



SPEC CPU® 2017 Floating Point Speed Result

Copyright 2017-2023 Standard Performance Evaluation Corporation

Fujitsu

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

SPECspeed®2017_fp_base =	319
SPECspeed®2017_fp_energy_base =	406
SPECspeed®2017_fp_peak =	Not Run
SPECspeed®2017_fp_energy_peak =	Not Run

CPU2017 License: 19

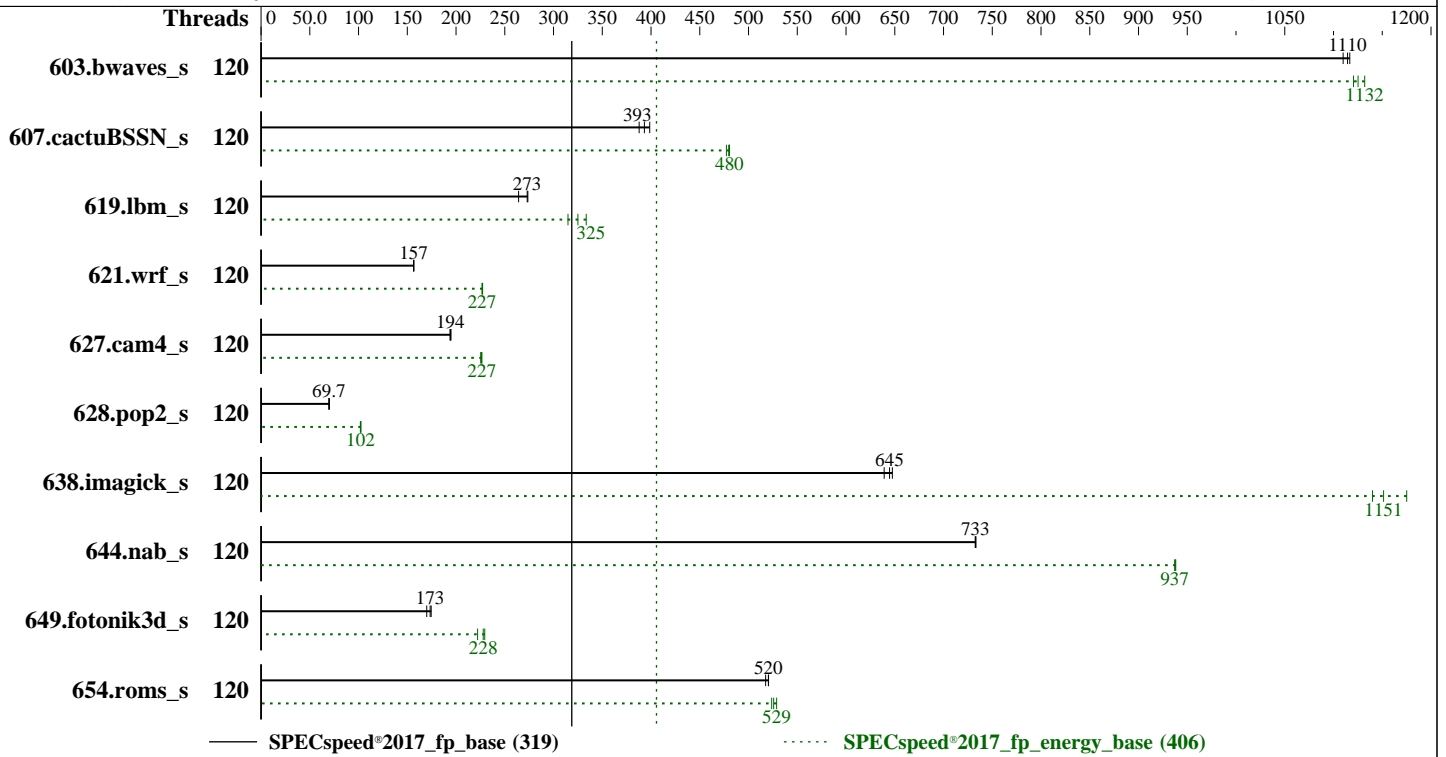
Test Sponsor: Fujitsu

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

Power

Max. Power (W): 1186.7
 Idle Power (W): 356.72
 Min. Temperature (C): 24.50

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Power (Continued)

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 #: 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 #: 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	Threads	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
603.bwaves_s	120	53.2	1110	57.4	1120	1080	1130	52.8	1120	57.2	1130	1080	1130	52.9	1110	56.9	1130	1070	1130
607.cactuBSSN_s	120	43.0	388	38.2	477	889	965	42.4	393	38.0	480	895	969	41.8	399	38.0	480	909	1130
619.lbm_s	120	19.8	264	18.9	315	953	1090	19.2	273	18.3	325	954	1110	19.1	274	17.8	334	932	1100
621.wrf_s	120	84.6	156	63.6	227	751	768	84.4	157	63.7	227	755	769	84.4	157	63.7	227	754	769
627.cam4_s	120	45.7	194	42.7	226	933	985	45.5	195	42.8	225	941	989	45.6	194	42.6	227	933	988
628.pop2_s	120	170	69.7	128	102	750	975	169	70.1	127	102	752	928	171	69.6	128	102	751	979
638.imagick_s	120	22.3	648	13.4	1180	601	1170	22.6	639	13.8	1140	611	1160	22.4	645	13.7	1150	610	1150
644.nab_s	120	23.8	733	20.3	937	851	936	23.8	733	20.3	938	850	937	23.8	733	20.3	938	850	935
649.fotonik3d_s	120	52.6	173	44.9	228	855	1100	53.6	170	46.1	222	859	1090	52.2	174	44.6	229	854	1100
654.roms_s	120	30.2	521	33.5	526	1110	1190	30.3	520	33.3	529	1100	1180	30.4	518	33.6	524	1100	1180

