 230 231 232 233 234 235 236 237 238 239
node 7 size: 128647 MB
node 7 free: 128202 MB
node distances:
node  0  1  2  3  4  5  6  7
  0:  10 12 12 12 21 21 21 21
  1:  12 10 12 12 21 21 21 21
  2:  12 12 10 12 21 21 21 21
  3:  12 12 12 10 21 21 21 21
  4:  21 21 21 21 10 12 12 12
  5:  21 21 21 21 12 10 12 12
  6:  21 21 21 21 12 12 10 12
  7:  21 21 21 21 12 12 12 10

```

From /proc/meminfo

MemTotal: 1056059684 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-SP4"

VERSION_ID="15.4"

PRETTY_NAME="SUSE Linux Enterprise Server 15 SP4"

ID="sles"

ID_LIKE="suse"

ANSI_COLOR="0;32"

CPE_NAME="cpe:/o:suse:sles:15:sp4"

uname -a:

Linux localhost 5.14.21-150400.22-default #1 SMP PREEMPT_DYNAMIC Wed May 11 06:57:18
UTC 2022 (49db222/lp) x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

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Platform Notes (Continued)

| | |
|--|--|
| 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 Jan 14 06:28

```
SPEC is set to: /home/Benchmark/speccpu-1.1.8
Filesystem      Type  Size  Used Avail Use% Mounted on
/dev/sda2       xfs   1.8T   76G  1.7T   5% /
```

```
From /sys/devices/virtual/dmi/id
Vendor:          FUJITSU
Product:         PRIMERGY RX2540 M7
Product Family: SERVER
Serial:          EWCExxxxxx
```

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:
 10x Samsung M321R8GA0BB0-CQKDG 64 GB 2 rank 4800
  6x Samsung M321R8GA0BB0-CQKVG 64 GB 2 rank 4800
```

```
BIOS:
 BIOS Vendor:      FUJITSU
 BIOS Version:     V1.0.0.0 R0.22.1 for D3983-A1x
 BIOS Date:        12/01/2022
 BIOS Revision:    0.22
 Firmware Revision: 2.0
```

(End of data from sysinfo program)



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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 2022.1.0 Build 20220316
Copyright (C) 1985-2022 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 2022.1.0 Build 20220316
Copyright (C) 1985-2022 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 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2022.1.0 Build 20220316
Copyright (C) 1985-2022 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 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
Version 2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.
Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version
2022.1.0 Build 20220316
Copyright (C) 1985-2022 Intel Corporation. All rights reserved.

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

Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version

(Continued on next page)



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Software Availability: Jun-2022

Compiler Version Notes (Continued)

2022.1.0 Build 20220316
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 Fortran, C | 521.wrf_r(base) 527.cam4_r(base)

Intel(R) Fortran Compiler for applications running on Intel(R) 64, Version
 2022.1.0 Build 20220316

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Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64,
 Version 2022.1.0 Build 20220316

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Base Compiler Invocation

C benchmarks:
 icx

C++ benchmarks:
 icpx

Fortran benchmarks:
 ifx

Benchmarks using both Fortran and C:
 ifx icx

Benchmarks using both C and C++:
 icpx icx

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

Base Portability Flags

503.bwaves_r: -DSPEC_LP64
 507.cactuBSSN_r: -DSPEC_LP64
 508.namd_r: -DSPEC_LP64

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SPEC CPU®2017 Floating Point Rate Result

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Fujitsu

PRIMERGY RX2540 M7, Intel Xeon Platinum 8490H,
1.90GHz

| | |
|--------------------------------|---------|
| SPECrate®2017_fp_base = | 938 |
| SPECrate®2017_fp_energy_base = | 910 |
| SPECrate®2017_fp_peak = | Not Run |
| SPECrate®2017_fp_energy_peak = | Not Run |

CPU2017 License: 19

Test Sponsor: Fujitsu

Tested by: Fujitsu

Test Date: Jan-2023

Hardware Availability: Mar-2023

Software Availability: Jun-2022

Base Portability Flags (Continued)

```
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:

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

Fortran benchmarks:

```
-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -Ofast -ffast-math -flto
-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-nostandard-realloc-lhs -align array32byte -auto -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
-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 -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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SPEC CPU®2017 Floating Point Rate Result

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Fujitsu

PRIMERGY RX2540 M7, Intel Xeon Platinum 8490H,
1.90GHz

SPECrate®2017_fp_base = 938

SPECrate®2017_fp_energy_base = 910

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CPU2017 License: 19

Test Sponsor: Fujitsu

Tested by: Fujitsu

Test Date: Jan-2023

Hardware Availability: Mar-2023

Software Availability: Jun-2022

Base Optimization Flags (Continued)

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

```
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4
-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-SPR-RevA.html>

http://www.spec.org/cpu2017/flags/Intel-ic2022-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-SPR-RevA.xml>

http://www.spec.org/cpu2017/flags/Intel-ic2022-official-linux64_revA.xml

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