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Results appear in the order in which they were run. Bold underlined text indicates a median measurement.



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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:
KMP_AFFINITY = "granularity=fine,compact"
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"
OMP_STACKSIZE = "192M"

General Notes

Binaries compiled on a system with 2x Intel Xeon Platinum 8280M CPU + 384GB RAM
memory using Redhat Enterprise Linux 8.0
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
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:
Hyper Threading = Disabled
DCU IP Prefetcher = Disabled
Package C State limit = C0
LLC Prefetch = Enabled
DBP-F = Enabled
CPU Performance Boost = Aggressive
FAN Control = Full
Optimized Power Mode = Enable

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Platform Notes (Continued)

sysinfo program /home/Benchmark/speccpu-1.1.8/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec0915b55891ef0e16acafc64d
running on localhost Sat Jan 14 11:07:34 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)
 120 "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  : 60
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): 120
On-line CPU(s) list: 0-119
Vendor ID: GenuineIntel
Model name: Intel(R) Xeon(R) Platinum 8490H
CPU family: 6
Model: 143
Thread(s) per core: 1
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
pdpe1gb 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
```

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Platform Notes (Continued)

```
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 bmil
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 fsrm 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): 2
NUMA node0 CPU(s): 0-59
NUMA node1 CPU(s): 60-119
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/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.

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Platform Notes (Continued)

```
available: 2 nodes (0-1)
node 0 cpus: 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
node 0 size: 515661 MB
node 0 free: 514145 MB
node 1 cpus: 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84
85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109
110 111 112 113 114 115 116 117 118 119
node 1 size: 515695 MB
node 1 free: 514840 MB
node distances:
node 0 1
0: 10 21
1: 21 10
```

```
From /proc/meminfo
MemTotal: 1056109444 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:

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

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Platform Notes (Continued)

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 11:07

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)

Compiler Version Notes

=====

C | 619.lbm_s(base) 638.imagick_s(base) 644.nab_s(base)

(Continued on next page)



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Compiler Version Notes (Continued)

```
-----
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 | 607.cactuBSSN_s(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 | 603.bwaves_s(base) 649.fotonik3d_s(base) 654.roms_s(base)
-----
```

```
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, C | 621.wrf_s(base) 627.cam4_s(base) 628.pop2_s(base)
-----
```

```
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.
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.
-----
```

Base Compiler Invocation

C benchmarks:

icx

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Base Compiler Invocation (Continued)

Fortran benchmarks:

ifx

Benchmarks using both Fortran and C:

ifx icx

Benchmarks using Fortran, C, and C++:

icpx icx ifx

Base Portability Flags

```
603.bwaves_s: -DSPEC_LP64
607.cactuBSSN_s: -DSPEC_LP64
619.lbm_s: -DSPEC_LP64
621.wrf_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
627.cam4_s: -DSPEC_LP64 -DSPEC_CASE_FLAG
628.pop2_s: -DSPEC_LP64 -DSPEC_CASE_FLAG -convert big_endian
-assume byterecl
638.imagick_s: -DSPEC_LP64
644.nab_s: -DSPEC_LP64
649.fotonik3d_s: -DSPEC_LP64
654.roms_s: -DSPEC_LP64
```

Base Optimization Flags

C benchmarks:

```
-m64 -g -std=c11 -Wl,-z,muldefs -xCORE-AVX2 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -fiopenmp
-DSPEC_OPENMP -L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

Fortran benchmarks:

```
-m64 -g -Wl,-z,muldefs -DSPEC_OPENMP -xCORE-AVX2 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -fiopenmp
-nostandard-realloc-lhs -align array32byte -auto
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

(Continued on next page)



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Base Optimization Flags (Continued)

Benchmarks using both Fortran and C:

```
-m64 -g -std=c11 -Wl,-z,muldefs -xCORE-AVX2 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -fiopenmp
-DSPEC_OPENMP -nostandard-realloc-lhs -align array32byte -auto
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

Benchmarks using Fortran, C, and C++:

```
-m64 -g -std=c11 -Wl,-z,muldefs -xCORE-AVX2 -Ofast -ffast-math
-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4 -fiopenmp
-DSPEC_OPENMP -nostandard-realloc-lhs -align array32byte -auto
-L/usr/local/jemalloc64-5.0.1/lib -ljemalloc
```

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

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